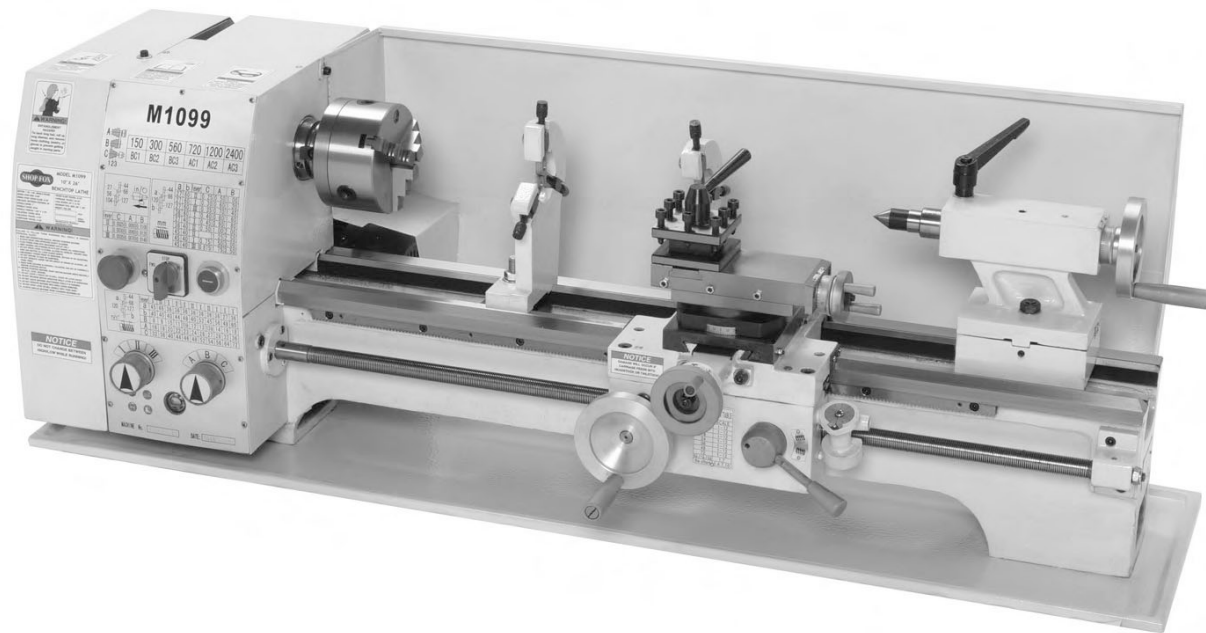


MODEL M1099 10" X 26" BENCHTOP LATHE



OWNER'S MANUAL (FOR MODELS MANUFACTURED SINCE 8/07)

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

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

THE WRITTEN APPROVAL OF WOODSTOCK INTERNATIONAL, INC.

#9052CR

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.

Table of Contents

INTRODUCTION	2	MAINTENANCE	32
Woodstock Technical Support	2	Basic Maintenance	32
Machine Specifications	3	General Lubrication.....	32
Identification	5	Belt Adjustment or Replacement.....	34
SAFETY	6	SERVICE	35
Standard Machinery Safety Instructions	6	Troubleshooting.....	35
Additional Safety Instructions for Lathes	8	Cross Slide Backlash Adjustment	37
ELECTRICAL	9	Gib Adjustments.....	37
Circuit Requirements	9	Electrical Component Connections.....	38
Grounding Requirements.....	10	Wiring Diagram	39
Extension Cords	10	PARTS	40
SETUP	11	Spindle and Drive Belt.....	40
Unpacking	11	Apron.....	42
Inventory	11	Apron Parts.....	43
Machine Placement	12	Tool Holder and Compound Rest.....	44
Cleaning Machine.....	12	Tailstock	45
Test Run & Break-In.....	13	Bed and Leadscrew	46
OPERATIONS	15	Steady Rest and Follow Rest	47
General	15	Motor and Electrical	48
Power Control.....	15	Gearbox Diagram A.....	49
Mounting Chuck or Faceplate	16	Gearbox Diagram B	51
Replacing Jaws	17	Cross Feed and Carriage	53
Four-Jaw Chuck	18	WARRANTY	55
Faceplate.....	19		
Tailstock	20		
Drilling With the Tailstock	20		
Cutting Shallow Tapers with Tailstock	21		
Aligning Tailstock	22		
Centers.....	23		
Steady Rest.....	24		
Follow Rest.....	24		
Compound Rest	25		
Tool Post.....	25		
Manual Feed Handwheels	26		
Determining Correct Spindle RPM	27		
Spindle RPM	28		
Power Feed Rate	29		
Inch Threads	30		
Metric Threads.....	31		

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





INTRODUCTION

Woodstock Technical Support

Your new **SHOP FOX**® Model M1099 Benchtop Lathe 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.
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Email: manuals@woodstockint.com

MACHINE SPECIFICATIONS



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MODEL M1099 SHOP FOX® 10" X 26" BENCH LATHE

Motors

Main

Type.....	Reversible TEFC Capacitor Start and Run Induction
Horsepower.....	1 HP
Voltage.....	110V
Phase.....	Single-Phase
Amps.....	13.6A
Speed.....	1725 RPM
Cycle.....	60 Hz
Number of Speeds.....	1
Power Transfer	Cogged Belt Drive
Bearings.....	Shielded and Lubricated

Main Specifications

Operation Info

Swing Over Bed.....	9-5/8 in.
Distance Between Centers.....	26 in.
Swing Over Cross Slide.....	6-1/8 in.
Swing Over Saddle.....	6-3/8 in.
Maximum Tool Bit Size.....	3/8 in.
Compound Travel.....	3-1/2 in.
Carriage Travel.....	22-1/2 in.
Cross Slide Travel.....	6-1/2 in.

Headstock Info

Spindle Bore.....	1 in.
Spindle Size.....	1-3/4 in.
Spindle Taper.....	MT#4
Spindle Threads.....	8
Number of Spindle Speeds.....	6
Spindle Speeds.....	150, 300, 560, 720, 1200, 2400 RPM
Spindle Type.....	Threaded
Spindle Bearings.....	Tapered Roller

Tailstock Info

Tailstock Quill Travel.....	2-1/2 in.
Tailstock Taper.....	MT#3



Threading Info

Number of Longitudinal Feeds.....	9
Range of Longitudinal Feeds.....	0.0023 – 0.013 in.
Number of Inch Threads.....	33
Range of Inch Threads.....	8 – 72 TPI
Number of Metric Threads.....	26
Range of Metric Threads.....	0.25 – 3.5

Dimensions

Bed Width.....	6-1/8 in.
Leadscrew Diameter.....	3/4 in.
Leadscrew TPI.....	12
Leadscrew Length.....	in.
Faceplate Size.....	12 in.

Construction

Headstock.....	Cast Iron
Headstock Gears.....	Steel
Bed.....	Hardened Cast Iron
Body.....	Cast Iron
Paint.....	Epoxy

Product Dimensions

Weight.....	330 lbs.
Width (side-to-side) x Depth (front-to-back) x Height.....	50 x 32 x 16-5/8 in.
Footprint (Length x Width).....	53-1/2 x 12-1/2 in.

Shipping Dimensions

Type.....	Wood Crate
Content.....	Machine
Weight.....	475 lbs.
Length x Width x Height.....	62 x 23 x 23 in.

Electrical

Power Requirement.....	110V, Single-Phase, 60 Hz
Minimum Circuit Size.....	20A
Switch.....	Push Button
Switch Voltage.....	110V
Cord Length.....	5 ft.
Cord Gauge.....	14 Gauge
Plug Included.....	Yes
Included Plug Type.....	NEMA 5-15

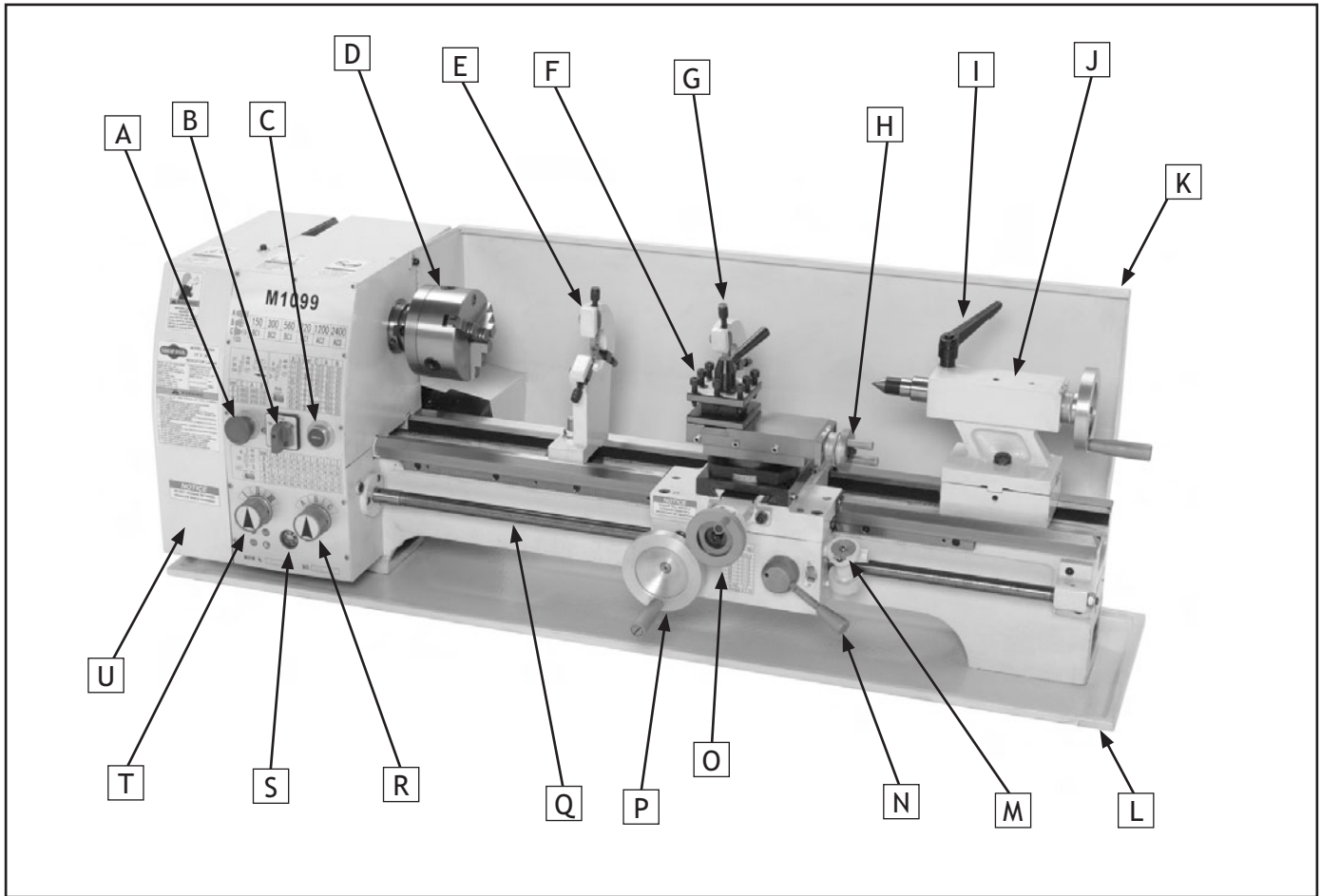
Other

Country Of Origin	China
Warranty	2 Year
Serial Number Location	Data Label on Headstock
Assembly Time	1 Hour


Features

- Hardened and Ground V-Ways
- Chip Tray Included
- Back Splash
- Full Featured Carriage and Apron Assemblies Provide Super Accurate Cuts and Finishes
- Long Bed Accommodates 26 in. Between Cuts

Identification



- | | |
|---|---|
| <ul style="list-style-type: none"> A. Emergency Stop Button B. Motor Direction Selector Knob C. Power ON Push Button D. 3-Jaw Chuck E. Steady Rest F. 4-Way Tool Holder G. Follow Rest H. Compound Feed Handwheel I. Tailstock Barrel Lock Lever J. Tailstock K. Back Splash | <ul style="list-style-type: none"> L. Chip Tray M. Thread Dial N. Half Nut Lever O. Cross Feed Handwheel P. Carriage Feed Handwheel Q. Lead Screw R. Threading Dial (Alpha) S. Gearbox Oil Level Sight Glass T. Threading Dial (Numeric) U. Change Gear and Belt Safety Cover |
|---|---|



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

SAFETY

For Your Own Safety, Read Manual Before Operating Machine

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



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



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



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

NOTICE

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

Standard Machinery Safety Instructions

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

NEVER STAND ON MACHINE. Serious injury or accidental contact with cutting tool may occur if machine is tipped. Machine may be damaged.

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

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

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

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

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

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

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

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

Additional Safety Instructions for Lathes

CLEARING CHIPS. Metal chips can easily cut bare skin—even through a piece of cloth. Avoid clearing chips by hand or with a rag. Use a brush or vacuum to clear metal chips.

CHUCK KEY SAFETY. A chuck key left in the chuck can become a deadly projectile when the spindle is started. Always remove the chuck key after using it. Develop a habit of not taking your hand off of a chuck key unless it is away from the chuck.

TOOL SELECTION. Cutting with an incorrect or dull tool bit will often overload the bit and cause it to dig into the workpiece and snap. As a result, hot razor-sharp shards may be ejected that can result in a burn or blinding injury. To increase safety, decrease tool bit load, and provide the best finish possible, always use the correct tool and one that is sharp.

SPEED RATES. Operating the lathe at the wrong speed can cause nearby parts to break or the workpiece to come loose, which will result in dangerous projectiles that could cause severe impact injury. Large workpieces must be turned at slow speeds. Always use the appropriate feed and speed rates.

STOPPING SPINDLE BY HAND. Stopping the spindle by putting your hand on the workpiece or chuck creates an extreme risk of entanglement, impact, crushing, friction, or cutting hazards. Never attempt to slow or stop the lathe spindle with your hand. Allow the spindle to come to a stop on its own or use the brake (if equipped).

LONG STOCK SAFETY. Long stock can whip violently if not properly supported, causing serious impact injury and damage to the lathe. Reduce this risk by supporting any stock that extends from the chuck/headstock more than three times its own diameter. Always turn long stock at slow speeds.

SAFE CLEARANCES. Workpieces that crash into other components on the lathe may throw dangerous projectiles in all directions, leading to impact injury and damaged equipment. Before starting the spindle, make sure the workpiece has adequate clearance by hand-rotating it through its entire range of motion. Also, check the tool and tool post clearance, chuck clearance, and saddle clearance.

REMOVING/INSTALLING CHUCKS. Chucks are heavy and often oily and slippery to hold. Losing your grip on a chuck can lead to crushed hands or amputated fingers. To reduce this risk and protect the lathe bed, cover the bed with a sheet of wood and use a chuck cradle. For large chucks, also get the assistance of one or more people, and use an appropriate hoisting apparatus when installing or removing.

SECURING WORKPIECE. A thrown workpiece may cause severe injury or even death. When swapping the chuck jaw positions, double-check that the jaw fasteners are tight and that the top jaw is fully seated with the lower jaw no gaps exist between the two. When clamping a workpiece, maximum gripping force is attained at full jaw and scroll gear engagement. If jaw and scroll gear are only partially engaged, clamping force is reduced.

CRASHES. Tooling or components that contact a spinning chuck may shatter sending metal fragments in all directions resulting in severe impact injuries and major damage to the lathe. Reduce this risk by releasing automatic feeds after use and checking clearances before starting the lathe.

CUTTING FLUID SAFETY. Contaminated cutting fluid is a toxic biohazard that can cause poisoning from skin contact. Incorrectly positioned cutting fluid nozzles can splash on the operator or the floor, resulting in an exposure or slipping hazard. To decrease your risk, change cutting fluid regularly and use the system carefully.

ELECTRICAL

Circuit Requirements

This machine must be connected to the correct size and type of power supply circuit, or fire or electrical damage may occur. Read through this section to determine if an adequate power supply circuit is available. If a correct circuit is not available, a qualified electrician **MUST** install one before you can connect the machine to power.

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

Full-Load Current Rating

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

Full-Load Current Rating at 110V 13.6 Amps


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

- Circuit Type 110V/120V, 60 Hz, Single-Phase**
- Circuit Size 15 Amps**
- Plug/Receptacle NEMA 5-15**

⚠ 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 later in this manual.

⚠ WARNING



Incorrectly wiring or grounding this machine can cause electrocution, fire, or machine damage. To reduce this risk, only a qualified electrician or service personnel should do any required electrical work for this machine.

NOTICE

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

ELECTRICAL

Grounding Requirements

This machine **MUST** be grounded. In the event of certain types of malfunctions or breakdowns, grounding provides a path of least resistance for electric current to travel—in order to reduce the risk of electric shock.

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

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

For 110V Connection

The plug provided with the machine has a ground prong that must be attached to the equipment-grounding wire inside the included power cord. The plug must only be inserted into a matching receptacle that is properly installed and grounded in accordance with all local codes and ordinances.

Extension Cords

We do not recommend using an extension cord with this machine. Extension cords cause voltage drop, which may damage electrical components and shorten motor life. Voltage drop increases with longer extension cords and the gauge smaller gauge sizes (higher gauge numbers indicate smaller sizes).

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

- Minimum Gauge Size at 220V 12 AWG
- Maximum Length (Shorter is Better) 50 ft.

⚠️ 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 later in this manual.

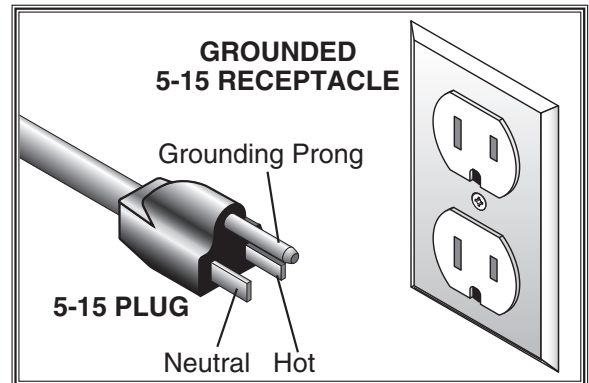


Figure 1. NEMA 5-15 plug & receptacle.

⚠️ CAUTION

DO NOT modify the provided plug or use an adapter if the plug will not fit your receptacle. This is an indication that your power supply circuit does **NOT** meet the requirements for the machine; have an electrician install the correct power supply circuit. If the machine must be reconnected for use on a different type of electric circuit, the reconnection should be made by a qualified electrician or service personnel; after reconnection, the machine must comply with all local codes and ordinances.

ELECTRICAL

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

After all the parts have been removed from your shipment, you should have the following items:

Installed Accessories (Figure 1)	Qty.
A. Three-Jaw Chuck (5")	1
B. Steady Rest	1
C. 4-Way Tool Post and Compound Rest	1
D. Compound Slide	1

Packaged Accessories (Figure 2)

E. Hex Wrench Set (2.5, 3, 4, 5, 6 mm)	1 EA
F. Tool Box	1
G. Faceplate (8")	1
H. Four-Jaw Universal Chuck (6 ¹ / ₂ ")	1
I. Low Range Belt	1
High Range Belt (Installed)	1
J. Phillips and Standard #2 Screwdriver	1 EA
K. Wrench Set (12/14, 12/14, 19/17 mm)	1 EA
L. Three-Jaw Chuck Internal Jaw Set	1
M. Three-Jaw Chuck Key	1
N. Four-Jaw Chuck Key	1
O. Oil Bottle	1
P. Cross Feed Handle	1
Q. Carriage Feed Handle	1
R. Dead Center MT#3	1
S. Change Gear Set	1
— Change Gear (27-tooth, Installed)	1
— Change Gear (36-tooth)	1
— Change Gear (40-tooth)	1
— Change Gear (44-tooth)	1
— Change Gear (46-tooth)	1
— Change Gear (48-tooth, Installed)	1
— Change Gear (52-tooth)	1
— Change Gear (45-tooth)	1
— Change Gear (56-tooth, Installed)	1
— Change Gear (60-tooth)	1
— Plastic Drive Gear (60-tooth, Installed)	1
— Change Gear (104-tooth, Installed)	1
— Change Gear (120-tooth)	1
— Change Gear (127-tooth, Installed)	1

NOTICE

Some hardware/fasteners on the inventory list may arrive pre-installed on the machine. Check these locations before assuming that any items from the inventory list are missing.

