

READ THIS FIRST



Model G0824

IMPORTANT UPDATE

For Machines Mfd. Since 02/25
and Owner's Manual Revised 03/21

For questions or help with this product contact Tech Support at (570) 546-9663 or techsupport@grizzly.com

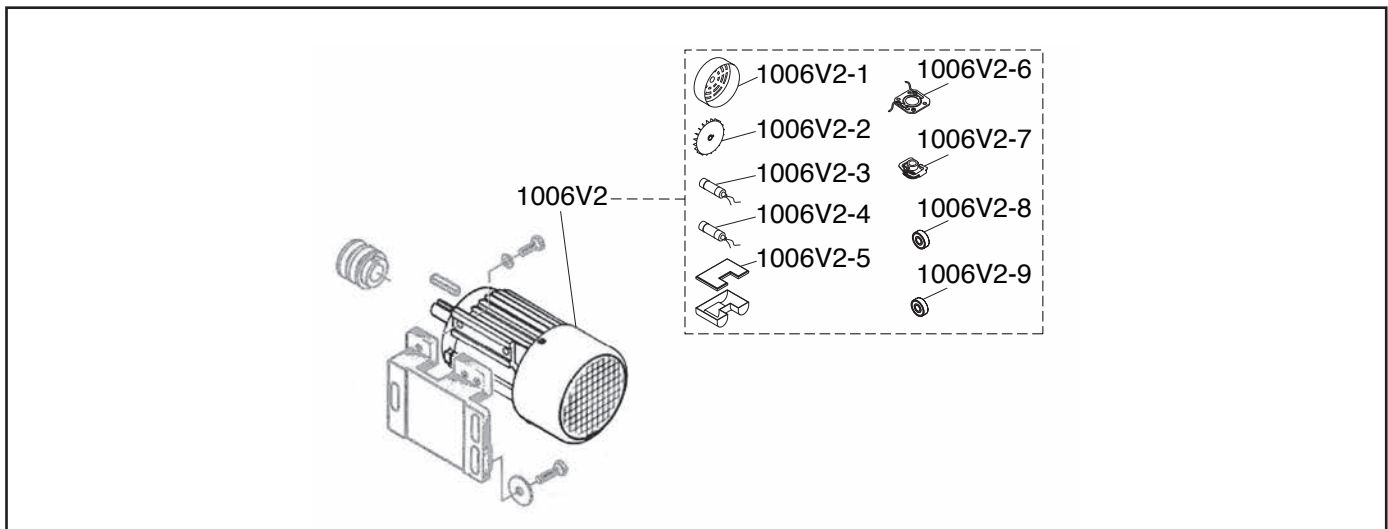
The following changes were recently made since the owner's manual was printed:

- Parts have changed.
- **Main & Pump Motor Wiring** have been updated.

Aside from this information, all other content in the owner's manual applies and **MUST** be read and understood for your own safety. **IMPORTANT: Keep this update with the owner's manual for future reference.**

For questions or help, contact our Tech Support at (570) 546-9663 or techsupport@grizzly.com.

Revised Parts



REF	PART #	DESCRIPTION
1006V2	P08241006V2	MOTOR 2.5HP 220V 1-PH V2.02.25
1006V2-1	P08241006V2-1	FAN COVER
1006V2-2	P08241006V2-2	MOTOR FAN
1006V2-3	P08241006V2-3	S CAPACITOR 150M 250V 1-3/8 X 2-3/4
1006V2-4	P08241006V2-4	R CAPACITOR 20M 450V 1-5/8 X 2-3/4

REF	PART #	DESCRIPTION
1006V2-5	P08241006V2-5	CAPACITOR BOX COVER
1006V2-6	P08241006V2-6	CONTACT PLATE
1006V2-7	P08241006V2-7	CENTRIFUGAL SWITCH
1006V2-8	P08241006V2-8	BALL BEARING 6205ZZ (FRONT)
1006V2-9	P08241006V2-9	BALL BEARING 6205ZZ (REAR)

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#SG23493 PRINTED IN CHINA

Main & Pump Motor Wiring

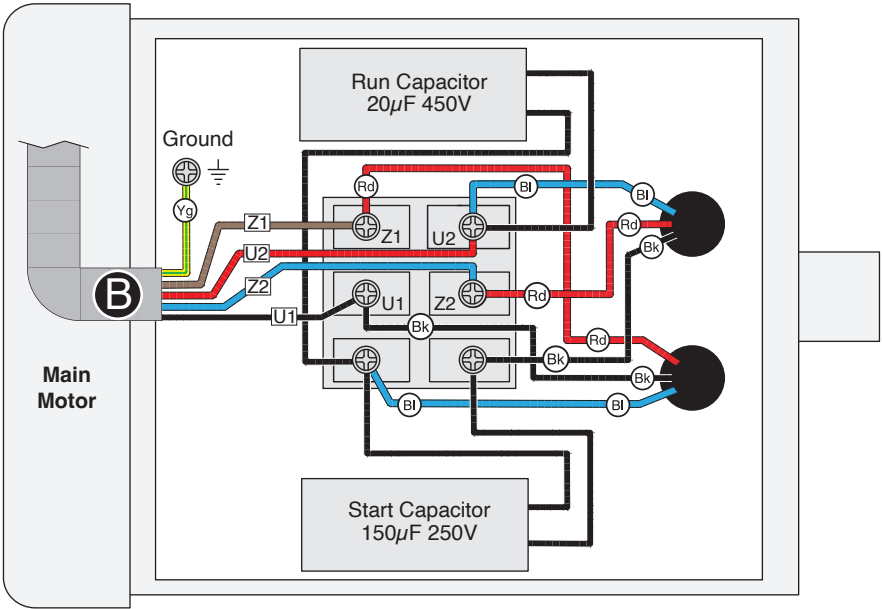


Figure 144. Main motor junction box.

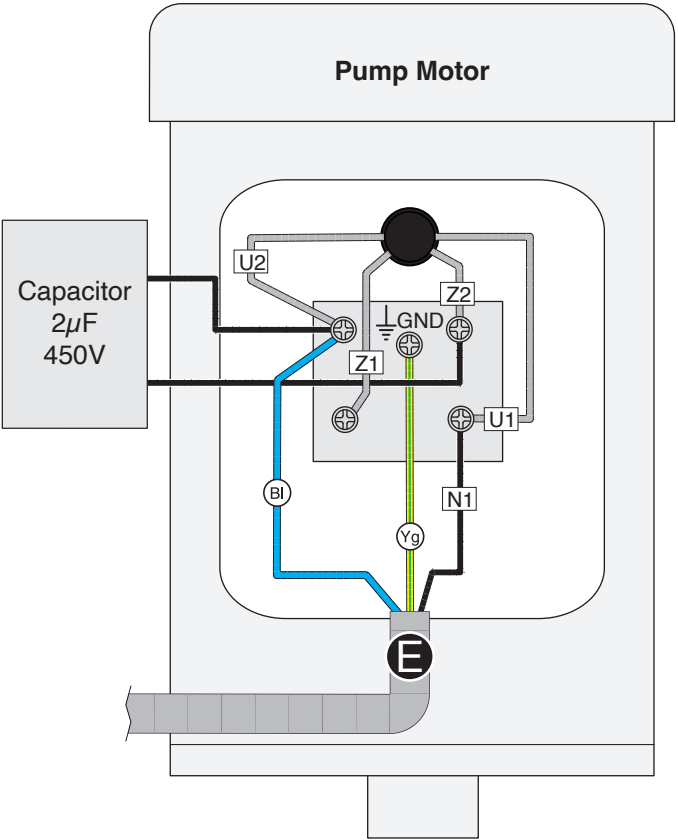


Figure 145. Coolant pump motor.





MODEL G0824

14" X 40" GUNSMITH LATHE

OWNER'S MANUAL

(For models manufactured since 01/21)



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V2.03.21



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.

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INTRODUCTION

Contact Info

We stand behind our machines! If you have questions or need help, contact us with the information below. Before contacting, make sure you get the **serial number** and **manufacture date** from the machine ID label. This will help us help you faster.

Grizzly Technical Support
1815 W. Battlefield
Springfield, MO 65807
Phone: (570) 546-9663
Email: techsupport@grizzly.com

We want your feedback on this manual. What did you like about it? Where could it be improved? Please take a few minutes to give us feedback.

Grizzly Documentation Manager
P.O. Box 2069
Bellingham, WA 98227-2069
Email: manuals@grizzly.com


Manual Accuracy

We are proud to provide a high-quality owner's manual with your new machine!

We made every effort to be exact with the instructions, specifications, drawings, and photographs in this manual. Sometimes we make mistakes, but our policy of continuous improvement also means that **sometimes the machine you receive is slightly different than shown in the manual.**

If you find this to be the case, and the difference between the manual and machine leaves you confused or unsure about something, check our website for an updated version. We post current manuals and manual updates for free on our website at **www.grizzly.com**.

Alternatively, you can call our Technical Support for help. Before calling, make sure you write down the **Manufacture Date** and **Serial Number** from the machine ID label (see below). This information is required for us to provide proper tech support, and it helps us determine if updated documentation is available for your machine.

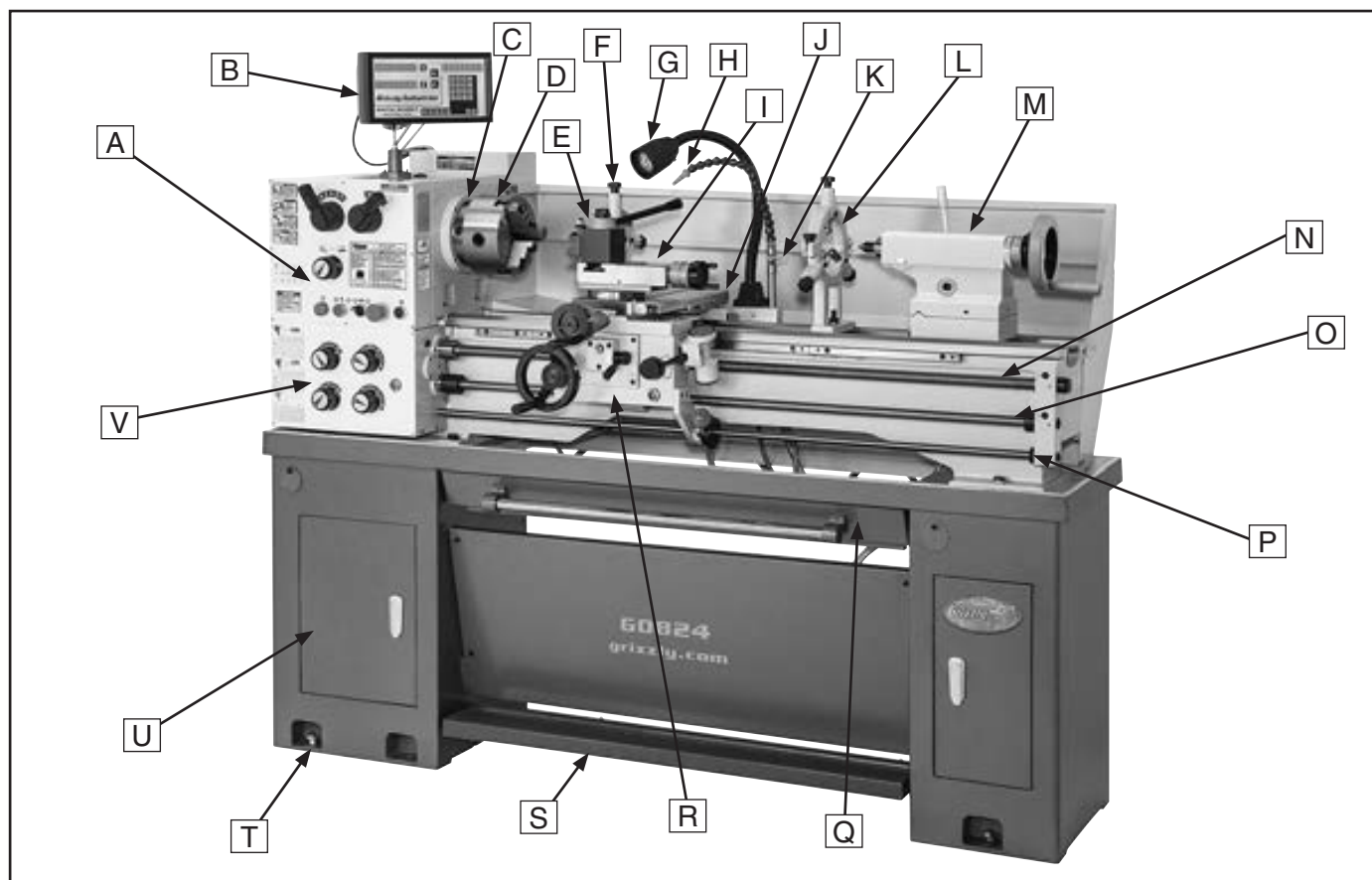
		MODEL GXXXX MACHINE NAME	
SPECIFICATIONS		▲ WARNING!	
Motor:	To reduce risk of serious injury when using this machine:		
Specification:	Read manual before operation.		
Specification:	Wear safety glasses and respirator.		
Specification:	Ensure safety is correctly adjusted/setup and		
Specification:	power is connected to grounded circuit before starting.		
Weight:	4. Make sure the motor has stopped and disconnect		
	power before adjustments, maintenance, or service.		
	5. DO NOT expose to rain or dampness.		
	6. DO NOT modify this machine in any way.		
	7.		
	8.		
	9. Do not use while tired, drowsy, or under the influence of drugs or alcohol.		
	10. Maintain machine carefully to prevent accidents.		

Manufactured for Grizzly in Taiwan



Identification

Become familiar with the names and locations of the controls and features shown below to better understand the instructions in this manual.



- | | |
|--|---|
| A. Headstock Controls (see Page 4 for details) | M. Tailstock (see Page 6 for details) |
| B. DRO Unit | N. Longitudinal Leadscrew |
| C. D1-5 Camlock MT#5 Spindle | O. Feed Rod |
| D. 3-Jaw Chuck 7" | P. Control Rod |
| E. Quick-Change Tool Post | Q. Chip Tray |
| F. Follow Rest | R. Carriage (see Page 6 for details) |
| G. LED Work Lamp | S. Foot Brake |
| H. Coolant Nozzle | T. Stand Mounting Points |
| I. Compound Rest | U. Storage Cabinet |
| J. Cross Slide | V. Quick-Change Gearbox Controls (see Page 4 for details) |
| K. Coolant Valve | |
| L. Steady Rest | |



Controls & Components

Refer to **Figures 1–8** and the following descriptions to become familiar with the basic controls of this lathe.

Headstock

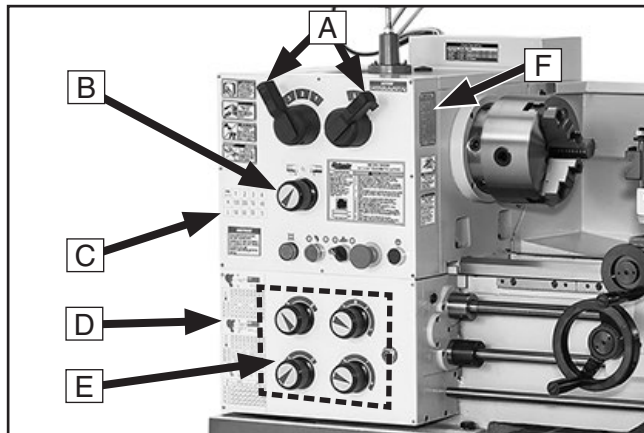


Figure 1. Headstock controls.

- A. Spindle Speed and Speed Range Levers:** The spindle speed lever (left) and spindle speed range lever (right) are used in conjunction with each other to select one of the eight available spindle speeds.
- B. Feed Direction Dial:** Changes direction of leadscrew/feed rod rotation (i.e. direction of carriage travel) without reversing direction of spindle rotation. Typically used for left-hand threading.
- C. Spindle Speed Chart:** Displays configuration of the spindle speed levers for each of the eight spindle speeds.
- D. Thread and Feed Charts:** Display the configuration of the gearbox dials and end gears to produce all available threading or feeding options.
- E. Quick-Change Gearbox Dials:** Control the leadscrew and feed rod speed for threading and feeding operations.
- F. Thread Dial Chart:** Indicates where on the thread dial to engage the half nut when cutting inch threads.

Control Panel

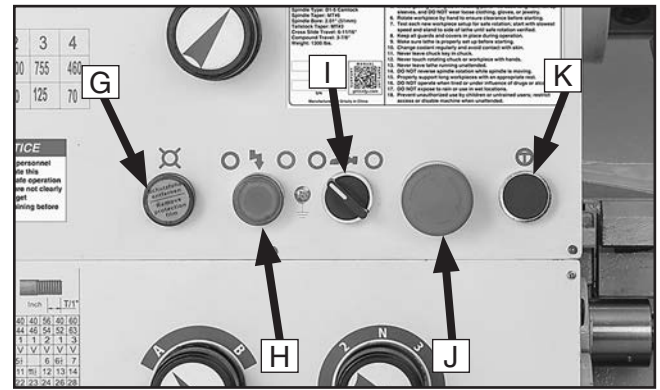


Figure 2. Control panel.

- G. Power Light:** Indicates lathe controls are receiving power. Illuminates when Emergency Stop/RESET button is reset.
- H. Power Button:** Enables the spindle motor when the Emergency Stop/RESET button is reset.
- I. Coolant Pump Switch:** Controls coolant pump motor.
- J. Emergency Stop/RESET Button:** Stops all machine functions. Twist clockwise to reset.
- K. Jog/Inching Button:** Starts forward spindle rotation as long as it is pressed.



Carriage

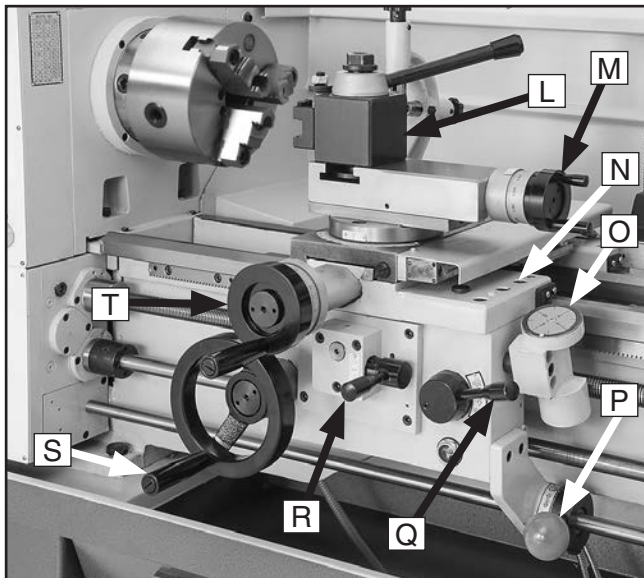


Figure 3. Carriage controls.

- L. Quick-Change Tool Post:** Allows the operator to quickly load and unload tools/tool holders.
- M. Compound Rest Handwheel:** Moves the tool toward and away from the workpiece at the preset angle of the compound rest. Dial is graduated in increments of 0.001" (0.100" per full revolution).
- N. Carriage Lock:** Secures the carriage in place for greater rigidity and cutting accuracy when it should not move.
- O. Thread Dial:** Indicates when to engage the half nut during threading operations.
- P. Spindle Lever:** Starts, stops, and reverses direction of spindle rotation.
- Q. Half Nut Lever:** Engages/disengages the half nut for threading operations.
- R. Feed Selection Lever:** Selects the carriage or cross slide for power feed.
- S. Carriage Handwheel:** Moves the carriage along the bed. Dial is graduated in increments of 0.005" (0.56" per full revolution).
- T. Cross Slide Handwheel:** Moves the cross slide toward and away from the workpiece. Dial is graduated in increments of 0.002" (0.200" per full revolution).

Tailstock

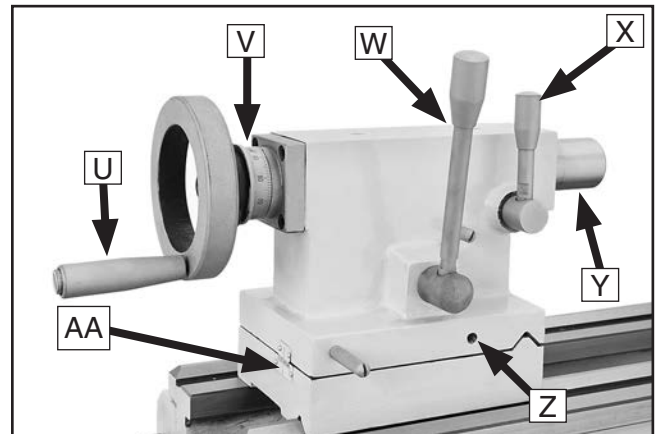


Figure 4. Tailstock controls.

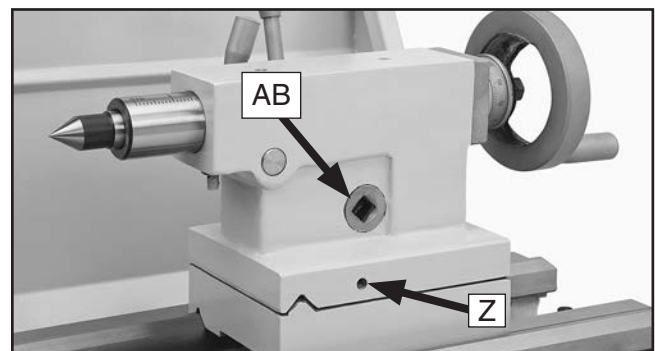


Figure 5. Additional 6 controls.

- U. Quill Handwheel:** Moves the quill toward or away from the spindle.
- V. Graduated Scale:** Indicates quill movement in increments of 0.001", with one full revolution equaling 0.100" of quill travel.
- W. Tailstock Lock Lever:** Secures the tailstock in position along the bedway.
- X. Quill Lock Lever:** Secures the quill in position.
- Y. Quill:** Moves toward and away from the spindle. Holds centers and tooling.
- Z. Tailstock Offset Screws:** Adjusts the tailstock offset left or right from the spindle centerline (1 of 2).
- AA. Offset Scale:** Indicates the relative distance of tailstock offset from the spindle centerline.
- AB. 1/2" Square-Drive Lock-Down:** Used with a torque wrench for precise alignment of centers.



End Gears

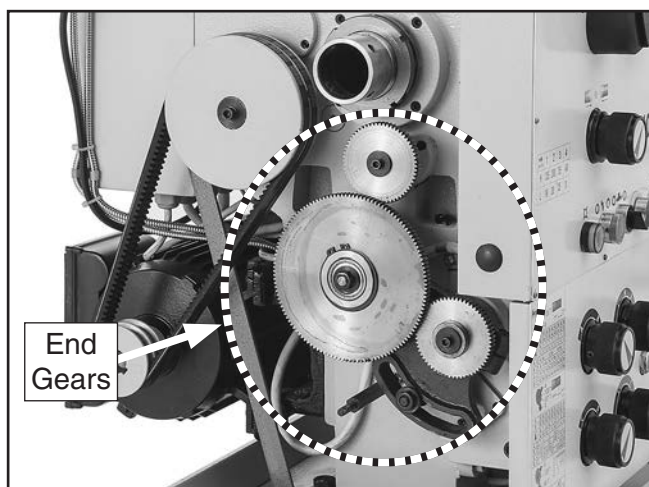


Figure 7. End gear components.

Configuring the end gears (shown in **Figure 7**) controls the speed of the leadscrew for threading, or the feed rod for power feed operations.

Safety Foot Brake

This lathe is equipped with a foot brake (see **Figure 8**) to quickly stop the spindle instead of allowing it to coast to a stop on its own. Pushing the foot brake while the spindle is **ON** cuts power to the motor and stops the spindle. After the foot brake is used, the spindle lever must be returned to the OFF (middle) position to reset the spindle switches before re-starting spindle rotation.

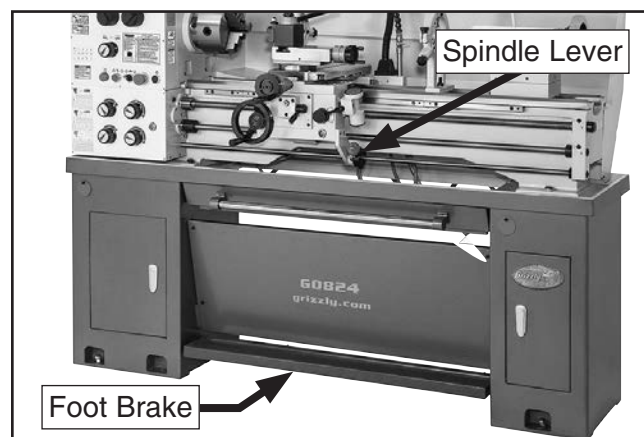


Figure 8. Foot brake and spindle lever.





MACHINE DATA SHEET

Customer Service #: (570) 546-9663 · To Order Call: (800) 523-4777 · Fax #: (800) 438-5901

MODEL G0824 14" X 40" GUNSMITH LATHE WITH 2" SPINDLE BORE

Product Dimensions:

Weight..... 1300 lbs.
Width (side-to-side) x Depth (front-to-back) x Height..... 78 x 31 x 61-1/2 in.
Footprint (Length x Width)..... 71 x 16 in.

Shipping Dimensions:

Type..... Wood Crate
Content..... Machine
Weight..... 1550 lbs.
Length x Width x Height..... 76 x 33 x 61 in.
Must Ship Upright..... Yes

Electrical:

Power Requirement..... 220V, Single-Phase, 60 Hz
Full-Load Current Rating..... 10.45A
Minimum Circuit Size..... 15A
Connection Type..... Cord & Plug
Power Cord Included..... Yes
Power Cord Length..... 6 ft.
Power Cord Gauge..... 14 AWG
Plug Included..... Yes
Included Plug Type..... 6-15
Switch Type..... Control Panel w/Magnetic Switch Protection

Motors:

Coolant Pump

Horsepower..... 40W
Phase..... Single-Phase
Amps..... 0.45A
Type..... TEFC Induction
Power Transfer Direct Drive
Bearings..... Shielded & Permanently Lubricated
Centrifugal Switch/Contacts Type..... N/A

Main

Horsepower..... 2.5 HP
Phase..... Single-Phase
Amps..... 10A
Speed..... 1720 RPM
Type..... TEFC Capacitor-Start Induction
Power Transfer Belt Drive
Bearings..... Shielded & Permanently Lubricated
Centrifugal Switch/Contacts Type..... Internal



Main Specifications:

Operation Info

Swing Over Bed.....	14 in.
Distance Between Centers.....	40 in.
Swing Over Cross Slide.....	8-13/16 in.
Swing Over Saddle.....	13-13/16 in.
Maximum Tool Bit Size.....	5/8 in.
Compound Travel.....	3-7/8 in.
Carriage Travel.....	36 in.
Cross Slide Travel.....	6-11/16 in.

Headstock Info

Spindle Bore.....	2.01 in. (51mm)
Spindle Taper.....	MT#6
Number of Spindle Speeds.....	8
Spindle Speeds.....	70 – 2000 RPM
Spindle Type.....	D1-5 Camlock
Spindle Bearings.....	High-Precision Tapered Roller
Spindle Length.....	17-1/4 in.
Spindle Length with 3-Jaw Chuck.....	22 in.
Spindle Length with 4-Jaw Chuck.....	21-1/2 in.
Spindle Length with Faceplate.....	20-1/2 in.

Tailstock Info

Tailstock Quill Travel.....	3-15/16 in.
Tailstock Taper.....	MT#3
Tailstock Barrel Diameter.....	1-21/32 in.

Threading Info

Number of Longitudinal Feeds.....	32
Range of Longitudinal Feeds.....	0.002 – 0.0548 in./rev.
Number of Cross Feeds.....	32
Range of Cross Feeds.....	0.0007 – 0.0187 in./rev.
Number of Inch Threads.....	34
Range of Inch Threads.....	4 – 56 TPI
Number of Metric Threads.....	26
Range of Metric Threads.....	0.4 – 7 mm

Dimensions

Bed Width.....	7-3/8 in.
Carriage Leadscrew Diameter.....	7/8 in.
Leadscrew TPI.....	8 TPI
Carriage Leadscrew Length.....	50 in.
Steady Rest Capacity.....	3/8 – 2-3/4 in.
Follow Rest Capacity.....	3/8 – 2-3/8 in.
Faceplate Size.....	11 in.
Feed Rod Diameter.....	3/4 in.
Floor to Center Height.....	45-1/2 in.

Construction

Headstock.....	Cast Iron
End Gears.....	Flame-Hardened Steel
Bed.....	Induction-Hardened Cast Iron
Body.....	Cast Iron
Stand.....	Steel
Paint Type/Finish.....	Epoxy



Fluid Capacities

Headstock Capacity.....	4 qt.
Headstock Fluid Type.....	ISO 32 (e.g. Grizzly T23963, Mobile DTE Light)
Gearbox Capacity.....	26 oz.
Gearbox Fluid Type.....	ISO 68 (e.g. Grizzly T23962, Mobile Vactra 2)
Apron Capacity.....	7 oz.
Apron Fluid Type.....	ISO 68 (e.g. Grizzly T23962, Mobile Vactra 2)
Coolant Capacity.....	10 qt.

Other Specifications:

Country of Origin	China
Warranty	1 Year
Approximate Assembly & Setup Time	2 Hours
Serial Number Location	ID Label
Sound Rating	82 dB
ISO 9001 Factory	Yes

Features:

- X- & Z-Axis DRO
- Quick-Change Spindle Speed and Gearbox Controls
- On/Off Reverse Spindle Switch on Carriage
- Adjustable Halogen Work Light
- Steady and Follow Rests with Roller Bearing Supports
- Outboard Spindle Support Spider with 4 Brass-Tipped Bolts
- Foot Brake with Motor Shut-Off Switch
- Built-In Coolant System
- D1-5 Camlock Spindle Nose
- 7 in. 3-Jaw Chuck and 8 in. 4-Jaw Chuck
- Pull-Out Chip Tray
- Full-Length Splash Guard
- 200-Series Quick-Change Tool Post

Accessories Included:

- 7 in. 3-Jaw Universal Chuck with 2 Sets of Jaws
- 8 in. 4-Jaw Independent Chuck with Reversible Jaws
- Steady and Follow Rests with Roller Bearing Supports
- 11 in. Faceplate
- Carbide-Tipped MT#3 Dead Center
- Standard MT#3 Dead Center
- Set of 8 Change Gears
- 1/2" Drill Chuck w/MT#3 Arbor
- MT#6-MT#3 Adapter Sleeve
- Toolbox with Service Tools



SECTION 1: SAFETY

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

The purpose of safety symbols is to attract your attention to possible hazardous conditions. This manual uses a series of symbols and signal words 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. Always use common sense and good judgment.



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. It may also be used to alert against unsafe practices.

NOTICE

Alerts the user to useful information about proper operation of the machine to avoid machine damage.

Safety Instructions for Machinery

WARNING

OWNER'S MANUAL. Read and understand this owner's manual **BEFORE** using machine.

TRAINED OPERATORS ONLY. Untrained operators have a higher risk of being hurt or killed. Only allow trained/supervised people to use this machine. When machine is not being used, disconnect power, remove switch keys, or lock-out machine to prevent unauthorized use—especially around children. Make your workshop kid proof!

DANGEROUS ENVIRONMENTS. Do not use machinery in areas that are wet, cluttered, or have poor lighting. Operating machinery in these areas greatly increases the risk of accidents and injury.

MENTAL ALERTNESS REQUIRED. Full mental alertness is required for safe operation of machinery. Never operate under the influence of drugs or alcohol, when tired, or when distracted.

ELECTRICAL EQUIPMENT INJURY RISKS.

You can be shocked, burned, or killed by touching live electrical components or improperly grounded machinery. To reduce this risk, only allow qualified service personnel to do electrical installation or repair work, and always disconnect power before accessing or exposing electrical equipment.

DISCONNECT POWER FIRST. Always disconnect machine from power supply **BEFORE** making adjustments, changing tooling, or servicing machine. This prevents an injury risk from unintended startup or contact with live electrical components.

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.



WARNING

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 reduce risk of slipping and losing control or accidentally contacting cutting tool or moving parts.

HAZARDOUS DUST. Dust created by machinery operations may cause cancer, birth defects, or long-term respiratory damage. Be aware of dust hazards associated with each workpiece material. Always wear a NIOSH-approved respirator to reduce your risk.

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.

REMOVE ADJUSTING TOOLS. Tools left on machinery can become dangerous projectiles upon startup. Never leave chuck keys, wrenches, or any other tools on machine. Always verify removal before starting!

USE CORRECT TOOL FOR THE JOB. Only use this tool for its intended purpose—do not force it or an attachment to do a job for which it was not designed. Never make unapproved modifications—modifying tool or using it differently than intended may result in malfunction or mechanical failure that can lead to personal injury or death!

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.

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

GUARDS & COVERS. Guards and covers reduce accidental contact with moving parts or flying debris. Make sure they are properly installed, undamaged, and working correctly **BEFORE** operating machine.

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

NEVER STAND ON MACHINE. Serious injury may occur if machine is tipped or if the cutting tool is unintentionally contacted.

STABLE MACHINE. Unexpected movement during operation greatly increases risk of injury or loss of control. Before starting, verify machine is stable and mobile base (if used) is locked.

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

UNATTENDED OPERATION. To reduce the risk of accidental injury, turn machine **OFF** and ensure all moving parts completely stop before walking away. Never leave machine running while unattended.

MAINTAIN WITH CARE. Follow all maintenance instructions and lubrication schedules to keep machine in good working condition. A machine that is improperly maintained could malfunction, leading to serious personal injury or death.

DAMAGED PARTS. Regularly inspect machine for damaged, loose, or mis-adjusted parts—or any condition that could affect safe operation. Immediately repair/replace **BEFORE** operating machine. For your own safety, **DO NOT** operate machine with damaged parts!

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 cord/plug with wet hands. Avoid cord damage by keeping it away from heated surfaces, high traffic areas, harsh chemicals, and wet/damp locations.

EXPERIENCING DIFFICULTIES. If at any time you experience difficulties performing the intended operation, stop using the machine! Contact our Technical Support at (570) 546-9663.



Additional Safety for Metal Lathes

WARNING

Serious injury or death can occur from getting entangled in, crushed between, or struck by rotating parts on a lathe! Unsecured tools or workpieces that fly loose from rotating objects can also strike nearby operators with deadly force. To minimize the risk of getting hurt or killed, anyone operating this machine **MUST** completely heed the hazards and warnings below.

CLOTHING, JEWELRY & LONG HAIR. Tie back long hair, remove jewelry, and do not wear loose clothing or gloves. These can easily get caught on rotating parts and pull you into lathe.

ROTATING PARTS. Always keep hands and body at a safe distance from rotating parts—especially those with projecting surfaces. Never hold anything against rotating workpiece, such as emery cloth, that can pull you into lathe.

GUARDING. Guards and covers protect against entanglement or flying objects. Always ensure they are properly installed while machine is running.

ADJUSTMENT TOOLS. Remove all chuck keys, wrenches, and adjustment tools before turning lathe **ON**. A tool left on the lathe can become a deadly projectile when spindle is started.

SAFE CLEARANCES. Before starting spindle, verify workpiece has adequate clearance by hand-rotating it through its entire range of motion.

NEW SETUPS. Test each new setup by starting spindle rotation at the lowest speed and standing to the side of the lathe until workpiece reaches full speed and you can verify safe rotation.

SPINDLE SPEEDS. Using spindle speeds that are too fast for the workpiece or clamping equipment can cause rotating parts to come loose and strike nearby people with deadly force. Always use slow spindle speeds with large or non-concentric workpieces. Never exceed rated RPM of the chuck.

LONG STOCK SAFETY. Long stock can whip violently if not properly supported. Always support any stock that extends from the chuck/headstock more than three times its own diameter.

CLEARING CHIPS. Metal chips can be razor sharp. Avoid clearing them by hand or with a rag. Use a brush or vacuum instead.

SECURE WORKPIECE. An improperly secured workpiece can fly off spindle with deadly force. Make sure workpiece is properly secured before starting the lathe.

CHUCKS. Chucks can be heavy and difficult to hold. During installation and removal, protect your hands and precision bed ways by using a chuck cradle or piece of plywood over the bed ways. Use lifting equipment, as necessary, for large chucks.

STOPPING SPINDLE. Always allow spindle to completely stop on its own, or use a brake, if provided. Never put hands or another object on a spinning workpiece to make it stop faster.

CRASHING. A serious explosion of metal parts can occur if cutting tool or other lathe component hits rotating chuck or a projecting part of workpiece. Resulting metal fragments can strike nearby people and lathe will be seriously damaged. To reduce risk of crashing, **ALWAYS** release automatic feeds after use, **NEVER** leave lathe unattended, and **CHECK** all clearances before starting lathe.

COOLANT SAFETY. Coolant can become very toxic through prolonged use and aging. To minimize toxicity, change coolant regularly. When using, position nozzle properly to avoid splashing operator or causing a slipping hazard on floor.

TOOL SELECTION. Cutting with incorrect or dull tooling increases risk of injury from broken or dislodged components, or as a result of extra force required for operation. Always use sharp tooling that is right for the job.

SANDING/POLISHING. To reduce risk of entanglement, never wrap emery cloth around rotating workpiece. Instead, use emery cloth with the aid of a tool or backing board.

MEASURING WORKPIECE. To reduce risk of entanglement, never measure rotating workpieces.



Additional Chuck Safety

WARNING

ENTANGLEMENT. Entanglement with a rotating chuck can lead to death, amputation, broken bones, or other serious injury. Never attempt to slow or stop the lathe chuck by hand, and always roll up long sleeves, tie back long hair, and remove any jewelry or loose apparel BEFORE operating.

CHUCK SPEED RATING. Excessive spindle speeds greatly increase the risk of the workpiece or chuck being thrown from the machine with deadly force. Never use spindle speeds faster than the chuck RPM rating or the safe limits of your workpiece.

USING CORRECT EQUIPMENT. Many workpieces can only be safely turned in a lathe if additional support equipment, such as a tailstock or steady/follow rest, is used. If the operation is too hazardous to be completed with the lathe or existing equipment, the operator must have enough experience to know when to use a different machine or find a safer way.

TRAINED OPERATORS ONLY. Using a chuck incorrectly can result in workpieces coming loose at high speeds and striking the operator or bystanders with deadly force. To reduce the risk of this hazard, read and understand this document and seek additional training from an experienced chuck user before using a chuck.

CHUCK CAPACITY. Avoid exceeding the capacity of the chuck by clamping an oversized workpiece. If the workpiece is too large to safely clamp with the chuck, use a faceplate or a larger chuck if possible. Otherwise, the workpiece could be thrown from the lathe during operation, resulting in serious impact injury or death.

CLAMPING FORCE. Inadequate clamping force can lead to the workpiece being thrown from the chuck and striking the operator or bystanders. Maximum clamping force is achieved when the chuck is properly maintained and lubricated, all jaws are fully engaged with the workpiece, and the maximum chuck clamping diameter is not exceeded.

PROPER MAINTENANCE. All chucks must be properly maintained and lubricated to achieve maximum clamping force and withstand the rigors of centrifugal force. To reduce the risk of a thrown workpiece, follow all maintenance intervals and instructions in this document.

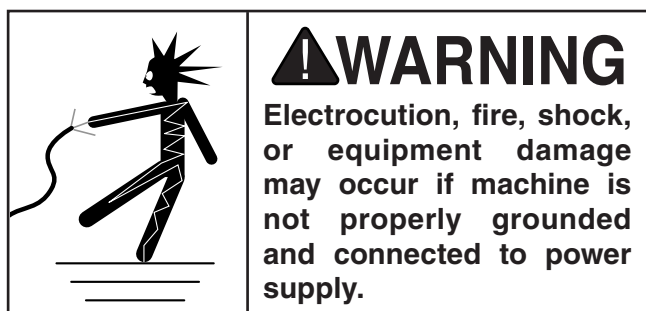
DISCONNECT POWER. Serious entanglement or impact injuries could occur if the lathe is started while you are adjusting, servicing, or installing the chuck. Always disconnect the lathe from power before performing these procedures.



SECTION 2: POWER SUPPLY

Availability

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



Full-Load Current Rating

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

Full-Load Current Rating at 220V 10.45 Amps

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

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

Circuit Requirements for 220V

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

Nominal Voltage 208V, 220V, 230V, 240V
Cycle 60 Hz
Phase 1-Phase
Power Supply Circuit 15 Amps
Plug/Receptacle NEMA 6-15
Cord “S”-Type, 3-Wire, 14 AWG, 300 VAC

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.)

! CAUTION

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

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



Grounding Instructions

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

The power cord and plug specified under “Circuit Requirements for 220V” on the previous page has an equipment-grounding wire and a grounding prong. The plug must only be inserted into a matching receptacle (outlet) that is properly installed and grounded in accordance with all local codes and ordinances (see figure below).

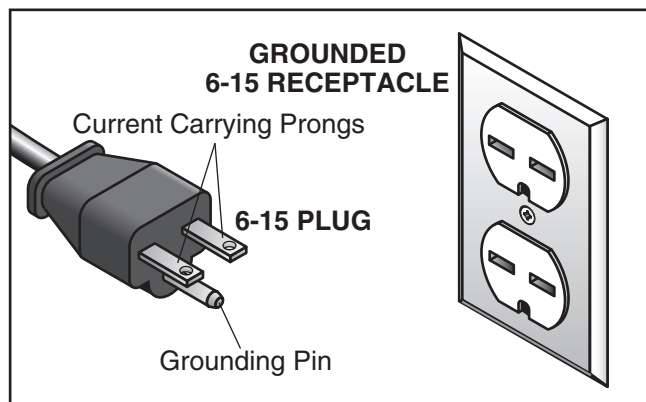
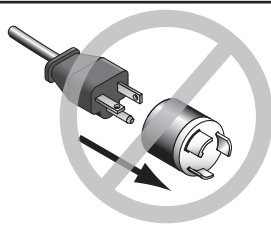


Figure 9. Typical 6-15 plug and receptacle.

⚠ WARNING

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

⚠ CAUTION



No adapter should be used with plug. If plug does not fit available receptacle, or if machine must be reconnected for use on a different type of circuit, reconnection must be performed by an electrician or qualified service personnel, and it must comply with all local codes and ordinances.

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

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

Extension Cords

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

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

Any extension cord used with this machine must be in good condition and contain a ground wire and matching plug/receptacle. Additionally, it must meet the following size requirements:

Minimum Gauge Size 14 AWG
Maximum Length (Shorter is Better).....50 ft.



SECTION 3: SETUP

Preparation

The list below outlines the basic process of preparing your machine for operation. Specific steps are covered later in this section.

The typical preparation process is as follows:

1. Unpack the lathe and inventory the contents of the box/crate.
2. Clean the lathe and its components.
3. Identify an acceptable location for the lathe and move it to that location.
4. Level the lathe and bolt it to the floor.
5. Assemble the loose components and make any necessary adjustments or inspections to ensure the lathe is ready for operation.
6. Check lathe for proper lubrication.
7. Connect the lathe to the power source.
8. Test run lathe to ensure it functions properly.
9. Perform the spindle break-in procedure to prepare the lathe for operation.

Unpacking

This machine was carefully packaged for safe transport. When unpacking, separate all enclosed items from packaging materials and inspect them for shipping damage. ***If items are damaged, please call us immediately at (570) 546-9663.***

IMPORTANT: Save all packaging materials until you are completely satisfied with the machine and have resolved any issues between Grizzly or the shipping agent. *You MUST have the original packaging to file a freight claim. It is also extremely helpful if you need to return your machine later.*

Needed for Setup

The following are needed to complete the setup process, but are not included with your machine.

- **For Lifting and Moving:**
 - A forklift or other power lifting device rated for at least 2000 lbs.
 - Two lifting straps rated for at least 2000 lbs. each
 - 2 Pieces 1¼" D x 44" L steel bar stock
 - Two people to guide machine
- **For Power Connection:**
 - A power source that meets the minimum circuit requirements for this machine (review **Power Supply** on **Page 14** for details)
 - An electrician or qualified service personnel to ensure a safe and code-compliant connection to the power source
- **For Assembly:**
 - Shop rags
 - Cleaner/degreaser (see **Page 18**)
 - Quality metal protectant lubricant
 - Safety glasses for each person
 - Floor mounting hardware (see **Page 22**)
 - Precision level at least 12" long



Inventory

The following is a list of items shipped with your machine. Before beginning setup, lay these items out and inventory them.

If any non-proprietary parts are missing (e.g. a nut or a washer), we will gladly replace them; or for the sake of expediency, replacements can be obtained at your local hardware store.

Mounted Inventory Components	Qty
A. Three-Jaw Universal Chuck 7".....	1
B. Quick-Change Tool Post w/Holder	1
C. Follow Rest.....	1
D. Steady Rest.....	1

Loose Inventory Components	Qty
E. DRO Unit	1
F. Toolbox	1
G. Faceplate 11"	1
H. Four-Jaw Chuck 8"	1
I. Camlock Studs (Installed)	6
J. Cap Screws M6-1 x 14 (Installed)	6
K. Four-Jaw Chuck Wrench	1

Toolbox Inventory Components	Qty
L. Bottle for Oil	1
M. Three-Jaw Chuck Key	1
N. Drill Chuck B16 1.6-13mm	1
O. Arbor B16 x MT#3.....	1
P. Drill Chuck Key.....	1
Q. Spindle Wrench.....	1
R. End Gears 30T (Installed), 40T, 44T, 46T, 52T, 54T, 56T, 57T, 63T	1 Ea.
S. End Gears 60T (One Installed)	2
T. Open-End Wrench Set 10/12, 12/14, 17/19mm	1 Ea.
U. Hex Wrenches 2, 2.5, 3, 4, 5, 6, 8mm ..	1 Ea.
V. Tapered Spindle Sleeve MT#6 x MT#3	1
W. Flat Head Screwdriver 3".....	1
X. Phillips Screwdriver 3".....	1
Y. Spider Screw w/Nuts.....	8
Z. Dead Center MT#3 Carbide Tip	1
AA. Dead Center MT#3 HSS Tip	1
AB. Handwheel Handles	2
AC. Tool Holder (One Installed)	2
AD. End Gear 120/127T (Installed)	1

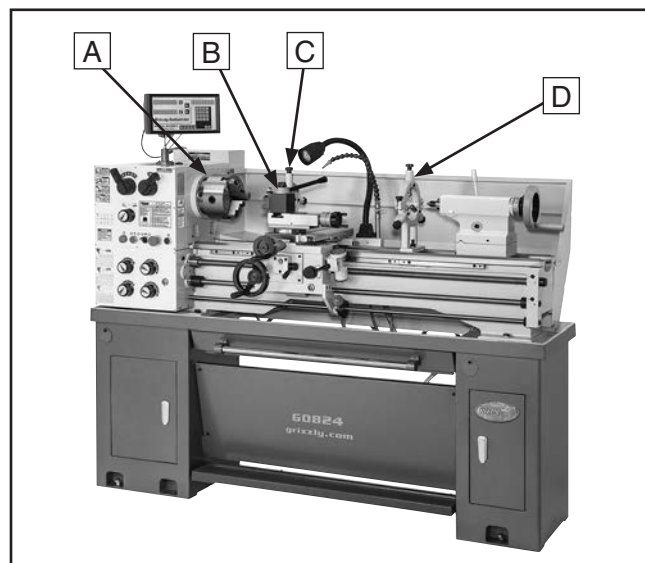


Figure 10. Mounted inventory components.

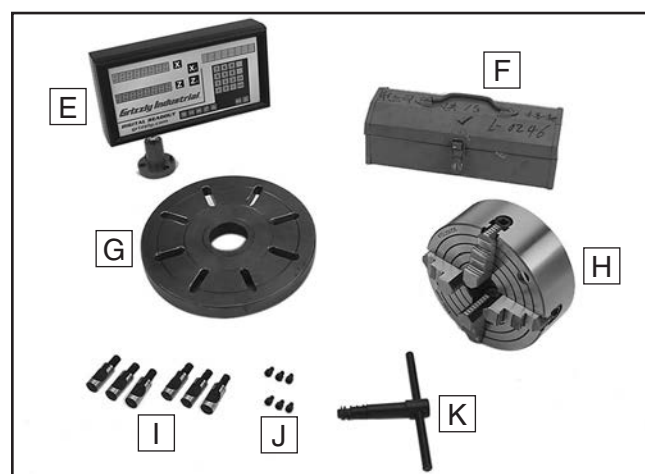


Figure 11. Loose inventory components.

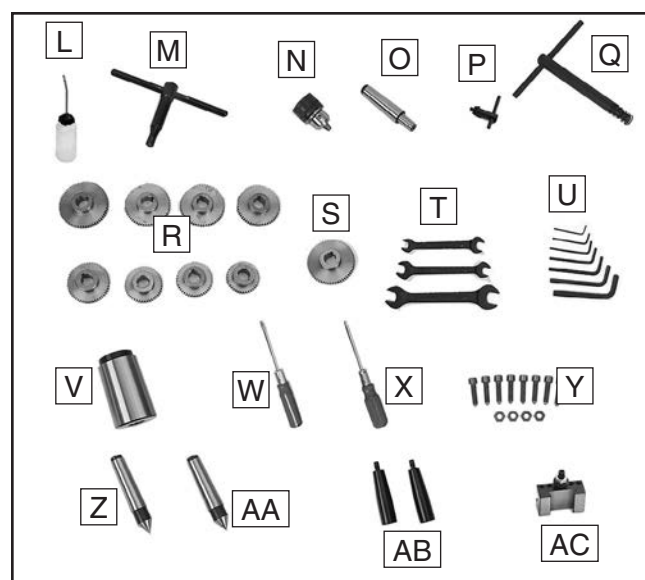


Figure 12. Toolbox inventory.



Cleanup

The unpainted surfaces of your machine are coated with a heavy-duty rust preventative that prevents corrosion during shipment and storage. This rust preventative works extremely well, but it will take a little time to clean.

Be patient and do a thorough job cleaning your machine. The time you spend doing this now will give you a better appreciation for the proper care of your machine's unpainted surfaces.

