READ THIS FIRST

Model G0678

IMPORTANT UPDATE

For Machines Mfd. Since 06/15
and Owner's Manual Revised 10/10

For questions or help with this product contact Tech Support at (570) 546-9663 or techsupport@grizzly.com

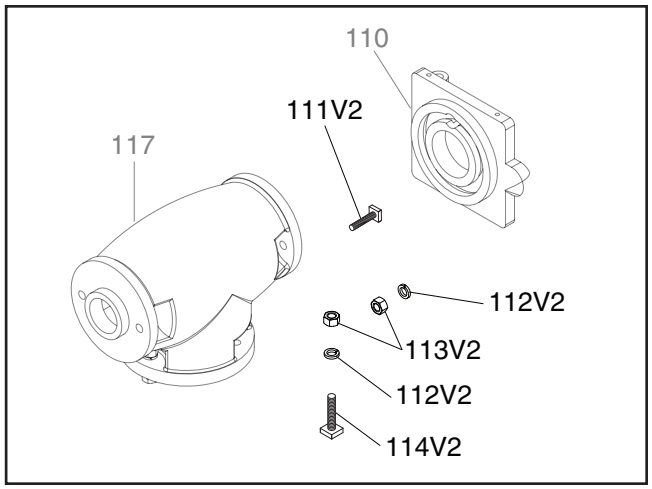
The following changes were recently made to this machine since the owner's manual was printed:

- Headstock hex bolts replaced with square head bolts.
- Changed motor V-belt.
- Changed spindle motor amperage.
- Updated electrical cabinet, control panel, and motor wiring diagrams.

Aside from this information, all other content in the owner's manual applies and MUST be read and understood for your own safety. **IMPORTANT: Keep this update with the owner's manual for future reference.**

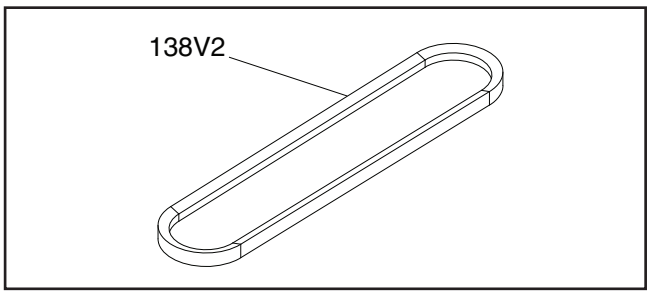
For questions or help, contact our Tech Support at (570) 546-9663 or techsupport@grizzly.com.

New Headstock Bolts



REF	PART #	DESCRIPTION
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

Part Change



REF	PART #	DESCRIPTION
138V2	P0678138V2	V-BELT B60 V2.06.15

Updated Spindle Motor Amperage

Amps 5A

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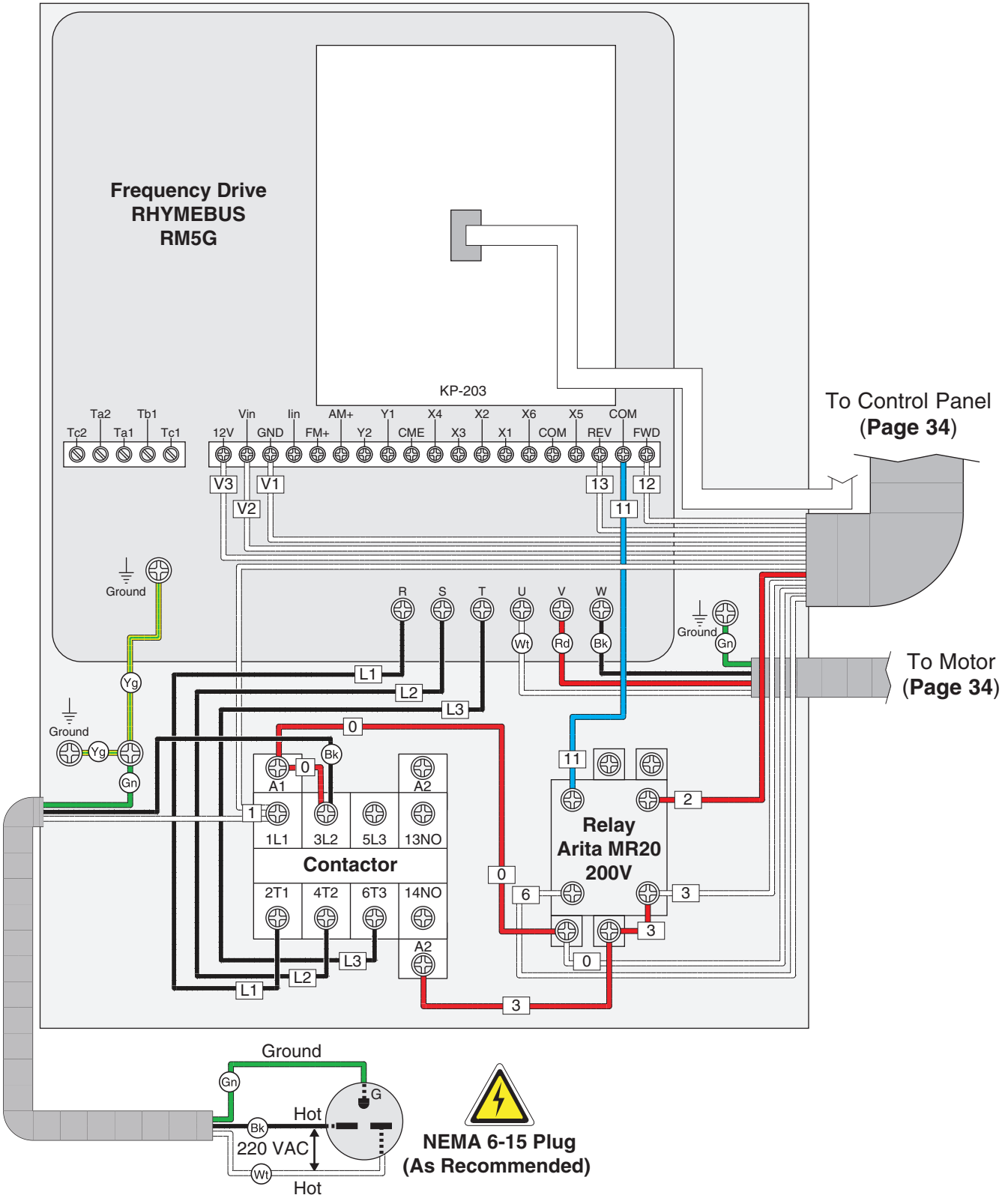
Electrical Cabinet Wiring



Control Panel & Motor Wiring

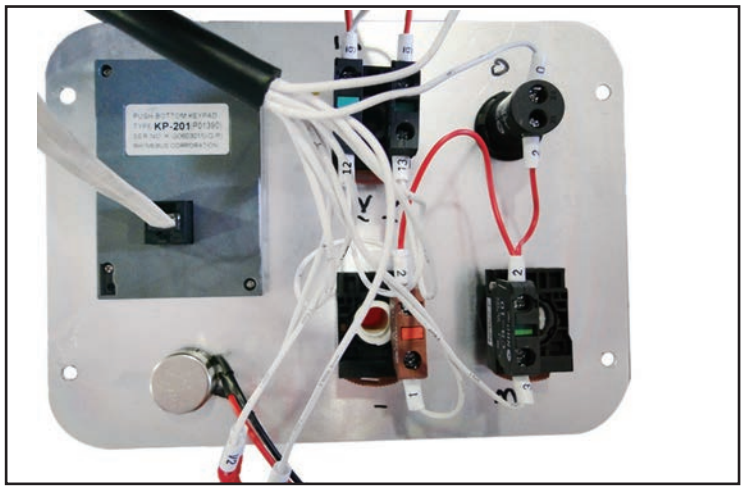


Figure 1. Control panel wiring (viewed from behind).

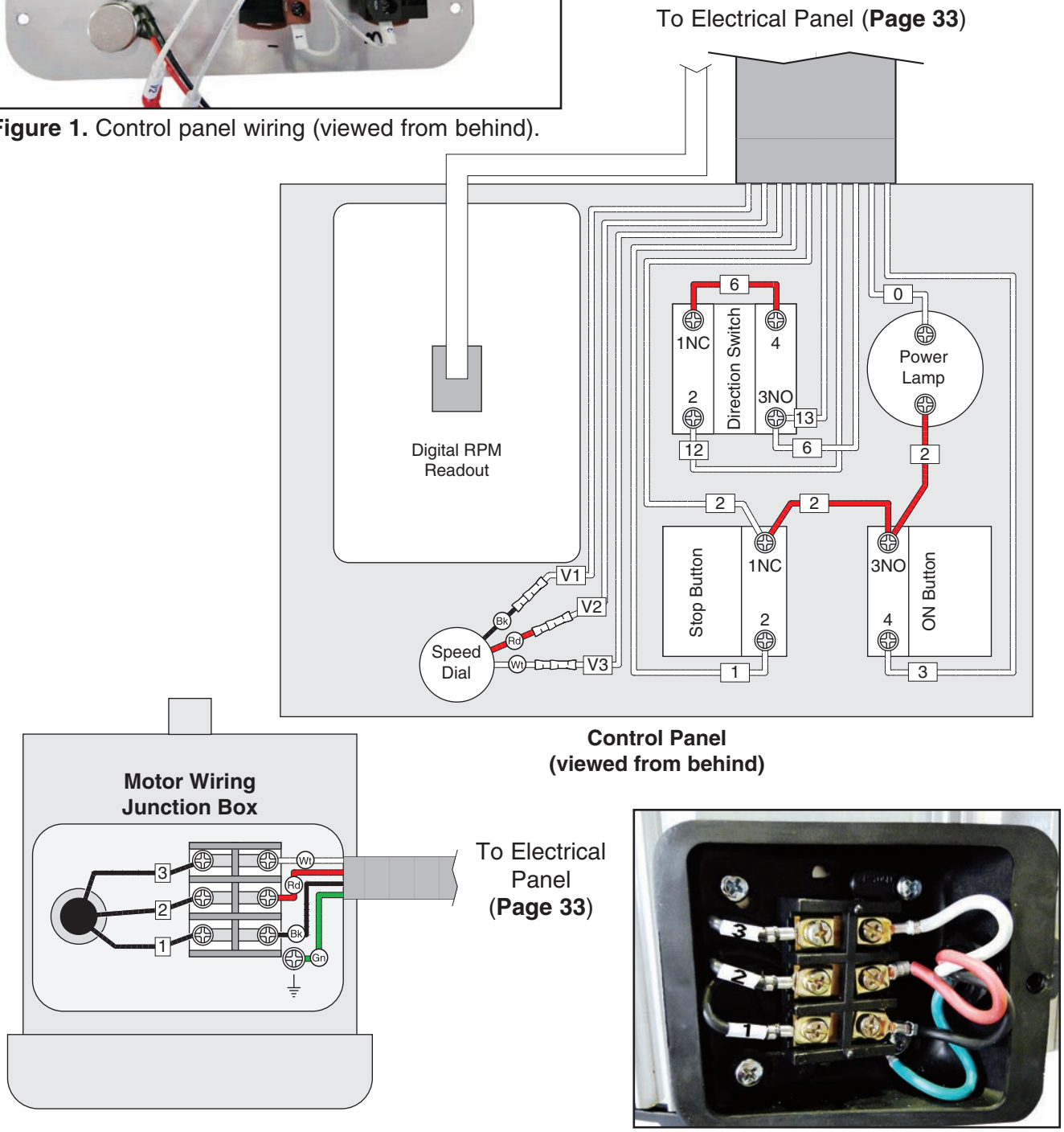


Figure 2. Motor wiring.

MODEL G0678
VARIABLE SPEED 8" x 30"
VERTICAL MILL
OWNER'S MANUAL

(FOR MODELS MANUFACTURED SINCE 9/10) #TS10934 PRINTED IN TAIWAN

⚠ WARNING!

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

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

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

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

⚠ WARNING!

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

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

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

Table of Contents

INTRODUCTION

Foreword

We are proud to offer the Model G0678 VS 8" x 30" Vertical Mill. This machine is part of a growing Grizzly family of fine metalworking machinery. When used according to the guidelines set forth in this manual, you can expect years of trouble-free, enjoyable operation and proof of Grizzly's commitment to customer satisfaction.

The specifications, drawings, and photographs illustrated in this manual represent the Model G0678 when the manual was prepared. However, owing to Grizzly's policy of continuous improvement, changes may be made at any time with no obligation on the part of Grizzly. For your convenience, we always keep current Grizzly manuals available on our website at **www.grizzly.com**. Any updates to your machine will be reflected in these manuals as soon as they are complete. Visit our site often to check for the latest updates to this manual!

Contact Info

We stand behind our machines. If you have any service questions, parts requests or general questions about the machine, please call or write us at the location listed below.

Grizzly Industrial, Inc.
1203 Lycoming Mall Circle
Muncy, PA 17756
Phone: (570) 546-9663
Fax: (800) 438-5901
E-Mail: techsupport@grizzly.com

If you have any comments regarding this manual, please write to us at the address below:

Grizzly Industrial, Inc.
C/O Technical Documentation Manager
P.O. Box 2069
Bellingham, WA 98227-2069
Email: manuals@grizzly.com

Functional Overview

The Model G0678 vertical mill is used to remove material from metal workpieces to form complex shapes. Tooling is inserted into the spindle, which can positioned in nearly any orientation above the table and workpiece.

During most operations, the workpiece is clamped to the table, then it is moved into the rotating cutter in any combination of three paths—longitudinal (X-axis), cross (Y-axis), and vertical (Z-axis). The range of movement for the table is greater than that of the head and spindle. However some operations, such as drilling or tapping, are better accomplished with vertical quill (spindle) movement, using the coarse or fine downfeed controls.

This mill uses a frequency drive to convert incoming 220V single-phase power to 220V 3-phase for efficient performance from the spindle motor. Power is transferred directly to the spindle from the motor by a V-belt and pulleys.

Spindle speed is electronically controlled by using the variable speed dial and readout on the control panel.

