



# OPERATOR'S MANUAL

Wood Working



Book 1 of 2

## WOOD ROUTER TABLE MODEL: WR-84V

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## THANK YOU & WARRANTY

Thank you for your purchase of a machine from Baileigh Industrial. We hope that you find it productive and useful to you for a long time to come.

**Inspection & Acceptance.** Buyer shall inspect all Goods within ten (10) days after receipt thereof. Buyer's payment shall constitute final acceptance of the Goods and shall act as a waiver of the Buyer's rights to inspect or reject the goods unless otherwise agreed. If Buyer rejects any merchandise, Buyer must first obtain a Returned Goods Authorization ("RGA") number before returning any goods to Seller. Goods returned without a RGA will be refused. Seller will not be responsible for any freight costs, damages to goods, or any other costs or liabilities pertaining to goods returned without a RGA. Seller shall have the right to substitute a conforming tender. Buyer will be responsible for all freight costs to and from Buyer and repackaging costs, if any, if Buyer refuses to accept shipment. If Goods are returned in unsalable condition, Buyer shall be responsible for full value of the Goods. Buyer may not return any special order Goods. Any Goods returned hereunder shall be subject to a restocking fee equal to 30% of the invoice price.

**Specifications.** Seller may, at its option, make changes in the designs, specifications or components of the Goods to improve the safety of such Goods, or if in Seller's judgment, such changes will be beneficial to their operation or use. Buyer may not make any changes in the specifications for the Goods unless Seller approves of such changes in writing, in which event Seller may impose additional charges to implement such changes.

**Limited Warranty.** Seller warrants to the original end-user that the Goods manufactured or provided by Seller under this Agreement shall be free of defects in material or workmanship for a period of twelve (12) months from the date of purchase, provided that the Goods are installed, used, and maintained in accordance with any instruction manual or technical guidelines provided by the Seller or supplied with the Goods, if applicable. The original end-user must give written notice to Seller of any suspected defect in the Goods prior to the expiration of the warranty period. The original end-user must also obtain a RGA from Seller prior to returning any Goods to Seller for warranty service under this paragraph. Seller will not accept any responsibility for Goods returned without a RGA. The original end-user shall be responsible for all costs and expenses associated with returning the Goods to Seller for warranty service. In the event of a defect, Seller, at its sole option, shall repair or replace the defective Goods or refund to the original end-user the purchase price for such defective Goods. Goods are not eligible for replacement or return after a period of 30 days from date of receipt. The foregoing warranty is Seller's sole obligation, and the original end-user's exclusive remedy, with regard to any defective Goods. This limited warranty does not apply to: (a) die sets, tooling, and saw blades; (b) periodic or routine maintenance and setup, (c) repair or replacement of the Goods due to normal wear and tear, (d) defects or damage to the Goods resulting from misuse, abuse, neglect, or accidents, (f) defects or damage to the Goods resulting from improper or unauthorized alterations, modifications, or changes; and (f) any Goods that has not been installed and/or maintained in accordance with the instruction manual or technical guidelines provided by Seller.

**EXCLUSION OF OTHER WARRANTIES.** THE FOREGOING LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED. ANY AND ALL OTHER EXPRESS, STATUTORY OR IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE ARE EXPRESSLY DISCLAIMED. NO WARRANTY IS MADE WHICH EXTENDS BEYOND THAT WHICH IS EXPRESSLY CONTAINED HEREIN.

**Limitation of Liability.** IN NO EVENT SHALL SELLER BE LIABLE TO BUYER OR ANY OTHER PARTY FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES (INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR DOWN TIME) ARISING FROM OR IN MANNER CONNECTED WITH THE GOODS, ANY BREACH BY SELLER OR ITS AGENTS OF THIS AGREEMENT, OR ANY OTHER CAUSE WHATSOEVER, WHETHER BASED ON CONTRACT, TORT OR ANY OTHER THEORY OF LIABILITY. BUYER'S REMEDY WITH RESPECT TO ANY CLAIM ARISING UNDER THIS AGREEMENT IS STRICTLY LIMITED TO NO MORE THAN THE AMOUNT PAID BY THE BUYER FOR THE GOODS.



**Force Majeure.** Seller shall not be responsible for any delay in the delivery of, or failure to deliver, Goods due to causes beyond Seller's reasonable control including, without limitation, acts of God, acts of war or terrorism, enemy actions, hostilities, strikes, labor difficulties, embargoes, non-delivery or late delivery of materials, parts and equipment or transportation delays not caused by the fault of Seller, delays caused by civil authorities, governmental regulations or orders, fire, lightening, natural disasters or any other cause beyond Seller's reasonable control. In the event of any such delay, performance will be postponed by such length of time as may be reasonably necessary to compensate for the delay.

**Installation.** If Buyer purchases any Goods that require installation, Buyer shall, at its expense, make all arrangements and connections necessary to install and operate the Goods. Buyer shall install the Goods in accordance with any Seller instructions and shall indemnify Seller against any and all damages, demands, suits, causes of action, claims and expenses (including actual attorneys' fees and costs) arising directly or indirectly out of Buyer's failure to properly install the Goods.

**Work By Others; Safety Devices.** Unless agreed to in writing by Seller, Seller has no responsibility for labor or work performed by Buyer or others, of any nature, relating to design, manufacture, fabrication, use, installation or provision of Goods. Buyer is solely responsible for furnishing, and requiring its employees and customers to use all safety devices, guards and safe operating procedures required by law and/or as set forth in manuals and instruction sheets furnished by Seller. Buyer is responsible for consulting all operator's manuals, ANSI or comparable safety standards, OSHA regulations and other sources of safety standards and regulations applicable to the use and operation of the Goods.

**Remedies.** Each of the rights and remedies of Seller under this Agreement is cumulative and in addition to any other or further remedies provided under this Agreement or at law or equity.

**Attorney's Fees.** In the event legal action is necessary to recover monies due from Buyer or to enforce any provision of this Agreement, Buyer shall be liable to Seller for all costs and expenses associated therewith, including Seller's actual attorneys' fees and costs.

**Governing Law/Venue.** This Agreement shall be construed and governed under the laws of the State of Wisconsin, without application of conflict of law principles. Each party agrees that all actions or proceedings arising out of or in connection with this Agreement shall be commenced, tried, and litigated only in the state courts sitting in Manitowoc County, Wisconsin or the U.S. Federal Court for the Eastern District of Wisconsin. Each party waives any right it may have to assert the doctrine of "forum non conveniens" or to object to venue to the extent that any proceeding is brought in accordance with this section. Each party consents to and waives any objection to the exercise of personal jurisdiction over it by courts described in this section. Each party waives to the fullest extent permitted by applicable law the right to a trial by jury.

#### **SUMMARY OF RETURN POLICY.**

- 10 Day acceptance period from date of delivery. Damage claims and order discrepancies will not be accepted after this time.
- You must obtain a Baileigh issued RGA number PRIOR to returning any materials.
- Returned materials must be received at Baileigh in new condition and in original packaging.
- Altered items are not eligible for return.
- Buyer is responsible for all shipping charges.
- A 30% re-stocking fee applies to all returns.

Baileigh Industrial makes every effort to ensure that our posted specifications, images, pricing and product availability are as correct and timely as possible. We apologize for any discrepancies that may occur. Baileigh Industrial reserves the right to make any and all changes deemed necessary in the course of business including but not limited to pricing, product specifications, quantities, and product availability.

#### **For Customer Service & Technical Support:**

Please contact one of our knowledgeable Sales and Service team members at:  
(920) 684-4990 or e-mail us at [sales@baileighindustrial.com](mailto:sales@baileighindustrial.com)



## **INTRODUCTION**

*The quality and reliability of the components assembled on a Baileigh Industrial machine guarantee near perfect functioning, free from problems, even under the most demanding working conditions. However, if a situation arises, refer to the manual first. If a solution cannot be found, contact the distributor where you purchased our product. Make sure you have the serial number and production year of the machine (stamped on the nameplate). For replacement parts refer to the assembly numbers on the parts list drawings.*

*Our technical staff will do their best to help you get your machine back in working order.*

### **In this manual you will find: (when applicable)**

- Safety procedures
- Correct installation guidelines
- Description of the functional parts of the machine
- Capacity charts
- Set-up and start-up instructions
- Machine operation
- Scheduled maintenance
- Parts lists

## **GENERAL NOTES**

After receiving your equipment remove the protective container. Do a complete visual inspection, and if damage is noted, **photograph it for insurance claims** and contact your carrier at once, requesting inspection. Also contact Baileigh Industrial and inform them of the unexpected occurrence. Temporarily suspend installation.

Take necessary precautions while loading / unloading or moving the machine to avoid any injuries.

Your machine is designed and manufactured to work smoothly and efficiently. Following proper maintenance instructions will help ensure this. Try and use original spare parts, whenever possible, and most importantly; **DO NOT** overload the machine or make any unauthorized modifications.



**Note:** This symbol refers to useful information throughout the manual.

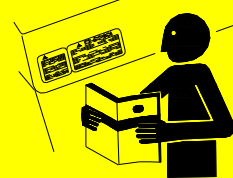




## IMPORTANT

### PLEASE READ THIS OPERATORS MANUAL CAREFULLY

It contains important safety information, instructions, and necessary operating procedures. The continual observance of these procedures will help increase your production and extend the life of the equipment.



## SAFETY INSTRUCTIONS

### LEARN TO RECOGNIZE SAFETY INFORMATION

This is the safety alert symbol. When you see this symbol on your machine or in this manual, **BE ALERT TO THE POTENTIAL FOR PERSONAL INJURY!**

Follow recommended precautions and safe operating practices.

### UNDERSTAND SIGNAL WORDS

A signal word – **DANGER**, **WARNING**, or **CAUTION** is used with the safety alert symbol. **DANGER** identifies a hazard or unsafe practice that will result in severe **Injury or Death.**

Safety signs with signal word **DANGER** or **WARNING** are typically near specific hazards.

