

# *Grizzly* *Industrial, Inc.*®

## MODEL G0669X HIGH-PRECISION 10" X 54" VS MILLING MACHINE OWNER'S MANUAL



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**WARNING: NO PORTION OF THIS MANUAL MAY BE REPRODUCED IN ANY SHAPE  
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#TS10556 PRINTED IN TAIWAN

# **WARNING!**

**This manual provides critical safety instructions on the proper setup, operation, maintenance and service of this machine/equipment.**

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

**The owner of this machine/equipment 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, blade/cutter 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

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## Foreword

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We are proud to offer the Model G0669X High-Precision 10" x 54" Milling Machine. This machine is part of a growing Grizzly family of fine 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 G0669X 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](http://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

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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](mailto: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](mailto:manuals@grizzly.com)

## Functional Overview

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The Model G0669X vertical mill is used to remove material from metal workpieces to form complex shapes. Tooling is inserted into the spindle of the head, which can be positioned in nearly any configuration above the table and workpiece.

During most operations, the tooling rotates in a stationary position while the operator moves the workpiece clamped to the table into the 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 using vertical quill (spindle) movement. There are coarse and fine manual controls for quill movement, and an auto-downfeed mechanism with adjustable speeds.

The high and low spindle speed range is selected using a convenient lever on the side of the head. Speeds are electronically controlled within these ranges by using the variable speed dial and read-out on the control panel.

Power feeds provide precision powered vertical and longitudinal table movement with adjustable limit stops for preset range of motion.

The coolant reservoir in the column base houses a pump that recycles the fluid back up to the workpiece, reducing friction and washing away the resulting swarf from the operation.

To enhance the already precise performance of this vertical mill, Grizzly offers a number of accessories such as digital readouts, table mounting devices, and automated drawbar systems (refer to **ACCESSORIES** on **Page 35**).



# Identification

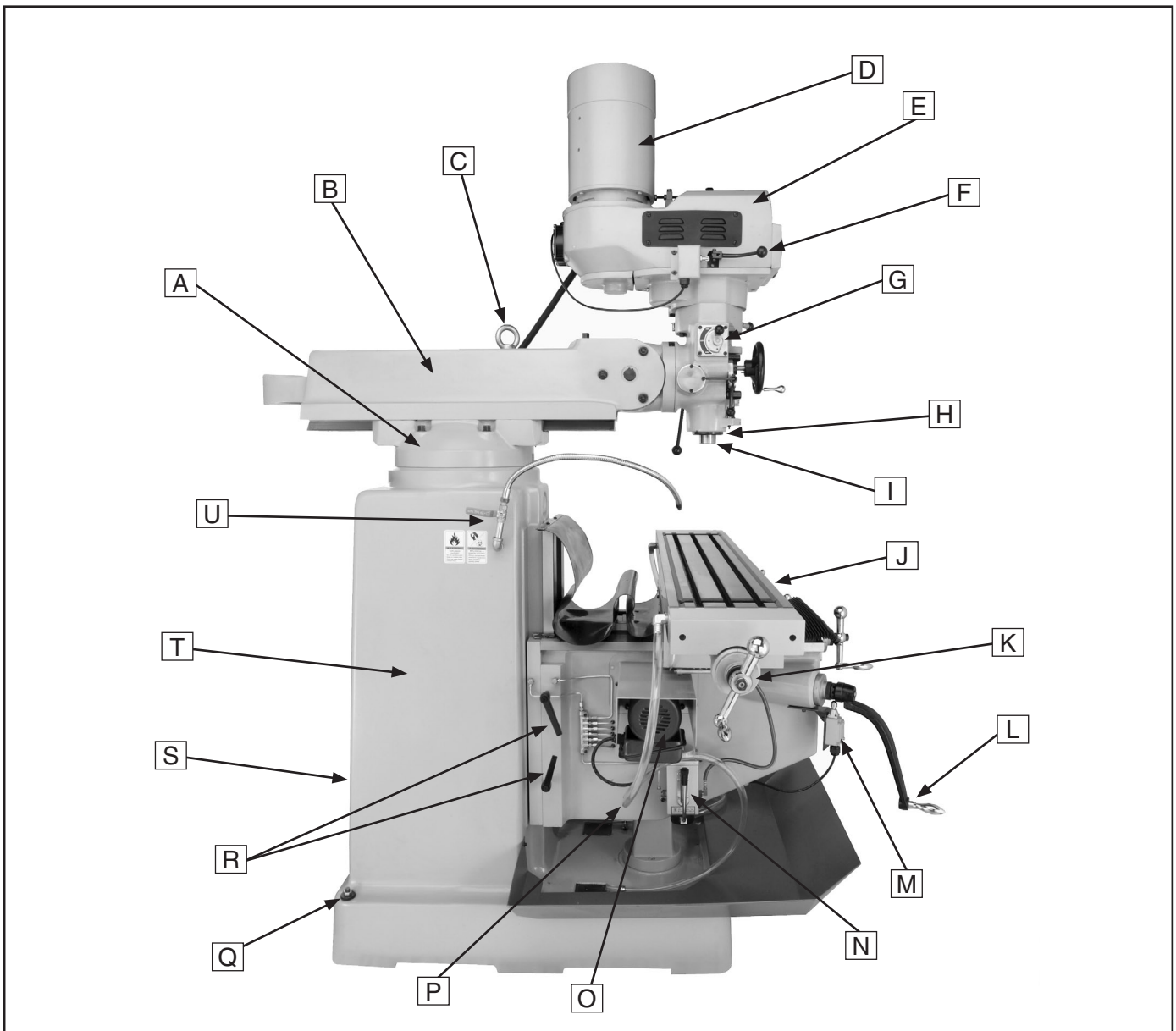
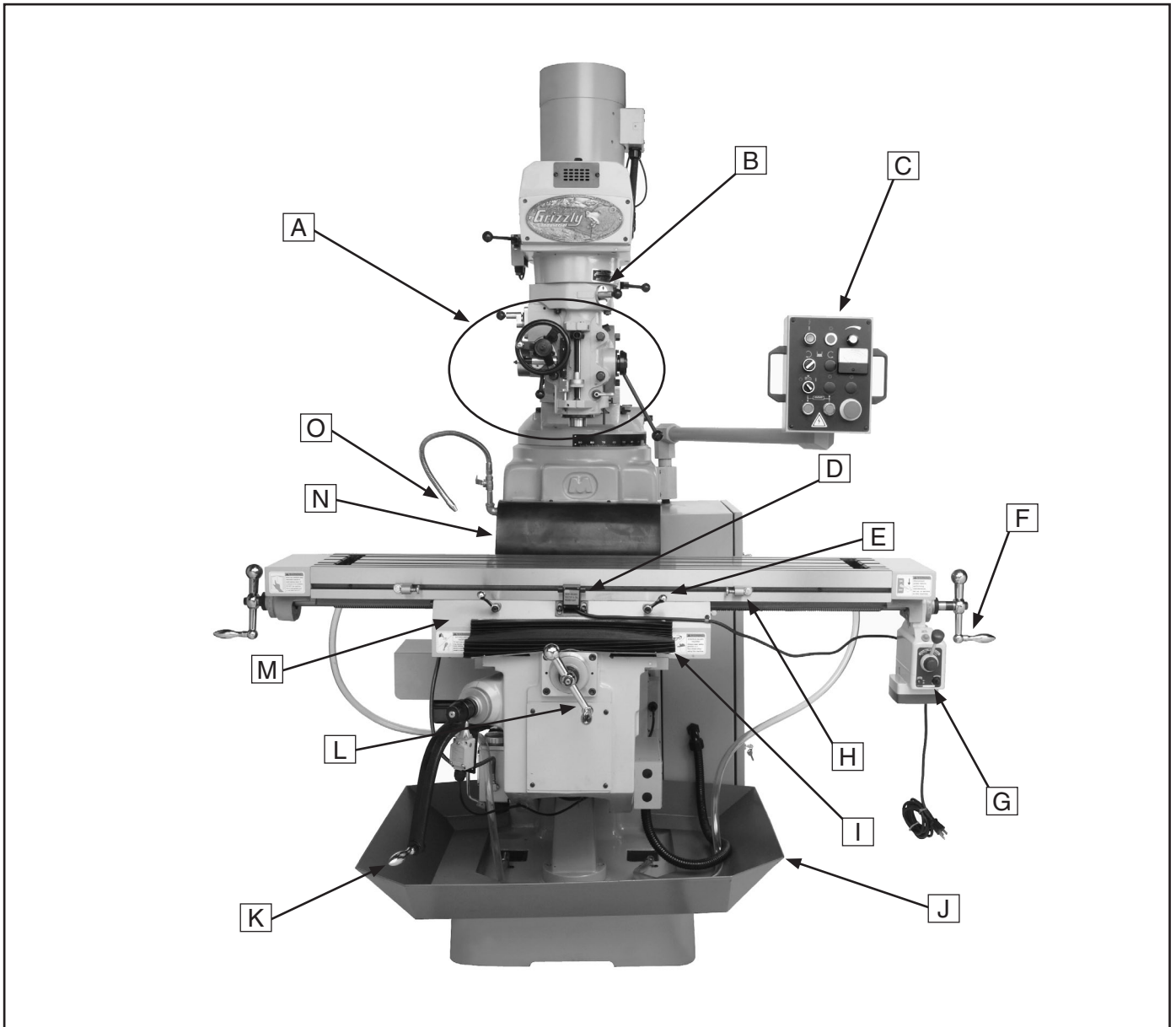


Figure 1. Left side identification.

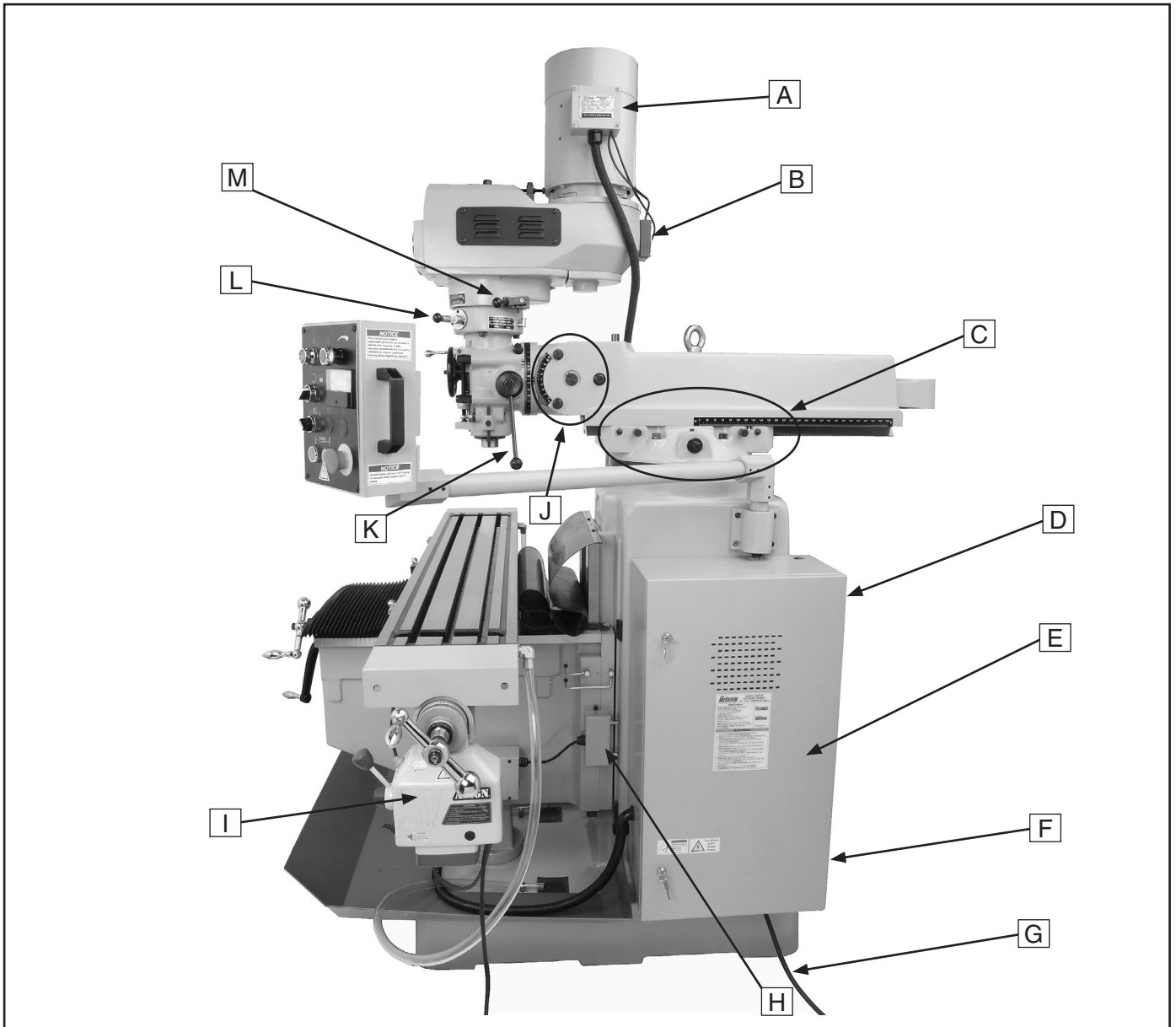
- |   |  |
|---|--|
| <b>A.</b> Turret                            | <b>L.</b> Vertical (Knee or Z-Axis) Crank                  |
| <b>B.</b> Ram                               | <b>M.</b> Vertical Crank Safety Switch                     |
| <b>C.</b> Lifting Eye Bolt                  | <b>N.</b> One-Shot Lubricator                              |
| <b>D.</b> Spindle Motor 5 HP 220V 3-Phase   | <b>O.</b> Vertical Power Feed Motor $\frac{1}{10}$ HP 110V |
| <b>E.</b> Drive System                      | <b>P.</b> Coolant Return Hose                              |
| <b>F.</b> Emergency Spindle Brake           | <b>Q.</b> Machine Mounting Point (1 of 4)                  |
| <b>G.</b> Quill Speed Selector              | <b>R.</b> Knee Locks                                       |
| <b>H.</b> Quill                             | <b>S.</b> Coolant Pump Access (in Column)                  |
| <b>I.</b> Spindle                           | <b>T.</b> Column   |
| <b>J.</b> Table                             | <b>U.</b> Coolant Valve and Nozzle                         |
| <b>K.</b> Longitudinal (X-Axis) Ball Handle |  |





**Figure 2.** Front identification.

- |   |  |
|---|--|
| <b>A.</b> Quill Auto-Downfeed Controls (see <b>Page 31</b> for more detail) | <b>H.</b> Longitudinal Power Feed Limit Stop |
| <b>B.</b> Quill Auto-Downfeed Selector                                      | <b>I.</b> Front Way Cover                    |
| <b>C.</b> Control Panel (see <b>Page 24</b> for more detail)                | <b>J.</b> Splash Pan                         |
| <b>D.</b> Longitudinal Power Feed Limit Switch                              | <b>K.</b> Vertical Crank                     |
| <b>E.</b> Table Lock  | <b>L.</b> Cross Feed (Y-Axis) Ball Handle    |
| <b>F.</b> Longitudinal Ball Handle  | <b>M.</b> Saddle                             |
| <b>G.</b> Longitudinal Power Feed   | <b>N.</b> Rear Way Cover                     |
|   | <b>O.</b> Coolant Nozzle                     |



**Figure 3.** Right side identification.

- |  |  |
|--|--|
| <b>A.</b> Spindle Motor Wiring Junction Box                      | <b>G.</b> Power Cord                         |
| <b>B.</b> Drive System Cooling Fan                               | <b>H.</b> Vertical Power Feed Limit Switch   |
| <b>C.</b> Ram Movement Controls                                  | <b>I.</b> Longitudinal Power Feed            |
| <b>D.</b> Main Power Switch (on back of Electrical Cabinet)      | <b>J.</b> Ram Forward/Backward Tilt Controls |
| <b>E.</b> Electrical Cabinet                                     | <b>K.</b> Coarse Downfeed Handle             |
| <b>F.</b> Auxiliary 110V Outlets (on back of Electrical Cabinet) | <b>L.</b> Quill Auto-Downfeed Selector       |
|  | <b>M.</b> Spindle Speed Range Selector       |



# MACHINE DATA SHEET

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

## MODEL G0669X EXTREME SERIES 10" X 54" VARIABLE-SPEED VERTICAL MILLING MACHINE w/POWER FEED

### Product Dimensions:

Weight ..... 3080 lbs.  
Length/Width/Height ..... 66" x 77" x 89"  
Foot Print (Length/Width)..... 41" x 24"

### Shipping Dimensions:

Type ..... Wood Crate  
Content..... Machine  
Weight ..... 3410 lbs.  
Length/Width/Height..... 74" x 60" x 77"

### Electrical:

Power Requirement ..... 220V, Single-Phase  
Switch..... ON/OFF Power Switch  
Inverter Type ..... Yasakawa V7AT25P5  
Inverter Size ..... 7½ HP  
Recommended Circuit Size ..... 20A  
Recommended Plug/Receptacle ..... NEMA L6-20

### Motors:

#### Spindle Motor

Type..... TEFC Induction  
Horsepower ..... 5 HP  
Voltage ..... 220V  
Phase ..... 3-Phase  
Amps ..... 14A  
Speed ..... 1725 RPM  
Cycle..... 60 Hz  
Power Transfer..... Belt Drive  
Bearings ..... Shielded & Lubricated

#### Coolant Pump Motor

Type..... Induction  
Horsepower ..... 1/8 HP  
Voltage ..... 220V  
Phase ..... Single-Phase  
Amps ..... 0.5A  
Speed ..... 3450 RPM  
Cycle..... 60 Hz  
Power Transfer..... Direct Drive  
Bearings ..... Sealed & Lubricated





**Longitudinal Power Feed Motor**

Type.....	DC Universal
Horsepower .....	1/10 HP
Voltage .....	110V
Phase .....	Single-Phase
Amps .....	0.8A
Speed .....	0-200 RPM
Cycle.....	60 Hz
Number Of Speeds.....	Variable
Power Transfer.....	Direct Drive
Bearings .....	Shielded & Lubricated

**Table Elevation Motor**

Type.....	TEFC Induction
Horsepower .....	1/2 HP
Voltage .....	220V
Phase .....	Single-Phase
Amps .....	1.9A
Cycle.....	60 Hz
Table Elevation Speed .....	1.4 FPM
Power Transfer.....	Gearbox Drive
Bearings .....	Shielded & Lubricated

**Main Specifications:**

**Table Information**

Table Length .....	54"
Table Width .....	10"
Table Thickness .....	3"
Number of T-Slots .....	3
T-Slot Width.....	5/8"
T-Slot Height .....	1"
T-Slot Center-To-Center.....	2 1/2"
Stud Size .....	1/2"

**Operation Information**

Longitudinal Table Travel.....	36"
Cross Table Travel .....	15"
Vertical Table Travel .....	13 1/2"
Distance Range Spindle Center to Column .....	5"-25"
Distance Range Spindle to Table.....	1 1/2"-15"
Ram Travel.....	19"
Ram Swivel .....	360°
Head Tilt .....	45° Forward, 45° Back
Head Swivel .....	90° Left, 90° Right
Drilling Capacity for Cast Iron .....	1"
Drilling Capacity for Steel.....	3/4"
Number of Spindle Speeds .....	Variable
Range of Spindle Speeds @ Low Range .....	75-520 RPM
Range of Spindle Speeds @ High Range.....	520-4200 RPM
Number of Longitudinal Feed Rates .....	Variable
Range of Longitudinal Feed Rate .....	0-31 1/2 in./min.
Number of Spindle Feed Rates.....	3
Spindle Feed Rates.....	0.0015, 0.003, 0.006 in./rev.



**Spindle Information**

Spindle Travel .....	5"
Spindle Taper .....	R-8
Spindle Size .....	1 <sup>3</sup> / <sub>8</sub> "
End Milling Capacity .....	1"
Face Milling Capacity .....	4"
Drawbar Diameter .....	7/ <sub>16</sub> "
Drawbar TPI .....	20 TPI
Drawbar Length .....	.23 <sup>1</sup> / <sub>2</sub> "
Spindle Bearings .....	Angular Contact, P5 Class

**Construction Information**

Table.....	Hardened & Precision-Ground Cast Iron
Quill .....	Chromed Steel
Column .....	Meehanite Cast Iron
Headstock.....	Meehanite Cast Iron
Knee .....	Meehanite Cast Iron
Saddle .....	Meehanite Cast Iron
Paint .....	Urethane

**Other Specifications**

Country of Origin.....	Taiwan
Warranty.....	1 Year
Serial Number Location .....	Machine ID Label on Right Side of Column
Customer Assembly & Setup Time.....	2 hours

**Features:**

- Built-In Single-Phase to 3-Phase Power Inverter
- One-Shot Pump Table Lubrication
- Auto Down Feed
- Auto Stop with Micro Adjustable Stop
- Longitudinal Power Feed with 550 In./Lbs. of Torque
- Spindle & Headstock Components Dynamically Balanced for Precision Milling
- Built-In Coolant System
- Heavy-Duty Spindle Brake
- High Precision Spindle w/P5 Class Angular Contact Ball Bearings
- Double-Bronzed Nut on X & Y Leadscrews for Ultra-Smooth Movement w/Minimal Backlash
- Powered Table Elevation with Feed Rate of 1.4 FPM



# SECTION 1: SAFETY

## WARNING

### 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.



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



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



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.

## WARNING

### Safety Instructions for Machinery

- 1. READ THE ENTIRE MANUAL BEFORE STARTING MACHINERY.** Machinery presents serious injury hazards to untrained users.
- 2. ALWAYS USE ANSI APPROVED SAFETY GLASSES WHEN OPERATING MACHINERY.** Everyday eyeglasses only have impact resistant lenses—they are NOT safety glasses.
- 3. ALWAYS WEAR A NIOSH APPROVED RESPIRATOR WHEN OPERATING MACHINERY THAT PRODUCES DUST.** Most types of dust (wood, metal, etc.) can cause severe respiratory illnesses.
- 4. ALWAYS USE HEARING PROTECTION WHEN OPERATING MACHINERY.** Machinery noise can cause permanent hearing loss.
- 5. WEAR PROPER APPAREL. DO NOT** wear loose clothing, gloves, neckties, rings, or jewelry that can catch in moving parts. Wear protective hair covering to contain long hair and wear non-slip footwear.
- 6. NEVER OPERATE MACHINERY WHEN TIRED OR UNDER THE INFLUENCE OF DRUGS OR ALCOHOL.** Be mentally alert at all times when running machinery.



# WARNING

## Safety Instructions for Machinery

7. **ONLY ALLOW TRAINED AND PROPERLY SUPERVISED PERSONNEL TO OPERATE MACHINERY.** Make sure operation instructions are safe and clearly understood.
8. **KEEP CHILDREN AND VISITORS AWAY.** Keep all children and visitors a safe distance from the work area.
9. **MAKE WORKSHOP CHILDPROOF.** Use padlocks, master switches, and remove start switch keys.
10. **NEVER LEAVE WHEN MACHINE IS RUNNING.** Turn power **OFF** and allow all moving parts to come to a complete stop before leaving machine unattended.
11. **DO NOT USE IN DANGEROUS ENVIRONMENTS.** DO NOT use machinery in damp, wet locations, or where any flammable or noxious fumes may exist.
12. **KEEP WORK AREA CLEAN AND WELL LIGHTED.** Clutter and dark shadows may cause accidents.
13. **USE A GROUNDED EXTENSION CORD RATED FOR THE MACHINE AMPERAGE.** Grounded cords minimize shock hazards. Undersized cords create excessive heat. Always replace damaged extension cords.
14. **ALWAYS DISCONNECT FROM POWER SOURCE BEFORE SERVICING MACHINERY.** Make sure switch is in OFF position before reconnecting.
15. **MAINTAIN MACHINERY WITH CARE.** Keep blades sharp and clean for best and safest performance. Follow instructions for lubricating and changing accessories.
16. **MAKE SURE GUARDS ARE IN PLACE AND WORK CORRECTLY BEFORE USING MACHINERY.**
17. **REMOVE ADJUSTING KEYS AND WRENCHES.** Make a habit of checking for keys and adjusting wrenches before turning machinery **ON**.
18. **CHECK FOR DAMAGED PARTS BEFORE USING MACHINERY.** Check for binding or misaligned parts, broken parts, loose bolts, and any other conditions that may impair machine operation. Repair or replace damaged parts before operation.
19. **USE RECOMMENDED ACCESSORIES.** Refer to the instruction manual for recommended accessories. Improper accessories increase risk of injury.
20. **DO NOT FORCE MACHINERY.** Work at the speed for which the machine or accessory was designed.
21. **SECURE WORKPIECE.** Use clamps or a vise to hold the workpiece when practical. A secured workpiece protects your hands and frees both hands to operate the machine.
22. **DO NOT OVERREACH.** Maintain stability and balance at all times.
23. **MANY MACHINES CAN EJECT WORKPIECES TOWARD OPERATOR.** Know and avoid conditions that cause the workpiece to "kickback."
24. **ALWAYS LOCK MOBILE BASES (IF USED) BEFORE OPERATING MACHINERY.**
25. **CERTAIN DUST MAY BE HAZARDOUS** to the respiratory systems of people and animals, especially fine dust. Be aware of the type of dust you are exposed to and always wear a respirator designed to filter that type of dust.



## **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.
- 5. SPINDLE SPEEDS.** Select the spindle speed that is appropriate for the type of work and material. Allow the mill to gain 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..... 16.4 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.**

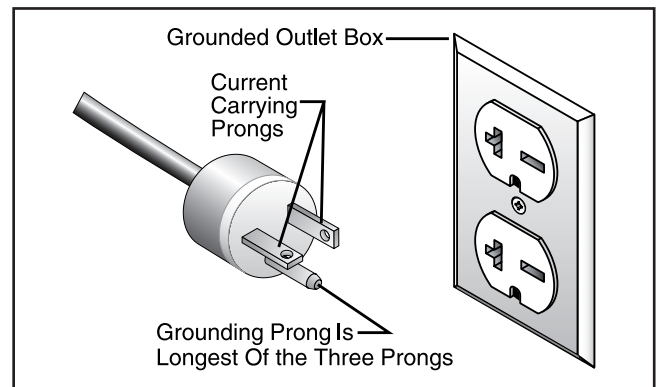
Minimum Circuit Size.....20 Amps

### **NOTICE**

The Model G0669X uses a 7½ 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 4**.



