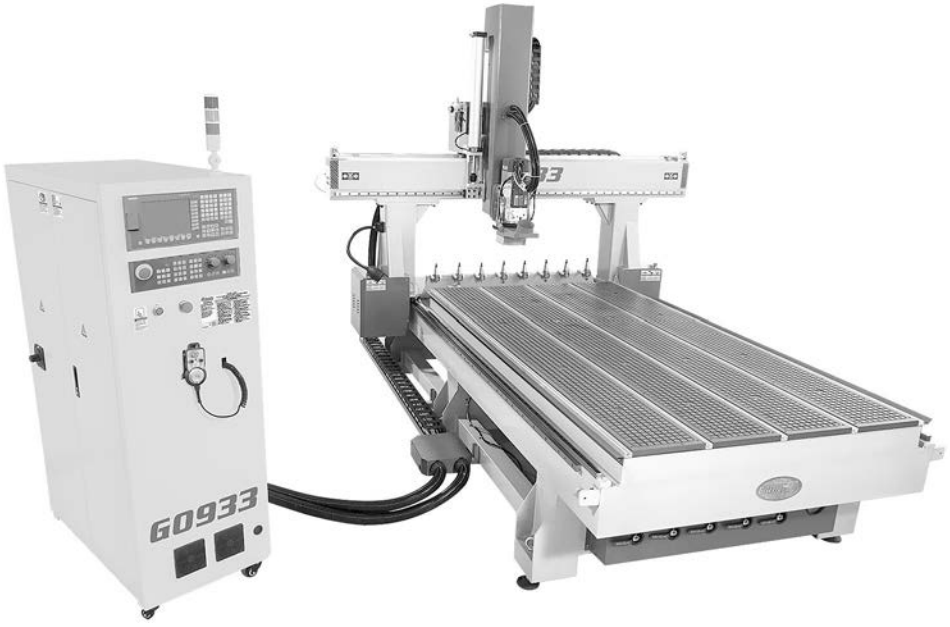
MODEL G0933
4' X 8' 4-AXIS CNC ROUTER W/VACUUM TABLE & LINEAR TOOL CHANGER

OWNER'S MANUAL

(For models manufactured since 02/21)



#KS22553 PRINTED IN U.S.A. V1.11.24

******Keep for Future Reference******

⚠ WARNING!

This manual provides critical safety instructions on the proper setup, operation, maintenance, and service of this machine/tool. Save this document, refer to it often, and use it to instruct other operators.

Failure to read, understand and follow the instructions in this manual may result in fire or serious personal injury—including amputation, electrocution, or death.

The owner of this machine/tool is solely responsible for its safe use. This responsibility includes but is not limited to proper installation in a safe environment, personnel training and usage authorization, proper inspection and maintenance, manual availability and comprehension, application of safety devices, cutting/sanding/grinding tool integrity, and the usage of personal protective equipment.

The manufacturer will not be held liable for injury or property damage from negligence, improper training, machine modifications or misuse.

⚠ WARNING!

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

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

Your risk from these exposures varies, depending on how often you do this type of work. To reduce your exposure to these chemicals: Work in a well ventilated area, and work with approved safety equipment, such as those dust masks that are specially designed to filter out microscopic particles.

Table of Contents

INTRODUCTION

Contact Info

We stand behind our machines! If you have questions or need help, contact us with the information below. Before contacting, make sure you get the **serial number** and **manufacture date** from the machine ID label. This will help us help you faster.

Grizzly Technical Support
1815 W. Battlefield
Springfield, MO 65807
Phone: (570) 546-9663
Email: techsupport@grizzly.com

We want your feedback on this manual. What did you like about it? Where could it be improved? Please take a few minutes to give us feedback.

Grizzly Documentation Manager
P.O. Box 2069
Bellingham, WA 98227-2069
Email: manuals@grizzly.com

Manual Scope

The scope of this manual covers basic machine functions, operations, and maintenance associated with the Model G0933 4' X 8' 4-Axis CNC Router w/Vacuum Table & Linear Tool Changer.

The Siemens© reference manuals included with your machine cover advanced programming, operations, and diagnostics for the Sinumerik 808D CNC Control System, and will be referenced throughout the course of this manual.

- For advanced programming and operation, refer to **SINUMERIK 808D User Manual**.
- For advanced troubleshooting, refer to **SINUMERIK 808D Diagnostics Manual**.

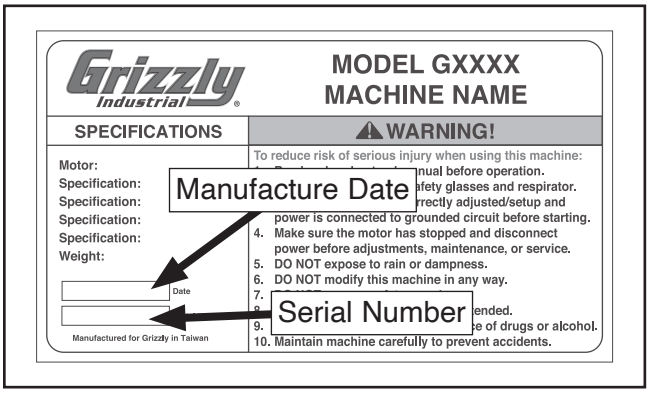
Manual Accuracy

We are proud to provide a high-quality owner's manual with your new machine!

We made every effort to be exact with the instructions, specifications, drawings, and photographs in this manual. Sometimes we make mistakes, but our policy of continuous improvement also means that **sometimes the machine you receive is slightly different than shown in the manual**.

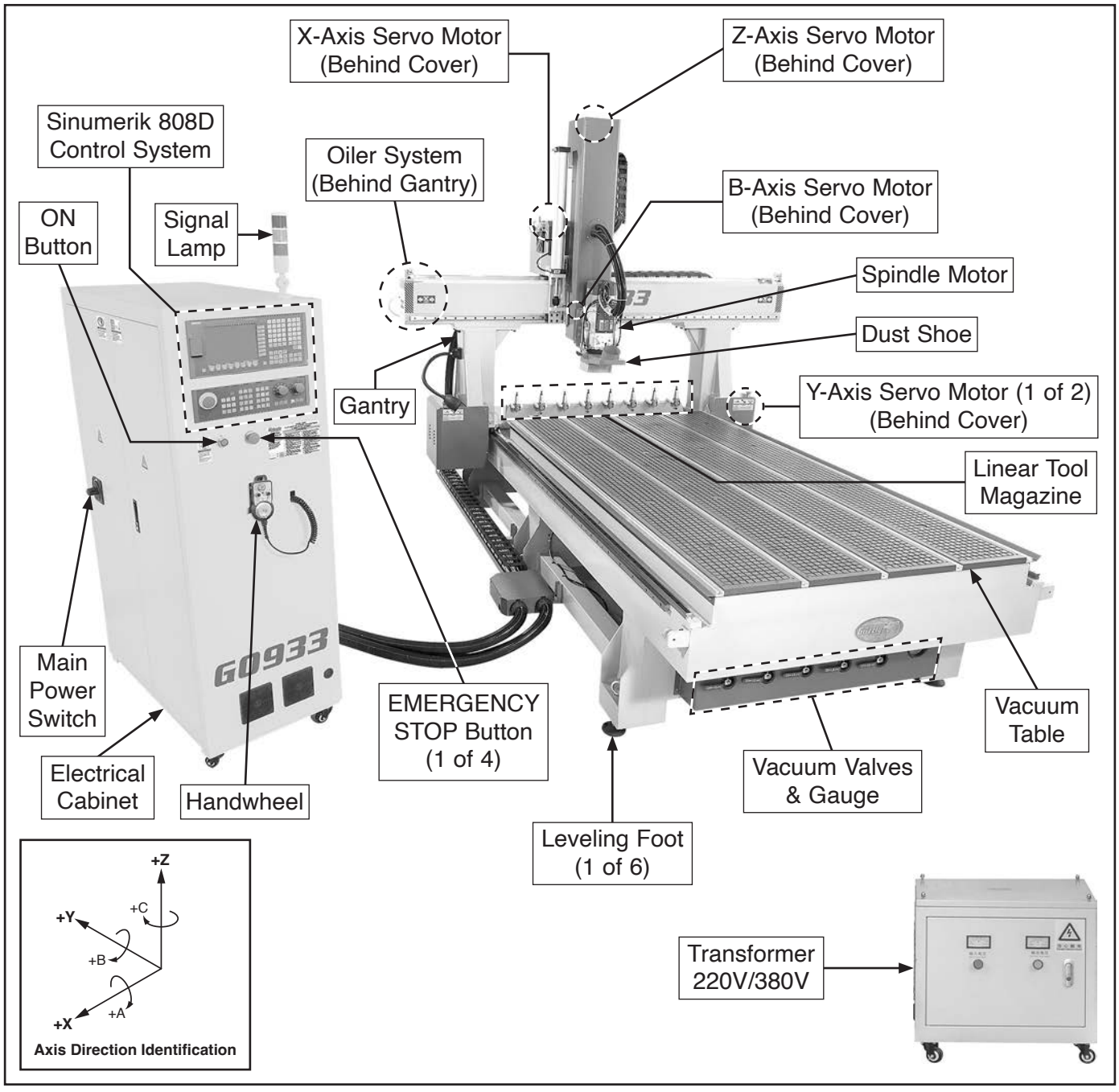
If you find this to be the case, and the difference between the manual and machine leaves you confused or unsure about something, check our website for an updated version. We post current manuals and manual updates for free on our website at **www.grizzly.com**.

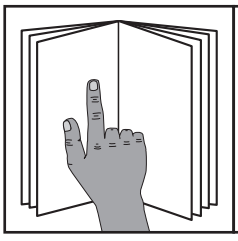
Alternatively, you can call our Technical Support for help. Before calling, make sure you write down the **manufacture date** and **serial number** from the machine ID label (see below). This information is required for us to provide proper tech support, and it helps us determine if updated documentation is available for your machine.



Identification

Become familiar with the names and locations of the controls and features shown below to better understand the instructions in this manual.

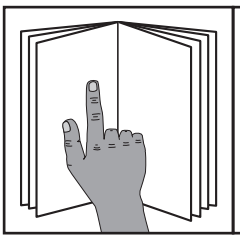




⚠WARNING

To reduce your risk of serious injury, read this entire manual BEFORE using machine.

Controls & Components



⚠WARNING

To reduce your risk of serious injury, read this entire manual BEFORE using machine.

Refer to the following figures and descriptions to become familiar with the basic controls and components of this machine. Understanding these items and how they work will help you understand the rest of the manual and minimize your risk of injury when operating this machine.

Power Controls

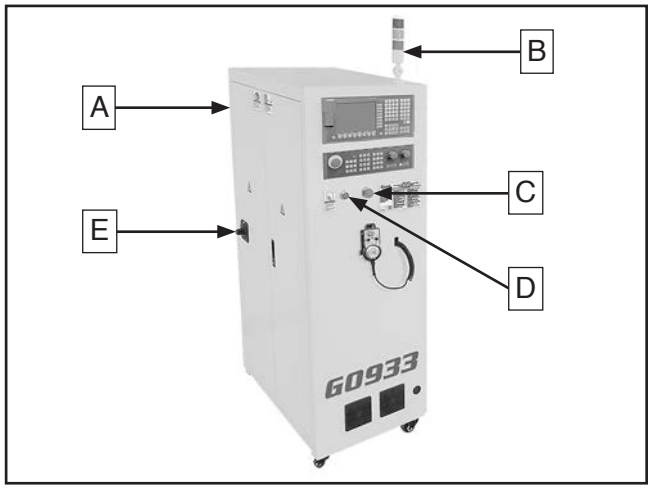


Figure 1. Power controls on electrical cabinet.

A. Electrical Cabinet: Houses machine electrical components and control system.

B. Signal Lamp: Three-color lamp that indicates current machine status:

— **Red:** Programming or machine error.

— **Yellow:** Machine idle/standby.

— **Green:** Part program operating.

C. EMERGENCY STOP Button (1 of 4): Turns machine and Sinumerik 808D control system ***OFF***. To reset, twist button clockwise until it pops out.

D. ON Button: Turns machine and Sinumerik 808D control system ***ON***.

E. Main Power Switch: Turns incoming power ***ON*** or ***OFF***.

Machine Controls

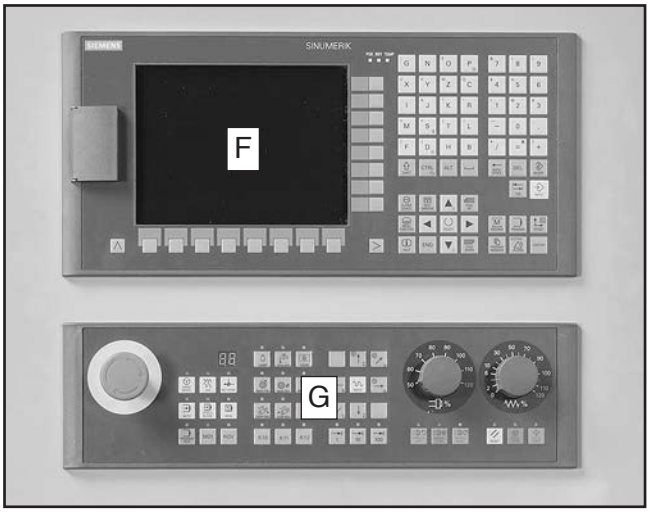


Figure 2. Machine control system.

F. Panel Processing Unit (PPU): Controls workpiece processing functions (see **Page 8** for additional information).

G. Machine Control Panel (MCP): Controls machine operating functions (see **Page 9** for additional information).

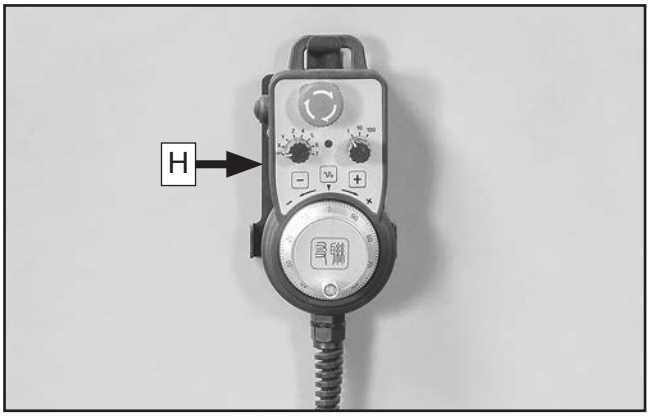


Figure 3. Handwheel.

H. Handwheel: Provides limited control of axes and feed rates when operator is away from machine control system (see **Page 10** for additional information).

Spindle

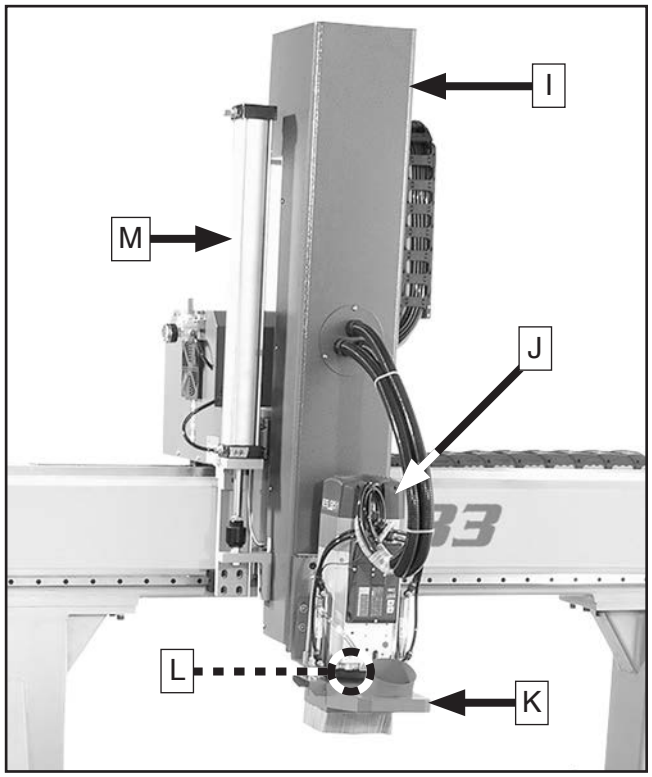


Figure 4. Spindle components.

I. Dust Cover: Helps protect spindle elevation components from dust and debris during operations.

J. Spindle Motor: A 10¾ HP variable-speed motor capable of turning at 0–24,000 RPM.

K. Dust Shoe: Connects to dust collection system and brushes debris off part surface as it traverses during operations.

L. Spindle: Motor shaft with a pneumatic draw bar capable of automatically securing and releasing an ISO30-ER32-50 tool holder.

M. Pneumatic Cylinder: Provides pneumatic assistance when raising and lowering spindle during operations.

Tool Holder

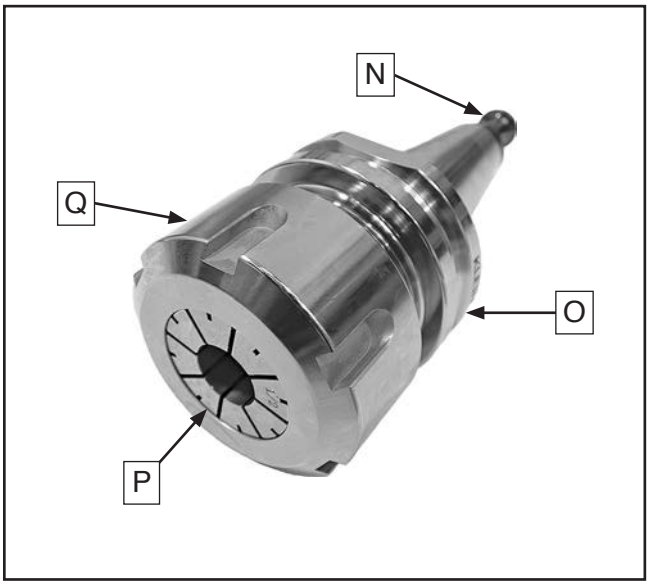


Figure 5. Tool holder components.

N. ISO30 Pull Stud: Mounting location between spindle draw bar and tool holder.

O. Tool Holder: Straight-style ISO30-ER32-50 tool holder used with indexable turrets in automatic tool changing.

P. ER32 Collet: Centers tooling in tool holder.

Q. Collet Nut: Secures ER32 collet and tool in tool holder.

Linear Tool Magazine (LTM)

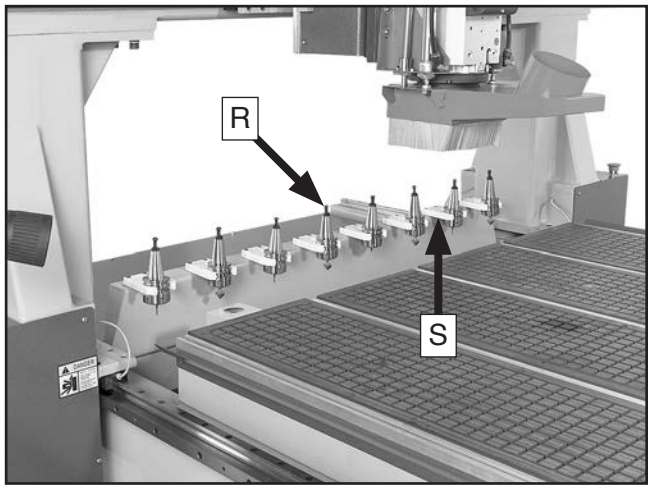


Figure 6. LTM components.

R. Linear Tool Magazine: Holds up to eight individual tool holders for programmable tooling changes during operation.

S. Tool Holder Clamp: Holds ISO30-ER32-50 tool holders in linear tool magazine.

Pneumatic Components

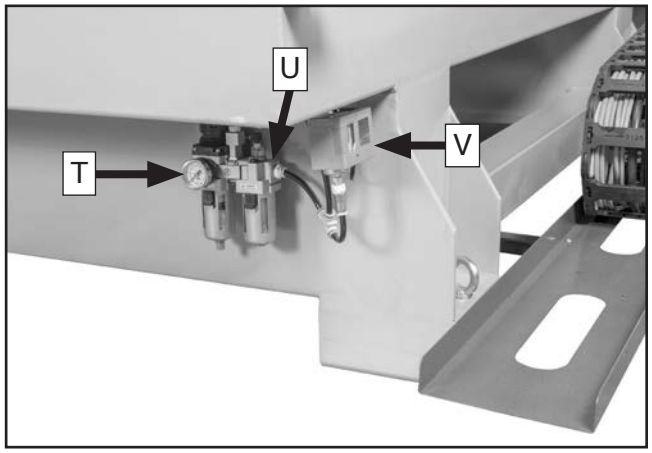


Figure 7. Pneumatic components.

T. Air Regulator: Provides inlet air connection and regulates air pressure.

U. Air Lubricator: Lubricates air-regulated components in machine pneumatic system.

V. Pressure Control Switch: Monitors inlet air pressure through control system.

IMPORTANT: The Sinumerik 808D control system will display an EMERGENCY STOP alarm if 90 PSI (0.6 MPa) of pressurized air is not connected to machine.

Vacuum Table Components

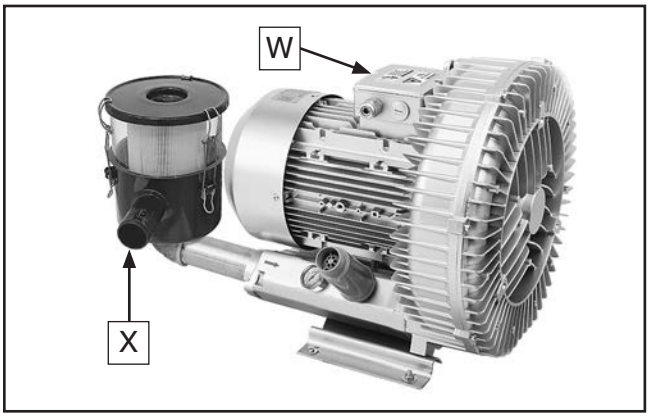


Figure 8. Vacuum pump.

W. Vacuum Pump Motor: Creates vacuum suction to hold workpiece to table.

X. Vacuum Pump Filter: Filters air before it is pulled through vacuum pump motor.

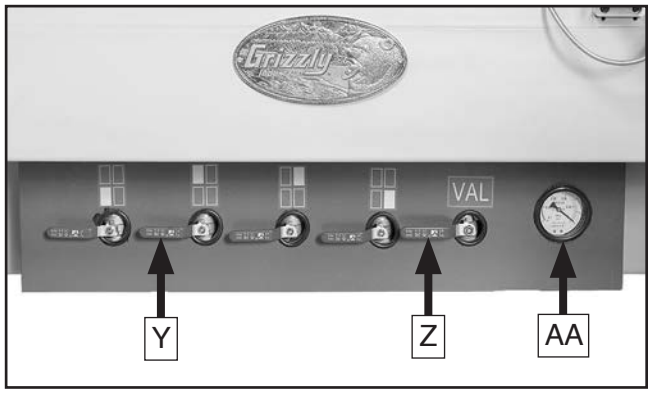


Figure 9. Vacuum valves.

Y. Vacuum Zone Valve (1 of 4): Each valve enables/disables vacuum to one vacuum zone. Drawing above each valve indicates corresponding zone.

Z. Main Vacuum Valve: Enables/disables vacuum to all vacuum zones.

AA. Vacuum Pressure Gauge: Displays vacuum pressure in MPa/PSI.

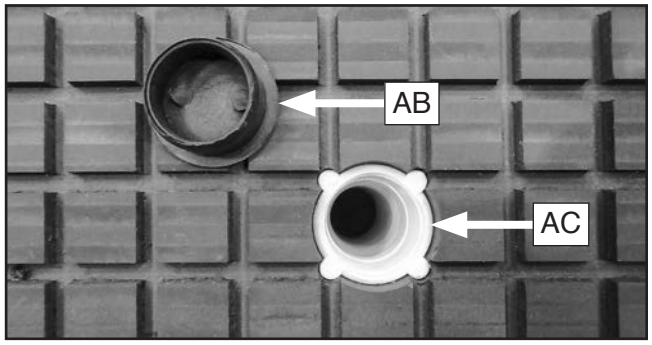


Figure 10. Vacuum port and plug.

AB. Vacuum Plug: Keeps debris out of unused ports. Remove plug when using port in that vacuum zone.

AC. Vacuum Port: Holds workpiece to table to prevent movement during operation.

Additional Components

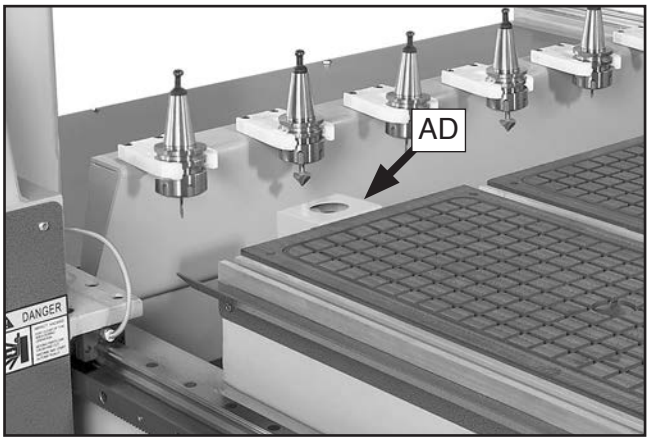


Figure 11. Tool probe.

AD. Tool Probe: Measures tool length and sets Z-axis origin.

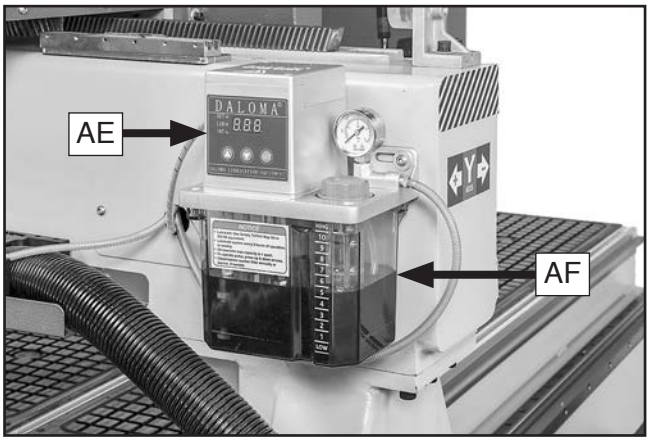


Figure 12. Oiler system components.

AE. Oiler System Control Panel: Controls amount of lubricating oil on linear guideways and ball screws.

AF. Oil Reservoir: Holds one quart of T27914 ISO 68 machine oil.

Panel Processing Unit (PPU)

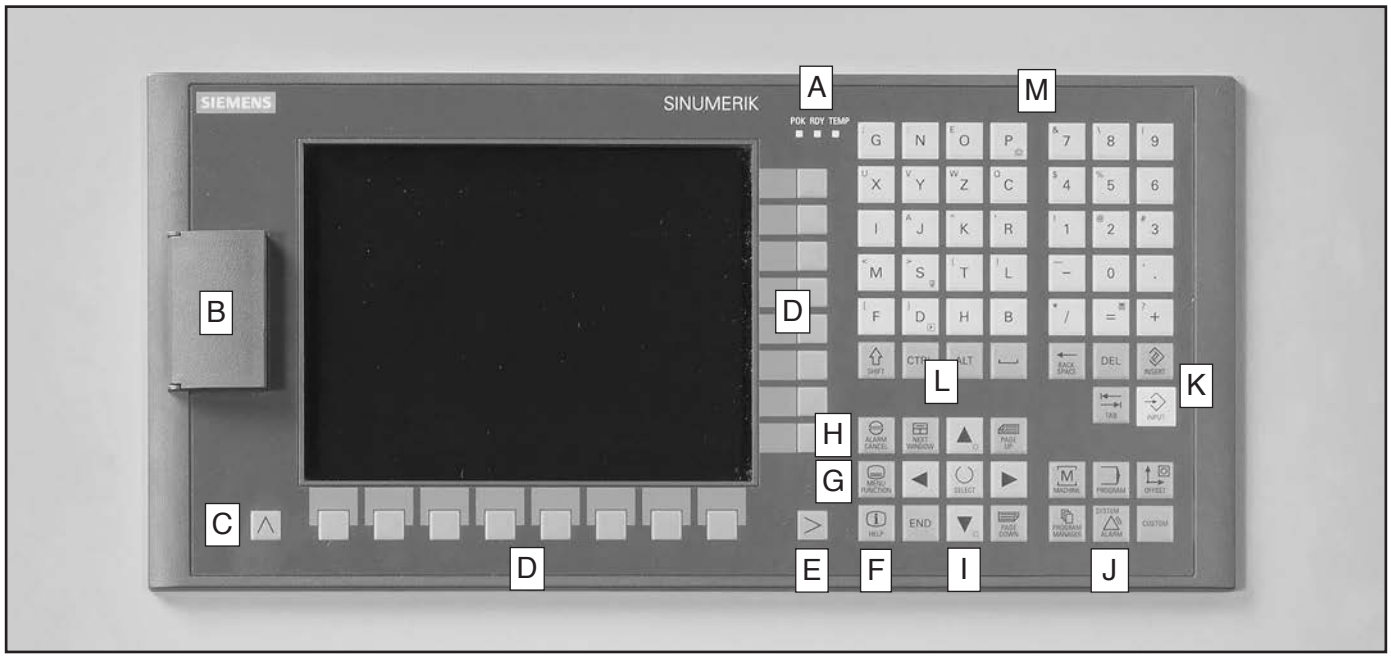


Figure 13. Panel Processing Unit (PPU).

The following controls are used for navigation of the Panel Processing Unit (PPU). Additional functions can be accessed with multi-button commands (see **SINUMERIK 808D User Manual** included with your machine).

A. Status Indicator Lights: Displays basic machine status using colored LEDs.

POK: Illuminates solid green when control system power supply is turned ***ON***.

RDY: Illuminates solid green when control system is ready and programmable logic controller (PLC) is in run mode, solid red when control system is in stop mode, solid orange when PLC is in stop mode, and flashing orange when PLC is in power-up mode.

TEMP: Illuminates solid orange when temperature of control system is above normal operating limit.

