



MODEL M1036 MICRO MILL



OWNER'S MANUAL

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

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WARNING

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

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

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

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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. 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 Micro Mill

Your new **SHOP FOX®** Micro 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.

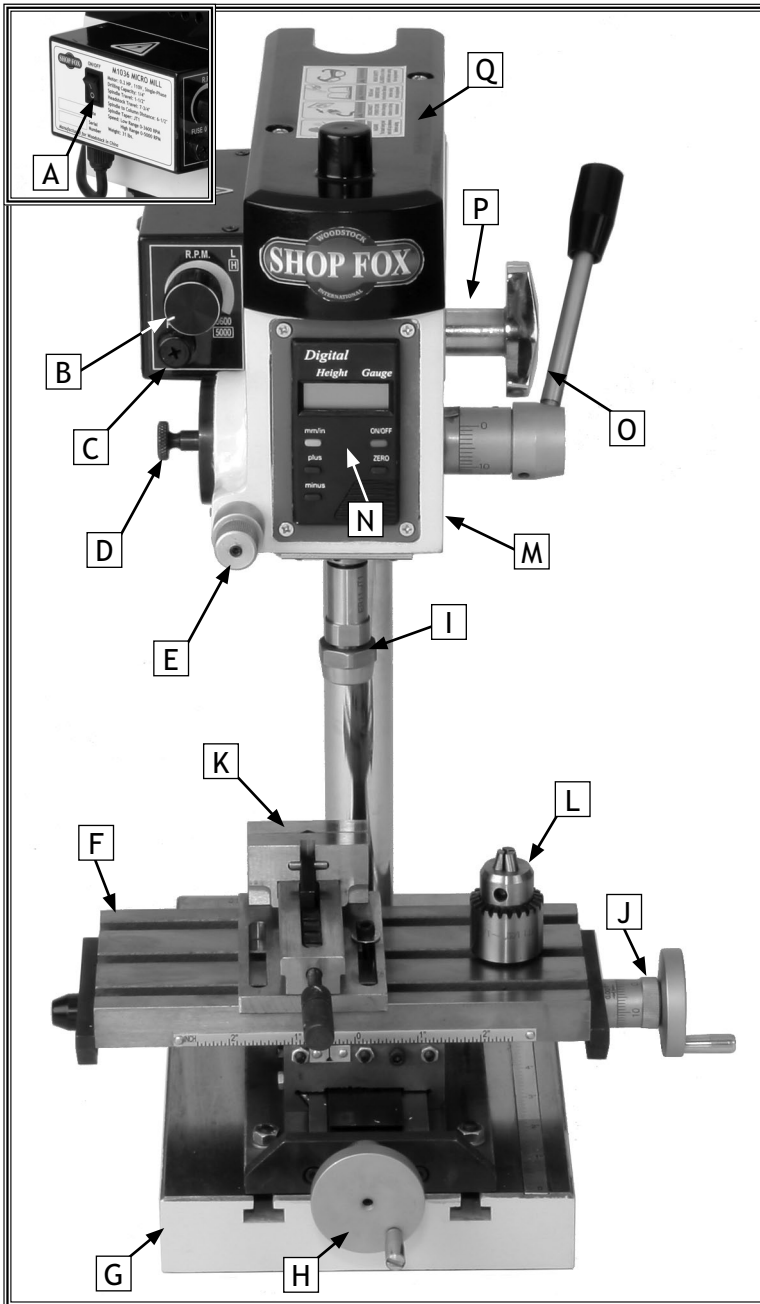
This Micro Mill is perfect for machining high precision small parts for working models or drilling holes that need to be identical depth and equal distance apart. The Model M1036 includes a removable cross feed table, a digital depth gauge, and a variable speed range from zero-5000 RPM.

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

Specifications

Motor.....	0.2 HP, 2A, 110V, Single-Phase
Drilling Capacity	1/4"
Spindle Taper.....	JT1
Spindle Travel	1 1/2"
Headstock Travel	7 3/4"
Spindle to Column Distance.....	6 1/2"
Table Travel, Longitudinal	2 3/4"
Table Travel, Cross.....	5 1/2"
Column Swivel.....	360°
Speeds	Low Range: 0-3600
.....	High Range: 0-5000
Weight	31 lbs.

Controls and Features



- A. ON/OFF Switch
- B. RPM Control Knob
- C. Fuse Box
- D. Clutch Knob
- E. Micro Downfeed Knob
- F. Compound Slide Table
- G. Base
- H. Crossfeed Handwheel
- I. Collet Chuck (Optional Accessory)
- J. Longitudinal Handwheel
- K. Vise (Optional Accessory)
- L. Drill Chuck
- M. Headstock
- N. Digital Height Gauge
- O. Downfeed Lever
- P. Column Lock Knob
- Q. Pulley Cover

Figure 1. M1036 Controls and features.

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

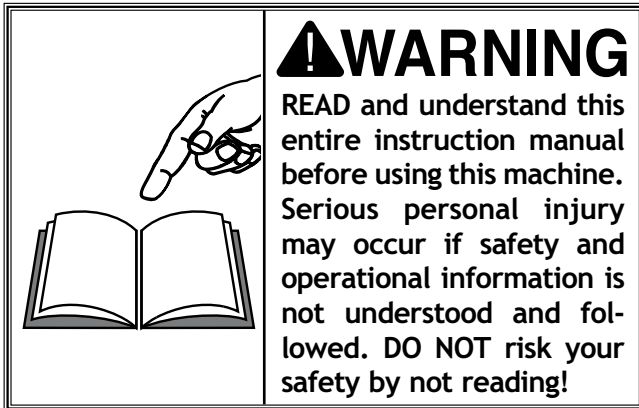
This symbol is used to alert the user to useful information about proper operation of the equipment, and/or a situation that may cause damage to the machinery.

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 mobile base, if used, to prevent the machine from moving during operation.**
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. **Habits—good and bad—are hard to break.** Develop good habits in your shop and safety will become second-nature to you.
24. **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.

Additional Safety Instructions for Micro Mills



1. **MILL ASSEMBLY.** Do not operate until unit is assembled and installed according to instructions.
2. **USER TRAINING.** This mill is intended to be used by operators who have the proper experience and training with this type of machine. Make sure you understand the use and operation of all controls.
3. **MILL INSPECTION.** Inspect the mill for damaged or worn parts before operation. Repair damage or perform maintenance immediately. Remove chuck key and any service tools immediately after use.
4. **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.
5. **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.
6. **CUTTING TOOLS.** Use the correct tool for the material you are milling. 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.
7. **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 or vacuum to remove them.
8. **FEED AND SPEED RATES.** Research the proper feed and speed rate for the material you are machining. Do not exceed these recommended rates.
9. **TURNING OFF MILL.** Allow the mill to come to a complete stop before leaving it unattended. **DO NOT** stop the spindle with your hand.
10. **SERVICING MILL.** Make sure mill is turned **OFF**, unplugged, and the mill has come to a complete stop before servicing. Perform routine inspections and correct service related issues promptly.
11. **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.
12. **AVOIDING ENTANGLEMENT.** Keep loose clothing articles such as sleeves, belts or jewelry items away from the mill spindle.

ELECTRICAL

110V Operation

The SHOP FOX® Model M1036 is prewired for 110 volt operation. The motor supplied with your new Micro Mill is rated at 0.2 HP and will draw approximately 2 amps. A 5-15 plug is included for your machine and is intended to be plugged into a matching 5-15 receptacle.

Connect your machine to a circuit (wire, breaker, plug, receptacle) that is rated for at least 10 amps.

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 the total amp load exceeds the rating of the circuit breaker or fuse, use a different circuit.