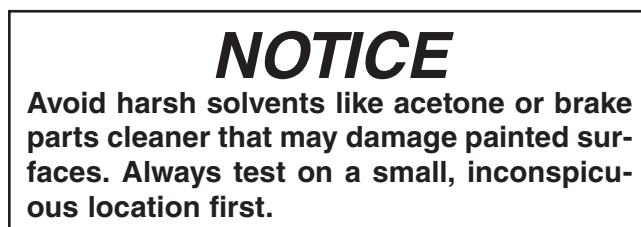
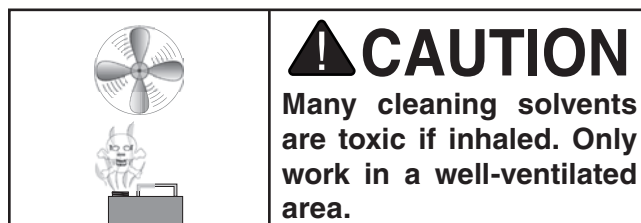
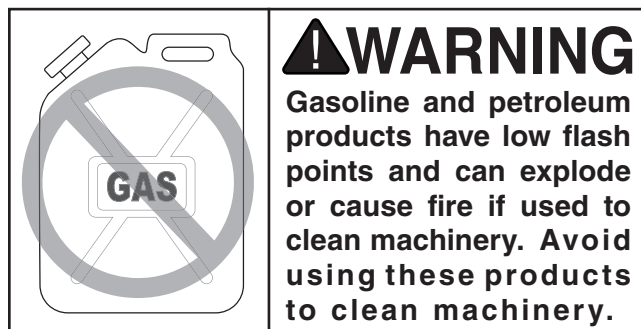
There are many ways to remove this rust preventative, but the following steps work well in a wide variety of situations. Always follow the manufacturer's instructions with any cleaning product you use and make sure you work in a well-ventilated area to minimize exposure to toxic fumes.

Before cleaning, gather the following:

- Disposable rags
- Cleaner/degreaser (WD-40 works well)
- Safety glasses & disposable gloves
- Plastic paint scraper (optional)

Basic steps for removing rust preventative:

1. Put on safety glasses.
2. Coat the rust preventative with a liberal amount of cleaner/degreaser, then let it soak for 5–10 minutes.
3. Wipe off the surfaces. If your cleaner/degreaser is effective, the rust preventative will wipe off easily. If you have a plastic paint scraper, scrape off as much as you can first, then wipe off the rest with the rag.
4. Repeat **Steps 2–3** as necessary until clean, then coat all unpainted surfaces with a quality metal protectant to prevent rust.



T23692—Orange Power Degreaser

A great product for removing the waxy shipping grease from the **non-painted** parts of the machine during clean up.



Figure 13. T23692 Orange Power Degreaser.



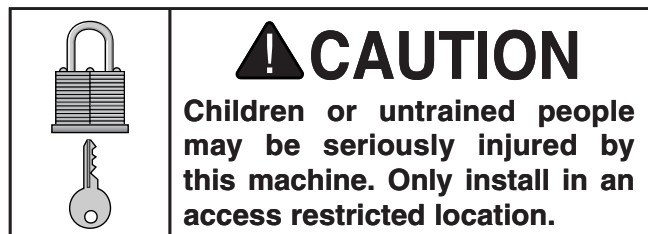
Site Considerations

Weight Load

Refer to the **Machine Data Sheet** for the weight of your machine. Make sure that the surface upon which the machine is placed will bear the weight of the machine, additional equipment that may be installed on the machine, and the heaviest workpiece that will be used. Additionally, consider the weight of the operator and any dynamic loading that may occur when operating the machine.

Space Allocation

Consider the largest size of workpiece that will be processed through this machine and provide enough space around the machine for adequate operator material handling or the installation of auxiliary equipment. With permanent installations, leave enough space around the machine to open or remove doors/covers as required by the maintenance and service described in this manual. **See below for required space allocation.**



Physical Environment

The physical environment where the machine is operated is important for safe operation and longevity of machine components. For best results, operate this machine in a dry environment that is free from excessive moisture, hazardous chemicals, airborne abrasives, or extreme conditions. Extreme conditions for this type of machinery are generally those where the ambient temperature range exceeds 41°–104°F; the relative humidity range exceeds 20%–95% (non-condensing); or the environment is subject to vibration, shocks, or bumps.

Electrical Installation

Place this machine near an existing power source. Make sure all power cords are protected from traffic, material handling, moisture, chemicals, or other hazards. Make sure to leave enough space around machine to disconnect power supply or apply a lockout/tagout device, if required.

Lighting

Lighting around the machine must be adequate enough that operations can be performed safely. Shadows, glare, or strobe effects that may distract or impede the operator must be eliminated.

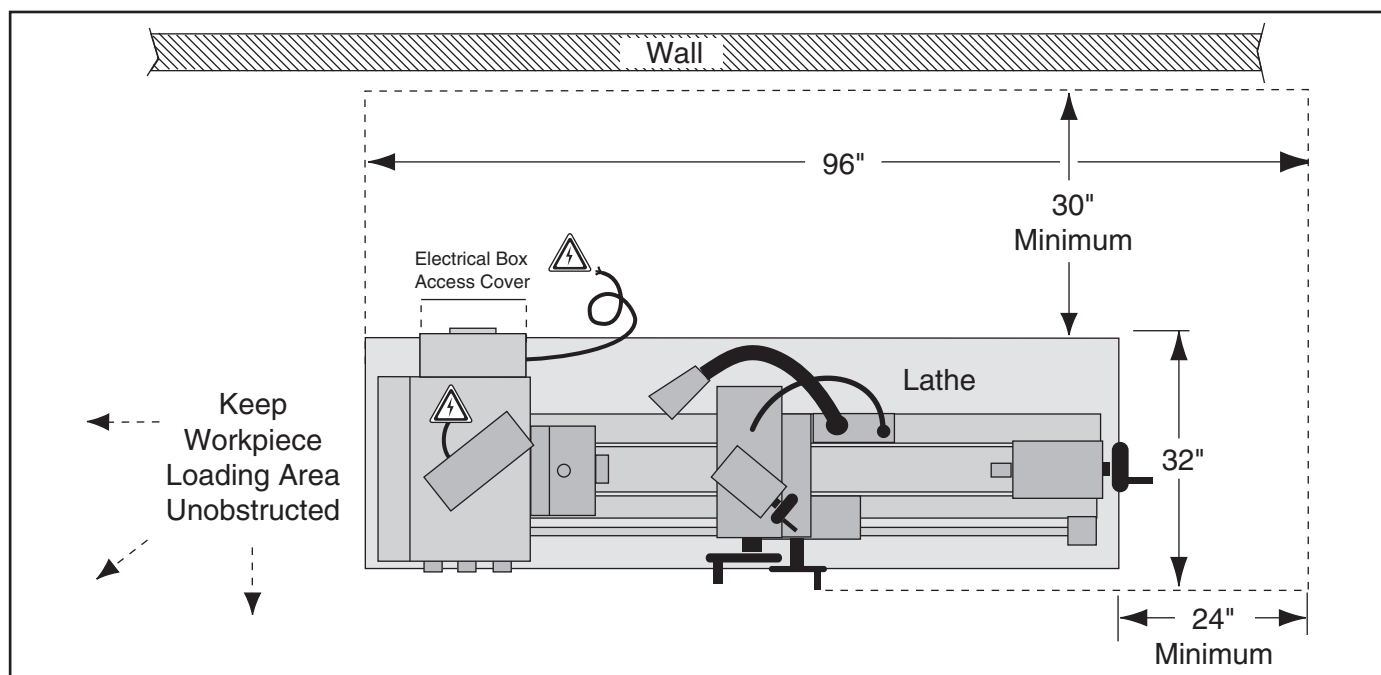


Figure 14. Minimum working clearances.



Assembly

The machine must be fully assembled before it can be operated. Before beginning the assembly process, refer to **Needed for Setup** and gather all listed items. To ensure the assembly process goes smoothly, first clean any parts that are covered or coated in heavy-duty rust preventative (if applicable).

With the exception of the handwheels and DRO unit, the Model G0824 is shipped fully assembled.

To assemble lathe:

1. Thread handles into handwheels, as shown in **Figure 15**.

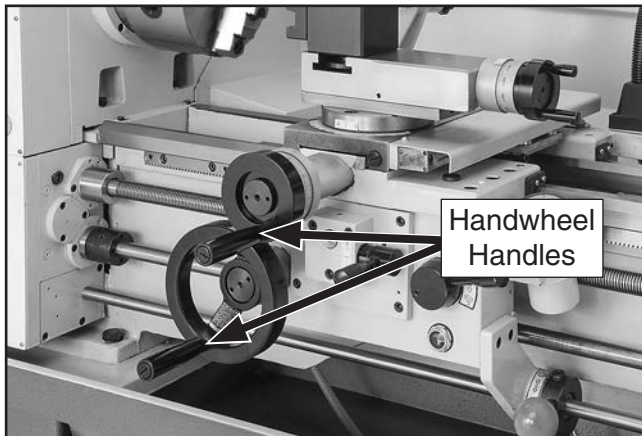


Figure 15. Handwheel handles installed.

2. Secure DRO assembly to threaded mounting holes in headstock cover, using (3) pre-installed M8-1.25 x 20 cap screws (see **Figure 16**).

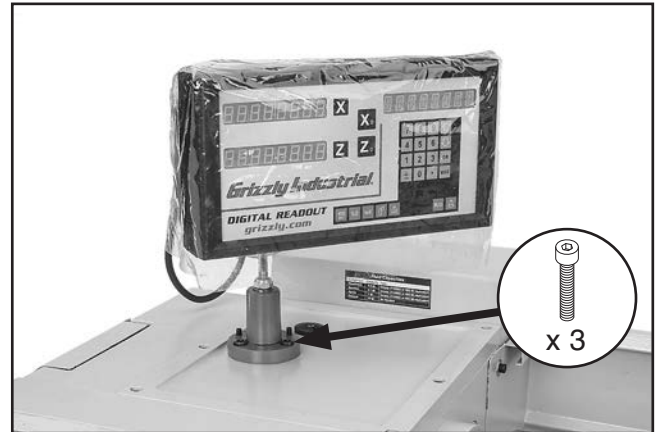


Figure 16. DRO unit mounted to headstock.

3. Connect X- and Z-axis cables and power cord to back of DRO unit, as shown in **Figure 17**.

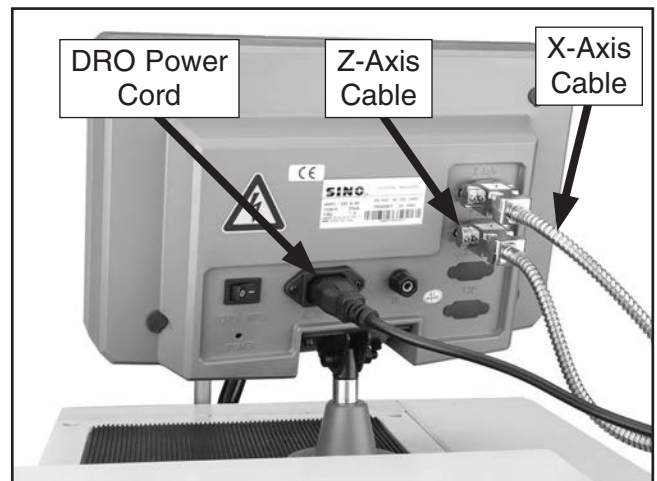
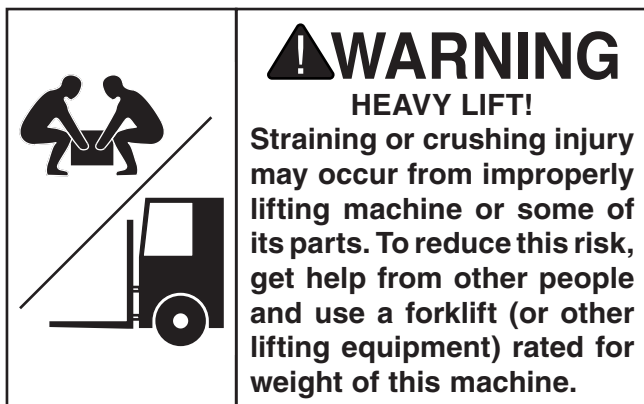


Figure 17. DRO electrical connections.



Lifting & Placing



Do not attempt to lift or move this lathe without using the proper lifting equipment (such as forklift or crane) or the necessary assistance from other people. Each piece of lifting equipment must be rated for at least 2000 lbs. to support dynamic loads that may be applied while lifting. Refer to **Needed for Setup** on **Page 16** for details.

To lift and move lathe:

1. Remove shipping crate top and sides, then remove small components from shipping pallet.
2. Move lathe to its prepared location while it is still attached to shipping pallet.
3. Unbolt lathe from shipping pallet.
4. To balance load for lifting, move tailstock and carriage to extreme right end of bedway, then lock them in place.

Note: Before attempting to move the carriage, make sure the carriage lock is loose, the half nut is disengaged, and the power feed is disengaged, using the feed selection lever (see **Page 4** for reference).

5. Remove back splash so it does not get damaged when lathe is raised.

6. Insert round steel bar stock through four lifting holes (see **Figure 18**).

Note: To properly support the lathe and avoid damaging lathe components, bar stock should be at least 1 1/4" diameter thick and 44" long, so it projects 14" from both sides of the lathe when installed.

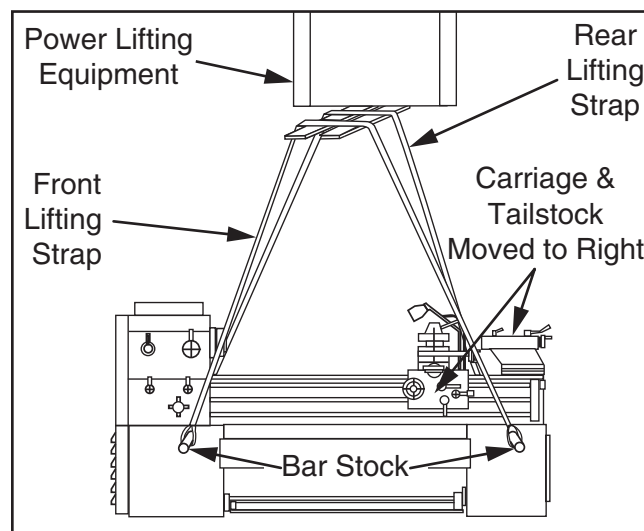


Figure 18. Example of lathe setup for lifting.

7. Attach lifting straps to bar stock and power-lifting equipment (see **Figure 17**). Make sure there is enough space between straps and control rod, feed rod, leadscrew and electrical cabinet to prevent putting pressure on these components when lifting.
8. Raise lathe a couple of inches and check balance of load. Have two other people carefully steady lathe to help prevent it from swinging.
— If load is not safely balanced, immediately lower lathe and resolve issue before attempting to lift it again.
9. Raise lathe enough to clear shipping pallet and carefully remove pallet.
10. Lower lathe into position.
11. Re-install back splash.



Anchoring to Floor

Number of Mounting Holes 6
Diameter of Mounting Hardware..... 1/2"

Anchoring machinery to the floor prevents tipping or shifting and reduces vibration that may occur during operation, resulting in a machine that runs slightly quieter and feels more solid.

If the machine will be installed in a commercial or workplace setting, or if it is permanently connected (hardwired) to the power supply, local codes may require that it be anchored to the floor.

If not required by any local codes, fastening the machine to the floor is an optional step. If you choose not to do this with your machine, we recommend placing it on machine mounts, as these provide an easy method for leveling and they have vibration-absorbing pads.

Anchoring to Concrete Floors

1. Use holes in bottom of cabinets (see **Figure 19**) as guides for drilling holes in floor and mount stand.

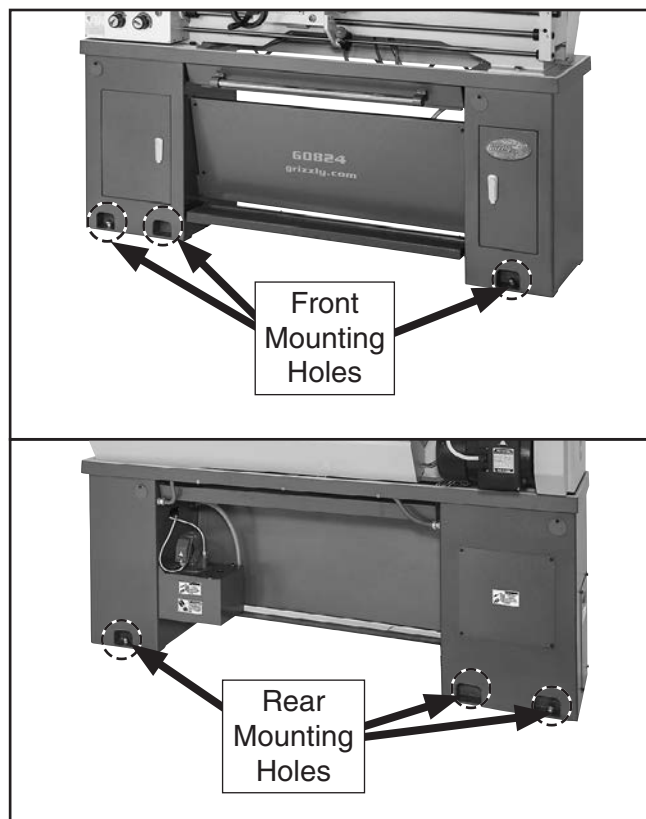


Figure 19. Locations for mounting lathe.

2. Follow **Steps 4–8** in **Lifting & Placing** on **Page 21**, raise lathe up as needed and install anchor studs (see **Figure 20**) in concrete floor.
3. Lower lathe into position so anchor studs slide into holes in cabinets, then secure anchor studs with hex nuts and flat washers (see **Figure 20**).

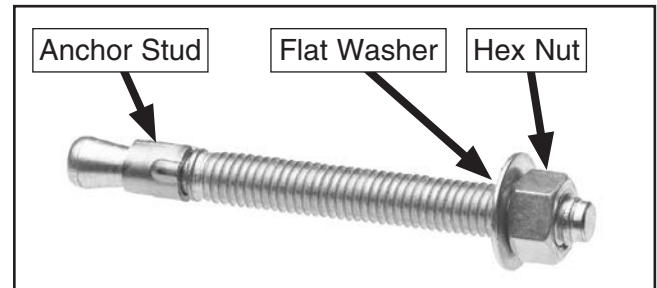


Figure 20. Typical anchor stud.

4. Shim between lathe and chip pan as necessary to level the ways at all four corner locations (refer to **Leveling** on **Page 23**).
5. For best results, recheck ways in 24 hours to make sure they are still level and have not twisted. Re-shim as required.

Using Machine Mounts

G7160—Machine Mount 4 3/4" 8,000 lb. Capacity

For the ultimate in heavy machine stabilization, these mounts feature easy setting, fast leveling, and vibration and noise reduction. Large rubber foot pads distribute weight evenly and long mounting studs provide a wide range of leveling adjustment. Sold individually. Stud size: M12-1.75 x 72.



Figure 21. G7160 Machine Mount.



Leveling

NOTICE

For accurate turning results and to prevent warping or twisting of cast iron bed and ways, lathe bedways **MUST** be leveled from side to side and from front to back on both ends.

Re-check the bedways 24 hours after installation, two weeks after that, and then annually to make sure they remain level.

Leveling machinery helps precision components, such as bedways, remain straight and flat during the lifespan of the machine. Components on a machine that is not level may slowly twist due to the dynamic loads placed on the machine during operation.

If needed, use metal shims between the lathe bed and chip pan when leveling the machine.

For best results, use a precision level that is at least 12" long and sensitive enough to show a distinct movement when a 0.003" shim (approximately the thickness of one sheet of standard newspaper) is placed under one end of the level.

See the figure below for an example of a high precision level offered by Grizzly.



Figure 22. Model H2683 Master Machinist's Level.

Lubricating Lathe



The headstock, quick-change gearbox, and apron oil reservoirs must have the proper amount of oil in them before the lathe can be operated.

Damage caused to the bearings and gears from running the lathe without oil in the reservoirs will not be covered under warranty. Refer to the **Lubrication** section, beginning on **Page 63**, for checking and adding oil.

In addition to the reservoirs, we also recommend that you lubricate all other points on the machine at this time. To do this, follow the steps provided in the maintenance schedule on **Page 63**.

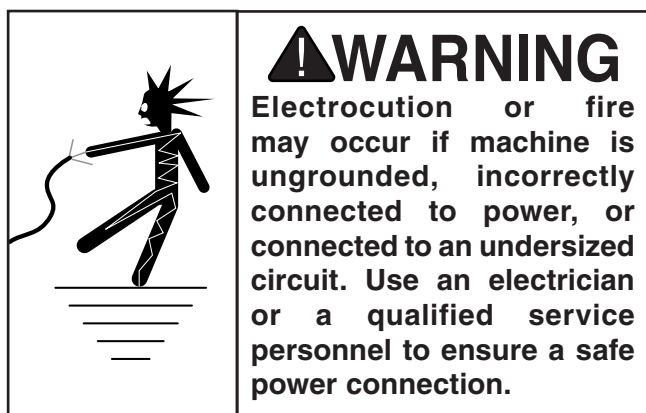
Note: *If this lathe was shipped with oil in the reservoirs, do not change that oil until after the test run and spindle break-in procedures.*

Adding Coolant

Add the coolant of your choice now. For detailed instructions on where the coolant tank is located and how to add fluid, refer to **Coolant System Service** on **Page 69**.



Power Connection



Before the machine can be connected to the power supply, there must be an electrical circuit that meets the **Circuit Requirements for 220V** on **Page 14**.

To minimize the risk of electrocution, fire, or equipment damage, installation work and electrical wiring **MUST** be done by an electrician or qualified service personnel.

Note About Extension Cords: *Using an incorrectly sized extension cord may decrease the life of electrical components on your machine. Refer to **Extension Cords** on **Page 15** for more information.*

To connect the power cord to the lathe:

1. Press Emergency Stop/RESET button on front of headstock, remove six Phillips head screws that secure electrical box cover, then remove cover.
2. Thread power cord through strain relief shown in **Figure 23**.

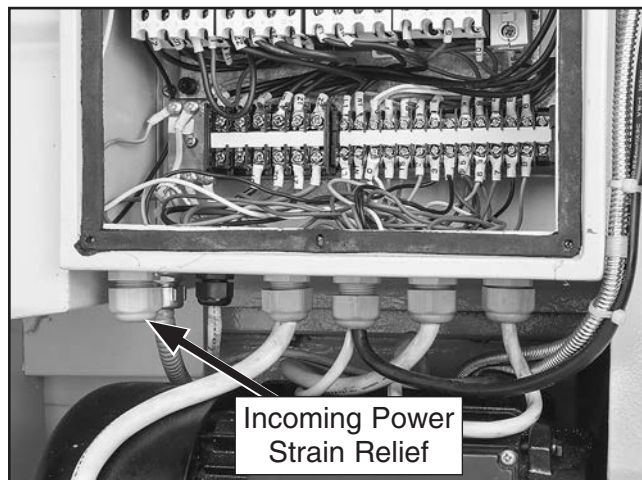


Figure 23. Location of hot wire terminals, ground terminal, and strain relief.

3. Identify **L** and **N** terminals and grounding plate (**PE**), shown in **Figure 24**, then connect incoming hot wires and ground wire to those terminals.

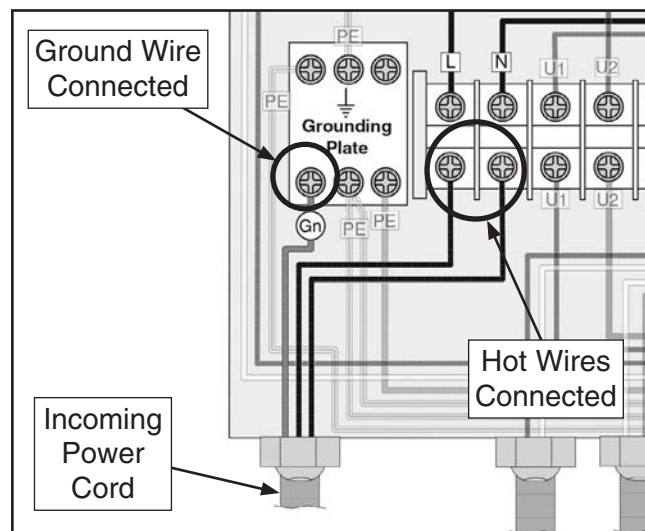


Figure 24. Incoming ground and hot wires connected.



4. Make sure wires have enough slack between strain relief and terminal connections so they are not pulled tight or stretched, then tighten strain relief to secure cord.

Note: *The strain relief must be tightened against the outer jacket of the cord. Avoid over-tightening the strain relief or it may crush the cord and cause a short.*

5. Test the strain relief to ensure it is properly tightened by pulling the cord from outside the box with light-to-moderate force. When strain relief is properly tightened, cord will not move inside cabinet.
6. Install a NEMA 6-15 plug on the other end of the power cord per plug manufacturer's instructions.
7. Re-install main electrical box cover.

NOTICE

To avoid unexpected start-up, keep the RESET button pressed in until instructed otherwise in the Test Run.

8. Plug cord into matching power supply receptacle and power source as specified in **Circuit Requirements for 220V** on **Page 14**.

Test Run

Once assembly is complete, test run the machine to ensure it is properly connected to power and safety components are functioning correctly.

If you find an unusual problem during the test run, immediately stop the machine, disconnect it from power, and fix the problem **BEFORE** operating the machine again. The **Troubleshooting** table in the **SERVICE** section of this manual can help.

WARNING

Serious injury or death can result from using this machine **BEFORE** understanding its controls and related safety information. **DO NOT** operate, or allow others to operate, machine until the information is understood.

WARNING

DO NOT start machine until all preceding setup instructions have been performed. Operating an improperly set up machine may result in malfunction or unexpected results that can lead to serious injury, death, or machine/property damage.

The test run consists of verifying the following:

- Motor powers up and runs correctly
- Emergency Stop/RESET button works correctly.
- Brake system works correctly
- Lamp works correctly
- Coolant system works correctly
- Jog button works correctly

To test run machine:

1. Clear away all tools and objects used during assembly, lubrication, and preparation.
2. Secure chuck and jaws, if installed (refer to **Chuck Installation** on **Page 30**).

Note: *If a chuck is not installed on the lathe, you do not need to install one for this test.*



3. Push Emergency Stop/RESET button on control panel (see **Figure 25**), and point coolant nozzle into chip pan.

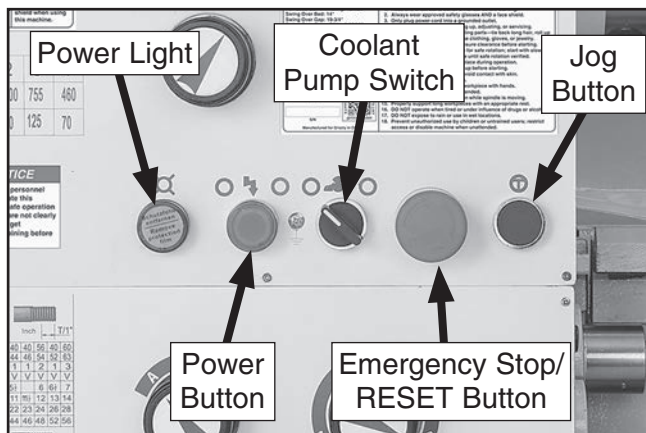


Figure 25. Control panel buttons used in test run.

Note: In the next step, you may need to rock the chuck back and forth as you make the adjustments to cause the gears to mesh.

4. Move spindle speed and speed range levers to **L** and **4**. This will set spindle rotation at 70 RPM (see **Figure 26**).

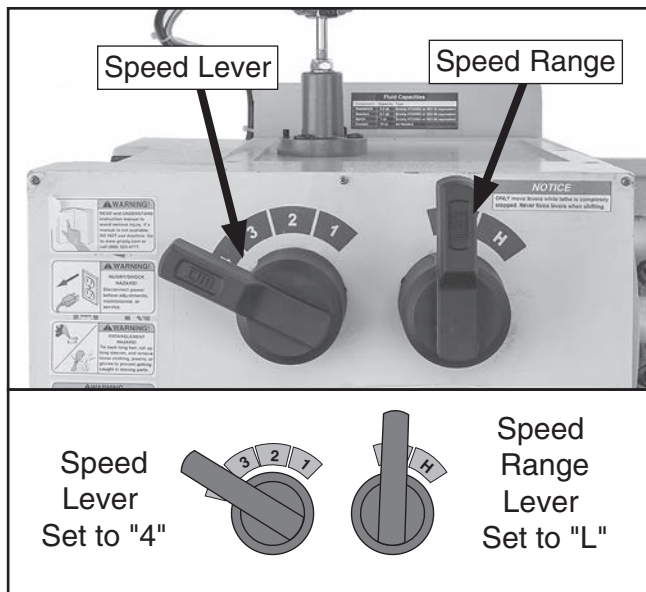


Figure 26. Spindle speed set to 70 RPM.

5. Make sure spindle lever is in OFF (middle) position (see **Figure 27**) to prevent unexpected startup when power is enabled.

Note: You need to pull the lever out (or right) to disengage the lug in order to adjust the position.

6. To ensure carriage components do not unexpectedly move during the following steps, disengage half nut lever and feed selection lever (see **Figure 27**). Rotate carriage and cross slide handwheels back and forth while moving levers to verify they are disengaged. When disengaged, handwheels will turn with ease.

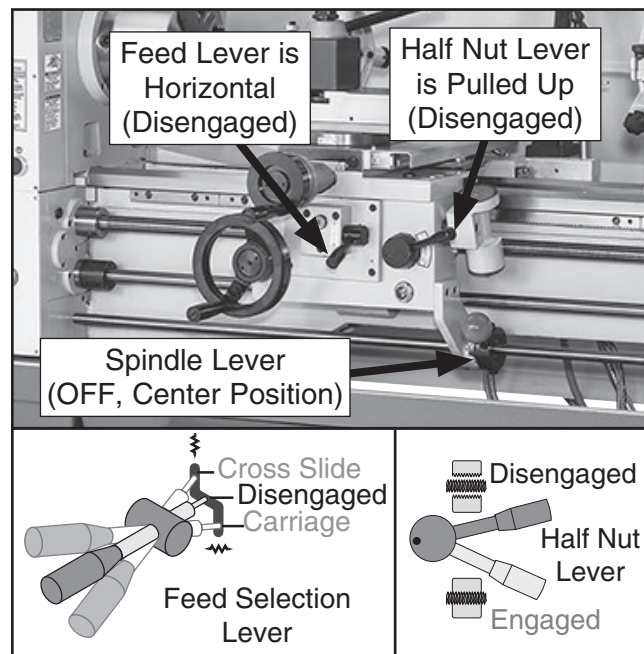


Figure 27. Disengaging carriage components.

7. Rotate Emergency Stop/RESET button clockwise so it pops out. Power light on the control panel should illuminate.
8. Push power button, then move spindle lever (see **Figure 27**) down to start spindle. The top of the chuck should turn down and toward front of lathe.
 - When operating correctly, machine will run smoothly with little or no vibration or rubbing noises.
 - Investigate and correct strange or unusual noises or vibrations before operating machine further. Always disconnect machine from power when investigating or correcting potential problems.



9. Push Emergency Stop/RESET button to turn lathe **OFF**, then, without resetting RESET button, try to restart spindle rotation, as instructed in **Step 8**. Spindle should *not* start.

- If spindle rotation *does* start with Emergency Stop/RESET button pressed in, the Emergency Stop/RESET button safety is not operating correctly. This safety feature must operate properly before continuing operation. Use spindle lever to stop lathe, disconnect it from power, and call Tech Support for help.

10. Move spindle lever to OFF (middle) position, and reset Emergency Stop/RESET button by twisting it clockwise until it pops out.

11. Restart spindle rotation.

12. Step on foot brake. Spindle should come to a quick stop.

- If brake pedal has no effect on lathe, push Emergency Stop/RESET button and call Tech Support for help.

13. Ensure work lamp functions properly.

14. Use cutting fluid pump switch on control panel to start pump (see **Figure 25** on **Page 26**), then open valve. Verify that cutting fluid flows from nozzle, then turn pump **OFF**.

15. Press power button, then press and briefly hold the jog button (see **Figure 25** on **Page 26**), then release it. The spindle should rotate when the jog button is pressed and come to a complete stop when released.

Congratulations! The test run is complete. Turn the lathe **OFF** and perform the following **Spindle Break-In** procedure.

Spindle Break-In

Before subjecting the spindle to operational loads, it is essential to complete the break-in process. This helps maximize the life of spindle bearings and other precision components by thoroughly lubricating them before placing them under load.

After spindle break-in is complete, we recommend changing headstock and gearbox oil to remove any metal particles or debris that are present from the assembly and break-in process.

The break-in must be performed in succession with the **Test Run** procedure described in this manual, as the steps in that procedure prepare the lathe controls for the break-in process.

NOTICE

DO NOT perform this procedure independently of the Test Run section. The lathe could be seriously damaged if the controls are set differently than instructed in that section.

To perform the spindle break-in:

1. Successfully complete the **Test Run** procedure beginning on **Page 25**.
2. Run spindle at 70 RPM for 10 minutes in each direction (first forward and then reverse).
3. Turn lathe **OFF**. Set spindle speed levers for 125 RPM (see **Setting Spindle Speed** on **Page 48** for more information), then run lathe for 5 minutes in each direction.
4. Repeat **Step 3** for remaining spindle speeds, progressively increasing to highest speed listed on spindle speed chart.
5. Press Emergency Stop/RESET button and **DISCONNECT MACHINE FROM POWER!**

Congratulations! The spindle break-in is complete. We recommend changing the headstock and gearbox oil before operating the machine further (refer to **Lubrication** on **Page 63**).

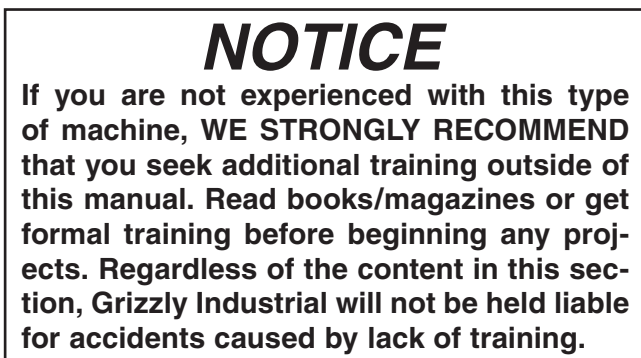


SECTION 4: OPERATIONS

Operation Overview

The purpose of this overview is to provide the novice machine operator with a basic understanding of how the machine is used during operation, so the machine controls/components discussed later in this manual are easier to understand.

Due to the generic nature of this overview, it is **not** intended to be an instructional guide. To learn more about specific operations, read this entire manual, seek additional training from experienced machine operators, and do additional research outside of this manual by reading "how-to" books, trade magazines, or websites.



To complete a typical operation, the operator does the following:

1. Securely mounts workpiece in lathe.
2. Puts on safety glasses and a face shield, rolls up sleeves, removes jewelry, and secures any clothing, jewelry, or hair that could get entangled in moving parts.
3. Installs tooling, aligns it with workpiece, then backs it away to establish a safe startup clearance.
4. Removes all setup tools from lathe.
5. Checks for safe clearances by rotating workpiece by hand at least one full revolution.
6. Sets correct spindle speed for operation.
7. If using power feed, selects proper feed rate for operation.
8. Resets Emergency Stop/RESET button.
9. Uses spindle lever to start spindle rotation.
10. Uses carriage handwheels or power feed options to move tooling into workpiece for operations.
11. When finished cutting, moves spindle lever to OFF position, presses foot pedal brake to completely stop spindle, presses Emergency Stop/RESET button, and then removes workpiece.



Chuck & Faceplate Mounting

This lathe is equipped with a D1-type spindle nose. This type of spindle uses camlocks that are adjusted with a chuck key to securely mount a chuck or faceplate with repeatable precision and ease.

WARNING

Never use spindle speeds faster than the chuck RPM rating or the safe limits of your workpiece. Excessive spindle speeds greatly increase the risk of the workpiece or chuck being thrown from the machine with deadly force!

This lathe ships with the 3-jaw chuck installed. This is a scroll-type chuck where all three jaws move in unison when the chuck key is used.

The included 4-jaw chuck features independent jaws, which are used for square or unevenly-shaped stock, and to mount work that needs to be adjusted to near-zero total indicated runoff.

The included faceplate has slots for T-bolts that hold standard or custom clamping hardware. With the correct clamping hardware, a faceplate offers a wide range of uses, including machining non-concentric workpieces, straight turning between centers, off-center turning, and boring.

Camlock Stud Installation

Follow this procedure to install camlock studs in chucks, faceplates, or drive plates so they can be mounted to the spindle.

Note: Skip this section if camlock studs are already installed.

To install camlock studs:

1. Lightly oil threads of each stud.
2. Thread studs until datum line is flush with (or just above) surface and alignment groove is positioned over hole.

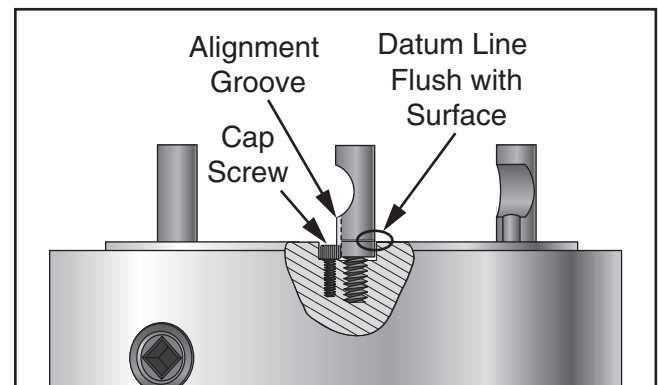


Figure 28. Camlock stud installation.

3. Install a cap screw in hole next to each stud. These cap screws prevent studs from rotating so they properly engage with camlock during installation.

Note: It is normal for studs to have a small amount of play or looseness after installing and tightening the cap screws.



Chuck Safety & Support Devices

Because chucks are heavy and often awkward to hold, some kind of lifting, support, or protective device should be used during installation or removal. The weight and size of the chuck will determine the appropriate device to use (refer to the following figure for examples).

! WARNING

Dropping a chuck can result in amputation, serious crushing injuries, or property damage. Always use a support or protective device to reduce this risk during installation or removal.

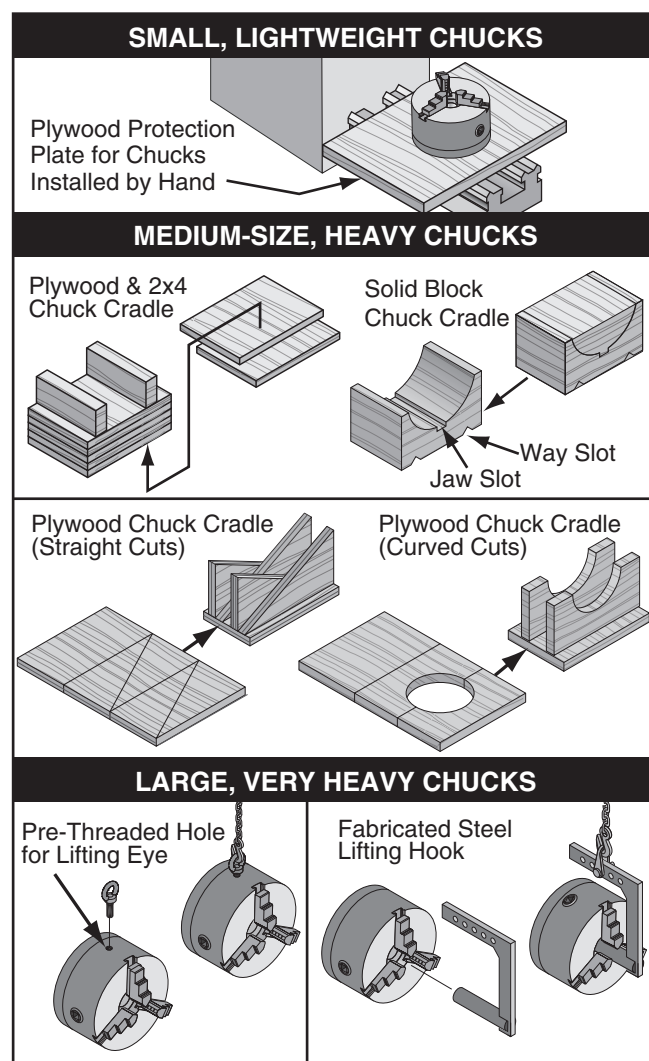


Figure 29. Examples of common devices used during chuck installation and removal.

Chuck Installation

To ensure accurate work, it is extremely important to make sure the spindle nose and chuck mating surfaces/tapers are clean. Even a small amount of lint or debris can affect accuracy.

The chuck is properly installed when all camlocks are tight, the spindle and chuck tapers firmly lock together, and the back of the chuck is firmly seated against the face of the spindle all the way around—without any gaps.

To install chuck:

1. DISCONNECT MACHINE FROM POWER!
2. Use appropriate lifting, support, or protective device to protect ways and support chuck during installation process (refer to **Chuck Safety & Support Devices**).
3. Clean and lightly oil camlock studs, then thoroughly clean mating surfaces of spindle and chuck.
4. Install chuck by inserting camlock studs straight into spindle cam holes.

IMPORTANT: Avoid inserting the studs by pivoting them in from an angle or rotating the spindle. This can damage studs or spindle cam holes.

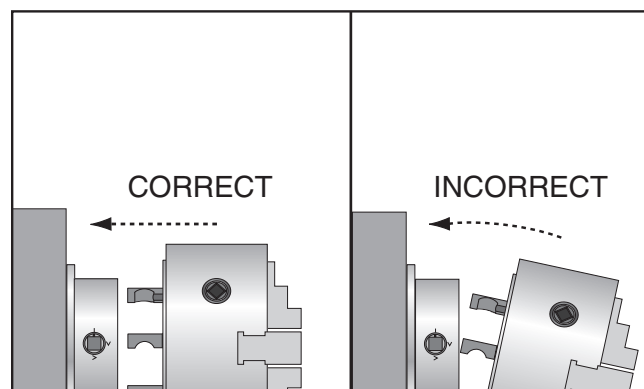


Figure 30. Inserting camlock studs into spindle cam holes.



5. Incrementally tighten camlocks in criss-cross or star pattern to ensure that chuck seats evenly against spindle.
6. When chuck is fully seated and all camlocks are tight, verify that cam line is between the two "V" marks on spindle nose, as shown in following figure.

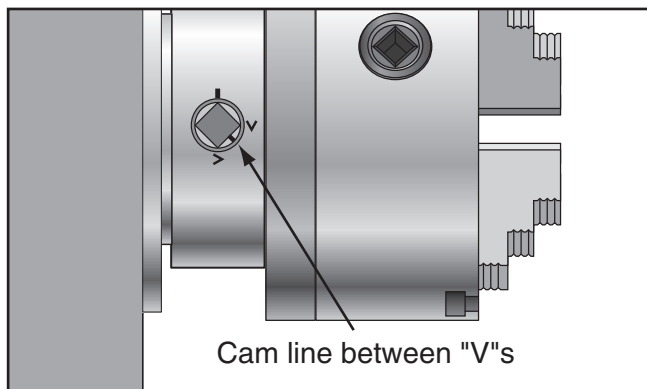


Figure 31. Cam line positioned between the "V" marks after the camlocks are fully tightened.

- If cam line is NOT between "V" marks when camlock is tight, stud may be installed at incorrect height. To fix this, adjust stud height as shown in following figure. Make sure to re-install stud cap screw afterward.
- If adjusting stud height does not correct problem, try swapping stud positions on chuck.

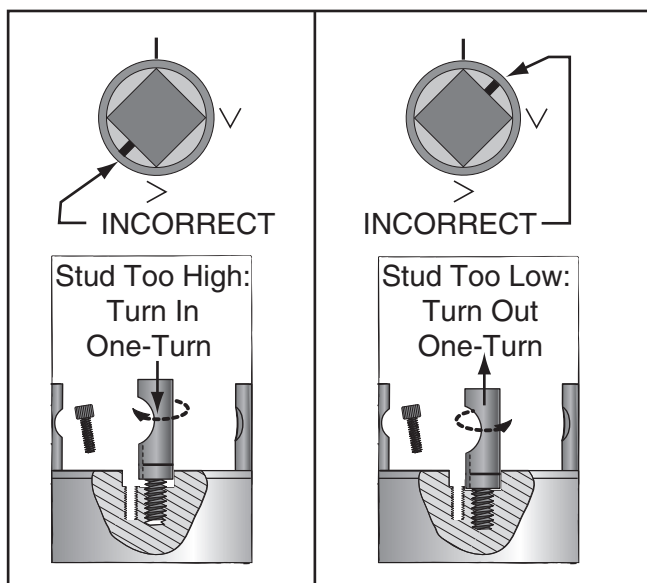


Figure 32. Correcting an improperly installed stud.

7. Verify that chuck fits spindle properly by checking for any gaps between mating surfaces.

— If there is not a gap, proceed to **Step 8**.

— If there *is* a gap, remove chuck, re-clean mating surfaces carefully, and re-install. If problem persists, contact our Tech Support.

8. Verify that chuck/spindle tapers are seated firmly together by removing chuck, per **Chuck Removal** instructions on following page, and pay close attention to how easily tapers release.

— If it was necessary to bump chuck or use a mallet to release tapers, then they are seating together properly.

— If tapers released easily with little intervention, they are not seated together firmly as required. Remove chuck, re-clean mating surfaces carefully, and re-install. If problem persists, contact our Tech Support.

Registration Marks

Lightly stamp registration marks across the mating seams of chuck components. These marks will help you re-install the chuck in the same position after removal, which ensures consistent chuck balance and turning results, and allows the same camlocks and studs to operate together for consistent locking and unlocking.

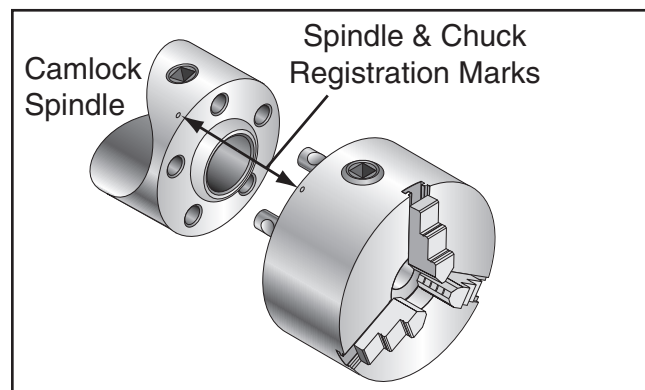


Figure 33. Registration mark locations.



Chuck Removal

To remove chuck:

1. DISCONNECT MACHINE FROM POWER!
2. Use appropriate lifting, support, or protective device to protect ways and support chuck (refer to **Chuck Safety & Support Devices** section for more details).
3. Loosen camlocks by turning key counter-clockwise until each cam line is aligned with its corresponding spindle mark, as shown below.

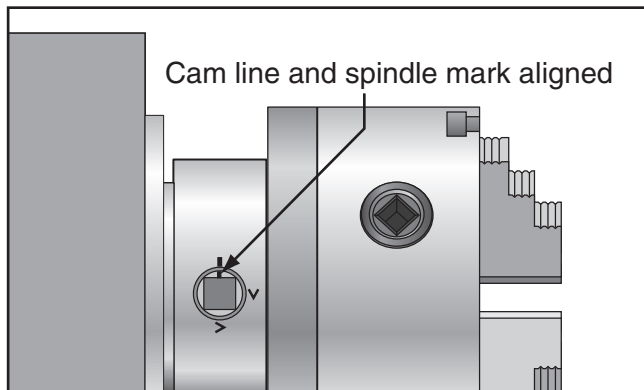


Figure 34. Camlock is fully loosened when the cam line is aligned with the spindle mark.

Tip: Camlocks can become very tight. A cheater pipe may be used as a last resort to add leverage when loosening. After loosening, you may need to wiggle the chuck key in the camlock to fully disengage the stud.

4. Using dead blow hammer or other soft mallet, lightly tap around outer circumference of chuck body to loosen it from spindle.
5. Remove chuck from spindle, using light rocking motion to carefully slide studs out of cam holes.
 - If chuck does not immediately come off, rotate it approximately 60° and tap it again. Make sure all marks on cams and spindle are properly aligned for removal.

Scroll Chuck Clamping

This 3-jaw, scroll-type chuck has an internal scroll-gear that moves all jaws in unison when adjusted with the chuck key. This chuck holds cylindrical parts on-center with the axis of spindle rotation and can be rotated at high speeds if the workpiece is properly clamped and balanced.

IMPORTANT: Never mix jaw types or positions to accommodate an odd-shaped workpiece. The chuck will spin out of balance and may throw the workpiece! Instead, use an independent jaw chuck or a faceplate.

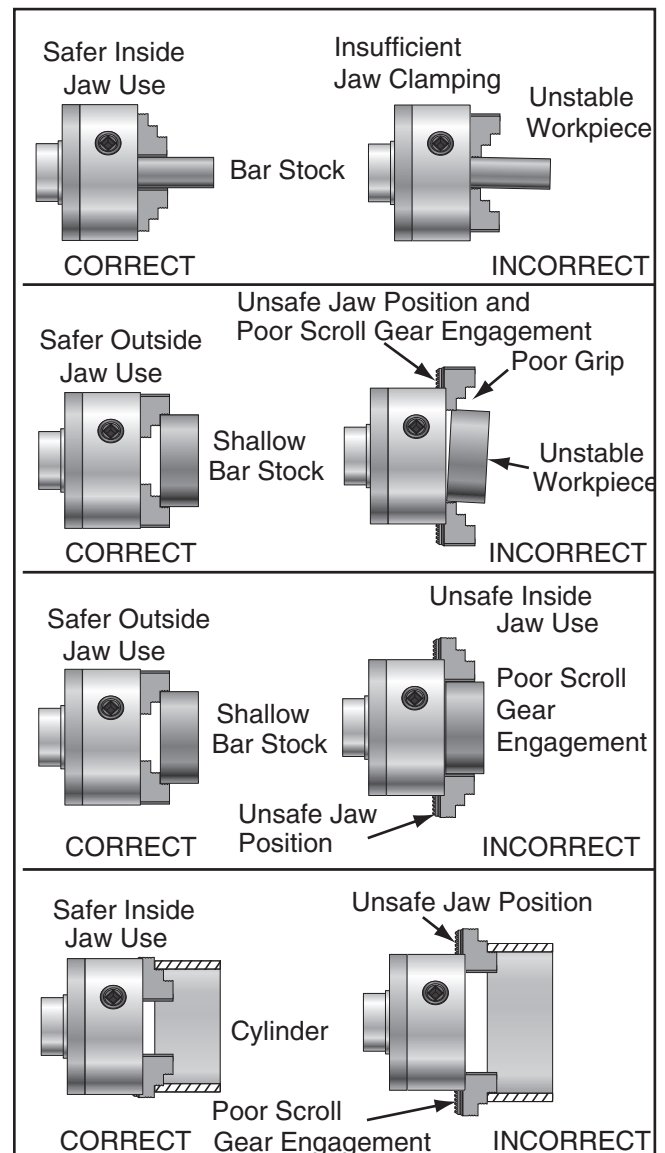


Figure 35. Jaw selection and workpiece holding.



Chuck Jaw Reversal

This chuck has 2-piece jaws that consist of a reversible top jaw and a master jaw. The top jaw can be removed, rotated 180°, and re-installed in the reverse position for additional work-holding options. When reversing the top jaws, always keep them matched with their original master jaw to ensure the best fit.