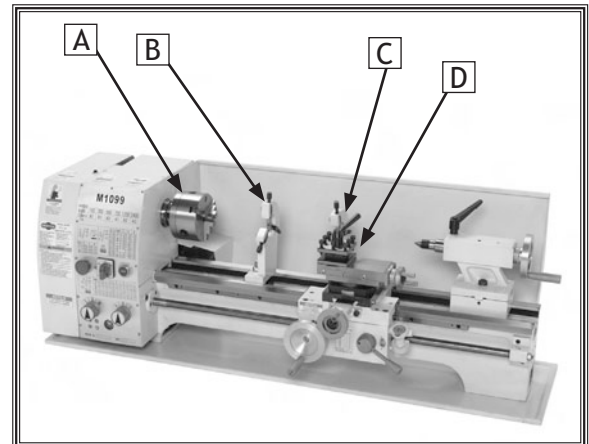


Figure 1. Installed accessories.

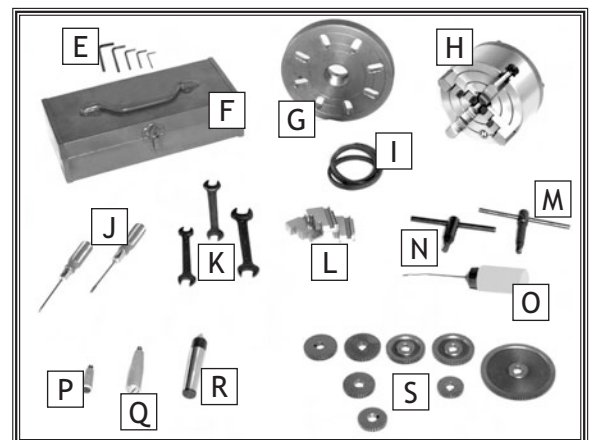


Figure 2. Packaged accessories.

Machine Placement

- **Workbench Load:** This machine distributes a heavy load in a small footprint. Some workbenches 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 Machine Type.
- **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 bed and other unpainted parts of your lathe 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.

SET UP

	<p>! WARNING NEVER clean with gasoline or other petroleum-based solvents. 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>! WARNING USE helpers or power lifting equipment to lift this Machine Name. Otherwise, serious personal injury may occur.</p>
--	---

	<p>! 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.</p>
--	--

	<p>! CAUTION MAKE your shop “child safe.” Ensure that your workplace is inaccessible to children 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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Test Run & Break-In

The purpose of the test run is to make sure the lathe and safety features operate correctly before proceeding with additional setup.

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

1. Make sure the lathe is lubricated and the headstock oil level is full. Refer to **General Lubrication** on **Page 32**.
2. Make sure the chuck is correctly secured to the spindle. Refer to **Mounting Chuck and Faceplate** on **Page 16** for details.
3. Change the belt position so the spindle will rotate at 150 RPM, and disengage the half nut with the lever shown in **Figure 3**. Refer to **Determining Correct Spindle RPM** on **Page 27** for clarification.
4. Rotate the red emergency stop button (**Figure 4**) clockwise so it pops out, and make sure the motor direction selector points to **STOP**.
5. Move the numeric gearbox dial to **I**, and the alpha gearbox dial to **C** (see **Figure 4**).

Note: You may have to slightly rotate the chuck by hand to engage the gears.

6. Push the green power button, then turn the motor direction dial to **FWD**. The top of the chuck should now be turning toward you.
7. Push the emergency stop button. The lathe should stop. If not, disconnect power and refer to **Troubleshooting** on **Page 35**.
8. Return the motor direction dial to **STOP**, reset the emergency stop button, restart the lathe, and let the lathe run for a minimum of 10 minutes.

– If you hear squealing or grinding noises, turn the lathe **OFF** immediately and correct any problem before further operation.

– If the problem is not readily apparent, refer to **Troubleshooting** on **Page 35**.

NOTICE

Make sure the half nut lever is disengaged before you start the lathe! Thoroughly familiarize yourself with all the controls and their functions before using the longitudinal feed! **NEVER SHIFT LATHE GEARS WHEN MACHINE IS OPERATING.**

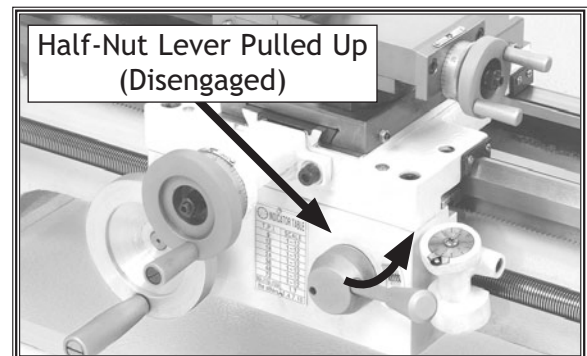


Figure 3. Half nut lever in the disengaged position.

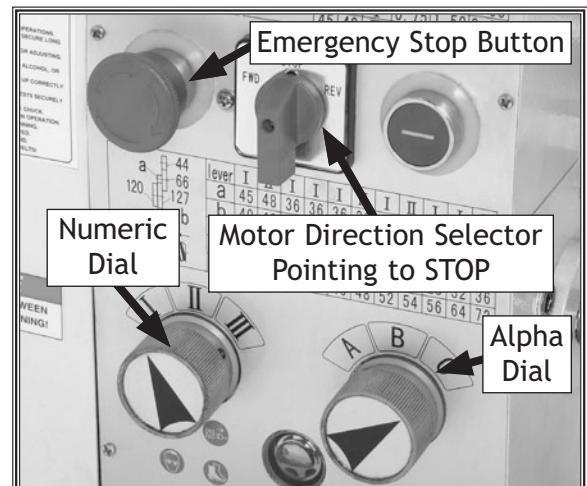


Figure 4. Headstock and gearbox controls.

SET UP

9. Turn the lathe **OFF**, disconnect power, move the drive belt to the next highest RPM and then run the lathe for 10 minutes.
10. Repeat **Step 9** for the rest of the speeds, progressively increasing the speed.
11. Change the lubricant in the headstock with Mobil DTE® Oil or an equivalent, and re-lubricate the lathe. Refer to **General Lubrication** on **Page 32** for steps and locations.

OPERATIONS

General

The Model M1099 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 lathe 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

Disconnect power to the lathe, and make sure the spindle is stopped before proceeding with any adjustments or maintenance. Failure to comply may result in serious personal injury or death.

Power Control

Pressing the red emergency stop button (Figure 5) cuts power to the machine. Twisting the emergency stop button clockwise and letting it pop out resets the lathe, so when you push the green power ON button lathe operations can begin again.

NOTICE

Complete the Test Run & Break-In procedure on Page 13 before using this lathe for any cutting or threading operations; otherwise, gear box damage will occur.

⚠ WARNING

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

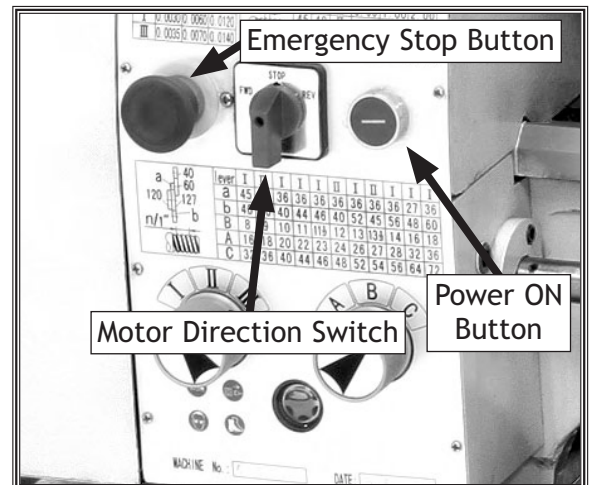


Figure 5. Lathe electrical controls.

OPERATIONS

Mounting Chuck or Faceplate

The three-jaw scroll chuck will automatically self-center the workpiece. It has hardened steel external jaws that hold the workpiece on the outside diameter of the part. An extra set of jaws is included for holding larger workpieces on the inside diameter of the part.

The four-jaw chuck has hardened steel jaws that must be independently adjusted to center the workpiece. Each jaw can be removed from the chuck body and reversed for clamping odd-shaped workpieces.

If either chuck cannot hold your workpiece, the cast-iron faceplate has slots for T-bolts that hold standard or custom clamping fixtures. With the correct clamping hardware, this faceplate will hold non-cylindrical parts such as castings.

Both chucks and the faceplate are removed and installed the same way.

To remove and install the chuck or faceplate, do these steps:

1. DISCONNECT POWER TO THE LATHE!
 2. Lay a piece of plywood over the bedways to protect the precision-ground way surfaces.
 3. Use a 5mm hex wrench to remove the two cap screws and the chuck locks (Figure 6).
 4. Insert the chuck keys as shown in Figure 7, hold the spindle, and loosen the chuck.
- Note:** *The chuck loosens in the counterclockwise direction.*
5. Support the chuck from falling off of the spindle; unscrew and remove the chuck.
 6. Clean, inspect, deburr, and lightly oil all threads and mating surfaces (Figure 8).
 7. Install the faceplate or the other chuck in the reverse order of the previous steps.

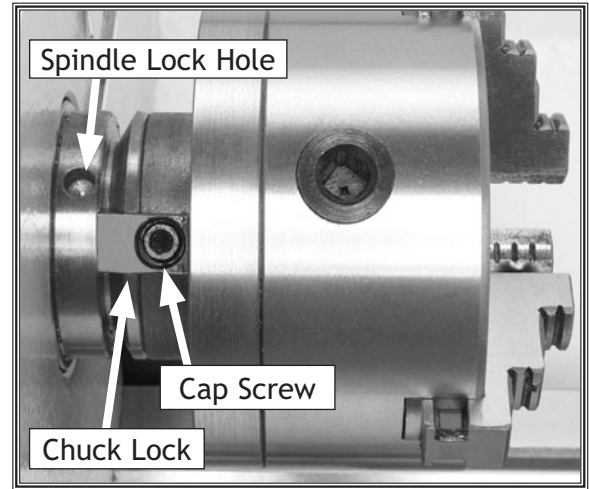


Figure 6. Cap screw, chuck lock and lock hole.



Figure 7. Inserting chuck keys to loosen or tighten the chuck onto the spindle.

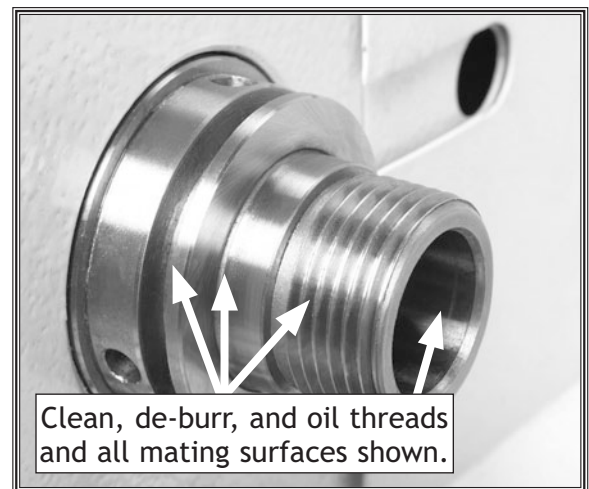


Figure 8. Spindle.

Replacing Jaws

The three-jaw scroll chuck has removable hardened steel jaws (Figure 9). The outside of the jaws are used to hold the workpiece from the outer diameter.

Numbered from 1-3, the jaws must be used in the matching numbered jaw guides (see Figure 10).

Note: The chuck need not be removed from the spindle to swap the jaws.

To remove a set of jaws, do these steps:

1. DISCONNECT POWER TO THE LATHE!
2. Place a piece of wood over the ways to protect them from potential damage.
3. Turn the chuck key counterclockwise and back the jaws out.
4. Clean the jaw mating surfaces and apply a film of white lithium grease to the mating surfaces.
5. Set the old jaws aside in a safe place free of moisture and abrasives.
6. Rotate the chuck key clockwise until you see the tip of the scroll-gear lead thread just begin to enter jaw guide #1 (see Figure 11).
7. Insert jaw #1 into jaw guide #1 and hold the jaw against the scroll-gear.
8. Rotate the chuck key clockwise one turn to engage the tip of the scroll-gear lead thread into the jaw. To verify the jaw is engaged with the lead thread, pull the jaw; it should be locked into the jaw guide.
9. Install the other jaws in the same manner.
 - If installed correctly, the three jaws will converge together at the center of the chuck.
 - If the jaws do not come together, repeat this procedure until they do.



Figure 9. Chuck and jaw selection.

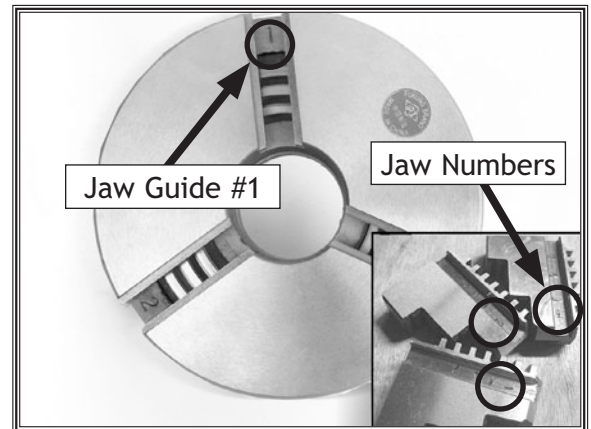


Figure 10. Jaw guide number.

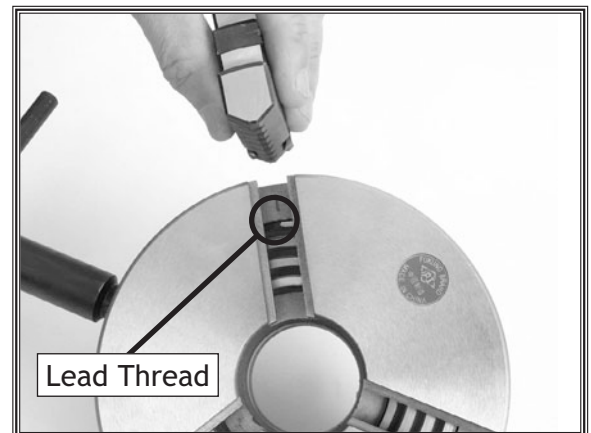


Figure 11. Lead thread on scroll gear.

Four-Jaw Chuck

To install the four-jaw chuck, do these steps:

Refer to the **Mounting Chuck or Faceplate** procedures on **Page 16** to mount the four-jaw chuck.

To hold a workpiece in the four-jaw chuck, do these steps:

1. DISCONNECT POWER TO THE LATHE!
2. Using the chuck key, open each jaw so the workpiece will lay flat against the chuck face.
3. Support the workpiece.
4. Lock the tailstock, then turn the tailstock quill so the dead center makes contact or is close to the center point of your workpiece (see **Figure 12**).
5. Turn each jaw until it just makes contact with the workpiece.
6. In an opposite pattern, tighten each jaw in small increments. After you have adjusted the first jaw, continue tightening the opposing jaw. Frequently check the dead center alignment to make sure you have not wandered off your index point due to applying too much pressure to a single jaw.
7. After the workpiece is held in place, back the tailstock away and rotate the chuck by hand. The center point will move if the workpiece is out of center.
8. Make fine adjustments by slightly loosening one jaw and tightening the opposing jaw until the workpiece is precisely aligned. Use a dial indicator to fine tune adjustments into alignment (see **Figure 13**).

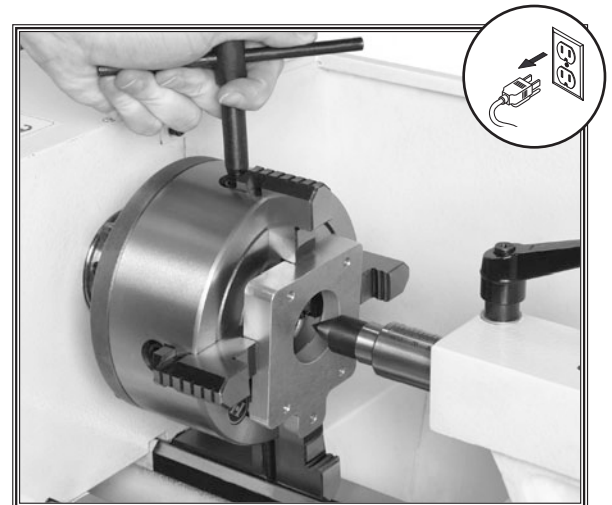


Figure 12. Rough centering procedure with a typical 4-jaw chuck, using the dead center and the tailstock.

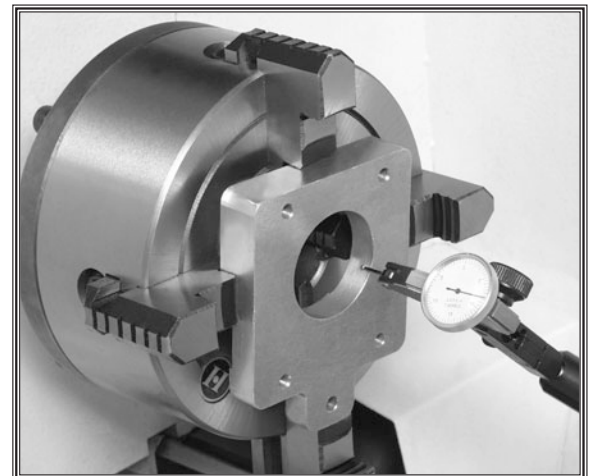


Figure 13. Exact centering procedure with a typical 4-jaw chuck using a dial indicator.

Faceplate

The faceplate can be used to turn non-cylindrical parts or for off-center turning by clamping the workpiece to the faceplate.

Refer to the **Mounting Chuck or Faceplate** procedures on **Page 16** to mount the faceplate.

To load a workpiece onto the faceplate:

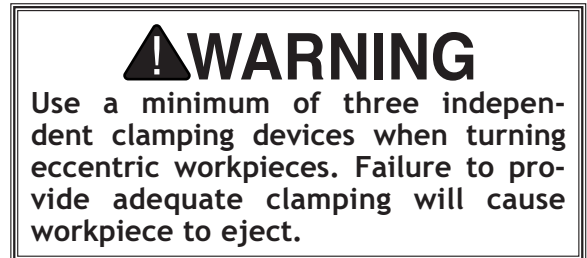
1. DISCONNECT POWER TO THE LATHE!
2. Support the workpiece.
3. Slide the tailstock to the workpiece.
4. Lock the tailstock, then turn the tailstock quill so the dead center makes contact with the center point of your workpiece.
5. Lock the tailstock quill when sufficient pressure is applied to hold the workpiece in place.