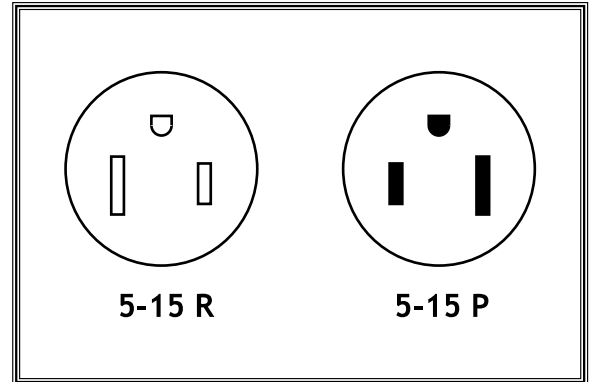


Figure 2. Typical 110V 3-prong plug and outlet.

Extension Cords

When it is necessary to use an extension cord, use the following guidelines:

- Use cords rated for Standard Service
- Never exceed a length of 100 feet
- Use cords with 16 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 comes with a grounding pin. Do not remove it. If your outlet does not accommodate a ground pin, have it replaced by a qualified electrician or have an appropriate adapter installed.

Note: When using an adapter, the adapter must be grounded.

⚠ 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.

ELECTRICAL

SET UP

Unpacking

The SHOP FOX® Model M1036 has been carefully packaged for safe transporting. If you notice the machine has been damaged, please contact your authorized SHOP FOX® dealer immediately.

	<p>!WARNING SUFFOCATION HAZARD! Immediately discard all plastic bags and packing materials to eliminate suffocation hazards for children and animals.</p>
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	<p>!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!</p>
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Items Needed for Set Up

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

- Safety Glasses (for each person).....1
- Solvent1
- Shop Rags1
- Wrench or Socket 10mm1
- Ruler.....1

Bench Mounting Hardware (Optional)

- Precision Level.....1
- Phillips Head Screw 6mm x Length Varies2
- Hex Nut 6mm2
- Flat Washer 6mm.....2
- Metal Shim Stock1
- Drill and 6mm Bit.....1

	<p>!WARNING UNPLUG power cord before you do any assembly or adjustment tasks! Otherwise, serious personal injury to you or others may occur!</p>
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SET UP

Inventory

The following is a description of the main components shipped with the SHOP FOX® Model M1036. Lay the components out to inventory them.

Box 1 Contents (Figure 3)	Qty
A. Headstock.....	1
B. Collar	1
C. Spacer	1
D. Base with Column	1
E. Downfeed Lever Handle	1
F. Column Lock Knob.....	1
G. Fence	1

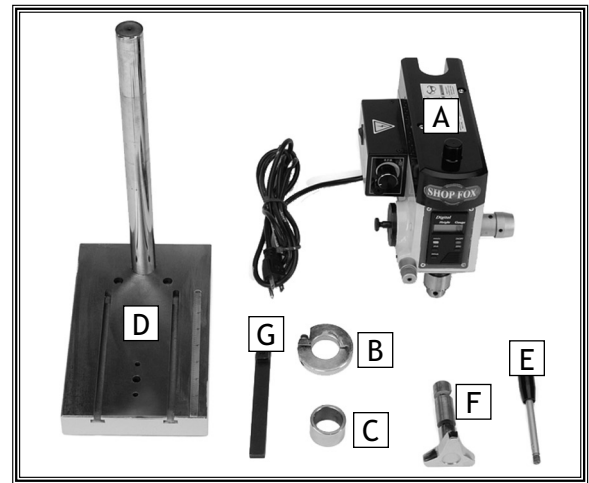


Figure 3. Box 1 contents.

Box 1 Tools and Hardware (Not Shown)	Qty
• Phillips Head Screwdriver	1
• Hex Wrenches 2, 2.5, 3, 4mm	1 Each
• Open End Wrench 5.5/7mm	1
• Chuck Removal Wedge	1
• Round Belt	1
• Cap Screw M5-.8 x 12.....	1
• Square Nut M5-.8.....	1

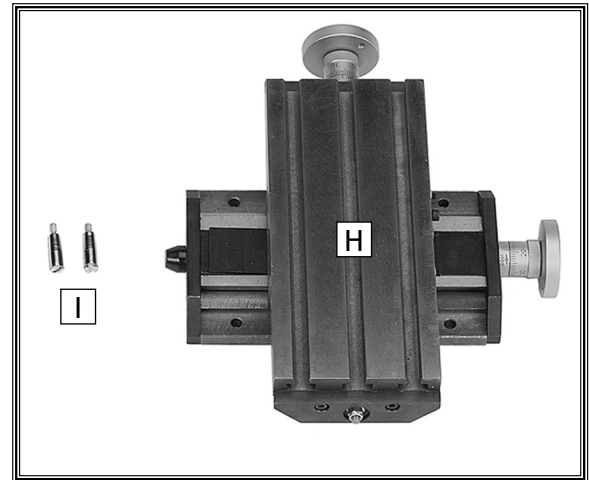


Figure 4. Box 2 contents.

Box 2 Contents (Figure 4)	Qty
H. Compound Slide Table.....	1
I. Handwheel Handles	2

Box 2 Hardware (Not Shown)	Qty
• T-Bolts M6-1 x 22.....	4
• T-Nuts M6-1	4
• Hex Nuts M6-1.....	2
• Flat Washers 6mm.....	2

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

NOTICE

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

SET UP

Machine Placement

- **Workbench Load:** Bolt your machine to a sturdy workbench that will not tip. Some workbenches may require additional reinforcement to support both the machine and the workpiece.
- **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 Micro Mill.
- **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.

Cleaning Machine

The table and other unpainted parts of your Micro 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>⚠ WARNING</p> <p>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!</p>
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	<p>⚠ CAUTION</p> <p>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.</p>
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	<p>⚠ CAUTION</p> <p>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.</p>
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SET UP

Mounting to Workbench

Mounting the mill to the workbench provides maximum rigidity and prevents the mill from tipping. Mounting the mill should be done before installing the headstock for the best access to the mounting holes. When choosing a location for the mill, make sure the cross feed and the longitudinal handwheels extend out beyond the edge of the table surface. This will allow unrestricted handwheel operation.

To mount the mill to the workbench, do these steps:

1. Measure the thickness of the workbench and add 1½" to determine the necessary screw length.
2. Mark your hole locations, using the mounting holes in the base as a guide (see Figure 5).
3. Drill 3/16" holes through the workbench.
4. Place a precision level on the mill/drill table and shim the mill/drill until it is level side-to-side and front-to-back.
5. Bolt the mill to the workbench with two 6mm cap screws (length determined in Step 1), hex nuts and flat washers.

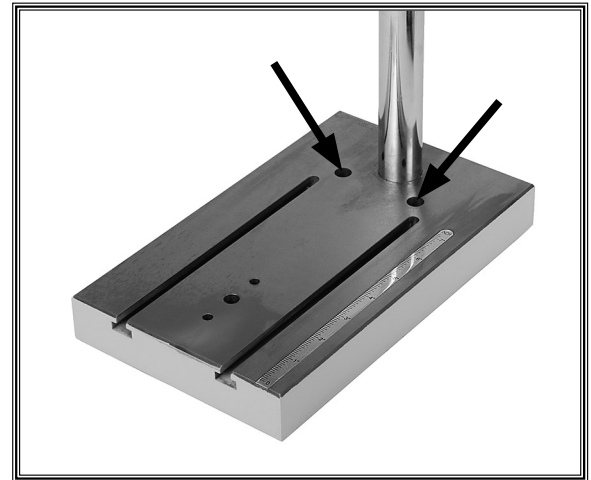


Figure 5. Mounting hole locations.



Figure 6. Collar and spacer installed on the column.

Mounting Headstock to Column

To install the headstock on the column, do these steps:

1. Set the base upright and slide the collar half way down the column.
2. Secure the collar by tightening the cap screw with a 4mm hex wrench, then slide the spacer over the column (see Figure 6).
3. Insert the column lock knob assembly into the headstock, as shown in Figure 7.
4. Slide the headstock onto the column, line the chuck up with the hole in the base, and lock it in place with the column lock knob.
5. Thread the downfeed lever into the hub and tighten with the included wrench.