B. USB Interface w/Cover: Connects external storage medium to machine through USB interface.

C. Return Key: Returns to next higher-level menu screen.

D. Horizontal/Vertical Keys: Used to select corresponding soft key displayed on screen.

E. Menu Extension Key: Displays extended menu commands.

F. Help Key: Displays help information.

G. Wizard Key: Guides user through performing basic operations.

H. Alarm Cancellation Key: Cancels alarms and messages marked with "⊖" symbol.

I. Cursor Keys: Controls screen navigation.

J. Operating Area Keys: Displays operation and programming screens.

K. Edit Control Keys: Interface for altering characters on screen.

L. Modifier Keys: Provides additional functions accessed through multi-button commands.

M. Alphanumeric Keys: Interface for entering alphanumeric characters on screen.

Machine Control Panel (MCP)

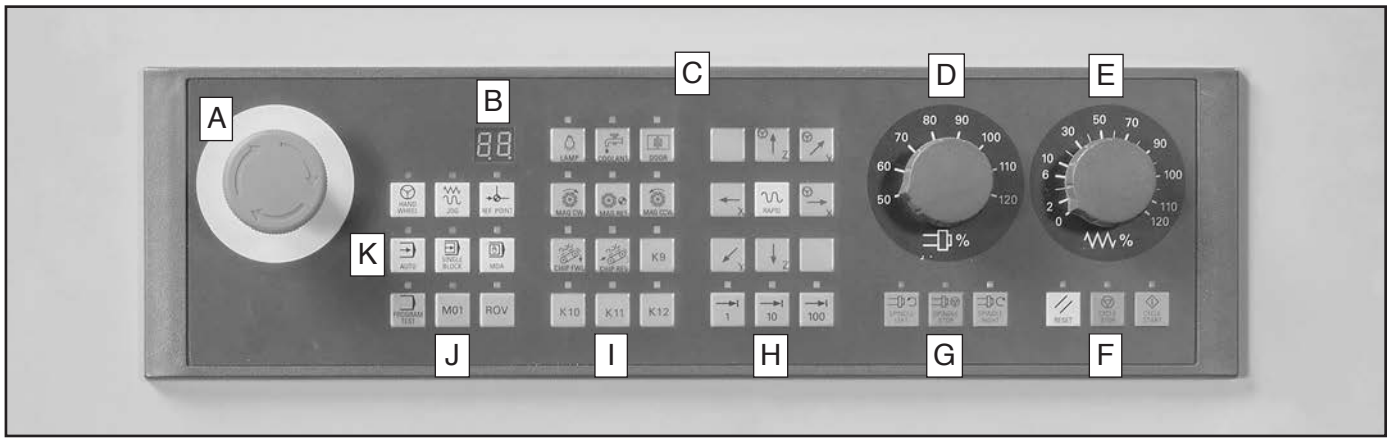


Figure 14. Machine Control Panel (MCP).

The following controls are used for navigation of the Machine Control Panel (MCP). Additional functions can be accessed with multi-button commands (see **SINUMERIK 808D User Manual** included with your machine).

A. Emergency Stop Button (1 of 4): Terminates running program, disables axes movement, and prevents further operation until reset. To reset, twist button clockwise until it pops out.

B. Tool Number Display: Displays designated number of currently active tool.

C. Labeling Strips: Pre-defined labeling strips located behind faceplate that can be changed depending upon desired machine operation.

D. Spindle Override Switch: Overrides current spindle speed by increasing or decreasing speed as a percentage.

E. Feed Rate Override Switch: Overrides current feed rate by increasing or decreasing feed rate as a percentage.

F. Program Start, Stop, and Reset Keys: Controls basic program functions.

G. Spindle Control Keys: Controls direction of spindle or stops operation.

H. Axis Traversing Keys: Initiates axis-referencing function in Reference Point mode. Controls movement of each axis in Jog mode. Selects axes and movement increments.

Note: *B-Axis movement is controlled via the blank upper-left key for positive direction, and blank lower-right key for negative.*

I. User-Defined Keys: Provides extended functionality of machine configuration.

J. Program Control Keys: Returns to next higher-level menu screen.

K. Operating Mode Selection Area: Selects operating mode.

PPU Display

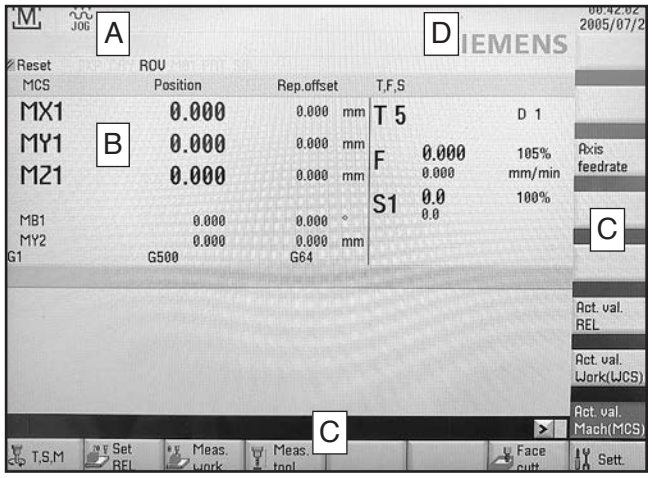


Figure 15. PPU display overview.

The PPU display shows current machine status, programming information, soft keys, alarms, and system messages.

A. Status Area: Displays current machine status, selected operating mode, and active filename and path.

B. Application Area: Shows current part program steps, coordinates, position, and operating units in inches/millimeters.

Note: *Values displayed in this area should match values written in the part program.*

C. Horizontal/Vertical Soft Key Area: Shows soft keys related to current procedure. Soft keys can be selected by pressing corresponding horizontal/vertical key.

D. Alarms & Messages Area: Shows active machine alarms, programming errors, and confirmation messages.

Note: *Alarms are displayed with red lettering, and messages are displayed with green lettering. An arrow next to the alarm number indicates that more than one alarm is currently active.*

Handwheel

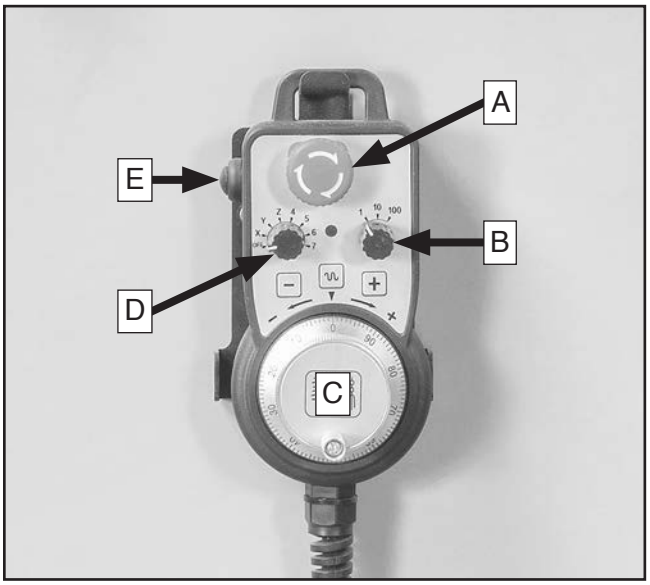


Figure 16. Handwheel controls.

The handwheel provides limited control of axes and feed rates when the operator is away from the machine control system. Assignment of the handwheel can be performed using either the PPU or MCP (see **SINUMERIK 808D User Manual** included with your machine).

A. Emergency Stop Button: Disables power to handwheel controls when in depressed position. To reset, twist button clockwise until it pops out.

B. Jog Mode Dial: Selects one of three traverse speed increments for designated axis.

C. Jog Wheel: Moves designated axis at incremental speed selected by jog mode dial.

D. Axis Selection Dial: Designates axis being controlled by handwheel.

E. Side Button: Safety feature that allows operation of handwheel only when pressed.

Glossary Of Terms

The following is a list of common definitions, terms and phrases used throughout this manual as they relate to this CNC router and woodworking in general. Become familiar with these terms for assembling, adjusting or operating this machine. Your safety is VERY important to us at Grizzly!

Axis: Direction of movement. On a four-axis machine, axes are typically X (left-right), Y (front-back), Z (up-down), and B (rotation around Y-axis).

Axis Direction: Described as positive or negative. On this machine, positive movement is defined as movement towards the rear (Y), right (X), top (Z), and counterclockwise (B) direction of the working envelope.

Auxiliary Axis: Any axis that is in addition to the primary axes of X, Y, and Z. Axes can be automatic (A, B, and C) or linear (U, V, or W).

Ball End Mill (Ball Nose): A cutting tool that has a rounded cutting arc, where the arc diameter is equal to the cutting diameter.

Ball Screw: Drive system component. The ball screw is rotated by the servo motor and provides the means for moving the gantry and spindle along the axes.

Bed: The bed of the CNC consists of a welded steel frame, an extruded aluminum table top, and a tongue-and-groove table top with integrated T-slots.

Block: A single line of CNC code consisting of program syntax that identifies what activities the machine is to execute.

CAD: Computer aided design. CAD software is used to create a digital model of a project.

CAM: Computer aided manufacturing. CAM software converts CAD models into a toolpath defined by G-code that CNC machines can interpret.

Chip Load: Chip load is the measure of the thickness of chips a tool will cut. Chip load is equal to: Feed Rate ÷ (Spindle Speed X Number of Flutes).

Climb Cut: Cut that occurs when the rotation of the tool moves in same direction as the workpiece.

CNC: Computer numerical control. Manufacturing controlled by a computer via coded instructions.

Collet: Metal collar that holds the cutting tool in place within a collet nut.

Compression Bit: A cutting tool with a combination of up and down shear cutting edges. Typically used for cutting laminate material to prevent tear-out on both sides of the sheet.

Conventional Cut: Cut that occurs when the rotation of the tool moves in opposite direction as the workpiece.

Coordinates: Numerical values that define the positional location of points from a predetermined zero point or origin.

Datum: Origin from which the dimensional location of a part is established.

Down-Cut Bit: A cutting tool with edges that carve downward on the face of the toolpath. Reduces the potential for tear-out, but requires a slower feed rate.

Dry Run: Executing a CNC part program with no part mounted to verify the programmed path under automatic operation.

Dust Shoe: An accessory that channels dust and debris directly from the cutting tool through an attached dust collection system.

Dwell: Part of an operation in which axis movement stops while the spindle is running and the tool is within the workpiece. Typically used for canned drilling cycles.

End Mill: A cutting tool with a straight end, typically with spiral flute(s). It creates a channel with a flat bottom perpendicular to the sides.

Feed Rate: The speed at which the cutting tool moves along a workpiece.

Finish Cut: A 3D toolpath that reduces or eliminates the irregular contours left by a rough cut.

Flutes: Deep grooves under the cutting edges (teeth) of a bit used for chip evacuation.

Flute Length: The length of the cutting portion on a router bit or cutting tool.

Form Bit: A bit that carves a standard profile such as a roundover, ogee, or similar contour.

Gantry: The structure that straddles the bed and carries the spindle. It moves the full length of the bed along the Y-axis.

G-Code: A machine language that uses axis points and commands, which the machine uses to move and perform functions.

Hold-Down: A clamp used to firmly hold a workpiece or fixture to the table.

Home Position: A fixed point on the machine set using a relative coordinate system. It is the machine zero point on all axes.

Jog: Activating JOG feed mode allows the selection of manual feeds along a single linear or rotational axis.

Letter Address: The first letter of a G-code command. Commands with similar functions are usually grouped within the same letter address. For example, the "G" letter address deals with preparatory functions that define the machine's operation, while the "M" letter address handles miscellaneous machine functions such as turning on spindles, pumps, and other auxiliary tasks.

Origin: User designated zero point for a workpiece from which the router will reference the positioning of all cutting.

Part Program: A set of instructions that, when entered into a machine control unit, will cause the machine to function in the manner necessary to produce a particular part.

Plunge: The distance on the Z-axis that the spindle and cutting tool moves toward, into, or along the workpiece.

Pocket Toolpath: A toolpath that creates a cavity in the horizontal surface of a workpiece.

Post Processor: A software function that formats G-code into a dialect understood by a specific machine.

Profile Toolpath: A toolpath that cuts along the profile of a set of vectors. Typically used to cut out the shape of a design.

Programmable Logic Controller (PLC): Computer adapted for control of CNC processes that requires high reliability, ease of programming, and process fault diagnosis.

Proximity Sensor: A sensor able to detect the presence of nearby objects without any physical contact. Often emits an electromagnetic field or a beam of electromagnetic radiation and looks for changes in the field or return signal. The object being sensed is often referred to as the proximity sensor's "target".

Rapid: The maximum speed of each axis. Higher rapid rates decrease machining times.

Rough Cut: A 3D toolpath where the initial cut is designed to remove unwanted material, leaving a rough contour.

Servo Motor: DC motor that moves in precise steps when pulses are received. Has very accurate positioning and speed control.

Soft Key: A button on a computer keyboard or other electronic device whose function can be changed programmatically.

Soft Limits: Axis limits imposed by the work space boundaries and based on controller settings and the location of home. An "out of soft limits error" implies that there is not enough room to move in a designated direction based on the positioning of the workpiece.

Spindle Speed: Rotational speed of cutting tool measured in Rotations Per Minute (RPM).

Spoilboard: Sacrificial material placed under the workpiece that allows the cutting tool to go past the workpiece to ensure a full, clean cut without damaging the work table. Usually made of MDF.

Surfacing: The process of leveling the surface of a workpiece or spoilboard so it is perpendicular to the spindle.

Tool Changer: A mechanical apparatus used to automatically change cutting tools by program control on CNC machines.

Tool Deflection: Tool deflection occurs when the spindle speed and feed rate exert sufficient force to deflect the cutting tool. Deflection leads to excessive wear and chatter, which can shorten tool life and leave unwanted tooling marks on the material.

Tool Offset: A dimensional value defining the position of the cutting edge(s) of a tool in relation to an established datum.

Tool Probe: A device used to measure tool dimensions and set the zero point (origin) for the Z-axis.

Toolpath: User defined route that the tool follows to machine a workpiece.

Up-Cut Bit: A cutting tool with edges that carve upward on the face of the toolpath. This removes chips from the material, but can pull the material off the bed and splinter the top edge.

Variable Frequency Drive (VFD): Variable frequency drive that controls the speed (RPM) of the spindle. Enables the fine tuning of the spindle during the operation of a toolpath.

Working Envelope: The three-dimensional area that the spindle can travel within while cutting or milling.

MACHINE DATA SHEET

Customer Service #: (570) 546-9663 · To Order Call: (800) 523-4777 · Fax #: (800) 438-5901

MODEL G0933
4' X 8' 4-AXIS CNC ROUTER
W/VACUUM TABLE & LINEAR TOOL CHANGER

Product Dimensions:

Weight	4344 lbs.
Width (side-to-side) x Depth (front-to-back) x Height	128 x 136 x 98-1/2 in.
Footprint (Length/Width)	110-1/2 x 63-1/2 in.
Electrical Cabinet Dimensions	21-1/2 x 39 x 61-1/2 in.

Shipping Dimensions:

Type	Wood Crate
Content	Machine/Electrical Cabinet/Transformer
Weight	4631 lbs.
Length x Width x Height	145 x 80 x 70 in.
Must Ship Upright	Yes

Electrical:

Power Requirement	220V, 3-Phase, 60 Hz
Full-Load Current Rating	28A
Minimum Circuit Size	30A
Connection Type	Permanent (Hardwire to Shutoff)
Switch Type	ON Push Button w/Emergency Stop
Inverter (VFD) Type	Delta MS-300 High Frequency VFD25AMS43ANSHA
Inverter (VFD) Size	15HP

Motor:

Spindle Motor

Model	HSD ES951
Type	Asynchronous
Horsepower	10-3/4 HP
Voltage	380V
Phase	3-Phase
Amps	13.9A
Speed	0 - 24,000 RPM
Number Of Speeds	Variable
Power Transfer	Direct

X-Axis Motor

Model	Simotics S-1FL6
Frame Size	NEMA 52
Amps	3A
Rated Speed	2000 RPM
Type	Servo
Power Transfer	Gear
Feedback Device	Encoder
Controller	Siemens

Y-Axis Motor 1

Model	Simotics S-1FL6
Frame Size	NEMA 52
Amps	3A
Rated Speed	2000 RPM
Type	Servo
Power Transfer	Gear
Feedback Device	Encoder
Controller	Siemens

Y-Axis Motor 2

Model	Simotics S-1FL6
Frame Size	NEMA 52
Amps	3A
Rated Speed	2000 RPM
Type	Servo
Power Transfer	Gear
Feedback Device	Encoder
Controller	Siemens

Z-Axis Motor

Model	Simotics S-1FL6
Frame Size	NEMA 52
Amps	3A
Rated Speed	2000 RPM
Type	Servo
Power Transfer	Gear
Feedback Device	Encoder
Controller	Siemens

B-Axis Motor

Model	Simotics S-1FL6
Frame Size	NEMA 52
Amps	3A
Rated Speed	2000 RPM
Type	Servo
Power Transfer	Gear
Feedback Device	Encoder
Controller	Siemens

Main Specifications:

Axis Information

X-Axis Travel	51-3/16 in.
Y-Axis Travel	98-7/16 in.
Z-Axis Travel	15-3/4 in.
A-Axis Travel	0 - 90 deg. L/R
XY Rapid Speed	1969 IPM
Z Rapid Speed	787 IPM

Construction

Table	Phenolic
Body Construction	Steel
Paint Type/Finish.	Enamel

Cutting Information

XYZ Work Envelope	51-3/16 x 98-7/16 x 15-3/4 in.
Max Distance Spindle to Table	15-3/4 in.
Cutting Accuracy	+/-0.002 in.

Table Information

Table Length	98-7/16 in.
Table Width	51-3/16 in.
Number of Vacuum Zones	4

Other Related Information

Number of Dust Ports	1
Dust Port Size	4 in.
Number of Leveling Feet	6
Collet Type	ER32
Controller	Siemens Sinumerik 808D Advanced
Transformer	SG-16KW/A (220V/380V)

Other Specifications:

Country of Origin	China
Warranty	1 Year
Approximate Assembly & Setup Time	6 Hours
Serial Number Location	ID Label

Features:

Siemens Sinumerik 808D Advanced Control System w/Built-In Digital Display and Input
Automatic Tool Changer (8-Position Linear Magazine)
HSD Air-Cooled Spindle Motor
Vacuum Table w/Four Independently Controlled Zones
Tool Probe for Quickly Setting Z-Axis Height
850-Watt Servo Axis Motors
Two-Stage Air Vacuum Pump (Requires Separate 3-Phase, 220V Power Connection)
LED Work Light
Automatic Oiler System
Helical Rack & Pinion X & Y Gantry Travel
4th-Axis Machining Capability Around Y-Axis

SECTION 1: SAFETY

For Your Own Safety, Read Instruction Manual Before Operating This Machine

The purpose of safety symbols is to attract your attention to possible hazardous conditions. This manual uses a series of symbols and signal words intended to convey the level of importance of the safety messages. The progression of symbols is described below. Remember that safety messages by themselves do not eliminate danger and are not a substitute for proper accident prevention measures. Always use common sense and good judgment.

⚠DANGER **Indicates an imminently hazardous situation which, if not avoided, WILL result in death or serious injury.**

⚠WARNING **Indicates a potentially hazardous situation which, if not avoided, COULD result in death or serious injury.**

⚠CAUTION **Indicates a potentially hazardous situation which, if not avoided, MAY result in minor or moderate injury. It may also be used to alert against unsafe practices.**

NOTICE **Alerts the user to useful information about proper operation of the machine to avoid machine damage.**

Safety Instructions for Machinery

⚠WARNING

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, disconnect 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 startup 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.

⚠WARNING

WEARING PROPER APPAREL. Do not wear loose clothing, gloves, neckties, 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 material. 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 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 mis-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.

EXPERIENCING DIFFICULTIES. If at any time you experience difficulties performing the intended operation, stop using the machine! Contact our Technical Support at (570) 546-9663.

Additional Safety for CNC Routers

⚠WARNING

You can be seriously injured or killed by getting clothing, jewelry, or long hair entangled with rotating cutter/spindle. You can be severely cut or have fingers amputated from contact with rotating cutters. You can be blinded or struck by broken cutting tools, wood chips, improperly secured workpieces, or adjustment tools thrown from rotating spindle with great force. To reduce risk of serious injury when operating this machine, heed and understand the following:

UNDERSTAND ALL CONTROLS. Make sure you understand the function and proper use of all controls before starting. This will help you avoid making mistakes that result in serious injury.

AVOIDING ENTANGLEMENT. DO NOT wear loose clothing, gloves, or jewelry, and tie back long hair. Keep all guards in place, secure, and properly operating. Always allow spindle to stop on its own. DO NOT stop spindle using your hand or any other object.

WEAR EYE PROTECTION. Always wear safety glasses. This provides protection for your eyes from wood chips or broken cutting tools.

USE CORRECT SPINDLE SPEED. Use proper speeds and feeds for each size and type of cutting tool as recommended by tool manufacturer. This helps avoid injury risk from tool breakage during operation and ensures best cutting results.

FIRE HAZARD. To reduce risk of fire, always use proper feeds and speeds for cutting tool and workpiece type. Avoid operations that dwell in one place. Be aware of signs of fire and keep fire extinguisher nearby. Chips and dust collection can disguise embers and smoke. Prepare a fire safety plan and ensure it is practiced by all operators. Never operate machine unattended unless workspace has a lights-out fire prevention system.

INSPECT CUTTING TOOL. Inspect cutting tools for sharpness, chips, or cracks before each use. Replace dull, chipped, or cracked cutting tools immediately. Do not use damaged tools as they are likely to break apart and could hit user with great speed and force.

PROPERLY SECURE CUTTER. Firmly secure cutting tool so it does not fly out of spindle during operation.

PROPERLY COLLECT DUST. Only use dust collector to clear chips while spindle is turning. DO NOT clear chips by hand when cleaning. Only use a brush or shop vacuum when spindle/axes are NOT turning or moving.

SECURE WORKPIECE TO TABLE. Secure workpiece to table so workpiece cannot unexpectedly move or spin during operation. NEVER hold workpiece by hand during operation.

PROPERLY MAINTAIN MACHINE. Keep machine in proper working condition to help ensure that it functions safely and all guards and other components work as intended. Perform routine inspections and all required maintenance. Never operate machine with damaged or worn parts that can break or result in unexpected movement during operation.

DISCONNECT POWER FIRST. To reduce risk of electrocution or injury from unexpected startup, make sure CNC router is turned ***OFF***, disconnected from power, and all moving parts are completely stopped before changing cutting tools or performing any inspection, adjustment, or maintenance procedure.

REMOVE SPINDLE TOOLS. Always remove wrenches and other tools used on the spindle immediately after use. This will prevent them from being thrown by the spindle upon startup.

SECTION 2: POWER SUPPLY

Availability

Before installing the machine, consider the availability and proximity of the required power supply circuit. If an existing circuit does not meet the requirements for this machine, a new circuit must be installed. To minimize the risk of electrocution, fire, or equipment damage, installation work and electrical wiring must be done by an electrician or qualified service personnel in accordance with all applicable codes and standards.

⚠WARNING

Electrocution, fire, shock, or equipment damage may occur if machine is not properly grounded and connected to power supply.

Full-Load Current Rating

The full-load current rating is the amperage a machine draws at 100% of the rated output power. On machines with multiple motors, this is the amperage drawn by the largest motor or sum of all motors and electrical devices that might operate at one time during normal operations.

Model G0933 at 220V, 3-Ph ..... 28 Amps
Vacuum Pump at 220V, 3-Ph ..... 21 Amps

The full-load current is not the maximum amount of amps that the machine will draw. If the machine is overloaded, it will draw additional amps beyond the full-load rating.

If the machine is overloaded for a sufficient length of time, damage, overheating, or fire may result—especially if connected to an undersized circuit. To reduce the risk of these hazards, avoid overloading the machine during operation and make sure it is connected to a power supply circuit that meets the specified circuit requirements.

Circuit Information

A power supply circuit includes all electrical equipment between the breaker box or fuse panel in the building and the machine. The power supply circuit used for this machine must be sized to safely handle the full-load current drawn from the machine for an extended period of time. (If this machine is connected to a circuit protected by fuses, use a time delay fuse marked D.)

⚠CAUTION

For your own safety and protection of property, consult an electrician if you are unsure about wiring practices or electrical codes in your area.

Note: *Circuit requirements in this manual apply to a dedicated circuit—where only one machine will be running on the circuit at a time. If machine will be connected to a shared circuit where multiple machines may be running at the same time, consult an electrician or qualified service personnel to ensure circuit is properly sized for safe operation.*

Model G0933 Circuit Requirements

This machine is prewired to operate on a power supply circuit that has a verified ground and meets the following requirements:

Nominal Voltage 208V, 220V, 230V, 240V
Cycle ..... 60 Hz
Phase 3-Phase
Power Supply Circuit ..... 30 Amps
Connection ..... Hardwire w/Locking Switch

Vacuum Pump Circuit Requirements

This machine is prewired to operate on a power supply circuit that has a verified ground and meets the following requirements:

Nominal Voltage 208V, 220V, 230V, 240V
Cycle ..... 60 Hz
Phase 3-Phase
Power Supply Circuit ..... 30 Amps
Connection ..... Hardwire w/Locking Switch

Connection Type

A permanently connected (hardwired) power supply is typically installed with wires running through mounted and secured conduit. A disconnecting means, such as a locking switch (see following figure), must be provided to allow the machine to be disconnected (isolated) from the power supply when required. This installation must be performed by an electrician in accordance with all applicable electrical codes and ordinances.

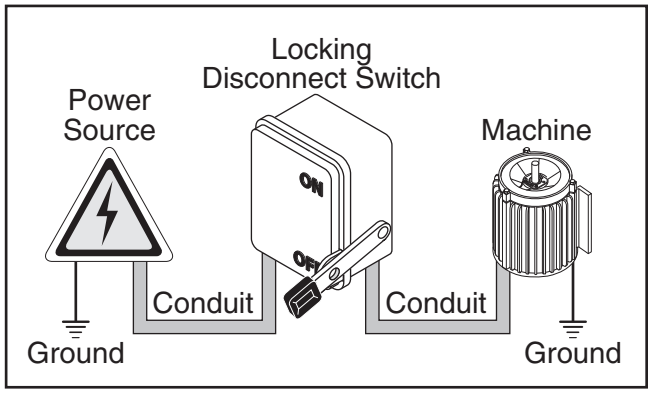


Figure 17. Typical setup of a permanently connected machine.

Grounding Instructions

This machine MUST be grounded. In the event of certain malfunctions or breakdowns, grounding reduces the risk of electric shock by providing a path of least resistance for electric current.

In the event of a malfunction or breakdown, grounding provides a path of least resistance for electrical current to reduce the risk of electric shock. A permanently connected machine must be connected to a grounded metal permanent wiring system; or to a system having an equipment-grounding conductor. All grounds must be verified and rated for the electrical requirements of the machine. Improper grounding can increase the risk of electric shock!

⚠WARNING

Serious injury could occur if you connect machine to power before completing setup process. DO NOT connect to power until instructed later in this manual.

Phase Converters

DO NOT use a static phase converter to create 3-phase power—it can quickly decrease the life of electrical components on this machine. If you must use a phase converter, only use a rotary or digital phase converter.

You can find the Model H3741, a compatible phase converter, on our website at **www.grizzly.com**.

H3741—30 HP Rotary Phase Converter

This rotary phase converter allows you to operate 3-phase machinery from a single-phase power source at 100% power and 95% efficiency.

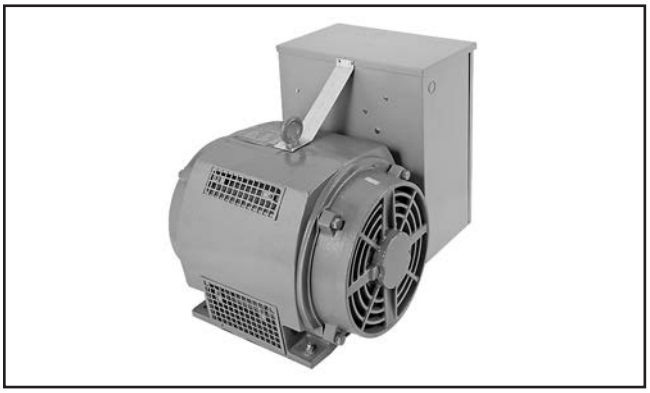
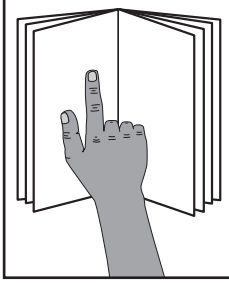


Figure 18. Model H3741 30 HP Rotary Phase Converter.

Extension Cords

Since this machine must be permanently connected to the power supply, an extension cord cannot be used.

SECTION 3: SETUP

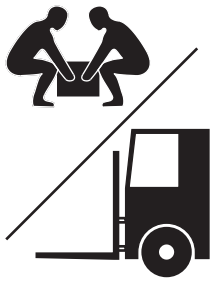


⚠WARNING

This machine presents serious injury hazards to untrained users. Read through this entire manual to become familiar with the controls and operations before starting the machine!

⚠WARNING

Wear safety glasses during the entire setup process!



⚠WARNING

HEAVY LIFT!

Straining or crushing injury may occur from improperly lifting machine or some of its parts. To reduce this risk, get help from other people and use a forklift (or other lifting equipment) rated for weight of this machine.

⚠CAUTION

No list of safety guidelines can be complete. Every shop environment is different. Always consider safety first, as it applies to your individual working conditions. Use this and other machinery with caution and respect. Failure to do so could result in serious personal injury, damage to equipment, or poor work results.

Needed for Setup

The following items are needed, but not included, for the setup/assembly of this machine.

Description	Qty
• Forklift or Hoist (rated for at least 5800 lbs.)	1
• Lifting Straps (rated for at least 5800 lbs.)	6
• Additional People	3
• Safety Glasses (for each person)	1
• Hearing Protection	As Needed
• Level	1
• Power Drill w/Phillips Head Bit #2	1
• Crowbar/Pry Bar	1
• Awl	1
• Phillips Head Screwdriver #2	1
• Adjustable Wrench	1
• Scissors	1
• Dust Collection System (**Page 69**)	1
• Dust Hose 4"	1
• Hose Clamps 4"	2
• Air Supply (rated for at least 90 PSI)	1
• Air Tubing ⅜"	As Needed
• Machine Oil (**Page 69**) (T27914 or ISO 68 Equivalent)	1 Qt.
• PTFE Thread Sealant Tape	As Needed
• Mounting Hardware (**Page 38**)	As Needed

Unpacking

This machine was carefully packaged for safe transport. When unpacking, separate all enclosed items from packaging materials and inspect them for shipping damage. ***If items are damaged, please call us immediately at (570) 546-9663.***

IMPORTANT: Save all packaging materials until you are completely satisfied with the machine and have resolved any issues between Grizzly or the shipping agent. *You MUST have the original packaging to file a freight claim. It is also extremely helpful if you need to return your machine later.*

Inventory

The following is a list of items shipped with your machine. Before beginning setup, lay these items out and inventory them.

If any non-proprietary parts are missing (e.g. a nut or a washer), we will gladly replace them; or for the sake of expediency, replacements can be obtained at your local hardware store.

