

Grizzly **Industrial, Inc.**®

MODEL G0776

13" x 40" GUNSMITH LATHE w/DRO

OWNER'S MANUAL

(For models manufactured since 6/15)



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**WARNING: NO PORTION OF THIS MANUAL MAY BE REPRODUCED IN ANY SHAPE
OR FORM WITHOUT THE WRITTEN APPROVAL OF GRIZZLY INDUSTRIAL, INC.**

#WK17052 PRINTED IN CHINA

V2.08.18

 **WARNING!**

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

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

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

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

 **WARNING!**

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

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

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

Table of Contents

- INTRODUCTION..... 3**
 - Machine Description 3
 - Contact Info..... 3
 - Manual Accuracy 3
 - Identification..... 4
 - Controls & Components..... 5
 - Machine Data Sheet 8
- SECTION 1: SAFETY 11**
 - Safety Instructions for Machinery 11
 - Additional Safety for Metal Lathes..... 13
 - Additional Chuck Safety..... 14
 - Glossary of Terms 15
- SECTION 2: POWER SUPPLY 16**
- SECTION 3: SETUP 18**
 - Preparation 18
 - Unpacking..... 18
 - Needed for Setup..... 18
 - Inventory 19
 - Cleanup..... 20
 - Site Considerations..... 21
 - Lifting & Placing..... 22
 - Anchoring to Floor 23
 - Leveling..... 23
 - Lubricating Lathe 24
 - Adding Coolant 24
 - Power Connection..... 24
 - Assembly 25
 - Test Run 26
 - Spindle Break-In 28
 - Recommended Adjustments..... 28
- SECTION 4: OPERATION..... 29**
 - Operation Overview 29
 - Chuck & Faceplate Mounting..... 30
 - Camlock Stud Installation 30
 - Chuck Safety & Support Devices 31
 - Chuck Installation..... 31
 - Chuck Removal..... 33
 - Scroll Chuck Clamping 33
 - Chuck Jaw Reversal 34
 - 4-Jaw Chuck 34
 - Faceplate 35
 - Tailstock..... 36
 - Centers 41
 - Steady Rest 43
 - Follow Rest 44
 - Carriage & Slide Locks 45
 - Compound Rest..... 45
 - Tool Post..... 46
 - Manual Feed 47
 - Spider..... 48
 - Spindle Speed..... 48
 - Power Feed..... 50
 - End Gears..... 52
 - Threading..... 55
 - Coolant System..... 59
- SECTION 5: ACCESSORIES 60**
- SECTION 6: MAINTENANCE..... 65**
 - Schedule 65
 - Cleaning/Protecting..... 65
 - Lubrication 66
 - Coolant System Service 71
 - Machine Storage..... 73

Table of Contents

SECTION 7: SERVICE	74	SECTION 9: PARTS	97
Troubleshooting	74	Stand/Brake/Coolant Pump	97
Adjusting Backlash.....	77	Headstock	99
Adjusting Gib.....	78	Headstock Controls.....	101
Adjusting Half Nut.....	80	Gearbox	103
Replacing Shear Pin	80	Gearbox Cont.....	104
Adjusting Feed Clutch.....	81	Change Gears.....	106
Adjusting Tailstock Lock	82	Apron	107
Tensioning/Replacing V-Belts.....	83	Cross Slide.....	109
Adjusting Spindle Bearing Preload	84	Compound Rest & Tool Post	111
Removing/Installing Gap Insert.....	86	Tailstock.....	112
Checking/Replacing Brake Shoes	87	Tailstock Parts	113
SECTION 8: WIRING	89	Lathe Bed & Motor.....	114
Wiring Safety Instructions	89	Feed Rod	116
Wiring Overview.....	90	Steady Rest & Follow Rest.....	117
Component Location Index.....	90	Electrical	118
Electrical Cabinet Wiring.....	91	Digital Readout	120
Electrical Cabinet.....	92	Accessories.....	121
Spindle Motor Wiring	93	Labels & Cosmetics	122
Control Panel Wiring.....	94	WARRANTY AND RETURNS	125
Coolant Pump & Brake Wiring.....	95		
Additional Component Wiring	96		
Power Connection Wiring	96		

INTRODUCTION

Machine Description

The Model G0776 13" x 40" Gunsmith Lathe features a 2-axis digital readout, 8-speed gearhead, powerful 2 HP motor, and a D1-4 spindle with a generous 1.57" bore. This model is equipped with a flood coolant system, as well as safety features such as halogen worklight and foot brake. The included outboard spindle "spider" support provides exceptional stability and alignment for professional gunsmiths.

This lathe is packed with high-end features and all the essential accessories you need to get started.