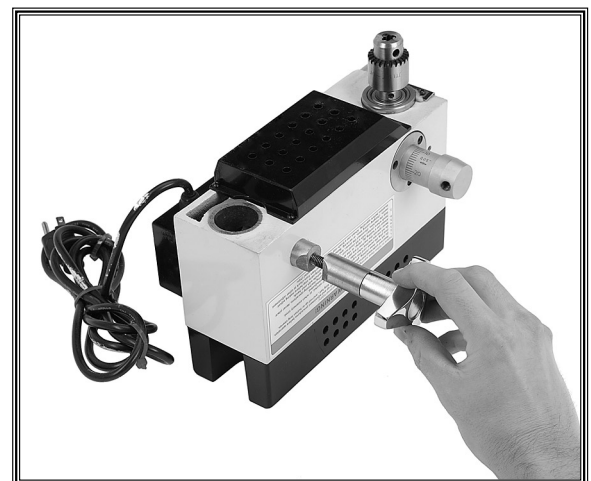


Figure 7. Installing the column lock knob.

SET UP

Compound Slide Table

Installation of the compound slide table is not necessary when using the mill as a drill. The compound slide table can be moved in the X and Y axis for use with milling cutters.

To install the compound slide table, do these steps:

1. Thread the handwheel handles into the handwheels.
2. Remove the fence from the base if installed.
3. Slide the T-bolts into the T-slots and place the compound slide table over the T-bolts, as shown in **Figure 8**.
4. Measure at the front and back of the compound slide table as shown in **Figure 9** to make sure the compound slide table is parallel to the base.
5. Place washers over the T-bolts and secure the compound slide table with the hex nuts.

Vise

To install the vise, do these steps:

1. Slide the T-nuts into the compound slide table.
2. Place the vise on the compound slide table and loosely secure it by threading two M6-1 x 18 cap screws with washers through the vise and into the T-bolts, as shown in **Figure 10**.
3. Align the vise parallel to the compound slide table and tighten the cap screws.

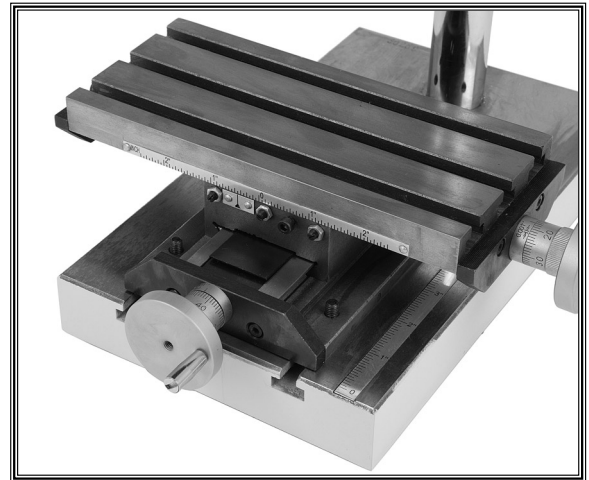


Figure 8. T-bolt installation.

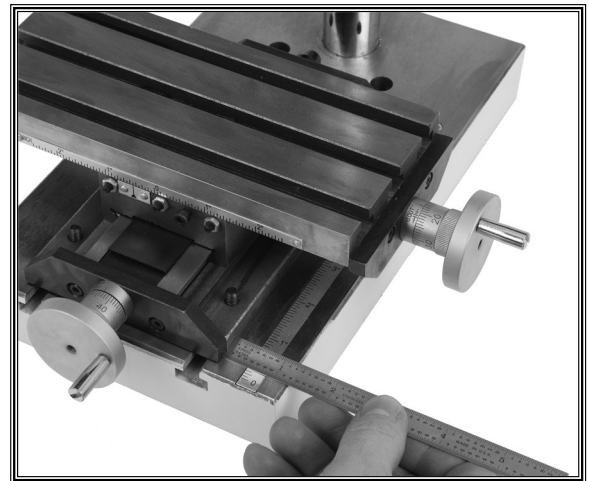


Figure 9. Aligning the compound slide table.

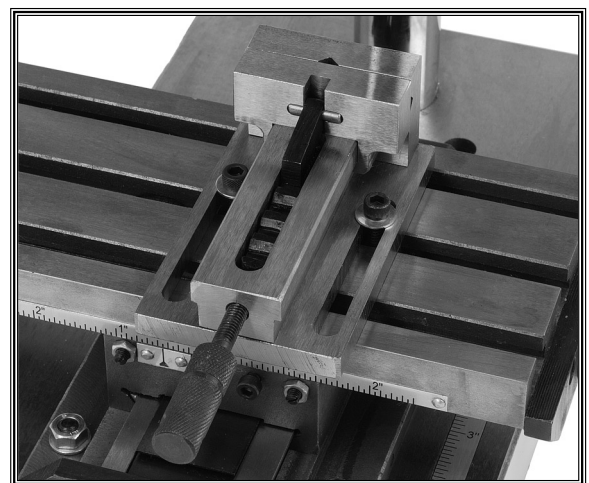


Figure 10. Securing the vise.

Test Run and Spindle Break-in

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 22**. It is essential to closely follow the proper break-in procedures to ensure trouble free performance.

To begin the test run and spindle break-in procedure, do these steps:

1. Make sure there are no obstructions around or underneath the spindle.
2. Put on safety glasses, and make sure any bystanders are wearing safety glasses and are out of the way.
3. Plug the machine in and turn the ON/OFF switch **ON**, then set the mill to the slowest RPM. See **Page 18** for adjusting RPM. 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.
4. If the mill runs smoothly, allow it to run for 10 minutes at slow speed.
5. Slowly increase the RPM and allow it to run at a medium RPM for another ten minutes.
6. Slowly increase the RPM and allow it to run at a high RPM for another ten minutes.

NOTICE

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 M1036 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 milling machine operator before performing any unfamiliar operations. **Above all, your safety should come first!**

Table Travel

The table can be moved in 2 axes. Each axis is independently controlled by a crank handle. 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 a crank handle at the end of the table, and can be locked in position by the cap screw located at the front of the table.

Cross Feed Control

The cross feed is controlled by the center crank handle, and can be locked in position by the cap screw located under the left side of the mill table.

⚠ 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

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



Figure 11. Wear eye protection and secure-ly clamp workpiece when operating mill.

Graduated Dials

Each mark on the handwheel graduated dials (**Figure 12**) represents 0.001" of movement. One full rotation of the handwheel is equal to 0.050". The graduated dials can be "zeroed" by grasping the knurled section and rotating the graduated dial to "0".

Example:

To drill a series of holes with 1/2" centers (0.500"), drill the first hole, zero the graduated dial, move the table 0.500" (10 rotations of the handwheel) in the appropriate direction, then drill the next hole.

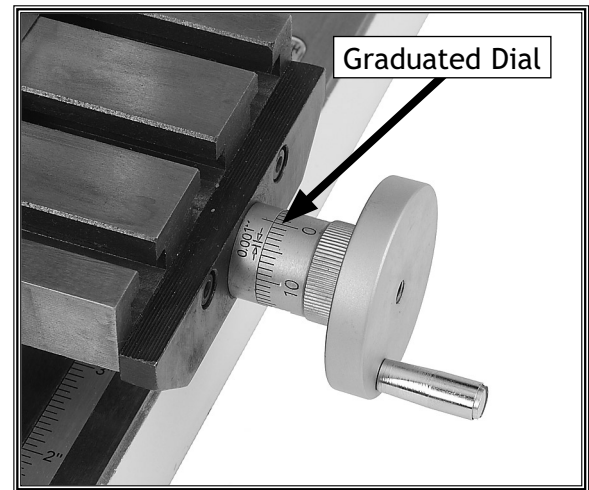


Figure 12. Graduated dial.