General precautions are listed on **CAUTION** safety signs. **CAUTION** also calls attention to safety messages in this manual.



**DANGER**



**WARNING**



**CAUTION**

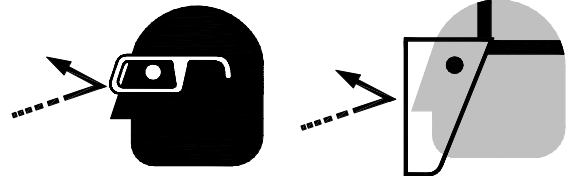


**SAVE THESE INSTRUCTIONS.**  
**Refer to them often and use them to instruct others.**



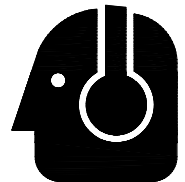
### **PROTECT EYES**

Wear safety glasses or suitable eye protection when working on or around machinery.



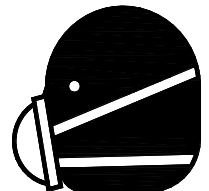
### **PROTECT AGAINST NOISE**

Prolonged exposure to loud noise can cause impairment or loss of hearing. Wear suitable hearing protective devices such as ear muffs or earplugs to protect against objectionable or uncomfortable loud noises.



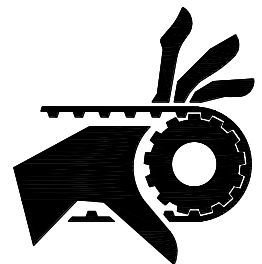
### **DUST HAZARD**

Wear appropriate dust mask. Dust created while using machinery can cause cancer, birth defects, and long term respiratory damage. Be aware of the dust hazards associated with all types of materials.



### **BEWARE OF PINCH POINTS**

Keep hands and fingers away from the servo motors drive belt and pulleys when performing maintenance. Keep motor guards in place at all times while the machine is running.



### **DUST PARTICLES AND IGNITION SOURCES**

**DO NOT** operate the table saw in areas where explosion risks are high. Such areas include locations near pilot lights, open flames, or other ignition sources.



### **ENTANGLEMENT HAZARD – ROTATING SPINDLE**

Contain long hair, **DO NOT** wear jewelry or loose fitting clothing.





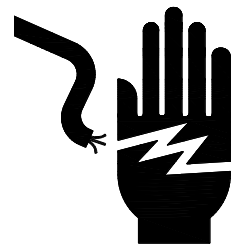
### **CUTTING HAZARD**

Keep hands and fingers away from the rotating shaper cutters. These rotating cutters can be extremely dangerous if you do not follow proper safety procedures. **NEVER place hands directly over or in front of the cutter. Keep hand at least 6" (150mm) from the shaper cutter while operating.**



### **HIGH VOLTAGE**

**USE CAUTION IN HIGH VOLTAGE AREAS. DO NOT** assume the power to be off.  
**FOLLOW PROPER LOCKOUT PROCEDURES.**



### **EMERGENCY STOP BUTTON**

In the event of incorrect operation or dangerous conditions, the machine can be stopped immediately by pressing the **E-STOP** button. Twist the emergency stop button clockwise (cw) to reset.  
**Note:** Resetting the E-Stop will not start the machine.



## **SAFETY PRECAUTIONS**



Wood working can be dangerous if safe and proper operating procedures are not followed. As with all machinery, there are certain hazards involved with the operation of the product. Using the machine with respect and caution will considerably lessen the possibility of personal injury. However, if normal safety precautions are overlooked or ignored, personal injury to the operator may result.

Safety equipment such as guards, push sticks, hold-downs, feather boards, goggles, dust masks and hearing protection can reduce your potential for injury. But even the best guard won't make up for poor judgment, carelessness or inattention. **Always use common sense** and exercise **caution** in the workshop. If a procedure feels dangerous, don't try it.

**REMEMBER: Your personal safety is your responsibility.**





**WARNING: FAILURE TO FOLLOW THESE RULES MAY RESULT IN  
SERIOUS PERSONAL INJURY**

### **Dear Valued Customer:**

- All Baileigh woodworking machines should be used only for their intended use.
- Baileigh does not recommend or endorse making any modifications or alterations to a Baileigh machine. Modifications or alterations to a machine may pose a substantial risk of injury to the operator or others and may do substantial damage to the machine.
- Any modifications or alterations to a Baileigh machine will invalidate the machine's warranty.

**Please enjoy your Baileigh machine! ....Please enjoy it SAFELY!**

1. **FOR YOUR OWN SAFETY, READ INSTRUCTION MANUAL BEFORE OPERATING THE MACHINE.** Learn the machine's application and limitations as well as the specific hazards.
2. **Only trained and qualified personnel can operate this machine.**
3. **Make sure guards are in place and in proper working order before operating machinery.**
4. **Remove any adjusting tools.** Before operating the machine, make sure any adjusting tools have been removed.
5. **Keep work area clean.** Cluttered areas invite injuries.
6. **Overloading machine.** By overloading the machine, you may cause injury from flying parts. **DO NOT** exceed the specified machine capacities.
7. **Do not force tool.** Your machine will do a better and safer job if used as intended. **DO NOT** use inappropriate attachments in an attempt to exceed the machines rated capacity.
8. **Use the right tool for the job. DO NOT** attempt to force a small tool or attachment to do the work of a large industrial tool. **DO NOT** use a tool for a purpose for which it was not intended.
9. **Dress appropriate. DO NOT** wear loose fitting clothing or jewelry as they can be caught in moving machine parts. Protective clothing and steel toe shoes are recommended when using machinery. Wear a restrictive hair covering to contain long hair.
10. **Use eye and ear protection.** Always wear ISO approved impact safety goggles. Wear a full-face shield if you are producing metal filings.
11. **Do not overreach.** Maintain proper footing and balance at all times. **DO NOT** reach over or across a running machine.
12. **Stay alert.** Watch what you are doing and use common sense. **DO NOT** operate any tool or machine when you are tired.



13. **Check for damaged parts.** Before using any tool or machine, carefully check any part that appears damaged. Check for alignment and binding of moving parts that may affect proper machine operation.
14. **Observe work area conditions.** **DO NOT** use machines or power tools in damp or wet locations. Do not expose to rain. Keep work area well lighted. **DO NOT** use electrically powered tools in the presence of flammable gases or liquids.
15. **Keep children away.** Children must never be allowed in the work area. **DO NOT** let them handle machines, tools, or extension cords.
16. **Store idle equipment.** When not in use, tools must be stored in a dry location to inhibit rust. Always lock up tools and keep them out of reach of children.
17. **DO NOT operate machine if under the influence of alcohol or drugs.** Read warning labels on prescriptions. If there is any doubt, **DO NOT** operate the machine.
18. Turn off power before checking, cleaning, or replacing any tooling or parts.
19. Be sure all equipment is properly installed and grounded according to national, state, and local codes.
20. Inspect power and control cables periodically. Replace if damaged or bare wires are exposed. **Bare wiring can kill!**
21. **Be Sure** all equipment is properly installed and grounded according to national, state, and local codes. If machine is equipped with a three-prong plug, it should be plugged into a three-hole electrical receptacle. If an adapter is used to accommodate a two-prong receptacle, the adapter plug must be attached to a known ground. Never remove the third prong.
22. **Never leave machine running unattended. TURN POWER OFF.** Don't leave machine until it comes to a complete stop.
23. Know the location of the ON - OFF switch and the "E" - STOP button.
24. **DO NOT** bypass or defeat any safety interlock systems.
25. Keep visitors a safe distance from the work area.
26. **Machines can eject** piece parts towards the operator. Know and avoid the conditions which cause the piece part to kickback.
27. **Material Removal Rate.** Attempting to remove too much material at once can cause the piece part to fly out of the lathe causing **severe bodily injury.**
28. **Check** for damaged parts before using machinery. Check for binding or misaligned parts, broken parts, loose bolts, or any other conditions which may impair the machines operation. Repair or replace any damaged parts before operation.
29. **Do not stop** the spindle using your hand. Allow the spindle to stop on its own.
30. **Disconnect power** and make sure all moving parts have come to a complete stop before changing cutting tools, starting any inspection, adjustment, or maintenance procedure.



31. **Properly secure** the cutting tool in the spindle before operating the machine.
32. **Do not remove** any warning signs.
33. **Control of the Piece Part.** If the piece part should unexpectedly move or bind the tool, kickback could occur. Make sure the piece part is supported and secured to the table surface.
34. **Respiratory Protection.** Wear an approved dust mask or respirator while using this machine. Continued exposure to wood dust can cause allergies or long term respiratory problems.
35. **Using Quality Stock.** Inspect the stock over carefully that you intend to route. **NEVER** route a board that has loose knots, staples, or nails in it. Warped stock should be run through a jointer before running it on the router table. **DO NOT** route a piece of stock if you have any doubts about its structural integrity.
36. **Cutting Depth.** **NEVER** attempt to remove too much material in one pass. Making several light cuts produces a cleaner finish and helps to prevent kickback.
37. **Using Safety Guards.** **NEVER** remove any guards or covers while machine is running.  
**Cutter Hazard.** **NEVER** place hands directly over or in front of the cutter. **ALWAYS** keep hands at least 6" (150mm) from the cutter while operating.
38. **Maintain machine in top condition.** Keep clean for best and safest performance. Follow instructions for lubricating and changing accessories.
39. **Warning:** The dust generated by certain woods and wood products can be injurious to your health. Always operate machinery in well-ventilated areas and provide for proper dust removal. Use wood dust collection systems whenever possible.

## **TECHNICAL SUPPORT**

Our technical support department can be reached at 920.684.4990, and asking for the support desk for purchased machines. Tech Support handles questions on machine setup, schematics, warranty issues, and individual parts needs: (other than die sets and blades).