Identification

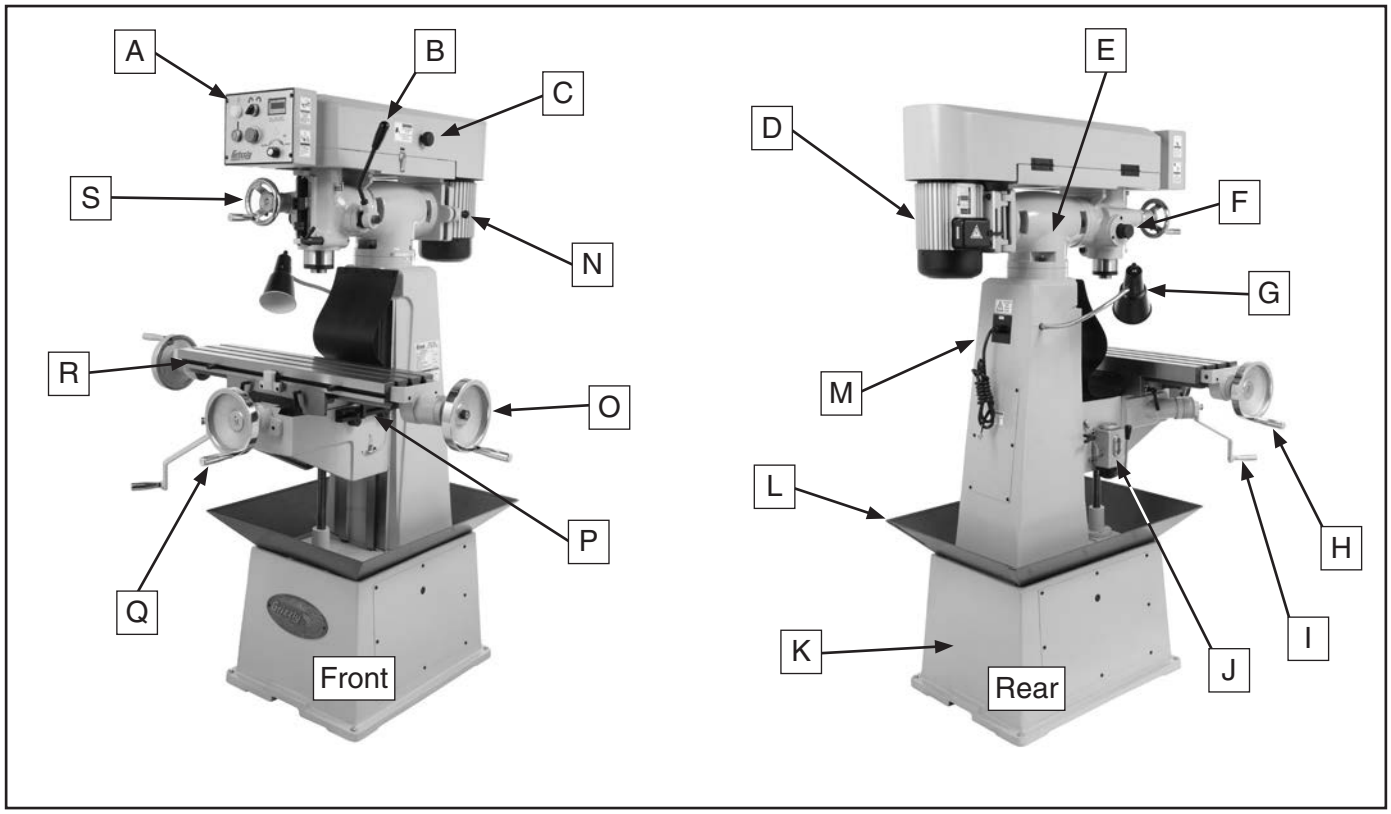


Figure 1. Model G0678 identification.

A. Control Panel (refer to **Page 16** for details)
B. Coarse Downfeed Handle
C. V-Belt Cover
D. Motor 1½HP, 220V, 3-Phase
E. Turret
F. Downfeed Selector
G. Work Light 110V
H. Longitudinal (X-Axis) Handwheel
I. Vertical (Z-Axis) Crank Handle
J. One-Shot Oiler
K. Base
L. Splash Pan
M. Column
N. V-Belt Tension Adjustment Bolt
O. Longitudinal Handwheel
P. Cross (Y-Axis) Feed Limit Stop Track
Q. Cross Feed Handwheel
R. Longitudinal Limit Stop Track
S. Fine Downfeed Handwheel

MACHINE DATA SHEET

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

MODEL G0678 8" X 30" 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..... 966 lbs.
Length x Width x Height..... 45 x 45 x 76 in.
Must Ship Upright..... Yes

Electrical:

Power Requirement..... 220V, Single-Phase, 60 Hz
Prewired Voltage..... 220V
Full-Load Current Rating..... 3.3A
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 Type..... Yaskawa RM5G-2001
Inverter Size..... 1 HP

Motors:

Main

Type..... TEFC Induction
Horsepower..... 1.5 HP
Phase..... 3-Phase
Amps..... 3.3A
Speed..... 1725 RPM
Power Transfer ..... V-Belt Drive
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)	7-3/4 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.
	7/16 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	Urethane

Other Specifications:

Country Of Origin	Taiwan
Warranty	1 Year
Approximate Assembly & Setup Time	1 Hour
Serial Number Location	ID Label on Side
ISO 9001 Factory	No
CSA Certified	No

Features:

One-Shot Lubrication
High Precision Ball Bearings
Bronze Nut on Longitudinal & Cross Feed Leadscrews
Variable Frequency Drive Speed Control
Hardened & 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 **This symbol is used to alert the user to useful information about proper operation of the machine.**

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 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 avoid accidental slips, which could cause loss of workpiece control.

HAZARDOUS DUST. Dust created while using machinery may cause cancer, birth defects, or long-term respiratory damage. Be aware of dust hazards associated with each workpiece material, and 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!

INTENDED USAGE. Only use machine for its intended purpose and never make modifications not approved by Grizzly. Modifying machine or using it differently than intended may result in malfunction or mechanical failure that can lead to serious 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.

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.

CHECK DAMAGED PARTS. Regularly inspect machine for any condition that may affect safe operation. Immediately repair or replace damaged or mis-adjusted parts before operating machine.

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.

⚠WARNING

Additional Safety Instructions For Mills

1. **UNDERSTANDING CONTROLS.** Make sure you understand the use and operation of all controls.

2. **SAFETY ACCESSORIES.** Always use a chip guard in addition to your safety glasses or use a face shield when milling to reduce the risk of injury from flying chips.

3. **WORK HOLDING.** Before starting the machine, be certain the workpiece has been properly clamped to the table. NEVER hold the workpiece by hand during operation.

4. **CHUCK KEY SAFETY.** Always remove chuck key, drawbar wrench, and any service tools immediately after use and before starting the mill.

5. **SPINDLE SPEEDS.** Select the spindle speed that is appropriate for the type of work and material. Allow the mill to reach full speed before beginning a cut.

6. **POWER DISRUPTION.** In the event of a local power outage during operation, turn ***OFF*** all switches to avoid possible sudden start up once power is restored.

7. **STOPPING SPINDLE.** DO NOT stop the spindle using your hand. Allow the spindle to stop on its own, or, in the case of an emergency, use the spindle brake.

8. **CLEAN-UP.** DO NOT clear chips by hand or compressed air. Use a brush or vacuum, and never clear chips while the spindle is turning.

9. **BE ATTENTIVE.** DO NOT leave mill running unattended for any reason.

10. **MACHINE CARE AND MAINTENANCE.** Never operate the mill with damaged or worn parts. Maintain your mill in proper working condition. Perform routine inspections and maintenance promptly. Put away adjustment tools after use.

11. **DISCONNECT POWER.** Make sure the mill is turned ***OFF***, disconnected from its power source and all moving parts have come to a complete stop before changing cutting tools, starting any inspection, adjustment, or maintenance procedure.

12. **AVOIDING ENTANGLEMENT**. DO NOT wear loose clothing, gloves, or jewelry when operating mill. Tie back long hair and roll up sleeves.

13. **TOOL HOLDING.** Always use the proper tools for your operation. Make sure tools are held firmly in place.

14. **CUTTING TOOL INSPECTION.** Inspect drills and end mills for sharpness, chips, or cracks before each use. Replace dull, chipped, or cracked cutting tools immediately. Handle new cutting tools with care. Leading edges are very sharp and can cause lacerations.

15. **SPINDLE DIRECTION CHANGES.** Never reverse spindle direction while the spindle is in motion.

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

⚠WARNING

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

SECTION 2: CIRCUIT REQUIREMENTS

220V Single-Phase Operation

⚠WARNING

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

⚠WARNING

Electrocution or fire could result if machine is not grounded and installed in compliance with electrical codes. Compliance MUST be verified by a qualified electrician!

Full Load Amperage Draw

This machine draws the following amps under maximum load:

Amp Draw.....3.3 Amps

Power Supply Circuit Requirements

You MUST connect your machine to a grounded circuit that is rated for the amperage given below. Never replace a circuit breaker on an existing circuit with one of higher amperage without consulting a qualified electrician to ensure compliance with wiring codes. **If you are unsure about the wiring codes in your area or you plan to connect your machine to a shared circuit, consult a qualified electrician.**

Minimum Circuit Size..... 15 Amps

NOTICE

The Model G0678 uses a 1 HP Yasakawa frequency drive to convert incoming single-phase power to 3-phase for greater spindle motor performance.

Power Connection Device

The type of plug required to connect your machine to power depends on the type of service you currently have or plan to install. We recommend using the plug shown in **Figure 2**.

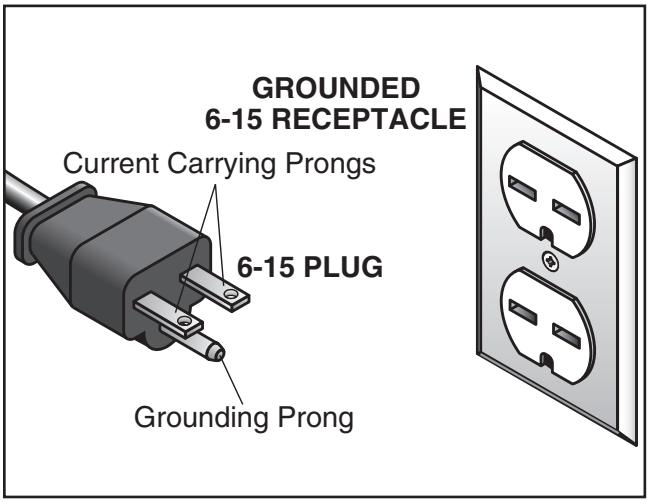


Figure 2. NEMA 6-15 plug and receptacle.

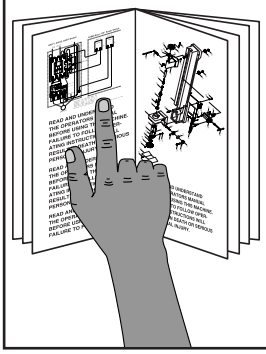
Extension Cords

Using extension cords may reduce the life of the motor. Instead, place the machine near a power source. If you must use an extension cord:

- Use at least a 16 gauge cord that does not exceed 50 feet in length!
- The extension cord must also have a ground wire and plug pin.
- A qualified electrician MUST size cords over 50 feet long to prevent motor damage.

SECTION 3: SETUP

Setup Safety

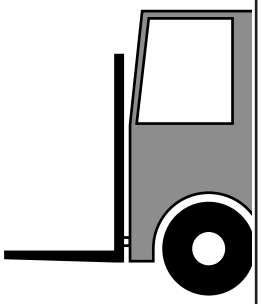


WARNING

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

The Model G0678 is a heavy machine. Serious personal injury may occur if safe moving methods are not used. To be safe, get assistance and use power equipment rated for at least 1500 lbs. to move the shipping crate and remove the machine from the crate.

Items Needed for Setup

The following items are needed to complete the setup process, but are not included with your 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

Your machine was carefully packaged for safe transportation. Remove the packaging materials from around your machine and inspect it. If you discover the machine is damaged, *please immediately call Customer Service at (570) 546-9663 for advice.*

Save the containers and all packing materials for possible inspection by the carrier or its agent. *Otherwise, filing a freight claim can be difficult.*

When you are completely satisfied with the condition of your shipment, inventory the contents.

Inventory

The following is a description of the main components shipped with your machine. Lay the components out to inventory them.

Note: *If you can't find an item on this list, check the mounting location on the machine or examine the packaging materials carefully. Occasionally we pre-install certain components for shipping purposes.*

Inventory: (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

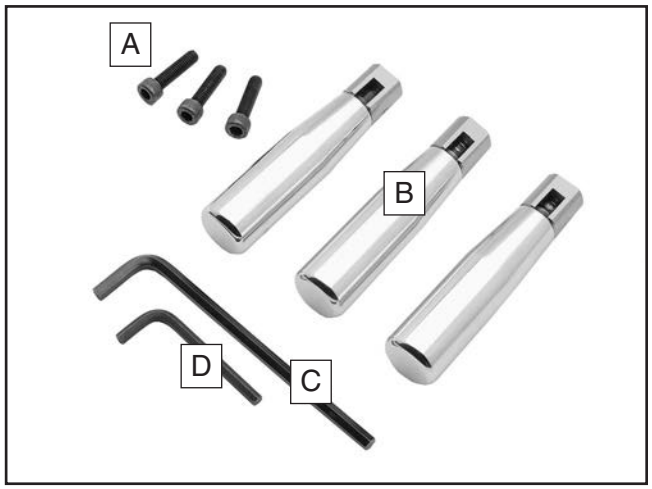
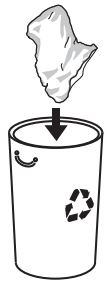


Figure 3. Model G0678 inventory.

If any nonproprietary 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.



⚠WARNING

SUFFOCATION HAZARD!

Immediately discard all plastic bags and packing materials to eliminate choking/suffocation hazards for children and animals.

Clean Up

The unpainted surfaces are coated with a waxy oil to prevent corrosion during shipment. Remove this protective coating with a solvent cleaner or degreaser, such as shown in **Figure 4**. For thorough cleaning, some parts must be removed. **For optimum performance, clean all moving parts or sliding contact surfaces.** Avoid chlorine-based solvents, such as acetone or brake parts cleaner that may damage painted surfaces. Always follow the manufacturer's instructions when using any type of cleaning product.

⚠WARNING

Gasoline and petroleum products have low flash points and can explode or cause fire if used to clean machinery. DO NOT use these products to clean the machinery.

⚠CAUTION

Many cleaning solvents are toxic if inhaled. Minimize your risk by only using these products in a well ventilated area.

G2544—Solvent Cleaner & Degreaser
H9692—Orange Power Degreaser
Great products for removing shipping grease.

Figure 4. Cleaner/degreasers available from Grizzly.

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 5** for the minimum working clearances.