Note: *Depending on the workpiece, some additional support may be needed.*

6. Secure the workpiece with a minimum of three independent clamping devices. Failure to follow this step may lead to deadly injury to yourself or bystanders. Take into account rotation and the cutting forces applied to the workpiece when clamping to the faceplate. **Make sure your clamping application will not fail!**
7. Use a lower RPM when machining heavy eccentric workpieces.



Figure 14. Faceplate installed.



Tailstock

The tailstock (Figure 15) can be used to support workpieces with a live or dead center. The lathe can drill or bore holes in the center of a part with a drill bit held by the tailstock. The tailstock can also be offset for cutting shallow tapers.

To use the tailstock, do these steps:

1. Slide the tailstock to the desired position.
2. Tighten the tailstock lock nut to lock the tailstock in place on the ways.
3. Loosen the quill lock lever to unlock the quill.
4. Turn the quill feed handwheel clockwise to move the quill towards the spindle or counterclockwise to move away from the spindle.
5. Tighten the quill lock lever to lock the quill in place.

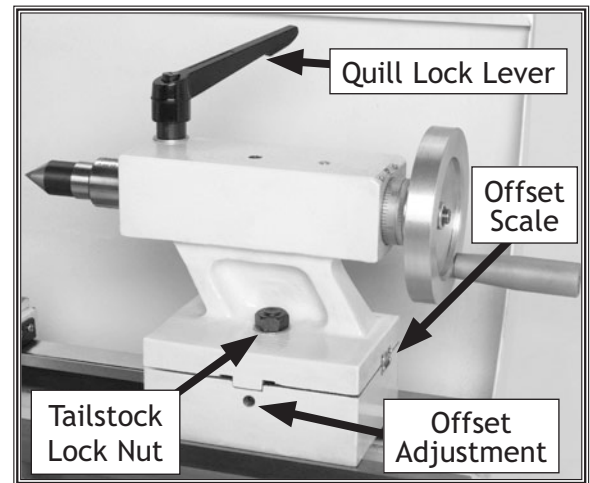


Figure 15. Tailstock and quill lock handles in locked position.

Drilling With the Tailstock

To setup the tailstock for drilling, do these steps:

1. With the tailstock locknut tight, unlock the quill lock lever.
2. Turn the quill feed handwheel clockwise to extend the quill about one inch.
3. Insert the MT#3 arbor and chuck or an MT#3 tapered drill shank into the quill until the taper is firmly seated.
4. Turn the quill feed handwheel clockwise to feed the drill bit into the rotating workpiece.
5. To remove the chuck and arbor, turn the quill feed handle counterclockwise until the chuck is pushed out of the tailstock taper.

Cutting Shallow Tapers with Tailstock

To setup the tailstock to cut tapers, do these steps:

1. Loosen the tailstock lock nut.
2. Using a 4mm hex wrench, alternately loosen and tighten the left and right offset adjustment set screws until the desired offset is indicated on the scale (see **Figure 16**).
3. Tighten the tailstock lock nut.

Note: To return the tailstock back to the original position, repeat the process until the centered position is indicated on the scale.

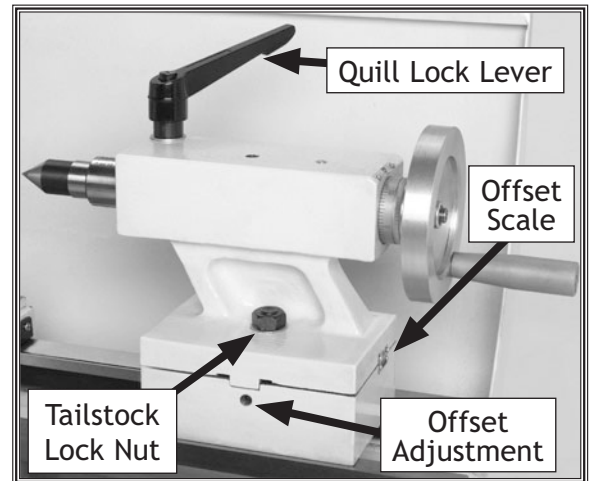


Figure 16. Left offset adjustment.

Aligning Tailstock

The tailstock is factory aligned with the headstock. We recommend that you take the time to ensure that the tailstock is aligned to your own desired tolerances.

To align the tailstock, do these steps:

1. Using a precision level on the bedways, make sure the bedways are level side-to-side and front-to-back. If the lathe is not level, correct this condition by shimming the lathe base before proceeding.
2. Get two pieces of steel round stock that are two inches in diameter and six inches long.
3. Center drill both ends of one piece of the round stock. Set the round stock aside for use in **Step 6**.
4. Using the other piece of stock, make a dead center by turning a shoulder to make a shank. Flip the piece over in the chuck and turn a 60° point (see **Figure 17**).

Note: As long as the dead center remains in the chuck, the point of your center will remain true to the spindle axis. Keep in mind that the point will have to be refinished whenever it is removed and returned to the chuck.

5. Place the live center in the tailstock.
6. Attach a lathe dog to the round stock and mount it between centers.
7. Turn approximately 0.010" off the diameter.
8. Mount a dial indicator so the dial plunger is on the tailstock barrel before moving the tailstock.
9. Measure the stock diameter with a micrometer.
 - If it is thicker at the tailstock end, move the tailstock toward you half of the diameter (**Figures 18 & 20**).
 - If it is thinner at the tailstock end, move the tailstock away from you half the distance of the diameter (**Figure 19 & 20**).
10. Turn another 0.010" off of the diameter and check for a taper. Repeat this process as necessary until the desired amount of accuracy is achieved.

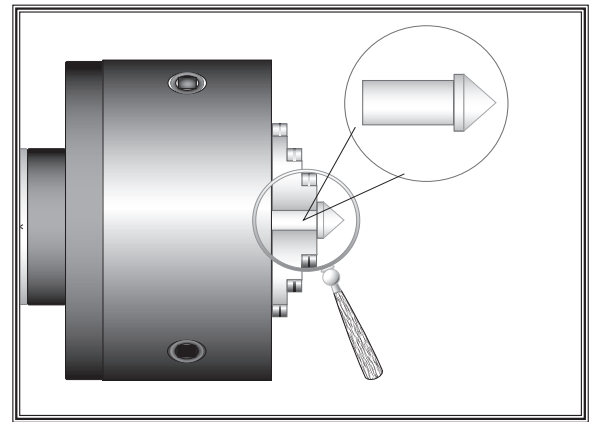


Figure 17. Chuck centering the dead center.

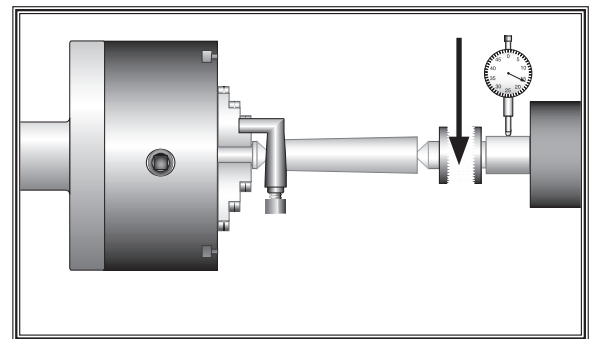


Figure 18. Tailstock adjustment option #1.

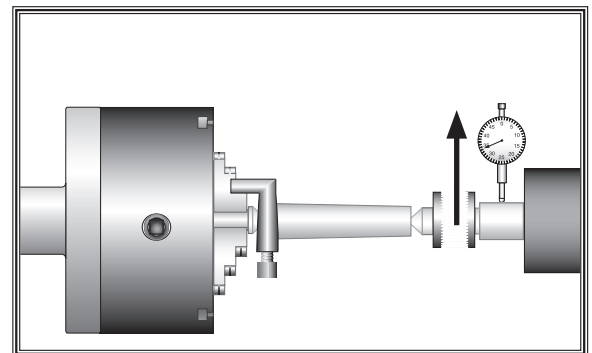


Figure 19. Tailstock adjustment option #2.

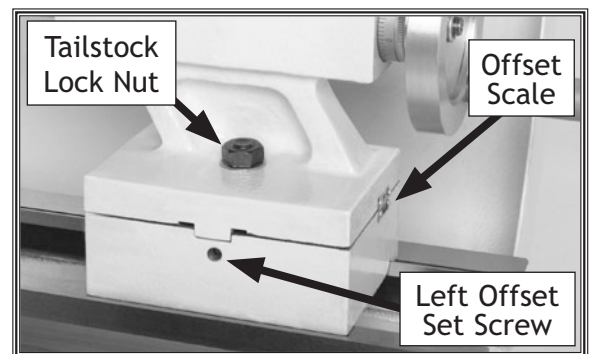


Figure 20. Left offset adjustment.

Centers

A dead center can be used in the tailstock and lathe spindle to support workpieces. When used in this manner, make sure to keep the dead center tip and workpiece lubricated to prevent tip galling.

To install a dead or live center, do these steps:

1. Feed the quill out about 1" and insert the dead center (**Figure 21**). The mating tapers provide the locking fit.
2. Move the tailstock into position and lock in place.

Note: Make sure there is a center drilled hole in the end of the workpiece for the dead center.

3. Feed the quill into the workpiece.
4. Lock the quill into place once the dead center and the workpiece rotate together. The quill may need to be adjusted during operation.
5. To remove the dead center, retract the quill until the dead center pops free.

To install an MT#4 dead center in the spindle, do these steps:

1. DISCONNECT POWER TO THE LATHE!
2. Remove the chuck from the spindle.
3. Install the MT#4 dead center in the spindle.
4. Attach the faceplate to the spindle, see **Figure 22**. Refer to **Mounting Chuck and Faceplate** on **Page 16** for details if required.

Note: When using the dead center in the spindle, use a lathe dog so that your part will rotate with the faceplate and not spin on the dead center tip.

NOTICE

Failure to keep dead center point well lubricated will gall the dead center and workpiece.

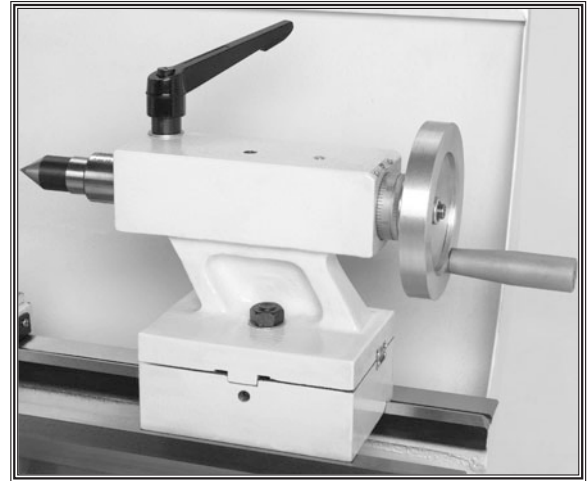


Figure 21. Inserted dead center.

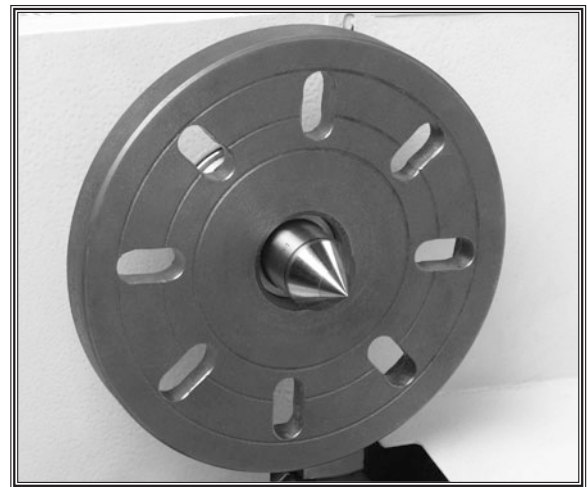


Figure 22. Faceplate and dead center setup.

Steady Rest

The steady rest serves as a support for long shafts. The steady rest can should be placed along the ways where the most support can be given to the workpiece and still allow for all of your intended lathe operations.

To use the steady rest, do these steps:

1. Carefully place the steady rest on the lathe bedways.
2. Loosen the finger lock nuts so the finger position can be adjusted (see **Figure 23**).
3. Loosen the steady rest lock nut (see **Figure 23**), and position the steady rest where desired.
4. Tighten the steady rest lock nut.
5. Clamp the workpiece into the chuck and position the tailstock to support the workpiece.
6. Turn the adjustment knobs so the fingers are snug against the workpiece, and then tighten the finger lock nuts.
7. Lubricate the finger tips with an anti-seize lubricant during operation.
8. After prolonged use, the fingers will show wear. Either mill or file the tips for a new contact surface.

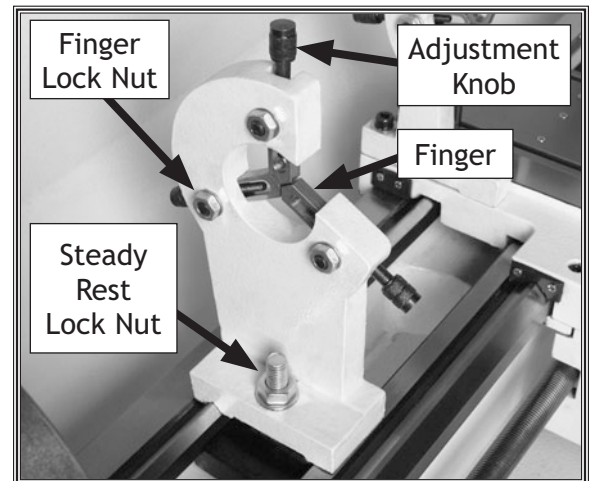


Figure 23. Steady rest.

Follow Rest

The follow rest in **Figure 24** is mounted on the front of the carriage directly above the ways and follows the movement of the tool. The follow rest requires only two fingers, as the cutting tool acts as the third. The follow rest is used on long, slender parts to prevent flexing of the workpiece from the pressure of the cutting tool.

The sliding fingers are set similar to those of the steady rest—free of play but not binding. Always lubricate during operation. After prolonged use, the fingers will need to be milled or filed to clean up the contact surface.

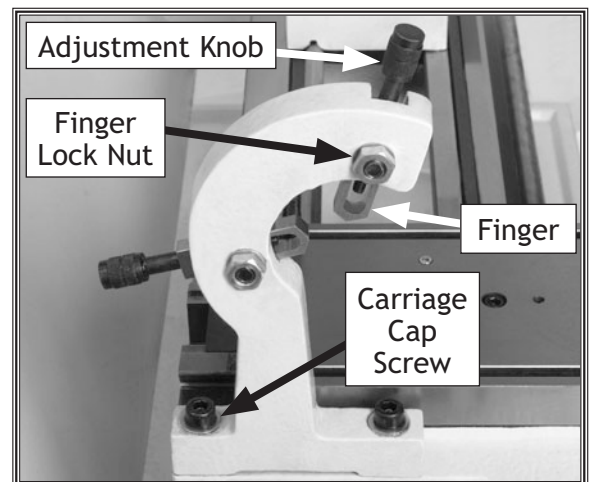


Figure 24. Follow rest.

Compound Rest

The compound rest is used to cut tapers on parts or to set the proper infeed angle when threading. It may also be used to cut specific lengths longitudinally, when set parallel to the spindle axis.

To set the angular position, do these steps:

1. Loosen the hex nuts on each side of the compound rest (see Figure 25).
2. While watching the scale, rotate the compound rest to the desired angular position.
3. Tighten the two hex nuts. Be sure to not overtighten, as you may strip threads or crack or distort the base casting.

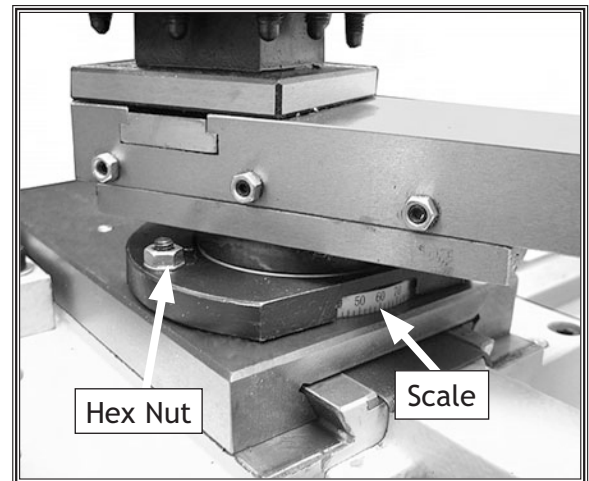


Figure 25. Compound rest, scale, and hex nuts.

Tool Post

The four-way tool post (Figure 26) is mounted on top of the compound rest and allows a maximum of four $\frac{3}{8}$ " x $\frac{3}{8}$ " tools to be loaded simultaneously.

The four-way tool post allows for quick indexing to new tools. This is accomplished by loosening the top handle, then rotating the tool post to the desired position. Tighten the top handle to lock the tool into position.

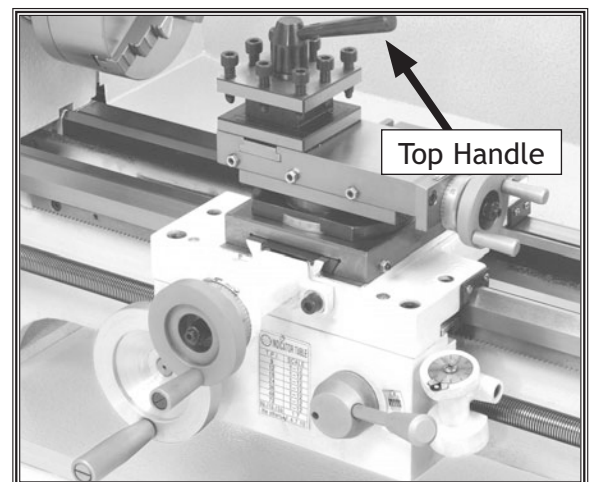


Figure 26. Four-way tool post and top handle.

Manual Feed Handwheels

You can manually move the cutting tool around the workpiece using the three handwheels shown in **Figure 27**.

Compound Rest Handwheel

The compound rest handwheel controls the position of the cutting tool relative to the workpiece. The graduated dial on the handwheel indicates the depth of compound rest movement. The angle adjustment is held by two hex nuts on the base of the compound rest.

Cross Slide Handwheel

The cross slide handwheel moves the top slide toward and away from the workpiece. Turning the handwheel clockwise moves the slide toward the workpiece. The graduated dial on the handwheel indicates the depth of cross slide movement.

Carriage Handwheel

The carriage handwheel moves the carriage left or right along the bed. This control is helpful when setting up the machine for turning or when manual movement is desired during turning operations.

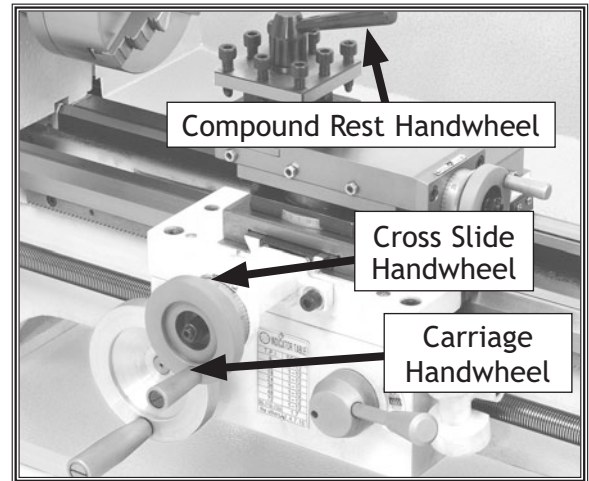


Figure 27. Manual handwheel controls.