For specific application needs or future machine purchases contact the Sales Department at: [sales@baileigh.com](mailto:sales@baileigh.com), Phone: 920.684.4990, or Fax: 920.684.3944.



**Note:** The photos and illustrations used in this manual are representative only and may not depict the actual color, labeling or accessories and may be intended to illustrate technique only.



**Note:** The specifications and dimensions presented here are subject to change without prior notice due to improvements of our products.



### **Noise Emission**

Given that there exists a relationship between noise level and exposure times, it is not precise enough to determine the need for supplementary precautions. The factors affecting the true level of exposure to operators are clearly the amount of time exposed, the characteristics of the working environment sources of dust and noise, etc. For example, adjacent machines; in other words, the level of ambient noise. Therefore, it is recommended that the operator(s) of this machine wear hearing protection whenever this machine is in operation.

### **Combustion Hazard**



**WARNING: POTENTIAL COMBUSTIBLE DUST HAZARD! Follow Safe Work Practices.**

**This machine creates dust and chips that may be combustible.**

- **The dust generated by certain materials can be injurious to your health. ALWAYS operate machinery in well-ventilated areas and provide for proper dust removal.**
- **ALWAYS wear proper PPE.**
- **Use a dust collection system which matches your material whenever possible.**
- **No Smoking or open flame.**
- **No Welding or open Arcs or Sparks.**
- **Use proper cleaning procedures.**

### **Combustion and Explosion Conditions**

The first three elements are those needed for a fire, i.e., the familiar "fire triangle":

- Combustible dust (fuel);
- Ignition source (heat); and,
- Oxygen in air (oxidizer).

An additional two elements must be present for a combustible dust explosion:

- Dispersion of dust particles in sufficient quantity and concentration; and,
- Confinement of the dust cloud.

If one of the first three elements is missing, a fire cannot occur.

If one of the above five elements is missing, an explosion cannot occur.



**Source:** Hazard Communication Guidance for Combustible Dusts  
OSHA 3371-08 2009



## **TECHNICAL SPECIFICATIONS**

Power	220V, 1Ph, 60Hz, 35A
Horsepower (Router)	7.5hp (5.5kw) air cooling spindle
Table Dimensions (L x W x H)	118.78" x 77.75" x 61.3" (3017 x 1975 x 1557mm)
Actual Working Area	48.5" x 97" x 5.375" (1232 x 2464 x 136mm)
Table Style	T-Slot with Vacuum Option
Router RPM (7 speeds)*	6,000min. – 18,000max. rpm
Maximum Moving Speed	590in/min. (15000mm/min.)
Maximum Engraving Speed	394in/min. (10000mm/min.)
Reposition Accuracy	0.0019" (.05mm)
Collet Type	ER32
Collet Nut	ER32-UM-W
Collet Size (Include)	1/8", 1/4", 3/8", and 1/2" (1 each)
Control System	NK105 DSP G2
File transfer mode	USB interface
X Y Transmission	Rack and Pinion
Z Transmission	Screw Drive
Guide Rails	HIWIN 25mm (X, Y, and Z)
Shipping Dimensions	124" x 86" x 69" (3150 x 2184 x 1753mm)
Weight	3200lbs. (1459kgs.)
Applicable Material	Acrylic, Copper, Aluminum, Wood, PVC, ABS, Insulation Plate, Bakelite Plate, Honeycomb Plate, Resin, Organic Board, Aluminum Composite Panel

\* The actual spindle rpm will vary slightly from the listed values for each step setting. They will normally be repeatable.

## **Vortex Air Pump (OPTIONAL)**

Model	ZBW-160E
Motor	7.5 HP (5.5kw)
Power	220V, 3Ph, 60Hz, 20A
Speed	1700Rpm
Maximum Flow Rate	5650ft <sup>3</sup> /h (160m <sup>3</sup> /h)
Maximum Pressure	-1775lbs/ft <sup>2</sup> (-85Kpa)





## UNPACKING AND CHECKING CONTENTS

Your Baileigh machine is shipped complete. Separate all parts from the packing material and check each item carefully. Make certain all items are accounted for before discarding any packing material.



**WARNING: SUFFOCATION HAZARD!** Immediately discard any plastic bags and packing materials to eliminate choking and suffocation hazards to children and animals.

If any parts are missing, **DO NOT** place the machine into service until the missing parts are obtained and installed correctly.

## Cleaning



**WARNING: DO NOT USE** gasoline or other petroleum products to clean the machine. They have low flash points and can explode or cause fire.



**CAUTION:** When using cleaning solvents work in a well-ventilated area. Many cleaning solvents are toxic if inhaled.

Your machine may be shipped with a rustproof waxy coating and/or grease on the exposed unpainted metal surfaces. Fully and completely remove this protective coating using a degreaser or solvent cleaner. Moving items will need to be moved along their travel path to allow for cleaning the entire surface. For a more thorough cleaning, some parts will occasionally have to be removed. **DO NOT USE** acetone or brake cleaner as they may damage painted surfaces.

Follow manufacturer's label instructions when using any type of cleaning product. After cleaning, wipe unpainted metal surfaces with a light coating of quality oil or grease for protection.



**Important:** This waxy coating is **NOT** a lubricant and will cause the machine to stick and lose performance as the coating continues to dry.





## **TRANSPORTING AND LIFTING**



**IMPORTANT:** *Lifting and carrying operations should be carried out by skilled workers, such as a truck operator, crane operator, etc. If a crane is used to lift the machine, attach the lifting chain carefully, making sure the machine is well balanced.*

### **Follow these guidelines when lifting with truck or trolley:**

- The lift truck must be able to lift at least 1.5 – 2 times the machines gross weight.
- Make sure the machine is balanced. While transporting, avoid rough or jerky motion, and maintain a safe clearance zone around the transport area.
- Use a fork lift with sufficient lifting capacity and forks that are long enough to reach the complete width of the machine.
- Remove the securing bolts that attach the machine to the pallet.
- Approaching the machine from the side, lift the machine on the frame taking care that there are no cables or pipes in the area of the forks.
- Move the machine to the required position and lower gently to the floor.
- Level the machine so that all the supporting feet are taking the weight of the machine and no rocking is taking place.

## **INSTALLATION**

### **IMPORTANT:**

Consider the following when looking for a suitable location to place the machine:

- Overall weight of the machine.
- Weight of material being processed.
- Sizes of material to be processed through the machine.
- Space needed for auxiliary stands, work tables, or other machinery.
- Clearance from walls and other obstacles.
- Maintain an adequate working area around the machine for safety.
- Have the work area well illuminated with proper lighting.
- Keep the floor free of oil and make sure it is not slippery.
- Remove scrap and waste materials regularly, and make sure the work area is free from obstructing objects.



- It is important to maintain free area around the machine, which is required for the working place. If any long material is machined, it is necessary to have a sufficient room in front of the machine as well behind it in the places of material input and output.
- **LEVELING:** The machine should be sited on a level, concrete floor. Provisions for securing it should be in position prior to placing the machine. The accuracy of any machine depends on the precise placement of it to the mounting surface.
- **FLOOR:** This tool distributes a large amount of weight over a small area. Make certain that the floor is capable of supporting the weight of the machine, work stock, and the operator. The floor should also be a level surface. If the unit wobbles or rocks once in place, be sure to eliminate by using shims.
- **WORKING CLEARANCES:** Take into consideration the size of the material to be processed. Make sure that you allow enough space for you to operate the machine freely.
- **POWER SUPPLY PLACEMENT:** The power supply should be located close enough to the machine so that the power cord is not in an area where it would cause a tripping hazard. Be sure to observe all electrical codes if installing new circuits and/or outlets.



## **GETTING TO KNOW YOUR MACHINE**

This NC machine is designed to give you years of safe service. Read this owner's manual in its entirety before assembly or use.

The advantage of the NC machine is that it can, in most cases fully machine the complete job without it being removed from the table so that you have finished parts of high accuracy that are extremely repeatable.

It can also produce intricate carvings with the purchase of the relevant software. Nesting is also a valuable feature of NC machining that saves on waste and costs.

- **Bed.** The bed of the machine consists of a durable phenolic deck spaced by aluminum "T-slot channels supported by a heavy steel frame. The "T" slots are used to clamp the job or fixtures to the bed.



**Note:** *This table is Vacuum Ready. The table has grooves and vacuum ports built in. This also includes the plumbing for the vacuum system. The vacuum pump is sold separately and may be added at any time.*

- **Gantry.** The gantry straddles the bed and carries the router spindle motion system. It is moved along the length of the bed by a rack and pinion system that is controlled by the machine controller.
- **Router Spindle.** The router spindle is moved along the gantry by a rack and pinion system that is controlled by the machine controller.
- **Frame.** The frame is a heavy welded construction that supports all the other parts of the machine.
- **Electrical Control Cabinet.** The electrical control cabinet is a separate console that may be positioned as needed by the operator within the length of the connecting cables. The operator must however consider: that the position of the cabinet provides quick access to the emergency stop if needed, does not interfere with the operation of the gantry, or loading and unloading of material, does not place the cords in a position they will cause a tripping hazard, or damage the cords.
- **Cable Reel Track.** The cable reel track runs along the side of the machine in a trough and carries all the electrical cables.



## ASSEMBLY AND SET UP

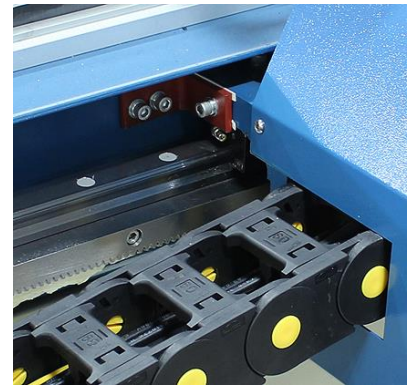


**WARNING:** For your own safety, **DO NOT** connect the machine to the power source until the machine is completely assembled and you read and understand the entire instruction manual.