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.**

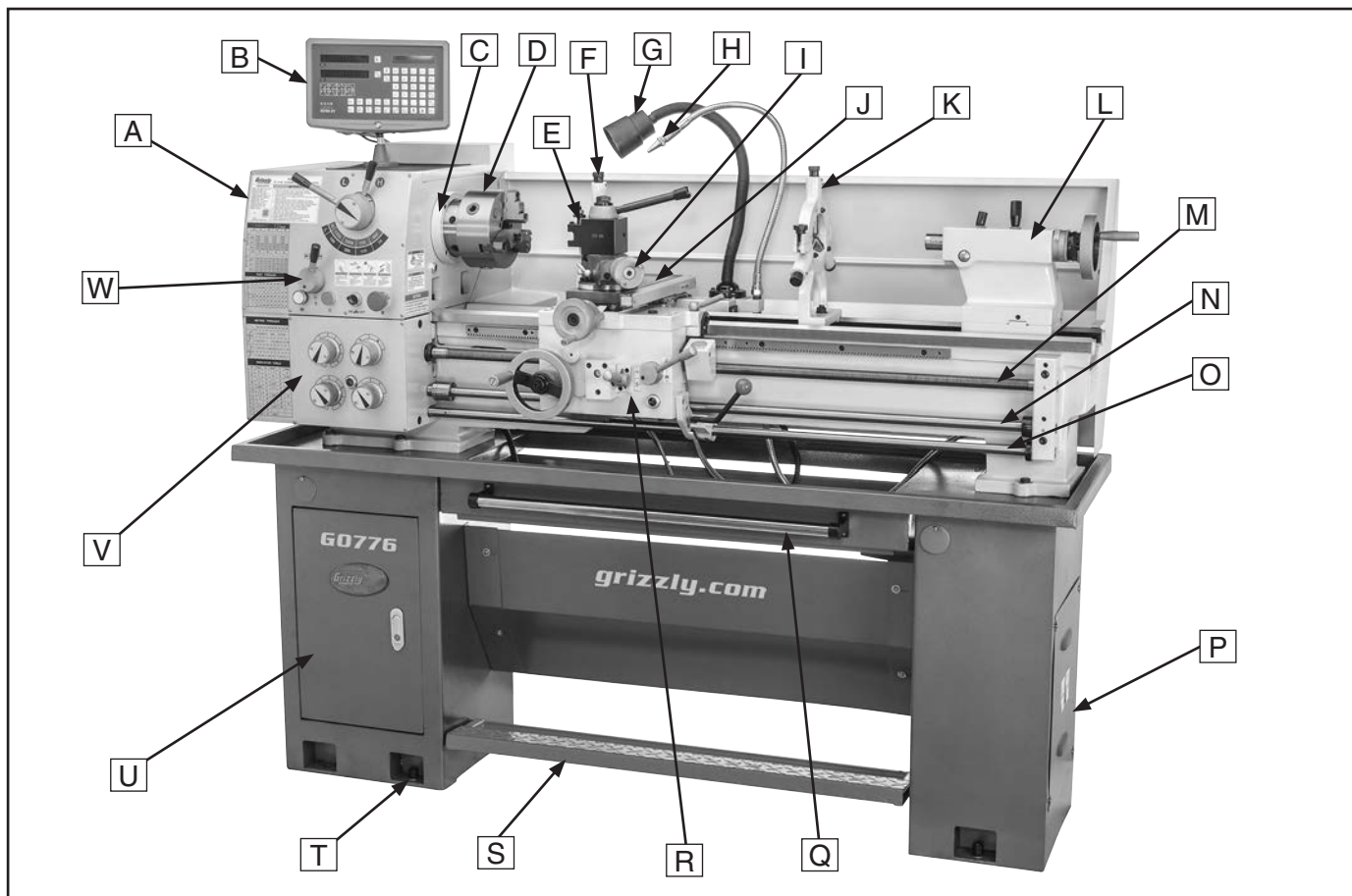
If you find this to be the case, and the difference between the manual and machine leaves you confused or unsure about something, check our website for an updated version. We post current manuals and manual updates for free on our website at www.grizzly.com.

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.

Grizzly Industrial		MODEL GXXXX
		MACHINE NAME
SPECIFICATIONS	WARNING!	
Motor:	To reduce risk of serious injury when using this machine:	
Specification:	1. Read manual before operation.	
Specification:	2. Wear safety glasses and respirator.	
Specification:	3. Make sure machine is properly adjusted/setup and	
Specification:	4. Make sure the motor has stopped and disconnect	
Weight:	5. DO NOT expose to rain or dampness.	
	6. DO NOT modify this machine in any way.	
	7.	
	8.	
	9.	
	10. Maintain machine carefully to prevent accidents.	



Identification



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

!WARNING

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

!WARNING

Untrained users have an increased risk of seriously injuring themselves with this machine. Do not operate this machine until you have understood this entire manual and received proper training.