Determining Correct Spindle RPM

To determine the correct spindle RPM, do these steps:

1. Use the table in **Figure 28** to determine the cutting speed required for the material of your workpiece.
2. Measure the diameter of your workpiece in inches and subtract the depth of the cut that will be taken on the initial pass.
3. Use the formula in **Figure 29** to determine the needed RPM for your operation.

Note: Always round to the closest RPM given on the spindle speed chart, and adjust your speed as the workpiece diameter decreases.

Example 1

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

Step 1:

300 (SFM from chart) x 4 = 1200

Step 2:

1200 / 0.5" (Diameter of workpiece) = 2400 RPM

Result:

The needed speed for this workpiece is 2400 RPM.

Example 2

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

Step 1:

60 (SFM from chart) x 2 (for carbide tool) = 120

Step 2:

120 (determined SFM) x 4 = 480

Step 3:

480 / 1" (Diameter of workpiece) = 480 RPM

Result:

The needed speed for this workpiece is 480 RPM.

⚠ WARNING

Failure to follow RPM and feed rate guidelines may threaten operator safety from ejected parts or broken 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 28. Cutting speed table for HSS cutting tools.

$$\frac{(\text{SFM}) \times 4}{\text{Workpiece Diameter}} = \text{RPM}$$

Figure 29. Formula to determine required spindle speed for lathes.

Spindle RPM

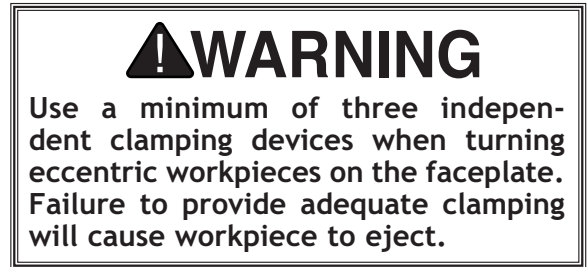
This lathe has six possible spindle speeds. Shown in **Figure 30** is an example of how you would use the chart to get a spindle RPM of 150.

To set the spindle RPM, do these steps:

1. DISCONNECT THE LATHE FROM POWER!
2. Refer to the RPM chart in **Figure 30** and determine which pulley combination you will need to get a particular spindle RPM.
3. Open the side cover and install the low range belt between pulleys B and C and in sheave 1 as shown in **Figure 30**.

Note: The low range belt is always used on pulleys B and C with the tensioner. This belt is 27.5" long. The high range belt is always used on pulleys A and C without using the tensioner. This belt is 33" long.

4. Close the side cover and secure it shut with the cap screw. The lathe is now ready to use at 150 RPM.



OPERATIONS

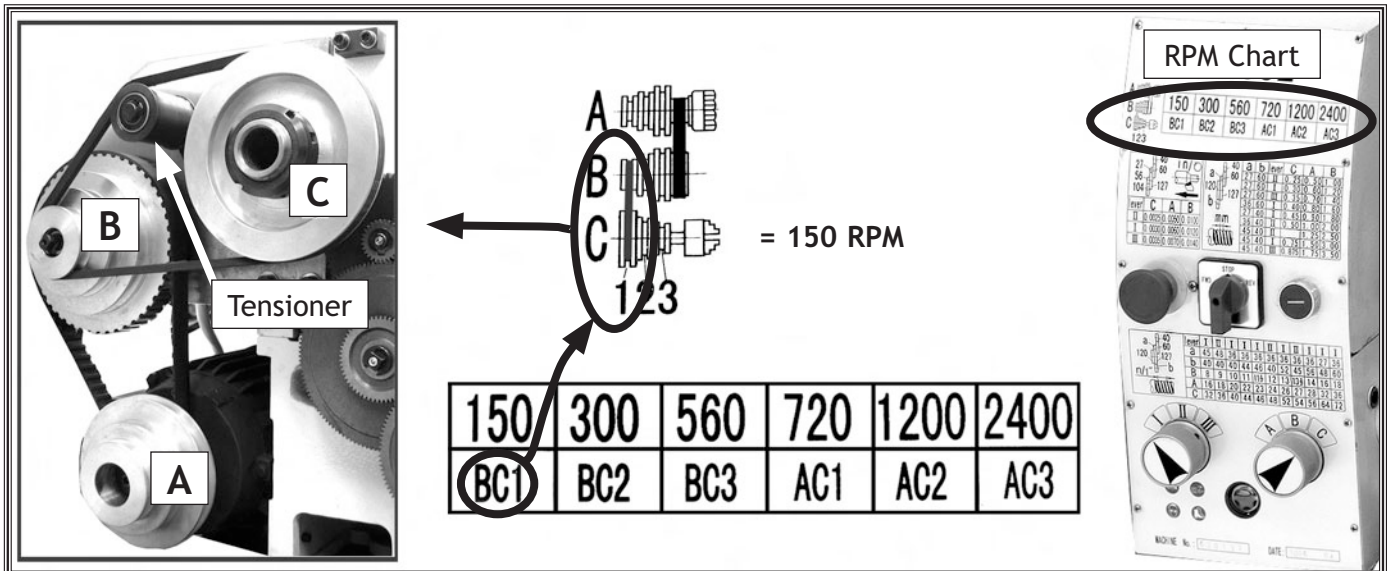


Figure 30. Pulley combination (BC1) achieves 150 RPM at the spindle.

Power Feed Rate

Use these steps to learn how to setup your lathe for a power feed operation. The example in **Figure 32** shows lathe setup for a power feed rate of 0.012". Remember, the carriage direction is reversed when spindle rotation is reversed.

To set and engage the power feed, do these steps:

1. DISCONNECT LATHE FROM POWER!
2. Turn the feed dials to the numeral and letter indicated by the chart in **Figure 32**.
3. Using the chart in **Figure 32**, gather the required change gears.
4. Open the side cover and use a 6mm hex wrench to loosen the lash adjuster (**Figure 32**) and swing the change gear assembly out of the way.
5. Remove the spindle E-clips and cap screw, lubricate, and swap out the change gears in the order shown on the chart in **Figure 32**.
6. Move the lash adjuster so the gear backlash is between 0.003" to 0.008", tighten the lash adjuster cap screw, and close the side cover.
7. Using a 5mm hex wrench, loosen the carriage lock (**Figure 31**), and use the half nut lever to engage and disengage the power feed when required.

NOTICE
 Feed rate is based on spindle RPM. Pay close attention to the feed rate you have chosen and be ready to disengage the carriage. Failure to do this may cause the carriage to crash into the chuck.

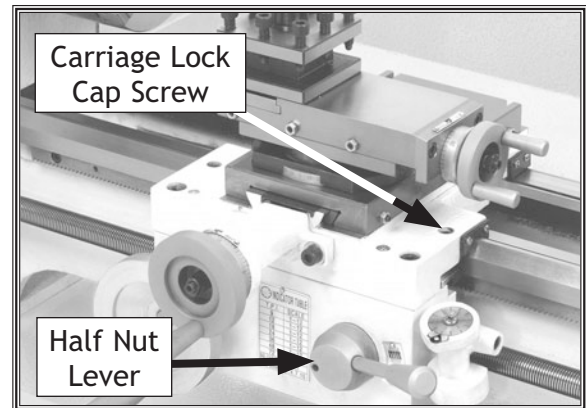


Figure 31. Carriage lock and feed control.

lever	C	A	B
II	0.0025	0.0050	0.0100
I	0.0030	0.0060	0.0120
III	0.0035	0.0070	0.0140

Figure 32. Power feed setup.

OPERATIONS

Inch Threads

Use these steps to learn how to setup your lathe for inch threading. The example in **Figure 34** shows lathe setup for cutting 64 TPI (Teeth Per/Inch) thread.

To setup for inch threading, do these steps:

1. DISCONNECT THE LATHE FROM POWER!
2. Turn the feed dials to the numeral and letter indicated by the chart in **Figure 34**.
3. Using the chart in **Figure 34**, gather the required change gears.
4. Open the side cover and use a 6mm hex wrench to loosen the lash adjuster (**Figure 32**) and swing the change gear assembly out of the way.
5. Remove the spindle E-clips and cap screw, lubricate, and swap out the change gears in the order shown on the chart in **Figure 32**.
6. Move the lash adjuster so the gear backlash is between 0.003" to 0.008", tighten the lash adjuster cap screw, and close the side cover.
7. Using a 5mm hex wrench, make sure the carriage lock is loose (**Figure 31**).

NOTICE

During threading keep your hand on the half-nut lever ready to disengage the half nut to avoid potential carriage/chuck crash.

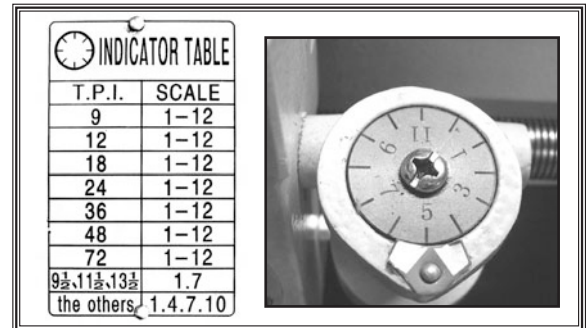


Figure 33. Thread dial chart and thread dial.

8. The lathe is now setup for threading.

Note: For faster threading and manual carriage return, based on which TPI being cut, refer to the **Indicator Table** in **Figure 33** to know if you can use the thread dial scale to show when to re-enter the thread manually after disengaging the half nut lever.

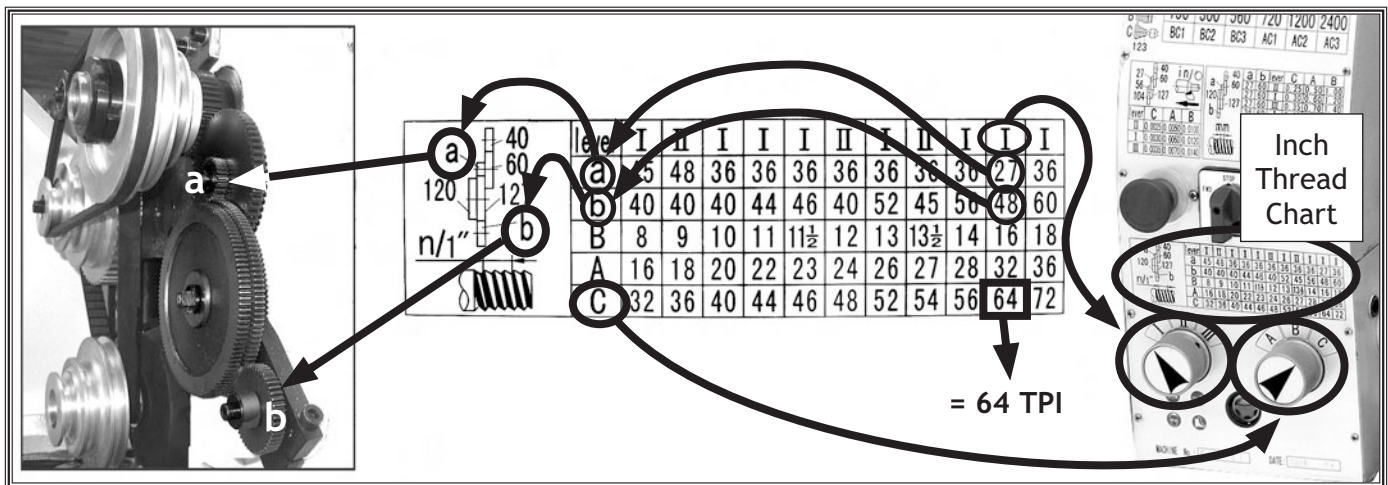


Figure 34. Inch threading setup.

Metric Threads

Use these steps to learn how to setup your lathe for metric threading. The example in **Figure 35** shows lathe setup for cutting a metric thread pitch of 0.45mm.

To setup for metric threading, do these steps:

1. DISCONNECT THE LATHE FROM POWER!
2. Turn the feed dials to the numeral and letter indicated by the chart in **Figure 35**.

Note: You may have to rock the chuck by hand slightly to get the gearbox gears to engage one another.
3. Using the chart in **Figure 34**, gather the required change gears.
4. Open the side cover and use a 6mm hex wrench to loosen the lash adjuster (**Figure 32**) and swing the change gear assembly out of the way.
5. Remove the spindle E-clips and cap screw, lubricate, and swap out the change gears in the order shown on the chart in **Figure 32**.

Note: All change gears are stamped with the number of teeth they have.

6. Move the lash adjuster so the gear backlash is between 0.003" to 0.008", tighten the lash adjuster cap screw, and close the side cover.
7. Using a 5mm hex wrench, make sure the carriage lock is loose (**Figure 31**).
8. The lathe is now setup for threading.

NOTICE

During threading keep your hand on the half-nut lever ready to disengage the half nut to avoid potential carriage/chuck crash.

Note: Since this lathe has an inch lead screw, do not use the thread dial when cutting metric threads. Instead you must leave the half nut engaged until the threading operation is totally complete.

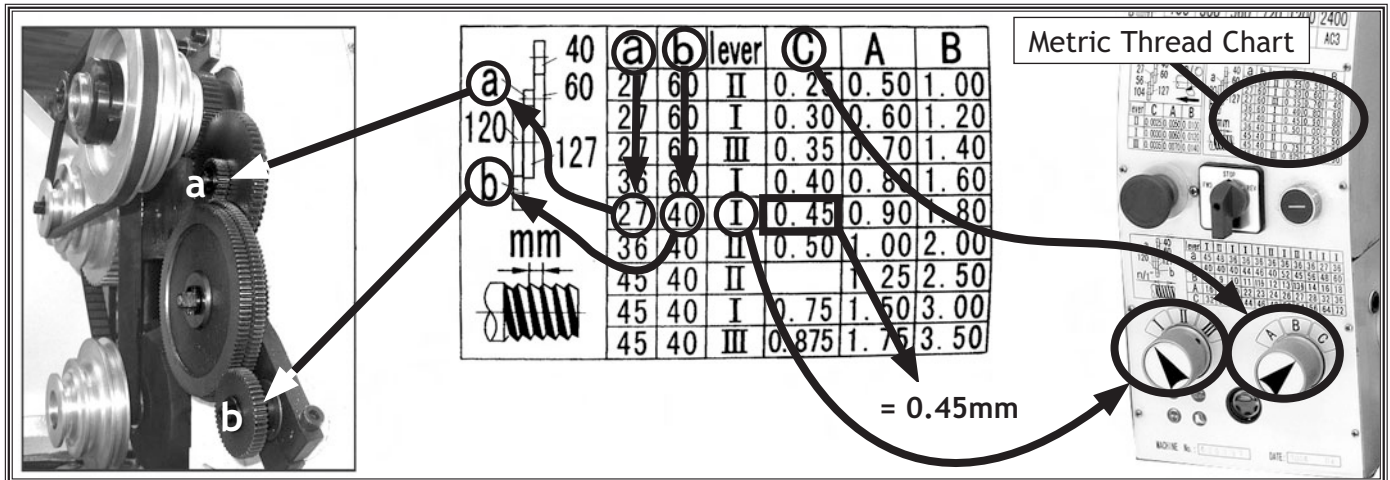


Figure 35. Metric threading setup.

MAINTENANCE

Basic Maintenance

Regular periodic maintenance of your lathe will ensure 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 mounting bolts and chuck.
- Worn switch or safety features.
- Worn or damaged cords or plug.
- Any other condition that could hamper the safe operation of this machine.

General Lubrication

Make sure to unplug the lathe before lubrication and cleaning.

Keep the gearbox oil level at $\frac{3}{4}$ full as shown by the sight glass (Figure 36). After break-in, change the oil in the gearbox with Mobil® DTE® Heavy-Medium or an equivalent grade of oil, then again after three months. After that, change the oil at the same time on an annual basis or more frequently if extreme machine use requires it.

For daily lubrication, use a manual oil gun with a general 10W machine oil to lubricate the 11 ball oilers. Refer to Figures 37-40 for ball oiler locations. Make sure you wipe off the fittings before you oil them.

To control surface rust on machined surfaces, wipe the unprotected metal as required with a rust inhibiting oil.

Never blow the lathe off with compressed air, otherwise you will force metal shavings deep into mechanisms. Use a shop vacuum instead. Never use acetone, gasoline, or lacquer thinner to remove stains or oil from painted surfaces. These chemicals will melt the paint. Use mineral spirits or mild household degreasers.



Figure 36. Headstock oil level sight glass.

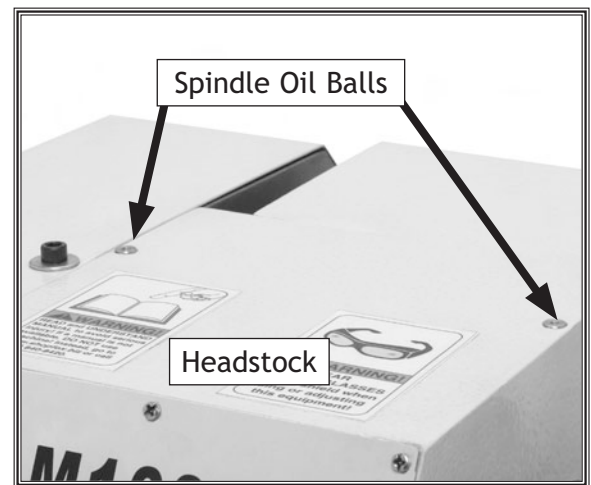


Figure 37. Spindle ball oilers in headstock.

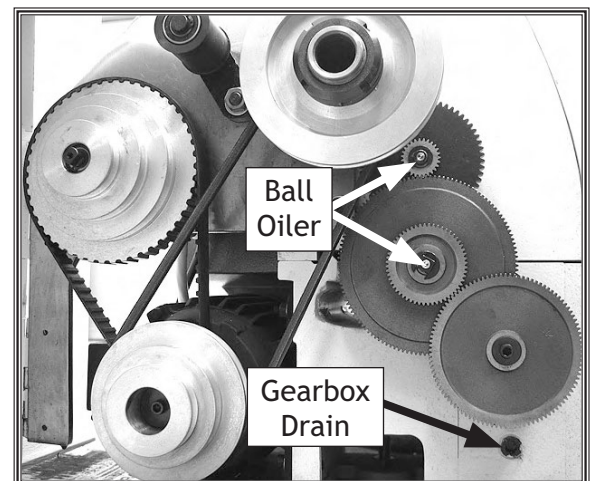


Figure 38. Change gear ball oilers and gearbox drain.

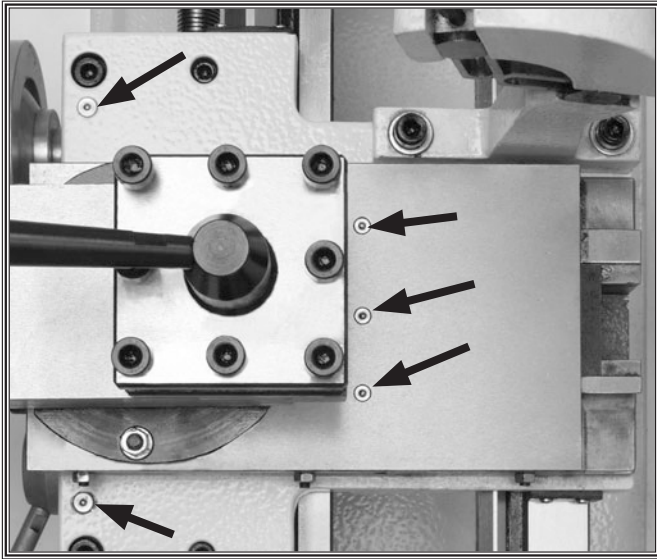


Figure 39. Apron and carriage ball oilers.