### Shipping Braces

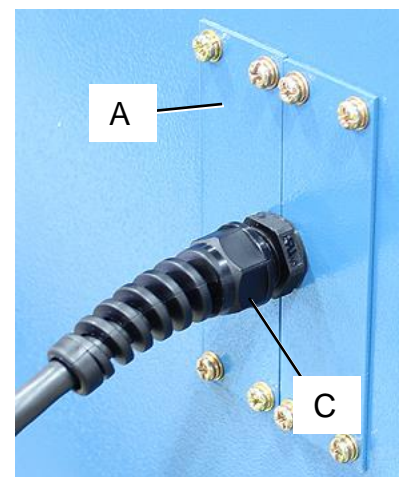
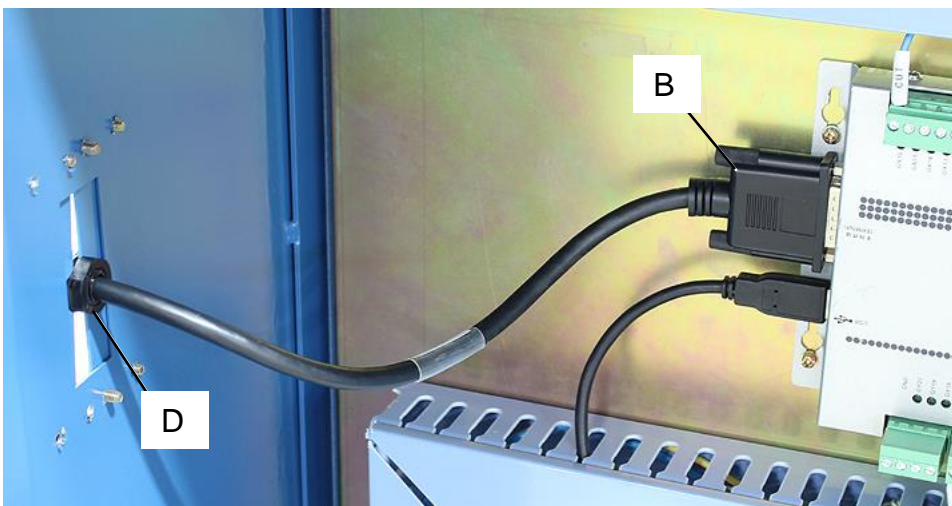


**IMPORTANT:** Remove the shipping braces securing the gantry to the table (4) to prevent movement during shipping.



### Hand Held Controller Connections

1. Open the electrical cabinet doors to gain access to the operating controller.
2. Remove the eight screws and the two covers (A) to allow the plug end of the hand-held cable to be routed into the control cabinet.
3. Route the plug and cable to the controller and connect the plug (B) to the board and ensure that the screws are finger tight. Verify that the USB connector has not been loosened.
4. Slide the cord relief up to the cabinet access covers and ensure that the one retaining nut (C and D) is on each side of the covers.
5. Install the cover around the cord relief and over the opening.
6. Tighten the inside nut (D) enough to hold the cord relief in position. Do not over tighten.
7. Close and latch the door.







## Dust Hose Connections

This machine is equipped with a dust collection port.



**Note:** A dust collector and ducting is optional and not included with the table.

The minimum required air speed at the end of flexible tube is 20 m/sec. The minimum required air volume of the machine is 750 m<sup>3</sup>/hr. (43,000~49,000 cu. ft./hr.). Use antistatic and electrically conductive hoses only.



**IMPORTANT:** Use care and planning when attaching and routing flexible hose for dust collection. DO NOT create an entanglement hazard or a trip hazard or an interference of the work station when routing the hose(s).

The 4" (100mm) dust port is part of and on the top of the router head.

When connecting the flexible hose, plan for:

- The hose to travel with the router head when the machine is in operation.
  - Positioning so as NOT to interfere with the operator or the work piece.
  - Prevention of the hose from creating a trip or entanglement hazard.
  - Having the hose secured to the port to prevent accidental detachment during operation.
1. Using the six cap screws installed in the top of the X, Z motor cover, install the dust hose adaptor support (A) to the top of the motor cover.
  2. Connect the adaptor hose onto the dust brush and the adaptor support and secure in place using a hose clamp on each end.





### **Dust Hose Support Pole**

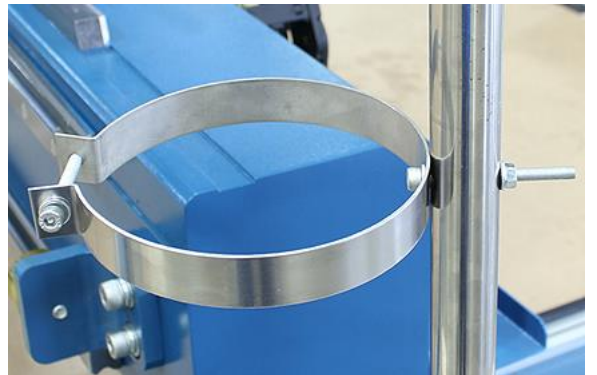
This table includes a support arm and support pole which may be installed and used to support and guide the dust collection hose during operation. The hose may be mounted to the pole which in turn is installed into the support arm, which allows the pole to pivot and track with the spindle during operation.

If your application uses a central vacuum system, then the support arm and pole may not be needed. If that is the case, then it will not be necessary to install the support arm and pole.



**IMPORTANT:** During the installation, be sure to test that the hose will reach to the full extent of the spindle travel. Test the fit to all four corners of the table.

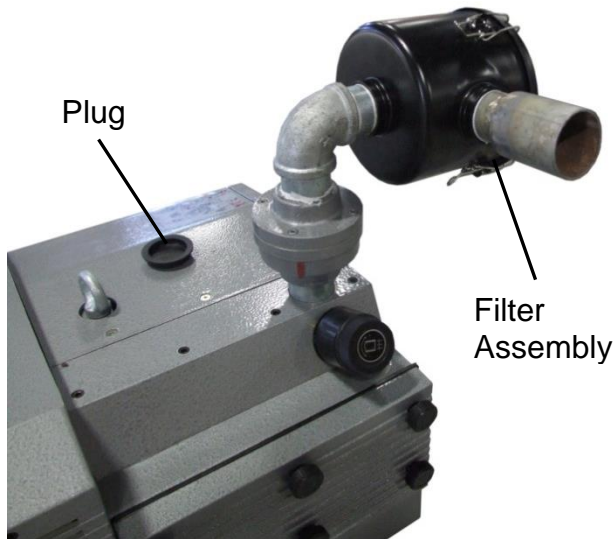
1. Remove the six bolts installed in the frame, and then attach and secure the support arm to the frame using the six bolts.
2. Install the support pole into the support arm so that it will reach up and over the table to near the mid-point of the table.
3. The support pole has 10 predrilled mounting holes for the hose clamps. Use at least two of the six hose clamps to secure the hose to the support pole.
4. Space and install the hose clamps as needed to route the hose to the dust collector or central ducting system.





### **VACUUM PUMP (Optional)**

1. Verify that the label on the pump indicates the correct power requirements, 220V, 3ph, 20A.
2. Place the vacuum pump at the rear of the table within reach of the main vacuum port. Leave a minimum of 6" (153mm) of open space on all side of the pump for air flow and service access.
3. Remove the hole plug and apply Teflon tape to the threaded nipple and screw the filter assembly into the hole of the pump as shown.
4. Route the Push the end of the vacuum hose from the table onto the filter assembly fitting, and secure with two hose clamps.

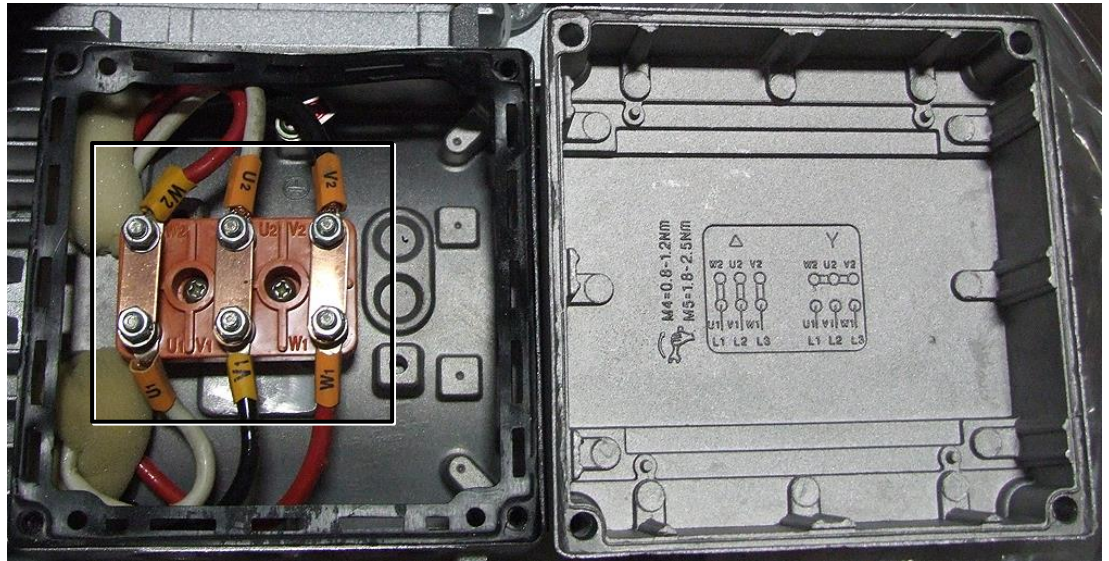


5. Have an electrician connect power to the vacuum pump on a separate 220V, 3ph, 30A (min.) circuit (customer supplied) following the safety and circuit considerations listed in the ELECTRICAL section.