To reverse 2-piece jaws:

1. DISCONNECT MACHINE FROM POWER!
2. Remove cap screws that secure top jaw to master (bottom) jaw.
3. Remove top jaw, rotate it 180°, then re-install it with longest cap screw in tallest portion of jaw.
4. Repeat **Steps 2–3** with each remaining jaw (we recommend only reversing one jaw at a time to keep all original parts together).

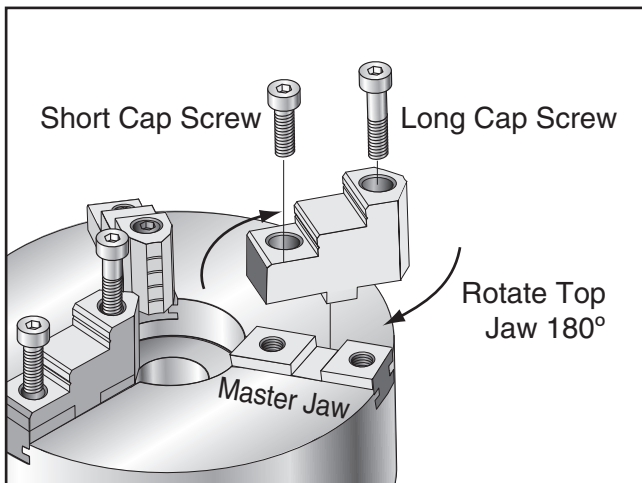


Figure 36. Reversing the chuck jaws.

4-Jaw Chuck

Refer to the **Chuck Installation** or **Chuck Removal** sections for instructions on installing or removing the 4-jaw chuck.

The 4-jaw chuck features independently adjustable jaws for holding non-concentric or off-center workpieces. Each jaw can be independently removed from the chuck body and reversed for a wide range of work-holding versatility.

WARNING

Because of dynamic forces involved in machining a non-concentric or off-center workpiece, always use a low spindle speed to reduce risk of workpiece coming loose and being thrown from lathe, which could cause death or serious personal injury.

Mounting Workpiece

1. DISCONNECT MACHINE FROM POWER!
2. Use an appropriate device to protect ways (refer to **Chuck Safety & Support Devices** section for more details).
3. Use chuck key to open each jaw so workpiece will fit into spindle opening and lay flat against chuck face and jaw steps.
4. With help from another person or a holding device, position workpiece so it is centered in chuck.



5. Tighten each jaw in small increments. After tightening first jaw, continue tightening remaining jaws in an opposing sequence, similar to sequential order shown below.

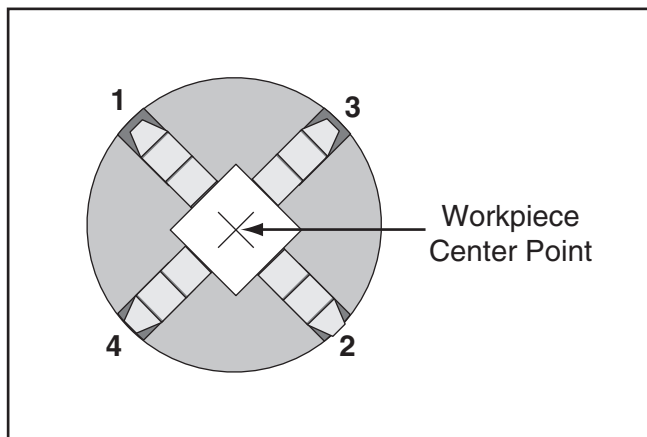


Figure 37. 4-jaw tightening sequence.

6. After workpiece is secured by jaws, use dial indicator to make sure workpiece is centered in chuck.
- If workpiece is not correctly centered, make fine adjustments by slightly loosening one jaw and tightening opposing jaw until workpiece is correctly positioned (see below for an example).



Figure 38. Example of non-cylindrical workpiece correctly mounted on the 4-jaw chuck.

Faceplate

Refer to the prior **Chuck Installation** and **Chuck Removal** subsections for instructions on installing or removing the faceplate.

The faceplate included with your lathe can be used for a wide range of operations, including machining non-concentric workpieces, straight turning between centers, off-center turning, and boring.

The tools needed for mounting a workpiece will vary depending on the type of setup you have.

!WARNING

Machining non-concentric workpieces at high speeds could cause the workpiece to be thrown from the lathe with deadly force. To reduce this risk, only machine non-concentric workpieces at low speeds and clamp counter-weights to the faceplate to balance it.

!WARNING

Failure to properly secure a workpiece to the faceplate could cause the workpiece to be thrown from the lathe with deadly force. To reduce this risk, use a minimum of THREE independent clamping devices to hold the workpiece onto the faceplate.



To mount a non-concentric workpiece to a faceplate:

1. DISCONNECT MACHINE FROM POWER!
2. Position appropriate device across bed ways to protect them from any potential damage from workpiece contact during installation.
3. With help from another person or holding device to support workpiece, position it onto faceplate and clamp it in place with a minimum of three independent clamping devices (see below for an example).

Be sure to take into account rotational and cutting forces that will be applied to workpiece when clamping it to faceplate. If necessary, use counter-weights to balance assembly and use a dial indicator to make sure workpiece is properly positioned for your operation.

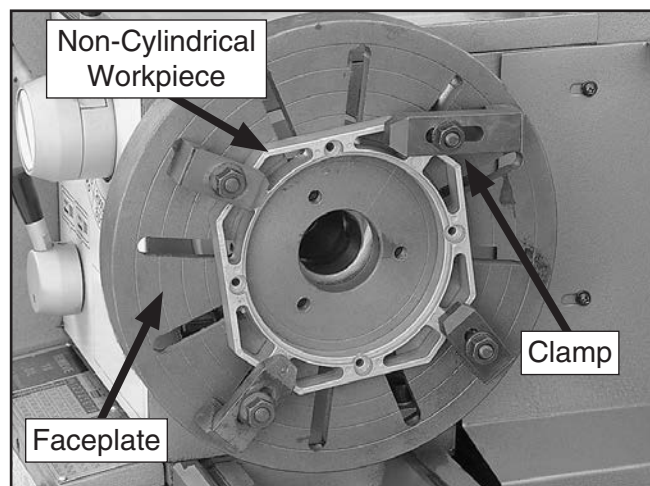


Figure 39. Generic picture of workpiece clamped in a faceplate.

Tailstock

The tailstock (see **Figure 39**) is typically used to support long workpieces by means of a live or dead center (refer to **Centers** on **Page 39** in the following section). It can also be used to hold a drill or chuck to bore holes in the center of a part. Custom arbors and tapers can also be cut on your lathe by using the offset tailstock adjustment.

Also, a torque wrench can be used with the tailstock for repeating super-accurate vertical alignment.

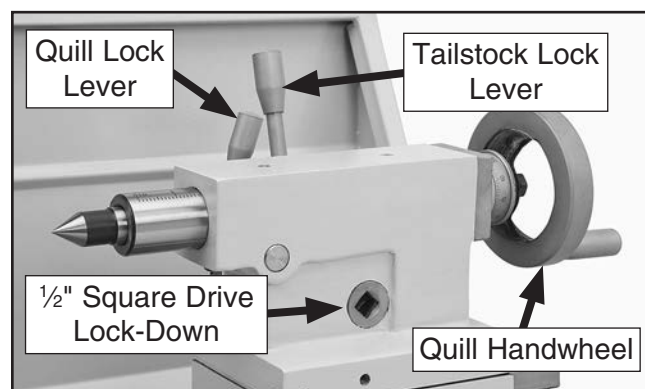


Figure 40. Tailstock and quill lock levers in locked position.

Graduated Dial

Increments.....	0.001"
One Full Revolution.....	0.100"

Increments on Quill

Inch	0"—4" in 0.100" Increments
------------	----------------------------

Positioning Tailstock

1. Rotate tailstock lock lever clockwise (facing machine) to unlock tailstock from bedways.
2. Slide tailstock to desired position by pushing it along the bedways.
3. Rotate tailstock lock lever counterclockwise to lock tailstock against bedways.

Optional: When doing precision work, the 1/2" square drive can be used to draw down the tailstock and bring the chuck and tailstock centers into more perfect alignment. This is a matter of trial and error, and it requires the use of precision measuring tools.



Using Quill

1. Rotate quill lock lever counterclockwise to loosen quill.
2. Turn quill handwheel clockwise to move quill toward spindle or counterclockwise to move it away from spindle.
3. Rotate quill lock lever clockwise to secure quill.

Installing Tooling

This tailstock uses a quill with an MT#3 taper that has a lock slot in the back of the bore that accepts tang arbors and drill bits (see the **Figures** below for examples).

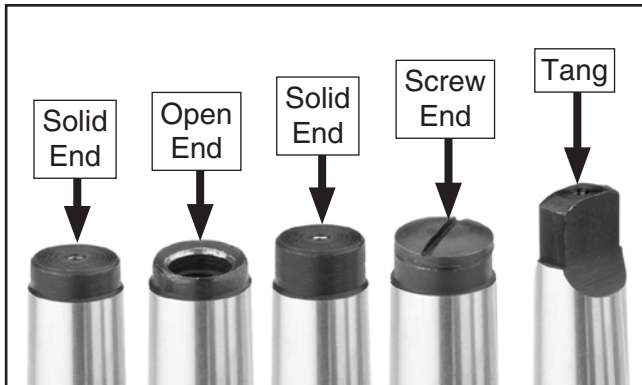


Figure 41. Types of tapered arbors and tooling.

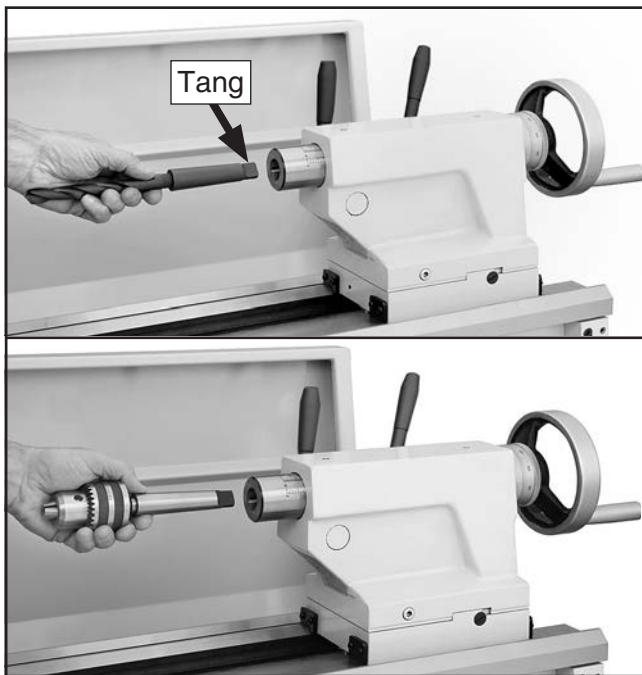


Figure 42. Example photos of inserting tools with tangs into the tailstock.

However, other tooling without tangs, such as the four remaining tools shown previously, can still be used if the potential load will not exceed the strength of the tapered fit. For example, this includes smaller drill chucks, drill bits, and centers.

Note: *If the tooling has an open hole in the end but is too short to be exposed in the drift slot for removal, then a screw can be threaded into the end of the tool to provide a solid surface for the quill pin to push against when the quill is retracted for tool removal. Otherwise, removal of such tooling may be difficult.*

To install and use tooling in tailstock:

1. With tailstock locked in place, unlock quill, then use handwheel to extend it approximately 1".
2. Thoroughly clean and dry tapered mating surfaces of quill and center, making sure that no lint or oil remain on tapers.
- Note:** *If tapered tool shaft has a tang, align it with slot in back of quill before seating it.*
3. With a firm and quick motion, insert tool into quill. Check to see if it is firmly seated by attempting to twist it—a firmly seated tool will not twist.
4. Unlock tailstock and move it until tip of tool is close to, but not touching workpiece, then relock tailstock.
5. Start spindle rotation, unlock quill lock lever, then turn quill handwheel clockwise to feed tool into workpiece.



Removing Tooling

1. Use shop rag to hold tool.
2. Rotate quill handwheel counterclockwise until tool is forced out of quill.
 - If tool does not come loose by retracting quill, extend quill and use drift key in slot shown in **Figure** below to remove tool.

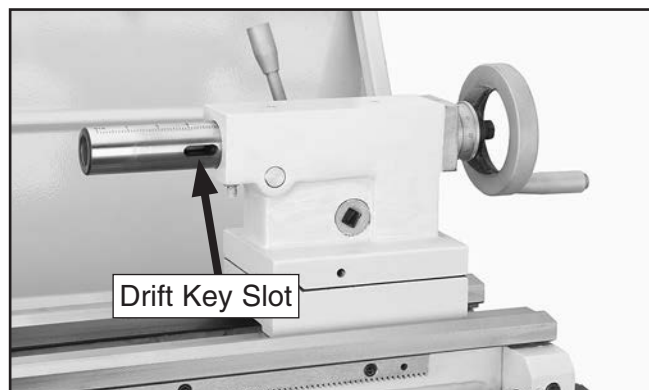


Figure 43. Drift key slot in the side of the quill.

Offsetting Tailstock

The tailstock quill can be offset from the spindle centerline for turning tapers. Offsetting the quill toward the front of the lathe results in a taper at the tailstock end. Conversely, offsetting the quill toward the back of the lathe results in a taper at the spindle end.

Note: The marks on the offset indicator (see **Figure 43**) are arbitrary. For a precise offset, use a dial indicator to check quill movement while adjusting the screws.

Tool Needed

Qty

Hex Wrench 4mm..... 1

To offset tailstock:

Rotate adjustment set screws (shown in **Figure 44**) in opposite directions for desired offset.

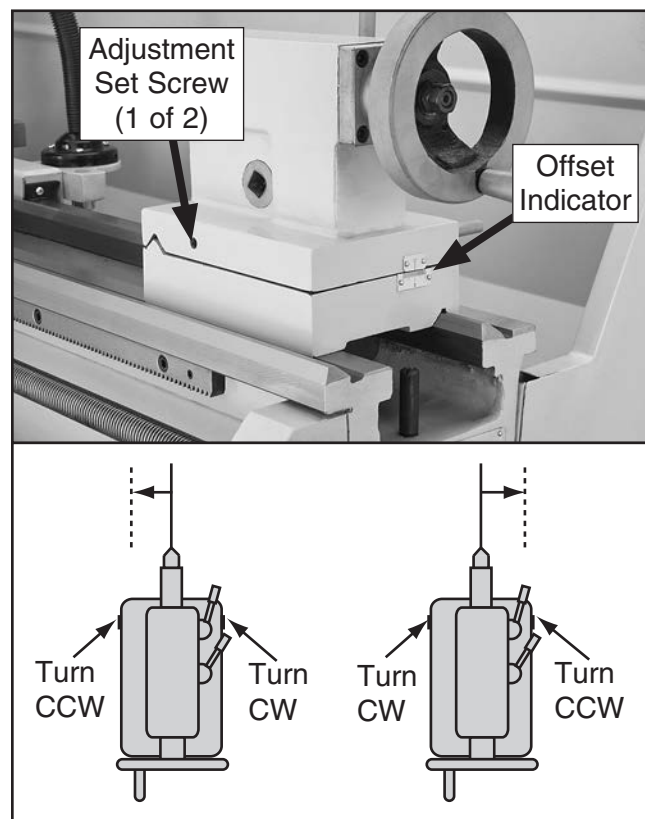


Figure 44. Set screw adjustment in relation to tailstock movement.



Aligning Tailstock to Spindle Centerline

This is an essential adjustment that should be verified or performed each time the tailstock is used to turn concentric workpieces between centers or immediately after offsetting the tailstock when turning a taper. If the tailstock is not aligned with the spindle centerline when it is supposed to be, turning results will be inaccurate along the length of the workpiece.

Items Needed	Qty
Hex Wrench 6mm.....	1
Round Stock 2" x 6"	2
Precision Level	1
Lathe Dog.....	1

To align tailstock to spindle centerline:

1. Use precision level to make sure bedway is level from side to side and from front to back.
— If bedway is not level, correct this condition before continuing with this procedure (refer to **Leveling** section in this manual).
2. Center drill both ends of a piece of round stock, then set it aside for use in **Step 5**.
3. Use another piece of round stock to make a dead center. Turn it to a 60° point, as illustrated below.

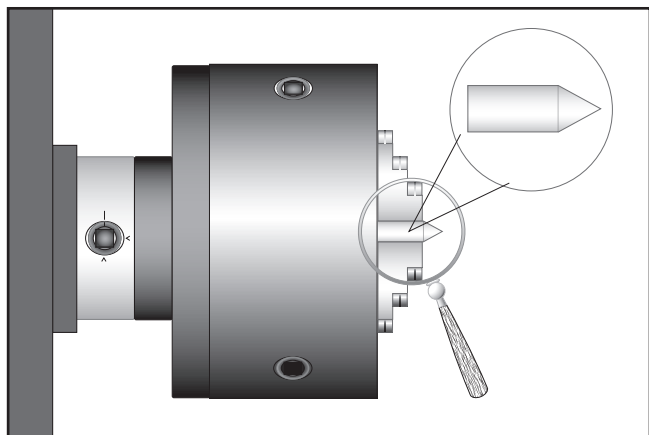


Figure 45. Turning a dead center.

Note: As long as this dead center remains unmoved in the chuck, its point will remain true to the spindle centerline. However, if the center is removed and later returned to the chuck, the point must be re-turned to once again be true with the spindle centerline.

4. Install center in tailstock.
5. Attach lathe dog to test stock from **Step 2**, then mount it between centers, as shown below.



Figure 46. Example photo of stock mounted between the centers.

6. Turn 0.010" off stock diameter.
7. Mount test or dial indicator so that plunger is on tailstock quill.

Note: If necessary in the following step, refer to the **Offsetting Tailstock** subsection for detailed instructions.



8. Use calipers to measure both ends of workpiece.

—If test stock is *thicker* at tailstock end, move tailstock toward *front* of lathe $\frac{1}{2}$ the distance of taper amount, as shown below.

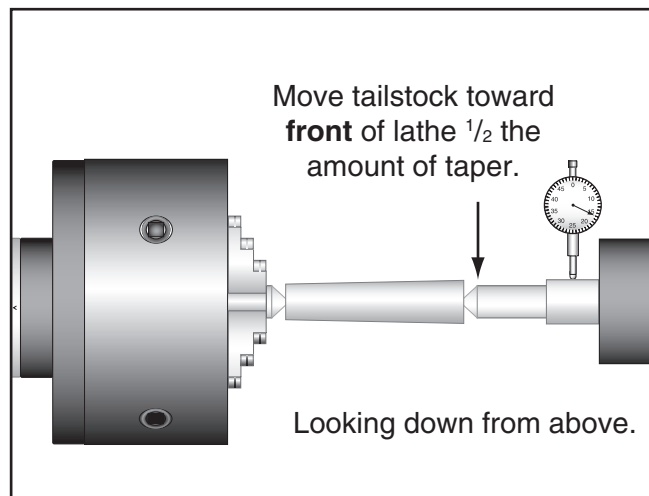


Figure 47. Adjust tailstock toward the operator.

—If test stock is *thinner* at tailstock end, move tailstock toward *back* of lathe $\frac{1}{2}$ the distance of taper amount, as shown below.

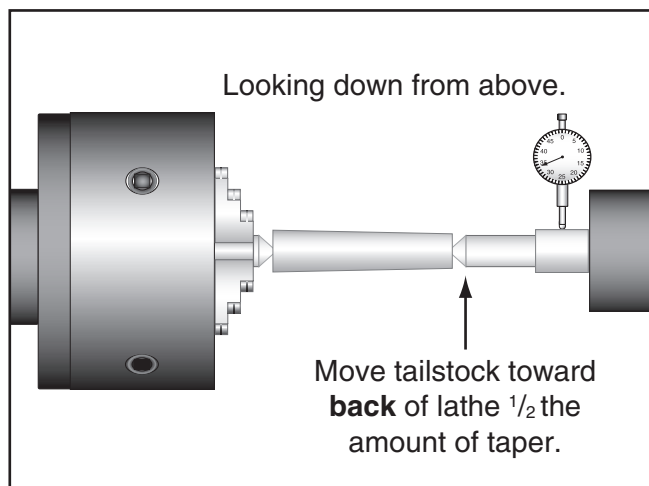


Figure 48. Adjust tailstock away from the operator.

9. Repeat **Steps 6–8** until desired accuracy is achieved.

Centers

Figure 49 shows the MT#3 dead centers included with the lathe. In addition, an MT#6 x MT#3 adapter sleeve is included for mounting MT#3 tooling in the spindle.

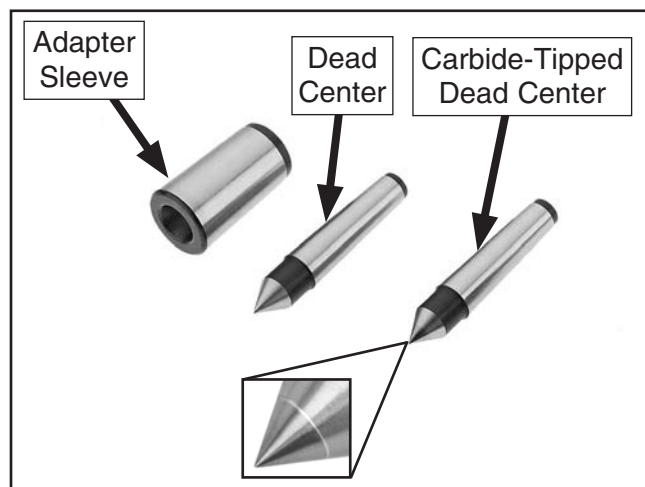


Figure 49. Adapter sleeve and centers.

Dead Centers

A dead center is a one-piece center that does not rotate with the workpiece and is used to support long, slender workpieces

Use the dead center in the spindle for operations where the workpiece rotates with the center and does not generate friction.

The carbide-tipped dead center can better withstand the effects of friction and is best used in the tailstock where the workpiece will rotate against it. The tip of the center must be generously lubricated during the operation to avoid premature wear and maximize smooth operation. Using low spindle speeds will also reduce the heat and wear from friction.



Mounting Dead Center in Spindle

1. DISCONNECT MACHINE FROM POWER!
2. Thoroughly clean and dry all threads and mating surfaces of spindle bore and center, making sure that no lint or oil remains on these surfaces.

Note: *This will prevent the tapered surfaces from seizing due to operational pressures, which could make it very difficult to remove the center.*
3. Mount chuck or faceplate onto spindle, whichever is correct for your operation.
4. Insert center into tapered spindle sleeve, then insert center into spindle bore.

The **Figure** below shows an example photo of a dead center installed in spindle, using a lathe dog and faceplate for turning between centers.

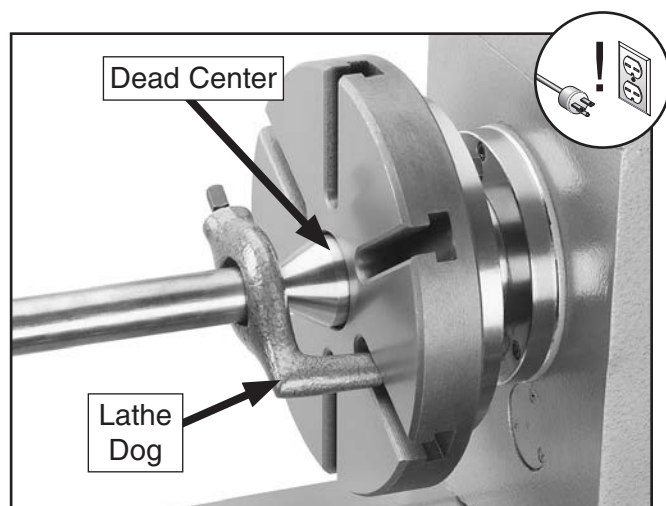


Figure 50. Example of using a dead center with a faceplate and lathe dog.

Live Centers

A live center has bearings that allow the center tip and the workpiece to rotate together; it can be installed in the tailstock quill for higher speeds.

Removing Center from Spindle

To remove the sleeve and center from the spindle, insert a piece of round bar stock (or similar) through the outside end of the spindle. Have another person hold onto the sleeve and center with a gloved hand or shop rag, then tap the bar stock to knock the sleeve loose.

Mounting Center in Tailstock

Either a carbide-tipped dead center or live center can be used in the tailstock. Mounting instructions are the same for both. The **Figure** below shows an example photo of a dead center mounted in a tailstock.

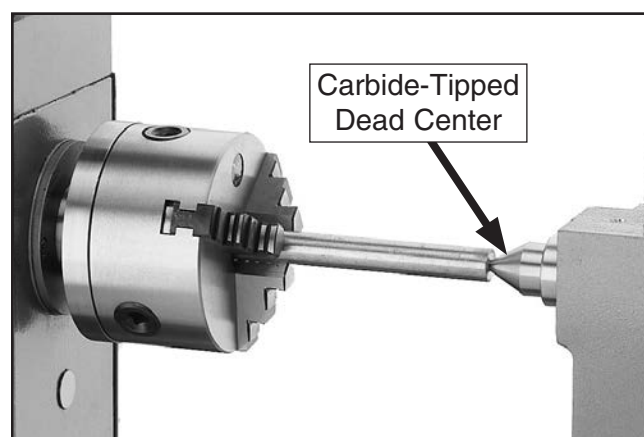


Figure 51. Example of using a carbide-tipped dead center installed in the tailstock.

NOTICE

To avoid premature wear of dead center or damage to workpiece, use low spindle speeds and keep tip of dead center mounted in tailstock well lubricated.

To mount a center in tailstock:

1. DISCONNECT MACHINE FROM POWER!
2. Thoroughly clean and dry tapered mating surfaces of tailstock quill bore and center, making sure no lint or oil remains on tapers.



3. Use quill handwheel to feed quill out from casting approximately 1".

Note: *The maximum quill travel is 3¹⁵/₁₆", but we do not recommend extending the quill more than 2" or stability and accuracy will be reduced.*

4. Insert center into tailstock quill.
5. Seat center firmly into quill during workpiece installation by rotating quill handwheel clockwise to apply pressure with center engaged in center hole of workpiece.

Note: *Only apply enough pressure with tailstock quill to securely mount workpiece between centers. Avoid overtightening center against workpiece, or it may become difficult to remove later, and it will result in excessive friction and heat, which may damage workpiece and center.*

Removing Center from Tailstock

To remove the center from the quill, hold onto it with a gloved hand or shop rag, then rotate the quill handwheel counterclockwise to draw the quill back into the casting until the center releases.

If the center does not come loose by retracting the quill, extend the quill to expose the slot shown in **Figure 52**, then use a drift key to remove the center.

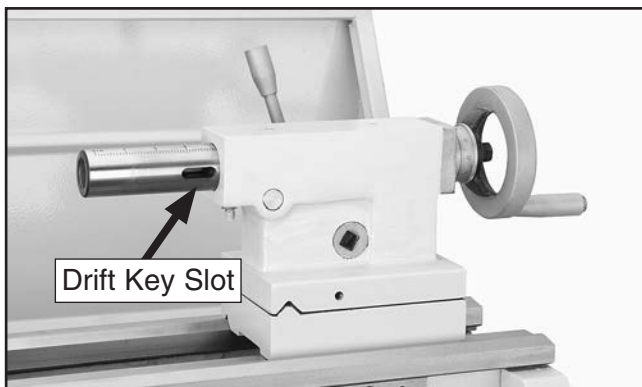


Figure 52. Drift key slot in the side of the quill.

Mounting Workpiece Between Centers

1. DISCONNECT MACHINE FROM POWER!
2. Drill center holes in both ends of workpiece.
3. Install dead center in spindle with lathe dog and chuck, faceplate or drive plate, then install live center or carbide-tipped dead center in tailstock.
4. Lubricate dead center point and workpiece center holes, then mount workpiece between centers and hold it in place with light pressure from tailstock center.
5. Seat center firmly into quill by rotating quill handwheel clockwise to apply pressure against workpiece (see example below).



Figure 53. Example photo of a workpiece mounted between the centers.

Note: *Only apply enough pressure to securely mount the workpiece between centers. Avoid over-tightening the center against the workpiece, or it may become difficult to remove later. Also, over-tightening will result in excessive friction and heat, which may damage the workpiece or center.*



Drill Chuck & Arbor

The drill chuck attaches to the tailstock quill with the included B16 x MT#3 arbor, shown in **Figure 54**. Matched tapers on the arbor and the inside of the chuck create a semi-permanent assembly when properly joined. The drill chuck can accept tooling from $\frac{1}{16}$ " – $\frac{1}{2}$ ".

Tool Needed	Qty
Rubber/Wooden Mallet.....	1

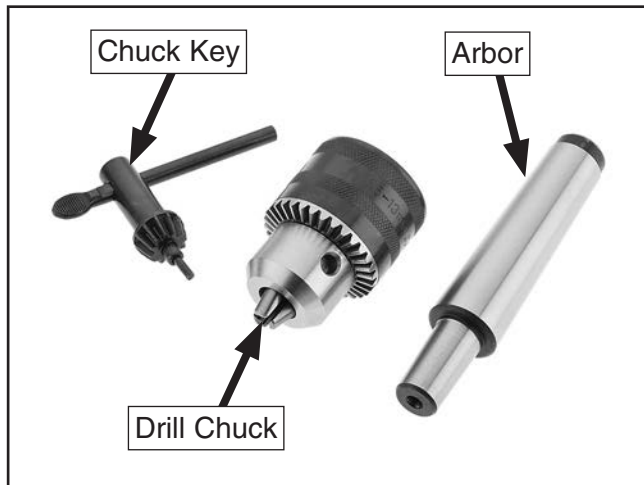


Figure 54. Chuck components.

To assemble the drill chuck and mount it in the tailstock quill:

1. Use mineral spirits to thoroughly clean drill chuck, arbor and quill barrel, and dry all surfaces before assembly.
2. Place drill chuck face down on a workbench.
3. Insert short tapered end of arbor into socket in back of drill chuck and tap it with a rubber or wooden mallet.

The procedure for mounting and removing the chuck and arbor from the tailstock quill is the same as for a center. Refer to **Mounting Center in Tailstock** and **Removing Center from Tailstock**.

Steady Rest

The steady rest supports long, small diameter shafts and can be mounted anywhere along the length of the bedways.

Familiarize yourself with the steady rest components shown in **Figure 55** to better understand the controls.

Tools Needed	Qty
Hex Wrench 3mm.....	1
Open-End Wrench 10mm.....	1
Open-End Wrench 19mm.....	1

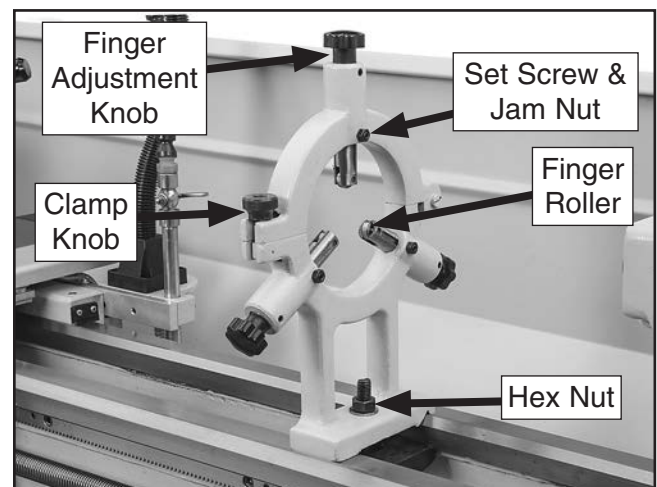


Figure 55. Steady rest components.

To install and use the steady rest:

1. DISCONNECT MACHINE FROM POWER!
2. Thoroughly clean all mating surfaces, then place the steady rest base on the bedways so the triangular notch fits over the bedway prism.
3. Position the steady rest with the base clamp where required to properly support the workpiece, then tighten the hex nut shown in **Figure 55** to secure it in place.



4. Loosen the clamp knob that secures the two halves of the steady rest and open the top portion, as shown in **Figure 56**.

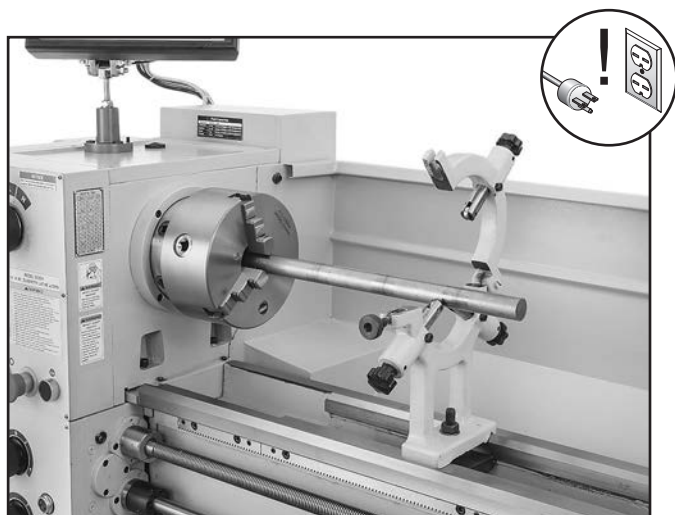


Figure 56. Example of workpiece mounted in the steady rest.

5. Loosen the jam nuts and set screws so the finger roller positions can be adjusted.
6. Use the finger adjustment knobs to position the bottom two finger rollers against the workpiece, as shown in **Figure 56**.
7. Close the steady rest, then use the finger adjustment knobs to adjust all three finger rollers so that they just touch the workpiece without causing deflection.

Note: *The finger rollers should properly support the workpiece along the spindle center-line while still allowing it to freely rotate.*

8. Lock the fingers with the set screws and jam nuts, then tighten the clamp knob.

Tip: *To reduce the effects of friction, lubricate the fingers with way oil during operation.*

Follow Rest

The follow rest mounts to the saddle with two cap screws (see **Figure 57**). It is used on long, slender parts to prevent workpiece deflection from the pressure of the cutting tool during operation. Adjust the follow rest fingers in the same manner as the those on the steady rest.

Note: *To reduce the effects of friction, lubricate the fingers with way oil during operation.*

Tools Needed	Qty
Hex Wrench 3mm.....	1
Hex Wrench 6mm.....	1
Open-End Wrench 10mm.....	1

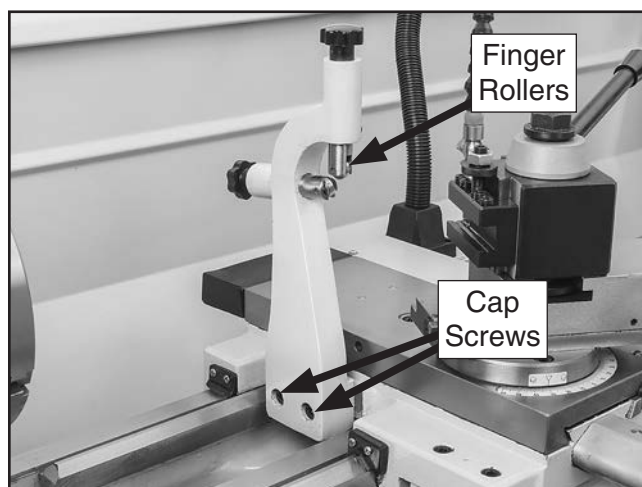


Figure 57. Follow rest attachment.



Carriage & Compound Locks

The carriage and compound rest have locks that can be tightened to provide additional rigidity during operation, especially during heavy cuts.

See **Figure 58** to identify the locations of the locks for each device.

Tools Needed	Qty
Hex Wrench 3mm.....	1
Hex Wrench 6mm.....	1

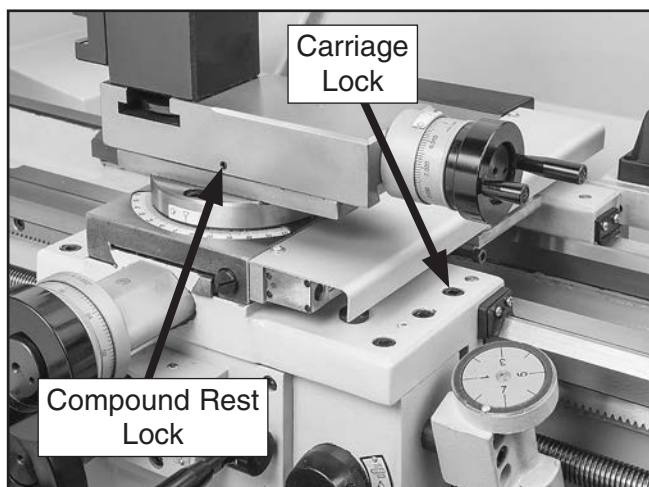


Figure 58. Location of carriage and compound rest locks.

Compound Rest

The compound rest handwheel has an indirect-read graduated scale. This means that the distance shown on the scale represents the actual distance the cutting tool moves. The base of the compound rest has another graduated scale used for setting the cutting tool to a specific angle.

Graduated Dial

Increments.....	0.001" (0.02mm)
One Full Revolution.....	0.100" (2.54mm)

Tool Needed

Tool Needed	Qty
Hex Wrench 6mm.....	1

To set compound rest at a certain angle:

1. Loosen two cap screws at base of compound rest (1 of 2 shown in **Figure 59**).

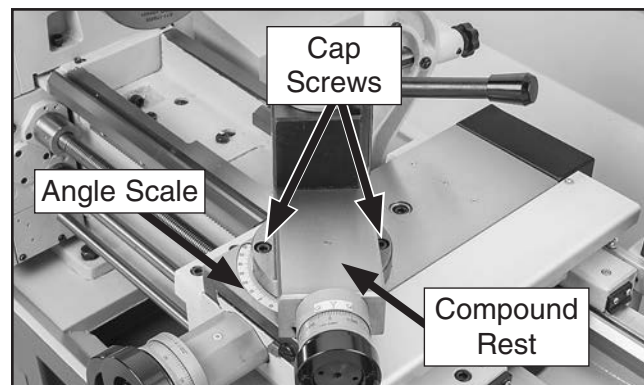


Figure 59. Compound rest angle adjustments.

2. Rotate rest to desired angle, as indicated by scale at base, then retighten two cap screws.

Tip: The first time you set the angle of the compound rest for cutting threads, mark the location on the cross slide as a quick reference point. This will allow you to quickly return the compound rest to that exact angle the next time you need to cut threads.



Tool Post

The included quick-change tool post (see **Figure 60**) is a 200-series design.

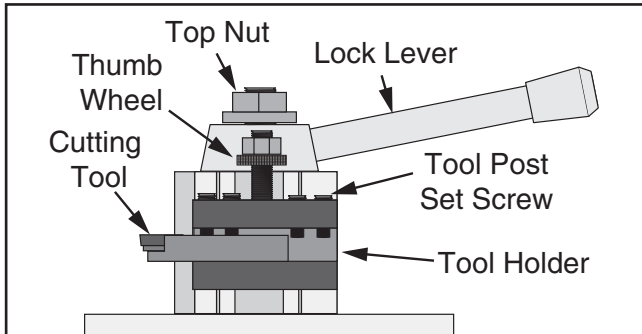


Figure 60. Example of tool mounted in tool post.

Tool holders can be quickly loaded and unloaded using the lock lever. Tools up to $\frac{5}{8}$ " can be secured by tightening the tool holder set screws. The thumb wheel rotates to adjust cutting tool height. The tool post is rotated by loosening the top nut.

Installing Tool in Tool Post

Tool Needed	Qty
Open-End Wrench/Socket 27mm.....	1
Hex Wrench Size 5mm.....	1

To install a tool in the tool post:

1. Position tool in holder so cutting edge extends just enough to allow tool to cut freely—but no more. Cutting edge must be well supported to ensure good cutting results and avoid chipping.

WARNING

Over-extending a cutting tool from the post will increase risk of tool chatter, breakage, or tool loosening during operation, which could cause metal pieces to be thrown at the operator or bystanders with great force. **DO NOT** extend a cutting tool more than 2.5 times the width of its cross-section (e.g., $2.5 \times 0.5" = 1.25"$).

2. Secure tool with at least two set screws.
3. Adjust cutting tool height to spindle centerline, as instructed in next subsection.

Aligning Cutting Tool with Spindle Centerline

For most operations, the cutting tool tip should be aligned vertically with the spindle centerline, as illustrated in **Figure 61**.

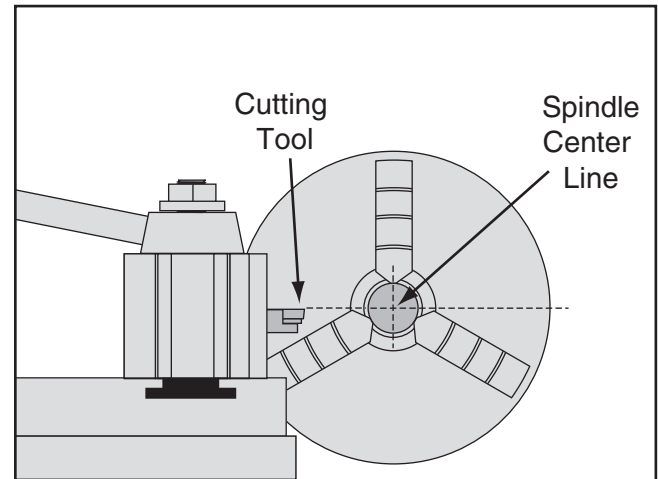


Figure 61. Cutting tool aligned with spindle centerline (viewed from tailstock).

There are a number of ways to check and align the cutting tool to the spindle centerline. If necessary, you can raise the cutting tool by placing steel shims underneath it. The shims should be as long and as wide as the cutting tool to properly support it.

Below are two common methods:

- Move the tailstock center over the cross slide and use a fine ruler to measure the distance from the surface of the cross slide to the tip of the center. Adjust the cutting tool height so it is the same distance above the cross slide as the tailstock center.
- Align the tip of the cutting tool with a tailstock center, as described in the following procedure. For this to work, the tailstock must be aligned to the spindle centerline (refer to **Aligning Tailstock To Spindle Centerline** on **Page 38** for detailed instructions).



Tools Needed	Qty
Hex Wrench 5mm.....	1
Open-End Wrench/Socket 27mm.....	1
Steel Shims	As Needed
Cutting Tool	1
Fine Ruler.....	1
Tailstock Center.....	1

To align cutting tool with tailstock center:

1. Mount cutting tool and secure post so tool faces tailstock.
2. Install a center in tailstock, and position tip near cutting tool.
3. Lock tailstock and quill in place.
4. Adjust height of cutting tool tip to meet center tip, as shown in **Figure 62**.

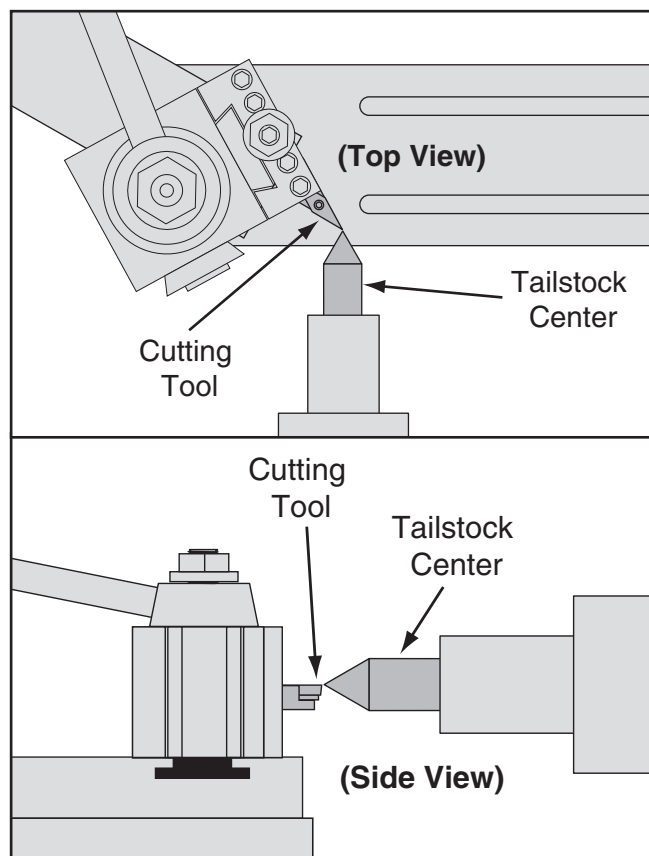


Figure 62. Cutting tool aligned to the tailstock center.

Spindle Spider

This lathe is equipped with a set of outboard spindle supports otherwise known as a "spider" (see **Figure 63**).

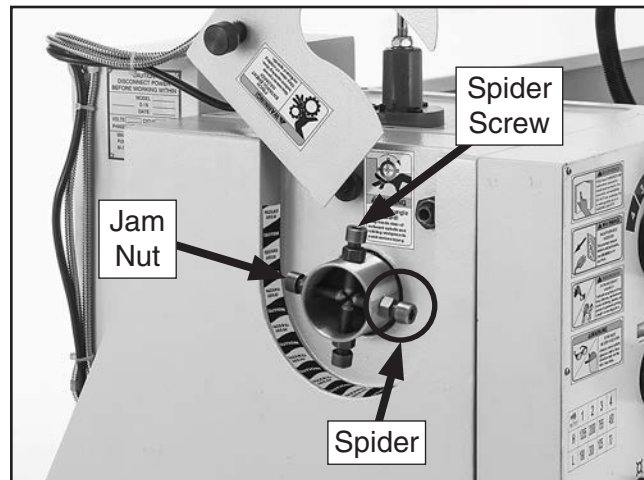


Figure 63. Spindle spider components.

! CAUTION

Remove spider screws when not in use. Always DISCONNECT LATHE FROM POWER when installing, removing, or adjusting spider screws. Ignoring this warning can lead to personal injury or machine damage.

The spider is especially designed for supporting gun barrels during chambering operations; however, it is a great support option for almost any long workpiece that extends through the outboard side of the spindle.

The tips of the spider screws have brass wear pads that hold the workpiece without causing indents in the finish.

When spider screws are installed, always use the jam nuts to lock each spider screw in position. Merely tightening the spider screws against the workpiece and leaving the jam nuts loose is not safe. Spiders screws that loosen during operation can crash into the lathe end cover.



Manual Feed

The handwheels shown in **Figure 64** allow the operator to manually position the cutting tool.

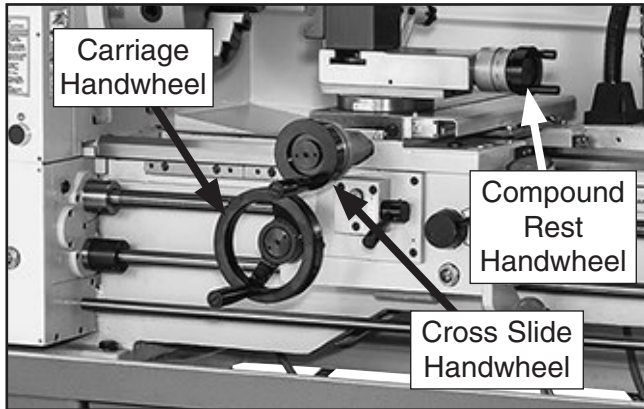


Figure 64. Carriage controls.

Carriage Handwheel

The carriage handwheel moves the carriage left or right along the bed. It has a graduated dial with 0.005" increments. One full revolution moves the carriage 0.56".

Cross Slide Handwheel

The cross slide handwheel moves the tool toward and away from the work. Adjust the position of the graduated scale by holding the handwheel with one hand and turning the dial with the other. The cross slide handwheel has an indirect-read graduated dial, which shows the actual distance the tool moves. The dial has 0.002" (0.05mm) increments. One full revolution moves the slide 0.200" (5.08mm).

Compound Rest Handwheel

The compound rest handwheel moves the cutting tool linearly along the set angle of the compound rest. The compound rest angle is set by hand-rotating it and securing in place with two hex nuts. The compound rest has an indirect-read graduated dial with 0.001" (0.02mm) increments. One full revolution of the handwheel moves the slide 0.100" (2.54mm).



Spindle Speed

Using the correct spindle speed is important for getting safe and satisfactory results, as well as maximizing tool life.

To set the spindle speed for your operation, you will need to: 1) Determine the best spindle speed for the cutting task, and 2) configure the lathe controls to produce the required spindle speed.

Determining Spindle Speed

Many variables affect the optimum spindle speed to use for any given operation, but the two most important are the recommended cutting speed for the workpiece material and the diameter of the workpiece, as noted in the formula shown in **Figure 65**.

$$\frac{\text{*Recommended Cutting Speed (FPM)} \times 12}{\text{Dia. of Cut (in inches)} \times 3.14} = \text{Spindle Speed (RPM)}$$

*Double if using carbide cutting tool

Figure 65. Spindle speed formula for lathes.

Cutting speed, typically defined in feet per minute (FPM), is the speed at which the edge of a tool moves across the material surface.

A recommended cutting speed is an ideal speed for cutting a type of material in order to produce the desired finish and optimize tool life.

The books **Machinery's Handbook** or **Machine Shop Practice**, and some internet sites, provide excellent recommendations for which cutting speeds to use when calculating the spindle speed. These sources also provide a wealth of additional information about the variables that affect cutting speed and they are a good educational resource.

Also, there are a large number of easy-to-use spindle speed calculators that can be found on the internet. These sources will help you take into account the applicable variables in order to determine the best spindle speed for the operation.

Setting Spindle Speed

The spindle speed and speed range levers, shown in **Figure 66**, are used to select one of the eight spindle speeds.

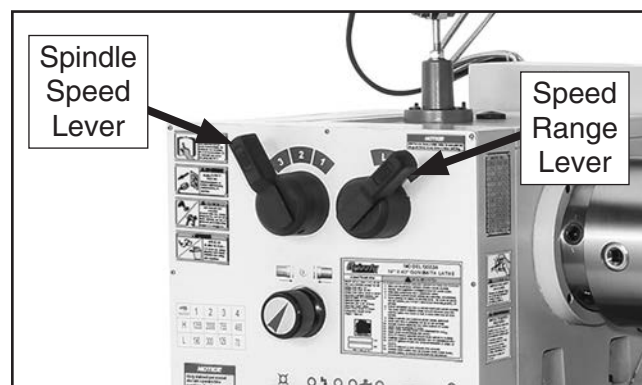


Figure 66. Spindle speed and speed range levers.

The spindle speed lever and speed range lever control the gear configuration in the headstock to produce the selected spindle speed.

NOTICE

To avoid damaging gears, ALWAYS make sure the spindle is completely stopped BEFORE moving the spindle speed levers.

The chart below shows the various combinations of lever positions for achieving a desired speed.

Spindle Speed RPM				
rev/min	1	2	3	4
H	1255	2000	755	460
L	190	300	125	70

Figure 67. Spindle speed chart.



Configuration Example

Figure 68 shows the speed lever and speed range levers positioned for a spindle speed of 460 RPM.