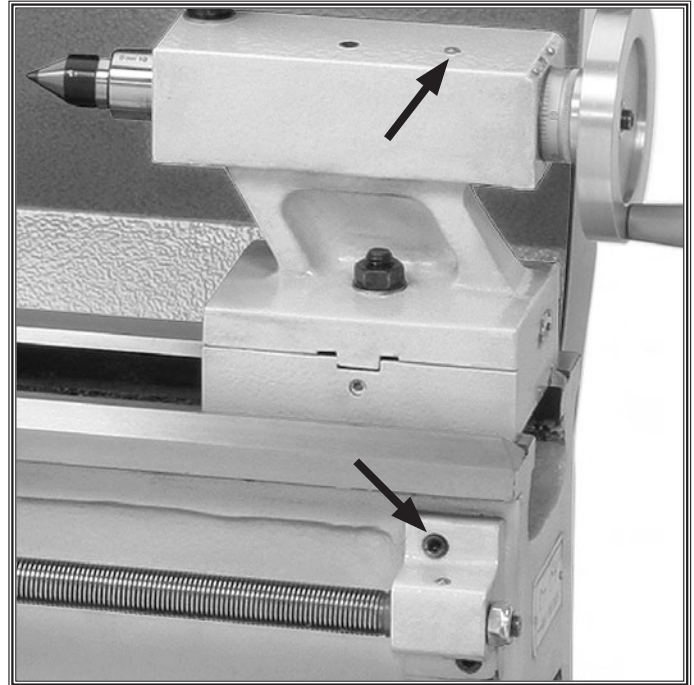


Figure 40. Leadscrew and tailstock ball oilers.

Belt Adjustment or Replacement

	<p>⚠ WARNING ENTANGLEMENT HAZARD! Disconnect this lathe from power and wait until all spinning parts have come to a complete stop before you access the belt and pulleys. Otherwise you may be severely injured!</p>
--	--

To replace or adjust the V-belts, do these steps:

1. DISCONNECT POWER TO THE LATHE!
2. Open the side access door to expose the belt, pulleys, and change gears.
 - If the high range belt (Figure 41) needs to be replaced, carefully roll the belt off of pulleys A and C and reinstall the new one.
 - If the low range belt (Figure 42) needs to be replaced, use the 17mm wrench to loosen the tensioner pulley arm that holds the pulley and replace the belt on pulleys B and C. Hold the tensioner pulley against the new belt so the belt is tight, and tighten the tensioner pulley in place.

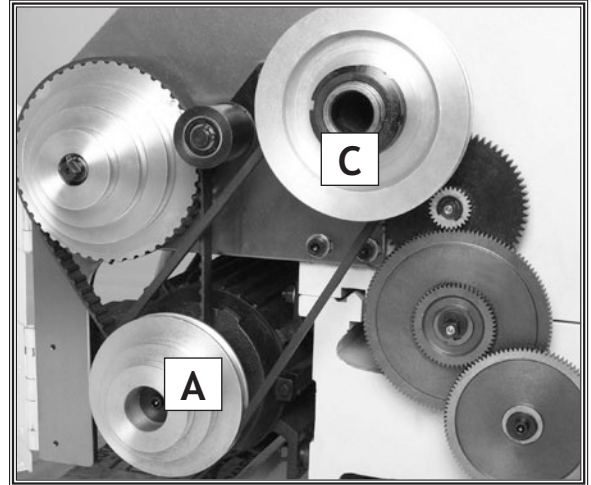


Figure 41. High-range belt position (A-C).

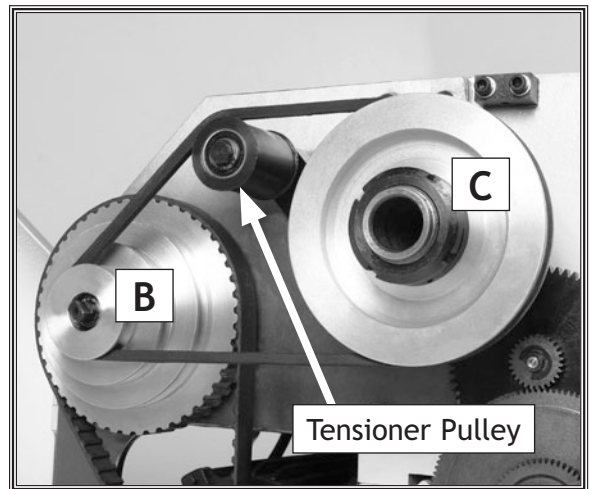
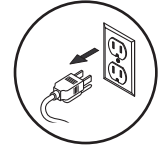


Figure 42. Low-range belt position (B-C).

SERVICE

Troubleshooting

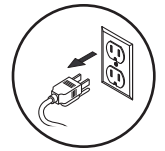
This section covers the most common problems and corrections with this type of machine. **WARNING! DO NOT** make any adjustments until power is disconnected and moving parts have come to a complete stop!



Motor & Gearbox

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
Motor will not start.	<ol style="list-style-type: none"> 1. Main power panel switch is <i>OFF</i>. 2. Emergency switch is pushed in. 3. Circuit breaker or fuse has tripped. 4. No voltage or open connection. 5. Capacitor is at fault. 6. Motor direction switch is at fault. 7. Power switch or magnetic contactor is at fault. 8. Motor is at fault. 	<ol style="list-style-type: none"> 1. Turn the main power panel switch <i>ON</i>. 2. Rotate emergency switch so it pops out. 3. Seek an electrician to troubleshoot and repair the shop power supply. 4. Test circuit, replace wires and connections as required. 5. Replace capacitor. 6. Replace switch. 7. Replace power switch or magnetic contactor. 8. Replace motor.
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. 2. Inspect all connections on motor for loose or shorted terminals or worn insulation. 3. Install correct fuses or circuit breakers.
Machine is loud, belt slips when cutting. Overheats or bogs down in the cut.	<ol style="list-style-type: none"> 1. Excessive depth of cut. 2. RPM or feed rate wrong for operation. 3. Dull cutters. 4. Belt is slipping. 5. Belt is at fault. 	<ol style="list-style-type: none"> 1. Decrease depth of cut. 2. Refer to RPM feed rate chart for appropriate rates. 3. Sharpen or replace cutters. 4. Remove grease or oil on belt or pulleys/tighten belt tensioner against low range belt. 5. Replace belt.
Gear change levers will not shift into position.	<ol style="list-style-type: none"> 1. Gears not aligned in headstock. 	<ol style="list-style-type: none"> 1. Rotate spindle by hand until gear falls into place.
Loud, repetitious noise.	<ol style="list-style-type: none"> 1. Pulley set screws or keys are missing or loose. 2. Motor fan is hitting the cover. 	<ol style="list-style-type: none"> 1. Inspect keys and set screws. Replace or tighten if necessary. 2. Replace fan and cover.
Motor is loud when cutting. Overheats or bogs down in the cut.	<ol style="list-style-type: none"> 1. Excessive depth of cut or feed rate. 2. RPM or feed rate wrong for cutting operation. 3. Cutting tool is dull. 	<ol style="list-style-type: none"> 1. Decrease depth of cut or feed rate. 2. Refer to RPM feed rate chart for appropriate rates. 3. Sharpen or replace the cutting tool.
Levers will not shift.	<ol style="list-style-type: none"> 1. Gears not aligned in headstock. 	<ol style="list-style-type: none"> 1. Rotate spindle by hand until gear falls into place.

Troubleshooting



Operation and Work Results

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
Lathe vibrates excessively.	<ol style="list-style-type: none"> 1. Workpiece is unbalanced. 2. Worn or broken gear present. 3. Chuck or faceplate has become unbalanced. 4. Spindle bearings at fault. 	<ol style="list-style-type: none"> 1. Reinstall workpiece so it is centered. 2. Inspect gears and replace if necessary. 3. Rebalance chuck or faceplate; contact a local machine shop for help. 4. Tighten or replace spindle bearings.
Cutting tool vibrates excessively during cutting.	<ol style="list-style-type: none"> 1. Tool holder not tight enough. 2. Cutting tool sticks too far out of tool holder; lack of support. 3. Gibs are out of adjustment. 4. Dull cutting tool. 5. Incorrect spindle speed or feed rate. 	<ol style="list-style-type: none"> 1. Check for debris, clean, and retighten. 2. Reinstall cutting tool so no more than 1/3 of the total length is sticking out of tool holder. 3. Tighten gib screws at affected component. 4. Replace or re-sharpen cutting tool. 5. Use the recommended spindle speed.
Can't remove tool from tailstock.	<ol style="list-style-type: none"> 1. Quill had not retracted all the way back into the tailstock. 	<ol style="list-style-type: none"> 1. Turn the quill handwheel until it forces taper out of quill.
Cross slide, compound rest, or carriage feed has lash.	<ol style="list-style-type: none"> 1. Gibs are out of adjustment. 2. Handwheel is loose. 3. Lead screw mechanism worn or out of adjustment. 	<ol style="list-style-type: none"> 1. Tighten gib screw(s). 2. Tighten handwheel fasteners. 3. Tighten any loose fasteners on lead screw mechanism.
Cross slide, compound rest, or carriage feed handwheel is hard to move.	<ol style="list-style-type: none"> 1. Gibs are loaded up with shavings or grime. 2. Gib screws are too tight. 3. Backlash setting too tight (cross slide only). 4. Bedways are dry. 	<ol style="list-style-type: none"> 1. Remove gibs, clean ways/dovetails, lubricate, and readjust gibs. 2. Loosen gib screw(s) slightly, and lubricate bedways. 3. Slightly loosen backlash setting by loosening the locking screw and adjusting the spanner ring at the end of the handle. 4. Lubricate bedways and handles.
Bad surface finish.	<ol style="list-style-type: none"> 1. Wrong RPM or feed rate. 2. Dull tooling or poor tool selection. 3. Too much play in gibs. 4. Tool too high. 	<ol style="list-style-type: none"> 1. Adjust RPM and feed rate. 2. Sharpen tooling or select a better tool for the intended operation. 3. Tighten gibs. 4. Lower the tool position.
Inaccurate turning results from one end of the workpiece to the other.	<ol style="list-style-type: none"> 1. Headstock and tailstock are not properly aligned with each other. 	<ol style="list-style-type: none"> 1. Realign the tailstock to the headstock spindle bore center line.
Carriage won't feed, or is hard to move.	<ol style="list-style-type: none"> 1. Gears are not all engaged or broken. 2. Gibs are too tight. 3. Loose screw on the feed handle. 4. Lead screw shear pin has sheared. 	<ol style="list-style-type: none"> 1. Adjust gear positions or replace. 2. Loosen gib screw(s) slightly. 3. Tighten. 4. Correct for cause of shear pin breakage, and replace shear pin.

Cross Slide Backlash Adjustment

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

Note: Avoid the temptation to overtighten the cross slide backlash screw. Overtightening will cause excessive wear to the sliding block and lead screw.

Backlash is adjusted by tightening or loosening the screw shown in **Figure 43**.

This screw draws a wedge-type nut against the lead screw and main nut. If it is too tight, loosen the screw a few turns and tap the cross slide a few times with a rubber or wooden mallet. Then turn the handle slowly back and forth until the handle turns freely. To readjust the backlash, rock the handle back and forth and tighten the screw slowly until the backlash is at between 0.001" to 0.002" as indicated on the handwheel.

Note: Reducing backlash to less than 0.001" is impractical and reduces the life of the cross slide.

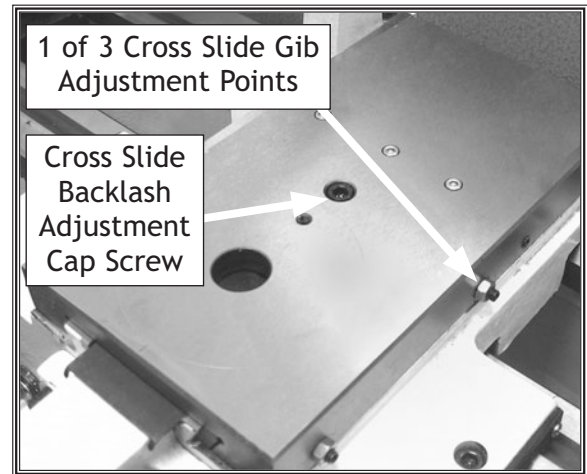


Figure 43. Cross slide adjustment.

Gib Adjustments

When adjusting gibs (**Figures 44 and 45**), the goal is to remove sloppiness in the ways without causing the slides or half nut to bind. Loose gibs will cause a poor finish on the workpiece and wear the slide. Tight gibs will damage the slide, lead screw, and half-nut. The cross slide gib is a tapered piece of iron. When the opposing front and rear gib adjustment screws are turned in opposing directions, the screws force the tapered gibs to fill the void in the way, thus tightening the play in the cross slide. If more play is needed turn the screws the other direction.

For the three saddle gibs (**Figure 44**), loosen the jam nuts and turn the three set screws until slight tension is felt and the gib plates are slightly pre-loaded against the underside of the flat-way. Tighten the jam nuts when finished.



Figure 44. Gib adjustment points.

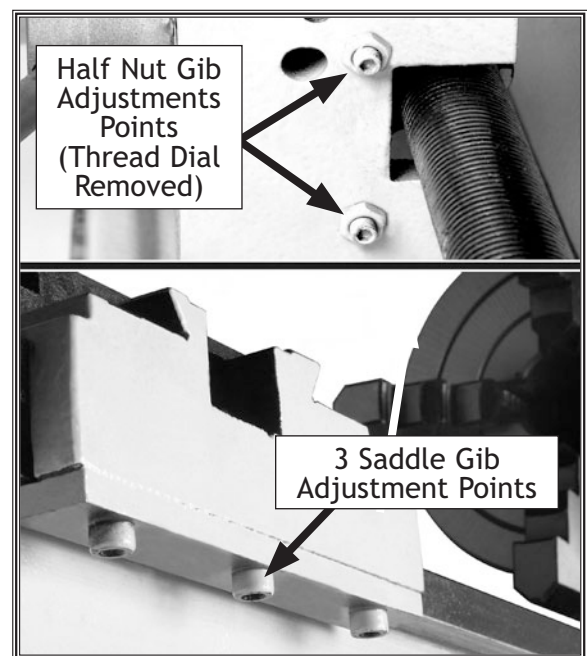


Figure 45. Half-nut saddle gib locations.

SERVICE

Electrical Component Connections

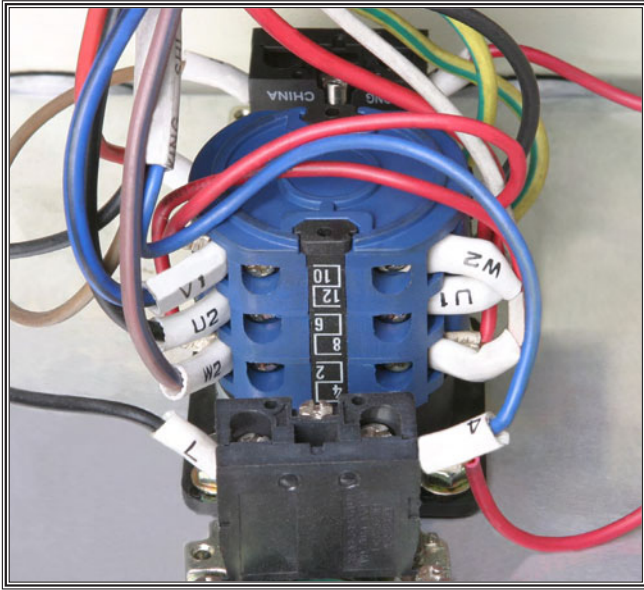


Figure 46. Motor rotary switch and ON power switch (SA and SB1).

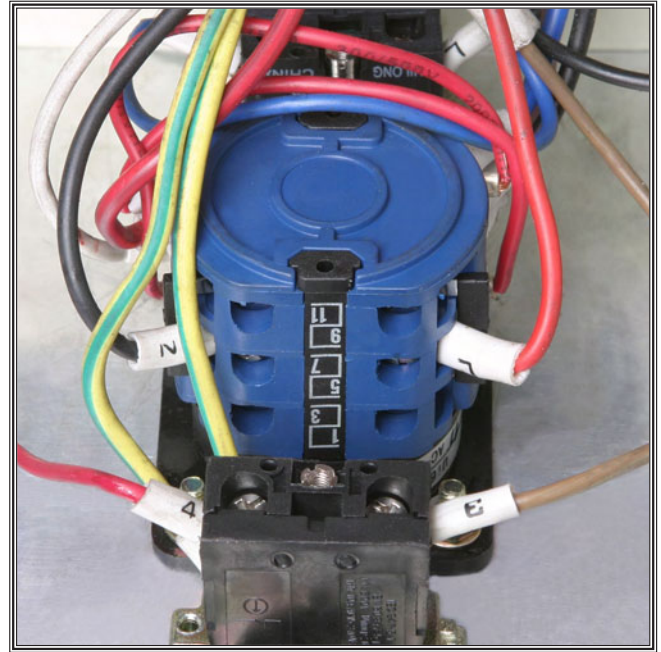


Figure 48. Motor rotary switch and emergency stop switch (SA and SB2).

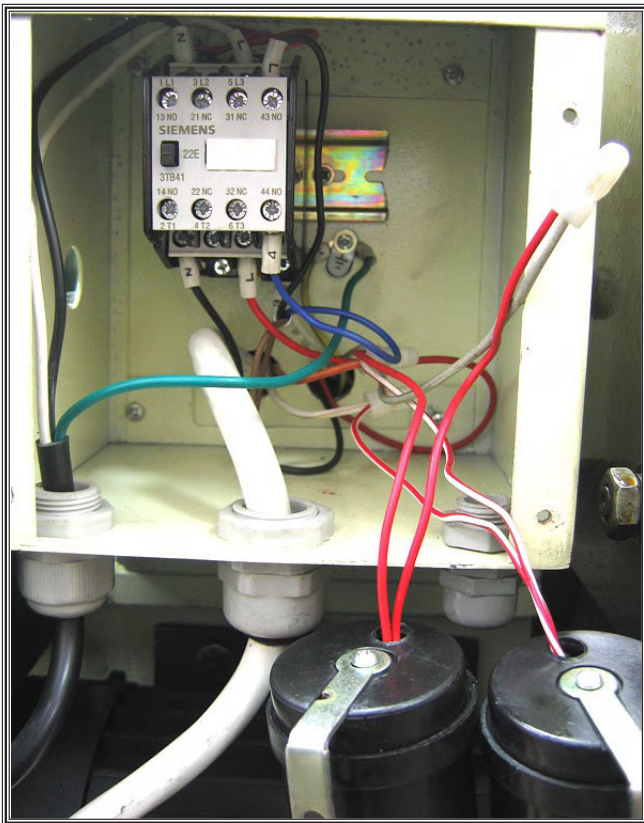


Figure 47. External motor capacitors.

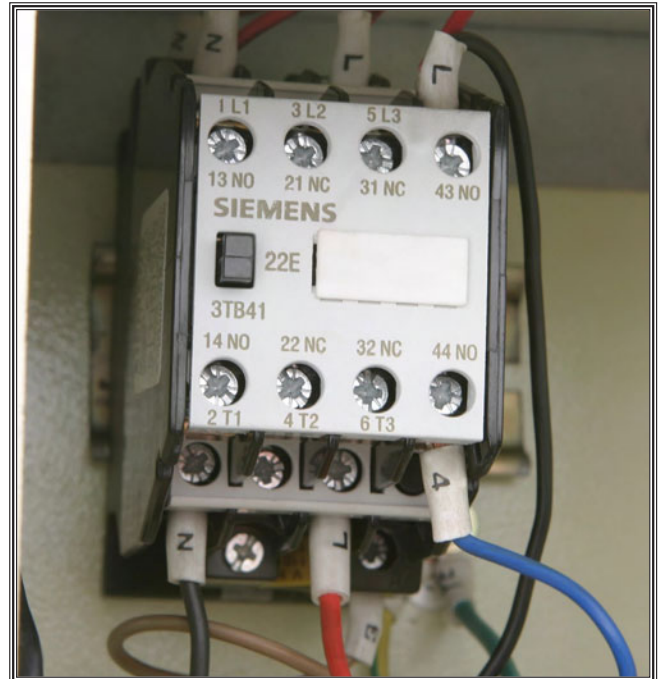


Figure 49. Motor start contactor.