6. Connect the L1, L2, and L3 wires to the terminal block using the Delta ( $\Delta$ ) wiring on the motor as shown.



7. Once power is connected to the entire machine, verify that the motor is rotating in the direction as indicated by the arrow on the motor cap to create a vacuum.
8. If not, disconnect power to the machine, and switch the L1 and L3 wires. DO NOT move the ground wire.
9. Once In operation, clean the filter frequently, daily to weekly depending upon the usage of the system.





## **ELECTRICAL**



**CAUTION:** HAVE ELECTRICAL UTILITIES CONNECTED TO MACHINE BY A CERTIFIED ELECTRICIAN!

Check if the available power supply is the same as listed on the machine nameplate.



**WARNING:** Make sure the grounding wire (green) is properly connected to avoid electric shock. DO NOT switch the position of the green grounding wire if any electrical plug wires are switched during hookup.

### **Power Specifications**

Your tool is wired for 220 volts, 60Hz alternating current. Before connecting the tool to the power source, make sure the machine is cut off from power source.

Before switching on the power, you must check the voltage and frequency of the power to see if they meet with the requirement, the allowed range for the voltage is  $\pm 5\%$ , and for the frequency is  $\pm 1\%$ .

### **Considerations**

- Observe local electrical codes when connecting the machine.
- The circuit should be protected with a time delay fuse or circuit breaker with a amperage rating slightly higher than the full load current of machine.
- A separate electrical circuit should be used for your tools. Before connecting the motor to the power line, make sure the switch is in the "OFF" position and be sure that the electric current is of the same characteristics as indicated on the tool.
- All line connections should make good contact. Running on low voltage will damage the motor.
- In the event of a malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce the risk of electric shock. This tool is equipped with an electric cord having an equipment-grounding conductor and a grounding plug. The plug must be plugged into a matching outlet that is properly installed and grounded in accordance with all local codes and ordinances.



**WARNING:** In all cases, make certain the receptacle in question is properly grounded. If you are not sure, have a qualified electrician check the receptacle.

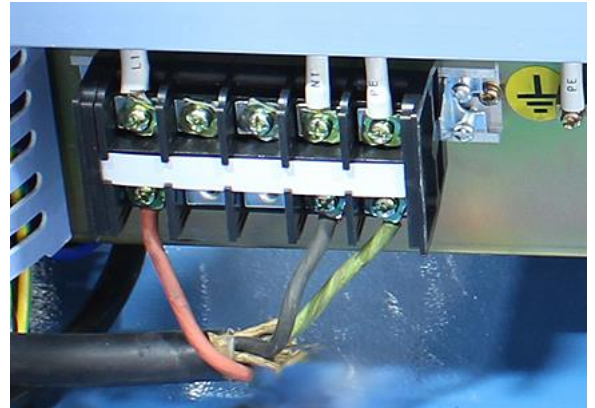




- Improper connection of the equipment-grounding conductor can result in risk of electric shock. The conductor with insulation having an outer surface that is green with or without yellow stripes is the equipment-grounding conductor. If repair or replacement of the electric cord or plug is necessary, do not connect the equipment-grounding conductor to a live terminal.
- Check with a qualified electrician or service personnel if the grounding instructions are not completely understood, or if in doubt as to whether the tool is properly grounded.
- Repair or replace damaged or worn cord immediately.

### **Power cord connection:**

1. Unlock and open the electrical enclosure door.
2. Route a power cord (customer supplied) from the machine toward the power supply.
  - a. Route the power cord so that it will NOT become entangled in the machine in any way.
  - b. Route the cord to the power supply in a way that does NOT create a trip hazard.
3. Connect the two power wires terminals L1, & L2. Connect the ground wire (typically green) to the PE block.
4. Check that the power cord has not been damaged during installation.
5. Close the electrical enclosure door. DO NOT operate with the door open.
6. When the machine is clear of any obstruction. The main power switch may be turned ON to test the operation. The controller will power ON, and Turn the switch OFF when the machine is not in operation.
7. Turn the main disconnect switch OFF when the machine is not in operation.





## MACHINE OPERATION

**⚠ CAUTION:** Always wear proper eye protection with side shields, safety footwear.

### Main Cabinet Controls

The control console is a semi portable cabinet that can be positioned as needed within the length of the operating cables.

By using the portability of the control cabinet along with the portability of the hand-held control, the operator will be able to position themselves in a location by which they can see the operation of the machine and safely start and stop the machines actions.



**IMPORTANT:** Watch and be aware of the routing of the cords between the control cabinet and the table so that they will NOT become a trip hazard or get entangled in the machine in any way.

The switch controls on the face of the control cabinet are from left to right:



Emergency Stop Button	In the event of incorrect operation or dangerous conditions, the machine can be stopped immediately by pressing the <b>E-STOP</b> button. Twist the emergency stop button clockwise (cw) to reset. <b>Note:</b> Resetting the E-Stop will not start the machine.
Off Button	The Off button will illuminate in Red when power is connected to the control cabinet and the table is Not powered On. When the table is powered On, the light will be off. When the machine is in operation, pressing the System button will shut down the machine operation.
On Button	When the table is ready for operation, press the On button to start the system and allow the system to boot up. When the system is On, the On button will illuminate in Green. When the table is Off the light will be off.
USB Port	The USB port is located on the side of the cabinet.



**CAUTION:** Always wear proper eye protection with side shields, safety footwear, and leather gloves to protect from burrs and sharp edges. When handling large heavy materials make sure they are properly supported.

### Turning the Table ON



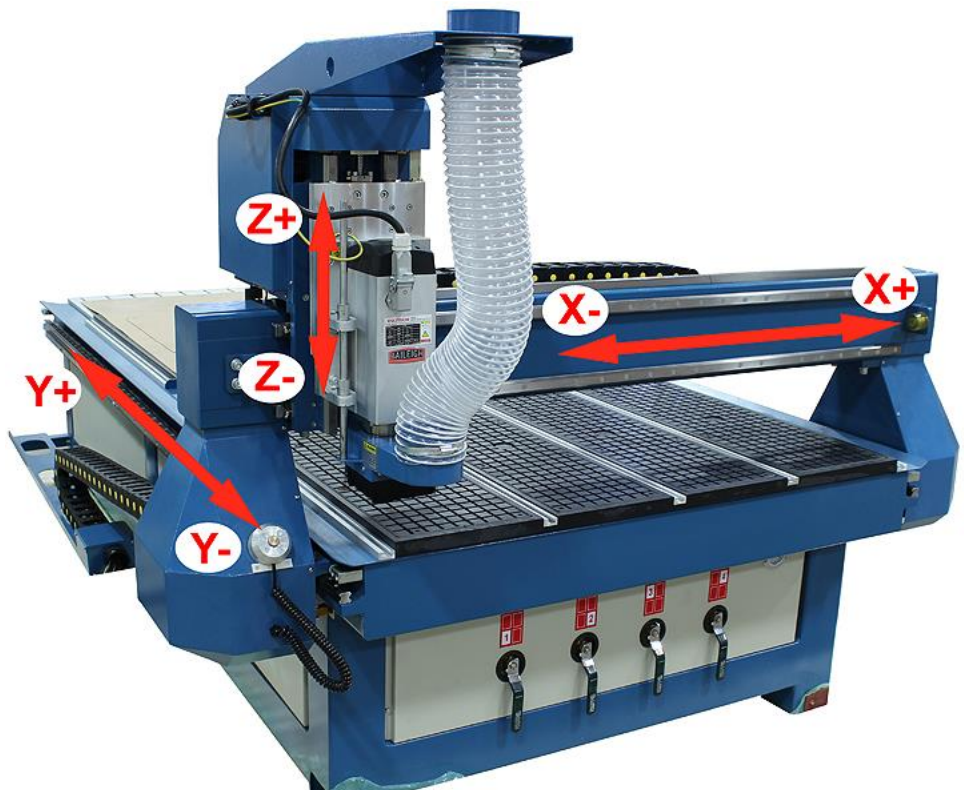
**Note:** Before you turn on the machine, remove all tools and other objects from the machine table.

1. Release the emergency stop by twisting clockwise (**cw**) and it will pop out.
2. Turn the main disconnect switch to the **ON** position to supply power to the console.
3. Press the green On button to power on the machine.
4. The hand held controller should power ON illuminating the display. The screen will display “**Back to REF. point?**” Make sure that the table surface is clear of obstructions and press the **OK** button.
5. The router head will move to the home position on the table.



**Note:** Home is a mechanical position that is a constant. It is determined by switches on each of the 3 axes.

- **X** = Across (from left-to-right when standing in front of the machine)
- **Y** = Length (from front-to-back when standing in front of the machine)
- **Z** = Vertical (up and down).





## **Operation Mode**

### **Auto Mode**

Under automatic operation mode, the head generates motions through the program loaded into the controller.

### **Manual Mode**

The manual mode provides two movement control options to meet the requirements desired under different situations. The system provides "Jog" and "Step" motion modes.

- Jog motion mode: Jog mode is often the mode used to move the head about the table to set the rough position of the head. The head will move as long as the axis key is pressed.
- Step motion mode: this motion mode is applicable to tuning the mechanical coordinates accurately.

## **Operation State**

In terms of the motion mode of the head, each operation mode can be divided into the following types of operation states. It is operation mode and operation state that decide the state of the system and then the operation of the machine.

### **IDLE State**

Idle state is the most common state. Under this state, the machine has no motion to output, but is ready to accept any new task.

### **ESTOP State**

This is an abnormal state. When there is an error in the hardware of the table. The system will enter into this state and implement the predetermined protection actions, such as stopping spindle motor and axis movement. Under this state, the machine is locked and cannot carry out any new action.

### **Running State**

When the machine is implementing any action, the system enters into Running State.

### **Pause State**

When a machine is running, if user presses the combination key of "pause during processing", the system will enter into PAUSE state and wait for further instruction. At this time, the user can press the "Start" key to make the system enter into "Running" state, or press the "Stop/ Cancel" key to make the system stop.

### **LOCK State**

Lock state is an internal state occurring at the time of software limit operation.