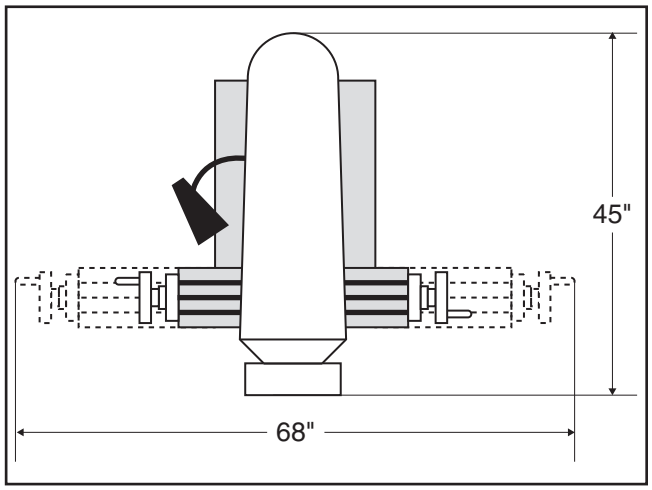
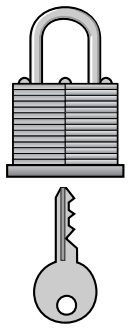


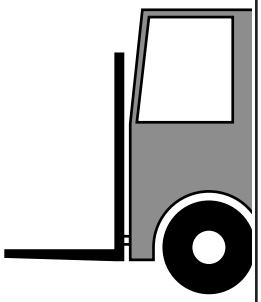
Figure 5. Minimum working clearances.



⚠CAUTION

Children and visitors may be seriously injured if unsupervised around this machine. Lock entrances to the shop or disable start switch or power connection to prevent unsupervised use.

Moving & Placing Base Unit



⚠WARNING

The Model G0678 is a heavy machine. Serious personal injury may occur if safe moving methods are not used. To be safe, get assistance and use power equipment rated for at least 1500 lbs. to move the shipping crate and remove the machine from the crate.

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 6**, and securely attach them to your power lifting equipment.

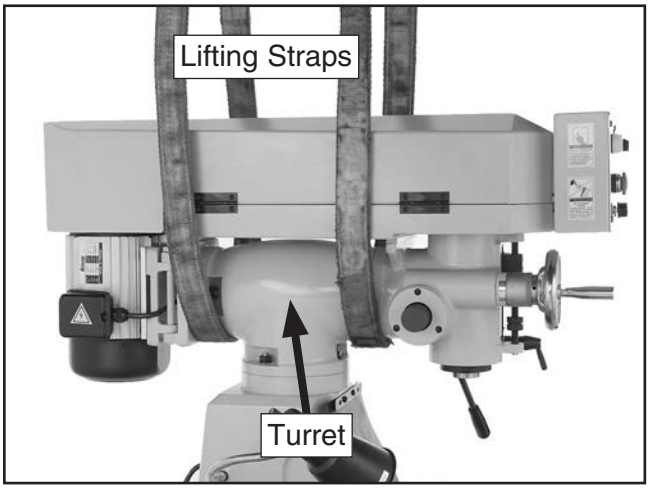


Figure 6. Positioning the lifting straps.

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 7**) 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.

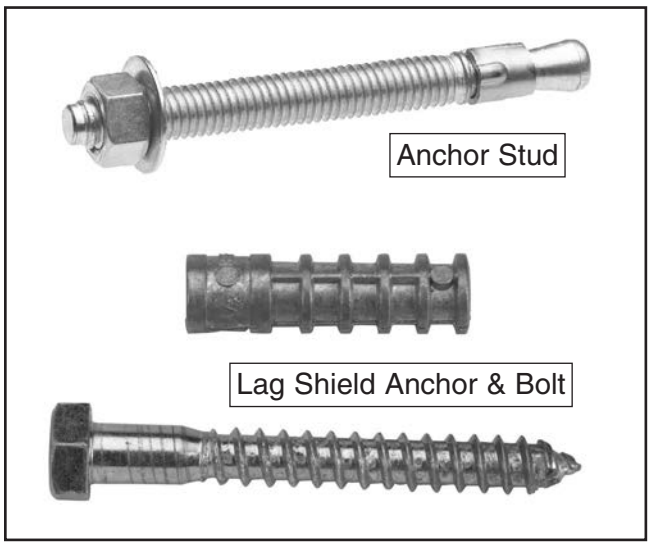


Figure 7. Typical fasteners for mounting to concrete floors.

Using Machine Mounts

Using machine mounts, shown in **Figure 8**, 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 8. Machine mount example.

Assembly

To assemble your mill:

1. Secure the three handles to the handwheels with the M6-1 x 25 cap screws, as shown in **Figure 9**.

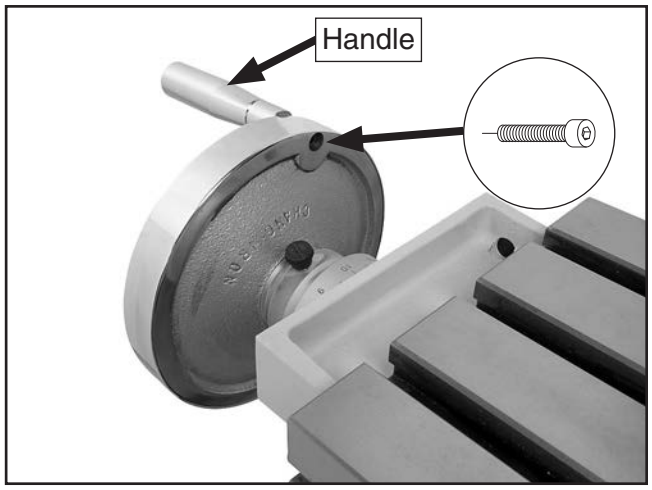


Figure 9. Handle attached to handwheel.

2. Use the external retaining ring pliers to remove the retaining ring from the end of the vertical crank screw, reverse the crank handle, then re-install the retaining ring (see **Figure 10**).

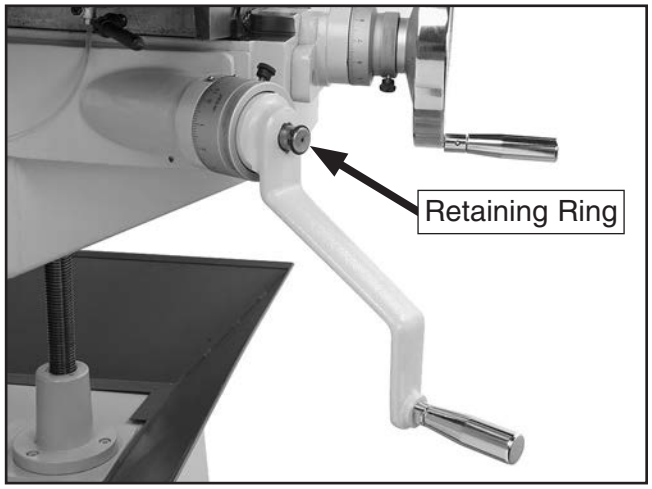


Figure 10. Vertical crank handle properly installed.

Test Run

Once the assembly is complete, test run your machine to make sure it runs properly and is ready for regular operation. The test run consists of verifying the following: 1) The motor powers up and runs correctly and 2) the stop button safety feature works correctly.

If, during the test run, you cannot easily locate the source of an unusual noise or vibration, stop using the machine immediately, then review **Troubleshooting** on **Page 28**.

If you cannot find a remedy, contact our Tech Support at (570) 546-9663 for assistance.

⚠WARNING

Before starting the mill, make sure you have performed the preceding assembly instructions, and you have read through the rest of the manual and are familiar with the various functions and safety features on this machine. Failure to follow this warning could result in serious personal injury or even death!

To test run the machine:

1. Make sure you understand the safety instructions at the beginning of the manual and that the machine is set up properly.

2. Make sure all tools and objects used during setup are cleared away from the machine.

3. Make sure the machine is lubricated (refer to **Lubrication** on **Page 25** for detailed instructions).

4. Refer to **Basic Controls** on **Page 16** to become familiar with the control panel functions.

5 . Connect the machine to the power source—the power lamp on the control panel should light.

6. Push the stop button in, then twist it clockwise so it pops out. When the stop button pops out, the switch is reset and ready for operation (see **Figure 11**).

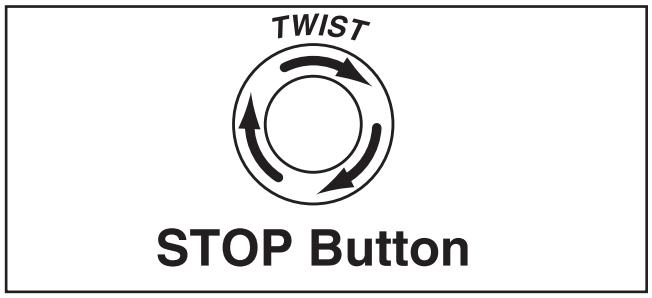


Figure 11. Resetting the switch.

7. Verify that the machine is operating correctly by pushing the ON button.

   —When operating correctly, the machine runs smoothly with little or no vibration or rubbing noises.

   —Investigate and correct strange or unusual noises or vibrations before operating the machine further. Always disconnect the machine from power when investigating or correcting potential problems.

8. With the machine still running, use the speed dial to decrease/increase the spindle speed.

9. Press the stop button to stop the machine.

10. WITHOUT resetting the switch, press the ON button. The machine should not start.

    —If the machine does not start, the stop button safety feature is working correctly. The Test Run is complete.

    —If the machine does start (with the stop button pushed in), immediately disconnect power to the machine. The stop button safety feature is not working correctly. This safety feature must work properly before proceeding with regular operations. Call Tech Support for help.

When all of the **Test Run** procedures are successfully completed, proceed to **Spindle Break-In**.

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 the 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.

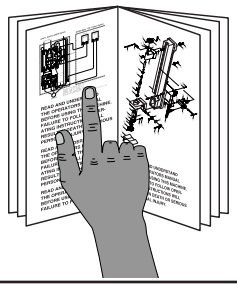
3. Use the spindle direction switch on the control panel to reverse the spindle direction, then turn the mill ***ON*** and let it run for another 20 minutes.

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 Safety

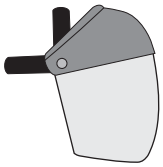


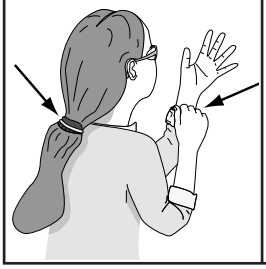
⚠WARNING

To reduce the risk of serious injury when using this machine, read and understand this entire manual before beginning any operations.

⚠WARNING

Damage to your eyes or face could result from using this machine without proper protective gear. Always wear safety glasses or a face shield when operating this machine.





⚠WARNING

Loose hair, clothing, or jewelry could get caught in machinery and cause serious personal injury. Keep these items away from moving parts at all times to reduce this risk.

NOTICE

If you have never used this type of machine or equipment before, we strongly recommend that you read books, trade 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 12** and the following descriptions to understand the basic controls of your mill.

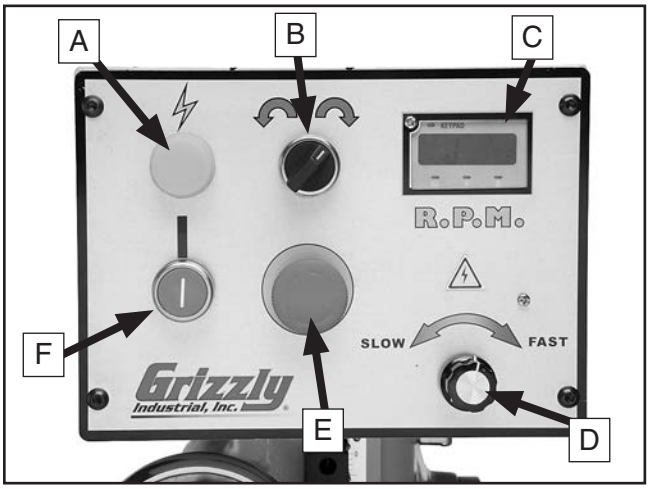


Figure 12. Control panel.

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. 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 13**): 1) Longitudinal (X-axis), 2) cross feed (Y-axis), and 3) vertical (Z-axis).

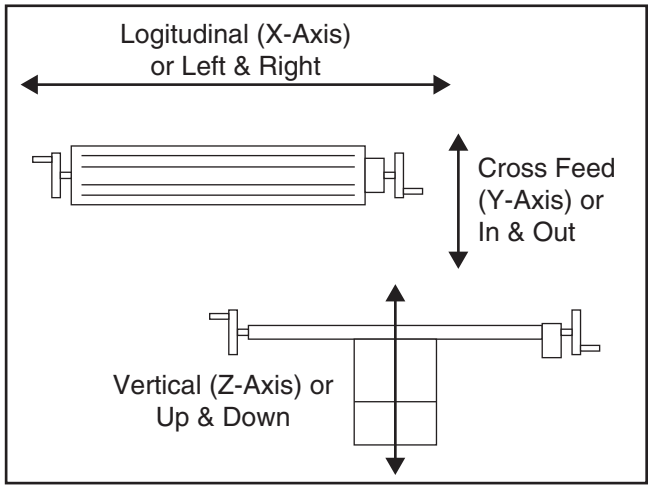


Figure 13. The three movement paths of the mill table.

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 14–15** to secure the table in position.

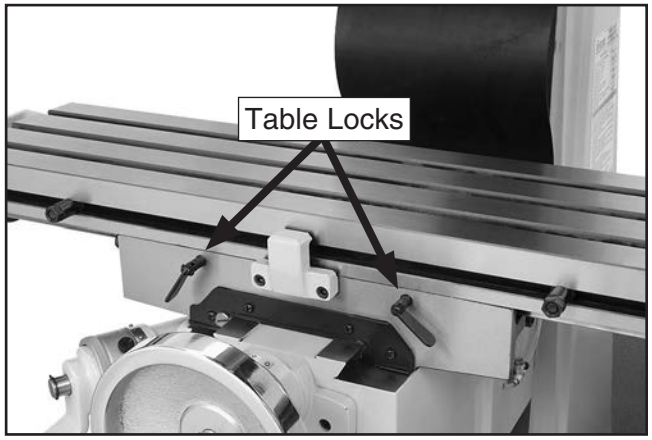


Figure 14. Table locks.

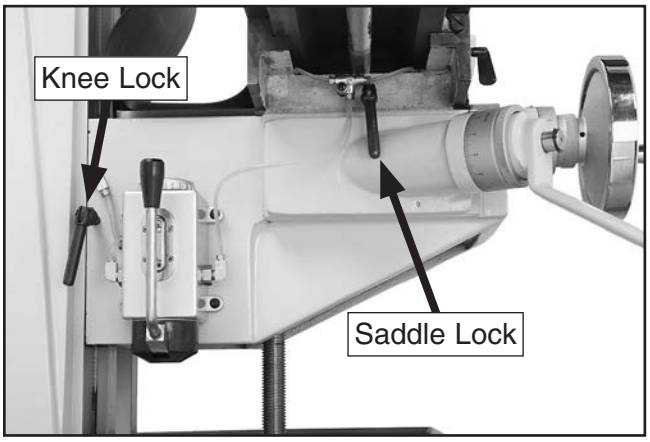


Figure 15. Saddle and knee locks.