Controls & Components

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

Many of the controls will be explained in greater detail later in this manual.

Main Power Switch

The rotary switch shown in **Figure 1** toggles incoming power ON and OFF to the lathe controls.

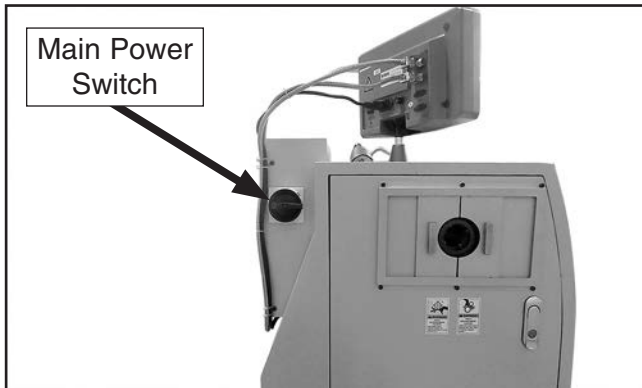


Figure 1. Location of the main power switch.



Headstock

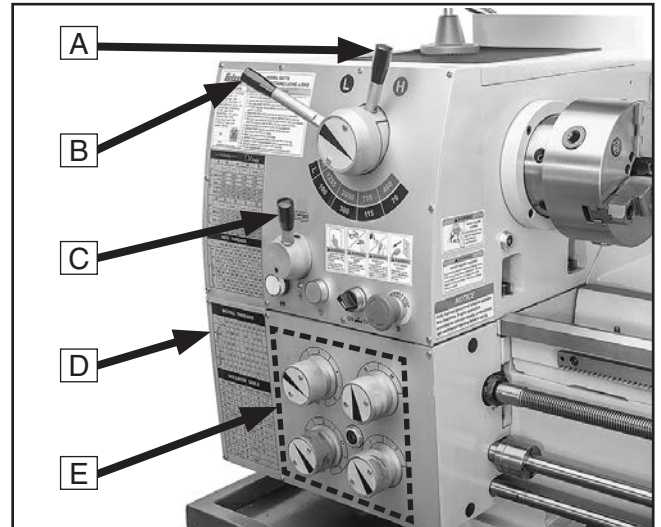


Figure 2. Headstock controls and components.

- A. Spindle Speed Range Lever:** Selects between high and low spindle speed ranges.
- B. Spindle Speed Lever:** Selects one of four different spindle speeds within the selected speed range.
- C. Headstock Feed Direction Lever:** Controls rotation direction of leadscrew and feed rod.
- D. Thread and Feed Chart:** Shows how to arrange gearbox controls for different threading or feeding options.
- E. Quick-Change Gearbox Dials:** Controls leadscrew and feed rod speed for threading and feeding operations.



Carriage

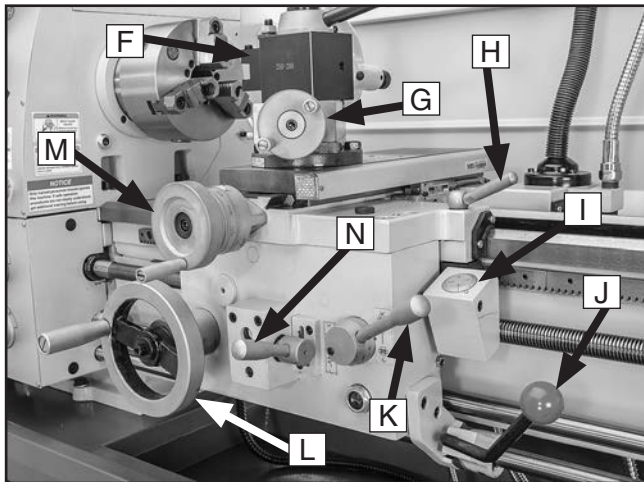


Figure 3. Carriage controls.

- F. **Quick-Change Tool Post:** Allows the operator to quickly load and unload tools.
- G. **Compound Rest Handwheel:** Moves tool toward and away from workpiece at preset angle.
- H. **Carriage Lock:** Secures carriage in place for greater rigidity when it should not move.
- I. **Thread Dial:** Indicates when to engage the half nut during inch threading operations.
- J. **Spindle Lever:** Starts, stops, and reverses direction of spindle rotation.
- K. **Half Nut Lever:** Engages/disengages half nut for threading operations.
- L. **Carriage Handwheel:** Moves carriage along the bed.
- M. **Cross Slide Handwheel:** Moves cross slide toward and away from workpiece.
- N. **Feed Selection Lever:** Selects power feed for carriage or cross slide.