Backlash

When changing table direction in either axis, the handwheel will rotate a few degrees before the table begins to move and the graduated dial must be adjusted. This is backlash.

To correct for backlash, do these steps:

1. Turn the handwheel in the opposite direction of your next operation.
2. Turn the handwheel to move the table in the intended direction.
3. When the lead screw catches and the table begins to move, backlash has been eliminated and the graduated dial can be "zeroed."

Note: You will not need to adjust for backlash as long as the table moves in the same direction.



Figure 13. Headstock height adjustment.

Headstock Height

Adjusting the height of the headstock, instead of extending the quill, maintains the rigidity of the mill and requires less motion when using the downfeed lever.

To adjust the headstock height, do these steps:

1. Loosen the collar (**Figure 13**) and lower it to the desired height.
2. Loosen the column lock knob and carefully lower the headstock until it rests on the collar spacer.

Note: Raise the headstock by reversing **Steps 1 & 2**.

Downfeed Controls

Quill Feed Control

The quill feed is controlled by the downfeed lever shown in **Figure 14**. The handle allows the mill to operate as a drill.

To use the downfeed lever, do this step:

1. Pull the quill downfeed lever (**Figure 14**) 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.

Micro Downfeed Knob

The micro downfeed knob is used to accurately control the quill depth (see **Figure 15**).

To use the micro downfeed handwheel, do these steps:

1. Push the clutch knob (**Figure 15**) in lightly and rotate the micro downfeed knob until the clutch knob engages the gear.
2. Rotate the micro downfeed knob clockwise to feed the quill down and counterclockwise to raise the quill.

Digital Height Gauge

The digital height gauge (**Figure 16**) provides accurate height measurements, zeroing at any height, and incremental readout adjustments.

ON/OFF button: Turns the digital height gauge **ON** or **OFF**. This gauge does not automatically turn OFF, so the batteries will die if the gauge is left ON.

ZERO button: Returns the digital readout to 0.000 independent of the height of the quill.

MM/IN button: Changes readout from inches to millimeters.

PLUS and MINUS buttons: Adds or subtracts from the number shown on the digital readout. You must hold the button for several seconds before it begins to function.

When the batteries wear out, open the cover shown in **Figure 16** and replace the battery.

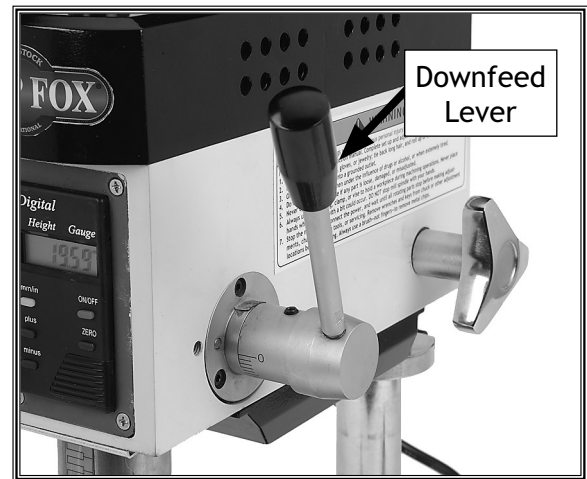


Figure 14. Quill downfeed lever.



Figure 15. Micro downfeed controls.



Figure 16. Digital height gauge.

Depth Stop

The depth stop allows the operator to make numerous holes that all are the same depth or to hold the mill at a specified depth.

To set the depth stop, do these steps:

1. Use the micro downfeed knob to set the desired depth.
2. To set the quill to repeat the same depth, rotate the graduated dial (**Figure 17**) past the 0 mark until it stops, then tighten the set screw.
3. To lock the quill at the specified depth, rotate the graduated dial past the 30 mark until it stops, then tighten the set screw.

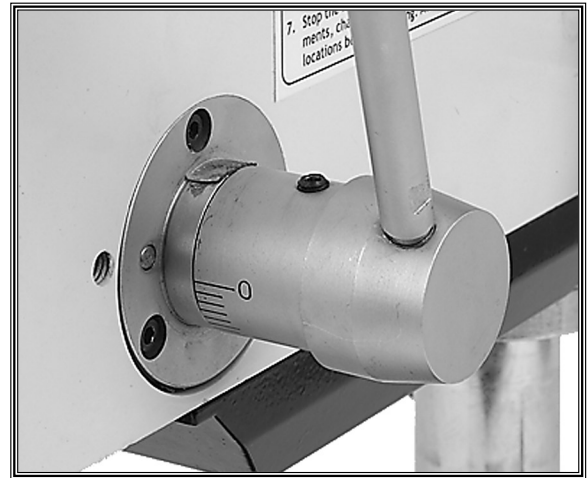


Figure 17. Depth stop.

Changing RPM

The variable speed dial shown in **Figure 18** controls the spindle speed and the pulleys shown in **Figure 19** control the speed range. As a general rule, smaller bits and softer material require higher speeds and less torque, and larger bits and harder materials require slower speeds and greater torque.

To change the RPM, do these steps:

1. Turn the mill **ON** and rotate the RPM dial (**Figure 18**) to reach the desired speed.



Figure 18. RPM dial.

To change speed range, do these steps:

1. Remove the pulley cover and loosen the motor mount nuts shown in **Figure 19**.
2. Slide the motor pulley toward the spindle pulley and move the round belt to the other pulley position.

Note: *The upper pulley position is the low range, and the lower pulley position is the high range.*

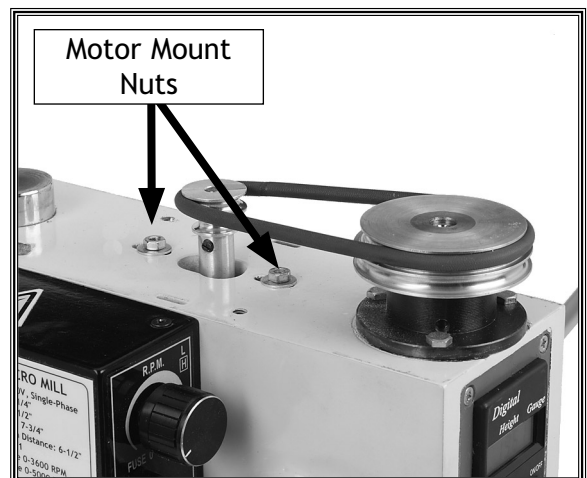


Figure 19. Spindle speed pulleys.

Drill Chuck

The drill chuck will only accept bits with a maximum of $\frac{1}{4}$ " shank. When installing a bit in the drill chuck, make sure it is tight enough that it will not come loose during operation.

To install a drill bit, do these steps:

1. UNPLUG THE MICRO MILL!
2. Open the drill chuck wide enough to accept the shank of the bit.
3. Insert the bit as far as possible into the chuck WITHOUT allowing the chuck jaws to touch the cutting edges, and hand tighten the chuck.

Note: Make sure small bits are not trapped between the edges of two jaws; if they are, reinstall the bit or it will not be secure enough to use for drilling.

4. Final tighten the drill chuck with the chuck key.

To remove a drill bit, do these steps:

1. UNPLUG THE MICRO MILL!
2. Use the chuck key to open the drill chuck, and catch the bit with a rag to protect your hands.

Drill Chuck Removal

The drill chuck and the collet chuck are attached to the arbor with a JT1 taper. Matched tapers on the arbor and the inside of the chuck use a friction fit to for a semi-permanent assembly.

To remove the drill chuck, do these steps:

1. Protect the table surface with a piece of cardboard, or hold the cutter or tool with a shop towel to prevent it from falling out of the collet.
2. Place the chuck removal wedge (**Figure 21**) between the top of the drill chuck and the spindle (see **Figure 22**), then tap the wedge to separate the chuck from the arbor.



Figure 20. Drill chuck.

