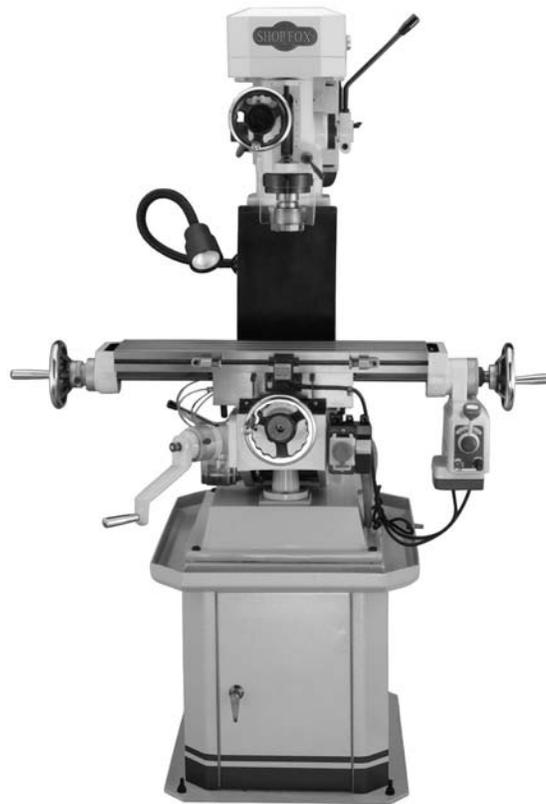


# MODEL M1001 6" X 26" VERTICAL MILL



# INSTRUCTION MANUAL

Phone: (360) 734-3482 • On-Line Technical Support: [tech-support@shopfox.biz](mailto:tech-support@shopfox.biz)

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WARNING: NO PORTION OF THIS MANUAL MAY BE REPRODUCED IN ANY SHAPE OR FORM WITHOUT

THE WRITTEN APPROVAL OF WOODSTOCK INTERNATIONAL, INC.

 **WARNING!**

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

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

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

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

 **WARNING!**

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

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

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

# Table of Contents

<b>INTRODUCTION</b> .....	<b>2</b>	<b>MAINTENANCE</b> .....	<b>26</b>
Woodstock Technical Support .....	2	General .....	26
About Your New 6" x 26" Vertical Mill .....	2	Cleaning .....	26
Machine Specifications .....	3	Table and Base .....	26
<b>SAFETY</b> .....	<b>7</b>	Lubrication .....	27
Standard Machinery Safety Instructions .....	7	Maintenance Schedule .....	28
Additional Safety Instructions for Vertical Mills .....	9	Maintenance Notes .....	28
<b>ELECTRICAL</b> .....	<b>10</b>	<b>SERVICE</b> .....	<b>29</b>
<b>SET UP</b> .....	<b>13</b>	General .....	29
Unpacking .....	13	Gibs .....	29
Inventory .....	13	Adjusting Backlash .....	30
Machine Placement .....	14	Electrical Safety Instructions .....	31
Cleaning Machine .....	14	Electrical Parts Identification .....	32
Mounting Mill on Shop Floor .....	15	Wiring Diagram .....	33
Assembly .....	16	Troubleshooting .....	34
Headstock Adjustment .....	16	Headstock Assembly .....	35
Handle Installation .....	16	<b>PARTS</b> .....	<b>35</b>
Drawbar .....	16	Headstock Assembly .....	35
Single Shot Lubrication .....	16	Base Assembly .....	36
Spindle Controls .....	17	Machine Parts Lists .....	37
Test Run .....	17	Machine Labels .....	39
<b>OPERATIONS</b> .....	<b>18</b>	<b>WARRANTY</b> .....	<b>40</b>
General .....	18	Warranty Registration .....	41
Positioning Spindle Head .....	18		
Table Travel .....	19		
Graduated Dials .....	20		
Power Feed Controls .....	20		
Quill Travel .....	21		
Determining Needed RPM .....	22		
Setting RPM .....	23		
Spindle Break-in Procedure .....	24		
Installing Tools .....	25		
Removing Cutting Tools .....	25		

INTRODUCTION

SAFETY

ELECTRICAL

SET UP

OPERATIONS

MAINTENANCE

SERVICE

PARTS

USE THE QUICK GUIDE PAGE LABELS TO SEARCH OUT INFORMATION FAST!





# INTRODUCTION

## Woodstock Technical Support

We stand behind our machines! In the event that questions arise about your machine, parts are missing, or a defect is found, please contact Woodstock International Technical Support at (360) 734-3482 or send e-mail to: [tech-support@shopfox.biz](mailto:tech-support@shopfox.biz). Our knowledgeable staff will help you troubleshoot problems and send out parts for warranty claims.

If you need the latest edition of this manual, you can download it from <http://www.shopfox.biz>. If you still have questions after reading the latest manual, or if you have comments please contact us at:

Woodstock International, Inc.  
Attn: Technical Support Department  
P.O. Box 2309  
Bellingham, WA 98227

## About Your New 6" x 26" Vertical Mill

Your new SHOP FOX® 6" x 26" Vertical Mill has been specially designed to provide many years of trouble-free service. Close attention to detail, ruggedly built parts and a rigid quality control program assure safe and reliable operation.

Woodstock International, Inc. is committed to customer satisfaction in providing this manual. It is our intent to make sure all the information necessary for safety, ease of assembly, practical use and durability of this product be included.



# MACHINE SPECIFICATIONS



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## MODEL M1001 SHOP FOX® VERTICAL MILL 6" X 26"

### Motors

#### Main

Type.....	TEFC Capacitor Start Induction
Horsepower.....	1-1/2 HP
Voltage.....	110V/220V
Prewired.....	110V
Phase.....	Single-Phase
Amps.....	16A at 110V, 8A at 220V
Speed.....	1725 RPM
Cycle.....	60 Hz
Number of Speeds.....	1
Power Transfer .....	V-Belt Drive
Bearings.....	Shielded, Permanently Lubricated

### Main Specifications

#### Operation Info

Spindle Travel.....	3 in.
Swing.....	11 in.
Longitudinal Table Travel.....	14-1/4 in.
Cross Table Travel.....	6 in.
Vertical Table Travel.....	14 in.
Knee Travel.....	11-3/4 in.
Ram Travel.....	12 in.
Head Travel.....	2-1/2 in.
Head Swivel (Left-to-Right).....	90 deg.
Head Swivel (Front-to-Back).....	45 deg.
Turret or Column Swivel (Left and Right).....	360 deg.
Maximum Distance Spindle to Column.....	5-1/2 in.
Maximum Distance Spindle to Table.....	11-7/8 in.
Drilling Capacity for Cast Iron.....	1 in.
Drilling Capacity for Steel.....	3/4 in.
Number of Vertical Spindle Speeds.....	9
Range of Vertical Spindle Speeds.....	240, 360, 520, 730, 1280, 1320, 1600, 2220, 2760 RPM
Number of Longitudinal Feeds.....	Variable
Feed Rate.....	0 – 140 FPM
Quill Diameter.....	2.950 in.



**Table Info**

Table Length.....	26 in.
Table Width.....	6-1/8 in.
Table Thickness.....	1-3/4 in.
Number of T-Slots.....	3
T-Slots Width.....	0.560 in.
T-Slots Height.....	0.850 in.
T-Slots Centers.....	1-9/16 in.
Stud Size.....	3/8 in.

**Spindle Info**

Spindle Taper.....	R-8
End Milling Capacity.....	3/4 in.
Face Milling Capacity.....	3 in.
Drawbar Diameter.....	7/16 in.
Drawbar TPI.....	20
Drawbar Length.....	12-1/4 in.
Spindle Bearings.....	Tapered Roller

**Lead Screw Info**

Leadscrew Diameter.....	15/16 in.
Leadscrew TPI.....	8
Leadscrew Length.....	31 in.

**Construction**

Spindle Housing/Quill.....	Cast Iron
Table.....	Surface-Ground Cast Iron
Head.....	Cast Iron
Column.....	Cast Iron
Base.....	Cast Iron
Stand.....	Steel
Paint.....	Epoxy

**Other**

Collar Graduations.....	0.001 in.
Recommended Mobile Base.....	D2058A

**Product Dimensions**

Weight.....	900 lbs.
Width (side-to-side) x Depth (front-to-back) x Height.....	45-1/2 x 41 x 66-5/8 in.
Footprint (Length x Width).....	27-1/2 x 21 in.

**Shipping Dimensions**

Type.....	Wood Crate
Content.....	Machine
Weight.....	936 lbs.
Length x Width x Height.....	37 x 41 x 75 in.

**Electrical**

Power Requirement.....	110V/220V, Single-Phase, 60 Hz
Prewired Voltage.....	110V
Minimum Circuit Size.....	20A at 110V, 15A at 220V
Switch.....	ON/OFF Switch
Switch Voltage.....	110V
Cord Length.....	6 ft.
Cord Gauge.....	14 Gauge
Plug Included.....	Yes
Included Plug Type.....	NEMA 5-15

**Other**

Country Of Origin .....	China
Warranty .....	2 Years
Assembly Time .....	1 Hour

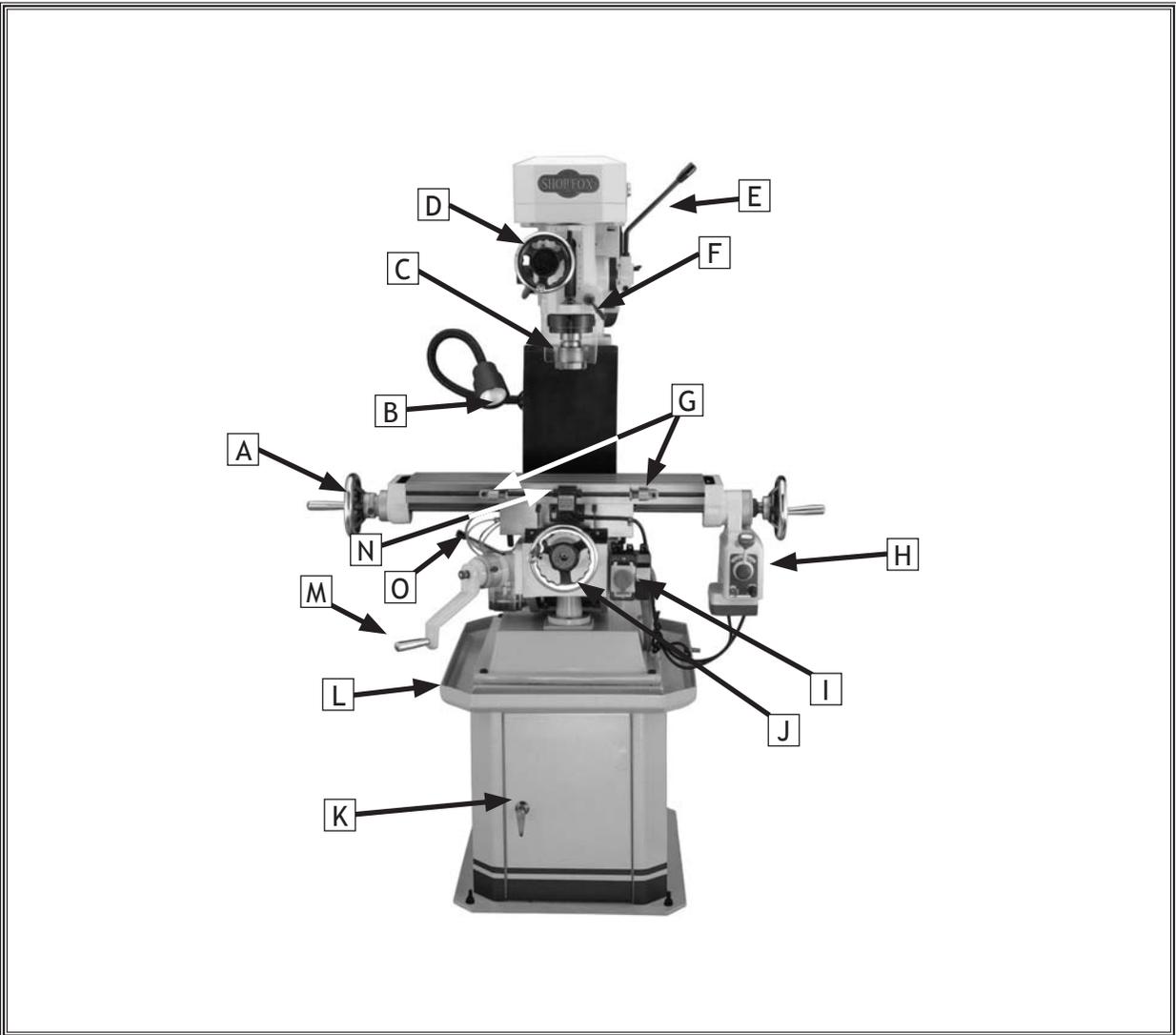
**Features**

- Milling Head Micro-Feed
- Built-In Work Light
- Class 7 Spindle Bearings
- Head Tilts to 45 Deg. Both Ways.
- Single-Shot Lubrication System
- High-Precision Ground Vertical and Cross Ways

**Accessories**

- Drawbar
- Tool Box
- 3 In. Shell Mill with Arbor
- Hex Wrench Set, 3-6mm
- Open End Wrenches
- Screwdrivers

# Controls and Features



- A. Longitudinal Handwheel
- B. Worklight
- C. 3" Shell Mill
- D. Quill Micro-Feed Handwheel
- E. Quill Down Feed Lever
- F. Quill Lock
- G. Power Feed Stops
- H. Longitudinal Power Feed
- I. ON/OFF Buttons
- J. Cross Feed Handwheel
- K. Storage Compartment
- L. Coolant Catch Basin
- M. Knee Lever
- N. Power Feed Limit Switch
- O. Single Shot Lubrication System

# SAFETY

## For Your Own Safety, Read Manual Before Operating 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—this responsibility is ultimately up to the operator!