**Figure 4.** NEMA 6-20 plug and receptacle.

### Extension Cords

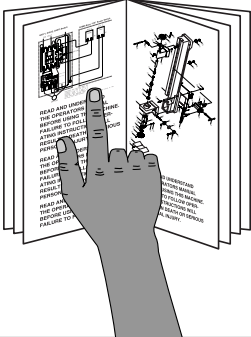
Using extension cords may reduce the life of the motor. Instead, place the machine near a power source. If you must use an extension cord:

- Use at least a 12 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

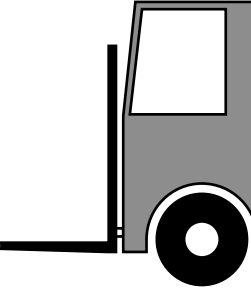
## Setup Safety



**!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 G0669X 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 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 .....	At Least 2
• Safety Glasses .....	1 for Each Person
• Precision Level .....	1
• Safety Hook and Chain or Lifting Straps (rated for at least 4000 lbs.) .....	1
• Power Lifting Equipment (rated for at least 4000 lbs.) .....	1
• Floor Mounting Hardware .....	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: (Figures 5–6)	Qty
A. Drawbar 7/16"-20 x 23 1/2" .....	1
B. Vertical Crank.....	1
C. Oil Bottle.....	1
D. Coarse Downfeed Handle .....	1
E. Handles .....	4
F. Fine Downfeed Handwheel .....	1
G. Close-End Wrench 17/19mm.....	1
H. Hex Wrench Set 1.5–10mm.....	1
I. Standard Screwdriver .....	1
J. Phillips Screwdriver .....	1
K. Open-End Wrench 17/19mm .....	1
L. Open-End Wrench 12/14mm.....	1
M. Indicator Rod.....	1
N. Frequency Drive Manual .....	1
O. Power Feed Manual .....	1
P. Tool Box.....	1
Q. Coolant Return Hoses.....	2
R. Front Way Cover.....	1
S. Rear Way Cover .....	1
T. Splash Pan.....	1

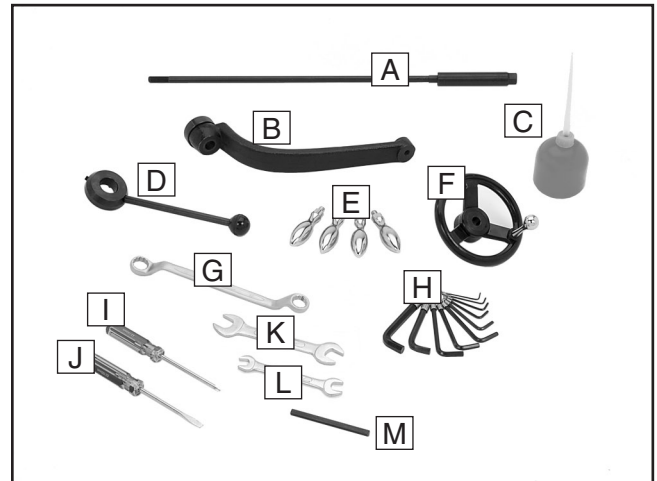


Figure 5. Model G0669X inventory (1).

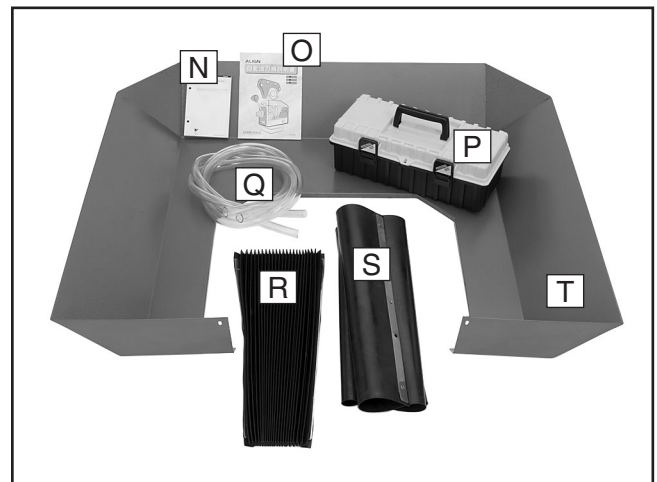



Figure 6. Model G0669X inventory (2).

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.

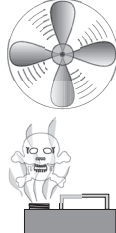




# Clean Up

The unpainted surfaces are coated with a waxy oil to prevent corrosion during shipment. Remove this protective coating with a solvent cleaner or degreaser shown in **Figure 7**. For thorough cleaning, some parts must be removed. **For optimum performance from your machine, 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.

	<p><b>! WARNING</b> Gasoline and petroleum products have low flash points and can explode or cause fire if used to clean machinery. <b>DO NOT</b> use these products to clean the machinery.</p>
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	<p><b>! CAUTION</b> Many cleaning solvents are toxic if inhaled. Minimize your risk by only using these products in a well ventilated area.</p>
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## G2544—Solvent Cleaner & Degreaser

A great product for removing the waxy shipping grease from your machine during clean up.

<p>Call <b>1-800-523-4777</b> To Order</p>	
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**Figure 7.** Cleaner/degreaser available from Grizzly.

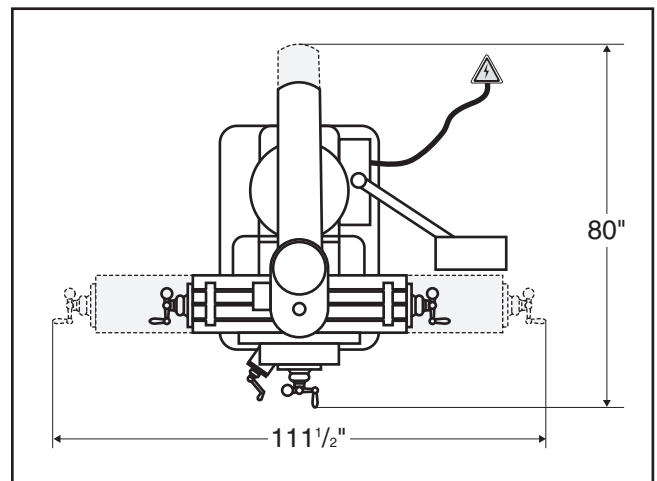
# Site Considerations

## Floor Load

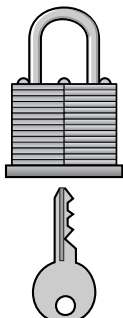
Refer to the **Machine Data Sheet** on **Page 6** for the weight and footprint specifications of your machine. Some residential floors may require additional reinforcement to support both the machine and operator.

## 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 8** for the minimum working clearances.

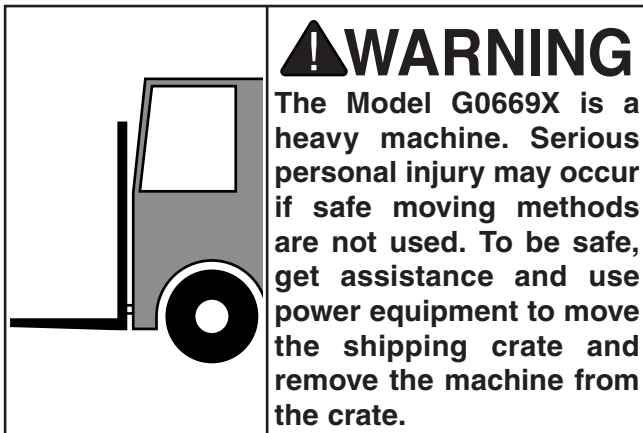


**Figure 8.** Minimum working clearances.

	<p><b>! CAUTION</b> 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.</p>
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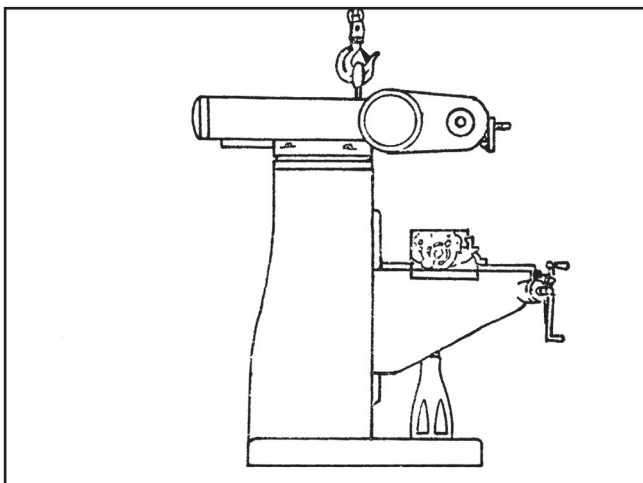
# Moving & Placing Base Unit



The two methods of lifting and moving described below require at least two assistants, and power lifting equipment with a safety hook and chain or lifting straps rated for at least 4000 lbs.

## Moving the Mill Using the Eye Bolt

1. Keep the headstock in the same position it was shipped in, similar to **Figure 9**.



**Figure 9.** Using the eye bolt to lift the mill.

2. Move the ram so that the eye bolt is aligned with the front edge of the column, then lock the ram in place (refer to **Ram Movement** on **Page 28** for detailed instructions).
3. Attach the safety hook to the lifting eye bolt, then lift the mill slowly to make sure the hook is secure and the mill is lifting evenly. Lift the mill only enough to clear the shipping pallet and floor obstacles.

—If the mill tips in one direction, lower the mill to the ground, then adjust the ram or table to balance the weight. Re-tighten all locks before lifting the mill again.

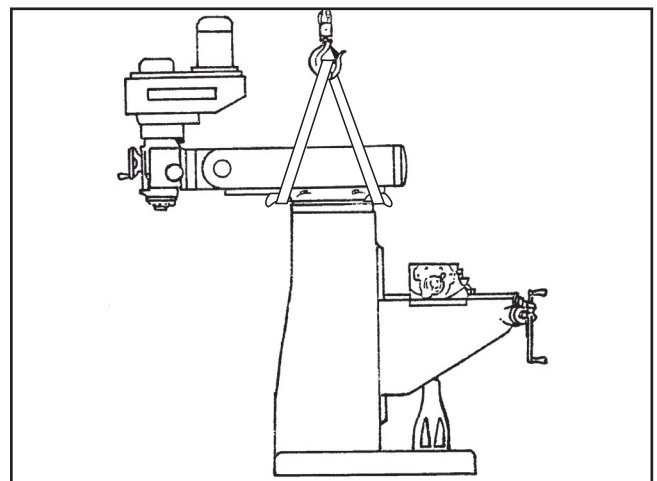
—If the mill lifts evenly, move it to its permanent location.

**Note:** Have your assistants steady the load as you move it to keep it from swinging.

4. Use a precision level to make sure the table is level. Shim between the base and the floor as necessary to avoid warping or cracking the cast iron base.

## Moving the Mill Using Straps

1. Position the head in an upright position, swivel the ram 180°, as shown in **Figure 10**, then lock it in place (refer to **Head Movement** on **Page 27** and **Ram Movement** on **Page 28** for detailed instructions).



**Figure 10.** Using lifting straps to lift the mill.

2. Position the lifting straps under the ram, as shown in **Figure 10**, with padding between the straps and the mill to protect the ram way.

3. Lift the mill slowly to make sure the hook and lifting straps are secure and the mill is lifting evenly. Lift the mill only enough to clear the shipping pallet and floor obstacles.

—If the mill tips in one direction, lower the mill to the ground, then adjust the ram or table to balance the weight. Re-tighten all locks before lifting the mill again.

—If the mill lifts evenly, move it to its permanent location.

**Note:** *Have your assistants steady the load as you move it to keep it from swinging.*

4. Use a precision level to make sure the table is level. Shim between the base and the floor as necessary to avoid warping or cracking the cast iron base.

## **⚠️ WARNING**

Only use lifting safety hook, chain or lifting straps, and power lifting equipment rated for at least 4000 lbs. and in good working condition. Only raise the mill enough to clear shipping pallet and floor obstacles. If the mill falls or tips over while moving it, serious personal injury and property damage could result.

## **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

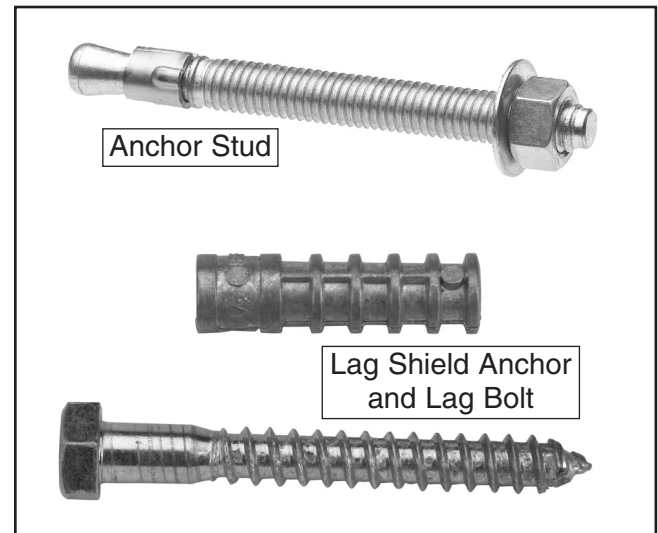
Although not required, we recommend that you mount your new machine to the floor. Because this is an optional step and floor materials may vary, floor mounting hardware is not included. Whichever option you choose, it is necessary to level your machine with a precision level.

## Bolting to Concrete Floors

Lag shield anchors with lag bolts and anchor studs (**Figure 11**) 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.

## **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.**



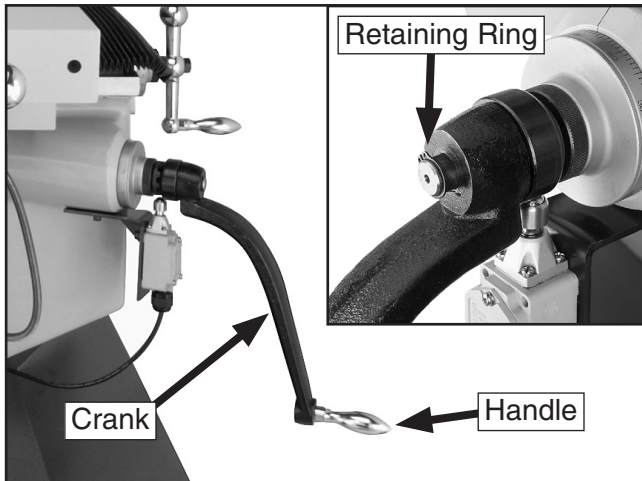
**Figure 11.** Typical fasteners for mounting to concrete floors.

# Assembly

Tools Needed .....	Qty
Snap Ring Pliers.....	1
Hex Wrench 4mm.....	1
Wrench 14mm .....	1
Phillips Screwdriver .....	1
Standard Screwdriver.....	1

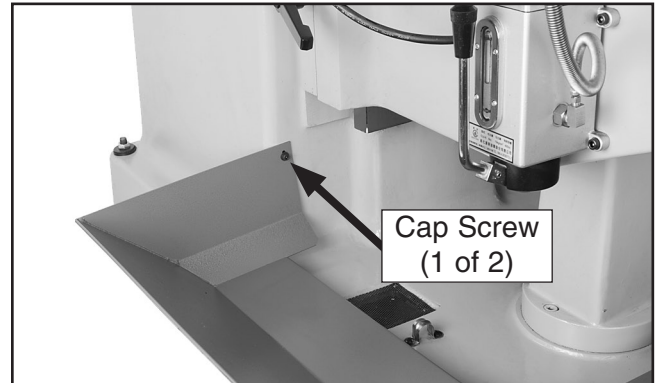
## To assemble the mill:

1. Move the head to an upright position (refer to **Head Movement** on **Page 27** for detailed instructions).
2. Thread a handle onto the vertical crank and use the 14mm wrench to fully tighten it.
3. Use the snap ring pliers to remove the retaining ring from the vertical crank leadscrew (see **Figure 12**), slide the crank on the leadscrew, then replace the retaining ring.



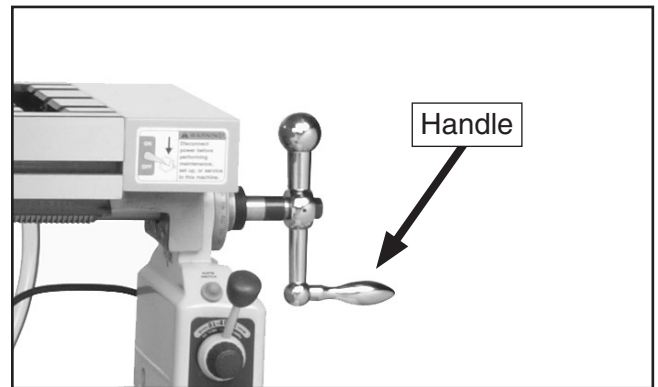
**Figure 12.** Vertical crank installed.

4. Use the vertical crank to raise the knee until you can position the splash pan on the base, then secure the pan in place with the two cap screws, as shown in **Figure 13**.



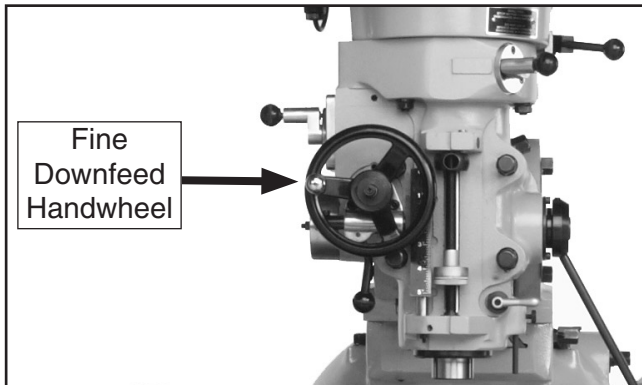
**Figure 13.** Splash pan installed (left side shown).

5. Thread the remaining handles onto the three ball handles and use the 14mm wrench to fully tighten them (see **Figure 14**).



**Figure 14.** Handle installed on ball handle.

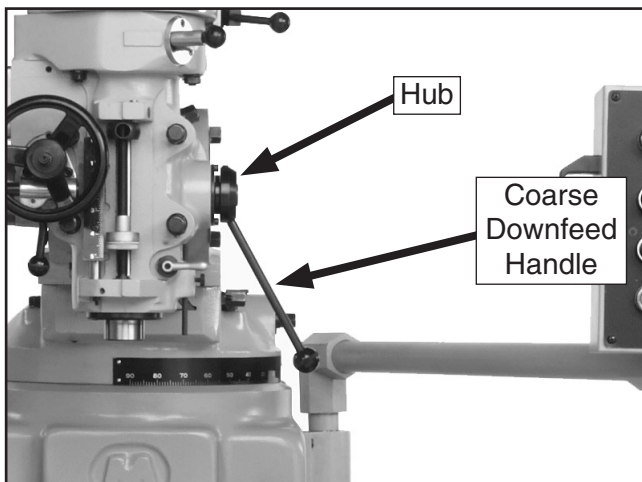
- Slide the fine downfeed handwheel onto the shaft on the front of the head, as shown in **Figure 15**.



**Figure 15.** Fine downfeed handle installed.

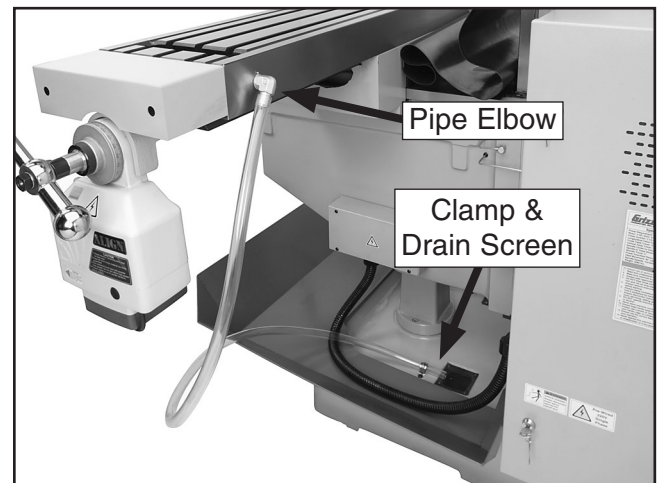
- Slip the coarse downfeed handle onto the shaft located on the right side of the head, as shown in **Figure 16**.

**Note:** If necessary, use the set screw on the hub of the handle to adjust the ball bearing pressure until the handle can be easily installed and removed.



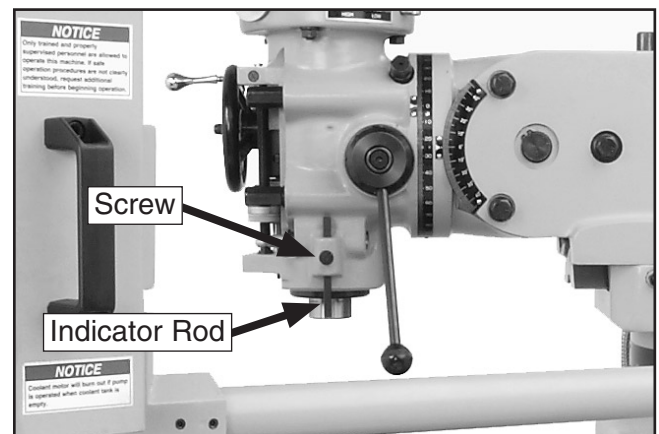
**Figure 16.** Coarse downfeed handle installed.

- Attach each coolant return hose to the pipe elbow on the rear of the table, then secure the other end through the clamp on the base and over the drain screen, as shown in **Figure 17**.



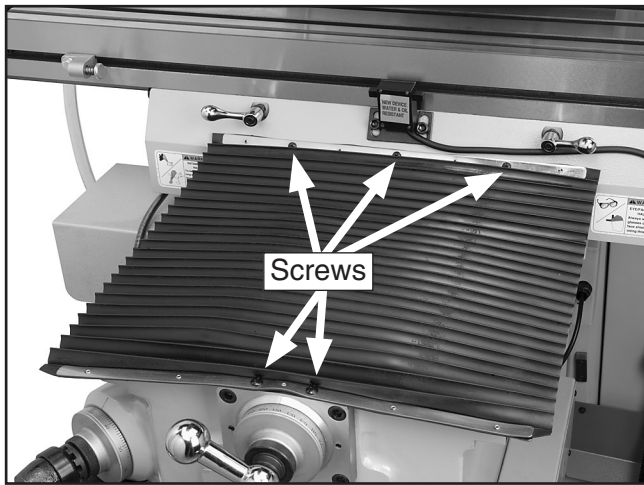
**Figure 17.** Coolant return hose installed (right side shown).

- Loosen the screw on the right side of the head shown in **Figure 18**, then, aligning the flat of the indicator rod with that of the hole, slide the rod into the hole from the bottom and retighten the screw.



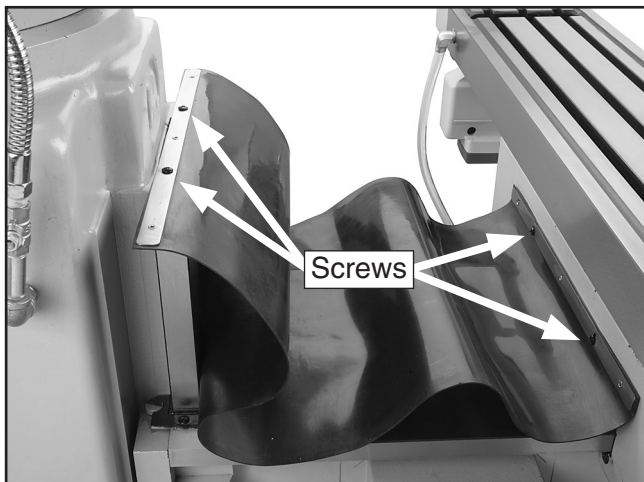
**Figure 18.** Indicator rod installed (right side of head shown).

10. Use the cross feed ball handle to move the table back to the column until you can position the front way cover on the saddle ways, then secure the cover in place with the five screws shown in **Figure 19**.



**Figure 19.** Front way cover installed.

11. Move the table to the front until you can position the rear way cover over the saddle and vertical ways, then secure it in place with the four screws shown in **Figure 20**.



**Figure 20.** Rear way cover 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:**

- The motor powers up and runs correctly.
- The emergency stop button safety feature works correctly.
- The electrical cabinet safety switch feature works correctly.
- The emergency spindle brake 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 43**.

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

### **!WARNING**

Before starting the mill, make sure you have performed the preceding assembly and adjustment 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!

*Continued on next page* →

### To test run the machine:

1. Make sure you understand the safety instructions at the beginning of the manual and that the machine is setup properly.
2. Make sure all tools and objects used during setup are cleared away from the machine.
3. Lubricate the mill, as explained in **Lubrication** on **Page 38**.
4. Fill the coolant reservoir (refer to **Coolant Reservoir** on **Page 40** for detailed instructions).
5. Connect the machine to the power source.
6. Make sure the electrical cabinet door is closed and locked, then rotate the main power switch to the **ON** position (see **Figure 21**).

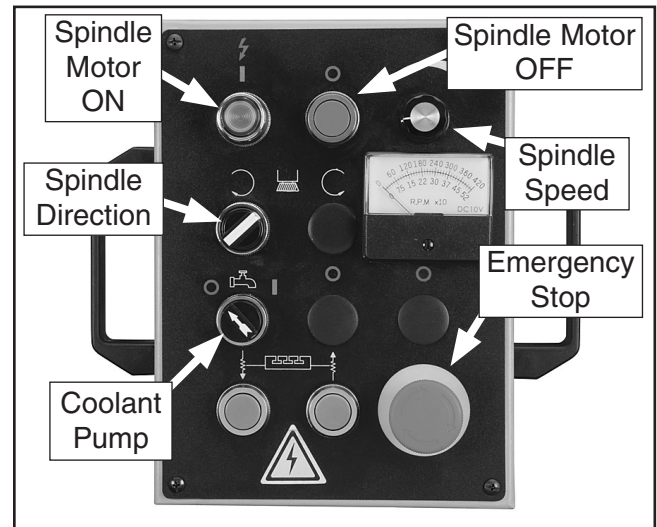
**Note:** The cooling fans on the back of the drive system and electrical cabinet should start.



**Figure 21.** Main power switch on back of electrical cabinet.

7. Push the emergency stop button, then twist it clockwise so it pops out. When the emergency stop button pops out, the switch is reset and ready for operation (see **Figure 22**).

**Note:** Refer to **Control Panel** on **Page 24** for additional details.



**Figure 22.** Control panel.

8. Rotate the spindle speed dial all the way to the left.
9. Push the spindle motor ON button, then turn the spindle direction switch to the left or right to start spindle rotation.

**Note:** Moving the spindle direction switch to the center or neutral position stops spindle rotation.

## **!WARNING**

Continuous operation of this mill without properly and successfully completing all procedures of the *Test Run* could lead to personal injury or machine damage, and could void the warranty.



10. Verify that the machine is operating correctly.

—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 stop the machine and disconnect it from power before investigating or correcting potential problems.

11. Press the emergency stop button to turn the machine **OFF**, then wait for the spindle to stop on its own.

12. WITHOUT resetting the emergency stop button, press the spindle motor ON button. The machine should not start.

—If the machine does not start, the emergency stop button safety feature is working correctly.

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

13. Reset the emergency stop button.

## **⚠️ WARNING**

To avoid the risk of electrocution during the next step of the *Test Run*, DO NOT reach into the electrical cabinet.

14. Without reaching into the cabinet, unlock and open the electrical cabinet door approximately 4", then press the spindle motor ON button located on the control panel.

