WOODSTOCK INTERNATIONAL

SHOP FOX®

MODEL M1002
8" X 36" VERTICAL MILLING MACHINE

INSTRUCTION MANUAL

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

#6903PC **Printed in China**

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.

Contents

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

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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**. 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 8" x 36" Vertical Milling Machine

Your new **SHOP FOX®** 8" x 36" Vertical Milling Machine 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.

This M1002 Vertical Milling Machine has a 1½ HP, belt-driven motor, 3-axis table movement with a longitudinal 9-speed power feed. Bedways are lubricated by a one shot lubrication system. The spindle accepts R-8 collets and comes equipped with a brake.

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.

Specifications

Motor:

Type	TEFC Capacitor Start Induction
Horsepower	1 1/2 HP
Phase	Single Phase/60Hz
Voltage	230V
Switch	Forward/Reverse
Amps	8.6A
RPM	1725 RPM
Power Transfer	V-Belts

Capacity:

Spindle Travel	5 3/8"
Max. Distance, Spindle to Column	15 1/2"
Max. Distance, Spindle to Table	13 3/4"
Table Travel, Longitudinal	20 1/2"
Table Travel, Cross	9 1/2"
Knee Travel	13 3/4"
Ram Travel	10 1/4"
Head Tilt	90° Both Ways
Column Swivel	360°
T-Slots	3 @ 2 1/2" Centers
Stud Size	1/2" Stud
Speeds	5
Range of Speeds	255, 425, 685, 1115, 1805 RPM

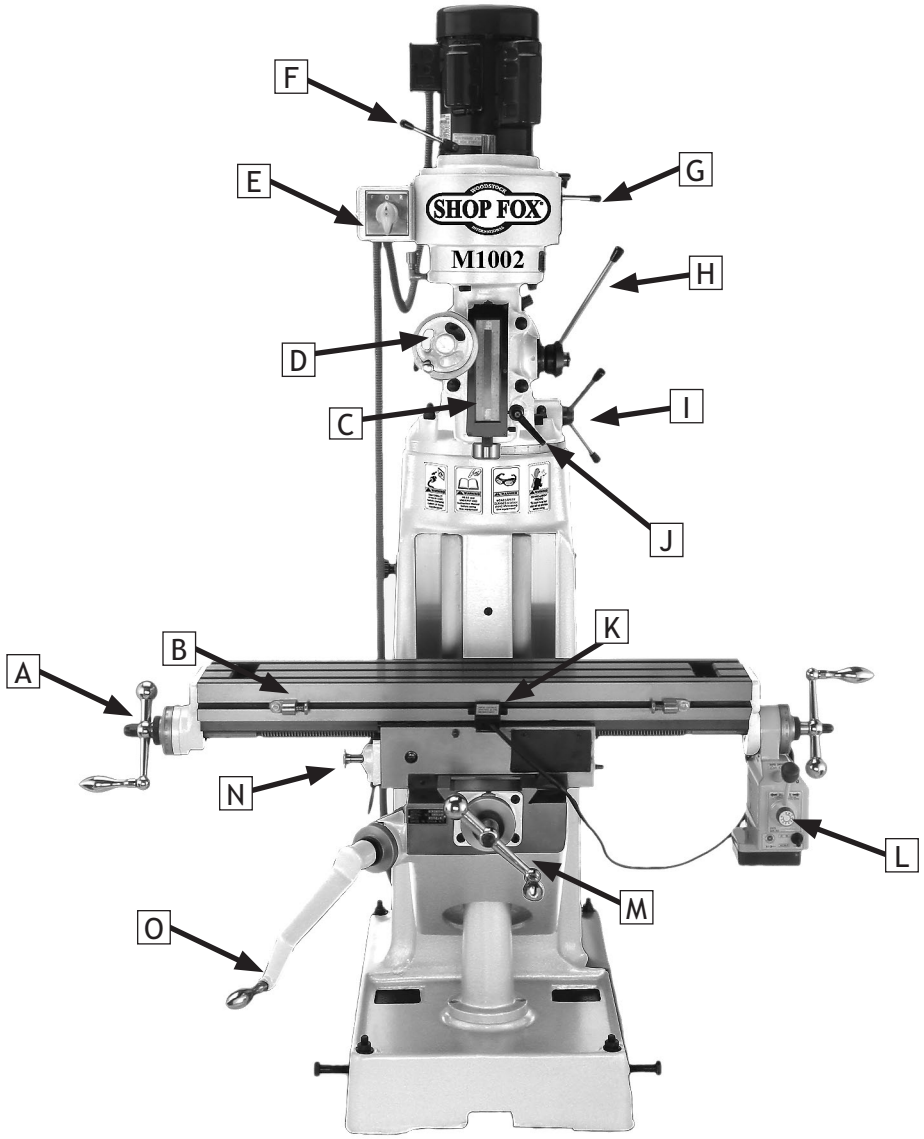
Overall Dimensions:

Overall Length	42"
Overall Width	52 1/2"
Height	75"
Table Size	7 7/8" x 35 3/4"
Weight (Shipping)	1650 lbs.
Crate Size	60" L x 67" W x 72" H
Footprint	33 1/2" x 19 1/2"

Features:

	One-Shot Lubrication
	Power Feed
	Spindle Brake
	R-8 Spindle

Controls and Features



A. Longitudinal Crank
B. Adjustable Power Feed Stop
C. Depth Stop Scale
D. Quill Micro-Feed Handwheel
E. Bi-directional Spindle Switch
F. Spindle Brake
G. Motor Release Lever
H. Quill Down Feed Lever
I. Ram Adjustment Handle
J. Quill Lock
K. Power Feed Limit Switch
L. Longitudinal Power Feed
M. Cross Feed Crank
N. Single Pump Lubrication System
O. Knee Crank

SAFETY

READ MANUAL BEFORE OPERATING MACHINE. FAILURE TO FOLLOW INSTRUCTIONS BELOW WILL RESULT IN PERSONAL INJURY.

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

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

⚠CAUTION Indicates a potentially hazardous situation which, if not avoided, MAY result in minor or moderate injury.

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 Safety Instructions

1. **Thoroughly read the Instruction Manual before operating your machine.** Learn the applications, limitations and potential hazards of this machine. Keep the manual in a safe and convenient place for future reference.

2. **Keep work area clean and well lighted.** Clutter and inadequate lighting invite potential hazards.

3. **Ground all tools.** If a machine is equipped with a three-prong plug, it must be plugged into a three-hole grounded electrical receptacle or grounded extension cord. If using an adapter to aid in accommodating a two-hole receptacle, ground using a screw to a known ground.

4. **Wear eye protection at all times.** Use safety glasses with side shields or safety goggles that meet the appropriate standards of the American National Standards Institute (ANSI).

5. **Avoid dangerous environments.** Do not operate this machine in wet or open flame environments. Airborne dust particles could cause an explosion and severe fire hazard.

6. **Ensure all guards are securely in place** and in working condition.

7. **Make sure switch is in the *OFF* position** before connecting power to machine.

8. **Keep work area clean,** free of clutter, grease, etc.

9. **Keep children and visitors away.** Visitors must be kept at a safe distance while operating unit.

10. **Childproof your workshop** with padlocks, master switches or by removing starter keys.

11. **Stop and disconnect the machine when cleaning, adjusting or servicing.**

12. **Do not force tool.** The machine will do a safer and better job at the rate for which it was designed.

13. **Use correct tool.** Do not force machine or attachment to do a job for which it was not designed.

14. **Wear proper apparel.** Do not wear loose clothing, neck ties, gloves, jewelry, and secure long hair away from moving parts.

15. **Remove adjusting keys, rags, and tools.** Before turning the machine on, make it a habit to check that all adjusting keys and wrenches have been removed.

16. **Avoid using an extension cord.** But if you must use one, examine the extension cord to ensure it is in good condition. Immediately replace a damaged extension cord. Always use an extension cord that uses a ground pin and connected ground wire. Use an extension cord that meets the amp rating on the motor nameplate. If the motor is dual voltage, be sure to use the amp rating for the voltage you will be using. If you use an extension cord with an undersized gauge or one that is too long, excessive heat will be generated within the circuit, increasing the chance of a fire or damage to the circuit.

17. **Keep proper footing and balance** at all times.

18. **Lock the mobile base from moving before feeding the workpiece into the machine**.

19. **Do not leave machine unattended.** Wait until it comes to a complete stop before leaving the area.

20. **Perform machine maintenance and care.** Follow lubrication and accessory attachment instructions in the manual.

21. **Keep machine away from open flame.** Operating machines near pilot lights or open flames creates a high risk if dust is dispersed in the area. Dust particles and an ignition source may cause an explosion. Do not operate the machine in high-risk areas, including but not limited to, those mentioned above.

22. **If at any time you are experiencing** difficulties performing the intended operation, stop using the machine! Then contact our technical support or ask a qualified expert how the operation should be performed.

23. **Be aware that certain metal shavings and cutting fluids may cause an allergic reaction in people and animals**, especially when cutting fumes can be inhaled. Make sure you know what type of metal and cutting fluid you will be exposed to and how to avoid contamination.

24. **Habits—good and bad—are hard to break.** Develop good habits in your shop and safety will become second-nature to you.

Additional Safety Instructions for Mills

⚠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!

⚠CAUTION

USE this and other machinery with caution and respect. Always consider safety first, as it applies to your individual working conditions. No list of safety guidelines can be complete—every shop environment is different. Failure to follow guidelines could result in serious personal injury, damage to equipment or poor work results.

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

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

3. **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.

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

5. **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.

6. **USER TRAINING.** This mill is intended to be used by operators who have the proper experience and training with this type of machine.

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

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

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

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

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

12. **SERVICING 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.

13. **CUTTING FLUIDS.** Cutting fluids used for machining may contain hazardous chemicals. Read and understand all user information on the cutting fluid container and take necessary precautions.

ELECTRICAL

220V Operation

The **SHOP FOX®** Model M1002 is prewired for 220 volt, single-phase operation. The motor supplied with your new Model M1002 mill is rated at 1½ HP and will draw approximately 9 amps. For 220V operation, we recommend using a 6-15 plug and receptacle (**see Figure 1**).

For 220V operation, only connect your machine to a circuit that is protected by a 15 amp circuit breaker.

⚠ CAUTION: Using a circuit breaker rated higher than 15 amps will increase the risk of fire!

Keep in mind that a circuit being used by other machines or tools at the same time will add to the total load being applied to the circuit. Add up the load ratings of all machines on the circuit. If this number exceeds the rating of the circuit breaker or fuse, use a different circuit.

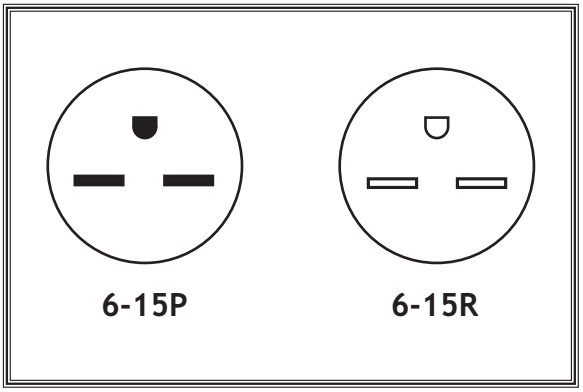


Figure 1. Typical 220V 3-prong plug and outlet.

⚠WARNING

This equipment must be grounded. Verify that any existing electrical outlet and circuit you intend to plug into is actually grounded. If it is not, it will be necessary to run a separate 12 AWG copper grounding wire from the outlet to a known ground. Under no circumstances should the grounding pin be removed from any three-pronged plug or serious injury may occur.

