WOODSTOCK INTERNATIONAL

SHOP FOX®

MODEL M1110
MILLING MACHINE W/DOVETAIL COLUMN

OWNER'S MANUAL

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

#9074CR

Printed in China

⚠ WARNING!

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

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

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

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

⚠ WARNING!

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

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

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

Contents

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

INTRODUCTION

Woodstock Technical Support

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

Woodstock International, Inc. is committed to customer satisfaction. Our intent with this manual is to include the basic information for safety, setup, operation, maintenance, and service of this product.

We stand behind our machines! In the event that questions arise about your machine, 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 process warranty claims.

If you need the latest edition of this manual, you can download it from **http://www.shopfox.biz**.
If you have comments about this manual, please contact us at:

Woodstock International, Inc.
Attn: Technical Documentation Manager
P.O. Box 2309
Bellingham, WA 98227
Email: manuals@woodstockint.com

MACHINE SPECIFICATIONS

Phone #: (360) 734-3482 • Online Tech Support: tech-support@shopfox.biz • Web: www.shopfox.biz

MODEL M1110
MILLING MACHINE WITH DOVETAIL COLUMN

Motor:

Type	110V Universal Motor
Horsepower	3/4 HP
Amps	7 Amp
Phase	Single
Speed	0-3725 RPM
Cycle	60 Hz
Power Transfer	Cogged Belt
Bearings	Sealed, Permanently Lubricated

Product Dimensions:

Weight	364 lbs.
Length/Width/Height	27"L x 30"W x 33 3/4"H
Foot Print (Length/Width)	16" x 13"

Shipping Dimensions:

Type	Wood Crate
Content	Machine
Weight	445 lbs.
Length/Width/Height	33"L x 32"W x 42"H

Electrical:

Switch	Forward/Reverse
Switch Voltage	110V
Cord Length	7 ft.
Cord Gauge	16 gauge
Recommended Circuit Size	15 Amp
Plug	NEMA 5-15
Power Supply	110V, Single-Phase

Continued on next page

General:

Spindle Travel 85mm
Drawbar ..... $^{7}/_{16}$" x 20 TPI
Spindle Taper R8
Swing ..... 18"
Longitudinal Table Travel ..... $15^{7}/_{8}$"
Cross Table Travel ..... $5^{3}/_{4}$"
Head Travel ..... $14^{7}/_{8}$"
Max. Distance Spindle To Column ..... 8"
Max. Distance Spindle To Table ..... $14^{3}/_{4}$"
Max. Drilling Capacity ..... 1"
Max. End Mill Capacity ..... 1"
Max. Face Mill Capacity ..... 2"
Spindle Speed Range ..... Low: 0-1000 RPM, High: 0-2000 RPM
Quill Diameter 60mm

Table:

Table Length ..... $21^{5}/_{8}$"
Table Width ..... $6^{1}/_{4}$"
Table Thickness ..... $1^{1}/_{2}$"
No. of T-Slots 3
T-Slot Width ..... 0.470"
T-Slot Height ..... 0.750"
T-Slot Centers ..... $1^{11}/_{16}$"
Stud Size ..... $^{3}/_{8}$"
Lead Screw Diameter ..... $^{5}/_{8}$"
Lead Screw TPI 12
Lead Screw Length ..... 26"

Construction:

Spindle Housing Construction ..... Cast Iron
Table Construction ..... Surface Ground Cast Iron
Head Construction ..... Cast Iron
Column Construction ..... Surface Ground Cast Iron
Base Construction ..... Cast Iron
Paint ..... Epoxy

Features:

3-16mm Drill Chuck with Key R-8/JT-6 Arbor
Leveling Feet
Manual Micro Depth Adjustment
Dovetailed Table Ways
Dovetailed Column Ways
High Low Range All-Steel Gearbox
Spindle Rotation Reversing Switch

Identification

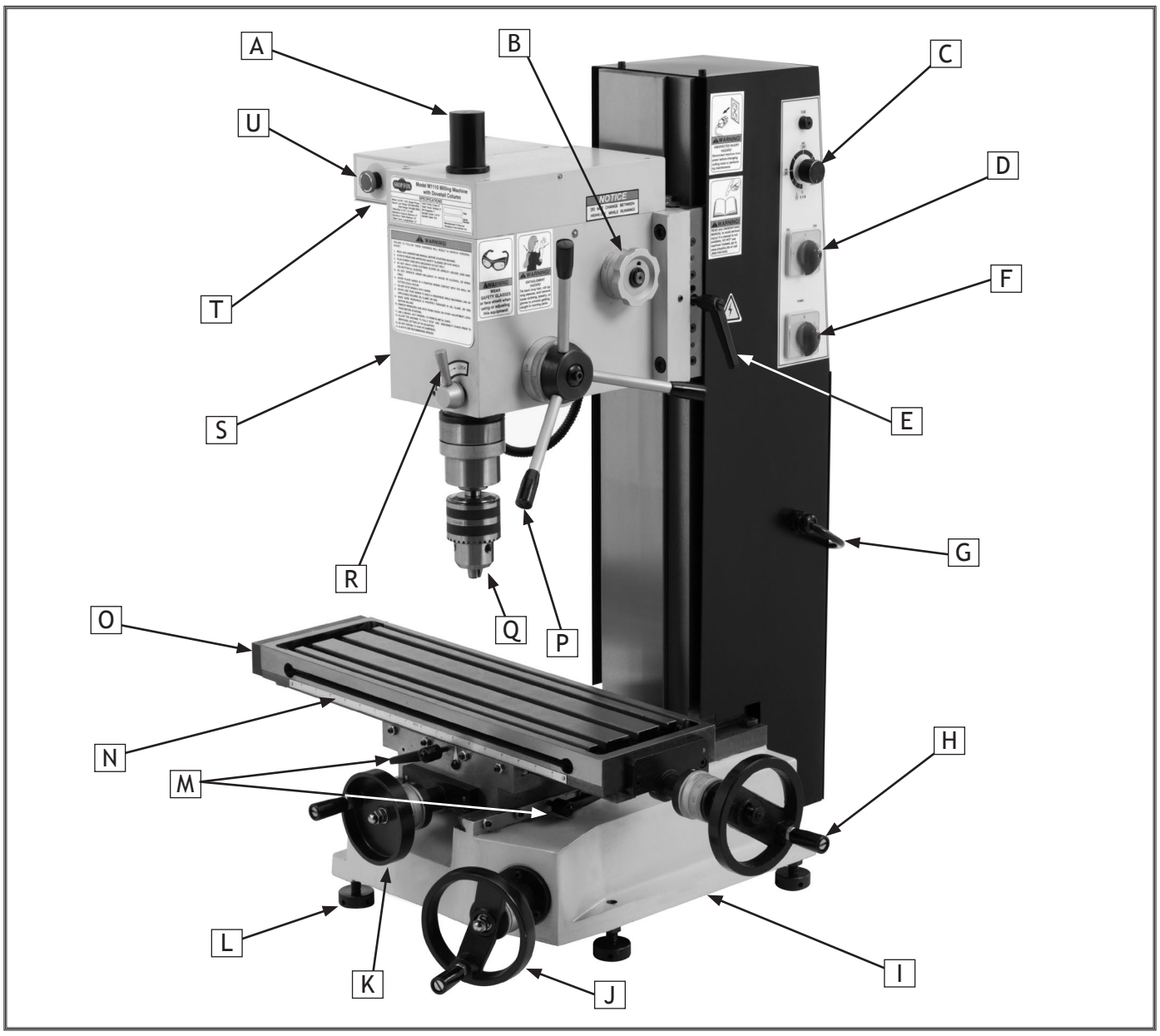


Figure 1. M1110 Identification.

A. Safety Cap and Drawbar
B. High-Low Gearbox Shifter Knob
C. Motor Speed Dial
D. Spindle Forward Reverse Switch
E. Column/Headstock Lock Lever
F. Main Power Switch
G. Power Cord
H. Longitudinal (X-Axis) Handwheel
I. Cast-Iron Base
J. Vertical (Z-Axis) Handwheel
K. Cross (Y-Axis) Handwheel
L. Adjustable Foot
M. Table Locks
N. Longitudinal Scale
O. Milling Table
P. Quill Feed Handles
Q. Drill Chuck
R. Quill lock lever
S. Heavy-Duty Cast-Iron Headstock
T. Belt/Electrical Safety Cover Box
U. Emergency Stop Button

SAFETY

⚠WARNING

For Your Own Safety, Read Instruction Manual Before Operating this Machine

The purpose of safety symbols is to attract your attention to possible hazardous conditions. This manual uses a series of symbols and signal words which are intended to convey the level of importance of the safety messages. The progression of symbols is described below. Remember that safety messages by themselves do not eliminate danger and are not a substitute for proper accident prevention measures.

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

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

⚠CAUTION **Indicates a potentially hazardous situation which, if not avoided, MAY result in minor or moderate injury. It may also be used to alert against unsafe practices.**

NOTICE **This symbol is used to alert the user to useful information about proper operation of the machine.**

⚠WARNING

Safety Instructions for Machinery

1. **READ THROUGH THE ENTIRE MANUAL BEFORE STARTING MACHINERY.** Machinery presents serious injury hazards to untrained users.

2. **ALWAYS USE ANSI APPROVED SAFETY GOGGLES WHEN OPERATING** MACHINERY. Everyday eyeglasses only have impact resistant lenses, they are NOT safety goggles.

3. **ALWAYS WEAR AN ANSI APPROVED RESPIRATOR WHEN OPERATING MACHINERY THAT PRODUCES DUST.** Wood dust is a carcinogen and can cause cancer and severe respiratory illnesses.

4. **ALWAYS USE HEARING PROTECTION WHEN OPERATING MACHINERY.** Machinery noise can cause permanent hearing damage.

5. **WEAR PROPER APPAREL.** DO NOT wear loose clothing, gloves, neckties, rings, or jewelry which may get caught in moving parts. Wear protective hair covering to contain long hair and wear nonslip footwear.

6. **NEVER OPERATE MACHINERY WHEN TIRED, OR UNDER THE INFLUENCE OF DRUGS OR ALCOHOL.** Be mentally alert at all times when running machinery.

7. **ONLY ALLOW TRAINED AND PROPERLY SUPERVISED PERSONNEL TO OPERATE MACHINERY.** Make sure operation instructions are safe and clearly understood.

8. **KEEP CHILDREN AND VISITORS AWAY.** Keep all children and visitors a safe distance from the work area.

9. **MAKE WORKSHOP CHILD PROOF.** Use padlocks, master switches, and remove start switch keys.

10. **NEVER LEAVE WHEN MACHINE IS RUNNING.** Turn power off and allow all moving parts to come to a complete stop before leaving machine unattended.

11. **DO NOT USE IN DANGEROUS ENVIRONMENTS.** DO NOT use machinery in damp, wet locations, or where any flammable or noxious fumes may exist.

12. **KEEP WORK AREA CLEAN AND WELL LIT.** Clutter and dark shadows may cause accidents.

13. **USE A GROUNDED EXTENSION CORD RATED FOR THE MACHINE AMPERAGE.** Undersized cords overheat and lose power. Replace extension cords if they become damaged. DO NOT use extension cords for 220V machinery.

14. **ALWAYS DISCONNECT FROM POWER SOURCE BEFORE SERVICING MACHINERY**. Make sure switch is in ***OFF*** position before reconnecting.

15. **MAINTAIN MACHINERY WITH CARE.** Keep blades sharp and clean for best and safest performance. Follow instructions for lubricating and changing accessories.

16. **MAKE SURE GUARDS ARE IN PLACE AND WORK CORRECTLY BEFORE USING MACHINERY.**

17. **REMOVE ADJUSTING KEYS AND WRENCHES.** Make a habit of checking for keys and adjusting wrenches before turning machinery ***ON***.

18. **CHECK FOR DAMAGED PARTS** B**EFORE USING MACHINERY.** Check for binding and alignment of parts, broken parts, part mounting, loose bolts, and any other conditions that may affect machine operation. Repair or replace damaged parts.

19. **DO NOT FORCE MACHINERY.** Work at the speed for which the machine or accessory was designed.

20. **SECURE WORKPIECE.** Use clamps or a vise to hold the workpiece when practical. A secured workpiece protects your hands and frees both hands to operate the machine.

21. **DO NOT OVERREACH.** Keep proper footing and balance at all times.

22. **MANY MACHINES WILL EJECT THE WORKPIECE TOWARD THE OPERATOR.** Know and avoid conditions that cause the workpiece to "kickback."