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.

### NOTICE

This symbol is used to alert the user to useful information about proper operation of the equipment, and/or a situation that may cause damage to the machinery.

## Standard Machinery Safety Instructions

**OWNER'S MANUAL.** Read and understand this owner's manual **BEFORE** using machine. Untrained users can be seriously hurt.

**EYE PROTECTION.** Always wear ANSI-approved safety glasses or a face shield when operating or observing machinery to reduce the risk of eye injury or blindness from flying particles. Everyday eyeglasses are not approved safety glasses.

**HAZARDOUS DUST.** Dust created while using machinery may cause cancer, birth defects, or long-term respiratory damage. Be aware of dust hazards associated with workpiece materials, and always wear a NIOSH-approved respirator to reduce your risk.

**WEARING PROPER APPAREL.** Do not wear clothing, apparel, or jewelry that can become entangled in moving parts. Always tie back or cover long hair. Wear non-slip footwear to avoid accidental slips which could cause a loss of workpiece control.

**HEARING PROTECTION.** Always wear hearing protection when operating or observing loud machinery. Extended exposure to this noise without hearing protection can cause permanent hearing loss.

**MENTAL ALERTNESS.** Be mentally alert when running machinery. Never operate under the influence of drugs or alcohol, when tired, or when distracted.

**DISCONNECTING POWER SUPPLY.** Always disconnect machine from power supply before servicing, adjusting, or changing cutting tools (bits, blades, cutters, etc.). Make sure switch is in **OFF** position before reconnecting to avoid an unexpected or unintentional start.

**DANGEROUS ENVIRONMENTS.** Do not use machinery in wet or rainy locations, cluttered areas, around flammables, or in poorly-lit areas. Keep work area clean, dry, and well-lit to minimize risk of injury.

**APPROVED OPERATION.** Untrained operators can be seriously hurt by machinery. Only allow trained or properly supervised people to use machine. When machine is not being used, disconnect power, remove switch keys, or lock-out machine to prevent unauthorized use—especially around children. Make workshop kid proof!

**ONLY USE AS INTENDED.** Only use machine for its intended purpose. Never modify or alter machine for a purpose not intended by the manufacturer or serious injury may result!

**USE RECOMMENDED ACCESSORIES.** Consult this owner's manual or the manufacturer for recommended accessories. Using improper accessories will increase the risk of serious injury.

**CHILDREN & BYSTANDERS.** Keep children and bystanders a safe distance away from work area. Stop using machine if children or bystanders become a distraction.

**REMOVE ADJUSTING TOOLS.** Never leave adjustment tools, chuck keys, wrenches, etc. in or on machine—especially near moving parts. Verify removal before starting!

**SECURING WORKPIECE.** When required, use clamps or vises to secure workpiece. A secured workpiece protects hands and frees both of them to operate the machine.

**FEED DIRECTION.** Unless otherwise noted, feed work against the rotation of blades or cutters. Feeding in the same direction of rotation may pull your hand into the cut.

**GUARDS & COVERS.** Guards and covers can protect you from accidental contact with moving parts or flying debris. Make sure they are properly installed, undamaged, and working correctly before using machine.

**STABLE MACHINE.** Unexpected movement during operations greatly increases the risk of injury and loss of control. Verify machines are stable/secure and mobile bases (if used) are locked before starting.

**FORCING MACHINERY.** Do not force machine. It will do the job safer and better at the rate for which it was designed.

**AWKWARD POSITIONS.** Keep proper footing and balance at all times when operating machine. Do not overreach! Avoid awkward hand positions that make workpiece control difficult or increase the risk of accidental injury.

**UNATTENDED OPERATION.** Never leave machine running while unattended. Turn machine off and ensure all moving parts completely stop before walking away.

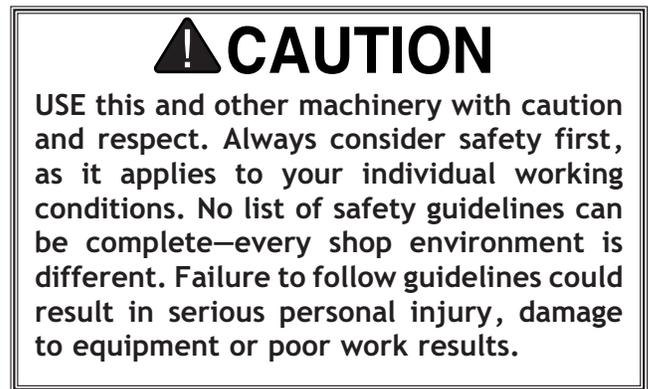
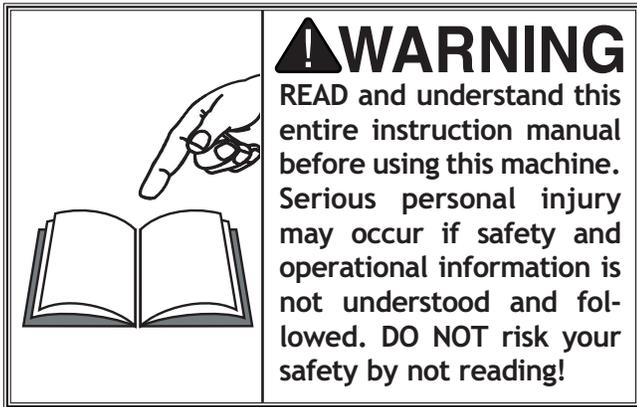
**MAINTAIN WITH CARE.** Follow all maintenance instructions and lubrication schedules to keep machine in good working condition. An improperly maintained machine may increase the risk of serious injury.

**CHECK DAMAGED PARTS.** Regularly inspect machine for damaged parts, loose bolts, mis-adjusted or mis-aligned parts, binding, or any other conditions that may affect safe operation. Always repair or replace damaged parts, wires, cords, or plugs before operating machine.

**MAINTAIN POWER CORDS.** When disconnecting cord-connected machines from power, grab and pull the plug—NOT the cord. Pulling the cord may damage the wires inside. Do not handle the cord/plug with wet hands. Avoid cord damage by keeping it away from heated surfaces, high traffic areas, harsh chemicals, and wet or damp locations.

**EXPERIENCING DIFFICULTIES.** If at any time you are experiencing difficulties performing the

# Additional Safety Instructions for Vertical Mills



**MILL ASSEMBLY.** Do not operate until unit is assembled and installed according to instructions.

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

**SECURING WORKPIECE.** Never hold a workpiece by hand for any type of machining operation. Hold your workpiece secure with a mill vise, step clamps, etc.

**SECURING CUTTING TOOLS.** Make sure that the cutting tool is chucked or colleted properly. Cutting tools that are loose or not rotating correctly can come off and cause serious personal injury.

**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.

**USING GUARDS.** Make sure cover is closed and latched before turning the machine ON.

**CHUCK KEY SAFETY.** Always remove your chuck key, draw bar wrench, and any service tools immediately after use.

**CLEARING CHIPS.** Turn off machine and wait for cutting tool to come to a complete stop before clearing away chips. Chips are sharp. Use a brush to remove them.

**FEED AND SPEED RATES.** Research the proper feed and speed rate for the material you are machining. Do not exceed these recommended rates.

**CHANGING SPINDLE DIRECTION.** Never reverse motor direction while the spindle is in motion.

**TURNING OFF THE MILL.** Allow the mill to come to a complete stop before leaving it unattended.

**SERVICING THE MILL.** Make sure mill is turned OFF, unplugged, and the machine has come to a complete stop before servicing. Perform routine inspections and correct service related issues promptly.

**HAZARDOUS COOLANTS.** Coolants used for machining may contain hazardous chemicals. Read and understand all user information on the coolant container and take any necessary precautions.

# ELECTRICAL

## Availability

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

## Full-Load Current Rating

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

Full-Load Current Rating at 110V ..... 16 Amps  
Full-Load Current Rating at 220V ..... 8 Amps

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

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

**⚠ WARNING**



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

**⚠ CAUTION**

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

ELECTRICAL

### Circuit Information

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

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

### Circuit Requirements for 110V

This machine is prewired to operate on a 110V power supply circuit that has a verified ground and meets the following requirements:

- Nominal Voltage..... 110V/120V
- Cycle.....60 Hz
- Phase ..... Single-Phase
- Minimum Circuit Size ..... 20 Amps
- Plug/Receptacle ..... NEMA 5-15

### Circuit Requirements for 220V

This machine can be converted to operate on a 220V power supply (refer to **Voltage Conversion** later in this section). The intended 220V circuit must have a verified ground and meet the following requirements:

- Nominal Voltage..... 220V/240V
- Cycle.....60 Hz
- Phase ..... Single-Phase
- Minimum Circuit Size ..... 15 Amps
- Plug/Receptacle ..... NEMA 6-15

ELECTRICAL

## Grounding & Plug Requirements

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

**For 110V operation:** This machine is equipped with a power cord that has an equipment-grounding wire and a grounding plug (similar to the figure on the right). The plug must only be inserted into a matching receptacle (outlet) that is properly installed and grounded in accordance with all local codes and ordinances.

**For 220V operation:** The plug specified under "Circuit Requirements for 220V" on the previous page has a grounding prong that must be attached to the equipment-grounding wire inside the included power cord. The plug must only be inserted into a matching receptacle (similar to the figure on the right) that is properly installed and grounded in accordance with all local codes and ordinances.

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

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

## Extension Cords

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

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

Any extension cord used with this machine must contain a ground wire, match the required plug and receptacle, and meet the following requirements:

**Minimum Gauge Size** ..... 12 AWG  
**Maximum Length (Shorter is Better)** ..... 50 ft.

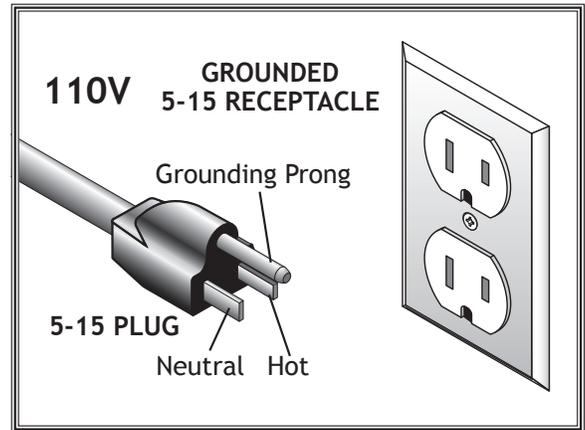


Figure 1. Typical 5-15 plug and receptacle.

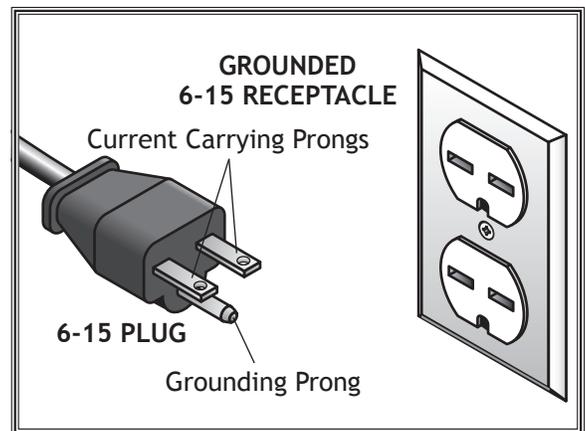


Figure 2. Typical 6-15 plug and receptacle.

**⚠ WARNING**

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

## Voltage Conversion

The voltage conversion **MUST** be performed by a qualified electrician. To perform the voltage conversion, install the correct plug and rewire the motor to the new voltage, according to the provided wiring diagram. *If the diagram included on the motor conflicts with the one in this manual, the motor may have changed since the manual was printed. Use the diagram provided on the motor.*

# SET UP

## Unpacking

The SHOP FOX® Model M1001 has been carefully packaged for safe transporting. If you notice the machine has been damaged, please contact your authorized SHOP FOX® dealer immediately.

## Inventory

The following is a description of the main components shipped with the SHOP FOX® Model M1001. Lay the components out to inventory them.

### Wooden Box Contents (Figures 3 & 4) Qty

- A. Milling Machine .....1
- B. Toolbox.....1

### Toolbox Contents (Figure 4) Qty

- C. 3" Shell Mill with Arbor .....1
- D. Handwheels.....2
- E. Handwheel Handles .....4
- F. Drawbar with Locking Nut .....1
- G. Spare V-Belts .....2
- H. 220V ON/OFF Switch.....1
- I. Open End Wrenches 17/19mm & 12/14mm .....2
- J. T-Slot Bolts M12-1.75 x 40 .....2
- K. Screwdriver .....1
- L. Phillips Head Screwdriver .....1
- M. Hex Wrenches 3, 4, 5, & 6mm .....4

### Inventory parts not shown:

- Power Feed Instruction Manual .....1

If any parts are missing, find the part number in the back of this manual and contact Woodstock International, Inc. at (360) 734-3482 or at [tech-support@shopfox.biz](mailto:tech-support@shopfox.biz)



Figure 3. Model M1001.

