

# **Grizzly** **Industrial, Inc.**®

## **MODEL G0678** **VARIABLE SPEED 8" X 30"** **VERTICAL MILL** **OWNER'S MANUAL** *(For models manufactured since 06/15)*



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## **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.**

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# 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 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](http://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.

		MODEL GXXXX MACHINE NAME	
SPECIFICATIONS		▲ WARNING!	
Motor:	To reduce risk of serious injury when using this machine:		
Specification:	Read manual before operation.		
Specification:	Wear safety glasses and respirator.		
Specification:	Ensure safety glasses/setup and		
Specification:	power is connected to grounded circuit before starting.		
Weight:	4. Make sure the motor has stopped and disconnect		
	power before adjustments, maintenance, or service.		
	5. DO NOT expose to rain or dampness.		
	6. DO NOT modify this machine in any way.		
	7.		
	8.		
	9. Do not operate if impaired by drugs or alcohol.		
	10. Maintain machine carefully to prevent accidents.		
Manufactured for Grizzly in Taiwan			

Manufacture Date

Serial Number



# Identification

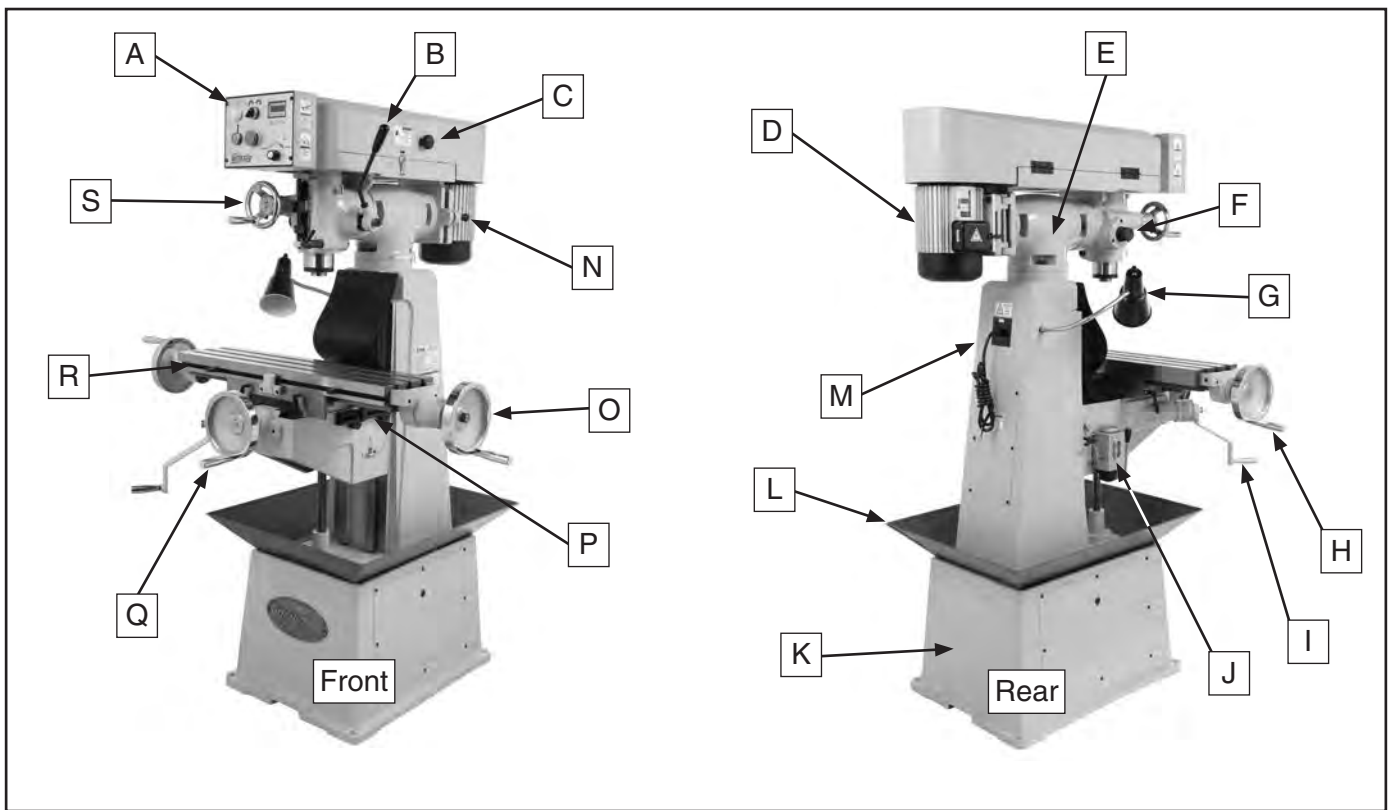
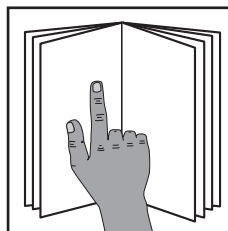


Figure 1. Model G0678 identification.

- |   |  |
|---|--|
| <b>A.</b> Control Panel (refer to <b>Page 17</b> for details) | <b>K.</b> Base                                 |
| <b>B.</b> Coarse Downfeed Handle                              | <b>L.</b> Splash Pan                           |
| <b>C.</b> V-Belt Cover  | <b>M.</b> Column                               |
| <b>D.</b> Motor 1½HP, 220V, 3-Phase                           | <b>N.</b> V-Belt Tension Adjustment Bolt       |
| <b>E.</b> Turret  | <b>O.</b> Longitudinal Handwheel               |
| <b>F.</b> Downfeed Selector                                   | <b>P.</b> Cross (Y-Axis) Feed Limit Stop Track |
| <b>G.</b> Work Light 110V                                     | <b>Q.</b> Cross Feed Handwheel                 |
| <b>H.</b> Longitudinal (X-Axis) Handwheel                     | <b>R.</b> Longitudinal Limit Stop Track        |
| <b>I.</b> Vertical (Z-Axis) Crank Handle                      | <b>S.</b> Fine Downfeed Handwheel              |
| <b>J.</b> One-Shot Oiler                                      |  |



## **WARNING**

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





# MACHINE DATA SHEET

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

## MODEL G0678 8" X 30" 1-1/2 HP VARIABLE-SPEED VERTICAL MILL

### Product Dimensions:

Weight..... 991 lbs.  
 Width (side-to-side) x Depth (front-to-back) x Height..... 40-1/2 x 42-3/4 x 67 in.  
 Footprint (Length x Width)..... 19 x 26 in.  
 Space Required for Full Range of Movement (Width x Depth)..... 68 x 45 in.

### Shipping Dimensions:

Type..... Wood Crate  
 Content..... Machine  
 Weight..... 1,210 lbs.  
 Length x Width x Height..... 45 x 45 x 76 in.  
 Must Ship Upright..... Yes

### Electrical:

Power Requirement..... 220V, Single-Phase, 60 Hz  
 Full-Load Current Rating..... 5A  
 Minimum Circuit Size..... 15A  
 Connection Type..... Cord & Plug  
 Power Cord Included..... No  
 Recommended Power Cord..... "S"-Type, 3-Wire, 16 AWG, 300 VAC  
 Plug Included..... No  
 Recommended Plug Type..... 6-15  
 Switch Type..... Control Panel w/Magnetic Switch Protection  
 Inverter (VFD) Type..... Rhymebus RM6S2  
 Inverter (VFD) Size..... 1 HP

### Motors:

#### Main

Horsepower..... 1.5 HP  
 Phase..... 3-Phase  
 Amps..... 3.3A  
 Speed..... 1725 RPM  
 Type..... TEFC Induction  
 Power Transfer ..... Belt  
 Bearings..... Shielded & Permanently Lubricated



**Main Specifications:**

**Operation Info**

Spindle Travel.....	3-1/2 in.
Max Distance Spindle to Column.....	7 in.
Max Distance Spindle to Table.....	20 in.
Longitudinal Table Travel (X-Axis).....	18 in.
Cross Table Travel (Y-Axis).....	7-1/2 in.
Vertical Table Travel (Z-Axis).....	17-3/4 in.
Turret or Column Swivel (Left /Right).....	360 deg.
Head Tilt (Left/Right).....	90 deg.
Drilling Capacity for Cast Iron.....	1 in.
Drilling Capacity for Steel.....	3/4 in.
End Milling Capacity.....	1 in.
Face Milling Capacity.....	3 in.

**Table Info**

Table Length.....	30 in.
Table Width.....	8 in.
Table Thickness.....	2 in.
Number of T-Slots.....	3
T-Slot Size.....	1/2 in.
T-Slots Centers.....	2-3/16 in.

**Spindle Info**

Spindle Taper.....	R-8
Number of Vertical Spindle Speeds.....	Variable
Range of Vertical Spindle Speeds.....	200 – 2250 RPM
Drawbar Thread Size.....	7/16-20
Drawbar Length.....	12-3/8 in.
Spindle Bearings.....	Angular Contact Bearings

**Construction**

Spindle Housing/Quill.....	Chrome-Plated & Precision-Ground Steel
Table.....	Hardened & Precision Ground Cast Iron
Head.....	Cast Iron
Column/Base.....	Cast Iron
Base.....	Cast Iron
Paint Type/Finish.....	Urethane

**Other Specifications:**

Country of Origin .....	Taiwan
Warranty .....	1 Year
Approximate Assembly & Setup Time .....	1 Hour
Serial Number Location .....	Machine ID Label

**Features:**


- One-Shot Lubrication
- High-Precision Ball Bearings
- Bronze Nut on Longitudinal & Cross Feed Leadscrews
- Variable Frequency Drive Speed Control
- Hardened and Precision-Ground Leadscrews
- Runs on Single-Phase Power Using a 3-Phase Inverter
- Work Light




# 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 clothing, apparel or jewelry that can become entangled in moving parts. Always tie back or cover long hair. Wear non-slip footwear to reduce risk of slipping and losing control or accidentally contacting cutting tool or moving parts.

**HAZARDOUS DUST.** Dust created by machinery operations may cause cancer, birth defects, or long-term respiratory damage. Be aware of dust hazards associated with each workpiece 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 Milling Machines

## 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, metal chips, workpieces, or adjustment tools thrown from the rotating spindle with great force. To reduce your risk of serious injury when operating this machine, completely 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 and secure. Always allow spindle to stop on its own. DO NOT stop spindle using your hand or any other object.

**WEAR FACE SHIELD.** Always wear a face shield in addition to safety glasses. This provides more complete protection for your face than safety glasses alone.

**USE CORRECT SPINDLE SPEED.** Follow recommended speeds and feeds for each size and type of cutting tool. This helps avoid tool breakage during operation and ensures best cutting results.

**INSPECT CUTTING TOOL.** Inspect cutting tools for sharpness, chips, or cracks before each use. Replace dull, chipped, or cracked cutting tools immediately.

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

**POWER DISRUPTION.** In the event of a local power outage during operation, turn spindle switch **OFF** to avoid a possible sudden startup once power is restored.

**CLEAN MACHINE SAFELY.** Metal chips or shavings can be razor sharp. DO NOT clear chips by hand or compressed air that can force chips farther into machine—use a brush or vacuum instead. Never clear chips while spindle is turning.

**SECURE WORKPIECE TO TABLE.** Clamp workpiece to table or secure in a vise mounted to table, so workpiece cannot unexpectedly shift 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 necessary 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 mill/drill is turned **OFF**, disconnected from power, and all moving parts have come to a complete stop before changing cutting tools or starting any inspection, adjustment, or maintenance procedure.

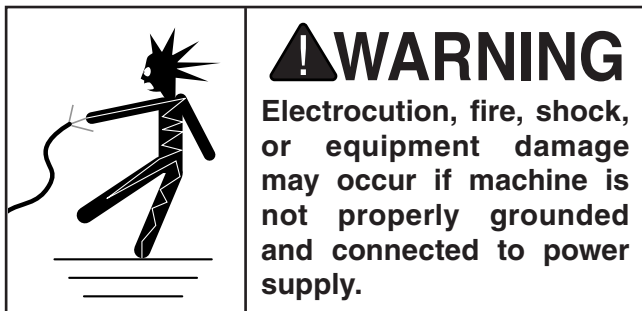
**REMOVE CHUCK KEY & SPINDLE TOOLS.** Always remove chuck key, drawbar wrench, and other tools used on the spindle immediately after use. This will prevent them from being thrown by the spindle upon startup.



# 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.



## 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.

### Full-Load Current Rating at 220V ..... 5 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 Requirements for 220V

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 ..... Single-Phase**  
**Power Supply Circuit ..... 15 Amps**  
**Plug/Receptacle ..... NEMA 6-15**

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.)



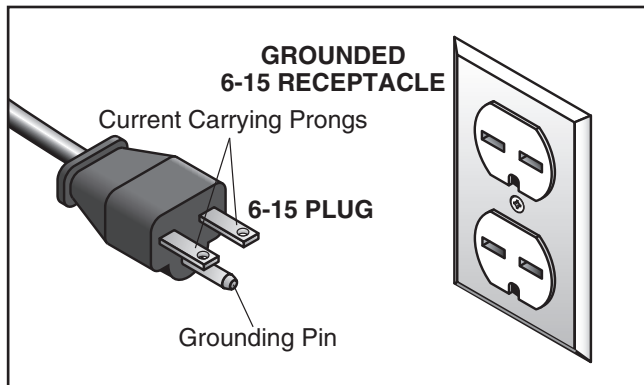
**Note:** *Circuit requirements in this manual apply to a dedicated circuit—where only one machine will be running on the circuit at a time. If machine will be connected to a shared circuit where multiple machines may be running at the same time, consult an electrician or qualified service personnel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



## Grounding Instructions

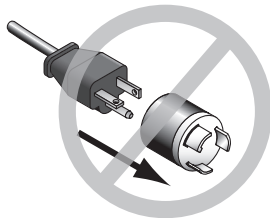
This machine **MUST** be grounded. In the event of certain malfunctions or breakdowns, grounding reduces the risk of electric shock by providing a path of least resistance for electric current.

The power cord and plug specified under “Circuit Requirements for 220V” on the previous page has an equipment-grounding wire and a grounding prong. The plug must only be inserted into a matching receptacle (outlet) that is properly installed and grounded in accordance with all local codes and ordinances (see figure below).



**Figure 2.** Typical 6-15 plug and receptacle.

## ⚠ CAUTION



**No adapter should be used with plug. If plug does not fit available receptacle, or if machine must be reconnected for use on a different type of circuit, reconnection must be performed by an electrician or qualified service personnel, and it must comply with all local codes and ordinances.**

## ⚠ 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.**

Improper connection of the equipment-grounding wire can result in a risk of electric shock. The wire with green insulation (with or without yellow stripes) is the equipment-grounding wire. If repair or replacement of the power cord or plug is necessary, do not connect the equipment-grounding wire to a live (current carrying) terminal.

Check with a qualified electrician or service personnel if you do not understand these grounding requirements, or if you are in doubt about whether the tool is properly grounded. If you ever notice that a cord or plug is damaged or worn, disconnect it from power, and immediately replace it with a new one.

## Extension Cords

We do not recommend using an extension cord with this machine. If you must use an extension cord, only use it if absolutely necessary and only on a temporary basis.

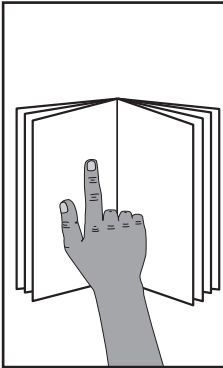
Extension cords cause voltage drop, which can damage electrical components and shorten motor life. Voltage drop increases as the extension cord size gets longer and the gauge size gets smaller (higher gauge numbers indicate smaller sizes).