23. **BE AWARE THAT CERTAIN DUST MAY BE HAZARDOUS** to the respiratory systems of people and animals, especially fine dust. Make sure you know the hazards associated with the type of dust you will be exposed to and always wear a respirator approved for that type of dust.

⚠WARNING
Additional Safety for Milling Machines

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

2. **SAFETY ACCESSORIES.** Always use the chip guard in addition to your safety goggles when milling to prevent bodily injury.

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

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

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

6. **SPINDLE DIRECTION CHANGES**. Never reverse spindle direction when milling or boring.

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

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

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

10. **AVOIDING ENTANGLEMENT.** Keep loose clothing articles such as sleeves, belts or jewelry items away from the mill spindle. Never wear gloves when operating the mill.

11. **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.

12. **EXPERIENCING DIFFICULTIES.** If at any time you are experiencing difficulties performing the intended operation, stop using the machine! Contact our Technical Support at (360) 734-3482.

ELECTRICAL

⚠WARNING

The machine must be properly set up before it is safe to operate. DO NOT connect this machine to the power source until instructed to do so in the "Test Run" portion of this manual.

110V Operation

The Model M1110 operates on a 110V power supply. We recommend connecting this machine to a dedicated circuit with a verified ground, using the circuit size below as a minimum. Never replace a circuit breaker with one of higher amperage without consulting a qualified electrician to ensure compliance with wiring codes.

This machine must be grounded! The electrical cord supplied with this machine comes with a grounding pin. If your outlet does not accommodate a ground pin, have it replaced by a qualified electrician.

If you are unsure about the wiring codes in your area or you plan to connect your machine to a shared circuit, you may create a fire or circuit overload hazard—consult a qualified electrician to reduce this risk.

Extension Cords

We do not recommend using an extension cord; however, if you have no alternative, use the following guidelines:

- Use a cord rated for Standard Service (S).
- Do not use an extension cord longer than 50 feet.
- Ensure that the cord has a ground wire and pin.
- Use the gauge size listed below as a minimum.

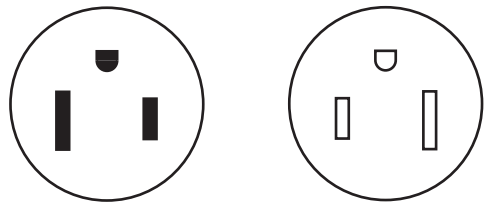


Figure 2. 5-15 plug and receptacle.

⚠WARNING

DO NOT work on your electrical system if you are unsure about electrical codes and wiring! Seek assistance from a qualified electrician. Ignoring this warning can cause electrocution, fire, or machine damage.

Electrical Specifications

Operating Voltage	Amp Draw	Min. Circuit Size	Plug/Receptacle	Extension Cord
110V Operation	7 Amps	15A	NEMA 5-15	14 Gauge

SETUP

Unpacking

This machine has been carefully packaged for safe transportation. If you notice the machine has been damaged during shipping, please contact your authorized Shop Fox dealer immediately.

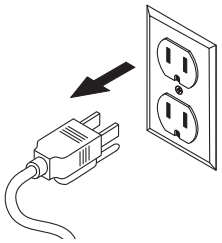
Inventory

The following is a description of the main components shipped with the Model M1110. Lay the components out to inventory them.

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

Box Inventory (Figures 3 & 4)	Qty
A. Assembled Mill/Drill	1
B. Drill Chuck and JT6 x R8 Arbor	1
C. Oil Bottle	1
D. Open-End Wrenches 8-10, 12-14, 17-19mm	1 ea
E. Lower Spindle Wrench	1
F. Adjustable Cast-Iron Feet	4
G. T-nuts	2
H. Chuck Key	1
I. Hex Wrench Set 3,4,5, and 6mm	1 ea

WARNING



Keep machine disconnected from power until instructed otherwise.

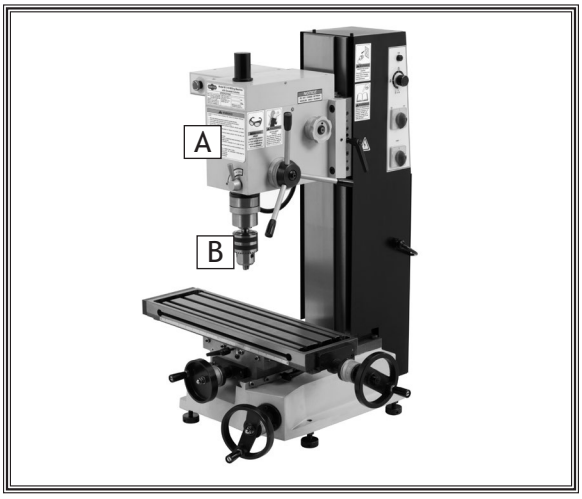


Figure 3. M1110 out of the crate.

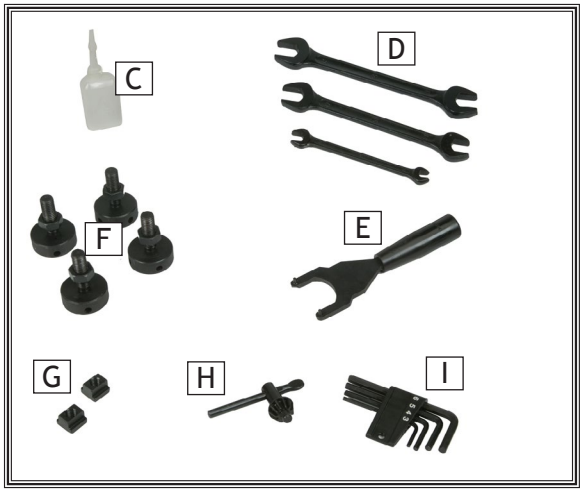


Figure 4. Inventory.

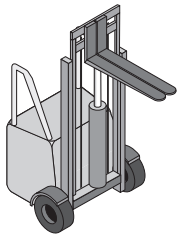
Machine Placement

- **Bench Load:** This machine distributes a heavy load in a small footprint. Some workbenches or tool tables may require additional bracing to support both machine and 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 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.



⚠WARNING

USE helpers or power lifting equipment to lift this mill. Otherwise, serious personal injury may occur.

⚠CAUTION

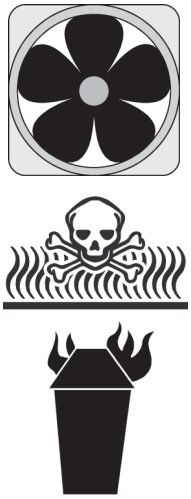
MAKE your shop "child safe." Ensure that your workplace is inaccessible to youngsters by closing and locking all entrances when you are away. NEVER allow untrained visitors in your shop when assembling, adjusting or operating equipment.

Cleaning Machine

The table and other unpainted parts of your machine type 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

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.

Bench Mounting

Four leveling feet have been included with your mill. However, for greater safety and better performance, your mill should be bolted to a workbench to provide maximum rigidity and safety.

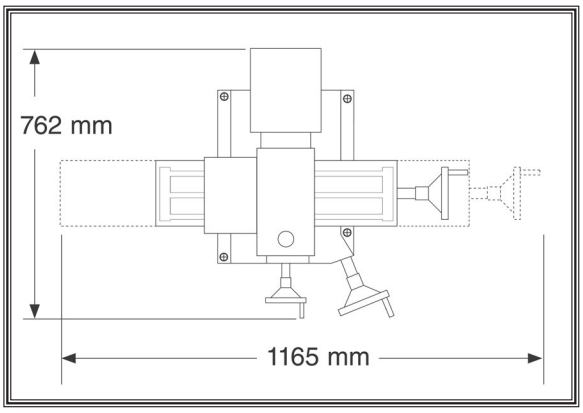


Figure 5. Minimum working clearances and mill mounting bolt pattern.

Secured Mounting

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

1. Determine the best position for the mill on the workbench.

   Note: *For the best performance, make sure the cross feed and the longitudinal handwheels extend out beyond the edge of the table surface. This will allow unrestricted handwheel operation.*

2. Mark your hole locations using the mounting holes in the base as a guide.

3. Drill the holes needed in the workbench.

4. Using appropriate power lifting equipment, place the mill on the workbench.

5. Place a precision level on the mill table and shim the mill until it is level side-to-side and front-to-back.

6. Bolt the mill base to the top of the workbench (**Figure 6**).

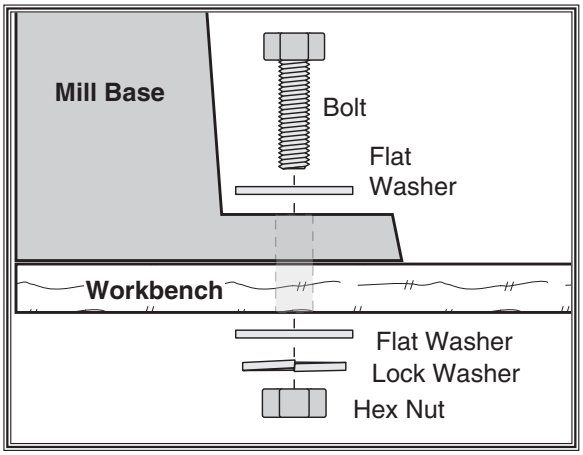


Figure 6. Example of a through mount setup.

Unsecured Mounting

To setup the mill for temporary mounting, do these steps:

1. Using appropriate power lifting equipment, tilt the mill and install the four feet into the base.

2. Place the mill on the workbench.

3. Place your precision level on the mill table.

4. Loosen the hex nut(s), as shown in **Figure 7**, and turn the feet until the mill is level side-to-side and front-to-back.

5. Retighten the hex nuts.

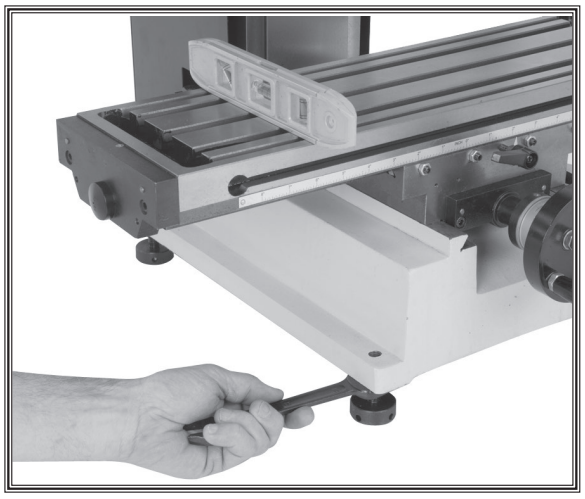


Figure 7. Leveling the mill.

Test Run and Spindle Break-In

The Model M1110 has two speed ranges: Low range is 0–1000; high range is 0–2000 RPM. It is essential to closely follow the proper break-in procedures to ensure the spindle bearings break-in before putting a load on the mill.

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

1. Do all lubrication procedures listed in **Lubrication** in **MAINTENANCE** on **Page 24.**

2. Make sure there are no obstructions around or underneath the spindle.

3. Remove the drawbar if there is no arbor or collet in the spindle.

NOTICE

DO NOT attempt to change between high and low speed ranges with the spindle *ON*. Damage to the spindle gearing will occur.

4. With the spindle at a complete stop, shift the high /low shift knob (**Figure 8**) into the low range, and set the FWD/REV switch (**Figure 9**) to FWD.

   Note: *If the knob will not rotate into gear, rotate the spindle by hand until the knob moves into gear.*

5. Make sure all switches are ***OFF*** and plug in the mill.

6. Turn the main power switch ***ON*** and the motor speed dial to approximately 600 RPM and let the mill run for a minimum of ten minutes in both FWD and REV spindle directions. The mill should run smoothly with minimal noise and vibration.

7. Set the speed to 1000 RPM and let the mill run for another ten minutes in both directions.

8. Push the emergency stop button to shut the mill ***OFF***. If the mill does not shut ***OFF***, use the main power switch, and refer to **Troubleshooting** on **Page 26**.

9. Shift to high range, rotate the emergency stop button clockwise so it pops out, and repeat **Steps 4** through **6** at 1200 and 2000 RPM.

NOTICE

DO NOT leave the area while break-in procedure is under way. You must be ready to stop the machine if a problem occurs.