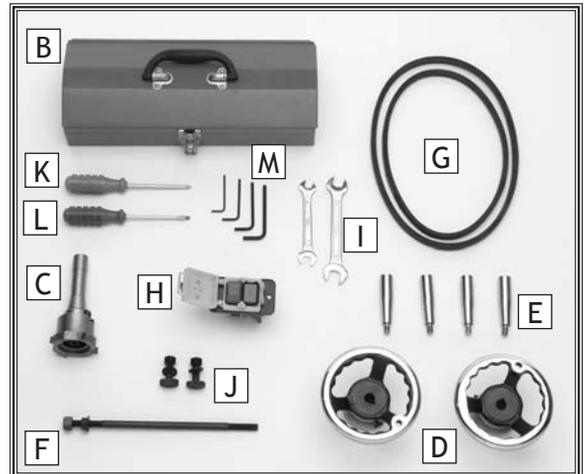
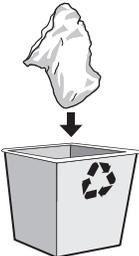


Figure 4. Toolbox contents.

## NOTICE

When ordering replacement parts, refer to the parts list and diagram in the back of the manual.



**⚠ WARNING**

**SUFFOCATION HAZARD!**

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

SET UP

# Machine Placement

- **Floor Load:** Your vertical mill has a large weight load of 822 lbs. in a small footprint. We recommend placing this mill on a concrete floor.
- **Working Clearances:** Consider existing and anticipated needs, size of material to be processed through the machine, and space for auxiliary stands, work tables or other machinery when establishing a location for your vertical mill (see **Figure 5**).
- **Lighting:** Lighting should be bright enough to eliminate shadow and prevent eye strain.
- **Electrical:** Electrical circuits must be dedicated or large enough to handle amperage requirements. Outlets must be located near each machine, so power or extension cords are clear of high-traffic areas. Follow local electrical codes for proper installation of new lighting, outlets, or circuits.

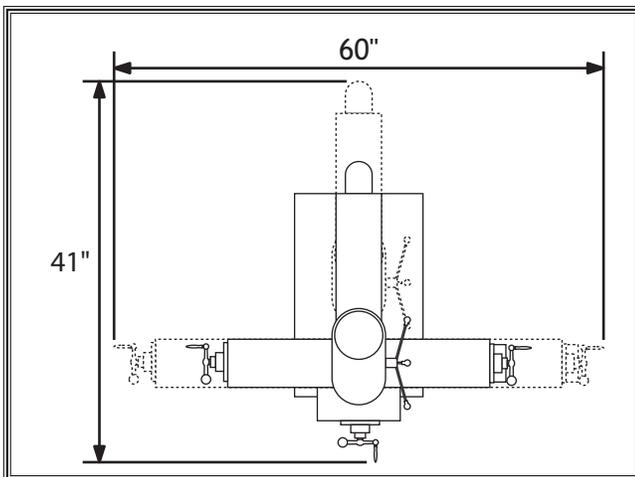


Figure 5. M1001 minimum working clearances.

# Cleaning Machine

The table and other unpainted parts of your Vertical Mill are coated with a waxy grease that protects them from corrosion during shipment. Clean this grease off with a solvent cleaner or citrus-based degreaser. **DO NOT** use chlorine-based solvents such as brake parts cleaner or acetone—if you happen to splash some onto a painted surface, you will ruin the finish.

	<p><b>⚠ WARNING</b></p> <p><b>NEVER</b> use gasoline or other petroleum-based solvents to clean with. Most have low flash points, which make them extremely flammable. A risk of explosion and burning exists if these products are used. Serious personal injury may occur if this warning is ignored!</p>
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	<p><b>⚠ CAUTION</b></p> <p><b>ALWAYS</b> work in well-ventilated areas far from possible ignition sources when using solvents to clean machinery. Many solvents are toxic when inhaled or ingested. Use care when disposing of waste rags and towels to be sure they <b>DO NOT</b> create fire or environmental hazards.</p>
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	<p><b>⚠ WARNING</b></p> <p><b>USE</b> helpers and power lifting equipment to lift this 6" x 26" Vertical Mill. Otherwise, serious personal injury may occur.</p>
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SET UP

# Mounting Mill on Shop Floor

Although not required, it is recommended that you mount your new mill to the floor. Because this is an optional step and floor materials may vary, floor mounting hardware is not included. Generally, you can either bolt your machine to the floor or mount it on machine mounts. Both options are described below. Whichever option you choose, it will be necessary to use a precision level to level your mill (see **Figures 6-8**).

## Bolting to Concrete Floors

Lag shield anchors with lag bolts and anchor studs are two predominate methods for anchoring an object to a concrete floor. We suggest you research the many options and methods for mounting your mill and choose the best that fits your specific application.

## Using Machine Mounts

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

### **NOTICE**

Anchor studs, as shown in **Figure 7**, 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 at a later point.



**Figure 6.** Typical lag shield anchor and lag bolt.



**Figure 7.** Typical anchor stud.



**Figure 8.** Machine mount example.

# Assembly

The Model M1001 comes fully assembled from the factory with the exception of one of the longitudinal handwheels and the cross handwheel. The head has been rotated to reduce the overall dimension of the shipping crate.

## Headstock Adjustment

Loosen the three nuts at the column and rotate the headstock to the "0" position on the column scale (see Figure 10).

## Handle Installation

The longitudinal and cross handwheels shown in Figure 11 need to be installed. The handwheel handles will need to be installed on all the handwheels. Attach the handwheels and handles with the hex wrench, screwdriver, and hardware provided.

## Drawbar

Open the top cover and insert the drawbar into the splined spindle located in the center of the front cone pulley (see Figure 12).

## Single Shot Lubrication

Unscrew the filler cap and fill the reservoir with non-detergent SAE-20 or similar way oil. Manually pump the lever until resistance from the oil pressure is felt (see Figure 9).

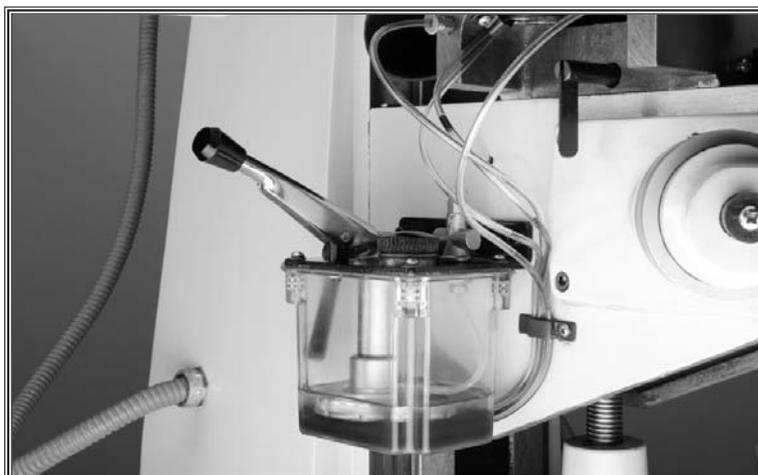


Figure 9. Single shot lubrication system.

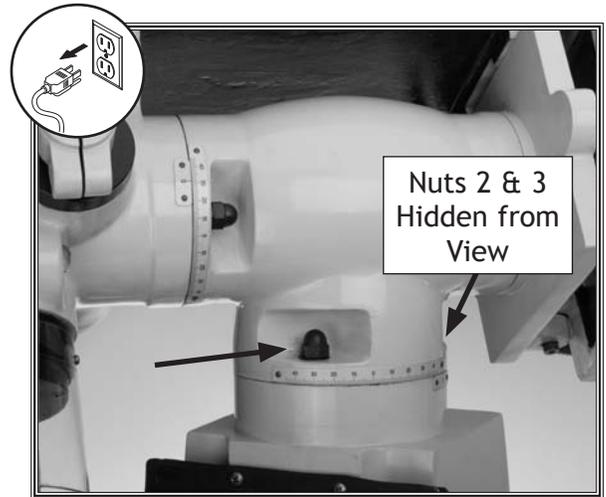


Figure 10. Headstock lock nuts.

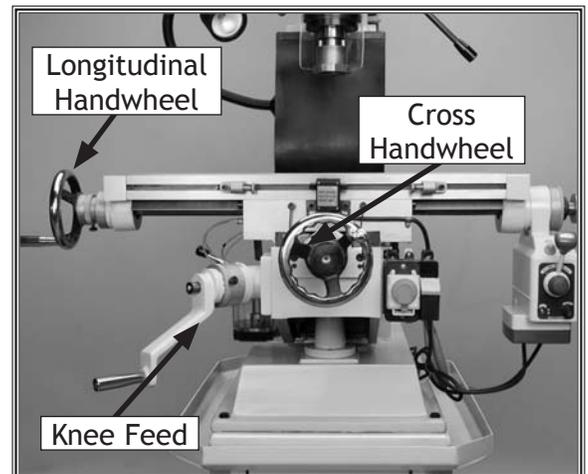


Figure 11. Handwheel locations.

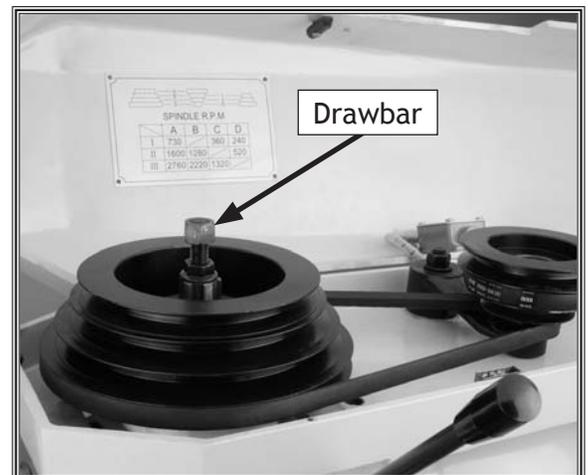


Figure 12. Drawbar location.

## Spindle Controls

Figure 13 shows the location of the ON/OFF buttons and the SPINDLE DIRECTION toggle for the Model M1001.

- The ON/OFF buttons control power to the spindle.
- The SPINDLE DIRECTION toggle will change the direction the spindle rotates. **DO NOT** change spindle rotation until spindle has come to a complete stop!

## Test Run

Complete this process once you have familiarized yourself with all instructions in this manual and you have made sure the machine is completely lubricated as described in **Lubrication** on **page 27**. The purpose of the test run is to make sure the motor is working properly before proceeding.

To begin the test run procedure, do these steps:

1. Make sure there are no obstructions around or underneath the spindle.
2. Set the mill to the slowest RPM. See **Page on page 23** for adjusting RPM.
3. Put on safety glasses, and make sure any bystanders are wearing safety glasses and are out of the way.
4. Plug the machine into the power outlet and push the ON/OFF switch to turn the mill **ON**, but make sure that your hand stays over the switch. The mill should run smoothly, with little or no vibration or rubbing noises.
  - If you hear squealing or grinding noises, turn the machine **OFF** immediately. Wait for the mill to stop moving, unplug the machine, and correct any problems before further operation.
  - If the source of an unusual noise or vibration is not readily apparent, contact our technical support for help at (360) 734-3482 or contact us online at [tech-support@shopfox.biz](mailto:tech-support@shopfox.biz).

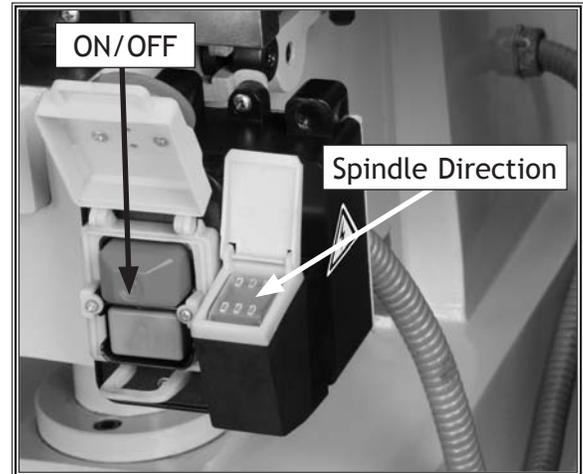


Figure 13. Spindle controls.

## NOTICE

Follow spindle break in procedures on **Page on page 24** after the test run and before performing any operations with this machine! Failure to follow the break-in procedures included in this manual may lead to shortened tool life and may void warranty.

# OPERATIONS

## General

The Model M1001 will perform many types of operations that are beyond the scope of this manual. Many of these operations can be dangerous or deadly if performed incorrectly.

The instructions in this section are written with the understanding that the operator has the necessary knowledge and skills to operate this machine. **If at any time you are experiencing difficulties performing any operation, stop using the machine!**

If you are an inexperienced operator, we strongly recommend that you read books, trade articles, or seek training from an experienced vertical mill operator before performing any unfamiliar operations. **Above all, your safety should come first!**

**! WARNING**

**READ and understand this entire instruction manual before using this machine. Serious personal injury may occur if safety and operational information is not understood and followed. DO NOT risk your safety by not reading!**

## Positioning Spindle Head

The spindle head can be rotated vertically 45° both ways, and can rotate horizontally on the column 45° in both directions.

To rotate the spindle head vertically, do these steps:

1. **UNPLUG THE MILL!**
2. Make sure the spindle is stopped and the work area is free from obstructions before proceeding.
3. Loosen the four nuts that lock the headstock in place with a 17mm wrench (see **Figure 14** on next page).
4. Rotate the headstock to the desired angle.
5. Tighten the spindle locking nuts.