Any extension cord used with this machine must be in good condition and contain a ground wire and matching plug/receptacle. Additionally, it must meet the following size requirements:

**Minimum Gauge Size ..... 16 AWG**  
**Maximum Length (Shorter is Better).....50 ft.**

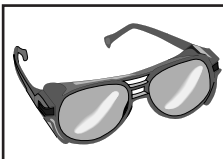


# SECTION 3: SETUP



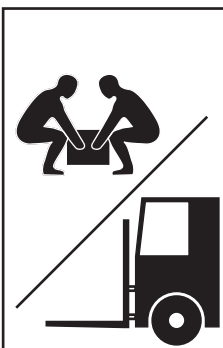
## **!WARNING**

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.

## **!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.

## Needed for Setup

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

Description	Qty
• Assistants .....	2
• Precision Level .....	1
• Hex Wrench 4mm.....	1
• External Retaining Ring Pliers .....	1
• Safety Glasses .....	1 Per Person
• Lifting Straps (rated for at least 1500 lbs.).....	2
• Power Lifting Equipment (rated for at least 1500 lbs.).....	1
• Machine Mounting Hardware .....	As Needed
• Cleaning Solvent & Rags .....	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.***

## **!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.



# 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.

Box 1 (Figure 3)	Qty
A. Cap Screws M6-1 x 25.....	3
B. Handwheel Handles.....	3
C. Hex Wrench 5mm.....	1
D. Hex Wrench 4mm.....	1

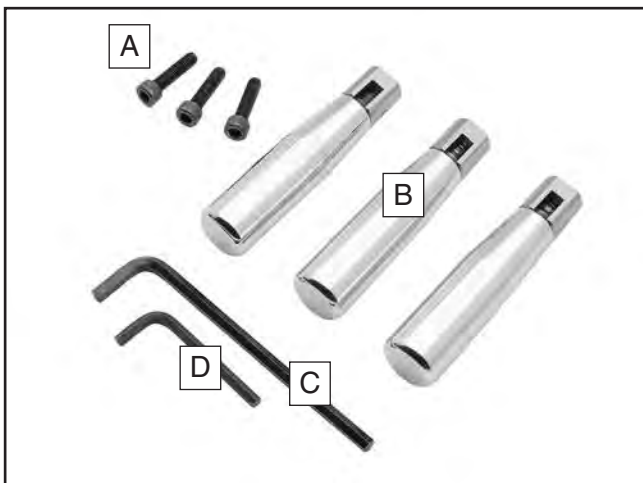


Figure 3. Model G0678 inventory.

## 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.

# Cleanup

The unpainted surfaces of your machine are coated with a heavy-duty rust preventative that prevents corrosion during shipment and storage. This rust preventative works extremely well, but it will take a little time to clean.

Be patient and do a thorough job cleaning your machine. The time you spend doing this now will give you a better appreciation for the proper care of your machine's unpainted surfaces.

There are many ways to remove this rust preventative, but the following steps work well in a wide variety of situations. Always follow the manufacturer's instructions with any cleaning product you use and make sure you work in a well-ventilated area to minimize exposure to toxic fumes.

### Before cleaning, gather the following:

- Disposable rags
- Cleaner/degreaser (WD•40 works well)
- Safety glasses & disposable gloves
- Plastic paint scraper (optional)

### Basic steps for removing rust preventative:

1. Put on safety glasses.
2. Coat the rust preventative with a liberal amount of cleaner/degreaser, then let it soak for 5–10 minutes.
3. Wipe off the surfaces. If your cleaner/degreaser is effective, the rust preventative will wipe off easily. If you have a plastic paint scraper, scrape off as much as you can first, then wipe off the rest with the rag.
4. Repeat **Steps 2–3** as necessary until clean, then coat all unpainted surfaces with a quality metal protectant to prevent rust.

## NOTICE

Avoid harsh solvents like acetone or brake parts cleaner that may damage painted surfaces. Always test on a small, inconspicuous location first.



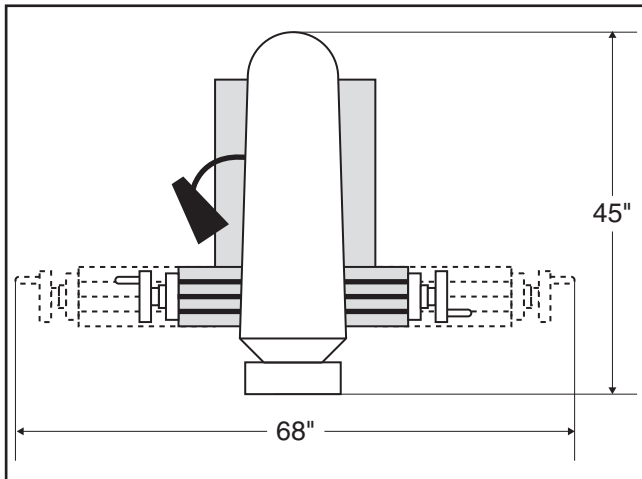
# Site Considerations

## Floor Load

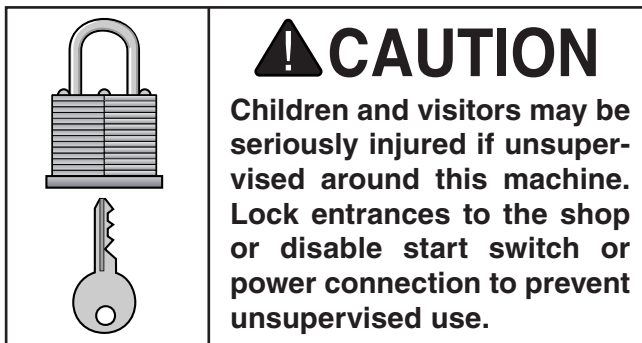
Refer to the **Machine Data Sheet** on **Page 4** for the weight and footprint specifications of your machine. Some residential floors may require additional reinforcement to support both the machine and operator.

## Placement Location

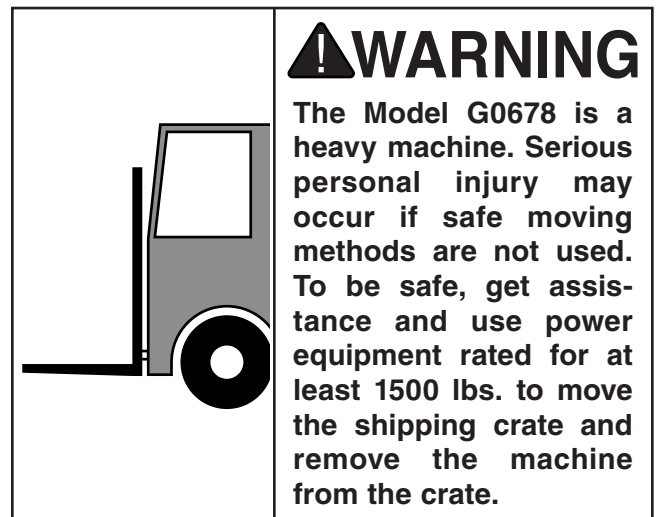
Consider existing and anticipated needs, size of material to be processed through each machine, and space for auxiliary stands, work tables or other machinery when establishing a location for your new machine. See **Figure 4** for the minimum working clearances.



**Figure 4.** Minimum working clearances.

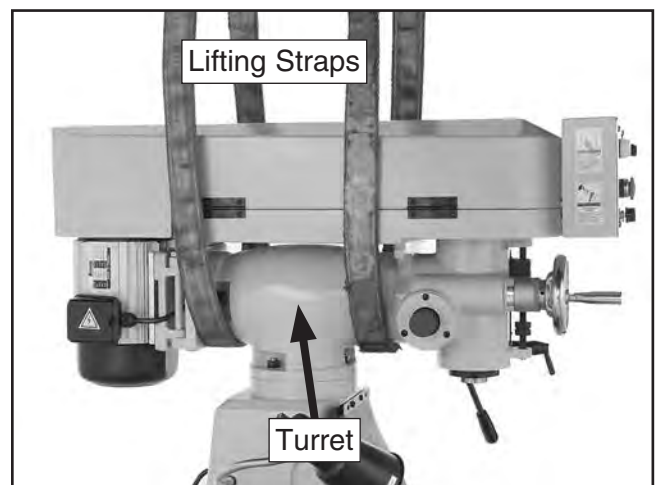


# Moving & Placing Base Unit



## To move and place your mill:

1. After removing the crate from the shipping pallet, wrap lifting straps around the turret, as shown in **Figure 5**, and securely attach them to your power lifting equipment.



**Figure 5.** Positioning the lifting straps.



2. Use a ½" wrench to unbolt the mill from the pallet.
3. With assistance to steady the machine, lift it just enough to clear the pallet and floor obstacles, then move it to the prepared location.
4. When mounting the machine to the floor, use a precision level to make sure the table is level from side-to-side and front-to-back.

**Note:** *If necessary, use shims to make sure there are no gaps between the base and the floor to avoid cracking or warping the cast iron.*

## **NOTICE**

**We strongly recommend securing your machine to the floor if it is hardwired to the power source. Consult with your electrician to ensure compliance with local codes.**

## **Mounting to Shop Floor**

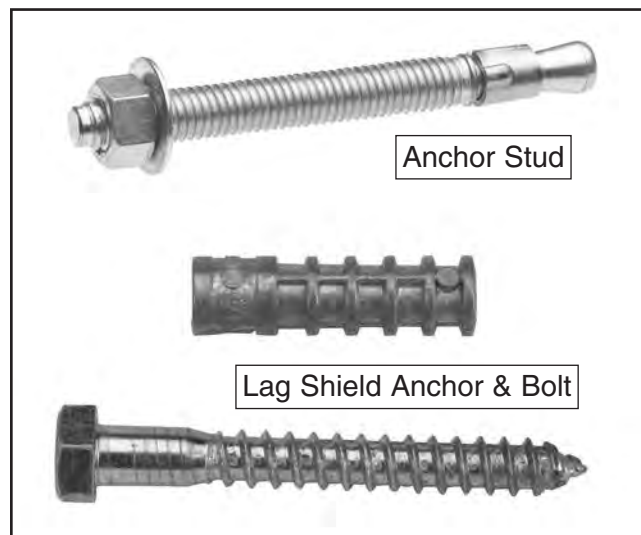
Although not required, we recommend that you mount your new machine to the floor. Because this is an optional step and floor materials may vary, floor mounting hardware is not included. Generally, you can either bolt your machine to the floor or mount it on machine mounts. Both options are described below. Whichever option you choose, it is necessary to level your machine with a precision level.

## **NOTICE**

**Anchor studs are stronger and more permanent alternatives to lag shield anchors; however, they will stick out of the floor, which may cause a tripping hazard if you decide to move your machine.**

## **Bolting to Concrete Floors**

Anchor studs and lag shield anchors with lag bolts (see **Figure 6**) are two popular methods for anchoring an object to a concrete floor. We suggest you research the many options and methods for mounting your machine and choose the best that fits your specific application.



**Figure 6.** Typical fasteners for mounting to concrete floors.

## **Using Machine Mounts**

Using machine mounts, shown in **Figure 7**, gives the advantage of fast leveling and vibration reduction. The large size of the foot pads distributes the weight of the machine to reduce strain on the floor.



**Figure 7.** Machine mount example.



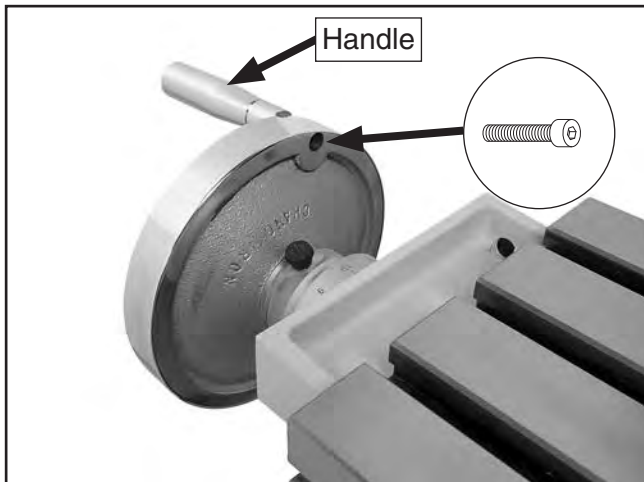


# Assembly

The machine must be fully assembled before it can be operated. Before beginning the assembly process, refer to **Needed for Setup** and gather all listed items. To ensure the assembly process goes smoothly, first clean any parts that are covered or coated in heavy-duty rust preventative (if applicable).

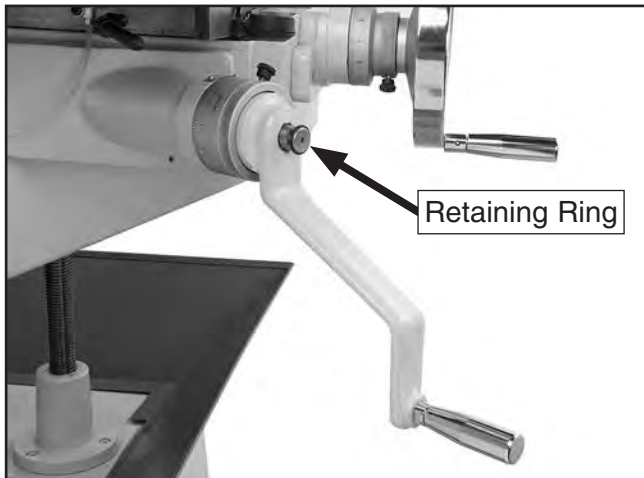
## To assemble mill:

1. Secure three handles to handwheels with the M6-1 x 25 cap screws, as shown in **Figure 8**.



**Figure 8.** Handle attached to handwheel.

2. Use external retaining ring pliers to remove retaining ring from end of vertical crank screw, reverse crank handle, then re-install retaining ring (see **Figure 9**).



**Figure 9.** Vertical crank handle properly installed.

# 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 motor powers up and runs correctly, and 2) the E-stop button safety feature works correctly.

## **!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**

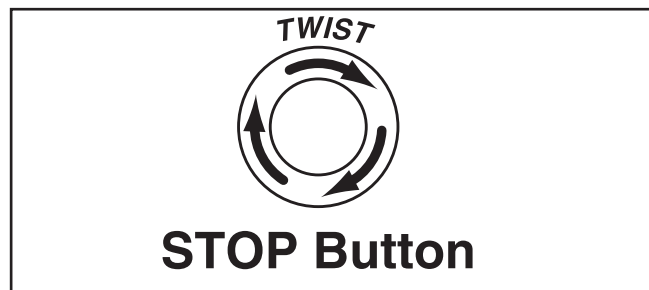
**DO NOT start machine until all preceding setup instructions have been performed. Operating an improperly set up machine may result in malfunction or unexpected results that can lead to serious injury, death, or machine/property damage.**

## To test run machine:

1. Clear all setup tools away from machine.
2. Make sure machine is lubricated (refer to **Lubrication** on **Page 26** for detailed instructions).
3. Press Emergency Stop button in.
4. Connect machine to power by inserting power cord plug into a matching receptacle.



5. Twist Emergency Stop button clockwise until it springs out (see **Figure 10**). This resets the switch so the machine can start.



**Figure 10.** Resetting the switch.

6. Press ON button to turn machine **ON**. Verify motor starts up and runs smoothly without any unusual problems or noises.
7. With machine still running, use speed dial to decrease/increase spindle speed.
8. Press Emergency Stop button to turn machine **OFF**.
9. **WITHOUT** resetting Emergency Stop button, try to start machine by pressing the ON button. The machine should not start.