Note: *If the spindle speed levers do not easily adjust into position, rotate the spindle by hand while you apply pressure to the levers. When the gears align, the levers will easily move into place. If you have trouble rotating the spindle by hand, you can use the spindle key or a chuck key to get additional leverage—just be sure to remove the key when you are done.*

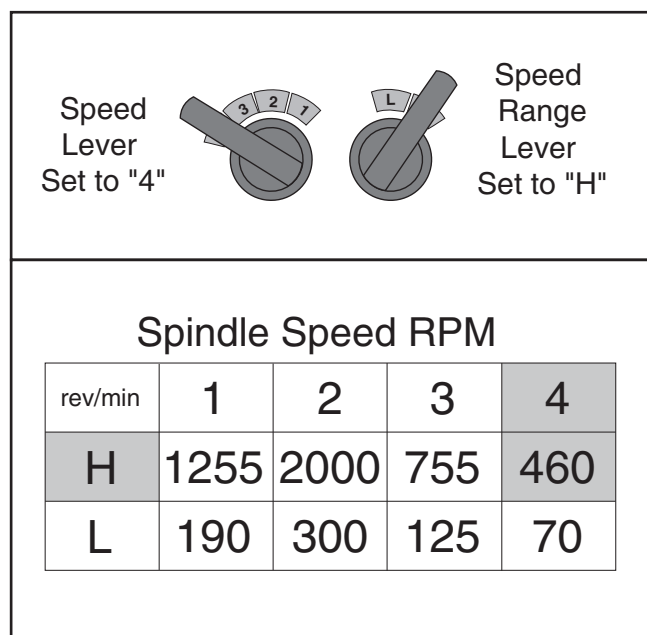


Figure 68. Setting spindle speed to 460 RPM.

Power Feed

Both the carriage and cross slide have power feed capability when the carriage is engaged with the feed rod. The rate that these components move per revolution of the feed rod is controlled by the quick-change gearbox lever positions and the end gear configuration.

The feed per revolution and the spindle speed must be considered together—this is the feed rate. The sources you use to determine the optimum spindle speed for an operation will also provide the optimal feed to use with that spindle speed.

Often, the experienced machinist will use the feeds and speeds given in their reference charts or web calculators as a starting point, then make minor adjustments to the feed rate (and sometimes spindle speed) to achieve the best results.

The carriage can alternately be driven by the leadscrew for threading operations. However, this section only covers the use of the power feed option for the carriage and cross slide components for non-threading operations. To learn how to power the carriage for threading operations, refer to **Threading** on **Page 54**.

NOTICE

If the feed selection lever and the half nut are engaged at the same time, machine damage could occur. Even though there is a lock-out device to prevent this, it could break if forced.



NOTICE

To avoid damaging the lathe, **ALWAYS** make sure the spindle is completely stopped **BEFORE** using the headstock controls to make changes.

Power Feed Controls

Use **Figures 69–70** and the following descriptions to understand the power feed controls.

Note: Before using power feed, you may have to re-configure the end gears, depending on how they are set up. Refer to **End Gears** on **Page 52** for detailed instructions.

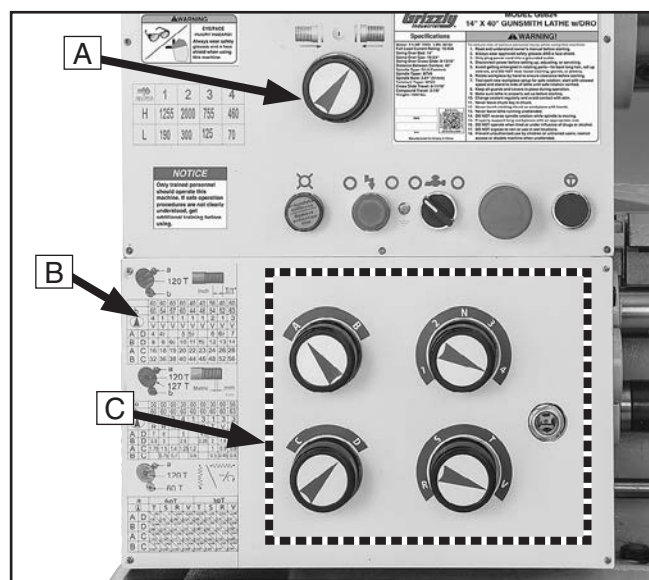


Figure 69. Power feed controls on the headstock.

- A. Feed Direction Dial:** Selects the direction of carriage travel for power feed relative to the rotation direction of the spindle. When the dial is positioned as shown in **Figure 69**, the carriage will move left (toward the spindle), or the cross feed will travel toward the rear of the lathe when the spindle is rotating counterclockwise (or toward the front of the lathe). When the dial is positioned in the opposite direction, the carriage will move right (toward the tailstock), or the cross feed will travel toward the front of the lathe when the spindle is rotating clockwise (or toward the rear of the lathe).

- B. Feed Rate Chart:** Displays the settings for the quick-change gearbox dials for the selected feed rate. Refer to **Setting Power Feed Rate** subsection on the next page for detailed instructions.

- C. Quick-Change Gearbox Feed Dials:** Position these to select different feed rates.

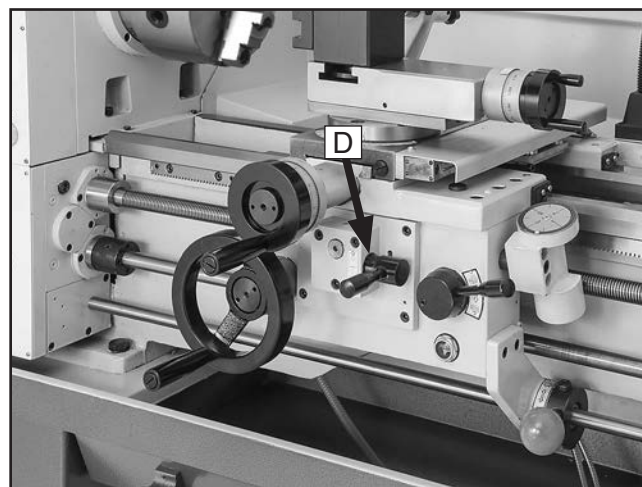


Figure 70. Apron power feed controls.

- D. Feed Selection Lever:** Changes the power feed to either the cross slide or the carriage.

When the lever is down and the indent pin is pointing up, the cross slide is selected. Conversely, when the lever is up and the pin is pointing down, the carriage is selected.

In the middle position, the apron gears are disengaged from the feed rod and neither component will move.

Note: When using this lever, you may need to slightly rotate the handwheel of the component you are trying to engage, so that the apron gears can mesh.



Setting Power Feed Rate

The feed rate chart (see **Figure 69** on previous page for location) displays the settings for the headstock feed controls for feed rates.

Examining the chart, you will see a series of boxes separated by slashes. The top number is the carriage feed rate, the bottom number is the cross-slide feed rate, as shown in **Figure 71**.

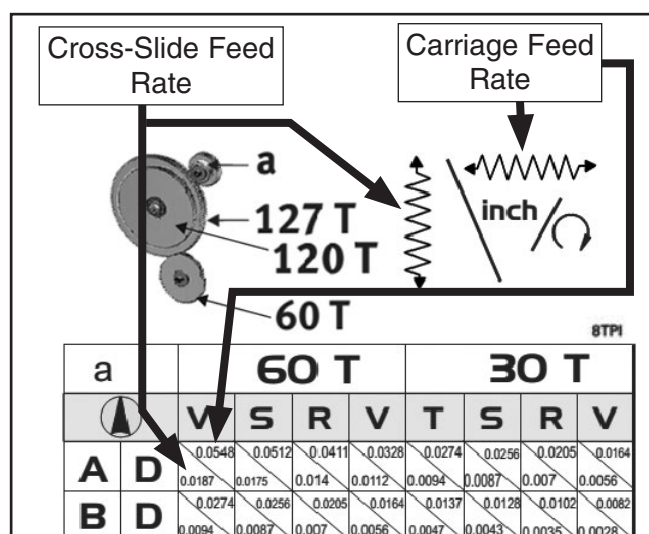


Figure 71. Cross slide and carriage feed rates.

Using the controls on the lathe, follow along with the example below to better understand how to set the lathe for the desired power feed rate.

To set cross-slide power feed rate of 0.0018 in./rev.:

1. Locate the box on the feed rate chart that lists 0.0018 in./rev., as shown in **Figure 72**.

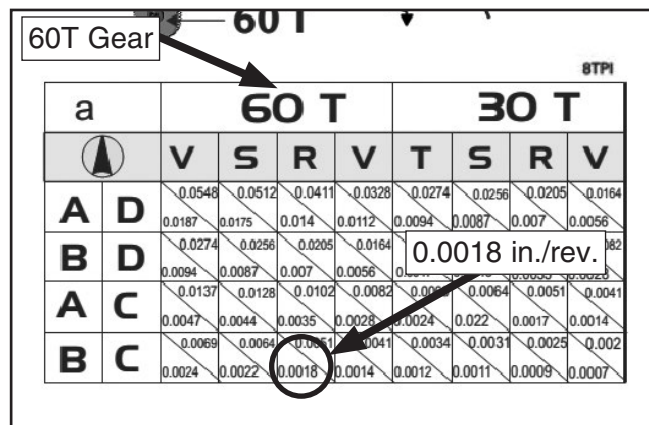


Figure 72. 0.0018 in./rev. location on feed chart.

2. Locate the applicable end gear on the chart—in this case it is the 60T gear.
3. Install the 60T gear in the upper "a" position so it meshes with the 127T gear (refer to **Power Feed Configuration** on the next page for details).
4. Position the gearbox dials as directed by the chart shown in **Figure 73**. Be sure to point the top right dial to "N" select the feed rod and disengage the leadscrew. If necessary, use the chuck key to rock the spindle back and forth to help mesh the gears.

Note: During all power feeding operations, the top right dial is set to "N" so the feed rod is selected.

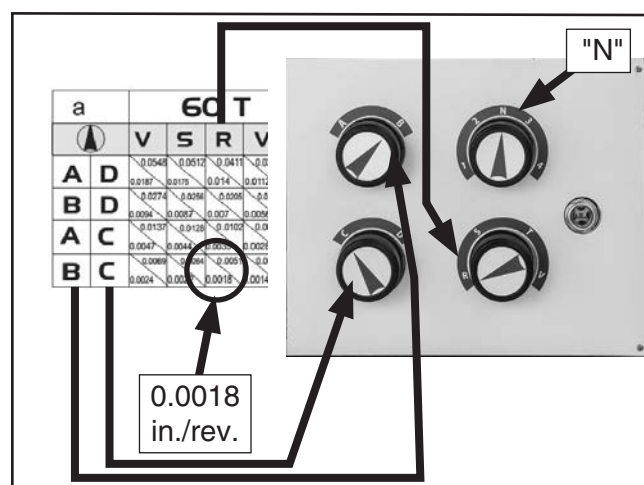


Figure 73. Gearbox dials positioned for 0.0018 in./rev.

5. The cross slide is now set up for a power feed rate of 0.0018 in./rev.



End Gears

The following subsections explain how to configure the end gears. The end gears must be configured according to the feeds/speeds and threading charts in order to perform specific power feed or threading operations.

In order to set these up properly according to the configurations show on the charts, you first need a basic understanding of the gears and positions referenced on the charts. Use **Figure 74** to identify the upper "a" position gear, middle 120T/127T end gears, and lower "b" position gear, also referenced on the headstock feed and threading charts.

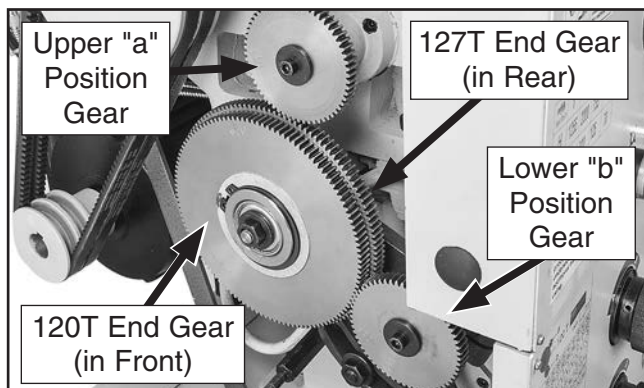


Figure 74. End gear identification.

Power Feed Configuration

Install either a 60T or 30T gear in the upper "a" position and mesh it with the 127T gear. Gear selection depends upon which feed speed is selected. Install another 60T gear in the bottom position, and mesh it with the 127T gear. Install the 120/127T combo gear in the middle position with the 127T gear facing the headstock.

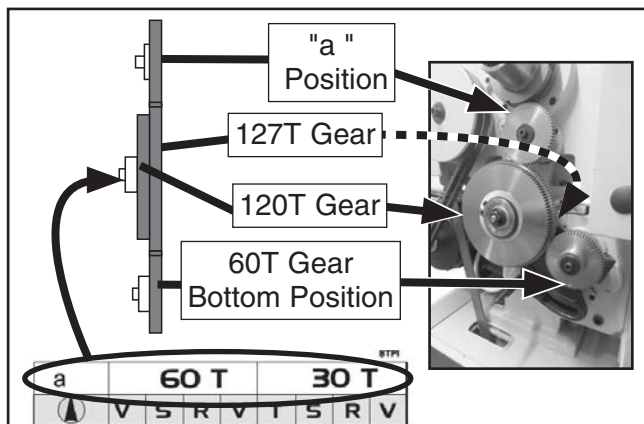


Figure 75. Power feed chart end gears.

Inch Threading Configuration

Install an end gear corresponding to the "b" row on the chart in the lower "b" position so it meshes with the 127T gear. Install an end gear corresponding to the "a" row in the upper "a" position and mesh it with the 127T gear, as shown below. Install the 120/127T combo gear in the middle position with the 127T gear facing the headstock.

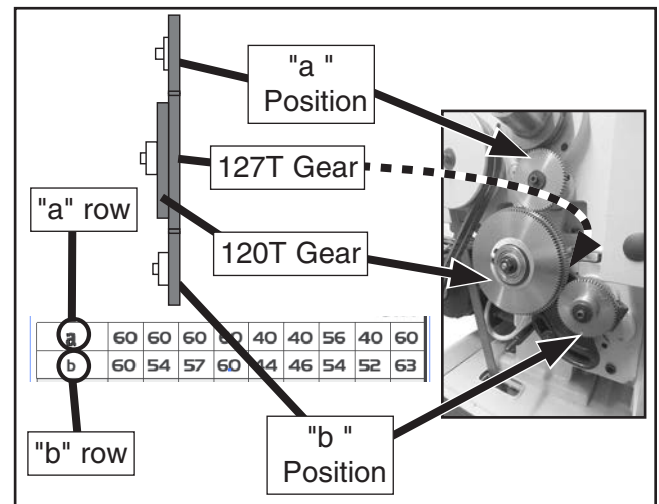


Figure 76. Inch feed chart end gears.

Metric Threading Configuration

An end gear corresponding to the "b" row on the chart is installed in the lower "b" position so it meshes with the inner 120T gear. An end gear corresponding to the "a" row is installed in the "a" position so it meshes with the outer 127T gear, as shown below. Install the 120/127T combo gear in the middle position with the 127T gear facing the headstock.

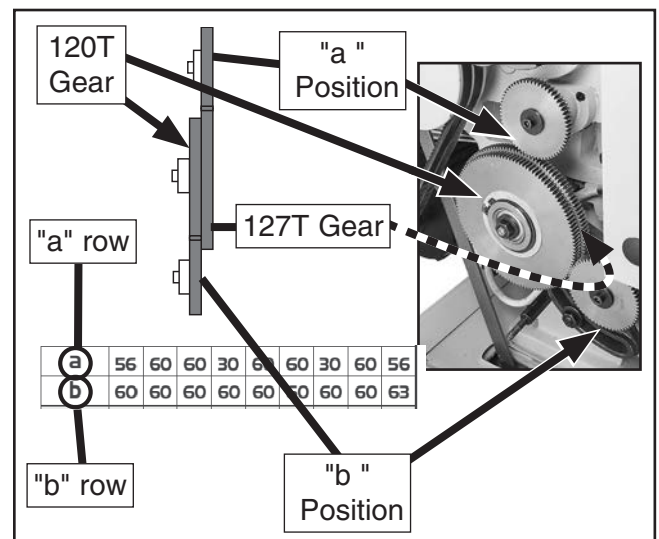


Figure 77. Metric feed chart end gears.



End-Gear Configuration Example

Follow the example below to better understand how to read the gear charts to configure the end gears accordingly.

Tools Needed

Qty

Hex Wrench 5mm..... 1
Open-End Wrench 17mm..... 1

To configure end gears for threading 18 TPI:

1. Locate **18** on inch thread chart, then look at numbers provided at top of column in "a" and "b" rows (**60** and **54**). These are end gears that need to be used in the "a" and "b" positions (see **Figure 78**).

60T & 54T Gears	a	60	60	60	60	40	40	56
	b	60	54	57	60	44	46	54
		4	I	I	I	I	I	2
		V	V	V	V	V	V	V
	A D	4	4 1/2		5	5 1/2		6
	B D	8	9	9 1/2	10	11	11 1/2	12
18 TPI	A C	18	19	20	22	23	24	
	B C	32	36	38	40	44	46	48

Figure 78. Locating end gears for 18 TPI.

2. DISCONNECT MACHINE FROM POWER!
3. Remove headstock end-gear cover.
4. Loosen arm-support cap screw shown in **Figure 78**.

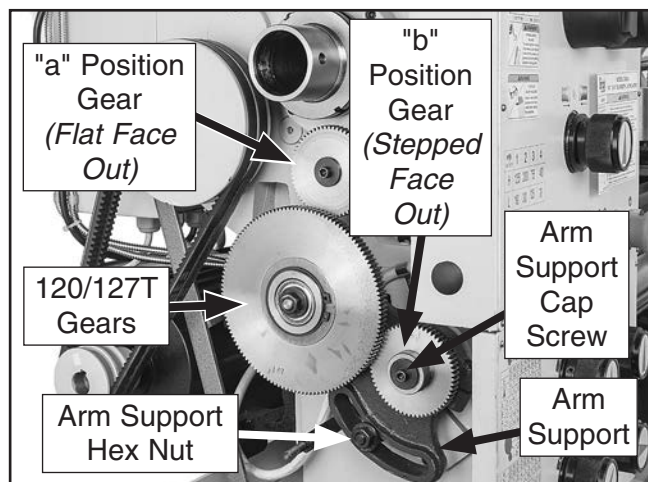


Figure 79. Arm support and end gears.

5. While holding the **120T/127T** gears, loosen the arm-support hex nut and slowly let gears pivot down and away from upper "a" position gear, as illustrated below.

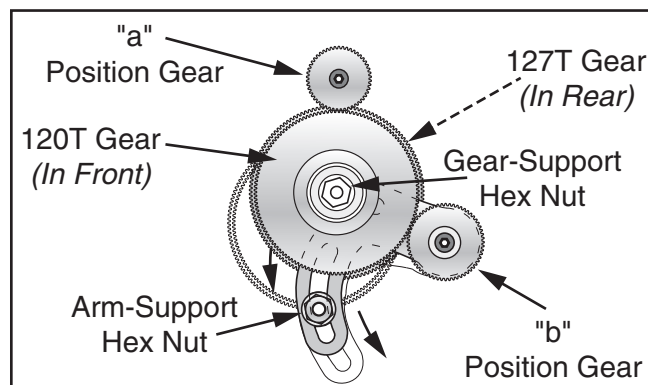


Figure 80. End gear placement.

6. Loosen **120T/127T** gear support hex nut and slide the middle gear away from lower "b" position gear.
7. Remove cap screw and flat washer from the upper "a" position and "b" position gears, then slide gears off of shafts.
8. Slide **60T** gear onto "a" position shaft and **54T** gear onto "b" position shaft, making sure to align keys and keyways.

Note: Position flat, non-stepped face of 60T gear away from headstock, but position stepped face of 54T gear away from the headstock in **Step 11** (see **Figure 80**).

9. Secure **60T** and **54T** gears with flat washers and cap screws removed earlier.



10. Slide **127T** gear against lower **54T** gear (see **Figure 81**) until they mesh with 0.002" to 0.004" backlash, then tighten gear support hex nut.

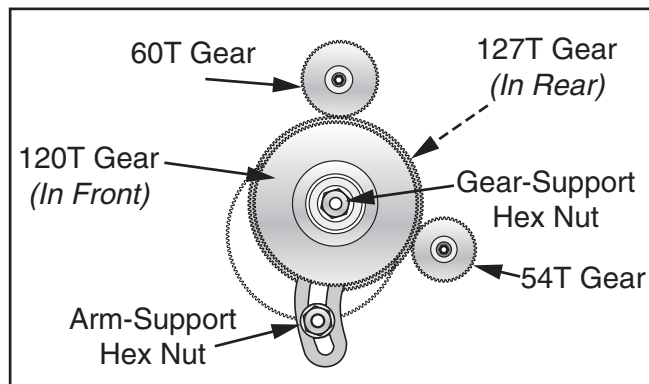


Figure 81. 60T & 54T gears installed.

11. Rotate **127T** gear up against **60T** gear until they mesh with 0.002" to 0.004" backlash.
12. Tighten arm support hex nut (see **Figure 81**).
13. Secure arm support cap screw (see **Figure 78**).
14. Re-install end gear cover.

Threading

The following subsections describe how to use the threading charts and controls to set up the lathe for a threading operation. If you are unfamiliar with the process of cutting threads on a lathe, we strongly recommend that you read books, review industry trade magazines, or get formal training before attempting any threading projects.

Headstock Threading Controls

The threading charts on the headstock face display the settings for inch and metric threading.

Using the controls on the lathe, follow the example below to understand how to set up the lathe for the desired threading operation.

To set dials for 18 TPI:

1. Locate 18 TPI on the inch threading chart shown in **Figure 82**.

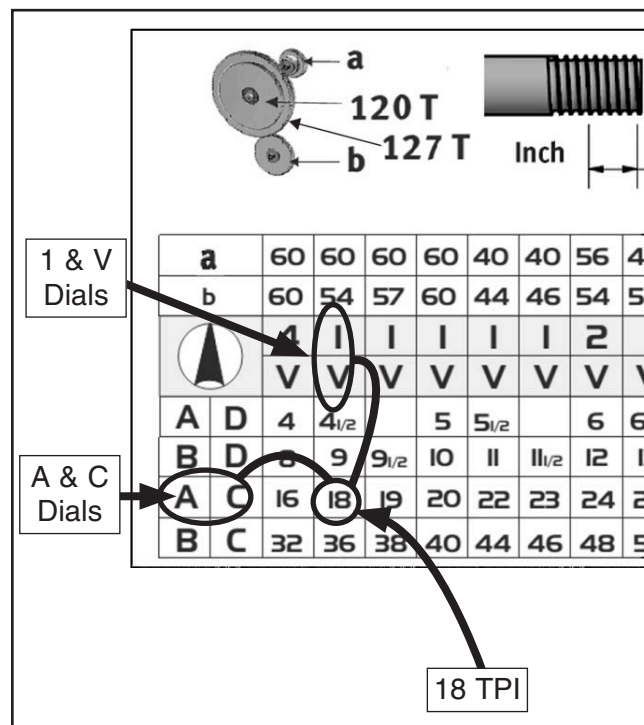


Figure 82. 18 TPI and corresponding dial positions.

2. Install 60T and 54T gears, as instructed in **End-Gear Configuration Example** on **Page 53**.



3. Locate **A** and **C** to left of 18 TPI and find **1** and **V** above it, as shown in **Figure 83**.

Note: In the next step, use the chuck key to rock the spindle back-and-forth as you make adjustments to help mesh the gears.

4. Position gearbox dials as shown in **Figure 83**.

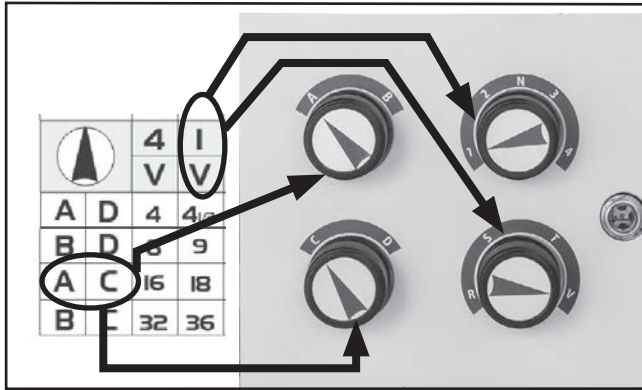


Figure 83. Gearbox dial settings for 18 TPI.

The lathe is now set up to cut 18 TPI threads.

Apron Threading Controls

The half nut lever engages the carriage with the leadscrew, which moves the carriage and cutting tool along the length of the workpiece for threading operations (see **Figure 84**).

Important: Make sure the feed selection lever is in the disengaged (middle) position before attempting to engage the half nut.

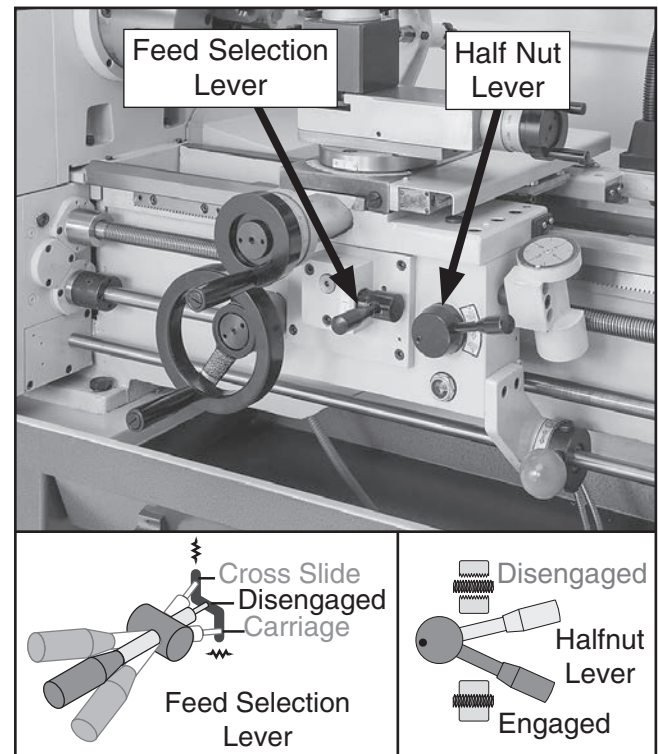


Figure 84. Apron threading controls.



Thread Dial

Tools Needed

Hex Wrench 6mm..... 1

Qty

The numbers on the thread dial are used with the thread dial chart to show when to engage the half nut during inch threading. Loosen the cap screw on the thread dial (see **Figure 85**), pivot the gear teeth so they mesh with the leadscrew threads, then re-tighten the cap screw.

Note: The thread dial is not used for metric threading. You must leave the half nut engaged from the beginning until the turning is complete for this type of operation.

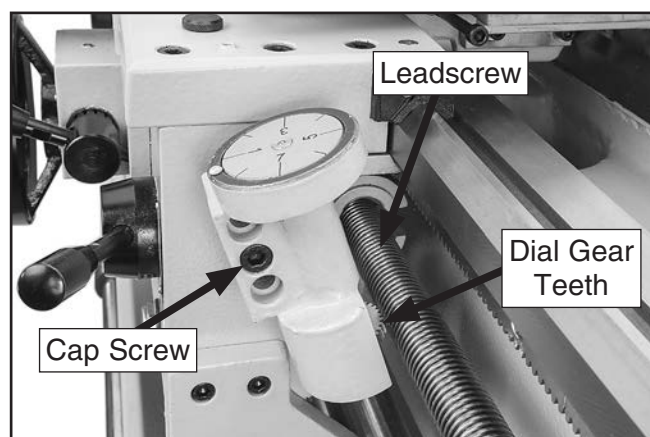


Figure 85. Thread dial engaged with the leadscrew.

NOTICE

When threading, we recommend using the slowest speed possible and avoiding deep cuts, so you are able to disengage the half nut when required and prevent an apron crash!

When the first thread cutting pass is complete, the operator disengages the carriage from the leadscrew using the half nut lever. The operator returns the carriage for the next pass and re-engages the half nut using the same thread dial setting to resume the cut in the previous pass.

Thread Dial Chart

The thread dial chart is located on the headstock in front of the chuck, as shown in **Figure 86**.

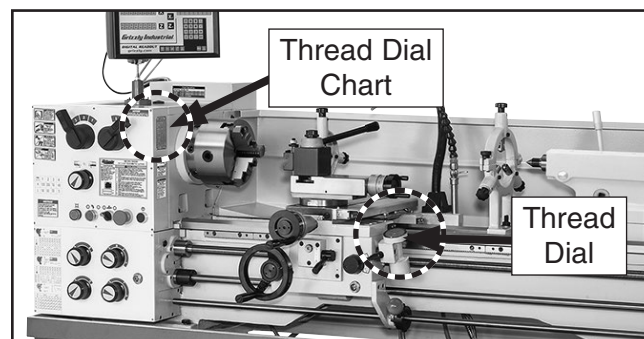


Figure 86. Locations of thread dial chart and thread dial.

To use the thread chart, find the TPI that you want to cut and reference the "Scale" number(s) next to it. The scale number(s) indicate when to engage the half nut when cutting that TPI.

For Example: If you are cutting 13 TPI threads, the chart shows "1, 3, 5, 7" next to the 13 (see the shaded boxes in **Figure 87**).

INDICATOR TABLE					
T.P.I	SCALE	T.P.I	SCALE	T.P.I	SCALE
4	1-8	11-1/2	15/37	28	1-8
4-1/2	15/37	12	1-8	32	1-8
5	1,3,5,7	13	1,3,5,7	36	1-8
5-1/2	15/37	14	1-8	38	1-8
6	1-8	16	1-8	40	1-8
6-1/2	15/37	18	1-8	44	1-8
7	1,3,5,7	19	1,3,5,7	46	1-8
8	1-8	20	1-8	48	1-8
9	1,3,5,7	22	1-8	52	1-8
9-1/2	15/37	23	1,3,5,7	56	1-8
10	1-8	24	1-8		
11	1,3,5,7	26	1-8		

Figure 87. Thread dial chart.

Important: You can engage on the number 1 on the thread dial to cut any thread if you do not want to use the chart, or if you forget any of the rules on the next page.



The following examples explain how to use the thread dial and the thread dial chart.

Even TPI: For threading even numbered TPI, use any mark on the thread dial (see the example in **Figure 88**).

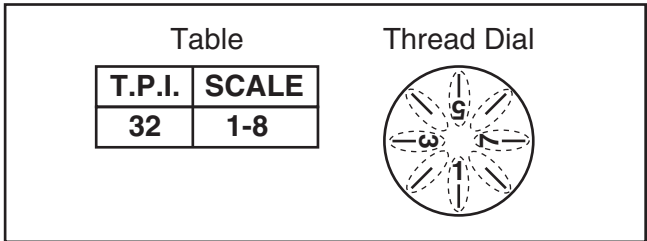


Figure 88. Any mark on dial for threading even numbered TPI.

Odd TPI: For threading odd numbered TPI, use any numbered line on the thread dial (see the example in **Figure 89**).

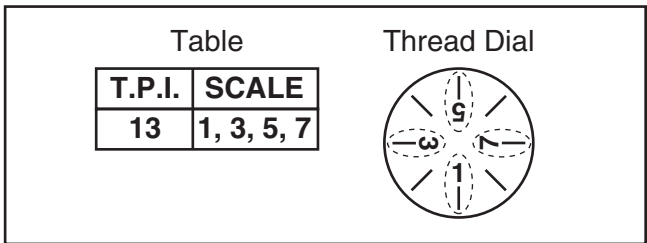


Figure 89. Any number on dial for threading odd numbered TPI.

Any Other TPI: For threading any other TPI, use only the number 1 on the thread dial (see the example in **Figure 90**).

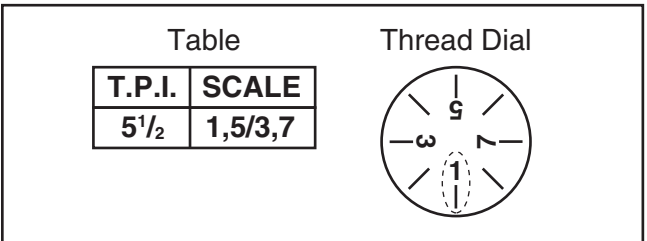


Figure 90. Thread dial position for any numbered TPI.



Coolant System

When the coolant pump is turned **ON**, fluid is delivered through the nozzle attached to the carriage.

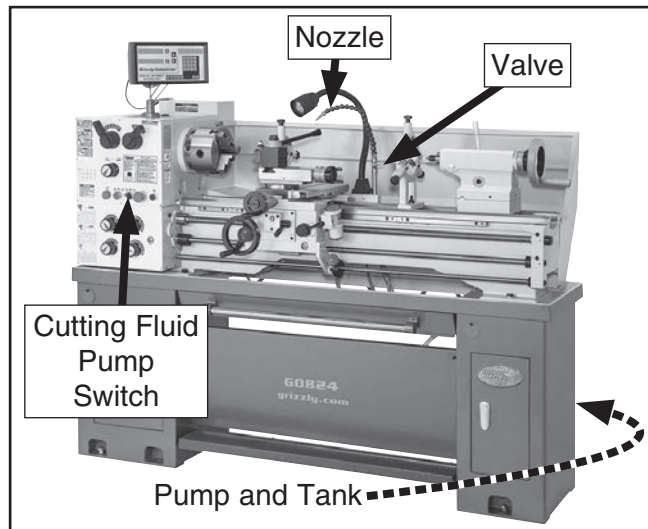


Figure 91. Cutting fluid system controls.

Always use high-quality coolant and follow the manufacturer's instructions for diluting. Only water soluble cutting fluids are compatible with the cutting fluid pump—DO NOT use synthetic fluids, sulfurized oil, or mineral oil or damage could occur to the pump.

Refer to **Coolant System Service** on **Page 69** for detailed instructions on how to add or change fluid. Check the coolant regularly and promptly change it when it becomes overly dirty or rancid, or as recommended by the fluid manufacturer.

	<p>! WARNING BIOLOGICAL & POISON HAZARD! Use the correct personal protection equipment when handling coolant. Follow federal, state, and fluid manufacturer requirements for proper disposal.</p>
--	---

<p>NOTICE Running the pump without adequate fluid in the coolant tank may permanently damage it, which will not be covered under warranty.</p>

To use coolant system:

1. Make sure coolant tank is properly serviced and filled with appropriate fluid, and that you are wearing necessary personal protection equipment.
2. Position coolant nozzle for your operation.
3. Use coolant pump switch on control panel to turn pump **ON**.
4. Adjust flow of coolant at nozzle.

IMPORTANT: Promptly clean any splashed fluid from the floor to avoid a slipping hazard.



SECTION 5: ACCESSORIES

!WARNING

Installing unapproved accessories may cause machine to malfunction, resulting in serious personal injury or machine damage. To reduce this risk, only install accessories recommended for this machine by Grizzly.

NOTICE

Refer to our website or latest catalog for additional recommended accessories.

T23962—ISO 68 Moly-D Way Oil, 5 gal.

T23963—ISO 32 Moly-D Machine Oil, 5 gal.

T26685—ISO 32 Moly-D Machine Oil, 1 gal.

Moly-D oils are some of the best we've found for maintaining the critical components of machinery because they tend to resist run-off and maintain their lubricity under a variety of conditions—as well as reduce chatter or slip. Buy in bulk and save with 5-gallon quantities.



Figure 92. ISO 68 and ISO 32 machine oil and multi-purpose grease.

T10295—7-Pc. Indexable-Carbide Turning Tool Set

This $\frac{5}{8}$ " 7-piece turning tool set is ideal for just about any project. Supplied with right-hand and left-hand turning/facing tool holders, the set is complemented with one threading and cut-off tool, too. Indexable inserts ensure cutting surfaces stay sharp.

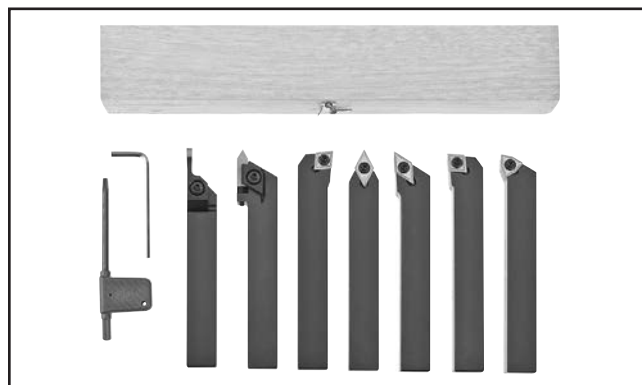


Figure 93. T10295 7-Pc. Indexable Carbide Tool Set.

T10439—4-Pc. Carbide Insert CCMT Boring Bar Set

These right-hand indexable solid steel boring bars use $\frac{1}{4}$ " and $\frac{3}{8}$ ", 80° diamond inserts and feature a negative 7° end and side cutting angle. Includes $\frac{3}{8}$ " x 6", $\frac{1}{2}$ " x 7", $\frac{5}{8}$ " x 8", and $\frac{3}{4}$ " x 10" boring bars. Set comes with Torx® wrenches and fitted aluminum case with handle.

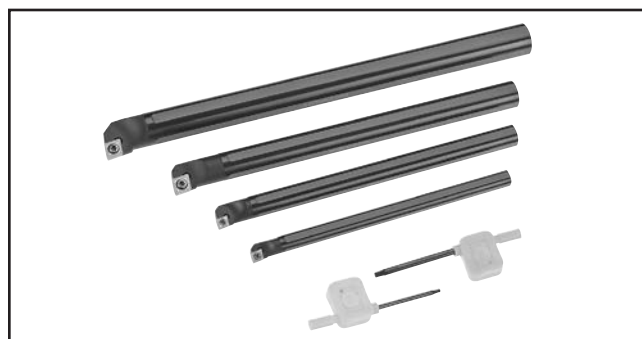


Figure 94. T10439 Carbide Insert CCMT Boring Bar Set.

order online at www.grizzly.com or call 1-800-523-4777



H7617—Oil Can w/Plastic Nozzle

This high-pressure oil can is perfect for lubricating the ball oilers found on your machine. Each can holds 5 ounces of oil.



Figure 95. High-pressure oil can for ball oilers.

Quick-Change Tool Holders

All models are Series 200

G5701—Boring Bar Holder $\frac{3}{4}$ "

G5704—Parting Tool Holder $\frac{5}{8}$ "

G5705—Knurling Tool Holder $\frac{1}{4}$ "– $\frac{5}{8}$ "

G5703—Morse Taper Holder MT#3

G5700—Turning/Boring Holder $\frac{1}{4}$ "– $\frac{5}{8}$ "; $\frac{1}{2}$ " \varnothing

G5699—Turning Holders $\frac{1}{4}$ "– $\frac{5}{8}$ "

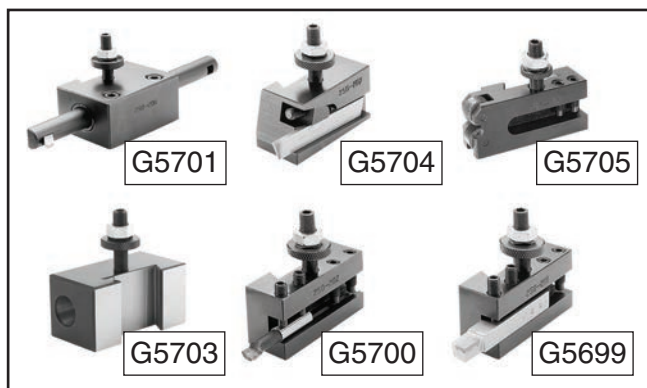


Figure 96. Quick-change tool holders.

H8314—Threading Tool Holder, Left-Hand

H8315—Threading Tool Holder, Right-Hand

For threading tough to machine materials. Made of high quality alloy steel, these holders offer maximum rigidity because of the "on edge" design of the cutter and double fastening system. Inserts not included. 20 x 20mm shank. Overall length: $4\frac{15}{16}$ ".



Figure 97. H8314 & H8315 Tool Holders.

H5930—4-Pc. Center Drill Set 60°

H5931—4-Pc. Center Drill Set 82°

Double ended HSS Center Drills are precision ground. Each set includes sizes 1-4.

SIZE	BODY DIA.	DRILL DIA.	OVERALL LENGTH
1	$\frac{1}{8}$ "	$\frac{3}{64}$ "	$1\frac{1}{4}$ "
2	$\frac{3}{16}$ "	$\frac{5}{64}$ "	$1\frac{7}{8}$ "
3	$\frac{1}{4}$ "	$\frac{7}{64}$ "	2"
4	$\frac{5}{16}$ "	$\frac{1}{8}$ "	$2\frac{1}{8}$ "

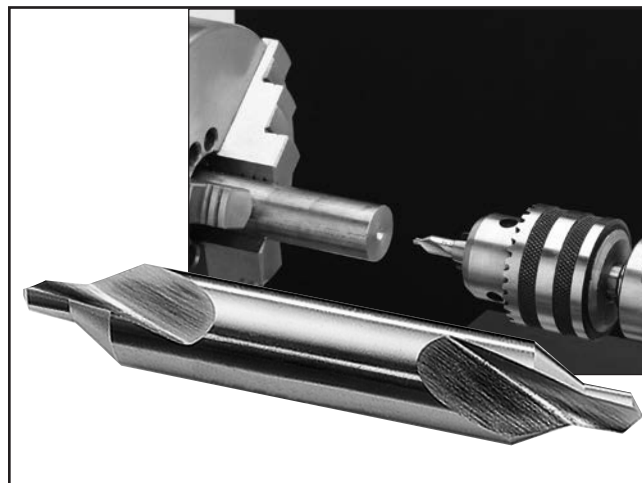


Figure 98. HSS ground center-drill sets.

order online at www.grizzly.com or call 1-800-523-4777



Basic Eye Protection

T20501—Face Shield Crown Protector 4"

T20502—Face Shield Crown Protector 7"

T20503—Face Shield Window

T20451—"Kirova" Clear Safety Glasses

T20452—"Kirova" Anti-Reflective S. Glasses

T20456—DAKURA Safety Glasses, Black/Clear



Figure 99. Assortment of basic eye protection.

G9849—Magnetic Base/Dial Indicator Combo

Magnetic base engages with the turn of a switch and allows pinpoint adjustment. The dial indicator features 0–1" travel and has a resolution of 0.001". Set includes a molded case for protection and convenience.



Figure 100. G9849 Magnetic base/dial indicator combo.

T26419—Syn-O-Gen Synthetic Grease

Formulated with 100% pure synthesized hydrocarbon basestocks that are compounded with special thickeners and additives to make Syn-O-Gen non-melt, tacky, and water resistant. Extremely low pour point, extremely high temperature oxidation, and thermal stability produce a grease that is unmatched in performance.



Figure 101. T26419 Syn-O-Gen Synthetic Grease.

T25613—Metal Lathe for Home Machinists

This project-based course provides a complete introduction to the lathe and lathe metalworking. It assumes no prior knowledge and works through the process of using a lathe from beginning to end. The reader advances through a series of practice projects that teach how to use the lathe and develop essential skills through practical application.

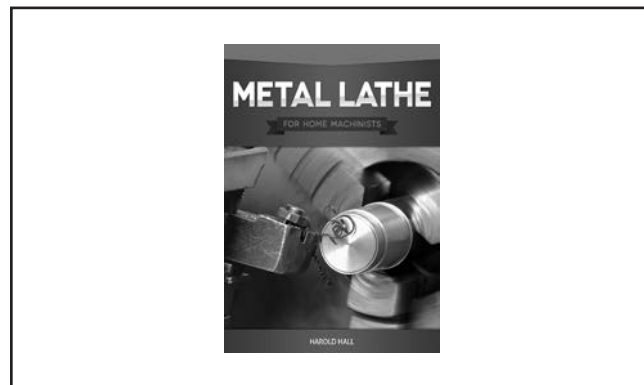


Figure 102. Model T25613 Metal Lathe for Home Machinists.

order online at www.grizzly.com or call 1-800-523-4777



SECTION 6: MAINTENANCE



Schedule

Ongoing

To maintain a low risk of injury and proper machine operation, if you ever observe any of the items below, shut down the machine immediately and fix the problem before continuing operations:

- Loose mounting bolts or fasteners.
- Worn, frayed, cracked, or damaged wires.
- Guards or covers removed.
- Emergency Stop/RESET button not working correctly or not requiring you to reset it before starting the machine again.
- Oil level not visible in the sight glasses.
- Damaged or malfunctioning components.

Daily, Before Operations

- Check/add coolant (**Page 69**).
- Check/add headstock oil (**Page 63**).
- Check/add gearbox oil (**Page 64**).
- Check/add apron oil (**Page 65**).
- Lubricate the bedways (**Page 65**).
- Add oil to the ball oilers (**Page 66**).
- Clean/lubricate the leadscrew (**Page 65**).
- Disengage the feed selection lever on the apron (to prevent crashes upon startup).
- Ensure carriage lock bolt is loose.

Daily, After Operations

- Press the Emergency Stop/RESET button (to prevent accidental startup).
- Vacuum/clean all chips and swarf from bed, slides.
- Wipe down all unpainted or machined surfaces with an oiled rag.

Semi-Annually

- Change the headstock oil (**Page 63**).

Annually

- Change the gearbox oil (**Page 64**).
- Change the apron oil (**Page 65**).
- Lubricate end gears (**Page 67**).
- Check/level bedway (**Page 23**).

Cleaning/Protecting

Because of its importance, we recommend that the cleaning routine be planned into the workflow schedule.

Typically, the easiest way to clean swarf from the machine is to use a wet/dry shop vacuum that is dedicated for this purpose. The small chips left over after vacuuming can be wiped up with a slightly oiled rag. Avoid using compressed air to blow off chips, as this may drive them deeper into the moving surfaces or cause sharp chips to fly into your face or hands.

All unpainted and machined surfaces should be wiped down daily to keep them rust free and in top condition. This includes any surface that is vulnerable to rust if left unprotected (especially parts that are exposed to water soluble cutting fluid). Use way oil to prevent corrosion.



Lubrication

Use the information in the charts below as a daily guide for lubrication tasks. We recommend using Grizzly Model T23962 or T23963 lubricants (see **Page 59**) for most of the lubrication tasks.

Lubrication Frequency

Lubrication Task	Frequency	Page Ref.
Headstock	Daily	63
Quick-Change Gearbox	Daily	64
Apron	Daily	65
Bedways	Daily	65
Longitudinal Leadscrew	Daily	65
Ball Oilers	Daily	66
End Gears	Annually	67

Lubrication Amount & Type

Lubrication Task	Oil Type	Amount
Headstock	ISO 32 (T23963)	4 Qts.
Quick-Change Gearbox	ISO 68 (T23962)	26 Oz.
Apron	ISO 68 (T23962)	7 Oz.
Bedways	ISO 68 (T23962)	As Needed
Longitudinal Leadscrew	ISO 68 (T23962)	As Needed
Ball Oilers	ISO 32 (T23963)	1-2 Squirts
End Gears	NLGI #2	Dab

Items Needed

	Qty
Hex Wrench 6mm.....	1
Hex Wrench 8mm.....	1
2.5-Gallon Catch Pan.....	1
Pump-Type Oil Can w/Plastic Cone Tip	1
Mineral Spirits.....	As Needed
Small Brushes	2

NOTICE

The recommended lubrication is based on light-to-medium usage. Keeping in mind that lubrication helps to protect the value and operation of the lathe, these lubrication tasks may need to be performed more frequently than recommended here, depending on usage.

Failure to follow reasonable lubrication practices as instructed in this manual could lead to premature failure of lathe components and will void the warranty.

Headstock

Oil Type Grizzly T23963 or ISO 32 Equivalent
 Oil Amount..... 4 Quarts
 Check/Add Frequency Daily
 Change Frequency Semi-Annually

The headstock gearing is lubricated by an oil bath that distributes the lubricant with the motion of the gears, much like an automotive manual transmission. Change the oil after the first 2 hours of use, then semi-annually.

Checking Oil Level

The headstock reservoir has the proper amount of oil when the oil level in the sight glass is approximately halfway. The oil sight glass is located below the chuck, as shown in **Figure 103**.



Figure 103. Location of headstock oil sight glass.



Adding Oil

The oil fill plug is located on top of the headstock, as shown in **Figure 104**.

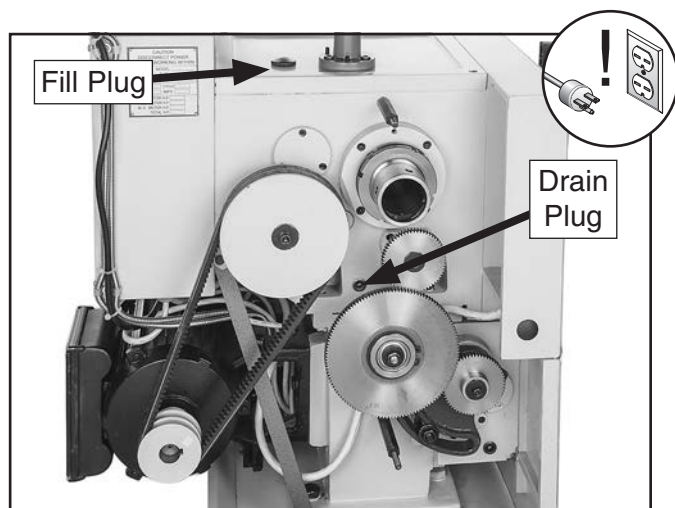


Figure 104. Headstock fill and drain plugs.

To change the headstock oil:

1. DISCONNECT MACHINE FROM POWER!
2. Remove end gear cover.
3. Remove V-belts so that oil does not get on them, necessitating their replacement (refer to the **V-Belt Tension & Replacement** on **Page 78** for detailed instructions).
4. Using an 8mm hex wrench, remove fill plug from top of headstock.
5. Place a 2.5-gallon catch pan under headstock drain plug (see **Figure 106**), then remove drain plug.
6. When headstock reservoir is empty, replace drain plug and clean away any spilled oil.
7. Fill headstock reservoir until oil level is approximately halfway in sight glass.
8. Replace and re-tension V-belts, then secure end-gear cover before re-connecting lathe to power.

Quick-Change Gearbox

Oil Type Grizzly T23962 or ISO 68 Equivalent
Oil Amount.....26 Ounces
Check/Add Frequency Daily
Change Frequency Annually

Checking Oil Level

The gearbox reservoir has the proper amount of oil when the oil level in the sight glass is approximately halfway. The oil sight glass is located on the front of the gearbox, as shown in **Figure 105**.



Figure 105. Location of gearbox oil sight glass and fill plug.

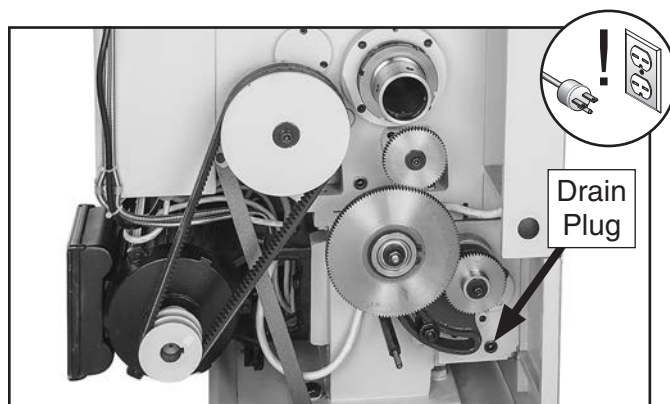


Figure 106. Location of the gearbox drain plug.