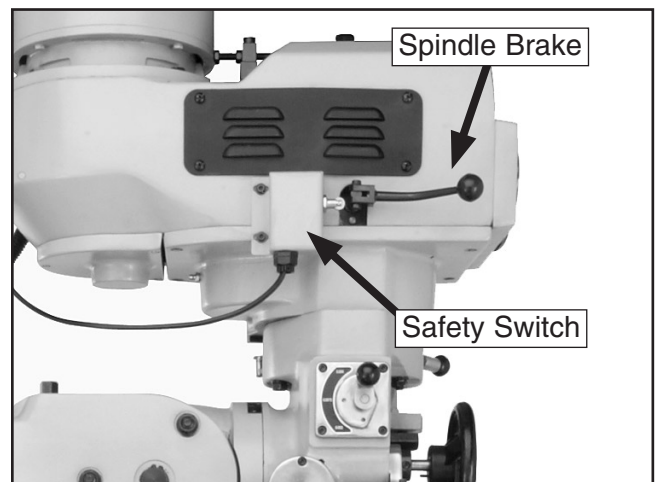
—If the machine does not start, the electrical cabinet safety switch feature is working correctly.

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

15. Close and lock the electrical cabinet door, start the spindle rotating, then push the emergency spindle brake (see **Figure 23**).

—If the machine turns **OFF** and the spindle stops, the emergency spindle brake is working properly.

—If the machine does not turn **OFF** or the spindle does not stop, immediately disconnect power to the machine. The emergency spindle brake safety feature is not working correctly. This safety feature must work properly before proceeding with regular operations. Call Tech Support for help.



**Figure 23.** Emergency spindle brake.



16. Start spindle rotation.
17. Test the variable speed dial by turning the speed all the way up for a few seconds, then turning it all the way down.
18. Point the coolant nozzle onto the table, turn the coolant pump switch to "I" or **ON**, then check for proper operation of the coolant system.
19. Use the vertical power feed buttons on the control panel to raise and lower the knee to make sure the vertical limit stops (right side of knee) are working properly.
20. Set the longitudinal limit stops and test the longitudinal power feed for proper operation (see **Longitudinal Power Feed** on **Page 26** for detailed instructions).

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. After successfully completing the **Test Run** procedures, make sure the mill is turned **OFF** and the spindle is stopped.
2. Move the spindle speed range selector to the **LOW** position (refer to **Selecting Spindle Speed Range** on **Page 30** for detailed instructions).

3. Turn the machine **ON**, start spindle rotation, then adjust the spindle speed dial for approximately 280 RPM.
4. Let the mill run at this speed for 20 minutes, then turn the spindle **OFF** and wait for it to stop.
5. Use the spindle direction switch on the control panel to reverse the spindle direction and start the spindle rotation, then let the mill run for another 20 minutes.
6. Turn the spindle **OFF** and wait for it to stop, then move the spindle speed range selector to the **HIGH** position and start spindle rotation.
7. Set the spindle speed at approximately 2100 RPM, then repeat **Steps 4–5**.
8. Turn the mill **OFF**. The spindle break-in is now complete and the machine is ready for operation.

## Recommended Adjustments

For your convenience, the adjustments listed below have been performed at the factory.

However, because of the many variables involved with shipping, we recommend that you at least verify the following adjustments to ensure the best possible results from your new machine.

Step-by-step instructions for these adjustments can be found in the **SERVICE** section starting on **Page 43**.

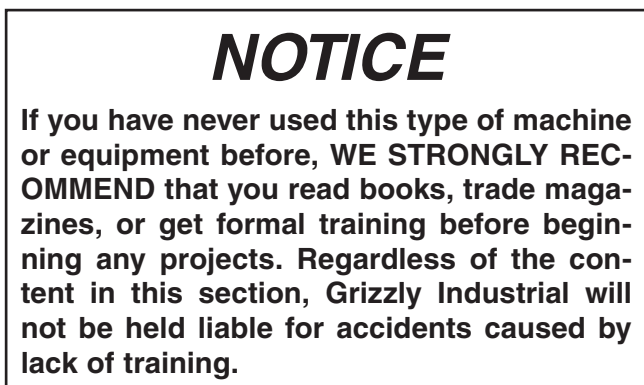
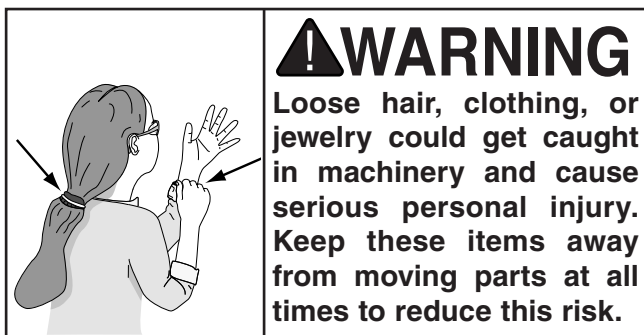
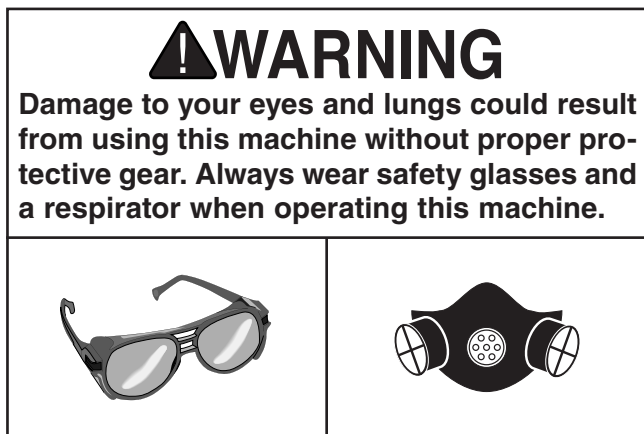
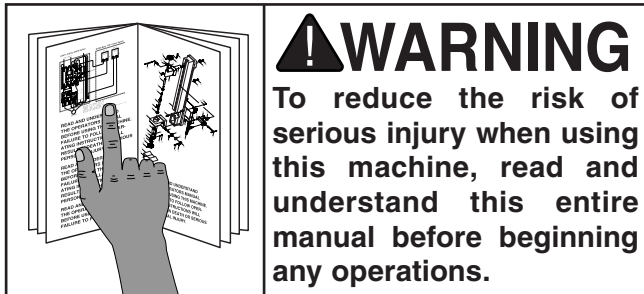
#### Factory adjustments that should be verified:

1. Gib adjustment (**Page 46**).
2. Leadscrew backlash adjustment (**Page 47**).



# SECTION 4: OPERATIONS

## Operation Safety



## Control Panel

Refer to **Figure 24** and the descriptions below to understand all the functions of control panel.



**Figure 24.** Model G0669X control panel.

- A. Spindle Motor ON Button:** Lights and starts the spindle motor.
- B. Spindle Motor OFF Button:** Stops the spindle motor.
- C. Spindle Speed Dial:** Controls the variable speed of the spindle.
- D. Spindle Direction Switch:** Starts, reverses, and stops spindle rotation.

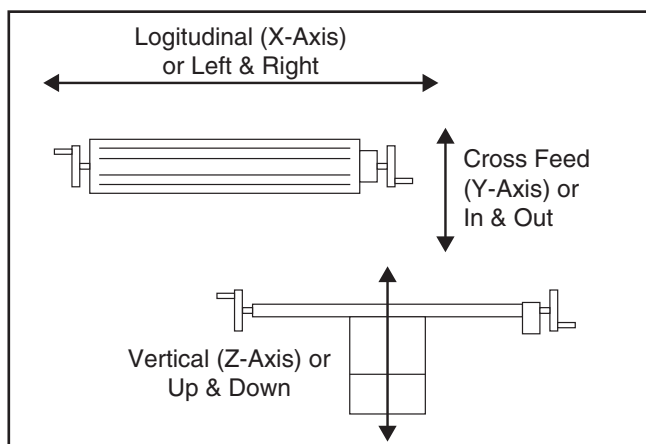
- E. **Spindle Speed Readout:** Displays the spindle speed in RPM's—the top numbers are for the high speed range, and the bottom numbers are for the low speed range.
- F. **Coolant Pump Switch:** Turns the coolant pump ON/OFF.
- G. **Vertical Power Feed Down Button:** Lowers the knee.
- H. **Vertical Power Feed Up Button:** Raises the knee.

**Note:** When the vertical power feed buttons are released, knee motion will stop.

- I. **Emergency Stop Button:** Disconnects power to all motors and the control panel. This button DOES NOT disconnect the machine from power.

## Table Movement

The mill table has three paths of movement (see **Figure 25**): 1) Longitudinal (X-axis) controlled by ball handles and the power feed, 2) cross feed (Y-axis) controlled by the ball handle, and 3) vertical (Z-axis) controlled by the knee crank and power feed buttons on the control panel.



**Figure 25.** The three paths of the mill table movement.

The increments of the graduated dials above the longitudinal and cross feed ball handles are 0.001". The table moves 0.200" with each full revolution of the ball handles.

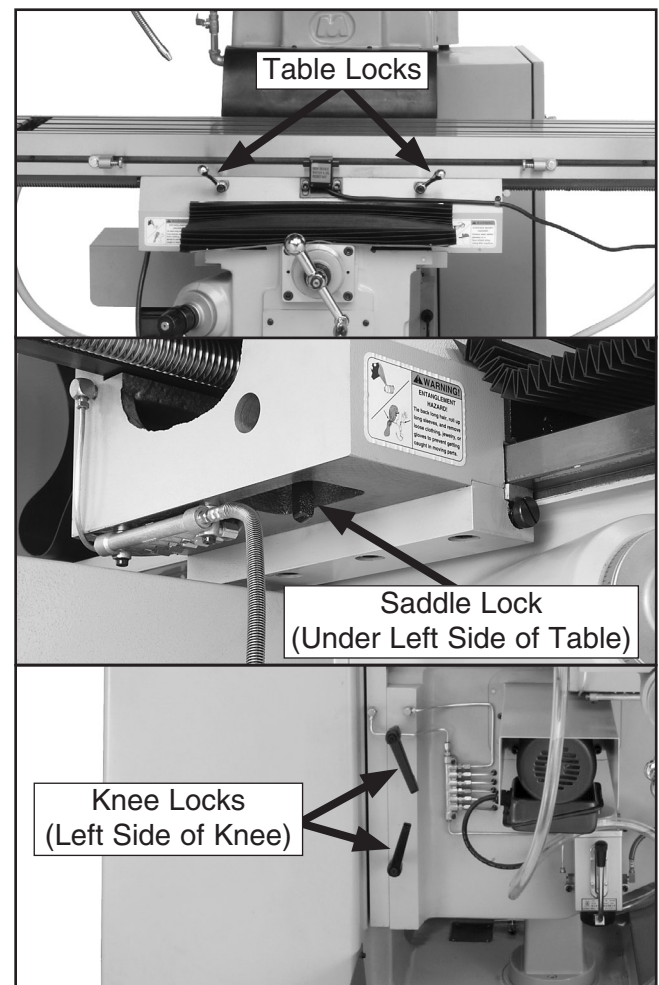
The graduated dial above the knee crank is in increments of 0.001", and the knee will move vertically 0.100" with each full revolution of the crank.

**Note:** When the vertical crank is engaged for manual operation, the safety switch below the crank disables the vertical power feed. Pull the crank out to disengage the safety switch and enable the vertical power feed.

## CAUTION

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

Use the table, saddle, and knee locks shown in **Figure 26** to secure the table in position.

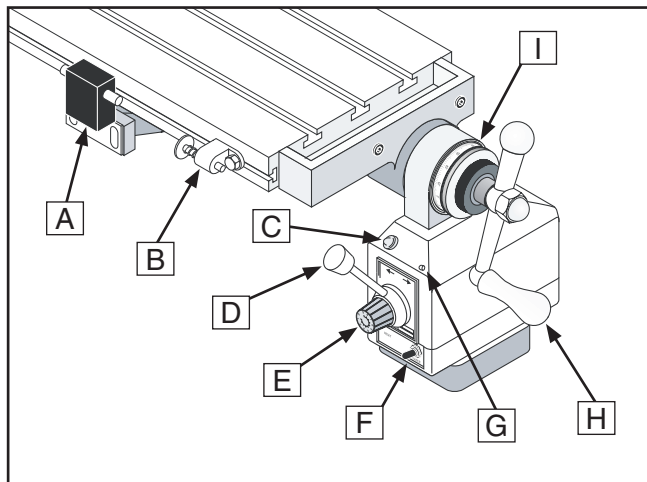


**Figure 26.** Table, saddle, and knee locks.



## Longitudinal Power Feed System

Your mill is equipped with a longitudinal power feed and limit switch for controlled X-axis table movement. Refer to **Figure 27** and the descriptions below to understand the functions of these devices.



**Figure 27.** Longitudinal power feed system.

- A. Limit Switch:** Stops powered table movement when either limit stop presses a plunger on the switch.
- B. Limit Stop:** Activates the limit switch. Secure these devices along the table in the required positions.
- C. Rapid Movement Button:** When pressed, moves the table at the maximum speed in the direction selected.
- D. Direction Lever:** Starts, reverses, and stops longitudinal table movement.
- E. Speed Dial:** Controls the speed that the table moves—turn the dial clockwise to increase the speed.
- F. ON/OFF Switch:** The master power switch for the power feed.
- G. Power Lamp:** Lights when the power feed is turned **ON**.
- H. Ball Handle:** Manually positions the table.
- I. Graduated Dial:** Marked in 0.001" increments, each complete revolution is equal to 0.200" of longitudinal table travel.

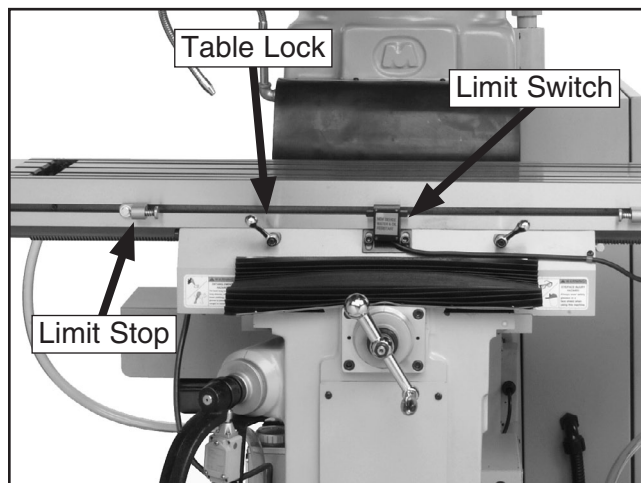
## ⚠ CAUTION

Stay away from the spinning longitudinal ball handles when using the power feed to avoid entanglement and personal injury.

**Tools Needed** Qty  
Wrench 12mm ..... 1

**To operate the longitudinal power feed:**

1. Loosen the table locks (see **Figure 28**).



**Figure 28.** Table lock, limit switch, and limit stop.

2. Position the limit stops along the table to confine the longitudinal distance you want the table to travel, then tighten the hex bolts to secure them in place.
3. Move the power feed direction lever to the center or neutral position, then plug the power feed power cord into one of the 110V outlets on the back of the electrical cabinet.

## ⚠ CAUTION

Be sure there is enough running clearance between the table, spindle, vise/clamps, or jigs before turning the power feed **ON**. Be aware that all of these objects represent potential pinch points.

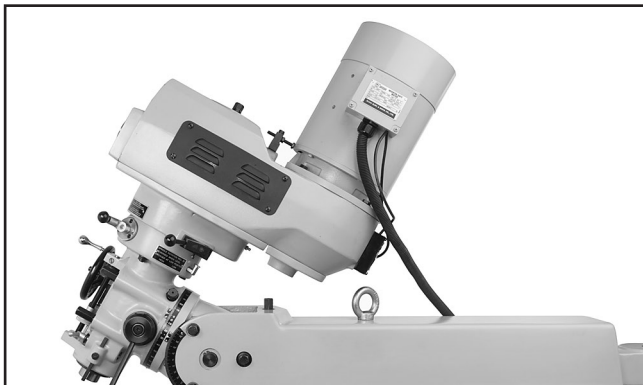
4. Rotate the speed dial all the way to the left, then use the direction lever to select the direction of table travel.
5. Flip the ON/OFF switch up to turn the power feed **ON**.
6. Adjust the speed dial to move the table at the correct speed for your operation.

**Note:** Power feed rates are difficult to precisely adjust. We recommend that you experiment with different dial settings to find the feed rate that best works for your operation.

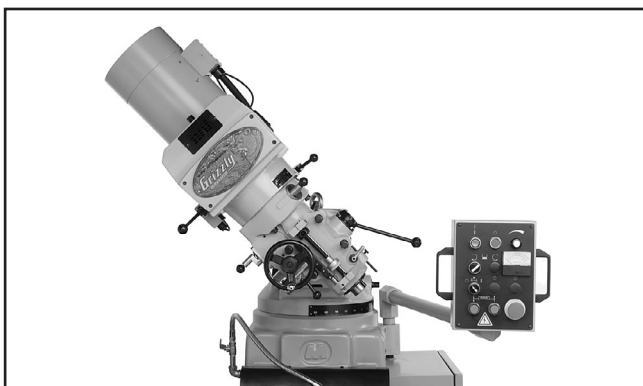
7. When you are through using the power feed, move the direction lever to the center neutral position, then flip the ON/OFF switch down to turn the power feed **OFF**.

## Head Movement

The head tilts 45° back-and-forth, and rotates 90° from left-to-right (see **Figures 29–30**).



**Figure 29.** Head tilted 30° back.

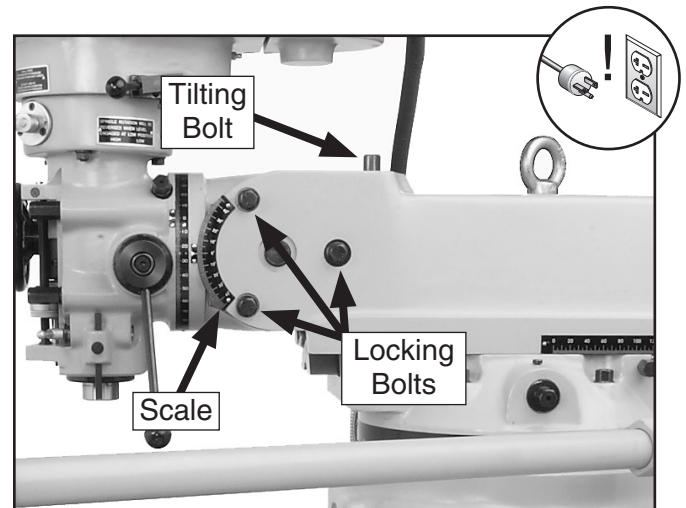


**Figure 30.** Head tilted 45° to the left.

Tools Needed	Qty
Wrench 19mm .....	2

### Tilting the Head

1. DISCONNECT THE MILL FROM POWER!
2. Loosen the three tilt locking bolts shown in **Figure 31**.



**Figure 31.** Head tilting bolts.

3. With one hand helping to support the weight of the head, slowly rotate the tilting bolt.

**Note:** Turn the tilting bolt clockwise to move the head forward and counterclockwise to tilt it backward.

4. Re-tighten the locking bolts to secure the head in place.

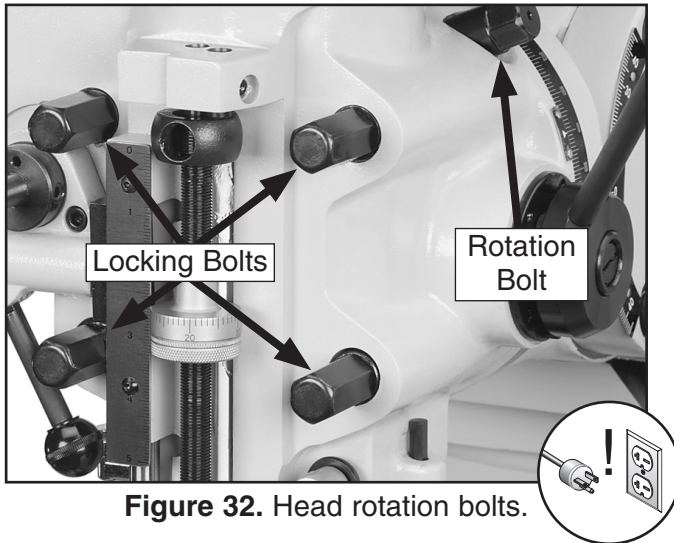
### **CAUTION**

Always lock the head firmly in place after adjusting the tilt or rotation. If the head unexpectedly moves during milling operations, the spinning cutter could bind with the workpiece and break apart, causing personal injury or property damage.



## Rotating the Head

1. DISCONNECT THE MILL FROM POWER!
2. Loosen the four rotation locking bolts shown in **Figure 32**.



**Figure 32.** Head rotation bolts.

3. With one hand helping to support the weight of the head, slowly turn the rotation bolt.

**Note:** Turn the rotation bolt clockwise to move the head to the right and counterclockwise to move it to the left.

4. Re-tighten the locking bolts to secure the head in place.

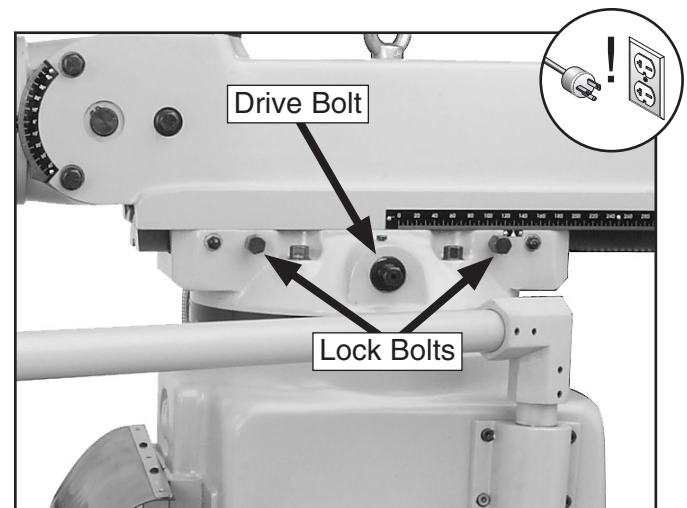
## Ram Movement

The ram moves back and forth horizontally, and rotates 360° around the column.

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

### Moving the Ram Forward/Backward

1. DISCONNECT THE MILL FROM POWER!
2. Loosen the two horizontal lock bolts shown in **Figure 33**.



**Figure 33.** Ram horizontal lock bolts and drive bolt.

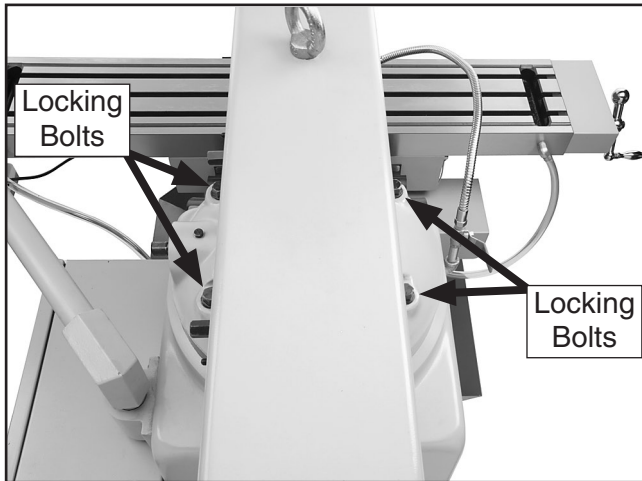
3. Slowly turn the horizontal drive bolt to move the ram to the desired position.
4. Re-tighten the horizontal lock bolts to secure the ram in place.

## ⚠ CAUTION

Always lock the ram firmly in place after adjusting its position. If the ram and head move unexpectedly during milling operations, the cutter could bind with the workpiece and break apart, resulting in personal injury or property damage.

## Rotating the Ram

1. DISCONNECT THE MILL FROM POWER!
2. Loosen the four rotation locking bolts on top of the column shown in **Figure 34**.



**Figure 34.** Ram rotation locking bolts.

3. Manually rotate the ram around the column to the desired position.

**Note:** Take care not to entangle or stretch the electrical cabling as you move the ram and head.

4. Re-tighten the four rotation locking bolts to hold the ram in place.

## Setting Spindle RPM

To select the correct spindle RPM for your milling operation, you will need to: 1) Determine the RPM needed for your workpiece, 2) select the correct spindle speed range, and 3) configure the spindle speed controls for the calculated RPM.

### Calculating RPM

1. Use the table in **Figure 35** to determine the cutting speed 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 35.** 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 RPM for your operation:

$$\frac{\text{Cutting Speed (SFM)} \times 4}{\text{Tool Diameter (in inches)}} = \text{RPM}$$

### Selecting Spindle Speed Range

1. Make sure the spindle motor is turned **OFF**, and the spindle is stopped.
2. Select the range in the chart below that includes the spindle speed that you have calculated for your workpiece.

Range	RPM
Low Range	75–520
High Range	520–4200

Figure 36. Spindle speed ranges.

## NOTICE

To avoid damage to the drive system, make sure the spindle motor is turned **OFF** and the spindle is stopped **BEFORE** you change the *spindle speed range*.

3. Press the selector handle in toward the head to retract the locking pin and move it. Make sure the locking pin is seated in the indent for the position you have chosen (see **Figure 37**).

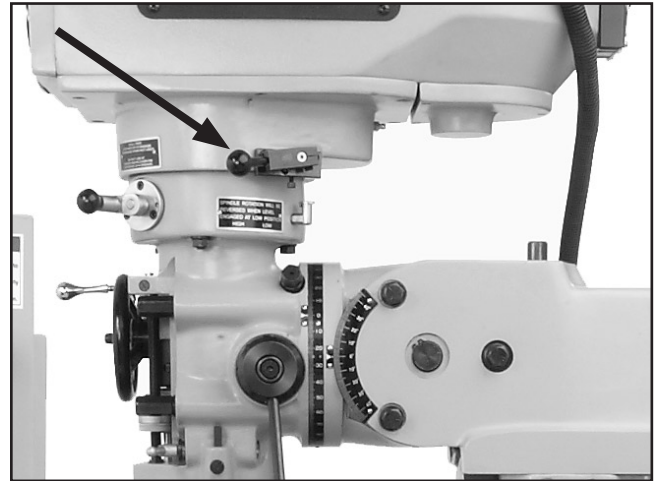


Figure 37. Spindle speed range selector in the HIGH position.

**Note:** As you move the selector, it may be necessary to rotate the spindle by hand to jog and mesh the gearing.

### Setting Spindle Variable Speed

1. With the spindle in motion, rotate the spindle speed dial on the control panel until the spindle has reached the desired speed as indicated by the spindle speed readout.

**Note:** The top numbers of the spindle speed readout are for the high speed range, and the bottom numbers are for the low speed range.

## NOTICE

Always have the spindle in motion **BEFORE** using the *spindle speed dial* to avoid damage to the variable speed system.