Extension Cords

We do not recommend using an extension cord for 220V equipment. Instead, arrange the placement of your machinery and installed wiring to eliminate the need for extension cords. If you must use an extension cord, please use the following guidelines:

- Use cords rated for Standard Service.
- Never exceed a length of 50 feet.
- Use cords with 10 ga. wire or bigger.
- Ensure cord has a ground wire and pin.
- Do not use cords in need of repair.

Grounding

This machine must be grounded! The electrical cord supplied with this machine does not come with a 220 volt plug. Use a plug with a ground pin. If your outlet does not accommodate a ground pin, have it replaced by a qualified electrician or have an appropriate adapter installed and grounded properly. An adapter with a grounding wire does not guarantee the machine will be grounded. A ground source must be verified.

SET UP

Unpacking

The **SHOP FOX®** Model M1002 has been carefully packaged for safe transporting. If you notice the machine has been damaged, please contact your authorized **SHOP FOX®** dealer immediately.

Items Needed for Set Up

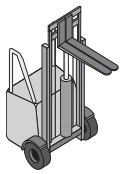
The following items are needed, but not included, to setup your machine:

- Forklift or other Power Lifting Equipment
- Safety Glasses (for each person)
- Heavy-Duty Slings Rated for Lifting
- An Assistant
- Machinist Level
- Mounting Hardware
- Solvent for Cleaning
- Shop Rags for Cleaning

⚠WARNING

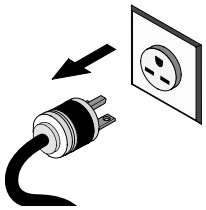
READ and understand this entire instruction manual before using this machine. Serious personal injury may occur if safety and operational information is not understood and followed. DO NOT risk your safety by not reading!

⚠WARNING



USE power lifting equipment and the help of assistants to move this milling machine. Otherwise, serious personal injury may occur.

⚠WARNING



UNPLUG-power cord before you do any assembly or adjustment tasks! Otherwise, serious personal injury to you or others may occur!

Inventory

The following is a description of the main components shipped with the **SHOP FOX®** Model M1002. Lay the components out to inventory them.

Crate Contents (Figure 2) **QTY**

A. Milling Machine 1
B. Toolbox 1
C. Drawbar 1

Toolbox Contents (Figure 3) **QTY**

D. Oil Can 1
E. Slotted Screwdriver 1
F. Phillips Head Screwdriver 1
G. Hex Wrenches 3, 4, 5, 6, 8, & 10mm.....6
H. Longitudinal & Cross Feed Lock Handle 1
I. Micro-Feed Clutch Knob 1
J. Crank Handles.....3
K. Knee Handle.....1
L. Box End Wrench 17/19mm.....1

Inventory parts not shown:

- Power Feed Instruction Manual 1

If any parts appear to be missing, examine the packaging carefully to be sure those parts are not among the packing materials. 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.**

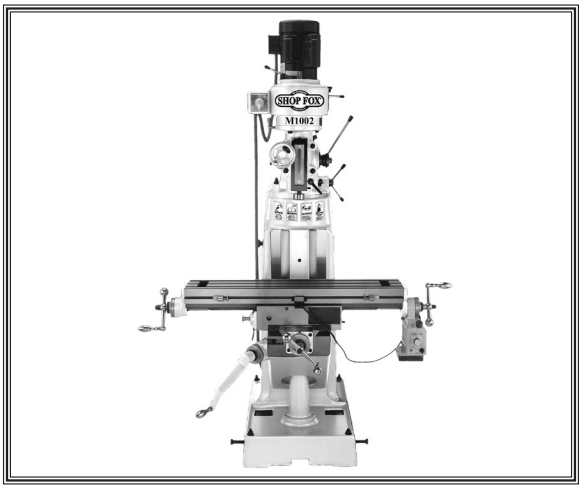


Figure 2. Crate contents.

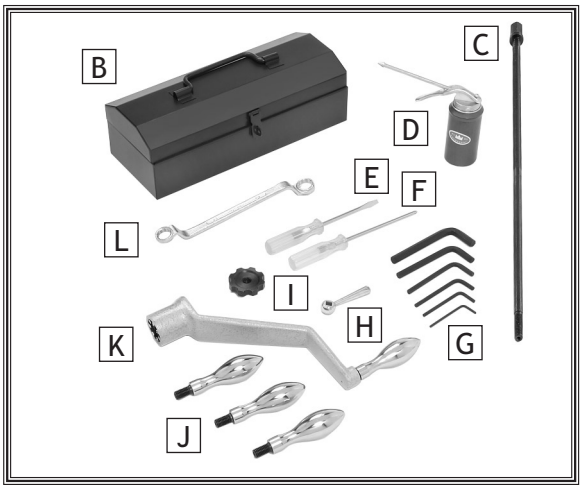
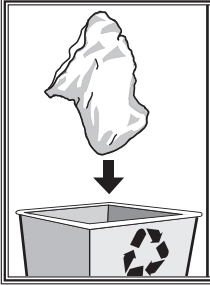


Figure 3. Toolbox contents.



⚠WARNING

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

NOTICE

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

SET UP

Machine Placement

- **Floor Load:** Your mill represents a large weight, approximately 1650 lbs. in a small footprint. Some residential floors may require additional bracing to support both machine and operator. When possible we recommend mounting your mill to 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 mill (see **Figure 4**).

- **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.

⚠CAUTION

MAKE your shop "child safe." Ensure that your workplace is inaccessible to youngsters by closing and locking all entrances when you are away. NEVER allow untrained visitors in your shop when assembling, adjusting or operating equipment.

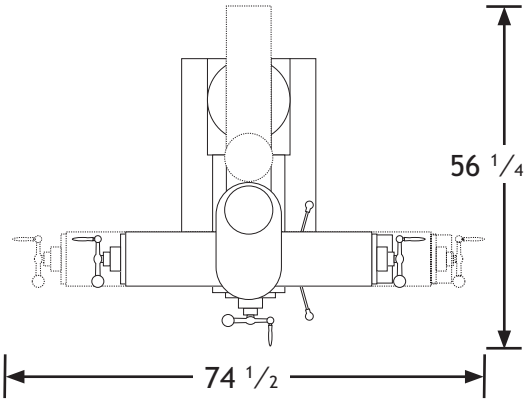


Figure 4. Working clearances.

Lifting Mill

The Model M1002 is a heavy piece of equipment. Care must be exercised when moving this machine. The weight of the mill is distributed unevenly and can become awkward to lift if the proper center of gravity is not maintained. Two methods are shown for lifting this mill (see **Figure 5**).

If you are unsure how to lift this mill, consult a qualified professional.

To lift the mill, do these steps:

1. Move the table all the way back toward the column and center on the saddle, then lock it in position.

2. Adjust the position of the head by sliding the ram toward the column to maintain the center of gravity.

3. Make sure that headstock, column, and ram are locked in position.

4. Remove all handles and handwheels to prevent accidental damage when moving the mill.

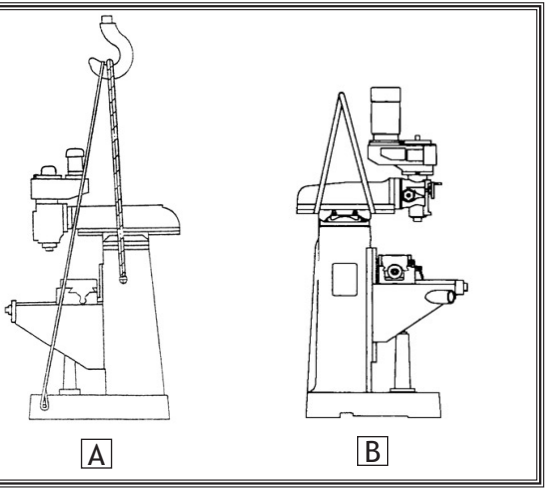


Figure 5. Lifting the mill.

To lift with the two sling method (Figure 5A) do these steps:

1. Remove the two covers on the side of the column.
2. Feed one loop of the sling through the center of the column and attach to the lift-hook.
3. Secure the other loop of the sling to the lift-hook.
4. Secure one end of the second sling to the $^{5}/_{8}$-12 x $2^{3}/_{4}$ hex bolt to the front and side of the base and repeat for the other side.
5. Attach to the lift hook.
6. Place protective padding between sling and mill surfaces.
7. Adjust the slings so equal tension is applied to the slings prior to lifting.

To lift the mill with the single sling method (Figure 5B) do these steps:

1. Loop the sling around the column and the ram.
2. Attach the sling to the lift-hook.
3. Place protective padding between sling and mill surfaces.

   Note: Raise the mill slowly. Pay close attention to how the mill is balanced. If it appears to be off balance, lower the mill and adjust the headstock in the appropriate direction. It is imperative the load be stable before transporting.

Cleaning Machine

The table and other unpainted parts of your 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.

⚠WARNING

ALWAYS use slings or chains approved for lifting and rated for the weight you are lifting. Failure to follow this warning could lead to serious injury or death.

⚠WARNING

Due to the weight distribution of milling machines, the load can be unbalanced when the mill is raised off the floor. Raise the load slowly and pay attention to how the load is carried. Keep all bystanders at a safe distance. Loss of load could cause serious injury or death.

⚠WARNING

NEVER 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!

⚠CAUTION

ALWAYS 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 DO NOT create fire or environmental hazards.

Mounting to Shop Floor

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

Bolting to Concrete Floors

Lag shield anchors with lag bolts (**Figure 6**) and anchor studs (**Figure 7**) are two popular methods for anchoring an object to a concrete floor. We suggest you research the many options and methods for mounting your machine and choose the best that fits your specific application.

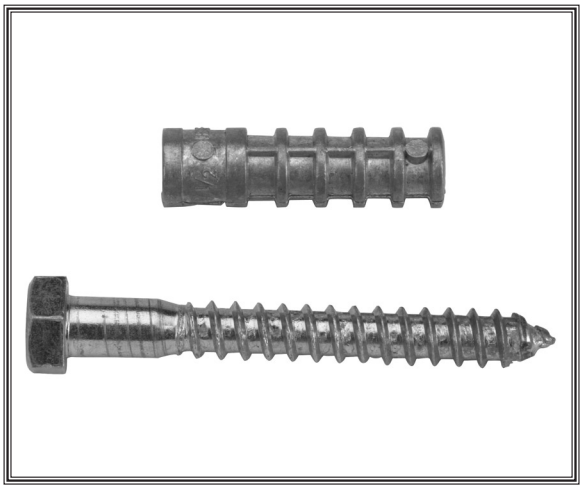


Figure 6. Typical lag shield anchor and lag bolt.

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 at a later point.

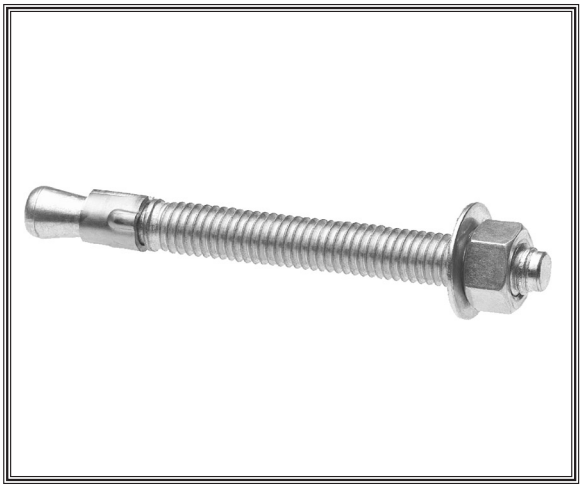


Figure 7. Typical anchor stud.