—If the machine *does not* start, the safety feature of the Emergency Stop button is working correctly. Congratulations! The Test Run is complete.

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

## Spindle Break-In

### **NOTICE**

Successfully complete the spindle break-in procedure to avoid rapid wear of spindle components when placed into operation.

It is essential to closely follow the proper break-in procedures to ensure trouble-free performance of your mill.

#### To perform spindle break-in procedure:

1. Turn the machine **ON**, then use the speed dial to adjust the spindle speed to approximately 200 RPM.
2. Let the mill run at this speed for 20 minutes, then turn the spindle **OFF** and wait for it to stop.
3. Use the spindle direction switch on the control panel to reverse the spindle direction, then turn the mill **ON** and let it run for another 20 minutes.
4. Set the spindle speed at approximately 1800 RPM, then repeat **Steps 2–3**.
5. Turn the mill **OFF**. The spindle break-in is now complete and the machine is ready for operation.

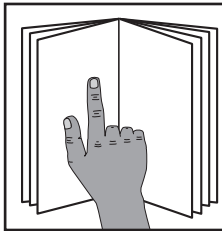


# SECTION 4: OPERATIONS

## 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.

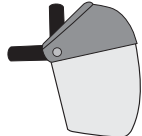


### **!WARNING**

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

### **!WARNING**

To reduce risk of eye or face injury from flying chips, always wear approved safety glasses and a face shield when operating this machine.

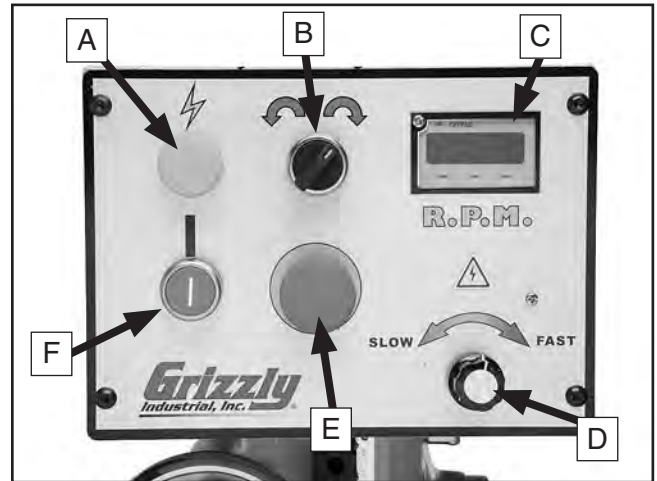


### **NOTICE**


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.

## Basic Controls

Refer to **Figure 11** and the following descriptions to understand the basic controls of your mill.



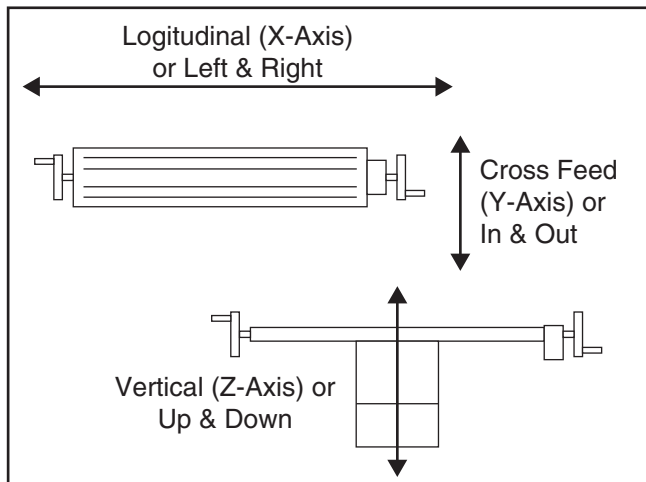
**Figure 11.** Control panel.

- A. Power Lamp:** Lights when there is power to the machine.
  - B. Direction Switch:** Controls the direction of spindle rotation.
  - C. Digital Speed Readout:** Displays the spindle speed in revolutions per minute (RPM).
  - D. Speed Dial:** Controls the spindle speed.
  - E. E-Stop Button:** Turns the spindle **OFF**. You must twist this button clockwise  so that it pops out before restarting the spindle with the ON button.
- Note:** Pressing this button **DOES NOT** disconnect the mill from power.
- F. ON Button:** Turns the spindle **ON** when there is power to the machine and the stop button is not pushed in.



# Table Movement

Your mill table has three paths of movement controlled by the corresponding handwheels or crank (see **Figure 12**): 1) Longitudinal (X-axis), 2) cross feed (Y-axis), and 3) vertical (Z-axis).

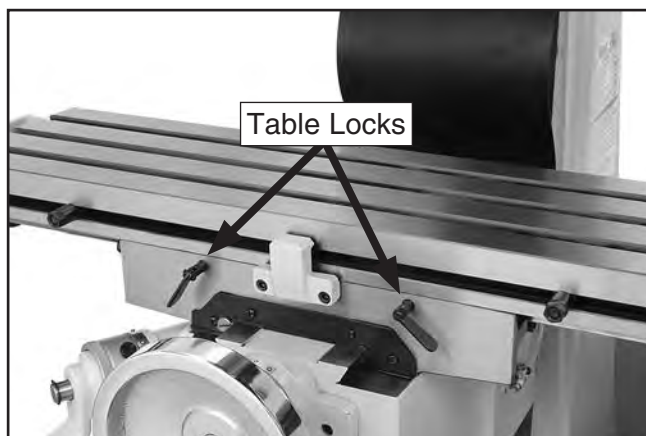


**Figure 12.** The three movement paths of the mill table.

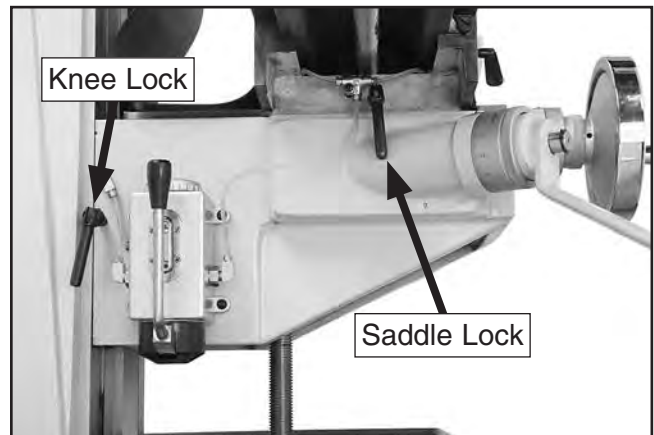
The graduated dials are marked in increments of 0.001", with a full revolution moving the table 0.125".

## Locks

Use the table, saddle, and knee locks shown in **Figures 13–14** to secure the table in position.



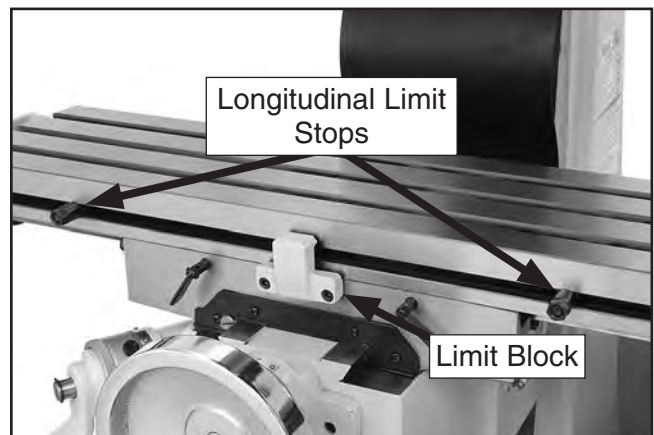
**Figure 13.** Table locks.



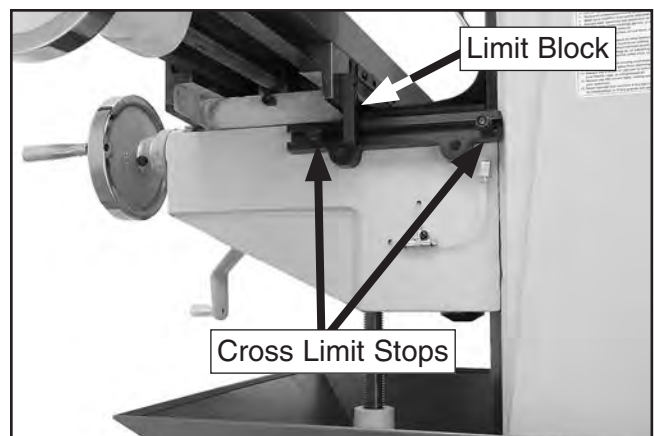
**Figure 14.** Saddle and knee locks.

## Limit Stops

Position the limit stops along the limit stop tracks to confine the distance the table or saddle can travel (see **Figures 15–16**).



**Figure 15.** Table limit stops and block.



**Figure 16.** Cross limit stops and block.



## ⚠ CAUTION

Always keep the table locked in place unless controlled movement is required for your operation. Unexpected table movement during operations could cause the cutter to bind with the workpiece resulting in damage to the cutter and workpiece, and possible personal injury.

## Head Rotation

The head rotates 90° from left to right (see **Figure 17**).



**Figure 17.** Head rotated 45° to the left.

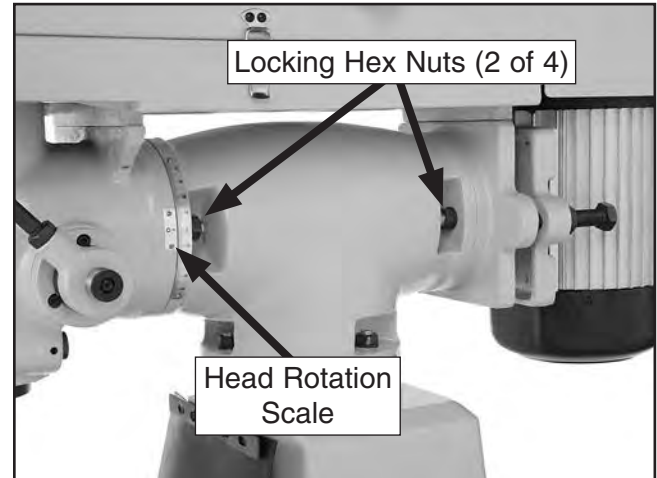
### Tools Needed

Qty

Wrench 19mm ..... 1

### To rotate the head left or right:

1. DISCONNECT THE MILL FROM POWER!
2. Loosen the four locking hex nuts on either side of the turret (see **Figure 18**).



**Figure 18.** Head rotation locking hex nuts (2 of 4 shown).

3. Rotate the head to the left or right and use the head rotation scale to determine the angle of rotation.
4. Re-tighten the four locking hex nuts to secure the head.

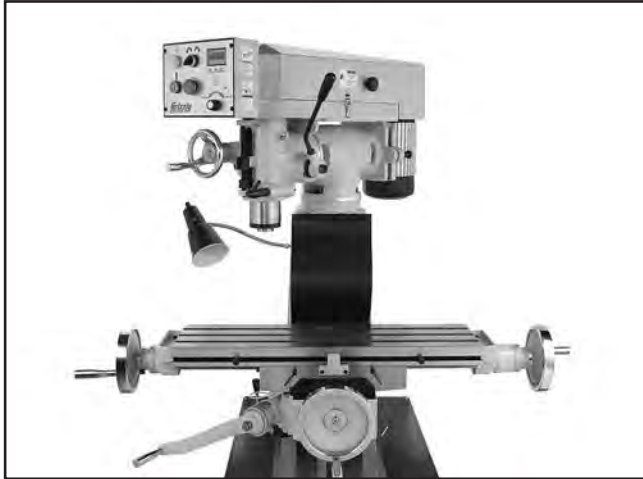
## ⚠ CAUTION

Always lock the head firmly in place after adjusting the rotation. Unexpected movement of the head during operations could cause the cutter to bind with the workpiece causing damage to the cutter and workpiece, and possible personal injury.



# Turret Rotation

The turret rotates 360° around the column (see **Figure 19**).



**Figure 19.** Head and turret rotated 45° to the left.

Tools Needed	Qty
Wrench 19mm .....	1

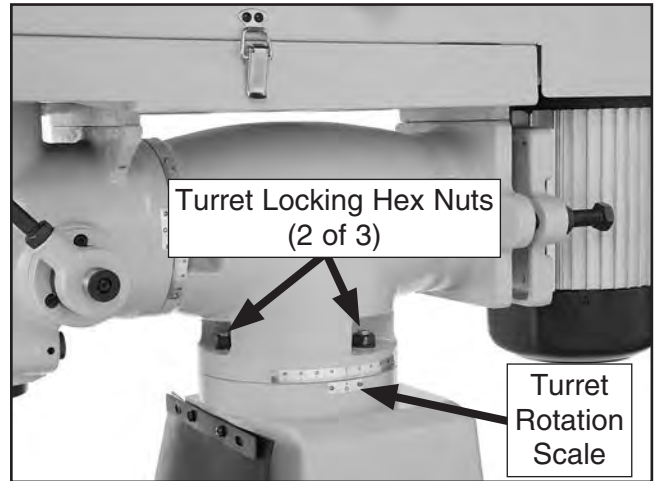
To rotate the turret left or right:

1. DISCONNECT THE MILL FROM POWER!

## CAUTION

Always lock the turret firmly in place after adjusting the rotation. Unexpected movement of the head during operations could cause the cutter to bind with the workpiece causing damage to the cutter and workpiece, and possible personal injury.

2. Loosen the three locking hex nuts on the turret (see **Figure 20**).



**Figure 20.** Turret rotation locking hex nuts (2 of 3 shown).

3. Rotate the head and turret around the column to the left or right and use the turret rotation scale to determine the amount of rotation.
4. Re-tighten the three locking hex nuts to secure the head and turret in place.



# Setting Spindle Speed

To select the correct spindle speed (RPM) for your milling operation, you will need to: 1) Determine the spindle speed needed for your workpiece, and 2) set the speed dial for the calculated speed.

## Calculating Spindle Speed

1. Use the table in **Figure 21** to determine the cutting speed or surface feet per minute (SFM) required for your workpiece material.

Cutting Speeds for High Speed Steel (HSS) Cutting Tools	
Workpiece Material	Cutting Speed (SFM)
Aluminum & alloys	300
Brass & Bronze	150
Copper	100
Cast Iron, soft	80
Cast Iron, hard	50
Mild Steel	90
Cast Steel	80
Alloy Steel, hard	40
Tool Steel	50
Stainless Steel	60
Titanium	50
Plastics	300-800
Wood	300-500

**Note:** For carbide cutting tools, double the cutting speed. These values are a guideline only. Refer to the *MACHINERY'S HANDBOOK* for more detailed information.