NOTICE

If you cannot find an item on this list, carefully check around/inside the machine and packaging materials. Often, these items get lost in packaging materials while unpacking or they are pre-installed at the factory.

Crate 1 (Figure 19)	Qty
A. CNC Router Base	1
B. Gantry	1
C. Electrical Cabinet	1
D. Transformer	1
E. Dust Covers	2
F. Y-Axis Servo Motors	2
G. Vacuum Valve Cover	1
H. Gantry Column Covers	2
I. Pneumatic Cylinder	1

Box 1 (Figure 20)	Qty
J. Vacuum Pump	1
K. Vacuum Filter	1
L. Elbow Fitting 2 IPS	1
M. Threaded Pipe 2 IPS 3"	1

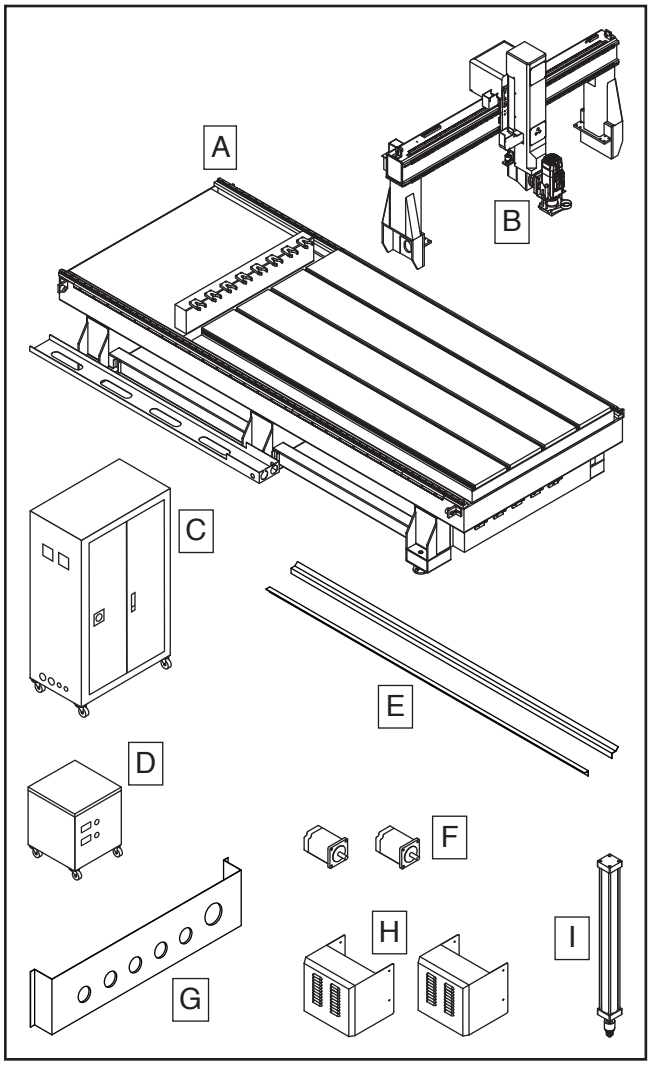


Figure 19. Crate 1 inventory.

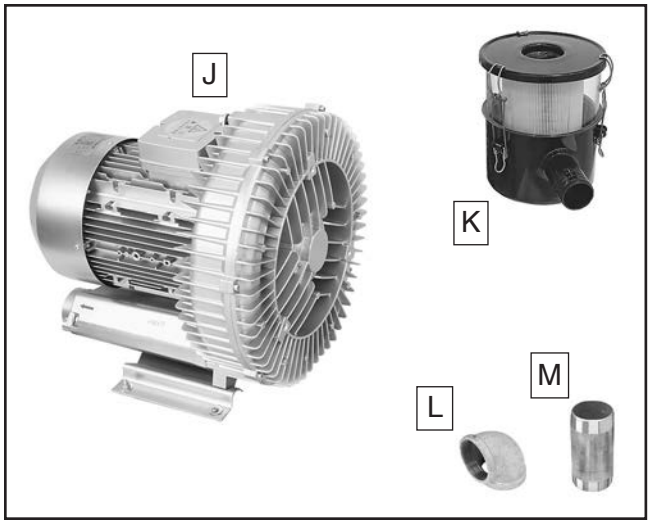


Figure 20. Box 1 inventory.

Box 2 (Figure 21)	Qty
N. ER32 Collets ⅛", ½", 4mm, 6mm	2 Ea.
O. Spoilboard Cutter 6 x 22mm	1
P. V-Groove Cutter 6 x 22mm	1
Q. Engraving Bits ⅛" (20-Pc.)	1
R. Tool Holders (ISO30, ER32)	4
S. Threaded Bolts M20-2.5 x 100	6
T. Hex Nuts M20-2.5	6
U. Flat Washers 20mm	6
V. Hold-Down Clamps	8
W. Rubber Grommets (Small)	5
X. Rubber Grommet (Large)	1
Y. Leveling Foot Pads	6
Z. Tool Holder Clamp (Spare)	1
AA. Fuses 20A (Spares)	2
AB. Sinumerik 808D Operating Manual	1
AC. Sinumerik 808D Diagnostics Manual	1
AD. ER32 Collet Wrench	1
AE. Door Keys	2
AF. Hex Wrench Set (1.5, 2, 2.5, 3, 4, 5, 6, 8, 10mm)	1
AG. Hose Clamps 2"	2
AH. Proximity Switch (Spare)	1
AI. Main Valve Label	1
AJ. Gasket Tubing	68 ft.
AK. Lock Nuts M6-1	5
AL. Vacuum Zone Label	4
AM. Vacuum Valve Handles	5

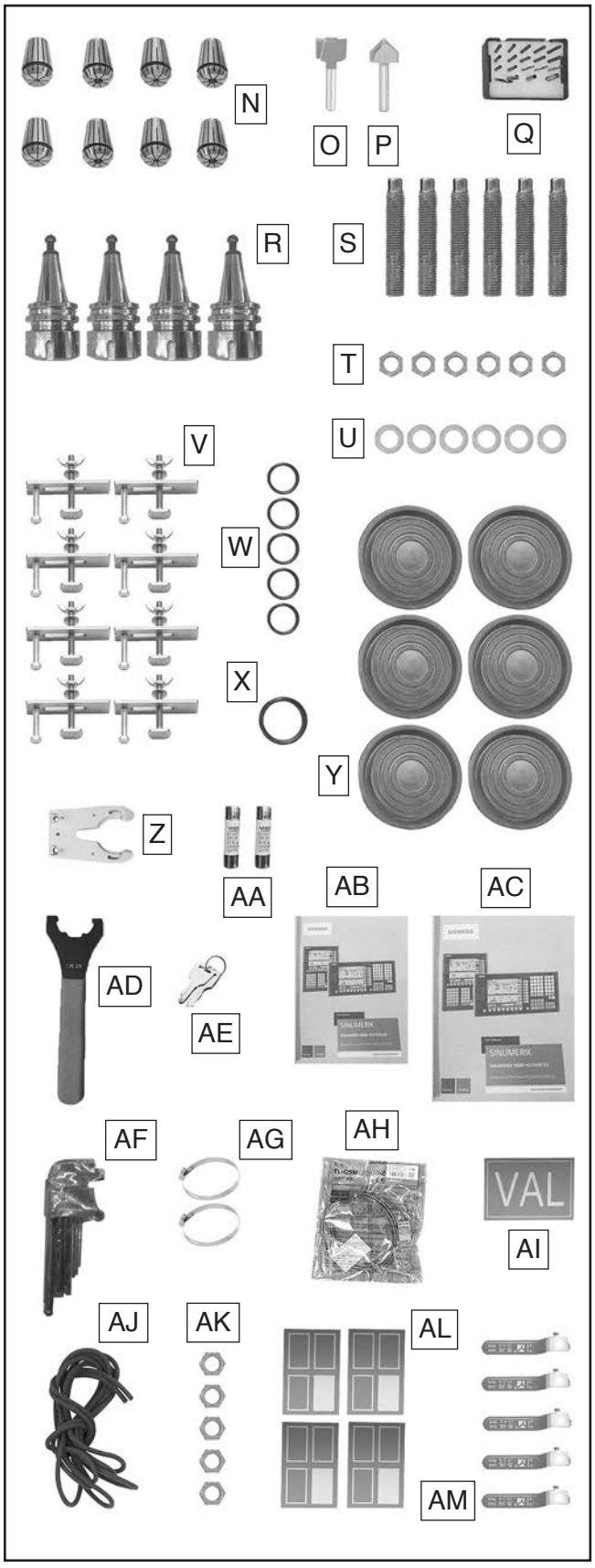


Figure 21. Box 2 inventory.

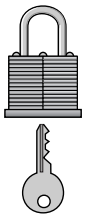
Site Considerations

Weight Load

Refer to the **Machine Data Sheet** for the weight of your machine. Make sure that the surface upon which the machine is placed will bear the weight of the machine, additional equipment that may be installed on the machine, and the heaviest workpiece that will be used. Additionally, consider the weight of the operator and any dynamic loading that may occur when operating the machine.

Space Allocation

Consider the largest size of workpiece that will be processed through this machine and provide enough space around the machine for adequate operator material handling or the installation of auxiliary equipment. With permanent installations, leave enough space around the machine to open or remove doors/covers as required by the maintenance and service described in this manual. **See below for required space allocation.**



⚠CAUTION

Children or untrained people may be seriously injured by this machine. Only install in an access restricted location.

Physical Environment

The physical environment where the machine is operated is important for safe operation and longevity of machine components. For best results, operate this machine in a dry environment that is free from excessive moisture, hazardous chemicals, airborne abrasives, or extreme conditions. Extreme conditions for this type of machinery are generally those where the ambient temperature range exceeds 41°–104°F; the relative humidity range exceeds 20%–95% (non-condensing); or the environment is subject to vibration, shocks, or bumps.

Electrical Installation

Place this machine near an existing power source. Make sure all power cords are protected from traffic, material handling, moisture, chemicals, or other hazards. Make sure to leave enough space around machine to disconnect power supply or apply a lockout/tagout device, if required.

Lighting

Lighting around the machine must be adequate enough that operations can be performed safely. Shadows, glare, or strobe effects that may distract or impede the operator must be eliminated.

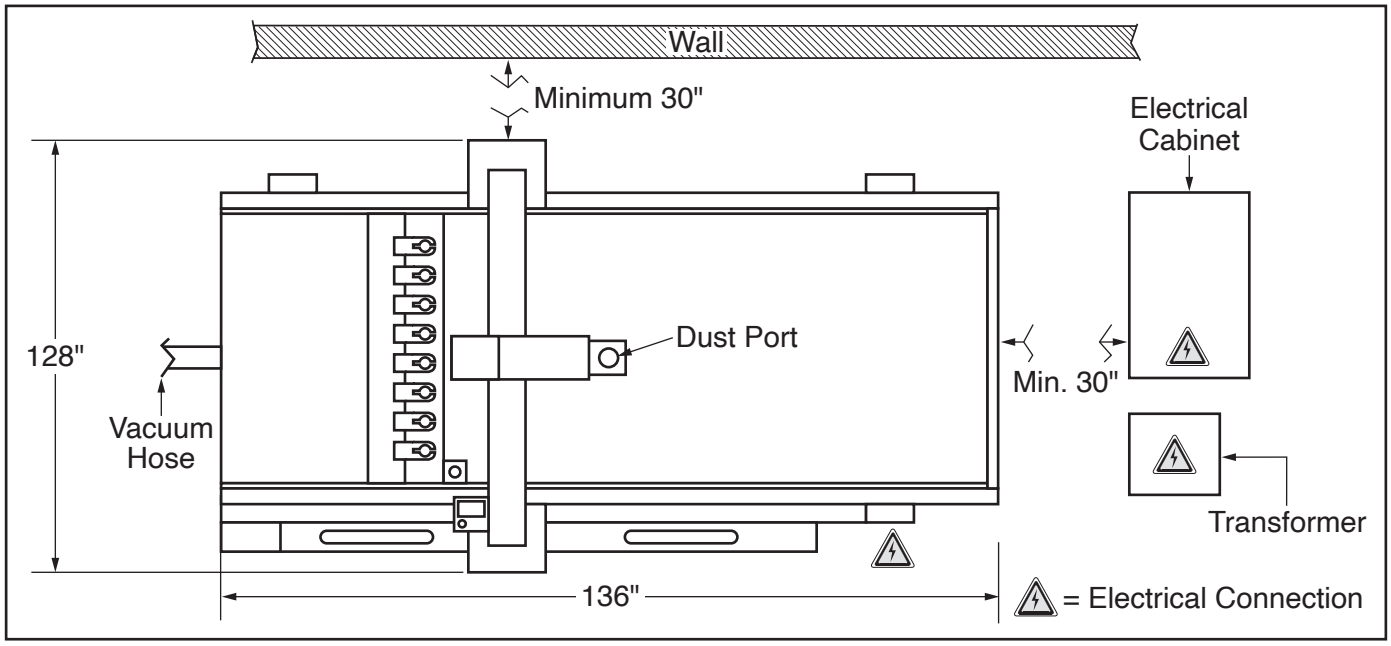
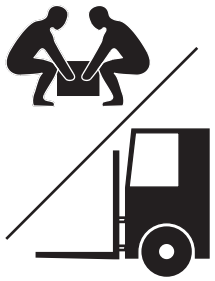


Figure 22. Minimum working clearances.

Lifting & Placing CNC Router



⚠WARNING

HEAVY LIFT!

Straining or crushing injury may occur from improperly lifting machine or some of its parts. To reduce this risk, get help from other people and use a forklift (or other lifting equipment) rated for weight of this machine.

DO NOT attempt to lift or move this machine without using the proper lifting equipment (such as a forklift or hoist) and the necessary assistance from other people. Each piece of lifting equipment must be rated for **at least 5800 lbs.** to support dynamic loads that may be applied while lifting. Refer to **Needed for Setup** on **Page 22** for a complete list of required equipment.

To lift and place CNC router:

1. Move crate to machine work site.

2. Remove crate top and sides, small items inside crate, and blocks on machine base.

3. Remove banding straps and support cables attaching items to CNC router base.

NOTICE

Gantry should remain secured to CNC router base until it is installed in Lifting & Installing CNC Gantry on Page 28.

4. With help from additional people, clear table of vacuum pump box, electrical cabinet, vacuum panel cover, gantry column covers, dust covers, and inventory box, and set aside.

— If using a forklift, proceed to **Step 5**.

— If using lifting straps, proceed to **Step 10** on **Page 27**.

5. Remove (6) eyebolts from mounting legs (see **Figure 23**).

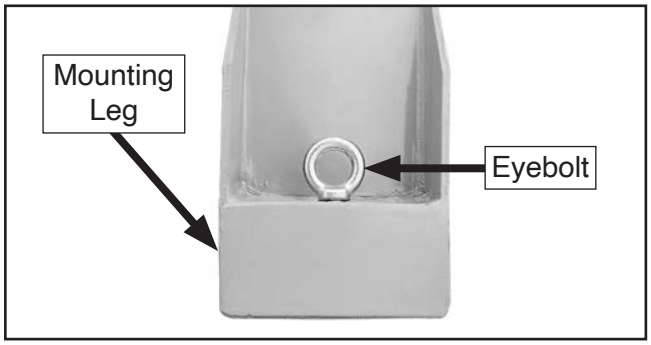


Figure 23. Eyebolt location on mounting leg.

6. Align forklift with right side of machine and position forks under lift beams on underside of machine body (see **Figure 24**). Only lift machine enough to clear pallet, then move pallet out of the way.

IMPORTANT: Position forks so they do not strike cable carrier or vacuum lines underneath machine.

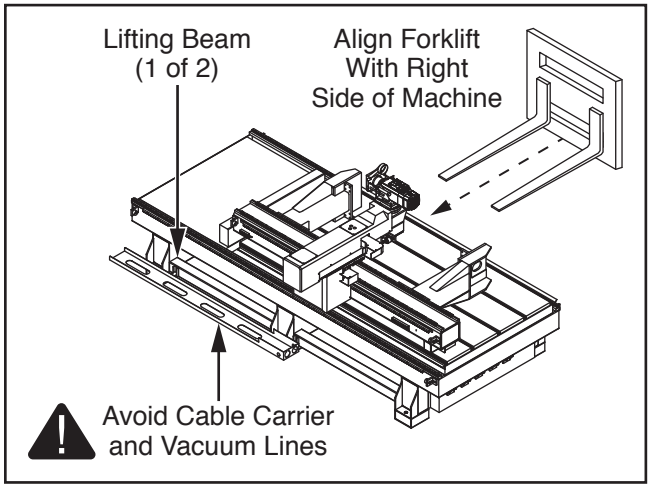


Figure 24. Lifting machine with a forklift.

7. Have an additional person install (1) M20-2.5 x 100 threaded bolt, M20-2.5 hex nut, and 20mm flat washer into each mounting leg with drive end on threaded bolt pointing up, as shown in **Figure 25** on **Page 27**.

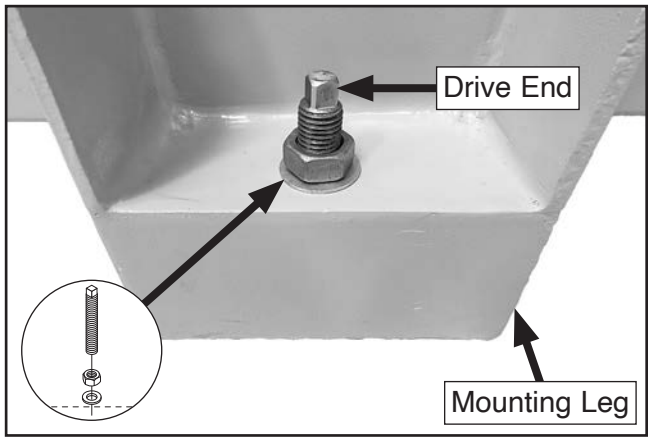


Figure 25. Leveling foot components.

8. Install (6) foot pads onto (6) threaded bolts in machine mounting legs (see **Figure 26**).

Note: *Loosen hex nut and tighten threaded bolt as needed to increase available threads for foot pads on bottom of threaded bolt.*

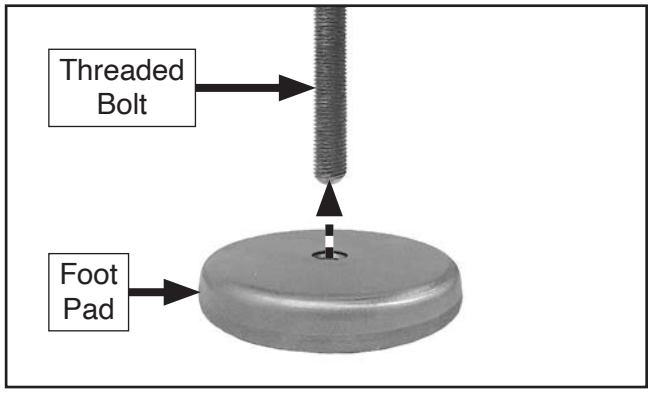


Figure 26. Installing foot pad on threaded bolt (mounting leg removed for clarity).

9. Tighten hex nuts on thread bolts, lower machine on leveling feet, then proceed to **Leveling** on **Page 28**.

10. Connect lifting straps to (6) eyebolts on mounting legs and secure (see **Figure 27**).

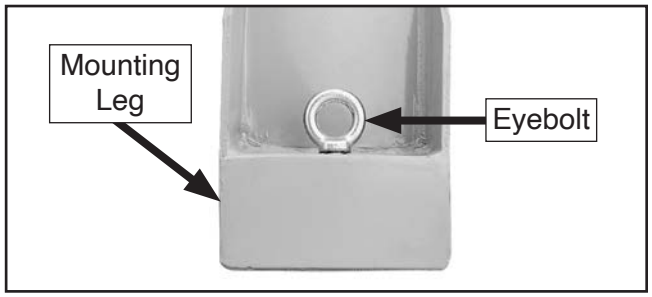


Figure 27. Eyebolt location on mounting leg.

11. Center lifting equipment over machine and connect lifting straps (see **Figure 28**).

IMPORTANT: Evenly balance lifting straps to prevent machine from tilting when lifted.

12. Raise lifting equipment until lifting straps are taut, then verify none of the lifting straps are binding on machine (see **Figure 28**). Only lift machine enough to clear pallet, then move pallet out of the way.

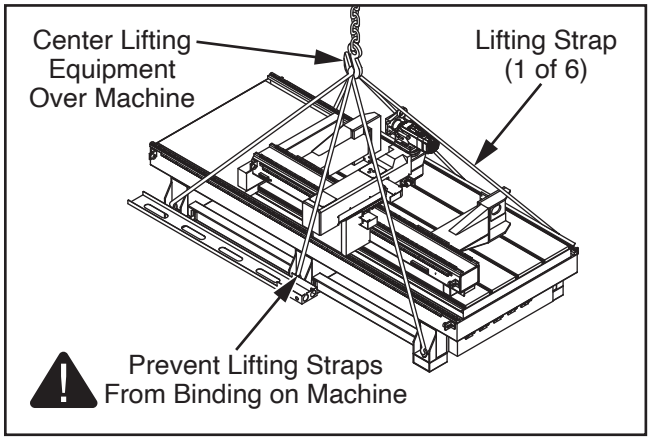


Figure 28. Lifting machine with straps.

13. Lower machine to floor and remove (1) lifting strap from (1) eyebolt on machine, then remove eyebolt from mounting leg.

IMPORTANT: Perform this procedure at each of the four corners of machine before attempting to perform it on center mounting legs. This will help stabilize machine when raising and lowering.

14. Perform **Steps 7–9** on mounting leg with eyebolt removed in **Step 13**.

Note: *It will be necessary to partially lift machine during **Step 8** in order to place foot pad underneath mounting leg.*

15. Repeat **Steps 13–14** until all (6) eyebolts have been replaced with leveling feet, then proceed to **Leveling** on **Page 28**.

Leveling

NOTICE

For accurate cutting results and to prevent gradual warping of the table and frame, machine MUST be leveled from side to side and from front to back on both ends. Check the table and frame 24 hours after installation, two weeks after that, and then annually to make sure they remain level.

Leveling machinery helps precision components remain straight and flat during the lifespan of the machine. Components on a machine that are not level may slowly twist due to the dynamic loads placed on the machine during operation.

To level machine:

1. Place level on table and align to either X- or Y-axis.

2. Loosen hex nut and adjust drive end on threaded bolt (see **Figure 29**). Tighten hex nut against mounting leg to secure.

   Note: *Tighten threaded bolt to raise machine, and loosen threaded bolt to lower machine.*

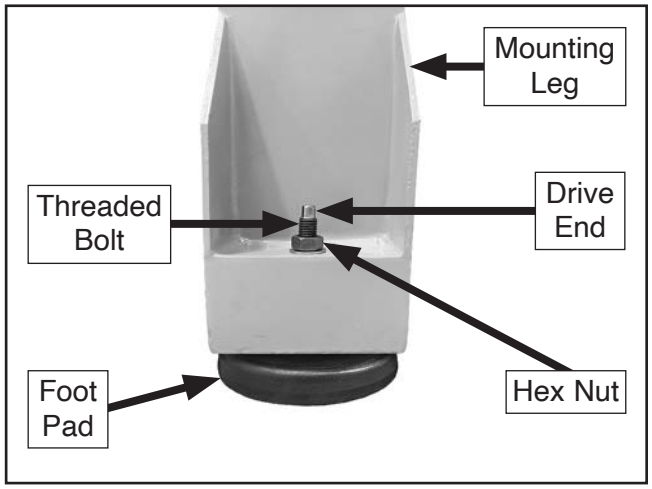


Figure 29. Leveling foot components.

3. Use level to check X- and Y-axes. Repeat as needed.

4. Remove level and proceed to **Lifting & Installing CNC Gantry**.

Lifting & Installing CNC Gantry

⚠DANGER

The Model G0933 gantry is extremely heavy and prone to tipping over when unsecured. Verify all personnel involved with the lifting and installation procedure are familiar with their roles and follow all safety guidelines in this section. Failure to adhere to these guidelines will result in death, crushing injuries, or catastrophic damage to the machine and its components.

DO NOT attempt to lift or move the gantry without using the proper lifting equipment (such as a forklift or hoist) or the necessary assistance from other people. Each piece of lifting equipment must be rated for **at least 5800 lbs.** to support dynamic loads that may be applied while lifting. Refer to **Needed for Setup** on **Page 22** for a complete list of required equipment.

To lift and install CNC gantry:

1. Discuss lifting and placing procedure with all additional personnel and verify each person is aware of what steps to perform and where their position will be. Assign a job role to each person as described below:

   Director: Oversees entire operation and guides personnel through steps and procedures as needed.

   Forklift/Hoist Operator: Lifts and guides gantry into position as instructed by Director.

   Spotters/Installers: Supports gantry on each side during movement and secures gantry when placed.

2. Position forks/hoist over center of gantry on router base.

3. Connect (1) end of lifting strap to eyebolt on gantry and secure opposite end to forklift/hoist (see **Figure 30**).

4. Connect (1) end of lifting strap around outer side of gantry beam, and connect other end to opposite side of gantry beam (see **Figure 30**). Secure middle portion of lifting strap to forklift/hoist.

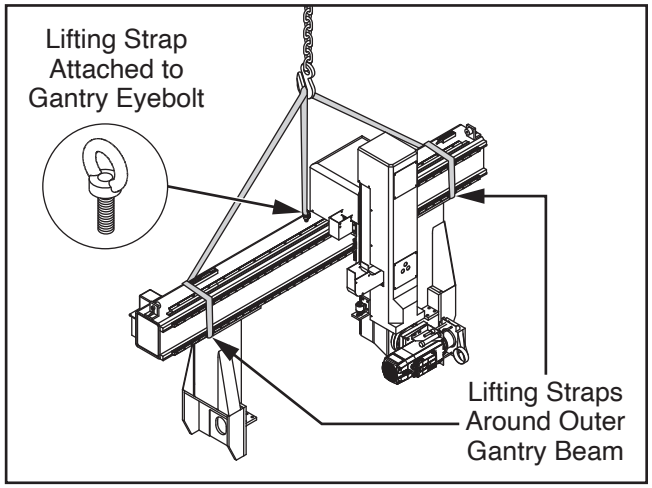


Figure 30. Lifting straps connected to eyebolt and gantry beam.

5. Lift gantry until it is standing upright, then wrap (1) additional lifting strap around lower gantry column on each side (see **Figure 31**).

6. Have spotters/installers hold on to lifting straps attached in **Step 5**, lift gantry until it clears CNC router base, then slowly move gantry into position towards rear of base (see **Figure 31**).

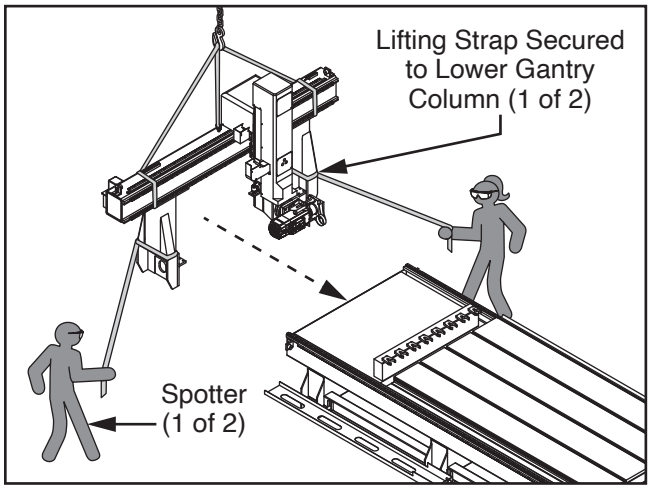


Figure 31. Gantry secured and positioned behind CNC router base.

7. Center gantry over rear dust cover area of CNC router base and position gantry columns directly over linear guideways (see **Figure 32**).

8. Have spotters/installers remove (4) pre-installed cap screws from (4) guideway carriages, then position guideway carriages under gantry columns (see **Figure 32**).

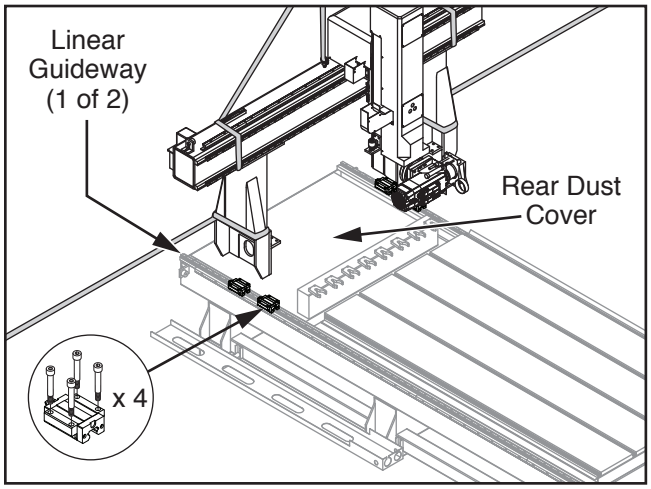


Figure 32. Gantry positioned over rear dust cover area and linear guideways.

9. Verify spindle and spindle column *will not* contact tool holder mount when gantry is lowered. Reposition gantry forward or backward if needed (see **Figure 33**).

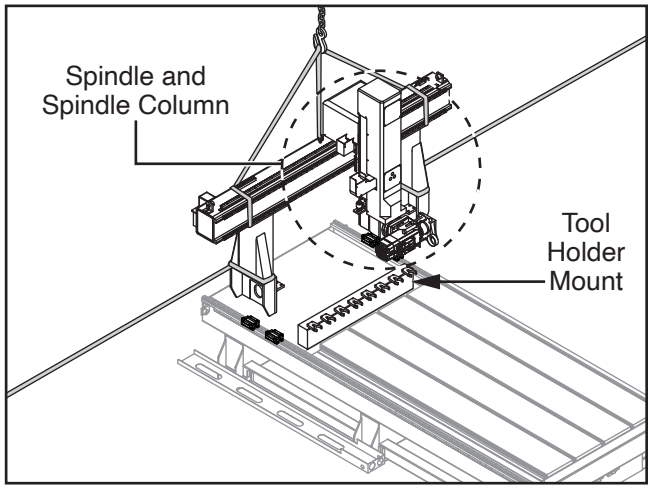


Figure 33. Verifying spindle and spindle column clearance.

10. Lower gantry until it is *almost* touching guideway carriages, then install (16) cap screws removed in **Step 8** (see **Figure 34**). Do not fully tighten fasteners at this time.