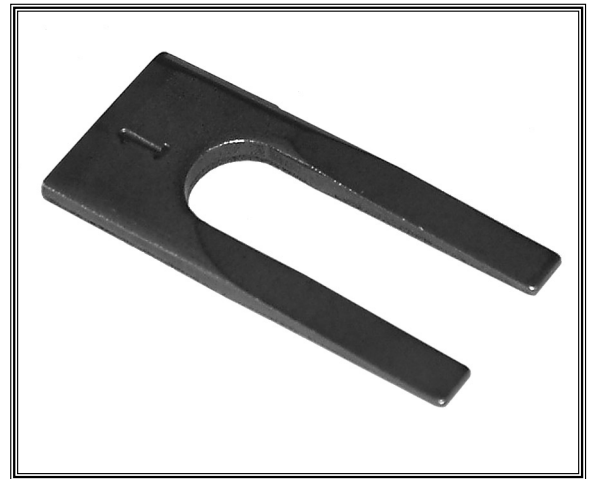


Figure 21. Chuck removal wedge.

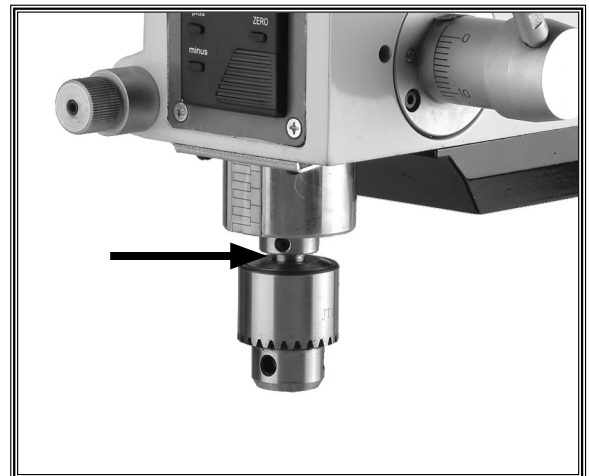


Figure 22. Drill chuck removal.

Collets

The collet chuck (an optional accessory) for the micro mill offers increased precision and rigidity compared to the drill chuck. Each collet will only fit tooling with a specific shaft diameter. This collet set includes $\frac{1}{4}$ ", $\frac{3}{16}$ ", $\frac{5}{32}$ ", $\frac{5}{64}$ ", $\frac{3}{64}$ " collets.

To install the collet chuck, do these steps:

1. UNPLUG THE MICRO MILL!
2. Remove the drill chuck and clean the arbor and collet chuck tapers with denatured alcohol.
3. Push the collet chuck onto the arbor.
4. Place a piece of wood on the compound slide table and use the downfeed lever to firmly press the collet chuck against the piece of wood (see Figure 23) to seat the collet chuck on the arbor.

To install the collet in the collet chuck, do these steps:

1. Place the grooved end of the collet into the collet nut until the off-center lip of the collet nut snaps into the collet groove. See Figure 24.

Note: *This lip and groove pulls the collet from the spindle when the collet nut is removed.*

2. Place the collet nut and collet into the collet chuck and finger tighten the collet nut onto the collet chuck.
3. Insert the bit into the collet, place a hex wrench through the hole in the spindle, and tighten the collet with a 22mm wrench (see Figure 25).

To remove a bit from the collet chuck, do these steps:

1. Protect the table surface with a piece of cardboard or hold the cutter or tool with a shop towel to prevent it from falling out of the collet.
2. Place a hex wrench through the hole in the spindle and loosen the collet nut with a 22mm wrench until the bit is free.

Note: *Remove the collet chuck in the same manner as removing the drill chuck.*

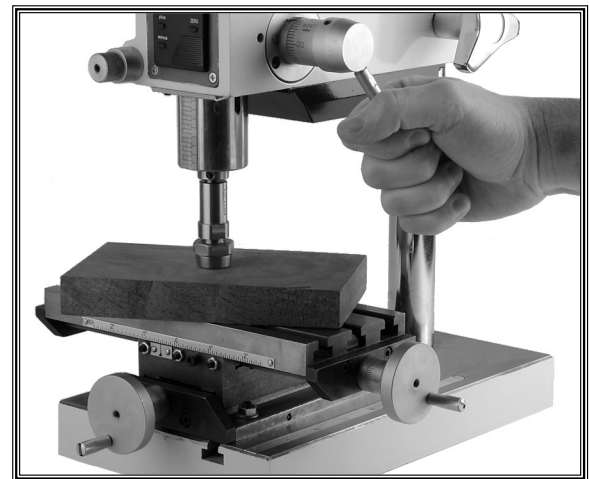


Figure 23. Installing the collet chuck.



Figure 24. Collet and collet nut lip.



Figure 25. Installing a collet.

MAINTENANCE

General

Regular periodic maintenance on your **SHOP FOX®** Model M1036 will ensure its optimum performance. Make a habit of inspecting your machine each time you use it.

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

- Loose chucks and arbors.
- Loose vises or clamps.
- Loose mounting bolts.
- Worn switch.
- Worn or damaged cords and plugs.
- Damaged round 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.

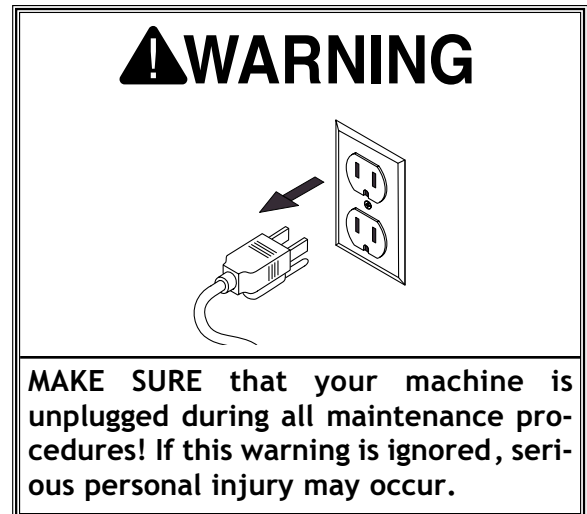
Cleaning

Cleaning the Model M1036 is relatively easy. Sweep or vacuum excess metal chips from the table and ways, and wipe off the remaining waste with a dry cloth. If any cutting fluid 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 & Base

Keep exposed cast iron rust-free with regular applications of surface lubricants designed for cast iron such as G96® Gun Treatment or SLIPIT®. For long term storage you may want to consider products like Boeshield T-9™.

Remove vises, clamps, compound slide tables, etc. after use so moisture cannot be trapped between the components and cause rust.



Lubrication

Regular lubrication will ensure your mill performs at its highest potential.

Place two to three drops of ISO 68 or SAE 20W non-detergent oil or similar lubricant directly on the following areas each time you use your mill (see Figure 26):

- Cross slide and saddle ways
- Quill shaft

Apply a light weight lithium based grease directly to these points once a month or more frequently as needed:

- Longitudinal leadscrew (Figure 27)
- Crossfeed leadscrew (Figure 28)

Note: Pry up the leadscrew cover to access the crossfeed leadscrew.

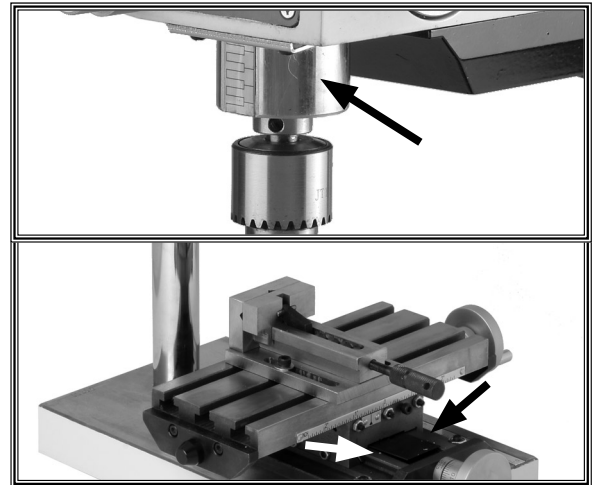


Figure 26. Points of lubrication.