Tailstock

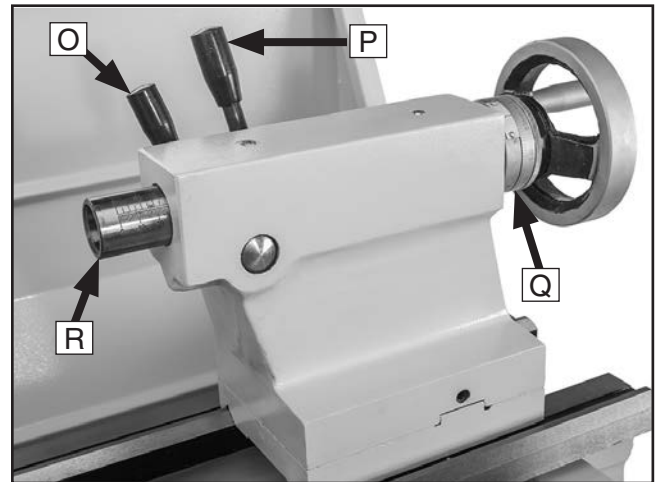


Figure 4. Tailstock controls.

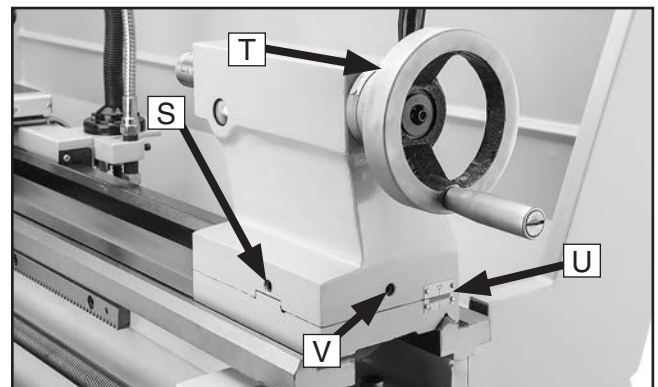


Figure 5. Additional tailstock controls.

- O. **Quill Lock Lever:** Secures quill in position.
- P. **Tailstock Lock Lever:** Secures tailstock in position along the bedway.
- Q. **Graduated Scale:** Indicates quill movement in increments of 0.001" with one full revolution equaling 0.100" of quill travel.
- R. **Quill:** Holds centers and tooling.
- S. **Tailstock Offset Screws:** Adjusts tailstock offset left or right from spindle centerline (1 of 2).
- T. **Quill Handwheel:** Moves quill toward or away from spindle.
- U. **Offset Scale:** Indicates relative distance of tailstock offset from spindle centerline.
- V. **Offset Locking Set Screw:** Locks tailstock in position left or right of spindle centerline.



Control Panel

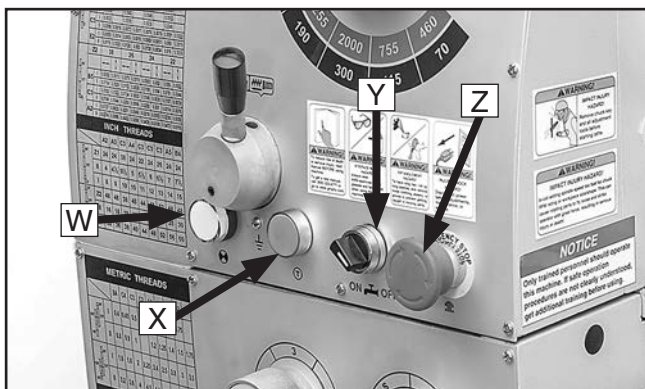


Figure 6. Control panel.

- W. Power Lamp:** Illuminates when main power switch is turned ON and EMERGENCY STOP button is reset.
- X. Jog/Inching Button:** Powers forward spindle rotation as long as it is pressed.
- Y. Coolant Pump Switch:** Controls coolant pump motor.
- Z. EMERGENCY STOP Button:** Stops all machine functions. Twist clockwise to reset.

End Gears

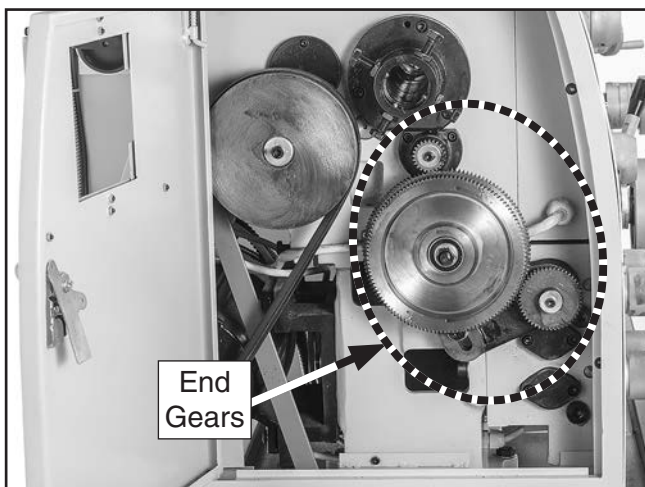


Figure 7. End gear components.