**Note:** Additional setup tools should be used to determine the precise angle of the spindle head.

**! WARNING**

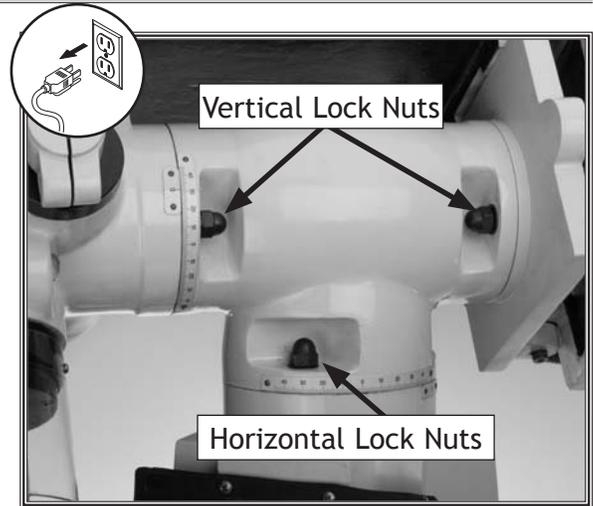
**Always wear safety glasses when operating the mill. Failure to comply may result in serious personal injury.**

**! WARNING**

**DO NOT investigate problems or adjust the mill while it is running. Wait until the machine is turned off, unplugged and all working parts have come to a complete stop before proceeding!**

To rotate the spindle head horizontally, do these steps:

1. **UNPLUG THE MILL!**
2. Make sure the spindle is stopped and the work area is free from obstructions before proceeding.
3. Using a 17mm wrench, loosen the three locking nuts shown in **Figure 14**.
4. Push or pull the spindle head to swivel it to the desired position. Use the scale located on the column to set the angle desired.
5. Tighten the three nuts to lock the headstock in position.



**Figure 14.** Vertical and horizontal headstock lock nuts.

## Table Travel

The table can be moved in 3 axes. Each axis is independently controlled by a handle or handwheel. The longitudinal travel has the added feature of a power feed, which will be explained in more detail later. Each handle or handwheel has a graduated dial to accurately position the workpiece in relation to the cutting tool. Each axis has the ability to be locked in position. Locking the axis in place will help keep workpiece vibration to a minimum.

### Longitudinal Feed Control

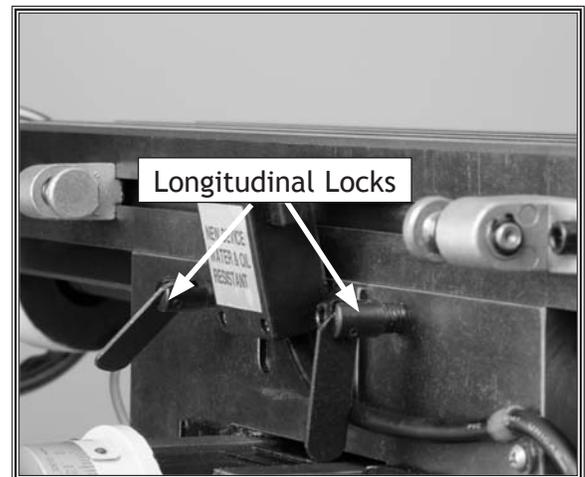
The longitudinal feed is controlled by two handwheels, one at each end of the table, and can be locked in position by the two locks at the front of the table (see **Figure 15**).

### Cross Feed

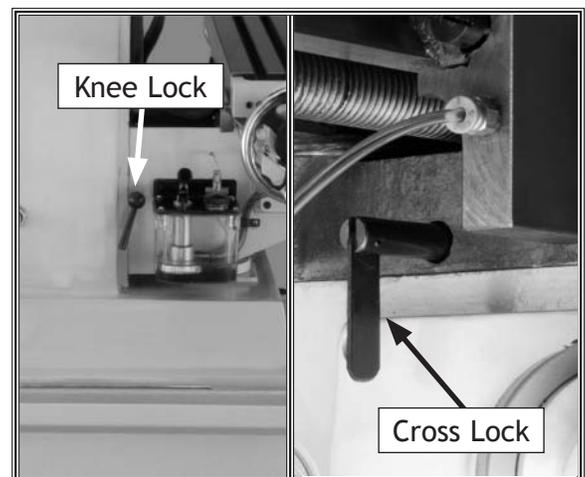
The cross feed is controlled by the center handwheel, and can be locked in position by the lock under the left side of the mill table (see **Figure 16**).

### Knee Feed

The knee feed is controlled by one handle, just off center at the front of the machine. The Model M1001 has one knee feed lock on the left side of machine next to the single shot pump, where the knee meets the ways (see **Figure 16**).



**Figure 15.** Longitudinal locks.



**Figure 16.** Cross and knee locks.

# Graduated Dials

The table handwheels and the knee handle have graduated dials. Each mark represents 0.001" of movement and one full revolution equals 0.100". The graduated dials float and can be indexed or "zeroed" by loosening the knurled head thumb screw, rotating the graduated dial to "0", and securing the setting with the knurled head thumb screw (see **Figure 17**).

**Example:**

Suppose you want to drill a series of holes with 1/2" centers (0.500"). After locating the first hole placement and drilling, you would zero the graduated dial of the appropriate axis, set the knurled head thumb screw, move the table 0.500" in the appropriate direction and drill the next hole.

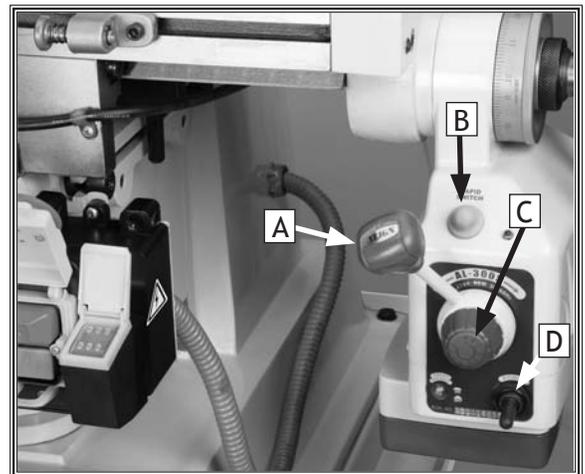


**Figure 17.** Graduated dial.

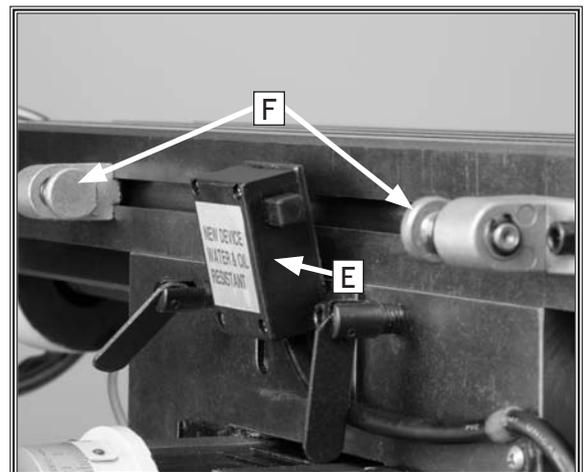
# Power Feed Controls

This mill comes equipped with a power feed on the longitudinal travel. The power feed has the following controls (see **Figure 18** for items A-D, and see **Figure 19** for items E-F): For additional information, please refer to the power feed manual supplied with this mill.

- A. **Right/Left Feed Selector**—Switch the lever to the left or the right for the desired travel direction. The table should come to a complete stop before changing directions.
- B. **Rapid Speed Switch**—Pressing this switch will cause the table to feed at its maximum rate until it is released.
- C. **Feed Setting Dial**—Setting from 0 (no travel) to 10 (fastest travel).
- D. **ON/OFF Switch**—Delivers power to the power feed.
- E. **Limit Switch**—Stops the power feed when it makes contact with the power feed stops.
- F. **Power Feed Stops**—Adjustable stops trigger the limit switch and shuts **OFF** the power feed when the table is at the end of its travel.



**Figure 18.** Power feed controls.



**Figure 19.** Limit switch and power feed stops.

# Quill Travel

## Quill Feed Control

The quill feed is controlled by the quill feed handle shown in **Figure 20**. The handle allows the mill to operate as a drill.

To use the quill feed handle, do these steps:

1. Pull the quill feed handle (see **Figure 20**) forward to feed the quill down towards the workpiece. The quill feed handle is spring loaded to assist in returning the handle to the upmost vertical position.
2. Lock the quill in place at any depth by tightening the quill feed handle lock shown in **Figure 20**.

**Note:** When the quill feed is not in use, return it to the upmost position and lock in place. This will help maintain mill rigidity and accuracy.

3. Adjust the position of the handle by loosening the pinch bolt on the quill shaft and then tightening when the handle is in the desired position.

## Micro-feed Depth Adjustment

The micro-feed handwheel is used to accurately control the quill depth (see **Figure 21**).

To use the micro-feed handwheel, do these steps:

1. Turn the mill **OFF** and allow the spindle to come to a complete stop.
2. Tighten the quill clutch knob.
3. Turn the micro-feed handwheel (see **Figure 21**) clockwise to feed the quill down or counterclockwise to feed the quill up.

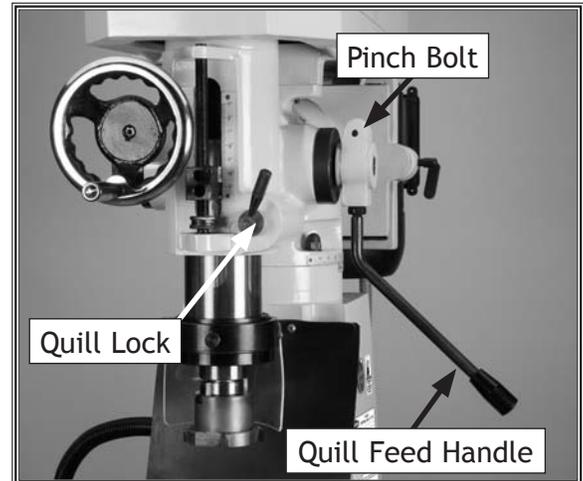


Figure 20. Quill feed controls.

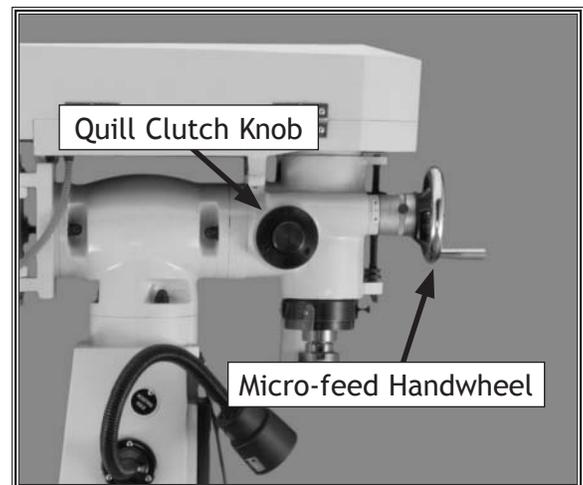


Figure 21. Micro-feed controls.

# Determining Needed RPM

Before changing speeds, you must first determine the best RPM to use with the material and diameter of your cutting tool. Using this determined RPM, you can then set the mill to match that speed.

To determine the RPM needed for your workpiece, do these steps:

1. Use the chart in **Figure 22** to determine the cutting speed for your workpiece material.
2. Measure the diameter of your cutting tool in inches.
3. Use the following formula in **Figure 23** to determine the best RPM for your operation.

**Note:** Always round to the closest RPM given on the spindle speed chart.

### Example 1

You have a piece of aluminum stock, and you are using a 1/2" diameter HSS cutting tool.

*Step 1:*  
300 (SFM from chart) x 4 = 1200

*Step 2:*  
1200 / .5" (Diameter of cutting tool) = 2400 RPM

*Result:*  
The best speed for this workpiece is 2400 RPM.

### Example 2

You have a piece of stainless steel, and you are using a 1" diameter carbide cutting tool.

*Step 1:*  
60 (SFM from chart) x 2 (for carbide tool) = 120

*Step 2:*  
120 (determined SFM) x 4 = 480

*Step 3:*  
480 / 1" (Diameter of cutting tool) = 480 RPM

*Result:*  
The best speed for this workpiece is 480 RPM.

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

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

**Figure 22.** Cutting speed chart for HSS cutting tools.

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

**Figure 23.** Formula to determine required RPM.

# Setting RPM

Setting the RPM on the Model M1001 involves placing the V-belts on the pulleys as shown in the spindle speed chart below.

To set the spindle speed, do these steps:

1. Examine the Spindle Speed Chart in Figure 24 to find the closest match to your needed RPM.
2. **UNPLUG THE MILL!**
3. Open the pulley cover.
4. Loosen the motor release lever and move the motor toward the spindle to loosen the tension on the V-belts.
5. Move the belts to the appropriate pulley combinations as shown on the spindle speed chart below.
6. Tension the V-belts by pulling the motor back and locking the motor release lever (see Figure 25).
7. Close the pulley cover and plug in the mill.

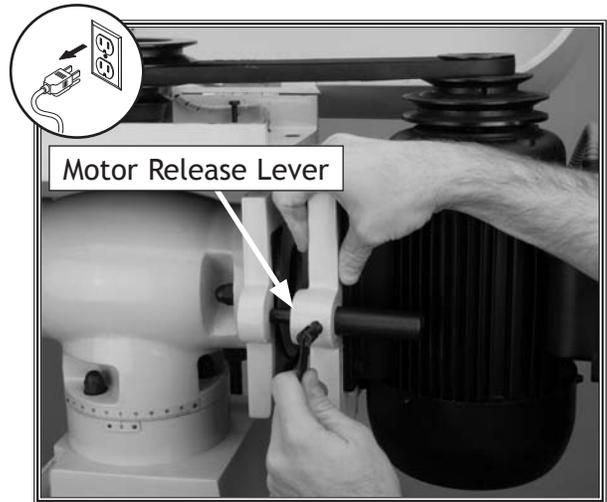


Figure 25. Applying tension to V-belts.