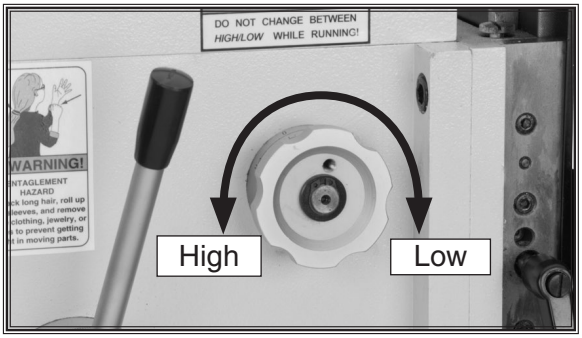


Figure 8. High/Low shift knob.

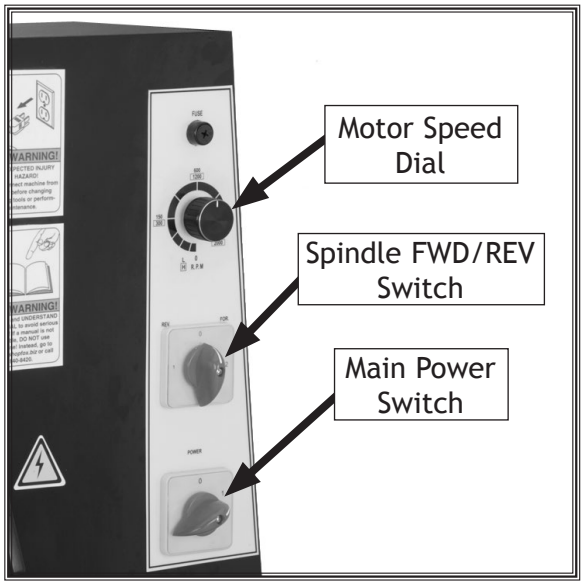


Figure 9. Control panel.

Figure 10. Control box.

OPERATIONS

General

This machine 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.

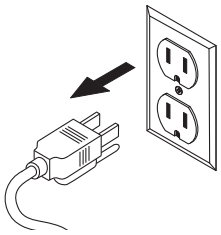
The instructions in this section are written with the understanding that the operator has the necessary knowledge and skills to operate this machine. **If at any time you are experiencing difficulties performing any operation, stop using the machine!**

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



DO NOT investigate problems or adjust the 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!

⚠WARNING

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

Spindle Height Control

Spindle height is changed by unlocking the quill lock lever and using the quill feed levers (**Figure 11**).

To change the spindle position, do these steps:

1. Unlock the quill lock lever.
2. Pull down on the quill feed levers to lower or raise the spindle.
3. Use the quill lock lever to hold the spindle where needed.

   Note: *Milling with the quill fully extended can cause tool chatter. For maximum spindle rigidity when milling, keep the spindle retracted completely with the quill lock lever locked.*

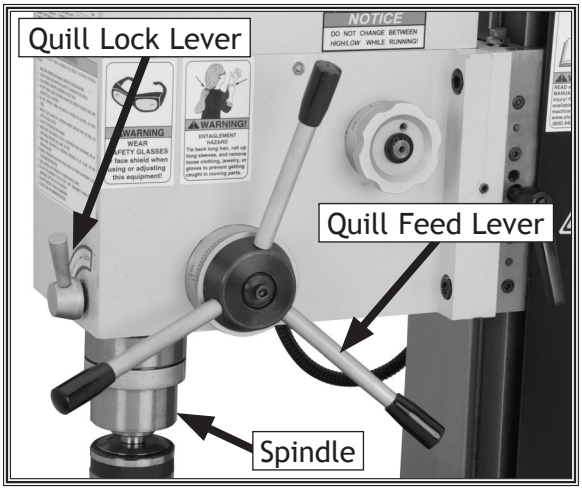


Figure 11. Spindle controls.

Table Travel (X-Axis and Y-Axis)

Longitudinal Feed

The longitudinal feed, or X-axis, is moved by the handwheel shown in **Figure 12** at the end of the table. The handwheel will move the table side-to-side in both directions. One complete revolution of the handwheel moves the longitudinal feed 0.100". There is also a scale on the front of the table for use when a tight tolerance is not required. The longitudinal feed can be locked in position by a table lock located on the front of the table (see **Figure 13**).

Cross Feed

The cross feed, or Y-axis in **Figure 12**, is moved with the handwheel on the front of the table base. One complete revolution of the handwheel moves the cross slide 0.100". The cross feed can be locked into position by a table lock located on the right side of the cross slide underneath the table (see **Figure 13**).

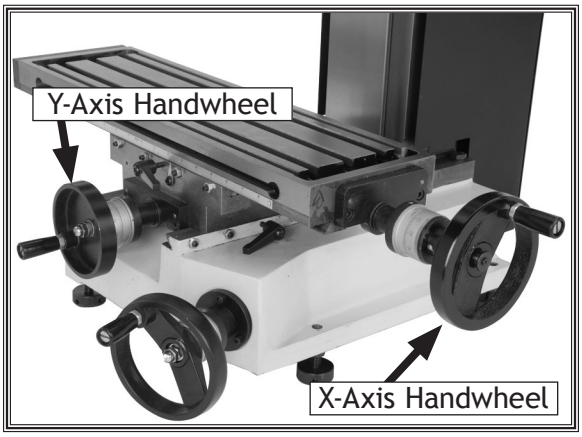


Figure 12. Table X and Y-axis controls.

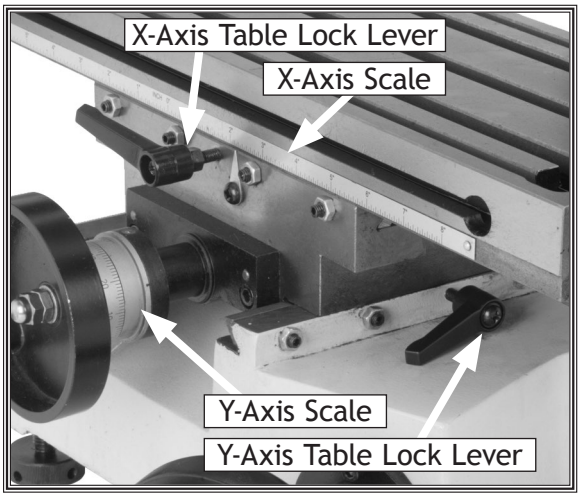


Figure 13. Table locks and scales.

Headstock Travel (Z-Axis and Rotation)

Headstock height is adjustable in the vertical Z-axis to accept large workpieces. Your mill has a dovetailed slide that allows you to reposition the headstock and change tooling without losing your alignment with a hole or milling path.

To raise or lower the headstock, do these steps:

1. Unlock the headstock slide lock lever shown in **Figure 14**.

2. Turn the Z-axis handwheel shown in **Figure 15** to raise or lower the headstock, then lock the headstock slide lock lever.

   Note: *Milling with the quill fully extended can cause tool chatter. For maximum spindle rigidity when milling, keep the spindle retracted completely with the quill lock lever locked.*

Figure 14. Headstock slide controls.

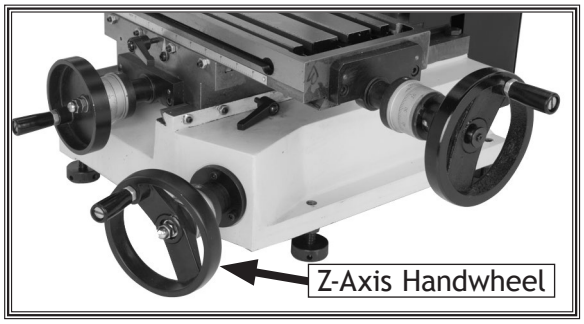


Figure 15. Z-axis control.

Drill Chuck

To remove the chuck and arbor from the spindle, do these steps:

1. DISCONNECT THE MILL FROM POWER!

2. Remove the drawbar safety cap (**Figure 17**).

3. Lock the quill in place with the quill lock.

4. Insert and hold the lower spanner wrench lugs in the two holes under the spindle (**Figure 16**).

5. Using 17mm wrench, loosen the drawbar one turn only. DO NOT completely unthread the drawbar before striking it with the hammer, or you will roll the drawbar and arbor threads.

6. Tap the top of the drawbar with the hammer. This will unseat the taper of the arbor from the spindle (see **Figure 17**).

7. Hold one hand under the chuck and finish loosening the drawbar by hand until the chuck falls out of the spindle. **Note:** *The chuck is attached to the arbor using a JT6 taper. This attachment is considered to be semi-permanent. There should be no need to remove the chuck from the arbor. Inspect the chuck from time to time to make sure it is still tight on the arbor. If it is loose, use a dead-blow or other soft headed hammer to re-seat the taper.*

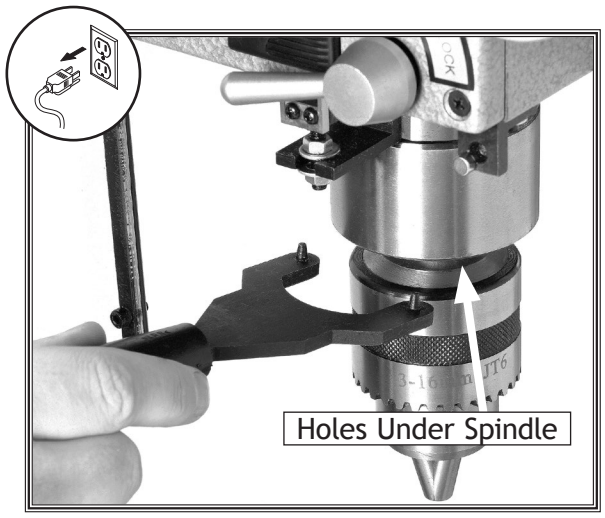


Figure 16. Spindle holes.

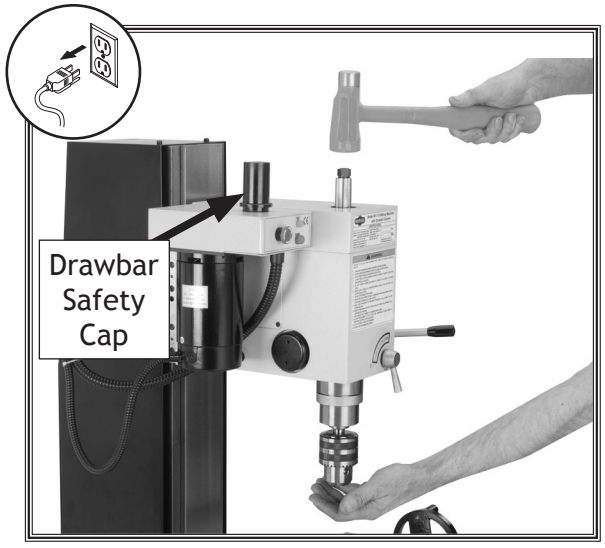


Figure 17. Tapping on the drawbar.

To install the drill chuck and arbor, do these steps:

1. DISCONNECT THE MILL FROM POWER!

2. Insert the chuck arbor into the spindle so it engages the alignment pin inside of the spindle and makes contact with the drawbar threads.

3. While supporting the chuck with one hand, thread the drawbar into the arbor until the arbor seats into the spindle taper.

4. Snug the drawbar with a 17mm wrench.

Note: *Do not overtighten the drawbar. Overtightening makes arbor removal difficult and will damage the arbor and threads.*

5. Install the drawbar safety cap (**Figure 17**).

R-8 Collets

⚠CAUTION

LACERATION HAZARD! Leading edges of end mills and other cutting tools can be very sharp. Protect your hands with gloves or a shop towel when handling.

Your Model M1110 features an R-8 spindle taper, which gives the freedom to use standard R-8 collets.

To install the R-8 collet, do these steps:

1. DISCONNECT THE MILL FROM POWER!
2. Unscrew the drawbar cap.
3. Carefully clean the surface of the collet and spindle taper. Ensure that they are free of debris and are lightly oiled just to prevent rust.
4. Insert the cutting tool into the collet, then insert the collet up into the spindle taper.
5. Rotate the collet so it engages the alignment pin inside of the spindle, then slide the collet upward until it makes contact with the drawbar threads.
6. While supporting the tool in the collet with one hand, thread the drawbar into the collet until the collet draws up into the spindle taper.
7. Snug the drawbar with A 17MM wrench in your opposite hand.

   Note: *Do not overtighten the drawbar. Overtightening makes collet removal difficult and will damage the drawbar threads, collet, and the spindle taper. Keep in mind that the taper keeps the collet and tool in place. The drawbar simply aids in seating the taper.*

To remove the collet, do these steps:

1. DISCONNECT THE MILL FROM POWER!
2. Tighten the headstock lock.
3. Protect the table surface with a piece of cardboard or hold the cutter/tool with a shop towel to prevent it from falling out of the collet.
4. Loosen the drawbar but DO NOT remove it.
5. Using the brass hammer, tap the drawbar to unseat the taper.
6. Unscrew the rest of the drawbar by hand and remove the collet.