Limit Stops

Position the limit stops along the limit stop tracks to confine the distance the table or saddle can travel (see **Figures 16–17**).

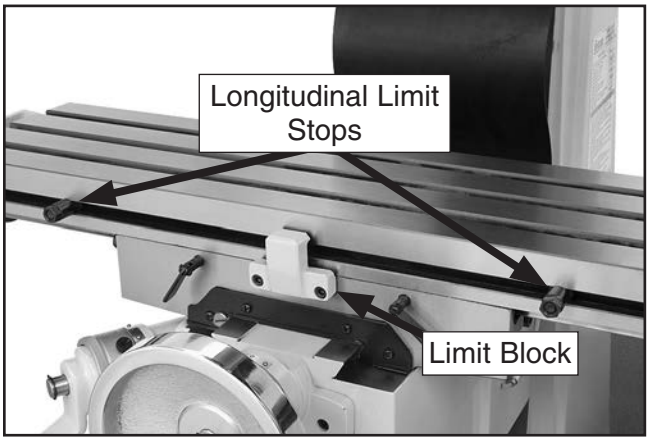


Figure 16. Table limit stops and block.

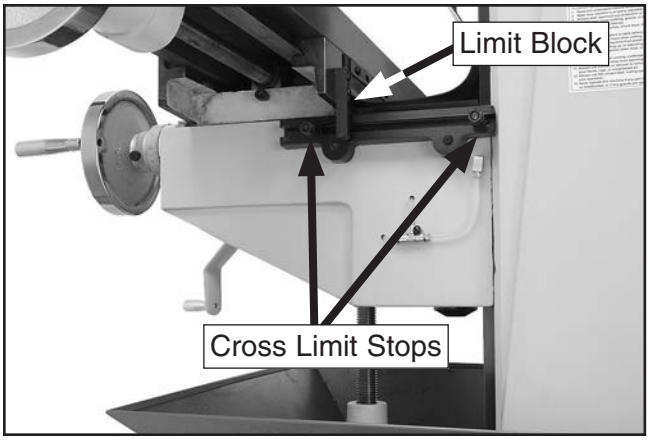


Figure 17. Cross limit stops and block.

⚠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 18**).

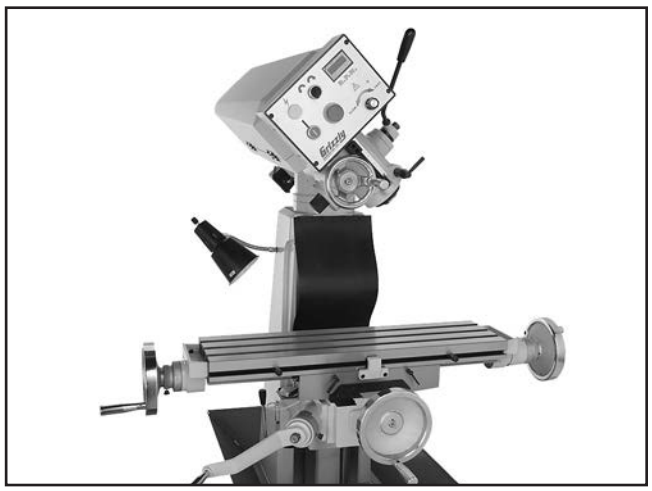


Figure 18. Head rotated 45° to the left.

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 19**).

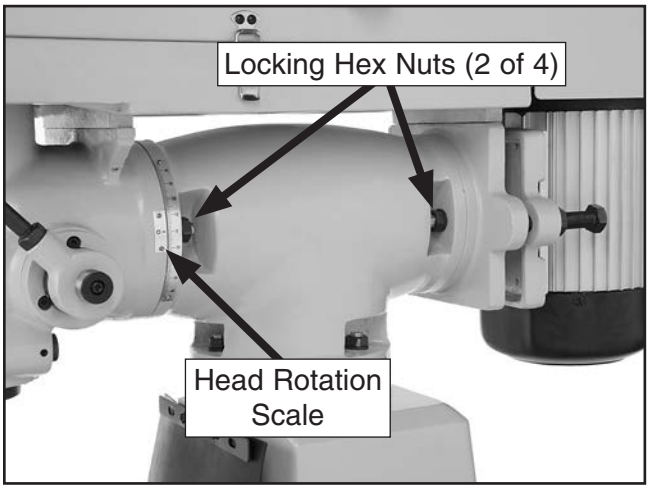


Figure 19. Head rotation locking hex nuts (2 of 4 shown).

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 20**).

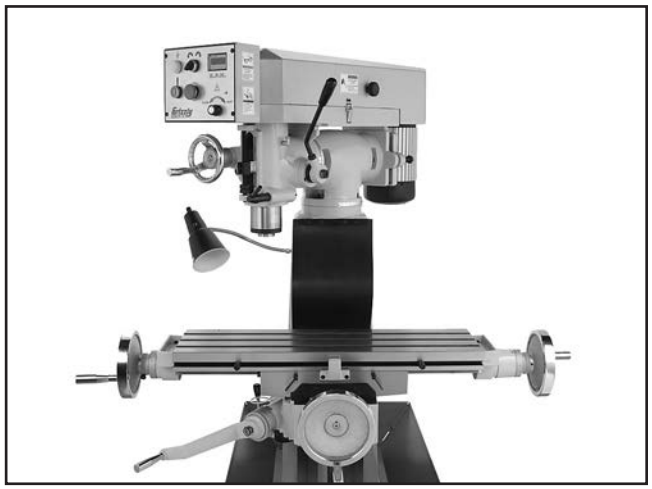


Figure 20. Head and turret rotated 45° to the left.

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 21**).

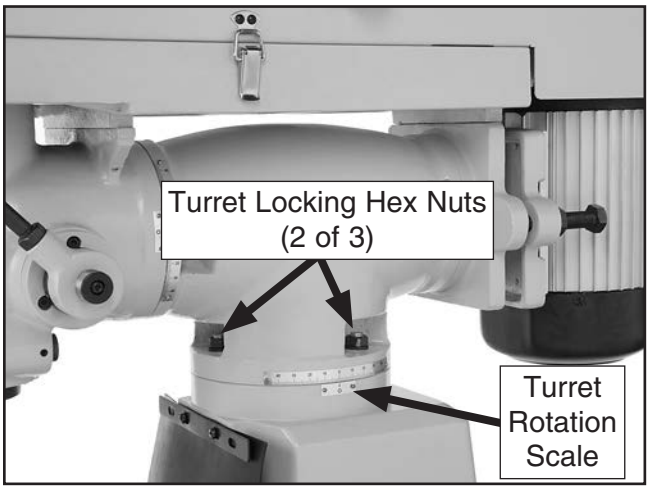


Figure 21. Turret rotation locking hex nuts (2 of 3 shown).

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 22** 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 22. 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:

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

*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 23**).

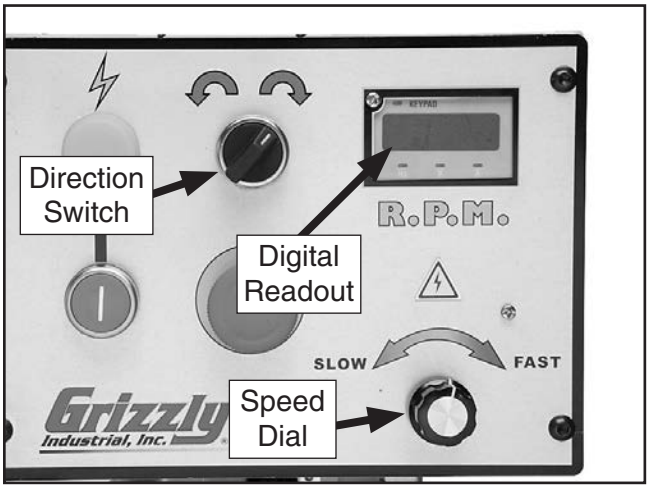


Figure 23. Spindle direction switch, speed dial, and digital readout.

Downfeed Controls

Refer to **Figures 24–25** and the following descriptions to understand the functions of the downfeed controls that affect the travel of the quill, spindle, and cutter.

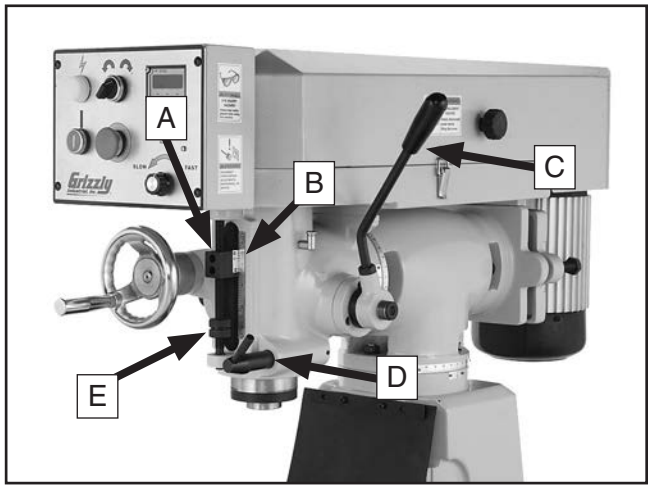


Figure 24. Downfeed controls viewed from the right side.

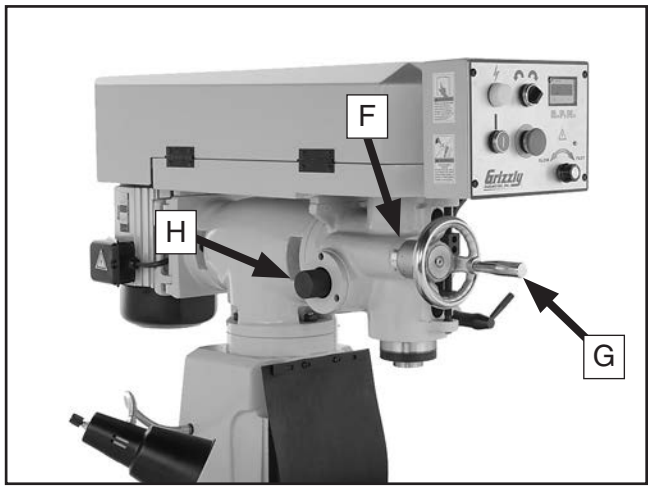


Figure 25. Downfeed controls viewed from the left side.

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 26**).

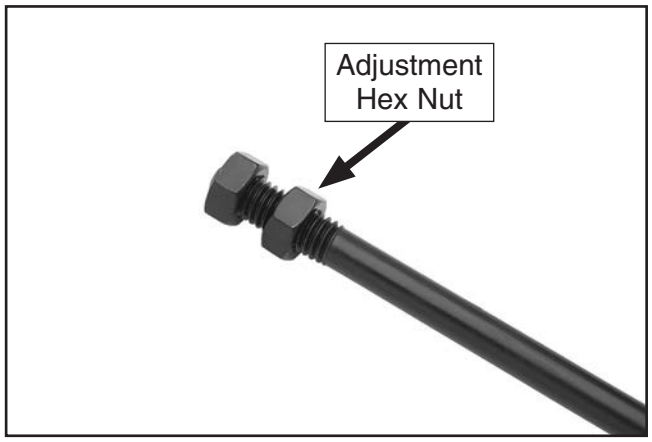


Figure 26. Drawbar and adjustment nut.

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 27**).

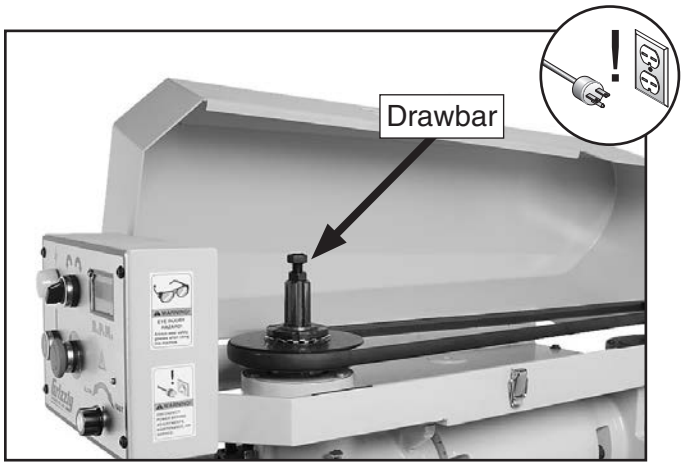


Figure 27. Drawbar inserted through the top of the spindle.

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

H6087—2 Axis Digital Readout (8" x 20")
H7848—3 Axis Digital Readout (8" x 20" x 16¾")
You will be amazed the list of features for these DROs that include: selectable resolution down to 5µm, 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 28. 3 Axis Digital Read Out.

G1075—52-PC. Clamping Kit
This clamping kit includes 24 studs, 6 step block pairs, 6 T-nuts, 6 flange nuts, 4 coupling nuts, and 6 end hold-downs. The rack is slotted so it can be mounted close to the machine for easy access. Made for ½" T-slots.

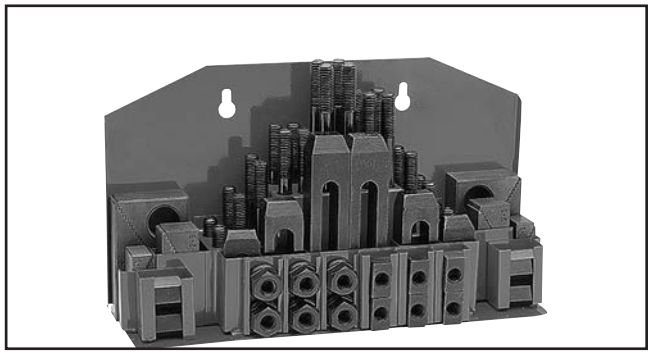


Figure 29. G1075 52-PC. Clamping Kit.

H8257—Primrose Armor Plate with Moly-D Machine and Way Oil 1 Quart
This superior machine and way lubricant prevents stick slip and chatter due to anti-friction capabilities resulting in greater precision machining capabilities. Provides the thinnest oil film possible while effectively providing needed lubrication and rust/corrosion protection. Adhesive/cohesive components are added for vertical surfaces. Resists squeeze out, running, dripping and non-gumming.

"This is good stuff! I use it on my lathes at home."
S. Balolia – President

Figure 30. Primrose Armor Plate Lubricant.

T10063—Milling Vise 12 5/16" x 6 9/16"
T10064—Milling Vise 17⅛" x 8¾"
- 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.