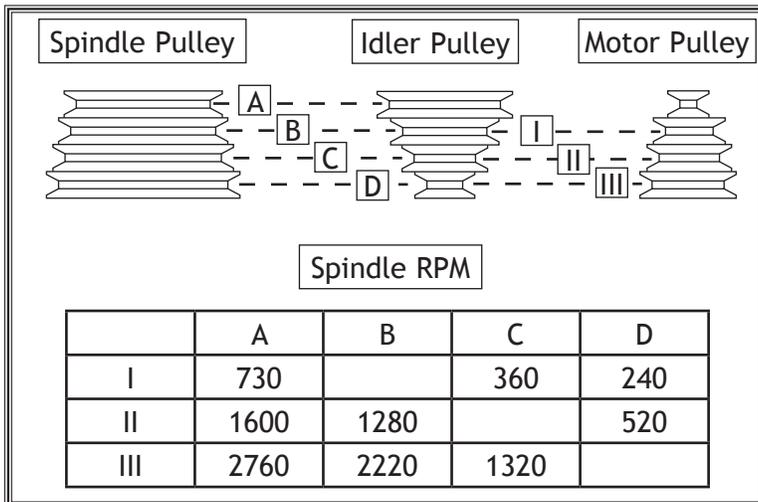


Figure 24. M1001 Spindle speed chart in RPMs.

**! WARNING**  
 Failure to follow RPM and feed rate guidelines may threaten operator safety from ejected parts or broken tools.

**NOTICE**  
 Failure to follow RPM and feed rate guidelines will put undue strain on moving parts, shorten tool life, and create poor workpiece results.

OPERATIONS

# Spindle Break-in Procedure

Complete this process once you have familiarized yourself with all instructions in this manual and have made sure the machine is completely lubricated.

## NOTICE

The spindle break-in procedure is important for ensuring long life and trouble-free performance from your mill. Failure to perform this procedure can shorten the life of your machine and void your warranty.

To break-in the spindle, do these steps:

1. Make sure the mill has been properly lubricated.
2. Make sure there are no obstructions around or underneath the spindle.
3. Set the spindle speed to the lowest RPM.
4. Set the SPINDLE DIRECTION toggle to the forward position.

5. Turn **ON** the spindle in the forward rotation and let it run for a minimum of 10 minutes.
6. Turn the spindle **OFF**, wait for the spindle to come to a complete stop.
7. Set the SPINDLE DIRECTION toggle to the reverse position and turn the spindle **ON**. Run the spindle in the reverse direction for 10 minutes.
8. Repeat these steps for each RPM setting.

## Installing Tools

To load a tool in the spindle, do these steps:

1. **UNPLUG THE MILL!**
2. Turn the mill **OFF**, allow it to come to a complete stop and unplug the mill.
3. Clean any debris from the spindle opening.
4. Insert the tool holder or a collet into the spindle.
5. Rotate the holder until the groove lines up with the key and the holder slides into the spindle.
6. Use a wrench to tighten the drawbar (see **Figure 26**) until the tool is secure in the spindle.

**Note:** Do not overtighten the drawbar. Overtightening makes collet removal difficult and causes unnecessary wear to the draw bar threads, collet, and the spindle taper.

7. Close the pulley cover and clear all items away from the cutting tool before turning the mill **ON**.

## Removing Cutting Tools

To remove cutting tools, do these steps:

1. **UNPLUG THE MILL!**
2. Make sure the spindle is turned **OFF** and the quill is at the upmost position.
3. Use a brush to remove any debris or chips from the tool and the tool holder/arbor.
4. Use a wrench to loosen the drawbar from the tool.
5. Once the tool is loosened, support the cutter with a gloved hand, and strike the drawbar with a dead blow hammer or rubber mallet to release the tool holder from the spindle.

**Note:** DO NOT strike the drawbar if it is completely unscrewed from the tool. This can damage the threads on the drawbar and the tool.

6. Finish unscrewing the drawbar by hand.
7. Clean any debris from the spindle opening area.

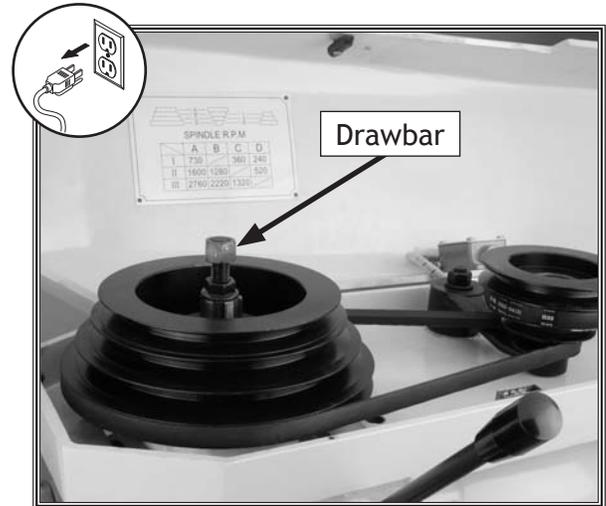


Figure 26. Drawbar location.

### NOTICE

**DO NOT** overtighten the drawbar. Overtightening makes collet removal difficult and causes damage to the drawbar threads, collets, and spindle taper.

### NOTICE

When not in use, always remove collets and cutting tools from spindle taper. Failure to do so may cause the collet to seize and be very hard to remove later.

# MAINTENANCE

## General

Regular periodic maintenance on your SHOP FOX® mill will ensure optimum performance. Make a habit of inspecting your mill each time you use it.

Check for the following conditions and repair or replace when necessary:

- Loose chucks and arbors.
- Loose vices or clamps.
- Loose mounting bolts.
- Worn switch and safety shut off features.
- Worn or damaged cords and plugs.
- Damaged V-belt.
- Any other condition that could hamper the safe operation of this machine.

A thorough cleaning, on a regular basis, will increase the machine durability and efficiency by removing chips and grime that can gum up moving parts.

A regular application of a protective spray coating will keep the table and other bare metal parts from rusting and pitting.

## Cleaning

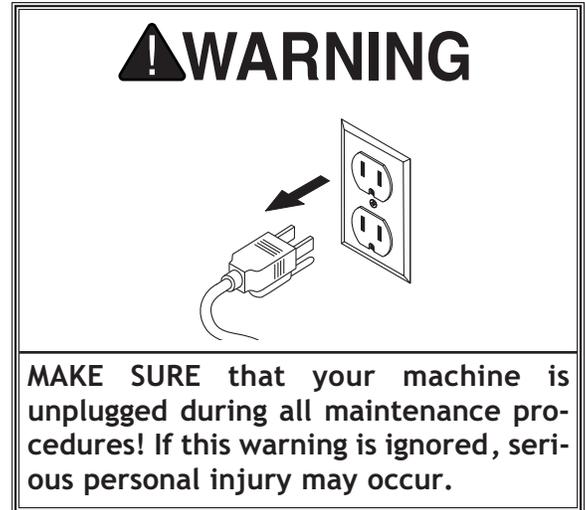
Cleaning the Model M1001 is relatively easy. Sweep excess metal chips from the table and ways, and wipe off the remaining waste with a dry cloth. If any coolant is left on the table, wipe it up with a rag. Treat all unpainted cast iron and steel with a non-staining lubricant after cleaning.

## Table and Base

Protect the unpainted cast iron surfaces by wiping them clean after every use—this ensures moisture does not remain on bare metal surfaces.

Keep exposed cast iron rust-free with regular applications of surface lubricants designed for cast iron.

Remove vices, clamps, rotary tables, etc. after use so moisture cannot be trapped between the components and cause rust.



# Lubrication

## Power Feed

The power feed uses SAE 40 oil and should not need to be changed unless the unit is being repaired.

## Single Shot Lubrication System

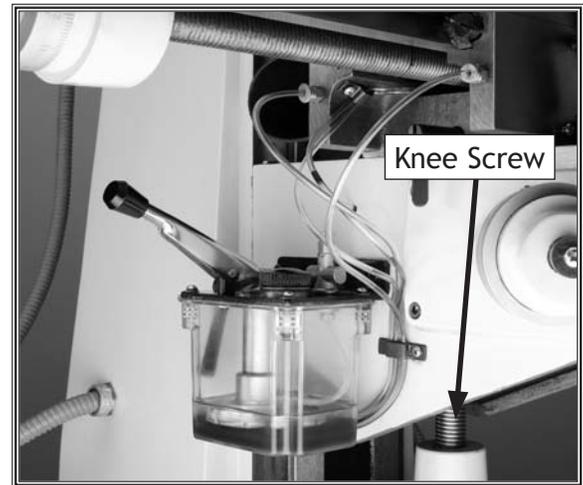
Use the single shot lubrication system to oil the ways, the crossfeed screw, and the longitudinal screw by pumping the handle on the reservoir 2-4 times each day (see **Figure 27**). Fill the reservoir regularly with ISO 68 or SAE 20 weight machine oil.

## Knee Elevating Screw

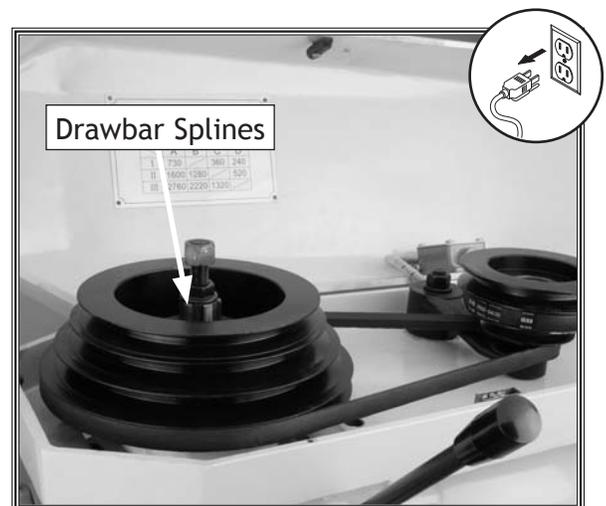
Apply liberal amounts of lithium or graphite based grease using a brush or shop rag to the entire length of the knee elevating screw.

## Drawbar Splines

Place five drops of ISO 68 or SAE 20 weight machine oil on the splines around the drawbar once a week. This is accomplished by moving the quill all the way down and locking it in place. Apply the oil to the splines on the back side of the drawbar hole. Next, run the quill through complete motion a couple of times to lubricate splines (see **Figure 28**).



**Figure 27.** Single shot lubrication system.



**Figure 28.** Drawbar splines.



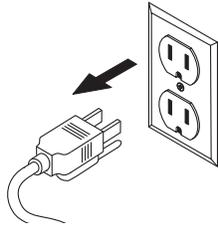
# SERVICE

## General

This section covers the most common service adjustments or procedures that may need to be made during the life of your machine. **Always disconnect your machine from the power source before performing any service!**

If you require additional machine service not included in this section, please contact Woodstock International Technical Support at (360) 734-3482 or send e-mail to: [tech-support@shopfox.biz](mailto:tech-support@shopfox.biz).

### WARNING



**MAKE SURE** that your machine is unplugged during all service procedures! If this warning is ignored, serious personal injury may occur.

## Gibs

The gibs are pre-adjusted at the factory and should not need further adjustment until many hours of machine use, if ever. If the movement seems too tight, make sure that the locks are fully released, ways are free of chips and debris and are thoroughly lubricated with oil.

When adjusting the gibs, the goal is to take out unnecessary play in the table and cross slide without causing the slides to bind. Loose gibs may cause poor finishes on the workpiece and may cause undue wear on the slide. Over-tightening may cause premature wear to the gib.

Adjust the gibs by a combination of loosening or tightening the adjustment screws until a slight drag is felt while moving the table/knee along the dovetail slides. There are two adjustment screws, one on each end of the gib (see **Figures 29-31** for the locations of the adjustment screws). The chip wiper guards must be removed to access some of the gib adjustment screws.



Figure 29. Cross gib screw.

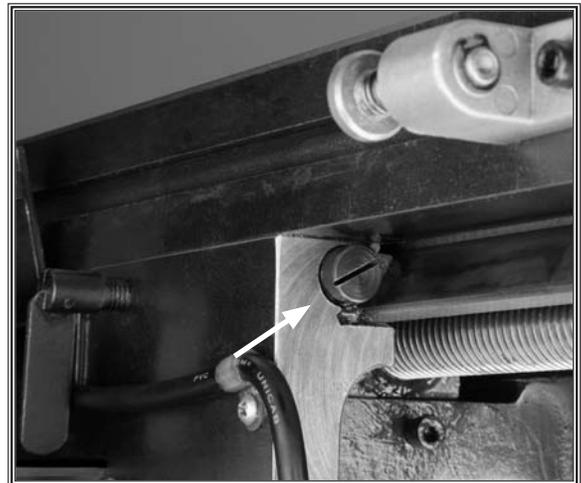


Figure 30. Longitudinal gib screw.



Figure 31. Knee gib screw.

# Adjusting Backlash

Backlash is the amount of play found in a leadscrew. It can be found by turning the cross slide handwheel in one direction, and then turning the handwheel the other direction. When the cross slide begins to move, the backlash has been taken up.