   Note: *When not in use, always remove collets and cutting tools from the spindle taper. Oxidation may cause the collet to seize and make it hard to remove later.*

Control Panel

It is vital that you become familiar with the power controls before operating the Model M1110 (**Figure 18**).

A. EMERGENCY STOP Button: Immediately cuts power to the system. Once pressed, this button must be twisted until it pops out to return power to the switches. The fault indicator light will turn on and the main power switch needs to be turned ***OFF***.

B. FAULT INDICATOR Light: Indicates a circuit interruption due to a switch being out of proper position. Turn all switches ***OFF*** when lit.

C. POWER INDICATOR Light: Shines when the system power is ***ON***.

D. FUSE SOCKET Houses a 10 Amp system fuse.

E. MOTOR SPEED Dial: Turns the spindle ***ON*** and controls the spindle RPM in both speed ranges.

F. FWD/REV Switch. Changes spindle rotational direction.

G. MAIN POWER Switch: This switch delivers power to the system.

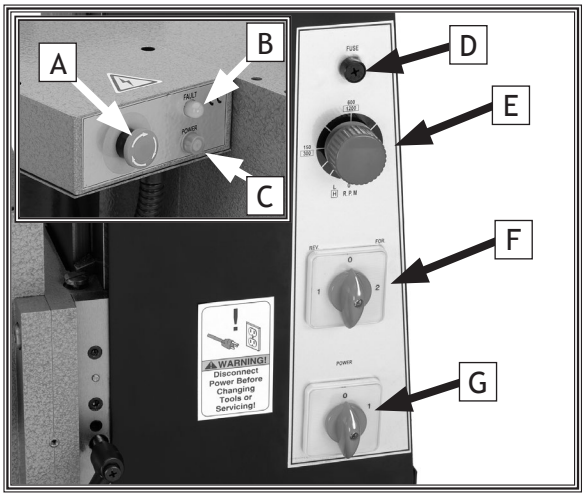


Figure 18. Control panel components.

Calculating Spindle RPM

Closely follow the proper cutting speed and proper feed to reduce undue strain on all moving parts and increase operator safety.

Prior to milling, determine the RPM needed to cut your workpiece, then set the RPM on the machine.

To determine the needed RPM, do these steps:

1. Use the table in **Figure 19** to determine the cutting speed required for the material of your workpiece.

2. Measure the diameter of your cutting tool in inches.

3. Use the following formula to determine the needed RPM for your operation:

   (Cutting Speed x 4) /Tool Diameter = 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

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

Figure 19. Cutting speed table for HSS cutting tools.

Milling/Drilling

This mill is designed to use most end mills, drill bits, and face cutters that are 2" in diameter or less. The milling table has a coolant trough with a drain for an optional cutting fluid system.

⚠WARNING

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

To mill a workpiece, do these steps:

1. Refer to **Control Panel** on **Page 19**, and learn how to use the machine controls.

2. Zero the spindle height scale on the spindle feed hub.

3. Clamp the workpiece to the milling table, and adjust the headstock to the needed height, depth of cut, and milling path.

   Remember: Milling with the quill fully extended can cause tool chatter. For maximum spindle rigidity, keep the spindle retracted into the headstock as far as possible with the quill lock lever locked and the fine feed lock knob tightened.

4. Refer to **Calculating Spindle RPM** on **Page 20** to find the best spindle RPM.

5. Put on your safety goggles, turn the main power switch ***ON***.

6. Select the FORWARD or REVERSE with the FWD/REV dial to select the appropriate cutting direction for the type of cutter that you are using.

7. Turn the high/low shift knob and the spindle speed dial to select the appropriate milling speed for the diameter of cutter and type of material to be cut.

8. Use the X-axis or Y-axis handwheels to feed the workpiece into the cutter slowly. If you are only milling in one direction, lock the unused table slide in place. Refer to **Table Travel** on **Page 15** for lock lever location.

Tapping

This mill is designed to turn very slowly for through-hole tapping operations. The wayed column allows for drill and tap changes and headstock repositioning without losing the tool registration. However, tapping with any mill without a slip clutch takes some level of skill. Avoid cutting threads in blind holes where the tap may bottom out and break before you can stop and reverse the spindle.

⚠WARNING

Failure to follow RPM and Feed Rate Guidelines may threaten operator safety from ejected parts or broken tools.

To drill and thread a hole, do these steps:

1. Refer to **Control Panel** on **Page 19,** and learn how to use the machine controls.

2. Zero the spindle height scale on the spindle feed hub, and calculate your maximum tapping depth without bottoming-out the tap.

3. Clamp the workpiece to the milling table, and adjust the headstock to the needed height for drilling and tapping.

4. Put on your safety goggles, turn the main power switch ***ON***.

5. Drill your hole with the appropriate speed and drill bit size for the tap. For large holes you may have to drill a pilot hole.

6. Install the tap, and apply tapping fluid or oil when needed.

7. Begin threading.

Accessories

The following M1110 milling machine accessories may be available through your local Woodstock International Inc. Dealer. If you do not have a dealer in your area, these products are also available through online dealers. Please call or e-mail Woodstock International Inc. Customer Service to get a current listing of dealers at: 1-800-545-8420 or at sales@woodstockint.com.

The Shop Fox Model D3694—Variable Speed Power Feed Kit: For those repetitive power-fed milling operations, this fantastic 110V power feed retrofit kit offers consistent speed control in both left and right directions for your Model M1110 milling machine. Let it do your work!

Figure 20. Variable speed power feed kit.

The Shop Fox Model M1091—18-pc. R-8 Boring Head Set: The set includes 2" boring head, 9 carbide tipped boring bars with 1/2" shanks. 2 facing tools with 3/16" square HSS cutting tools. Dial graduated in 0.001", 0.050" per revolution/0.025" actual motion. R-8 shank with 7/8"-20 mounting threads. Stand included.

Figure 21. R-8 boring head set.

The Shop Fox Model D3693—Worktable with Angle: Enjoy having an economical way to support your workpiece at an array of angles. This high-quality tilting worktable is quick and easy to setup and use.

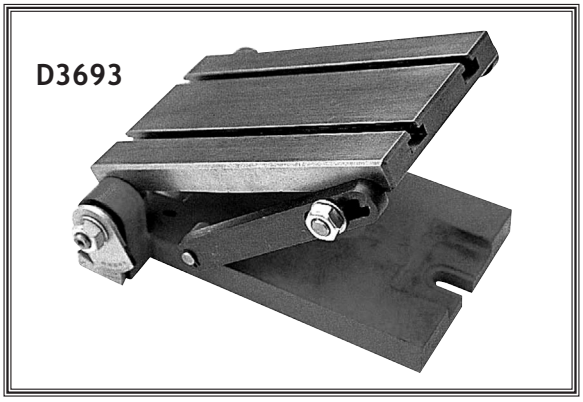


Figure 22. Worktable with angle.

OPERATIONS

The Shop Fox Model M1078—6" Precision Rotary Table:
Has the following great features: 4 T-slots for 3/8" studs, 4° per rotation of the hand wheel, 10 minute vernier resolution, whole degree marks on table, coolant trough and the worm gear can be easily disengaged for quick setting angles, an MT#2 center hole, and weighs approximately 49 lbs.

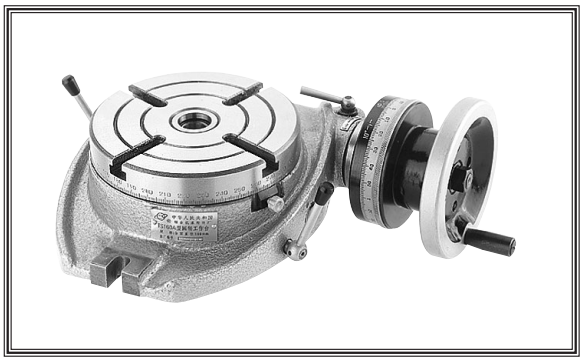


Figure 23. 6" Precision rotary table.

The Shop Fox Model: M1079—Precision R-8 Collets:
These collets are precision ground to very close tolerances and will maximize your milling rigidity. Sizes include: 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 9/16", 5/8", 11/16", 3/4" and 7/8."

Figure 24. Precision R-8 collets.

The Shop Fox Model M1080—52-pc. Clamping Kit:
The kit includes case hardened blocks, bolts, nuts and hold-downs. Each Clamping Kit includes: 24 studs, 6 step block pairs, 6 T-nuts, 6 flange nuts, 4 coupling nuts and 6 end hold-downs. We offer the two most popular sizes: 3/8" and 1/2". Racks can be bolted to the wall or on the side of a machine for easy access.

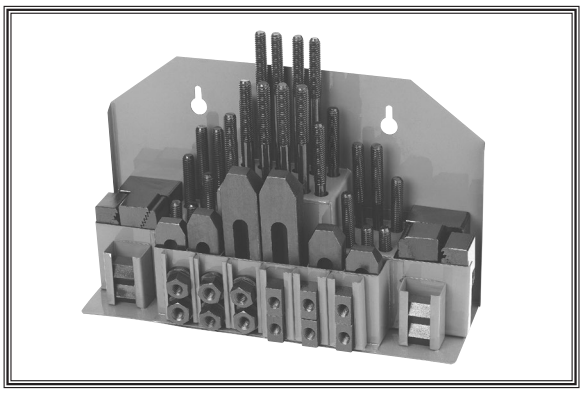
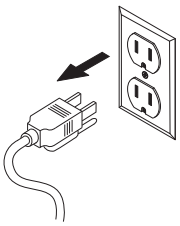


Figure 25. Clamping kit.

MAINTENANCE



⚠WARNING

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

Basic Schedule

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

Daily Check:
- Mill is disconnected from power when not in use.
- Loose mounting bolts.
- Mill is clean and lubricated.
- Worn or damaged wires.
- Any other unsafe condition.

Monthly Check:
- Gibs are adjusted properly.

Annual or Biannual Check:
- Lubricate headstock lead screw and gears.

General Lubrication

Regular lubrication will ensure your mill performs at its highest potential. Place two to three drops of a general machine oil directly on the ways of the cross slide and saddle. An oil bottle has been provided for this purpose. Nine ball oilers (**Figures 26**–**28**) should be lubricated daily with several drops of oil.

Protect the unpainted cast iron surfaces with regular applications of light machine oil, and periodically clean and lubricate all lead screws with white lithium grease.

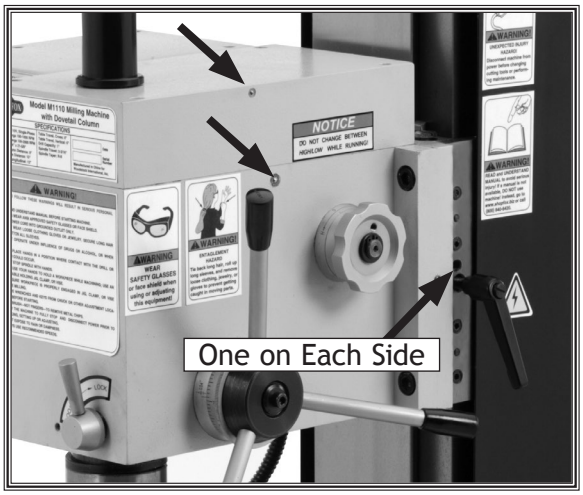


Figure 26. Headstock ball oiler locations.

Figure 27. Table and base ball oiler locations.

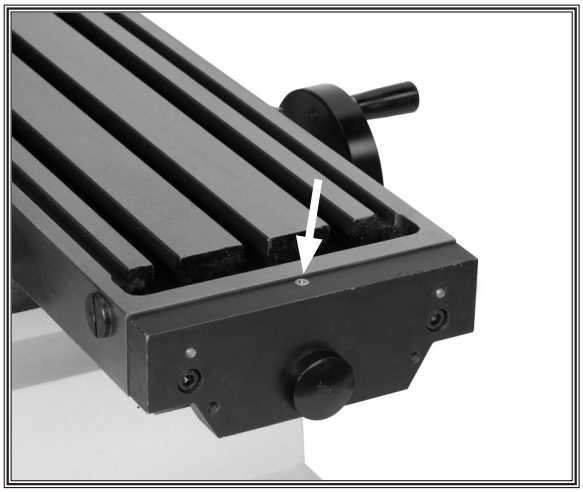
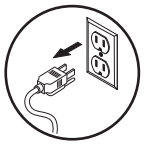


Figure 28. Table ball oiler location.