NOTICE

Lack of lubrication causes poor machine performance. Keep your mill lubricated to reduce wear on parts and discourage oxidation.

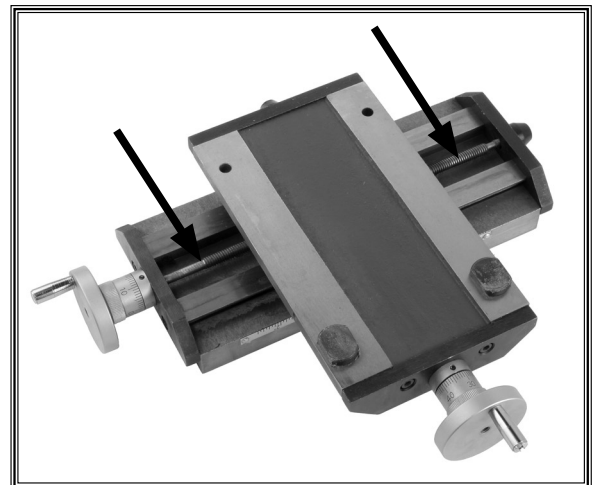


Figure 27. Longitudinal leadscrew.

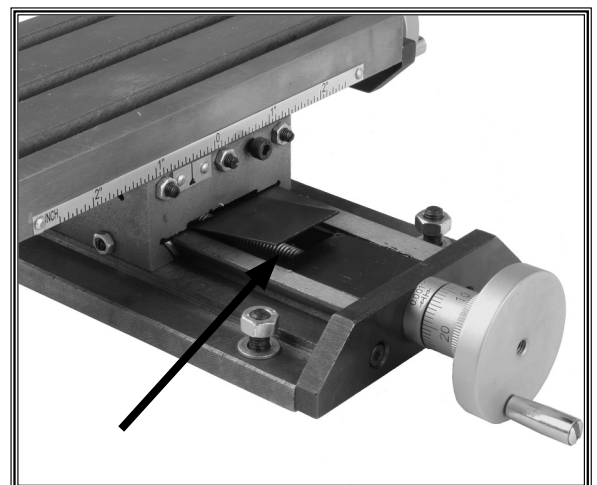


Figure 28. Crossfeed leadscrew.

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.

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 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 binding and premature wear to the gib.

Each gib has multiple lock nuts and set screws that need to be adjusted. Make your adjustments equally and in small increments.

To adjust the gibs, do these steps:

1. UNPLUG THE MICRO MILL!
2. Loosen the lock nuts as shown in **Figure 30**.
3. Move the table back-and-forth, while slightly tightening each set screw. When properly adjusted, the gib should offer slight resistance without binding.
4. Tighten the lock nuts.

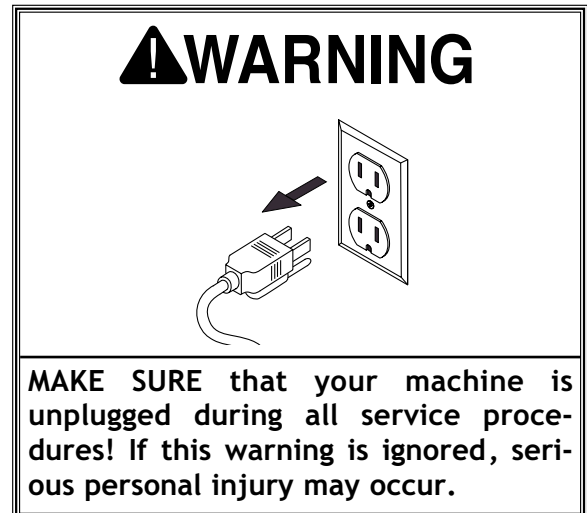


Figure 29. Always unplug before servicing.

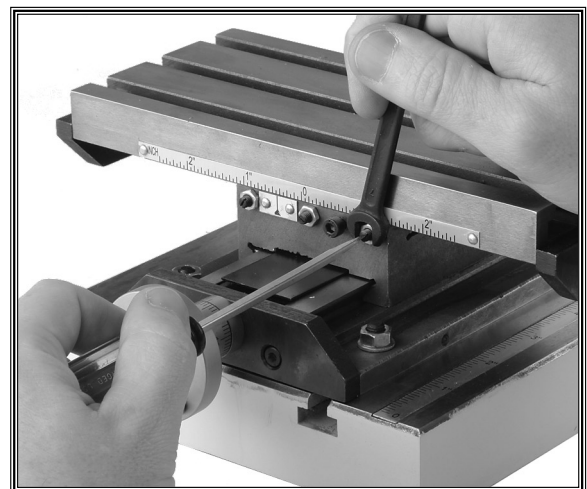


Figure 30. Longitudinal gib screw.

Replacing Motor Brushes

After some period of time, the carbon brushes on the DC motor will need to be replaced. Always replace the brushes in pairs.

To replace the motor brushes, do these steps:

1. UNPLUG THE MICRO MILL!
2. Remove the lower motor cover (see **Figure 31**) to expose the motor.
3. Unscrew the cap from the motor housing (see **Figure 32**).
4. Remove the spring and carbon brush, and replace with a new spring and carbon brush.
5. Screw the cap back into the motor housing.

Fuse Replacement

A fuse is located in the switch housing near the RPM dial.

To replace the fuse, do these steps:

1. Loosen the fuse cap.
2. Remove and replace the fuse from the fuse cradle (see **Figure 33**).
3. Replace the fuse cap.



Figure 31. Lower motor cover.

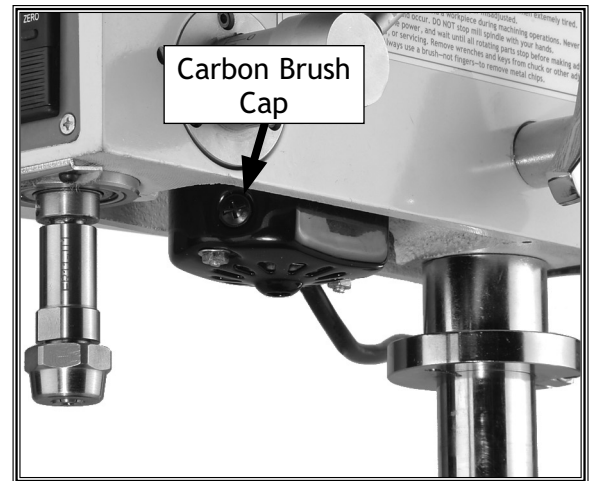
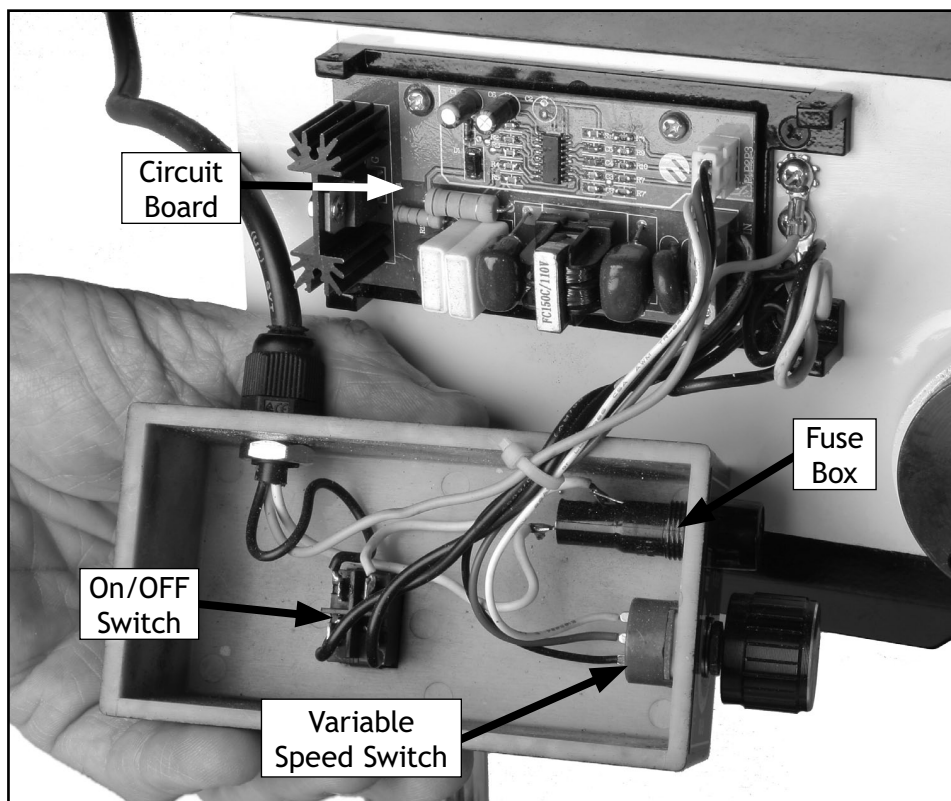