**Figure 21.** Cutting speed table for HSS cutting tools.

2. Measure the diameter of your cutting tool in inches.
3. Use the following formula to calculate the required spindle speed (RPM) for your operation:

$$\frac{\text{*Recommended Cutting Speed (FPM) x 12}}{\text{Tool Dia. (in inches) x 3.14}} = \text{Spindle Speed (RPM)}$$

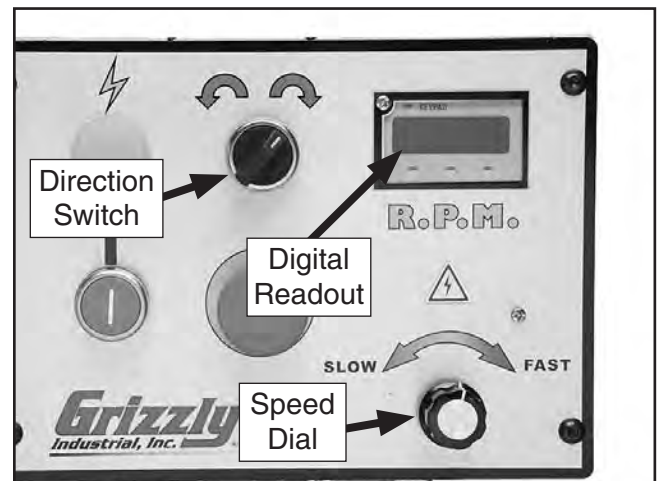
\*Double if using carbide cutting tool

## Setting Spindle Speed

1. Rotate the speed dial all the way to the left, setting the startup spindle speed close to zero.

**Note:** This precaution avoids unexpected high speed startup of the spindle.

2. Use the direction switch to select the direction of spindle rotation, turn the spindle **ON**, then rotate the speed dial until the calculated spindle speed is displayed on the digital readout on the control panel (see **Figure 22**).

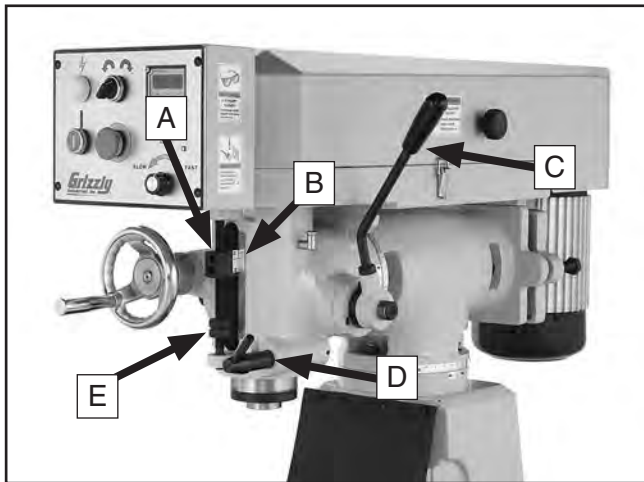


**Figure 22.** Spindle direction switch, speed dial, and digital readout.

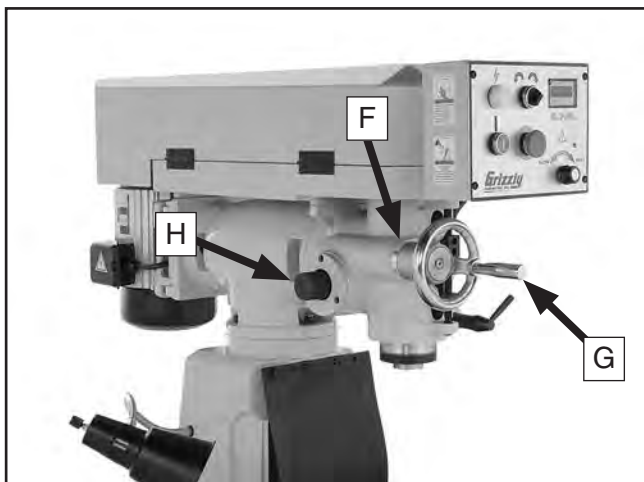


# Downfeed Controls

Refer to **Figures 23–24** and the following descriptions to understand the functions of the downfeed controls that affect the travel of the quill, spindle, and cutter.



**Figure 23.** Downfeed controls viewed from the right side.



**Figure 24.** Downfeed controls viewed from the left side.

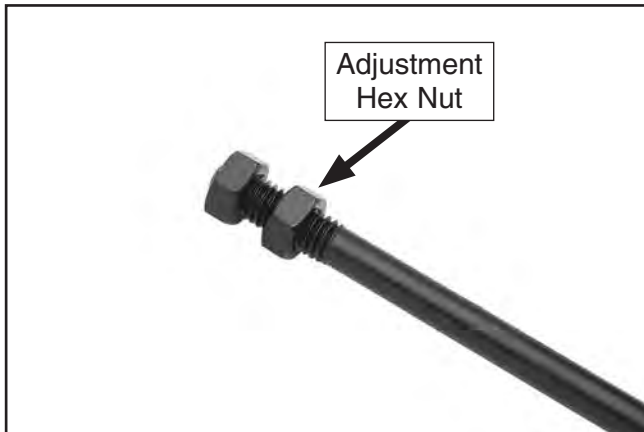
- A. Quill Dog:** Moves with the quill. Use the pointer on the side with the downfeed scale to determine the depth of downfeed.
- B. Downfeed Scale:** Displays in inches the amount of quill travel.
- C. Coarse Downfeed Handle:** When this handle is enabled with the downfeed selector, it raises/lowers the quill quickly.
- D. Quill Lock:** Locks the quill in place but does not affect spindle rotation.
- E. Downfeed Stop & Lock:** Stops downfeed travel when the quill dog reaches this point. Set the stop at any position along the downfeed scale, then secure it in place by tightening the lock up to it.
- F. Graduated Scale:** Displays quill travel in 0.001" increments when the fine downfeed handwheel is used. One full revolution represents 0.080" of quill travel.
- G. Fine Downfeed Handwheel:** When this handwheel is enabled with the downfeed selector, it raises/lowers the quill in small increments.
- H. Downfeed Selector:** Enables either the coarse or fine downfeed control. Tighten the selector to enable the fine downfeed handwheel, and loosen it to enable the coarse downfeed handle.





# Loading/Unloading Tooling

Your mill is equipped with a 7/16"-20 x 12 3/8" drawbar (see **Figure 25**).



**Figure 25.** Drawbar and adjustment nut.

Tools Needed	Qty
Wrench 19mm .....	1

## Loading Tooling

1. DISCONNECT THE MILL FROM POWER!
2. Clean any debris or oily substances from the mating surfaces of the spindle and tool tapers.

**⚠ CAUTION**

Cutting tools are sharp and can quickly injure your hands. Always protect your hands when handling cutting tools.

3. Open the V-belt cover, rotate the adjustment hex nut to the top of the drawbar, then place the drawbar through the top of the spindle (see **Figure 26**).



**Figure 26.** Drawbar inserted through the top of the spindle.

4. Push the tool firmly into the spindle taper to seat it, then while holding it in place with one hand, thread the drawbar into the tool.
5. To fully seat the tool into the spindle, tighten the drawbar adjustment hex nut down to draw the tool up only until it is snug.

**Note:** *Over-tightening the drawbar could make removing the tool difficult.*

## Unloading Tooling

1. DISCONNECT THE MILL FROM POWER!
2. Keep one hand on the tool, loosen the adjustment hex nut, then completely unthread the drawbar.

—If the tool does not release from the spindle when the drawbar unthreaded, turn the drawbar back into the tool one or two threads, then tap the top of the drawbar with a dead-blow hammer or rubber mallet until the tool releases.



# 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.

**H6087—2-Axis Digital Readout (8" x 20")**

**H7848—3-Axis Digital Readout (8" x 20" x 16<sup>3</sup>/<sub>4</sub>")**

You will be amazed at the list of features these DROs include: selectable resolution down to 5 $\mu$ m, absolute/incremental coordinate display, arc function, line of holes function, angled cuts function, 199 user-defined datum points, centering/cutter offset, double sealed scales, inches/millimeters, calculator with trig functions, and linear error compensation.

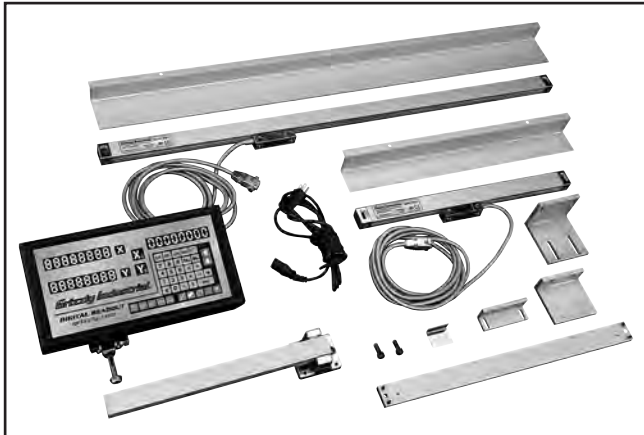


Figure 27. Digital readouts.

**T23962—ISO 68 Moly-D Way Oil, 5 Gal.**

**T23963—ISO 32 Moly-D Machine Oil, 5 Gal.**

**T26685—ISO 32 Moly-D Machine Oil, 1 Gal.**

Moly-D oils are some of the best we've found for maintaining the critical components of machinery because they tend to resist run-off and maintain their lubricity under a variety of conditions—as well as reduce chatter or slip. Buy in bulk and save with 1- or 5-gallon quantities.



Figure 28. ISO 68 and ISO 32 machine oil.

**T10063—Milling Vise 12<sup>5</sup>/<sub>16</sub>" x 6<sup>9</sup>/<sub>16</sub>"**

**T10064—Milling Vise 17<sup>1</sup>/<sub>8</sub>" x 8<sup>3</sup>/<sub>4</sub>"**

- Ultra precise in flatness, parallelism, and verticality.
- Anti-lift mechanism ensures the workpiece does not lift when jaws are tightened.
- Ductile iron body.
- Flame hardened vise bed and jaws.
- Sealed bearing system.
- 8200 lbs. of clamping pressure.

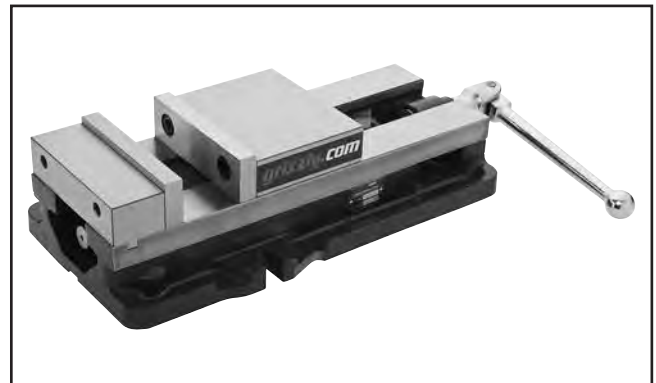


Figure 29. T10064 Milling Vise.

**order online at [www.grizzly.com](http://www.grizzly.com) or call 1-800-523-4777**



### G9299—10" Yuasa-Type Rotary Table

This high precision rotary table features extra-deep coolant channels, dual positive action locks, very low profiles, 10 second vernier scales, gear drives with oil immersion and satin chrome dials. See the current Grizzly catalog for full specifications. Features: 4.330" overall height (horizontal), 6.750" height to center hole (vertical), #3 Morse Taper, 0.465" T-slot width, and 117 lb. approximate shipping weight.

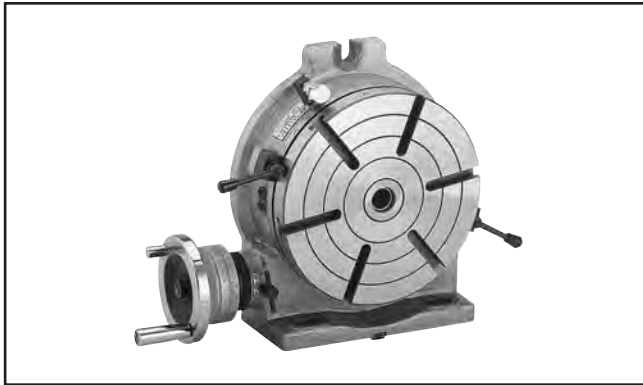


Figure 30. G9299 10" Yuasa-Type Rotary Table.

### Basic Eye Protection

T20501—Face Shield Crown Protector 4"

T20502—Face Shield Crown Protector 7"

T20503—Face Shield Window

T20451—"Kirova" Clear Safety Glasses

T20452—"Kirova" Anti-Reflective S. Glasses

T20456—DAKURA Safety Glasses, Black/Clear



Figure 31. Eye protection assortment.

G5562—SLIPIT® 1 Qt. Gel

G5563—SLIPIT® 12 oz Spray

G2871—Boeshield® T-9 12 oz Spray

G2870—Boeshield® T-9 4 oz Spray

H3788—G96® Gun Treatment 12 oz Spray

H3789—G96® Gun Treatment 4.5 oz Spray



Figure 32. Recommended products for protecting unpainted cast iron/steel part on machinery.

### H8371—Power Feed for Knee Mills

This power feed has all the torque needed for those milling machines with the big tables. The infinitely adjustable speed control provides finishes not possible with manual control. Includes bi-directional limit switch with stops, mounting bracket, bevel gear and motor. Specs: 4–160 RPM, 160 RPM rapid switch, 650 in/lb. maximum torque, 110V 60Hz motor, 4:8:1 bevel drive gear.



Figure 33. H8371 Power Feed.

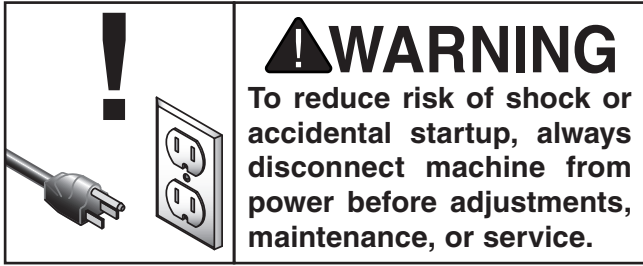
**order online at [www.grizzly.com](http://www.grizzly.com) or call 1-800-523-4777**



# SECTION 6: MAINTENANCE

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## Schedule

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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.
- Worn or damaged tooling.
- Worn or damaged wires.
- Any other unsafe condition.

### Every 8 Hours of Operation:

- Use the one-shot oiler (**Page 27**).
- Lubricate quill gearing (**Page 27**).
- Clean the mill.

### Every 40 Hours of Operation:

- Lubricate the vertical bevel gears (**Page 27**).
- Lubricate the longitudinal, cross, and vertical leadscrews (**Page 28**).

## Cleaning & Protecting

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Use a brush and shop vacuum to remove chips and debris from the mill. Never blow off the mill with compressed air, as this will force metal chips deep into the mechanisms and may injure yourself or bystanders.

Wipe built-up grime from the mill with a rag and a mild solvent. Remove any rust from the unpainted cast iron surfaces of your mill, then treat them with regular applications of products such as G96® Gun Treatment, SLIPIT®, or Boeshield® T-9 (see **Section 5: Accessories** on **Page 24** for more details).

## Lubrication

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Your mill has numerous moving metal-to-metal contacts that require proper lubrication to help ensure efficient and long-lasting mill operation.

Other than lubrication points covered in this section, all other bearings are internally lubricated and sealed at the factory. Simply leave them alone unless they need to be replaced.

Before adding lubricant, clean debris and grime from the devices to avoid contaminating the new lubrication.

**DISCONNECT THE MILL FROM POWER BEFORE PERFORMING LUBRICATION!**



# NOTICE

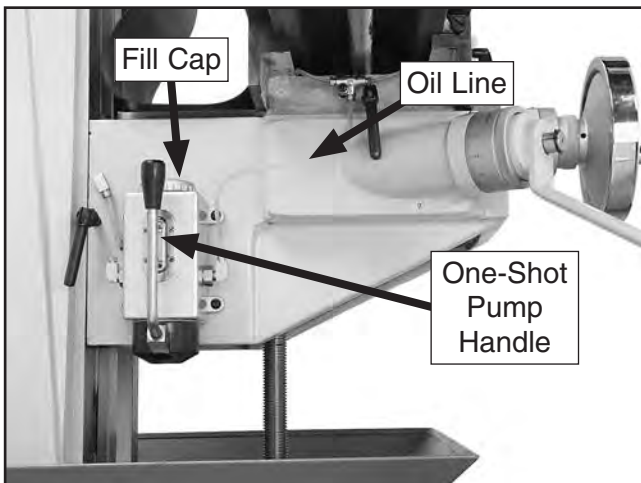
Follow the lubrication practices outlined in this manual. Failure to do so could lead to premature failure of your mill and will void the warranty.