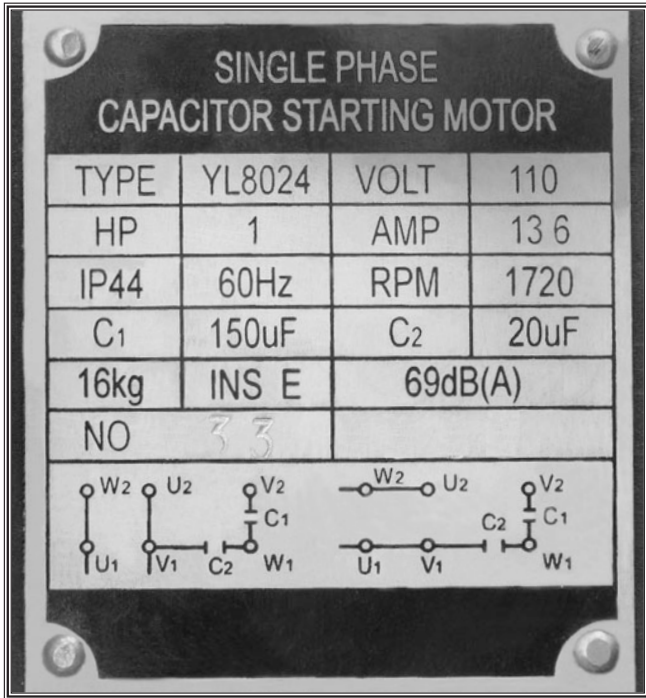


Figure 50. Motor data plate.

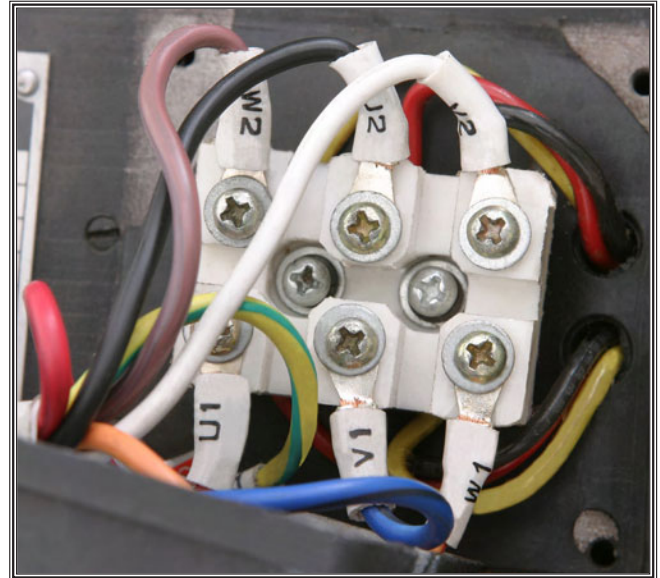
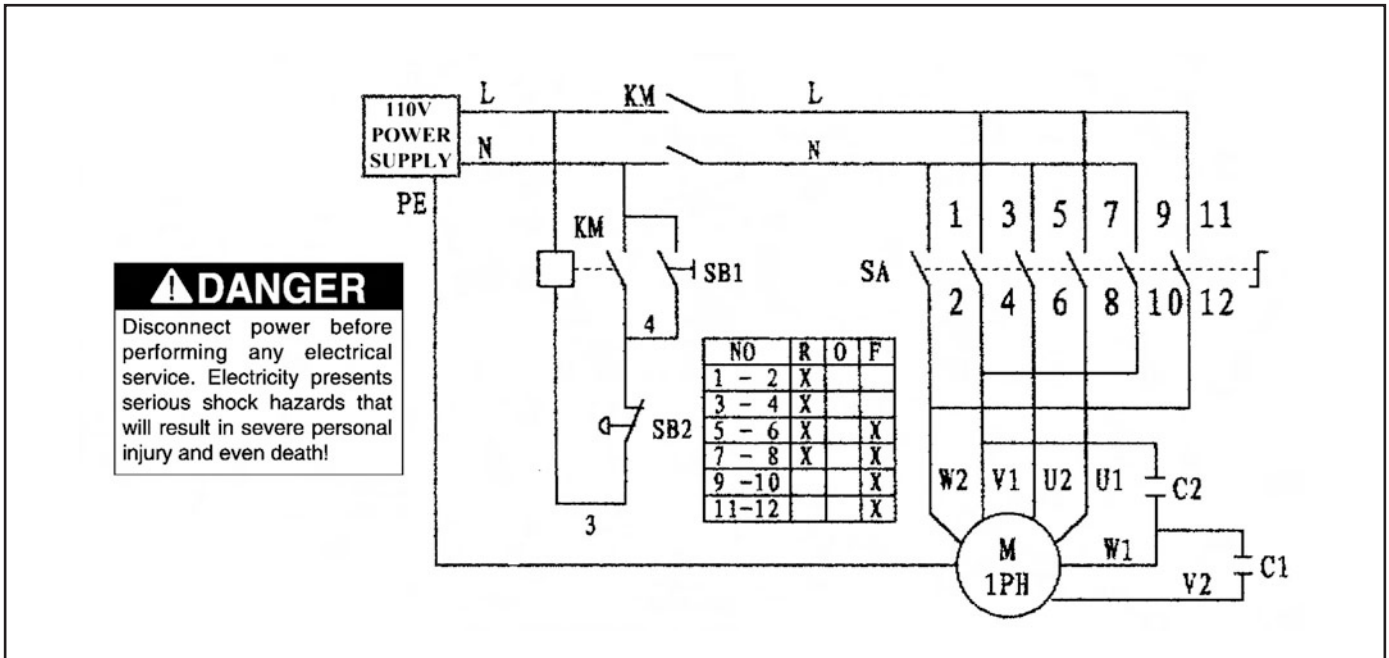


Figure 51. Motor connection detail.

Wiring Diagram



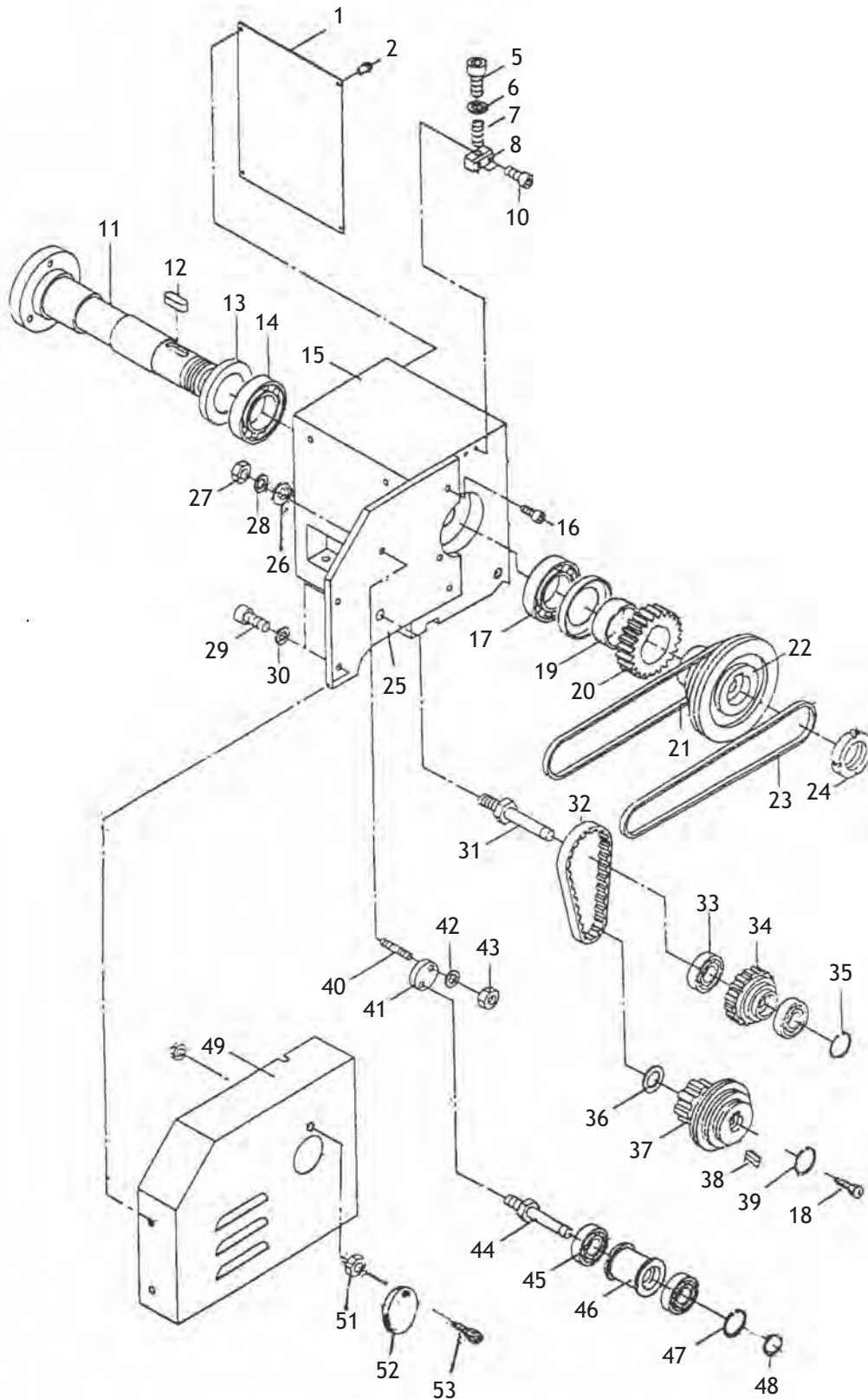
LEGEND

- | | |
|--|-----------------------------------|
| KM: Magnetic Contactor 110V | C1: Capacitor |
| SB1: ON Push Button Switch | C2: Capacitor |
| SB2: Emergency Stop Push Button Switch | SA: Motor Direction Rotary Switch |
| M: Motor 110V | |

SERVICE

PARTS

Spindle and Drive Belt

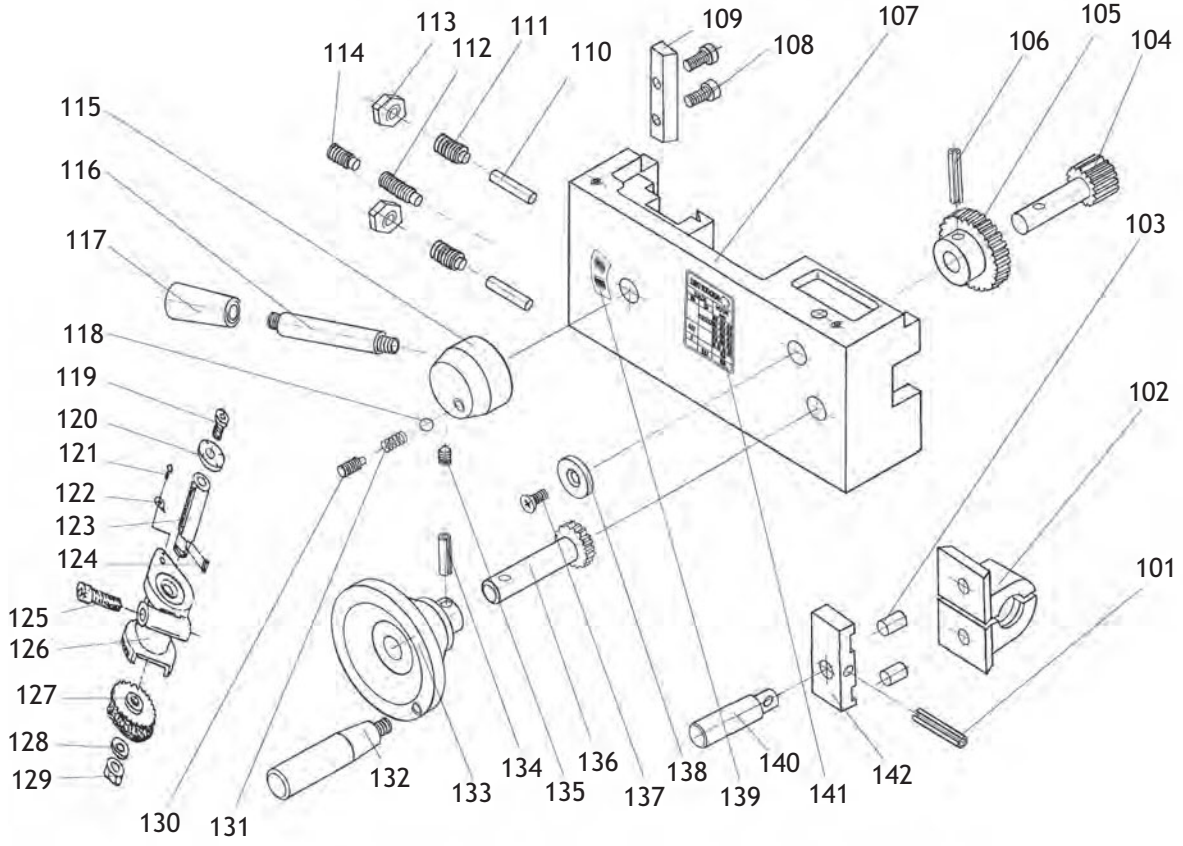


Spindle and Drive Belt Parts

REF	PART #	DESCRIPTION
1	XM1099001	CONTROL PANEL FACE
2	XPS17M	PHLP HD SCR M4-.7 X 6
5	XPSB06M	CAP SCREW M6-1 X 25
6	XPW03M	FLAT WASHER 6MM
7	XM1099007	COMPRESSION SPRING
8	XM1099008	CLAMP
10	XPSB06M	CAP SCREW M6-1 X 25
11	XM1099011	SPINDLE
12	XPK123M	KEY 10 X 10 X 55
13	XM1099013	SPACER
14	XM1099014	BALL BEARING (45 X 75 X 20)
15	XM1099015	HEADSTOCK
16	XPSB14M	CAP SCREW M8-1.25 X 20
17	XM1099014	BALL BEARING (45 X 75 X 20)
18	XPSB02M	CAP SCREW M6-1 X 20
19	XM1099019	SPACER
20	XM1099020	GEAR
21	XPVM27A	V-BELT M-27.5 3L275
22	XM1099022	PULLEY
23	XPVM33	V-BELT M-33 3L330
24	XM1099024	SPANNER NUT M30 X 1.5
25	XM1099025	BRACKET PLATE
26	XPLW06M	LOCK WASHER 10MM
27	XPNO2M	HEX NUT M10-1.5
28	XPW04M	FLAT WASHER 10MM

REF	PART #	DESCRIPTION
29	XPSB50M	CAP SCREW M5-.8 X 10
30	XPW02M	FLAT WASHER 5MM
31	XM1099031	SPINDLE SHAFT
32	XM1099032	COGGED BELT 263L
33	XP6001	BALL BEARING 6001
34	XM1099034	COGGED PULLEY
35	XPR03M	EXT RETAINING RING 12MM
36	XM1099036	SPACER
37	XM1099037	COGGED PULLEY
38	XPK11M	KEY 6 X 6 X 40
39	XM1099039	SPACER
40	XM1099040	STUD
41	XM1099041	PLATE
42	XPW04M	FLAT WASHER 10MM
43	XPNO2M	HEX NUT M10-1.5
44	XM1099044	SPINDLE SHAFT
45	XM1099045	BALL BEARING (12 X 28 X 8)
46	XM1099046	ROLLER
47	XPR20M	INT RETAINING RING 28MM
48	XPR03M	EXT RETAINING RING 12MM
49	XM1099049	COVER
51	XPNO6M	HEX NUT M5-.8
52	XM1099052	COVER
53	XPS08M	PHLP HD SCR M5-.8 X 12

Apron

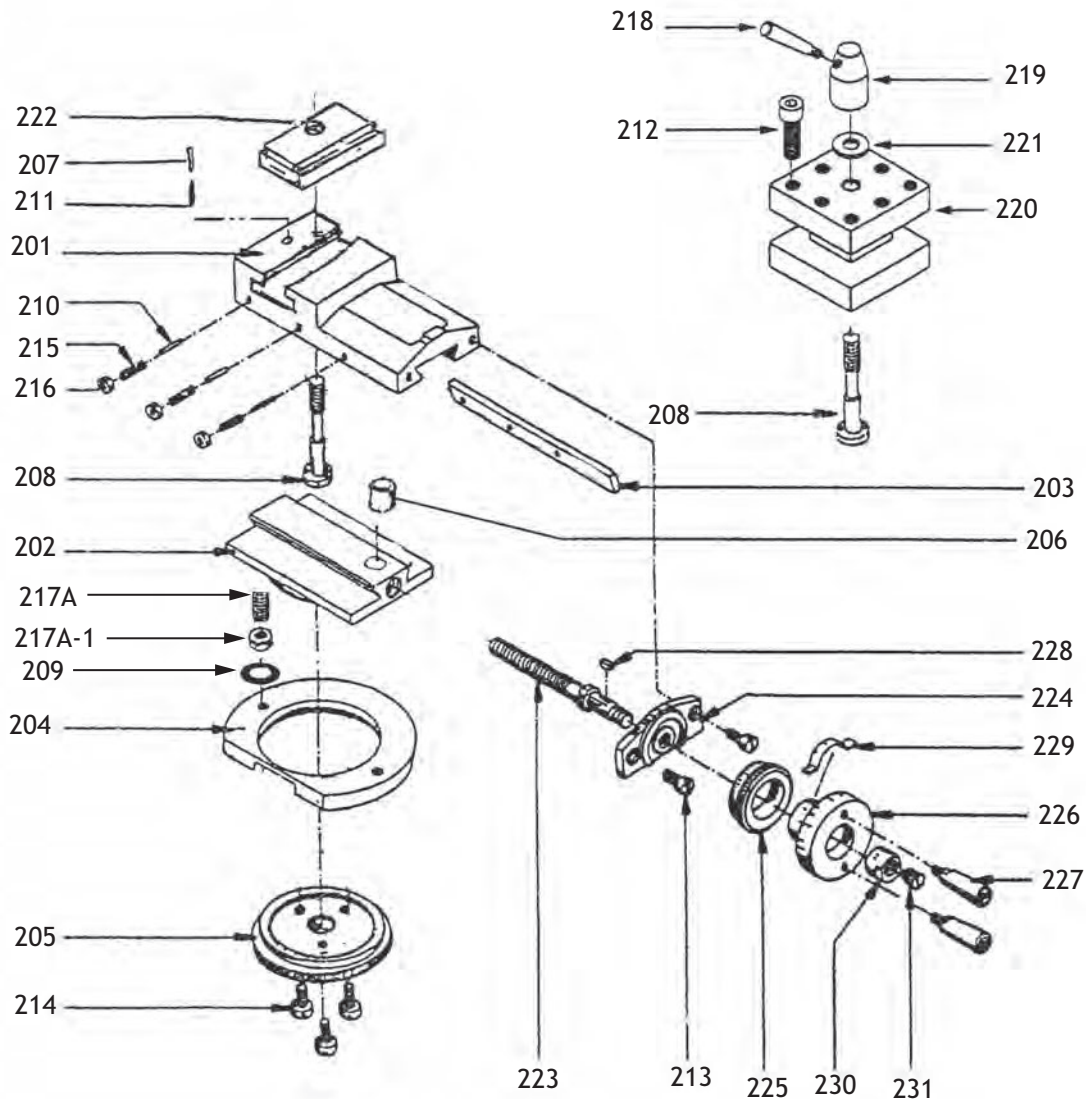


Apron Parts

REF	PART #	DESCRIPTION
101	XPRP19M	ROLL PIN 4 X 14
102	XM1099102	HALF NUT
103	XPRP59M	ROLL PIN 5 X 12
104	XM1099104	GEAR SHAFT
105	XM1099105	GEAR
106	XPRP73M	ROLL PIN 4 X 30
107	XM1099107	APRON CASTING
108	XPSB23M	CAP SCREW M4-.7 X 12
109	XM1099109	GIB
110	XPRP76M	ROLL PIN 4 X 16
111	XPSS34M	SET SCREW M5-.8 X 16
112	XPSS12M	SET SCREW M6-1 X 25
113	XPNO6M	HEX NUT M5-.8
114	XPSS04M	SET SCREW M6-1 X 12
115	XM1099115	LEVER HUB
116	XM1099116	LEVER
117	XM1099117	LEVER HANDLE
118	XM1099118	STEEL BALL
119	XPSB85M	CAP SCREW M6-1 X 6
120	XM1099120	DIAL
121	XM1099121	RIVET 2 X 5