Figure 32. Carbon brush removal.

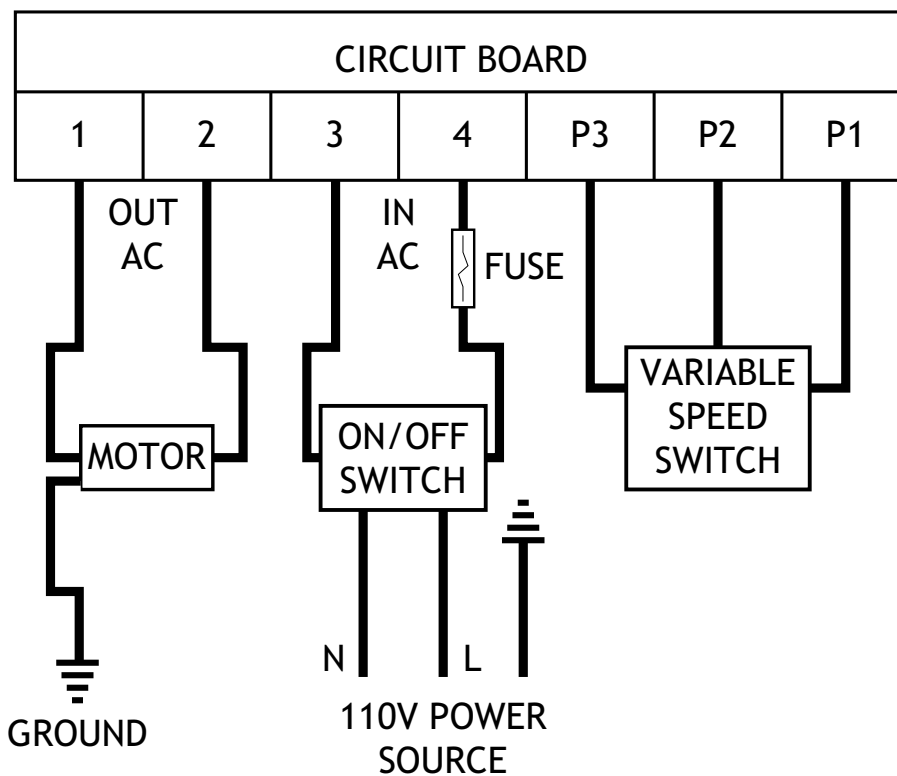


Figure 33. Fuse replacement.

Electrical Components

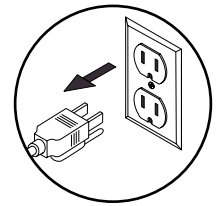


Wiring Diagram



SERVICE

Troubleshooting



This section covers the most common problems and corrections with this type of machine. **WARNING! DO NOT** make any adjustments until power is disconnected and moving parts have come to a complete stop!

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
Motor will not start.	<ol style="list-style-type: none"> 1. Blown system fuse. 2. Tripped circuit breaker inside power source breaker box. 3. Low voltage. 4. Open circuit in motor or loose connections. 5. Switch at fault. 	<ol style="list-style-type: none"> 1. Replace fuse. 2. Reset circuit breaker by flipping switch on then off then back on. 3. Check power supply for proper voltage. 4. Inspect all lead connections on motor and magnetic switch for loose or open connections. 5. Replace switch.
Fuses or circuit breakers trip open.	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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.	<ol style="list-style-type: none"> 1. Motor overloaded. 2. Air circulation through the motor restricted. 3. Motor brushes are wearing. 	<ol style="list-style-type: none"> 1. Reduce load on motor. 2. Clean out motor to provide normal air circulation. 3. Inspect motor brushes, replace if necessary.
Bit slips in collet or drill chuck.	<ol style="list-style-type: none"> 1. Chuck is not fully tightened. 2. Bit installed in drill chuck off center. 3. Wrong size collet. 4. Debris in collet or in spindle taper. 5. Taking too big of a cut. 	<ol style="list-style-type: none"> 1. Tighten the collet or drill chuck. 2. Re-install bit in drill chuck. 3. Measure tool shank diameter and match with appropriate diameter collet. 4. Remove all oil and debris from collet and spindle taper. 5. Lessen depth of cut and allow chips to clear.
Breaking tools or cutters.	<ol style="list-style-type: none"> 1. RPM and or feed rate is too fast. 2. Cutting tool getting too hot. 3. Taking too big of a cut. 	<ol style="list-style-type: none"> 1. Reduce 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.	<ol style="list-style-type: none"> 1. Excessive depth of cut. 2. Dull cutting tools. 	<ol style="list-style-type: none"> 1. Decrease depth of cut. 2. Use sharp cutting tools.
Workpiece vibrates or chatters during operation.	<ol style="list-style-type: none"> 1. Table locks not tight. 2. Workpiece not securely clamped to table or into mill vise. 3. RPM and feed rate too high. 	<ol style="list-style-type: none"> 1. Tighten down table locks. 2. Check that clamping is tight and sufficient for the job. Make sure mill vise is tight to the table. 3. Use appropriate RPM and feed for the job.
Table hard to move.	<ol style="list-style-type: none"> 1. Table locks are tightened down. 2. Chips have loaded up on bedways. 3. Bedways are dry and in need of lubrication. 4. Gibs are too tight. 	<ol style="list-style-type: none"> 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. Loosen gib screw(s).
Bad surface finish.	<ol style="list-style-type: none"> 1. Wrong RPM or feed rate. 2. Dull cutting tool or poor cutting tool selection. 3. Table locks not tightened down. 4. Gibs are loose. 	<ol style="list-style-type: none"> 1. Adjust for appropriate RPM and feed rate. 2. Sharpen cutting tool or select a better cutting tool for the intended operation. 3. Tighten table locks to maintain rigidity. 4. Tighten gibs slightly.
Difficulty removing collet from spindle.	<ol style="list-style-type: none"> 1. Debris in spindle taper or collet taper or both. 	<ol style="list-style-type: none"> 1. Keep all taper surfaces spotlessly clean.