Note: *Use an awl or screwdriver to help align gantry column mounts with guideway carriages. Thread each cap screw lightly so that they may still be adjusted if needed.*

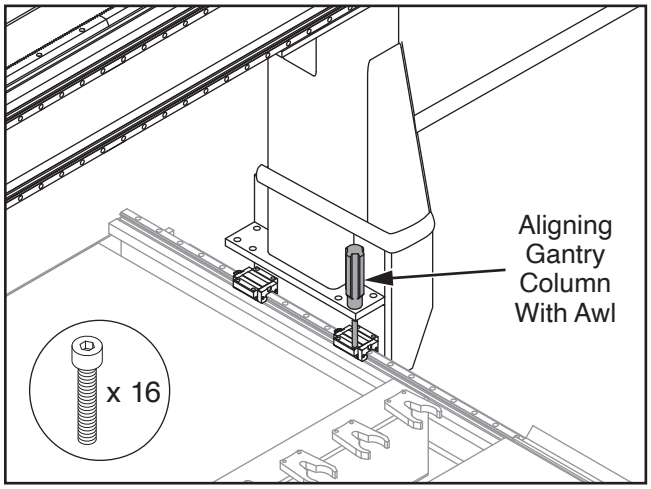


Figure 34. Aligning gantry column with awl.

DANGER

Always maintain constant support of gantry with forklift/hoist until all cap screws are fully secure, and all personnel are clear of machine.

11. With all cap screws threaded into guideway carriages, lower gantry until it is resting on carriages and fully tighten all (16) cap screws.

Note: *Raise/lower gantry or reposition as needed if cap screws are binding or are difficult to fully tighten.*

12. Proceed to **Assembly** on **Page 31**.

Assembly

⚠WARNING

HEAVY LIFT!

Straining or crushing injury may occur from improperly lifting machine or some of its parts. To reduce this risk, get help from other people and use a forklift (or other lifting equipment) rated for weight of this machine.

DO NOT attempt to lift or move machine parts without the necessary assistance from other people. Refer to **Needed for Setup** on **Page 22** for a complete list of needed equipment for setup and installation.

To assemble machine:

1. Remove any support straps, parts inside plastic wrap, and tie straps on servo motors.

2. Loosen (2) gib screws on left and right gantry columns, but do not remove (see **Figure 35**).

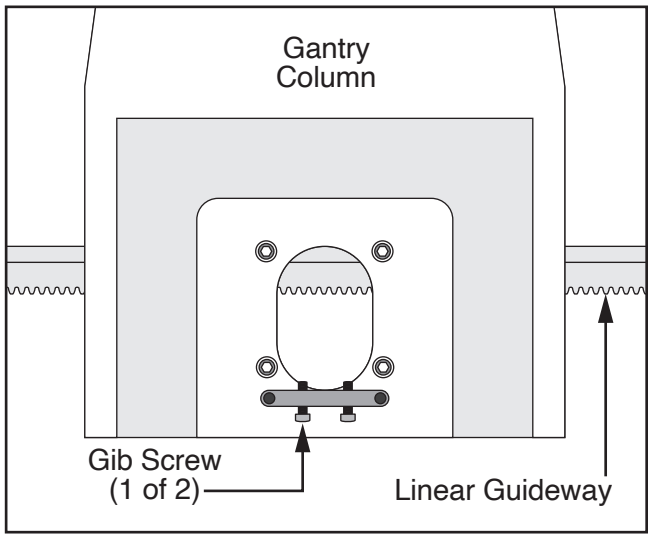


Figure 35. Gantry column gib screw location.

3. Install (1) Y-Axis servo motor on either gantry column using (4) M8-1.25 x 24 cap screws, 8mm lock washers, and 8mm flat washers pre-installed on gantry column (see **Figure 36**). DO NOT fully tighten cap screws.

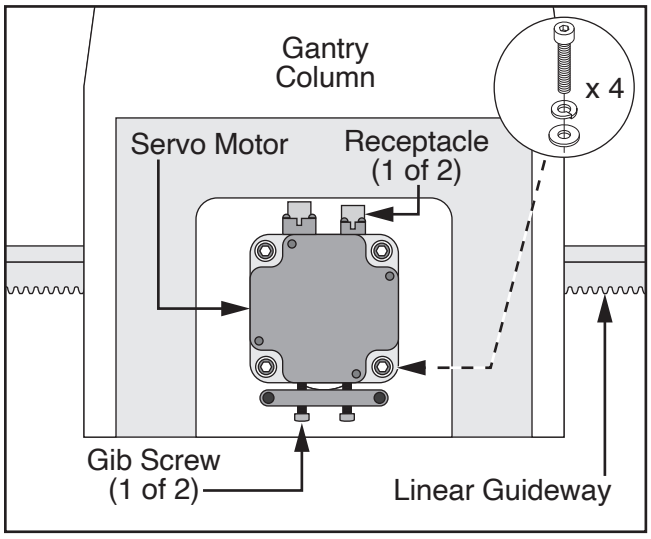


Figure 36. Servo motor installed on gantry.

4. Tighten (2) gib screws on gantry column until servo motor pulley fully meshes with linear guideway (see **Figure 37**). Fully tighten cap screws installed in **Step 3** at this time.

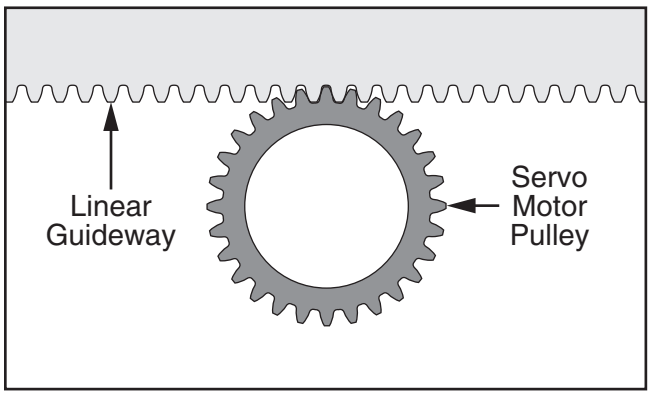


Figure 37. Servo motor pulley meshed with linear guideway.

5. Connect (2) servo driver electrical connectors to matching receptacles on servo motor (see **Figure 38**).

   IMPORTANT: Verify electrical connections are fully seated on receptacles. If connector seizes while tightening, gently wiggle connector strain relief back and forth and try tightening again.

   Note: *Connectors are different sizes and cannot be interchanged.*

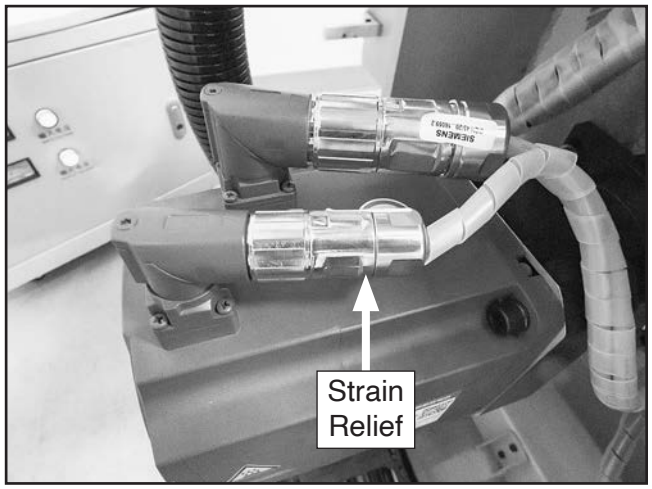


Figure 38. Servo motor electrical connections.

6. Repeat **Steps 3–5** on opposite column.

7. Loosen and remove (2) pre-installed cap screws securing cable carrier access panel, then remove panel (see **Figure 39**).

8. Locate tool probe plug and air tubing secured underneath machine next to cable carrier access panel (see **Figure 39**). Remove any tie straps on plug and tubing.

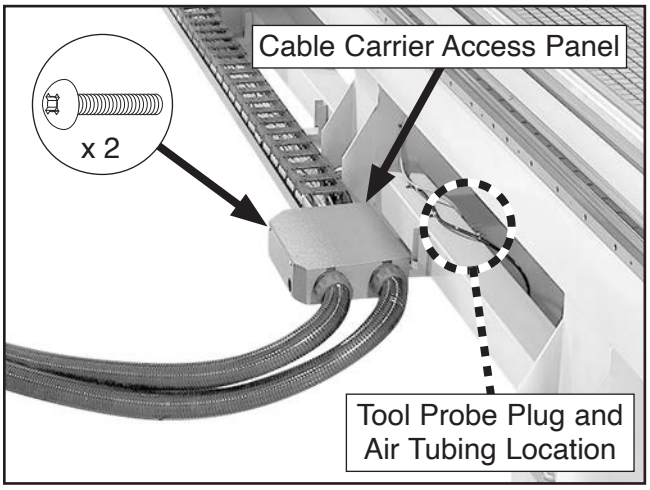


Figure 39. Cable carrier access panel location.

9. Connect tool probe plug to receptacle in cable carrier access area, then insert end of air tubing into push-to-connect fitting on air line (see **Figure 40**).

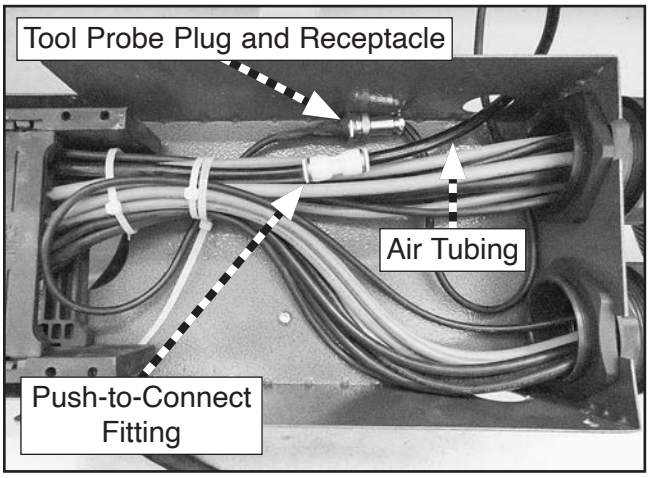


Figure 40. Example of cable carrier access area connections.

10. Loosen (2) Phillips head screws on gantry EMERGENCY STOP button (see **Figure 41**).

11. Separate EMERGENCY STOP button head from button base by turning head counter-clockwise and pulling apart (see **Figure 41**).

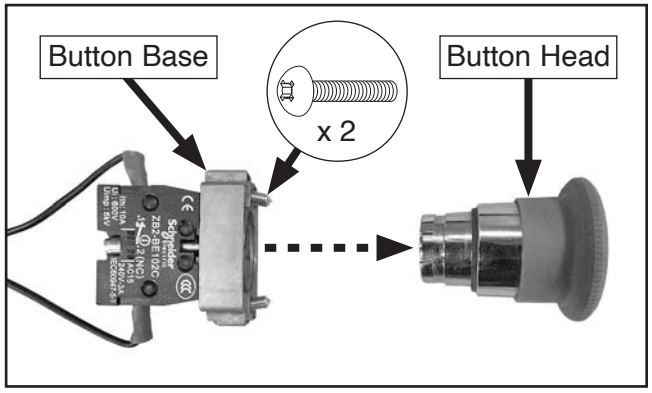


Figure 41. Gantry EMERGENCY STOP button components.

12. Insert EMERGENCY STOP button head through cutout in gantry column cover and into button base, then turn button head clockwise until secure (see **Figure 42**).

Note: *Each gantry column cover will be numbered to match the corresponding number on gantry column. If no number is present, verify cutout on cover is positioned toward front of machine when installed.*

13. Tighten (2) Phillips head screws on EMERGENCY STOP button base until they are snug against gantry column cover (see **Figure 42**).

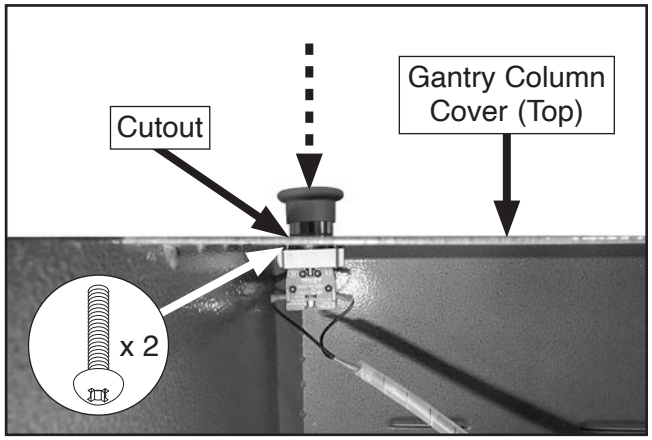


Figure 42. EMERGENCY STOP button installed.

14. Test security of EMERGENCY STOP button installation by twisting button head clockwise until it springs out, then push button back in (see **Figure 43**).

— EMERGENCY STOP button should remain fixed in place and not shift or wobble while twisting/pushing.

Figure 43. Resetting EMERGENCY STOP button.

15. Repeat **Steps 10–14** on opposite gantry EMERGENCY STOP button.

16. Install gantry column covers on gantry columns using (4) M6-1 x 8 button head cap screws pre-installed on each gantry column (see **Figure 44**).

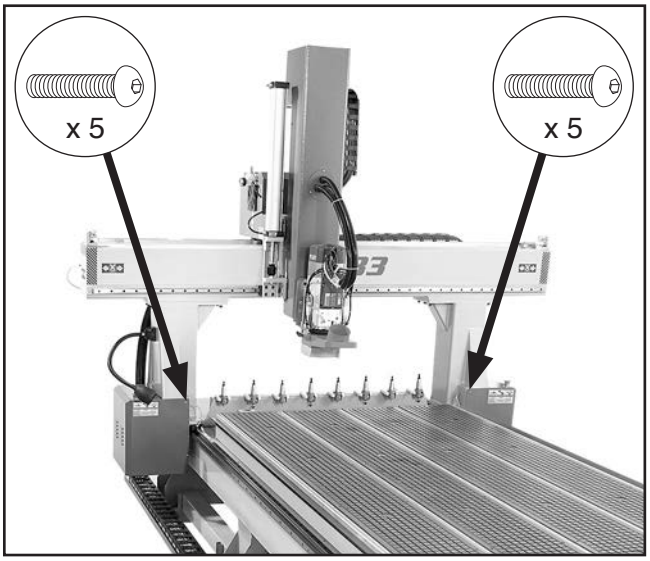


Figure 44. Gantry column covers installed on gantry columns.

17. Install vacuum valve cover over vacuum valves using (4) M6-1 x 8 cap screws pre-installed on router base (see **Figure 45**).

18. Install (5) small grommets and (1) large grommet in matching holes in vacuum valve cover (see **Figure 45**).

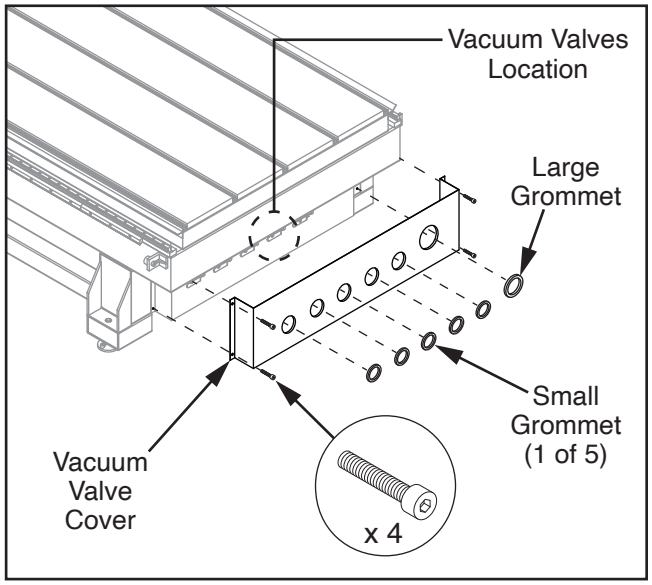


Figure 45. Installing vacuum valve cover and grommets.

19. Install (5) vacuum valve handles on vacuum valves using (5) M6-1 lock nuts, as shown in **Figure 46**.

Note: *Position vacuum valve handle so handle is pointing left, and tab on handle rests against stop tab on vacuum valve (see **Figure 46**).*

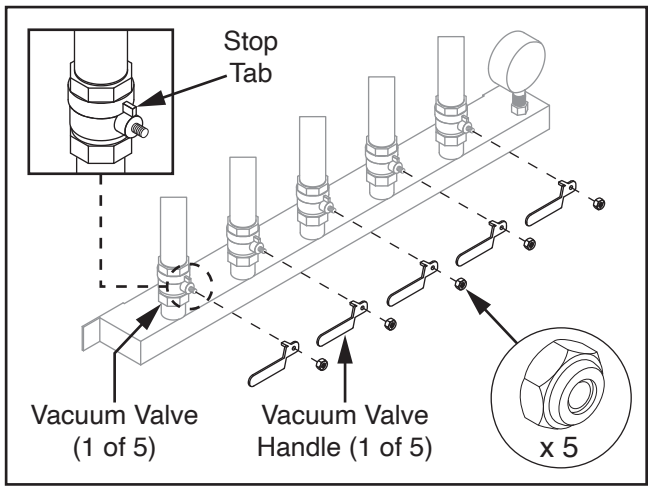


Figure 46. Installing vacuum valve handles (vacuum valve cover removed for clarity).

20. Install (4) vacuum zone labels and (1) main valve label on vacuum valve cover above each handle (see **Figure 47**).

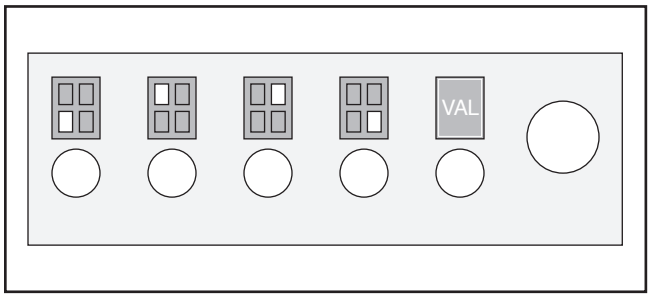


Figure 47. Vacuum labels installed.

21. Install (2) dust covers using (10) M6-1 x 8 cap screws pre-installed on both sides of router base table (see **Figure 48**).

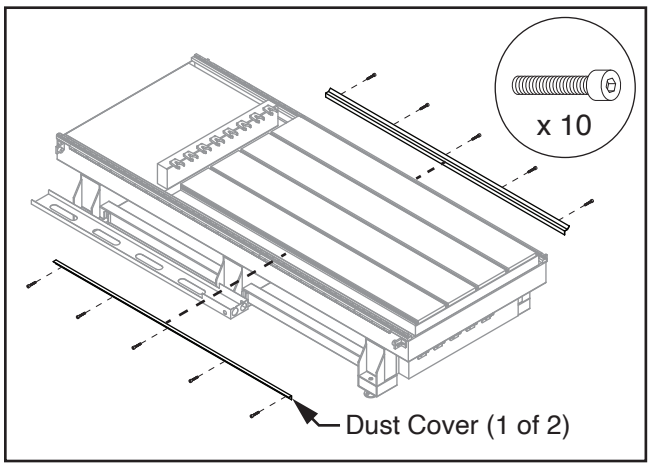


Figure 48. Installing dust covers (gantry removed for clarity).

22. Remove (1) M16-1.5 hex nut, (2) 16mm flat washers, and (4) cap screws pre-installed on end of pneumatic cylinder (see **Figure 49**).

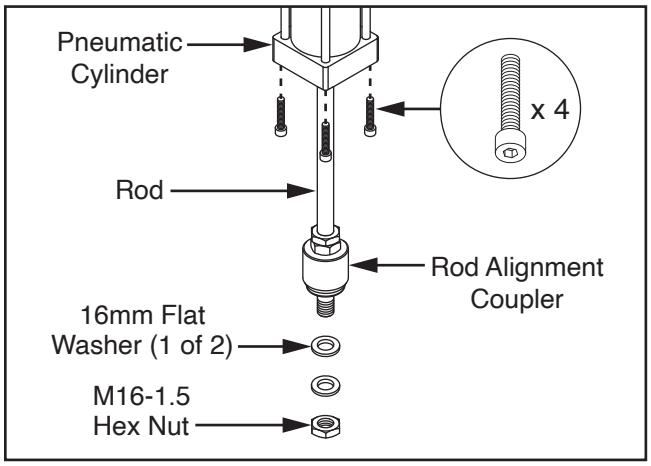


Figure 49. Pneumatic cylinder components.

23. Place pneumatic cylinder on upper cylinder mount and secure with (4) cap screws removed in **Step 22** (see **Figure 50**).

24. Extend rod alignment coupler to lower cylinder mount and secure with (2) 16mm flat washers and (1) M16-1.5 hex nut removed in **Step 22** (see **Figure 50**).

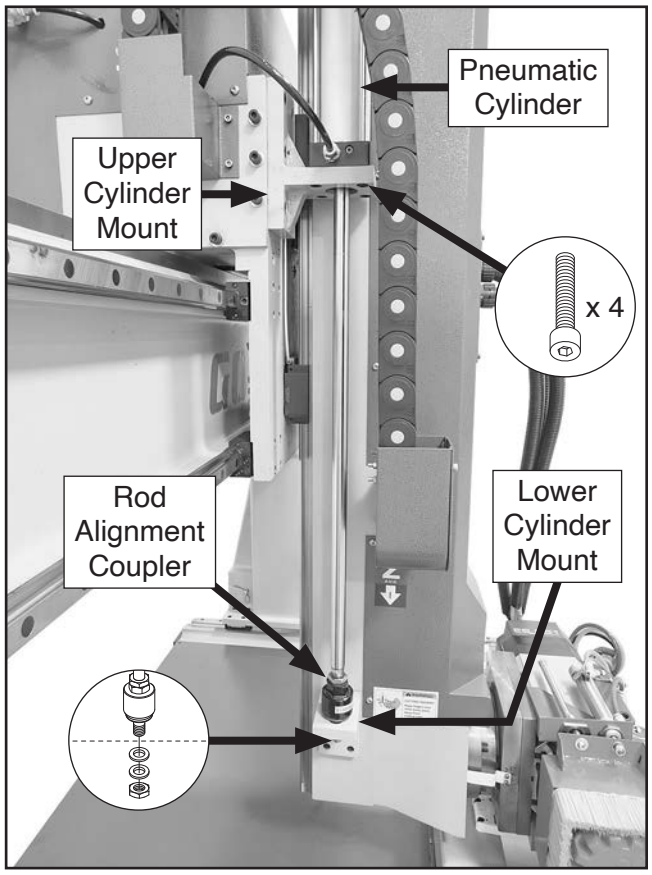


Figure 50. Placing pneumatic cylinder.

25. Insert end of air tubing exiting dust cover into push-to-connect fitting on pneumatic cylinder (see **Figure 51**).

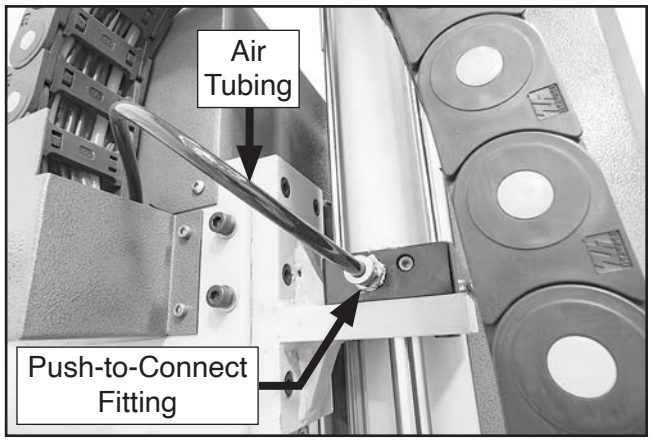


Figure 51. Air tubing connected.

26. Connect oil tube fitting from gantry to oiler system reservoir and secure (see **Figure 52**).

27. Fill reservoir with 1 quart of ISO 68 machine oil (see **Figure 52**).

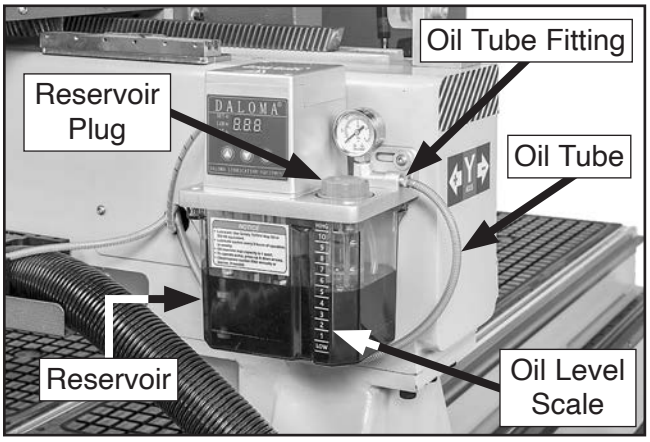


Figure 52. Example of oiler system components.

28. Remove any ties securing oil tubing on gantry columns and insert (4) oil tubes into (4) guideway carriage fittings (see **Figure 53**). Tug oil tubes with light force to make sure they do not easily come out.

Note: *A secure fit is necessary to prevent oil leaks.*

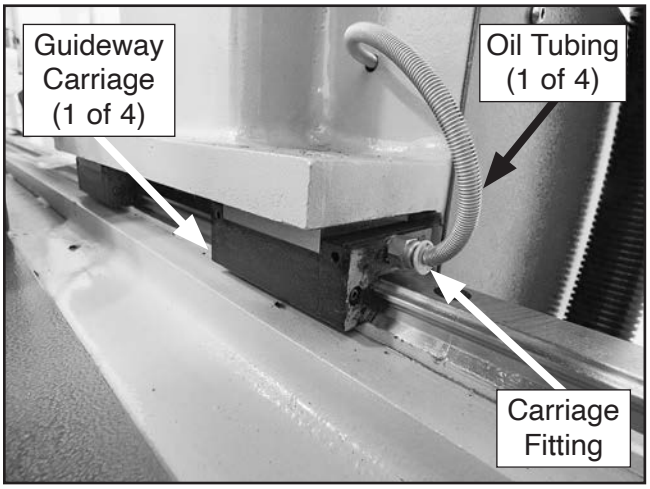


Figure 53. Example of oil tubing installed on guideway carriage.

29. Remove any cardboard protective covers, tape, and plastic wrap covering machine components, then proceed to **Pneumatic System** on **Page 36**.

Pneumatic System

⚠WARNING

Eye injury hazard! Always wear safety glasses when handling pressurized air system components.

⚠CAUTION

Pressurized air escaping through valves/ fittings can be extremely loud. Protect hearing with ANSI-approved hearing protection in following steps.

The Model G0933 pneumatic system supplies pressurized air to a pneumatic cylinder, which provides positioning for machine components during operations (see **Figure 54**). The pneumatic system components help filter the air, remove moisture and heat, and regulate air pressure.

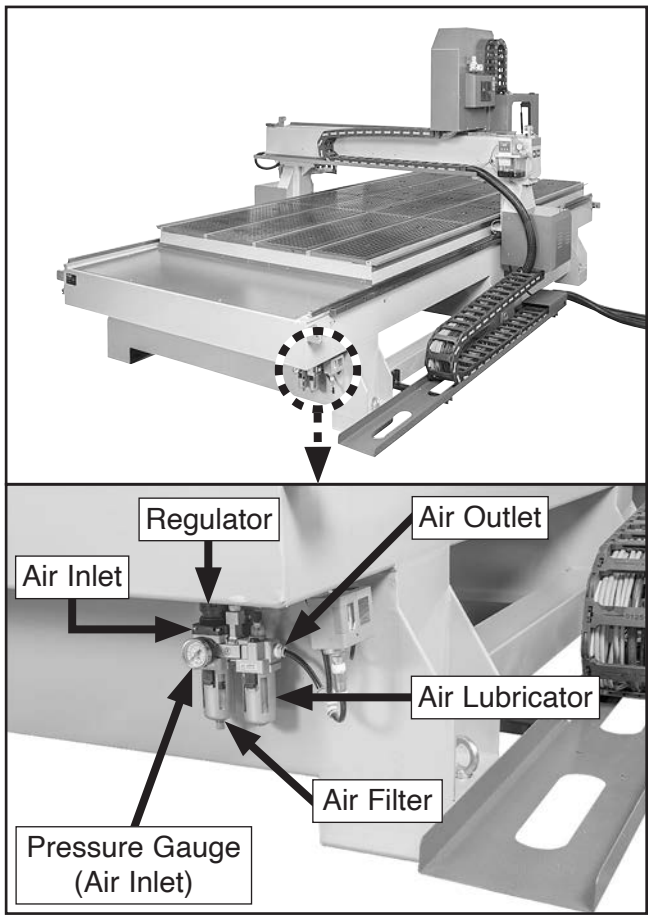


Figure 54. Example of pneumatic system components.

To connect pneumatic system:

1. Prepare an air supply that will provide a constant 90 PSI (0.6 MPa) of pressurized air on demand.

   — If using an air compressor, make sure compressor is mounted at least 30" away from machine for maintenance.

   — If using an overhead air line, make sure air line does not interfere with full range of gantry movement.

2. Adjust in-line regulator for air supply line to 0 PSI and connect one end of air tubing to air supply.

3. Insert other end of tubing into push-to-connect fitting on air inlet side of air filter (see **Figure 55**).

4. Increase in-line air supply regulator to 90 PSI and rotate machine regulator to adjust incoming air pressure to 90 PSI (see **Figure 55**).

5. Verify pressure control switch is set to 15 Psig/1 bar (see **Figure 55**).

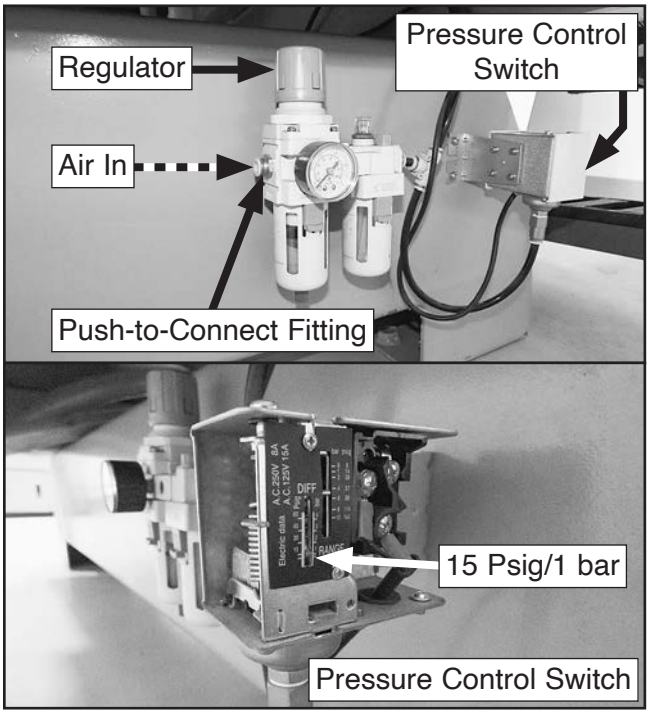


Figure 55. Example of connecting air supply to pneumatic system.