Using Machine Mounts

Using machine mounts, shown in **Figure 8**, gives the advantage of fast leveling and vibration reduction. The large size of the foot pads distributes the weight of the machine.

Figure 8. Machine mount example.

Handle Installation

The longitudinal and cross feed steel balanced cranks come installed on the mill, but with the handles removed for transport. The knee handle, micro-feed clutch knob, and table lock handle are in the toolbox. Attach theses handles as described below.

To attach the handles to the mill, do these steps:

1. Using a 6mm hex wrench, attach the handles to the steel balanced cranks.

2. Slide the knee handle onto the shaft and engage the teeth (see **Figure 10**).

3. Screw the micro-feed clutch knob onto the stud protruding from the opposite side of the quill feed lever (see **Figure 11**).

4. The longitudinal and cross feed locks are operated by a lever that is interchangeable between the two (see **Figure 12**).

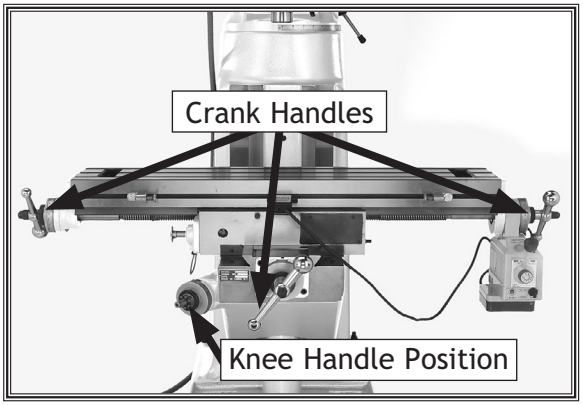


Figure 10. Handle positions.

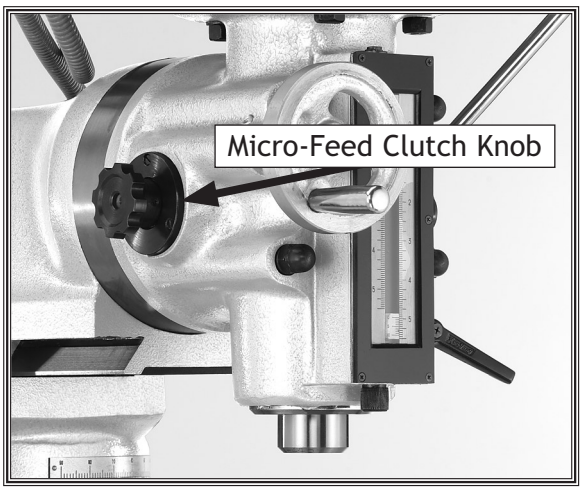


Figure 11. Micro-feed clutch knob.

Drawbar

Insert the drawbar into the splined spindle located in the center of the front cone pulley (see **Figure 9**).

Note: Wait to install the drawbar after you have made the **Test Run** on the following page; or insert a collet to keep the draw bar from rattling in the spindle during the test run.

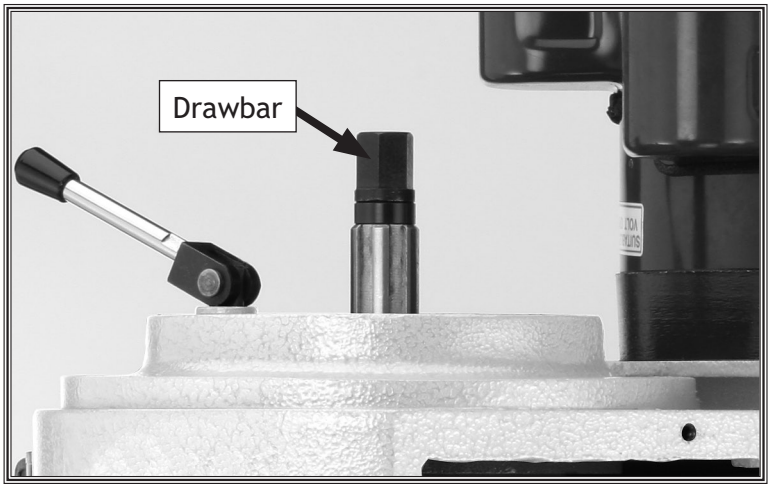


Figure 9. Drawbar inserted.

Figure 12. Longitudinal lock.

Spindle Controls

Figure 13 shows the location of the ON/OFF and SPINDLE DIRECTION switch and spindle brake for the Model M1002.

- The switch turns to the right for counterclockwise rotation.
- The switch turns to the left for clockwise rotation. DO NOT change spindle rotation until spindle has come to a complete stop!
- The spindle brake will bring the spindle to a stop after the switch has been turned ***OFF***. The spindle brake will engage by pushing forward or pulling backward on the spindle brake lever.

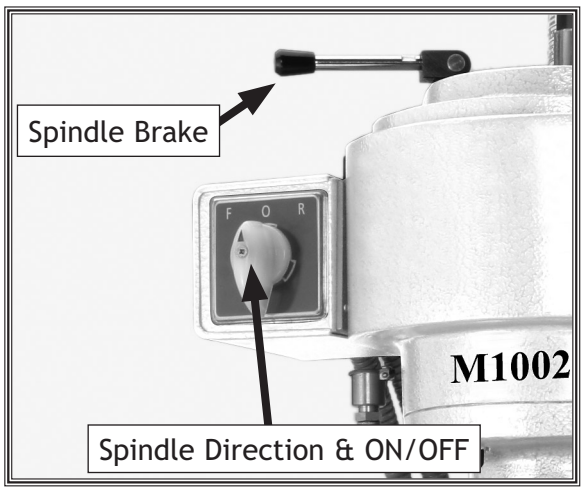


Figure 13. Spindle controls.

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 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 in and turn the ON/OFF switch to turn the mill ***ON***, the mill should run smoothly, with little or no vibration or rubbing noises.
5. If successful, familiarize yourself with **OPERATIONS**, then perform **Spindle Break-in Procedures.**
   - 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**.

NOTICE

Follow spindle break in procedures 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 M1002 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 mill operator before performing any unfamiliar operations. **Above all, your safety should come first!**

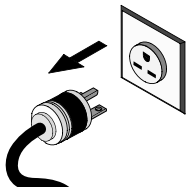
⚠WARNING

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!

⚠WARNING

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

⚠WARNING



DO NOT investigate problems or adjust the 8" x 36" Vertical Milling Machine while it is running. Wait until the machine is turned off, unplugged and all working parts have come to a complete stop before proceeding!

Positioning Spindle Head

The spindle head can be rotated vertically 90˚ both ways, and can rotate horizontally on the column 90˚ 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. Using a 19mm wrench, loosen, but do not remove the four nuts that lock the headstock in place (see **Figure 14**).
4. Using a 19mm wrench, turn the drive nut on the worm gear with wrench to rotate the head up to 90º in either direction (see **Figure 15**).
5. Tighten the headstock lock nuts.

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

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 19mm wrench, loosen, but don't remove the four turret swivel lock nuts on the column (see **Figure 16**).
4. Push or pull the spindle head to swivel it to the desired position. Use the scale located on the column to set the desired angle.
5. Tighten the four lock nuts to secure the turret and the headstock in position.

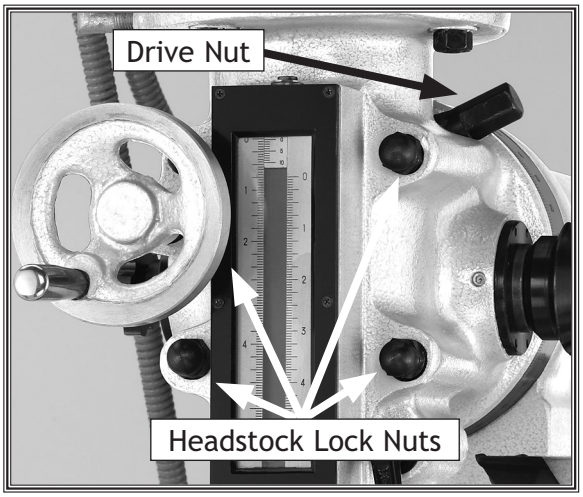


Figure 14. Vertical head rotation.

Figure 15. Vertical head rotation.

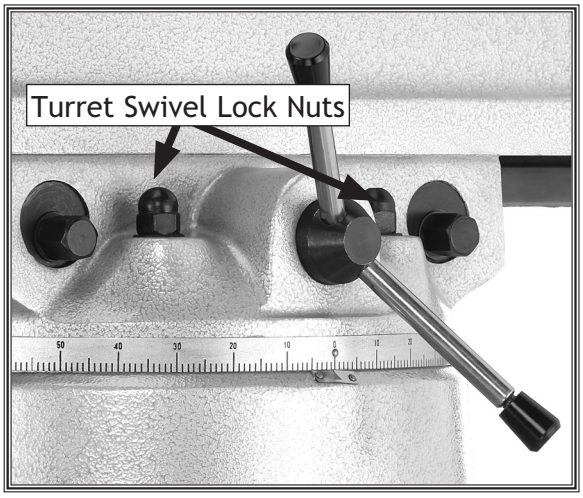


Figure 16. Horizontal head rotation.

To change the position of the ram, do these steps:

1. **UNPLUG THE MILL!**
2. Loosen the two ram lock nuts on the side of the ram (see **Figure 17**).
3. Rotate the ram lever to move the ram back and forth.
4. Tighten to lock nuts to secure the ram in place.

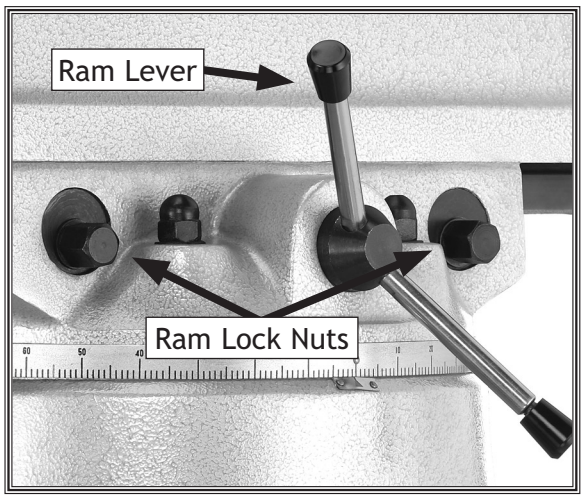


Figure 17. Ram adjustment.

Table Travel

The table can be moved in 3 axes. Each axis is independently controlled by a crank handle. The longitudinal travel has the added feature of a power feed, which will be explained in more detail later. Each handle 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 crank handles, one at each end of the table, and can be locked in position by a single lock at the front of the table (see **Figure 18**). This lock will share a lever with the cross feed lock.

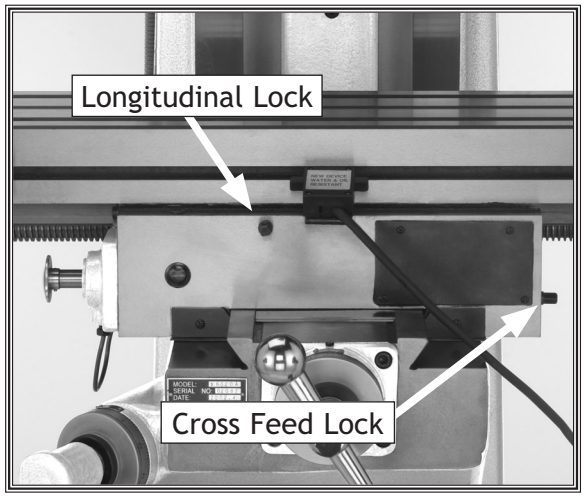


Figure 18. Longitudinal & cross feed locks.