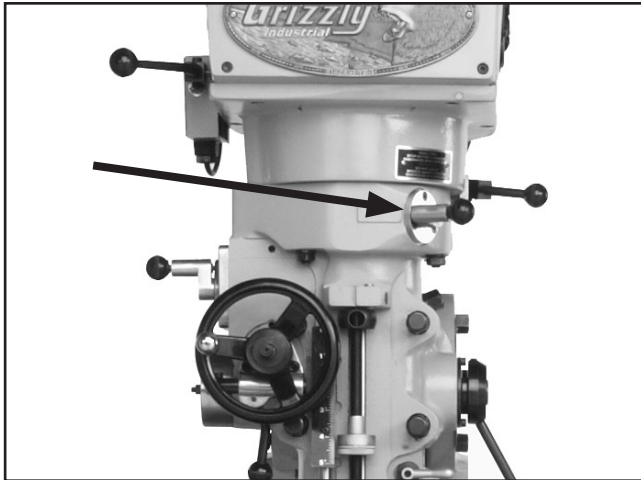


# Downfeed Controls

The quill downfeed movement is controlled by three mechanisms: 1) The coarse downfeed handle, 2) the fine downfeed handwheel, and 3) the quill auto-downfeed system.

## Coarse Downfeed Handle

1. Turn the spindle motor **OFF** and wait for the spindle to stop.
2. Pull the quill auto-downfeed selector knob out and rotate it clockwise to the DISENGAGE (forward) position (see **Figure 38**).



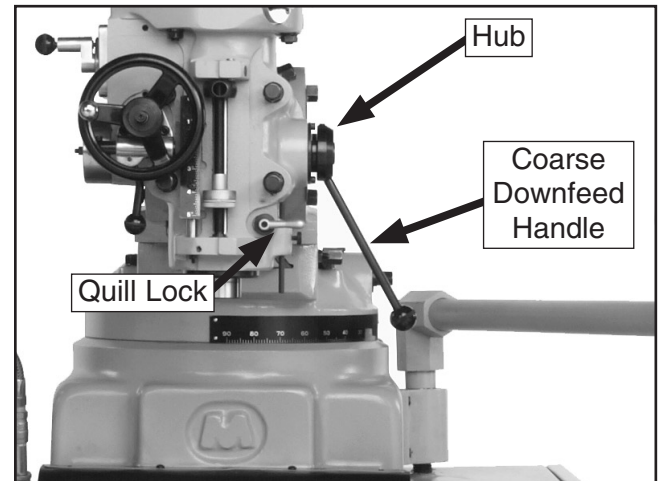
**Figure 38.** Quill auto-downfeed selector in the DISENGAGE (forward) position.

## **NOTICE**

To avoid damage to the quill auto-downfeed gearing, always rotate the selector **CLOCKWISE**.

3. Align the pin in the handle hub with one of the holes in the handle base, then firmly seat the handle into the base (see **Figure 39**).

**Note:** If necessary, use the set screw on the hub of the handle to adjust the detent ball tension pressure so that the handle can be installed and removed easily.

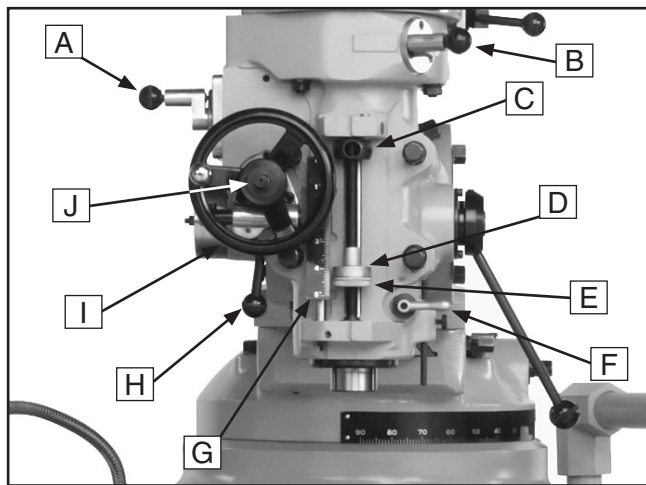


**Figure 39.** Coarse downfeed handle installed.

4. Make sure the quill lock is loose (see **Figure 39**), then rotate the coarse downfeed handle around its hub to control the depth of the spindle.

## Fine & Auto-Downfeed Components

There are a number of devices that are used for fine downfeed and quill auto-downfeed control. Use **Figure 40** and the descriptions below to understand the functions of these devices.



**Figure 40.** Fine downfeed and quill auto-downfeed system components.

- A. Auto-Downfeed Rate Selector:** Selects one of three auto-downfeed rates.
- B. Quill Auto-Downfeed Selector:** Changes downfeed control between manual downfeed or auto-downfeed.
- C. Quill Dog:** Disengages the auto-downfeed clutch lever as it moves with the quill to stop or reverse quill movement.
- D. Auto-Downfeed Stop:** Sets the maximum depth of the quill.
- E. Auto-Downfeed Stop Lock:** Locks the auto-downfeed stop in position.
- F. Quill Lock:** Locks the quill in position.
- G. Auto-Downfeed Scale:** Shows the position of the auto-downfeed stop (marked in inches).
- H. Auto-Downfeed Clutch Lever:** Engages the auto-downfeed gearing to move the quill.

- I. Fine Downfeed Handwheel:** Moves the quill approximately  $\frac{1}{30}$  of the distance that the coarse downfeed handles moves it.
- J. Auto-Downfeed Direction Pin:** Starts (in or out), stops (middle), or reverses direction of the quill when in auto-downfeed mode.

## Quill Auto-Downfeed

1. Turn the spindle motor **OFF**, and wait for the spindle to stop.
2. Rotate the quill auto-downfeed selector clockwise to the ENGAGE (rear) position.
3. Adjust the auto-downfeed stop to the desired depth, then lock it in place.

**Note:** *The increments marked on the auto-downfeed stop represent 0.001" of quill movement, with one full revolution equal to 0.010" of quill movement.*

4. Move the auto-downfeed direction pin to the center (neutral) position.

**Note:** *The auto-downfeed direction pin has three positions—in, center, and out. Moving the pin to the in or out positions will start or reverse quill movement. Move it to the center position to stop the quill movement.*

5. Position the auto-downfeed clutch lever to the right so that the gearing is disengaged.
6. Turn the spindle motor **ON** and start spindle rotation.
7. Move the auto-downfeed rate selector to the setting that is correct for your operation.

*Continued on next page* →

8. Push or pull the auto-downfeed direction pin to select the desired direction of quill movement.

## **NOTICE**

**When the spindle speed range is changed, the rotation direction of the spindle will reverse and so will the direction of the quill when in auto-downfeed mode.**

9. Move the auto-downfeed clutch lever to the left to engage the auto-downfeed gears and move the quill.

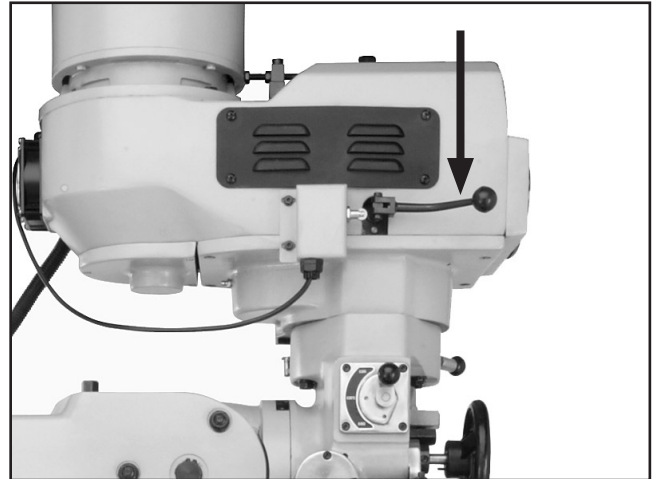
**Note:** *If the quill movement is downward, the quill will automatically return to the top when the quill dog engages the auto-downfeed stop and disengages the gearing. If the quill movement is upward, quill movement will automatically stop when the quill dog reaches the top.*

## **NOTICE**

**Never use the quill auto-downfeed for spindle speeds over 2500 RPM to avoid damage to the system gearing.**

# Emergency Spindle Brake

Pull the emergency spindle brake handle down to turn the spindle motor **OFF** and stop spindle rotation (see **Figure 41**).



**Figure 41.** Emergency spindle brake on the left side of the head.

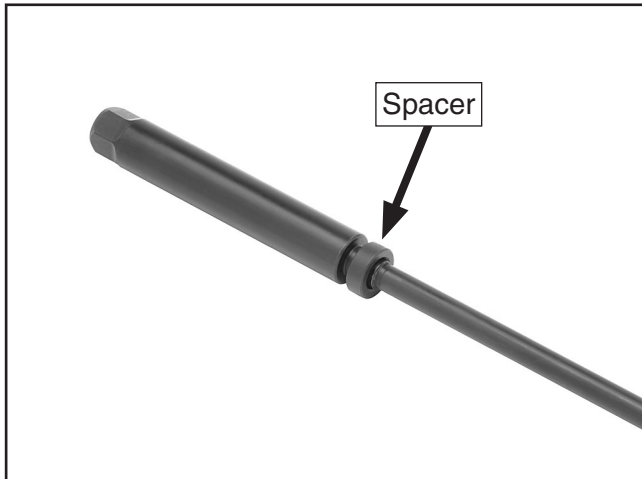
## **⚠️ WARNING**

**Using the emergency spindle brake DOES NOT disconnect the mill from power! To avoid the risk of serious personal injury from electric shock, you must pull the plug or use the circuit breaker to disconnect the mill from power before performing adjustments, setup, or service.**



# Loading/Unloading Tooling

Your mill is equipped with a  $\frac{7}{16}$ "-20 x 23 $\frac{1}{2}$ " drawbar that includes one spacer for tool attachment flexibility (see **Figure 42**).



**Figure 42.** Drawbar and spacer.

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.
3. Tighten the quill lock to keep the spindle from rotating.
4. Align the tool keyway with the protruding set screw inside the spindle, then push the tool firmly into the spindle taper to seat it.

## ⚠ CAUTION

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

5. Holding the tool in place, insert the drawbar into the top of the head, as shown in **Figure 43**, then thread it into the tool.



**Figure 43.** Drawbar inserted into the head.

6. Only tighten the drawbar into the tool until it is snug.

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

## Unloading Tooling

1. DISCONNECT THE MILL FROM POWER!
2. Tighten the quill lock to keep the spindle from rotating.
3. Keep one hand on the tool, then completely unthread the drawbar.

**Note:** *If the tool does not immediately release from the spindle when the drawbar is first loosened, you may need to tap the top of the drawbar with a dead-blow hammer or rubber mallet.*

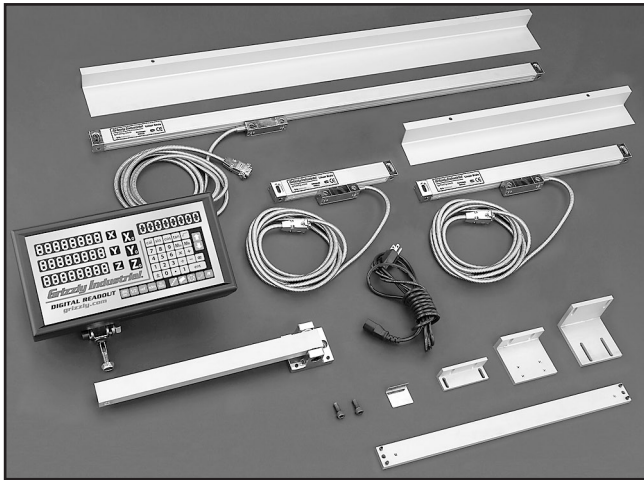
# SECTION 5: ACCESSORIES

**H6089—2 Axis Digital Read Out  
(12" x 30")**

**H6093—3 Axis Digital Read Out  
(12" x 30" x 5")**

**H7850—3 Axis Digital Read Out  
(12" x 30" x 16<sup>3</sup>/<sub>4</sub>")**

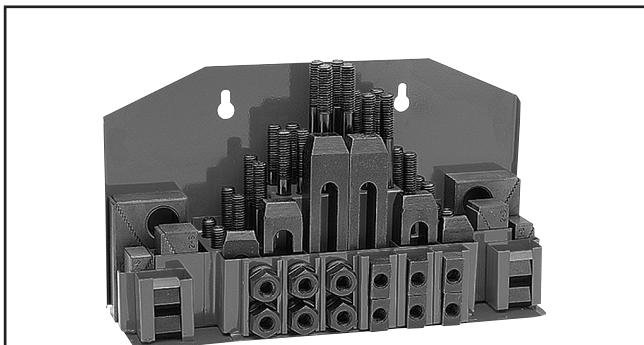
You will be amazed the list of features for these DROs that include: selectable resolution down to 5 $\mu$ m, absolute/incremental coordinate display, arc function, line of holes function, angled cuts function, 199 user defined datum points, centering/cutter offset, double sealed scales, inches/millimeters,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



**Figure 44.** 3 Axis Digital Read Out.

**G1076—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 5/8" T-slots.



**Figure 45.** G1076 52-PC. Clamping Kit.

**H8257—Primrose Armor Plate with Moly-D Machine and Way Oil 1-Quart**

- Prevents stick slip and chatter due to superior anti-friction capabilities resulting in greater precision.
- Provides the thinnest oil film possible while effectively providing needed lubrication.
- Superior rust and corrosion protection.
- Adhesive/cohesive additive components for vertical surfaces.
- Resists squeeze out, running, dripping, and is non-gumming.



**Figure 46.** H8257 Primrose Armor Plate with Moly-D.

**H8368—Electric Power Drawbar**

Reduce your tool changing time to a fraction. This easy-to-use Power Drawbar kit will enable you to make tool changes in a flash on both manual and CNC milling machines. It has enough torque for tapers ranging from R-8 to NT50 and simple installation is supported by complete instructions. Specifications: Motor 220V, 7.5 maximum amperage draw, 2100 RPM, and 240 ft/lbs.



**Figure 47.** H8368 electric power drawbar.

**Call 1-800-523-4777 To Order**



**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>"**

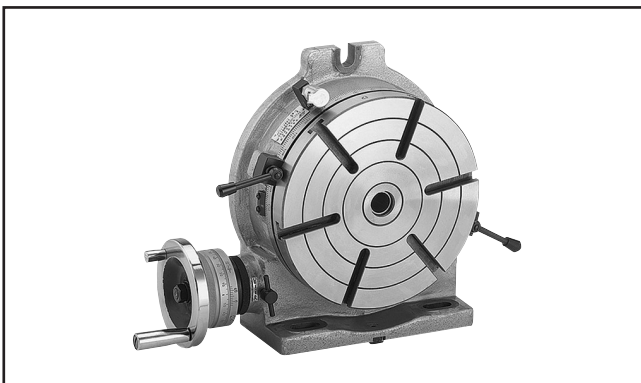
- Ultra precise in flatness, parallelism and verticality.
- Anti-lift mechanism ensures the workpiece does not lift when jaws are tightened.
- Ductile iron body.
- Flame hardened vise bed and jaws.
- Sealed bearing system.
- 8200 lbs. of clamping pressure.



**Figure 48.** 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 49.** G9299 10" Yuasa-Type Rotary Table.

**Call 1-800-523-4777 To Order**

**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 50.** Recommended products for protecting unpainted cast iron/steel part on machinery.

**T20501—Face Shield, 4" Crown, Clear**

**T20502—Face Shield, 7" Crown, Clear**

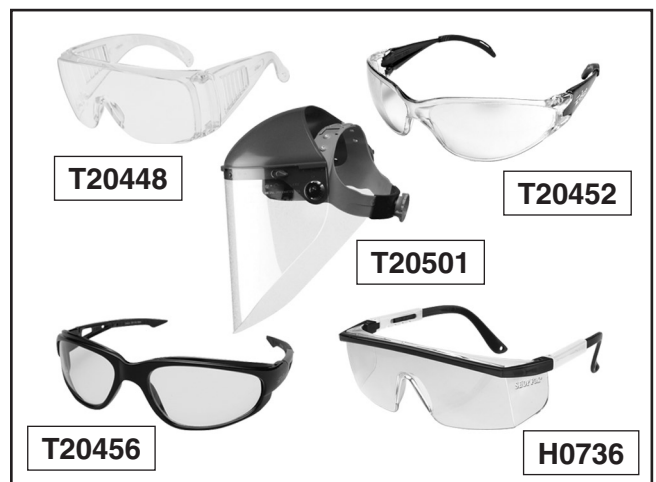
**T20448—Economy Clear Safety Glasses**

**T20452—"Kirova" Anti-Reflective Glasses**

**T20456—"Dakura" Clear Safety Glasses**

**H0736—Shop Fox® Safety Glasses**

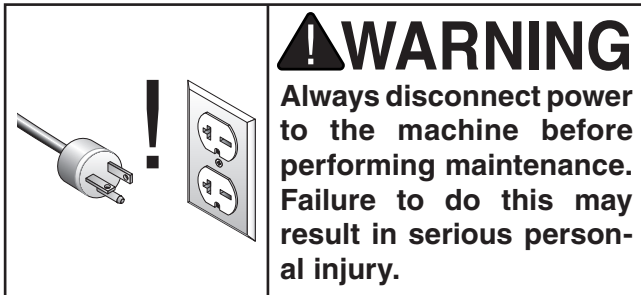
These glasses meet ANSI Z87.1-2003 specifications. Buy extras for visitors or employees. You can't be too careful with shop safety!



**Figure 51.** Our most popular eye protection.

# SECTION 6: MAINTENANCE

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## Schedule

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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/replace damaged tooling.
- Check/repair/replace worn or damaged wires.
- Use one-shot oiler (**Page 38**).
- Check/fill coolant reservoir (**Page 40**).
- Clean the mill of debris and built-up grime.
- Check for any other unsafe condition.

### Every 8 Hours of Operation:

- Use one-shot oiler (**Page 38**).
- Lubricate quill gearing (**Page 38**).

### Every 40 Hours of Operation:

- Lubricate bull and spindle speed range gearing (**Page 38**).
- Lubricate ram way (**Page 39**).
- Lubricate vertical leadscrew bevel gears (**Page 39**).

### Every 120 Hours of Operation:

- Lubricate longitudinal power feed gearing (**Page 39**).
- Empty/clean/refill coolant reservoir (**Page 40**).
- Check/tension high range drive belt (**Page 42**).

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

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## Cleaning and 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.

Clean debris and grime from the coolant return screens on the base of the machine and the fluid slots in the table.

Wipe built-up grime from the mill—use a light application of solvent or mineral spirits if necessary. Remove any rust build-up from the unpainted cast iron surfaces of your mill, and treat them with regular applications of products like G96® Gun Treatment, SLIPIT®, or Boeshield® T-9 (see **Section 5: Accessories** on **Page 35** 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.

## NOTICE

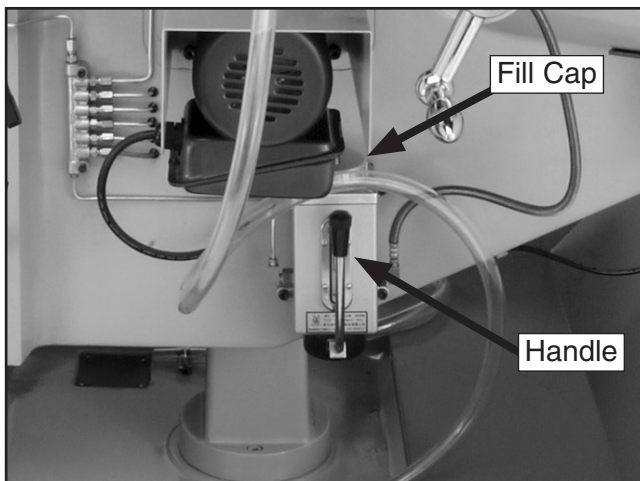
Follow reasonable lubrication practices as outlined in the manual for your mill. Failure to do so could lead to premature failure of your mill and will void the warranty.

### One-Shot Oiler

Lubricant	Frequency	Qty
ISO 68 SAE 20W Bearing and Gear Lubricant	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, as well the longitudinal, cross feed, and vertical leadscrews.

Pull the handle (see **Figure 52**) and release it to send the lubricant through the lines.

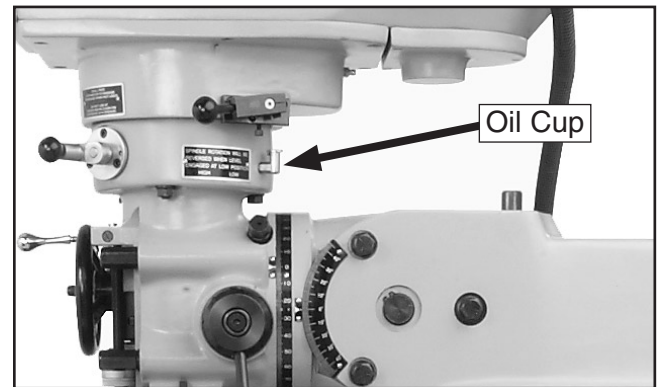


**Figure 52.** One-shot oiler (on left side of knee).

### Quill Gearing

Lubricant	Frequency	Qty
ISO 68 SAE 20W Bearing and Gear Lubricant	Every 8 Hours of Operation	5 Drops

Clean debris and grime from the quill gearing oil cup shown in **Figure 53**, then lift the cap and add the correct amount of lubricant to the cup.

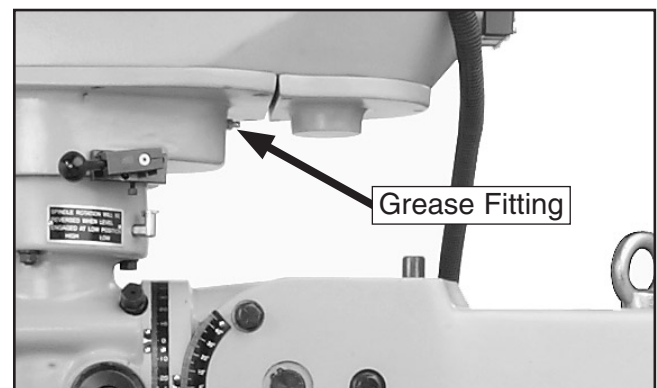


**Figure 53.** Quill gearing oil cup on right side of head.

### Bull & Spindle Speed Range Gearing

Lubricant	Frequency	Qty
Multi-Purpose Gear Grease	Every 40 Hours of Operation	5 Pumps from Grease Gun

Clean debris and grime from the grease fitting shown in **Figure 54**, then use a grease gun to add the correct amount of lubricant to the fitting. Clean off the fitting afterward to keep debris from accumulating.



**Figure 54.** Bull and spindle speed range gearing grease fitting.



## Ram Way

Lubricant	Frequency	Qty
ISO 68 SAE 20W Bearing and Gear Lubricant	Every 40 Hours of Operation	Thin Coat

Move the ram forward and backward as necessary to access the entire length of the ram way (see **Figure 55**). Use mineral spirits and shop rag to wipe the old lubricant and debris from the way surfaces, then brush on a thin coat of lubricant.

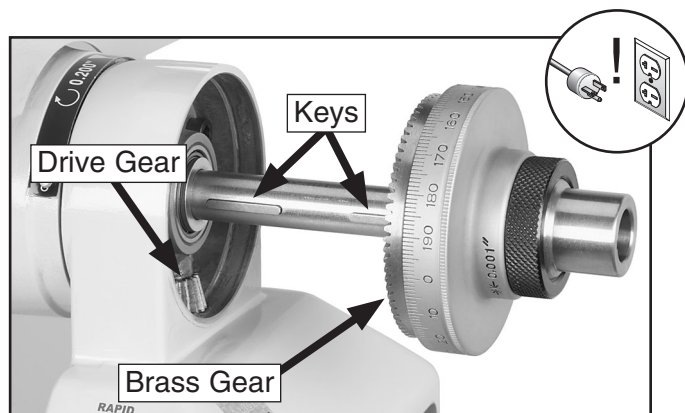


**Figure 55.** Ram way.

## Longitudinal Power Feed Gearing

Lubricant	Frequency	Qty
Multi-Purpose Gear Grease	Every 120 Hours of Operation	Thin Coat

Remove the right longitudinal ball handle, spacers, and leadscrew keys. Slide the graduated dial assembly out from the power feed unit. Apply a thin coat of lubricant to the brass and drive gears shown in **Figure 56**, then re-install the parts in reverse order.

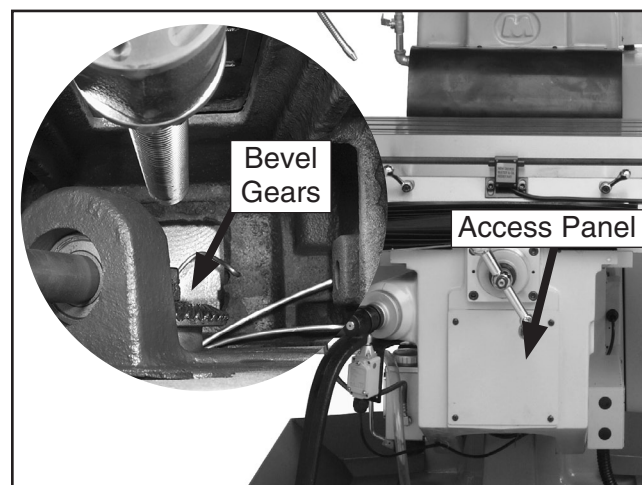


**Figure 56.** Longitudinal power feed gearing.

## Vertical Leadscrew Bevel Gears


Lubricant	Frequency	Qty
Multi-Purpose Gear Grease	Every 40 Hours of Operation	Thin Coat

Open the access panel on the front of the saddle shown in **Figure 57**. Using mineral spirits and a shop rag, reach through the opening and clean old lubricant and debris from the vertical bevel gears. Apply a thin coat of lubricant, then replace the access panel.



**Figure 57.** Vertical leadscrew bevel gears.

# Coolant Reservoir

	<p><b>!WARNING</b></p> <p>Coolant is a potent and extremely poisonous solution to humans and animals. Use personal protective equipment when handling coolant to prevent infections or poisoning.</p>
---	---

A small amount of coolant is lost during normal operation. Check the coolant reservoir regularly and fill it if necessary.

## Checking/Adding Coolant

Tools Needed	Qty
Phillips Screwdriver .....	1

### To check/add coolant:

1. DISCONNECT THE MILL FROM POWER!
2. Clean away debris and grime from the reservoir screen on the base of the mill, then remove it to inspect the level of coolant.
3. If the level of coolant is more than 2" below the top of the reservoir, add more coolant to fill the tank.
4. Replace the reservoir screen and make sure the fluid return hose is secured in position.

## **!WARNING**

The coolant reservoir on this mill is designed to store only coolant. During storage some fluids grow dangerous microbes, or, due to the collection of toxic metal chips in the fluid, the fluid can become a potent and extremely poisonous solution to humans and animals.

Use the correct personal protection equipment when handling coolant to prevent infections and poisoning.

Follow Federal, State, and the coolant manufacturer's requirements to properly dispose of used coolant.

## **NOTICE**

Running the coolant pump without adequate coolant in the reservoir may permanently damage the coolant pump motor. This is considered abuse and is not covered by the warranty.