Changing Oil

Place a catch pan under the gearbox drain plug (see **Figure 106**). Use an 8mm hex wrench to remove the gearbox fill plug (see **Figure 105**), then remove the drain plug and allow the gearbox reservoir to empty. Re-install the drain plug and add oil until the level is approximately halfway in the gearbox oil sight glass, then re-install the fill plug.



Apron

Oil Type Grizzly T23962 or ISO 68 Equivalent
Oil Amount.....7 Ounces
Check/Add Frequency Daily
Change Frequency..... Annually

Checking Oil Level

The apron oil sight glass is on the front of the apron, as shown in **Figure 107**. Maintain the oil volume so that the level is approximately halfway in the sight glass.

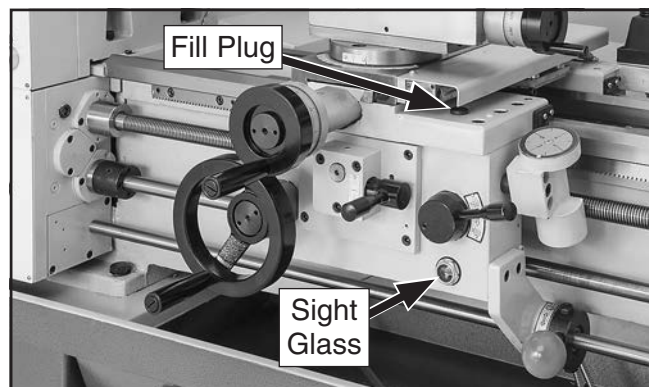


Figure 107. Location of apron oil sight glass.

Changing Oil & Flushing Reservoir

Small metal particles may accumulate at the bottom of the reservoir with normal use. Therefore, to keep the reservoir clean, drain and flush it at least once a year.

Place a catch pan under the apron drain plug shown in **Figure 108**, remove the fill plug, then use a 6mm hex wrench to remove the drain plug and empty the reservoir.

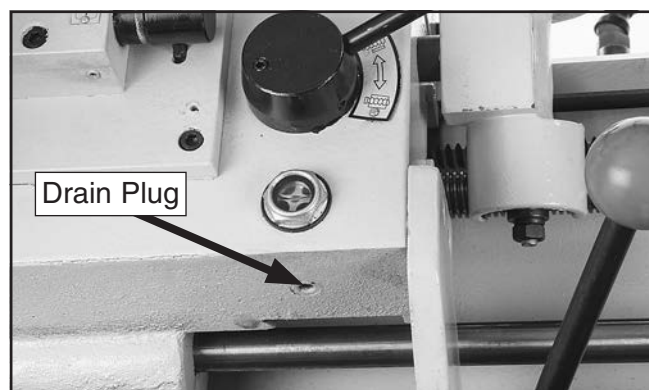


Figure 108. Location of apron drain plug.

Flush the reservoir by pouring a small amount of clean oil into the fill hole and allowing it to drain out the bottom. Replace the drain plug, add oil as previously described, then re-install the fill plug.

Bedways

Oil Type Grizzly T23962 or ISO 68 Equivalent
Oil Amount..... As Needed
Lubrication Frequency Daily

Before lubricating the bedways (see **Figure 109**), clean them with mineral spirits. Apply a thin coat of oil along the length of the bedway. Move the steady rest, carriage, and tailstock to access the entire length of the bedways. If the lathe is in a moist or dirty environment, increase the lubrication interval.

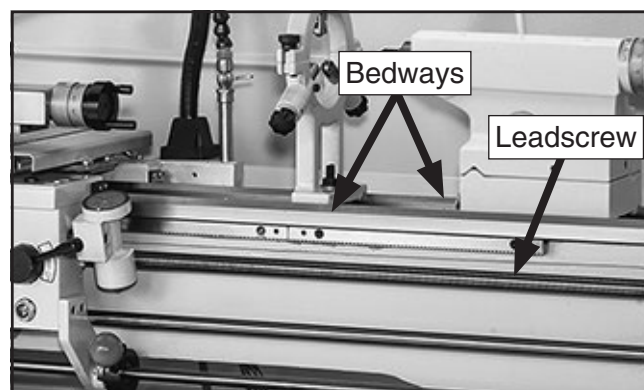


Figure 109. Bedways.

Longitudinal Leadscrew

Oil Type Grizzly T23962 or ISO 68 Equivalent
Oil Amount..... As Needed
Lubrication Frequency Daily

Before lubricating the leadscrew (see **Figure 109**), clean it first with mineral spirits. A stiff brush works well to help clean out the threads. Make sure to move the carriage out of the way, so you can clean the entire length of the leadscrew.

Apply a thin coat of oil along the length of the leadscrew. Use a stiff brush to make sure the oil is applied evenly and down into the threads.

Note: *In some environments, abrasive material can become caught in the leadscrew lubricant and drawn into the half nut. In this case, lubricate the leadscrew with a quality dry lubricant.*



Ball Oilers

Oil Type Grizzly T23963 or ISO 32 Equivalent
 Oil Amount.....1 or 2 Squirts
 Lubrication Frequency..... Daily

This lathe has 15 ball oilers that should be oiled on a daily basis before beginning operation. Refer to **Figures 110–115** for their locations.

Ball Oilers

Proper lubrication of ball oilers is done with a pump-type oil can that has a plastic or rubberized cone tip. We do not recommend using metal needle or lance tips, as they can push the ball too far into the oiler, break the spring seat, and lodge the ball in the oil galley.

Lubricate the ball oilers before and after machine use, and more frequently under heavy use. When lubricating ball oilers, first clean the outside surface to remove any dust or grime. Push the rubber or plastic tip of the oil can nozzle against the ball oiler to create a hydraulic seal, then pump the oil can once or twice. If you see sludge and contaminants coming out of the lubrication area, keep pumping the oil can until the oil runs clear. When finished, wipe away any excess oil.

- A. Cross-slide leadscrew & slides
- B. Compound-rest leadscrew, slides, handwheel
- C. Saddle slides
- D. Thread dial gear
- E. Carriage handwheel
- F. Feed selection lever gearing
- G. Tailstock ball oilers
- H. Leadscrew end bearing
- I. Feed rod end bearing

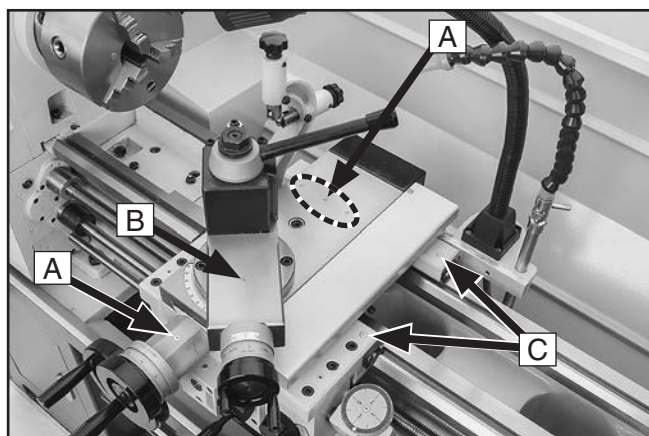


Figure 110. Saddle and slide ball oilers.

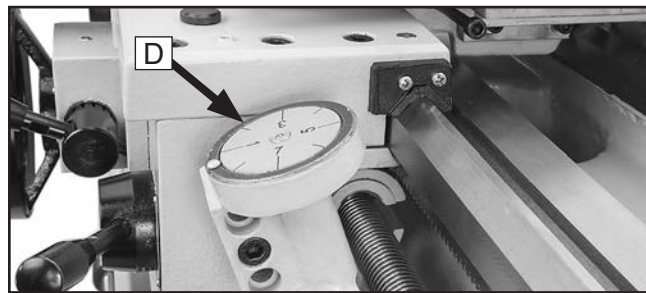


Figure 111. Thread dial ball oiler.

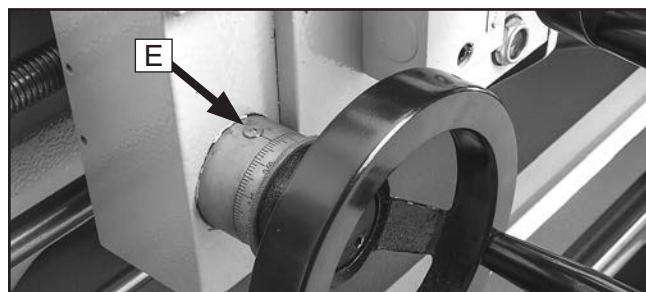


Figure 112. Carriage handwheel ball oiler.

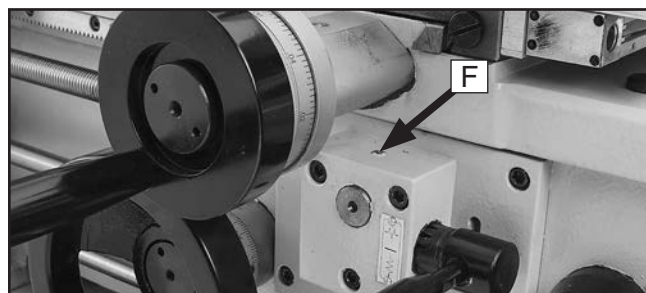


Figure 113. Feed selection lever ball oiler.

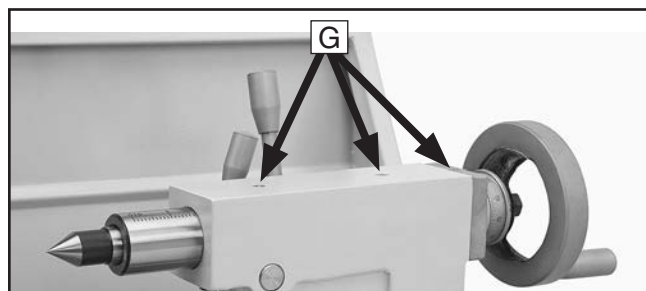


Figure 114. Tailstock ball oilers.

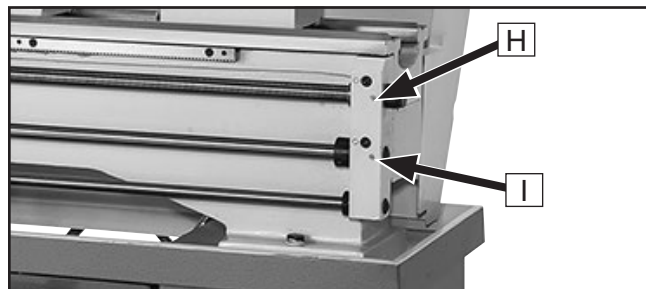


Figure 115. Leadscrew & feed rod ball oilers.



End Gears

Grease Type..... T23964 (or NLGI#2 Equivalent)
Frequency..... Annually or When Changing

The end gears, shown in **Figure 116**, should always have a thin coat of heavy grease to minimize corrosion, noise, and wear. Wipe away excess grease that could be thrown onto the V-belts and reduce optimal power transmission from the motor.

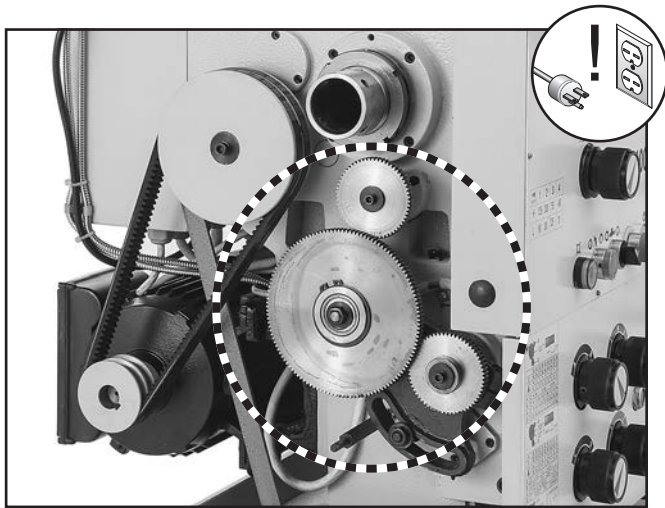


Figure 116. End gears.

Handling & Care

Make sure to clean and lubricate any gears you install or change. Be very careful during handling and storage—the grease coating on the gears will easily pickup dirt or debris, which can then spread to the other gears and increase the rate of wear.

Make sure the end gear cover remains installed whenever possible to keep the gears free of dust or debris from the outside environment.

Lubricating

1. DISCONNECT MACHINE FROM POWER!
2. Remove end gear cover and all end gears shown in **Figure 116**.
3. Clean end gears thoroughly with mineral spirits to remove old grease. Use a small brush if necessary to clean between teeth.
4. Clean shafts, and wipe away any grease splatters in vicinity and on inside of end gear cover.
5. Using a clean brush, apply a thin layer of grease on gears. Make sure to get grease between gear teeth, but do not fill teeth valleys.
6. Install end gears and mesh them together with an approximate 0.002"–0.004" backlash. Once gears are meshed together, apply a small dab of grease between them where they mesh together—this grease will be distributed when gears rotate and re-coat any areas scraped off during installation.
7. Re-install end gear cover before re-connecting lathe to power.



Coolant System Service

The coolant system consists of a fluid tank, pump, and flexible nozzle. The pump pulls fluid from the tank and sends it to the nozzle, which controls the flow of coolant. As the fluid leaves the work area, it drains from the chip drawer, where the swarf and metal chips are screened out, through the drain chute, and back into the tank. The chip drawer slides open and is removable for cleaning.

Use **Figures 117–118** to identify the locations of the coolant system controls and components.

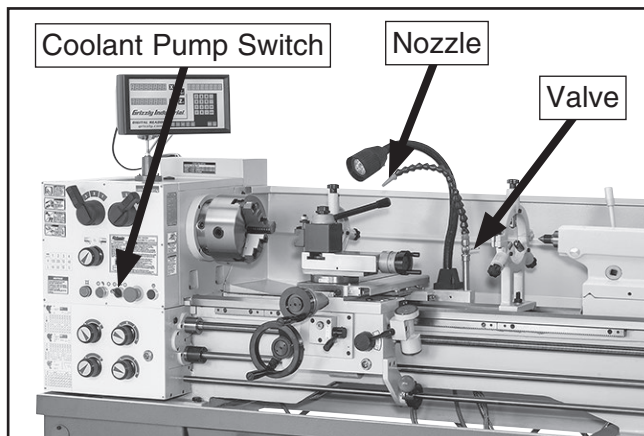


Figure 117. Coolant controls.

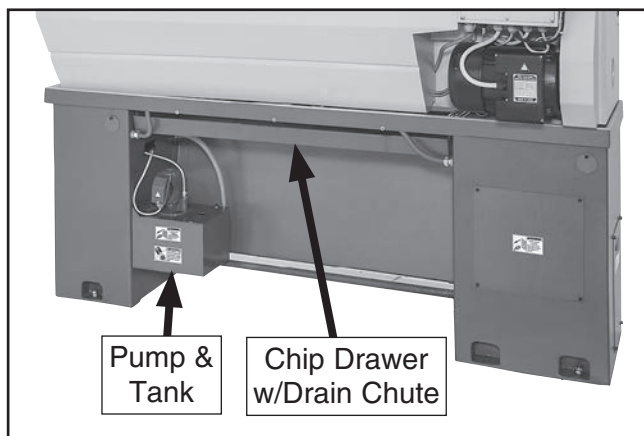


Figure 118. Additional coolant components.

⚠ CAUTION

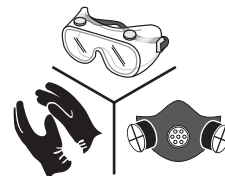
Chip drawer is very heavy. Unless removing chip drawer for cleaning, pull it out less than halfway to prevent it from falling and causing impact injuries. If removing drawer for cleaning, get assistance!

Although most swarf from machining operations is screened out of the coolant before it returns to the tank, small particles will accumulate in the bottom of the tank in the form of sludge. To prevent this sludge from being pulled into the pump and damaging it, the pump's intake is positioned several inches from the bottom of the tank. This works well when the tank is regularly cleaned; however, if excess sludge is allowed to accumulate, the pump will inevitably begin sucking it up.

Hazards

As coolant ages and gets used, dangerous microbes can proliferate and create a biological hazard. The risk of exposure to this hazard can be greatly reduced by replacing the old fluid on a monthly basis, or as indicated by the fluid manufacturer.

When working with the coolant, minimize exposure to your skin, eyes, and lungs by wearing the proper PPE (Personal Protective Equipment), such as long-sleeve waterproof gloves, protective clothing, splash-resistant safety goggles, and a NIOSH-approved respirator.



⚠ WARNING

BIOLOGICAL & POISON HAZARD!

Use correct personal protection equipment when handling coolant. Follow federal, state, and fluid manufacturer requirements for proper disposal.



Adding Coolant

Items Needed	Qty
Safety Wear.....	See Hazards on Page 68
New Coolant.....	10.0 Quarts
Funnel.....	1
Disposable Shop Rags.....	As Needed

To add coolant:

1. DISCONNECT MACHINE FROM POWER!
2. Remove return drain hose (see **Figure 119**) from hole in top of tank and pour coolant into tank until it is approximately 1" from top.

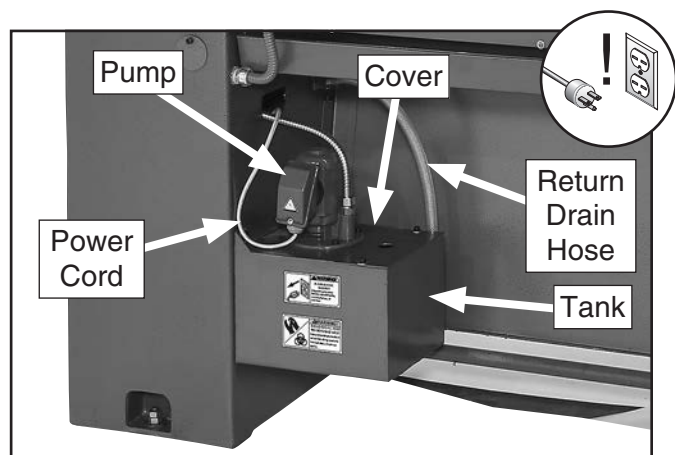


Figure 119. Location of coolant tank and pump.

3. Re-install return drain hose.

Changing Coolant

When you replace the old coolant, take the time to thoroughly clean out the chip drawer and fluid tank. The entire job only takes about a 1/2 hour when you are prepared with the proper materials and tools. Make sure to dispose of old fluid according to federal, state, and fluid manufacturer's requirements.

Items Needed	Qty
Safety Wear.....	See Hazards on Page 68
New Coolant.....	10.0 Quarts
Hex Wrench 5mm.....	1
Disposable Shop Rags.....	As Needed
Magnets (Optional).....	As Many As Desired

To change coolant:

1. Position coolant nozzle over back splash so that it is pointing behind lathe.
2. Have another person hold bucket up to nozzle to prevent coolant from splashing out.
3. Turn coolant pump **ON** and open valve (see **Figure 117** on **Page 68**) to pump old fluid out of reservoir. Turn pump **OFF** immediately after fluid stops flowing.

NOTICE

Running coolant pump longer than necessary for this procedure without adequate fluid in tank may permanently damage it, which will not be covered under warranty.

4. DISCONNECT MACHINE FROM POWER!
5. Lift coolant tank off of mounting screws and set on ground.
6. Remove cover (see **Figure 119**) and pour remaining coolant into 2-gallon bucket and close lid.
7. Clean all sludge from bottom of tank and then flush it clean. Use second bucket to hold waste and make sure to seal lid closed when done.

Dispose of old coolant and swarf according to federal, state, and fluid manufacturer's requirements.

8. Replace cover and re-install tank, making sure to insert return drain hose into tank opening.
9. Add coolant as instructed on this page.



Machine Storage

To prevent the development of rust and corrosion, the lathe must be properly prepared if it will be stored for a long period of time. Doing this will ensure the lathe remains in good condition for later use.

Preparing Lathe for Storage

1. Run lathe and bring all reservoirs to operating temperature, then drain and refill them with clean oil.
2. Pump out old coolant, then add a few drops of way oil and blow out lines with compressed air.
3. **DISCONNECT MACHINE FROM POWER!**
4. Thoroughly clean all unpainted, bare metal surfaces, then apply a liberal coat of way oil, heavy grease, or rust preventative. Take care to ensure these surfaces are completely covered but that the rust preventative or grease is kept off of painted surfaces.
5. Lubricate machine as outlined in **Lubrication** on **Page 63**. Be sure to use an oil can to fill all ball oilers and oil passages with fresh oil.
6. Loosen or remove V-belts so they do not become stretched during storage period.

Note: *Be sure to place a maintenance note near power button as a reminder that belts have been loosened or removed.*

7. Place a few moisture absorbing desiccant packs inside of electrical box.
8. Cover lathe and place it in a dry area that is out of direct sunlight and away from hazardous fumes, paint, solvents, or gas. Fumes and sunlight can bleach or discolor paint.
9. Every few months, rotate by hand all gear-driven components a few times in several gear selections. This will keep bearings, bushings, gears, and shafts well lubricated and protected from corrosion—especially during winter months.
10. Slide carriage, tailstock, and steady rest down lathe bed to make sure that wayspotting is not beginning to occur.

Bringing Lathe Out of Storage

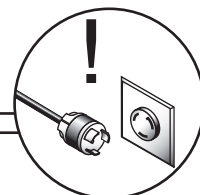
1. Re-install V-belts and re-tension them (refer to **Page 78**) if you removed them for storage purposes.
2. Remove moisture absorbing desiccant packs from the electrical box.
3. Repeat **Test Run** and **Spindle Break-In** procedures, beginning on **Page 25**.
4. Add coolant, as described in **Coolant System Service** on **Page 68**.



SECTION 7: SERVICE

Review the troubleshooting procedures in this section if a problem develops with your machine. If you need replacement parts or additional help with a procedure, call our Technical Support. **Note:** *Please gather the serial number and manufacture date of your machine before calling.*

Troubleshooting



Motor & Electrical

Symptom	Possible Cause	Possible Solution
Machine does not start or a circuit breaker trips immediately upon startup.	<ol style="list-style-type: none"> Emergency Stop/RESET button depressed/at fault. Plug/receptacle at fault/wired wrong. Incorrect power supply voltage or circuit size. Power supply circuit breaker tripped or fuse blown. Wires disconnected, damaged, or connected incorrectly. Thermal overload relay tripped/at fault. Motor wires connected incorrectly. ON/OFF switch at fault. Start capacitor at fault. Contactors not energized/has poor contacts. Centrifugal switch at fault. Spindle rotation switch at fault. Motor at fault. 	<ol style="list-style-type: none"> Rotate button head to reset; replace. Test for good contacts; correct the wiring. Ensure correct power supply voltage and circuit size. Ensure circuit is sized correctly and free of shorts. Reset circuit breaker or replace fuse. Fix or replace damaged, disconnected, or misconnected wires. Reduce load on motor if overheated; reset; replace. Correct motor wiring connections (Page 88). Replace switch. Test/replace. Test all legs for power/replace. Adjust/replace centrifugal switch if available. Test/replace switch. Test/repair/replace.
Motor stalls or is underpowered.	<ol style="list-style-type: none"> Machine undersized for task. Feed rate/cutting speed too fast. Improper tooling or workpiece material. Belt slipping due to oil/grease contamination, improper tension or excessive wear. Motor wired incorrectly. Motor overheated. Run capacitor at fault. Pulley/sprocket slipping on shaft. Gearbox at fault. 	<ol style="list-style-type: none"> Use sharp tools at correct angle; reduce feed rate/depth of cut; use coolant if possible. Decrease feed rate/cutting speed. Use proper cutting tools and workpiece materials. Tension/replace belt(s) (Page 78); clean belt(s) of any oil/grease. Wire motor correctly. Clean motor, let cool, and reduce workload. Test/repair/replace. Replace loose pulley/shaft. Replace broken or slipping gears.
Machine has vibration or noisy operation.	<ol style="list-style-type: none"> Motor or component loose. Bit chattering. V-belt(s) worn or loose. Motor fan rubbing on fan cover. Pulley loose or misaligned. Motor mount loose/broken. 	<ol style="list-style-type: none"> Inspect/replace damaged bolts/nuts, and retighten with thread-locking fluid. Sharpen/replace bit; index bit to workpiece; use correct feed rate and cutting RPM. Inspect/replace belts with a new matched set (Page 78). Fix/replace fan cover; replace loose/damaged fan. Re-align/replace pulley/shaft, pulley set screw, and key. Tighten/replace.



Lathe Operation

Symptom	Possible Cause	Possible Solution
Entire machine vibrates upon startup and while running.	<ol style="list-style-type: none"> 1. Workpiece is unbalanced. 2. Workpiece is hitting stationary object. 3. Loose or damaged V-belt(s). 4. V-belt pulleys not properly aligned. 5. Chuck or faceplate is unbalanced. 6. Gears not aligned in headstock or no backlash. 7. Worn/broken gear or bad bearing. 8. Spindle bearings at fault. 	<ol style="list-style-type: none"> 1. Re-install workpiece as centered with the spindle bore as possible. 2. Stop lathe immediately and correct interference problem. 3. Re-tension/replace V-belt(s) as necessary (Page 78). 4. Align V-belt pulleys. 5. Rebalance chuck or faceplate; contact a local machine shop for help. 6. Adjust end gears and establish backlash (Page 54). 7. Replace broken gear or bearing. 8. Reset spindle bearing preload (Page 81) or replace worn spindle bearings.
Bad surface finish.	<ol style="list-style-type: none"> 1. Incorrect spindle speed or feed rate. 2. Dull tooling or wrong tool selection. 3. Workpiece is flexing. 4. Excessive play in gibs. 5. Material building up on cutting tool. 6. Bearing preload needs to be adjusted. 7. Belts are bad. 8. Spindle bearings are bad. 	<ol style="list-style-type: none"> 1. Use correct spindle speed (Page 48) and feed rate (Page 51). 2. Sharpen tooling; use correct tool for operation. 3. Change setup to properly support workpiece. 4. Tighten gibs (Page 75). 5. Use coolant on tool and workpiece during operation. 6. Adjust bearing preload (Page 83). 7. Replace belts (Page 78). 8. Change spindle bearings.
Tapered tool difficult to remove from tailstock quill.	<ol style="list-style-type: none"> 1. Quill not fully retracted into tailstock. 2. Debris not removed from tool taper before inserting into quill. 	<ol style="list-style-type: none"> 1. Rotate quill handwheel until it forces tapered tool out of quill. 2. Remove quill from tailstock and drive tool out with a punch. Carefully deburr bore of quill.
Cross slide, compound rest, or carriage feed has sloppy operation.	<ol style="list-style-type: none"> 1. Gibs are out of adjustment. 2. Handwheel has excessive backlash. 3. Leadscrew mechanism is worn or out of adjustment. 	<ol style="list-style-type: none"> 1. Adjust gibs (Page 75). 2. Tighten handwheel fasteners or adjust handwheel backlash to a minimum (Page 74). 3. Adjust leadscrew to remove end play.
Cross slide, compound, or carriage handwheels hard to move.	<ol style="list-style-type: none"> 1. Bedways are dry and in need of lubricant. 2. Ways are loaded with shavings, dust, or grime. 3. Gibs are too tight. 4. Backlash setting is too tight. 	<ol style="list-style-type: none"> 1. Lubricate bedways/ball oilers (Page 66). 2. Remove gibs, clean ways, lubricate, re-install, and re-adjust. 3. Loosen gibs slightly (Page 75), and lubricate bedways. 4. Slightly loosen backlash setting (Page 74).
Cutting tool or machine components vibrate excessively during cutting.	<ol style="list-style-type: none"> 1. Tool holder is not tight enough. 2. Cutting tool sticks too far out of tool holder; lacks support. 3. Workpiece is deflecting. 4. Workpiece is unbalanced. 5. Gibs are out of adjustment. 6. Cutting tool is dull. 7. Spindle speed or feed rate is incorrect. 	<ol style="list-style-type: none"> 1. Tighten tool holder. 2. Re-install cutting tool so no more than $\frac{1}{3}$ of total length is sticking out of tool holder. 3. Use steady or follow rest (Page 42). 4. Balance workpiece. 5. Adjust gibs (Page 75). 6. Replace or resharpen cutting tool. 7. Use recommended spindle speed (Page 48), and feed rate (Page 51).



Symptom	Possible Cause	Possible Solution
Workpiece is tapered.	<ol style="list-style-type: none"> 1. Spindle and tailstock centers are not properly aligned with each other. 2. Lathe bed is twisted. 	<ol style="list-style-type: none"> 1. Re-align tailstock to headstock spindle centerline (Page 38). 2. Level lathe (Page 23).
Chuck jaws will not move or do not move easily.	<ol style="list-style-type: none"> 1. Chips are lodged in jaws or scroll plate. 2. Dent/ridge in jaw slot of chuck body. 	<ol style="list-style-type: none"> 1. Remove jaws, clean and lubricate scroll plate, then re-install jaws. 2. Stone or file off high spot in jaw slots.
Spindle lacks turning power or starts up slowly.	<ol style="list-style-type: none"> 1. Belts are slipping. 	<ol style="list-style-type: none"> 1. Tighten belts (Page 78); inspect for oil/grease on belts and clean/replace as necessary.
Gear change dials will not shift into position.	<ol style="list-style-type: none"> 1. Gears not aligned inside headstock/quick-change gearbox. 	<ol style="list-style-type: none"> 1. Rotate spindle by hand with light pressure on the dial until gears fall into place.
Workpiece slips in chuck.	<ol style="list-style-type: none"> 1. Chuck jaws do not match workpiece diameter. 2. Cutting pressure/feed rate is too high. 3. Spindle speed is too high. 4. Jaws are worn or not installed properly. 	<ol style="list-style-type: none"> 1. Reposition or mold workpiece so that diameter matches chuck jaw dimensions. 2. Reduce cutting force. 3. Reduce spindle speed (Page 48). 4. Remove/re-install properly; turn jaws with cutting tool so they are concentric; replace jaws or chuck.
Carriage will not feed or is hard to move.	<ol style="list-style-type: none"> 1. Gears are not all engaged. 2. Half nut lever is engaged. 3. Carriage lock is tightened down. 4. Screw is loose on feed handle. 5. Chips have loaded up on ways. 6. Ways are dry and in need of lubrication. 7. Gibs are too tight. 8. Gears broken. 9. Feed clutch is slipping. 	<ol style="list-style-type: none"> 1. Engage gears using gear dials. 2. Disengage half nut lever. 3. Check to make sure carriage lock is fully released. 4. Tighten. 5. Frequently clear away chips that load up during turning operations. 6. Lubricate bedways/ball oilers (Page 65). 7. Loosen gib screw(s) slightly (Page 75). 8. Replace gears. 9. Increase clutch spring pressure (Page 80).



Backlash Adjustment

Backlash is the amount of play in a leadscrew and can be felt as the free play in a handwheel when changing direction of rotation. The amount of backlash can be viewed on the handwheel micrometer-collar graduated dial.

When adjusting backlash, tighten the components enough to remove backlash, but not so much that the components bind the leadscrew, making it hard to turn. Overtightening will cause excessive wear to the sliding block and leadscrew.

Tools Needed	Qty
Hex Wrench 6mm.....	1
Hex Wrench 3mm.....	1
Punch Pin 3mm	1

Cross Slide Backlash

1. Feed cross slide toward front of machine until it reaches the end of its travel.
2. Remove the cap screw that secures the cross slide leadscrew nut (see **Figure 120**).



Figure 120. Location of cap screw that secures the leadscrew nut.

3. Rotate cross slide handle clockwise to feed leadscrew nut out from under cross slide, as shown in **Figure 121**.

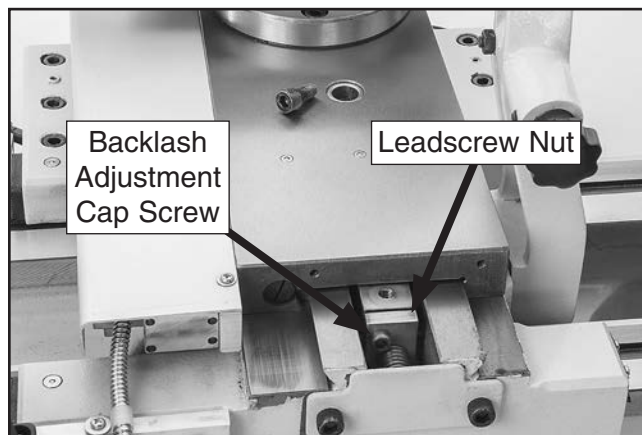


Figure 121. Leadscrew nut.

4. Tighten backlash adjustment cap screw shown in **Figure 121** in small increments.
5. Hold leadscrew nut and test after each adjustment by rotating handwheel back-and-forth until backlash amount is acceptable.
6. Feed leadscrew nut back under the cross slide and replace cap screw removed in **Step 2**.

Compound Slide Backlash

1. Turn compound slide handwheel counter-clockwise several turns.
2. Loosen set screw on compound slide faceplate several turns (see **Figure 122**).

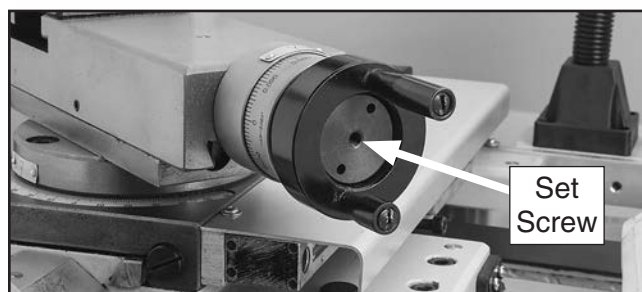


Figure 122. Compound slide backlash adjustments.

3. Use a punch pin to loosen faceplate and turn it until backlash is approximately 0.002"–0.003", as indicated on graduated dial.
4. Secure setting with set screw.
5. Repeat adjustments above if necessary.



Leadscrew End-Play Adjustment

After a long period of time, you may find that the leadscrew develops a bit of end play. This lathe is designed so that play can be removed with a simple adjustment.

Items Needed	Qty
Hex Wrench 3mm.....	1
Wrench 24mm	1
NLGI#2 Grease	As Needed

To remove leadscrew end-play:

1. DISCONNECT MACHINE FROM POWER.
2. Back out leadscrew set screw approximately five turns (see **Figure 123**).
3. Un-thread leadscrew flange bolt (see **Figure 123**), and slide bearing cover off end of leadscrew.

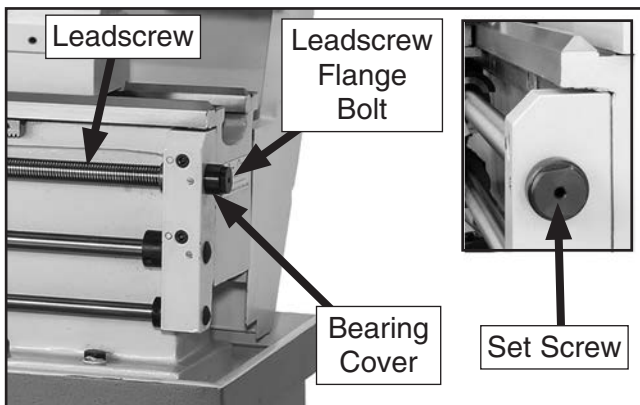


Figure 123. Leadscrew end-play bearings.

4. Clean bearings with minerals spirits, then dry and repack them with NLGI#2 grease. Re-install bearing cover.
5. With your left hand, pull leadscrew toward tailstock, and thread leadscrew flange bolt back on until it is finger tight and no leadscrew end-play exists.
6. Hold leadscrew flange bolt with 24mm wrench, and tighten set screw until it is snug at bottom of its bore.

Gib Adjustment

The goal of adjusting the gib screws is to remove sloppiness or "play" from the ways without over-adjusting them to the point where they become stiff and difficult to move.

In general, loose gibs cause poor finishes and tool chatter; however, over-tightened gibs cause premature wear and make it difficult to turn the handwheels.

The cross-slide and compound slide on this lathe each use a long steel wedge called a gib that is positioned between the component and its dove-tailed-ways. At the end of each gib is a gib screw, which moves and holds the gib. Depending upon which direction the gib moves, the space between the sliding ways increases or decreases to control the rigidity of the cross slide and compound slide.

Before adjusting the gibs, loosen the locks for the device so that the gibs can freely slide during adjustment, then lubricate the ways.

The gib adjustment process usually requires some trial-and-error. Repeat the adjustment process as necessary until you find the best balance between loose and stiff movement. Most machinists find that the ideal gib adjustment is one where a small amount of drag or resistance is present, yet the handwheels are still easy to move.



Cross-Slide & Compound-Slide Gibs

Make sure the ways and leadscrew have been cleaned and re-lubricated before beginning any adjustments. Refer to **Ball Oiler Lubrication** on **Page 66** for instructions and lubricant specifications.

Tools Needed

	Qty
Standard Screwdriver #2.....	1
Hex Wrench 3mm.....	1
Hex Wrench 5mm.....	1
Hex Wrench 6mm.....	1

To adjust cross slide and compound slide gibs:

1. DISCONNECT MACHINE FROM POWER!
2. Adjust cross slide gib screw shown in **Figure 124** as follows:
 - To increase slide tension, loosen rear gib screw $\frac{1}{8}$ turn, and tighten front gib screw $\frac{1}{8}$ turn.
 - To decrease slide tension, loosen front gib screw $\frac{1}{8}$ turn, and tighten rear gib screw $\frac{1}{8}$ turn.

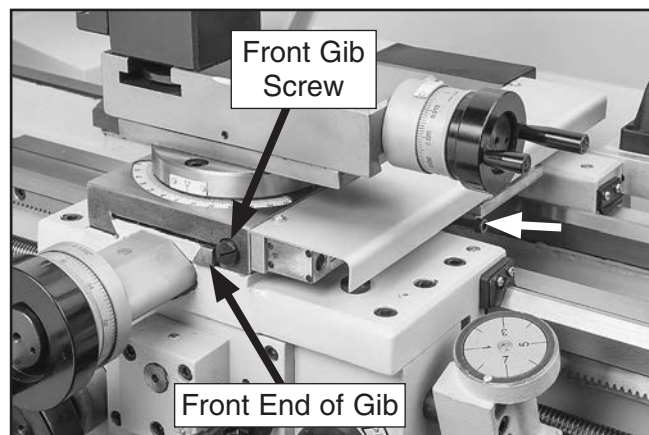


Figure 124. Cross slide gib components.

3. Repeat adjustments as necessary until gib screw drag is acceptable.

Figure 125 shows the gib location on the compound slide. The compound slide gib adjusts in the same manner and with the same tools as the cross slide gib. However, in this case, to increase or decrease tension, the gib adjustment screw directions are reversed.

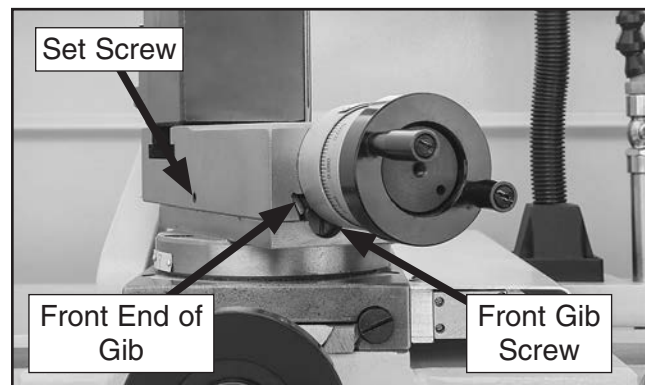


Figure 125. Compound slide gib components.

Saddle Gib

The saddle is supplied with a carriage lock on the front right-hand side of the slide (see **Figure 126**). This bolt locks the saddle in place for increased rigidity when making face cuts. Before making adjustments to the saddle gib, make sure that this lock is loose by turning it counterclockwise one full turn.

IMPORTANT: Do not loosen carriage lock more than a couple of turns or components inside will come apart. Re-installing these components is difficult and time consuming.

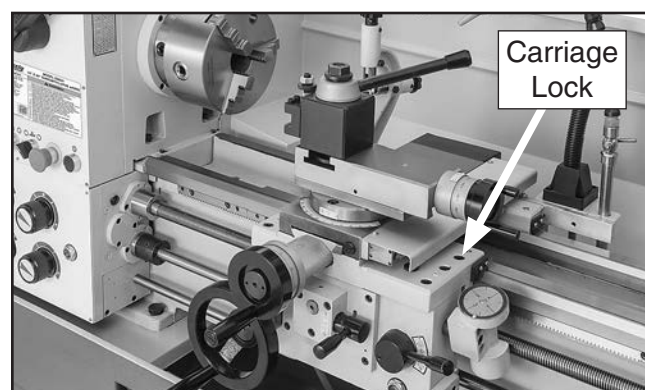


Figure 126. Location of carriage lock.



The saddle gib is located on the bottom of the back edge of the slide (see **Figure 127**). This gib is designed differently than the cross or compound slide gibs. Instead of being a wedge-shaped plate, it is a flat bar. The gib pressure is applied by four set screws. Hex nuts secure these set screws in place, so they will not loosen during operation.

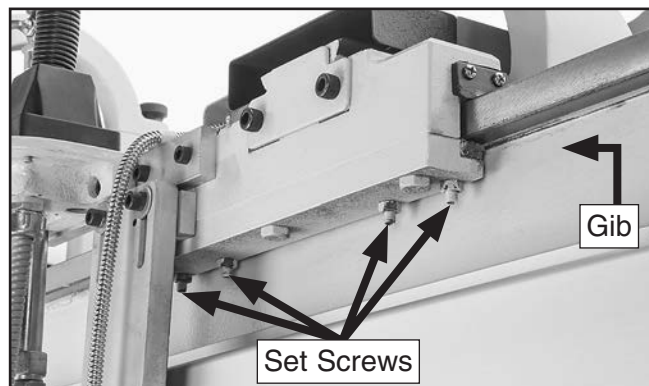


Figure 127. Saddle gib components.

Tools Needed	Qty
Open-End Wrench 10mm.....	1
Hex Wrench 3mm.....	1
Hex Wrench 6mm.....	1

To adjust saddle slide gib:

1. DISCONNECT MACHINE FROM POWER!
2. Clean and lubricate lathe bedways (refer to **Page 65**).
3. If carriage lock (see **Figure 126**) is tight, loosen it two turns.
4. Loosen jam nuts on four set screws shown in **Figure 130**, and adjust set screws same amount as follows:
 - To tighten carriage gib, tighten set screws.
 - To loosen gib, loosen set screws.
5. Move carriage back and forth and repeat adjustments as necessary until the gib pressure is acceptable.
6. Hold set screws in place and tighten jam nuts.

Half Nut Adjustment

The half-nut mechanism can be adjusted if it becomes loose from wear. The half nut is mounted in ways with a gib exerting pressure between components to reduce sloppy movement. The half-nut gib is a flat bar-type gib, similar to the saddle gib, and is tensioned with three set screws.

Tools Needed	Qty
Hex Wrenches 2.5, 6mm.....	1 Each
Wrench 8mm	1

To adjust half nut:

1. DISCONNECT MACHINE FROM POWER!
2. Disengage half nut and remove thread dial.
3. Loosen hex nuts on the set screws shown in **Figure 128**.

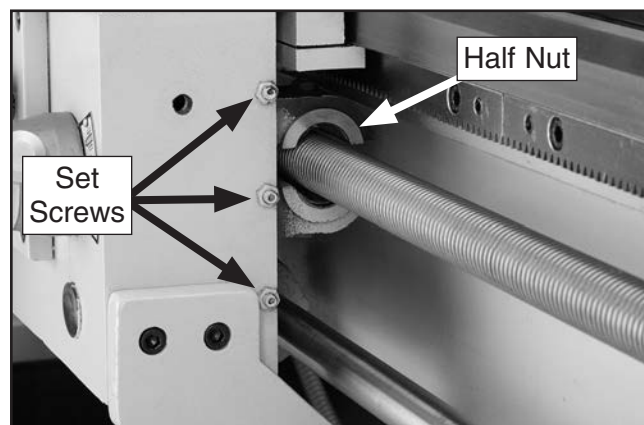


Figure 128. Half-nut gib set screws.

4. Tighten each set screw approximately $\frac{1}{8}$ of a turn, then retighten hex nuts without moving set screws.
5. Move carriage handwheel until half nut can fully close, then open/close half nut several times and notice how it feels. The half nut is correctly adjusted when you feel a slight drag while opening and closing it. It should not feel too stiff or too loose.
6. Repeat **Steps 3–5**, if necessary, until you are satisfied with half nut adjustment, then re-install thread dial.



V-Belt Tension & Replacement

After initial break-in, the V-belts slightly stretch and seat into the pulley. It is important to check and adjust them to compensate for this initial wear. Check the tension thereafter on a monthly basis. If the belts become excessively worn or damaged, replace them as a matched set.

Tools Needed	Qty
Hex Wrench 17mm	1

Tensioning V-Belts

1. DISCONNECT MACHINE FROM POWER!
2. Remove end gear cover.
3. Loosen motor mount bolts (see **Figure 129**).

Note: It may be more convenient to access the motor mount hex nuts if you first remove back splash.

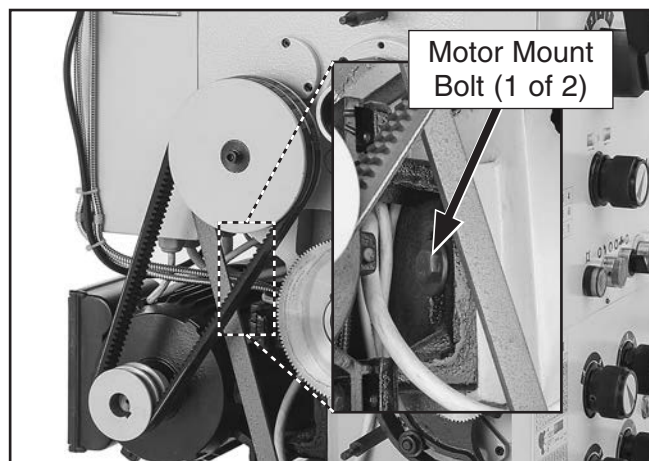


Figure 129. Checking V-belt deflection.

4. Push down on motor and re-tighten mounting hex bolts.

5. Check belt tension: Each belt is correctly tensioned when there is approximately $\frac{1}{4}$ " deflection when it is pushed with moderate pressure, as shown in **Figure 130**.

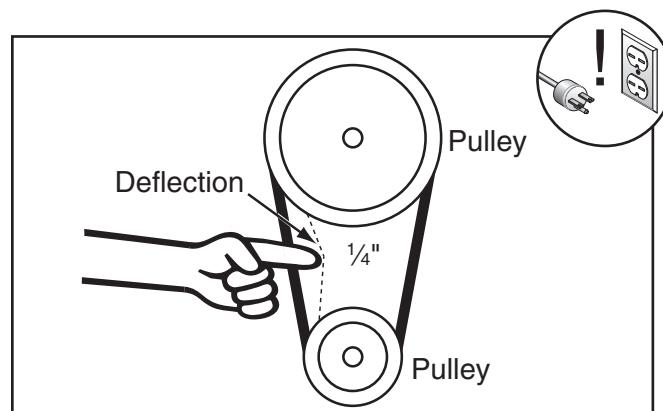


Figure 130. Correct timing-belt deflection.

— If there is more than $\frac{1}{4}$ " deflection when each belt is pushed with moderate pressure, loosen motor mount bolts, lower motor, adjust belt tension as required, then tighten bolts.

6. Secure end gear cover.

Replacing V-Belts

1. DISCONNECT MACHINE FROM POWER!
2. Remove end gear cover.
3. Loosen motor mount bolts (see **Figure 129**), slide motor up, and remove V-belts.

Note: It may be more convenient to access the motor mount bolts if you first remove the back splash.

4. Install new V-belts as a matched set so they equally share the load.
5. Tension belts. (Refer to **Tensioning V-Belts** on this page.)
6. Secure end gear cover.



Leadscrew Shear Pin Replacement

A straight 4 x 42mm brass shear pin (see **Figure 131**) holds the leadscrew and the drive hub together. The pin is designed to break and disengage the power transfer to the leadscrew to help protect more expensive lathe components in the case of a carriage crash or the lathe is overloaded.

Contact Grizzly Customer Service at (570) 546-9663 to order a replacement shear pin (Part P08241060).

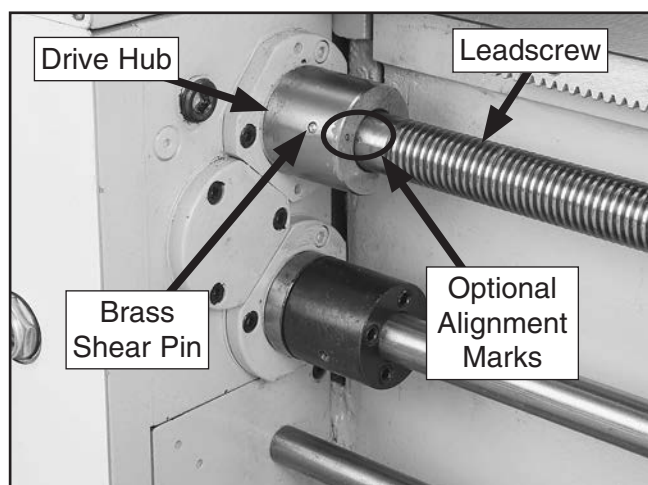


Figure 131. Leadscrew shear pin.

Tools Needed	Qty
Hammer.....	1
Dowel Punch $\frac{3}{16}$ ".....	1
Drill Bit $\frac{1}{8}$ ".....	1
Hand Drill.....	1
Wood Screw #8 x 1" (or longer).....	1
Pointed Center Punch.....	1
Standard Pliers.....	1

To replace leadscrew shear pin:

1. DISCONNECT MACHINE FROM POWER!
2. Unlock half-nut lever and turn top right gear-box dial to "N" (see **Figure 132**) so leadscrew can be rotated by hand.

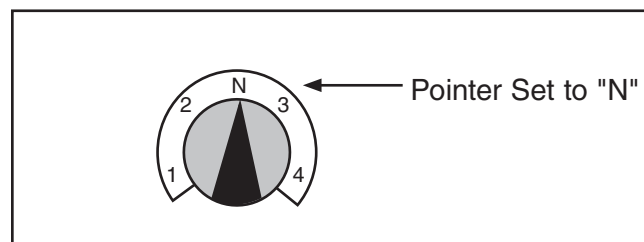


Figure 132. Gearbox dial set to "N" .