Leadscrews are adjusted for backlash at the factory and should not need any adjustment for many hours of machine use, if ever. Keeping a clean and well lubricated machine will ensure long leadscrew life.

To adjust the backlash, do these steps:

## Longitudinal Feed Adjustment

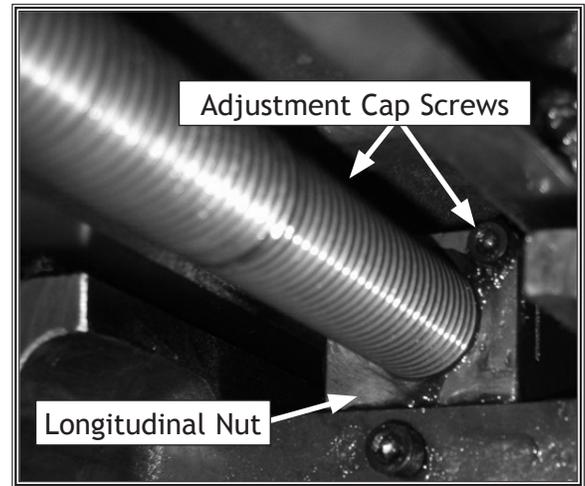
1. Slightly tighten the two cap screws on the longitudinal nut (see **Figure 32**). DO NOT overtighten.
2. Rotate the handwheel in both directions to see if backlash has been reduced or eliminated. There should only be a slight drag when turning the handwheel.

**Note:** If the cap screws are too tight, it will cause excessive wear to the longitudinal nut and leadscrew, which could lead to costly repairs.

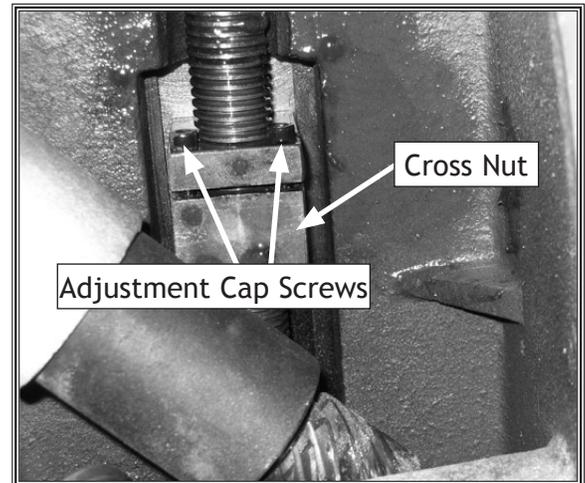
## Crossfeed Adjustment

1. Slightly tighten the two cap screws on the cross nut (see **Figure 33**). DO NOT overtighten.
2. Rotate the handwheel in both directions to see if backlash has been reduced or eliminated. There should only be a slight drag when turning the handwheel.

**Note:** If the cap screws are too tight, it will cause excessive wear to the cross nut and leadscrew, which could lead to costly repairs.



**Figure 32.** Longitudinal nut.



**Figure 33.** Cross nut.

# Electrical Safety Instructions

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 Woodstock International Technical Support at (360) 734-3482.

## WARNING

1. **SHOCK HAZARD.** Working on wiring that is connected to a power source is extremely dangerous. Touching electrified parts will result in personal injury including but not limited to severe burns, electrocution, or death. Disconnect the power from the machine before servicing electrical components!
2. **QUALIFIED ELECTRICIAN.** Due to the inherent hazards of electricity, only a qualified electrician should perform wiring tasks on this machine. If you are not a qualified electrician, get help from one before attempting any kind of wiring job.
3. **WIRE CONNECTIONS.** All connections must be tight to prevent wires from loosening during machine operation. Double-check all wires disconnected or connected during any wiring task to ensure tight connections.
4. **WIRE/COMPONENT DAMAGE.** Damaged wires or components increase the risk of serious personal injury, fire, or machine damage. If you notice that any wires or components are damaged while performing a wiring task, replace those wires or components before completing the task.
5. **MOTOR WIRING.** The motor wiring shown in these diagrams is current at the time of printing, but it may not match your machine. Always use the wiring diagram inside the motor junction box.
6. **MODIFICATIONS.** Using aftermarket parts or modifying the wiring beyond what is shown in the diagram may lead to unpredictable results, including serious injury or fire.
7. **CAPACITORS/INVERTERS.** Some capacitors and power inverters store an electrical charge for up to five minutes after being disconnected from the power source. To avoid being shocked, wait at least this long before working on these components.
8. **ELECTRICAL REQUIREMENTS.** You **MUST** follow the electrical requirements at the beginning of this manual when connecting your machine to a power source.
9. **EXPERIENCING DIFFICULTIES.** If you are experiencing difficulties understanding the information included in this section, contact our Technical Support at (360) 734-3482.

### NOTICE

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

### WIRING DIAGRAM COLOR KEY

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

SERVICE

# Electrical Parts Identification

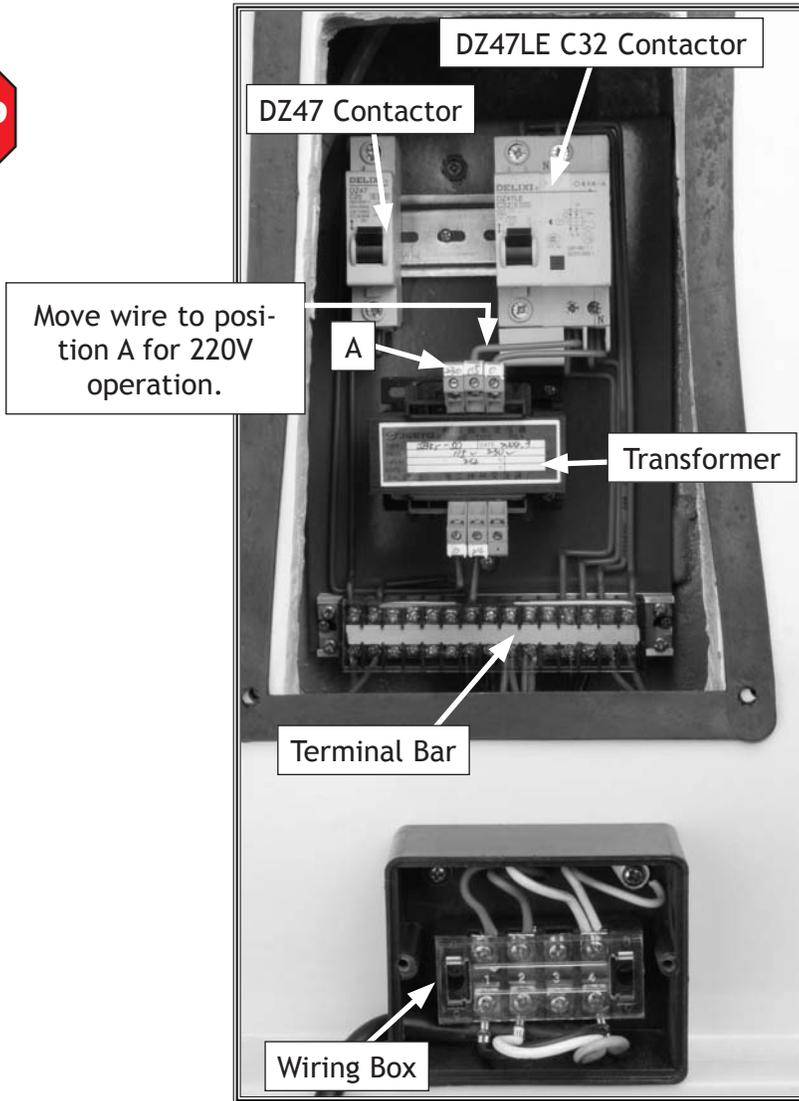


Figure 34. M1001 Electrical panel.

# Wiring Diagram

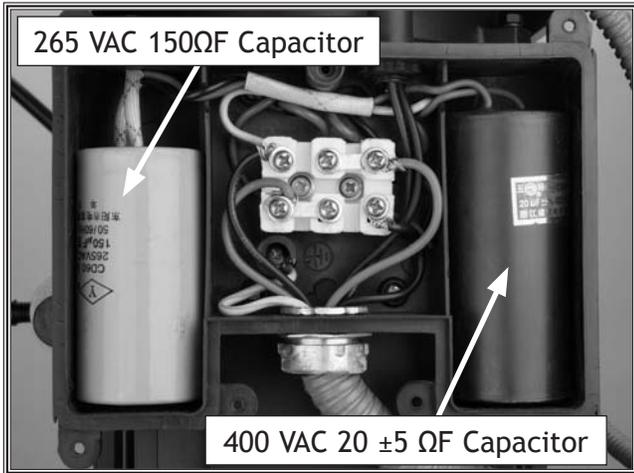


Figure 35. Motor wiring box currently wired for 110V.

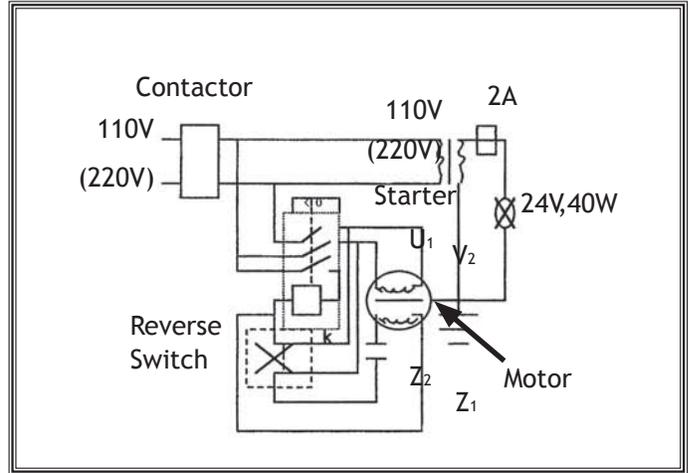


Figure 37. M1001 Wiring schematic.

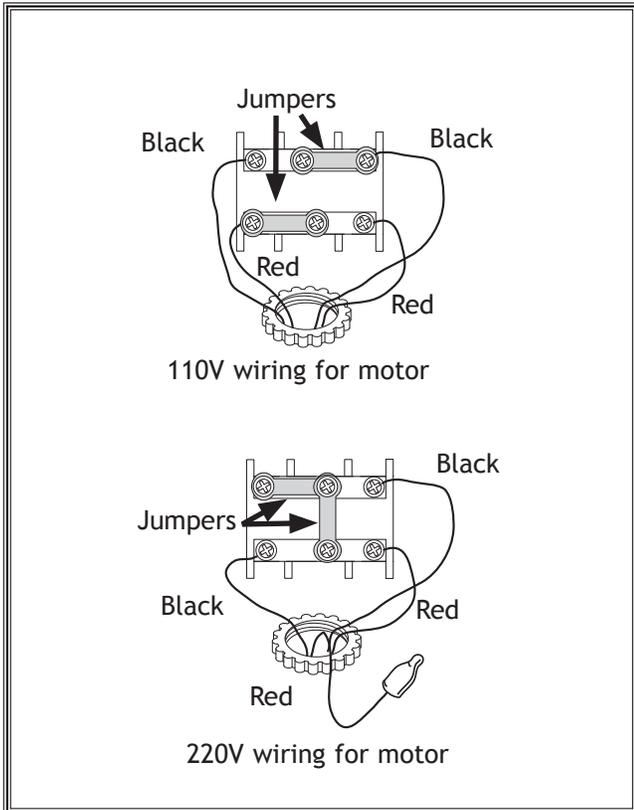


Figure 36. Motor wiring for 110V or 220V. Also refer to Figure 37.

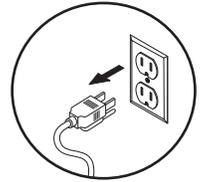


## NOTICE

If you find the spindle rotates in the opposite direction as indicated by the switch, reverse the position of the two black power wires.