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!**

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
Motor will not start.	1. E-Stop button is pressed. 2. Open circuit in motor or loose connections. 3. Blown system fuse.	1. Twist E-Stop button until in pops out. 2. Inspect all lead connections on motor for loose or open connections. 3. Replace fuse.
Motor will not start; fuses or circuit breakers blow.	1. Short circuit in line cord or plug.	1. Repair or replace cord or plug for damaged insulation and shorted wires.
Motor shuts off unexpectedly.	1. Motor is overloaded due to high feed rate. 2. Thermal protection unit is overheated.	1. Reduce feed rate and amount of material removed. 2. Wait for system to cool down.
Motor overheats.	1. Motor overloaded. 2. Air circulation through the motor restricted. 3. Motor brushes are wearing.	1. Reduce load on motor. 2. Clean out motor to provide normal air circulation. 3. Inspect motor brushes, replace if necessary.
Motor stalls (resulting in blown fuses or tripped circuit).	1. Short circuit in motor or loose connections. 2. Incorrect fuses or circuit breakers in power line. 3. Motor overloaded.	1. Repair or replace connections on motor for loose or shorted terminals or worn insulation. 2. Install correct fuses or circuit breakers. 3. Reduce load on motor.
Cutter slows when cutting.	1. Brushes worn.	1. Replace brushes (**Page 30**).
Poor surface finishes., or Vibration when cutting.	1. Feed rate to fast. 2. Dull cutter. 3. Lock not tightened down. 4. Quill is extended too far. 5. Loose table/headstock. 6. Loose gibs.	1. Slow feed rate or adjust RPM. 2. Always use newly sharpened cutters. 3. Adjust gibs and backlash (**Page 27**). 4. Retract quill into headstock completely and lock all lock levers. 5. Tighten table lock levers. 6. Adjust gibs and backlash (**Page 27**).
Difficulty removing collet from spindle.	1. Debris in spindle taper or collet taper or both. 2. Head not locked in position.	1. Keep all taper surfaces spotlessly clean. 2. Lock headstock in place on column.

Gibs and Backlash

During the life of your mill drill, you may have to adjust the gibs and the handwheels to remove any lash or looseness that is a result of normal wear. Do not overtighten the gibs or half-nuts, or premature wear will occur.

To adjust the table gibs and the handwheel backlash, do these steps:

1. DISCONNECT THE MILL FROM POWER!
2. Loosen the four lock nuts (**Figure 29**).
3. When properly adjusted, the table should move with slight resistance as felt in the handwheel. Each gib has multiple lock nuts and set screws that must also be adjusted. Make your adjustments equally and in small increments.
4. Tighten the lock nuts.
5. Remove the table end-plate cap screws and the end plate (**Figure 30**).
6. Locate the X-axis lead screw half-nut (**Figure 31**), and adjust both cap screws until the handwheel has approximately 0.003" backlash as shown by the dial.
7. Repeat **Step 6** on the Y-axis leadscrew half-nut and lubricate the lead screws with white lithium grease and oil the gibs.
8. Reinstall the end plate.

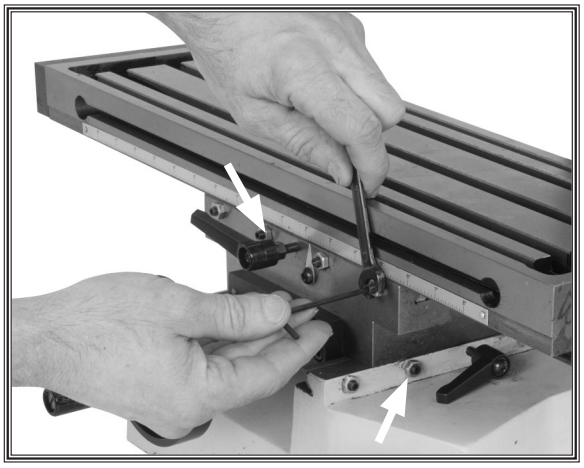


Figure 29. Gib screws and adjustment.

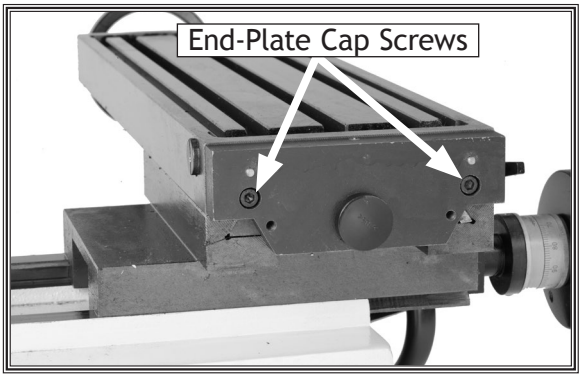


Figure 30. Table end-plate.

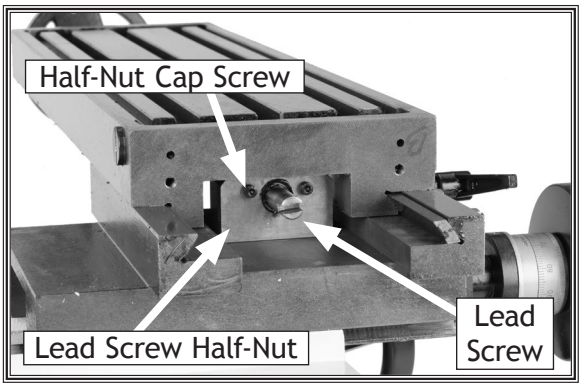


Figure 31. Handwheel backlash adjustment.

SERVICE

To adjust the headstock gibs, do these steps:

1. DISCONNECT THE MILL FROM POWER!

2. Loosen the headstock lock lever (**Figure 32**).

3. Loosen or tighten the upper and lower gib screws (**Figure 32**) in an alternating manner to adjust the headstock gib.

   The headstock should slide smoothly with no play or looseness. Do not overtighten the gibs or premature slide and gib wear will occur.

4. Lubricate the headstock way and gib with oil.

Figure 32. Headstock gib adjustment.

Service Lubrication

On an annual basis, or every six months under heavy use, we recommend that you clean and lubricate the headstock leadscrew and gears with white lithium grease and a light machine oil.

To lubricate the leadscrew and gears, do these steps:

1. DISCONNECT THE MILL FROM POWER!
2. Use the hex wrench to remove the two lower cap screws from the cabinet assembly (see **Figure 33**).
3. Hold the cabinet assembly, and remove the two upper cap screws (see **Figure 33**).
4. Carefully lift and swing the cabinet assembly out of the way from the column.
5. Using mineral spirits, a toothbrush, and rags, thoroughly clean the leadscrew and gears.
6. Paint the headstock leadscrew and gear teeth with lithium grease, and oil the bearing shown in **Figure 33**.
7. Reinstall the cabinet assembly on the column.

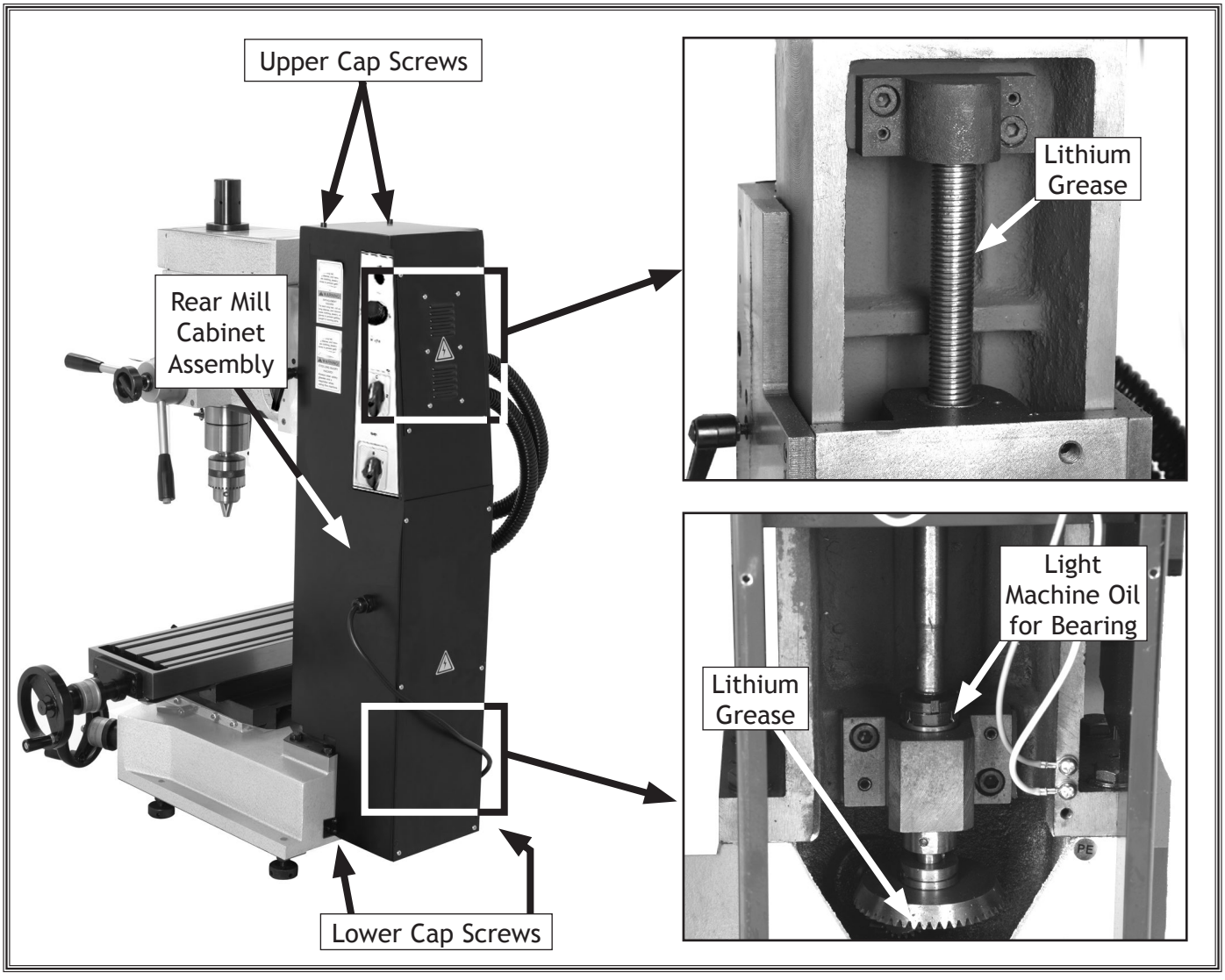


Figure 33. Headstock leadscrew access and lubrication.

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. Use part # XM11102242.

To replace the motor brushes, do these steps:

1. DISCONNECT THE MILL FROM POWER!

2. Remove and replace the spring and carbon brush as shown in **Figure 34.**

   Note: *A 10 Amp fuse is housed in the body near the main controls.*

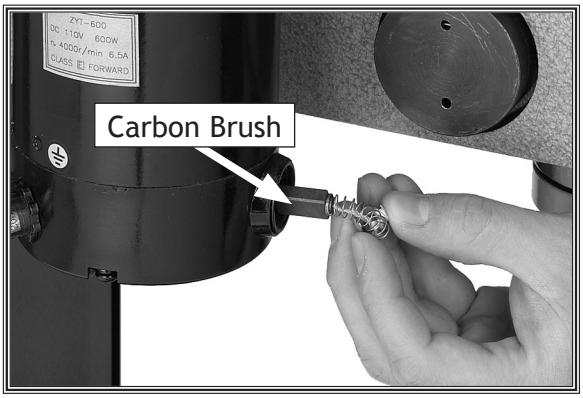


Figure 34. Carbon brush removal.

Replacing Main Fuse

Should a fuse ever blow, do not replace the 10 amp fuse with a fuse rated for a higher amp rating. Doing so will damage the circuit board and void the warranty. Refer to **Troubleshooting** or call Woodstock International Technical Support for a solution.