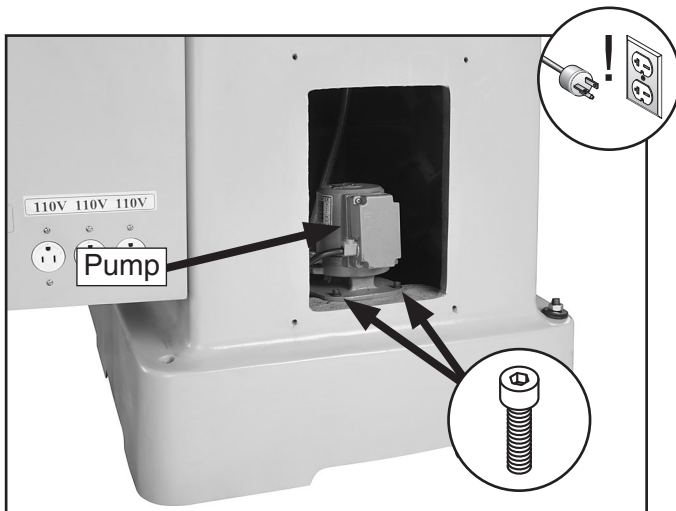
## Changing Coolant

The Model G0669X coolant reservoir holds approximately 7 gallons (26 liters) of fluid. We recommend changing this fluid every three months or sooner if it develops an unpleasant odor.

Tools Needed	Qty
Phillips Screwdriver .....	1
Hex Wrench 5mm.....	1
Catch Pan.....	1

### To change the coolant:

1. DISCONNECT THE MILL FROM POWER!
2. Put on personal protective equipment and remove the pump access panel on the rear of the column.
3. Remove the two pump mounting cap screws and move the pump out of the way (see **Figure 58**).



**Figure 58.** Coolant reservoir pump.

4. Drain the reservoir, then clean any debris and sludge from the reservoir and pump.
5. Replace the pump and access panel.
6. Remove the reservoir screen on the mill base, fill the reservoir with non-flammable water-based coolant, then replace the screen.

## **!**WARNING

Always use non-flammable water-based coolant to avoid explosions when the fluid comes in contact with hot metal chips from the milling operation. For best results, always follow the coolant manufacturer's recommendations for coolant/water ratios.



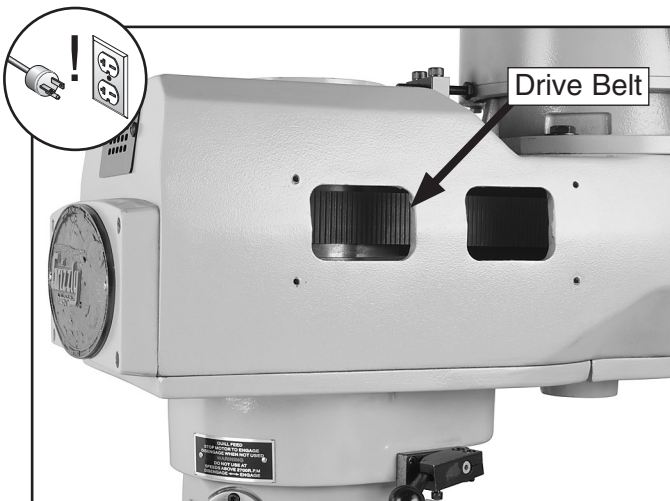
# Drive Belt Tensioning

Power is transferred from the motor to the spindle with a heavy-duty drive 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
Phillips Screwdriver .....	1
Wrench 13mm .....	1
Wrench 17mm.....	1

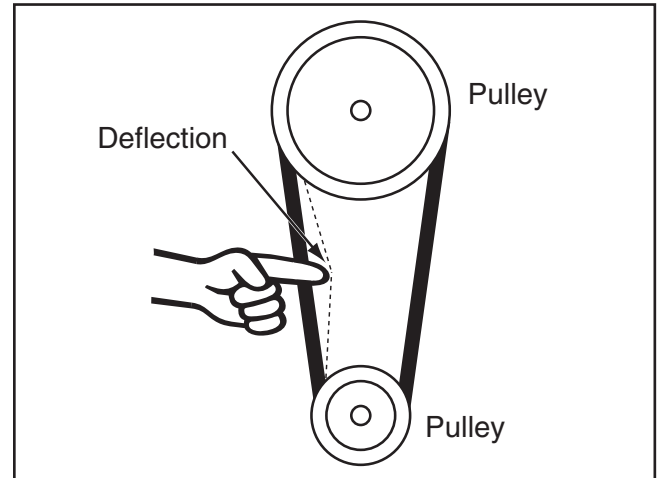
## To check/tension the drive belt:

1. DISCONNECT THE MILL FROM POWER!
2. Remove the belt access panel from the right side of the head (see **Figure 59**).



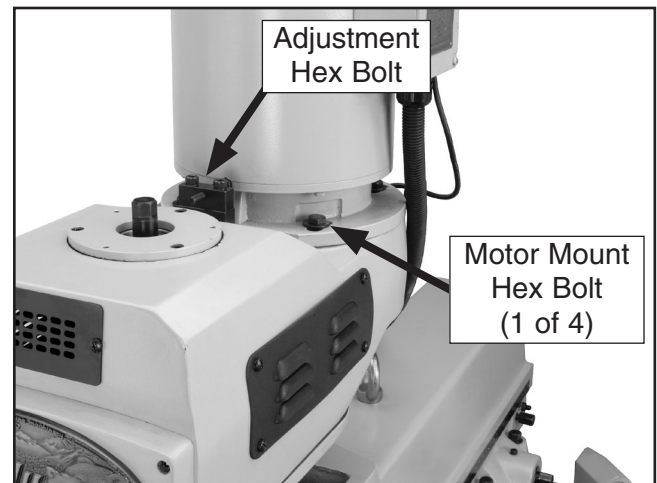
**Figure 59.** Access panel removed to access drive belt.

3. Check the belt tension. When moderate pressure is applied to the belt between the pulleys (see **Figure 60**), there should be approximately  $\frac{1}{2}$ " of belt deflection.



**Figure 60.** Checking for belt deflection.

4. Loosen the four motor mount hex bolts (see **Figure 61**).



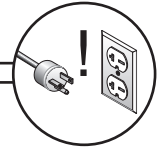
**Figure 61.** Motor mount and drive belt tension adjustment hex bolts.

5. Push the motor back until there is the correct amount of belt deflection, then tighten the adjustment hex bolt in and against the motor mounting plate to secure the setting.
6. Re-tighten the motor mount hex bolts.
7. Re-install the drive belt access panel before beginning milling operations.

# 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

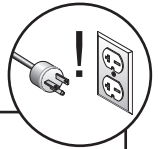


### Motor & Electrical

Symptom	Possible Cause	Possible Solution
Machine does not start or a breaker trips.	<ol style="list-style-type: none"> <li>Emergency stop push-button is engaged or is at fault.</li> <li>Main power switch on electrical cabinet door turned OFF or is at fault.</li> <li>Electrical cabinet door is open engaging safety switch; switch is at fault.</li> <li>Power supply switched OFF or is at fault.</li> <li>Plug/receptacle is at fault or wired incorrectly.</li> <li>Machine fuse has blown.</li> <li>Motor connection wired incorrectly.</li> <li>Relay switch is at fault.</li> <li>Wall fuse/circuit breaker is blown/tripped.</li> <li>Contactator not getting energized/has burnt contacts.</li> <li>Wiring is open/has high resistance.</li> <li>Motor ON button switch is at fault.</li> <li>Transformer is at fault.</li> <li>Motor is at fault.</li> <li>Frequency drive is at fault.</li> </ol>	<ol style="list-style-type: none"> <li>Rotate clockwise slightly until it pops out/replace it.</li> <li>Turn the main power switch ON; replace.</li> <li>Close and secure electrical cabinet door; replace switch.</li> <li>Ensure power supply is switch on; ensure power supply has the correct voltage.</li> <li>Test for good contacts; correct the wiring.</li> <li>Replace fuse.</li> <li>Correct motor wiring connections (<b>Page 55</b>).</li> <li>Replace relay switch.</li> <li>Ensure circuit size is suitable for this machine; replace weak breaker.</li> <li>Test for power on all legs and contactor operation. Replace unit if it is at fault.</li> <li>Check for broken wires or disconnected/corroded connections, and repair/replace as necessary.</li> <li>Replace ON button switch.</li> <li>Test/repair/replace.</li> <li>Test/repair/replace.</li> <li>Test/replace.</li> </ol>
Machine stalls or is overloaded.	<ol style="list-style-type: none"> <li>Feed rate/cutting speed too fast for task.</li> <li>Workpiece alignment is poor.</li> <li>Dull or incorrect cutting tool.</li> <li>Drive belt loose or worn.</li> <li>Gearbox is at fault.</li> <li>Motor connection is wired incorrectly.</li> <li>Plug/receptacle is at fault.</li> <li>Pulley/sprocket slipping on shaft.</li> <li>Motor bearings are at fault.</li> <li>Machine is undersized for the task.</li> </ol>	<ol style="list-style-type: none"> <li>Decrease feed rate/cutting speed.</li> <li>Eliminate workpiece binding; use vise or clamps as required for workpiece alignment control.</li> <li>Use sharp and correct cutting tool for the operation.</li> <li>Re-tension drive belt (<b>Page 42</b>); replace.</li> <li>Select appropriate spindle speed range; replace broken or slipping gears.</li> <li>Correct motor wiring connections.</li> <li>Test for good contacts; correct the wiring.</li> <li>Replace loose pulley/shaft.</li> <li>Test by rotating shaft; rotational grinding/loose shaft requires bearing replacement.</li> <li>Use smaller sharp tooling; reduce the feed rate; reduce the spindle RPM; use coolant.</li> </ol>



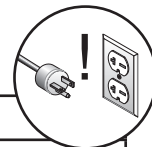
## Motor & Electrical (continued)



Symptom	Possible Cause	Possible Solution
Machine stalls or is overloaded.	<ol style="list-style-type: none"> <li>11. Contactor not getting energized or has poor contacts.</li> <li>12. Motor has overheated.</li> <li>13. Spindle rotation switch at fault.</li> <li>14. Motor is at fault.</li> <li>15. Frequency drive at fault.</li> </ol>	<ol style="list-style-type: none"> <li>11. Test for power on all legs and contactor operation. Replace if at fault.</li> <li>12. Let cool, Clean off motor, and reduce workload.</li> <li>13. Turn switch to FWD/REV; replace bad switch.</li> <li>14. Test/repair/replace.</li> <li>15. Test/replace.</li> </ol>
Machine has vibration or noisy operation.	<ol style="list-style-type: none"> <li>1. Chuck 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. Motor mount loose/broken.</li> <li>6. Machine is incorrectly mounted or sits unevenly.</li> <li>7. Motor fan is rubbing on fan cover.</li> <li>8. Motor bearings are at fault.</li> <li>9. Gearbox is at fault.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace out-of-round chuck; 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.</li> <li>6. Tighten/replace anchor studs in floor; relocate/shim machine.</li> <li>7. Replace dented fan cover; replace loose/damaged fan.</li> <li>8. Test by rotating shaft; rotational grinding/loose shaft requires bearing replacement.</li> <li>9. Rebuild gearbox for bad gear(s)/bearing(s).</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 29</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 29</b>).</li> <li>5. Adjust gibs properly (<b>Page 46</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. Lubricate ways (<b>Page 38</b>).</li> <li>4. Adjust gibs properly (<b>Page 46</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 29</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 46</b>).</li> </ol>
Longitudinal power feed chatters or grinds on operation.	<ol style="list-style-type: none"> <li>1. Bevel gear is loose.</li> <li>2. Power feed unit is at fault.</li> </ol>	<ol style="list-style-type: none"> <li>1. Tighten ball handle hex nut.</li> <li>2. Replace.</li> </ol>
Vertical power feed does not work.	<ol style="list-style-type: none"> <li>1. Vertical crank engaged, tripping safety switch.</li> <li>2. Safety switch/motor at fault.</li> </ol>	<ol style="list-style-type: none"> <li>1. Disengage vertical crank.</li> <li>2. Test/repair/replace.</li> </ol>



# Adjusting Gibs

Gibs control the accuracy of table and ram 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.**

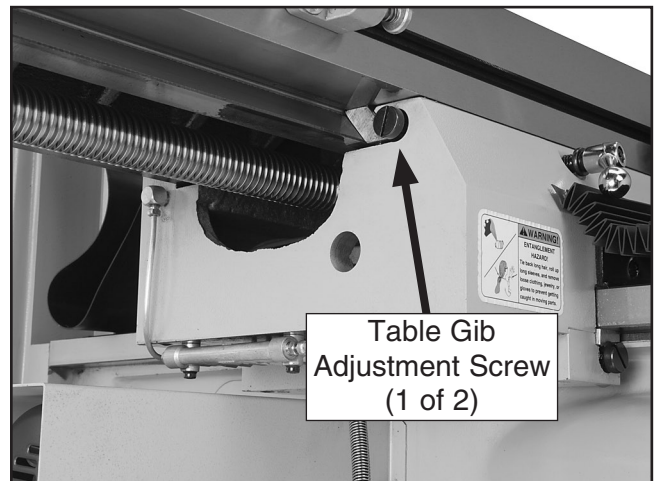
## Table, Saddle, and Knee Gibs

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 of the device. 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 62–64** for the locations of the table, saddle, and knee gib adjustment screws.



**Figure 62.** Table gib adjustment screw (view of left screw).



**Figure 63.** Saddle gib adjustment screw (view of right front screw).



**Figure 64.** Knee gib adjustment screw (view of right top screw).



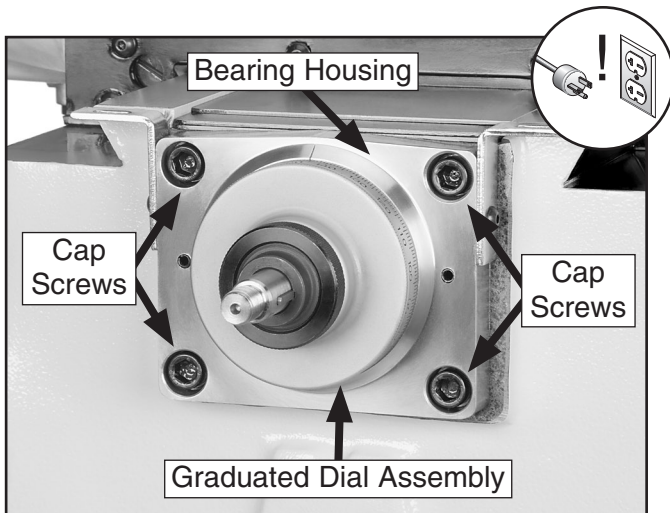
# Adjusting Backlash

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.

Tools Needed	Qty
T-Handle Hex Wrench 5mm.....	1
Hex Wrench 8mm.....	1
Wrench or Socket 19mm.....	1

## To adjust leadscrew backlash:

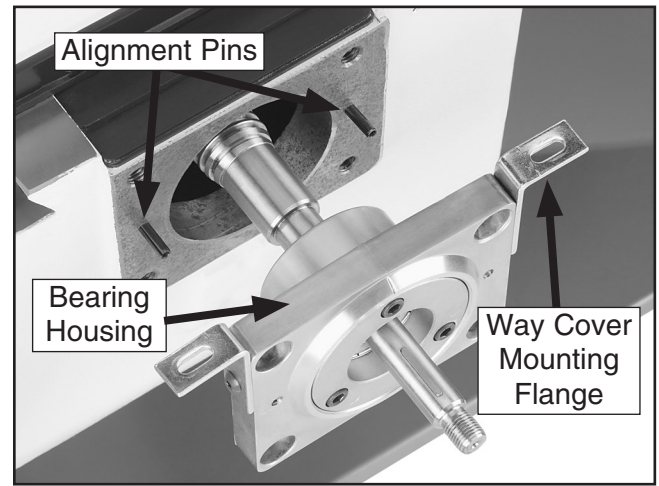
1. DISCONNECT THE MILL FROM POWER!
2. Remove the front way cover.
3. Move the table and saddle all the way forward, then remove the ball handle.
4. Remove the four cap screws shown in **Figure 65** that hold the bearing housing to the saddle.



**Figure 65.** Cross feed graduated dial assembly and bearing housing with ball handle removed.

5. Slide the graduated dial assembly off the leadscrew, then remove the key from the end of the leadscrew.
6. Carefully loosen the bearing housing from the alignment pins, then remove it from the leadscrew (see **Figure 66**).

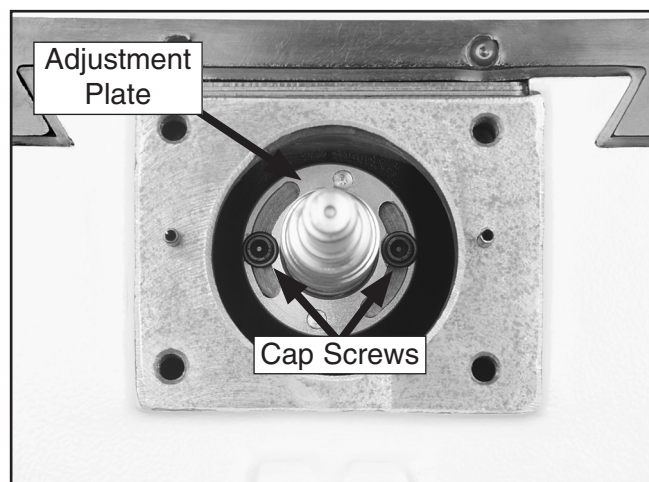
**Note:** If you need to pry the bearing housing loose, do so carefully and evenly from all sides to avoid damaging the bearing and leadscrew.



**Figure 66.** Cross feed bearing housing and alignment pins.



7. Use the T-handle 5mm hex wrench to loosen the two cap screws shown in **Figure 67**.



**Figure 67.** Cross feed leadscrew backlash adjustment plate and cap screws.

8. Rotate the adjustment plate in small increments, then test the backlash.

**Note:** *To test the backlash, re-install the key and ball handle onto the leadscrew.*

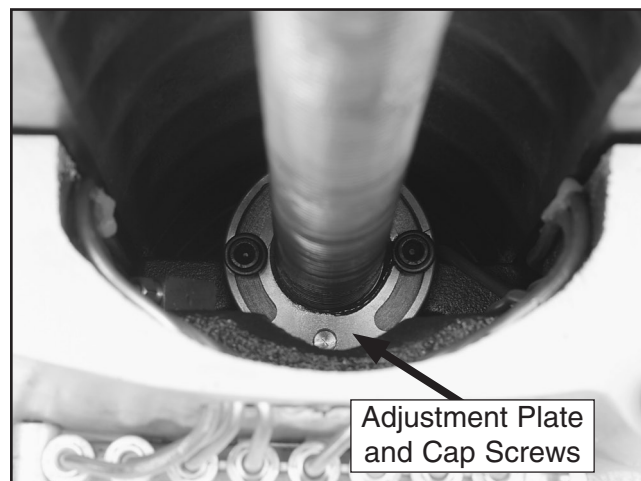
9. When you are satisfied with the amount of backlash, re-tighten the adjustment plate cap screws.

10. Make sure that all mating surfaces are clean from debris and oil, then re-install the bearing housing, key, graduated dial assembly, and ball handle.

**Note:** *When re-installing the bearing housing, make sure the way cover mounting flanges (see **Figure 66**) are on the top for proper alignment.*

*If the bearing housing does not easily slip onto the alignment pins, use light taps from a dead-blow hammer or wooden mallet evenly on all sides of the housing to gradually seat it against the saddle.*

The longitudinal leadscrew backlash is adjusted in the same manner as the cross feed. Refer to **Figure 68** for the location of the longitudinal backlash adjustment plate and cap screws.



**Figure 68.** Longitudinal leadscrew adjustment plate and cap screws as seen from the left side of the table.

# 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 12**. **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.** Electrocutation 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](http://www.grizzly.com).



COLOR KEY	
BLACK	
WHITE	
GREEN	
RED	
YELLOW	
BLUE	
BROWN	
GRAY	
Grn/Ylw	



# Electrical Panel

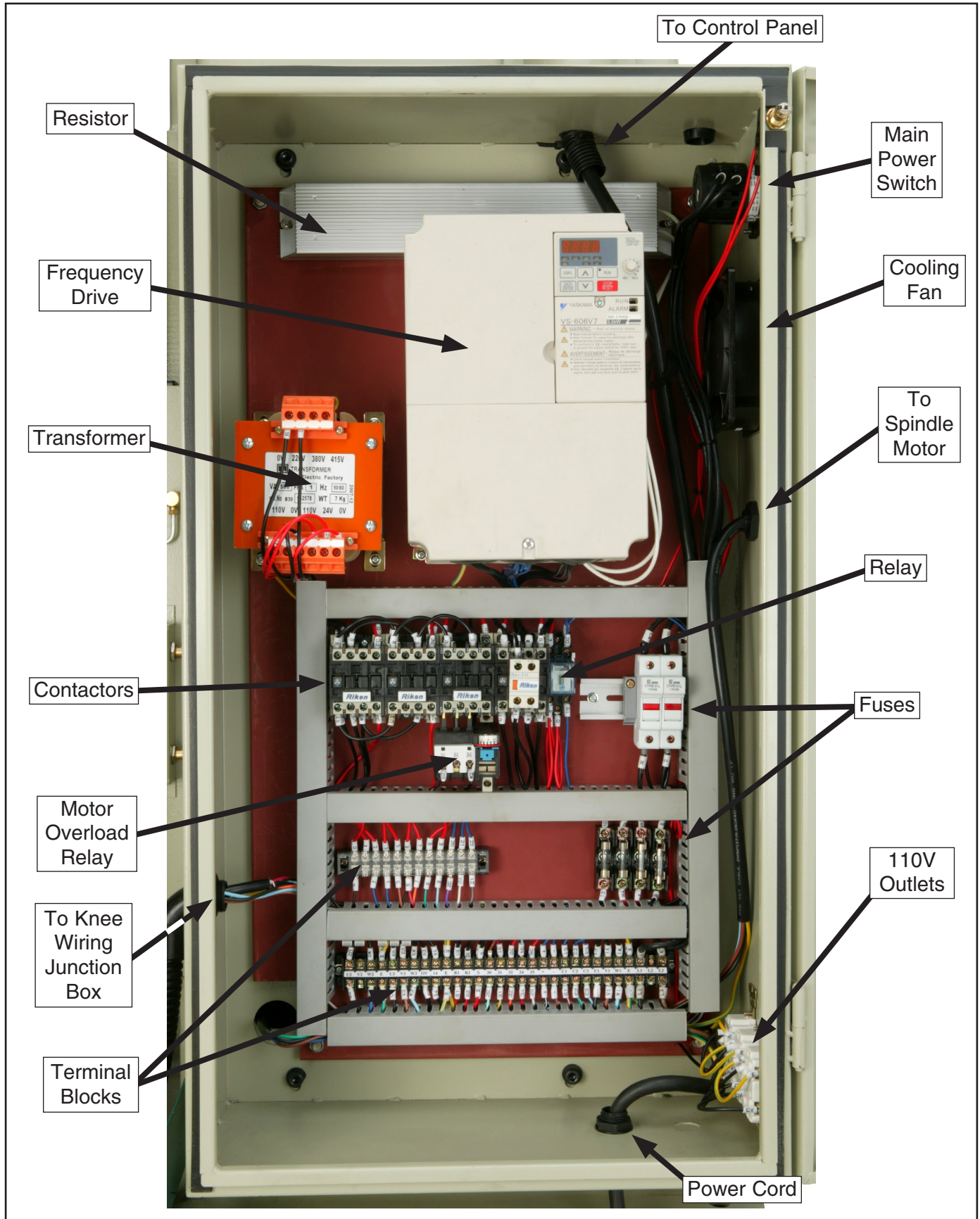
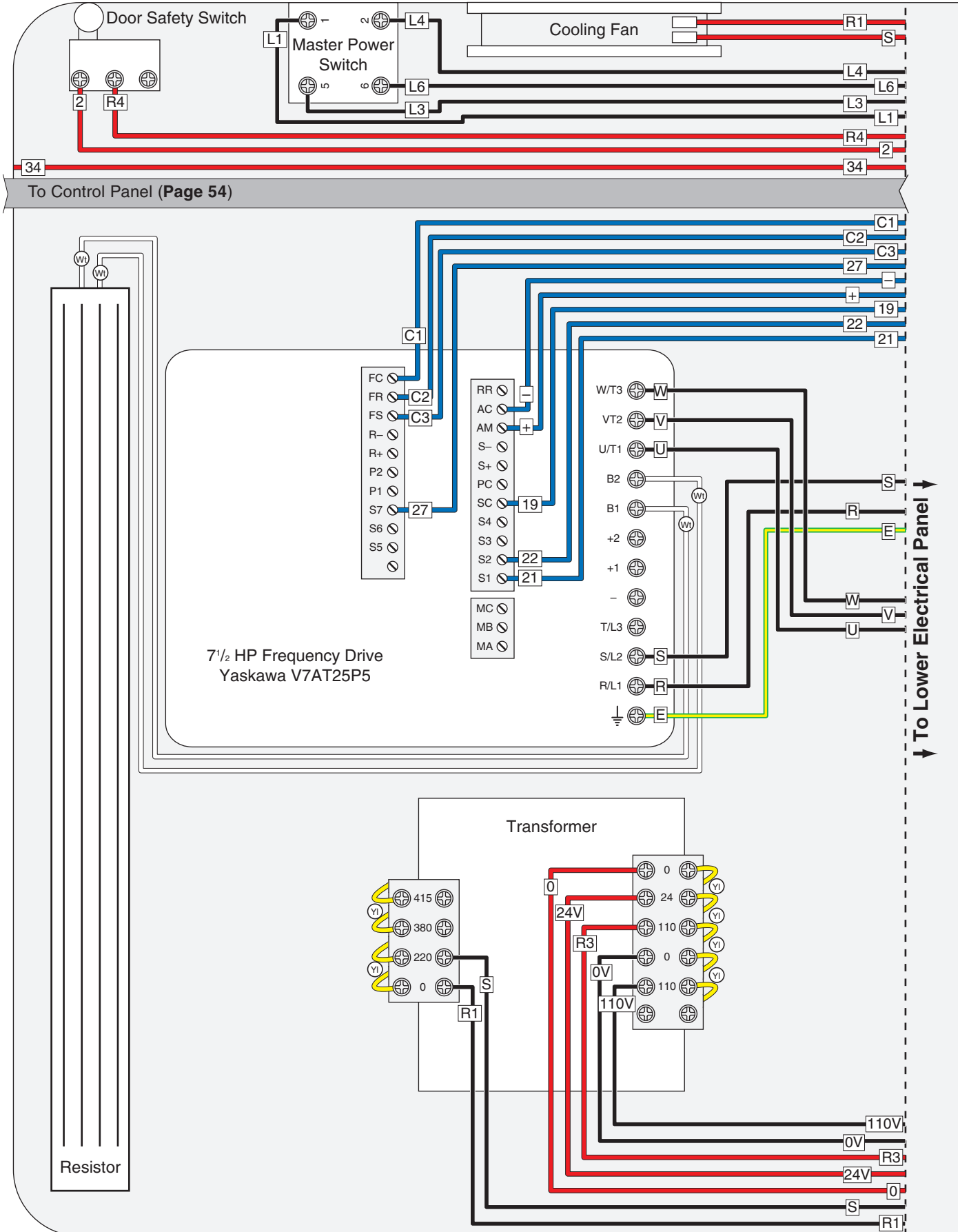


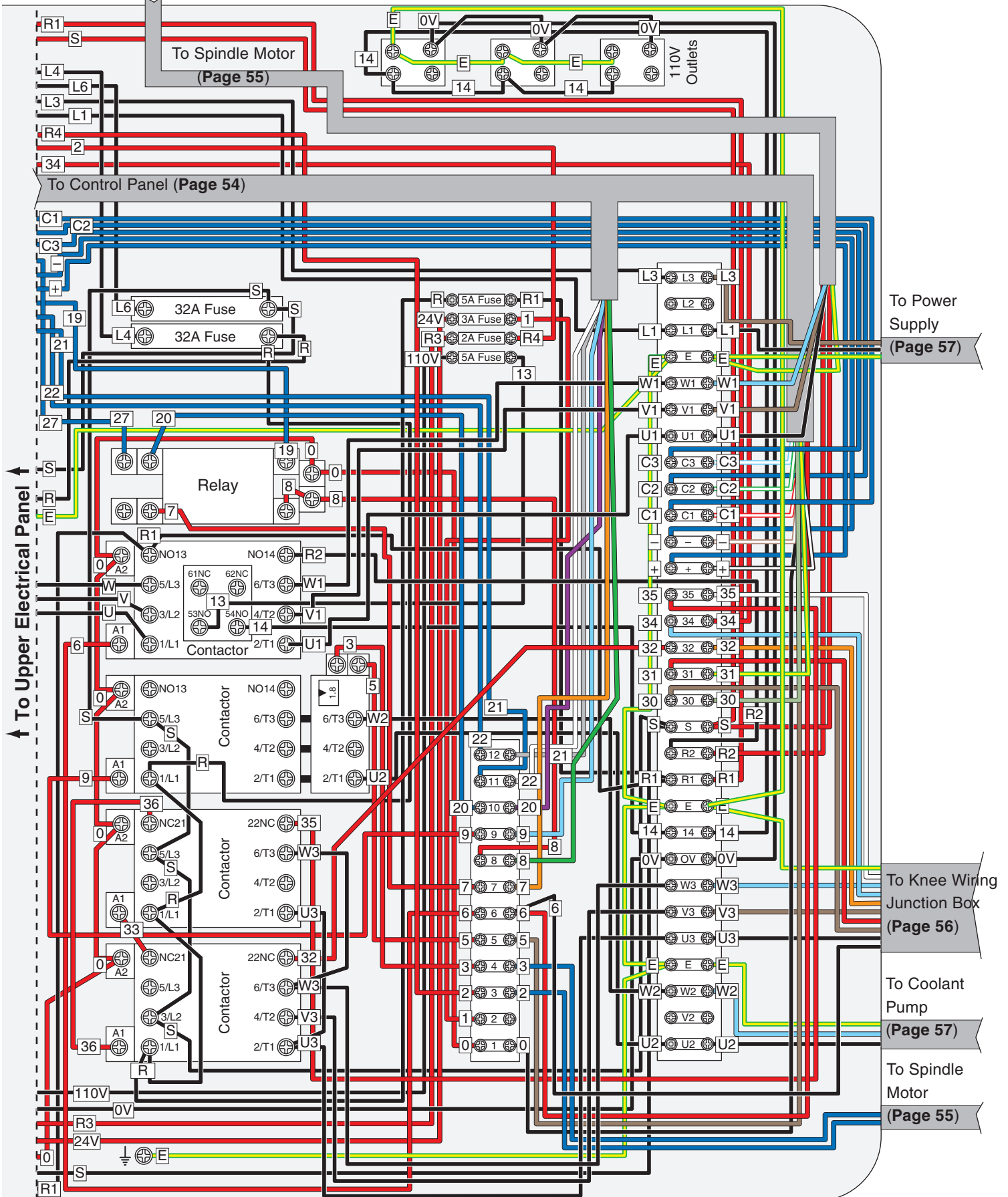
Figure 69. Electrical panel wiring.