REF	PART #	DESCRIPTION
122	XM1099122	POINTER
123	XM1099123	SHAFT
124	XPK39M	KEY 3 X 3 X 10
125	XPSB83M	CAP SCREW M6-1 X 55
126	XM1099126	THREAD DIAL BODY
127	XM1099127	SIDE GEAR
128	XPW01M	FLAT WASHER 8MM
129	XPNO3M	HEX NUT M8-1.25
130	XPSS02M	SET SCREW M6-1 X 6
131	XM1099131	COMPRESSION SPRING
132	XM1099132	HANDLE
133	XM1099133	HANDWHEEL
134	XPRP04M	ROLL PIN 4 X 24
135	XM1099135	POINTED SET SCR M6-1 X 12
136	XM1099136	GEAR SHAFT
137	XPFH43M	FLAT HD SCR M6-1 X 10
138	XPW03M	FLAT WASHER 6MM
139	XM1099139	INDICATOR PLATE
140	XM1099140	SHAFT
141	XM1099141	THREADED DIAL PLATE
142	XM1099142	LOCKING CAM

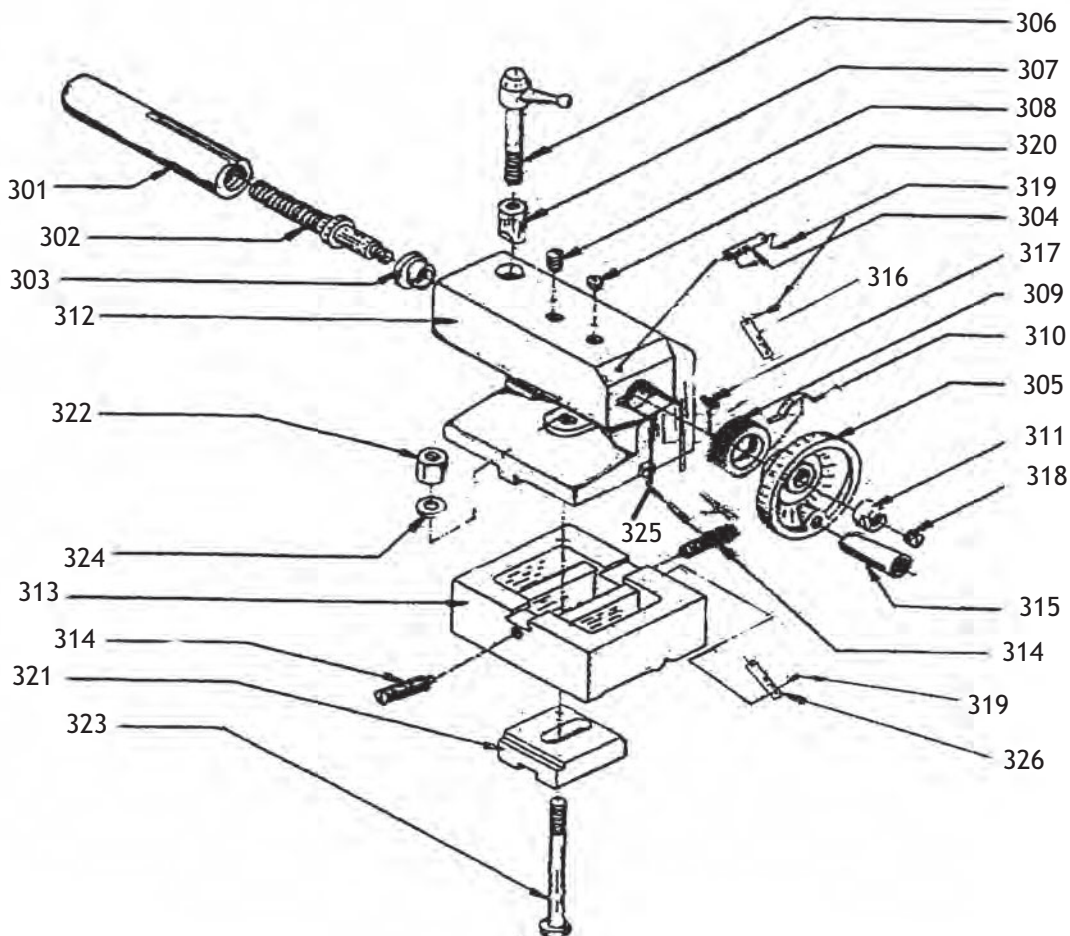
Tool Holder and Compound Rest



REF	PART #	DESCRIPTION
201	XM1099201	COMPOUND REST
202	XM1099202	SWIVEL BASE
203	XM1099203	GIB
204	XM1099204	CLAMPING RING
205	XM1099205	GRADUATED DIAL
206	XM1099206	BARREL NUT
207	XM1099207	DOWEL PIN
208	XM1099208	TOOL POST STUD
209	XPW01M	FLAT WASHER 8MM
210	XM1099210	DOWEL PIN
211	XM1099211	COMPRESSION SPRING
212	XM1099212	BULLNOSE CAP SCR M8-1.25 X 30
213	XPSB31M	CAP SCREW M8-1.25 X 25
214	XPSB26M	CAP SCREW M6-1 X 12
215	XPSS34M	SET SCREW M5-.8 X 16
216	XPN06M	HEX NUT M5-.8

REF	PART #	DESCRIPTION
217A	XPSS19M	SET SCREW M8-1.25 X 30
217A-1	XPNO3M	HEX NUT M8-1.25
218	XM1099218	HANDLE
219	XM1099219	HANDLE HUB
220	XM1099220	TOOL REST
221	XM1099221	RUB SPACER
222	XM1099222	SLIDE PLATE
223	XM1099223	LEAD SCREW
224	XM1099224	LEAD SCREW MOUNT
225	XM1099225	GRADUATED DIAL
226	XM1099226	HANDWHEEL
227	XM1099227	HANDLE
228	XPK03M	KEY 3 X 3 X 8
229	XM1099229	POINTER
230	XM1099230	THREADED COLLAR
231	XPSS17M	SET SCREW M8-1.25 X 6

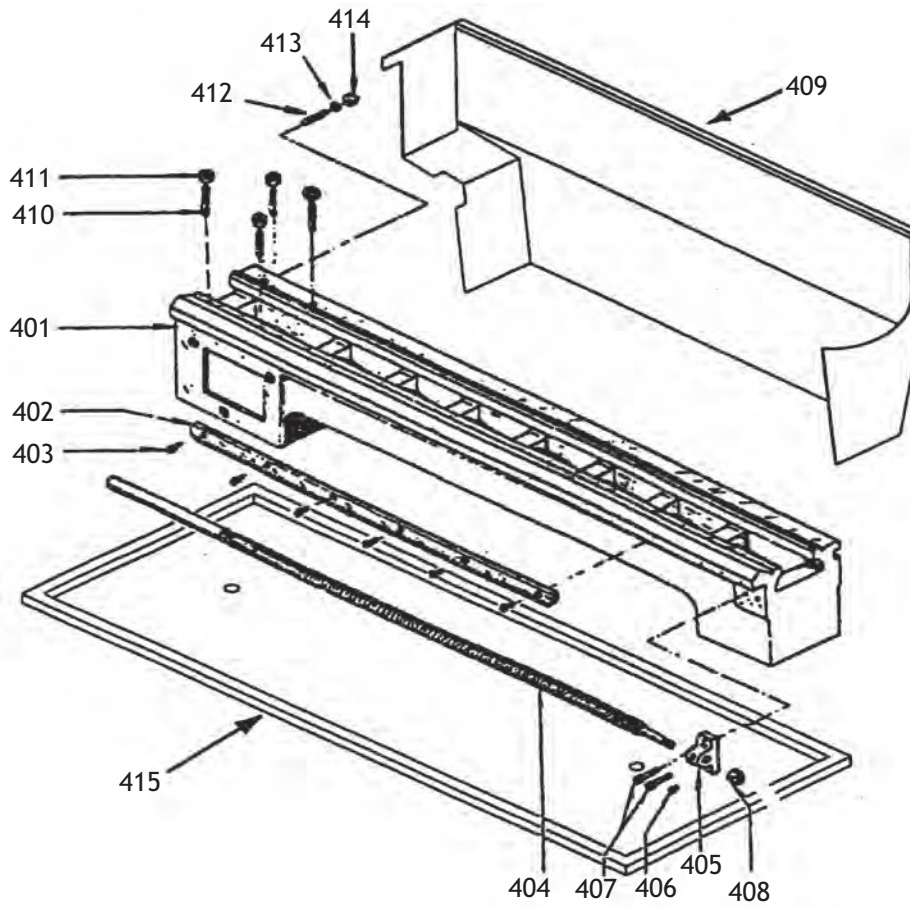
Tailstock



REF	PART #	DESCRIPTION
301	XM1099301	TAILSTOCK QUILL
302	XM1099302	LEAD SCREW
303	XM1099303	BUSHING
304	XM1099304	HANDWHEEL SCALE PLATE
305	XM1099305	HANDWHEEL
306	XM1099306	LEVER BOLT M12-1.75 X 50
307	XM1099307	BARREL NUT
308	XPSS04M	SET SCREW M6-1 X 12
309	XM1099309	GRADUATED DIAL
310	XM1099310	POINTER
311	XM1099311	SPACER
312	XM1099312	TAILSTOCK BODY
313	XM1099313	TAILSTOCK BASE

REF	PART #	DESCRIPTION
314	XPSS21M	SET SCREW M8-1.25 X 25
315	XM1099315	HANDLE
316	XM1099316	OFFSET SCALE PLATE
317	XM1099317	LEADSCREW KEY
318	XPLN05M	LOCK NUT M10-1.5
319	XM1099319	RIVET 2 X 5
320	XM1099320	BALL OILER
321	XM1099321	CLAMPING PLATE
322	XPN09M	HEX NUT M12-1.75
323	XPB158M	HEX BOLT M12-1.75 X 90
324	XPW06M	FLAT WASHER 12MM
325	XPSS26M	SET SCREW M5-.8 X 6
326	XM1099326	PLATE

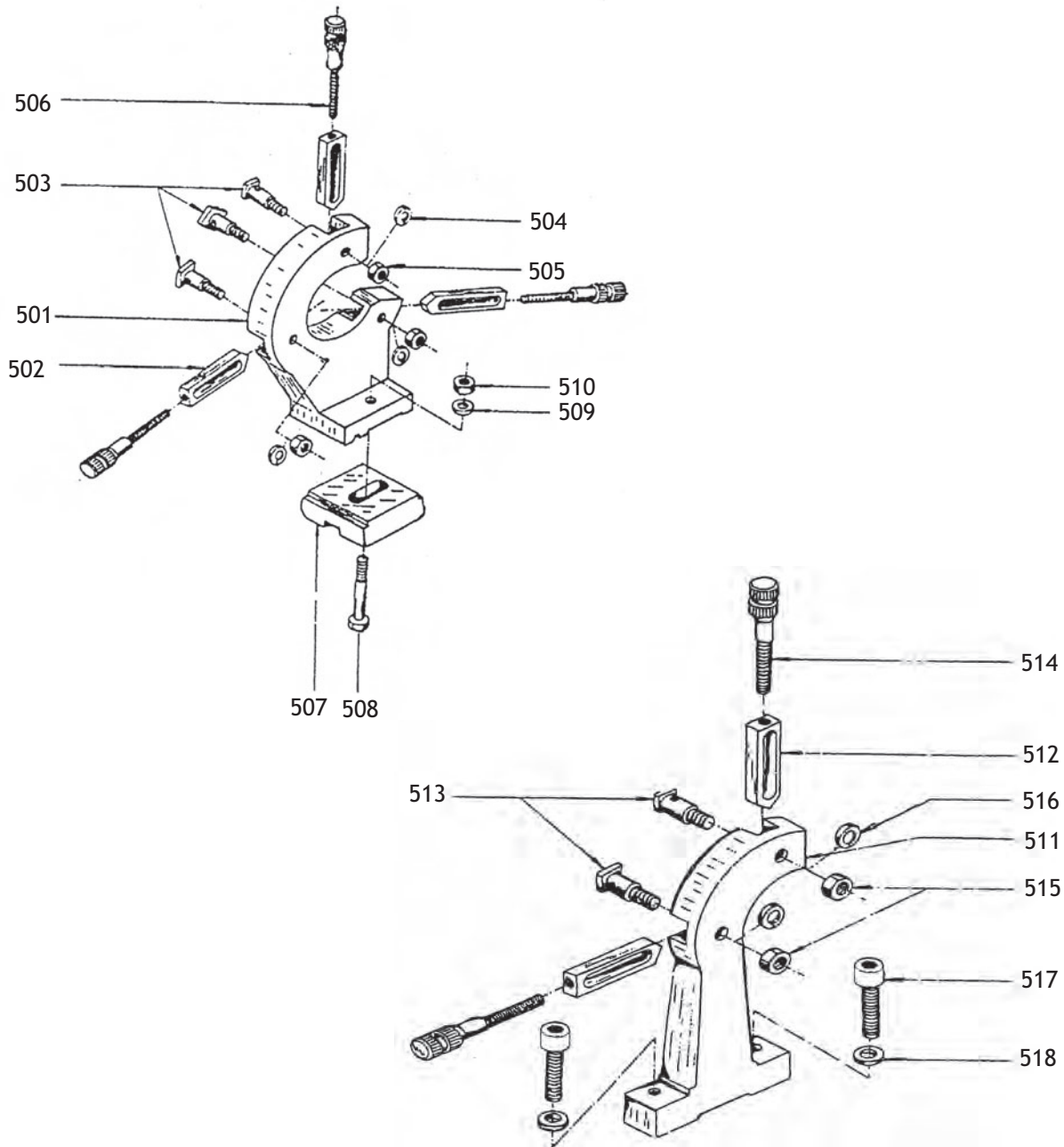
Bed and Leadscrew



REF	PART #	DESCRIPTION
401	XM1099401	BED
402	XM1099402	RACK
403	XPSB33M	CAP SCREW M5-.8 X 12
404	XM1099404	LEAD SCREW
405	XM1099405	BRACKET
406	XM1099406	BALL OILER
407	XPSB02M	CAP SCREW M6-1 X 20
408	XPLN05M	LOCK NUT M10-1.5

REF	PART #	DESCRIPTION
409	XM1099409	SPLASH GUARD
410	XM1099410	STUD M10-1.5 X 35
411	XPN02M	HEX NUT M10-1.5
412	XPSS44M	SET SCREW M8-1.25 X 40
413	XPW01M	FLAT WASHER 8MM
414	XPN03M	HEX NUT M8-1.25
415	XM1099415	CHIP PAN

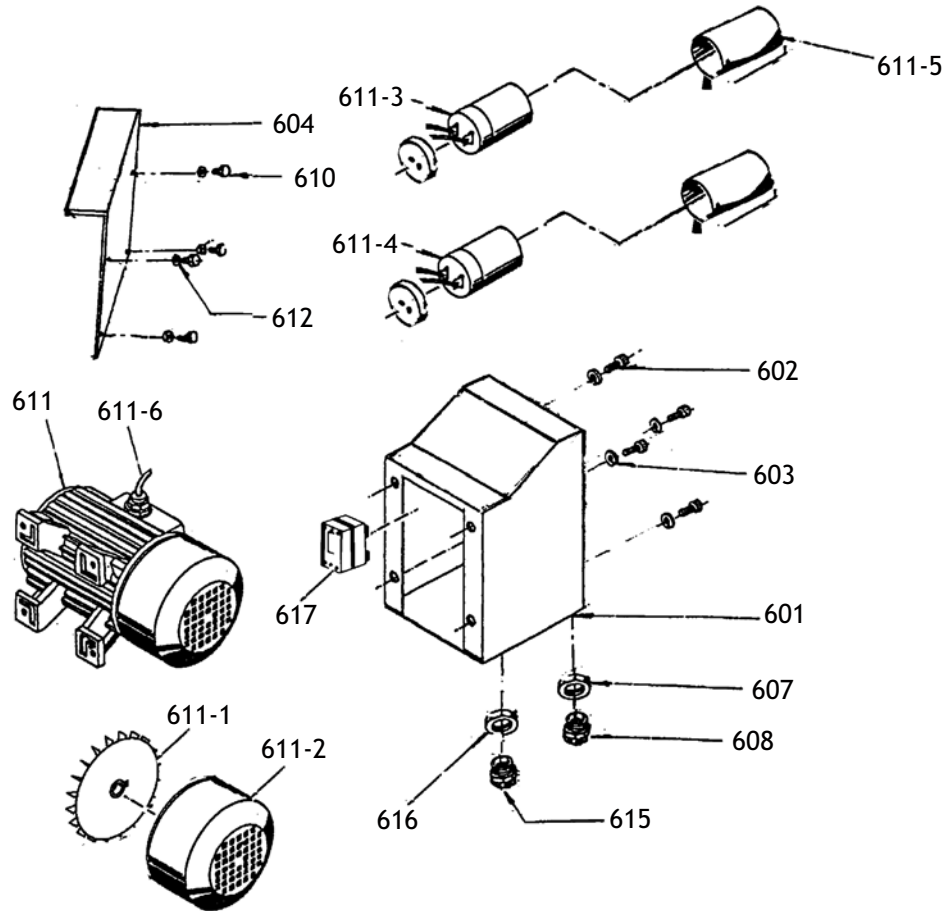
Steady Rest and Follow Rest



REF	PART #	DESCRIPTION
501	XM1099501	STEADY REST CASTING
502	XM1099502	FINGER
503	XM1099503	T-BOLT M6-1
504	XPLW03M	LOCK WASHER 6MM
505	XPN01M	HEX NUT M6-1
506	XM1099506	ADJUSTING SCREW
507	XM1099507	CLAMPING PLATE
508	XPB125M	HEX BOLT M12-1.75 X 65
509	XPW04M	FLAT WASHER 10MM