Cross Feed Control

The cross feed is controlled by the center crank handle, and can be locked in position by the lock under the left side of the mill table (see **Figure 18**).

Knee Feed Control

The knee feed is controlled by one crank handle, just off center at the front of the machine. The Model M1002 has one knee feed lock on the left side of the machine next to the single shot pump, where the knee meets the ways (see **Figure 19**).

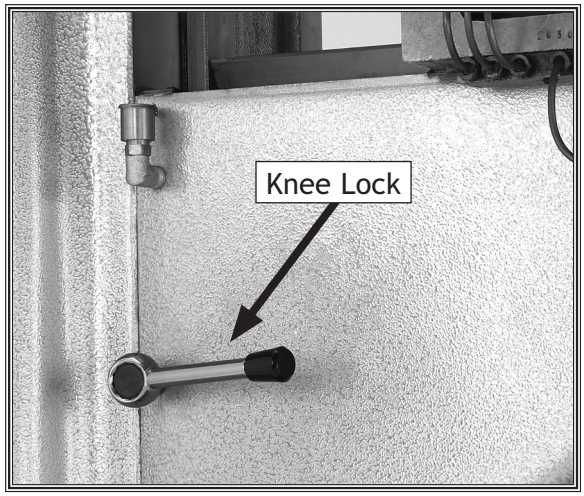


Figure 19. Knee lock.

Graduated Dials

The table handles and the knee handle have graduated dials. Each mark represents 0.001" of movement and one full revolution equals 0.200" The graduated dials float and can be indexed or "zeroed" by loosening the knurled lock ring, rotating the graduated dial to "0", and securing the setting with the knurled lock ring (see **Figure 20**).

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.

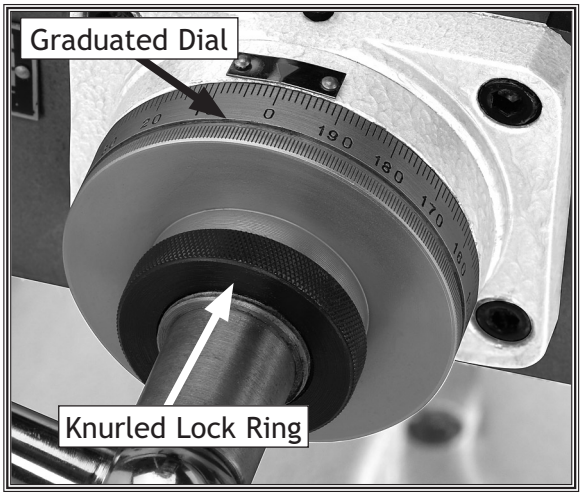


Figure 20. Graduated dial.

Power Feed Controls

This mill comes equipped with a power feed on the longitudinal travel. The power feed has the following controls (see **Figure 21** for items A–D, and see **Figure 22** for items E & F):

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.

For additional information, please refer to the power feed manual supplied with this mill.

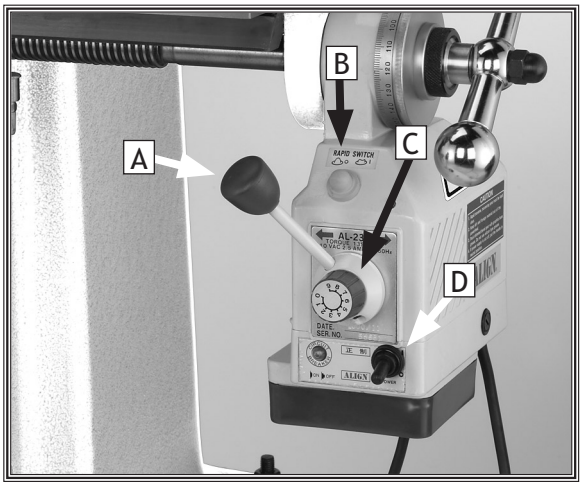


Figure 21. Power feed controls.

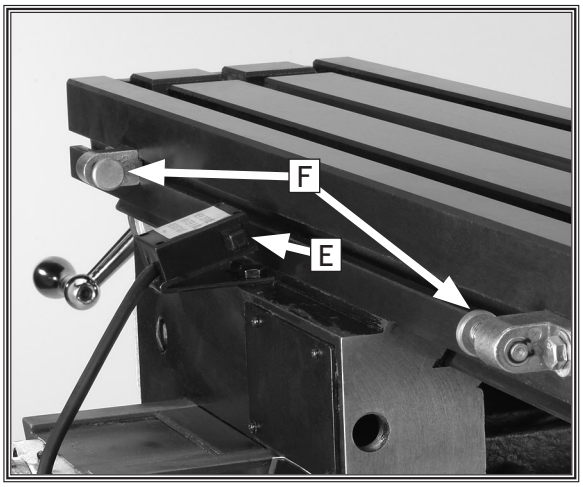


Figure 22. Limit switch and power feed stops.

Quill Travel

Quill Feed Control

The quill feed is controlled by the quill feed handle shown in **Figure 23**. 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 23**) 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 23**.

   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 it when the handle is in the desired position.

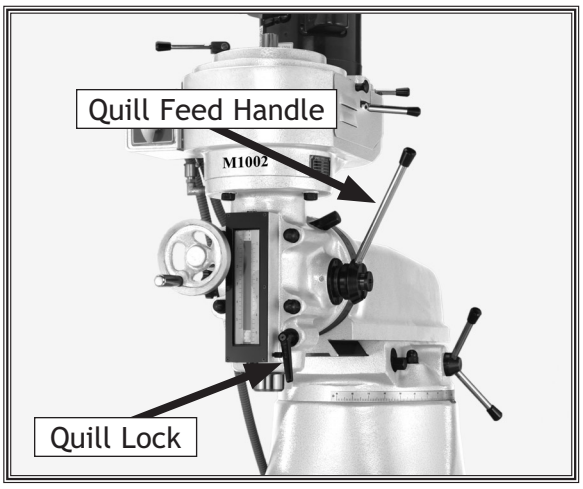


Figure 23. Quill controls.

Micro-feed Depth Adjustment

The micro-feed handwheel is used to accurately control the quill depth (see **Figure 24**).

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 clockwise to feed the quill down or counterclockwise to feed the quill up.

4. Use the thumbscrew on the depth stops to set a predetermined depth (see **Figure 25**).

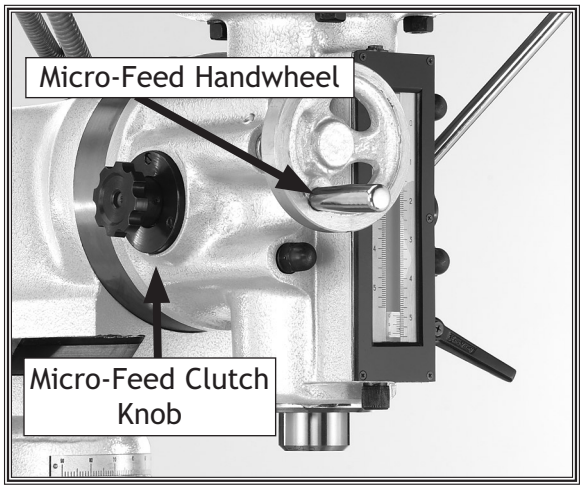


Figure 24. Micro-feed controls.

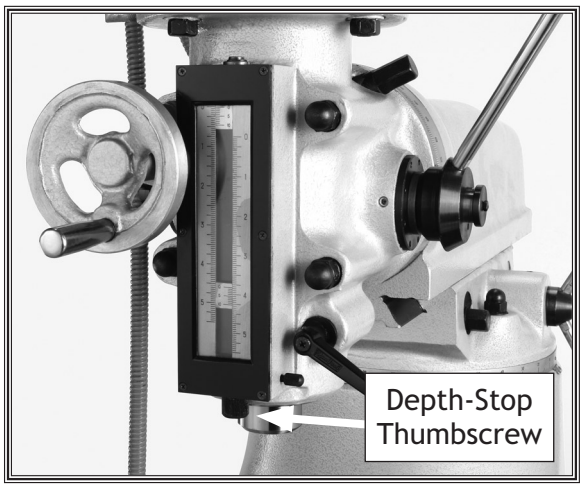


Figure 25. Depth stop detail.

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 26** 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 27** 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 / 0.5" (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.

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
*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 26. Cutting speed chart for HSS cutting tools.

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

Figure 27. Formula to determine required RPM.

Setting RPM

Setting the RPM on the Model M1002 involves placing the V-belt 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 28** 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 push the motor toward the spindle to loosen the tension on the V-belt (see **Figure 29**).
5. Move the belt to the appropriate pulley combinations as shown on the spindle speed chart below and in **Figure 30**.
6. Tension the V-belt by pulling the motor back and locking the motor release lever.
7. Close the pulley cover and plug in the mill.

⚠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.

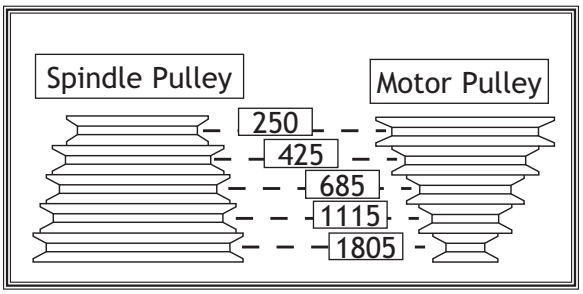


Figure 28. M1002 Spindle speed chart in RPMs.

Figure 29. Releasing tension to V-belt.

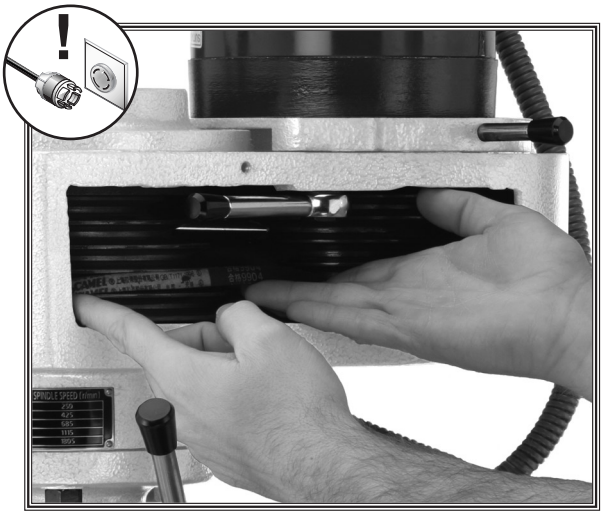


Figure 30. Changing V-belt position.

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.

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

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.

Installing Tools

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

1. Turn the mill ***OFF*** and allow it to come to a complete stop.

2. Clean any debris from the spindle opening.

3. Insert the tool holder or a collet into the spindle.

4. Rotate the holder until the groove lines up with the key and the holder slides into the spindle.

5. While setting the spindle brake, use a wrench to tighten the drawbar (see **Figure 31**) 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.