To replace the fuse, do these steps:

1. DISCONNECT THE MILL FROM POWER!

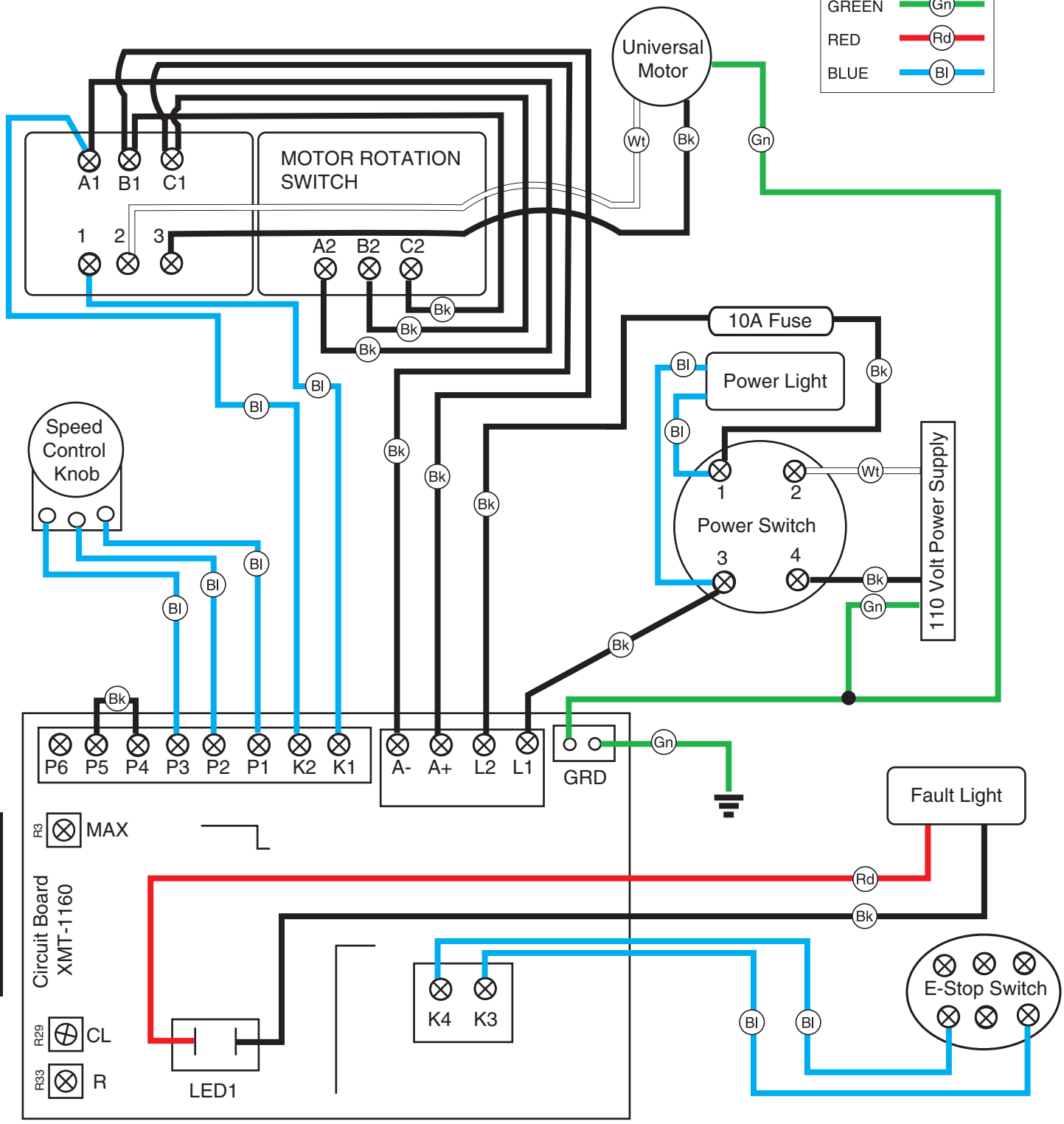
2. Remove and replace the fuse from the fuse cradle, as shown in **Figure 35.**

Figure 35. Fuse replacement.

Wiring Diagram (M1110)

COLOR KEY

BLACK	Bk
WHITE	Wt
GREEN	Gn
RED	Rd
BLUE	Bl



SERVICE

Electrical Components

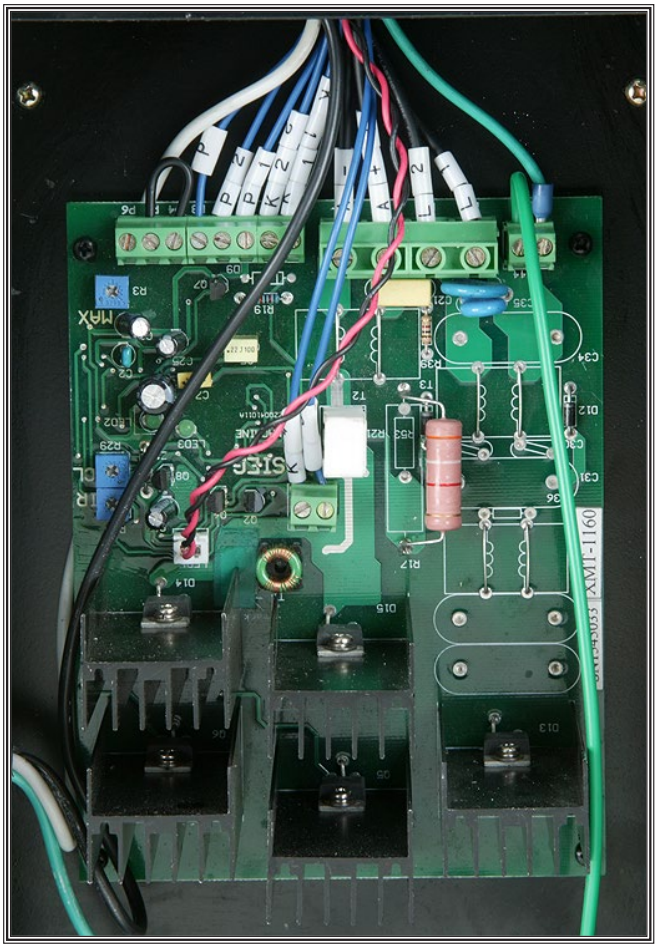


Figure 36. Motor power supply circuit board.

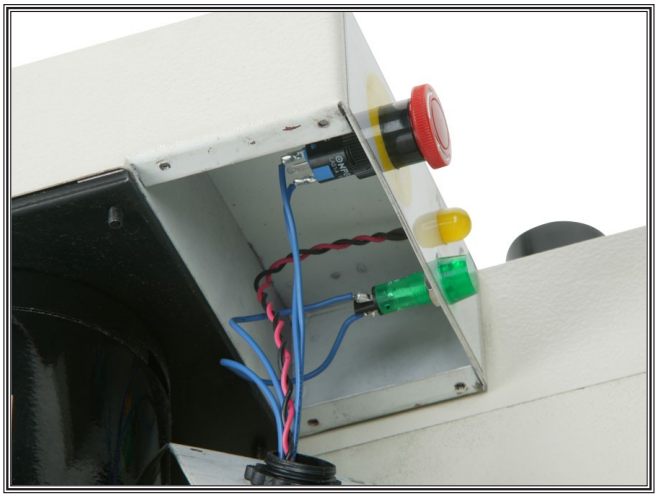
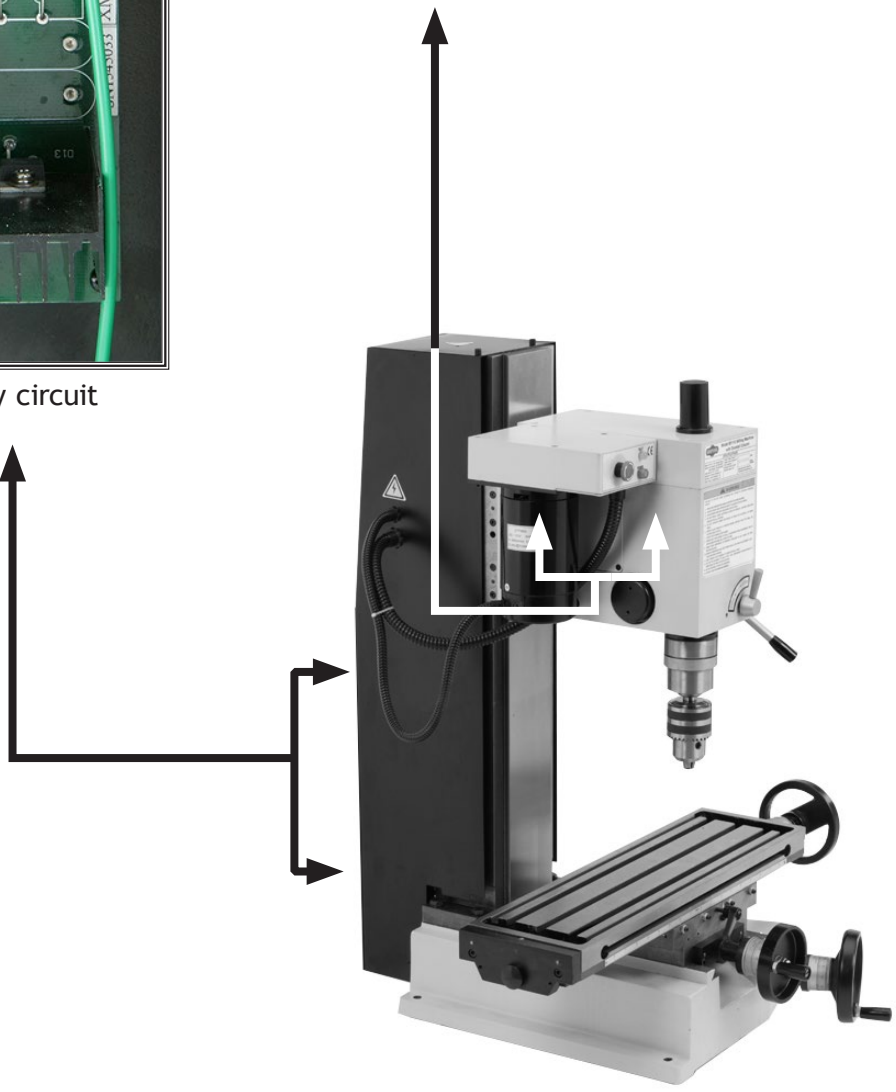


Figure 37. Emergency stop switch, and power and fault indicator lamps.



Electrical Components

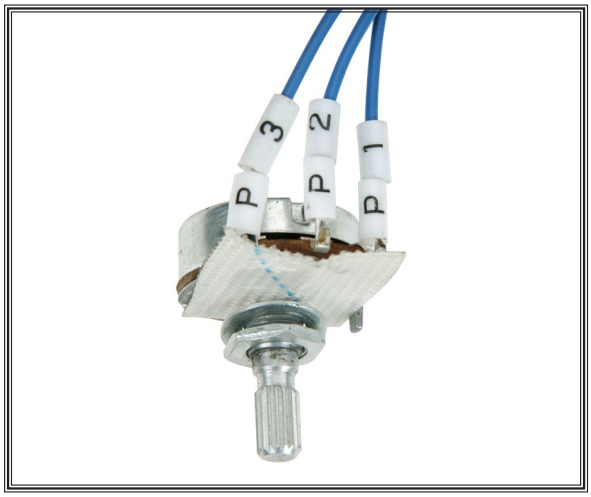


Figure 38. Motor speed dial.

Figure 39. Motor rotation switch.