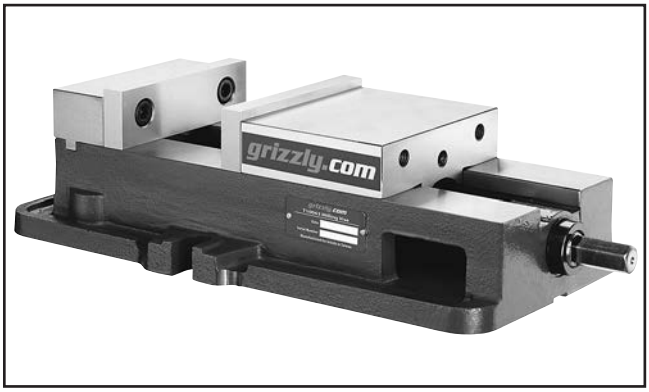


Figure 31. T10064 Milling vise (handle included, but not shown).

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.

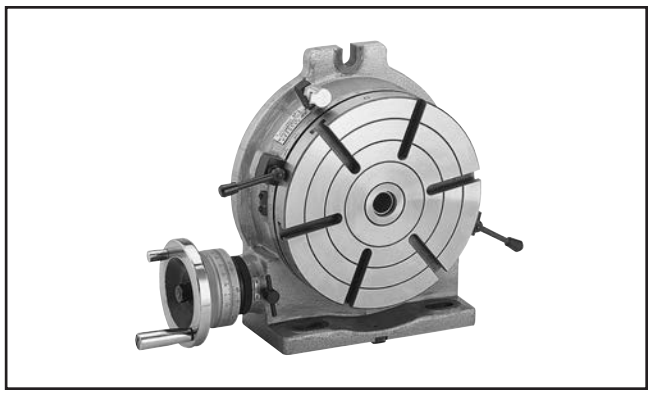


Figure 32. G9299 10" Yuasa-Type Rotary Table.

T20501—Face Shield Crown Protector 4"
T20502—Face Shield Crown Protector 7"
T20503—Face Shield Window
T20452—"Kirova" Anti-Reflective S. Glasses
T20451—"Kirova" Clear Safety Glasses
H0736—Shop Fox® Safety Glasses
H7194—Bifocal Safety Glasses 1.5
H7195—Bifocal Safety Glasses 2.0
H7196—Bifocal Safety Glasses 2.5

Figure 33. 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 34. 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.

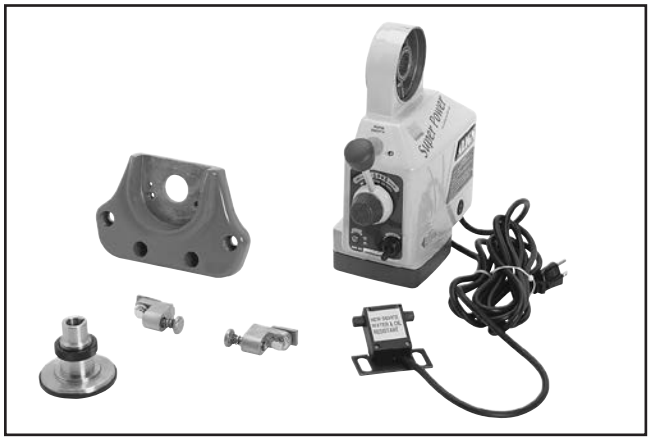
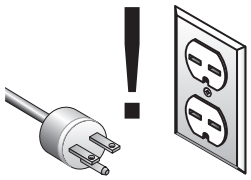


Figure 35. H8371 Power Feed.

Call 1-800-523-4777 To Order

SECTION 6: MAINTENANCE



⚠WARNING
Always disconnect power to the machine before performing maintenance. Failure to do this may result in serious personal injury.

Schedule

For optimum performance from your machine, follow this maintenance schedule and refer to any specific instructions given in this section.

Before Daily Operation:
- Check/tighten loose mounting bolts.
- Check/sharpen/replace worn or damaged tooling.
- Check/repair/replace worn or damaged wires.
- Check for any other unsafe condition.
- Use the one-shot oiler (**Page 26**).

Every 8 Hours of Operation:
- Use the one-shot oiler (**Page 26**).
- Lubricate quill gearing (**Page 26**).
- Clean the mill.

Every 40 Hours of Operation:
- Lubricate the vertical bevel gears (**Page 26**).
- Lubricate the longitudinal, cross, and vertical leadscrews (**Page 27**).

Note: *This maintenance schedule is based on average usage. Adjust the maintenance schedule to match your actual usage to keep your mill running smoothly and to protect your investment.*

Cleaning & Protecting

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 Primrose Armor Plate Way Oil**,** G96® Gun Treatment, SLIPIT®, or Boeshield® T-9 (see **Section 5: Accessories** on **Page 23** for more details).

Lubrication

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 36**) and release it to send the lubricant through the lines.

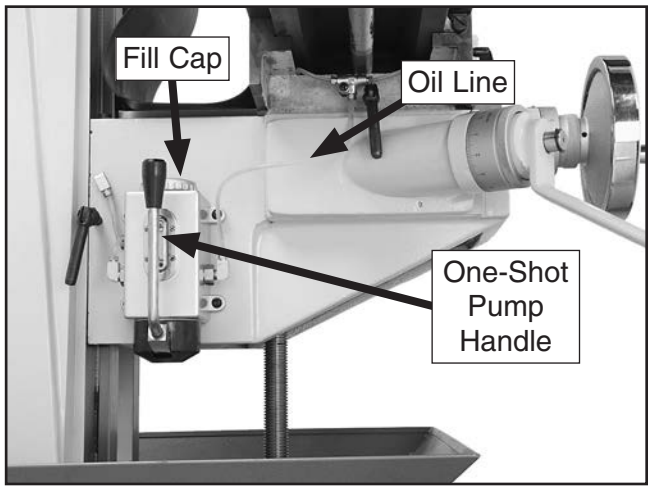


Figure 36. One-shot oiler.

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 37** to add the lubricant.

Figure 37. 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 38**.

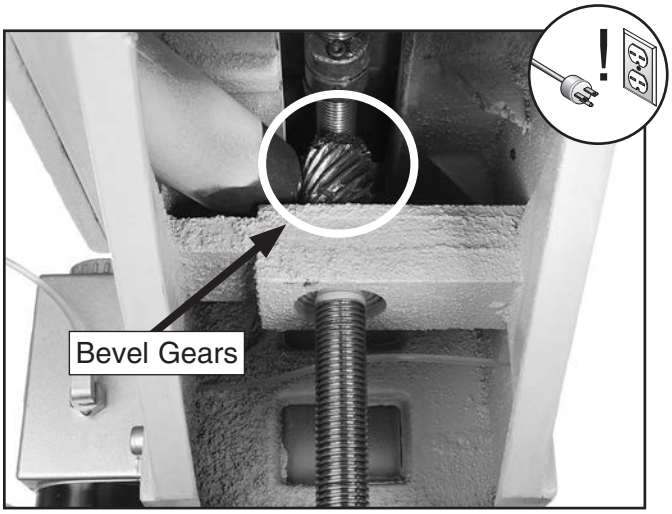


Figure 38. Vertical bevel gears.

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 39–40**).

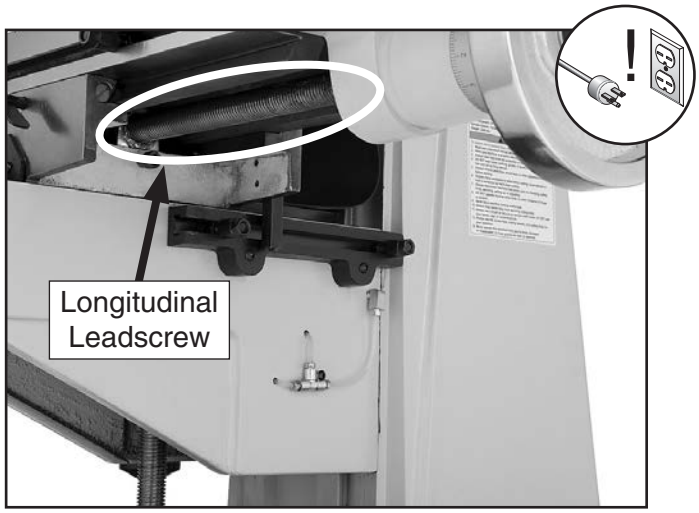


Figure 39. Longitudinal leadscrew.

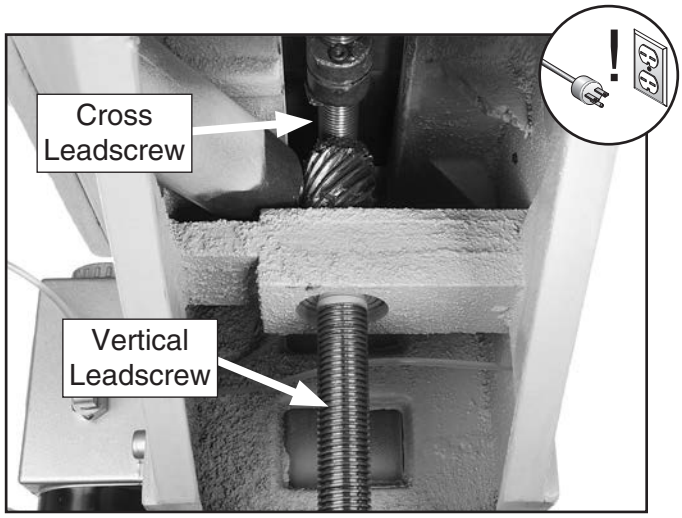


Figure 40. Cross and vertical leadscrews.

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 41**).

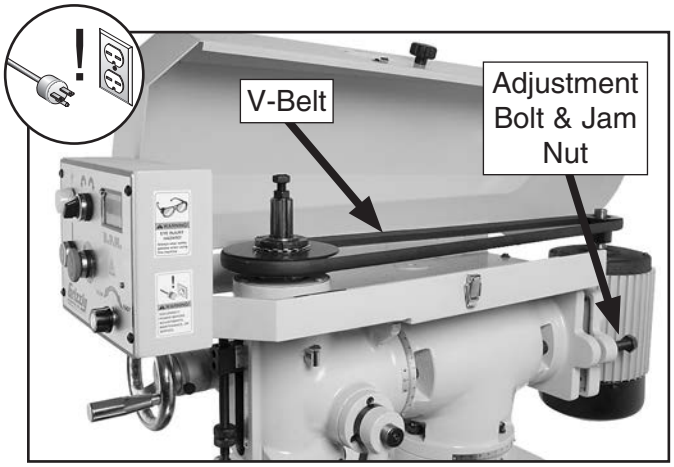


Figure 41. V-belt tension adjustment bolt.

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 42**), then re-tighten the jam nut and close the V-belt cover.

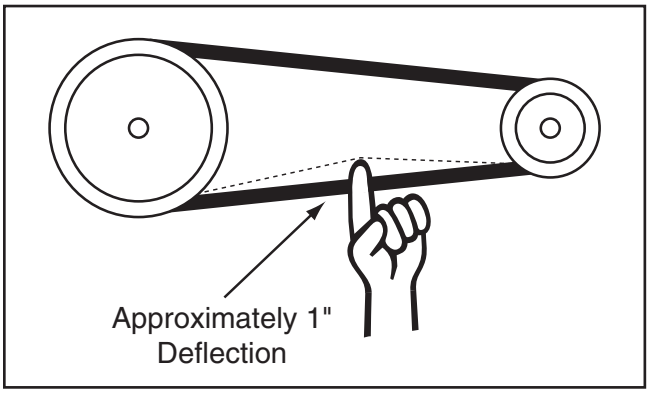


Figure 42. Checking for belt deflection.

SECTION 7: SERVICE

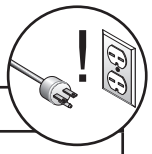
Review the troubleshooting and procedures in this section to fix or adjust your machine if a problem develops. If you need replacement parts or you are unsure of your repair skills, then feel free to call our Technical Support at (570) 546-9663.

Troubleshooting

Motor & Electrical

Symptom	Possible Cause	Possible Solution
Machine does not start or a breaker trips.	1. Stop button is pushed in or is at fault.	1. Turn the stop button clockwise until it pops out; replace if faulty.
	2. ON button is at fault.	2. Replace faulty ON button.
	3. Plug/receptacle is at fault or wired incorrectly.	3. Test for good contacts; correct the wiring.
	4. Power supply is switched ***OFF*** or is at fault.	4. Ensure hot lines have correct voltage on all legs and main power supply is switched ***ON***.
	5. Motor connection wired incorrectly.	5. Correct motor wiring connections (**Page 34**).
	6. Motor windings or motor is at fault.	6. Replace motor.
Machine stalls or is overloaded.	1. Machine is undersized for the task.	1. Use smaller sharp tooling; reduce the feed rate; reduce the spindle RPM; use coolant.
	2. Workpiece alignment is poor.	2. Eliminate workpiece binding; use vise or clamps as required for workpiece alignment control.
	3. Dull or incorrect cutting tool.	3. Use sharp and correct cutting tool for the operation.
	4. Motor connection is wired incorrectly.	4. Correct motor wiring connections (**Page 34**).
	5. Plug/receptacle is at fault.	5. Test for good contacts; correct the wiring.
	6. Pulley/sprocket slipping on shaft.	6. Replace loose pulley/shaft.
	7. Motor bearings are at fault.	7. Test by rotating shaft; rotational grinding/loose shaft requires bearing replacement.
	8. Motor has overheated.	8. Clean off motor, let cool, and reduce workload.
	9. Motor is at fault.	9. Test and repair or replace.
Machine has vibration or noisy operation.	1. Tool holder or cutter is at fault.	1. Replace out-of-round tool holder; replace/resharpen cutter; use appropriate feed rate and cutting RPM.
	2. Workpiece alignment is poor.	2. Eliminate workpiece binding; use vise or clamps as required for workpiece alignment control.
	3. Motor or component is loose.	3. Inspect/replace stripped or damaged bolts/nuts, and re-tighten with thread locking fluid.
	4. Pulley is loose.	4. Realign/replace shaft, pulley, setscrew, and key as required.
	5. Machine is incorrectly mounted or sits unevenly.	5. Tighten/replace mounting bolts in floor; relocate/shim machine.
	6. Motor fan is rubbing on fan cover.	6. Replace dented fan cover or fan.
	7. Motor bearings are at fault.	7. Test by rotating shaft; rotational grinding/loose shaft requires bearing replacement.