## **Machine Coordinate System**

Coordinate system is a terminology that is used to describe the motion of the head. For the sake of unification, standard coordinate system adopts the right-hand rule.

The basic coordinate axes of NC and CNC machines are X-axis, Y-axis, and Z-axis. The positive and negative directions of the axes are based upon the "Home" position which is the "0, 0" position.

- Z axis is the head moving up and down. The direction of the head moving up (away from the workpiece) is its positive direction (+Z).
- X-axis is the head moving left and right across the width of the table. The direction of the head moving to the right from the home position is its positive direction (+X).
- Y-axis is the head moving along the length of the table. The direction of the head moving away from the home position is its positive direction (+Y).

## **SYSTEM START UP**

When power is turn ON, the system will boot up.

Booting the system...

After system boot-up is complete, "Back to REF. Point" will be displayed. Press OK to cause the head (all axes) to move to the HOME position (recommended), or ESC to cancel this operation.

Back to REF. Point?

OK

ESC

When the head is back at the home position, the operating screen will display.

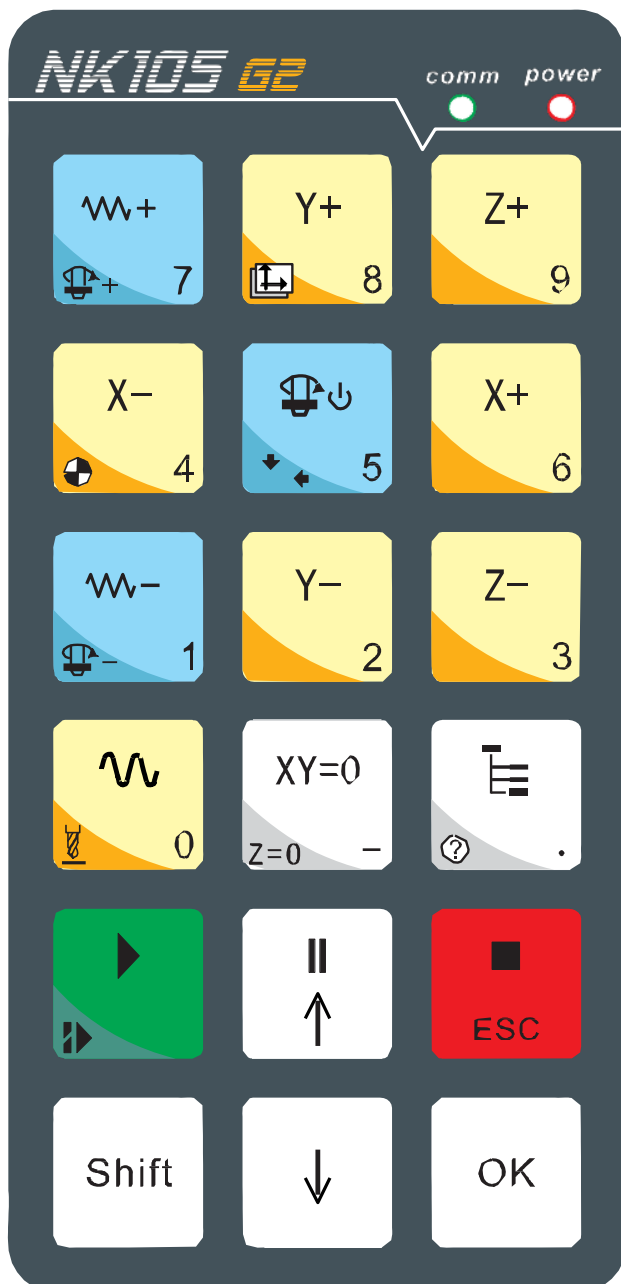
1X	0.000	Idle
1Y	0.000	SOff
1Z	0.000	Slow
Jog		100%





## Functions & Operation Methods of Panel Keys
















The NK105 control panel is operated with either single key or a combination keys to complete a task. Single key operation may be press and release or press and activation. The combination key functions are all press (both keys) and release operation.





## Single-key Function

### Single-key function table

Key icon	Key name	Function
	Override+	Increase of feed rate override (This will increase the feed rate at 10% increments to a maximum of 120% of the set feed rate.); Input of number 7; Increase of spindle speed with the help of auxiliary key when spindle port has input.
	Y+	Positive shift of Y axis; input of number 8; switch between MCS and WCS with the help of auxiliary key.
	Z+	Positive shift of Z axis; input of number 9.
	X-	Negative shift of X axis; input of number 4; returning to mechanical origin (Home) with the help of auxiliary key.
	Spindle start/stop	Start or stop of spindle under manual mode; input of number 5; back to workpiece origin with the help of auxiliary key.
	X+	Positive shift of X axis; input of number 6.
	Override-	Decrease of feed rate override (This will decrease the feed rate at 10% increments to zero [travel stopped].); Input of number 1; Decrease of spindle speed with the help of auxiliary key when spindle port has input.
	Y-	Negative shift of Y axis; input of number 2.
	Z-	Negative shift of Z axis; input of number 3.
	Speed switchover	Switch between manual high/low speed; input of number 0; Tool touch-off setting with the help of auxiliary key.
	Setting origin	Sets (zeros) the workpiece origin of X and Y axes; Input of minus; Sets (zeros) the origin of Z axis with the help of auxiliary key.
	Menu	Entering menu page; input of decimal point; entering image update page at the time of system start-up.
	Start	Start key; breakpoint resuming with the help of auxiliary key.
	Up	Suspend (pause) processing; Up direction key. Moves the cursor up in the various menus.
	ESC	Stop processing; cancellation of various selections, inputs and operations.













Shift	Shift	Auxiliary key
↓	Down	Down direction key. Moves the cursor down in the various menus.
OK	OK	Entering manual high/low speed adjustment page under menu page; confirmation of various selections, inputs and operations

### **Function Information of Combination Key**







The usage of combination key is as follows: press the first key then the second; release the two keys simultaneously after the corresponding content appears.


### **Combination key function table**




Key icon	Function
Shift + 	Increase of spindle speed (rpm)
Shift + 	Switch between WCS and MCS
Shift + 	Back to mechanical origin (Homing all axes)
Shift + 	Back to workpiece origin
Shift + 	Decrease of spindle speed (rpm)
Shift + 	Tool Touch-off Setting (Sets the length of the bit.)
Shift + 	Z clear
Shift + 	Breakpoint resuming
Shift + 	Entering help page
Shift + 	Jiggle at pause



## Router Head Positioning

Use the , , , , , and  key to move and position the router head to the desired position on the table.

Use the  key to control the speed of the head travel.

When the head is in the desired position, press the  key to set the workpiece origin of the X and Y axes. Press the combination of the  + the  keys to set the workpiece origin of the Z axis.

The controller will use this point as the starting point for the X and Y axes.

## Setting the Z origin point [tool touch off]



The machine needs to know when the router bit is just touching the top of the workpiece. When installing a router bit into the collet, the tip of the router bit will be at a different height above the work piece each time it or a different bit is installed. The touch pad allows for zeroing of the tip so that the system can accurately calculate the depth of a cut.

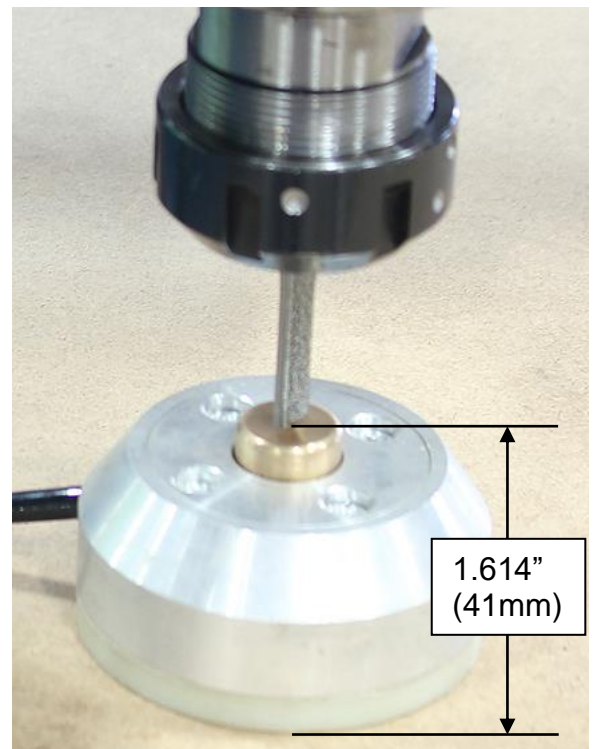
The C.A.D. disk is connected to the controller electrically. When the tip of the bit touches the C.A.D. disk, the controller now knows the exact distance the tip of the bit is above the surface of the work piece. This is then used by the controller to calculate the full cut depth as based upon the machining program.

1. Install the desired bit into the spindle.
2. Move the spindle over the highest point of the workpiece to be machined.
3. Place the CAD disk on the material directly under the tip of the bit (will require it to be held in position)



**Note:** Be prepared to press the ESC key if needed. Pressing the ESC key will cancel the C.A.D. function and no Z zero position will be recorded.

4. Press the compound keys of  +  and release at the same time to access the C.A.D function.
5. The Z axis will lower slowly. When it reaches the C.A.D., it will go up slightly. The Z axis working origin (zero point) is now set.





## MACHINING PROCEDURE



**CAUTION:** Always wear proper eye protection with side shields, safety footwear, and leather gloves to protect from burrs and sharp edges. When handling large heavy material make sure they are properly supported.

1. Verify that the interconnect cables have been properly installed and that electrical service has been provided to the control console and if installed the dust collector by a qualified electrician.
2. Place the material to be machined on the table and secure it as directed in "ATTACHING WORKPIECE".
3. Assemble and install the desired bit into the router head as directed in "ROUTER BIT INSTALLATION AND REMOVAL".
4. Power up the control console and if used, the dust collector.
5. Allow the system to boot up, and select OK when asked to complete the homing process.
6. Install a USB flash drive (UDisk) into the connector and load the desired program.