3. Rotate drive hub , and inspect it to see if pin is still stuck in both sides of it.
 - If one half of shear pin has fallen out and the leadscrew shaft can be seen through the pin hole, rotate leadscrew until you see the end of the inner sheared pin. Use a $\frac{3}{16}$ " dowel punch to tap pin out through other side.
 - If shear pin halves are stuck in both sides of drive hub, center punch one of the pins and drill an $\frac{1}{8}$ " hole in the pin approximately $\frac{1}{4}$ " deep. Thread a #8 wood screw into the hole until the screw begins to thread into the brass. Using pliers, pull the pin from the hole, then drive the rest of the pin out, as described above.
4. Align holes in drive hub with hole in leadscrew, and tap the new shear pin into position until it is flush.

Tip: For easy shear pin replacement in the future, use the center punch or a scribe and mark the end of the drive hub and the side of the leadscrew with a mark to indicate where true hole alignment is located (see **Figure 131**). Next, scribe a line on the leadscrew just where it enters the drive hub, this line will indicate correct depth of leadscrew. Should the pin ever shear again, line-up the marks, and drive out the pin pieces, and tap in the new pin.



Feed Clutch Adjustment

This lathe is equipped with a feed rod clutch, shown in **Figure 133**, that connects the feed drive hub with the feed rod through a set of spring-loaded ball bearings. This clutch helps protect the apron feed system from overload. The feed rod clutch comes set from the factory, and unless there is a problem, it needs no adjustment.

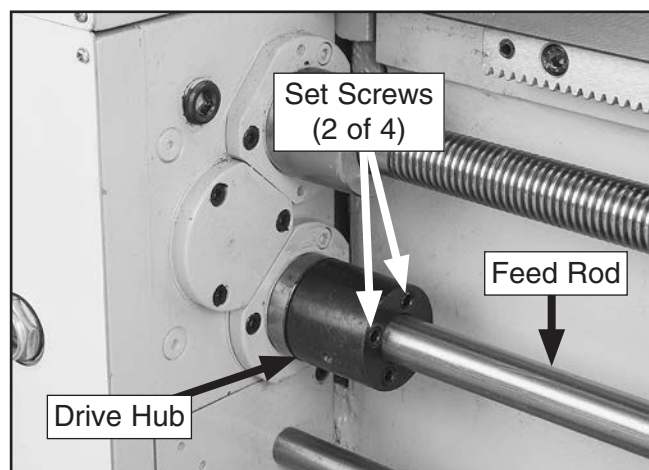


Figure 133. Feed rod clutch.

The clutch may slip if the path for the carriage or the cross feed is obstructed during turning or facing operations, the tool bit crashes into a workpiece shoulder, the carriage lock is incorrectly tightened when the feed selection lever is engaged, or if too deep of a cut is taken—causing a sudden binding of the tool and workpiece.

Never completely tighten the feed clutch past its normal setting in an attempt to completely eliminate clutch slip. Doing so will void the warranty, and can lead to a non-slipping clutch, resulting in catastrophic gearbox damage.

Tool Needed

Hex Wrench 4mm..... 1

Qty

To adjust feed rod clutch:

1. DISCONNECT MACHINE FROM POWER!
2. Point top right dial at "N", then position bottom right hand gearbox dial pointer between "S" and "T" (see **Figure 134**). This allows feed rod to move freely so adjustments can be made to the clutch.

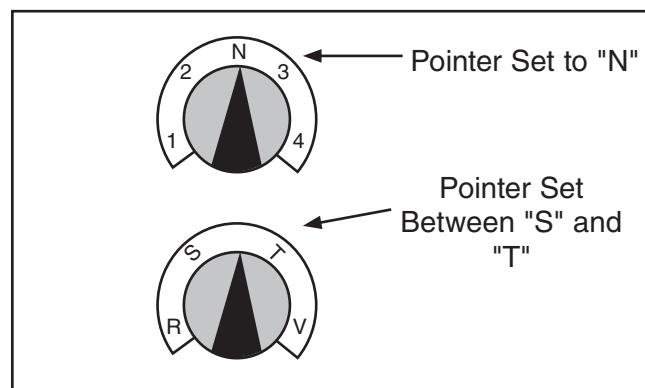


Figure 134. Gearbox dial settings for feed clutch adjustment.

- If the clutch slips during normal work loads, increase the clutch spring pressure by tightening each of the four clutch drive set screws shown in **Figure 133** one full turn, then recheck for slippage.
- If the clutch does not slip when it should, reduce the clutch spring pressure by loosening each of the four clutch set screws one full turn, then recheck for slippage.



Bearing Preload

This lathe is shipped from the factory with the spindle bearing preload adjusted. If the spindle ever develops a bit of end-play and the workpiece finish suffers, you can adjust the bearing preload to remove the end-play and improve the workpiece finish.

Adjusting the bearing preload requires using a spanner wrench or a punch and hammer. You can either purchase the spanner wrench at a tool store or fabricate one, using the diagram shown in **Figure 135**.

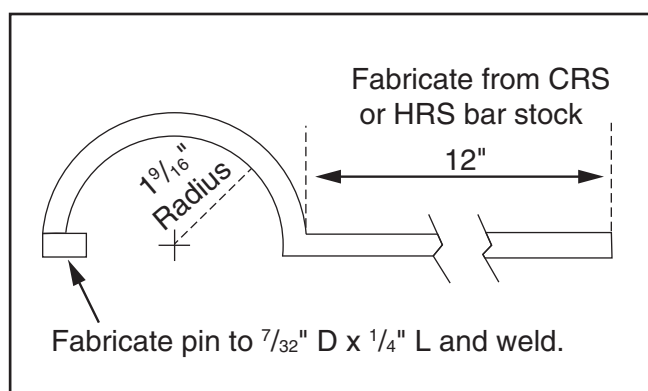


Figure 135. Spanner wrench diagram.

Tools Needed	Qty
Spanner Wrench.....	1
Chuck Key	1
Dead Blow Hammer	1
Piece of Scrap Wood.....	1
Dial Indicator	1
Hex Wrench 6mm.....	1

To adjust preload:

1. Run lathe for 20 minutes on high speed to bring lathe to a normal temperature.
2. DISCONNECT MACHINE FROM POWER!

3. Remove chuck, then shift spindle to neutral by positioning spindle speed lever between "3" and "4" and speed range lever between "L" and "H", as shown in **Figure 136**.

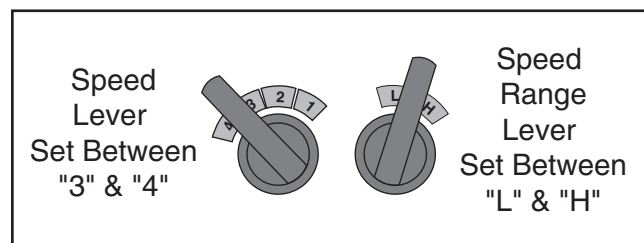


Figure 136. Spindle speed levers set to neutral.

4. Place chuck key in cam-lock socket and keep the spindle from rotating.
5. Using a spanner wrench, or hammer-and-punch, rotate outer spanner nut (see **Figure 137**) counterclockwise and remove it.

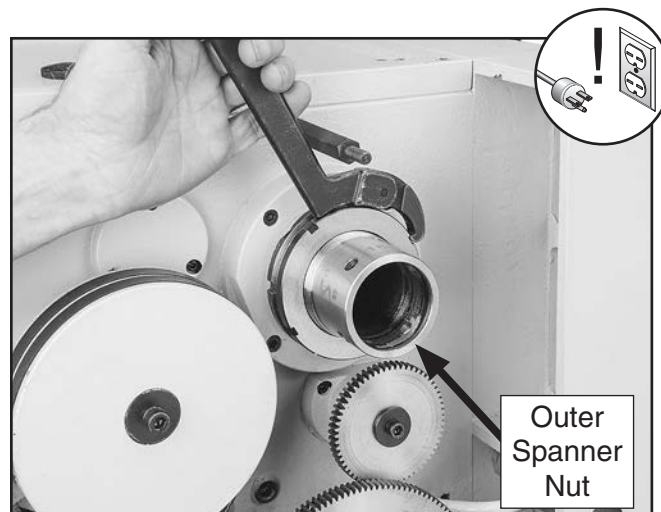


Figure 137. Loosening outer spanner nut.

6. Loosen inner spanner nut one turn.

Note: You may have to tap on the outboard end of the spindle as explained in **Step 7**, to help unload the spindle and break the spanner nut loose.



7. Place a wooden block over outboard end of spindle, tap it a few times with a small sledge or heavy dead blow hammer (see **Figure 138**). Your goal is to slide the spindle forward just enough to introduce spindle end-play that you can feel by hand.

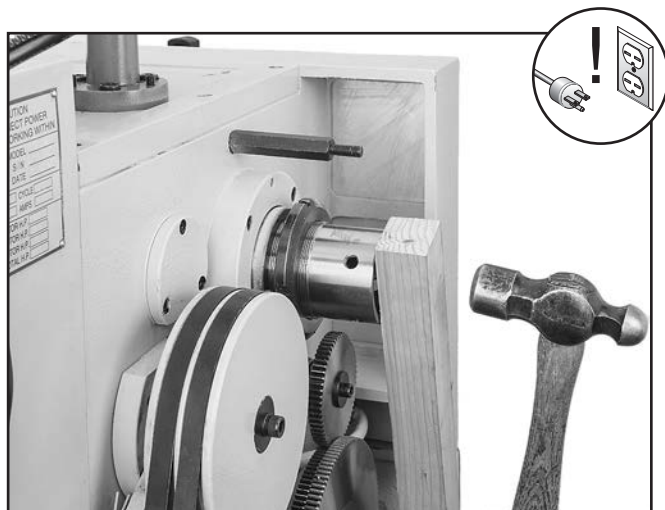


Figure 138. Introducing detectable end-play.

8. Place a dial indicator on cross slide and move carriage toward headstock until contact point of indicator touches spindle face, as shown in **Figure 139**.



Figure 139. Example of dial indicator setup.

9. Move carriage an additional 0.100" toward headstock.

10. Insert chuck key into a cam socket to prevent spindle from turning, then tighten inner spanner nut until dial indicator needle just stops moving (see **Figure 140**).

Note: For convenience and accuracy, we recommend having another person watch the dial while you tighten the inner spanner nut.

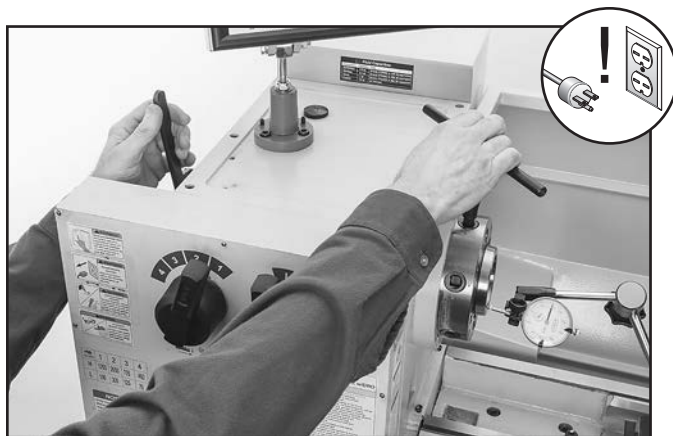


Figure 140. Adjusting spindle bearings.

While tightening the inner spanner nut, rock the spindle back and forth slightly with the chuck key to make sure the spindle tapered roller bearings seat properly in their races.

When the dial indicator needle stops moving, there will be no spindle end-play and no bearing preload. It is important that you find this point without tightening the spanner nut too much and inadvertently preloading the spindle bearings.

If you think you have gone past the zero end-play point, unload the bearings by repeating **Steps 7–8**, then re-tighten the inner spanner nut until it has reached the zero end-play position.



11. Tighten inner spanner nut an additional $\frac{1}{16}$ " along its circumference. See **Figure 141** for an example of this measurement.

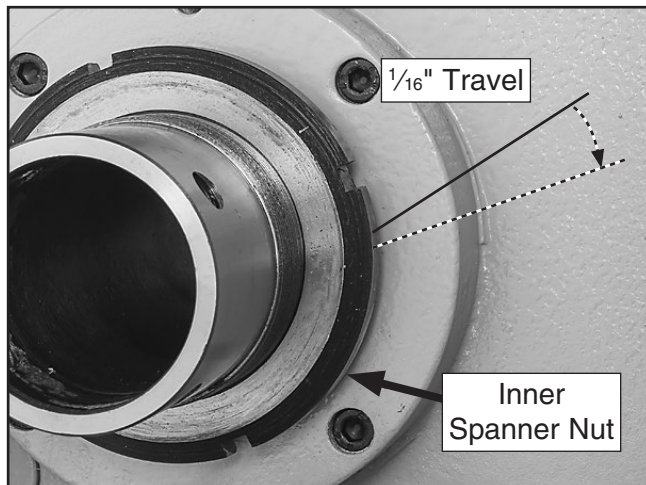


Figure 141. Final spanner nut rotation.

12. Without allowing inner spanner nut to tighten any further, install and tighten outer spanner nut against inner nut (see **Figure 142**).

DO NOT overtighten outer spanner nut because additional preload can force bearings even tighter against races in the headstock and cause headstock to compress, or crack, or cause bearing failure.

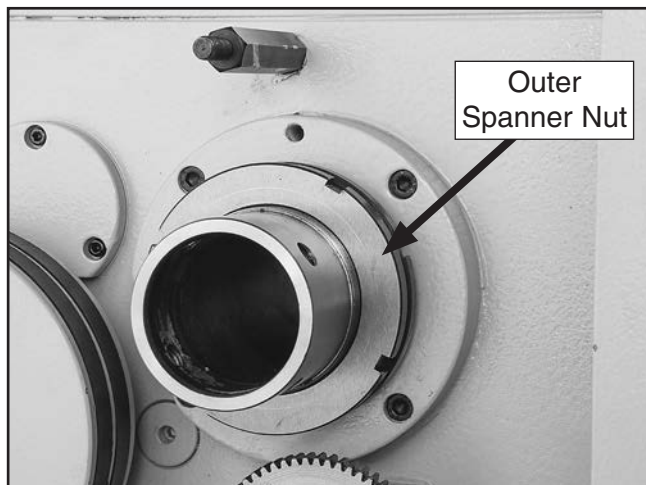


Figure 142. Outer spanner nut re-installed.

13. Re-install outboard spindle cover.

To confirm bearings are correctly preloaded:

1. Re-attach all removed lathe components and prepare it for operation.
2. Install chuck and tighten jaws.
3. Set the spindle speed to its highest setting.
4. Connect lathe to power and turn lathe spindle **ON**.
5. Let lathe run for 20 minutes, periodically shutting it down a few times and checking temperature.
6. Turn spindle **OFF**, disconnect lathe from power, and check temperature of spindle.

— If spindle nose is slightly warm to the touch, you have correct bearing preload.

— If spindle nose is hotter than you can comfortably keep your hand on, preload is too tight and you must repeat bearing preload adjustment procedure. When repeating the procedure, rotate the inner spanner nut a little less during **Step 12** in the preceding instructions.



SECTION 8: WIRING

These pages are current at the time of printing. However, in the spirit of improvement, we may make changes to the electrical systems of future machines. Compare the manufacture date of your machine to the one stated in this manual, and study this section carefully.

If there are differences between your machine and what is shown in this section, call Technical Support at (570) 546-9663 for assistance BEFORE making any changes to the wiring on your machine. An updated wiring diagram may be available. **Note:** Please gather the serial number and manufacture date of your machine before calling. This information can be found on the main machine label.

WARNING

Wiring Safety Instructions

SHOCK HAZARD. Working on wiring that is connected to a power source is extremely dangerous. Touching electrified parts will result in personal injury including but not limited to severe burns, electrocution, or death. Disconnect the power from the machine before servicing electrical components!

MODIFICATIONS. Modifying the wiring beyond what is shown in the diagram may lead to unpredictable results, including serious injury or fire. This includes the installation of unapproved after-market parts.

WIRE CONNECTIONS. All connections must be tight to prevent wires from loosening during machine operation. Double-check all wires disconnected or connected during any wiring task to ensure tight connections.

CIRCUIT REQUIREMENTS. You MUST follow the requirements at the beginning of this manual when connecting your machine to a power source.

WIRE/COMPONENT DAMAGE. Damaged wires or components increase the risk of serious personal injury, fire, or machine damage. If you notice that any wires or components are damaged while performing a wiring task, replace those wires or components.

MOTOR WIRING. The motor wiring shown in these diagrams is current at the time of printing but may not match your machine. If you find this to be the case, use the wiring diagram inside the motor junction box.











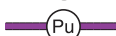

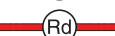

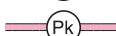
CAPACITORS/INVERTERS. Some capacitors and power inverters store an electrical charge for up to 10 minutes after being disconnected from the power source. To reduce the risk of being shocked, wait at least this long before working on capacitors.

EXPERIENCING DIFFICULTIES. If you are experiencing difficulties understanding the information included in this section, contact our Technical Support at (570) 546-9663.

NOTICE

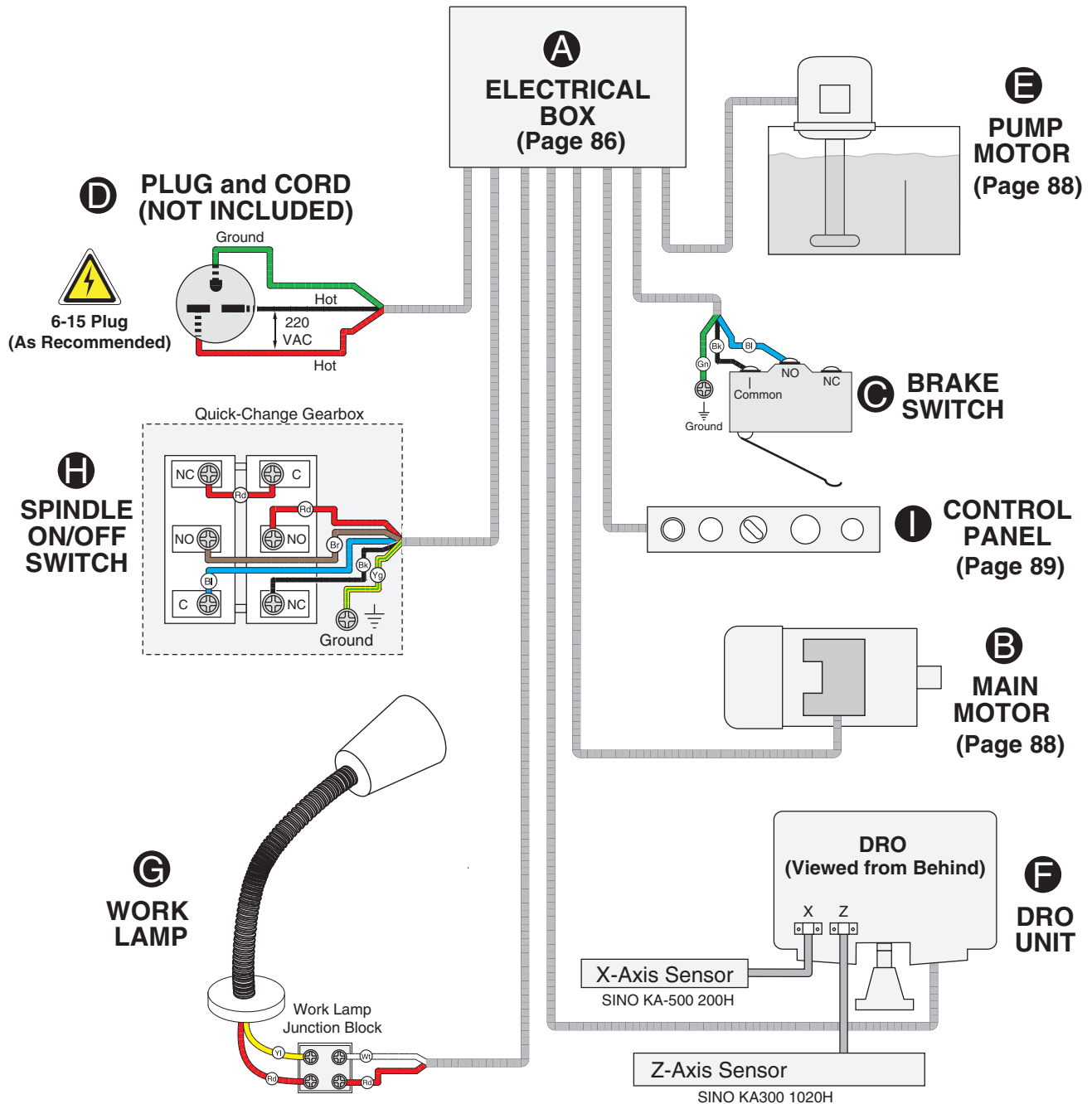
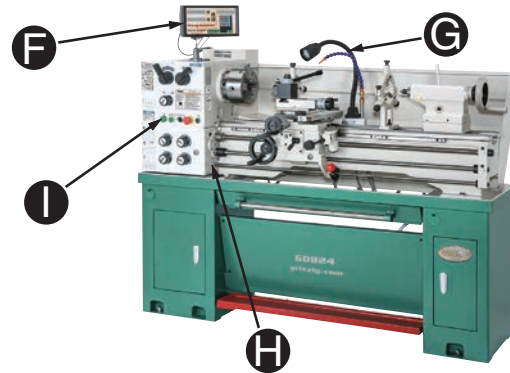
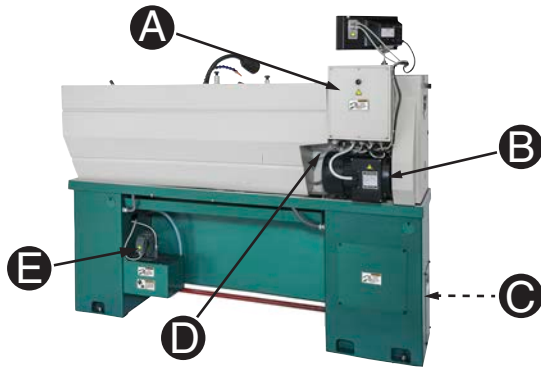
The photos and diagrams included in this section are best viewed in color. You can view these pages in color at www.grizzly.com.

COLOR KEY

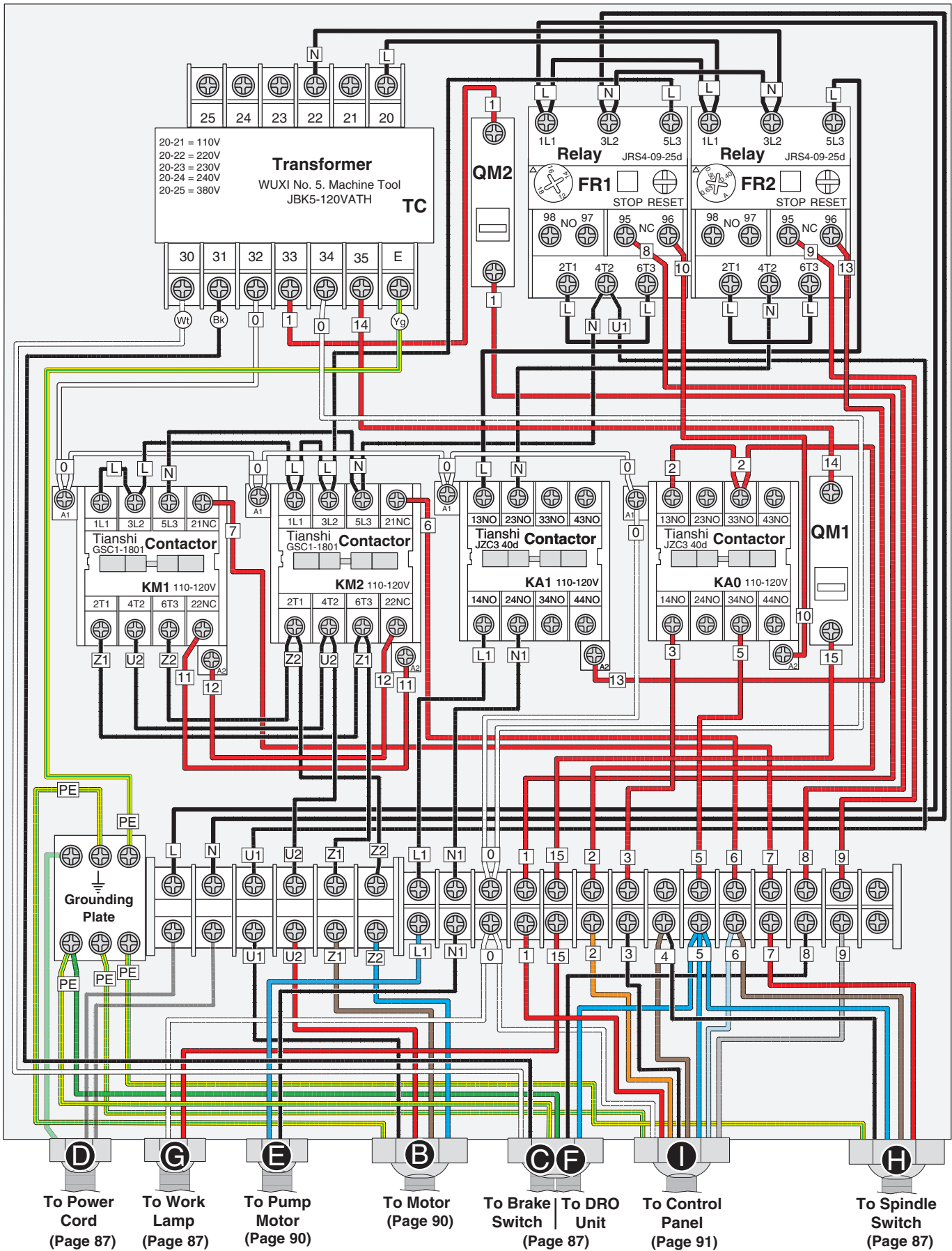
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WHITE		BROWN		YELLOW GREEN		BLUE WHITE	
GREEN		GRAY		PURPLE		TURQUOISE	
RED		ORANGE		PINK			



Wiring Overview



Electrical Cabinet Wiring



Electrical Cabinet

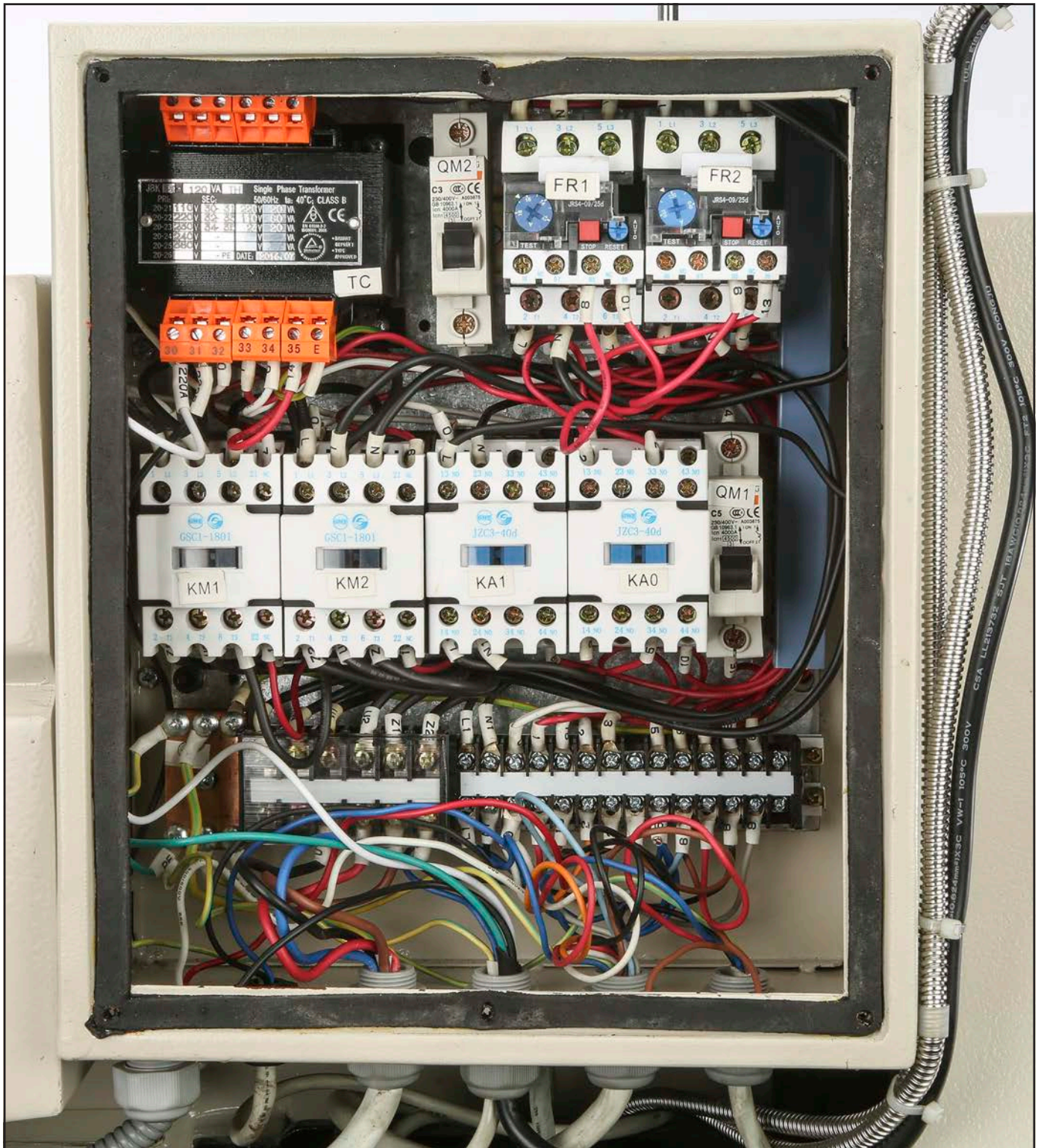


Figure 143. Electrical cabinet wiring.

Main & Pump Motor Wiring

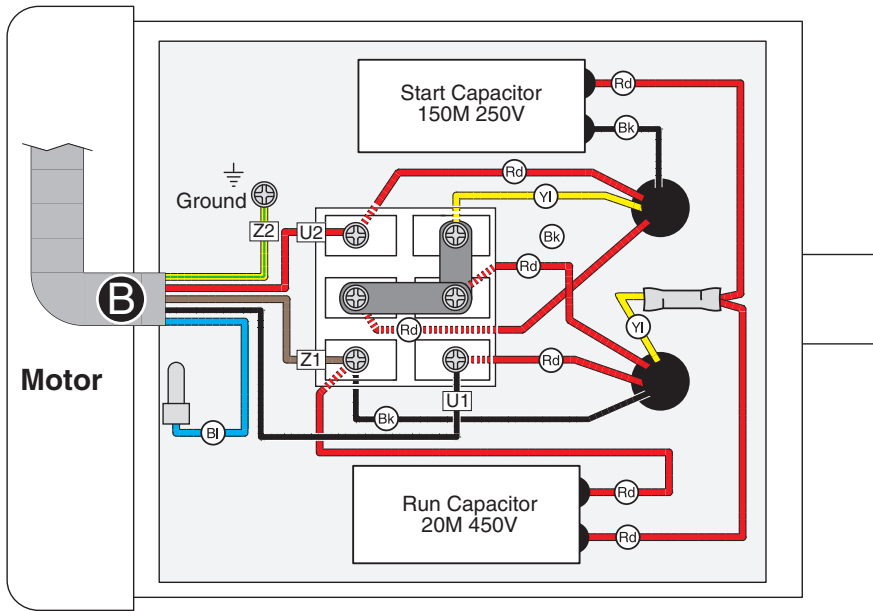


Figure 144. Spindle motor junction box.

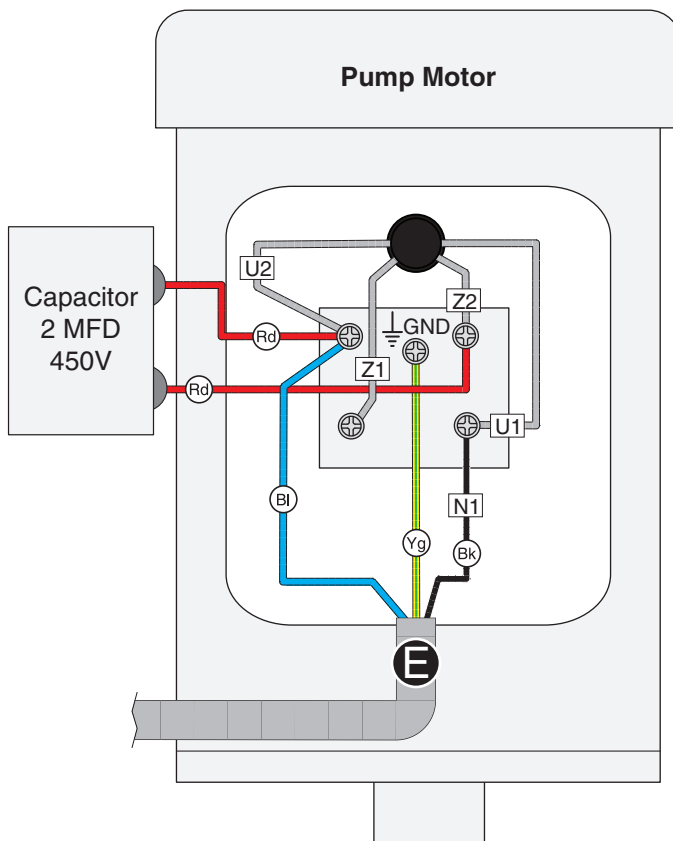


Figure 145. Coolant pump motor.



Control Panel Wiring

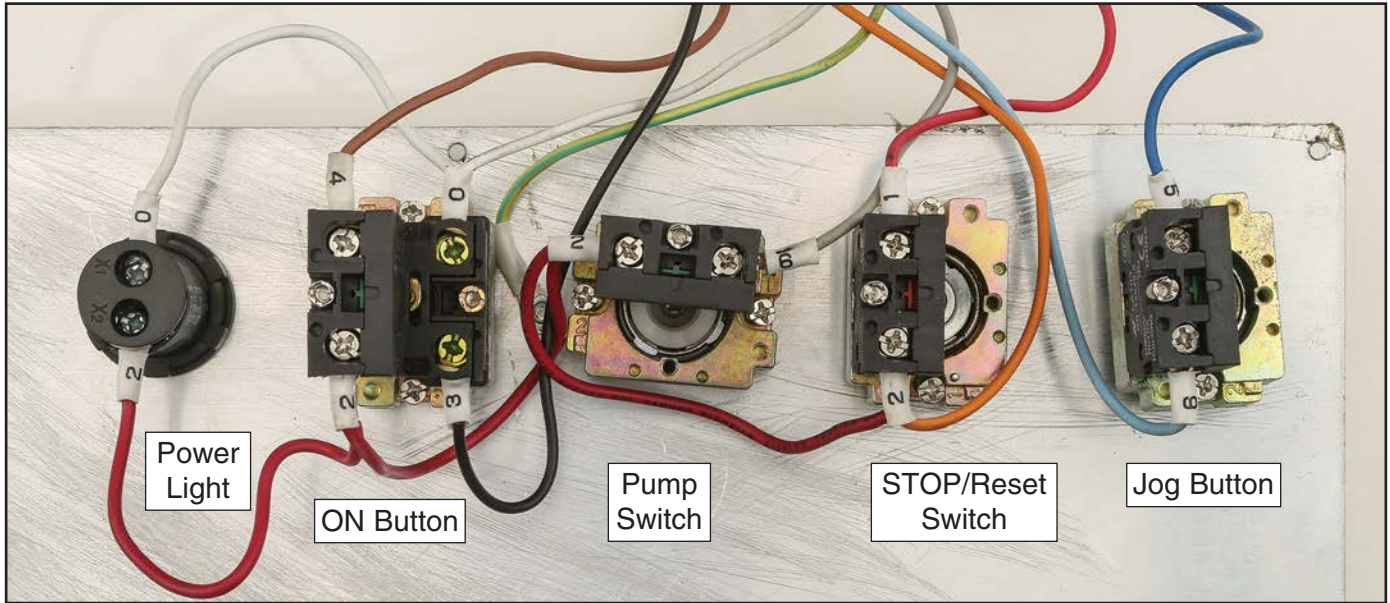
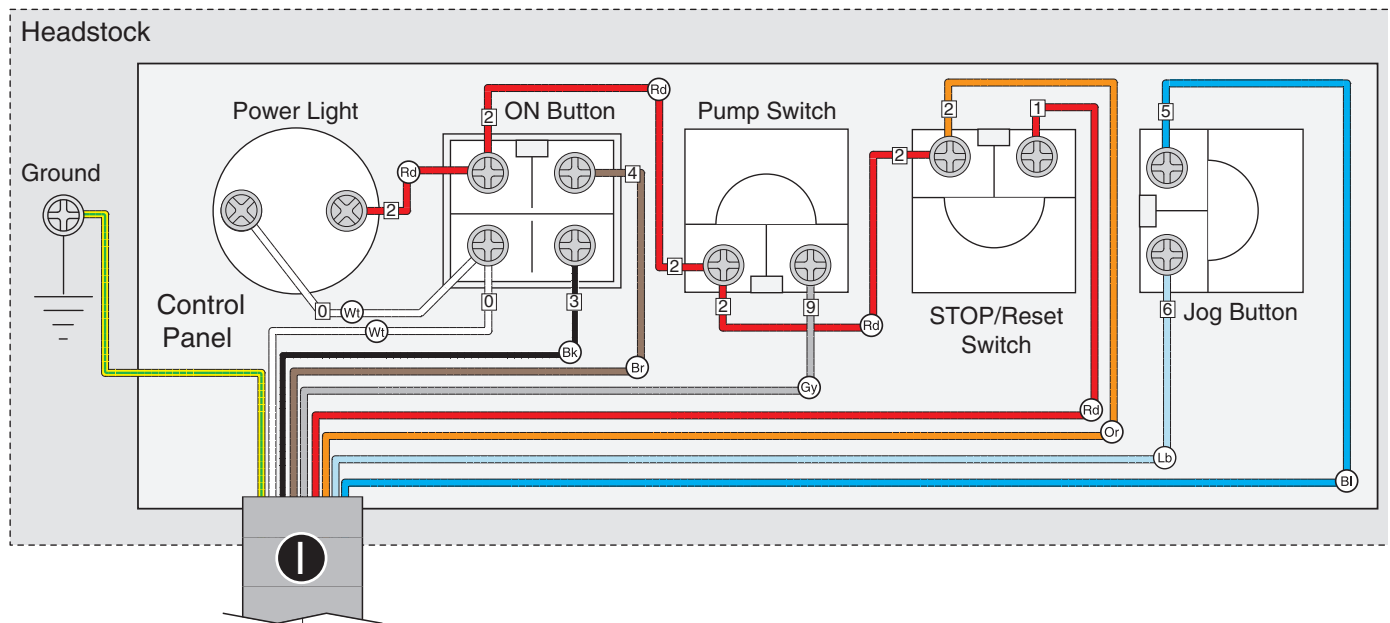


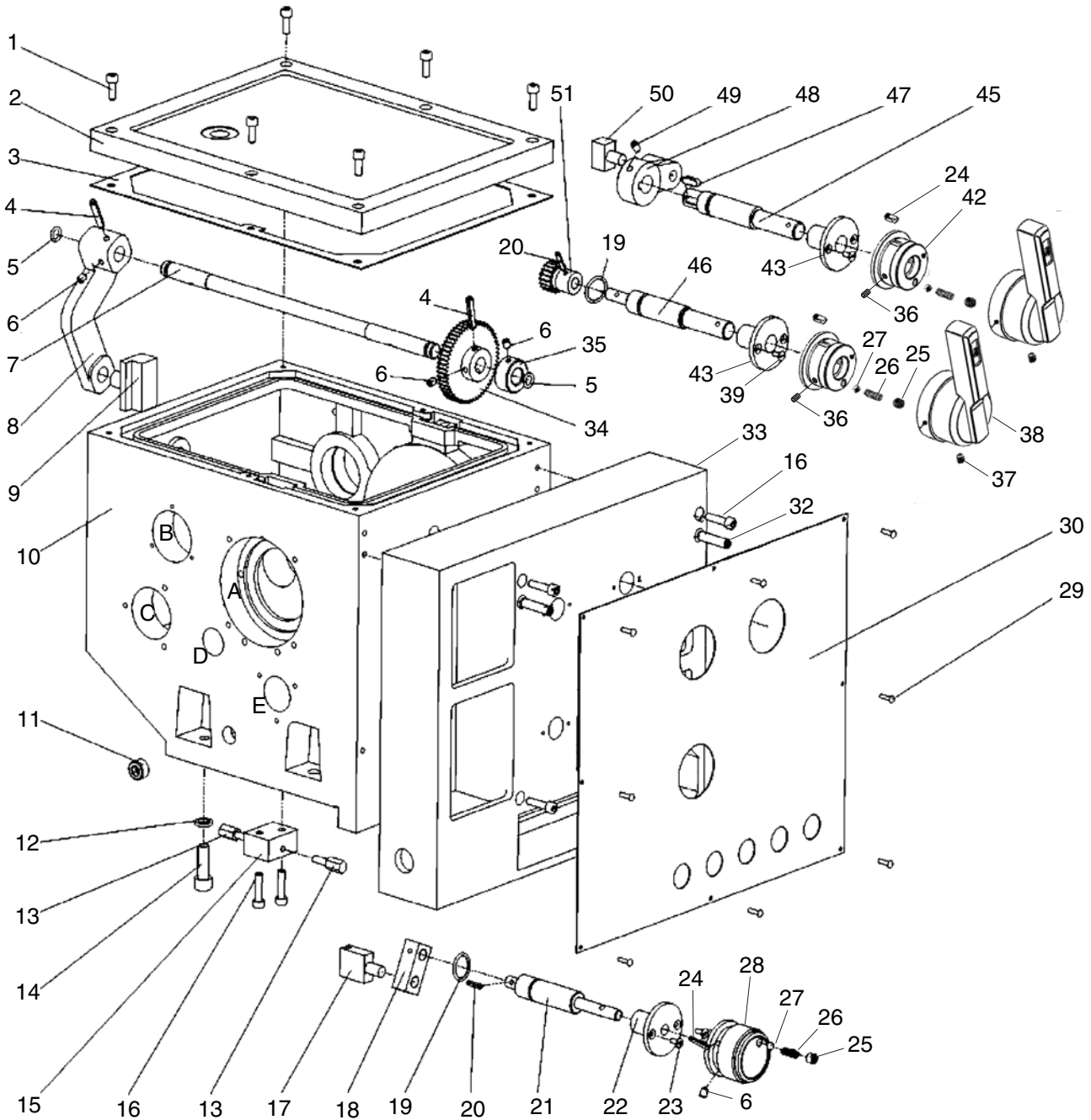
Figure 146. Control panel wiring.



SECTION 9: PARTS

We do our best to stock replacement parts when possible, but we cannot guarantee that all parts shown are available for purchase. Call (800) 523-4777 or visit www.grizzly.com/parts to check for availability.

Headstock Case & Shift



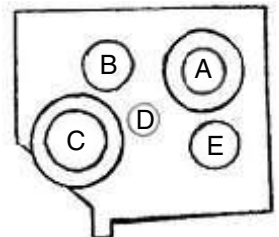
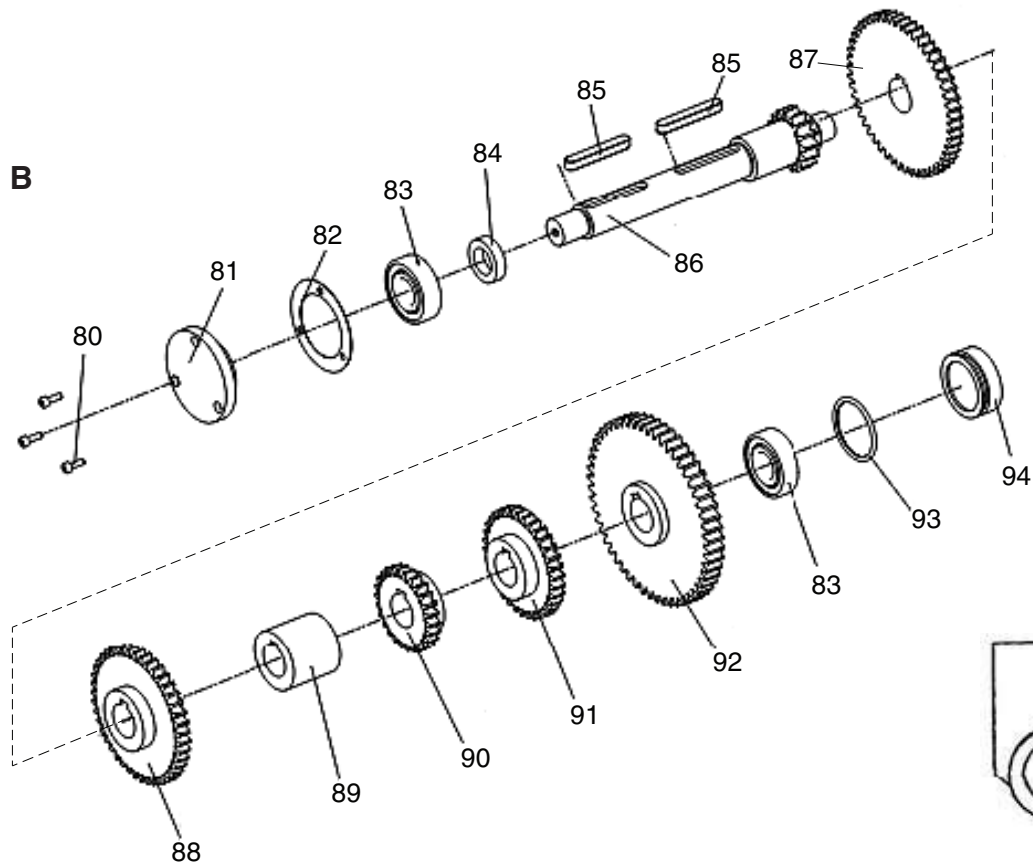
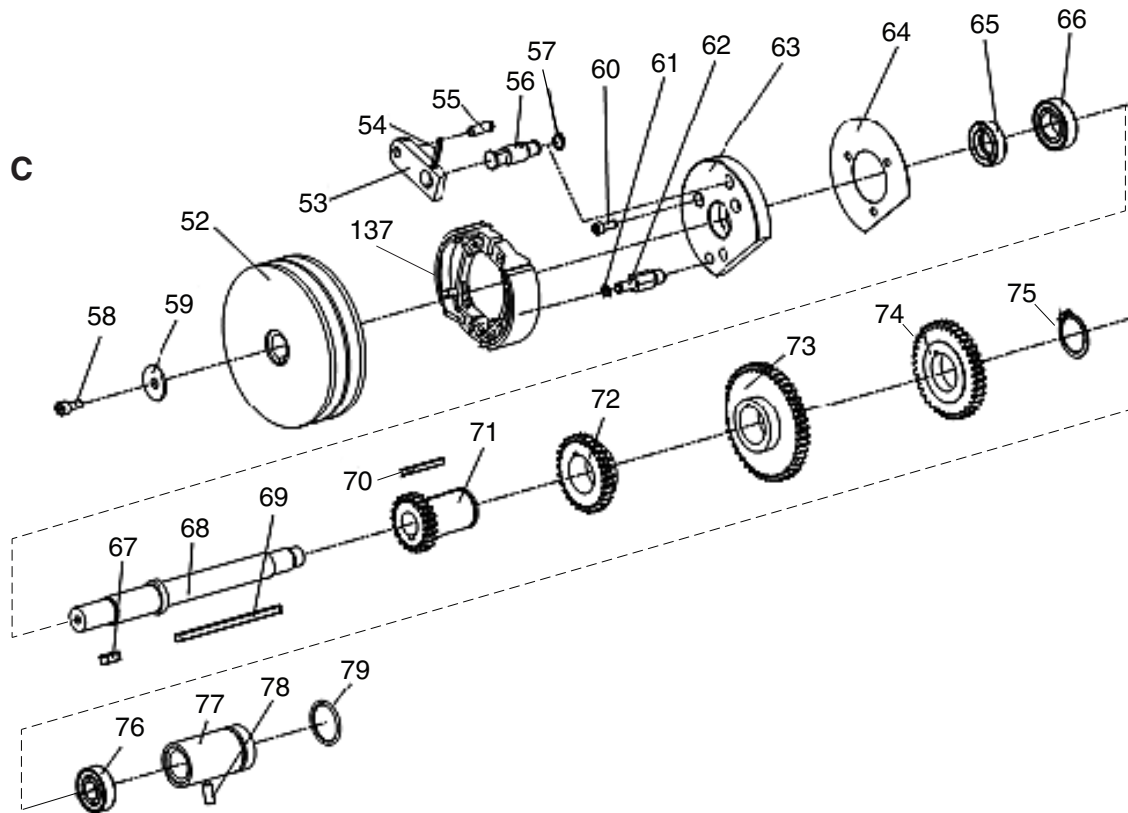
Headstock Case & Shift Parts

REF PART #	DESCRIPTION
1	P08240001 CAP SCREW M6-1 X 20
2	P08240002 HEADSTOCK COVER
3	P08240003 HEADSTOCK COVER GASKET
4	P08240004 ROLL PIN 6 X 30
5	P08240005 O-RING 14 X 2.4
6	P08240006 SET SCREW M6-1 X 8
7	P08240007 SHIFT SHAFT
8	P08240008 SHIFT LEVER
9	P08240009 SHIFT LEVER BLOCK
10	P08240010 HEADSTOCK CASTING
11	P08240011 OIL PLUG ZG 3/8" NPT
12	P08240012 LOCK WASHER 10MM
13	P08240013 HEX BOLT M10-1.5 X 18, 36L, EXT HEAD
14	P08240014 CAP SCREW M10-1.5 X 30
15	P08240015 FEED DIRECTION SHAFT BRACKET
16	P08240016 CAP SCREW M6-1 X 25
17	P08240017 SHIFT LEVER
18	P08240018 SHIFT BLOCK
19	P08240019 O-RING 25 X 2.4
20	P08240020 ROLL PIN 4 X 20
21	P08240021 FEED DIRECTION SHAFT
22	P08240022 FEED DIRECTION DIAL COLLAR
23	P08240023 FLAT HD SCR M4-.7 X 10
24	P08240024 KEY 4 X 6 X 14 RE