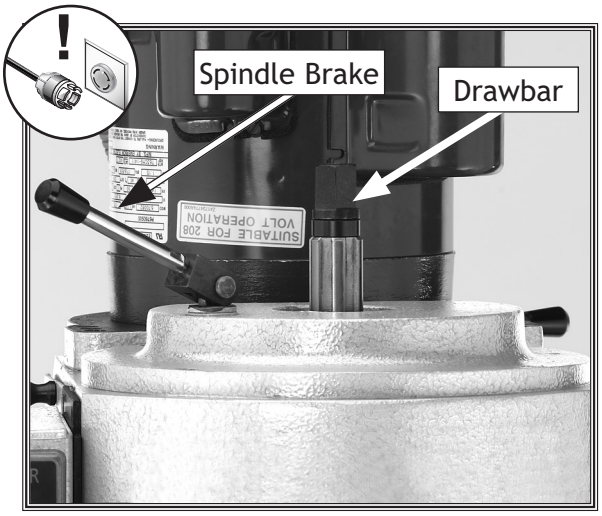


Figure 31. Drawbar location.

NOTICE

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

Removing Cutting Tools

To remove cutting tools, do these steps:

1. Make sure the mill is turned ***OFF*** and the quill is locked at the upmost position.

2. Use a brush to remove any debris or chips from the tool and the tool holder/arbor.

3. While setting the spindle brake, use a wrench to loosen the drawbar from the collet or arbor.

4. 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 collet. This can damage the threads on the drawbar and the collet.

5. Finish unscrewing the drawbar by hand.

6. Clean any debris from the spindle opening area.

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

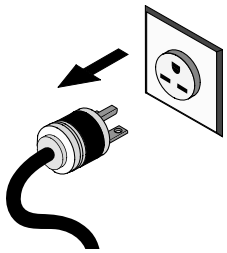
Check for the following conditions and repair or replace when necessary:

- 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.

⚠WARNING



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

Cleaning

Cleaning the Model M1002 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

The M1002 was shipped without oil in its reservoirs. It will be necessary to fill and prime all reservoirs with oil prior to the **Test Run** or **Start Up** procedures. After that, get in the habit of checking fluid levels daily to ensure the best performance from your mill.

Single Shot Lubrication System

Use the single-shot lubrication system to oil the ways, by pumping the handle on the reservoir 2-4 times each day (see **Figure 32**). Fill the reservoir regularly with ISO 68 or SAE 20 weight way oil.

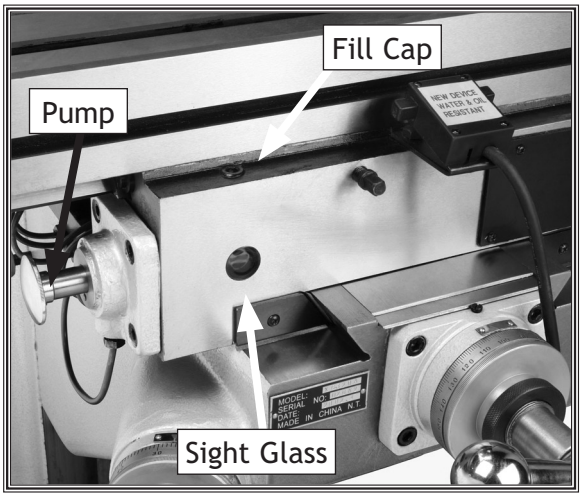


Figure 32. Single-shot lubrication system.

Longitudinal and Crossfeed Lead Screws

Apply liberal amounts of lithium or graphite based grease using a brush or shop rag to the entire length of the longitudinal and crossfeed lead screw.

Knee Elevating Screw & Ways

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

Top off the oil cups on the side of the knee ways daily with ISO 68 or SAE 20 weight way oil (see **Figure 33**).

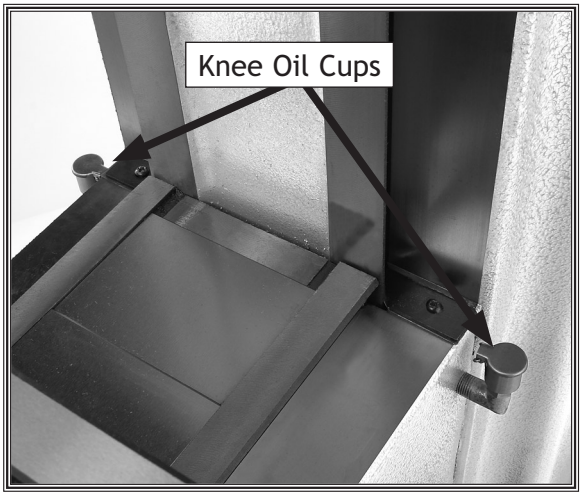


Figure 33. Knee oil cup locations.

Headstock Oil Cup

Top off the oil cup on the side of the headstock daily with ISO 68 or SAE 20 weight machine oil (see **Figure 34**).

Power Feed

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

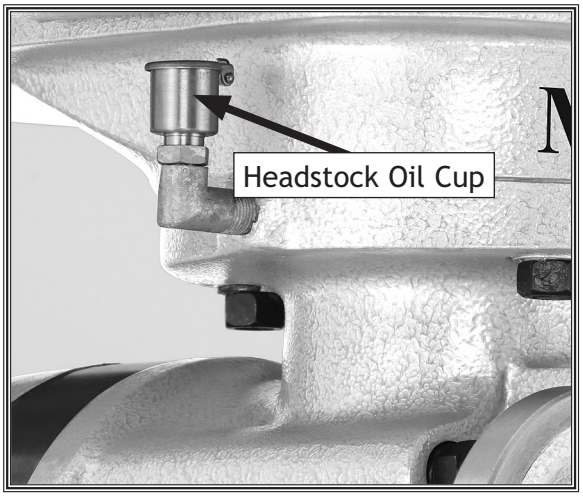


Figure 34. Headstock oil cup location.

Maintenance Schedule

Daily:
- Check and replenish fluid in oil cups and reservoirs.
- Pump single-shot lubrication system 2-4 times.
- Clean machine to remove debris.
- Make sure table and vise are clean and free of metal chips.
- Clean spindle openings before inserting tools.
- Check for any unsafe conditions.

Weekly:
- Thoroughly clean the machine ways to remove chips and debris.
- Clean and grease the longitudinal, cross, and knee lead screws.

Monthly:
- Clean and vacuum dust build-up from the motor.
- Check mill for level, correct if necessary.

Every Year:
- Inspect brake and belt for wear, and replace as needed.

Maintenance Notes

DATE	MAINTENANCE PERFORMED

Maintenance Notes

DATE	MAINTENANCE PERFORMED

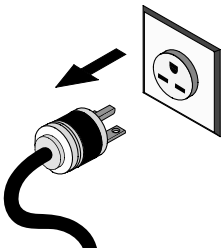
SERVICE

General

This section covers the most common service adjustments or procedures that may need to be made during the life of your machine.

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**.

⚠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. Overtightening may cause binding and premature wear to the gib.

Adjust the gibs by loosening or tightening the gib adjustment screw until a slight drag is felt while moving the table/knee along the dovetail slides (see **Figures 35-37**) for the locations of the adjustment screws). The chip wiper guards must be removed to access some of the gib adjustment screws.

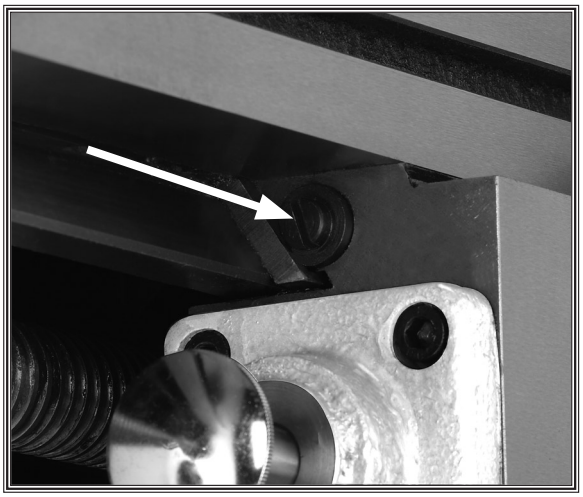


Figure 35. Longitudinal gib screw.

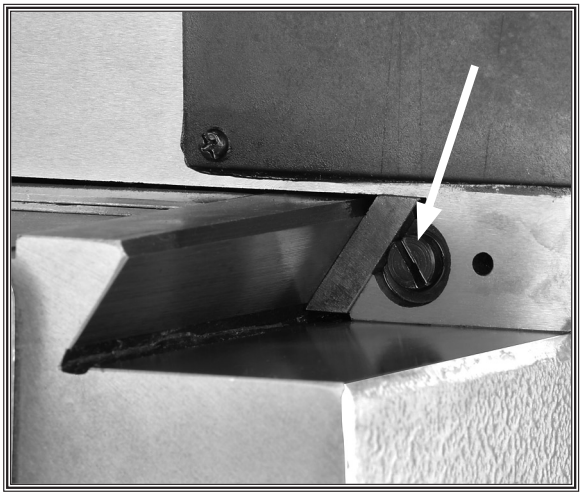


Figure 36. Crossfeed gib screw.

Figure 37. Knee gib screw.

Electrical Parts Identification

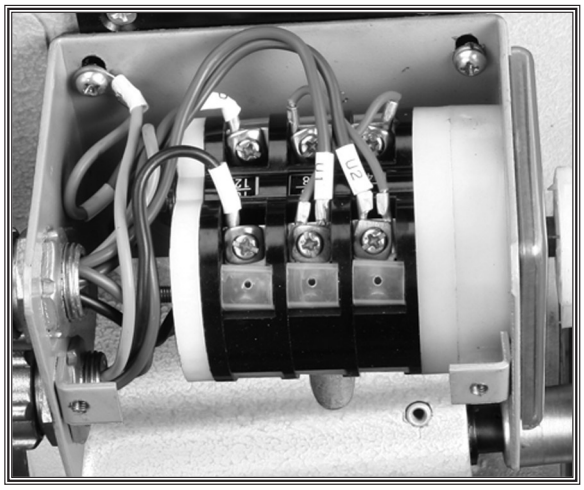


Figure 38. Switch wiring, top view.

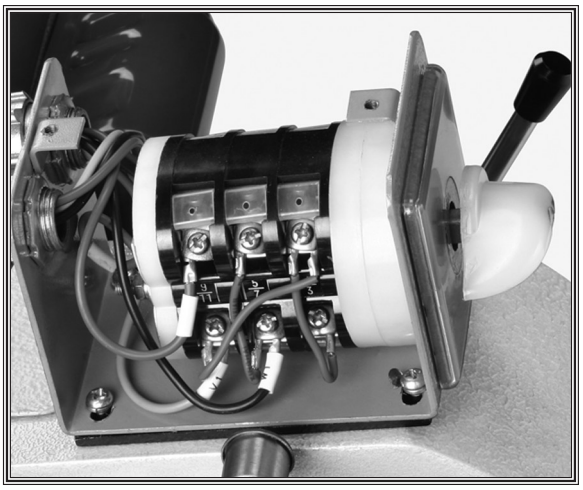


Figure 39. Switch wiring, bottom view.

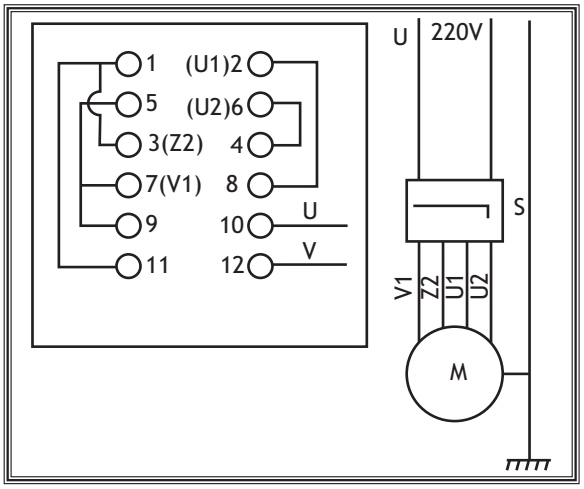
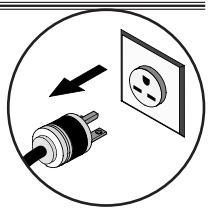


Figure 40. Wiring diagram.