Operation



Symptom	Possible Cause	Possible Solution
Tool slips in collet.	1. Collet is not fully drawn into spindle taper. 2. Wrong size collet. 3. Debris on collet or spindle mating surface. 4. Excessive depth of cut.	1. Snug up drawbar. 2. Use correct collet for shank diameter. 3. Remove oil and debris from collet and spindle mating surfaces, then re-install. 4. Decrease depth of cut and allow chips to clear.
Breaking tooling.	1. Spindle speed/feed rate too fast. 2. Tooling getting too hot. 3. Excessive depth of cut.	1. Use correct spindle RPM and feed rate (**Page 20**). 2. Use coolant; reduce spindle RPM/feed rate. 3. Decrease depth of cut and allow chips to clear.
Machine is loud when cutting; overheats or bogs down in the cut.	1. Excessive depth of cut. 2. Dull tooling. 3. Feed rate too fast.	1. Decrease depth of cut and allow chips to clear. 2. Use sharp tooling. 3. Decrease feed rate.
Workpiece vibrates or chatters during operation.	1. Locks not tight. 2. Workpiece not securely clamped to table or mill vise. 3. Tooling not secure or is damaged. 4. Spindle speed/feed rate too fast. 5. Gibs are too loose.	1. Tighten all locks on mill that are not associated with movement for the operation. 2. Check that clamping is tight and sufficient for the operation; make sure mill vise is tight to table. 3. Secure tooling; replace if damaged. 4. Use correct spindle RPM and feed rate (**Page 20**). 5. Adjust gibs properly (**Page 30**).
Table hard to move.	1. Locks are tightened down. 2. Chips have loaded up on the ways. 3. Ways are dry and in need of lubrication. 4. Gibs are too tight.	1. Fully loosen locks needed for movement. 2. Frequently clean away chips that load up during operations. 3. Use one-shot oiler to lubricate ways (**Page 26**). 4. Adjust gibs properly (**Page 30**).
Bad surface finish.	1. Wrong spindle speed/feed rate. 2. Dull/damaged tooling; wrong tooling for operation. 3. Wrong spindle rotation for tooling. 4. Workpiece not securely clamped to table or mill vise. 5. Gibs are too loose.	1. Use correct spindle RPM and feed rate (**Page 20**). 2. Sharpen/replace tooling; use correct tooling for operation. 3. Check for proper spindle rotation for tooling. 4. Check that clamping is tight and sufficient for the operation; make sure mill vise is tight to table. 5. Adjust gibs properly (**Page 30**).

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. Overtightening 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 43–45** for the locations of the table, saddle, and knee gib adjustment screws.

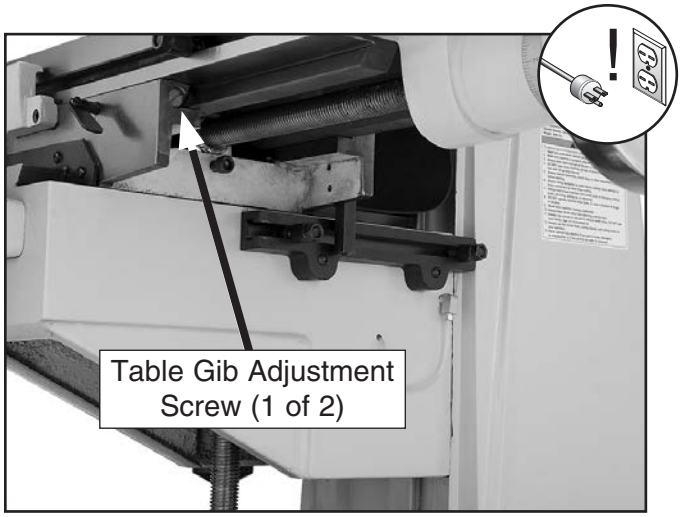


Figure 43. Table gib adjustment screw (1 of 2).

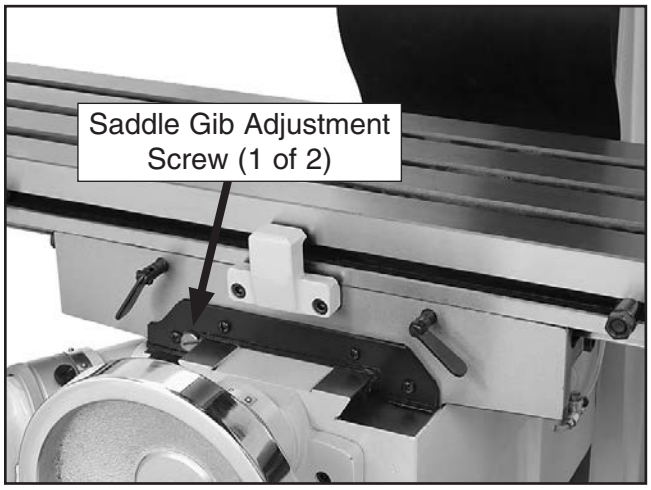


Figure 44. Saddle gib adjustment screw (1 of 2).

Figure 45. 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 46–47**).

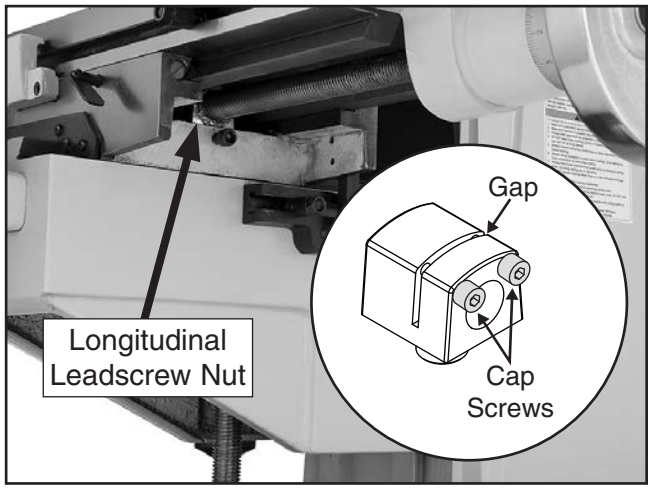


Figure 46. Longitudinal leadscrew nut.

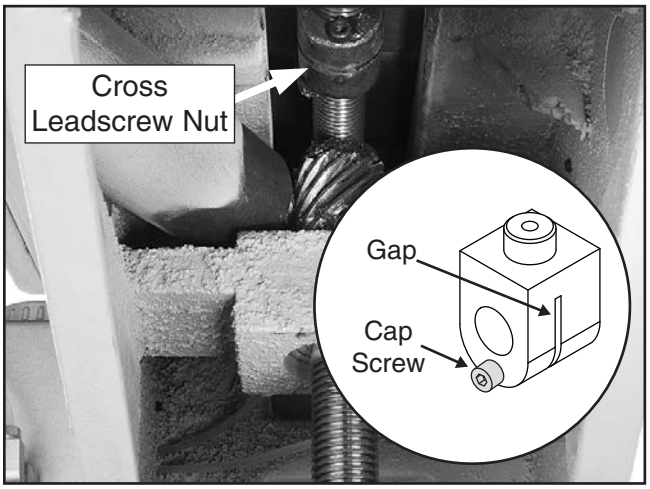


Figure 47. Cross leadscrew nut.

Use a 5mm hex wrench to tighten or loosen the cap screws on the leadscrew nuts shown in **Figures 46–47**, then test the amount of backlash by slowly rocking the handwheels back-and-forth.

SECTION 8: ELECTRICAL

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. Study this diagram carefully. If you notice differences between your machine and these wiring diagrams, call Technical Support at (570) 546-9663 for assistance.

⚠WARNING
Electrical Safety Instructions

1. **SHOCK HAZARD.** Disconnect the power from the machine before servicing electrical components. Touching electrified parts will result in personal injury including but not limited to severe burns, electrocution, or death.

2. **CIRCUIT REQUIREMENTS.** You MUST follow the **CIRCUIT REQUIREMENTS** section on **Page 9**. **If you are unsure about the wiring codes in your area or you plan to connect your machine to a shared circuit, consult a qualified electrician.**

3. **GROUNDED CIRCUIT.** Electrocution or fire could result if the machine is not grounded and installed in compliance with electrical codes. Compliance MUST be verified by a qualified electrician.

4. **FREQUENCY DRIVE.** The frequency drive inside the electrical cabinet was configured for your machine at the factory. It should not need any adjustment. Making changes to the frequency drive may cause damage to the machine and void the warranty.

5. **220V SINGLE-PHASE POWER.** This machine uses a frequency drive to convert incoming single-phase power to 3-phase for greater spindle motor performance. Attempting to change this design may result in serious personal injury, damage to the machine, and may void the warranty.

6. **MOTOR WIRING.** The motor wiring shown in these diagrams are current at the time of printing, but it may not match your machine. Always use the wiring diagram inside the motor junction box.

7. **EXPERIENCING DIFFICULTIES.** If at any time 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.*

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COLOR KEY

BLACK	Bk	BLUE	Bl	YELLOW	Yl	LIGHT BLUE	Lb
WHITE	Wt	BROWN	Br	YELLOW GREEN	Yg	BLUE WHITE	Bw
GREEN	Gn	GRAY	Gy	PURPLE	Pu	TUR-QUOISE	Tu
RED	Rd	ORANGE	Or	PINK	Pk		

Electrical Panel Wiring

Figure 48. Electrical panel wiring inside the column.

Control Panel & Motor Wiring

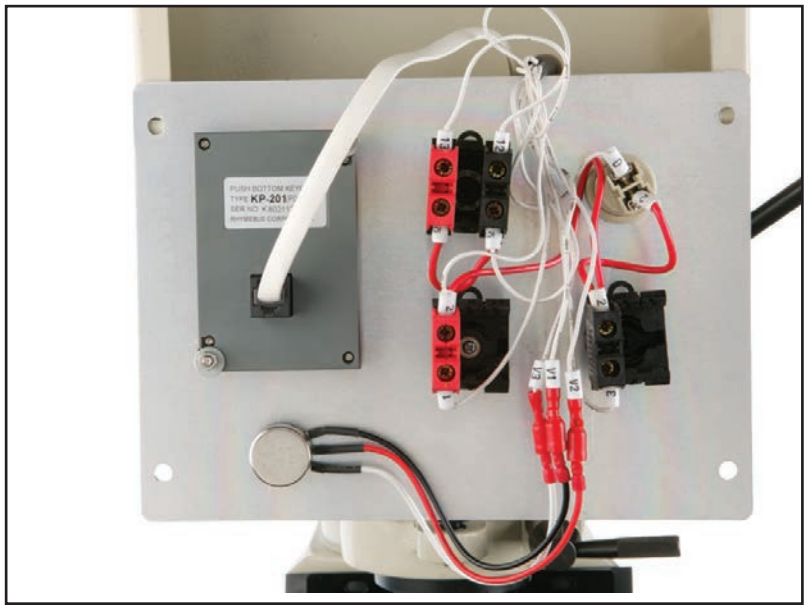


Figure 49. Control panel wiring (viewed from behind).

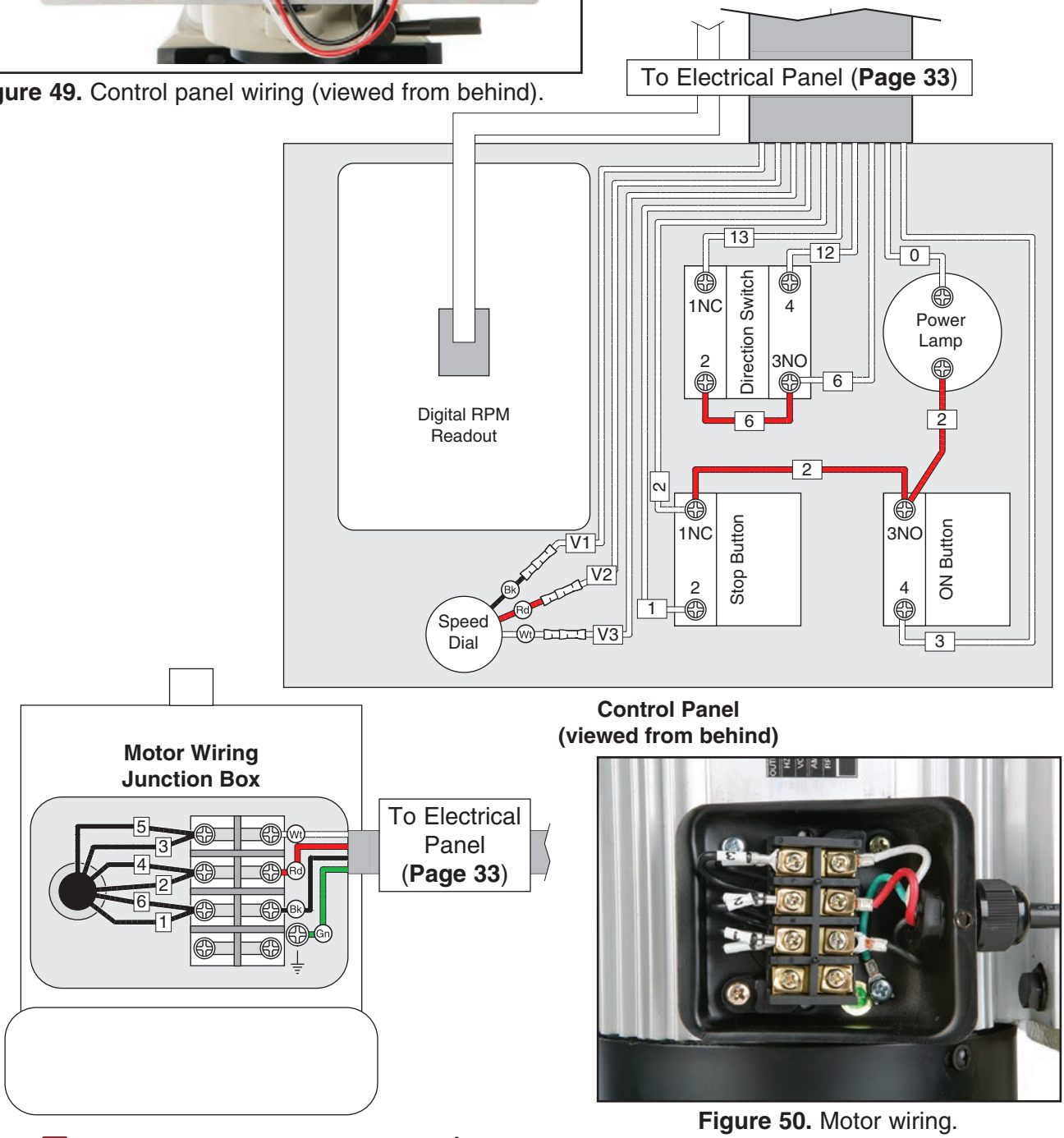
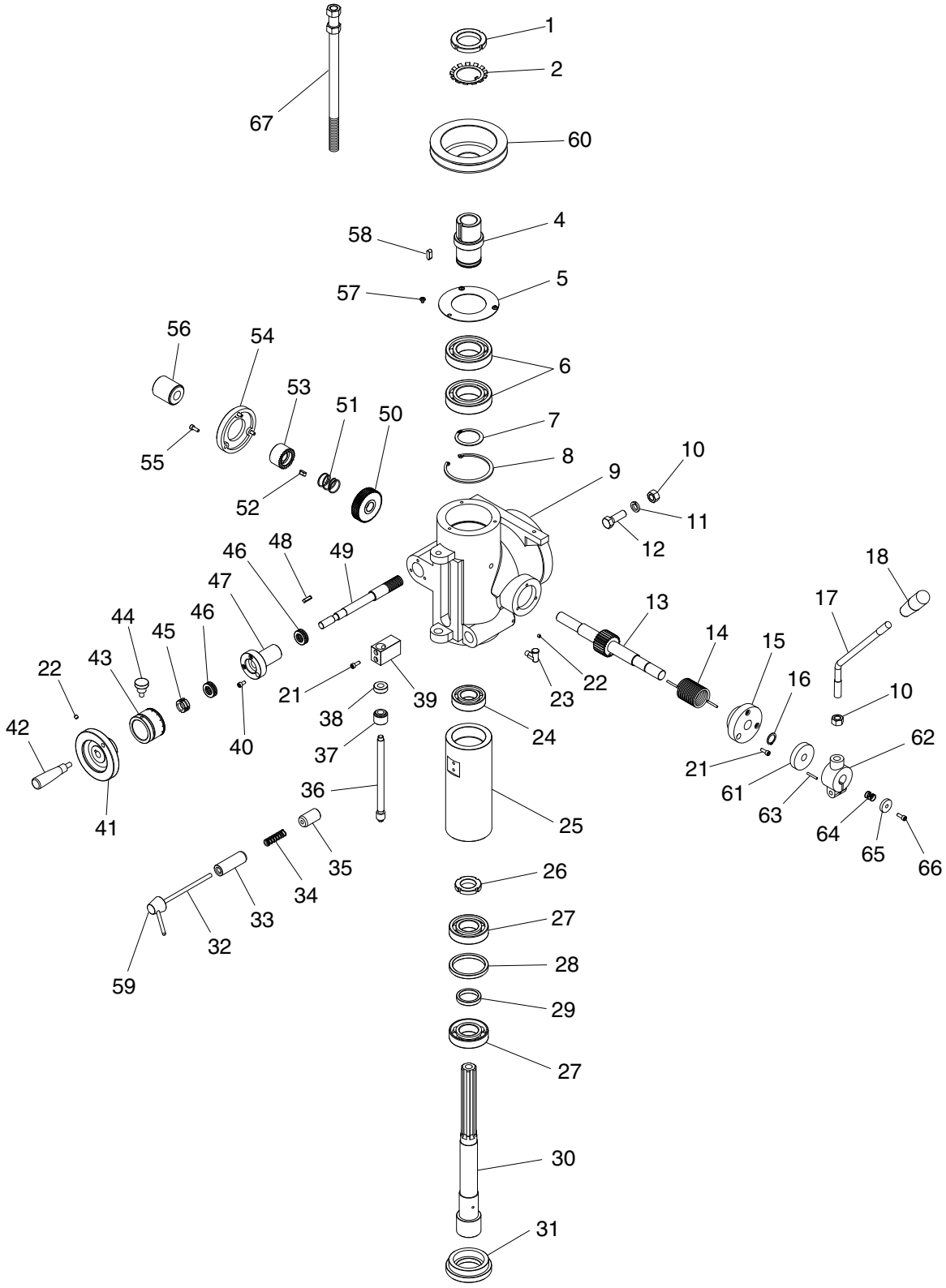