REF PART #	DESCRIPTION
25	P08240025 SET SCREW M8-1.25 X 8
26	P08240026 COMPRESSION SPRING 18 X 6 X 1.2
27	P08240027 STEEL BALL 6MM
28	P08240028 FEED DIRECTION DIAL 50MM D
29	P08240029 PHLP HD SCR M3-.5 X 6
30	P08240030 HEADSTOCK CONTROL PANEL PLATE
32	P08240032 ROLL PIN 8 X 35
33	P08240033 HEADSTOCK CONTROL PANEL FRAME
34	P08240034 GEAR 57T
35	P08240035 LOCK COLLAR
36	P08240036 SET SCREW M6-1 X 8 CONE PT
37	P08240037 SET SCREW M6-1 X 6
38	P08240038 SPEED CONTROL LEVER
39	P08240039 FLAT HD SCR M6-1 X 16
42	P08240042 SPEED CONTROL LEVER SLEEVE
43	P08240043 COLLAR
45	P08240045 SPEED RANGE SHAFT
46	P08240046 SPINDLE SPEED SHAFT
47	P08240047 KEY 6 X 6 X 18 RE
48	P08240048 SHIFT COLLAR
49	P08240049 SET SCREW M6-1 X 10 CUP-PT
50	P08240050 SHIFT FORK
51	P08240051 GEAR SHAFT 19T



Headstock Drive



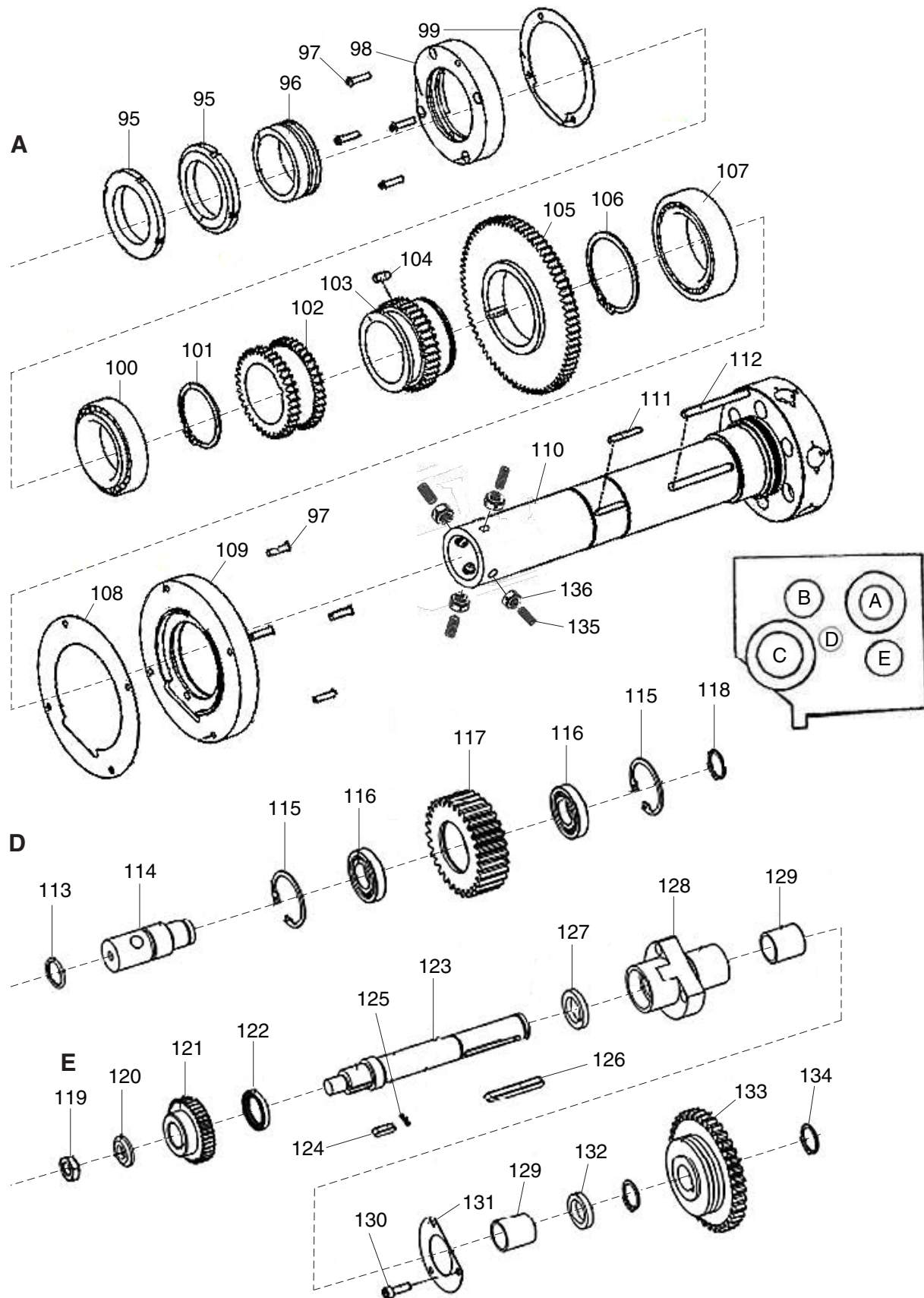
Headstock Drive Parts

REF	PART #	DESCRIPTION
52	P08240052	SPINDLE PULLEY
53	P08240053	ROCKER
54	P08240054	ROLL PIN 5 X 25
55	P08240055	ANCHOR PIN
56	P08240056	ROCKER SHAFT
57	P08240057	EXT RETAINING RING 8MM
58	P08240058	CAP SCREW M8-1.25 X 15
59	P08240059	FENDER WASHER 8MM
60	P08240060	CAP SCREW M6-1 X 16
61	P08240061	EXT RETAINING RING 8MM
62	P08240062	SHAFT
63	P08240063	GEAR SHAFT END COVER
64	P08240064	BEARING COVER GASKET
65	P08240065	OIL SEAL SD25 X 40 X 10
66	P08240066	BALL BEARING 6005ZZ
67	P08240067	KEY 8 X 8 X 32 RE
68	P08240068	GEAR SHAFT C
69	P08240069	KEY 6 X 6 X 120
70	P08240070	KEY 5 X 5 X 50
71	P08240071	TOOTHED COLLAR GEAR
72	P08240072	GEAR 29T
73	P08240073	GEAR 46T

REF	PART #	DESCRIPTION
74	P08240074	GEAR 38T
75	P08240075	EXT RETAINING RING 35MM
76	P08240076	BALL BEARING 6203ZZ
77	P08240077	FRONT END COVER C
78	P08240078	SET SCREW M8-1.25 X 16 DOG-PT
79	P08240079	O-RING 40 X 3.1
80	P08240080	CAP SCREW M4-.7 X 12
81	P08240081	BEARING COVER
82	P08240082	BEARING COVER GASKET
83	P08240083	BALL BEARING 6204ZZ
84	P08240084	SPACER 20 X 32 X 8
85	P08240085	KEY 8 X 8 X 55 RE
86	P08240086	GEAR SHAFT B
87	P08240087	GEAR 51T
88	P08240088	GEAR 43T
89	P08240089	SPACER
90	P08240090	GEAR 26T
91	P08240091	GEAR 34T
92	P08240092	GEAR 53T
93	P08240093	O-RING 47 X 3.1
94	P08240094	FRONT END COVER B
137	P08240137	BRAKE SHOE ASSEMBLY



Headstock Spindle



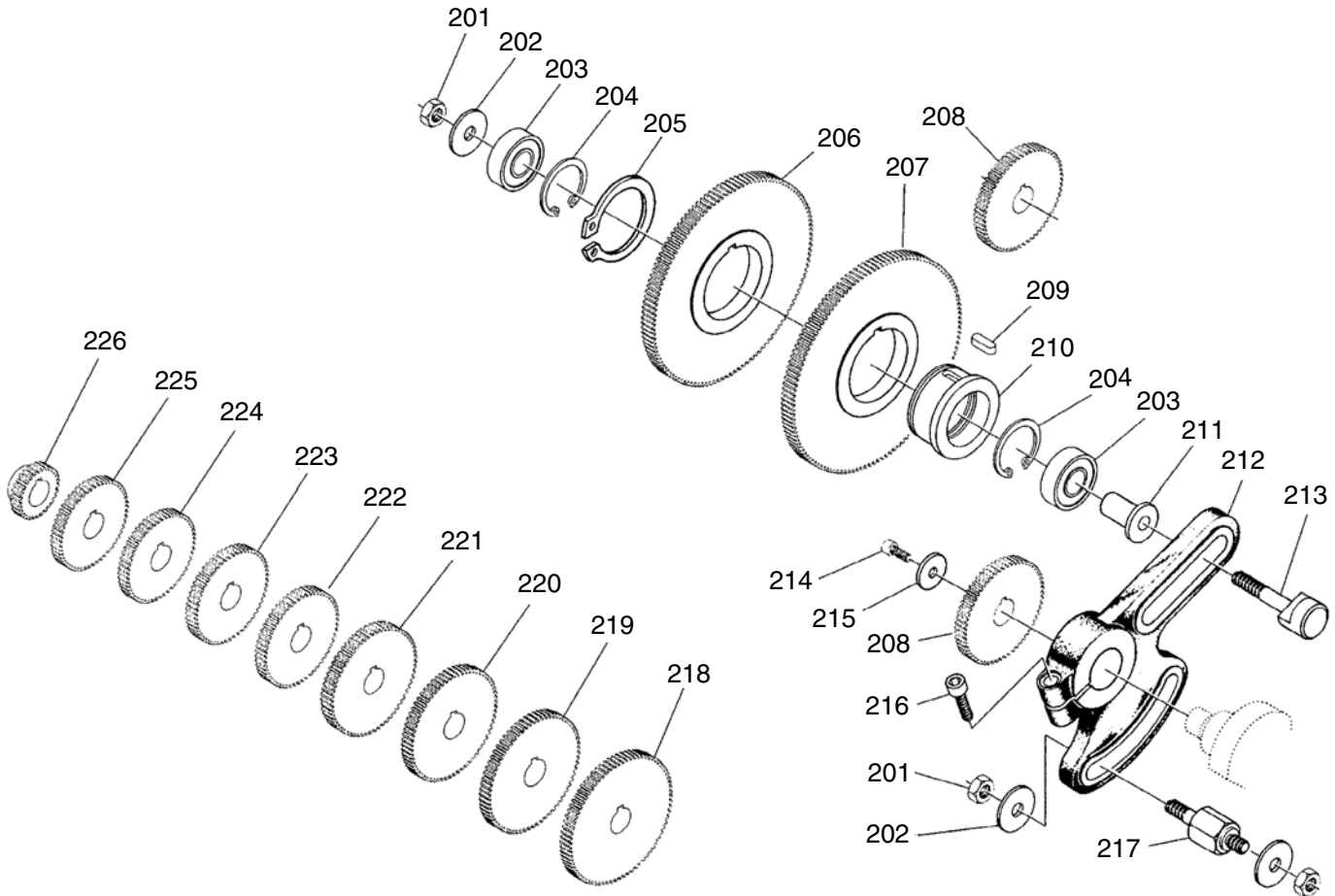
Headstock Spindle Parts

REF	PART #	DESCRIPTION
95	P08240095	SPANNER NUT M65-2
96	P08240096	COLLAR
97	P08240097	SET SCREW M6-1 X 25 DOG-PT
98	P08240098	OUTBOARD SPINDLE COVER
99	P08240099	OUTBOARD SPINDLE GASKET
100	P08240100	TAPERED ROLLER BEARING 32013 P5
101	P08240101	EXT RETAINING RING 65MM
102	P08240102	GEAR 37T
103	P08240103	GEAR 37T
104	P08240104	KEY 8 X 8 X 18
105	P08240105	GEAR 74T
106	P08240106	EXT RETAINING RING 82MM
107	P08240107	TAPERED ROLLER BEARING 32015 P5
108	P08240108	GASKET
109	P08240109	FRONT SPINDLE COVER
110	P08240110	SPINDLE
111	P08240111	KEY 6 X 6 X 40 RE
112	P08240112	KEY 8 X 8 X 84 RE
113	P08240113	O-RING 25 X 2.4
114	P08240114	SHAFT D
115	P08240115	INT RETAINING RING 42MM

REF	PART #	DESCRIPTION
116	P08240116	BALL BEARING 16004ZZ
117	P08240117	GEAR 30T
118	P08240118	EXT RETAINING RING 20MM
119	P08240119	HEX NUT M12-1.75
120	P08240120	SHOULDER WASHER 12 X 25 X 4
121	P08240121	GEAR 40T
122	P08240122	OIL SEAL
123	P08240123	GEAR SHAFT E
124	P08240124	KEY 5 X 5 X 18 RE
125	P08240125	ROLL PIN 3 X 10
126	P08240126	KEY 6 X 6 X 50 RE
127	P08240127	SPACER
128	P08240128	FLANGE HUB
129	P08240129	SPACER
130	P08240130	CAP SCREW M5-.8 X 16
131	P08240131	GASKET
132	P08240132	SPACER
133	P08240133	GEAR 37T
134	P08240134	EXT RETAINING RING 20MM
135	P08240135	SPIDER SCREW M10-1.5 X 35
136	P08240136	HEX NUT M10-1.5



Change Gears

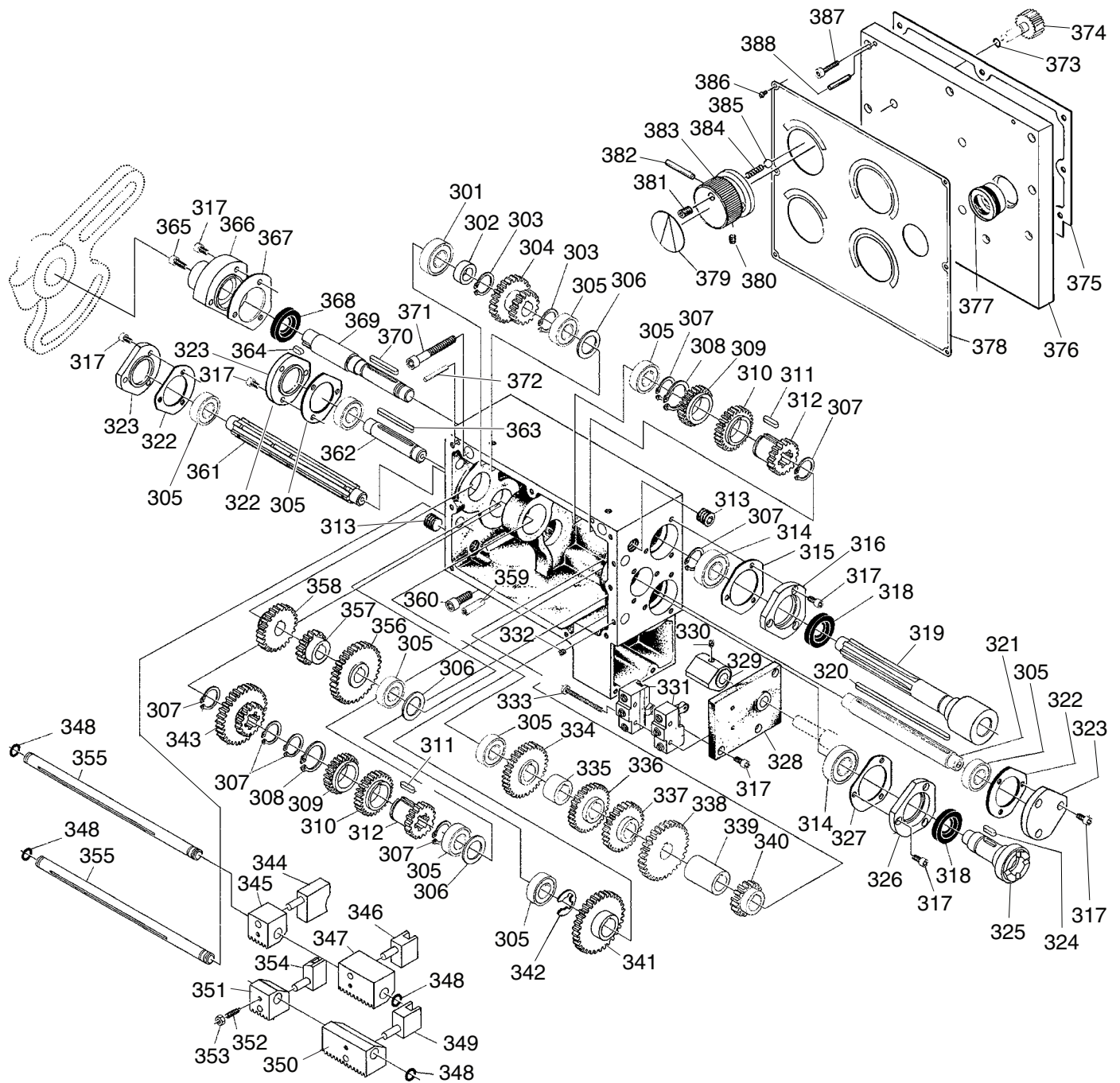


REF	PART #	DESCRIPTION
201	P08240201	HEX NUT M10-1.5
202	P08240202	FENDER WASHER 10MM
203	P08240203	BALL BEARING 6203ZZ
204	P08240204	INT RETAINING RING 40MM
205	P08240205	EXT RETAINING RING 55MM
206	P08240206	GEAR 120T
207	P08240207	GEAR 127T
208	P08240208	GEAR 60T
209	P08240209	KEY 6 X 6 X 18 RE
210	P08240210	BEARING HOUSING
211	P08240211	SLEEVE
212	P08240212	SWING ARM FRAME
213	P08240213	GEAR SUPPORT SHAFT M10-1.5

REF	PART #	DESCRIPTION
214	P08240214	CAP SCREW M6-1 X 15
215	P08240215	FENDER WASHER 6MM
216	P08240216	CAP SCREW M8-1.25 X 30
217	P08240217	STANDOFF HEX M10-1.5 X 64
218	P08240218	CHANGE GEAR 52T
219	P08240219	CHANGE GEAR 46T
220	P08240220	CHANGE GEAR 44T
221	P08240221	CHANGE GEAR 63T
222	P08240222	CHANGE GEAR 57T
223	P08240223	CHANGE GEAR 56T
224	P08240224	CHANGE GEAR 54T
225	P08240225	CHANGE GEAR 30T
226	P08240226	CHANGE GEAR 40T



Quick Change Gearbox



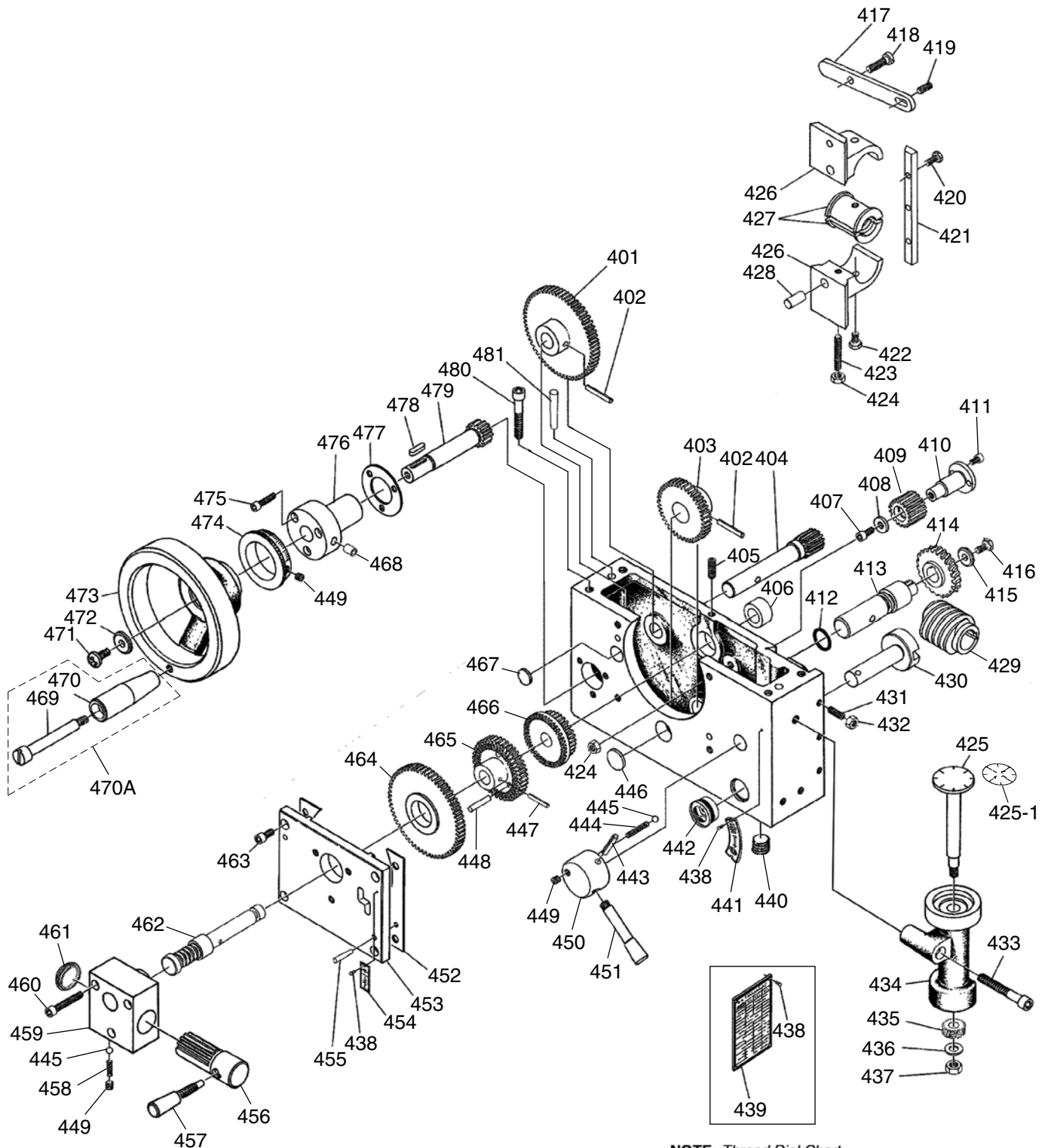
Quick Change Gearbox Parts

REF	PART #	DESCRIPTION
301	P08240301	BALL BEARING 6203-2RS
302	P08240302	SPACER
303	P08240303	EXT RETAINING RING 16MM
304	P08240304	COMBO GEAR 16T/24T
305	P08240305	BALL BEARING 6202-2RS
306	P08240306	SPACER
307	P08240307	EXT RETAINING RING 20MM
308	P08240308	EXT RETAINING RING 28MM
309	P08240309	GEAR 24T
310	P08240310	GEAR 28T
311	P08240311	KEY 4 X 4 X 22
312	P08240312	GEAR 18T
313	P08240313	DRAIN PLUG 3/8" NPT
314	P08240314	BALL BEARING 6004-2RS
315	P08240315	LEADSCREW BEARING COVER GASKET
316	P08240316	LEADSCREW BEARING COVER
317	P08240317	CAP SCREW M5-.8 X 12
318	P08240318	OIL SEAL 25 X 40 X 7
319	P08240319	LEADSCREW SHAFT
320	P08240320	KEY 4 X 4 X 145
321	P08240321	SHAFT
322	P08240322	BEARING COVER GASKET
323	P08240323	BEARING COVER
324	P08240324	KEY 5 X 5 X 18
325	P08240325	FEED ROD SHAFT
326	P08240326	FEED ROD SHAFT BEARING COVER
327	P08240327	FEED ROD SHAFT GASKET
328	P08240328	SPINDLE SWITCH COVER
329	P08240329	SPINDLE SWITCH ARM
330	P08240330	SET SCREW M6-1 X 8
331	P08240331	LIMIT SWITCH SHANGHAI MACHINE
332	P08240332	SET SCREW M5-.8 X 6
333	P08240333	BUTTON HD CAP SCR M4-.7 X 45
334	P08240334	GEAR 32T
335	P08240335	SPACER
336	P08240336	GEAR 30T
337	P08240337	GEAR 28T
338	P08240338	GEAR 30T
339	P08240339	SPACER
340	P08240340	GEAR 16T
341	P08240341	GEAR 32T
342	P08240342	E-CLIP 15MM
343	P08240343	GEAR 32T/16T
344	P08240344	SHIFT FORK A

REF	PART #	DESCRIPTION
345	P08240345	SHIFT FORK A RACK
346	P08240346	SHIFT FORK B
347	P08240347	SHIFT FORK B RACK
348	P08240348	O-RING 12 X 1.9
349	P08240349	SHIFT FORK C
350	P08240350	SHIFT FORK C RACK
351	P08240351	SHIFT FORK D RACK
352	P08240352	SET SCREW M4-.7 X 16
353	P08240353	HEX NUT M4-.7
354	P08240354	SHIFT FORK D
355	P08240355	SHIFT FORK SHAFT
356	P08240356	GEAR 32T
357	P08240357	GEAR 16T
358	P08240358	GEAR 24T
359	P08240359	TAPERED PIN 8 X 26
360	P08240360	CAP SCREW M8-1.25 X 25
361	P08240361	LOWER GEARBOX SPLINED SHAFT
362	P08240362	UPPER GEARBOX SHAFT
363	P08240363	KEY 4 X 4 X 55
364	P08240364	KEY 5 X 5 X 18
365	P08240365	CAP SCREW M6-1 X 16
366	P08240366	LWR CHANGE GEAR SHAFT BRACKET
367	P08240367	GEAR SHAFT BRACKET GASKET
368	P08240368	OIL SEAL 22 X 35 X 7
369	P08240369	LOWER CHANGE GEAR SHAFT
370	P08240370	KEY 5 X 5 X 45
371	P08240371	CAP SCREW M8-1.25 X 65
372	P08240372	ROLL PIN 4 X 30
373	P08240373	O-RING 7 X 1.9
374	P08240374	PINION SHAFT
375	P08240375	GEARBOX COVER GASKET
376	P08240376	GEARBOX COVER
377	P08240377	GEARBOX OIL SIGHT GLASS A12
378	P08240378	GEARBOX COVER PLATE
379	P08240379	GEARBOX DIAL COVER PLATE
380	P08240380	SET SCREW M6-1 X 8
381	P08240381	SET SCREW M6-1 X 10
382	P08240382	ROLL PIN 5 X 40
383	P08240383	GEARBOX DIAL 50MM D
384	P08240384	COMPRESSION SPRING 1 X 5 X 20
385	P08240385	STEEL BALL 6MM
386	P08240386	PHLP HD SCR M4-.7 X 8
387	P08240387	CAP SCREW M5-.8 X 25
388	P08240388	ROLL PIN 5 X 40



Apron



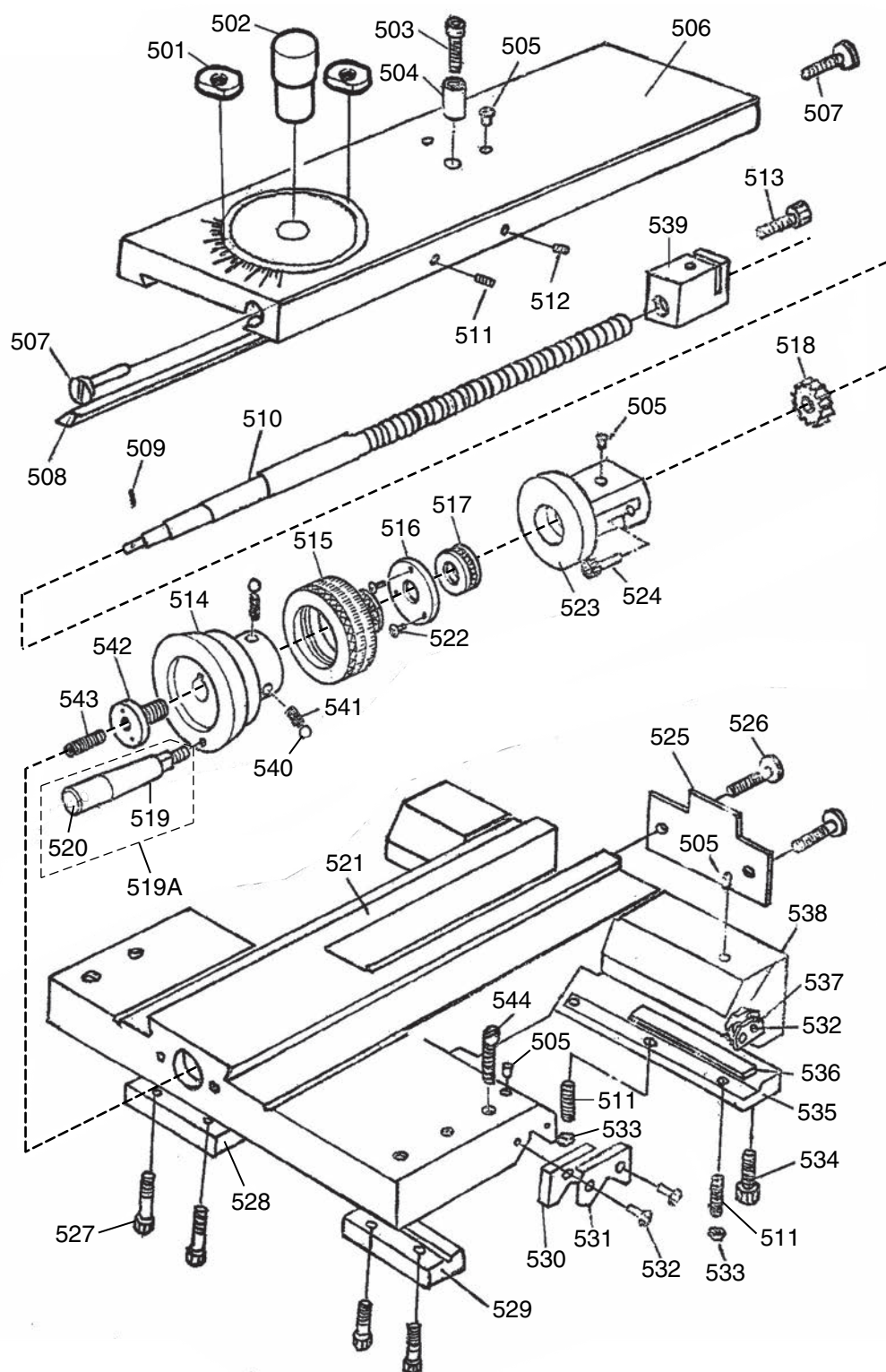
Apron Parts

REF	PART #	DESCRIPTION
401	P08240401	GEAR 60T
402	P08240402	ROLL PIN 5 X 30
403	P08240403	GEAR 18T W/COLLAR
404	P08240404	PINION GEAR 13T
405	P08240405	SET SCREW M6-1 X 16
406	P08240406	BUSHING
407	P08240407	CAP SCREW M6-1 X 12
408	P08240408	FLAT WASHER 6MM
409	P08240409	GEAR 18T
410	P08240410	IDLER SHAFT
411	P08240411	CAP SCREW M5-.8 X 12
412	P08240412	O-RING 20 X 2.4
413	P08240413	SHAFT
414	P08240414	WORM GEAR
415	P08240415	FLAT WASHER 6MM
416	P08240416	CAP SCREW M6-1 X 12
417	P08240417	INTERLOCK BAR
418	P08240418	CAP SCREW M6-1 X 12
419	P08240419	SET SCREW M6-1 X 12
420	P08240420	HEX BOLT M5-.8 X 20
421	P08240421	HALF-NUT GIB
422	P08240422	HEX BOLT M6-1 X 10
423	P08240423	SET SCREW M6-1 X 35
424	P08240424	HEX NUT M6-1
425	P08240425	THREAD DIAL INDICATOR
425-1	P08240425-1	THREAD DIAL LABEL
426	P08240426	HALF-NUT BRACKET
427	P08240427	HALF-NUT ASSEMBLY
428	P08240428	DOWEL PIN 8 X 16
429	P08240429	WORM GEAR
430	P08240430	CAM SHAFT
431	P08240431	SET SCREW M5-.8 X 16
432	P08240432	HEX NUT M5-.8
433	P08240433	CAP SCREW M8-1.25 X 50
434	P08240434	THREAD DIAL BODY
435	P08240435	HELICAL GEAR 32T
436	P08240436	FLAT WASHER 8MM
437	P08240437	HEX NUT M8-1.25
438	P08240438	RIVET 3 X 5MM NAMEPLATE
439	P08240439	THREAD DIAL CHART
440	P08240440	DRAIN PLUG 1/8 NPT
441	P08240441	HALF-NUT INDICATOR PLATE

REF	PART #	DESCRIPTION
442	P08240442	OIL SIGHT GLASS M20-2.5
443	P08240443	ROLL PIN 5 X 35
444	P08240444	COMPRESSION SPRING
445	P08240445	STEEL BALL 3/16
446	P08240446	APRON GEARBOX PLUG (L)
447	P08240447	ROLL PIN 3 X 25
448	P08240448	DOWEL PIN 5 X 25
449	P08240449	SET SCREW M6-1 X 6
450	P08240450	LEVER HUB
451	P08240451	LEVER HANDLE M8-1.25 X 10, 90L
452	P08240452	SPACER
453	P08240453	FRONT COVER
454	P08240454	FEED DIRECTION INDICATOR
455	P08240455	TAPER PIN 5 X 20
456	P08240456	FEED SELECTION CAM SHAFT
457	P08240457	LEVER HANDLE M8-1.25 X 33 ROUND TIP, 90L
458	P08240458	COMPRESSION SPRING
459	P08240459	CAM SHAFT BRACKET
460	P08240460	CAP SCREW M6-1 X 35
461	P08240461	FEED SELECTION BRACKET PLUG
462	P08240462	TOOTHED SHIFT SHAFT
463	P08240463	CAP SCREW M6-1 X 16
464	P08240464	CLUTCH GEAR 63T
465	P08240465	CLUTCH GEAR 40T
466	P08240466	COMBO CLUTCH GEAR 30T
467	P08240467	APRON GEARBOX PLUG (R)
468	P08240468	BALL OILER 8MM TAP-IN
469	P08240469	SHLDR SCR M8-1.25 X 12, 10 X 66
470	P08240470	HANDWHEEL HANDLE 22 X 75 X 10
470A	P08240470A	HANDLE 22 X 75 X 10 W/SCREW
471	P08240471	FLAT HD SCR M6-1 X 16
472	P08240472	FLAT WASHER 6MM
473	P08240473	HANDWHEEL TYPE-4 140D X 16B-K
474	P08240474	GRADUATED DIAL
475	P08240475	CAP SCREW M5-.8 X 25
476	P08240476	HANDWHEEL SUPPORT HUB
477	P08240477	SPACER
478	P08240478	KEY 5 X 5 X 20
479	P08240479	GEARED SHAFT 14T
480	P08240480	CAP SCREW M8-1.25 X 30
481	P08240481	TAPER PIN 8 X 40



Cross Slide



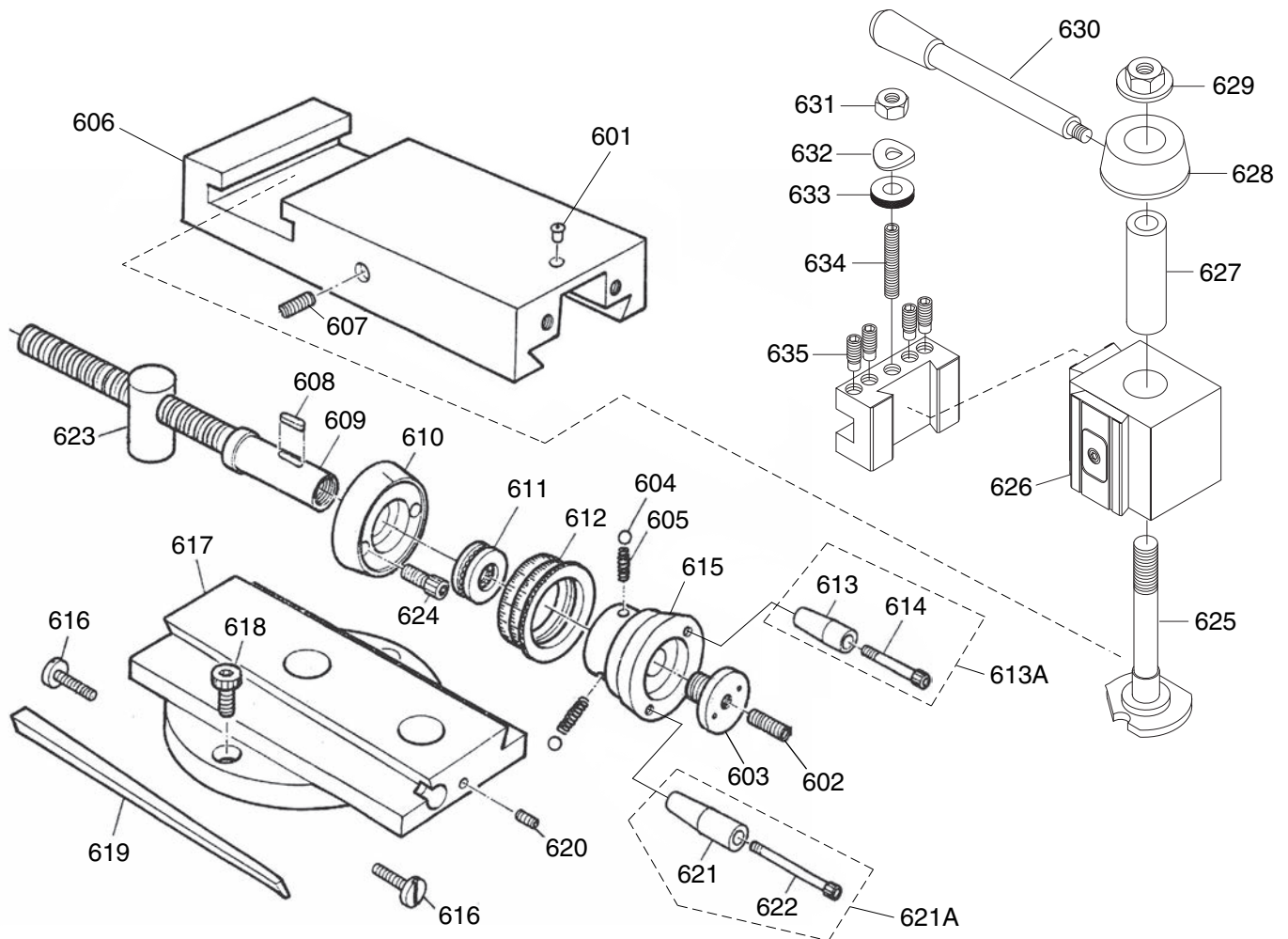
Cross Slide Parts

REF	PART #	DESCRIPTION
501	P08240501	SLIDE NUT M8-1.25
502	P08240502	COMPOUND REST AXIS
503	P08240503	CAP SCREW M6-1 X 16
504	P08240504	BUSHING
505	P08240505	BALL OILER 8MM TAP-IN
506	P08240506	CROSS SLIDE
507	P08240507	GIB ADJUSTING SCREW
508	P08240508	CROSS-SLIDE GIB
509	P08240509	ROLL PIN 3 X 16
510	P08240510	CROSS-SLIDE LEADSCREW
511	P08240511	SET SCREW M6-1 X 25
512	P08240512	SET SCREW M8-1.25 X 10
513	P08240513	CAP SCREW M6-1 X 16
514	P08240514	HANDWHEEL 86MM D
515	P08240515	GRADUATED DIAL
516	P08240516	BEARING COVER
517	P08240517	THRUST BEARING 8102
518	P08240518	GEAR 19T
519	P08240519	HANDWHEEL HANDLE 22 X 75 X 10
519A	P08240519A	HANDLE 22 X 75 X 10 W/SCREW
520	P08240520	SHLDR SCR M8-1.25 X 12, 10 X 66
521	P08240521	SADDLE CASTING
522	P08240522	PHLP HD SCR M5-.8 X 10

REF	PART #	DESCRIPTION
523	P08240523	CROSS SLIDE LEADSCREW HUB
524	P08240524	CAP SCREW M6-1 X 25
525	P08240525	COVER PLATE
526	P08240526	CAP SCREW M8-1.25 X 12
527	P08240527	CAP SCREW M8-1.25 X 20
528	P08240528	GIB SLIDE (FRONT LEFT)
529	P08240529	GIB SLIDE (FRONT RIGHT)
530	P08240530	V-WIPER
531	P08240531	V-WIPER SUPPORT PLATE
532	P08240532	PHLP HD SCR M4-.7 X 12
533	P08240533	HEX NUT M6-1
534	P08240534	CAP SCREW M8-1.25 X 25
535	P08240535	GIB SUPPORT
536	P08240536	SADDLE GIB
537	P08240537	FLAT WIPER SUPPORT PLATE
538	P08240538	FLAT WIPER
539	P08240539	CROSS-SLIDE LEADSCREW NUT
540	P08240540	STEEL BALL 6MM
541	P08240541	COMPRESSION SPRING
542	P08240542	BACKLASH ADJUSTMENT DISC
543	P08240543	SET SCREW M6-1 X 25
544	P08240544	CAP SCREW M8-1.25 X 55



Compound Slide & Tool Post

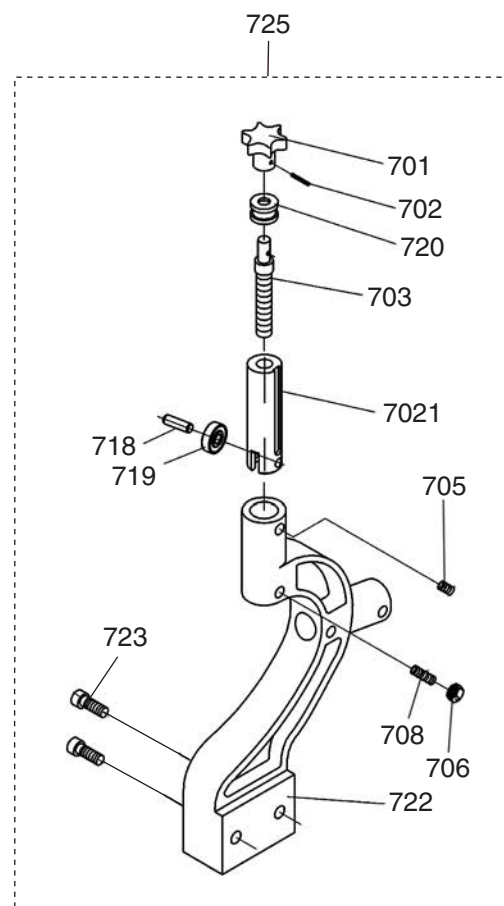
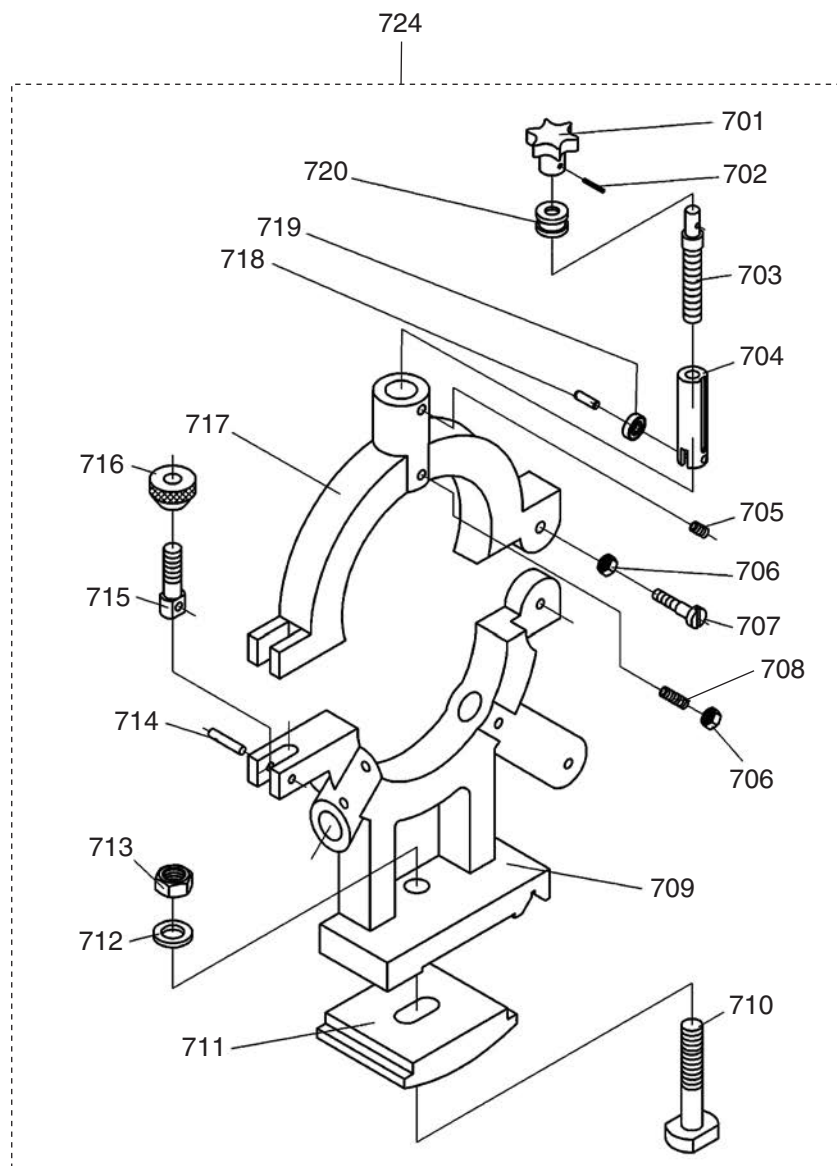


REF	PART #	DESCRIPTION
601	P08240601	BALL OILER 6MM TAP-IN
602	P08240602	SET SCREW M6-1 X 25
603	P08240603	INNER HUB
604	P08240604	STEEL BALL 6MM
605	P08240605	COMPRESSION SPRING
606	P08240606	COMPOUND SLIDE
607	P08240607	SET SCREW M6-1 X 6
608	P08240608	KEY 4 X 4 X 14
609	P08240609	COMPOUND LEADSCREW
610	P08240610	BEARING HOUSING
611	P08240611	THRUST BEARING 8103
612	P08240612	GRADUATED DIAL 0.001"/0.2"
613	P08240613	HANDWHEEL HANDLE 12 X 25 X 6
613A	P08240613A	HANDLE 12 X 25 X 6 W/SCREW
614	P08240614	SHLDR SCR M5-.8 X 8, 6 X 27
615	P08240615	HANDWHEEL TYPE-10 61D B-K
616	P08240616	GIB ADJUSTING SCREW
617	P08240617	SWIVEL SLIDE
618	P08240618	CAP SCREW M8-1.25 X 16

REF	PART #	DESCRIPTION
619	P08240619	COMPOUND SLIDE GIB
620	P08240620	SET SCREW M6-1 X 8
621	P08240621	HANDWHEEL HANDLE 12 X 40 X 6
621A	P08240621A	HANDLE 12 X 40 X 6 W/SCREW
622	P08240622	SHLDR SCR M5-.8 X 8, 6 X 42
623	P08240623	COMPOUND LEADSCREW NUT
624	P08240624	CAP SCREW M6-1 X 20
625	P08240625	TOOL POST BOLT M16-1.5 X 35
626	P08240626	QUICK-CHANGE TOOL POST BLOCK
627	P08240627	TOOL POST BUSHING
628	P08240628	TOOL POST HANDLE HUB
629	P08240629	FLANGE NUT M16-1.5
630	P08240630	TOOL POST HANDLE M12-1.75 X 8
631	P08240631	HEX NUT M10-1
632	P08240632	WAVY WASHER 10MM
633	P08240633	KNURLED THUMB NUT M10-1
634	P08240634	SET SCREW M10-1 X 45
635	P08240635	SET SCREW M10-1.5 X 14 PILOT



Steady & Follow Rests

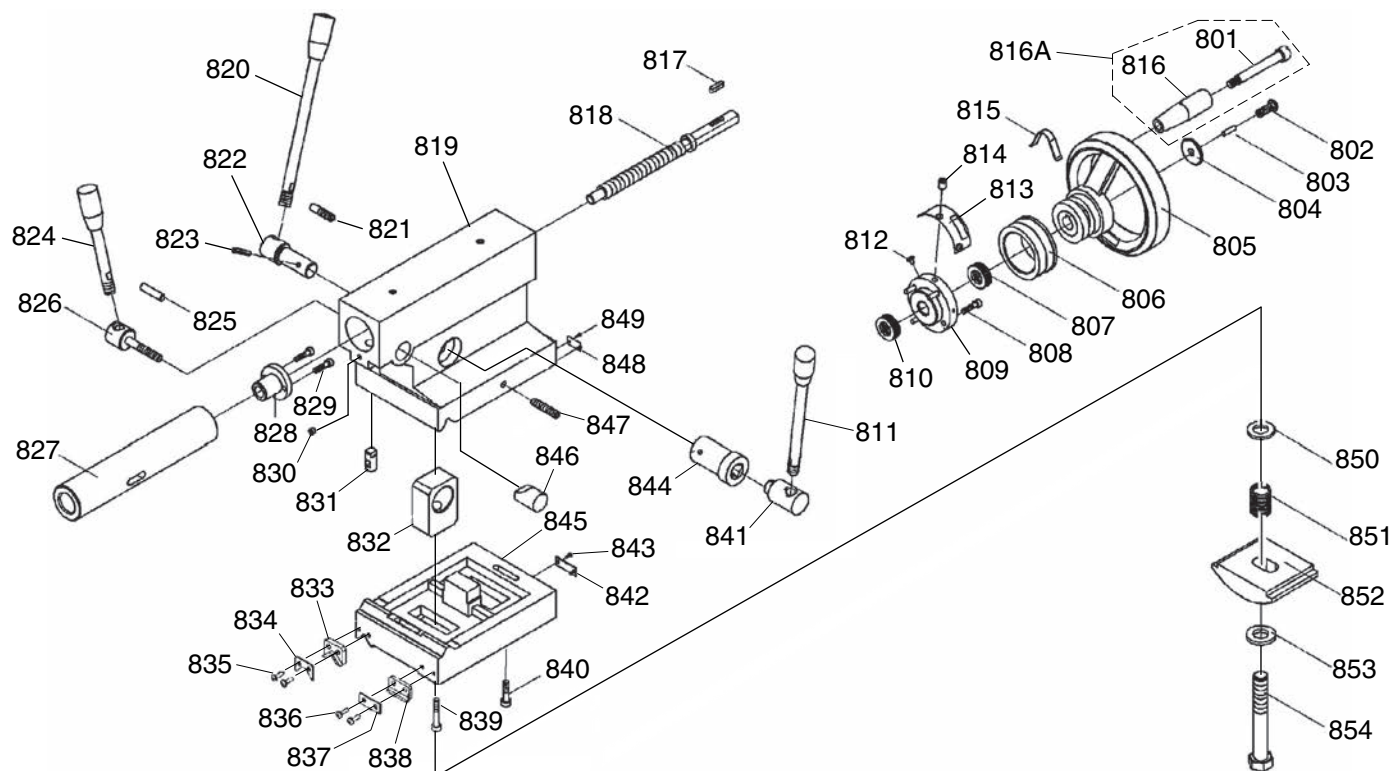


REF	PART #	DESCRIPTION
701	P08240701	PINNED KNOB, 7-LOBE 18 X 31
702	P08240702	ROLL PIN 3 X 18
703	P08240703	JACK SCREW
704	P08240704	FINGER SLIDE 18 X 63
705	P08240705	SET SCREW M6-1 X 6
706	P08240706	HEX NUT M6-1
707	P08240707	SLOTTED SCREW M6-1 X 30
708	P08240708	SET SCREW M6-1 X 18
709	P08240709	STEADY REST CASTING
710	P08240710	T-BOLT M12-1.75 X 65
711	P08240711	CLAMP BLOCK
712	P08240712	FLAT WASHER 12MM
713	P08240713	HEX NUT M12-1.75