## One-Shot Oiler

Lubricant	Frequency	Qty
ISO 68 Lubricant or Equivalent	Every 8 Hours of Operation	1 Pump

The oil lines running from the one-shot oiler feed lubrication to the ways of the column (knee), saddle, and table.

Use the sight glass on the front of the oiler to make sure it is full, then pull the handle (see **Figure 34**) and release it to send the lubricant through the lines.



**Figure 34.** One-shot oiler.

## Quill Gearing

Lubricant	Frequency	Qty
ISO 68 Lubricant or Equivalent	Every 8 Hours of Operation	5 Drops

Lift the cap of the oil cup shown in **Figure 35** to add the lubricant.

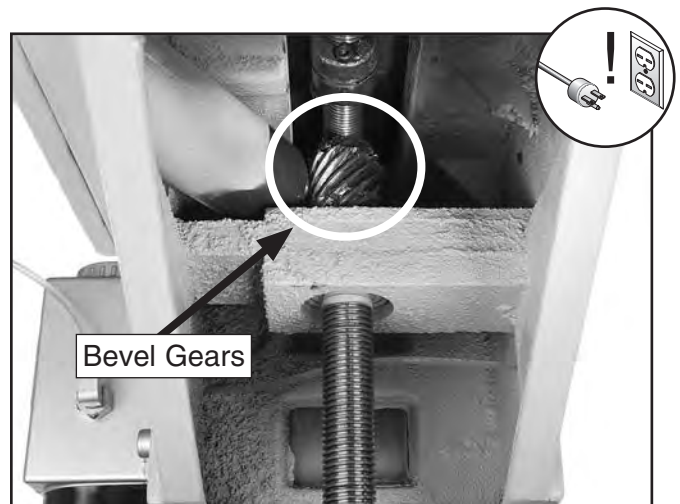


**Figure 35.** Quill gearing oil cup.

## Vertical Bevel Gears

Lubricant	Frequency	Qty
NLGI #2 Grease	Every 40 Hours of Operation	Thin Coat

Raise the knee up to access the vertical bevel gears underneath the saddle, then clean and lubricate the bevel gears shown in **Figure 36**.



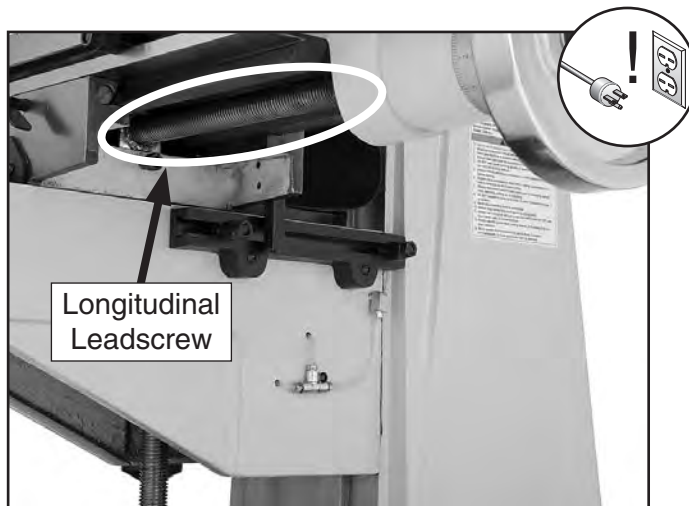
**Figure 36.** Vertical bevel gears.



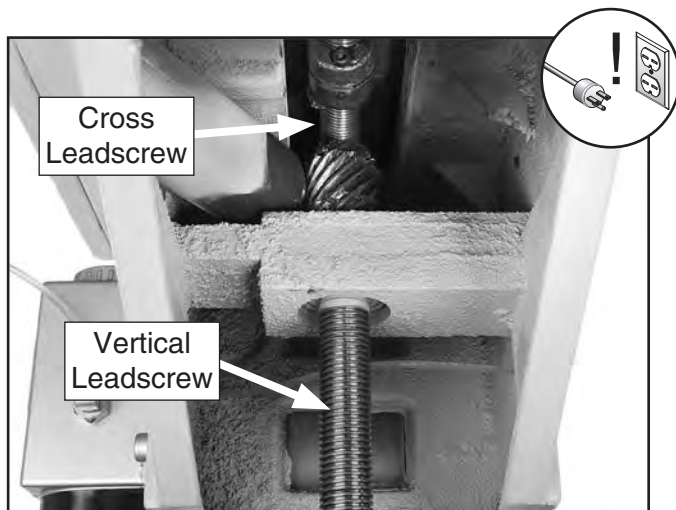
## Leadscrews

Lubricant	Frequency	Qty
NLGI #2 Grease	Every 40 Hours of Operation	Thin Coat

Use a shop rag and mineral spirits to clean away debris and grime from the longitudinal, cross, and elevation leadscrews and leadscrew nuts. Apply a thin coat of lubricant to the leadscrews, then move the table through the full range of movement for each leadscrew to distribute the grease (see **Figures 37–38**).



**Figure 37.** Longitudinal leadscrew.



**Figure 38.** Cross and vertical leadscrews.

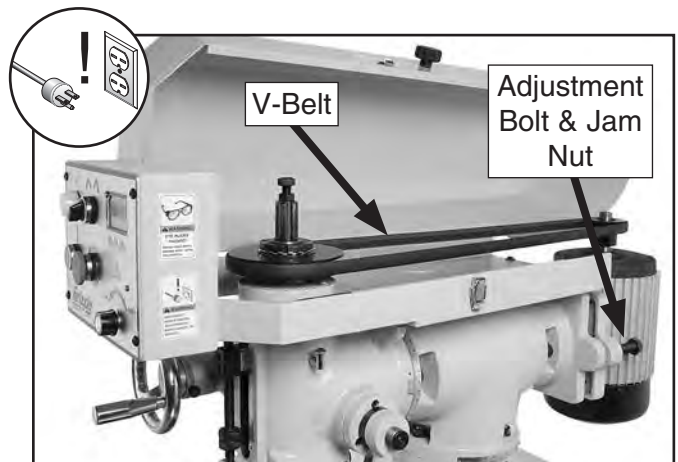
## V-Belt Tensioning

Power is transferred from the motor to the spindle with a V-belt. With normal use, this belt will gradually stretch over time. When it does, perform the following procedures to re-tension it.

**Tools Needed** Qty  
Wrench 24mm ..... 1

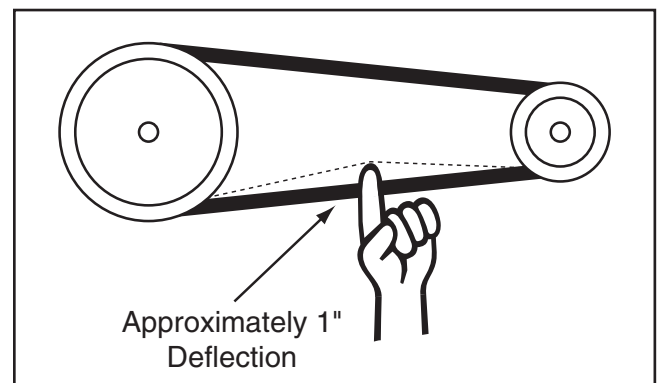
### To tension the V-belt:

1. DISCONNECT THE MILL FROM POWER!
2. Lift the V-belt cover, then loosen the adjustment bolt jam nut near the motor (see **Figure 39**).



**Figure 39.** V-belt tension adjustment bolt.

3. Rotate the adjustment bolt until the V-belt has approximately 1" of deflection when moderate pressure is applied midway between the pulleys (see **Figure 40**), then re-tighten the jam nut and close the V-belt cover.



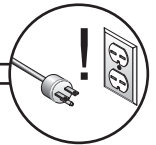
**Figure 40.** Checking for belt deflection.



# SECTION 7: SERVICE

Review the troubleshooting procedures in this section if a problem develops with your machine. If you need replacement parts or additional help with a procedure, call our Technical Support. **Note:** *Please gather the serial number and manufacture date of your machine before calling.*

## Troubleshooting

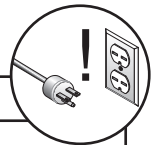


### Motor & Electrical

Symptom	Possible Cause	Possible Solution
Machine does not start or a breaker trips.	<ol style="list-style-type: none"> <li>1. Stop button is pushed in or is at fault.</li> <li>2. ON button is at fault.</li> <li>3. Plug/receptacle is at fault or wired incorrectly.</li> <li>4. Power supply is switched <b>OFF</b> or is at fault.</li> <li>5. Motor connection wired incorrectly.</li> <li>6. Motor windings or motor is at fault.</li> </ol>	<ol style="list-style-type: none"> <li>1. Turn the stop button clockwise until it pops out; replace if faulty.</li> <li>2. Replace faulty ON button.</li> <li>3. Test for good contacts; correct the wiring.</li> <li>4. Ensure hot lines have correct voltage on all legs and main power supply is switched <b>ON</b>.</li> <li>5. Correct motor wiring connections (<b>Page 34</b>).</li> <li>6. Replace motor.</li> </ol>
Machine stalls or is overloaded.	<ol style="list-style-type: none"> <li>1. Machine is undersized for the task.</li> <li>2. Workpiece alignment is poor.</li> <li>3. Dull or incorrect cutting tool.</li> <li>4. Motor connection is wired incorrectly.</li> <li>5. Plug/receptacle is at fault.</li> <li>6. Pulley/sprocket slipping on shaft.</li> <li>7. Motor bearings are at fault.</li> <li>8. Motor has overheated.</li> <li>9. Motor is at fault.</li> </ol>	<ol style="list-style-type: none"> <li>1. Use smaller sharp tooling; reduce the feed rate; reduce the spindle RPM; use coolant.</li> <li>2. Eliminate workpiece binding; use vise or clamps as required for workpiece alignment control.</li> <li>3. Use sharp and correct cutting tool for the operation.</li> <li>4. Correct motor wiring connections (<b>Page 34</b>).</li> <li>5. Test for good contacts; correct the wiring.</li> <li>6. Replace loose pulley/shaft.</li> <li>7. Test by rotating shaft; rotational grinding/loose shaft requires bearing replacement.</li> <li>8. Clean off motor, let cool, and reduce workload.</li> <li>9. Test and repair or replace.</li> </ol>
Machine has vibration or noisy operation.	<ol style="list-style-type: none"> <li>1. Tool holder or cutter is at fault.</li> <li>2. Workpiece alignment is poor.</li> <li>3. Motor or component is loose.</li> <li>4. Pulley is loose.</li> <li>5. Machine is incorrectly mounted or sits unevenly.</li> <li>6. Motor fan is rubbing on fan cover.</li> <li>7. Motor bearings are at fault.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace out-of-round tool holder; replace/resharpen cutter; use appropriate feed rate and cutting RPM.</li> <li>2. Eliminate workpiece binding; use vise or clamps as required for workpiece alignment control.</li> <li>3. Inspect/replace stripped or damaged bolts/nuts, and re-tighten with thread locking fluid.</li> <li>4. Realign/replace shaft, pulley, setscrew, and key as required.</li> <li>5. Tighten/replace mounting bolts in floor; relocate/shim machine.</li> <li>6. Replace dented fan cover or fan.</li> <li>7. Test by rotating shaft; rotational grinding/loose shaft requires bearing replacement.</li> </ol>



## Operation



Symptom	Possible Cause	Possible Solution
Tool slips in collet.	<ol style="list-style-type: none"> <li>1. Collet is not fully drawn into spindle taper.</li> <li>2. Wrong size collet.</li> <li>3. Debris on collet or spindle mating surface.</li> <li>4. Excessive depth of cut.</li> </ol>	<ol style="list-style-type: none"> <li>1. Snug up drawbar.</li> <li>2. Use correct collet for shank diameter.</li> <li>3. Remove oil and debris from collet and spindle mating surfaces, then re-install.</li> <li>4. Decrease depth of cut and allow chips to clear.</li> </ol>
Breaking tooling.	<ol style="list-style-type: none"> <li>1. Spindle speed/feed rate too fast.</li> <li>2. Tooling getting too hot.</li> <li>3. Excessive depth of cut.</li> </ol>	<ol style="list-style-type: none"> <li>1. Use correct spindle RPM and feed rate (<b>Page 21</b>).</li> <li>2. Use coolant; reduce spindle RPM/feed rate.</li> <li>3. Decrease depth of cut and allow chips to clear.</li> </ol>
Machine is loud when cutting; overheats or bogs down in the cut.	<ol style="list-style-type: none"> <li>1. Excessive depth of cut.</li> <li>2. Dull tooling.</li> <li>3. Feed rate too fast.</li> </ol>	<ol style="list-style-type: none"> <li>1. Decrease depth of cut and allow chips to clear.</li> <li>2. Use sharp tooling.</li> <li>3. Decrease feed rate.</li> </ol>
Workpiece vibrates or chatters during operation.	<ol style="list-style-type: none"> <li>1. Locks not tight.</li> <li>2. Workpiece not securely clamped to table or mill vise.</li> <li>3. Tooling not secure or is damaged.</li> <li>4. Spindle speed/feed rate too fast.</li> <li>5. Gibs are too loose.</li> </ol>	<ol style="list-style-type: none"> <li>1. Tighten all locks on mill that are not associated with movement for the operation.</li> <li>2. Check that clamping is tight and sufficient for the operation; make sure mill vise is tight to table.</li> <li>3. Secure tooling; replace if damaged.</li> <li>4. Use correct spindle RPM and feed rate (<b>Page 21</b>).</li> <li>5. Adjust gibs properly (<b>Page 31</b>).</li> </ol>
Table hard to move.	<ol style="list-style-type: none"> <li>1. Locks are tightened down.</li> <li>2. Chips have loaded up on the ways.</li> <li>3. Ways are dry and in need of lubrication.</li> <li>4. Gibs are too tight.</li> </ol>	<ol style="list-style-type: none"> <li>1. Fully loosen locks needed for movement.</li> <li>2. Frequently clean away chips that load up during operations.</li> <li>3. Use one-shot oiler to lubricate ways (<b>Page 27</b>).</li> <li>4. Adjust gibs properly (<b>Page 31</b>).</li> </ol>
Bad surface finish.	<ol style="list-style-type: none"> <li>1. Wrong spindle speed/feed rate.</li> <li>2. Dull/damaged tooling; wrong tooling for operation.</li> <li>3. Wrong spindle rotation for tooling.</li> <li>4. Workpiece not securely clamped to table or mill vise.</li> <li>5. Gibs are too loose.</li> </ol>	<ol style="list-style-type: none"> <li>1. Use correct spindle RPM and feed rate (<b>Page 21</b>).</li> <li>2. Sharpen/replace tooling; use correct tooling for operation.</li> <li>3. Check for proper spindle rotation for tooling.</li> <li>4. Check that clamping is tight and sufficient for the operation; make sure mill vise is tight to table.</li> <li>5. Adjust gibs properly (<b>Page 31</b>).</li> </ol>





# Adjusting Gibs

Gibs control the accuracy of the table movements along the ways. Tight gibs make the movements more accurate, but harder to move. Loose gibs make the movements sloppy, but easier to move. The goal of gib adjustment is to remove unnecessary sloppiness without causing the ways to bind.