### Loading a Program



**CAUTION:** The router head with the spindle turning will be moving around the table once the program is loaded. Verify that the table is clear and that the tooling will only contact intended material which is properly secured to the table. Failure to clear the surface or secure the material can cause serious injury.

The console has a USB port located on the control console.



**Note:** Never use a memory stick with a format other than FAT32. If you do it will crash your machine computer. Contact technical support should this occur. It is recommended that if you use additional memory sticks, they be formatted to FAT32 and identified for NC machine use only.




**IMPORTANT:** Ensure that the spindle is clear of any persons, parts, pieces, and or tooling. The spindle will start to turn and could cause injury.



1. Load your \*.nc program onto the USB flashdrive.
2. Plug the USB into the USB slot in the console.








3. Press the  key. The menu screen will display the file location choices.


1	Local File
2	USB Files
3	Operations
4	Oper Param

4. Use the  key to select the USB File and press .

Test1.nc	
FakeKey.nc	
4x4Star.nc	✓
U: ①Ld②De③Copy	




5. When the files are listed, use the  or  arrow keys to select the file that you want to load into the controller.
6. When the program you want is highlighted, press the  key to select the desired file. This will place a check mark at the right side of the screen for the program selected.
7. When the desired file is selected, press 1 to load the file, 2 to delete the file or 3 to copy the file. Normal operation from the USB drive will be to Load the file.
8. The screen will change to show the main operating screen.


1X	0.000	Idle
1Y	0.000	SOff
1Z	11.000	Slow
Jog		100%


9. Pressing the  key will OK open the operational parameter screen. This will allow the operator to edit the travel speed of the head during the machining operation.



MSpd	6000	/3000
StepXY	10.000	
StepZ	1.000	
File	4x4Star.nc	

10. Use the  or  arrow keys to highlight the desired value to edit. Then use the digit keys to enter the desired values and press the  key to accept the change.

11. Press the  key to return to the main operating screen.



12. Verify that the spindle and the table are clear and safe for operation. Press the  key to start the machining operation.





1X	999.000	Run
1Y	999.000	1S
1Z	-99.000	Slow
F:3600	100%	



**Note:** The coordinates for the X, Y, and Z axis will be the values that the spindle is at and will be changing as the head moves to complete the program. The “F” rate (travel speed) will also change as the program is running.


13. The spindle will start and come to full (as set) rpm and the operating screen will display the operating information as the program is running.

14. During the operation of a program, the travel speed may be changed in 10% increments from 0% (stopped) to 120% by pressing the  or the  keys.

15. The spindle rpm may be changed by pressing the combination of the  + , or the  +  keys. This will change the spindle speed from 0S stopped, up to 7S, maximum spindle rpm.



OK

16. When the program is completed, pressing the  key will display the program process information. This will be the file name and the time in hours, minutes and seconds in which it took to run the program.
17. The head will remain at the end position from the program. The operational key may be used to move the head to a location which provides the safest and easiest access to the material to be removed or repositioned, or for a tool change.



## **ATTACHING THE WORKPIECE**



**CAUTION:** The router head with the spindle turning will be moving around the table once the program is loaded. Verify that the table is clear and that the tooling will only contact intended material which is properly secured to the table. Failure to clear the surface or secure the material can cause serious injury.

There are two methods of attaching the workpiece during the machining process. These may be used together or separately. Using both methods together is recommended.

### **Mechanical Clamping**

This machine is equipped with 5 T-Slot rails evenly spaced within the cutting surface. Using the T-Slots and the simple leverage clamps, will hold the material to the surface and prevent movement during the machining process. This job attachment method can only be used if the outside edges are not being machined. When using the clamps, place a piece of packing under the jacking bolt to protect the bed of the machine.



### **Vacuum Clamping (Optional, when installed)**

This machine is vacuum ready. If the vacuum pump was purchased, the vacuum system can be used to hold the material to the table. It may be necessary to use additional retaining methods such as double-sided tape or adding stop cleats to prevent the material from sliding and shifting during machining. This can be most noticed with smooth materials that have a low amount of friction to prevent sliding.



When using vacuum, make sure there is no foreign matter on table and keep it clean before working so that the machine has enough vacuum force. It is recommended to use a double-sides adhesive tape or sealant (customer supplied consumables) to create the seal between the table and the sacrificial board and or material.

Open and close the vacuum valves at the front of the table to direct the vacuum force toward that area of the table that is being used to hold material. Insert the port plugs into the unused ports to prevent debris from entering the ports and clogging the vacuum filter.

### **Vacuum Considerations**

- Regularly clean the vacuum system air filters and passages to ensure enough vacuum force.
- Seal as much of the surface between the table and the workpiece and possible to limit vacuum leakage.
- When using spoil board (typical and recommended) such as MDF or similar, use a fly cutter to machine both surfaces to remove just enough material to open the pours of the material to allow the vacuum to suck through the material. Be sure to seal the edges and any areas not covered by the workpiece.
- Consider having more than one spoil board. Having spoil board that are made for specific machining operations that may be repeated will allow for the spoil board to be customized with holes and or slots through the spoil board to the table surface. This can increase the vacuum force that will pass through the spoil board to hold the workpiece. Be aware however, that if these passages are used on a workpiece that allows these holes to be open and uncovered, this will reduce the hold force of the vacuum.

### **SACRIFICIAL BOARD**

(Spoil Board)



**Note:** Do not confuse flatness with bow. If the board is bowed it may not stick down. Never use a bowed board as a sacrificial board.

A popular method to fixture parts onto the table is to use a sacrificial board attached to the machine table with two sided or double-stick tape. The sacrificial board should be a flat smooth material such as 1/2" thick, MDF, melamine covered particle board or other smooth material. The parts to be machined can also be attached to the melamine surface with two-sided tape.

Ideally, the sacrificial board needs to be positioned in the center of the machine's work envelope if possible, to provide the greatest flexibility.

1. Using the design program that you have purchased for your machine, draw the work envelope that corresponds to your machine.
2. The lower-left corner of the work envelope is actually the machine's home position (X0, Y0 in the drawing).





3. Then draw the sacrificial board, example, a 48" X 48" (1219mm x 1219mm) square and locate it in the center of the work envelope.
4. Note the dimension that the corner of the square is from the home position.
5. This will provide you the exact location of the sacrificial board's lower left corner.
6. An easy way to set this position is to fit a pointed bit into the router spindle and jog the router spindle to the corner position based on the coordinates determined in the drawing and align the sacrificial board with this position. This procedure will also give you practice in jogging the router spindle to a required position.

### **Precautions regarding sacrificial boards**

The sacrificial board will become porous when the melamine has been cut through, and will absorb moisture. As moisture is absorbed the dimensions of the board will change. In general, this will not be a problem as the changes from day to day are typically very small. Also, the changes will in general be over the complete board.

There are however exceptions. Do not allow the board to become wet. If the board does become wet, remove the board from the machine and replace with a new board. Allowing the board to dry may take several days. Once the board has completely dried it may be possible to plane the board and re-use it, but the likely hood is that it is scrap.

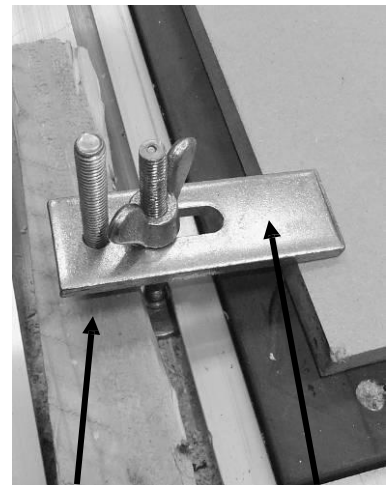
### **Attaching the Workpiece Using T-slots**

You may find it convenient to clamp the job to the sacrificial board using the table clamps. This job attachment method can only be used if the outside edges are not being machined.

When using the clamps, place a piece of packing under the jacking bolt to protect the bed of the machine.

### **Attaching Workpiece to Sacrificial Board**

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



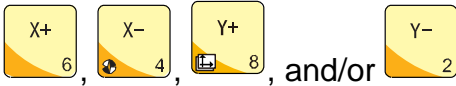
### **Removing Workpiece from Sacrificial Board**





Lift the part off the sacrificial board with a wide blade putty knife or similar tool.




### Moving the router head to the sacrificial board corner position.

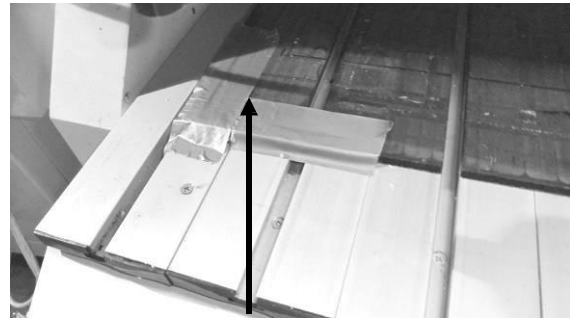
1. With the router head in the home position, lower the router bit to just above the sacrificial board top face.



2. Use the , , , and/or  keys to set the X and Y position to the corner dimension.
3. The point of the router bit is now located over the point that the corner of the sacrificial board will be.