REF	PART #	DESCRIPTION
714	P08240714	DOWEL PIN 5 X 24
715	P08240715	PIVOT STUD M10-1.5 X 45
716	P08240716	KNURLED THUMB KNOB M10-1.5
717	P08240717	UPPER STEADY REST CASTING
718	P08240718	DOWEL PIN 5 X 16
719	P08240719	BALL BEARING 625ZZ
720	P08240720	JACK SCREW COLLAR
721	P08240721	FINGER SLIDE 18 X 52
722	P08240722	FOLLOW REST CASTING
723	P08240723	CAP SCREW M8-1.25 X 45
724	P08240724	STEADY REST ASSEMBLY
725	P08240725	FOLLOW REST ASSEMBLY



Tailstock

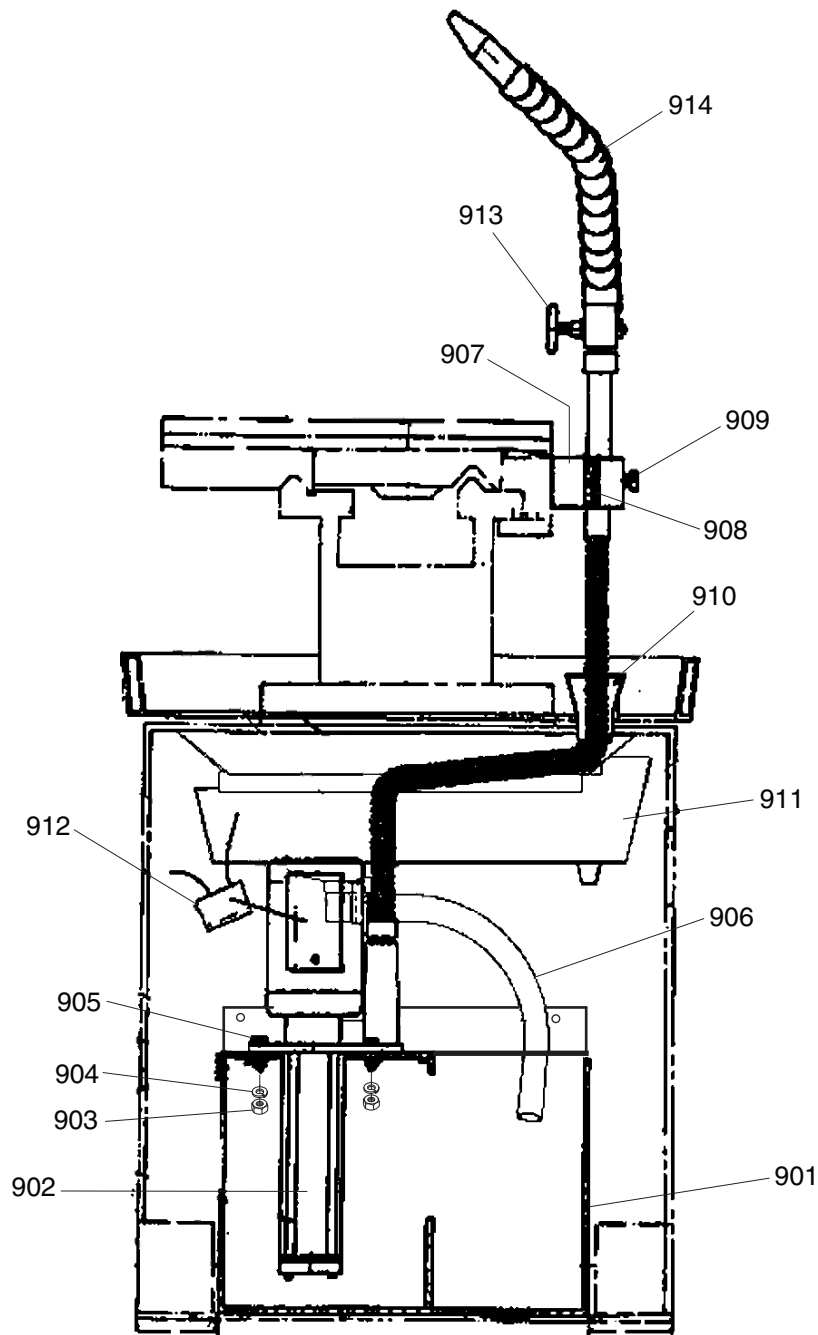


REF	PART #	DESCRIPTION
801	P08240801	SHOULDER SCR M8-1.25 X 12, 10 X 66
802	P08240802	HOLLOW CAP SCREW M8-1.25 X 20, M5-.8
803	P08240803	SET SCREW M5-.8 X 20
804	P08240804	FENDER WASHER 8MM
805	P08240805	HANDWHEEL TYPE-4 140D B-K
806	P08240806	GRADUATED DIAL FOR TAILSTOCK
807	P08240807	THRUST BEARING 8102
808	P08240808	CAP SCREW M5-.8 X 20
809	P08240809	FLANGE HUB
810	P08240810	THRUST BEARING 8102
811	P08240811	LEVER HANDLE
812	P08240812	FLAT HD SCR M4-.7 X 6
813	P08240813	CALIBRATED INDICATOR PLATE
814	P08240814	BALL OILER 6MM TAP-IN
815	P08240815	HANDWHEEL FLAT SPRING
816	P08240816	HANDLE W/OUT SHAFT 22 X 75 X 10
816A	P08240816A	HANDLE 22 X 75 X 10 W/SCREW
817	P08240817	KEY 5 X 5 X 20 RE
818	P08240818	TAILSTOCK LEADSCREW
819	P08240819	TAILSTOCK CASTING
820	P08240820	TAILSTOCK LOCK LEVER
821	P08240821	STOP PIN M8-1.25 X 37L
822	P08240822	LEVER HUB
823	P08240823	ROLL PIN 5 X 30
824	P08240824	QUILL LOCK LEVER
825	P08240825	STOP PIN M8-1.25 X 37L
826	P08240826	HUB LOCK
827	P08240827	TAILSTOCK QUILL MT#3

REF	PART #	DESCRIPTION
828	P08240828	END BUSHING
829	P08240829	CAP SCREW M5-.8 X 20
830	P08240830	SET SCREW M6-1 X 6
831	P08240831	QUILL GUIDE
832	P08240832	SUPPORT COLLAR BLOCK
833	P08240833	V-WIPER
834	P08240834	WIPER RETAINING PLATE
835	P08240835	PHLP HD SCR M4-.7 X 12
836	P08240836	CAP SCREW M4-.7 X 12
837	P08240837	WIPER RETAINING PLATE
838	P08240838	FLAT WIPER
839	P08240839	CAP SCREW M6-1 X 35
840	P08240840	CAP SCREW M6-1 X 25
841	P08240841	DRIVE HUB
842	P08240842	SCALE PLATE
843	P08240843	RIVET 2 X 5 NAMEPLATE
844	P08240844	SUPPORT COLLAR
845	P08240845	TAILSTOCK BASE
846	P08240846	LOCK BLOCK
847	P08240847	SET SCREW M8-1.25 X 40
848	P08240848	SCALE PLATE
849	P08240849	RIVET 2 X 5 NAMEPLATE
850	P08240850	FLAT WASHER 16MM
851	P08240851	COMPRESSION SPRING
852	P08240852	TAILSTOCK LOCK BLOCK
853	P08240853	FLAT WASHER 16MM
854	P08240854	HEX BOLT M16-2 X 120



Pump

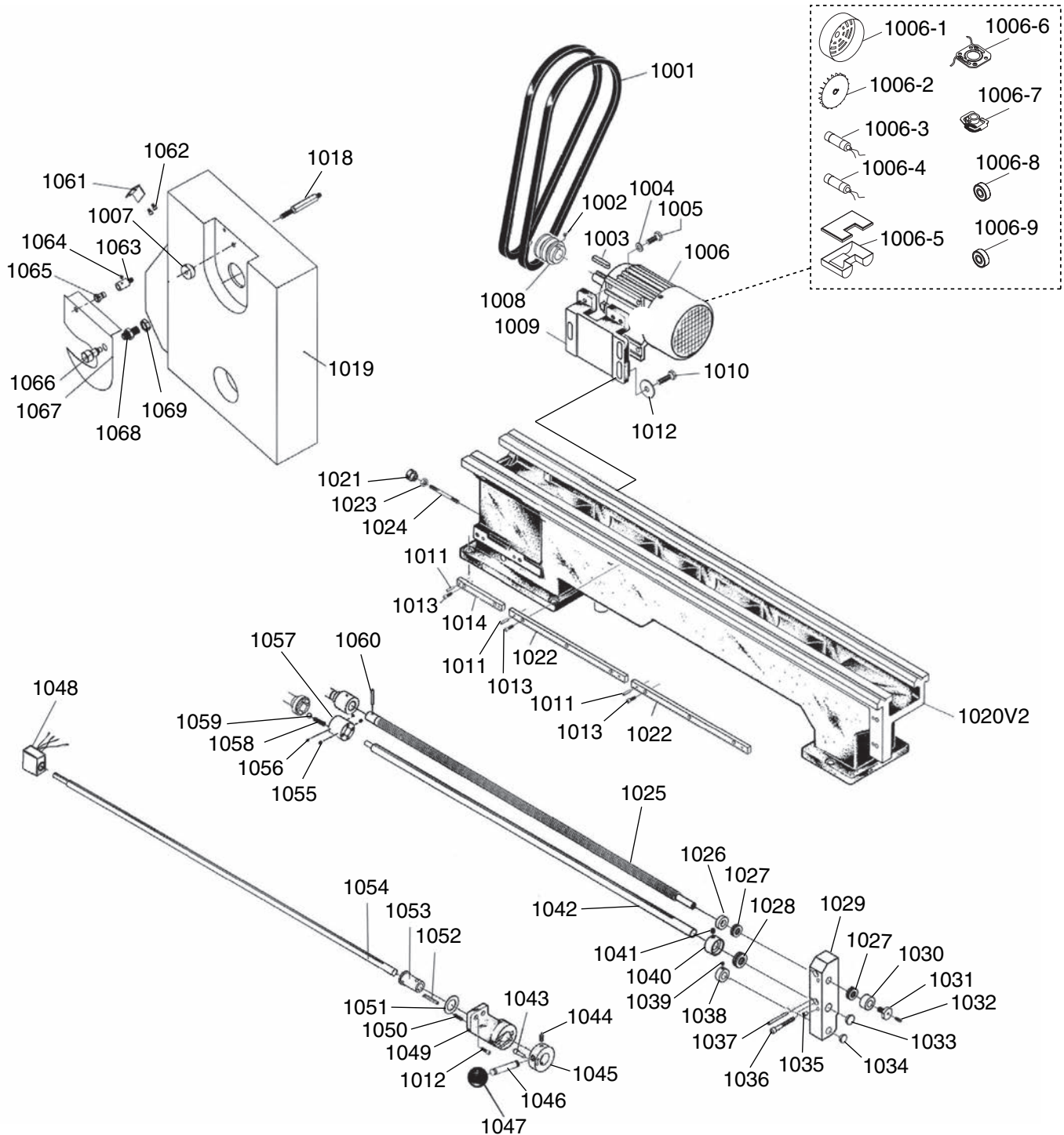


REF	PART #	DESCRIPTION
901	P08240901	COOLANT TANK 10Q
902	P08240902	COOLANT PUMP 0.8HP 110V/220V 1-PH
903	P08240903	HEX NUT M6-1
904	P08240904	LOCK WASHER 6MM
905	P08240905	RECTANGULAR CONNECTOR
906	P08240906	RETURN TUBE 16"
907	P08240907	NOZZLE MOUNTING BASE

REF	PART #	DESCRIPTION
908	P08240908	CAP SCREW M5-.8 X 25
909	P08240909	CAP SCREW M5-.8 X 16
910	P08240910	RUBBER BUSHING
911	P08240911	OIL PAN
912	P08240912	CAPACITOR 2M 450V 13 X 25 X 37
913	P08240913	FLOW CONTROL VALVE
914	P08240914	COOLANT PIPE W/NOZZLE 60"



Motor & Feed Rod



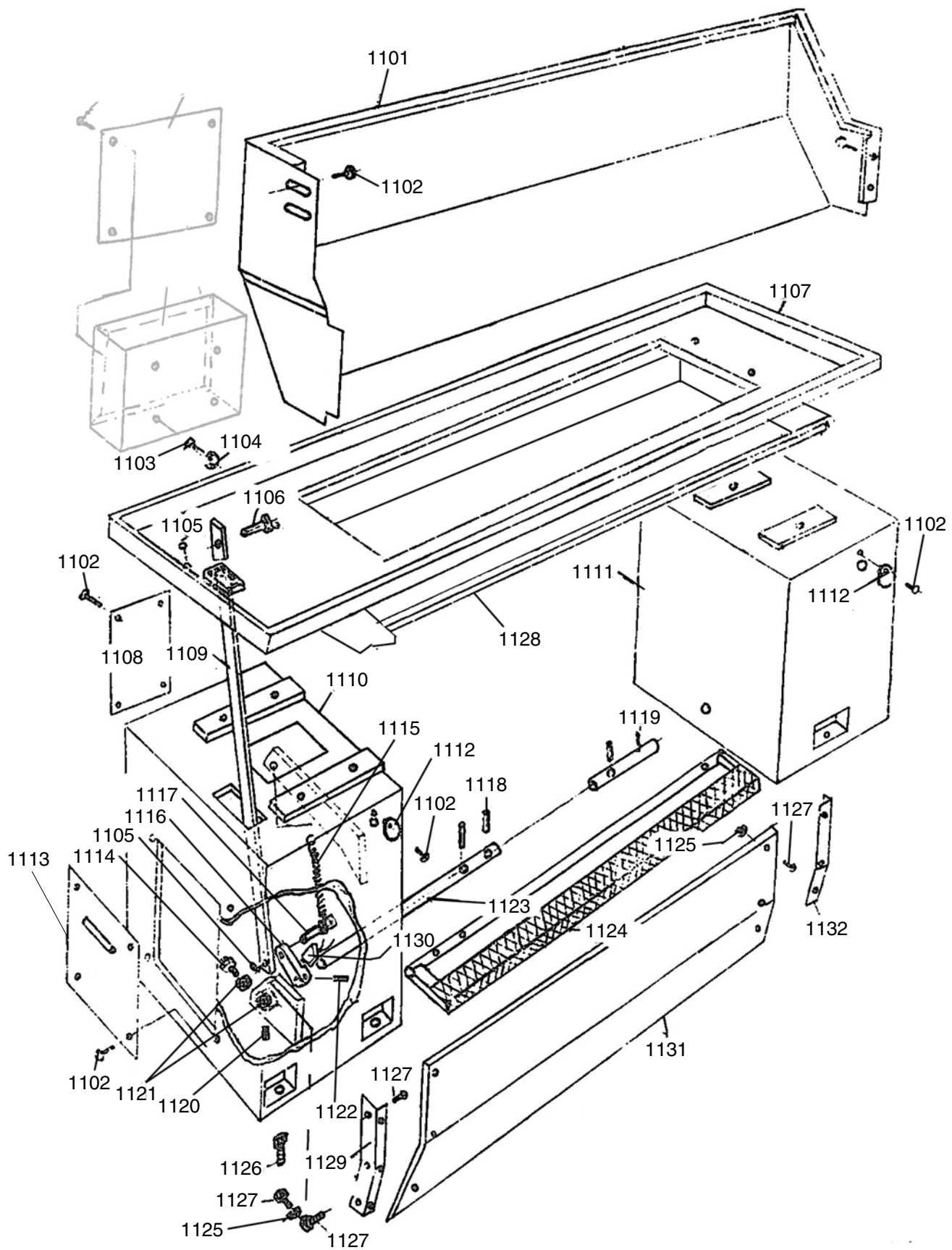
Motor & Feed Rod Parts

REF	PART #	DESCRIPTION
1001	P08241001	V-BELT GATES V13 X 920
1002	P08241002	SET SCREW M6-1 X 12
1003	P08241003	KEY 8 X 8 X 40
1004	P08241004	LOCK WASHER 8MM
1005	P08241005	HEX BOLT M8-1.25 X 25
1006	P08241006	MOTOR 2.5HP 220V 1-PH
1006-1	P08241006-1	FAN COVER
1006-2	P08241006-2	MOTOR FAN
1006-3	P08241006-3	S CAPACITOR 150M 250V 1-3/8 X 2-3/4
1006-4	P08241006-4	R CAPACITOR 20M 450V 1-5/8 X 2-3/4
1006-5	P08241006-5	CAPACITOR BOX COVER
1006-6	P08241006-6	CONTACT PLATE
1006-7	P08241006-7	CENTRIFUGAL SWITCH
1006-8	P08241006-8	BALL BEARING 60205ZZ (FRONT)
1006-9	P08241006-9	BALL BEARING 60205ZZ (REAR)
1007	P08241007	KNURLED KNOB M8-1.25, 16 X 25
1008	P08241008	MOTOR PULLEY
1009	P08241009	MOTOR MOUNT
1010	P08241010	HEX BOLT M10-1.5 X 30
1011	P08241011	ROLL PIN 6 X 25
1012	P08241012	FLAT WASHER 10MM
1013	P08241013	CAP SCREW M6-1 X 25
1014	P08241014	GAP RACK
1018	P08241018	STANDOFF HEX M8-1.25 X 11 X 20, 100L
1019	P08241019	GEAR COVER
1020V2	P08241020V2	LATHE BED V2.01.21
1021	P08241021	KNURLED THUMB KNOB M10-1.5
1022	P08241022	RACK
1023	P08241023	HEX NUT M8-1.25
1024	P08241024	STANDOFF HEX M8-1.25 X 25 X 30, 140L
1025	P08241025	LONGITUDINAL LEADSCREW
1026	P08241026	SLEEVE
1027	P08241027	THRUST BEARING 8102
1028	P08241028	THRUST BEARING 8104
1029	P08241029	HOUSING
1030	P08241030	BEARING COVER
1031	P08241031	SHOULDER FLANGE SCREW
1032	P08241032	SET SCREW M6-1 X 20

REF	PART #	DESCRIPTION
1033	P08241033	FEED ROD END PLUG
1034	P08241034	CONTROL ROD END PLUG
1035	P08241035	BALL OILER 6MM TAP-IN
1036	P08241036	CAP SCREW M8-1.25 X 60
1037	P08241037	TAPER PIN 5 X 60
1038	P08241038	LOCK COLLAR
1039	P08241039	SET SCREW M6-1 X 8
1040	P08241040	LOCKING BEARING COVER
1041	P08241041	SET SCREW M8-1.25 X 10
1042	P08241042	FEED ROD
1043	P08241043	INDEX LUG PIN
1044	P08241044	SET SCREW M8-1.25 X 16
1045	P08241045	LOCK COLLAR
1046	P08241046	SPINDLE ON/OFF LEVER
1047	P08241047	PLASTIC BALL KNOB M12-1.75
1048	P08241048	SPINDLE ON/OFF SWITCH ASSY
1049	P08241049	ROD HOUSING
1050	P08241050	COMPRESSION SPRING
1051	P08241051	THRUST WASHER
1052	P08241052	KEY 4 X 4 X 40
1053	P08241053	FLANGED SLEEVE
1054	P08241054	CONTROL ROD
1055	P08241055	SET SCREW M4-.7 X 4.5 CONE-PT
1056	P08241056	FLAT HD SCR M4-.7 X 6
1057	P08241057	CLUTCH ASSEMBLY
1058	P08241058	COMPRESSION SPRING
1059	P08241059	STEEL BALL 6MM
1060	P08241060	SHEAR PIN
1061	P08241061	SHUT-OFF SUPPORT
1062	P08241062	PHLP HD SCR M5-.8 X 8
1063	P08241063	PIVOT SHAFT SOCKET
1064	P08241064	SET SCREW M5-.8 X 6
1065	P08241065	PIVOT SHAFT
1066	P08241066	KNURLED KNOB M8-1.25, 16 X 25
1067	P08241067	SPIDER SAFETY GUARD
1068	P08241068	THREADED RECEIVER M16-2 X 40
1069	P08241069	HEX NUT M16-2



Cabinet & Brake



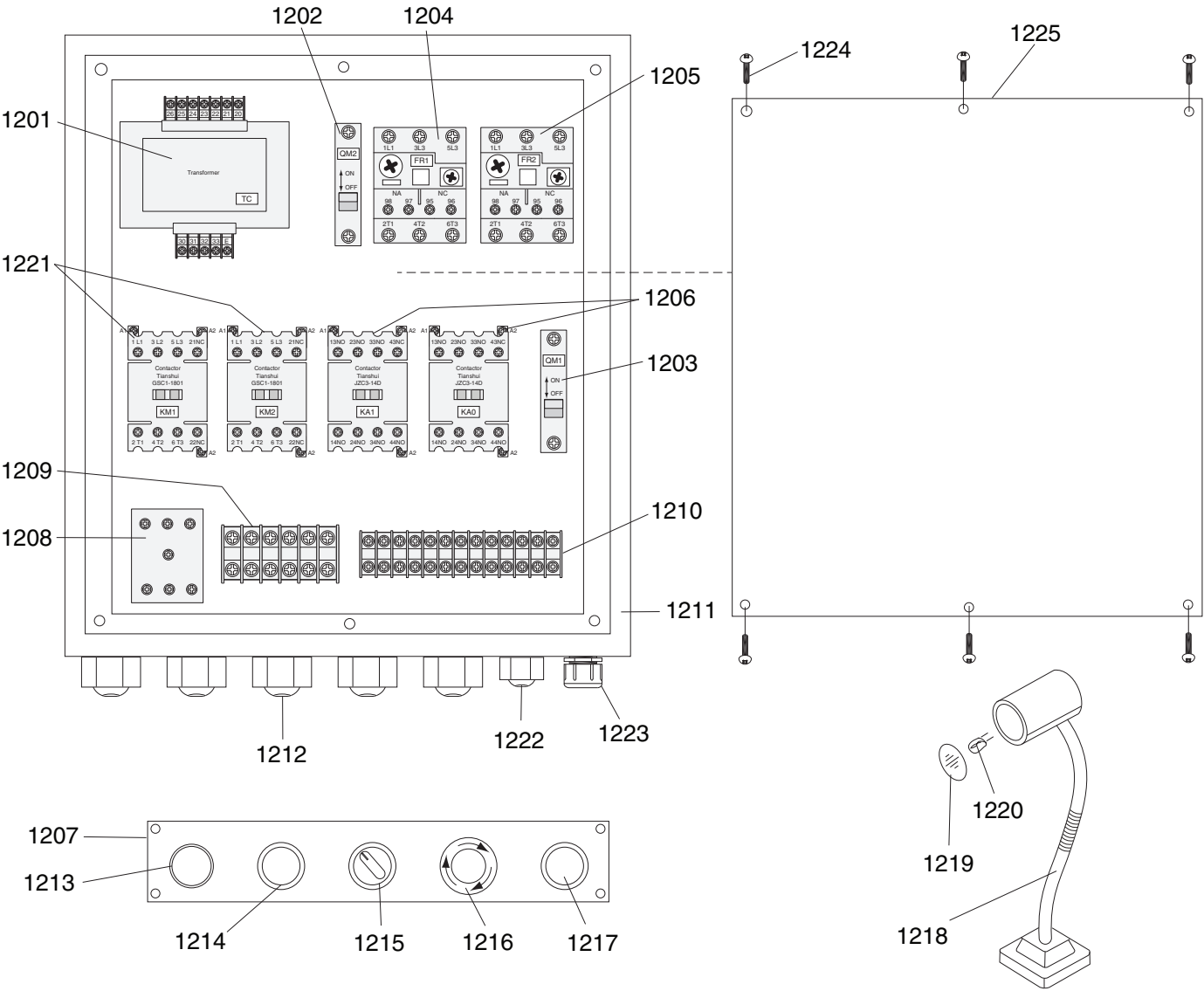
Cabinet & Brake Parts

REF	PART #	DESCRIPTION
1101	P08241101	BACK SPLASH
1102	P08241102	PHLP HD SCR M6-1 X 10
1103	P08241103	CAP SCREW M6-1 X 20
1104	P08241104	FLAT WASHER 6MM
1105	P08241105	COTTER PIN 2 X 12
1106	P08241106	CLEVIS PIN
1107	P08241107	BASE PAN
1108	P08241108	ACCESS PLATE (REAR)
1109	P08241109	BRAKE PULL ROD
1110	P08241110	PEDESTAL (LEFT)
1111	P08241111	PEDESTAL (RIGHT)
1112	P08241112	COVER (LIFT ACCESS)
1113	P08241113	LEFT CABINET COVER (SIDE)
1114	P08241114	HEX BOLT M8-1.25 X 40
1115	P08241115	EXTENSION SPRING
1116	P08241116	PEDAL ARM

REF	PART #	DESCRIPTION
1117	P08241117	CLEVIS PIN
1118	P08241118	ROLL PIN 3 X 25
1119	P08241119	BRAKE PEDAL SHAFT (SHORT)
1120	P08241120	SET SCREW M8-1.25 X 6
1121	P08241121	HEX NUT M8-1.25
1122	P08241122	ROLL PIN 5 X 40
1123	P08241123	BRAKE PEDAL SHAFT (LONG)
1124	P08241124	BRAKE PEDAL
1125	P08241125	HEX NUT M6-1
1126	P08241126	CAP SCREW M12-1.75 X 50
1127	P08241127	CAP SCREW M6-1 X 10
1128	P08241128	CHIP DRAWER
1129	P08241129	STAND PLATE BRACKET (LEFT)
1130	P08241130	LIMIT SWITCH SHANGHAI MACHINE LXW5
1131	P08241131	STAND PLATE
1132	P08241132	STAND PLATE BRACKET (RIGHT)



Main Electrical Breakdown

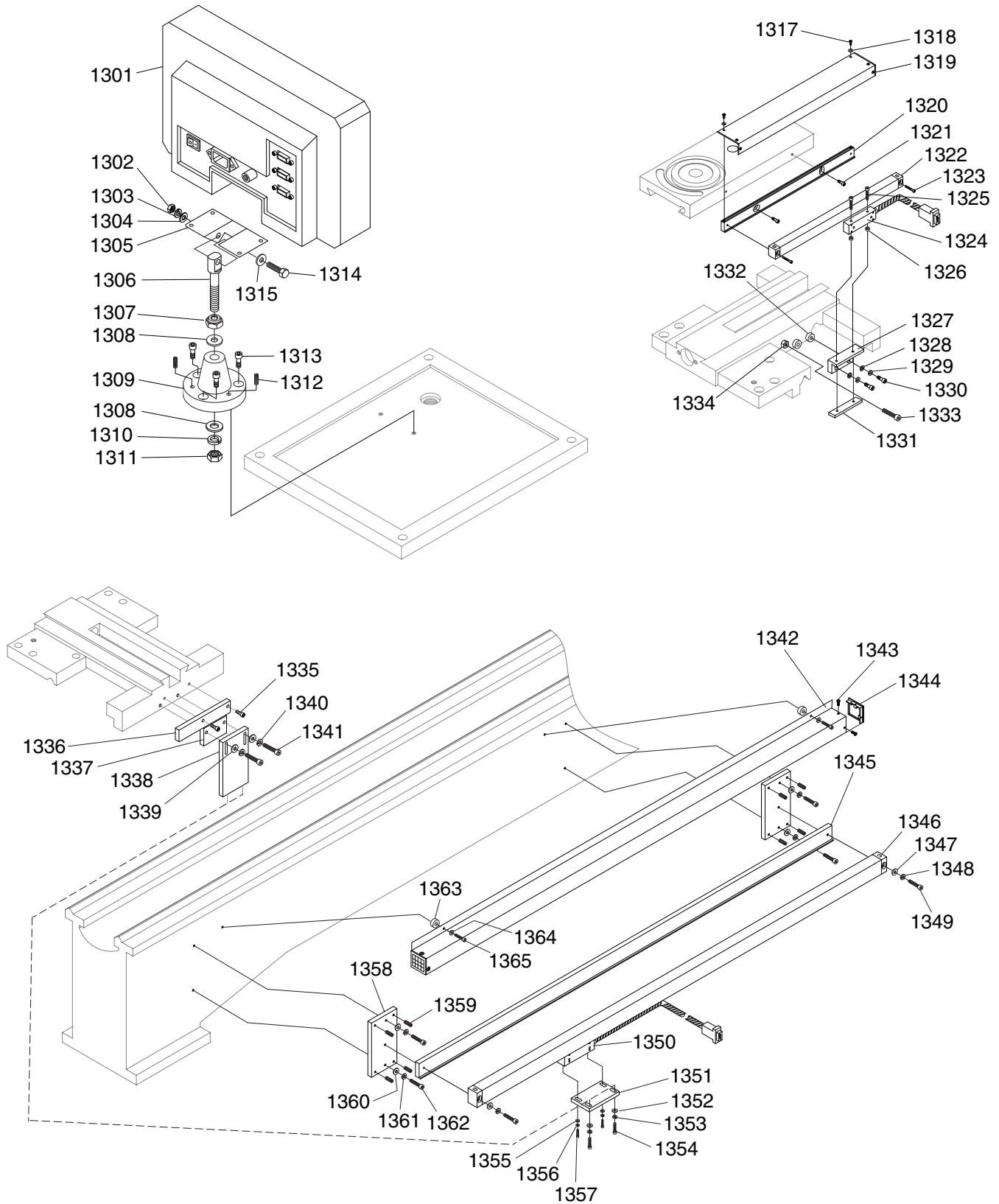


REF	PART #	DESCRIPTION
1201	P08241201	TRANSFORMER WUXI JBK5-120VATH
1202	P08241202	CIRCUIT BREAKER TIAN DZ451-63 3A
1203	P08241203	CIRCUIT BREAKER TIAN DZ451-63 5A
1204	P08241204	OL RELAY TIAN JRS4-09/40D 9-13A
1205	P08241205	OL RELAY TIAN JRS4-09/40D 0.4-0.63A
1206	P08241206	CONTACTOR TIAN JZC3-40D 110V
1207	P08241207	CONTROL PANEL PLATE
1208	P08241208	COPPER GROUND BLOCK
1209	P08241209	TERMINAL BAR 12P
1210	P08241210	TERMINAL BAR 28P
1211	P08241211	ELECTRICAL BOX ASSEMBLY
1212	P08241212	STRAIN RELIEF TYPE-3 M20-1.5 ST PLASTIC
1213	P08241213	INDICATOR LIGHT X01013 GREEN

REF	PART #	DESCRIPTION
1214	P08241214	BUTTON SWITCH HUILONG LA103 GREEN 22MM
1215	P08241215	ROTARY SWITCH HUILONG LA103 ON/OFF 22MM
1216	P08241216	E-STOP BUTTON HUILONG LA103 22MM
1217	P08241217	JOG BUTTON HUILONG LA103 10A 22MM
1218	P08241218	LED WORK LAMP ASSY.
1219	P08241219	LAMP LENS
1220	P08241220	LED BULB 24V MR16 (1W X 3) V3.05.15
1221	P08241221	CONTACTOR TIANSHUI GSC1-1801 110V
1222	P08241222	STRAIN RELIEF TYPE-3 M16-1.5 ST PLASTIC
1223	P08241223	STRAIN RELIEF TYPE-7 1/4 ST METAL
1224	P08241224	PHLP HD SCR M5-.8 X 6
1225	P08241225	ELECTRICAL BOX COVER



Digital Readout



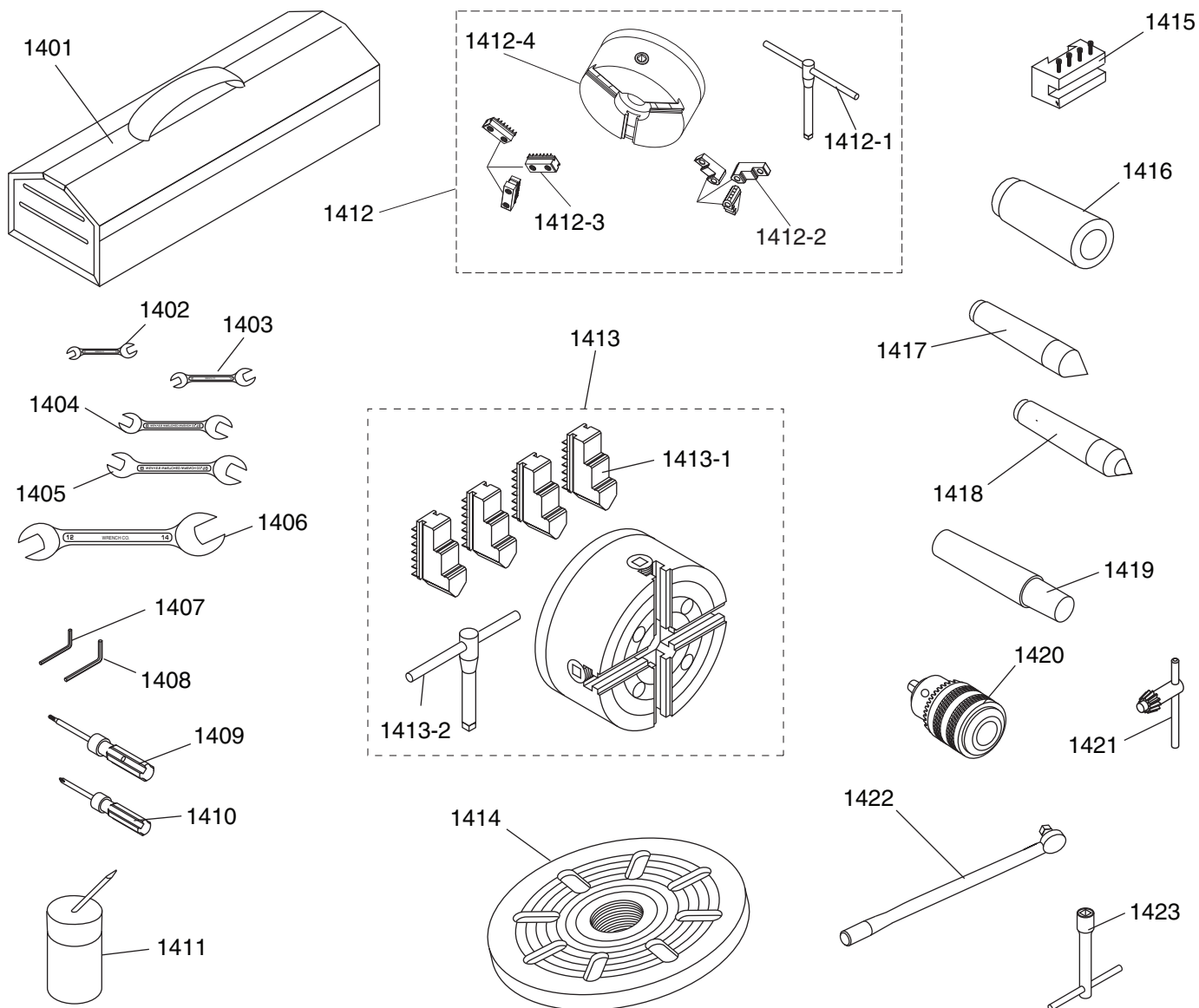
Digital Readout Parts

REF	PART #	DESCRIPTION
1301	P08241301	DRO DISPLAY
1302	P08241302	HEX NUT M8-1.25
1303	P08241303	LOCK WASHER 8MM
1304	P08241304	FLAT WASHER 8MM
1305	P08241305	DISPLAY MOUNT PLATE
1306	P08241306	DISPLAY MOUNT POST
1307	P08241307	LOCK NUT M10-1.5
1308	P08241308	FLAT WASHER 10MM
1309	P08241309	DISPLAY MOUNT BASE
1310	P08241310	LOCK WASHER 10MM
1311	P08241311	HEX NUT M10-1.5
1312	P08241312	SET SCREW M6-1 X 20
1313	P08241313	CAP SCREW M8-1.25 X 22
1314	P08241314	HEX BOLT M8-1.25 X 60
1315	P08241315	FLAT WASHER 8MM
1317	P08241317	PHLP HD SCR M4-.7 X 8
1318	P08241318	FLAT WASHER 4MM
1319	P08241319	DRO CROSS SLIDE SENSOR COVER
1320	P08241320	DRO CROSS SLIDE ADAPTER PLATE
1321	P08241321	CAP SCREW M5-.8 X 10
1322	P08241322	DRO CROSS SLIDE SENSOR 345MM
1323	P08241323	CAP SCREW M4-.7 X 14
1324	P08241324	X-AXIS DRO SENSOR W/BNC CONNECTOR
1325	P08241325	CAP SCREW M4-.7 X 35
1326	P08241326	SPACER 4.8 X 6 X 18OD
1327	P08241327	SADDLE ADAPTER PLATE
1328	P08241328	FLAT WASHER 5MM
1329	P08241329	LOCK WASHER 5MM
1330	P08241330	CAP SCREW M5-.8 X 25
1331	P08241331	DRO ATTACHMENT PLATE
1332	P08241332	SPACER
1333	P08241333	CAP SCREW M6-1 X 70

REF	PART #	DESCRIPTION
1334	P08241334	HEX NUT M6-1
1335	P08241335	CAP SCREW M6-1 X 20
1336	P08241336	LAMP MOUNTING PLATE
1337	P08241337	DRO SPACER PLATE
1338	P08241338	DRO SENSOR PLATE
1339	P08241339	FLAT WASHER 6MM
1340	P08241340	LOCK WASHER 6MM
1341	P08241341	CAP SCREW M6-1 X 40
1342	P08241342	DRO POSITION SENSOR COVER
1343	P08241343	TAP SCREW M3 X 6
1344	P08241344	END CAP
1345	P08241345	DRO POSITION SENSOR MOUNTING PLATE
1346	P08241346	DRO POSITION SENSOR 1146MM
1347	P08241347	FLAT WASHER 5MM
1348	P08241348	LOCK WASHER 5MM
1349	P08241349	CAP SCREW M5-.8 X 30
1350	P08241350	Z-AXIS DRO SENSOR W/BNC CONNECTOR
1351	P08241351	DRO SENSOR BRACKET
1352	P08241352	FENDER WASHER 6MM
1353	P08241353	LOCK WASHER 6MM
1354	P08241354	CAP SCREW M6-1 X 25
1355	P08241355	FENDER WASHER 4MM
1356	P08241356	LOCK WASHER 4MM
1357	P08241357	CAP SCREW M4-.7 X 13
1358	P08241358	DRO ADAPTER PLATE
1359	P08241359	SET SCREW M5-.8 X 16
1360	P08241360	FLAT WASHER 5MM
1361	P08241361	LOCK WASHER 5MM
1362	P08241362	CAP SCREW M5-.8 X 25
1363	P08241363	SPACER 5.2 X 6 X 18OD
1364	P08241364	FLAT WASHER 5MM
1365	P08241365	CAP SCREW M5-.8 X 16



Accessories

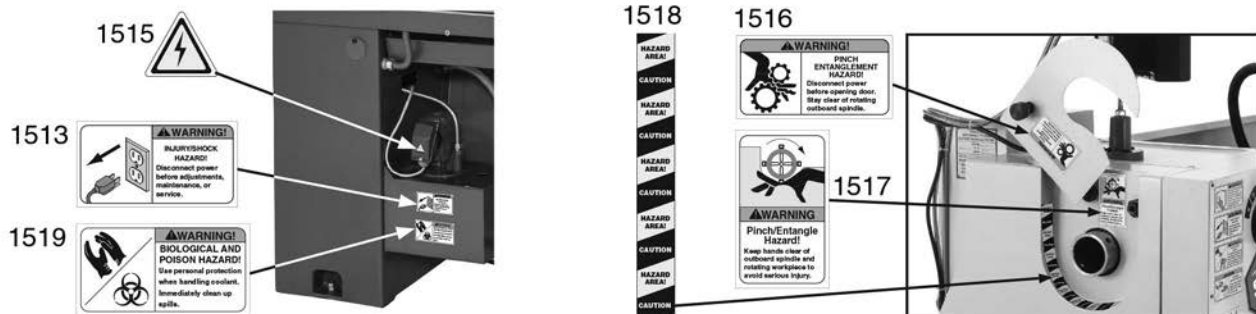
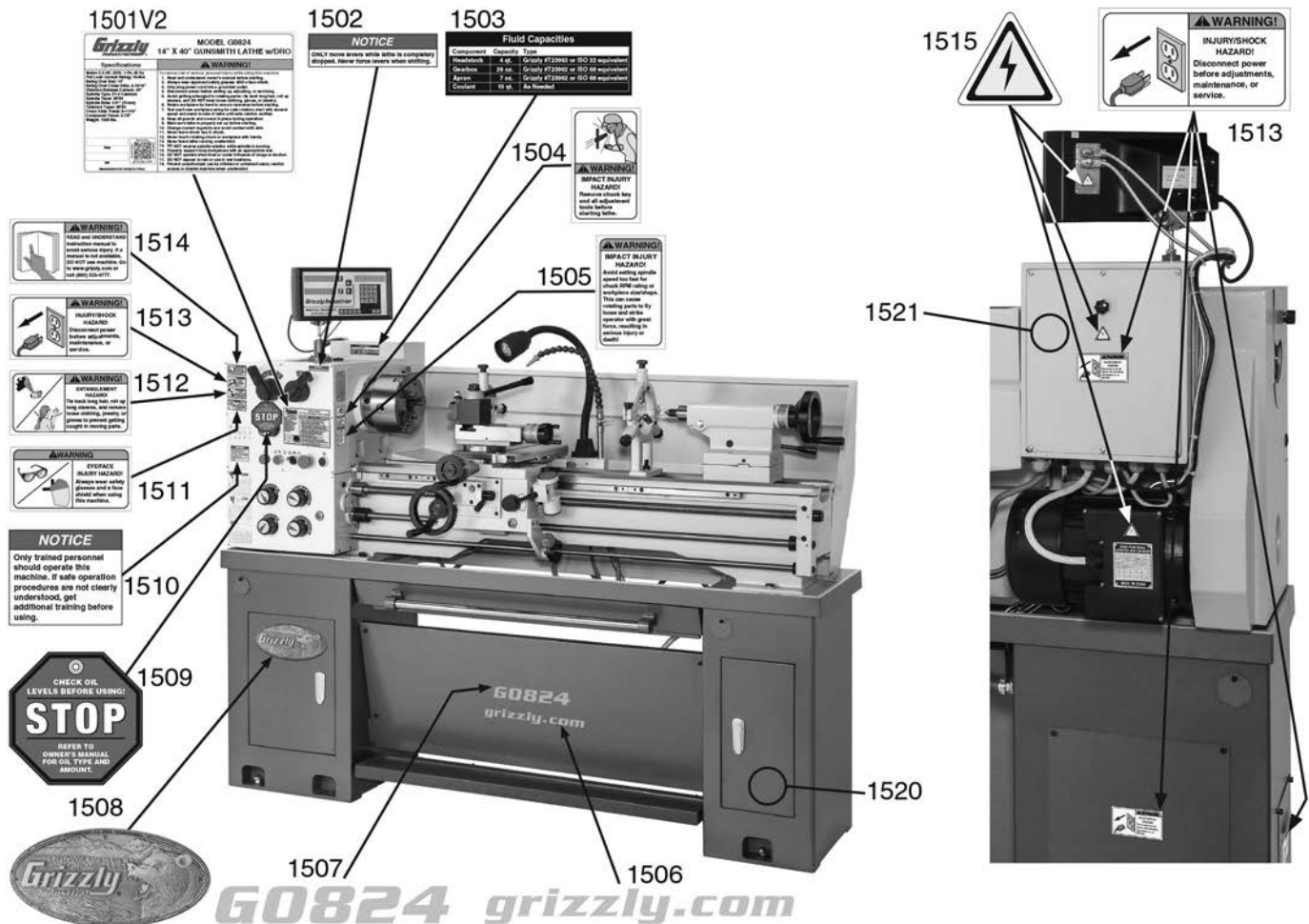


REF	PART #	DESCRIPTION
1401	P08241401	TOOL BOX
1402	P08241402	OPEN-END WRENCH 9/11MM
1403	P08241403	COMBO WRENCH 12 X 14MM
1404	P08241404	COMBO WRENCH 13 X 16MM
1405	P08241405	COMBO WRENCH 17 X 19MM
1406	P08241406	COMBO WRENCH 24 X 27MM
1407	P08241407	HEX WRENCH 6MM
1408	P08241408	HEX WRENCH 8MM
1409	P08241409	SCREWDRIVER PHILLIPS #2
1410	P08241410	SCREWDRIVER FLAT #2
1411	P08241411	BOTTLE FOR OIL
1412	P08241412	3-JAW CHUCK 7" D1-5 ASSEMBLY
1412-1	P08241412-1	3-JAW CHUCK WRENCH
1412-2	P08241412-2	3-JAW CHUCK TOP JAW SET
1412-3	P08241412-3	3-JAW CHUCK BOTTOM JAW SET

REF	PART #	DESCRIPTION
1412-4	P08241412-4	3-JAW CHUCK 7" D1-5
1413	P08241413	4-JAW CHUCK 8" D1-5 ASSEMBLY
1413-1	P08241413-1	4-JAW CHUCK REVERSIBLE JAW
1413-2	P08241413-2	4-JAW CHUCK WRENCH
1414	P08241414	FACEPLATE 11" D1-5
1415	P08241415	TOOL HOLDER 200-SERIES
1416	P08241416	SPINDLE SLEEVE MT#6 X MT#3
1417	P08241417	DEAD CENTER MT#3 HSS
1418	P08241418	DEAD CENTER MT#3 CARBIDE-TIPPED
1419	P08241419	DRILL CHUCK ARBOR MT#3 X B16
1420	P08241420	DRILL CHUCK B16 1.5-13MM
1421	P08241421	DRILL CHUCK KEY
1422	P08241422	TAILSTOCK LEVER 1/2 DRIVE
1423	P08241423	TOOL HOLDER WRENCH



Labels & Cosmetics




REF	PART #	DESCRIPTION
1501V2	P08241501V2	MACHINE ID LABEL V2.02.21
1502	P08241502	MOVE LEVERS NOTICE LABEL
1503	P08241503	FLUID CAPACITY LABEL
1504	P08241504	IMPACT INJURY LABEL
1505	P08241505	IMPACT INJURY (SPINDLE SPEED)
1506	P08241506	GRIZZLY.COM LABEL
1507	P08241507	MODEL NUMBER LABEL
1508	P08241508	GRIZZLY NAMEPLATE-LARGE
1509	P08241509	CHECK OIL LEVEL TAG
1510	P08241510	TRAINED PERSONNEL NOTICE LABEL
1511	P08241511	EYE-FACE WARNING LABEL


REF	PART #	DESCRIPTION
1512	P08241512	ENTANGLEMENT WARNING LABEL
1513	P08241513	DISCONNECT 110V LABEL
1514	P08241514	READ MANUAL LABEL
1515	P08241515	ELECTRICITY WARNING LABEL
1516	P08241516	PINCH/ENTANGLEMENT LABEL O/B SPINDLE
1517	P08241517	PINCH/ENTANGLEMENT WARNING LABEL
1518	P08241518	HAZARD AREA CAUTION LABEL
1519	P08241519	BIOLOGICAL/POISON LABEL
1520	P08241520	TOUCH-UP PAINT, GRIZZLY GREEN
1521	P08241521	TOUCH-UP PAINT, GRIZZLY PUTTY

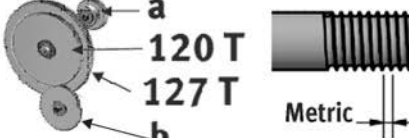



SECTION 10: APPENDIX

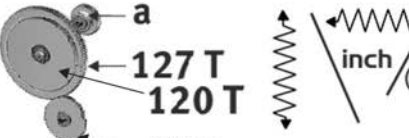
Threading & Feed Charts




a	60	60	60	60	40	40	56	40	60
b	60	54	57	60	44	46	54	52	63
	4	I	I	I	I	I	2	I	3
	V	V	V	V	V	V	V	V	V
A D	4	4 1/2		5	5 1/2		6	6 1/2	7
B D	8	9	9 1/2	10	11	11 1/2	12	13	14
A C	16	18	19	20	22	23	24	25	26
B C	32	36	38	40	44	46	48	52	56



a	56	60	60	30	60	60	30	60	56
b	60	60	60	60	60	60	60	60	63
	4	I	3	4	I	3	I	3	3
	R	R	S	T	V	R	T	V	V
A D	7	6		5		4.5	4		
B D	3.5	3		2.5		2.25	2	1.8	1.6
A C	1.75	1.5	1.4	1.25	1.2		1	0.9	0.8
B C		0.75	0.7		0.6		0.5	0.45	0.4



a		60 T				30 T			
		V	S	R	V	T	S	R	V
A D		0.0548	0.0512	0.0411	0.0328	0.0274	0.0256	0.0205	0.0164
		0.0187	0.0175	0.014	0.0112	0.0094	0.0087	0.007	0.0056
B D		0.0274	0.0256	0.0205	0.0164	0.0137	0.0128	0.0102	0.0082
		0.0094	0.0087	0.007	0.0056	0.0047	0.0043	0.0035	0.0028
A C		0.0137	0.0128	0.0102	0.0082	0.0069	0.0064	0.0051	0.0041
		0.0047	0.0044	0.0035	0.0028	0.0024	0.0022	0.0017	0.0014
B C		0.0069	0.0064	0.0051	0.0041	0.0034	0.0031	0.0025	0.002
		0.0024	0.0022	0.0018	0.0014	0.0012	0.0011	0.0009	0.0007



WARRANTY & RETURNS

Grizzly Industrial, Inc. warrants every product it sells for a period of **1 year** to the original purchaser from the date of purchase. This warranty does not apply to defects due directly or indirectly to misuse, abuse, negligence, accidents, repairs or alterations or lack of maintenance. This is Grizzly'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 or represent that the merchandise complies with the provisions of any law or acts unless the manufacturer so warrants. In no event shall Grizzly's liability under this warranty exceed the purchase price paid for the product and any legal actions brought against Grizzly 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.

The manufacturers reserve the right to change specifications at any time because they constantly strive to achieve better quality equipment. We make every effort to ensure that our products meet high quality and durability standards and we hope you never need to use this warranty.

In the event you need to use this warranty, contact us by mail or phone and give us all the details. We will then issue you a "Return Number," which must be clearly posted on the outside as well as the inside of the carton. We will not accept any item back without this number. Proof of purchase must accompany the merchandise.

Please feel free to write or call us if you have any questions about the machine or the manual.

Thank you again for your business and continued support. We hope to serve you again soon.

To take advantage of this warranty, you must register it at <https://www.grizzly.com/forms/warranty>, or you can scan the QR code below to be automatically directed to our warranty registration page. Enter all applicable information for the product.





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