## **NOTICE**

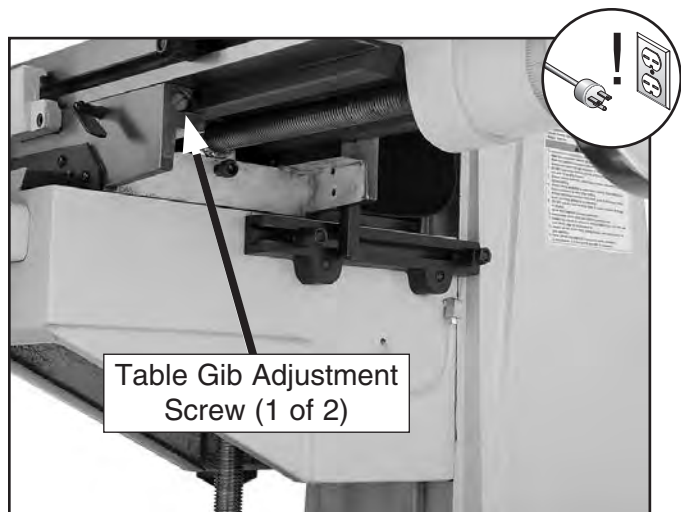
**Excessively loose gibs may cause poor workpiece finishes, and may cause undue wear of sliding surfaces and ways. Over-tightening the gibs may cause premature wear of these sliding devices.**

Each sliding surface for the table, saddle, and knee has a tapered gib that is sandwiched between the stationary and moving surfaces. The saddle and knee have a gib on both sides. There are two adjustment screws, one on each end of each gib, that move the tapered gib back and forth increasing or decreasing friction of the sliding surfaces.

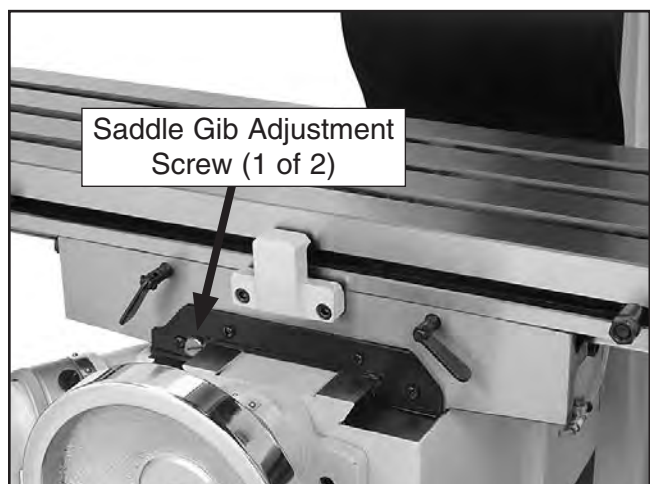
**DISCONNECT THE MILL FROM POWER BEFORE ADJUSTING THE GIBS!**

Loosen one adjustment screw and tighten the other the same amount to move the gib until you feel a slight drag in that path of movement.

Refer to **Figures 41–43** for the locations of the table, saddle, and knee gib adjustment screws.



**Figure 41.** Table gib adjustment screw (1 of 2).



**Figure 42.** Saddle gib adjustment screw (1 of 2).



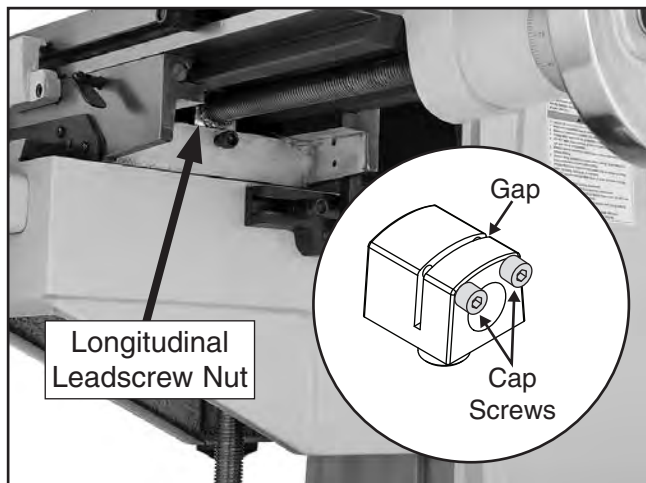
**Figure 43.** Knee gib adjustment screw (1 of 2).



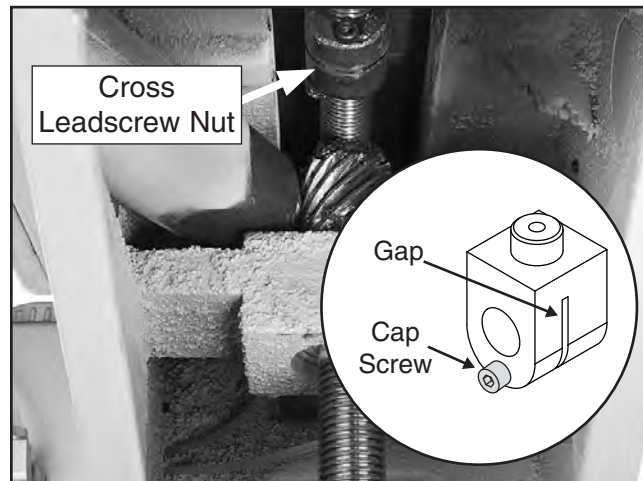
# Adjusting Backlash

Leadscrew backlash is the amount of motion the leadscrew rotates before the device begins to move. Leadscrews always have a certain amount of backlash that will increase with wear. Generally, 0.005"–0.010" of backlash is acceptable.

The backlash of the longitudinal and cross leadscrew can be adjusted by changing the gap in the leadscrew nuts (see **Figures 44–45**).



**Figure 44.** Longitudinal leadscrew nut.



**Figure 45.** Cross leadscrew nut.

Use a 5mm hex wrench to tighten or loosen the cap screws on the leadscrew nuts shown in **Figures 44–45**, then test the amount of backlash by slowly rocking the handwheels back-and-forth.



# SECTION 8: WIRING

These pages are current at the time of printing. However, in the spirit of improvement, we may make changes to the electrical systems of future machines. Compare the manufacture date of your machine to the one stated in this manual, and study this section carefully.

If there are differences between your machine and what is shown in this section, call Technical Support at (570) 546-9663 for assistance BEFORE making any changes to the wiring on your machine. An updated wiring diagram may be available. **Note:** *Please gather the serial number and manufacture date of your machine before calling. This information can be found on the main machine label.*

## WARNING

### Wiring Safety Instructions

**SHOCK HAZARD.** Working on wiring that is connected to a power source is extremely dangerous. Touching electrified parts will result in personal injury including but not limited to severe burns, electrocution, or death. Disconnect the power from the machine before servicing electrical components!

**MODIFICATIONS.** Modifying the wiring beyond what is shown in the diagram may lead to unpredictable results, including serious injury or fire. This includes the installation of unapproved after-market parts.

**WIRE CONNECTIONS.** All connections must be tight to prevent wires from loosening during machine operation. Double-check all wires disconnected or connected during any wiring task to ensure tight connections.

**CIRCUIT REQUIREMENTS.** You MUST follow the requirements at the beginning of this manual when connecting your machine to a power source.

**WIRE/COMPONENT DAMAGE.** Damaged wires or components increase the risk of serious personal injury, fire, or machine damage. If you notice that any wires or components are damaged while performing a wiring task, replace those wires or components.

**MOTOR WIRING.** The motor wiring shown in these diagrams is current at the time of printing but may not match your machine. If you find this to be the case, use the wiring diagram inside the motor junction box.
















**CAPACITORS/INVERTERS.** Some capacitors and power inverters store an electrical charge for up to 10 minutes after being disconnected from the power source. To reduce the risk of being shocked, wait at least this long before working on capacitors.

**EXPERIENCING DIFFICULTIES.** If you are experiencing difficulties understanding the information included in this section, contact our Technical Support at (570) 546-9663.

#### NOTICE

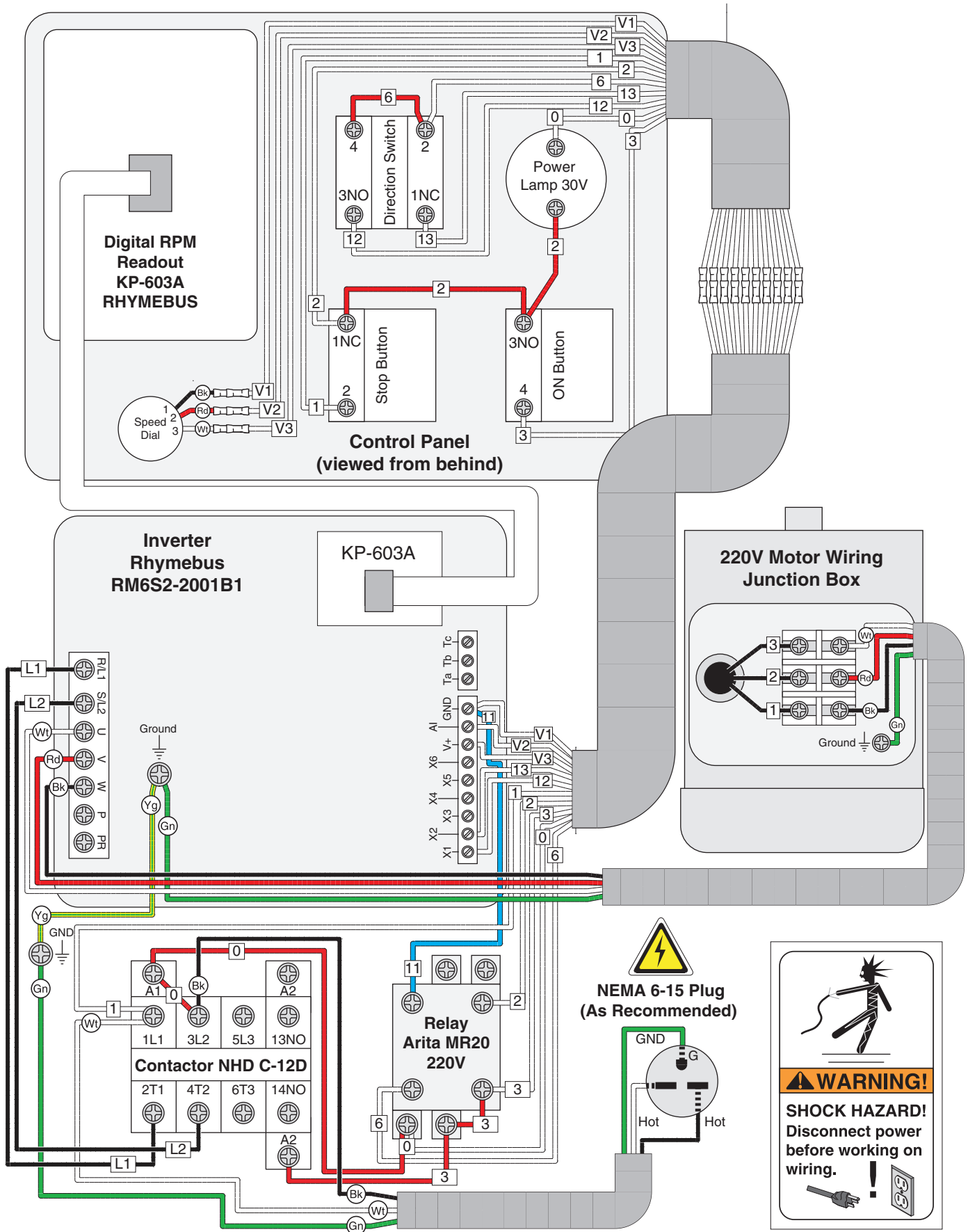
The photos and diagrams included in this section are best viewed in color. You can view these pages in color at [www.grizzly.com](http://www.grizzly.com).

#### COLOR KEY

BLACK 	BLUE 	YELLOW 	LIGHT BLUE 
WHITE 	BROWN 	YELLOW GREEN 	BLUE WHITE 
GREEN 	GRAY 	PURPLE 	TURQUOISE 
RED 	ORANGE 	PINK 	



# Wiring Diagram



# Electrical Component Wiring



Figure 46. Control panel wiring.

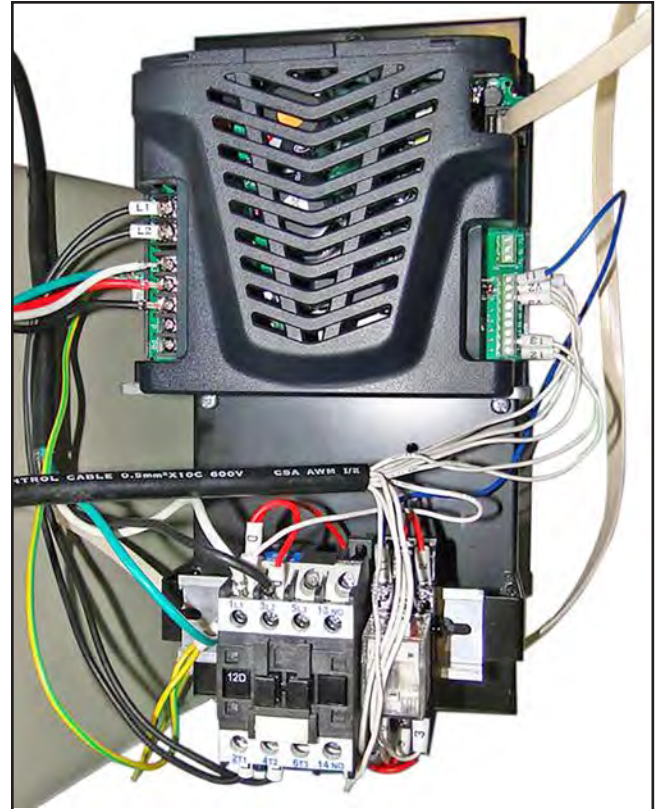


Figure 48. Inverter, contactor, and relay wiring.