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 the spindle 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.

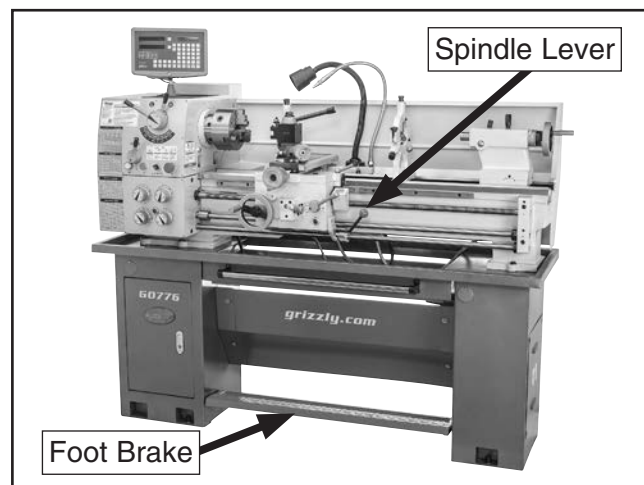


Figure 8. Foot brake and spindle lever.





MACHINE DATA SHEET

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

MODEL G0776 13" X 40" GUNSMITHING LATHE WITH DRO

Product Dimensions:

Weight..... 1280 lbs.
Width (side-to-side) x Depth (front-to-back) x Height..... 74-1/2 x 31 x 58 in.
Footprint (Length x Width)..... 70-1/2 x 19-3/4 in.

Shipping Dimensions:

Type..... Wood Crate
Content..... Machine
Weight..... 1370 lbs.
Length x Width x Height..... 74 x 30 x 60 in.
Must Ship Upright..... Yes

Electrical:

Power Requirement..... 220V, Single-Phase, 60 Hz
Full-Load Current Rating..... 8.5A
Minimum Circuit Size..... 15A
Connection Type..... Cord & Plug
Power Cord Included..... Yes
Power Cord Length..... 6.5 ft.
Power Cord Gauge..... 14 AWG
Plug Included..... No
Recommended Plug Type..... 6-15
Switch Type..... Control Panel w/Magnetic Switch Protection

Motors:

Spindle

Horsepower..... 2 HP
Phase..... Single-Phase
Amps..... 8.5A
Speed..... 1720 RPM
Type..... TEFC Capacitor-Start Induction
Power Transfer V-Belt Drive
Bearings..... Shielded & Permanently Sealed
Centrifugal Switch/Contacts Type..... Internal

Main Specifications:

Operation Info

Swing Over Bed..... 13.70 in.
Distance Between Centers..... 40 in.
Swing Over Cross Slide..... 7.71 in.
Swing Over Saddle..... 11.75 in.
Swing Over Gap..... 18.50 in.
Maximum Tool Bit Size..... 5/8 in.
Compound Travel..... 3-1/4 in.
Carriage Travel..... 33 in.
Cross Slide Travel..... 5-7/8 in.



Headstock Info

Spindle Bore.....	1.57 in. (40 mm)
Spindle Taper.....	MT#5
Spindle Threads.....	M42 X 1.5 mm
Number of Spindle Speeds.....	8
Spindle Speeds.....	70 – 2000 RPM
Spindle Type.....	D1-4
Spindle Bearings.....	Tapered Roller
Spindle Length.....	16-5/16 in.
Spindle Length with 3-Jaw Chuck.....	21-3/16 in.
Spindle Length with 4-Jaw Chuck.....	20-1/2 in.
Spindle Length with Faceplate.....	17-3/4 in.

Tailstock Info

Tailstock Quill Travel.....	4 in.
Tailstock Taper.....	MT#3
Tailstock Barrel Diameter.....	1-1/4 in.

Threading Info

Number of Longitudinal Feeds.....	48
Range of Longitudinal Feeds.....	0.0019 – 0.0472 in./rev.
Number of Cross Feeds.....	36
Range of Cross Feeds.....	0.0014 – 0.0116 in./rev.
Number of Inch Threads.....	36
Range of Inch Threads.....	4 – 60 TPI
Number of Metric Threads.....	32
Range of Metric Threads.....	0.4 – 7 mm

Dimensions

Bed Width.....	7-1/16 in.
Carriage Leadscrew Diameter.....	0.866 in.
Leadscrew TPI.....	8 TPI
Carriage Leadscrew Length.....	44-1/2 in.
Steady Rest Capacity.....	0.31 – 2.95 in.
Follow Rest Capacity.....	0.31 – 2.16 in.
Faceplate Size.....	10 in.
Feed Rod Diameter.....	0.787 in.
Floor to Center Height.....	45-11/16 in.