# Electrical Panel Wiring Diagram (Upper)



# Electrical Panel Wiring Diagram (Lower)



# Control Panel

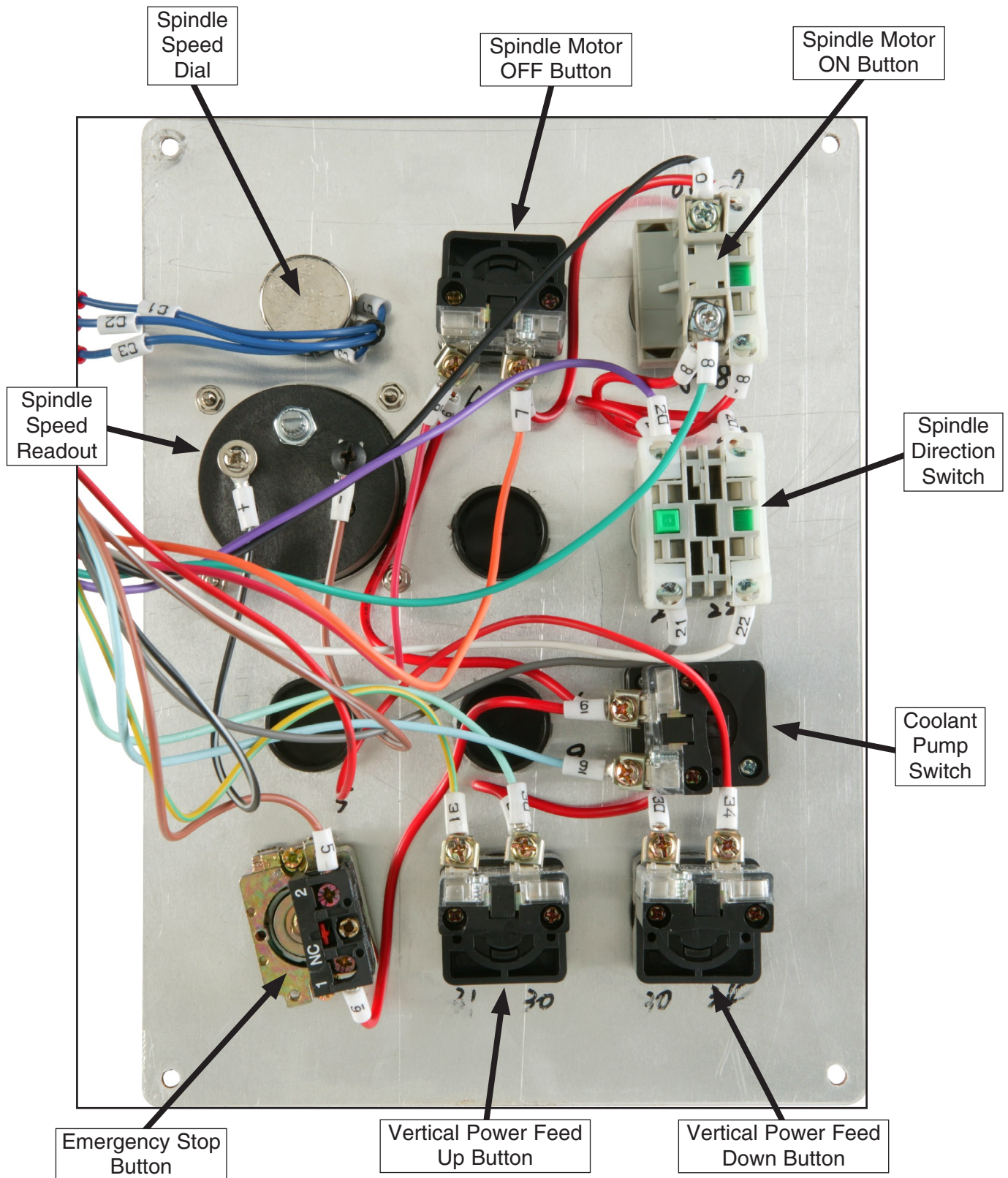
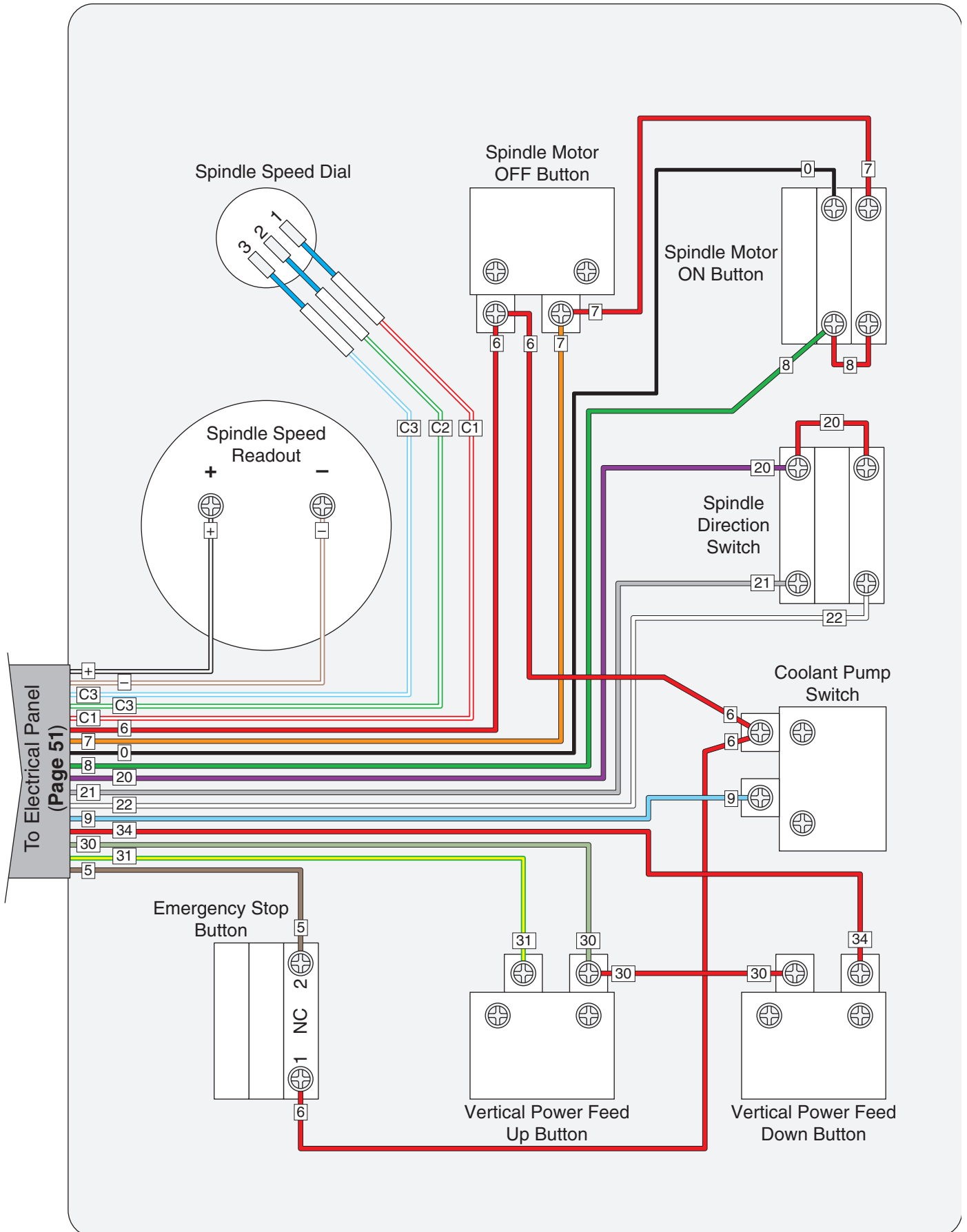


Figure 70. Control panel wiring.



# Control Panel Wiring Diagram





# Spindle & Vertical Power Feed Motors

## Spindle Motor

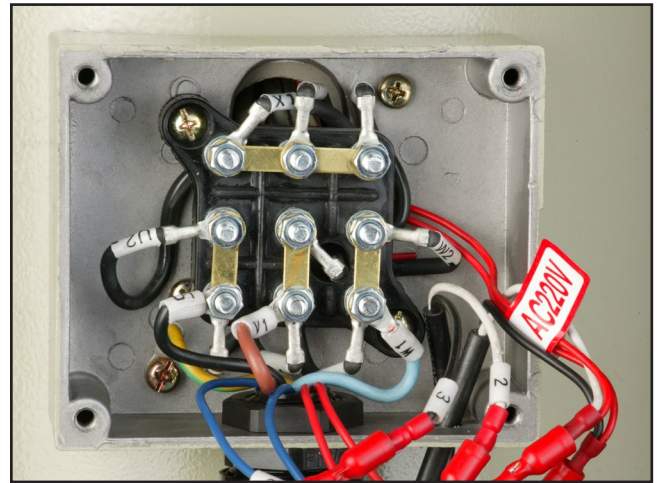
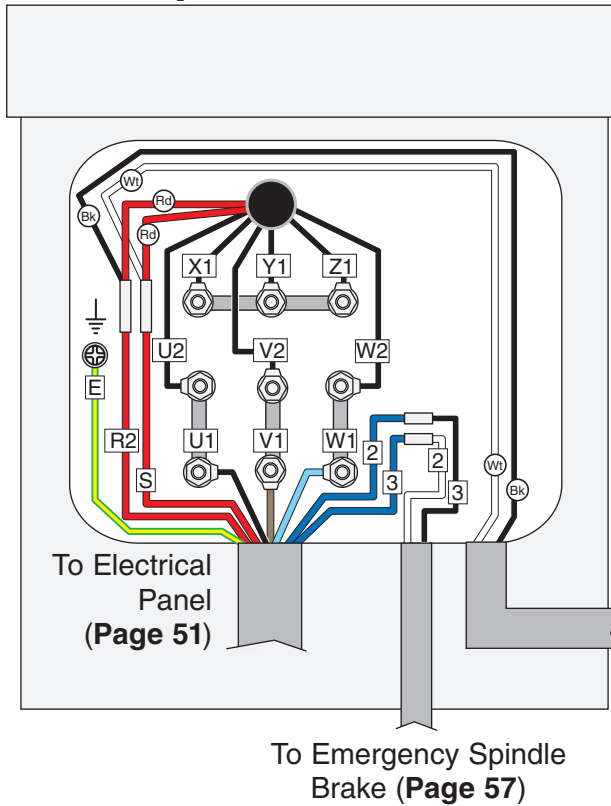


Figure 71. Spindle motor wiring junction box.

## Vertical Power Feed Motor

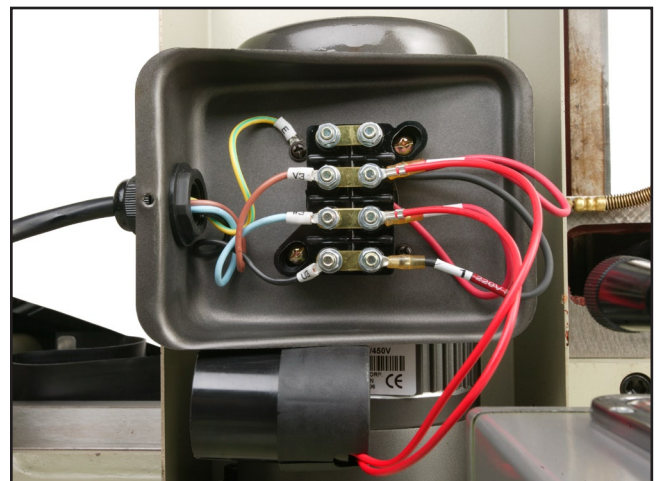
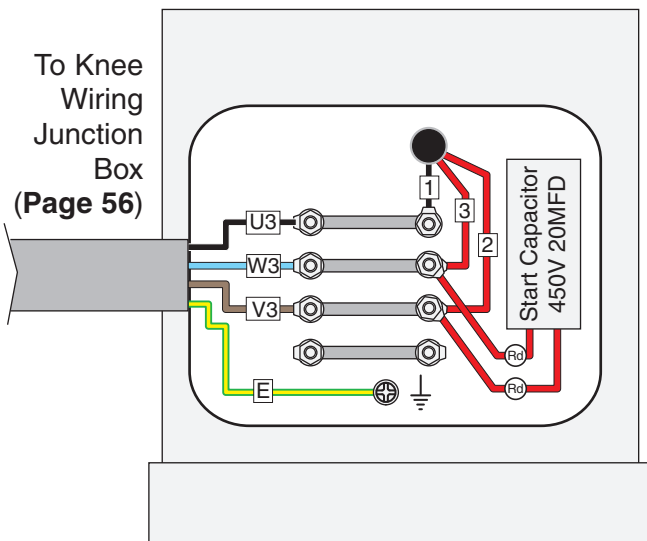


Figure 72. Vertical power feed motor wiring junction box.



# Electrical Components

## Knee Wiring Junction Box

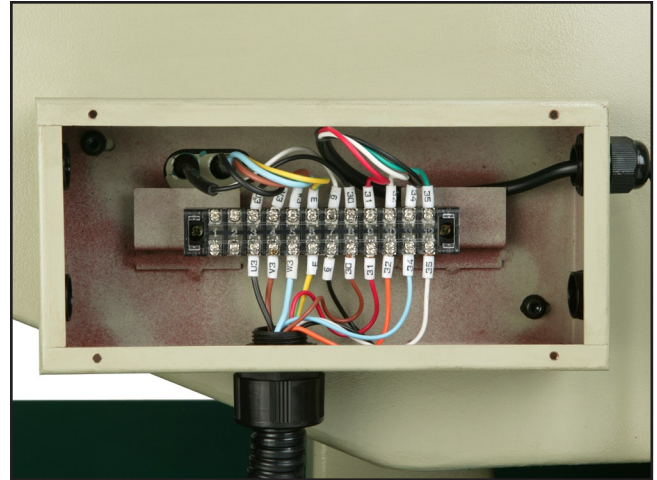
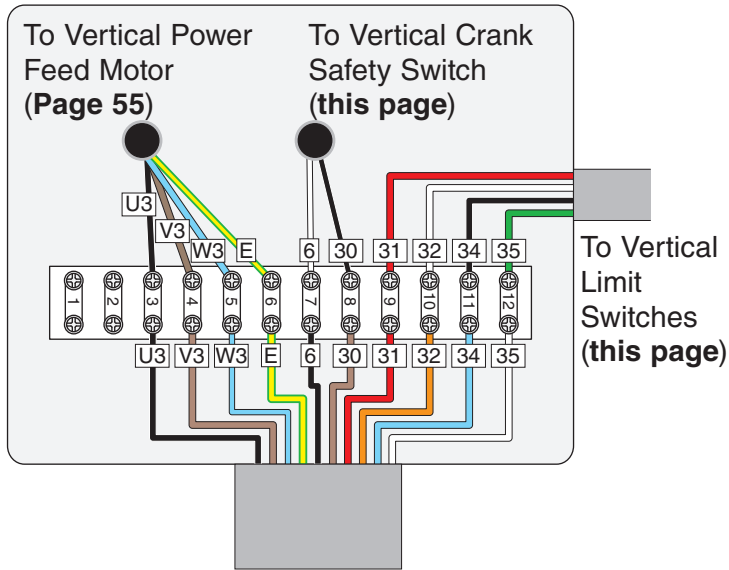


Figure 73. Knee wiring junction box.

## Vertical Crank Safety Switch

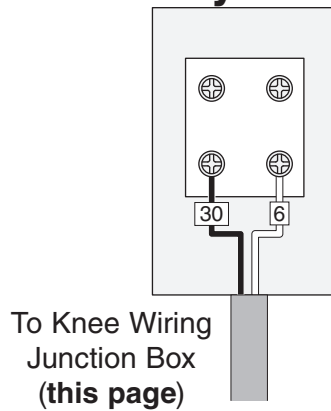


Figure 74. Vertical crank safety switch.

## Vertical Limit Switches

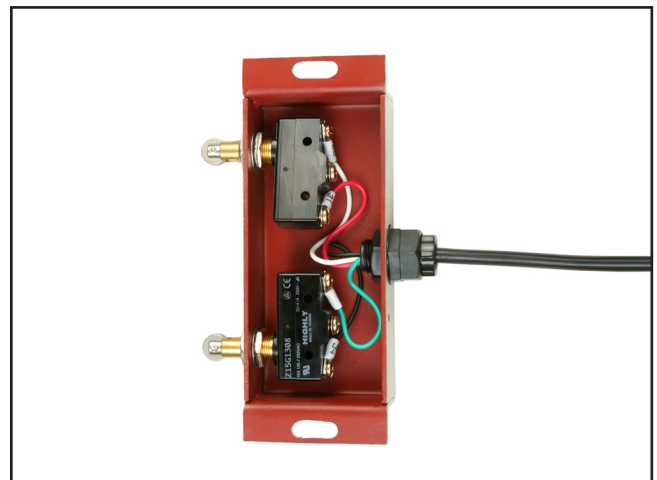
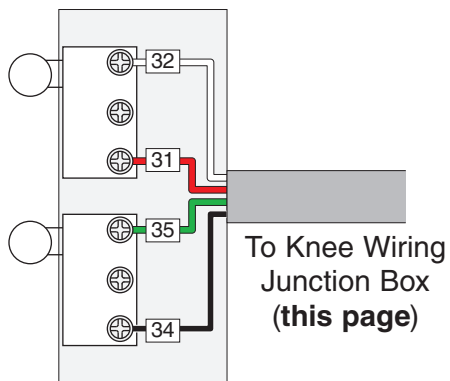


Figure 75. Vertical limit switch wiring.



# Electrical Components

## Coolant Pump

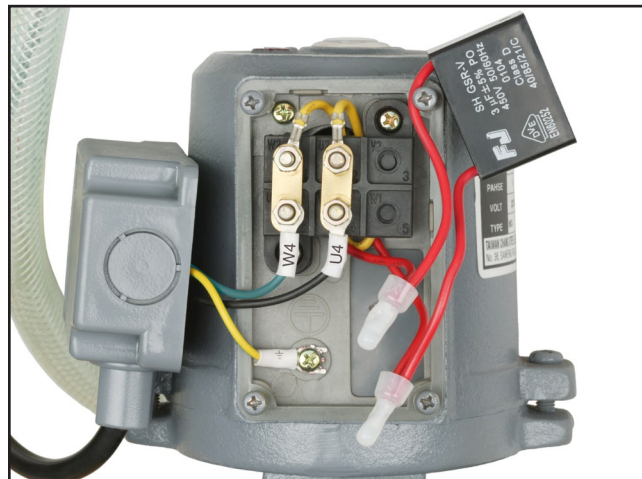
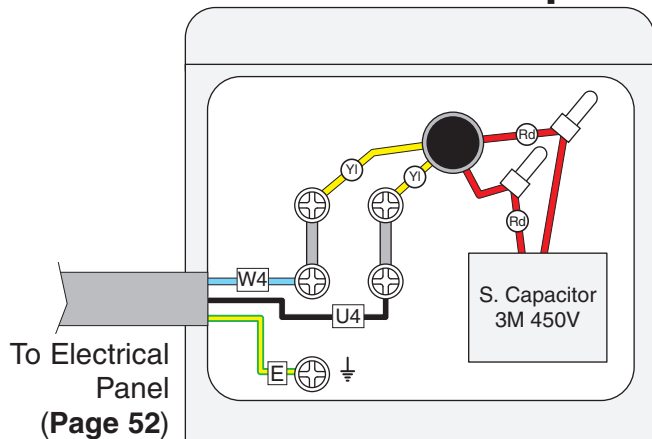


Figure 76. Coolant pump wiring.

## Drive System Cooling Fan

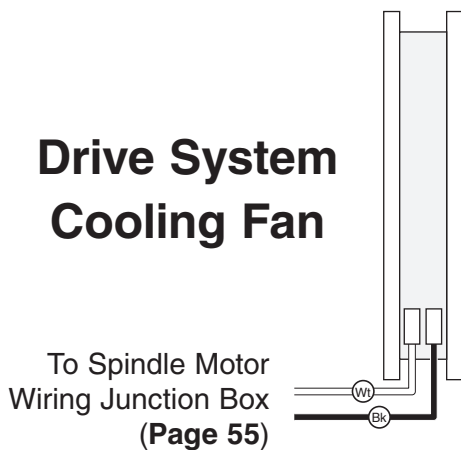


Figure 77. Drive system cooling fan wiring.

## Emergency Spindle Brake Safety Switch

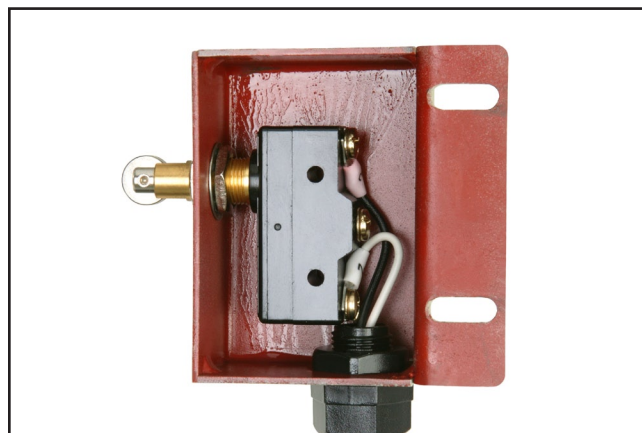
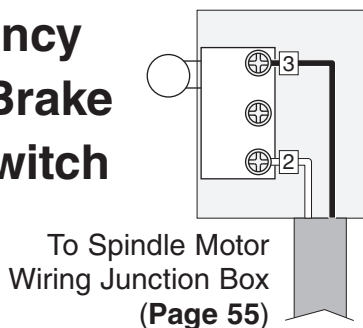
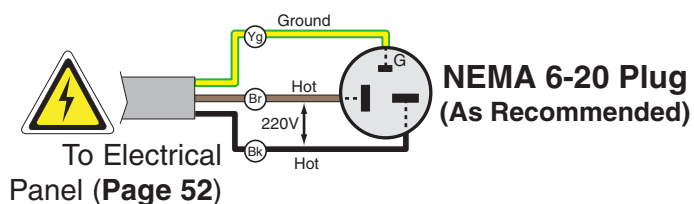
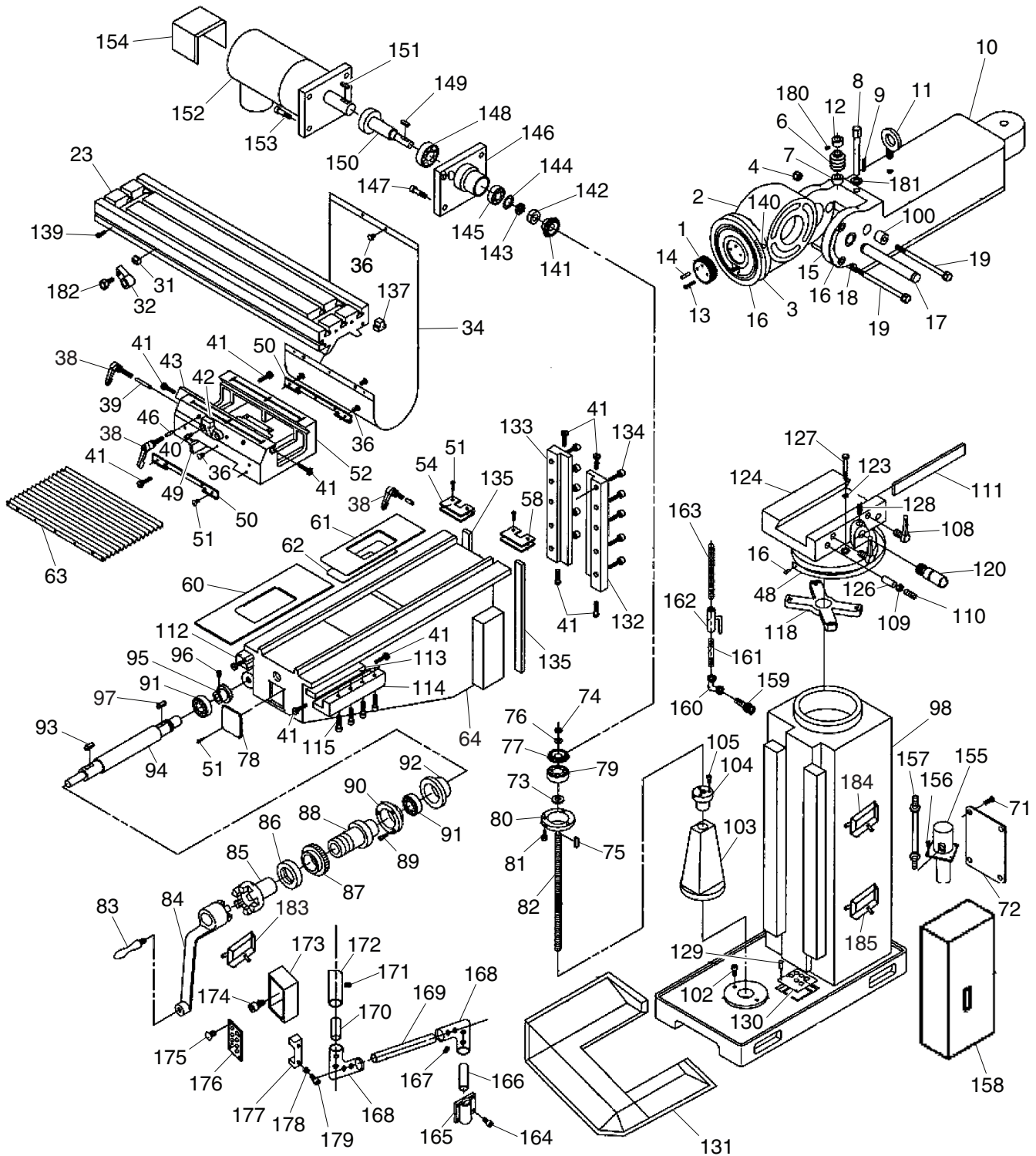


Figure 78. Emergency spindle brake safety switch.