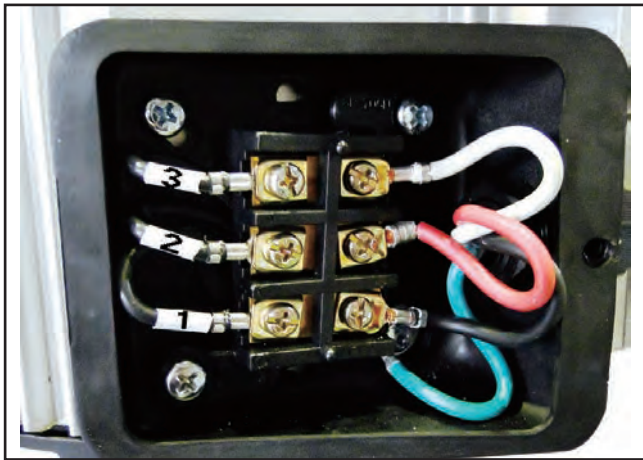


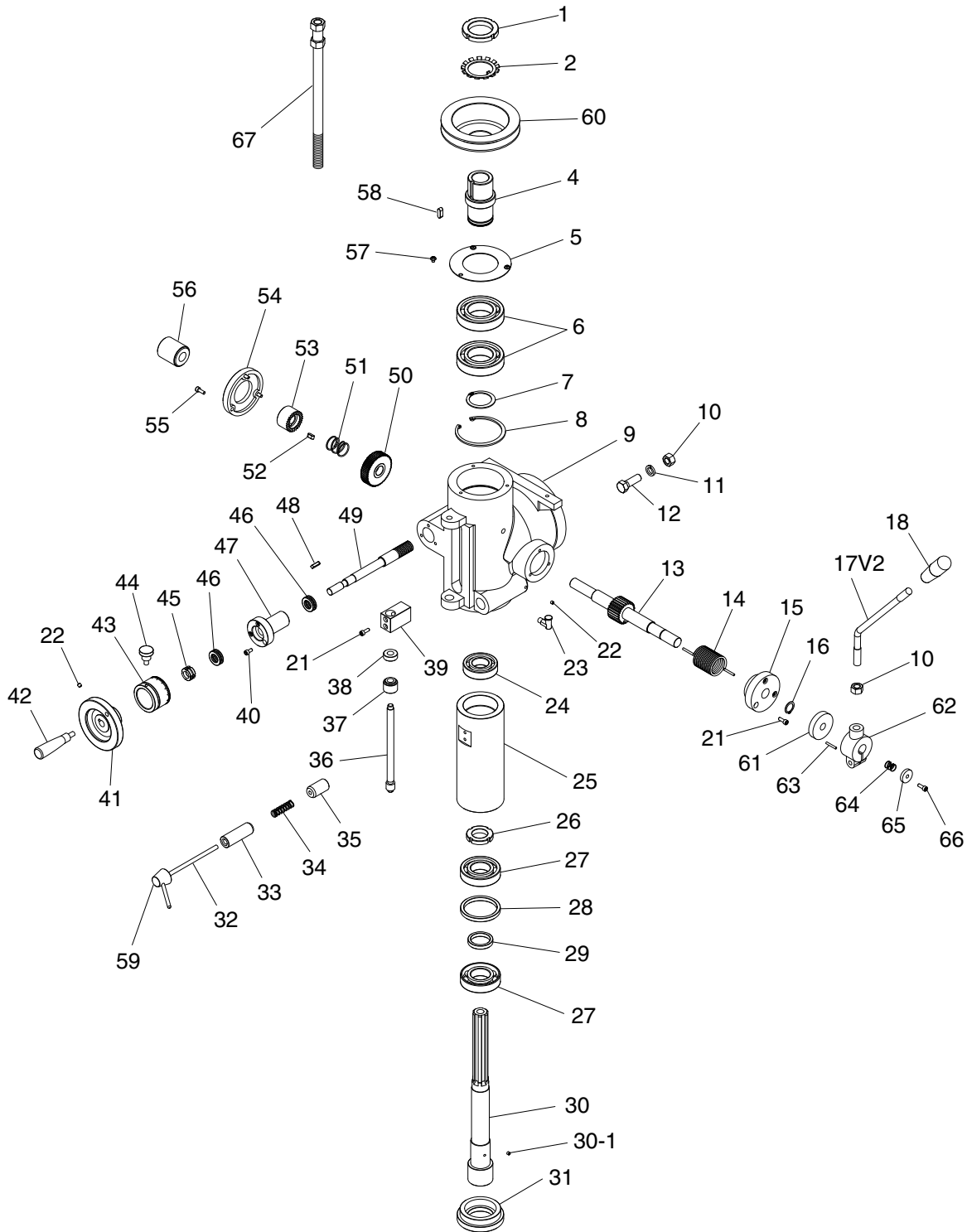
Figure 47. Motor junction box.



# SECTION 9: PARTS

We do our best to stock replacement parts when possible, but we cannot guarantee that all parts shown are available for purchase. Call (800) 523-4777 or visit [www.grizzly.com/parts](http://www.grizzly.com/parts) to check for availability.

## Head



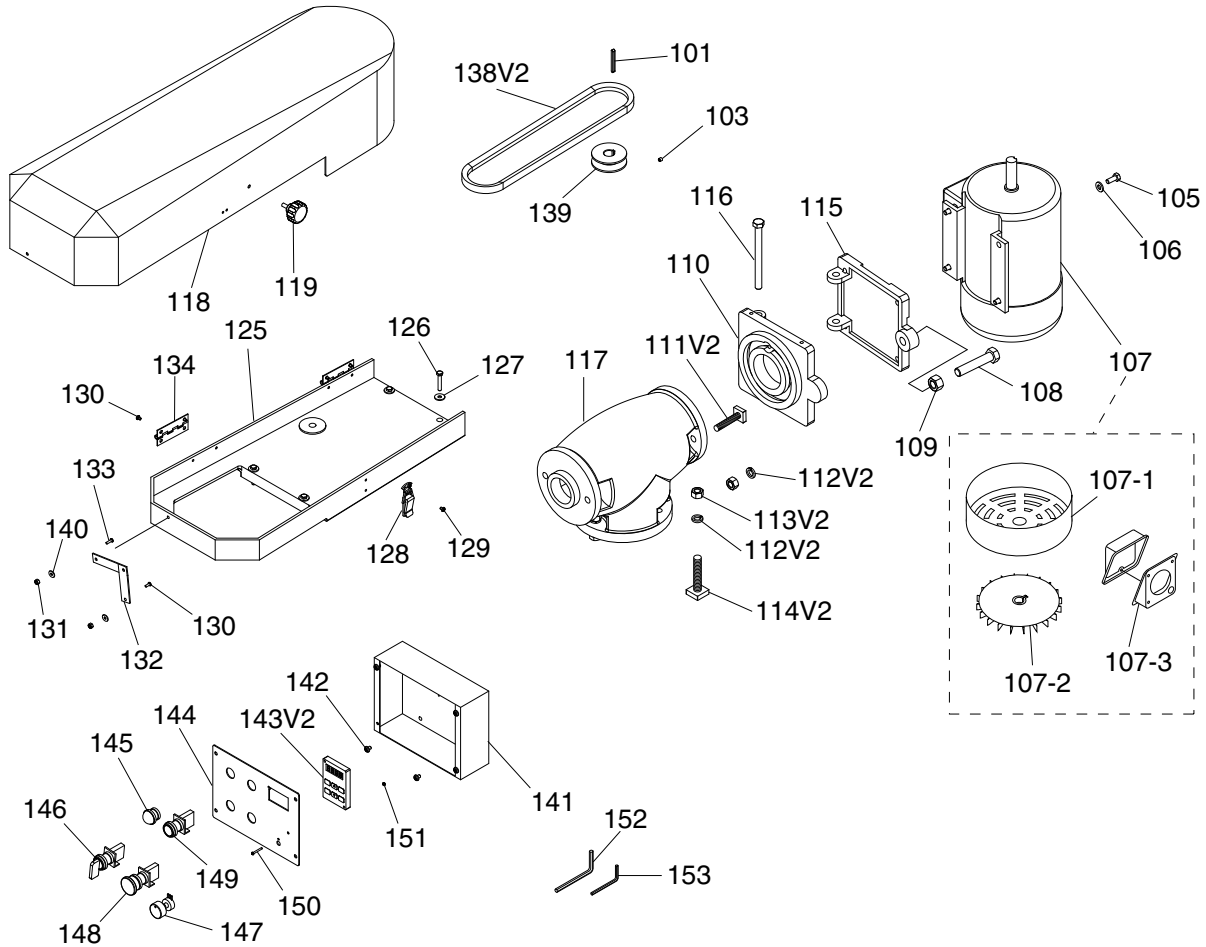
# Head Parts List

REF	PART #	DESCRIPTION
1	P0678001	SPANNER NUT
2	P0678002	SPANNER LOCK WASHER
4	P0678004	SPLINE SLEEVE
5	P0678005	BEARING COVER
6	P0678006	BALL BEARING 6209ZZ
7	P0678007	EXT RETAINING RING 45MM
8	P0678008	INT RETAINING RING 85MM
9	P0678009	HEAD CASTING
10	P0678010	HEX NUT 1/2-13
11	P0678011	LOCK WASHER 1/2
12	P0678012	HEX BOLT 1/2-13 X 1-1/2
13	P0678013	GEAR SHAFT
14	P0678014	TORSION SPRING
15	P0678015	END CAP
16	P0678016	EXT RETAINING RING 19MM
17V2	P0678017V2	DOWNFEED HANDLE COARSE M10-1.5
18	P0678018	KNOB
21	P0678021	CAP SCREW M5-.8 X 16
22	P0678022	SET SCREW M6-1 X 8
23	P0678023	OIL CUP
24	P0678024	BALL BEARING 6206ZZ
25	P0678025	QUILL
26	P0678026	SPANNER NUT
27	P0678027	ANGULAR CONTACT BEARING 7207
28	P0678028	BEARING SPACER LARGE
29	P0678029	BEARING SPACER SMALL
30	P0678030	SPINDLE
30-1	P0678030-1	SET SCREW M4-.7 X 10
31	P0678031	SPINDLE COLLAR
32	P0678032	LOCK SHAFT
33	P0678033	LOCK PLUNGER LARGE
34	P0678034	COMPRESSION SPRING
35	P0678035	LOCK PLUNGER SMALL

REF	PART #	DESCRIPTION
36	P0678036	DOWNFEED SCREW
37	P0678037	DOWNFEED LOCK RING
38	P0678038	DOWNFEED STOP RING
39	P0678039	QUILL DOG
40	P0678040	PHLP HD SCR M5-.8 X 15
41	P0678041	FINE DOWNFEED HANDWHEEL
42	P0678042	HANDLE
43	P0678043	GRADUATED DIAL
44	P0678044	LOCKING THUMB SCREW
45	P0678045	HEX NUT 9/16-12
46	P0678046	THRUST BEARING 51102
47	P0678047	SLEEVE
48	P0678048	KEY 5 X 5 X 20
49	P0678049	WORM SHAFT
50	P0678050	WORM
51	P0678051	COMPRESSION SPRING
52	P0678052	KEY 6 X 6 X 15
53	P0678053	BUSHING
54	P0678054	END CAP
55	P0678055	PHLP HD SCR M5-.8 X 10
56	P0678056	KNURLED KNOB
57	P0678057	PHLP HD SCR M5-.8 X 8
58	P0678058	SPECIAL KEY
59	P0678059	LOCK HANDLE
60	P0678060	SPINDLE PULLEY
61	P0678061	SPACER
62	P0678062	HANDLE HUB
63	P0678063	STOP PIN
64	P0678064	COMPRESSION SPRING
65	P0678065	FLAT WASHER 5MM
66	P0678066	CAP SCREW M5-.8 X 25
67	P0678067	DRAWBAR 7/16-20 X 12-3/8



# Drive System



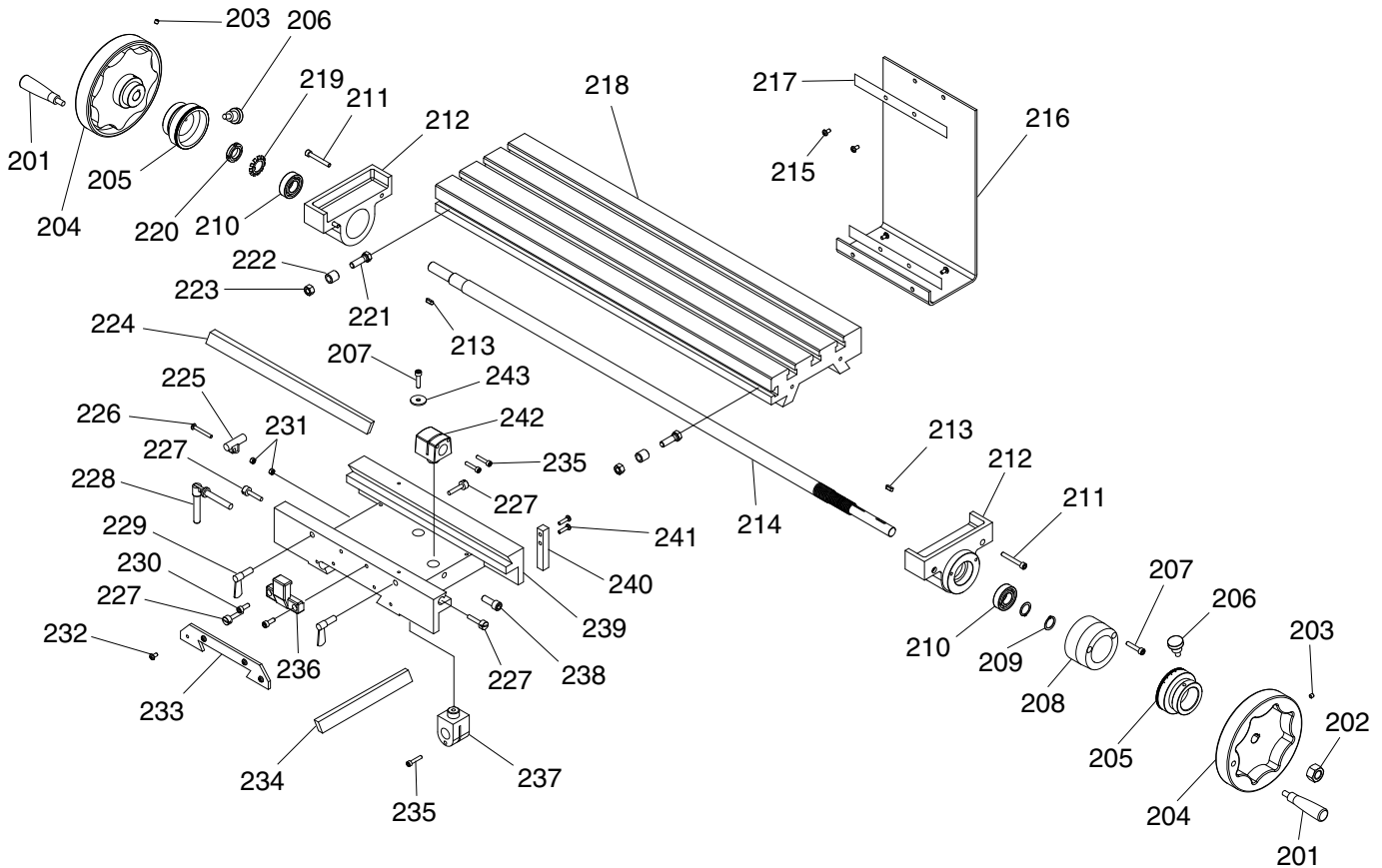
REF	PART #	DESCRIPTION
101	P0678101	KEY 5 X 5 X 40
103	P0678103	SET SCREW M6-1 X 8
105	P0678105	CAP SCREW M8-1.25 X 20
106	P0678106	FLAT WASHER 8MM
107	P0678107	MOTOR 1-1/2HP 220V 3-PH
107-1	P0678107-1	MOTOR FAN COVER
107-2	P0678107-2	MOTOR FAN
107-3	P0678107-3	MOTOR WIRING JUNCTION BOX
108	P0678108	HEX BOLT M16-2 X 75
109	P0678109	HEX NUT M16-2
110	P0678110	MOTOR BRACKET
111V2	P0678111V2	SQUARE BOLT M12-1.75 X 40 V2.01.17
112V2	P0678112V2	LOCK WASHER 12MM V2.01.17
113V2	P0678113V2	HEX NUT M12-1.75 V2.01.17
114V2	P0678114V2	SQUARE BOLT M12-1.75 X 45 V2.01.17
115	P0678115	MOTOR MOUNT
116	P0678116	PIVOT BOLT
117	P0678117	TURRET
118	P0678118	UPPER BELT COVER
119	P0678119	STAR KNOB
125	P0678125	LOWER BELT COVER
126	P0678126	HEX BOLT M6-1 X 35
127	P0678127	FLAT WASHER 6MM