Other

Carriage Handwheel Graduations.....	0.02 in.
Carriage Handwheel Revolution.....	0.66 in.
Cross Slide Handwheel Graduations.....	0.002 in.
Cross Slide Handwheel Revolution.....	0.2 in.
Compound Handwheel Graduations.....	0.001 in.
Compound Handwheel Revolution.....	0.1 in.
Tailstock Handwheel Graduations.....	0.001 in.
Tailstock Handwheel Revolution.....	0.1 in.

Construction

Base.....	Steel
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.....	2.3 qt.
Headstock Fluid Type.....	ISO 32 (eg. Grizzly T23963, Mobil DTE Light)
Gearbox Capacity.....	0.68 qt.
Gearbox Fluid Type.....	ISO 68 (SB1365, Grizzly T23962, Mobil Vactra 2)
Apron Capacity.....	0.23 qt.
Apron Fluid Type.....	ISO 68 (eg. Grizzly T23962, Mobil Vactra 2)
Coolant Capacity.....	7.4 qt.

Other Specifications:

Country of Origin	China
Warranty	1 Year
Approximate Assembly & Setup Time	1 Hour
Serial Number Location	ID Label on Front of Lathe
Sound Rating	82 dB
ISO 9001 Factory	No
Certified by a Nationally Recognized Testing Laboratory (NRTL)	No

Features:

- D1-4 Camlock Spindle
- Quick-Change Gearbox
- Convenient Pull-Out Chip Tray
- Spindle Spider for Outboard Projects
- Full-Length Splash Guard
- Built-In Coolant System
- Foot Brake with Motor Shut-Off Switch
- Adjustable Halogen Work Light
- Flame-Hardened Headstock Gears
- Quick-Change Tool Post on Compound Rest
- 2-Axis Digital Readout

Accessories Included:

- 6" Self-Centering 3-Jaw Chuck
- 8" Independent 4-Jaw Chuck
- 10" Face Plate
- Steady Rest
- Follow Rest
- Quick-Change Tool Post
- Tool Box w/Service Tools
- Change Gears: 52T, 44T, 38T, 26T, 22T
- 2 MT#3 Dead Centers



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.



Glossary of Terms

The following is a list of common definitions, terms and phrases used throughout this manual as they relate to this lathe and metalworking in general. Become familiar with these terms for assembling, adjusting or operating this machine. Your safety is **VERY** important to us at Grizzly!

Arbor: A machine shaft that supports a cutting tool.

Backlash: Wear in a screw or gear mechanism that may result in slippage, vibration, and loss of tolerance.

Carriage: A main housing that consists of the apron and the saddle.

Cross Slide: A fixture attached to the lathe carriage that holds the compound rest and can be moved in and out.

Compound Rest: A fixture attached to the cross slide that holds the tool holder and can be moved in and out.

Cutting Speed: The distance a point on a cutter moves in one minute, expressed in meters or feet per minute.

Dial Indicator: An instrument used in setup and inspection work that shows on a dial the amount of error in size or alignment of a part.

Facing: In lathe work, cutting across the end of a workpiece, usually to machine a flat surface.

Feed: The movement of a cutting tool into a workpiece.

Fixture: A device that securely holds the workpiece in place during cutting operation as opposed to a jig which is used to hold and guide a workpiece through an operation.

Gib: A tapered wedge located along a sliding member to take up wear or to ensure a proper fit.

Headstock: The major lathe component that houses the spindle and motor drive system to turn the workpiece.

Lathe Center: A lathe accessory with a 60° point which is inserted into the headstock or tailstock of the lathe and is used to support the workpiece.

Leadscrew: Lathe—The long screw that is driven by the change gears and supplies power to the carriage.

Saddle: The upper portion of carriage that rides on the lathe ways and supports the cross feed and the follow rest.

Spindle: The revolving shaft that holds and drives the workpiece or cutting tool.

Tailstock: A moveable fixture opposite of the headstock on a lathe that has a spindle used to support one end of a workpiece and for holding tools.

Tool Post: The part of the compound rest that holds the tool holder.

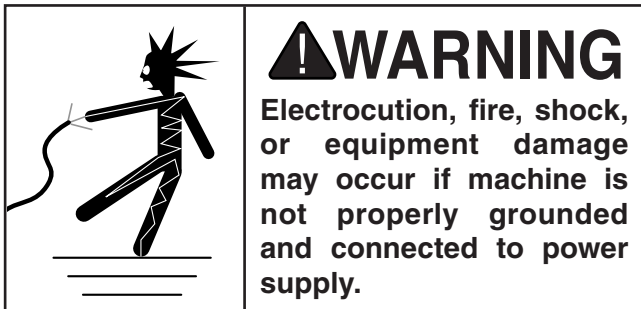
Ways: The precision machined and flat tracks on a lathe on which the carriage and tailstock slide.