# SECTION 9: PARTS

## Base Machine Breakdown



# Base Machine Parts List

REF	PART #	DESCRIPTION
1	P0669X001	WORM WASHER
2	P0669X002	RAM ADAPTER
3	P0669X003	ADAPTER SCALE
4	P0669X004	LOCK BOLT HEX NUT
6	P0669X006	WORM
7	P0669X007	COLLAR
8	P0669X008	WORM SHAFT
9	PK36M	KEY 5 X 5 X 50
10	P0669X010	RAM
11	P0669X011	LIFTING EYE BOLT 3/4-10
12	P0669X012	SPACER
13	PSB13M	CAP SCREW M8-1.25 X 30
14	PRP107M	ROLL PIN 8 X 40
15	P0669X015	ANGLE PLATE
16	P0669X016	RIVET
17	P0669X017	ADAPTER PIVOT STUD
18	P0669X018	SPECIAL WASHER
19	P0669X019	LOCK BOLT
23	P0669X023	TABLE
31	P0669X031	T-NUT 3/8-16
32	P0669X032	LIMIT STOP
34	P0669X034	REAR WAY COVER
36	PS06	PHLP HD SCR 10-24 X 3/8
38	P0669X038	LOCK HANDLE
39	P0669X039	SADDLE LOCK PLUNGER
40	PSB105	CAP SCREW 3/8-16 X 5/8
41	P0669X041	GIB ADJUSTMENT SCREW
42	P0669X042	TABLE LIMIT SWITCH
43	P0669X043	TABLE GIB
46	P0669X046	TABLE LOCK PLUNGER
48	P0669X048	TURRET SCALE
49	P0669X049	SADDLE GIB
50	P0669X050	KNEE WAY WIPER
51	PS09M	PHLP HD SCR M5-.8 X 10
52	P0669X052	SADDLE
54	P0669X054	LEFT COLUMN WAY WIPER
58	P0669X058	RIGHT COLUMN WAY WIPER
60	P0669X060	CHIP GUARD LARGE
61	P0669X061	CHIP GUARD MEDIUM
62	P0669X062	CHIP GUARD SMALL
63	P0669X063	FRONT WAY COVER
64	P0669X064	KNEE
71	PS09M	PHLP HD SCR M5-.8 X 10
72	P0669X072	COOLANT PUMP COVER
73	PW01	FLAT WASHER 1/2
74	PN01	HEX NUT 1/2-20
75	PK23M	KEY 5 X 5 X 25
76	PW01	FLAT WASHER 1/2
77	P0669X077	BEVEL GEAR 36T
78	P0669X078	COVER

REF	PART #	DESCRIPTION
79	P0669X079	ANG. CONTACT BEARING 5305ZZ
80	P0669X080	BEARING CAP
81	PSB02M	CAP SCREW M6-1 X 20
82	P0669X082	ELEVATION LEADSCREW
83	P0669X083	HANDLE
84	P0669X084	ELEVATION CRANK
85	P0669X085	CRANK CLUTCH
86	P0669X086	DIAL LOCK COLLAR
87	P0669X087	GRADUATED DIAL
88	P0669X088	DIAL HOLDER
89	PSB02M	CAP SCREW M6-1 X 20
90	P0669X090	BEARING CAP
91	P6204	BALL BEARING 6204ZZ
92	P0669X092	BEARING CAP
93	PK155M	KEY 3 X 3 X 18
94	P0669X094	SHAFT
95	P0669X095	GRUB SET SCREW
96	P0669X096	BEVEL GEAR 18T
97	PK102M	KEY 4 X 4 X 18
98	P0669X098	COLUMN
100	P0669X100	BUSHING
102	PSB84M	CAP SCREW M10-1.5 X 35
103	P0669X103	ELEVATION LEADSCREW HOUSING
104	P0669X104	ELEVATION LEADSCREW NUT
105	PSB02M	CAP SCREW M6-1 X 20
108	P0669X108	LOCK HANDLE
109	PN08	HEX NUT 3/8-16
110	PSS71M	SET SCREW M10-1.5 X 60
111	P0669X111	RAM GIB
112	P0669X112	LEFT SADDLE SLIDE HOLDER
113	P0669X113	SADDLE SLIDE
114	P0669X114	RIGHT SADDLE SLIDE HOLDER
115	PSB84M	CAP SCREW M10-1.5 X 35
118	P0669X118	TURRET SPIDER
120	P0669X120	RAM PINION
123	P0669X123	SPECIAL LOCK WASHER
124	P0669X124	TURRET
126	P0669X126	RAM LOCK PLUNGER
127	P0669X127	LOCK BOLT
128	P0669X128	RAM PINION SET SCREW
129	P0669X129	RIVET
130	P0669X130	COOLANT SCREEN
131	P0669X131	CHIP TRAY
132	P0669X132	RIGHT COLUMN SLIDE
133	P0669X133	LEFT COLUMN SLIDE
134	PSB111M	CAP SCREW M12-1.75 X 35
135	P0669X135	KNEE GIB
137	P0669X137	TABLE SLOT PLUG
139	PSB50M	CAP SCREW M5-.8 X 10
140	P0669X140	INDICATOR PLATE



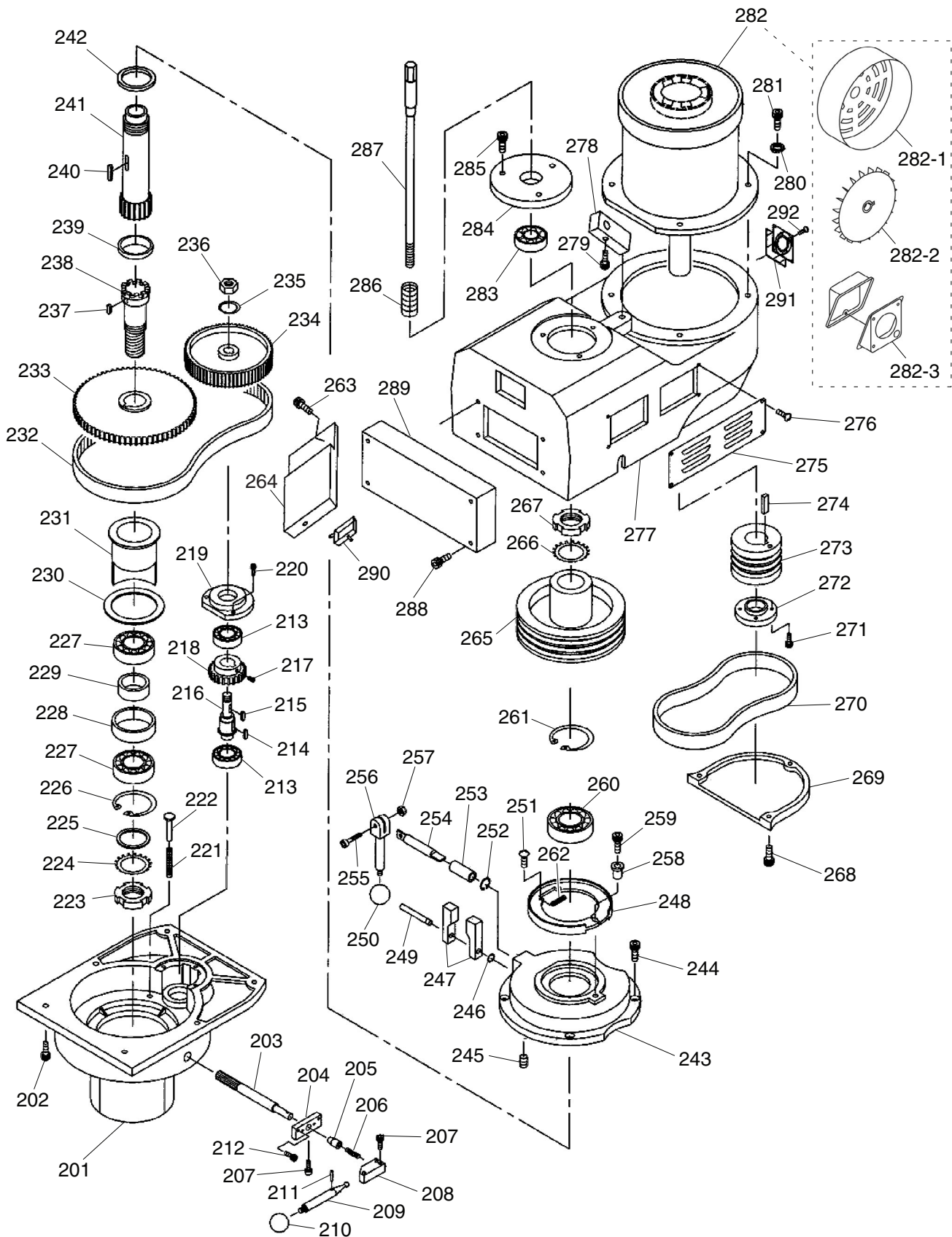
# Base Machine Parts List

REF	PART #	DESCRIPTION
141	P0669X141	BEVEL GEAR 18T
142	P0669X142	SPACER
143	P0669X143	SPANNER NUT
144	P0669X144	SPANNER LOCK WASHER
145	P6204	BALL BEARING 6204ZZ
146	P0669X146	BEARING BRACKET
147	PSB14M	CAP SCREW M8-1.25 X 20
148	P6206	BALL BEARING 6206ZZ
149	PK48M	KEY 4 X 4 X 20
150	P0669X150	DRIVE SHAFT
151	PK34M	KEY 5 X 5 X 20
152	P0669X152	ELEV. MOTOR 1/2HP 220V 1-PH
153	PSB14M	CAP SCREW M8-1.25 X 20
154	P0669X154	MOTOR COVER
155	P0669X155	COOLANT PUMP 1/8HP 220V 1-PH
156	PSB28M	CAP SCREW M6-1 X 15
157	P0669X157	HOSE 3/8 ID
158	P0669X158	ELECTRICAL CABINET
159	P0669X159	PIPE NIPPLE 3/8
160	P0669X160	ELBOW JOINT 3/8
161	P0669X161	PIPE 3/8
162	P0669X162	VALVE 3/8
163	P0669X163	COOLANT NOZZLE

REF	PART #	DESCRIPTION
164	PSB31M	CAP SCREW M8-1.25 X 25
165	P0669X165	BRACKET
166	P0669X166	PIPE
167	PSS01M	SET SCREW M6-1 X 10
168	P0669X168	ELBOW CONNECTOR
169	P0669X169	PIPE
170	P0669X167	PIPE
171	PSS01M	SET SCREW M6-1 X 10
172	P0669X172	BRACKET
173	P0669X173	CONTROL PANEL BOX
174	PSB52M	CAP SCREW M8-1.25 X 10
175	PS17M	PHLP HD SCR M4-.7 X 6
176	P0669X176	CONTROL PANEL
177	P0669X177	CONTROL PANEL HANDLE
178	PN03M	HEX NUT M8-1.25
179	PSB100M	CAP SCREW M8-1.25 X 15
180	PSS02M	SET SCREW M6-1 X 6
181	P0669X181	SPECIAL WASHER
182	PB18	HEX BOLT 3/8-16 X 1
183	P0669X183	ELEV. CRANK SAFETY SWITCH
184	P0669X184	KNEE UPPER LIMIT SWITCH
185	P0669X185	KNEE LOWER LIMIT SWITCH



# Drive System Breakdown



# Drive System Parts List

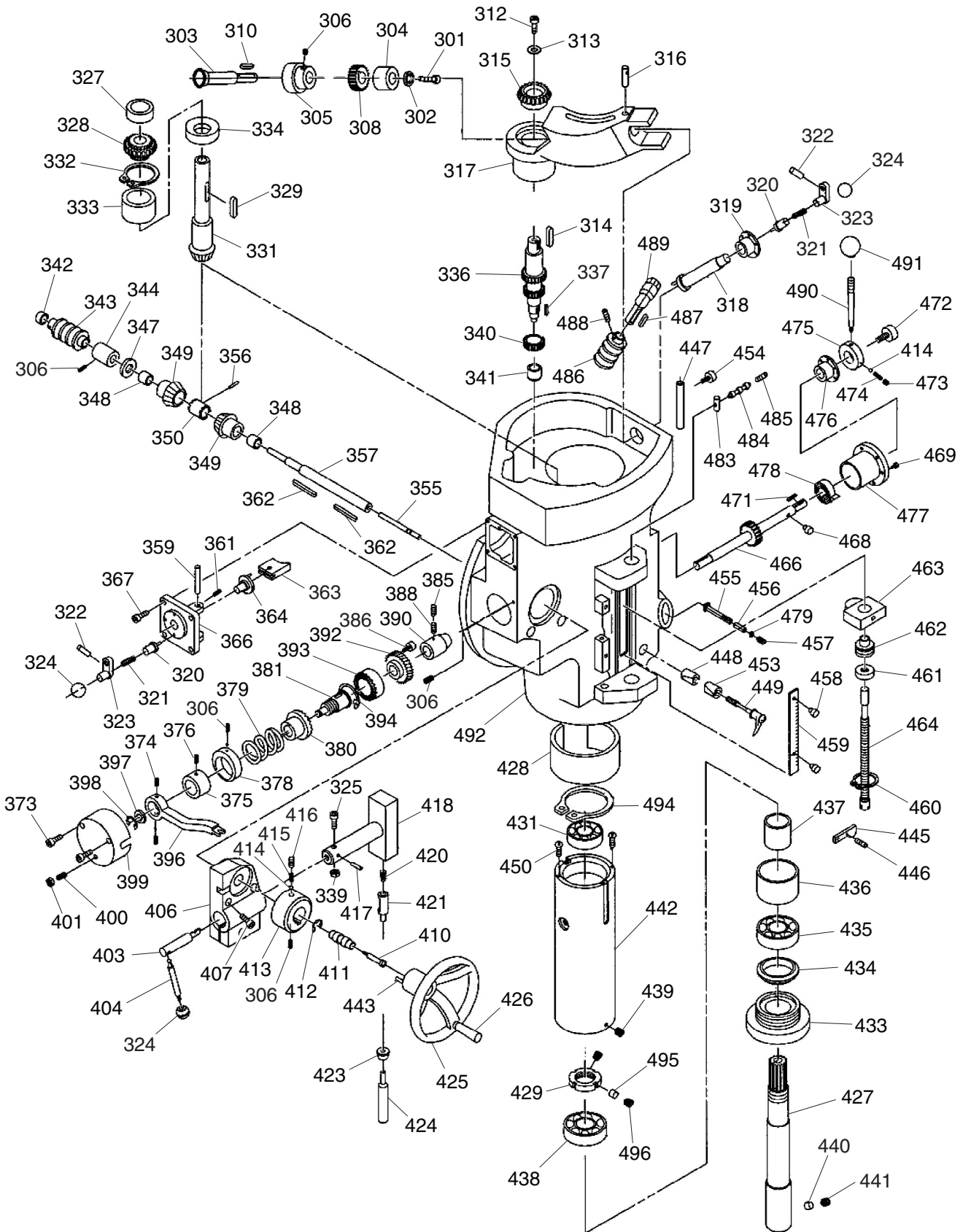
REF	PART #	DESCRIPTION
201	P0669X201	LOWER PULLEY HOUSING
202	PSB02M	CAP SCREW M6-1 X 20
203	P0669X203	GEAR SHAFT PINION
204	P0669X204	DETENT PLATE
205	P0669X205	DETENT PLUNGER
206	P0669X206	COMPRESSION SPRING
207	PSB20M	CAP SCREW M5-.8 X 14
208	P0669X208	PINION BLOCK
209	P0669X209	PINION CRANK
210	P0669X210	KNOB
211	PRP42M	ROLL PIN 3 X 20
212	PSB24M	CAP SCREW M5-.8 X 16
213	P6203	BALL BEARING 6203ZZ
214	PK14M	KEY 5 X 5 X 18
215	PK20M	KEY 5 X 5 X 15
216	P0669X216	GEAR SHAFT
217	PSS02M	SET SCREW M6-1 X 6
218	P0669X218	BULL GEAR 26T
219	P0669X219	BEARING CAP
220	PSB15M	CAP SCREW M5-.8 X 20
221	P0669X221	COMPRESSION SPRING
222	P0669X222	SPRING SHAFT
223	P0669X223	SPANNER NUT
224	P0669X224	SPANNER LOCK WASHER
225	P0669X225	SPACER
226	PR38M	INT RETAINING RING 62MM
227	P6908	BALL BEARING 6908ZZ
228	P0669X228	BEARING SLEEVE
229	P0669X229	BUSHING
230	P0669X230	SPACER
231	P0669X231	RACK CUP
232	P0669X232	TIMING BELT 225L100
233	P0669X233	SPINDLE TIMING PULLEY
234	P0669X234	SPINDLE IDLER TIMER PULLEY
235	PLW06	LOCK WASHER 5/8
236	PN09	HEX NUT 5/8-18
237	P0669X237	KEY 8 X 7 X 12
238	P0669X238	SPINDLE GEAR HUB
239	P0669X239	COLLAR
240	PK55M	KEY 7 X 7 X 40
241	P0669X241	SPINDLE PULLEY SHAFT
242	P0669X242	COLLAR
243	P0669X243	LOWER PULLEY HOUSING COVER
244	PSB02M	CAP SCREW M6-1 X 20
245	PSS02M	SET SCREW M6-1 X 6
246	PR88M	INT RETAINING RING 8MM
247	P0669X247	BRAKE STUD
248	P0669X248	BRAKE SHOE

REF	PART #	DESCRIPTION
249	P0669X249	BRAKE FINGER PIVOT STUD
250	P0669X250	KNOB
251	P0669X251	PHLP HD SCR #5-40 X 3/8
252	PR49M	INT RETAINING RING 12MM
253	P0669X253	BRAKE SHAFT SLEEVE
254	P0669X254	BRAKE SHAFT
255	PSB06M	CAP SCREW M6-1 X 25
256	P0669X256	BRAKE PIVOT ROD
257	PN01M	HEX NUT M6-1
258	P0669X258	SCREW SLEEVE
259	PSB24M	CAP SCREW M5-.8 X 16
260	P6010	BALL BEARING 6010ZZ
261	PR50M	INT RETAINING RING 80MM
262	P0669X262	BRAKE EXTENSION SPRING
263	PSB33M	CAP SCREW M5-.8 X 12
264	P0669X264	BRAKE SWITCH COVER
265	P0669X265	SPINDLE PULLEY
266	P0669X266	SPANNER LOCK WASHER
267	P0669X267	SPANNER NUT
268	PSB15M	CAP SCREW M5-.8 X 20
269	P0669X269	MOTOR PULLEY LOWER COVER
270	P0669X270	BELT 11M-900
271	PSB24M	CAP SCREW M5-.8 X 16
272	P0669X272	LOCK COLLAR
273	P0669X273	MOTOR PULLEY
274	PK84M	KEY 10 X 8 X 30
275	P0669X275	V-BELT COVER
276	PS08M	PHLP HD SCR M5-.8 X 12
277	P0669X277	DRIVE SYSTEM HOUSING
278	P0669X278	MOTOR ADJUSTMENT BLOCK
279	PSB31M	CAP SCREW M8-1.25 X 25
280	PLW06M	LOCK WASHER 10MM
281	PSB72M	CAP SCREW M10-1.5 X 30
282	P0669X282	SPINDLE MOTOR 5HP 220V 3-PH
282-1	P0669X282-1	MOTOR FAN COVER
282-2	P0669X282-2	MOTOR FAN
282-3	P0669X282-3	MOTOR WIRING JUNCTION BOX
283	P6007	BALL BEARING 6007ZZ
284	P0669X284	MOTOR MOUNT
285	PSB24M	CAP SCREW M5-.8 X 16
286	P0669X286	DRAWBAR SPACER
287	P0669X287	DRAWBAR 7/16-20 X 23-1/2
288	PSB04M	CAP SCREW M6-1 X 10
289	P0669X289	FRONT COVER
290	P0669X290	BRAKE SAFETY SWITCH
291	P0669X291	COOLING FAN
292	PS22M	PHLP HD SCR M5-.8 X 25





# Head Breakdown



# Head Parts List

REF	PART #	DESCRIPTION
301	PSB26M	CAP SCREW M6-1 X 12
302	PW03M	FLAT WASHER 6MM
303	P0669X303	FEED BEVEL PINION
304	P0669X304	GEAR SHAFT SLEEVE
305	P0669X305	LOCK COLLAR
306	PSS02M	SET SCREW M6-1 X 6
308	P0669X308	FEED GEAR 20T
310	PK103M	KEY 3 X 3 X 12
312	PSB11M	CAP SCREW M8-1.25 X 16
313	PW01M	FLAT WASHER 8MM
314	PK03M	KEY 3 X 3 X 8
315	P0669X315	BEVEL GEAR 24T
316	P0669X316	FEED ENGAGE PIN
317	P0669X317	WORM GEAR CRADLE
318	P0669X318	WORM GEAR CRADLE SHAFT
319	P0669X319	SHAFT SLEEVE
320	P0669X320	GEAR SHAFT PLUNGER
321	P0669X321	COMPRESSION SPRING
322	PRP42M	ROLL PIN 3 X 20
323	P0669X323	SHIFT CRANK
324	P0669X324	KNOB
325	PSB33M	CAP SCREW M5-.8 X 12
327	P0669X327	BUSHING
328	P0669X328	BEVEL GEAR 28T
329	PK53M	KEY 3 X 3 X 45
331	P0669X331	GEAR SHAFT 12T
332	PR06M	EXT RETAINING RING 16MM
333	P0669X333	BEVEL GEAR BUSHING
334	P0669X334	SPACER
336	P0669X336	GEAR SHAFT 18T
337	PK39M	KEY 3 X 3 X 10
339	PN06M	HEX NUT M5-.8
340	P0669X340	FEED DRIVE GEAR 23T
341	P0669X341	NEEDLE BEARING BA-66
342	P0669X342	BUSHING
343	P0669X343	WORM
344	P0669X344	BUSHING
347	P0669X347	SPACER
348	P0669X348	BUSHING
349	P0669X349	BEVEL GEAR 24T
350	P0669X350	FEED REVERSE CLUTCH
355	P0669X355	REVERSE CLUTCH ROD
356	PRP42M	ROLL PIN 3 X 20
357	P0669X357	FEED WORM SHAFT
359	PRP61M	ROLL PIN 3 X 12
361	PSS05M	SET SCREW M5-.8 X 10
362	PK52M	KEY 3 X 3 X 15
363	P0669X363	FEED GEAR SHIFT FORK
364	P0669X364	GEAR SHIFT CRANK
366	P0669X366	CLUSTER GEAR COVER

REF	PART #	DESCRIPTION
367	PSB33M	CAP SCREW M5-.8 X 12
373	PSB79M	CAP SCREW M5-.8 X 35
374	P0669X374	CLUTCH RING PIN
375	P0669X375	CLUTCH RING
376	PSS03M	SET SCREW M6-1 X 8
378	P0669X378	CLUTCH CONCENTRIC COLLAR
379	P0669X379	CLUTCH SPRING
380	P0669X380	OVERLOAD CLUTCH
381	P0669X381	OVERLOAD CLUTCH SLEEVE
385	PSS02M	SET SCREW M6-1 X 6
386	PS56M	PHLP HD SCR M4-.7 X 16
388	P0669X388	COMPRESSION SPRING
390	P0669X390	BUSHING
392	P0669X392	GEAR 30T
393	P0669X393	CLUTCH
394	PR45M	INT RETAINING RING 10MM
396	P0669X396	CLUTCH TRIP LEVER
397	P0669X397	CLUTCH SPACER
398	PEC03M	E-CLIP 10MM
399	P0669X399	CLUTCH ARM COVER
400	PSS11M	SET SCREW M6-1 X 16
401	PN01M	HEX NUT M6-1
403	P0669X403	CAM ROD
404	P0669X404	HANDLE
406	P0669X406	FEED TRIP BRACKET
407	PSB02M	CAP SCREW M6-1 X 20
410	P0669X410	KNOB STUD
411	P0669X411	REVERSE BALL STUD
412	PEC09M	E-CLIP 6MM
413	P0669X413	LOCK COLLAR
414	P0669X414	STEEL BALL
415	P0669X415	COMPRESSION SPRING
416	PSS17M	SET SCREW M8-1.25 X 6
417	P0669X417	ROLL PIN 3 X 15
418	P0669X418	CAM ROD SLEEVE
420	P0669X420	COMPRESSION SPRING
421	P0669X421	TRIP PLUNGER
423	P0669X423	BUSHING
424	P0669X424	FEED TRIP PLUNGER
425	P0669X425	HANDWHEEL
426	P0669X426	HANDLE
427	P0669X427	SPINDLE
428	P0669X428	QUILL SKIRT
429	P0669X429	LOCK COLLAR
431	P6206	BALL BEARING 6206ZZ
433	P0669X433	QUILL NOSE
434	P0669X434	SPINDLE SEAL
435	P0669X435	ANG. CONTACT BEARING 7207C
436	P0669X436	SPACER