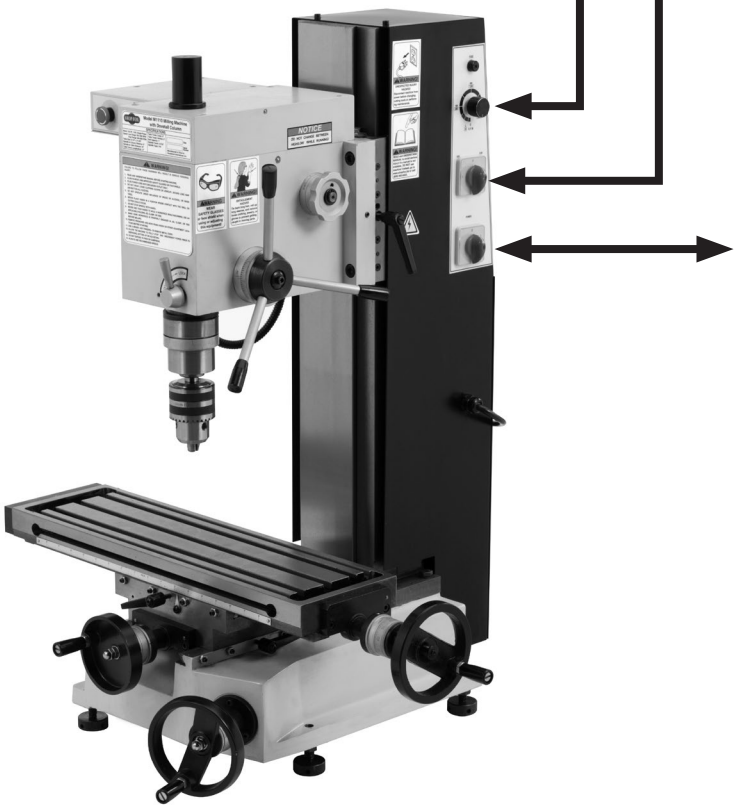
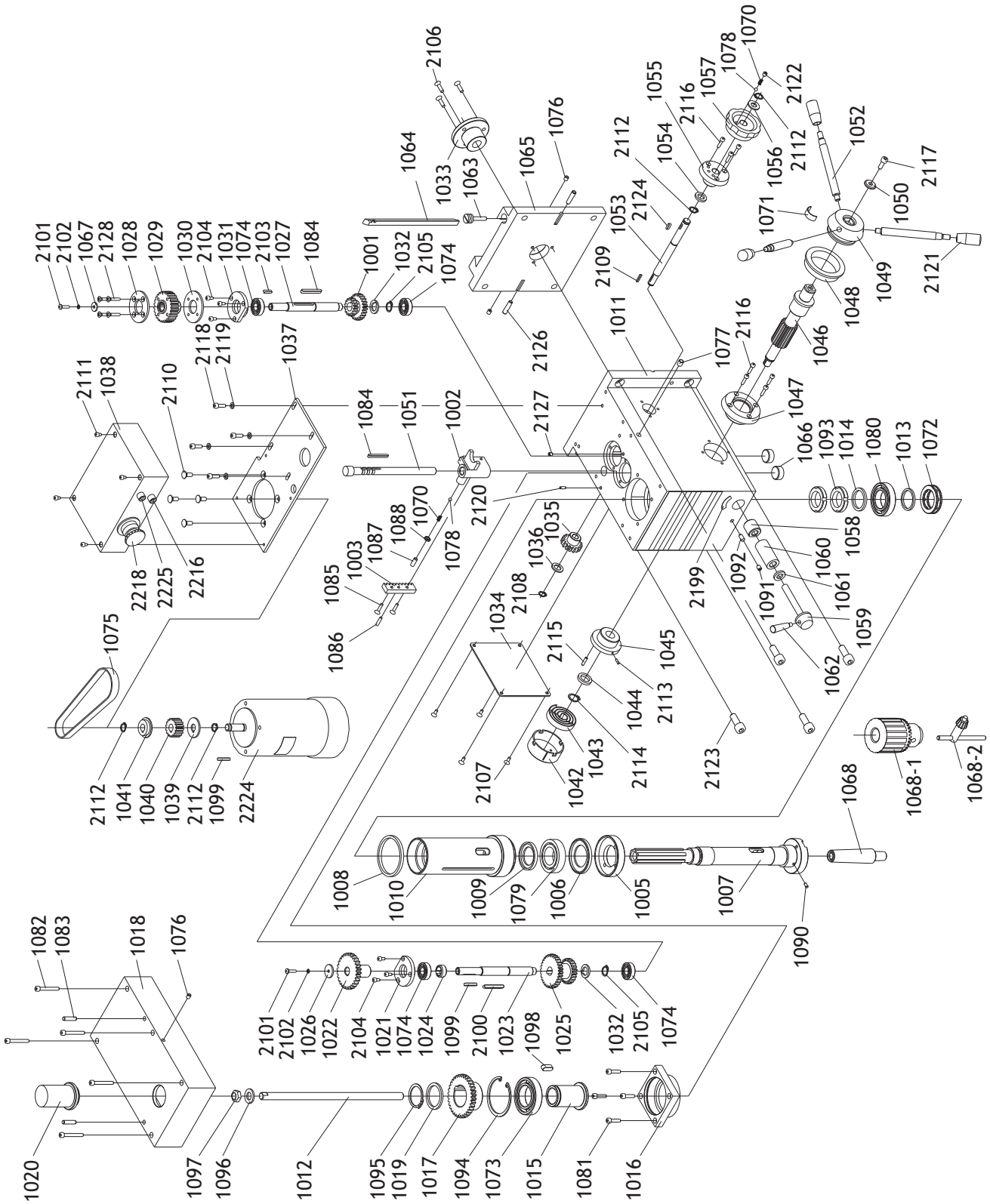


Figure 40. Main power switch.

Headstock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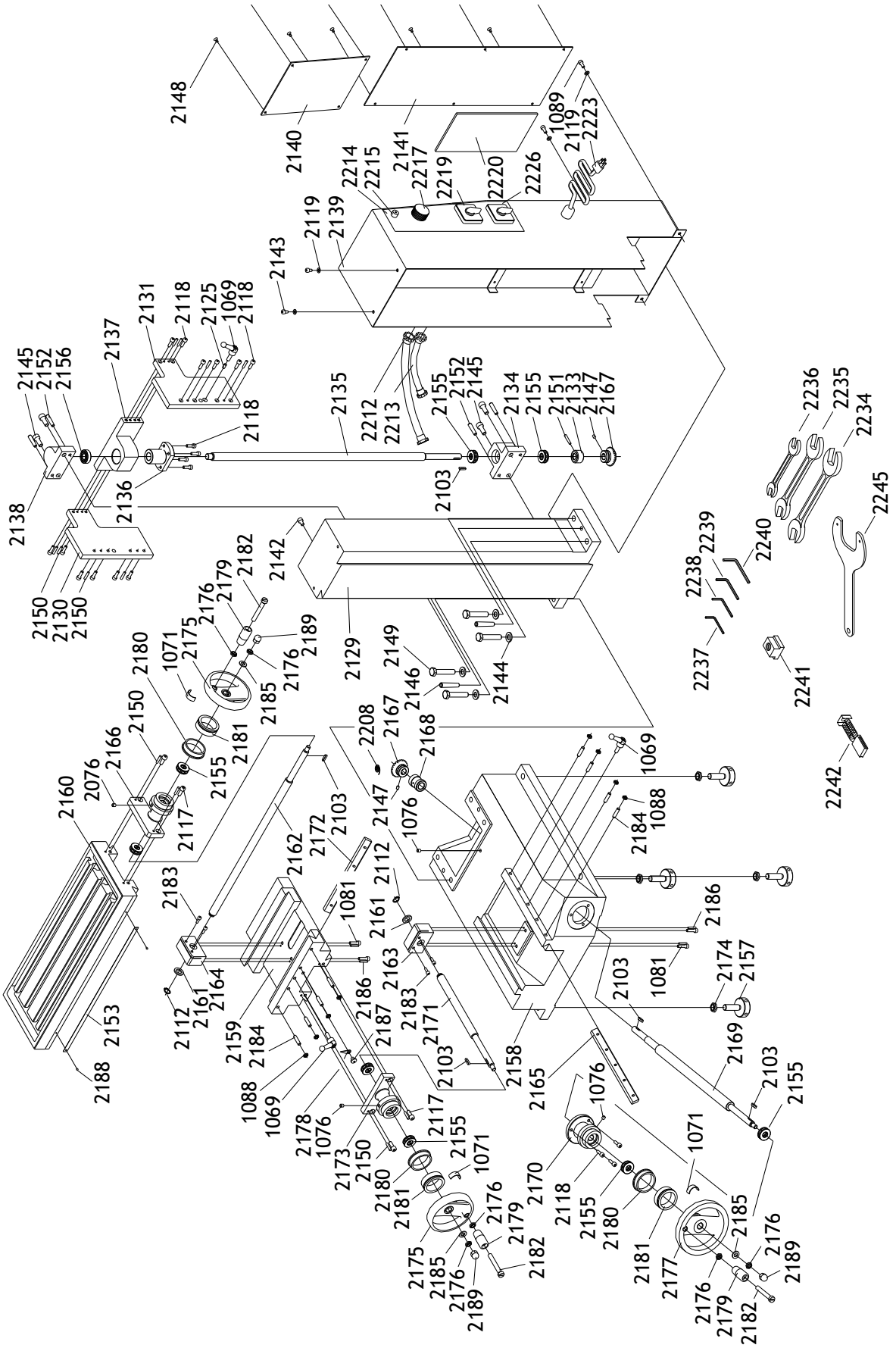
Column and Table



REF	PART #	DESCRIPTION
1001	XM11101001	TRANSMISSION GEAR
1002	XM11101002	DIAL FORK
1003	XM11101003	SMALL GEAR RACK
1005	XM11101005	DUST CAP
1006	XM11101006	OIL SEAL
1007	XM11101007	SPINDLE
1008	XM11101008	SLEEVE
1009	XM11101009	OIL SEAL
1010	XM11101010	QUILL
1011	XM11101011	HEAD CASTING
1012	XM11101012	DRAWBAR
1013	XM11101013	SPACER
1014	XM11101014	SPACER
1015	XM11101015	SLEEVE
1016	XM11101016	BEARING SEAT
1017	XM11101017	SPINDLE GEAR
1018	XM11101018	COVER
1019	XM11101019	SPACER
1020	XM11101020	DRAWBAR CAP
1021	XM11101021	BEARING SEAT
1022	XM11101022	GEAR
1023	XM11101023	SHAFT
1024	XM11101024	SLEEVE
1025	XM11101025	TRANSMISSION GEAR
1026	XM11101026	FENDER WASHER 4MM
1027	XM11101027	SHAFT
1028	XM11101028	UPPER FLANGE
1029	XM11101029	GEAR
1030	XM11101030	LOWER FLANGE
1031	XM11101031	BEARING SEAT
1032	XM11101032	SPACER
1033	XM11101033	FLANGE
1034	XM11101034	COVER
1035	XM11101035	GEAR
1036	XPW06M	FLAT WASHER 12MM
1037	XM11101037	MOTOR FIXED TRAY
1038	XM11101038	CONTROL BOX
1039	XM11101039	SPACER
1040	XM11101040	GEAR
1041	XM11101041	SPACER
1042	XM11101042	SPRING COVER
1043	XM11101043	FLAT COIL SPRING
1044	XM11101044	BUSHING
1045	XM11101045	LEFT SUPPORT FLANGE
1046	XM11101046	PINION
1047	XM11101047	RIGHT SUPPORT FLANGE
1048	XM11101048	COLLAR
1049	XM11101049	HANDLE HUB
1050	XM11101050	CAP WASHER
1051	XM11101051	DIAL FORK SHAFT

REF	PART #	DESCRIPTION
1052	XM11101052	QUILL HANDLE
1053	XM11101053	SHAFT
1054	XM11101054	BUSHING
1055	XM11101055	RIGHT SUPPORT FLANGE
1056	XM11101056	BUSHING
1057	XM11101057	HIGH/LOW KNOB
1058	XM11101058	SPINDLE LOCK SLEEVE II
1059	XM11101059	SPINDLE LOCK HANDLE
1060	XM11101060	SPINDLE LOCK SLEEVE I
1061	XM11101061	SPACER
1062	XM11101062	SMALL HANDLE
1063	XM11101063	GIB ADJUST SCREW
1064	XM11101064	GIB
1065	XM11101065	COLUMN PLATE
1066	XM11101066	END CAP
1067	XM11101067	CAP
1068	XM11101068	ARBOR R8/JT6
1068-1	XM11101068-1	CHUCK 3-16MM/JT6
1068-2	XM11101068-2	CHUCK KEY
1069	XM11101069	SMALL HANDLE
1070	XM11101070	COMPRESSION SPRING
1071	XM11101071	FLAT SPRING
1072	XM11101072	THRUST BEARING 8106
1073	XP6007	BALL BEARING 6007
1074	XP6001	BALL BEARING 6001
1075	XM11101075	COGGED BELT 2X65
1076	XM11101076	BALL OILER
1077	XM11101077	BALL OILER
1078	XM11101078	STEEL BALL
1079	XM11101079	BEARING 2007106
1080	XP6006	BALL BEARING 6006
1081	XPSB15M	CAP SCREW M5-.8 X 20
1082	XPSB78M	CAP SCREW M5-.8 X 40
1083	XM11101083	SOLID PIN 6 X 25
1084	XPK68M	KEY 4 X 4 X 40
1085	XPS56M	PHLP HD SCR M4-.7 X 16
1086	XPRP76M	ROLL PIN 4 X 16
1087	XPSS11M	SET SCREW M6-1 X 16
1088	XPN01M	HEX NUT M6-1
1089	XPSB33M	CAP SCREW M5-.8 X 12
1090	XPRP74M	ROLL PIN 4 X 8
1091	XPSS53M	SET SCREW M5-.8 X 12
1092	XPSS04M	SET SCREW M6-1 X 12
1093	XM11101093	LOCK RING M27 -1.5
1094	XPR38M	INT RETAINING RING 62MM
1095	XPR12M	EXT RETAINING RING 35MM
1096	XPW06M	FLAT WASHER 12MM
1097	XPN09M	HEX NUT M12-1.75
1098	XPK107M	KEY 8 X 8 X 20
1099	XPK30M	KEY 4 X 4 X 25