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 8.5 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 220V/240V
Cycle.....60 Hz
Phase.....Single Phase
Circuit Rating..... 15 Amps
Plug/Receptacle NEMA 6-15
Cord “S”-Type , 3-Wire, 14 AWG, 300VAC

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.)



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).

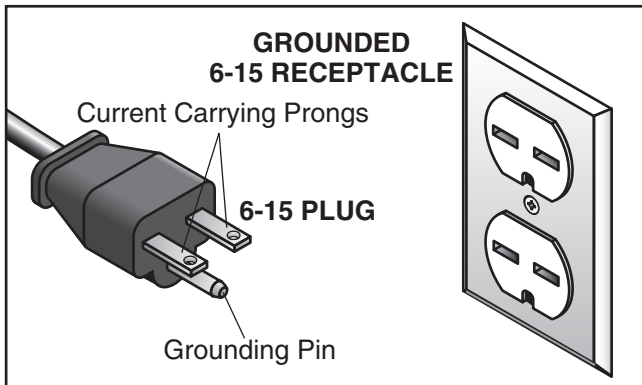
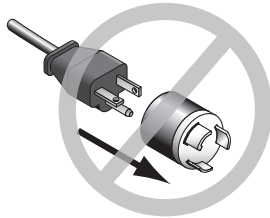


Figure 9. NEMA 6-15 plug and receptacle.

⚠️ 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 lathe and inventory contents of box/ crate.
2. Clean lathe and its components.
3. Identify an acceptable location for lathe and move it to that location.
4. Level lathe and bolt it to floor.
5. Assemble loose components and make any necessary adjustments or inspections to ensure lathe is ready for operation.
6. Check lathe for proper lubrication.
7. Connect lathe to power source.
8. Test run lathe to ensure it functions properly.
9. Perform spindle break-in procedure to prepare 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
 - 1" diameter x 51" long steel barstock
 - 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 16** 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 20**)
 - Quality metal protectant lubricant
 - Safety glasses for each person
 - Floor mounting hardware as needed (see **Page 23**)
 - 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 Chuck 6".....	1
B. Follow Rest.....	1
C. Quick Change Tool Post w/Holder.....	1
D. Steady Rest.....	1

Loose Inventory Components	Qty
E. DRO Unit.....	1
F. Toolbox.....	1
G. Four-Jaw Chuck 8".....	1
H. Four-Jaw Chuck Wrench.....	1
I. Faceplate Camlock Set.....	1
J. Faceplate 10".....	1

Toolbox Inventory Components	Qty
K. Spindle Sleeve MT#5/MT#3.....	1
L. Dead Center MT#3 Carbide Tip.....	1
M. Dead Center MT#3 HSS Tip.....	1
N. Tool Holder (One Installed).....	2
O. Bottle for Oil.....	1
P. Hex Wrench Set 3–6, 8, 10mm.....	1 Ea.
Q. Phillips and Standard Screwdriver #2.....	1 Ea.
R. Open-End Wrench Set 9/11, 10/12, 12/14mm.....	1 Ea.
S. Three-Jaw Chuck Key.....	1
T. Quick-Change Gear Set.....	1 Ea.
U. V-Belt A33.....	2

NOTICE

If you cannot find an item on this list, carefully check around/inside the machine and packaging materials. Often, these items get lost in packaging materials while unpacking or they are pre-installed at the factory.

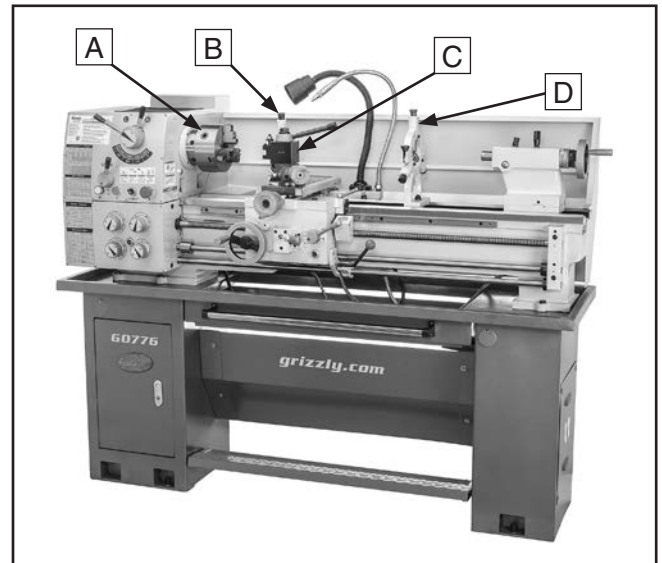


Figure 10. Mounted inventory components.