SERVICE

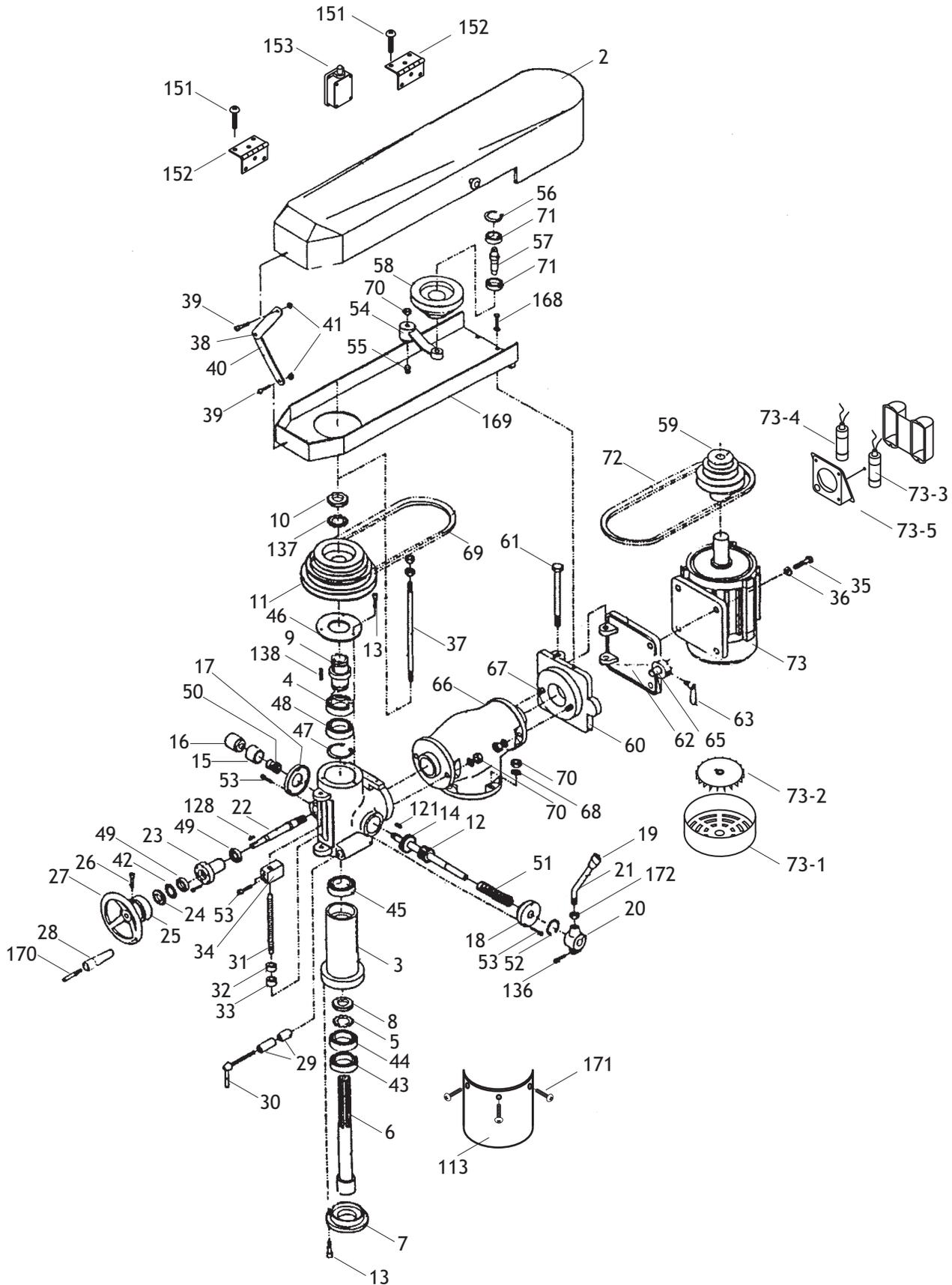
# Troubleshooting



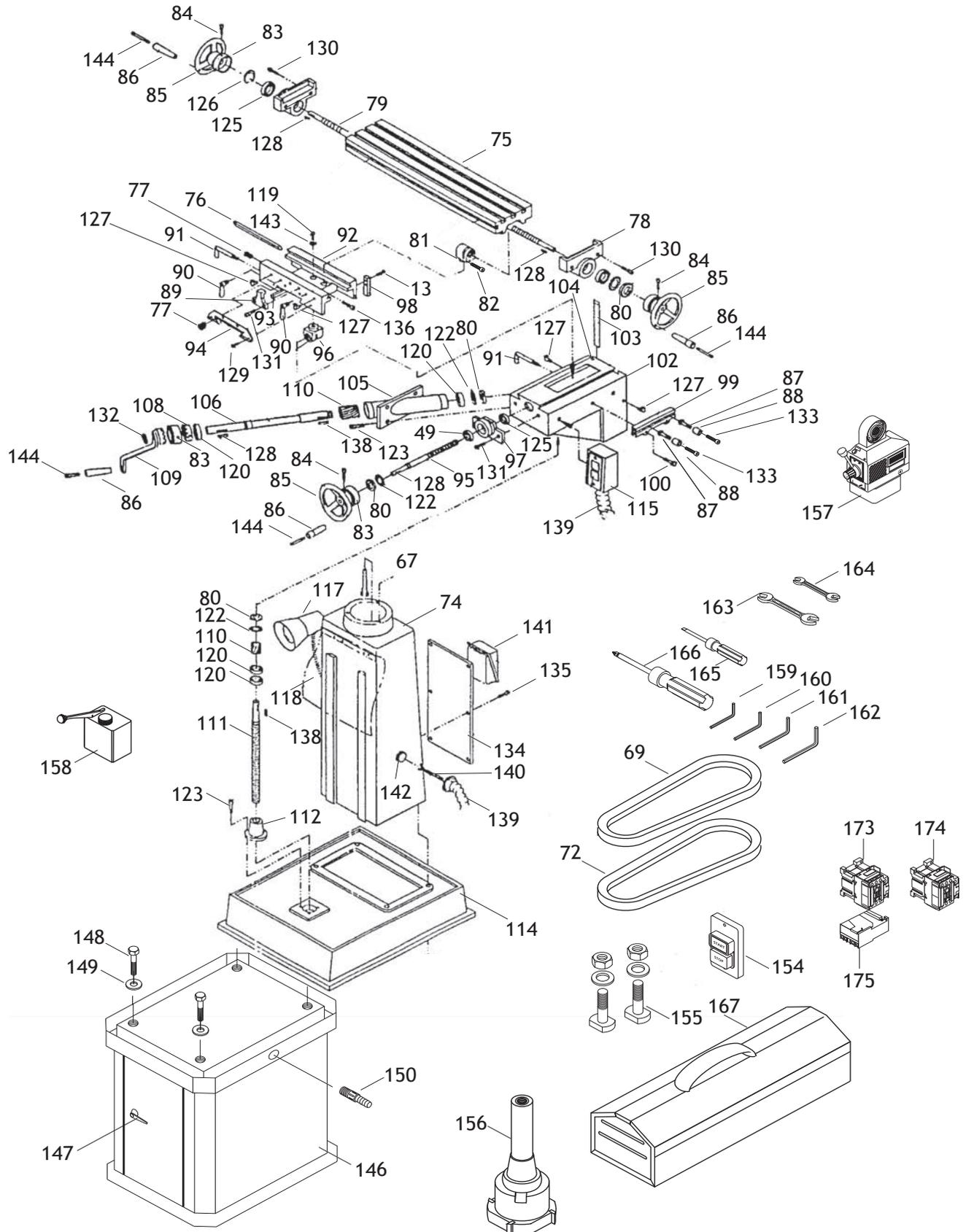
This section covers the most common problems. **WARNING! DO NOT** make any adjustments until the mill is unplugged and all moving parts have come to a complete stop.

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
Motor will not start.	<ol style="list-style-type: none"> <li>1. Tripped circuit breaker or relay inside machine wiring box or power source breaker box.</li> <li>2. Low voltage.</li> <li>3. Open circuit in motor or loose connections.</li> <li>4. Switch at fault.</li> <li>5. Faulty start capacitor.</li> </ol>	<ol style="list-style-type: none"> <li>1. Reset circuit breaker by flipping switch on then off then back on. Reset relay by pressing the reset button located on the face.</li> <li>2. Check power supply for proper voltage.</li> <li>3. Inspect all lead connections on motor and magnetic switch for loose or open connections.</li> <li>4. Replace switch.</li> <li>5. Replace start capacitor.</li> </ol>
Fuses or circuit breakers trip open.	<ol style="list-style-type: none"> <li>1. Short circuit in line cord or plug.</li> <li>2. Short circuit in motor or loose connections.</li> <li>3. Incorrect fuses or circuit breakers in power supply.</li> </ol>	<ol style="list-style-type: none"> <li>1. Inspect cord or plug for damaged insulation and shorted wires and replace extension cord.</li> <li>2. Inspect all connections on motor for loose or shorted terminals or worn insulation.</li> <li>3. Install correct fuses or circuit breakers.</li> </ol>
Motor overheats.	<ol style="list-style-type: none"> <li>1. Motor overloaded.</li> <li>2. Air circulation through the motor restricted.</li> </ol>	<ol style="list-style-type: none"> <li>1. Reduce load on motor.</li> <li>2. Clean out motor to provide normal air circulation.</li> </ol>
Tool slips in collet.	<ol style="list-style-type: none"> <li>1. Collet is not fully drawn up into spindle taper.</li> <li>2. Wrong size collet.</li> <li>3. Debris in collet or in spindle taper.</li> <li>4. Taking too big of a cut.</li> </ol>	<ol style="list-style-type: none"> <li>1. Snug up draw bar.</li> <li>2. Measure tool shank diameter and match with appropriate diameter collet.</li> <li>3. Remove all oil and debris from collet and spindle taper.</li> <li>4. Lessen depth of cut and allow chips to clear.</li> </ol>
Breaking tools or cutters.	<ol style="list-style-type: none"> <li>1. RPM and or feed rate is too fast.</li> <li>2. Cutting tool getting too hot.</li> <li>3. Taking too big of a cut.</li> </ol>	<ol style="list-style-type: none"> <li>1. Use tables to set correct RPM and feed rates.</li> <li>2. Use cutting fluid or oil for appropriate application.</li> <li>3. Lessen 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 cutting tools.</li> </ol>	<ol style="list-style-type: none"> <li>1. Decrease depth of cut.</li> <li>2. Use sharp cutting tools.</li> </ol>
Workpiece vibrates or chatters during operation.	<ol style="list-style-type: none"> <li>1. Table locks not tight.</li> <li>2. Spindle lock not tight.</li> <li>3. Workpiece not securely clamped to table or into mill vice.</li> <li>4. RPM and feed rate too high.</li> </ol>	<ol style="list-style-type: none"> <li>1. Tighten down table locks.</li> <li>2. Tighten spindle lock.</li> <li>3. Check that clamping is tight and sufficient for the job. Make sure mill vice is tight to the table.</li> <li>4. Use appropriate RPM and feed for the job.</li> </ol>
Table hard to move.	<ol style="list-style-type: none"> <li>1. Table locks are tightened down.</li> <li>2. Chips have loaded up on bedways.</li> <li>3. Bedways are dry and in need of lubrication.</li> <li>4. Longitudinal stops are interfering.</li> <li>5. Gibs are too tight.</li> </ol>	<ol style="list-style-type: none"> <li>1. Make sure table locks are fully released.</li> <li>2. Frequently clean away chips that load up during milling operations.</li> <li>3. Lubricate bedways and handles.</li> <li>4. Check to make sure that stops are floating and not hitting the center stop.</li> <li>5. Loosen gib screw(s).</li> </ol>
Bad surface finish.	<ol style="list-style-type: none"> <li>1. Wrong RPM or feed rate.</li> <li>2. Dull cutting tool or poor cutting tool selection.</li> <li>3. Wrong rotation of cutting tool.</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust for appropriate RPM and feed rate.</li> <li>2. Sharpen cutting tool or select a better cutting tool for the intended operation.</li> <li>3. Check for proper cutting rotation for cutting tool.</li> </ol>

# Headstock Assembly



# Base Assembly



PARTS

# Machine Parts Lists

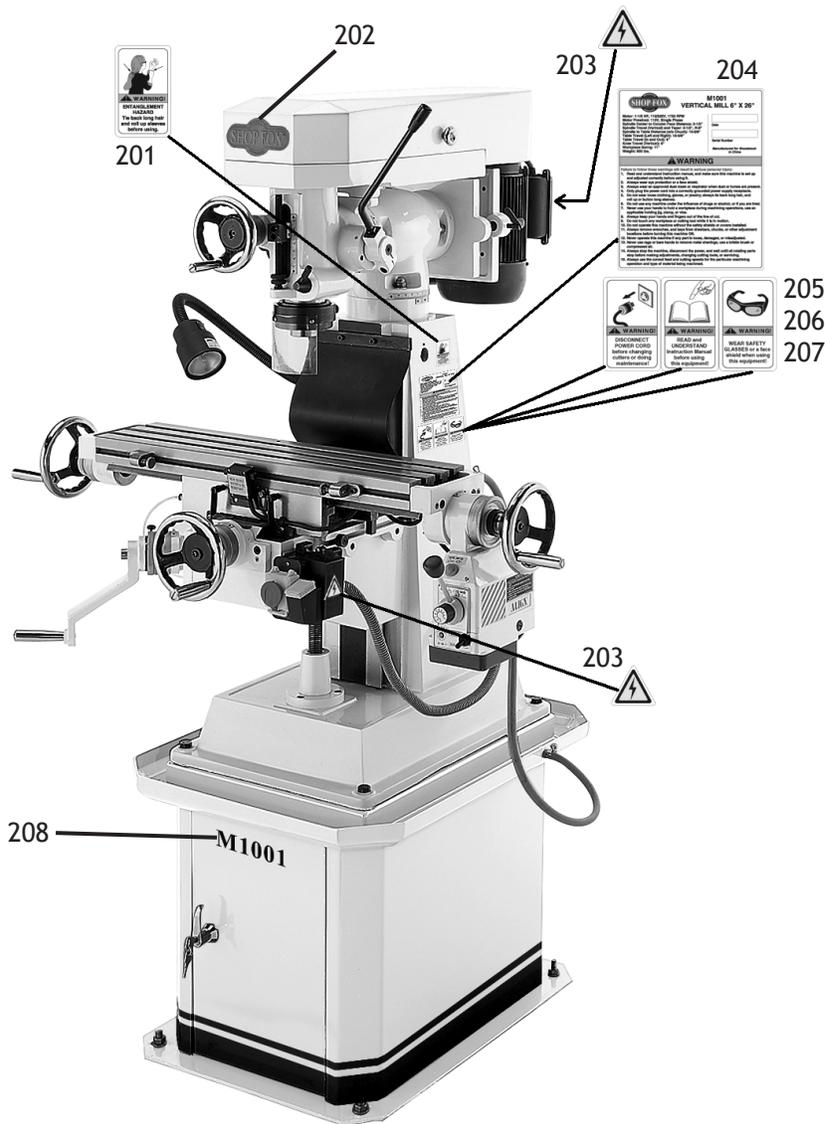
REF	PART #	DESCRIPTION
1	XM1001001	VERTICAL MILLING HEAD
2	XM1001002	BELT HOUSING COVER
3	XM1001003	QUILL
4	XPR67M	INT RETAINING RING 75MM
5	XPLW15M	LOCK WASHER 30MM
6	XM1001006	VERTICAL SPINDLE
7	XM1001007	COVER
8	XM1001008	BEARING ADJUSTING NUT
9	XM1001009	SPINDLE SLEEVE
10	XM1001010	PULLEY LOCKING NUT
11	XM1001011	SPINDLE PULLEY
12	XM1001012	QUILL PINION SHAFT
13	XPS09M	PHP HD SCREW M5-.8 X 10
14	XM1001014	CLUTCH WORM GEAR
15	XM1001015	CLUTCH
16	XM1001016	CLUTCH ADJUSTING NUT
17	XM1001017	CLUTCH COVER
18	XM1001018	PINION SHAFT SEAT
19	XM1001019	HANDLE
20	XM1001020	SHAFT COLLAR
21	XM1001021	HAND LEVER
22	XM1001022	WORM SHAFT
23	XM1001023	WORM SHAFT SLEEVE
24	XM1001024	BEARING LOCKNUT M14 x 1.5
25	XM1001025	DIAL
26	XM1001026	DIAL POSITIONING SCREW
27	XM1001027	HANDWHEEL
28	XM1001028	HANDLE
29	XM1001029	QUILL LOCKING BLOCK
30	XM1001030	QUILL LOCKING BOLT
31	XM1001031	QUILL STOP MICRO SCREW
32	XM1001032	MICROMETER NUT
33	XM1001033	QUILL MICRO STOP NUT
34	XM1001034	QUILL STOPPER
35	XPB09M	HEX HEAD BOLT M8-1.25 x 20
36	XPW01M	FLAT WASHER 8MM
37	XM1001037	DRAW BAR
38	XM1001038	C5 x 15 RIVET
39	XPS09M	PHL HD SCREW M5-.8 x 10
40	XM1001040	COVER SUPPORTING ARM
41	XPN06M	HEX NUT M5-.8
42	XM1001042	FLAT WASHER 72MM
43	XP7207	BEARING 7207
44	XP6007ZZ	BALL BEARING 6007ZZ
45	XP6206	BALL BEARING 6206ZZ
46	XM1001046	BEARING COVER
47	XPR67M	INT RETAINING RING 75MM
48	XP6009	BALL BEARING 6009Z
49	XM1001049	THRUST BEARING 1052