Figure 50. Motor wiring.
Model G0678 (Mfg. since 9/10)

STOP ***READ ELECTRICAL SAFETY ON PAGE 32!***

SECTION 9: PARTS

Head Breakdown

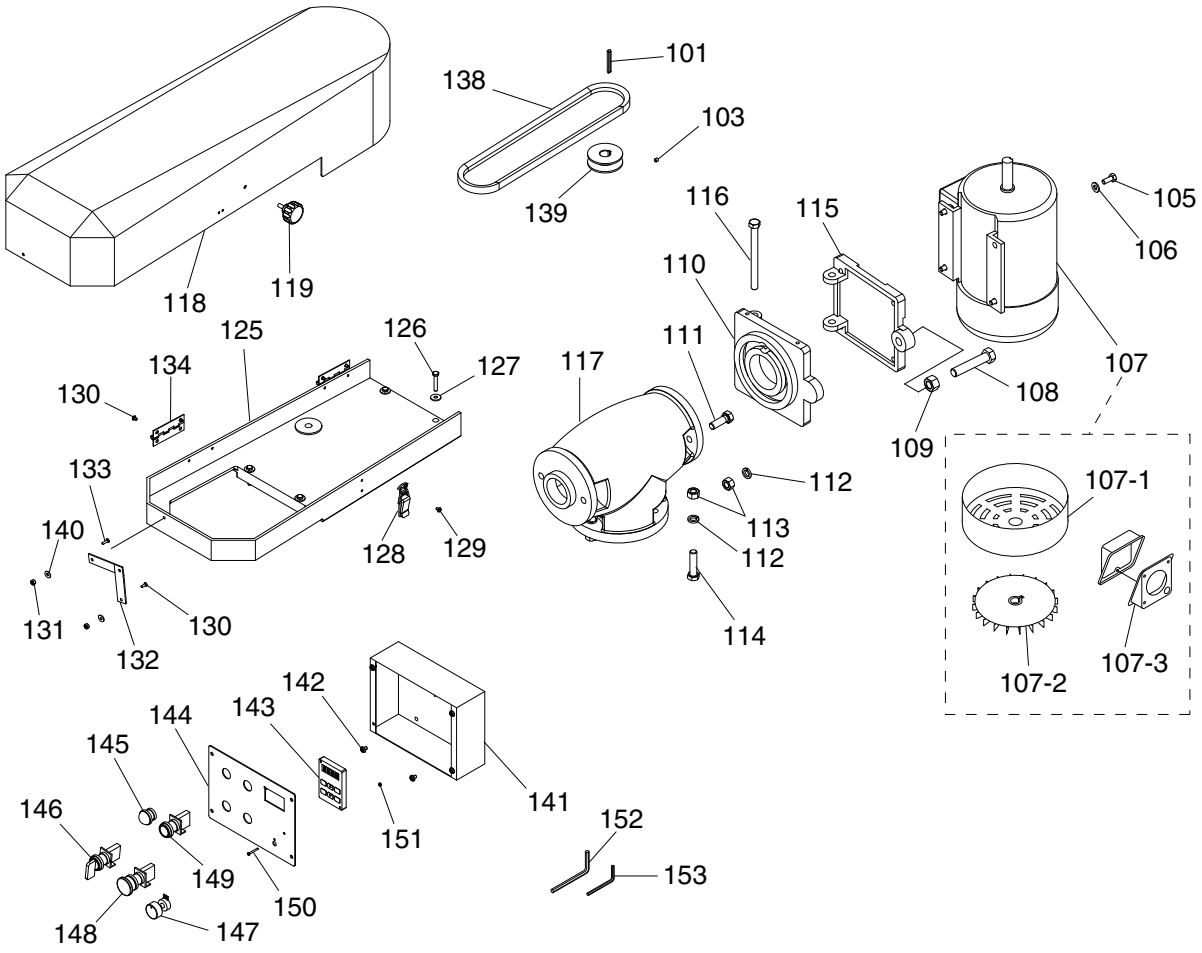


Head Parts List

REF	PART #	DESCRIPTION
1	P0678001	SPANNER NUT
2	P0678002	SPANNER LOCK WASHER
4	P0678004	SPLINE SLEEVE
5	P0678005	BEARING COVER
6	P6209	BALL BEARING 6209ZZ
7	PR56M	EXT RETAINING RING 45MM
8	PR27M	INT RETAINING RING 85MM
9	P0678009	HEAD CASTING
10	PN06	HEX NUT 1/2-13
11	PLW07	LOCK WASHER 1/2
12	PB55	HEX BOLT 1/2-13 X 1-1/2
13	P0678013	GEAR SHAFT
14	P0678014	TORSION SPRING
15	P0678015	END CAP
16	PR08M	EXT RETAINING RING 19MM
17	P0678017	COARSE DOWNFEED HANDLE
18	P0678018	KNOB
21	PSB24M	CAP SCREW M5-.8 X 16
22	PSS03M	SET SCREW M6-1 X 8
23	P0678023	OIL CUP
24	P6206	BALL BEARING 6206ZZ
25	P0678025	QUILL
26	P0678026	SPANNER NUT
27	P7207	ANGULAR CONTACT BEARING 7207
28	P0678028	BEARING SPACER LARGE
29	P0678029	BEARING SPACER SMALL
30	P0678030	SPINDLE
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	PS20M	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	PN15	HEX NUT 9/16-12
46	P51102	THRUST BEARING 51102
47	P0678047	SLEEVE
48	PK34M	KEY 5 X 5 X 20
49	P0678049	WORM SHAFT
50	P0678050	WORM
51	P0678051	COMPRESSION SPRING
52	PK99M	KEY 6 X 6 X 15
53	P0678053	BUSHING
54	P0678054	END CAP
55	PS09M	PHLP HD SCR M5-.8 X 10
56	P0678056	KNURLED KNOB
57	PS05M	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	PW02M	FLAT WASHER 5MM
66	PSB38M	CAP SCREW M5-.8 X 25
67	P0678067	DRAWBAR 7/16-20 X 12-3/8

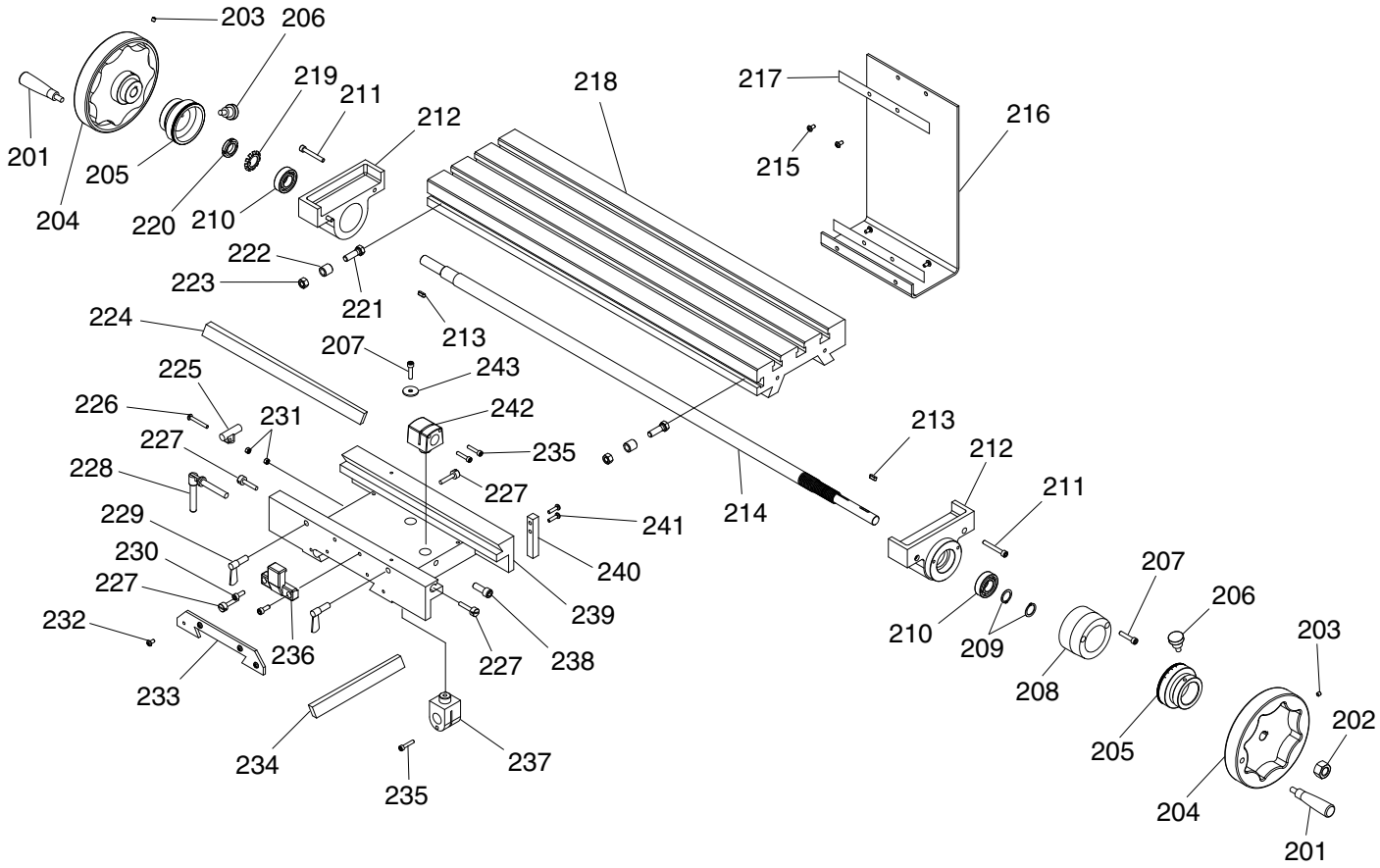
Drive System Breakdown



REF	PART #	DESCRIPTION
101	PK02M	KEY 5 X 5 X 40
103	PSS03M	SET SCREW M6-1 X 8
105	PSB14M	CAP SCREW M8-1.25 X 20
106	PW01M	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	PN13M	HEX NUT M16-2
110	P0678110	MOTOR BRACKET
111	PB55	HEX BOLT 1/2-13 X 1-1/2
112	PLW07	LOCK WASHER 1/2
113	PN06	HEX NUT 1/2-13
114	PB56	HEX BOLT 1/2-13 X 1-3/4
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	PB52M	HEX BOLT M6-1 X 35
127	PW03M	FLAT WASHER 6MM

REF	PART #	DESCRIPTION
128	P0678128	LATCH
129	PS79M	PHLP HD SCR M3-.5 X 8
130	PS05M	PHLP HD SCR M5-.8 X 8
131	PN06M	HEX NUT M5-.8
132	P0678132	BRACE
133	PS09M	PHLP HD SCR M5-.8 X 10
134	P0678134	HINGE
138	PVB59	V-BELT B-59 5L590
139	P0678139	MOTOR PULLEY
140	PW02M	FLAT WASHER 5MM
141	P0678141	CONTROL BOX
142	PS11M	PHLP HD SCR M6-1 X 16
143	P0678143	SPINDLE SPEED READOUT
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	PS34	PHLP HD SCR M3-.5 X 25
151	PN07M	HEX NUT M3-.5
152	PAW05M	HEX WRENCH 5MM
153	PAW04M	HEX WRENCH 4MM