Parts List

REF	PART #	DESCRIPTION
1	XPSS64M	SET SCREW M6-1 X 14
2	XPR39M	EXT RETAINING RING 8MM
3	XM1036003	GEAR
4	XM1036004	SPECIAL WASHER
5	XPS12M	PHLP HD SCR M3-.5 X 6
6	XM1036006	ROUND PIN 4 X 10
7	XM1036007	DIAL RING
8	XPSS31M	SET SCREW M5-.8 X 8
9	XM1036009	HANDLE SEAT
10	XM1036010	HANDLE SHAFT
11	XM1036011	HANDLE KNOB M8-1.25
12	XPRP61M	ROLL PIN 3 X 12
13	XPSB93M	CAP SCREW M3-.5 X 14
14	XM1036014	SPRING SEAT
15	XM1036015	WOUND SPRING
16	XM1036016	SHAFT
17	XM1036017	SPACER
18	XM1036018	STRAIN RELIEF
19	XM1036019	LOCK KNOB
20	XM1036020	STUD M8-1.25
21	XM1036021	FIXTURE BLOCK (I)
22	XM1036022	FIXTURE BLOCK (II)
23	XM1036023	HEAD STOCK
24	XPW05M	FLAT WASHER 4MM
25	XPLW02M	LOCK WASHER 4MM
26	XPN04M	HEX NUT M4-.7
27	XM1036027	LOCKING PIN
28	XM1036028	SMALL PULLEY
29	XPSS08M	SET SCREW M4-.7 X 5
30	XM1036030	UPPER COVER
31	XPS87M	PHLP HD SCR M5-.8 X 45
32	XM1036032	ROUND BELT
33	XM1036033	BIG PULLEY
34	XPB97M	HEX BOLT M4-.7 X 12
35	XM1036035	BEARING SEAT
36	XP6001	BALL BEARING 6001ZZ
37	XM1036037	SPACER
38	XPWRCD110L	POWER CORD

REF	PART #	DESCRIPTION
39	XM1036039	SPACER
40	XPR20M	INT RETAINING RING 28MM
41	XM1036041	HUB
42	XM1036042	GEAR
43	XM1036043	COVER
44	XM1036044	ROUND PIN 3 X 10
45	XM1036045	ELECTRICAL BOX (I)
46	XM1036046	FLAT HD SCR M2-.4 X 6
47	XM1036047	CONNECTING PLATE (LEFT)
48	XPFH49M	FLAT HD SCR M3-.5 X 6
49	XM1036049	PLATE
50	XM1036050	DIGITAL READ OUT
51	XM1036051	CLUTCH KNOB
52	XM1036052	CONNECTING PLATE (RIGHT)
53	XM1036053	RUBBER WASHER
54	XPSB15M	CAP SCREW M5-.8 X 20
55	XM1036055	DUST PLATE
56	XPR05M	EXT RETAINING RING 15MM
57	XM1036057	SPINDLE SLEEVE
58	XM1036058	INDUCTIVE PLATE
59	XM1036059	SPINDLE
60	XP6002	BALL BEARING 6002
61	XM1036061	CHUCK JT1
62	XM1036062	LOCK RING
63	XM1036063	COMPRESSION SPRING
64	XM1036064	RUBBER FOOT
65	XM1036065	SPACER
66	PSS34M	SET SCREW M5-.8 X 16
67	XM1036067	FELT DUSTER
68	XPSB125M	CAP SCREW M3-.5 X 5
69	XM1036069	MOTOR
69-1	XM1036069-1	CARBON MOTOR BRUSH
69-2	XM1036069-2	BRUSH CAP
70	XM1036070	BOTTOM COVER
71	XM1036071	SPACER
72	XM1036072	RULER
73	XM1036073	SQUARE NUT M5-.8
74	XM1036074	SPANNER NUT M24-3 X 1.5

REF	PART #	DESCRIPTION
75	XM1036075	FLAT WASHER 24MM
76	XM1036076	BASE
77	XM1036077	COLUMN
78	XPSB33M	CAP SCREW M5-.8 X 12
79	XM1036079	PARALLEL BAR
80	XPSS26M	SET SCREW M5-.8 X 6
81	XM1036081	SMALL WHEEL
82	XM1036082	SPACER
83	XM1036083	WORM SHAFT
84	XPSS08M	SET SCREW M4-.7 X 5
85	XPW05M	FLAT WASHER 4MM
86	XM1036086	ELECTRICAL BOX BASE
87	XM1036087	FLAT HD SCR M3-.5 X 8
88	XPS12M	PHLP HD SCR M3-.5 X 6
89	XM1036089	POWER SWITCH
90	XM1036090	MACHINE ID LABEL
91	XM1036091	TAP SCREW M3-.5 X 6
92	XM1036092	VARIABLE SPEED CONTROL KNOB
93	XM1036093	FUSE BOX
94	XM1036094	PC BOARD
95	XM1036095	WARNING LABEL
96	XLABEL04	ELECTRICITY LABEL
97	XM1036097	SHOP FOX LOGO LABEL
98	XM1036098	WARNING ICON LABEL
99	XM1036099	COMPOUND SLIDE ASSEMBLY
99-1	XM1036099-1	HANDLE SCREW M4-.7 X 8
99-2	XM1036099-2	HANDLE
99-3	XPSS26M	SET SCREW M5-.8 X 6
99-4	XM1036099-4	HANDWHEEL
99-5	XM1036099-5	FLAT SPRING
99-6	XPSB18M	CAP SCREW M4-.7 X 8
99-7	XM1036099-7	RIGHT SUPPORT SEAT
99-8	XM1036099-8	WORKTABLE
99-9	XM1036099-9	LEADSCREW SUPPORT SEAT

REF	PART #	DESCRIPTION
99-10	XPW02M	FLAT WASHER 5MM
99-11	XM1036099-11	END COVER
99-12	XPN06M	HEX NUT M5-.8
99-13	XM1036099-13	POSITION GAUGE
99-14	XM1036099-14	RIVET
99-15	XM1036099-15	LONGITUDINAL LEADSCREW NUT
99-16	XPSB80M	CAP SCREW M3-.5 X 8
99-17	XM1036099-17	LONGITUDINAL WEDGE
99-18	XPSB23M	CAP SCREW M4-.7 X 12
99-19	XPSS22M	SET SCREW M4-.7 X 12
99-20	XPN04M	HEX NUT M4-.7
99-21	XM1036099-21	INDICATOR PLATE
99-22	XM1036099-22	CROSS WEDGE
99-23	XPSB39M	CAP SCREW M4-.7 X 20
99-24	XPSS50M	SET SCREW M4-.7 X 20
99-25	XM1036099-25	CROSS LEADSCREW NUT
99-26	XM1036099-26	CROSS LEADSCREW
99-27	XM1036099-27	FRONT SUPPORTING SEAT
99-28	XM1036099-28	BASE
99-29	XM1036099-29	SUPPORT SEAT
99-30	XM1036099-30	COVER 1
99-31	XM1036099-31	COVER 2
99-32	XM1036099-32	LONGITUDINAL LEADSCREW
99-33	XM1036099-33	SADDLE
99-34	XM1036099-34	DIAL
99-35	XPSS45M	SET SCREW M3-.5 X 6
99-36	XM1036099-36	GRADUATED DIAL
102	XM1036102	DOUBLE END WRENCH 5.5 X 7MM
103	XPSDP2	#2 PHILLIPS SCREWDRIVER
104	XPAW02M	HEX WRENCH 2MM
105	XPAW02.5M	HEX WRENCH 2.5MM
106	XPAW03M	HEX WRENCH 3MM
107	XPAW04M	HEX WRENCH 4MM

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?

<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:

2. 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
------------------------------------	------------------------------------	-------------------------------------	------------------------------------

3. 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+
------------------------------	------------------------------	------------------------------	------------------------------

4. Do you think your machine represents a good value?

<input type="checkbox"/> Yes	<input type="checkbox"/> No
------------------------------	-----------------------------

5. Would you recommend Shop Fox® products to a friend?

<input type="checkbox"/> Yes	<input type="checkbox"/> No
------------------------------	-----------------------------

6. 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+

7. 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+

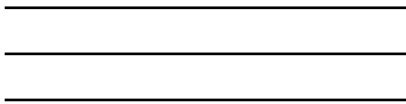
8. Which of the following magazines do you subscribe to?

<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:
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9. Comments: _____

CUT ALONG DOTTED LINE

FOLD ALONG DOTTED LINE



Place
Stamp
Here



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