REF	PART #	DESCRIPTION
128	P0678128	LATCH
129	P0678129	PHLP HD SCR M3-.5 X 8
130	P0678130	PHLP HD SCR M5-.8 X 8
131	P0678131	HEX NUT M5-.8
132	P0678132	BRACE
133	P0678133	PHLP HD SCR M5-.8 X 10
134	P0678134	HINGE
138V2	P0678138V2	V-BELT B-60 V2.06.15
139	P0678139	MOTOR PULLEY
140	P0678140	FLAT WASHER 5MM
141	P0678141	CONTROL BOX
142	P0678142	PHLP HD SCR M6-1 X 16
143V2	P0678143V2	SPINDLE SPEED READOUT V2.01.21
144	P0678144	CONTROL PANEL
145	P0678145	POWER LIGHT
146	P0678146	ON BUTTON
147	P0678147	SPEED DIAL
148	P0678148	STOP BUTTON
149	P0678149	DIRECTION SWITCH
150	P0678150	PHLP HD SCR M3-.5 X 25
151	P0678151	HEX NUT M3-.5
152	P0678152	HEX WRENCH 5MM
153	P0678153	HEX WRENCH 4MM





# Table & Saddle

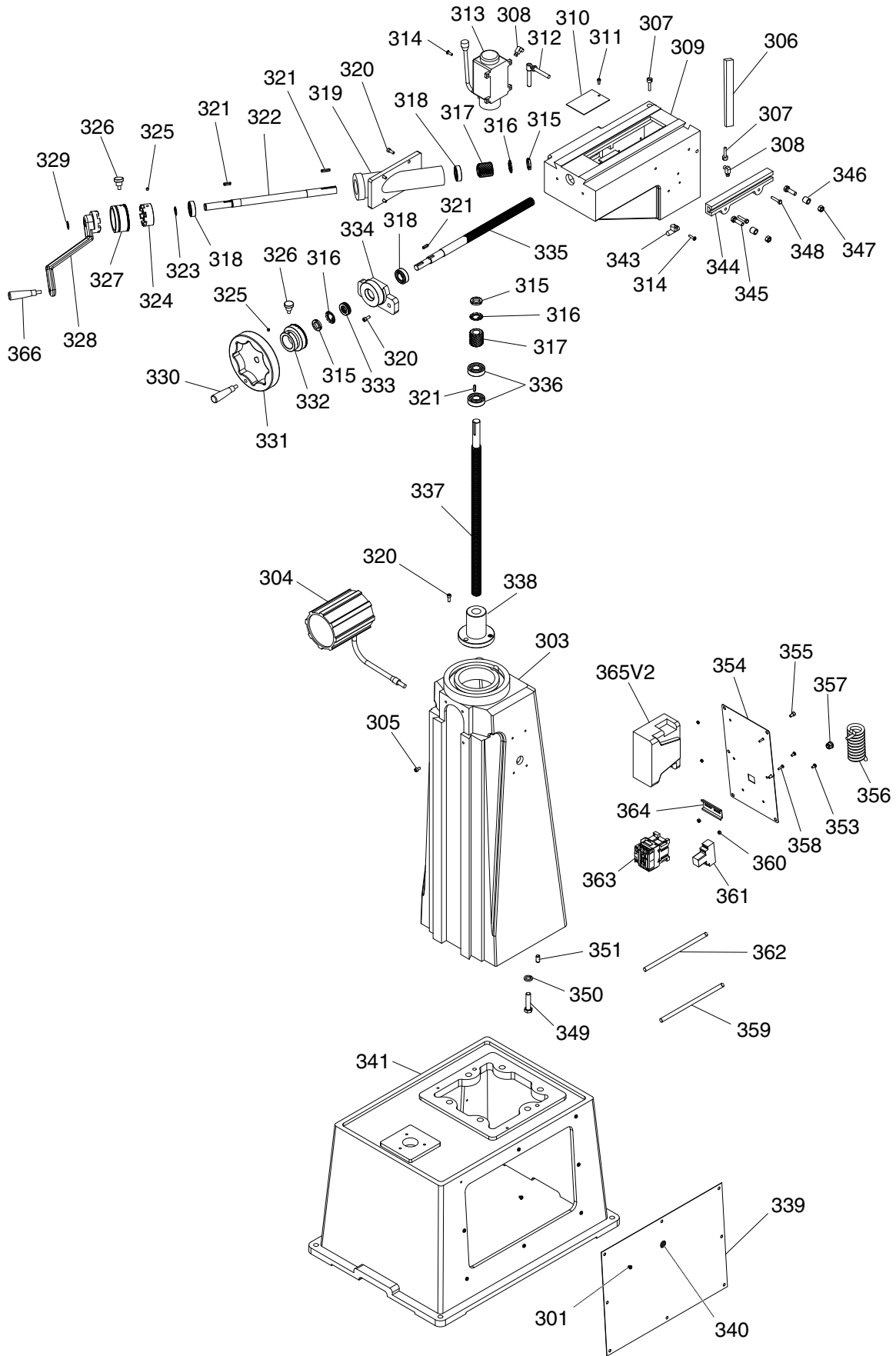


REF	PART #	DESCRIPTION
201	P0678201	HANDLE
202	P0678202	HEX NUT 5/8-11
203	P0678203	SET SCREW M6-1 X 8
204	P0678204	HANDWHEEL
205	P0678205	GRADUATED DIAL
206	P0678206	LOCKING THUMB SCREW
207	P0678207	CAP SCREW M6-1 X 25
208	P0678208	COLLAR
209	P0678209	EXT RETAINING RING 20MM
210	P0678210	BALL BEARING 6004ZZ
211	P0678211	CAP SCREW M6-1 X 45
212	P0678212	LEADSCREW BRACKET
213	P0678213	KEY 5 X 5 X 20
214	P0678214	LONGITUDINAL LEADSCREW
215	P0678215	PHLP HD SCR M6-1 X 8
216	P0678216	REAR WAY COVER
217	P0678217	WAY COVER HOLDER
218	P0678218	TABLE
219	P0678219	SPANNER NUT WASHER
220	P0678220	SPANNER NUT
221	P0678221	HEX BOLT M10-1.5 X 30
222	P0678222	LIMIT STOP

REF	PART #	DESCRIPTION
223	P0678223	HEX NUT M10-1.5
224	P0678224	TABLE GIB
225	P0678225	LIMIT BLOCK
226	P0678226	PHLP HD SCR M5-.8 X 30
227	P0678227	GIB ADJUSTMENT SCREW
228	P0678228	SADDLE LOCKING SCREW
229	P0678229	TABLE LOCKING SCREW
230	P0678230	CAP SCREW M6-1 X 16
231	P0678231	HEX NUT M5-.8
232	P0678232	PHLP HD SCR M5-.8 X 10
233	P0678233	WAY WIPER
234	P0678234	SADDLE GIB
235	P0678235	CAP SCREW M5-.8 X 25
236	P0678236	LIMIT BLOCK
237	P0678237	CROSS LEADSCREW NUT
238	P0678238	CAP SCREW M8-1.25 X 25
239	P0678239	SADDLE
240	P0678240	STOP BLOCK
241	P0678241	PHLP HD SCR M5-.8 X 20
242	P0678242	LONGITUDINAL LEADSCREW NUT
243	P0678243	FLAT WASHER 6MM



# Knee & Base



# Knee & Base Parts List

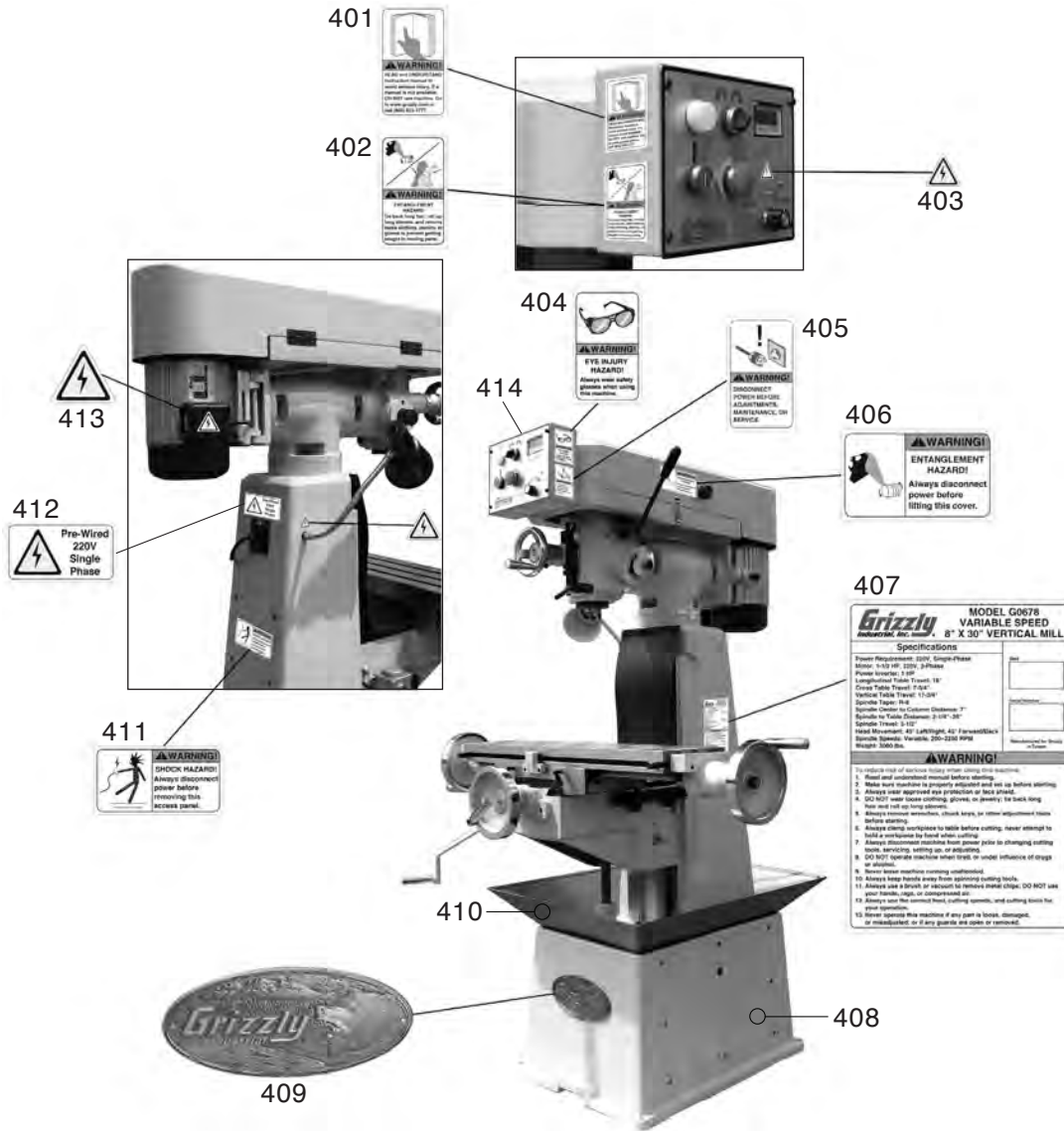
REF	PART #	DESCRIPTION
301	P0678301	PHLP HD SCR M6-1 X 10
303	P0678303	COLUMN
304	P0678304	WORK LIGHT ASSEMBLY 110V
305	P0678305	CAP SCREW M6-1 X 8
306	P0678306	KNEE GIB
307	P0678307	GIB ADJUSTMENT SCREW
308	P0678308	OIL JOINT
309	P0678309	KNEE
310	P0678310	CHIP GUARD
311	P0678311	PHLP HD SCR M3-.5 X 6
312	P0678312	KNEE LOCKING SCREW
313	P0678313	ONE-SHOT OILER
314	P0678314	PHLP HD SCR M5-.8 X 15
315	P0678315	SPANNER NUT
316	P0678316	SPANNER NUT WASHER
317	P0678317	BEVEL GEAR
318	P0678318	BALL BEARING 6004ZZ
319	P0678319	VERTICAL CRANK HOUSING
320	P0678320	CAP SCREW M6-1 X 16
321	P0678321	KEY 5 X 5 X 20
322	P0678322	VERTICAL CRANK SHAFT
323	P0678323	EXT RETAINING RING 20MM
324	P0678324	CLUTCH
325	P0678325	SET SCREW M6-1 X 8
326	P0678326	LOCKING THUMB SCREW
327	P0678327	GRADUATED DIAL
328	P0678328	CRANK HANDLE
329	P0678329	EXT RETAINING RING 18MM
330	P0678330	HANDLE
331	P0678331	HANDWHEEL
332	P0678332	GRADUATED DIAL
333	P0678333	THRUST BEARING 51104

REF	PART #	DESCRIPTION
334	P0678334	BEARING HOUSING
335	P0678335	CROSS FEED LEADSCREW
336	P0678336	BALL BEARING 6204ZZ
337	P0678337	VERTICAL LEADSCREW
338	P0678338	LEADSCREW BASE
339	P0678339	BASE SIDE COVER
340	P0678340	PLUG
341	P0678341	BASE
343	P0678343	LIMIT BLOCK
344	P0678344	LIMIT TRACK
345	P0678345	HEX BOLT M10-1.5 X 30
346	P0678346	LIMIT STOP
347	P0678347	HEX NUT M10-1.5
348	P0678348	HEX BOLT M6-1 X 30
349	P0678349	HEX BOLT 1/2-13 X 2
350	P0678350	LOCK WASHER 1/2
351	P0678351	PIN 10 X 20
353	P0678353	PHLP HD SCR 10-24 X 1/2
354	P0678354	COLUMN ACCESS PANEL
355	P0678355	PHLP HD SCR M6-1 X 8
356	P0678356	POWER CORD 12-GA 3-WIRE 86"
357	P0678357	STRAIN RELIEF
358	P0678358	PHLP HD SCR 10-24 X 3/4
359	P0678359	CABLE 3-WIRE
360	P0678360	HEX NUT 10-24
361	P0678361	RELAY ARITA MR20 220V
362	P0678362	CABLE 4-WIRE
363	P0678363	CONTACTOR NHD C-12D
364	P0678364	MOUNTING TRACK
365V2	P0678365V2	INVERTER RHYME RM6S2 1-PH 200V V2.01.21
366	P0678366	HANDLE
367	P0678367	SPLASH PAN *

\*Not Shown



# Labels & Cosmetics



REF	PART #	DESCRIPTION
401	P0678401	READ MANUAL LABEL
402	P0678402	ENTANGLEMENT HAZARD LABEL
403	P0678403	ELECTRICITY LABEL
404	P0678404	EYE INJURY HAZARD LABEL
405	P0678405	DISCONNECT POWER LABEL 220V
406	P0678406	COVER ENTANGLEMENT LABEL
407	P0678407	MACHINE ID LABEL

REF	PART #	DESCRIPTION
408	P0678408	TOUCH-UP PAINT, GRIZZLY PUTTY
409	P0678409	GRIZZLY NAMEPLATE
410	P0678410	TOUCH-UP PAINT, GRIZZLY GREEN
411	P0678411	SHOCK HAZARD LABEL
412	P0678412	PRE-WIRED 220V LABEL
413	P0678413	ELECTRICITY LABEL
414	P0678414	CONTROL PANEL LABEL

## WARNING

Safety labels help reduce the risk of serious injury caused by machine hazards. If any label comes off or becomes unreadable, the owner of this machine **MUST** replace it in the original location before resuming operations. For replacements, contact (800) 523-4777 or [www.grizzly.com](http://www.grizzly.com).







# WARRANTY & RETURNS

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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.

To take advantage of this warranty, you must register it at <https://www.grizzly.com/forms/warranty>, or you can scan the QR code below to be automatically directed to our warranty registration page. Enter all applicable information for the product.



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