REF	PART #	DESCRIPTION
50	XM1001050	COIL SPRING
51	XM1001051	COIL SPRING
52	XM1001052	INT RETAINING RING 19MM
53	XPSB28M	CAP SCREW M6-1 x 15
54	XM1001054	SWIVEL ARM
55	XM1001055	SWIVEL STUD
56	XM1001056	INT RETAINING RING 35MM
57	XM1001057	PULLEY PIVOT STUD
58	XM1001058	V-BELT PULLEY
59	XM1001059	V-BELT PULLEY
60	XM1001060	MOTOR MOUNT
61	XM1001061	MOTOR SUSPENDING PIVOT
62	XM1001062	MOTOR MOUNT
63	XM1001063	BELT TENSIONING LOCK SCREW
65	XM1001064	BELT TENSIONING SPRING
66	XM1001066	VERTICAL HEAD ADAPTER
67	XM1001067	STUD M12-1.75 X 35
68	XM1001068	FLAT WASHER 10MM
69	XPVA35	V-BELT A-35 4L350
70	XPN26M	HEX NUT ACORN M12-1.75
71	XP6003	BALL BEARING 6003Z
72	XPVA31	V-BELT A-31 4L310
73	XM1001073	MOTOR 1.5 HP 4 POLE-1725
73-1	XM1001073-1	MOTOR COVER
73-2	XM1001073-2	MOTOR FAN
73-3	XPC20A	CAPACITOR 20MFD 400V
73-4	XPC150A	CAPACITOR 150MFD 250VAC
73-5	XM1001073-5	JNCTN BOX & CPCTR COVER
74	XM1001074	COLUMN
75	XM1001075	TABLE
76	XM1001076	TABLE GIB
77	XM1001077	GIB ADJUSTING SCREW
78	XM1001078	LONGITDNL BEARING BRACKET
79	XM1001079	LONGITUDINAL LEAD SCREW
80	XM1001080	BEARING NUT M20 x 15
81	XM1001081	LONGITUDINAL FEED NUT
82	XPSB38M	CAP SCREW M5-.8 x 25
83	XM1001083	DIAL
84	XM1001084	DIAL POSITIONING SCREW
85	XM1001085	HANDWHEEL
86	XM1001086	HANDWHEEL HANDLE
87	XM1001087	LONGITDNL ADJUSTING SCREW
88	XM1001088	ADJUSTING SCREW SLEEVE
89	XM1001089	TABLE STOPPER
90	XM1001090	TABLE LOCKING SCREW
91	XM1001091	HANDLE BAR
92	XM1001092	SADDLE
93	XM1001093	SADDLE GIB
94	XM1001094	WAY COVER

REF	PART #	DESCRIPTION
95	XM1001095	CROSS LEAD SCREW
96	XM1001096	CROSS FEED NUT
97	XM1001097	CROSS FEED BEARING BRACKET
98	XM1001098	STOP BLOCK
99	XM1001099	STOP BLOCK FIXTURE
100	XM1001100	CROSS ADJUSTING SCREW
102	XM1001102	KNEE
103	XM1001103	KNEE GIB
104	XM1001104	KNEE LOCKING SCREW
105	XM1001105	GEAR SHAFT SLEEVE
106	XM1001106	GEAR SHAFT
108	XM1001108	ELEVATING HANDLE CLUTCH
109	XM1001109	HANDLE ARM
110	XM1001110	ELEVATING GEAR
111	XM1001111	ELEVATING LEAD SCREW
112	XM1001112	ELEVATING LEAD SCREW NUT
113	XM1001113	CHIP GUARD
114	XM1001114	BASE
115	XM1001115	SWITCH
117	XM1001117	LIGHT
118	XM1001118	RUBBER SHEET
119	XPSB06M	CAP SCREW M6-1 X 25
120	XP6004	BALL BEARING 6004ZZ
121	XPK99M	KEY 6 X 6 X 15
122	XPW22M	FLAT WASHER 45MM
123	XPSB28M	CAP SCREW M6-1 X 15
125	XP6004	BALL BEARING 6004ZZ
126	XPR09M	EXT RETAINING RING 20MM
127	XM1001127	OIL CUP
128	XPK34M	KEY 5 X 5 X 20
129	XPSB50M	CAP SCREW M5-.8 X 10
130	XPSB30M	CAP SCREW M6-1 X 45
131	XPSB28M	CAP SCREW M6-1 X 15
132	XPR09M	EXT RETAINING RING 20MM
133	XPSB02M	CAP SCREW M6-1 X 20
134	XM1001134	COVER
135	XPS03M	PHLP HD SCR M6-1 X 8
136	XPSB31M	CAP SCREW M8-1.25 X 25

REF	PART #	DESCRIPTION
138	XPK25M	KEY 7 X 7 X 20
139	XM1001139	FLEXIBLE CONDUIT
140	XM1001140	WIRE
141	XM1001141	WIRING TERMINAL
142	XM1001142	CONNECTOR
143	XPW03M	FLAT WASHER 6MM
144	XM1001144	SHOULDER BOLT M10-1.5 X 74
146	XM1001146	BASE CABINET
147	XM1001147	DOOR LATCH
148	XPB31M	HEX BOLT M10-1.5 X 40
149	XPW04M	FLAT WASHER 10MM
150	XM1001150	BARBED HOSE FITTING
151	XPS05M	PHLP HD SCR M5-.8 x 8
152	XM1001152	HINGE
153	XM1001153	SAFETY SWITCH
154	XM1001154	240V ON OFF SWITCH
155	XM1001155	T-BOLTS M12-1.75 X 40
156	XM1001156	SHELL MILL 3"
157	XM1001157	POWER FEED UNIT
158	XM1001158	SINGLE SHOT OILER
159	XPAW03M	HEX WRENCH 3MM
160	XPAW04M	HEX WRENCH 4MM
161	XPAW05M	HEX WRENCH 5MM
162	XPAW06M	HEX WRENCH 6MM
163	XPWR1719	OPEN END WRENCH 17/19MM
164	XPWR1214	OPEN END WRENCH 12/14MM
165	XM1001165	SCREWDRIVER
166	XM1001166	PHILLIPS HEAD SCREWDRIVER
167	XM1001167	TOOLBOX
168	XPSB48M	CAP SCREW M6-1 X 35
169	XM1001169	PULLEY BASE
170	XM1001170	SHOULDER BOLT M8-1.25 X 60
171	XPS17M	PHLP HD SCR M4-.7 x 6
172	XPN02M	HEX NUT M10-1.5
173	XM1001173	CONTACTOR DZ47
174	XM1001174	CONTACTOR DZ47LE C32
175	XM1001175	TRANSFORMER

# Machine Labels



REF	PART #	DESCRIPTION
201	XLABEL-09	ENTANGLEMENT LABEL
202	D3375	SHOPFOX LOGO SMALL
203	XLABEL-14	ELECTRICITY LABEL
204	XM1001204	MACHINE ID LABEL

REF	PART #	DESCRIPTION
205	XLABEL-07	DISCONNECT LABEL
206	XLABEL-08	READ MANUAL LABEL
207	XLABEL-11	SAFETY GLASSES LABEL
208	XM1001208	MODEL NUMBER LABEL

## WARNING

Safety labels warn about machine hazards and how to prevent machine damage or injury. The owner of this machine **MUST** maintain the original location and readability of all labels on this machine. If any label is removed or becomes unreadable, **REPLACE** that label before allowing the machine to enter service again. Contact Woodstock International, Inc. at (360) 734-3482 or [www.shopfoxtools.com](http://www.shopfoxtools.com) to order new labels.

# WARRANTY

Woodstock International, Inc. warrants all Shop Fox machinery to be free of defects from workmanship and materials for a period of two years from the date of original purchase by the original owner. This warranty does not apply to defects due directly or indirectly to misuse, abuse, negligence or accidents, lack of maintenance, or reimbursement of third party expenses incurred.

Woodstock International, Inc. will repair or replace, at its expense and at its option, the Shop Fox machine or machine part, which in normal use has proven to be defective, provided that the original owner returns the product prepaid to a Shop Fox factory service center with proof of their purchase of the product within two years, and provides Woodstock International, Inc. reasonable opportunity to verify the alleged defect through inspection. If it is determined there is no defect, or that the defect resulted from causes not within the scope of Woodstock International Inc.'s warranty, then the original owner must bear the cost of storing and returning the product.

This is Woodstock International, Inc.'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 that Shop Fox machinery complies with the provisions of any law or acts. In no event shall Woodstock International, Inc.'s liability under this warranty exceed the purchase price paid for the product, and any legal actions brought against Woodstock International, Inc. 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.

Every effort has been made to ensure that all Shop Fox machinery meets high quality and durability standards. We reserve the right to change specifications at any time because of our commitment to continuously improve the quality of our products.



# Warranty Registration

Name \_\_\_\_\_  
 Street \_\_\_\_\_  
 City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
 Phone # \_\_\_\_\_ Email \_\_\_\_\_ Invoice # \_\_\_\_\_  
 Model # \_\_\_\_\_ Serial # \_\_\_\_\_ Dealer Name \_\_\_\_\_ Purchase Date \_\_\_\_\_

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

- How did you learn about us?
 

<input type="checkbox"/> Advertisement	<input type="checkbox"/> Friend	<input type="checkbox"/> Local Store
<input type="checkbox"/> Mail Order Catalog	<input type="checkbox"/> Website	<input type="checkbox"/> Other:
- How long have you been a woodworker/metalworker?
 

<input type="checkbox"/> 0-2 Years	<input type="checkbox"/> 2-8 Years	<input type="checkbox"/> 8-20 Years	<input type="checkbox"/> 20+ Years
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- How many of your machines or tools are Shop Fox®?
 

<input type="checkbox"/> 0-2	<input type="checkbox"/> 3-5	<input type="checkbox"/> 6-9	<input type="checkbox"/> 10+
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- Do you think your machine represents a good value?  Yes  No
- Would you recommend Shop Fox® products to a friend?  Yes  No
- What is your age group?
 

<input type="checkbox"/> 20-29	<input type="checkbox"/> 30-39	<input type="checkbox"/> 40-49
<input type="checkbox"/> 50-59	<input type="checkbox"/> 60-69	<input type="checkbox"/> 70+
- What is your annual household income?
 

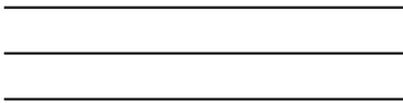
<input type="checkbox"/> \$20,000-\$29,000	<input type="checkbox"/> \$30,000-\$39,000	<input type="checkbox"/> \$40,000-\$49,000
<input type="checkbox"/> \$50,000-\$59,000	<input type="checkbox"/> \$60,000-\$69,000	<input type="checkbox"/> \$70,000+
- Which of the following magazines do you subscribe to?
 

<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	

9. Comments: \_\_\_\_\_  
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CUT ALONG DOTTED LINE

FOLD ALONG DOTTED LINE



Place  
Stamp  
Here



WOODSTOCK INTERNATIONAL INC.  
P.O. BOX 2309  
BELLINGHAM, WA 98227-2309



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