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.**

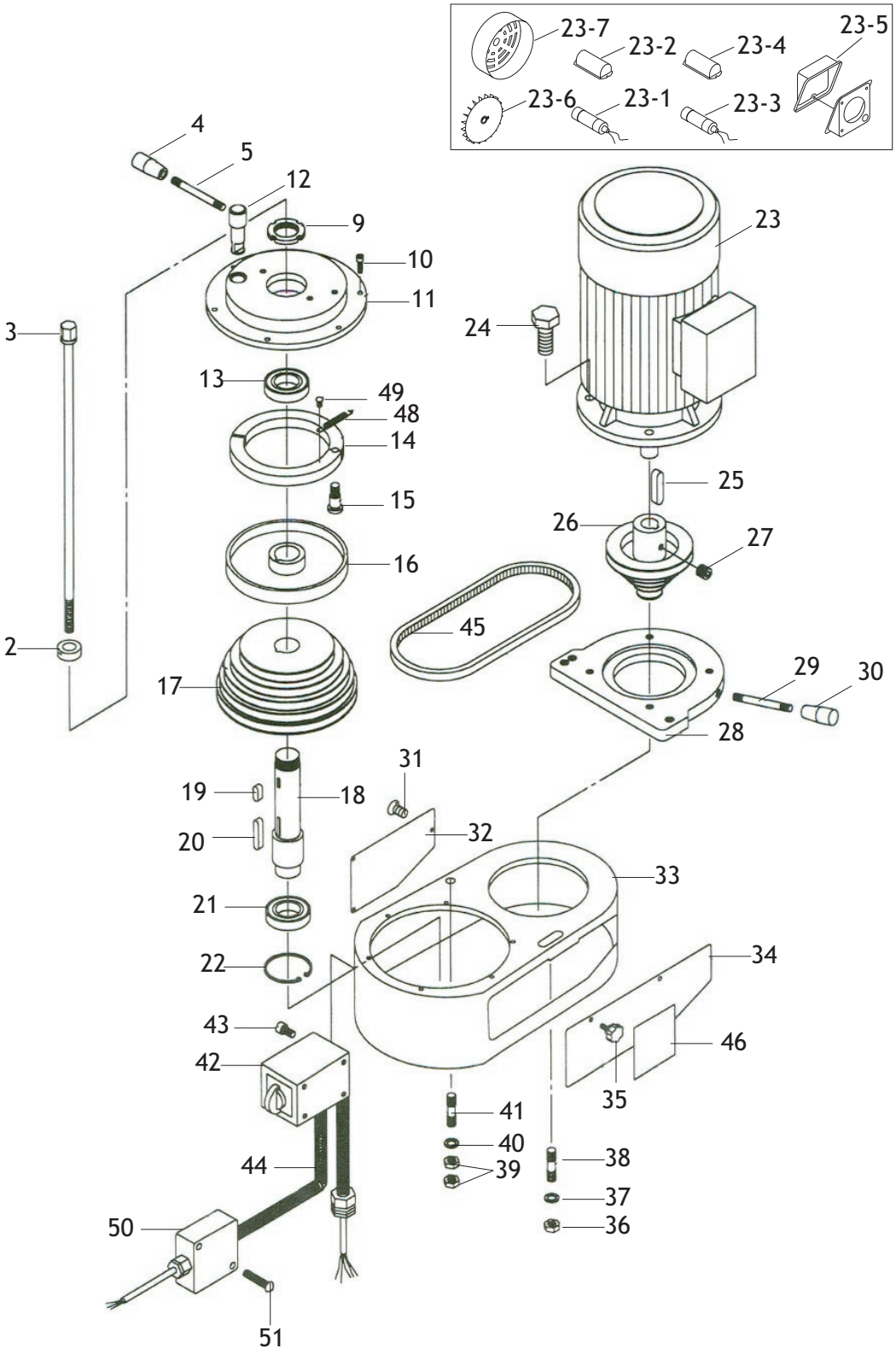
SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
Motor will not start.	1. Tripped circuit breaker inside power source breaker box. 2. Low voltage. 3. Open circuit in motor or loose connections. 4. Switch at fault. 5. Faulty start capacitor.	1. Reset circuit breaker by flipping switch on then off then back on. 2. Check power supply for proper voltage. 3. Inspect all lead connections on motor and magnetic switch for loose or open connections. 4. Replace switch. 5. Replace start capacitor.
Fuses or circuit breakers trip open.	1. Short circuit in line cord or plug. 2. Short circuit in motor or loose connections. 3. Incorrect fuses or circuit breakers in power supply.	1. Inspect cord or plug for damaged insulation and shorted wires and replace extension cord. 2. Inspect all connections on motor for loose or shorted terminals or worn insulation. 3. Install correct fuses or circuit breakers.
Motor overheats.	1. Motor overloaded. 2. Air circulation through the motor restricted.	1. Reduce load on motor. 2. Clean out motor to provide normal air circulation.
Tool slips in collet.	1. Collet is not fully drawn up into spindle taper. 2. Wrong size collet. 3. Debris in collet or in spindle taper. 4. Taking too big of a cut.	1. Snug up draw bar. 2. Measure tool shank diameter and match with appropriate diameter collet. 3. Remove all oil and debris from collet and spindle taper. 4. Lessen depth of cut and allow chips to clear.
Breaking tools or cutters.	1. RPM and or feed rate is too fast. 2. Cutting tool getting too hot. 3. Taking too big of a cut.	1. Use tables to set correct RPM and feed rates. 2. Use cutting fluid or oil for appropriate application. 3. Lessen depth of cut and allow chips to clear.
Machine is loud when cutting. Overheats or bogs down in the cut.	1. Excessive depth of cut. 2. Dull cutting tools.	1. Decrease depth of cut. 2. Use sharp cutting tools.
Workpiece vibrates or chatters during operation.	1. Table locks not tight. 2. Spindle lock not tight. 3. Workpiece not securely clamped to table or into mill vice. 4. RPM and feed rate too high.	1. Tighten down table locks. 2. Tighten spindle lock. 3. Check that clamping is tight and sufficient for the job. Make sure mill vice is tight to the table. 4. Use appropriate RPM and feed for the job.
Table hard to move.	1. Table locks are tightened down. 2. Chips have loaded up on bedways. 3. Bedways are dry and in need of lubrication. 4. Longitudinal stops are interfering. 5. Gibs are too tight.	1. Make sure table locks are fully released. 2. Frequently clean away chips that load up during milling operations. 3. Lubricate bedways and handles. 4. Check to make sure that stops are floating and not hitting the center stop. 5. Loosen gib screw(s).
Bad surface finish.	1. Wrong RPM or feed rate. 2. Dull cutting tool or poor cutting tool selection. 3. Wrong rotation of cutting tool. 4. Gibs are loose.	1. Adjust for appropriate RPM and feed rate. 2. Sharpen cutting tool or select a better cutting tool for the intended operation. 3. Check for proper cutting rotation for cutting tool. 4. Tighten gibs slightly.

Service Notes

DATE	SERVICE PERFORMED

PARTS

Upper Head Assembly

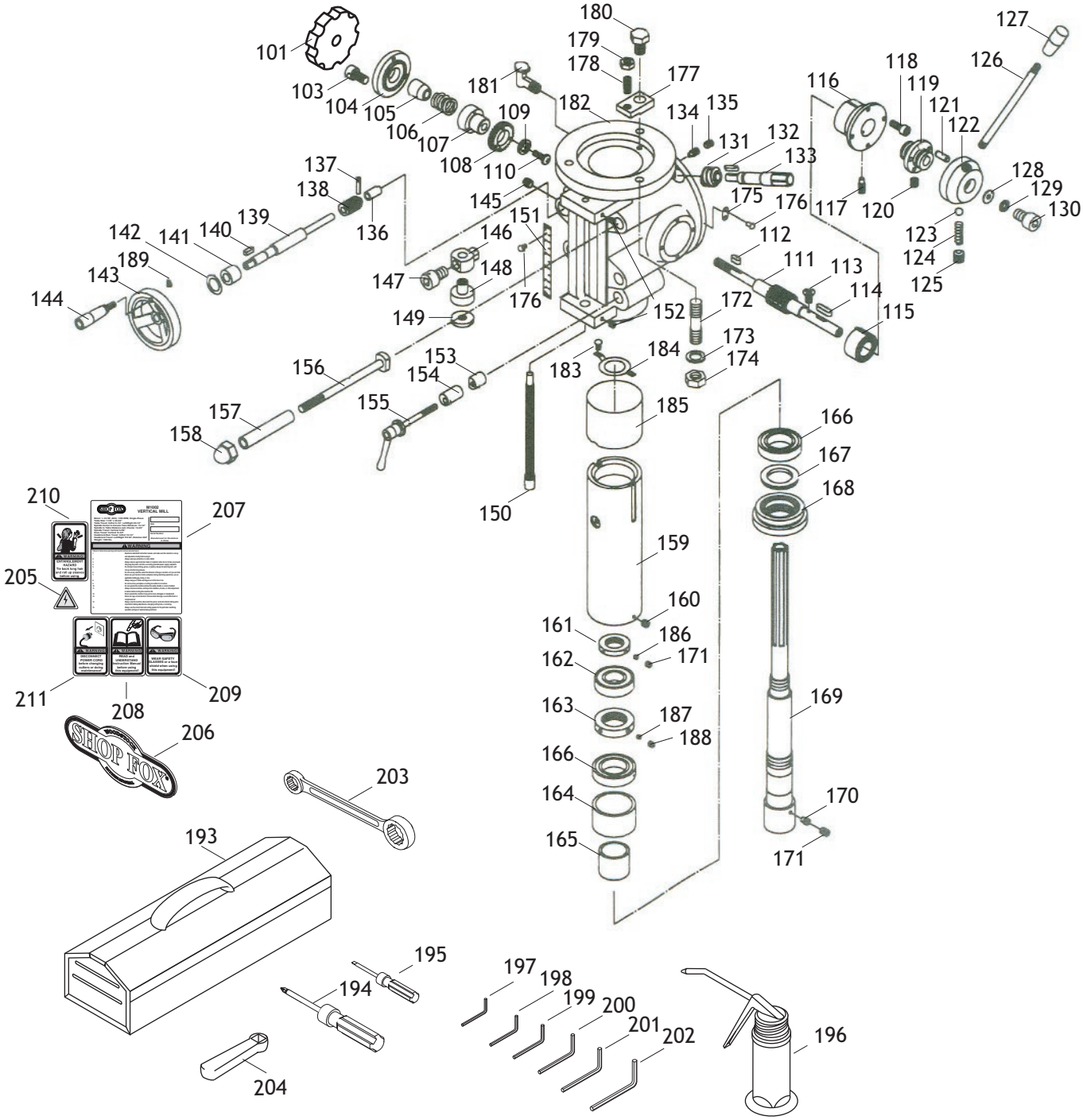


Upper Head Parts

REF	PART #	DESCRIPTION
2	XM1002002	SPACER
3	XM1002003	DRAW BAR
4	XM1002004	HANDLE
5	XM1002005	BRAKE HANDLE SHAFT
9	XM1002009	SPANNER NUT
10	XPSB01M	CAP SCREW M6-1 X 16
11	XM1002011	SPINDLE COVER
12	XM1002012	BRAKE ROD
13	XP6007	BALL BEARING 6007ZZ
14	XM1002014	BRAKE
15	XM1002015	PIVOT PIN
16	XM1002016	BRAKE DRUM
17	XM1002017	SPINDLE PULLEY
18	XM1002018	SPINDLE SHAFT
19	XPK99M	KEY 6 X 6 X 15
20	XPK42M	KEY 6 X 6 X 30
21	XP6007	BALL BEARING 6007ZZ
22	XPR38M	INT RETAINING RING 62MM
23	XM1002023	MOTOR 1-1/2HP 110/220V 1 PH
23-1	XPC040A	CAPACITOR 40MFD 250V
23-2	XM1002023-2	CAPACITOR COVER
23-3	XM1002023-3	CAPACITOR 324-389 MFD 165V
23-4	XM1002023-4	CAPACITOR COVER
23-5	XM1002023-5	WIRING BOX
23-6	XM1002023-6	FAN
23-7	XM1002023-7	FAN COVER
24	XPB32M	HEX BOLT M10-1.5 X 25