REF	PART #	DESCRIPTION
2100	XPK34M	KEY 5 X 5 X 20
2101	XPSB16M	CAP SCREW M4-.7 X 16
2102	XPLW02M	LOCK WASHER 4MM
2103	XPK37M	KEY 4 X 4 X 16
2104	XPSB18M	CAP SCREW M4-.7 X 8
2105	XPR06M	EXT RETAINING RING 16MM
2106	XPS40M	PHLP HD SCR M5-.8 X 16
2107	XPS07M	PHLP HD SCR M4-.7 X 8
2108	XPR01M	EXT RETAINING RING 10MM
2109	XPK98M	KEY 3 X 3 X 16
2110	XPS11M	PHLP HD SCR M6-1 X 16
2111	XPSB110M	CAP SCREW M4-.7 X 6
2112	XPR06M	EXT RETAINING RING 16MM
2113	XPRP44M	ROLL PIN 3 X 10
2114	XPR06M	EXT RETAINING RING 16MM
2115	XPRP76M	ROLL PIN 4 X 16
2116	XPSB16M	CAP SCREW M4-.7 X 16
2117	XPSB01M	CAP SCREW M6-1 X 16
2118	XPSB24M	CAP SCREW M5-.8 X 16
2119	XPW02M	FLAT WASHER 5MM
2120	XPRP84M	ROLL PIN 4 X 10
2121	XM11102121	LONG HANDLE SLEEVE
2122	XPSS02M	SET SCREW M6-1 X 6
2123	XPSB64M	CAP SCREW M10-1.5 X 25
2124	XPK69M	KEY 4 X 4 X 12
2125	XPRP35M	ROLL PIN 5 X 10
2126	XPRP85M	ROLL PIN 6 X 26
2127	XPSS26M	SET SCREW M5-.8 X 6
2128	XPS52M	PHLP HD SCR M4-.7 X 20
2129	XM11102129	COLUMN
2130	XM11102130	LEFT SIDE PLATE
2131	XM11102131	RIGHT SIDE PLATE
2133	XM11102133	LIMIT SLEEVE
2134	XM11102134	LOWER BEARING SEAT
2135	XM11102135	VERTICAL LEAD SCREW
2136	XM11102136	VERTICAL LEAD NUT
2137	XM11102137	SUPPORT
2138	XM11102138	UPPER BEARING SEAT
2139	XM11102139	REAR CABINET
2140	XM11102140	SMALL COVER
2141	XM11102141	LARGE COVER
2142	XPSB04M	CAP SCREW M6-1 X 10
2143	XPSB03M	CAP SCREW M5-.8 X 8
2144	XPW04M	FLAT WASHER 10MM
2145	XPSB14M	CAP SCREW M8-1.25 X 20
2146	XPRP86M	ROLL PIN 8 X 45
2147	XPSS31M	SET SCREW M5-.8 X 8
2148	XPS17M	PHLP HD SCR M4-.7 X 6

REF	PART #	DESCRIPTION
2149	XPB73M	HEX BOLT M10-1.5 X 50
2150	XPRP39M	ROLL PIN 4 X 20
2151	XPRP56M	ROLL PIN 4 X 25
2152	XPRP73M	ROLL PIN 4 X 30
2153	XM11102153	SCALE
2155	XP8101	THRUST BEARING 8101
2156	XP6001	BALL BEARING 6001
2157	XM11102157	ADJUSTABLE FOOT
2158	XM11102158	BASE
2159	XM11102159	SADDLE
2160	XM11102160	WORKTABLE
2161	XM11102161	SPACER
2162	XM11102162	Y-AXIS FEED SCREW
2163	XM11102163	X-AXIS FEED SCREW NUT
2164	XM11102164	Y-AXIS FEED SCREW NUT
2165	XM11102165	X-AXIS GIB
2166	XM11102166	Y-AXIS BEARING SEAT
2167	XM11102167	GEAR
2168	XM11102168	SLEEVE
2169	XM11102169	Z-AXIS SHAFT
2170	XM11102170	SUPPORT FLANGE
2171	XM11102171	X-AXIS FEED SCREW
2172	XM11102172	Y-AXIS GIB
2173	XM11102173	X-AXIS BEARING SEAT
2174	XPN09M	HEX NUT M12-1.75
2175	XM11102175	HANDWHEEL
2176	XPN03M	HEX NUT M8-1.25
2177	XM11102177	HANDWHEEL
2178	XM11102178	POINTER
2179	XM11102179	HANDLE SLEEVE
2180	XM11102180	INLAY RING
2181	XM11102181	GRADUATED DIAL
2182	XM11102182	SHOULDER SCREW M8-1.25 X 55
2183	XPSB23M	CAP SCREW M4-.7 X 12
2184	XPSS12M	SET SCREW M6-1 X 25
2185	XPW01M	FLAT WASHER 8MM
2186	XPRP42M	ROLL PIN 3 X 20
2187	XPS37M	PHLP HD SCR M6-1 X 6
2188	XM11102188	RIVET
2189	XM11102189	CAP NUT
2208	XM11102208	FINE LEAD WIRE 1 X 85
2212	XM11102212	STRAIN RELIEF
2213	XM11102213	FLEX CONDUIT
2214	XM11102214	SWITCH LABEL
2215	XM11102215	FUSE BOX
2216	XM11102216	POWER INDICATING LAMP
2217	XM11102217	RPM CONTROLLER

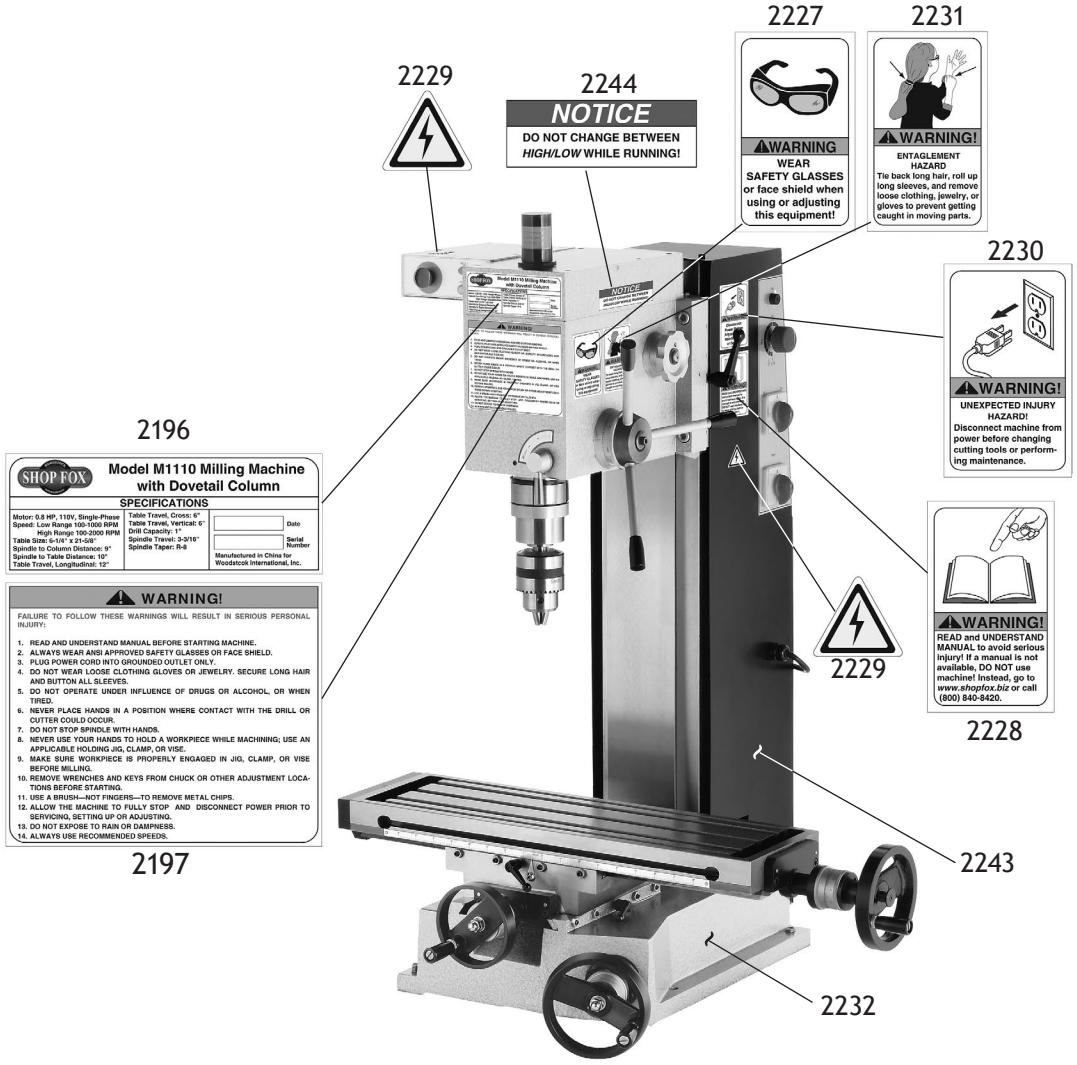
REF	PART #	DESCRIPTION
2218	XM11102218	EMERGENCY STOP SWITCH
2219	XM11102219	REV/OFF/FWD SWITCH
2220	XM11102220	PC BOARD
2223	XM11102223	POWER CORD
2224	XM11102224	MOTOR
2225	XM11102225	FAULT INDICATING LAMP
2226	XM11102226	POWER SWITCH
2234	XPWR1719	WRENCH 17 X 19
2235	XPWR1214	WRENCH 12 X 14

REF	PART #	DESCRIPTION
2236	XPWR810	WRENCH 8 X 10
2237	XPAW03M	HEX WRENCH 3MM
2238	XPAW04M	HEX WRENCH 4MM
2239	XPAW05M	HEX WRENCH 5MM
2240	XPAW06M	HEX WRENCH 6MM
2241	XM11102241	T-NUT 3/8"
2242	XM11102224	MOTOR BRUSH
2245	XM11102245	LOWER SPINDLE WRENCH

Label Placement

⚠WARNING

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



REF	PART #	DESCRIPTION
2196	XM11102196	MACHINE ID LABEL
2197	XM11102197	WARNING LABEL
2227	XPLABEL-11	SAFETY GLASSES LABEL
2228	XPLABEL-12	READ MANUAL LABEL
2229	XPLABEL-14	ELECTRICITY LABEL
2230	XPLABEL-26	UNPLUG 110V LABEL

REF	PART #	DESCRIPTION
2231	XPLABEL-41	ENTAGLEMENT LABEL
2232	XPPAINT-9	SHOP FOX LIGHT-GREY SPOT PAINT
2233	XM11102233	CHANGE GEARS LABEL
2243	XPPAINT-7	SHOP FOX BLACK SPOT PAINT
2244	XM11102244	DONT SHIFT GEARS LABEL

Warranty

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

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

This is Woodstock International, Inc.'s sole written warranty and any and all warranties that may be implied by law, including any merchantability or fitness, for any particular purpose, are hereby limited to the duration of this written warranty. We do not warrant that **SHOP FOX**® machinery complies with the provisions of any law or acts. In no event shall Woodstock International, Inc.'s liability under this warranty exceed the purchase price paid for the product, and any legal actions brought against Woodstock International, Inc. shall be tried in the State of Washington, County of Whatcom. We shall in no event be liable for death, injuries to persons or property or for incidental, contingent, special or consequential damages arising from the use of our products.

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

Warranty Registration

Name_____

Street _____

City _____ State _____ Zip _____

Phone #_____ Email_____ Invoice #_____

Model #_____ Serial #_____ Dealer Name_____ Purchase Date_____

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

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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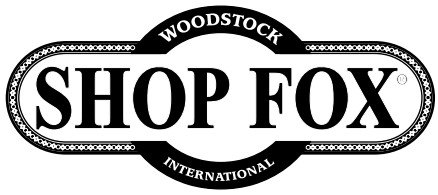

WOODSTOCK INTERNATIONAL INC.
P.O. BOX 2309
BELLINGHAM, WA 98227-2309

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TAPE ALONG EDGES--PLEASE DO NOT STAPLE