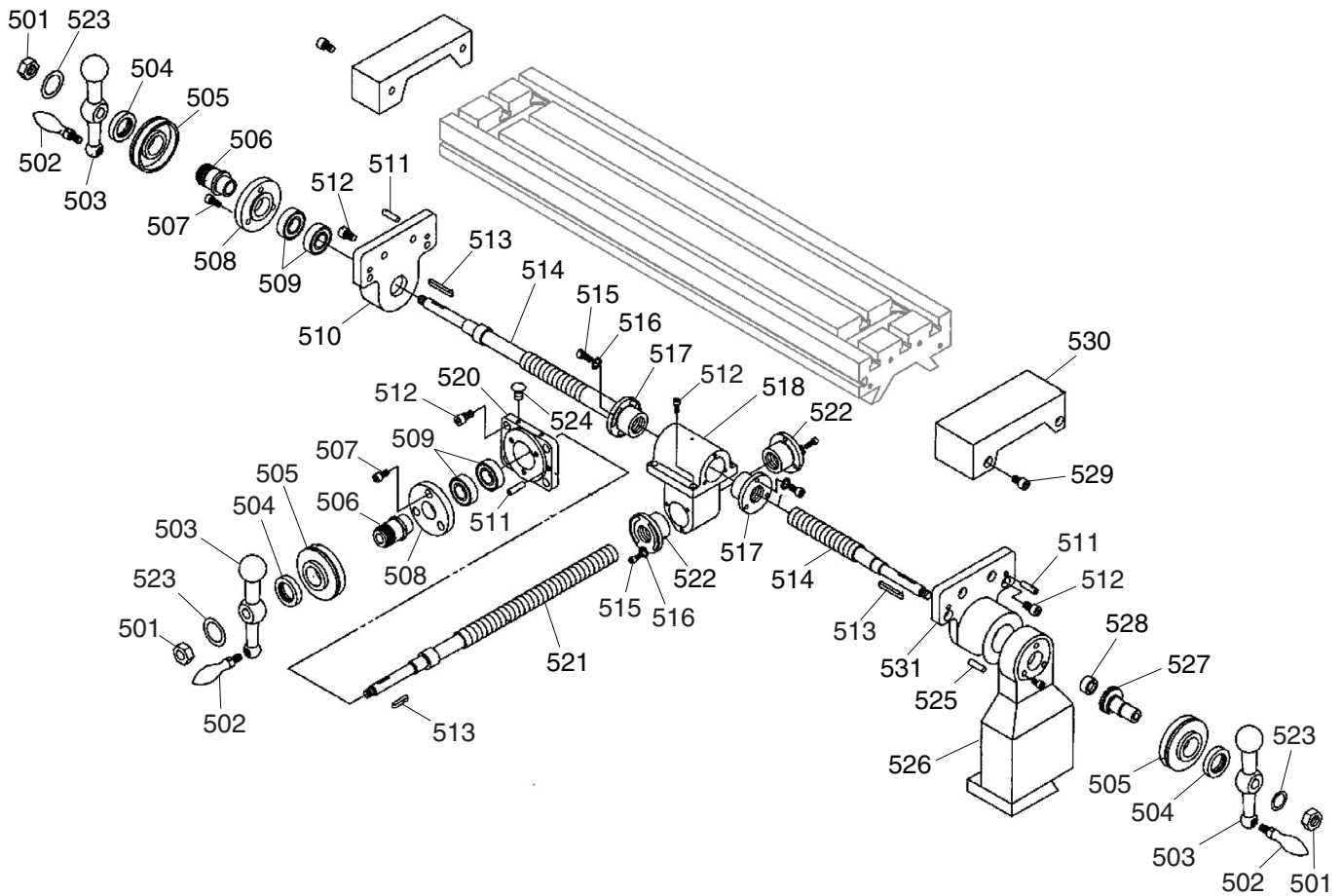
# Head Parts List

REF	PART #	DESCRIPTION
437	P0669X437	BUSHING
438	P0669X435	ANGULAR BEARING 7207C
439	PSS07M	SET SCREW M5-.8 X 5
440	P0669X443	BUSHING
441	PSS02M	SET SCREW M6-1 X 6
442	P0669X442	QUILL
443	PRP02M	ROLL PIN 3 X 16
445	P0669X445	TRIP LEVER
446	P0669X446	TRIP LEVER PIN
447	P0669X447	INDICATOR ROD
448	P0669X448	QUILL INNER LOCK PLUNGER
449	P0669X449	LOCK HANDLE
450	PS05M	PHLP HD SCR M5-.8 X 8
453	P0669X453	QUILL OUTER LOCK PLUNGER
454	P0669X454	INDICATOR ROD SCREW
455	P0669X455	LOCK BOLT
456	P0669X456	LOCK BOLT SLEEVE
457	P0669X457	LOCK BOLT HEX NUT
458	PS38M	PHLP HD SCR M4-.7 X 10
459	P0669X459	DOWNFEED SCALE
460	PR06M	EXT RETAINING RING 16MM
461	P0669X461	DOWNFEED DIAL LOCK RING
462	P0669X462	DOWNFEED DIAL STOP
463	P0669X463	QUILL DOG
464	P0669X464	DOWNFEED STUD

REF	PART #	DESCRIPTION
466	P0669X466	QUILL PINION SHAFT
468	P0669X467	QUILL PINION SHAFT PIN
469	PSB33M	CAP SCREW M5-.8 X 12
471	PK96M	KEY 3 X 3 X 20
472	P0669X472	PINION SHAFT HUB SCREW
473	PSS58M	SET SCREW M6-1 X 18
474	P0669X474	COMPRESSION SPRING
475	P0669X475	HANDLE HUB
476	P0669X476	HUB SLEEVE
477	P0669X477	SPRING COVER
478	P0669X478	COILED SPRING
479	P0669X479	LOCK BOLT SPACER
483	P0669X483	REVERSE TRIP BALL LEVER
484	P0669X484	REVERSE TRIP PLUNGER
485	P0669X485	TRIP BALL LEVER SCREW
486	P0669X486	WORM
487	PK102M	KEY 4 X 4 X 18
488	PSS01M	SET SCREW M6-1 X 10
489	P0669X489	WORM SHAFT
490	P0669X490	HANDLE
491	P0669X491	KNOB
492	P0669X492	HEADSTOCK CASTING
494	PR15M	EXT RETAINING RING 30MM
495	P0669X495	BUSHING
496	PSS02M	SET SCREW M6-1 X 6



# Longitudinal & Cross Slide Leadscrews Breakdown & Parts List

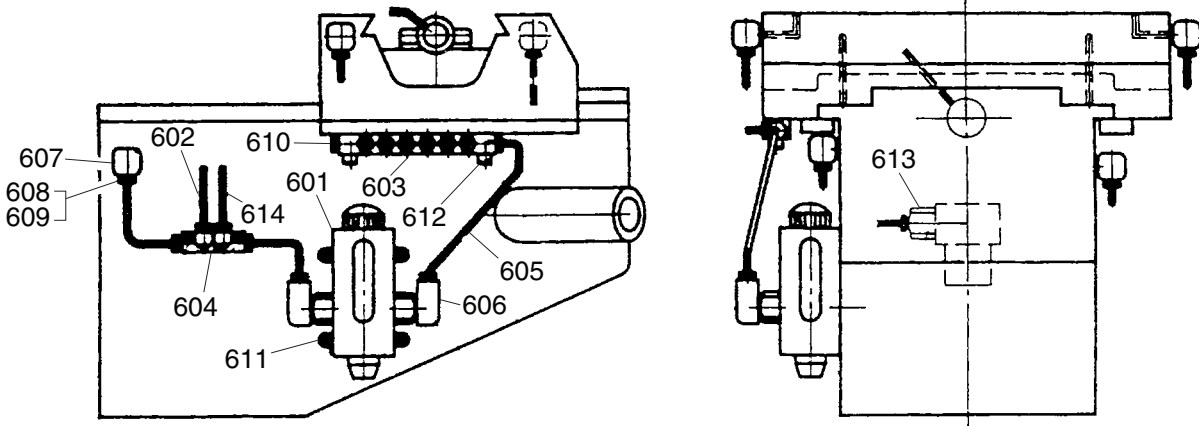


REF	PART #	DESCRIPTION
501	PN01	HEX NUT 1/2-20
502	P0669X502	HANDLE
503	P0669X503	BALL CRANK
504	P0669X504	DIAL LOCK RING
505	P0669X505	GRADUATED DIAL
506	P0669X506	DIAL HOLDER
507	PSB26M	CAP SCREW M6-1 X 12
508	P0669X508	BEARING CAP
509	P6204	BALL BEARING 6204ZZ
510	P0669X510	LEADSCREW BRACKET LEFT
511	PRP49M	ROLL PIN 5 X 25
512	PSB64M	CAP SCREW M10-1.5 X 25
513	PK92M	KEY 3 X 3 X 25
514	P0669X514	LONGITUDINAL LEADSCREW
515	PSB28M	CAP SCREW M6-1 X 15

REF	PART #	DESCRIPTION
516	P0669X516	SPECIAL WASHER
517	P0669X517	LONGITUDINAL LEADSCREW NUT
518	P0669X518	LEADSCREW NUT BRACKET
520	P0669X520	CROSS LEADSCREW BRACKET
521	P0669X521	CROSS FEED LEADSCREW
522	P0669X522	CROSS LEADSCREW NUT
523	P0669X523	SPECIAL WASHER
524	PS09M	PHLP HD SCR M5-.8 X 10
525	PRP24M	ROLL PIN 5 X 16
526	P0669X526	POWER FEED ASSEMBLY
527	P0669X527	BEVEL GEAR SHAFT 72T
528	P0669X528	BUSHING
529	PSB26M	CAP SCREW M6-1 X 12
530	P0669X530	TABLE END COVER
531	P0669X531	LEADSCREW BRACKET RIGHT



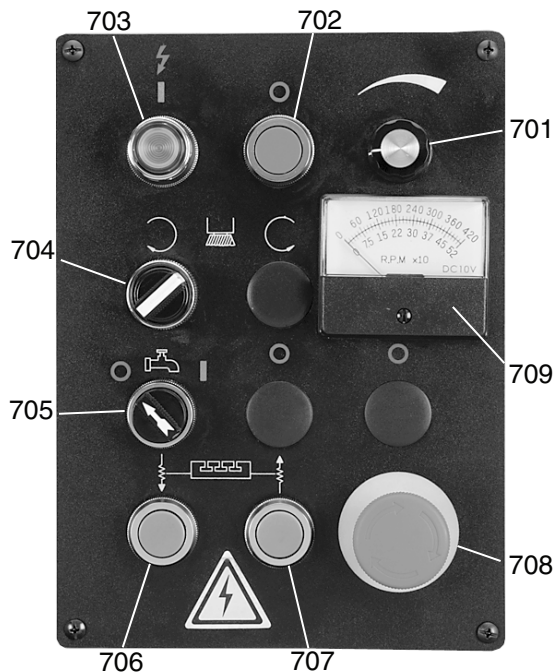
# One-Shot Oiler Breakdown & Parts List



REF	PART #	DESCRIPTION
601	P0669X601	ONE SHOT OILER ASSEMBLY
602	P0669X602	ALUMINUM PIECE 13.5MM
603	P0669X603	OIL REGULATION DISTRIBUTOR
604	P0669X604	OIL REGULATION DISTRIBUTOR
605	P0669X605	FLEXIBLE STEEL TUBE 4 X 550MM
606	P0669X606	ELBOW JOINT
607	P0669X607	ELBOW JOINT

REF	PART #	DESCRIPTION
608	P0669X608	THIMBLE NUT
609	P0669X609	THIMBLE
610	P0669X610	UNION
611	PS15M	PHLP HD SCR M6-1 X 14
612	PSB38M	CAP SCREW M5-.8 X 25
613	P0669X613	STRAIGHT JOINT
614	P0669X614	NYLON PIECE

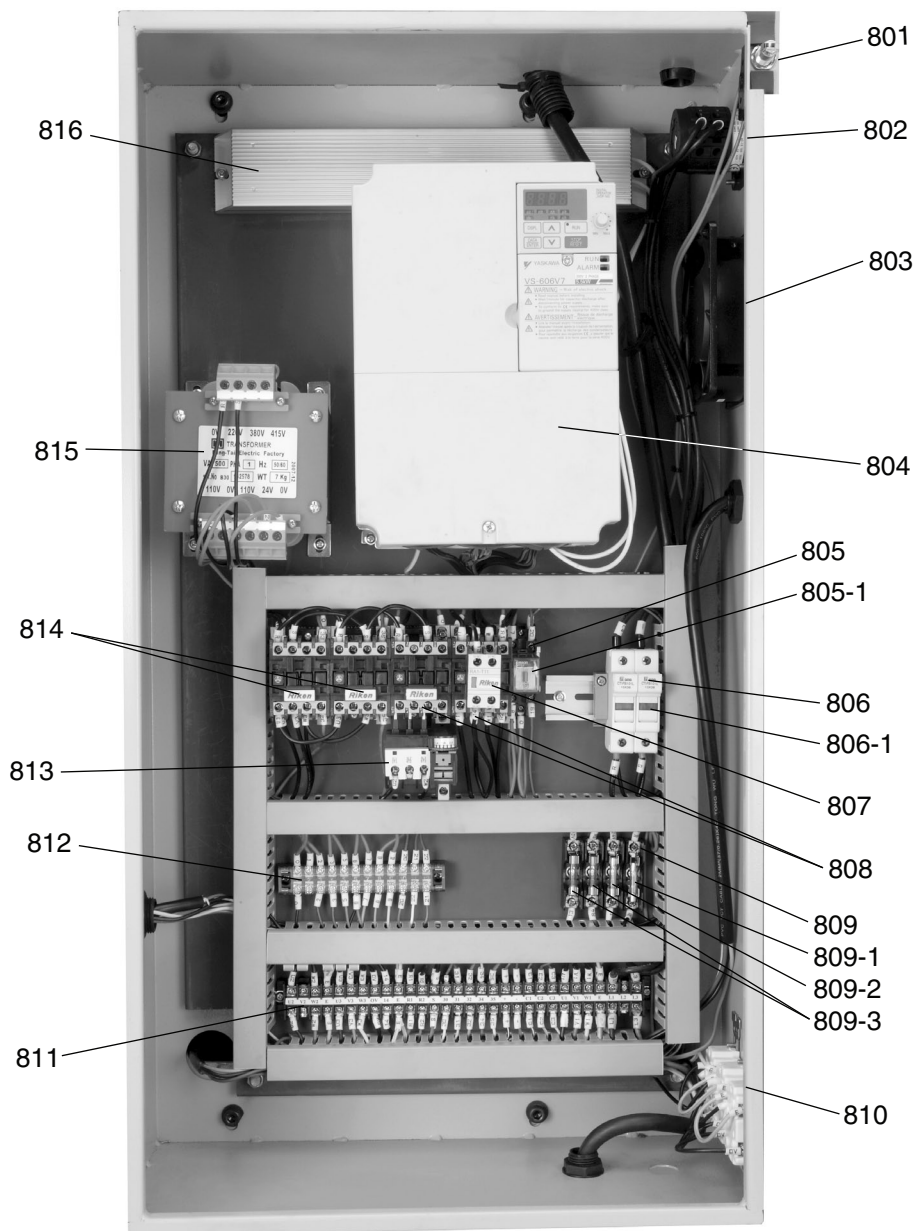
# Control Panel Electrical Components Breakdown & Parts List



REF	PART #	DESCRIPTION
701	P0669X701	SPINDLE SPEED DIAL
702	P0669X702	SPINDLE OFF SWITCH
703	P0669X703	SPINDLE ON SWITCH
704	P0669X704	SPINDLE DIRECTION SWITCH
705	P0669X705	COOLANT PUMP SWITCH
706	P0669X706	ELEVATION DOWN SWITCH
707	P0669X707	ELEVATION UP SWITCH
708	P0669X708	EMERGENCY STOP SWITCH
709	P0669X709	RPM DIAL
710	P0669X710	PANEL PLUG



# Electrical Cabinet Breakdown & Parts List

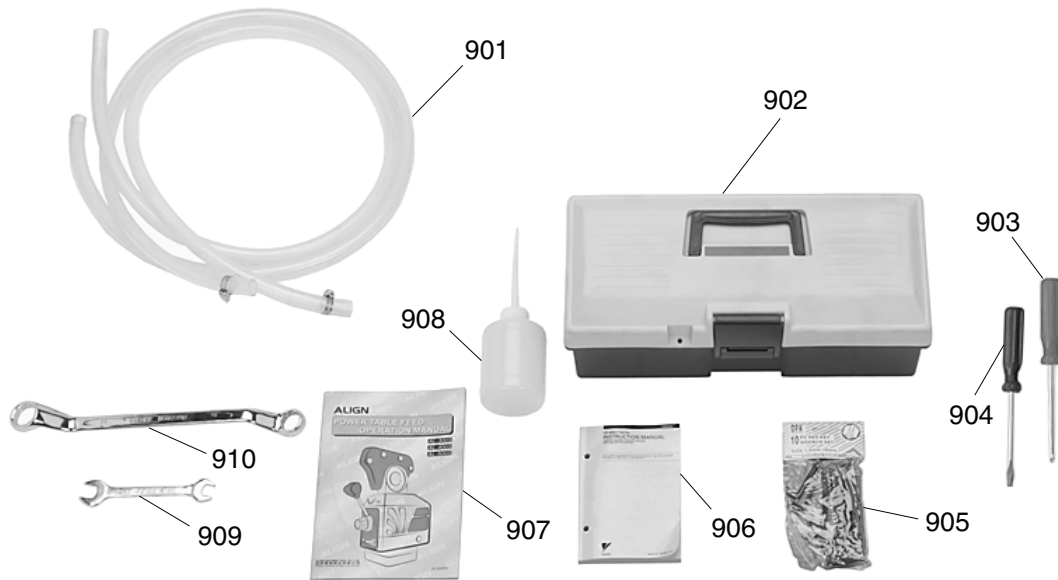


REF	PART #	DESCRIPTION
801	P0669X801	ELECT CABINET SAFETY SWITCH
802	P0669X802	POWER SWITCH KEDU ZH-HD-2
803	P0669X803	COOLING FAN
804	P0669X804	FREQ DRIVE YASKAWA VS-606V7
805	P0669X805	RELAY OMRON MY2-110NJ
805-1	P0669X805-1	RELAY SOCKET OMRON PYF-08A
806	P0669X806	FUSE HOLDER GIKOKA 3P30A600V
806-1	P0669X806-1	FUSE 32A GIN-SING 30A600V
807	P0669X807	AUXILLARY CONTACTOR RIKEN
808	P0669X808	CONTACTOR RIKEN RAB-09T10110V
809	P0669X809	FUSE HOLDER RENY 1P10A250V

REF	PART #	DESCRIPTION
809-1	P0669X809-1	FUSE 5A
809-2	P0669X809-2	FUSE 2A
809-3	P0669X809-3	FUSE 3A
810	P0669X810	110V RECEPTACLE
811	P0669X811	TERMINAL BLOCK 30-POS
812	P0669X812	TERMINAL BLOCK 15-POS
813	P0669X813	OL RELAY RIKEN 18T-2H 1.4-2.2
814	P0669X814	CONTACTOR RIKEN RAB-09T01110V
815	P0669X815	TRANSFORMER 500V 1-PH
816	P0669X816	HEAT RESISTOR



# Accessories Breakdown & Parts List

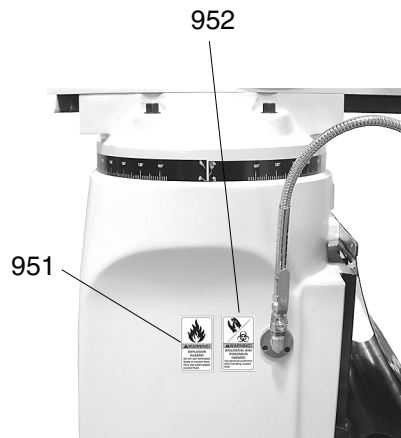


REF	PART #	DESCRIPTION
901	P0669X901	COOLANT HOSE W/CLAMP
902	P0669X902	TOOL BOX
903	PSDP2	SCREWDRIVER PHILLIPS #2
904	PSDF2	SCREWDRIVER FLAT #2
905	P0669X905	HEX WRENCH SET 1.5-10MM

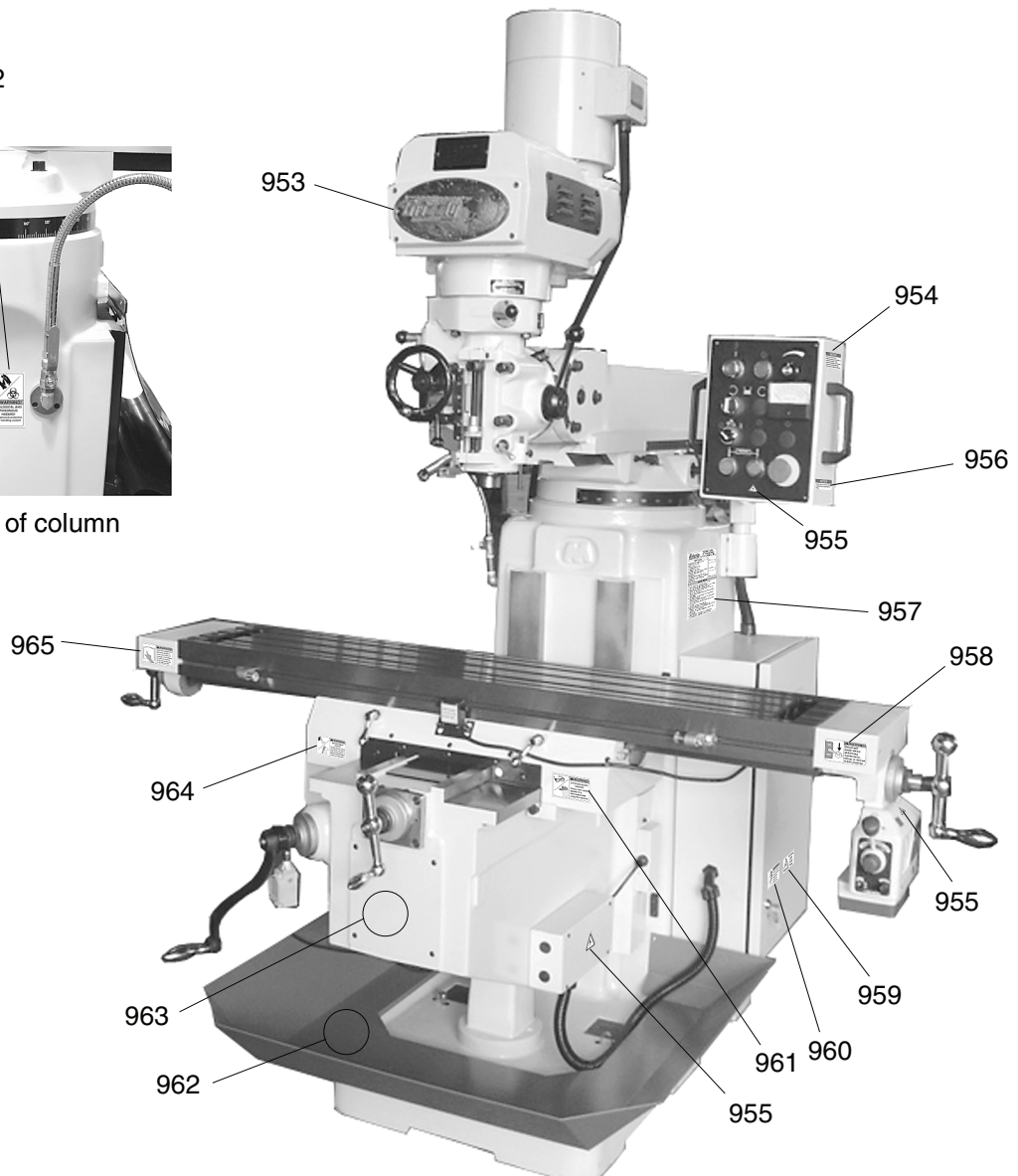
REF	PART #	DESCRIPTION
906	P0669X906	FREQUENCY DRIVE MANUAL
907	P0669X907	POWER FEED MANUAL
908	P0669X908	OIL BOTTLE
909	PWR1214	WRENCH 12/14
910	PWR1719	WRENCH 17/19



# Label Placement



Left side of column



REF	PART #	DESCRIPTION
951	P0669X951	EXPLOSION HAZARD LABEL
952	P0669X952	BIO/POISON HAZARD LABEL
953	G8588	GRIZZLY OVAL NAMEPLATE
954	P0669X954	TRAINED PERSONNEL ONLY LABEL
955	PLABEL-14	ELECTRICITY LABEL
956	P0669X956	COOLANT PUMP NOTICE LABEL
957	P0669X957	MACHINE ID LABEL
958	P0669X958	DISCONNECT POWER LABEL HORZ

REF	PART #	DESCRIPTION
959	P0669X959	PRE-WIRED 220V LABEL
960	P0669X960	SHOCK HAZARD LABEL HORZ
961	P0669X961	EYE/FACE INJURY LABEL HORZ
962	PPAINT-1	GRIZZLY GREEN TOUCH-UP PAINT
963	PPAINT-11	GRIZZLY PUTTY TOUCH-UP PAINT
964	P0669X964	ENTANGLEMENT HAZARD LABEL
965	P0669X965	READ MANUAL LABEL HORZ

## 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](http://www.grizzly.com) to order new labels.







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|---|--|---|
| <input type="checkbox"/> Cabinet Maker          | <input type="checkbox"/> Popular Mechanics   | <input type="checkbox"/> Today's Homeowner    |
| <input type="checkbox"/> Family Handyman        | <input type="checkbox"/> Popular Science     | <input type="checkbox"/> Wood                 |
| <input type="checkbox"/> Hand Loader            | <input type="checkbox"/> Popular Woodworking | <input type="checkbox"/> Wooden Boat          |
| <input type="checkbox"/> Handy                  | <input type="checkbox"/> Practical Homeowner | <input type="checkbox"/> Woodshop News        |
| <input type="checkbox"/> Home Shop Machinist    | <input type="checkbox"/> Precision Shooter   | <input type="checkbox"/> Woodsmith            |
| <input type="checkbox"/> Journal of Light Cont. | <input type="checkbox"/> Projects in Metal   | <input type="checkbox"/> Woodwork             |
| <input type="checkbox"/> Live Steam             | <input type="checkbox"/> RC Modeler          | <input type="checkbox"/> Woodworker West      |
| <input type="checkbox"/> Model Airplane News    | <input type="checkbox"/> Rifle               | <input type="checkbox"/> Woodworker's Journal |
| <input type="checkbox"/> Modeltec               | <input type="checkbox"/> Shop Notes          | <input type="checkbox"/> Other:               |
| <input type="checkbox"/> Old House Journal      | <input type="checkbox"/> Shotgun News        |   |

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: \_\_\_\_\_

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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

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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.

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.

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