REF	PART #	DESCRIPTION
25	XM1002025	KEY 8 X 7 X 36
26	XM1002026	MOTOR PULLEY
27	XPSS20M	SET SCREW M8-1.25 X 8
28	XM1002028	MOTOR COVER
29	XM1002029	ROD
30	XM1002030	HANDLE
31	XPS37M	PHLP HD SCR M6-1 X 6
32	XM1002032	COVER
33	XM1002033	PULLEY HOUSING
34	XM1002034	COVER
35	XM1002035	KNOB M5-.8 X 10
36	XPN09M	HEX NUT M12-1.75
37	XPW06M	FLAT WASHER 12MM
38	XM1002038	STUD M12-1.75 X 50
39	XPN09M	HEX NUT M12-1.75
40	XPW06M	FLAT WASHER 12MM
41	XM1002041	STUD M12-1.75 X 50
42	XM1002042	SWITCH ASSEMBLY
43	XPSB68M	CAP SCREW M6-1 X 8
44	XM1002044	SWITCH CORD
45	XPVA29	V-BELT A-29 4L290
46	XM1002046	SPINDLE SPEED CHART
48	XM1002048	EXTENSION SPRING
49	XPS45M	PHLP HD SCR M5-.8 X 5
50	XM1002050	ELECTRICAL BOX
51	XPS100M	PHLP HD SCR M5-.8 X 40

Headstock Assembly

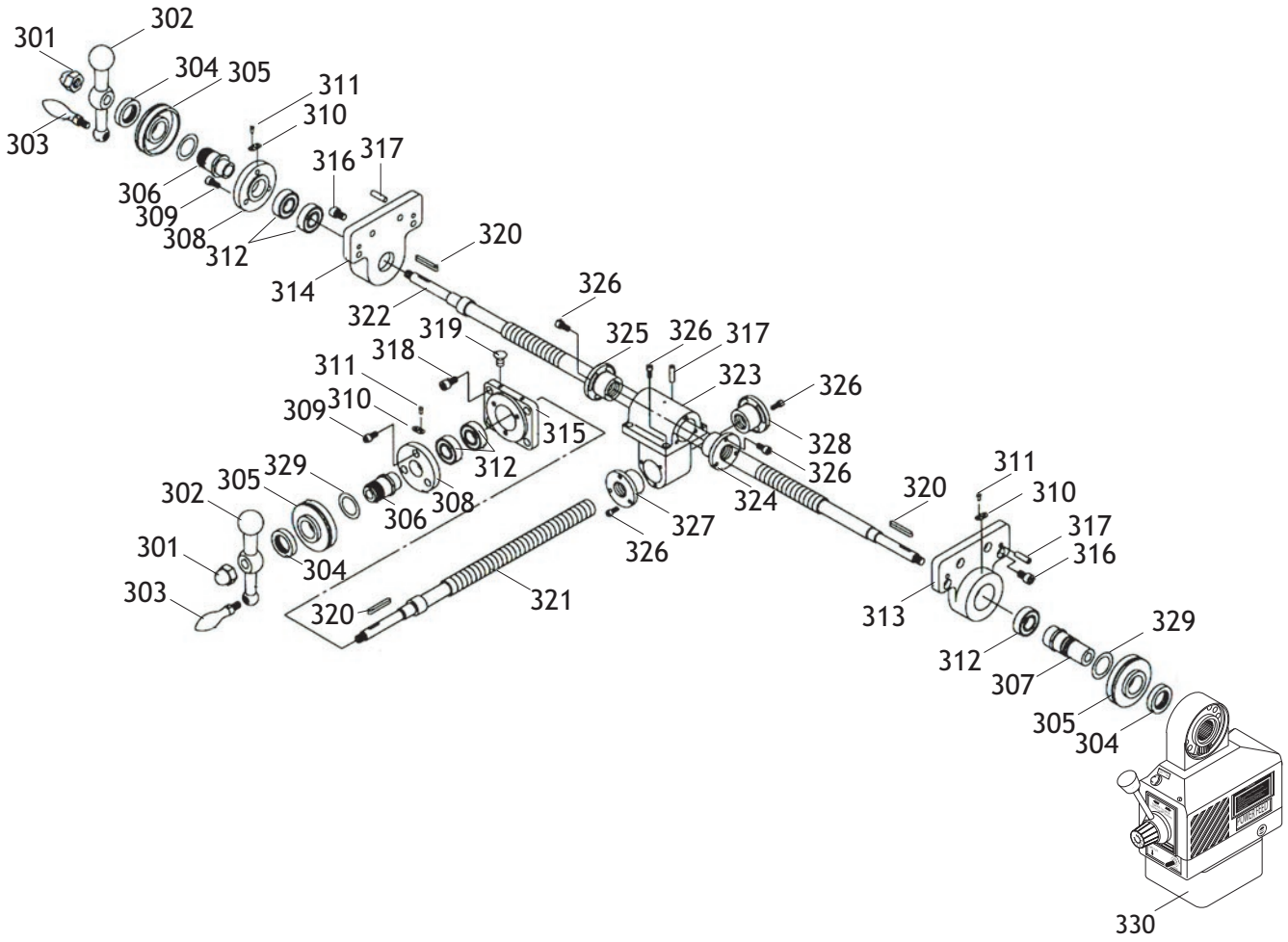


Headstock Parts

REF	PART #	DESCRIPTION
101	XM1002101	QUILL CLUTCH KNOB
103	XPSB26M	CAP SCREW M6-1 X 12
104	XM1002104	COVER
105	XM1002105	TAPER SLEEVE
106	XM1002106	RETURN SPRING
107	XM1002107	TRANSMISSION SLEEVE
108	XM1002108	WORM GEAR
109	XM1002109	SPRING WASHER 4MM
110	XPS56M	PHLP HD SCR M4-.7 X 16
111	XM1002111	SHAFT
112	XPK34M	KEY 5 X 5 X 20
113	XPS19M	PHLP HD SCR M5-.8 X 6
114	XPK34M	KEY 5 X 5 X 20
115	XM1002115	VOLUME SPRING
116	XM1002116	SPRING BRACKET
117	XPSS20M	SET SCREW M8-1.25 X 8
118	XPS11M	PHLP HD SCR M6-1 X 15
119	XM1002119	TRANSMISSION SLEEVE
120	XPSS20M	SET SCREW M8-1.25 X 8
121	XM1002121	ROUND PIN
122	XM1002122	HANDLE BASE
123	XM1002123	STEEL BALL
124	XM1002124	SPRING COMPRESSION
125	XPSS20M	SET SCREW M8-1.25 X 8
126	XM1002126	QUILL HANDLE
127	XM1002127	KNOB
128	XPW01M	FLAT WASHER 8MM
129	XM1002129	SPRING WASHER 8MM
130	XPSB11M	CAP SCREW M8-1.25 X 16
131	XM1002131	WORM
132	XPK37M	KEY 4 X 4 X 16
133	XM1002133	WORM SHAFT
134	XPSS26M	SET SCREW M5-.8 X 6
135	XPSS26M	SET SCREW M5-.8 X 6
136	XM1002136	BUSHING
137	XPRP37M	ROLL PIN 3 X 14
138	XM1002138	WORM
139	XM1002139	SHAFT
140	XPK69M	KEY 4 X 4 X 12
141	XM1002141	BUSHING
142	XM1002142	SPACER
143	XM1002143	WHEEL
144	XM1002144	HAND GRIP
145	XPSS01M	SET SCREW M6-1 X 10
146	XM1002146	LOCATING BLOCK

REF	PART #	DESCRIPTION
147	XPSB58M	CAP SCREW M8-1.25 X 12
148	XM1002148	GRADUATED RING
149	XM1002149	GRADUATED LOCK NUT
150	XM1002150	SCREW
151	XM1002151	GRADUATED SCALE
152	XPSS20M	SET SCREW M8-1.25 X 8
153	XM1002153	CAM
154	XM1002154	CAM
155	XM1002155	FLEXIBLE HANDLE
156	XM1002156	T-HEAD BOLT
157	XM1002157	SLEEVE PIPE
158	XPN26M	HEX NUT ACORN M12-1.75
159	XM1002159	RACK SLEEVE
160	XPSS07M	SET SCREW M5-.8 X 5
161	XM1002161	THREADED COLLAR
162	XP6206	BALL BEARING 6206ZZ
163	XM1002163	THREADED COLLAR
164	XM1002164	SPACER
165	XM1002165	SPACER
166	XM1002166	BALL BEARING 7008ZZ
167	XM1002167	PROTECTION RING
168	XM1002168	PROTECTION COVER
169	XM1002169	SPINDLE SHAFT
170	XPSS26M	SET SCREW M5-.8 X 6
171	XPSS26M	SET SCREW M5-.8 X 6
172	XM1002172	STUD M12-1.75 X 50
173	XPW06M	FLAT WASHER 12MM
174	XPN09M	HEX NUT M12-1.75
175	XM1002175	LIMIT PLATE
176	XM1002176	RIVET 2MM
177	XM1002177	STOP BLOCK
178	XPSS04M	SET SCREW M6-1 X 12
179	XPN01M	HEX NUT M6-1
180	XPB06M	HEX BOLT M8-1.25 X 12
181	XM1002181	OIL CUP
182	XM1002182	HEAD BODY
183	XPS19M	PHLP HD SCR M5-.8 X 6
184	XM1002184	PLATE
185	XM1002185	COVER
186	XM1002186	BLOCK 4 X 3MM
187	XM1002187	BLOCK 6 X 3MM
188	XPSS20M	SET SCREW M8-1.25 X 8
189	XPSS26M	SET SCREW M5-.8 X 6
193	XM1002193	TOOLBOX
194	XM1002194	PHLP HD SCREWDRIVER

Leadscrew Assembly



Headstock Parts cont.