Dust Collection

⚠CAUTION

This machine creates a lot of wood chips/dust during operation. Breathing airborne dust on a regular basis can result in permanent respiratory illness. Reduce your risk by wearing a respirator and capturing the dust with a dust-collection system.

Minimum CFM at Dust Port: 400 CFM

Do not confuse this CFM recommendation with the rating of the dust collector. To determine the CFM at the dust port, you must consider these variables: (1) CFM rating of the dust collector, (2) hose type and length between the dust collector and the machine, (3) number of branches or wyes, and (4) amount of other open lines throughout the system. Explaining how to calculate these variables is beyond the scope of this manual. Consult an expert or purchase a good dust collection "how-to" book.

NOTICE

Ensure dust hose is long enough for full range of gantry movement prior to beginning installation.

The Model G0933 includes a dust shoe (see **Figure 56**) that connects to a dust collection system and brushes debris off of part surfaces as it traverses during operations.

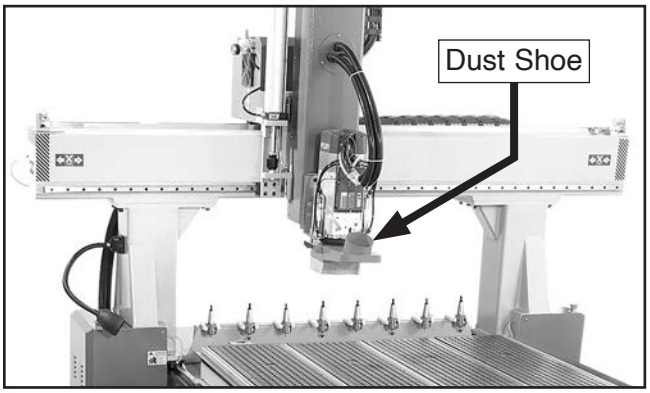


Figure 56. Location of dust shoe.

To connect dust collection system to machine:

1. Fit 4" dust hose over dust shoe and secure with hose clamp (see **Figure 57**).

Figure 57. Example of dust collection hose attached.

2. Tug hose to make sure it does not come off.

   Note: *A tight fit is necessary for proper performance.*

Lifting & Mounting Vacuum Pump

⚠WARNING

This machine and its components are very heavy. Get lifting help or use power lifting equipment such as a forklift to move heavy items.

NOTICE

The vacuum pump can be mounted horizontally or vertically as long as the mounting surface can support the full weight of the pump. Grizzly Industrial recommends concrete floors for horizontal mounting, and steel I-beams for vertical mounting.

DO NOT attempt to lift or move the vacuum pump without necessary assistance from other people.

To lift and mount vacuum pump:

1. Move vacuum pump box to work site mounting location.

2. Remove box cover, small items inside box, and any hardware securing vacuum pump to pallet base.

3. With help from an assistant, lift vacuum pump off pallet base, move pallet out of the way, then place vacuum pump on concrete floor.

4. Secure vacuum pump to concrete floor as instructed in **Anchoring Vacuum Pump to Floor**.

Anchoring Vacuum Pump to Floor

Number of Mounting Holes 4
Diameter of Mounting Hardware..... ½"

Anchoring machinery to the floor prevents tipping or shifting and reduces vibration that may occur during operation, resulting in a machine that runs slightly more quietly and feels more solid.

If the machine will be installed in a commercial or workplace setting, or if it is permanently connected (hardwired) to the power supply, local codes may require that it be anchored to the floor.

If not required by any local codes, fastening the machine to the floor is an optional step. If you choose not to do this with your machine, we recommend placing it on machine mounts, as these provide an easy method for leveling and they have vibration-absorbing pads.

Anchoring to Concrete Floors

Lag shield anchors with lag screws (see below) are a popular way to anchor machinery to a concrete floor, because the anchors sit flush with the floor surface, making it easy to unbolt and move the machine later, if needed. However, anytime local codes apply, you MUST follow the anchoring methodology specified by the code.

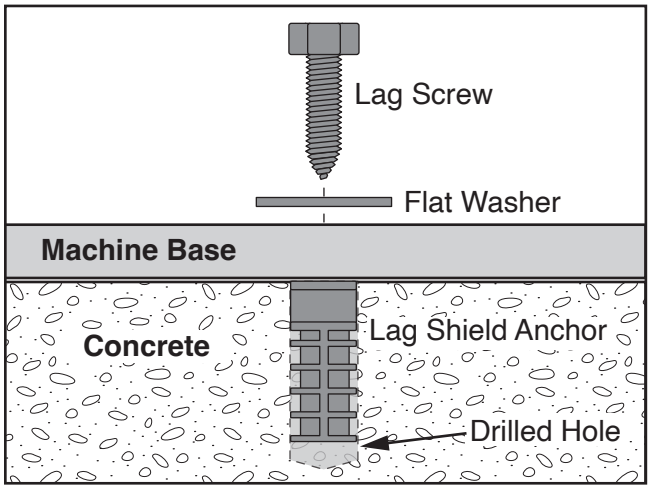


Figure 58. Popular method for anchoring machinery to a concrete floor.

Connecting Vacuum Pump & Filter

The vacuum pump is connected to the Model G0933 with a 2" diameter vacuum hose located underneath the table. The vacuum pump air filter removes particulates and debris created during operations. Wrap the pipe threads with PTFE tape (thread sealant tape) to seal all pipe connections.

NOTICE

DO NOT connect vacuum pump to power without verifying junction box terminal configuration (see Page 42). Operating vacuum pump in incorrect configuration can cause severe machine damage.

To connect vacuum pump and filter:

1. Connect 2 IPS elbow fitting to 2 IPS threaded pipe (see **Figure 59**).

2. Connect 2 IPS threaded pipe to vacuum pump inlet (see **Figure 59**).

3. Connect vacuum filter to 2 IPS elbow fitting (see **Figure 59**).

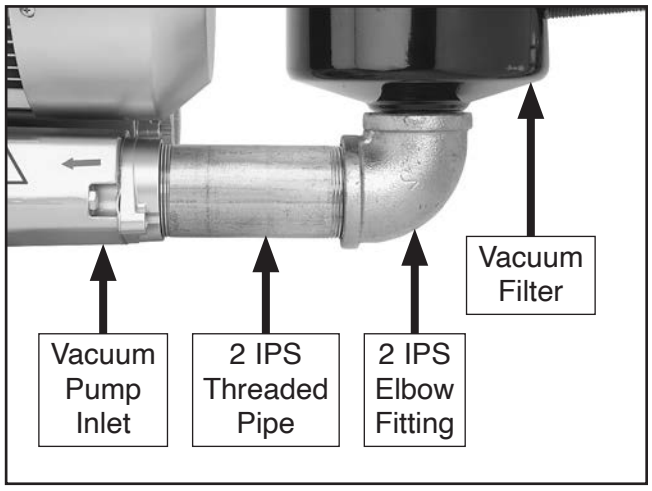


Figure 59. Pump to filter connection.

4. Connect 2" vacuum hose from machine (see **Figure 60**) to vacuum filter inlet port (see **Figure 61**) and secure with 2" hose clamp.

   IMPORTANT: Verify 2" hose clamp and end of vacuum hose are over smooth portion of vacuum filter inlet port before securing to prevent air leaks during operation.

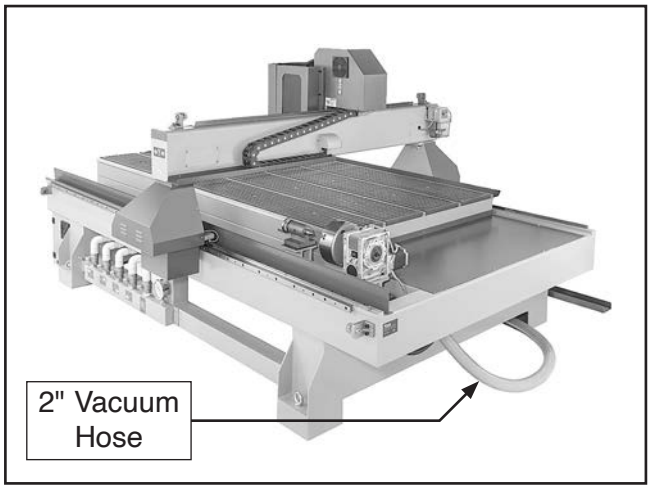


Figure 60. Example of vacuum hose location (under table).

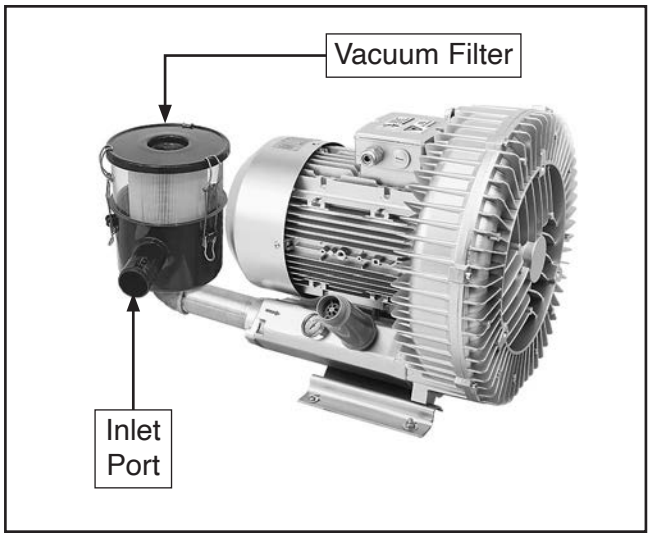


Figure 61. Vacuum filter inlet port location.

Power Connections

⚠WARNING

Electrocution or fire can occur if machine is ungrounded, incorrectly connected to power, or connected to an undersized circuit. Use an electrician or a qualified service personnel to ensure a safe power connection.

⚠WARNING

Connecting power supply wires to machine without first disconnecting power supply may result in serious injury or death.

Before the Model G0933 and vacuum pump can be connected to separate power sources, two electrical circuits must be made available that meet the minimum specifications given in **Circuit Requirements** on **Page 20**. If power circuits have not been prepared for the machine, do that now. To ensure a safe and code-compliant setup, we strongly recommend that all electrical work be done by an electrician or qualified service personnel.

Model G0933 Power Connection

Move the disconnect switch handle to the ON position, as illustrated below. The machine is now connected to the power source.

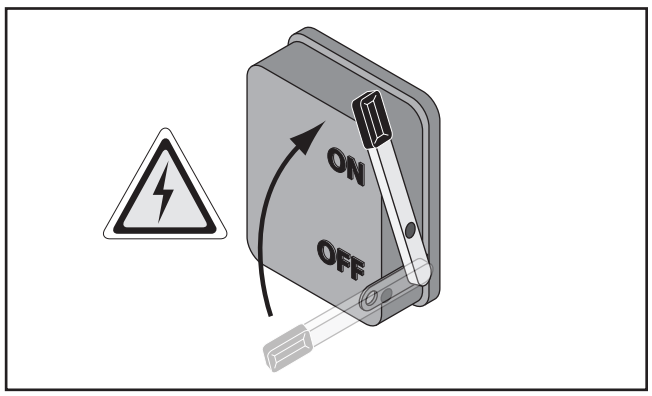


Figure 62. Connecting power to machine.

Move the disconnect switch handle to the OFF position, as illustrated below. The machine is now disconnected from the power source.

Note: *Lock the switch in the OFF position to restrict others from starting the machine.*

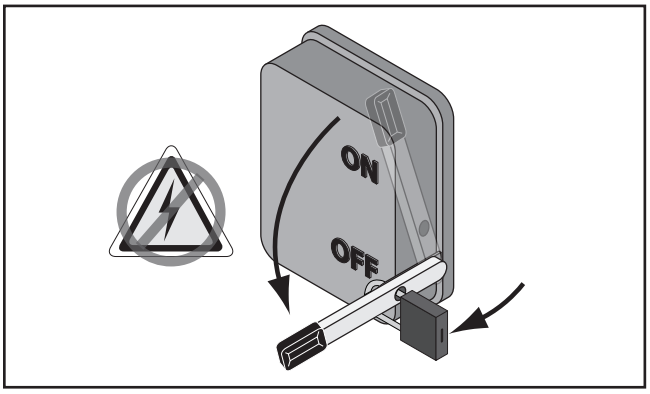


Figure 63. Disconnecting power from machine.

To connect incoming power wires:

1. DISCONNECT POWER SUPPLY WIRES OR LOCK DISCONNECT SWITCH BOX IN OFF POSITION!

2. Remove (4) acorn nuts securing transformer lid and open transformer.

3. Route incoming 220V power wires through enclosure pass-through and connect to 220V terminals on transformer (see **Figure 64**).

4. Connect outgoing 380V power wires to 380V terminals on transformer and route through enclosure pass-through (see **Figure 64**).

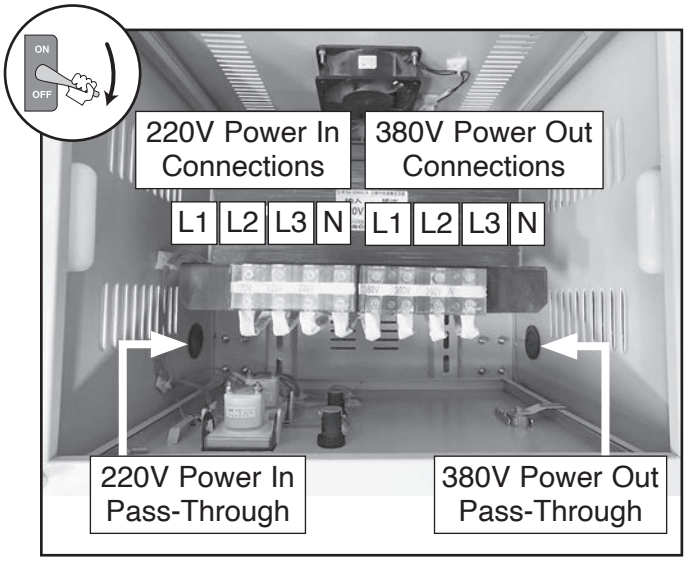


Figure 64. Example of transformer components.

5. Route 380V power wires through electrical cabinet pass-through and connect to 380V terminals on terminal block (see **Figure 65**).

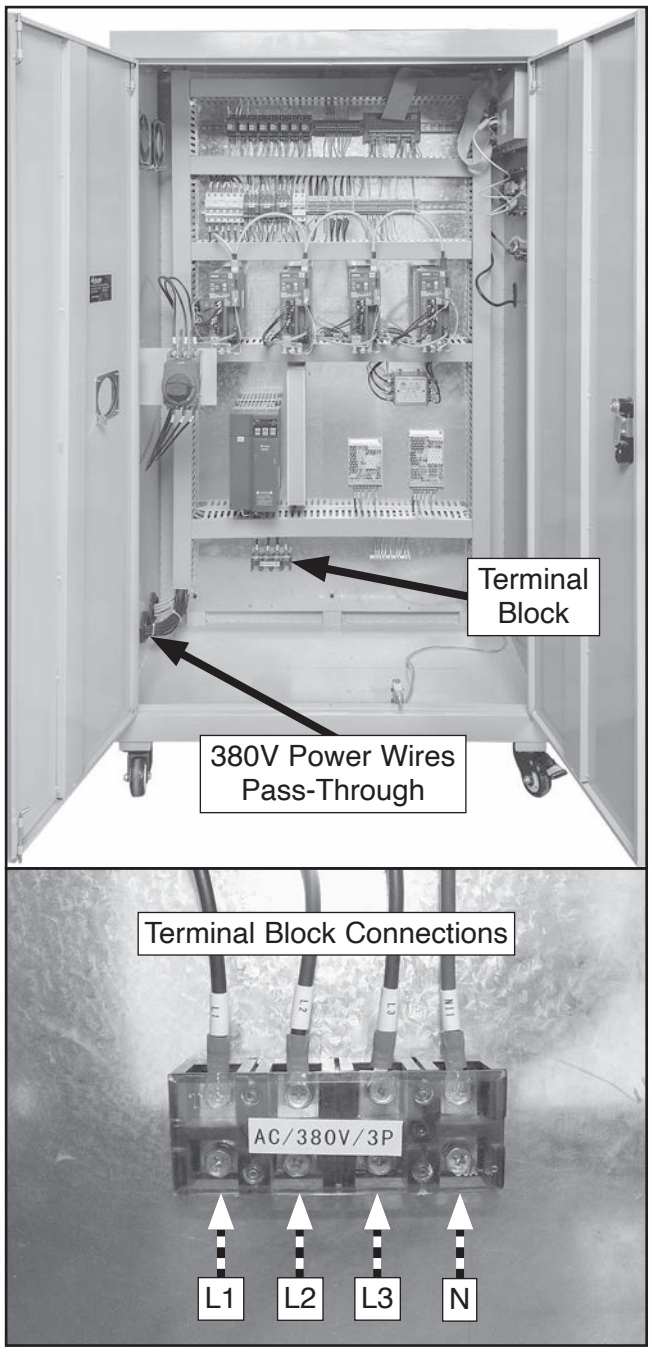


Figure 65. Example of electrical cabinet components location.

Vacuum Pump Power Connection

Move the disconnect switch handle to the ON position, as illustrated below. The machine is now connected to the power source.

NOTICE

DO NOT connect vacuum pump to power without verifying junction box terminal configuration (see Page 42). Operating vacuum pump in incorrect configuration can cause severe machine damage.

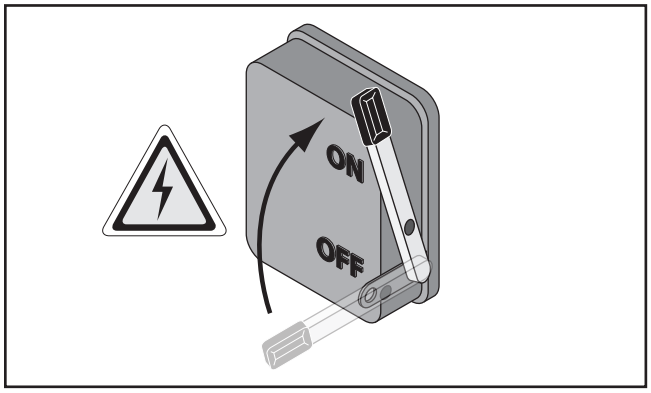


Figure 66. Connecting power to vacuum pump.

Move the disconnect switch handle to the OFF position, as illustrated below. The machine is now disconnected from the power source.

Note: *Lock the switch in the OFF position to restrict others from starting the machine.*

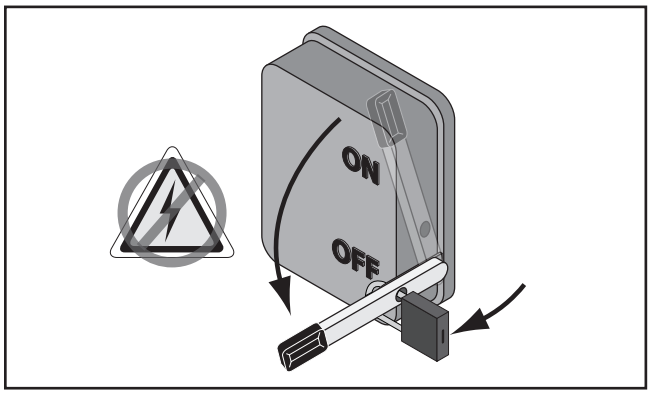


Figure 67. Disconnecting power from vacuum pump.

To connect vacuum pump power wires:

1. DISCONNECT POWER SUPPLY WIRES OR LOCK DISCONNECT SWITCH BOX IN OFF POSITION!

2. Open vacuum pump junction box (see **Figure 68**).

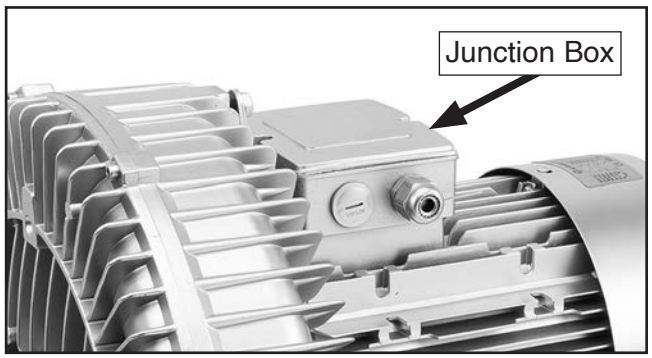


Figure 68. Vacuum pump junction box.

3. Verify terminal jumpers are arranged in 220V delta configuration (see **Figure 69**).

   IMPORTANT: Machines running on 220V power MUST be in delta configuration. Machines running on 380V power MUST be in wye configuration.

NOTICE

United States customers should ONLY use a 220V delta configuration for their vacuum pumps due to voltage availability in North America. Connecting a vacuum pump with a wye configuration to 220V power will damage the vacuum pump!

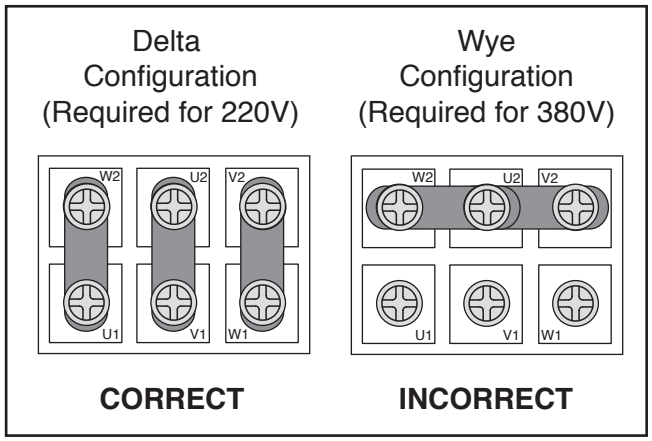


Figure 69. Vacuum pump junction box configurations.

4. Loosen strain relief on junction box, then insert incoming power wires into junction box.

⚠WARNING

During next step, make sure incoming ground wire is connected to correct terminal to ensure machine will be properly grounded (see "GND" in Figure 70). An ungrounded or improperly grounded machine can cause electrocution if live electrical wires make contact with frame or other parts touched by operator.

5. Connect incoming power wires to terminals, as shown in **Figure 70**.

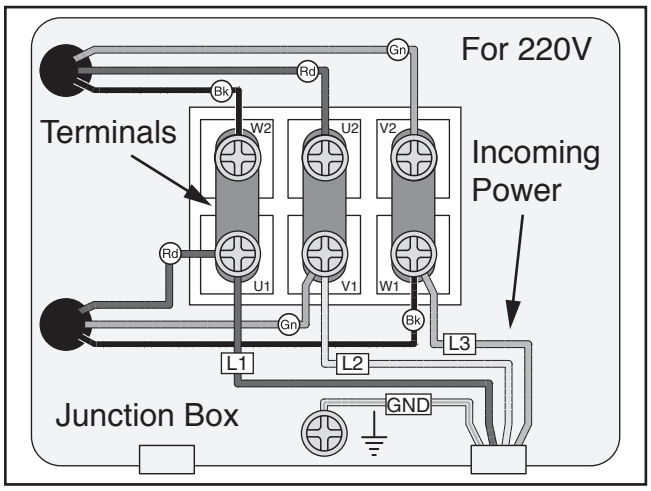


Figure 70. Vacuum pump junction box connection in delta configuration for 220V.

6. Tighten strain relief on junction box against conduit, then close cover. Leave some slack in wires inside box.

Test Run

Once assembly is complete, test run the machine to ensure it is properly connected to power and safety components are functioning correctly.

If you find an unusual problem during the test run, immediately stop the machine, disconnect it from power, and fix the problem BEFORE operating the machine again. The **Troubleshooting** table in the **SERVICE** section of this manual can help.

The test run consists of verifying the following: 1) the EMERGENCY STOP buttons safety feature functions properly, 2) the servo motors for each axis (X, Y, Z, and B) run correctly, 3) the spindle motor powers up and runs correctly, 4) the vacuum pump phase polarity is correct, 5) the referencing function operates correctly to synchronize all axes.

⚠WARNING

Serious injury or death can result from using this machine BEFORE understanding its controls and related safety information. DO NOT operate, or allow others to operate, machine until the information is understood.

⚠WARNING

DO NOT start machine until all preceding setup instructions have been performed. Operating an improperly set up machine may result in malfunction or unexpected results that can lead to serious injury, death, or machine/property damage.

NOTICE

DO NOT change operating units of the Sinumerik 808D Control System from metric to standard without first consulting Grizzly Tech Support. Changes to these units may traverse machine components beyond set ranges and severely damage machine.

Main Power Controls

This procedure verifies operation of the main power controls on the electrical cabinet.

To test main power controls:

1. Clear all setup tools away from machine.
2. Connect air to pneumatic system as instructed in **Pneumatic System** on **Page 36**.
3. Connect machine to power as instructed in **Power Connections** on **Page 40**.
4. Turn main power switch to ON position (see **Figure 71**).

Figure 71. Main power switch turned to ON position.

5. Press ON button on electrical cabinet to turn machine ***ON*** (see **Figure 72**).

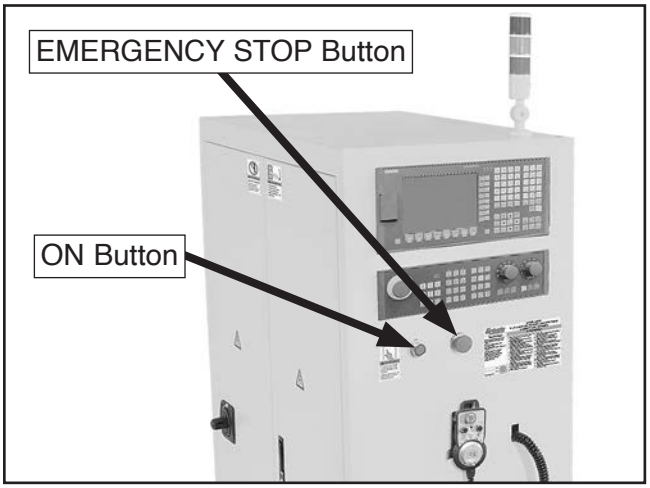


Figure 72. Location of power controls on electrical cabinet.

6. Verify Panel Processing Unit (PPU) begins boot sequence. During this boot time, observe and verify all key pads are illuminating.

   — After approximately 30 seconds, key pads will stop flashing and display will show machining screen (see **Figure 73**).

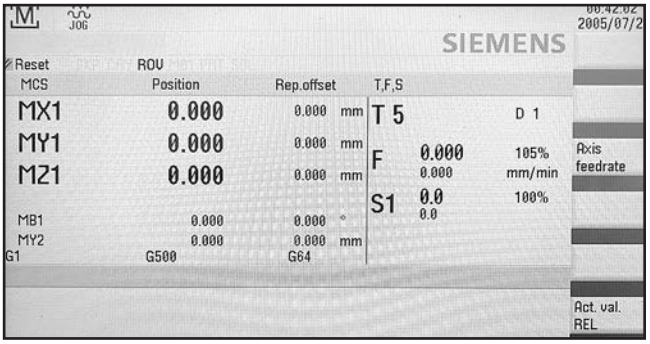


Figure 73. PPU machining screen.

7. Press EMERGENCY STOP button on electrical cabinet to turn machine ***OFF***.

   — If machine turns ***OFF***, safety feature of EMERGENCY STOP button is working properly.

   — If machine stays ***ON***, immediately disconnect it from power supply. Safety feature of EMERGENCY STOP button is NOT working properly and must be replaced before further using machine.

8. Twist EMERGENCY STOP button clockwise until it springs out (see **Figure 74**). This resets button so machine can start.

Figure 74. Resetting EMERGENCY STOP button.

9. Proceed to **Electrical Cabinet Door Safety Switch**.

Electrical Cabinet Door Safety Switch

This procedure verifies operation of the electrical cabinet door safety feature for the electrical cabinet (see **Figure 75**).

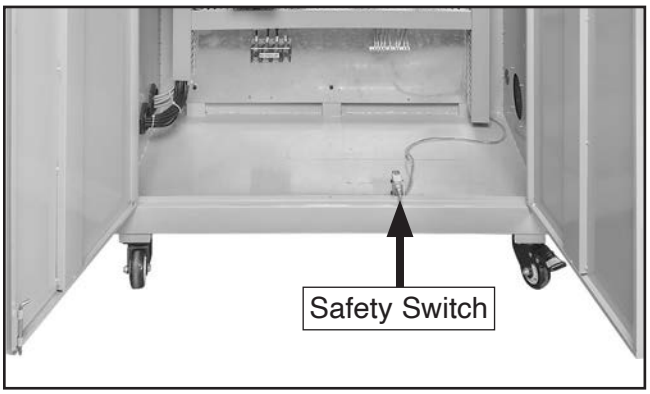


Figure 75. Electrical cabinet door safety switch location.

To test electrical cabinet door safety switch:

1. If opened, close and secure both electrical cabinet doors.

2. Push ON button to turn machine ***ON*** and wait for boot sequence to finish.

3. Open right electrical cabinet door to turn machine ***OFF***.

4. WITHOUT closing electrical cabinet door, try to start machine by pressing ON button. The machine should not start.

   — If the machine *does not* start, the safety feature of the electrical cabinet door safety switch is working properly.

   — If the machine *does* start, immediately turn it ***OFF*** and disconnect power. The safety feature of the electrical cabinet door safety switch is NOT working properly and must be replaced before further using machine.

5. Close right electrical cabinet door and secure, then proceed to **Reference Point Test** on **Page 45**.

Reference Point Test

This procedure verifies the physical X-, Y-, Z- and B-axes of machine home with the control system.

IMPORTANT: This procedure is *always* required before starting machine operations.

To test reference point:

1. Press ON button on electrical cabinet to turn machine ***ON***.

2. Verify Panel Processing Unit (PPU) begins boot sequence. After approximately 30 seconds, key pads will stop flashing and display will show machining screen.

   — On MCP, REF POINT and ROV lights will illuminate, and tool number display will show "01" (see **Figure 76**).