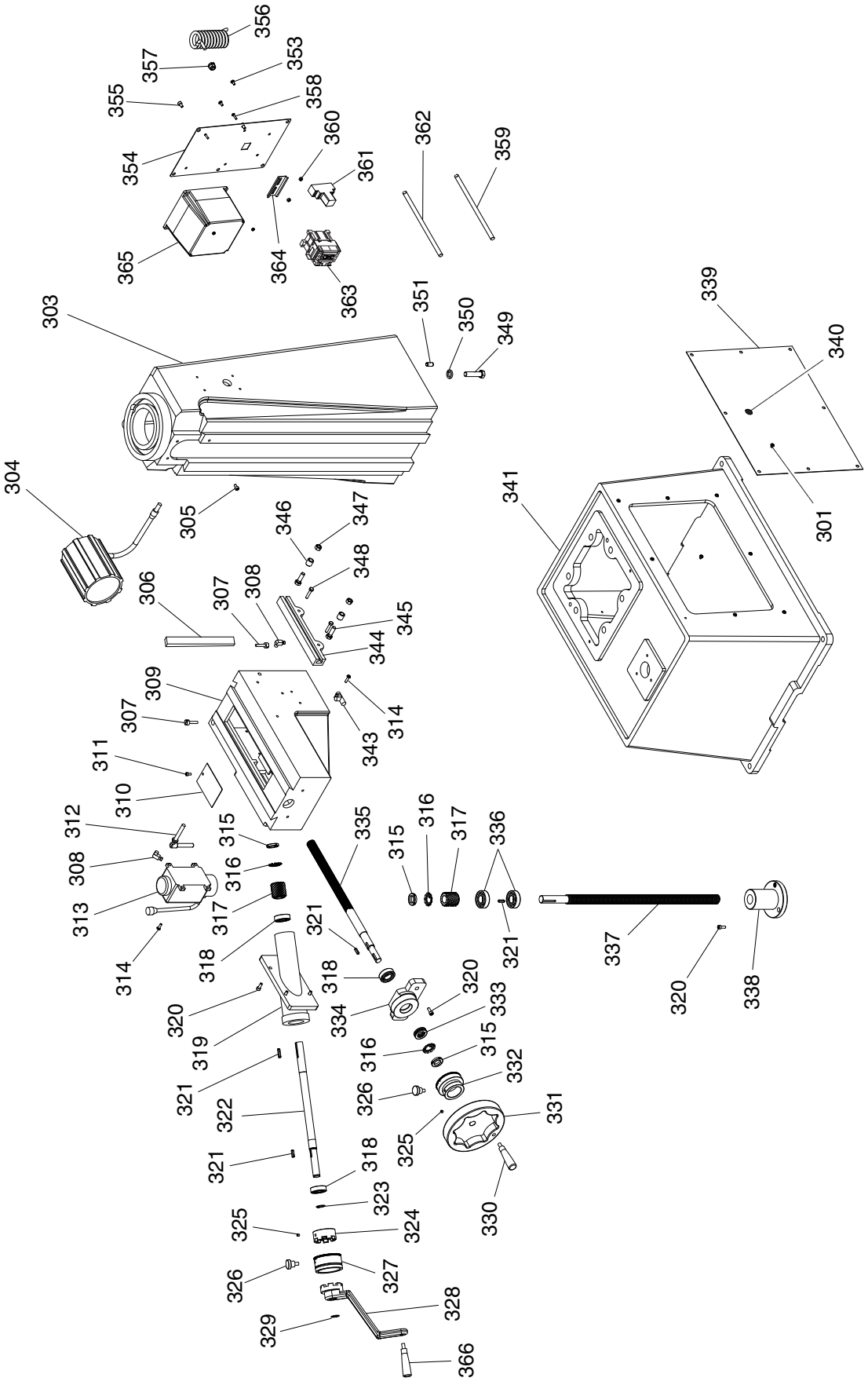
Table & Saddle Breakdown



REF	PART #	DESCRIPTION
201	P0678201	HANDLE
202	PN04	HEX NUT 5/8-11
203	PSS03M	SET SCREW M6-1 X 8
204	P0678204	HANDWHEEL
205	P0678205	GRADUATED DIAL
206	P0678044	LOCKING THUMB SCREW
207	PSB06M	CAP SCREW M6-1 X 25
208	P0678208	COLLAR
209	PR09M	EXT RETAINING RING 20MM
210	P6004	BALL BEARING 6004ZZ
211	PSB30M	CAP SCREW M6-1 X 45
212	P0678212	LEADSCREW BRACKET
213	PK34M	KEY 5 X 5 X 20
214	P0678214	LONGITUDINAL LEADSCREW
215	PS03M	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	PB01M	HEX BOLT M10-1.5 X 30
222	P0678222	LIMIT STOP

REF	PART #	DESCRIPTION
223	PN02M	HEX NUT M10-1.5
224	P0678224	TABLE GIB
225	P0678225	LIMIT BLOCK
226	PS60M	PHLP HD SCR M5-.8 X 30
227	P0678227	GIB ADJUSTMENT SCREW
228	P0678228	SADDLE LOCKING SCREW
229	P0678229	TABLE LOCKING SCREW
230	PSB01M	CAP SCREW M6-1 X 16
231	PN06M	HEX NUT M5-.8
232	PS09M	PHLP HD SCR M5-.8 X 10
233	P0678233	WAY WIPER
234	P0678234	SADDLE GIB
235	PSB38M	CAP SCREW M5-.8 X 25
236	P0678236	LIMIT BLOCK
237	P0678237	CROSS LEADSCREW NUT
238	PSB31M	CAP SCREW M8-1.25 X 25
239	P0678239	SADDLE
240	P0678240	STOP BLOCK
241	PS06M	PHLP HD SCR M5-.8 X 20
242	P0678242	LONGITUDINAL LEADSCREW NUT
243	PW03M	FLAT WASHER 6MM

Knee & Base Breakdown



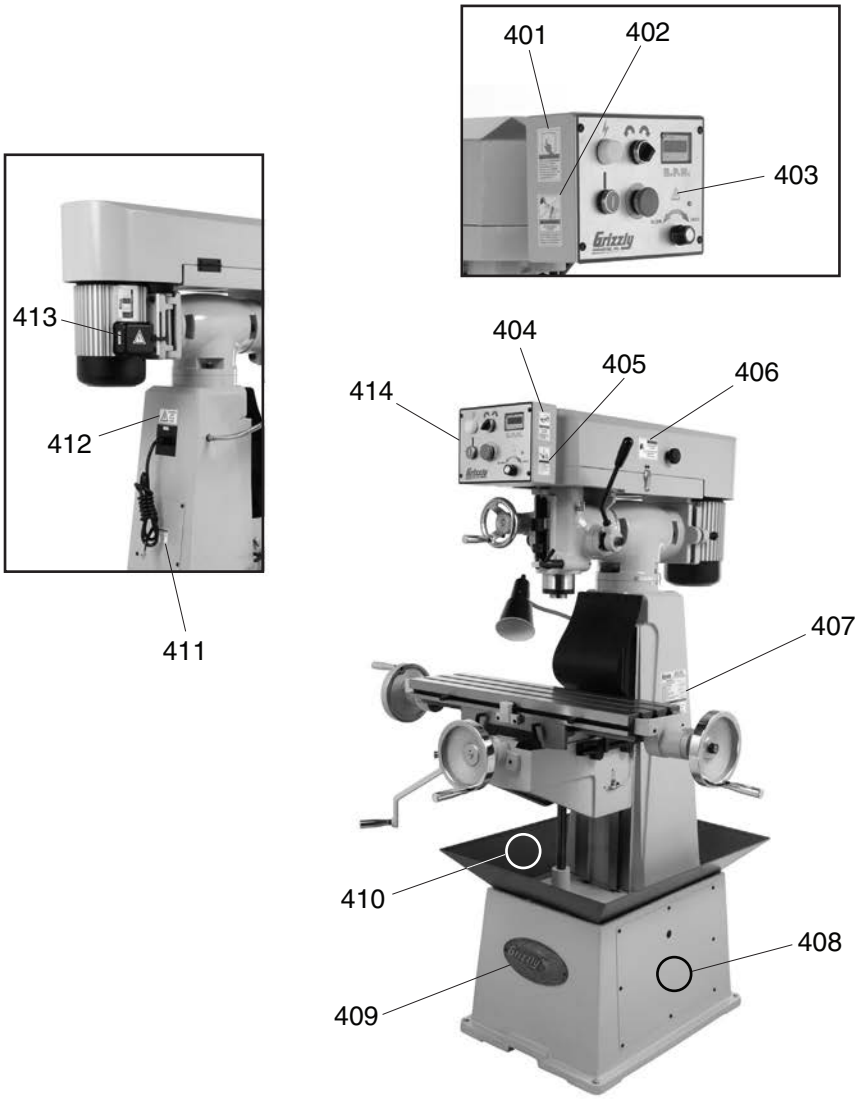
Knee & Base Parts List

REF	PART #	DESCRIPTION
301	PS68M	PHLP HD SCR M6-1 X 10
303	P0678303	COLUMN
304	P0678304	WORK LIGHT ASSEMBLY 110V
305	PSB68M	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	PS12M	PHLP HD SCR M3-.5 X 6
312	P0678312	KNEE LOCKING SCREW
313	P0678313	ONE-SHOT OILER
314	PS20M	PHLP HD SCR M5-.8 X 15
315	P0678315	SPANNER NUT
316	P0678316	SPANNER NUT WASHER
317	P0678317	BEVEL GEAR
318	P6004	BALL BEARING 6004ZZ
319	P0678319	VERTICAL CRANK HOUSING
320	PSB01M	CAP SCREW M6-1 X 16
321	PK34M	KEY 5 X 5 X 20
322	P0678322	VERTICAL CRANK SHAFT
323	PR09M	EXT RETAINING RING 20MM
324	P0678324	CLUTCH
325	PSS03M	SET SCREW M6-1 X 8
326	P0678044	LOCKING THUMB SCREW
327	P0678327	GRADUATED DIAL
328	P0678328	CRANK HANDLE
329	PR07M	EXT RETAINING RING 18MM
330	P0678230	HANDLE
331	P0678331	HANDWHEEL
332	P0678332	GRADUATED DIAL
333	P51104	THRUST BEARING 51104

REF	PART #	DESCRIPTION
334	P0678334	BEARING HOUSING
335	P0678335	CROSS FEED LEADSCREW
336	P6204	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	PB01M	HEX BOLT M10-1.5 X 30
346	P0678346	LIMIT STOP
347	PN02M	HEX NUT M10-1.5
348	PB29M	HEX BOLT M6-1 X 30
349	PB72	HEX BOLT 1/2-13 X 2
350	PLW07	LOCK WASHER 1/2
351	P0678351	PIN 10 X 20
353	PS01	PHLP HD SCR 10-24 X 1/2
354	P0678354	COLUMN ACCESS PANEL
355	PS03M	PHLP HD SCR M6-1 X 8
356	PWRCRD220L	POWER CORD 12-GA 3-WIRE 86"
357	PSW04-4	STRAIN RELIEF
358	PS08	PHLP HD SCR 10-24 X 3/4
359	P0678359	CABLE 3-WIRE
360	PN07	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
365	P0678365	FREQ. DRIVE YASAKAWA RM5G
366	P0678042	HANDLE
367	P0678367	SPLASH PAN *

* Not Shown

Label Placement



REF	PART #	DESCRIPTION
401	PLABEL-12C	READ MANUAL VS
402	PLABEL-55A	ENTANGLEMENT LABEL VS
403	PLABEL-14A	ELECTRICITY LABEL MEDIUM
404	PLABEL-11B	EYE HAZARD LABEL VS
405	PLABEL-63A	DISCONNECT LABEL 220V VS
406	P0678406	COVER ENTANGLEMENT LABEL
407	P0678407	MACHINE ID LABEL

REF	PART #	DESCRIPTION
408	PPAINT-11	GRIZZLY PUTTY TOUCH-UP PAINT
409	G8588	GRIZZLY OVAL NAMEPLATE
410	PPAINT-1	GRIZZLY GREEN TOUCH-UP PAINT
411	P0678411	SHOCK HAZARD LABEL
412	P0678412	PRE-WIRED 220V LABEL
413	PLABEL-14	ELECTRICITY LABEL LARGE
414	P0678414	CONTROL PANEL LABEL

⚠WARNING

Safety labels warn about machine hazards and ways to prevent injury. The owner of this machine MUST maintain the original location and readability of the labels on the machine. If any label is removed or becomes unreadable, REPLACE that label before using the machine again. Contact Grizzly at (800) 523-4777 or www.grizzly.com to order new labels.

Grizzly Industrial, Inc. WARRANTY CARD

Name _____

Street _____

City _____ State _____ Zip _____

Phone # _____ Email _____

Model # _____ Order # _____ Serial # _____

The following information is given on a voluntary basis. It will be used for marketing purposes to help us develop better products and services. ***Of course, all information is strictly confidential.***

1. How did you learn about us?

____ Advertisement ____ Friend ____ Catalog
____ Card Deck ____ Website ____ Other:

2. Which of the following magazines do you subscribe to?

____ Cabinetmaker & FDM
____ Family Handyman
____ Hand Loader
____ Handy
____ Home Shop Machinist
____ Journal of Light Cont.
____ Live Steam
____ Model Airplane News
____ Old House Journal
____ Popular Mechanics
____ Popular Science
____ Popular Woodworking
____ Precision Shooter
____ Projects in Metal
____ RC Modeler
____ Rifle
____ Shop Notes
____ Shotgun News
____ Today's Homeowner
____ Wood
____ Wooden Boat
____ Woodshop News
____ Woodsmith
____ Woodwork
____ Woodworker West
____ Woodworker's Journal
____ Other:

3. What is your annual household income?

____ $20,000-$29,000 ____ $30,000-$39,000 ____ $40,000-$49,000
____ $50,000-$59,000 ____ $60,000-$69,000 ____ $70,000+

4. What is your age group?

____ 20-29 ____ 30-39 ____ 40-49
____ 50-59 ____ 60-69 ____ 70+

5. How long have you been a woodworker/metalworker?

____ 0-2 Years ____ 2-8 Years ____ 8-20 Years ____ 20+ Years

6. How many of your machines or tools are Grizzly?

____ 0-2 ____ 3-5 ____ 6-9 ____ 10+

7. Do you think your machine represents a good value? _____Yes _____No

8. Would you recommend Grizzly Industrial to a friend? _____Yes _____No

9. Would you allow us to use your name as a reference for Grizzly customers in your area?
Note: *We never use names more than 3 times.* _____Yes _____No

10. Comments: _____

_____

_____

_____

CUT ALONG DOTTED LINE

FOLD ALONG DOTTED LINE

Place
Stamp
Here

GRIZZLY INDUSTRIAL, INC.
P.O. BOX 2069
BELLINGHAM, WA 98227-2069

FOLD ALONG DOTTED LINE

Send a Grizzly Catalog to a friend:

Name_____

Street_____

City_____State_____Zip_____

TAPE ALONG EDGES--PLEASE DO NOT STAPLE

WARRANTY AND RETURNS

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

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

To take advantage of 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.

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.

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.