REF	PART #	DESCRIPTION
195	XM1002195	SCREWDRIVER
196	XM1002196	OIL CAN
197	XPAW03M	HEX WRENCH 3MM
198	XPAW04M	HEX WRENCH 4MM
199	XPAW05M	HEX WRENCH 5MM
200	XPAW06M	HEX WRENCH 6MM
201	XPAW08M	HEX WRENCH 8MM
202	XPAW10M	HEX WRENCH 10MM
203	XM1002203	BOX END WRENCH 17/19MM

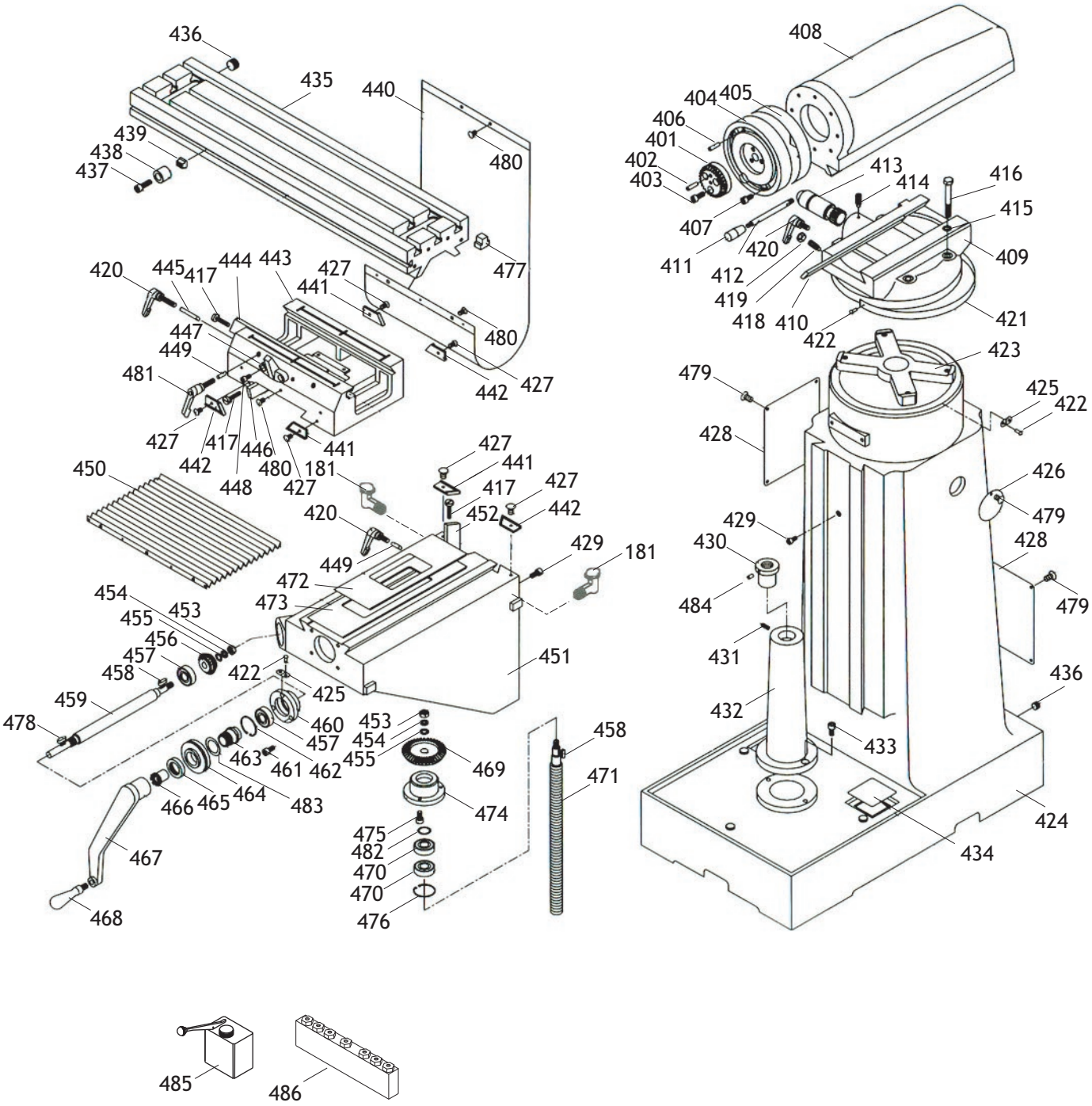
REF	PART #	DESCRIPTION
204	XM1002204	HANDLE
205	XLABEL04	LABEL, ELECTRICITY
206	XM1002206	SHOP FOX LOGO PLATE
207	XM1002207	MACHINE ID LABEL
208	XLABEL08	LABEL, READ MANUAL
209	XLABEL01	LABEL, SAFETY GLASSES
210	XLABEL09	LABEL, LOOSE CLOTHING
211	XLABEL02	LABEL, UNPLUG POWER

Leadscrew Parts

REF	PART #	DESCRIPTION
301	XPN26M	HEX NUT ACORN M12-1.75
302	XM1002302	HANDLE
303	XM1002303	BALL HANDLE
304	XM1002304	KNURLED NUT
305	XM1002305	DIAL
306	XM1002306	DIAL HOLDER
307	XM1002307	DIAL HOLDER
308	XM1002308	BEARING RETAINING COVER
309	XPSB11M	CAP SCREW M8-1.25 X 16
310	XM1002310	INDICATOR PLATE
311	XM1002311	RIVET
312	XP6204	BALL BEARING 6204ZZ
313	XM1002313	BEARING BRACKET
314	XM1002314	BEARING BRACKET
315	XM1002315	BEARING BLOCK

REF	PART #	DESCRIPTION
316	XPSB11M	CAP SCREW M8-1.25 X 16
317	XM1002317	TAPER PIN 8 X 130MM
318	XPSB14M	CAP SCREW M8-1.25 X 20
319	XPS37M	PHLP HD SCR M6-1 X 6
320	XPK106M	KEY 3 X 3 X 28
321	XM1002321	LEADSCREW
322	XM1002322	LEADSCREW
323	XM1002323	FEED NUT BRACKET
324	XM1002324	FEED SCREW NUT
325	XM1002325	FEED SCREW NUT
326	XPSB01M	CAP SCREW M6-1 X 16
327	XM1002327	FEED SCREW NUT
328	XM1002328	FEED SCREW NUT
329	XM1002329	SPACER
330	XM1002330	POWER FEED AL235

Knee and Base Assembly



Knee and Base Parts

REF	PART #	DESCRIPTION
401	XM1002401	WORM GEAR
402	XM1002402	TAPER PIN 8 X 150MM
403	XPSB64M	CAP SCREW M10-1.5 X 25
404	XM1002404	GRADUATED DIAL
405	XM1002405	GRADUATED DIAL PLATE
406	XM1002406	TAPER PIN 8 X 130MM
407	XPSB11M	CAP SCREW M8-1.25 X 16
408	XM1002408	RAM
409	XM1002409	TURRET
410	XM1002410	TURRET GIB
411	XM1002411	KNOB
412	XM1002412	HANDLE
413	XM1002413	PINION SHAFT
414	XPSS04M	SET SCREW M6-1 X 12
415	XPW06M	FLAT WASHER 12MM
416	XM1002416	HEX BOLT M12-1.75 X 115
417	XM1002417	GIB SCREW
418	XPSS01M	SET SCREW M6-1 X 10
419	XPN01M	HEX NUT M6-1
420	XM1002420	LOCK HANDLE
421	XM1002421	GRADUATED SCALE
422	XM1002422	RIVET
423	XM1002423	SPIDER ARM
424	XM1002424	BASE
425	XM1002425	INDICATOR PLATE
426	XM1002426	PLATE
427	XPS37M	PHLP HD SCR M6-1 X 6
428	XM1002428	PLATE
429	XPSB58M	CAP SCREW M8-1.25 X 12
430	XM1002430	ELEVATING NUT
431	XPSS64M	SET SCREW M6-1 X 15
432	XM1002432	KNEE SCREW COLUMN
433	XPSB72M	CAP SCREW M10-1.5 X 30
434	XM1002434	STRAINER
435	XM1002435	TABLE
436	XM1002436	OIL PLUG 3/8"
437	XPSB14M	CAP SCREW M8-1.25 X 20
438	XM1002438	LONGITUDINAL STOP
439	XM1002439	T-NUT
440	XM1002440	WAY COVER
441	XM1002441	WIPER
442	XM1002442	WIPER
443	XM1002443	SADDLE

REF	PART #	DESCRIPTION
444	XM1002444	SADDLE GIB
445	XM1002445	SHOE
446	XM1002446	SADDLE GIB
447	XM1002447	TABLE STOP BRACKET
448	XPSB14M	CAP SCREW M8-1.25 X 20
449	XM1002449	SHOE
450	XM1002450	WAY COVER
451	XM1002451	KNEE
452	XM1002452	KNEE GIB
453	XPN09M	HEX NUT M12-1.75
454	XM1002454	SPRING WASHER 12MM
455	XPW06M	FLAT WASHER 12MM
456	XM1002456	STRAIGHT BEVEL GEAR
457	XM1002457	BALL BEARING 6204ZZ
458	XPK08M	KEY 5 X 5 X 16
459	XM1002459	SHAFT
460	XM1002460	BEARING BLOCK
461	XPSB01M	CAP SCREW M6-1 X 16
462	XPR25M	INT RETAINING RING 47MM
463	XM1002463	DIAL HOLDER
464	XM1002464	DIAL
465	XM1002465	KNURLED NUT
466	XM1002466	CLUTCH INSERT
467	XM1002467	HAND LEVER
468	XM1002468	HAND GRIP
469	XM1002469	STRAIGHT BEVEL GEAR
470	XP6204	BALL BEARING 6204ZZ
471	XM1002471	KNEE SCREW
472	XM1002472	UPPER CHIP GUARD
473	XM1002473	LOWER CHIP GUARD
474	XM1002474	BEARING HOUSING
475	XPSB02M	CAP SCREW M6-1 X 20
476	XPR25M	INT RETAINING RING 47MM
477	XM1002477	RUBBER T-NUT
478	XM1002478	KEY 3 X 3 X 28
479	XPS68M	PHLP HD SCR M6-1 X 10
480	XPS14M	PHLP HD SCR M6-1 X 12
481	XM1002481	LOCK HANDLE
482	XM1002482	SPACER
483	XM1002483	SPACER
484	XM1002484	BALL OIL FITTING
485	XM1002485	OIL PUMP
486	XM1002486	MANIFOLD

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 the **SHOP FOX®** factory service center or authorized repair facility designated by our Bellingham, WA office, 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.***

1. How did you learn about us?
_____ Advertisement ____ Friend ____ Local Store
_____ Mail Order Catalog ____ Website ____ Other:

2. How long have you been a woodworker/metalworker?
_____ 0-2 Years _____ 2-8 Years ____ 8-20 Years _____ 20+ Years

3. How many of your machines or tools are **Shop Fox®**?
_____ 0-2 _____ 3-5 ____ 6-9 _____ 10+

4. Do you think your machine represents a good value? _____ Yes ____ No

5. Would you recommend **Shop Fox®** products to a friend? _____ Yes ____ No

6. What is your age group?
_____ 20-29 ____ 30-39 ____ 40-49
_____ 50-59 ____ 60-69 ____ 70+

7. 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+

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

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

9. Comments:_____

_____

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CUT ALONG DOTTED LINE

FOLD ALONG DOTTED LINE

Place
Stamp
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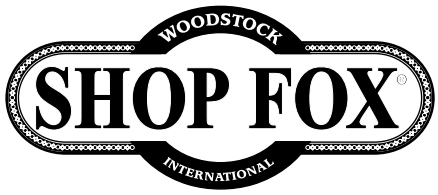

WOODSTOCK INTERNATIONAL INC.
P.O. BOX 2309
BELLINGHAM, WA 98227-2309

FOLD ALONG DOTTED LINE

TAPE ALONG EDGES--PLEASE DO NOT STAPLE