4. Press the  key. This will set the origin and the machine has a new datum point and will be the X=0 / Y=0 in your design program.
5. Move the sacrificial board so that the corner of the sacrificial board is directly under the point of the router bit.
6. Place tape around the corner of the sacrificial board on the bed of the machine. This will give you a position to place the double-sided tape that will be used to attach the sacrificial board the bed of the machine.
7. Move the router head in the X+ direction so that it is approximately at the end of the sacrificial board.
8. Move the sacrificial board so that it lines up with the point of the router bit.
9. Place tape on the bed of the machine at the edge of the sacrificial board.
10. Move the router head to the end of the machine furthest X and Y position. The router head will be out of the way and allow you to have access to the bed of the machine.
11. Remove the sacrificial board.
12. Clean the bed of the machine so that there are no wood chips or dust. Apply double sided tape to the bed of the machine using the tape that you have just applied as reference. You need to apply three or 4 strips of double sided tape to the bed of the machine with sufficient length so that the sacrificial board is attached along its complete length and width.
13. Clean the sacrificial board so that the surface will adhere to the double-sided tape.
14. Remove the backing from the double-sided tape.
15. With 2 people, lift the sacrificial board over the table and lower so the reference tape that you applied to the bed of the machine aligns with the corner and edge of the sacrificial board.
16. Lower and press down so that the double-sided tape sticks to the sacrificial board. Do not worry if the sacrificial board is not perfectly aligned with the tape as you will have to reset the home position. The clamps can also be used to clamp the sacrificial board to the bed of the machine.



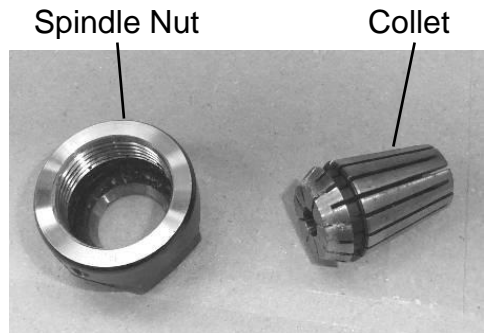


## ROUTER BIT INSTALLATION AND REMOVAL



**Note:** Collets & spindle collet hole must be cleaned regularly. Ensure that the slots in the collets are free of sawdust, as sawdust build up will keep the collet from compressing. If the collet or spindle holes are not clean, the router bit may not run true and this will affect the performance of your machine.

1. Disconnect and lockout power to the router table.
2. Select a router bit and its relevant collet.
3. Install the collet into the spindle nut. Press the collet into the spindle nut until it snaps into place. The face of the collet and the face of the spindle nut will be close to flush.



**Note:** The router bit must not be installed into the collet until the collet has been installed into the spindle nut. With the router bit installed into the collet, the collet cannot compress and snap into the spindle nut.



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



Collet fitted to Spindle Nut

4. Install the spindle nut and collet assembly onto the spindle thread by hand.
5. Press the bit into the collet. Verify that the flute of the router bit is not inside the collet and is at least a minimum of 1/16" (2.50mm) outside the collet.
6. Hold the router spindle with the supplied wrench and tighten the collet with a second wrench. Do not over tighten.



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





## **Router Bits**

Types of router bits.

There are five basic types of router bits: straight, up shear, down shear, combination (also called compression), and form tools (round over, ogee, etc.).

### **1. Straight Router Bits.**

These are the standard router bits that are commonly used with handheld routers and are readily available at most home centers.



### **2. Up Shear Router Bits.**

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

Ball nose Router Bits are a variation of the up shear bit design but have a radius end. These bits are typically used for 3D surfacing applications.

### **3. Down Shear Router Bits.**

These bits are similar to the up shear but with an opposite spiral that actually tends to pack the chips into the kerf. These bits prevent chipping the material surface, especially with veneers or melamine surfaces.

### **4. Combination (Compression) Router Bits.**

These bits combine the advantages of both up shear and down shear designs. The top section of the tool is down shear to prevent chipping the top surface of the material and the lower part of the bit is up shear to prevent chipping the bottom surface of the material.

Combination Router Bits are the preferred configuration for machining veneered plywood as well as melamine surfaced product. A variation of the bit is called the "Mortising Compression" router bit. With this bit, the up shear portion of the bit is less than 1/4" (6mm) in length so that the bit can be used on 1/4" (6mm) veneered plywood and for dados.

### **5. Form Router Bits.**

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



## LUBRICATION AND MAINTENANCE



**WARNING:** Make sure the electrical disconnect is OFF before working on the machine.

Maintenance should be performed on a regular basis by qualified personnel.

Always follow proper safety precautions when working on or around any machinery.

### Daily Maintenance

- Check daily for any unsafe conditions and fix immediately.
- Check that all nuts and bolts are properly tightened.
- Do a general cleaning by removing dust and scrap from the T-slots on the bed. Keep area around machine clear of debris.
- Check that the control console circulating fans are working and the emergency stop button is in good working order.
- Clean the machine and lubricate unpainted surfaces with a Teflon lubricant. Wipe off any excess and buff with a dry polishing cloth. This will reduce the chance of rust forming.
- Check cutter teeth for chips and dullness. Sharpen or replace any worn or damaged tooling.
- Generally inspect the machine for damage and loose or worn parts.
- Collets & spindle collet hole must be cleaned regularly.
- Ensure that the slots in the collets are free of sawdust. As sawdust builds up it will stop the collet from compressing. If the collet or spindle hole is not clean, the router bit may not run true and this will affect the performance of your machine.
- Check the filters on the inlet of the vacuum pump for debris.
- Inspect the power plug and cord.



**Note:** When cleaning chips and debris from the machine, use a brush and a shop vacuum. **DO NOT** blow off the machine with compressed air. The force of the compressed air may force chips into critical mechanisms or may inflict injury to yourself or others.

### Weekly Maintenance

- Thoroughly clean the machine.
- Check any exposed electrical wiring for wear or damage.
- Inspect the power unit ground clamp for wear or damage.
- Clean the cutters.





- Generally inspect the machine for damage and loose or worn parts.
- Check the dust extraction system for blockages and any large scrap that could cause blockages.
- Check the screen on the inlet of the vacuum pump for debris.

#### **Monthly Maintenance**

- Tighten any loose bolts, nuts, or screws on the machine.
- Inspect the timing belts for wear (every 3 months).
- Grease the gear racks for the "X" & "Y" axes. Use a general purpose grease.



## **SOFTWARE INFORMATION**

Each new cutting table comes with one license of the latest version of BobCAD CAM Express software and Services provided by BobCAD-CAM.

Contact a representative from BobCAD-CAM to get started with BobCAD-CAM. The service representative will help to get you directed to the download links and the license activated. Whether drawing squares or squirrels, flanges or flowers, BobCAD-CAM will help to bring out your drafting artistry skills. Practice and Have Fun!

BobCAD-CAM Vxx (latest version) Express (Covers: Mill, Laser, Plasma, and Waterjet) This software is best for 2D/3D CAD and 2 axis shape cutting.

- DXF DWG IGES & More
- Shape Library, Stretch, Splines, Snap Grid
- Hole Patterns Gears CAMS Sprockets
- Profiling, Kerf Comp, Lead in/out, Backplotting
- Post Processor

### **BobART**

This software is best for image conversions and embossing.

- EPS AI PDF
- JPEG, BMP, Tiff, GIF, PNG, PSD, and more....
- Vectorize (convert images)
- Embossing, Texture, Smoothing
- V carving

### **1 Hour of Online Line Training**

This training is best to learn BobCAD-CAM Fast.

- One on One web training
- Your Parts
- Your Questions
- Your Office
- Video Recording of Training Session

### **1 Year Technical Support Package**

This support package will get you started.

- Expert Technical Support
- Starts from Day of Purchase
- Phone & Email
- Remote Access (connecting computers)

### **BobCAD-CAM Contacts:**

Licensing, Support  
727-489-0003  
support@bobcad.com

Sales, General Inquiry  
844-529-0660  
partners@bobcad.com



Use the information below to ensure you are working with a BobCAD-CAM supported and optimized system.

Use the following link to view the most up to date system requirements.

[http://bobcad.com/support/system-requirements/?source=webinars\\_footer](http://bobcad.com/support/system-requirements/?source=webinars_footer)

BobCAD-CAM is supported to run on the following Operating Systems:

- Windows 7
- Windows 8
- Windows 10

A 64 Bit System is needed.

BobCAD-CAM System Requirements

- Windows (Minimum)
- 64-bit Operating System
- 3GB RAM
- 256 MB Graphics Card\* that supports OpenGL 1.1
- Intel® or AMD® Processors\*\*
- 2GHz Processor
- Windows 10, Windows 8 or Windows 7
- Windows Indexing Service Must Be Enabled
- IE9 or above

Windows (Recommended)

- 6GB RAM or More on Windows 8 x64 Operating System
- 1GB Graphics Card\*
- Intel® or AMD® Processors\*\*
- 2GHz Processor (Multi-core) or higher
- Windows 10



**Note:**

*\*BobCAD-CAM's stability is dependent on the graphics card ability to process information; integrated memory graphics cards may work but are not recommended.*

*ATI® or NVIDIA® graphics cards with dedicated memory are recommended. The graphics card's software driver must be updated to the current software drivers released by the graphics card manufacturer.*

*\*4K displays are not currently supported and may require reducing your screen resolution.*

*\*\*BobCAD-CAM is not supported on Apple Macintosh® -based machines. Some customers have shown success in running BobCAD-CAM in a Virtual Windows environment on Mac computers using Boot Camp. While the end user may choose to run Windows on a MAC®, this is not supported by BobCAD-CAM Inc.*



## WR-84V with Wiehong CONTROLLER QUICK REFERENCE GUIDE

### Set X, Y Origin

- to move to desired location for origin
- location is now saved

### Set Z Origin

- lower tool approx. 1" above workpiece.
- Place C.A.D. disk on workpiece directly under the tool + , release.
- Tool will lower to touch off on disk; Z origin is now set.

### Adjust Speed During the Cut

- Spindle + or one step with each compound press. Will display on 1Y row as: F# (F0 -F7)
- Feedrate or 10% change with each press. Will display on bottom row as: % (0% - 120%)

### Load and Run Program

- Insert USB → Udisk file
- highlight desired program
- to select 1 to load.
- to start program.
- to pause cut, to stop cut.
- + restart at current location and point in program.
- restart from beginning of program.



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