   Note: *If REF POINT or ROV lights above keys are not illuminated, press associated key to turn light* ***ON****.*

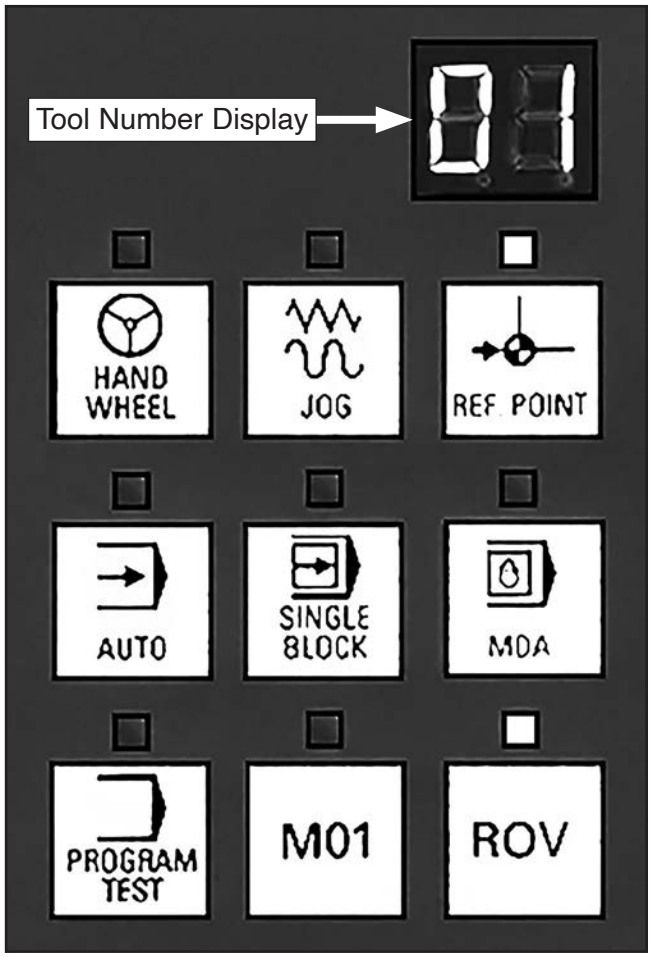


Figure 76. MCP operating mode area.

3. On MCP axis traversing keypad, press and release left X-axis traverse key, as shown in **Figure 77**.

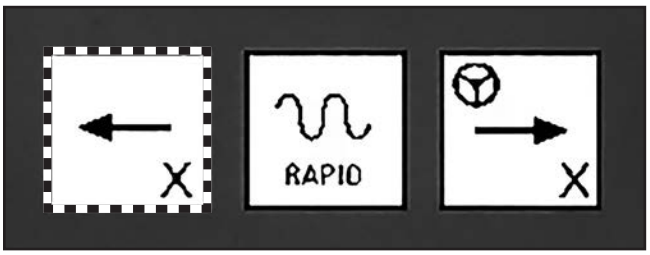


Figure 77. X-axis traverse keys.

   — PPU displays open circle symbol (○) next to "MX1" as X-axis traverses towards machine zero. Open circle symbol changes to pinwheel symbol (◒) once reference point is established (see **Figure 78**).

   Note: *Pinwheel symbol* (◒) *indicates axis homing is successful.*

Figure 78. Application area indicating X-axis homed successfully.

4. Press and release down-left Y-axis traverse key (see **Figure 79**).

   — PPU displays open circle symbol (○) next to "MY1" as Y-axis traverses towards machine zero. Open circle symbol changes to pinwheel symbol (◒) once reference point is established.

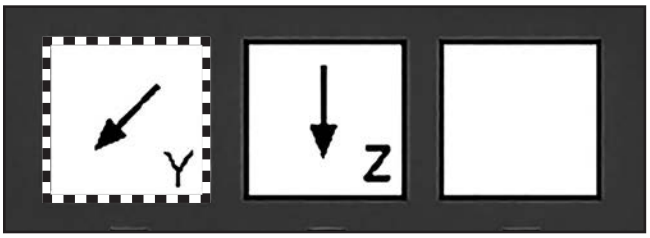


Figure 79. Down-left Y-axis traverse key.

5. Press and release up Z-axis traverse key (see **Figure 80**).

   — PPU displays open circle symbol (○) next to "MZ1" as Z-axis traverses towards machine zero. Open circle symbol changes to pinwheel symbol (◒) once reference point is established.

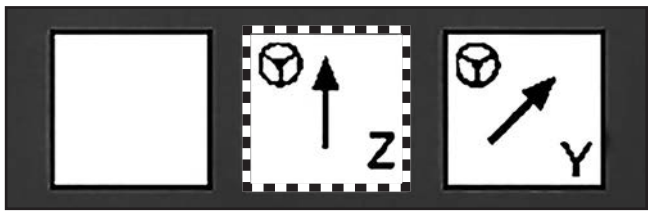


Figure 80. Up-arrow Z traverse key .

6. Press and release upper-left B-axis traverse key (see **Figure 81**).

   — PPU displays open circle symbol (○) next to "MB1" as B-axis traverses towards machine zero. Open circle symbol changes to pinwheel symbol (◒) once reference point is established.

Figure 81. Upper-left B traverse key .

7. Verify PPU application area displays pinwheel symbols (◒) shown adjacent to MX1, MY1, MZ1, MB1, and MY2, and reference point values show "0.000" for each axis (see **Figure 82**).

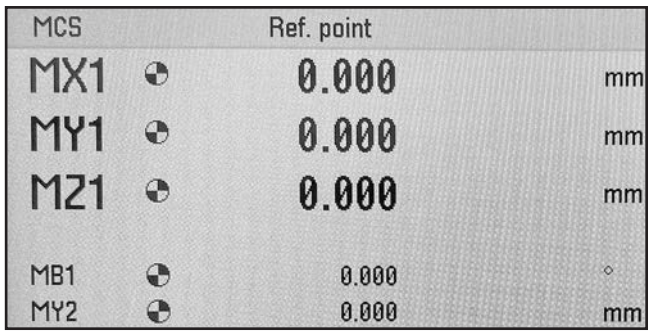


Figure 82. Application area axis identifiers.

8. Proceed to **EMERGENCY STOP Button (MCP)**.

EMERGENCY STOP Button (MCP)

This procedure verifies operation of the EMERGENCY STOP button safety feature on the Machine Control Panel (MCP).

To test EMERGENCY STOP button (MCP):

1. Press EMERGENCY STOP button on MCP (see **Figure 83**) to disable machine controls and display two alarms (003000, 700016) in PPU status area.

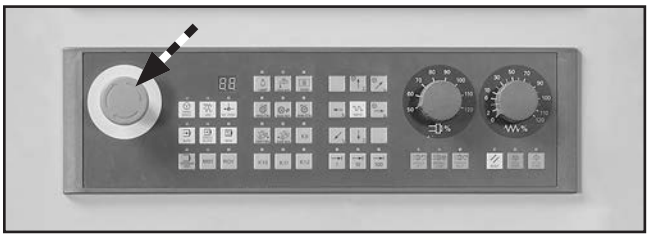


Figure 83. Location of MCP EMERGENCY STOP button.

2. WITHOUT resetting EMERGENCY STOP button, try to operate controls on MCP. Machine should not respond to control input.

   — If controls *are not* responding, safety feature of EMERGENCY STOP button is working properly.

   — If controls *are* responding, immediately turn machine ***OFF*** and disconnect power. Safety feature of EMERGENCY STOP button is NOT working properly and must be replaced before further using the machine.

3. Twist EMERGENCY STOP button on MCP clockwise until it springs out.

4. Press RESET key located in bottom right corner of MCP (see **Figure 84**) to extinguish PPU status area alarms.

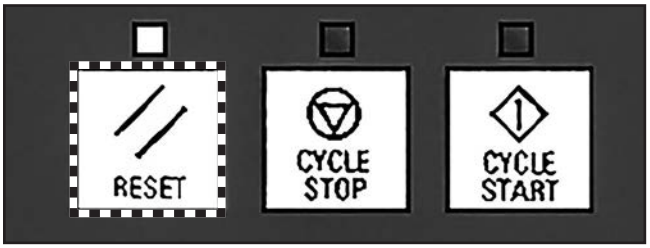


Figure 84. RESET key location.

5. Proceed to **Spindle Travel Test (Z-Axis)** on **Page 47**.

Spindle Travel Test (Z-Axis)

This procedure verifies full spindle movement along the Z-axis.

To test spindle travel:

1. Press JOG key; LED will illuminate indicating that machine is in JOG mode, as shown in **Figure 85**.

   Note: *Tool number display will show a numerical value indicating which tool is currently loaded in spindle.*

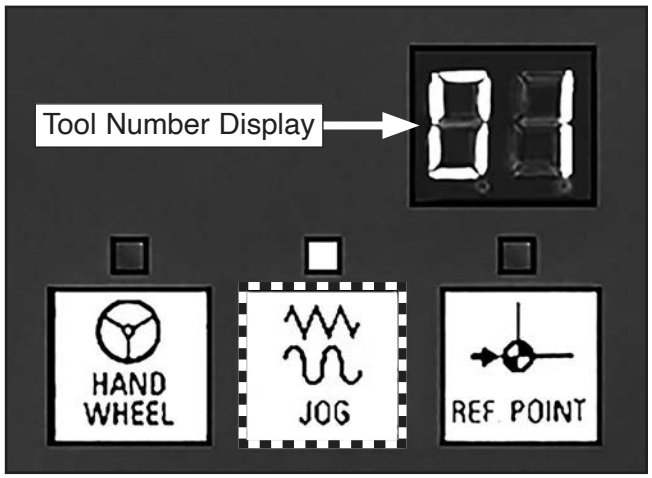


Figure 85. JOG mode key activated.

   — PPU display returns to machining screen (see **Figure 86**).

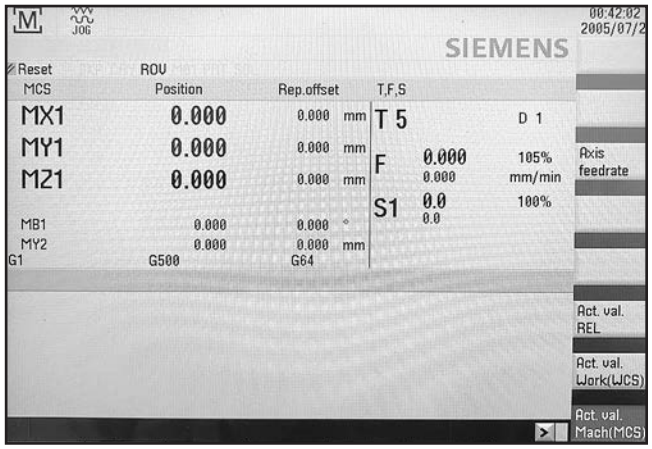


Figure 86. PPU machining screen.

2. Turn feedrate override switch on MCP to 100 (see **Figure 87**).

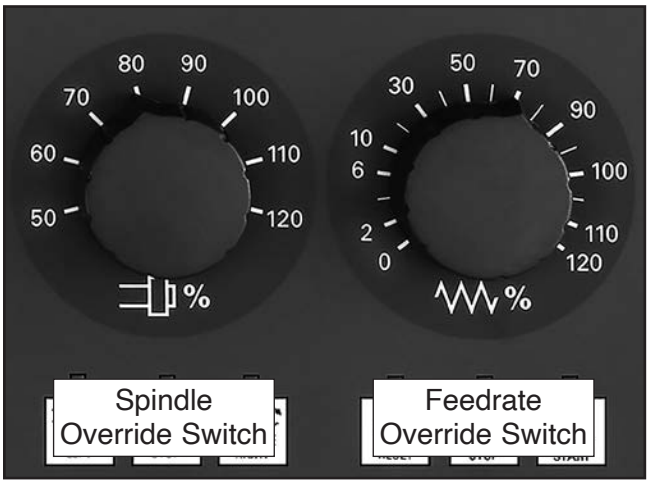


Figure 87. MCP override switches.

3. Press and hold down Z-axis traverse key until spindle reaches lowest point of travel and activates soft limit (see **Figure 88**).

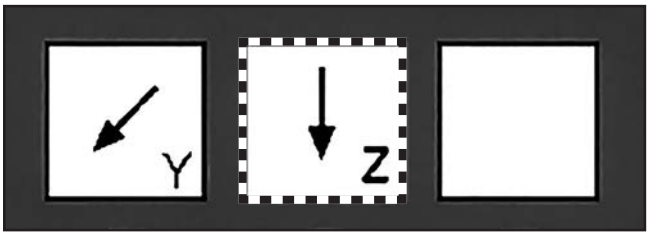


Figure 88. Down Z-axis traverse key.

   — At lowest point of travel, soft limit will activate and alarm "010621" will appear in PPU status area.

4. Press RESET key (see **Figure 89**) to extinguish PPU status area alarms.

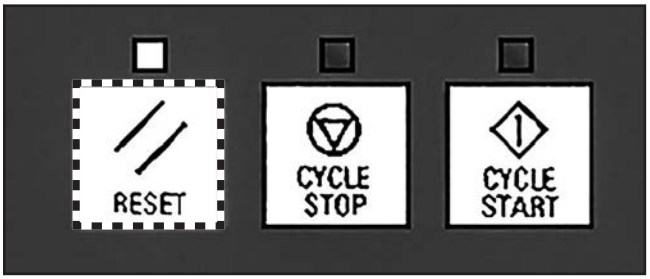


Figure 89. RESET key on MCP.

5. Press and hold up Z-axis traverse key until spindle reaches highest point of travel and activates soft limit (see **Figure 90**).

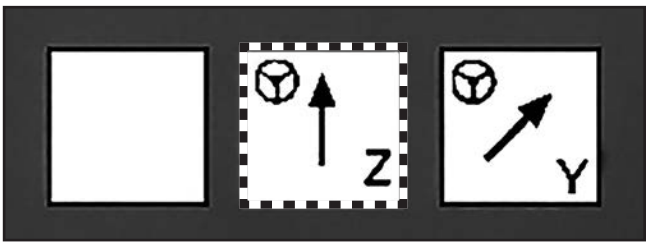


Figure 90. Up Z-axis traverse key.

— At highest point of travel, soft limit will activate and alarm "010621" will appear in PPU status area.

6. Press RESET key to clear alarm.

7. Proceed to **Spindle Rotation Test**.

Spindle Rotation Test

This procedure verifies full spindle rotation clockwise and counterclockwise.

Note: *Spindle override switch increments shown in **Figure 91** are percentages, and the S1 RPM value shown in **Figure 92** is the measured speed of the spindle.*

To test spindle rotation:

1. Turn spindle override switch to 100, then press SPINDLE RIGHT key (see **Figure 91**).

— SPINDLE RIGHT light will illuminate and spindle will rotate clockwise.

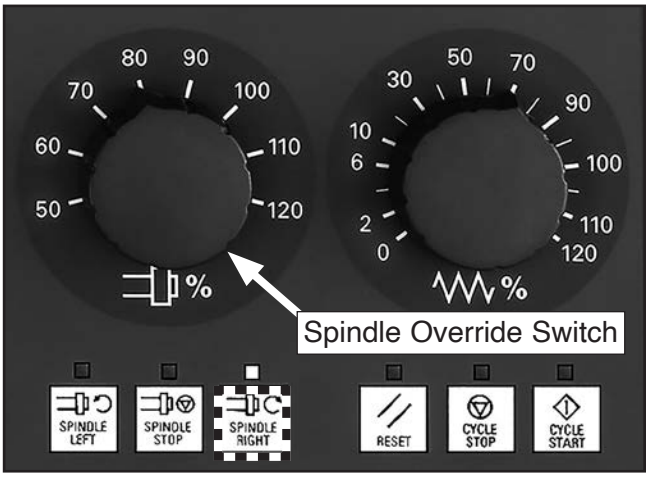


Figure 91. MCP override switches and keys.

2. Turn spindle override switch through full speed range. Verify S1 RPM value shown in PPU application area varies with spindle override switch setting (see **Figure 92**).

— PPU displays spindle speeds between 0–24,000 RPM depending on position of spindle override switch.

Note: *A red, clockwise arrow will appear below S1 indicating clockwise rotation.*

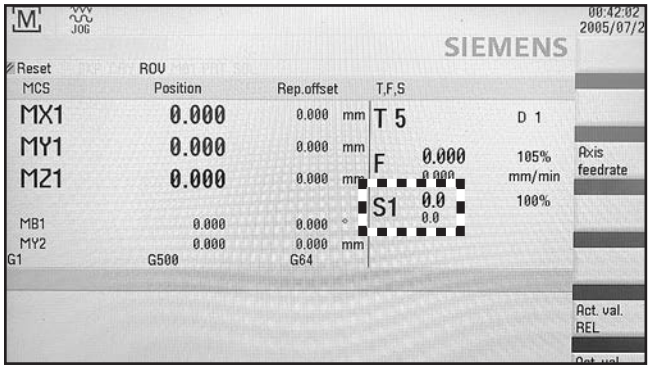


Figure 92. PPU application area displaying S1 spindle speed.

3. Press SPINDLE STOP key (see **Figure 93**).

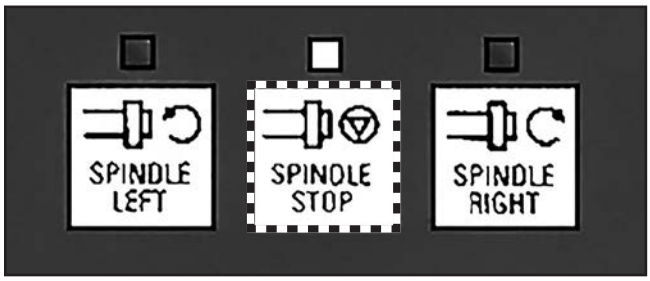


Figure 93. Spindle control keys on MCP.

4. Turn spindle override switch to 100, then press SPINDLE LEFT key.

— SPINDLE LEFT light will illuminate and spindle will rotate counterclockwise.

5. Turn spindle override switch through full speed range. Verify S1 RPM value shown in PPU application area varies with spindle override switch setting.

   — PPU displays spindle speeds between 0–24,000 RPM depending on position of spindle override switch.

   Note: *A red, counterclockwise arrow will appear below S1 indicating counterclockwise rotation.*

6. Press SPINDLE STOP key.

7. Proceed to **Handwheel Test**.

Handwheel Test

This procedure verifies operation of the Emergency Stop button safety feature on the handwheel, and that the axis movement and spindle rotation controls function correctly.

IMPORTANT: If soft limits are triggered and alarm "010621" is displayed in PPU status area, press the RESET key to restore functionality.

To test handwheel:

1. On MCP, press HANDWHEEL key, as shown in **Figure 94**.

   — Status light on handwheel will illuminate (see **Figure 95**).

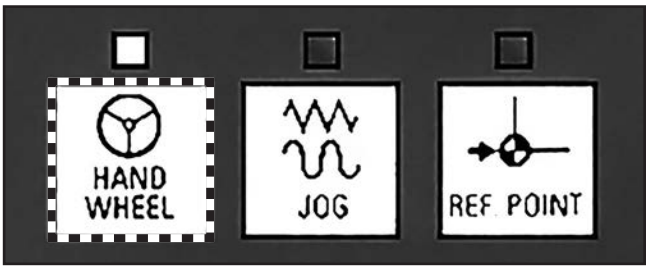


Figure 94. Handwheel key on MCP.

2. On handwheel, twist Emergency Stop button clockwise until it springs out (see **Figure 95**).

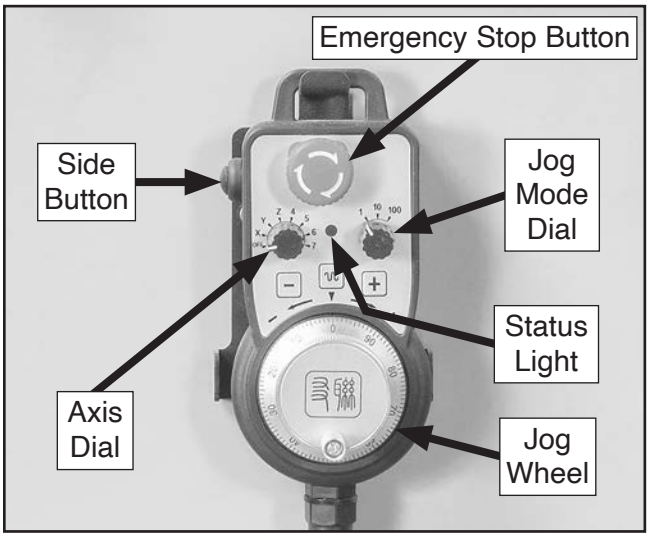


Figure 95. Handwheel controls overview.

3. Press RESET key on MCP to clear any status area alarms.

4. Turn axis dial to X, and jog mode dial to x100 to test X-axis movement (see **Figure 95**).

5. Press and hold side button, then rotate jog wheel clockwise, and again in counterclockwise direction.

   — PPU status area will display alarm 700010.

   — X-axis moves in positive direction (right) with clockwise rotation of jog wheel, and in negative (left) direction with counterclockwise rotation.

   Note: *Clockwise rotation moves axis in positive direction, and counterclockwise moves axis in negative direction.*

6. Repeat **Step 5** with jog mode dial set to x1 and x10, then proceed to **Step 7**.

7. Turn axis dial to Y, and jog mode dial to x100 to test Y-axis movement (see **Figure 95**).

8. Press and hold side button, then rotate jog wheel clockwise, and again in counterclockwise direction.

   — PPU status area will display alarm 700010.

   — Y-axis moves in positive direction (rear) with clockwise rotation of jog wheel, and in negative direction (front) with counterclockwise rotation.

9. Repeat **Step 8** with jog mode dial set to x1 and x10, then proceed to **Step 10**.

10. Turn axis dial to Z, and jog mode dial to x100 to test Z-axis movement.

11. Press and hold side button, then rotate jog wheel clockwise, and again in counterclockwise direction.

    — PPU status area will display 700010.

    — Z-axis moves in positive direction (up) with clockwise rotation of jog wheel, and in negative direction (down) with counterclockwise rotation.

12. Repeat **Step 11** with jog mode dial set to x1 and x10, then proceed to **Step 13**.

13. On handwheel, press Emergency Stop button to disable machine controls and display two alarms (003000, 700016) in PPU status area.

14. WITHOUT resetting Emergency Stop button, try to operate controls on handwheel. Machine should not respond to control input.

    — If controls *are not* responding, safety feature of handwheel Emergency Stop button is working properly.

    — If controls *are* responding, immediately turn machine ***OFF*** and disconnect power. Safety feature of the handwheel Emergency Stop button is NOT working properly and must be replaced before further using the machine.

15. On handwheel, twist Emergency Stop button clockwise until it springs out, press RESET key on MCP, then proceed to **EMERGENCY STOP Buttons (Gantry)**.

EMERGENCY STOP Buttons (Gantry)

This procedure verifies operation of the EMERGENCY STOP buttons safety feature on the gantry.

To test EMERGENCY STOP buttons (gantry):

1. On gantry, twist both EMERGENCY STOP buttons clockwise until they spring out (see **Figure 96**).

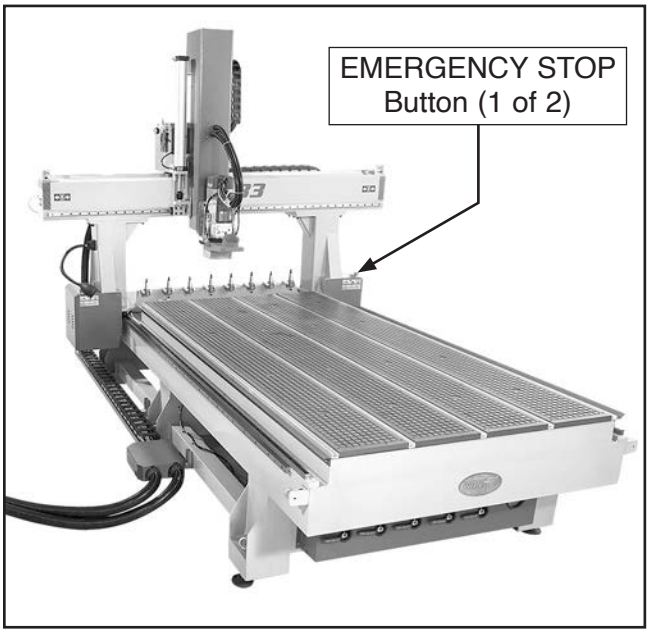


Figure 96. Gantry EMERGENCY STOP buttons location.

2. On MCP, press JOG key (see **Figure 97**).

    — PPU display returns to machining screen.

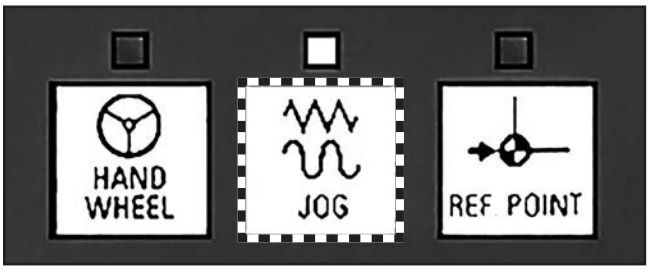


Figure 97. Jog key on MCP.

3. On gantry, press left or right EMERGENCY STOP button to disable machine controls and display two alarms (003000, 700016) in PPU status area.

4. WITHOUT resetting EMERGENCY STOP button, try to operate controls on MCP. Machine should not respond to control input.

   — If controls *are not* responding, safety feature of gantry EMERGENCY STOP button is working properly.

   — If controls *are* responding, immediately turn machine ***OFF*** and disconnect power. Safety feature of the gantry EMERGENCY STOP button is NOT working properly and must be replaced before further using the machine.

5. On gantry, twist EMERGENCY STOP button activated in **Step 3** clockwise until it springs out.

6. Press RESET key located in bottom right corner of MCP (see **Figure 98**) to extinguish PPU status area alarms.

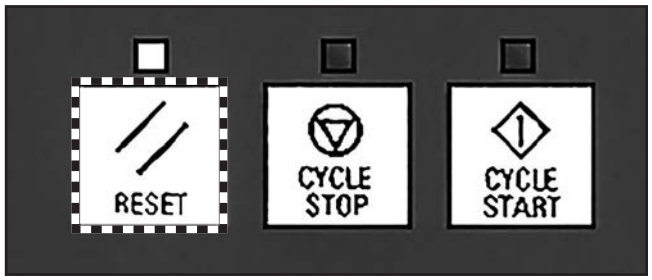


Figure 98. RESET key location.

7. Repeat **Steps 3–6** on opposite gantry EMERGENCY STOP button.

8. Proceed to **Vacuum Pump Test**.

Vacuum Pump Test

This procedure verifies operation of the vacuum pump on the Model G0933.

To test vacuum pump:

1. Connect vacuum pump to power as instructed in **Power Connections** on **Page 40**.

   IMPORTANT: Vacuum pump junction box must be in correct configuration before connecting vacuum pump to power.

2. Turn vacuum pump ***ON*** and verify vacuum pump is pulling air through filter in correct direction (air should be blowing from outlet port near base of vacuum pump).

   — If air *is not* moving in correct direction, stop vacuum pump and DISCONNECT FROM POWER! Phase of incoming power supply is reversed. Remove vacuum pump junction box cover and swap incoming power wires at U1 and V1 terminals, as shown in **Figure 99**, then re-install junction box cover and reconnect vacuum pump to power. Repeat **Step 2**.

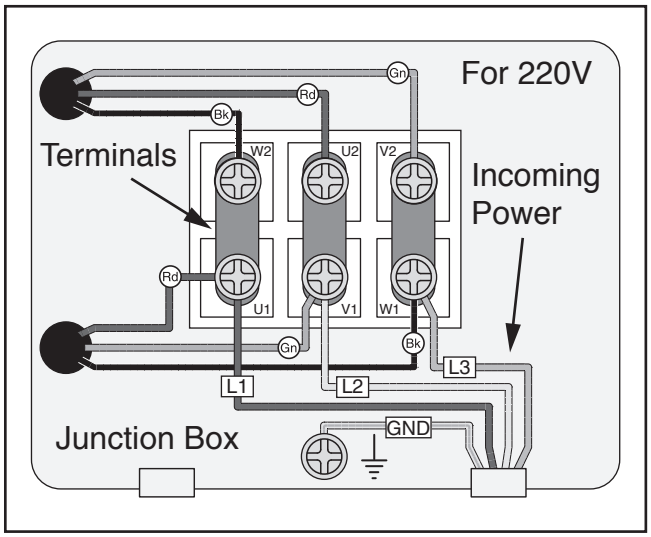


Figure 99. Vacuum pump junction box connection in delta configuration for 220V.

   — If air *is* moving in correct direction, stop vacuum pump and proceed to **Step 3**.

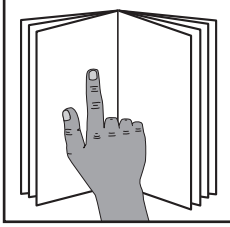
3. Congratulations! Test Run is complete.

SECTION 4: OPERATIONS

Operation Overview

The purpose of this overview is to provide the novice machine operator with a basic understanding of how the machine is used during operation, so the machine controls/components discussed later in this manual are easier to understand.

Due to the generic nature of this overview, it is **not** intended to be an instructional guide. To learn more about specific operations, read this entire manual, seek additional training from experienced machine operators, and do additional research outside of this manual by reading "how-to" books, trade magazines, or websites.



⚠WARNING

To reduce your risk of serious injury, read this entire manual BEFORE using machine.

⚠WARNING

Eye injuries, respiratory problems, or hearing loss can occur while operating this tool. Wear personal protective equipment to reduce your risk from these hazards.

NOTICE

If you are not experienced with this type of machine, WE STRONGLY RECOMMEND that you seek additional training outside of this manual. Read books/magazines or get formal training before beginning any projects. Regardless of the content in this section, Grizzly Industrial will not be held liable for accidents caused by lack of training.

To complete a typical operation, the operator does the following:

1. Designs/writes program that defines toolpath.
2. Uploads part program to USB drive, or directly to control system once power is applied.
3. Examines workpiece to make sure it is suitable for processing.
4. Installs appropriate tool for type of material and operation.
5. If necessary, cuts workpiece with table saw or other machine to fit within working envelope of this machine.
6. Secures workpiece to table. If using vacuum table, turns vacuum pump ***ON***.
7. Turns machine ***ON***.
8. Sets machine reference point and homes all axes (see **Page 60**).
9. Connects USB drive or ethernet cable to control system.
10. Sets work origin. Uses tool probe to measure tool and set Z-axis relative to workpiece or table, depending on toolpath requirements.
11. Connects dust shoe and dust collection system to spindle.
12. Puts on safety glasses, respirator, and hearing protection.
13. Turns dust collection system ***ON.***
14. Runs program. Spindle will automatically start and follow toolpath.
15. When toolpath is complete, spindle will stop and return to position defined by program.
16. Turns machine ***OFF***, then turns dust collection system ***OFF***.

Workpiece Inspection

⚠WARNING

Like all machinery there is potential danger when operating this machine. Accidents are frequently caused by lack of familiarity or failure to pay attention. Use this machine with respect and caution to decrease the risk of operator injury. If normal safety precautions are overlooked or ignored, serious personal injury may occur.