REF	PART #	DESCRIPTION
510	XPN02M	HEX NUT M10-1.5
511	XM1099511	FOLLOW REST CASTING
512	XM1099512	FINGER
513	XM1099503	T-BOLT M6-1
514	XM1099514	ADJUSTING SCREW
515	XPN01M	HEX NUT M6-1
516	XPLW03M	LOCK WASHER 6MM
517	XPSB40M	CAP SCREW M8-1.25 X 35
518	XPW01M	FLAT WASHER 8MM

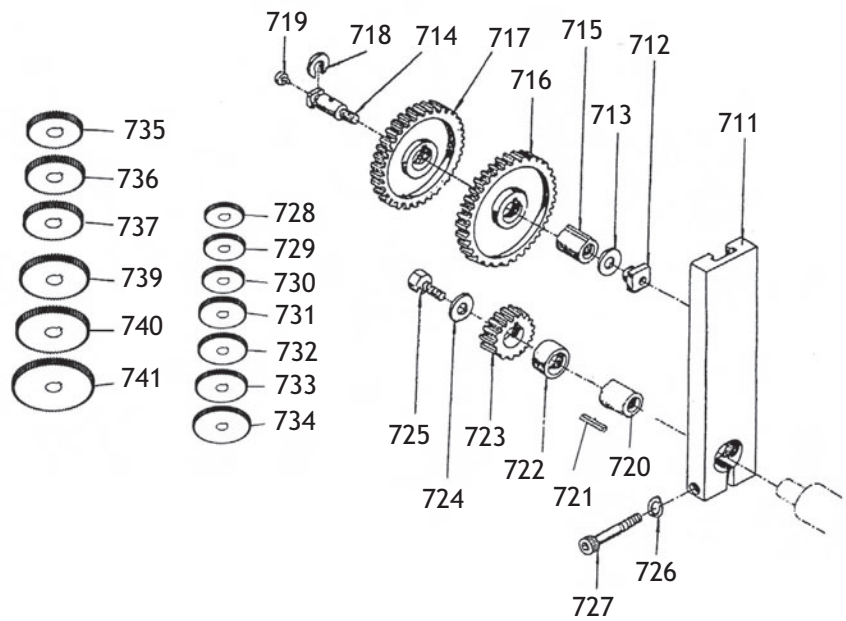
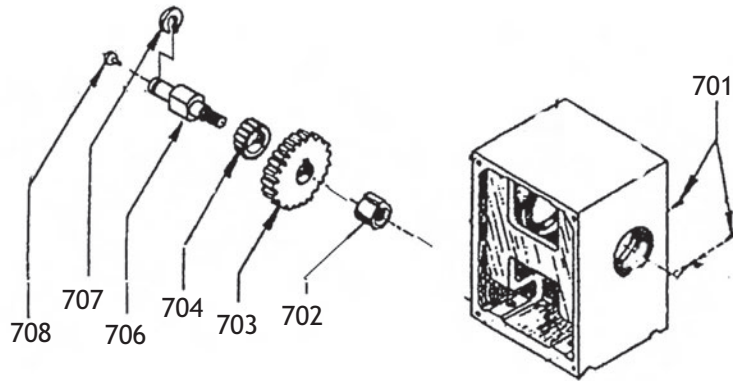
Motor and Electrical



REF	PART #	DESCRIPTION
601	XM1099601	CABINET
602	XPSB06M	CAP SCREW M6-1 X 25
603	XPLW03M	LOCK WASHER 6MM
604	XM1099604	COVER
607	XM1099607	STRAIN RELIEF NUT
608	XM1099608	STRAIN RELIEF
610	XPS09M	PHLP HD SCR M5-.8 X 10
611	XM1099611	REVERSIBLE MOTOR 110V
611-1	XM1099611-1	FAN

REF	PART #	DESCRIPTION
611-2	XM1099611-2	FAN COVER
611-3	XM1099611-3	START CAPACITOR 150MFD/125VAC
611-4	XM1099611-4	RUN CAPACITOR 20MFD/400VAC
611-5	XM1099611-5	CAPACITOR COVER W/CAP
611-6	XM1099611-6	POWER CORD
612	XPLW03M	LOCK WASHER 6MM
615	XM1099615	STRAIN RELIEF
616	XM1099616	STRAIN RELIEF NUT
617	XM1099617	CONTACTOR 3TB41 22E 110V

Gearbox Diagram A

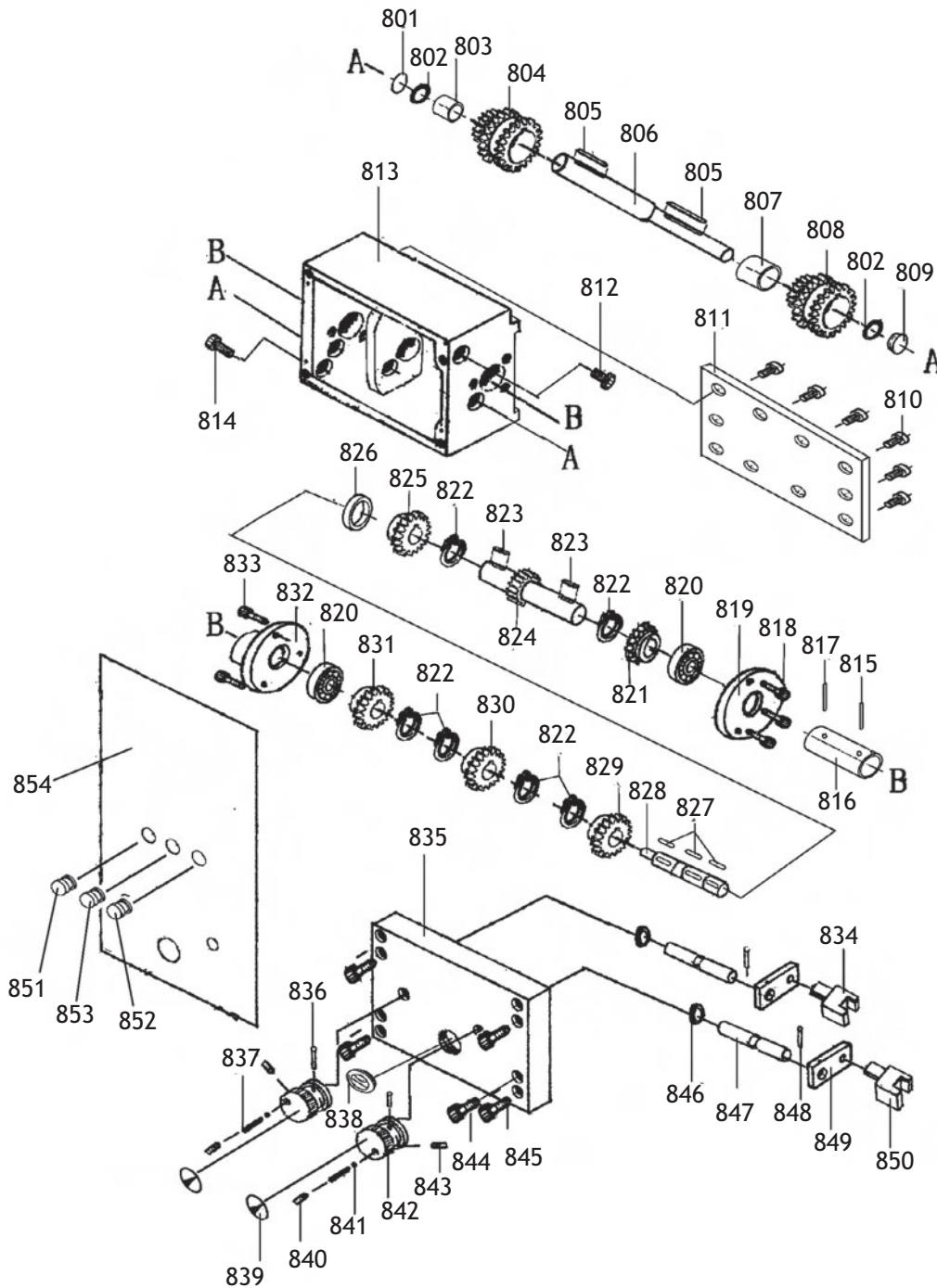


Gearbox Diagram A Parts

REF	PART #	DESCRIPTION
701	XPSS01M	SET SCREW M6-1 X 10
702	XM1099702	BUSHING
703	XM1099703	PLASTIC DRIVE GEAR (60-TOOTH)
704	XM1099704	CAST-IRON GEAR 27T
706	XM1099706	SHAFT
707	XM1099707	KNURELD KEEPER
708	XM1099708	BALL OILER
711	XM1099711	BRACKET
712	XM1099712	T-NUT
713	XM1099713	SPACER WASHER
714	XM1099714	SHAFT
715	XM1099715	BUSHING
716	XM1099716	GEAR 127T
717	XM1099717	GEAR 56T
718	XM1099707	KNURELD KEEPER
719	XM1099719	BALL OILER
720	XM1099720	BUSHING
721	XPK97M	KEY 4 X 4 X 14
722	XM1099722	SPACING RING

REF	PART #	DESCRIPTION
723	XM1099723	GEAR 104T
724	XPW03M	FLAT WASHER 6MM
725	XPSB85M	CAP SCREW M6-1 X 6
726	XPLW04M	LOCK WASHER 8MM
727	XPSB12M	CAP SCREW M8-1.25 X 40
728	XM1099728	CHANGE GEAR (36-TOOTH)
729	XM1099729	CHANGE GEAR (36-TOOTH)
730	XM1099730	CHANGE GEAR (40-TOOTH)
731	XM1099731	CHANGE GEAR (44-TOOTH)
732	XM1099732	CHANGE GEAR (46-TOOTH)
733	XM1099733	CHANGE GEAR (48-TOOTH)
734	XM1099734	CHANGE GEAR (52-TOOTH)
735	XM1099735	CHANGE GEAR (45-TOOTH)
736	XM1099736	CHANGE GEAR (56-TOOTH)
737	XM1099737	CHANGE GEAR (60-TOOTH)
739	XM1099739	CHANGE GEAR (104-TOOTH)
740	XM1099740	CHANGE GEAR (120-TOOTH)
741	XM1099741	CHANGE GEAR (127-TOOTH)

Gearbox Diagram B

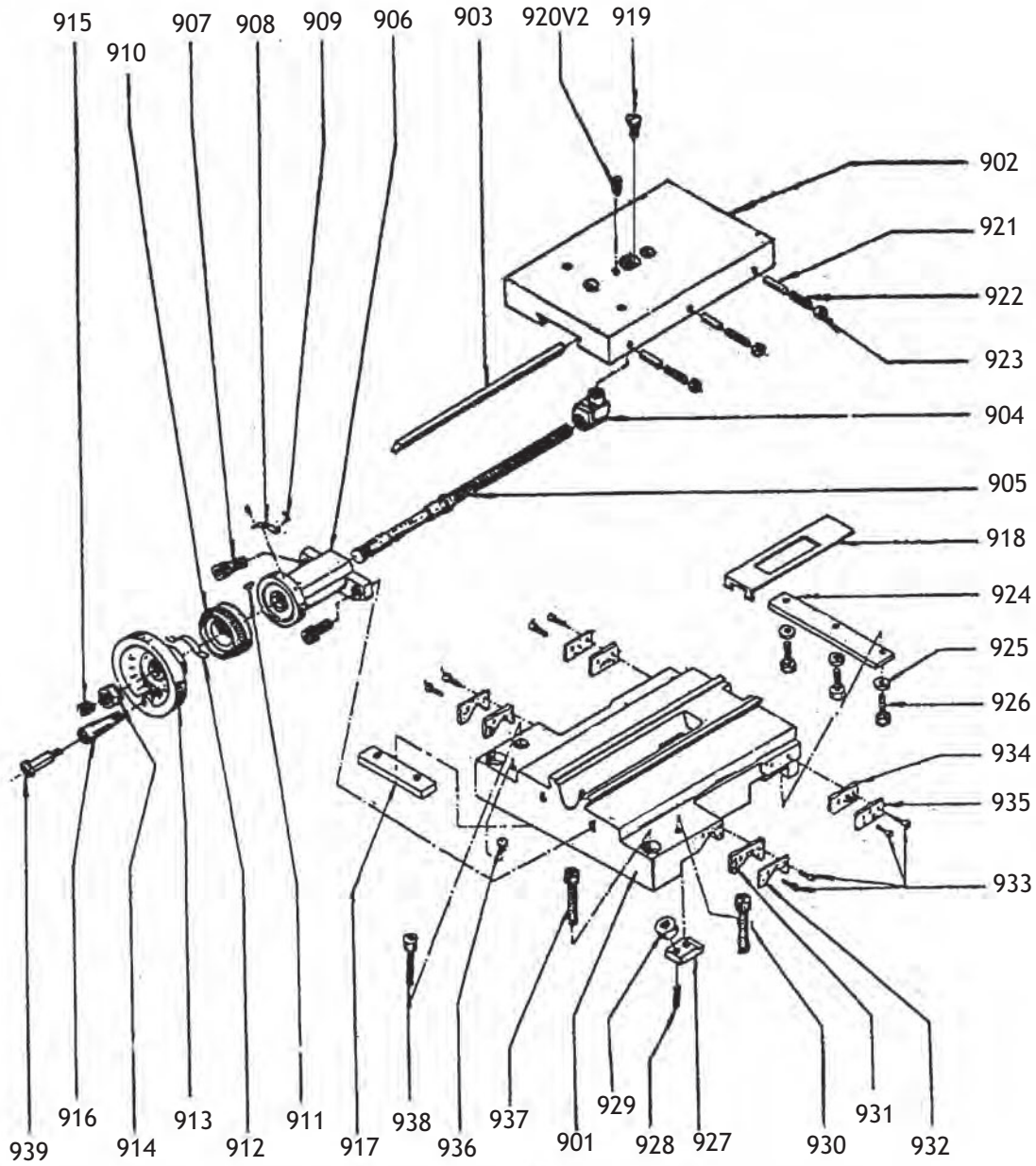


Gearbox Diagram B Parts

REF	PART #	DESCRIPTION
801	XM1099801	PLUG
802	XM1099802	O-RING
803	XM1099803	BUSHING
804	XM1099804	CLUSTER GEAR 30-36-33T
805	XPK133M	KEY 4 X 4 X 50
806	XM1099806	SHAFT
807	XM1099807	BUSHING
808	XM1099808	CLUSTER GEAR 22-44-33T
809	XM1099809	PLUG
810	XPSB50M	CAP SCREW M5-.8 X 10
811	XM1099811	COVER
812	XM1099812	PLUG
813	XM1099813	GEAR BOX CASE
814	XM1099814	DRAIN PLUG
815	XM1099815	SHEAR PIN 5 X 20
816	XM1099816	COLLAR
817	XM1099815	SHEAR PIN 5 X 20
818	XPSB26M	CAP SCREW M6-1 X 12
819	XM1099819	FLANGE
820	XP6202	BALL BEARING 6202
821	XM1099821	GEAR 33T
822	XPR03M	EXT RETAINING RING 12MM
823	XPK29M	KEY 4 X 4 X 8
824	XM1099824	GEAR SHAFT 22T
825	XM1099825	GEAR 44T
826	XM1099826	COLLAR
827	XPK05M	KEY 4 X 4 X 10

REF	PART #	DESCRIPTION
828	XM1099828	SHAFT
829	XM1099829	GEAR 33T
830	XM1099830	GEAR 30T
831	XM1099831	GEAR 35T
832	XM1099832	FLANGE
833	XPSB01M	CAP SCREW M6-1 X 16
834	XM1099834	SHIFT FORK
835	XM1099835	COVER
836	XPRP05M	ROLL PIN 5 X 30
837	XM1099837	COMPRESSION SPRING
838	XM1099838	SIGHT GLASS
839	XM1099839	POINTER DISK
840	XPSS01M	SET SCREW M6-1 X 10
841	XM1099841	STEEL BALL
842	XM1099842	SHIFT HUB
843	XPSS01M	SET SCREW M6-1 X 10
844	XPSB37M	CAP SCREW M6-1 X 50
845	XPSB02M	CAP SCREW M6-1 X 20
846	XM1099846	O-RING
847	XM1099847	SHAFT
848	XPRP03M	ROLL PIN 5 X 20
849	XM1099849	SHIFT LEVER
850	XM1099850	SHIFT FORK
851	XM1099851	EMERGENCY OFF SWITCH
852	XM1099852	ON PUSH BUTTON SWITCH
853	XM1099853	MOTOR ROTATION SWITCH
854	XPO602854	CONTROL PANEL

Cross Feed and Carriage



Cross Feed and Carriage Parts

REF	PART #	DESCRIPTION
901	XM1099901	SADDLE
902V2	XM1099902V2	CROSS SLIDE V2.08.07
903	XM1099903	GIB
904	XM1099904	CROSS SLIDE NUT
905	XM1099905	LEAD SCREW
906	XM1099906	HOUSING
907	XPSB31M	CAP SCREW M8-1.25 X 25
908	XM1099908	PLATE
909	XM1099909	RIVET 2 X 5
910	XM1099910	GRADUATED DIAL
911	XPK105M	KEY 3 X 3 X 6
912	XM1099912	LEAF SPRING
913	XM1099913	HANDWHEEL
914	XM1099914	SPECIAL HEX NUT
915	XPSS17M	SET SCREW M8-1.25 X 6
916	XM1099916	HANDLE
917	XM1099917	SLIDE BLOCK
918	XM1099918	CHIP GUARD
919	XPSB26M	CAP SCREW M6-1 X 12
920	XPSS11M	SET SCREW M6-1 X 16

REF	PART #	DESCRIPTION
921	XM1099921	DOWEL PIN
922	XPSS34M	SET SCREW M5-.8 X 16
923	XPN06M	HEX NUT M5-.8
924	XM1099924	APRON TENSION BAR
925	XPW03M	FLAT WASHER 6MM
926	XPSB01M	CAP SCREW M6-1 X 16
927	XM1099927	CLIP
928	XPSS25M	SET SCREW M6-1 X 20
929	XPN01M	HEX NUT M6-1
930	XPSB48M	CAP SCREW M6-1 X 35
931	XM1099931	WIPER
932	XM1099932	WIPER CLAMP
933	XPS07M	PHLP HD SCR M4-.7 X 8
934	XM1099934	WAY COVER
935	XM1099935	COVER MOUNT
936	XM1099936	OIL PORT
937	XPSB40M	CAP SCREW M8-1.25 X 35
938	XPSB48M	CAP SCREW M6-1 X 35
939	XM1099939	SPECIAL SHOULDER BOLT

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 _____
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 Phone # _____ Email _____ Invoice # _____
 Model # _____ Serial # _____ Dealer Name _____ Purchase Date _____

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

- How did you learn about us?

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

<input type="checkbox"/> 0-2 Years	<input type="checkbox"/> 2-8 Years	<input type="checkbox"/> 8-20 Years	<input type="checkbox"/> 20+ Years
------------------------------------	------------------------------------	-------------------------------------	------------------------------------
- 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+
------------------------------	------------------------------	------------------------------	------------------------------
- Do you think your machine represents a good value? Yes No
- Would you recommend Shop Fox products to a friend? Yes No
- What is your age group?

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

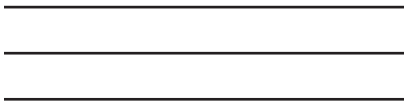
<input type="checkbox"/> \$20,000-\$29,000	<input type="checkbox"/> \$30,000-\$39,000	<input type="checkbox"/> \$40,000-\$49,000
<input type="checkbox"/> \$50,000-\$59,000	<input type="checkbox"/> \$60,000-\$69,000	<input type="checkbox"/> \$70,000+
- Which of the following magazines do you subscribe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

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<input type="checkbox"/> Handy	<input type="checkbox"/> Practical Homeowner	<input type="checkbox"/> Woodshop News
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