⚠CAUTION

No list of safety guidelines can be complete. Every shop environment is different. Always consider safety first, as it applies to your individual working conditions. Use this and other machinery with caution and respect. Failure to do so could result in serious personal injury, damage to equipment, or poor work results.

Some workpieces are not safe to cut or may first require modification. **Before cutting, inspect all workpieces for the following:**

- ***Material Type:*** This machine is only intended for cutting natural and man-made wood products, laminated wood products, and plastics. Cutting drywall or cementitious backer board creates extremely fine dust and may reduce the life of the bearings. This machine is NOT designed to cut metal, glass, stone, tile, etc.; cutting these materials with this machine may lead to injury or damage.
- ***Foreign Objects:*** Nails, staples, dirt, rocks, tramp metal, and other foreign objects are often embedded in wood. While cutting, these objects can become dislodged, break the tool, or cause workpiece kickback—all of which could fly out and strike the operator or bystanders. Always visually inspect workpiece carefully before cutting it. If foreign objects can not be removed, DO NOT cut the workpiece.
- ***Large/Loose Knots:*** Loose knots can become dislodged during cutting operation. Large knots can cause tool or machine damage. Only use workpieces that do not have large/loose knots or plan ahead to avoid cutting through them.
- ***Wet or "Green" Stock:*** Cutting wood with a moisture content over 20% causes unnecessary wear on tooling and yields poor results.
- ***Excessive Warping:*** Workpieces with excessive cupping, bowing, or twisting are dangerous to cut because they are unstable and can come loose or move unexpectedly when being cut. DO NOT cut workpieces with excessive warping!
- ***Minor Warping:*** Workpieces with slight cupping can be safely supported if cupped side is facing table and workpiece is firmly clamped to table. On the contrary, a workpiece with bowed side facing table will rock during a cut and could cause severe injury.

Choosing Tooling

There are many types of tooling available that can be used for a variety of different processes (see **Figure 100**). Be sure to choose the right one for your application and material. Read all manufacturer instructions before installing and using tools.

Figure 100. T32918 8-Pc. ½" General Purpose CNC Router Bit Collection

When choosing a tool, consider:

1. ***Material Type:*** Most tools are designed for specific material. Choose a unique bit for plywood, engineered wood products, hardwood, and composite woods to improve overall results. If a general-purpose bit is needed, a two-flute, upcut, spiral bit is a good choice.

2. ***Application:*** Many design features are best cut using specific tools. For example:

   — Use a V-bit for cutting signs and lettering.

   — Use a spoilboard cutter or fly cutter for surfacing a spoilboard or finishing a smooth, flat workpiece, such as a counter top.

   — Use a form bit to cut a profile with a uniform contour, such as an ogee or round over.

   — Use a chipbreaker or rougher for rough cuts and quickly removing a large amount of material when the finish does not matter.

3. ***Feed and Speed Rates:*** Feed rate, spindle speed, and number of flutes on the tool determine chip load. The chip load affects the best diameter bit to use to get the highest quality finish while minimizing wear. Most manufacturers will list the recommended chip load for their tooling.

4. ***Depth and Width of Cut:*** The tool must be long enough to reach the maximum plunge depth of the operation, and small enough to cut the details of the piece. However, shorter, wider bits will deflect less, leading to more accurate cuts, and they are less prone to wear and breakage.

5. ***Finish:*** If a high-quality finish is a priority, use a tool with more flutes. Four-flute tools work well for this in most cases. Do not forget that number of flutes is a component of calculating chip load.

6. ***Chip Displacement:*** Up-cut bits keep the workpiece clear of chips, but on composite materials the upward force of operation will chip and fray the top surface of workpiece. Down-cut bits leave a smooth finish on the top of the workpiece, but pressing chips down creates more heat during the cut, and frays the bottom of the workpiece on through-cuts. Compression bits are fluted to cut up on the bottom, and down on the top, compressing the workpiece during a cutting operation. Compression bits are ideal for cutting materials like plywood and other composites.

Installing/Removing Tooling

⚠CAUTION

Cutting bits are sharp! To reduce the risk of injury, wear leather gloves when handling, installing, and removing tooling from spindle.

The Model G0933 spindle supports ISO30-ER32-50 straight-style tool holders which hold an ER32 collet. Tooling can be installed in each tool holder and then indexed in the 8-position linear tool magazine for automated tool changes through a part program.

Items Needed	Qty
ER32 Collet Wrench	1
Open-End Wrench 30mm	1
Heavy Leather Gloves	1 Pr.

Installing Tool In Holder

1. Loosen and remove collet nut on tool holder, then insert collet (see **Figure 101**).

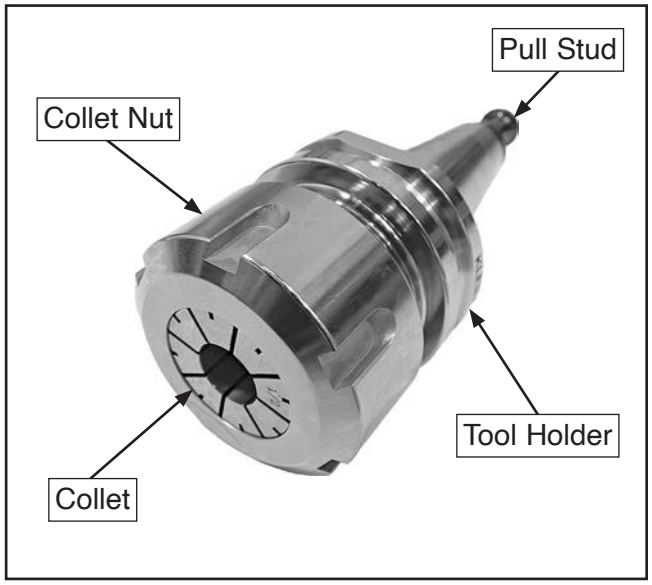


Figure 101. Tool holder components.

Note: *The Model G0933 includes an ER32 tightening fixture on the right gantry column that can be used to loosen or tighten collet nut on tool holder, as shown in* ***Figure 102****.*

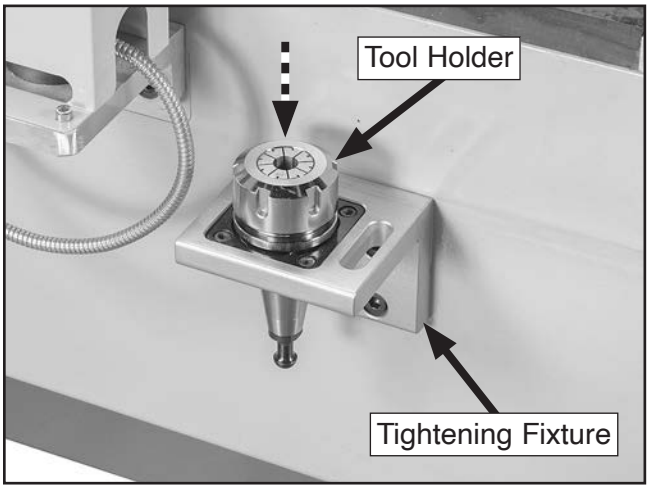


Figure 102. Example of tool holder set in tightening fixture.

2. Insert tool into collet and verify entire length of tool shaft will be secured by collet springs.

3. Install collet nut and secure.

Installing Tool Holder in Spindle

1. Turn machine ***ON*** and allow control system to finish boot sequence.

2. Press CHIP FWD key on MCP to raise dust shoe (see **Figure 103**).

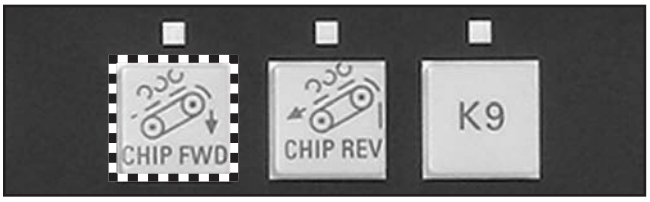


Figure 103. CHIP FWD key on MCP.

3. Insert tool holder into spindle and maintain upward pressure on tool holder to prevent it from lowering.

4. Press green tool change button on front of spindle to secure tool holder (see **Figure 104**).

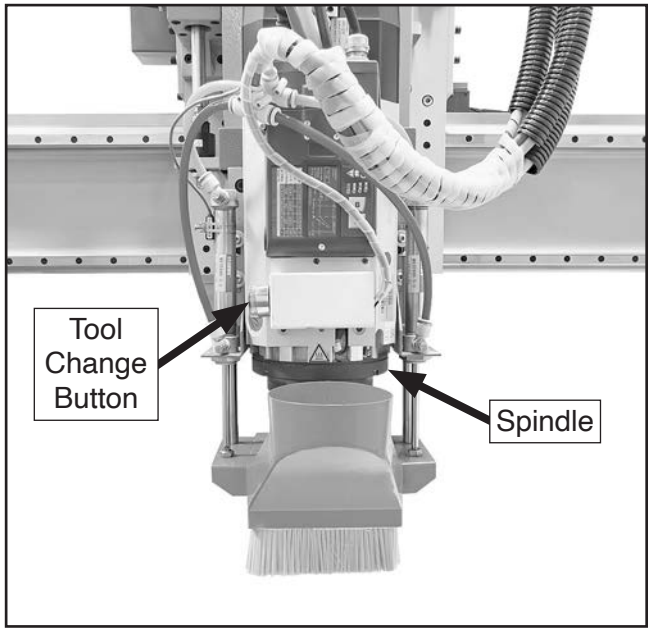


Figure 104. Tool change button location.

Removing Tool Holder from Spindle

1. Turn machine ***ON*** and allow control system to finish boot sequence.

2. Press CHIP FWD key on MCP to raise dust shoe.

3. Grasp tool holder to prevent it from dropping on table.

4. Press green tool change button on front of spindle to release tool holder (see **Figure 104**).

Installing Tool Holder in Clamp

1. DISCONNECT MACHINE FROM POWER!

2. Align clamp groove on tool holder with notches on tool holder clamp fingers, as shown in **Figure 105**.

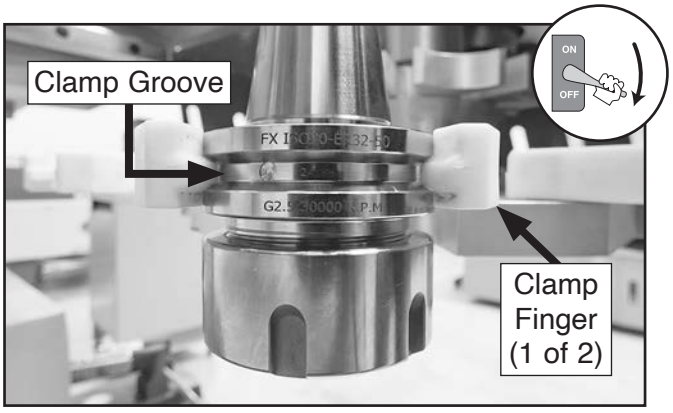


Figure 105. Aligning tool holder.

3. Insert tool holder into tool holder clamp (see **Figure 106**).

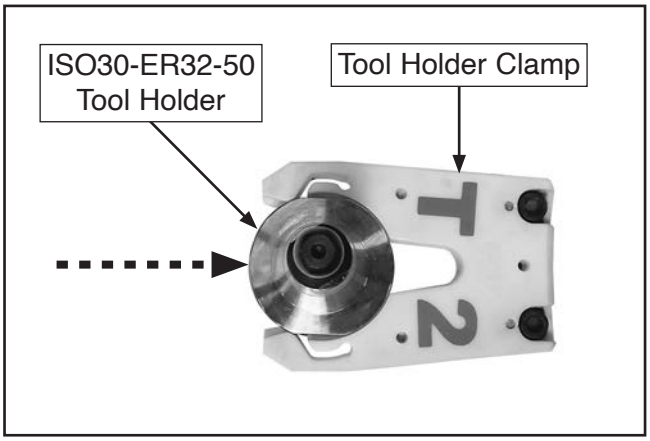


Figure 106. Tool holder in tool holder clamp.

Creating a Tool

The Sinumerik 808D control system supports up to 64 unique tools and 128 cutting edges, with a maximum of nine cutting edges per tool.

Before designing a part program, establish the required tooling in the control system for easier referencing during programming.

Creating Tooling

1. Turn machine ***ON*** and allow control system to finish boot sequence.

2. Press OFFSET key in lower-right PPU.

3. Press TOOL LIST soft key displayed on PPU.

4. Press NEW TOOL soft key.

5. Select tool type from displayed list by pressing associated soft key.

   — New tooling window will open automatically, and tool number can be entered at this time (see **Figure 107**).

Figure 107. New tool window.

6. Enter tool number and press OK soft key.

   — Tooling data window will open automatically, and tool data can be entered at this time (see **Figure 108**).

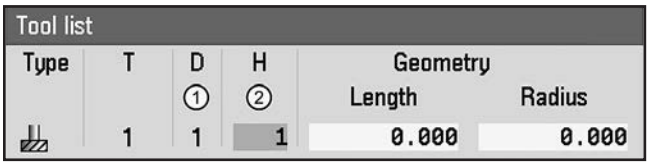


Figure 108. Tool data window.

7. Enter tool data and press INPUT key on PPU to confirm tool settings.

Creating Cutting Edge

1. Turn machine ***ON*** and allow control system to finish boot sequence.

2. Press OFFSET key in lower-right PPU.

3. Press TOOL LIST soft key displayed on PPU.

4. Highlight desired tool and press EDGES soft key displayed on PPU.

5. Press NEW EDGE soft key.

   — Tool list window will open automatically with a new cutting edge added. Cutting edge specifications can be entered at this time (see **Figure 109**).

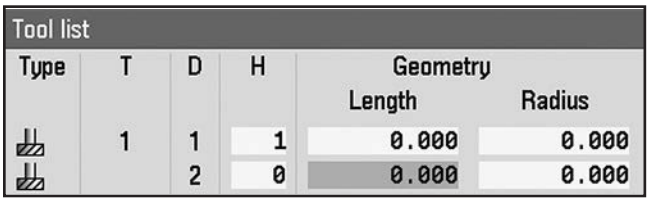


Figure 109. Tool list window.

Activating Tool & Spindle

IMPORTANT: Tools shown in the tool list are not active unless they have been activated in the T,S,M window, or in MDA mode.

To activate tool & spindle:

1. Turn machine ***ON*** and allow control system to finish boot sequence.

2. Press MACHINE key in lower-right PPU to enter machine operating area screen.

3. Press JOG key to enter JOG mode.

4. Press T,S,M soft key displayed on PPU.

   — T,S,M window will open automatically with fields for tool number, spindle speed, and miscellaneous functions (see **Figure 110**).

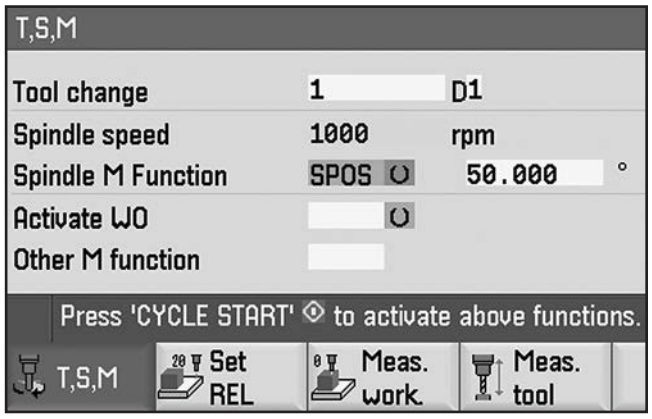


Figure 110. T,S,M window.

5. Use ▲ and ▼ cursor keys to cycle through T,S,M settings, then use alphanumeric keys followed by SELECT key to enter desired values.

6. Press CYCLE START to confirm settings and activate tool and spindle.

7. Press RESET to stop spindle rotation.

Changing Tools

The Model G0933 indexes eight individual tool holders in an 8-position linear tool magazine. Tool changes can be cycled manually, automatically, or written into a parts program.

The Sinumerik 808D control system supports T-word programming that can initiate tool changes within the G-code of a parts program.

IMPORTANT: Setting the machine reference point is *always* required before machine operations.

Manually Changing Tools

1. Set machine reference point (see **Setting Machine Reference Point** on **Page 60**).

2. Press MACHINE key in lower-right PPU to enter machine operating area screen.

3. Press JOG key to enter JOG mode (see **Figure 111**).

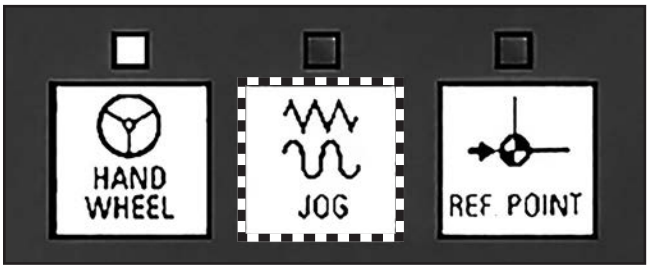


Figure 111. Jog key on MCP.

4. Press T,S,M soft key displayed on PPU.

   — T,S,M window will open automatically with fields for tool number, spindle speed, and miscellaneous functions.

5. Enter tool number in "Tool change" field (see **Figure 110**), then press CYCLE START to initiate tool change.

   — Spindle will traverse towards linear tool magazine, unload current tool, then install selected tool.

Automatically Changing Tools

1. Set machine reference point (see **Setting Machine Reference Point** on **Page 60**).

2. Press MACHINE key in lower-right PPU to enter machine operating area screen.

3. Press JOG key to enter JOG mode.

4. Press CHIP REV key on MCP, as shown in **Figure 112**.

   Note: *When CHIP REV key is selected, the tool will automatically traverse to the tool probe for measurement after tool change operation is completed.*

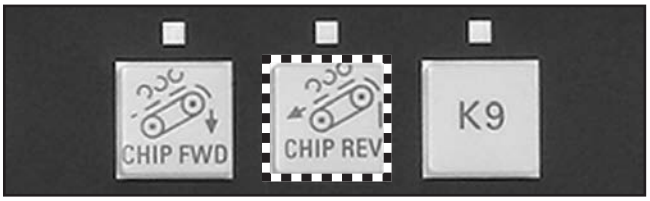


Figure 112. CHIP REV key on MCP.

5. Press T,S,M soft key displayed on PPU.

   — T,S,M window will open automatically with fields for tool number, spindle speed, and miscellaneous functions (see **Figure 110** on **Page 58**).

6. Enter tool number in "Tool change" field, then press CYCLE START to initiate tool change.

   — Spindle will traverse towards LTM, unload current tool, then install selected tool.

   — With CHIP REV key active, spindle will traverse towards tool probe and measure installed tool after tool change.

Programming Tool Change

1. Set machine reference point (see **Setting Machine Reference Point** on **Page 60**).

2. Perform **Steps 1–6** of **Creating a Part Program** on **Page 62**.

3. Within G-code, enter tool function code (letter "T" with associated tool number), and "M06" tool change command to initiate tool change on desired block. For example:

   — Entering "T2 M06" on block N10 will initiate a change to the second tool in LTM on part program start.

   — Entering "T5 M06" on block N80 will initiate a change to the fifth tool in LTM after blocks N10–N70 have been performed.

   — Entering "T0 M06" on block N100 will initiate a change to remove the installed tool from spindle after blocks N10–N90 have been performed.

   Note: *Spindle will remain empty after a "T0" instruction until a new tool is either manually installed or programmed in G-code.*

4. Proceed to **Part Program Simulation** on **Page 64** to simulate tool changes within the part program structure.

   IMPORTANT: Additional information for tool change programming can be found in the **SINUMERIK 808D User Manual** included with your machine.

Setting Machine Reference Point

Setting the machine reference point returns all four axes to "home" position or the machine-specific zero point. Home is oriented relative to the machine, and is defined by G-code in an established parts program.

IMPORTANT: Setting the machine reference point is *always* required before machine operations can be started.

To set machine reference point:

1. Turn machine ***ON*** and allow control system to finish boot sequence.

   — After approximately 30 seconds, key pads will stop flashing and display will show machining screen.

   — On MCP, REF POINT and ROV lights will illuminate (see **Figure 113**).

   Note: *If REF POINT or ROV lights above keys are not illuminated, press associated key to turn light* ***ON****.*

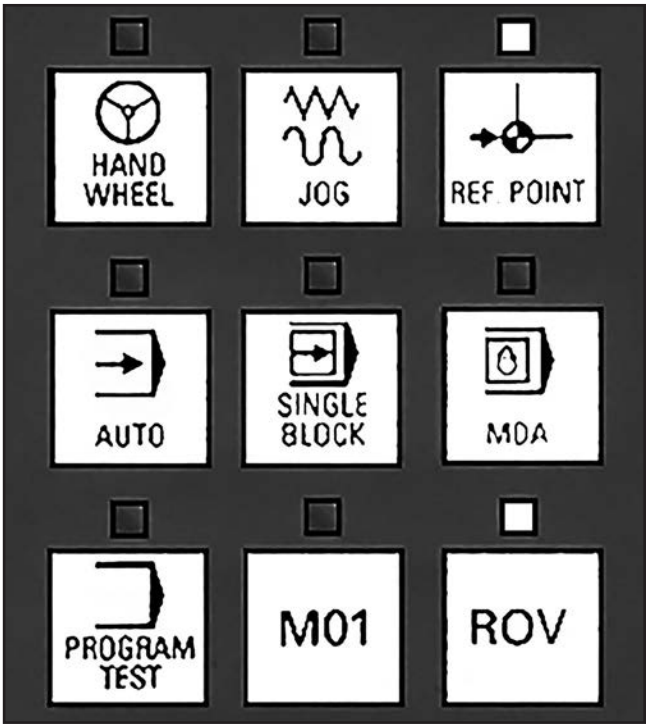


Figure 113. MCP operating mode area.

2. Press and release left X-axis and down-left Y-axis negative-direction traversing keys, then press and release upper Z-axis and B-axis positive-direction traversing keys (see **Figure 114**).

   — PPU displays open circle symbol (○) next to MX1, MY1, MZ1, MB1, and MY2 as axes traverse towards machine-zero. Open circle symbol changes to pinwheel symbol (◒) once reference point has been established (see **Figure 115**).

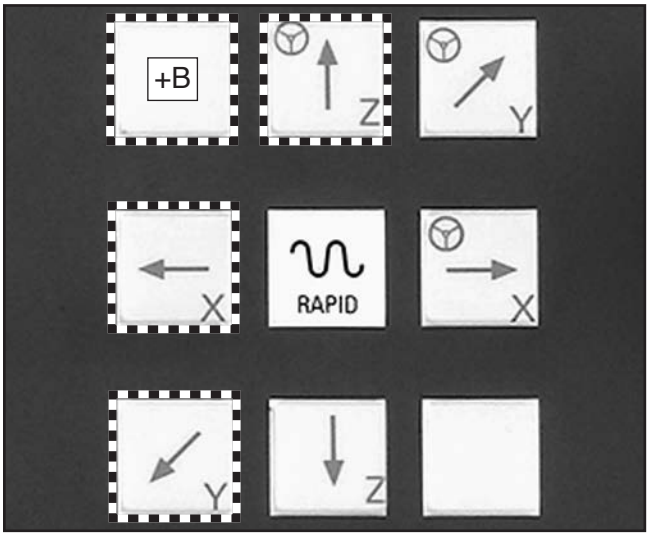


Figure 114. MCP direction-traversing keys.

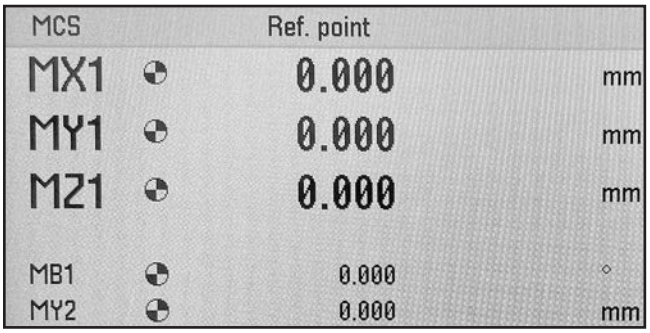


Figure 115. Application area axis identifiers.

Adjusting Axis Position Manually

Knowing how to manually control axis movement is an essential part of operating the Model G0933. Axes must be positioned manually whenever a work origin is set.

Use the axis traversing keys on the MCP to move axes (see **Figure 116**). See **Machine Control Panel (MCP)** on **Page 9** for detailed button descriptions.

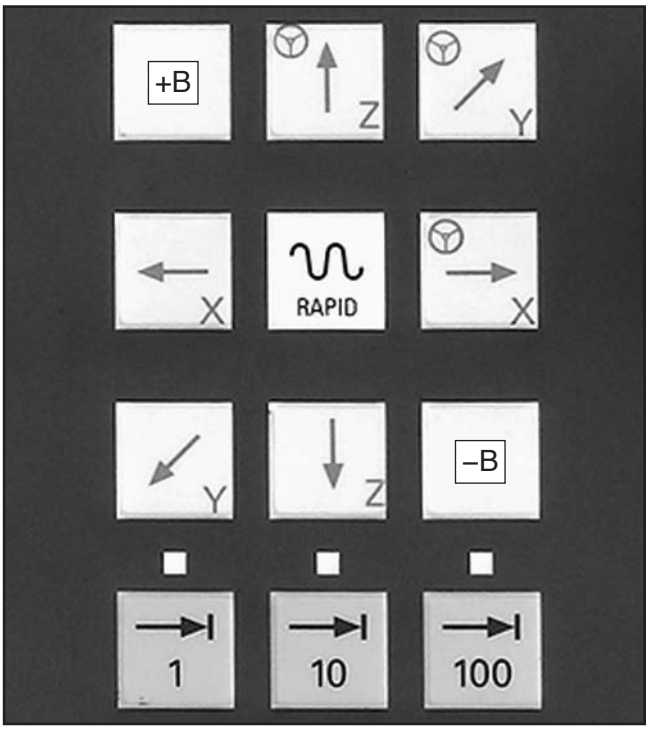


Figure 116. MCP axes traversing keys.

To traverse axis position manually:

1. Turn machine ***ON*** and allow control system to finish boot sequence.

   — After approximately 30 seconds, key pads will stop flashing and display will show machining screen.

2. Set machine reference point (see **Setting Machine Reference Point** on **Page 60**).

3. On MCP, press JOG key to enter JOG mode (see **Figure 117**).

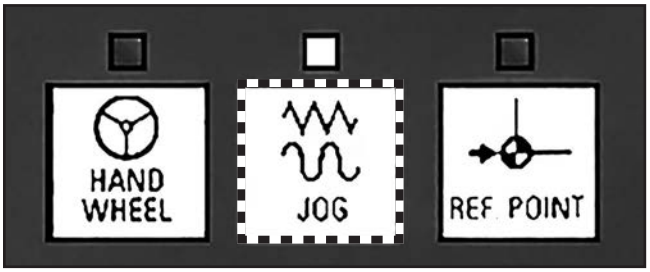


Figure 117. JOG key location on MCP.

4. Press desired axis traversing key to move axis as needed:

   — ← ↙ ↓ traversing keys move axes in *negative* direction.

   — ↑ ↗ → traversing keys move axes in *positive* direction.

Creating a Part Program

Before operations can begin on the Model G0933, a part program must be designed and converted to G-code, then processed through the Sinumerik 808D control system.

The Sinumerik 808D control system is capable of creating part programs manually. Often, this is more efficient than designing and processing through CAD/CAM software.

NOTICE

DO NOT change operating units of the Sinumerik 808D Control System from metric to standard without first consulting Grizzly Tech Support. Changes to these units may traverse machine components beyond set ranges and severely damage machine.

To create a part program:

1. Turn machine ***ON*** and allow control system to finish boot sequence.

   — After approximately 30 seconds, key pads will stop flashing and display will show machining screen.

2. Press PROGRAM MANAGER key in lower-right PPU.

3. Press NC soft key displayed on PPU.

4. Press NEW soft key.

5. Press NEW FILE soft key. A window will appear for entering part program filename (see **Figure 118**).

   Note: *File name extensions can be added to the filename as* ***.MPF*** *(main program) or* ***.SPF*** *(subprogram).*

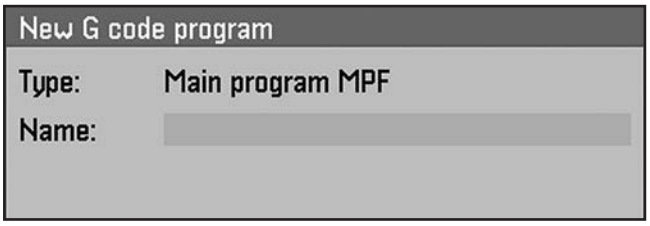


Figure 118. PPU filename window.

6. Press OK soft key to confirm filename.

   — Part program editor screen will open automatically, and G-code can be entered at this time (see **Figure 119**).

   Note: *File progress is saved automatically as G-code is entered.*

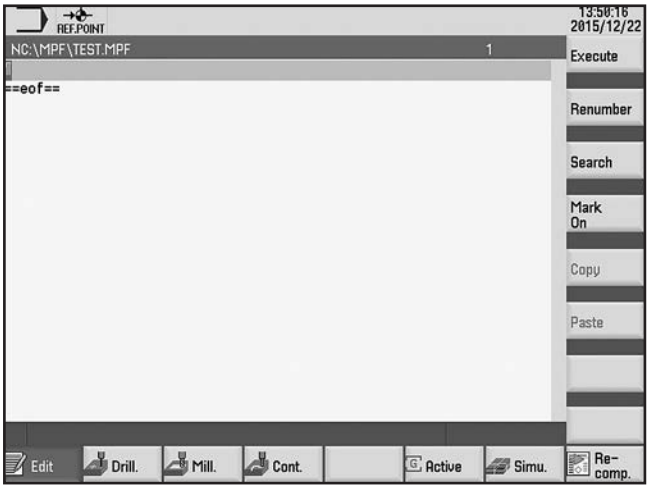


Figure 119. Part program editor screen.

7. Proceed to **Part Program Simulation** on **Page 64**.

   IMPORTANT: Additional information for part program structure and workflow can be found in the **SINUMERIK 808D User Manual** included with your machine.

Transferring a Part Program

The Sinumerik 808D control system supports part programs created using CAD/CAM software.

CAM software converts a CAD model into G-code, which defines a toolpath for the project, and then formats the G-code into a machine specific dialect via a post-processor.

IMPORTANT: Use CAD/CAM software or a text editor with ANSI character encoding to create/edit part programs on a personal computer. Part programs created using other encoding formats, such as Unicode, may cause unexpected errors when uploaded to the control system.

⚠WARNING

Running a part program from an unknown source may cause unexpected control system operations, which could lead to personal injuries or machine damage. Only use self-created part programs or those from reliable sources.

Transferring Through USB

1. Turn machine ***ON*** and allow control system to finish boot sequence.

   — After approximately 30 seconds, key pads will stop flashing and display will show machining screen.

2. Open USB interface cover and insert USB flash drive (see **Figure 120**).

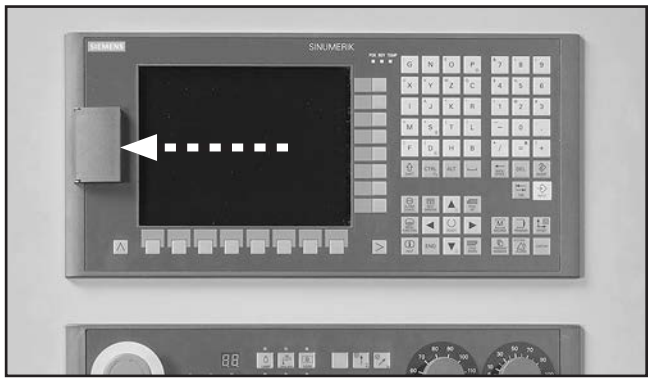


Figure 120. USB interface location on PPU.

3. Press PROGRAM MANAGER key in lower-right PPU.

4. Press USB soft key displayed on PPU.

5. Highlight desired file and press COPY soft key displayed on PPU.

6. Press NC soft key to enter program directory.

7. Press PASTE soft key to transfer USB file to control system.

Transferring Through Ethernet

1. DISCONNECT MACHINE FROM POWER!

2. Connect one end of ethernet cable to personal computer, then connect opposite end to ethernet port on rear of PPU, as shown in **Figure 121**.

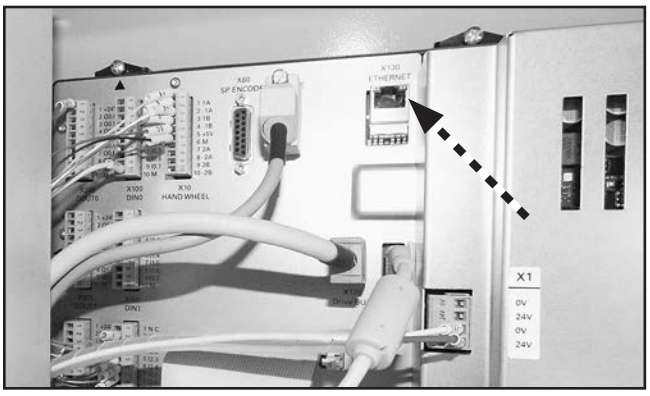


Figure 121. Ethernet port location on PPU.

3. Turn machine ***ON*** and allow control system to finish boot sequence.

   — After approximately 30 seconds, key pads will stop flashing and display will show machining screen.

4. Press SHIFT + SYSTEM ALARM keys to access system data operating area.

5. Press > menu extension key.

6. Press SERV. DISPL. soft key, then press SERVICE CONTROL soft key.

7. Press DIRECT CONNECT. soft key to establish a direct network connection with machine control system.

Part Program Simulation

Before executing a part program on the Model G0933, the part program must be proven on the Sinumerik 808D control system to establish that tooling requirements, speeds, and tool paths are accurate and free of errors.

The Sinumerik 808D control system includes a simulator capable of determining if the part program contains errors, or if the completed workpiece will conform to the intended design.

To simulate a part program:

1. Turn machine ***ON*** and allow control system to finish boot sequence.

   — After approximately 30 seconds, key pads will stop flashing and display will show machining screen.

2. Press PROGRAM MANAGER key in lower-right PPU.

3. Press NC soft key displayed on PPU.

4. Use cursor keys to highlight desired part program, then press INPUT key.

   — Part program editor screen opens with selected part program.

5. Press AUTO key in lower-left MCP.

6. Press SIMU. soft key displayed on PPU.

   — Program control mode activates.

7. Press CYCLE START key in lower-left MCP to begin simulation.

   — Part program simulation is displayed as a detailed graphic showing current G-code coordinates (see **Figure 122**).

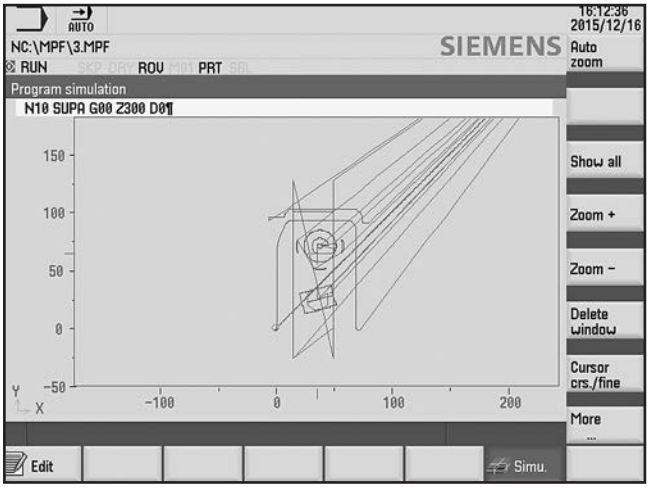


Figure 122. Part program simulation.

8. During part program simulation, press any of the following keys to stop or resume process:

   — Press CYCLE STOP key to stop (pause) simulation.

   — Press RESET key to cancel simulation.

   — Press CYCLE START key to continue simulation.

9. When simulation is complete, press EDIT soft key to return to part program editor.

Securing Workpiece on Table

The Model G0933 comes with a vacuum table that has four vacuum zones separated by T-slots. Workpieces with a wide range of shapes and sizes can be secured using clamps, the vacuum table, or both. Always secure the workpiece to the table to avoid injury and damage to the machine.

Clamps are always the most consistent method to secure a workpiece, but the vacuum table is an excellent option when cutting to the edge of the workpiece where clamps would normally get in the way. However, a flat surface on the bottom of the workpiece is required to create a strong vacuum seal. For workpieces with a rough or uneven bottom that will not seal, clamps are required. There is no harm in using both clamps and the vacuum table at the same time.

Using Clamps

Always use at least four clamps when clamping a workpiece to the table.

Items Needed	Qty
Clamps	4 or More
Scrap Wood	As Needed

To clamp workpiece to table:

1. Clear dust, wood chips, and tools from table surface and T-slots.

2. Thread hex bolt into clamp plate, then insert T-bolt through clamp plate and thread on flat washer and wing nut (see **Figure 123**).

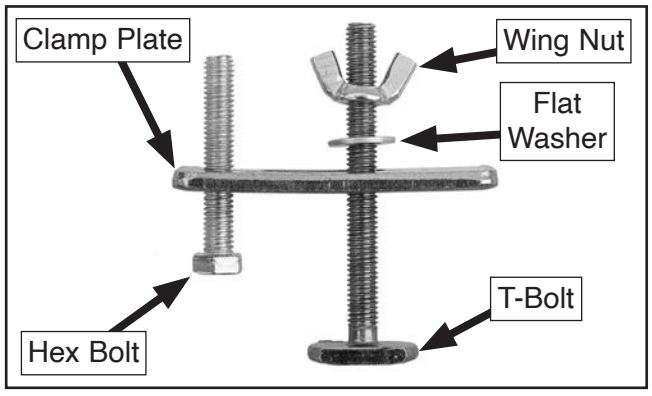


Figure 123. T-slot clamp components.

3. Place workpiece on table. Joint or shim if necessary to ensure a flat work surface.

4. Slide T-bolts into T-slots, then adjust wing nuts and hex bolts so clamp plates are higher than workpiece (see **Figure 124**).

   Note: *Place a piece of scrap wood under the head of each hex bolt to prevent damaging table surface.*

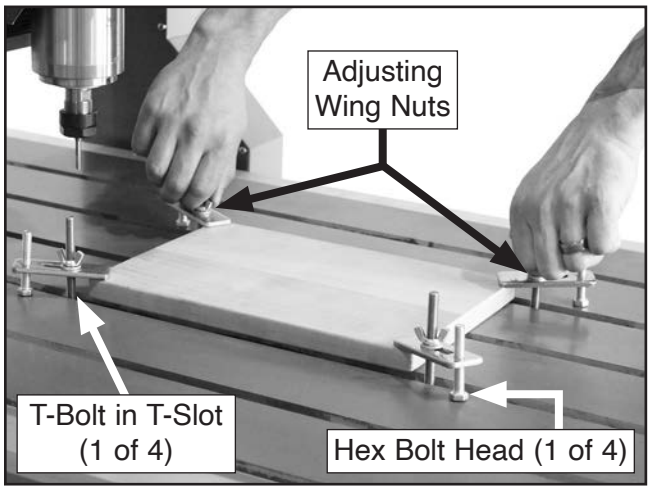


Figure 124. Example of clamping workpiece to table.

5. Position clamps so workpiece is stable and does not rock. Take into consideration axis positions when G-code runs.

6. Tighten wing nuts until workpiece is secure and flat against table on all four sides/corners.

Using Vacuum Table

The vacuum table is an alternate way to hold material to the work surface for cutting. It is especially useful when clamps are in the way or the workpiece is irregular in shape. However, if the workpiece does not have a tight enough seal with the vacuum table, an alternative method must be used to secure it.

Items Needed	Qty
Flat Scrap Material	As Needed
Gasket Tube	As Needed
Vacuum Port Plugs	As Needed

NOTICE

A tight seal is required between vacuum table and workpiece for vacuum table to function properly. Always follow setup procedure to ensure seal is achieved and avoid machine damage. Always keep table clean and unused vacuum ports plugged to prevent dust from entering vacuum system and damaging vacuum pump.

To secure workpiece using vacuum table:

1. Inspect workpiece and ensure bottom of material is flat. Joint or plane bottom of workpiece if needed.

   Note: *Porous material and workpieces with knot holes may not create a tight enough seal for vacuum table to function.*

2. Clear dust, wood chips, and tools from table surface and T-slots with wet/dry vac or dust collector.

3. Position workpiece on table so that it covers as few vacuum zones as possible.

   — If workpiece does not fully cover vacuum zones it is over, use included gasket tube to seal the outside of the workpiece. Arrange tube on table so it fits just underneath outer edge of workpiece, then cut tube to size (see **Figure 125**).

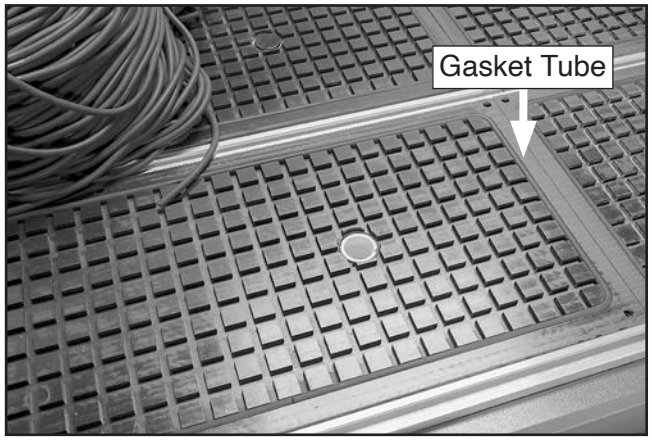


Figure 125. Example of gasket tube cut to size to seal workpiece to vacuum zone.

4. Only open vacuum valves (see **Figure 126**) for each zone covered by workpiece. Close all other vacuum valves, and plug all unused vacuum ports.

   Note: *Using as few zones as possible and turning off unused zones will improve vacuum strength and better secure the workpiece to the table.*

Figure 126. Example of vacuum zone control valves.

5. Turn vacuum pump ***ON***.

6. Push edge of workpiece with moderate pressure to verify workpiece is properly secured by vacuum system with enough strength to withstand cutting forces.

   — If workpiece is not well secured, repeat **Steps 1–6**. If workpiece is still not secure, use hold down clamps to augment vacuum.

Using a Spoilboard

A spoilboard should be used with any operation in which the tool cuts completely through the workpiece. Typically, a spoilboard is made of MDF that has been surfaced perfectly flat. Even a new piece of material should be surfaced before use.

The vacuum table can be used with an MDF spoilboard that is properly prepared. The vacuum pulls air through the porous spoilboard, causing workpieces to be firmly secured to the top of the spoilboard.

NOTICE

Moisture will swell and warp MDF spoilboards. Using a warped spoilboard will result in damaged or inaccurately cut workpieces and could result in damage to the machine. If liquid is spilled on spoilboard, it must be dried and resurfaced, or replaced.

Preparing a Vacuum Spoilboard

Items Needed **Qty**
MDF ¾" (sized for table or workpiece) 1
Sealant
(Epoxy or Rubberized Paint) ..... As Needed

To create a vacuum spoilboard:

1. Surface both sides of MDF to remove at least 0.5mm of sealant.

2. Seal all four edges of spoilboard using epoxy or rubberized paint.

   Note: *Spoilboards can be resurfaced and reused until thickness is reduced to approximately ¼" or less.*

Clamping Spoilboard

Clamps can be used in combination with the vacuum table if the spoilboard does not create a strong seal with the vacuum table.

Items Needed **Qty**
MDF (sized for table or workpiece) 1
Clamp Set, Double-Sided Tape,
or Wood Screws ..... As Needed

To clamp a spoilboard:

1. Clamp surfaced spoilboard to machine bed using included hold-down clamps (see **Figure 127**). If vacuum table is used, secure spoilboard as shown in **Using Vacuum Table** on **Page 65**.

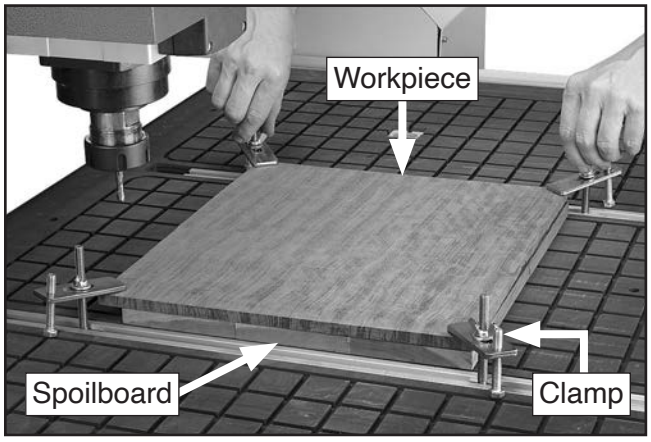


Figure 127. Example of spoilboard clamped to router bed.

2. Secure workpiece to spoilboard.

   Note: *Depending on the needs of the workpiece and G-code, it could be appropriate to use additional hold-down clamps, double-sided tape, or mount the workpiece directly to the spoilboard with screws. If vacuum table is used, the suction through the spoilboard may be sufficient to secure workpiece. Always verify workpiece is secure before beginning work operations.*

SECTION 5: ACCESSORIES

⚠WARNING

Installing unapproved accessories may cause machine to malfunction, resulting in serious personal injury or machine damage. To reduce this risk, only install accessories recommended for this machine by Grizzly.

NOTICE

Refer to our website or latest catalog for additional recommended accessories.

V-Carve CNC Router Software

T28100—V-Carve Desktop Software
T28101—V-Carve Pro Software

V-Carve provides a powerful but intuitive software solution for cutting parts on a CNC Router. It combines CAD and CAM so you can design your work and create your toolpath in one interface. V-Carve includes the functionality demanded for complex work while remaining incredibly easy to use and affordably priced.

Figure 128. T28100 V-Carve Desktop Software.

Router Bits

C1921—Router Bit Set for Sign Making
DC1808—3/16" Solid Carbide Upcut Spiral
DC1809—1/4" Solid Carbide Upcut Spiral
T30941—CNC Router Bit Starter Set #1
T32931—1/4" X-CARVE CNC Router Bit Set

Figure 129. C1921 Router Bit Set for Sign Making.

T32917—8-Pc. 1/4" CNC Router Bit Collection

Designed specifically for a wide variety of applications. Each router bit is manufactured according to stringent quality standards.

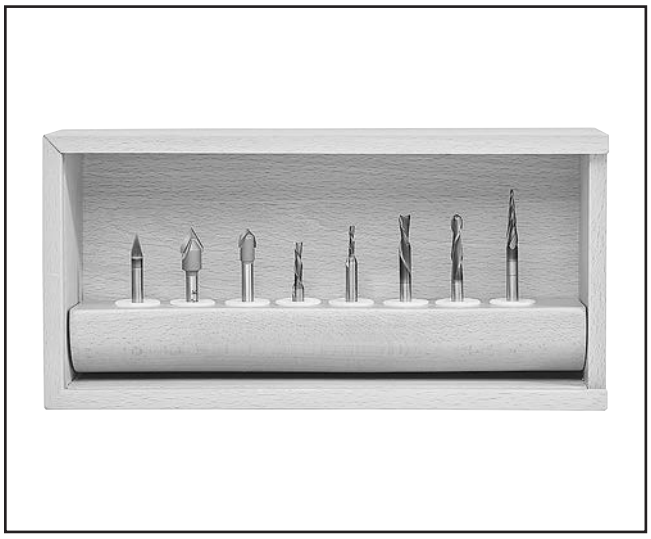


Figure 130. T32917 8-Pc. 1/4" CNC Router Bit Collection.

T27914—Moly-D Machine and Way Oil, 1 Gal.
This ISO 68 machine and way oil is one of the best we've found for maintaining bed ways, sliding ways, gearboxes, and leadscrews. It is extremely tacky and includes the superior friction-reducing compound Moly-D to maximize component life and minimize wear.

Figure 131. T27914 Machine Oil.

T26419—NLGI#2 Syn-O-Gen Synthetic Grease
Formulated with 100% pure synthesized hydrocarbon basestocks that are compounded with special thickeners and additives to make Syn-O-Gen non-melt, tacky, and water resistant. Extremely low pour point, extremely high temperature oxidation, and thermal stability produce a grease that is unmatched in performance.

Figure 132. T26419 Syn-O-Gen Synthetic Grease.

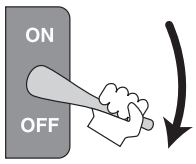
G0862—3 HP Portable Cyclone Dust Collector
The capstone of our line of affordable, high- quality cyclones, the G0862 features a 3 HP motor, a whopping 1941 CFM of airflow capacity, and a 45-gallon collection capacity. It's packed with features like a quick-release collection drum, latching system, high-efficiency, two-stage separation driven by a 16" aluminum impeller, durable powder coated finish, and a heavy-duty steel frame and housing.

Figure 133. G0862 Cyclone Dust Collector.

H7617—High Pressure Oil Can w/Flex Nozzle
This high-pressure oil can is perfect for lubricating the ball oilers found on your machine. Each can holds 5 ounces of oil.

Figure 134. High-pressure oil can for ball oilers.

SECTION 6: MAINTENANCE



⚠WARNING
To reduce risk of shock or accidental startup, always disconnect machine from power before adjustments, maintenance, or service.

Schedule

For optimum performance from this machine, this maintenance schedule must be strictly followed.

Ongoing
To minimize your risk of injury and maintain proper machine operation, shut down the machine immediately if you ever observe any of the items below, and fix the problem before continuing operations:

- Loose mounting bolts.
- Damaged or dull cutter.
- Clogged or dirty collet, spindle nut, or spindle collet hole.
- Blocked dust collection.
- Worn or damaged wires.
- Dirty vacuum pump filter.
- Dust and debris on vacuum table.
- Any other unsafe condition.

Daily Maintenance
- Check/adjust oil level in oiler system.
- Check/adjust oil level in air lubricator.
- Clean/lubricate linear guideways/ball screws.

Weekly Maintenance
- Clean/lubricate rack and pinion gear.
- Clean/vacuum dust buildup in T-slots.
- Inspect spoilboard for defects and flatness.

Monthly Check
- Inspect wiring connections for loose wires.
- Verify fasteners on moving parts are secure.

Annual Maintenance
- Check/level frame and table.

Cleaning & Protecting

Cleaning the Model G0933 is relatively easy. Vacuum excess wood chips and sawdust, and wipe off the remaining dust with a dry cloth.

Add a few drops of pneumatic tool oil (ISO 15 or equivalent) to the air lubricator before operations to prevent corrosion, reduce condensation, and prevent material buildup in the pneumatic system.

Lubrication

By design, the linear guide rails, helical rack and pinion gears, and other metal parts on this machine have hardened surfaces that are highly resistant to corrosion and wear. However, periodically wipe metal parts with light machine oil and synthetic grease (see **Page 69**) to extend their life.

Note: *Lubrication can cause sludge build-up that will bind moving parts, and corrosion can still occur if catalysts are trapped beneath lubricant. Always clean surfaces before applying any form of lubrication.*

Items Needed	Qty
Disposable Gloves	1 Pair
Stiff Brushes	4
Clean Shop Rags	As Needed
Mineral Spirits	As Needed
T27914 or ISO 68 Equivalent	As Needed
T26419 or NLGI#2 Equivalent	As Needed

Oiler System Operation

The Model G0933 linear guide rails and ball screw require regular lubrication to perform properly. The oiler system (see **Figure 135**) on the rear of the gantry pumps oil to these components.

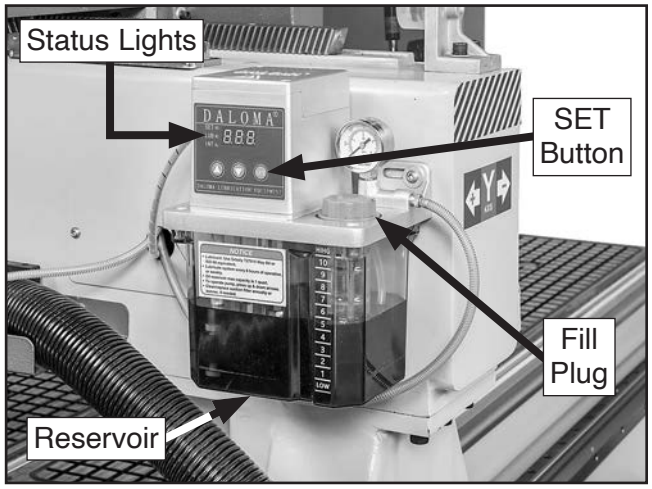


Figure 135. Oiler system control components.

Lube Type..... T27914 or ISO 68 Equivalent
Lube Amount..... As Needed
Lubrication Frequency..... Daily
Oil Reservoir Max Capacity ..... 1 Qt.

To operate oiler system:

1. Verify reservoir is filled with *at least* (1) quart of Grizzly T27914 machine oil or ISO 68 equivalent, then turn router ***ON***.

2. Press and hold SET button on oiler until an audible beep is heard (see **Figure 135**).

3. Verify SET and LUB status lights illuminate and oil dispense time (in seconds) is displayed on digital readout (see **Figure 136**). Set desired values using ▲ and ▼ buttons on oiler system control panel.

   — To dispense a *small* amount of oil, set the number of seconds to a lower value.

   — To dispense a *large* amount of oil, set the number of seconds to a higher value.

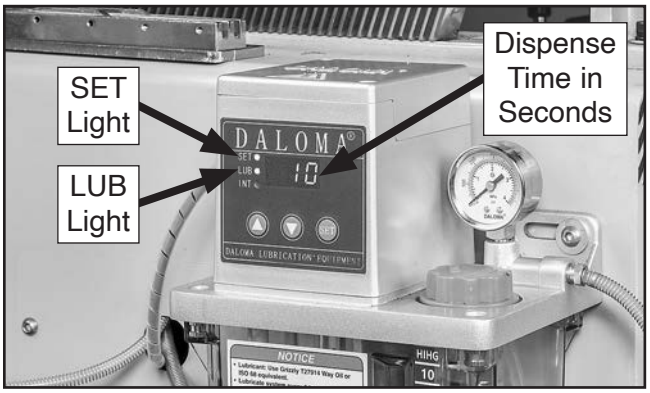


Figure 136. Setting oiler dispense time.

4. Press and hold set button on oiler until an audible beep is heard.

5. Verify SET and INT status lights illuminate and oil dispense duration (in minutes) is displayed on digital readout (see **Figure 137**). Set desired values using ▲ and ▼ buttons on oiler controls.

   — To dispense oil over a *short* amount of time, set the number of minutes to a lower value.

   — To dispense oil over a *long* amount of time, set the number of minutes to a higher value.

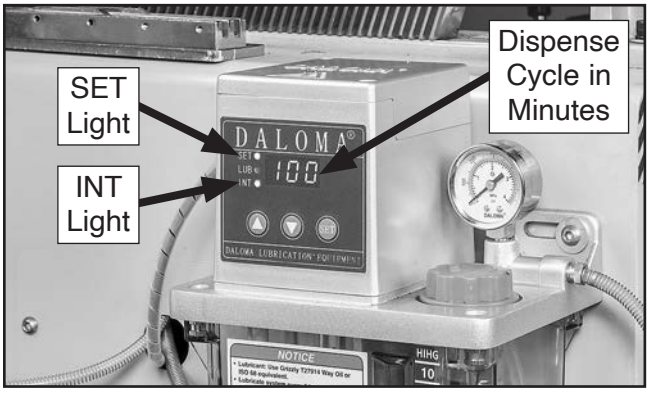


Figure 137. Setting oiler dispense cycle.

6. Press and hold set button to confirm settings and start oiler system lubrication cycle.

X-Axis Rack & Pinion

Lube Type..... T26419 or NLGI#2 Equivalent
Lube Amount ..... As Needed
Lubrication Frequency .....Weekly

To lubricate X-axis rack and pinion:

1. DISCONNECT MACHINE FROM POWER!

2. Clean X-axis helical and linear gear with mineral spirits to remove old lubrication (see **Figure 138**).

3. Use clean brush to wipe entire length of helical and linear gear with Grizzly T26419 or NLGI#2 Equivalent (see **Figure 138**).

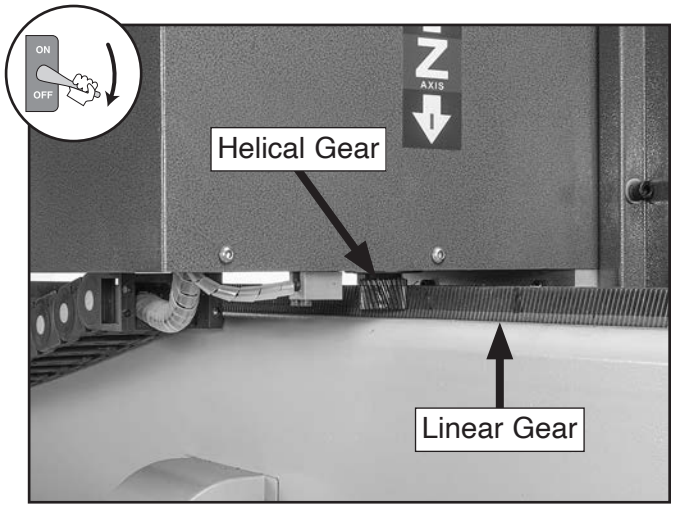


Figure 138. Example of rack and pinion lubrication area.

4. Turn machine ***ON*** and move spindle several times over full range of X-axis travel to spread lubricant and ensure smooth movement.

X-, Y-, & Z-Axis Linear Guideways

Lube Type..... T27914 or ISO 68 Equivalent
Lube Amount ..... As Needed
Lubrication Frequency .....Weekly

To lubricate linear guideways:

1. DISCONNECT MACHINE FROM POWER!

2. Clean axes guideways with mineral spirits to remove old lubrication (see **Figure 139**).

3. Use clean shop rag to wipe entire length of axes guideways with Grizzly T27914 or ISO 68 equivalent (see **Figure 139**).

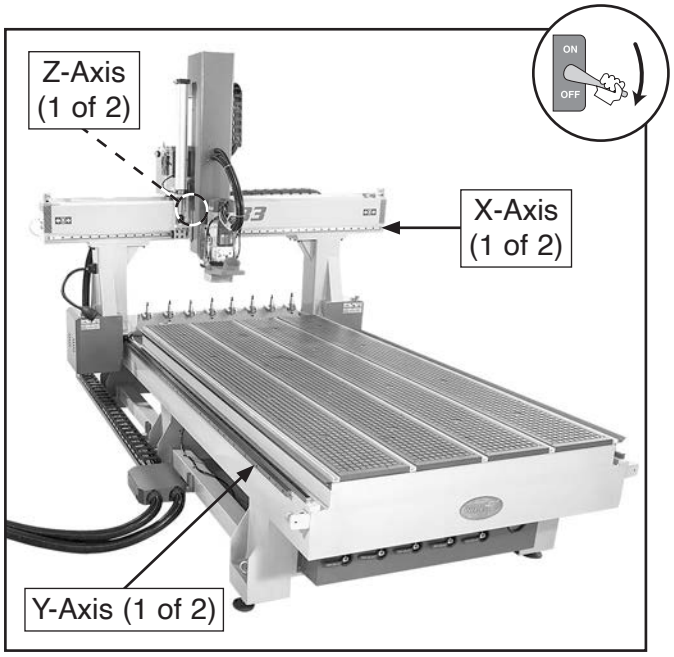


Figure 139. Location of axes linear guideway lubrication areas.

4. Turn machine ***ON*** and move spindle several times over full range of X- and Z-axis travel to spread lubricant and ensure smooth movement.

5. Move gantry several times over full range of Y-axis travel to spread lubricant and ensure smooth movement.

WARRANTY & RETURNS

Grizzly Industrial, Inc. warrants every product it sells for a period of **1 year** to the original purchaser from the date of purchase. This warranty does not apply to defects due directly or indirectly to misuse, abuse, negligence, accidents, repairs or alterations or lack of maintenance. This is Grizzly's sole written warranty and any and all warranties that may be implied by law, including any merchantability or fitness, for any particular purpose, are hereby limited to the duration of this written warranty. We do not warrant or represent that the merchandise complies with the provisions of any law or acts unless the manufacturer so warrants. In no event shall Grizzly's liability under this warranty exceed the purchase price paid for the product and any legal actions brought against Grizzly shall be tried in the State of Washington, County of Whatcom.

We shall in no event be liable for death, injuries to persons or property or for incidental, contingent, special, or consequential damages arising from the use of our products.

The manufacturers reserve the right to change specifications at any time because they constantly strive to achieve better quality equipment. We make every effort to ensure that our products meet high quality and durability standards and we hope you never need to use this warranty.

In the event you need to use this warranty, contact us by mail or phone and give us all the details. We will then issue you a "Return Number," which must be clearly posted on the outside as well as the inside of the carton. We will not accept any item back without this number. Proof of purchase must accompany the merchandise.

Please feel free to write or call us if you have any questions about the machine or the manual.

Thank you again for your business and continued support. We hope to serve you again soon.

For further information about the warranty, visit **https://www.grizzly.com/forms/warranty** or scan the QR code below to be automatically directed to our warranty page.

WARRANTY

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