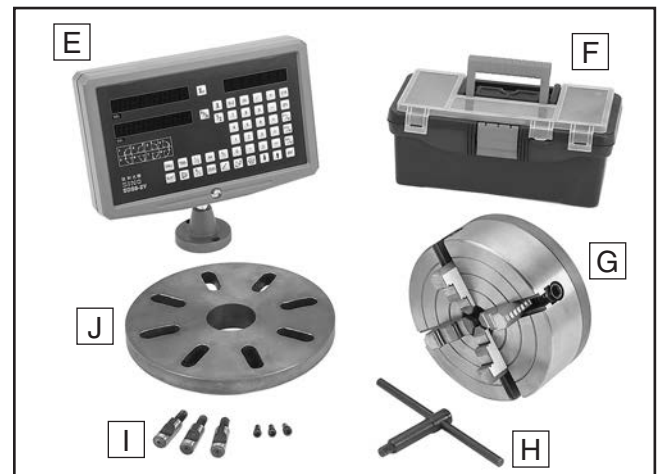


Figure 11. Loose inventory components.

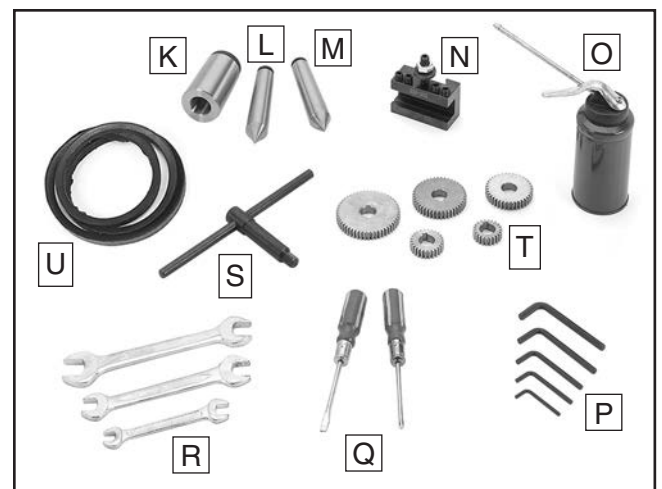


Figure 12. Toolbox inventory.



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.

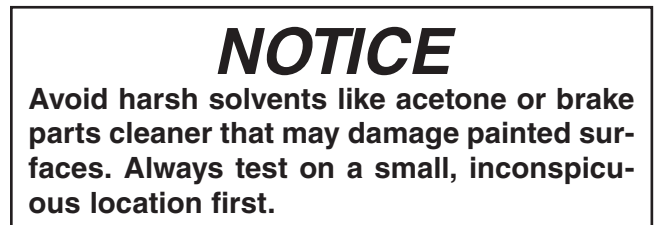
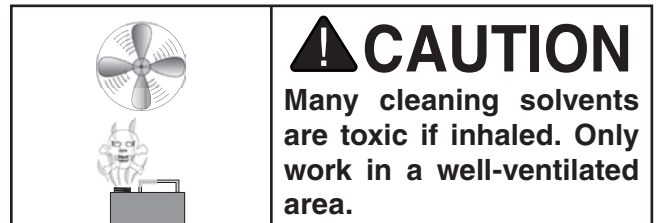
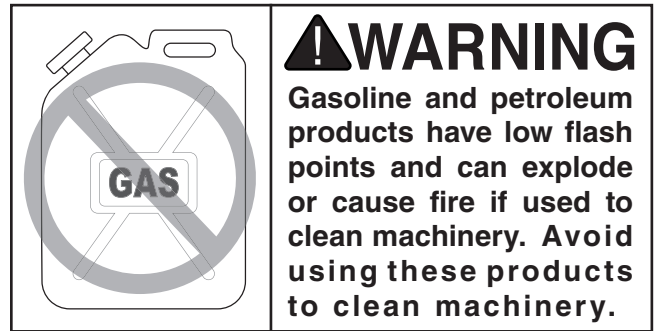
There are many ways to remove this rust preventative, but the following steps work well in a wide variety of situations. Always follow the manufacturer's instructions with any cleaning product you use and make sure you work in a well-ventilated area to minimize exposure to toxic fumes.

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.



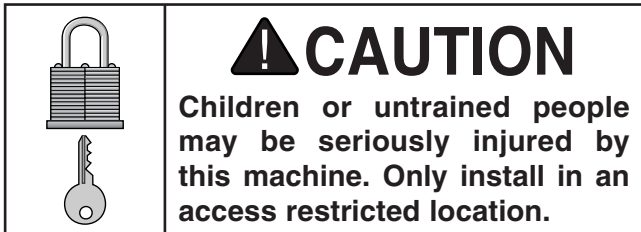
Site Considerations

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.

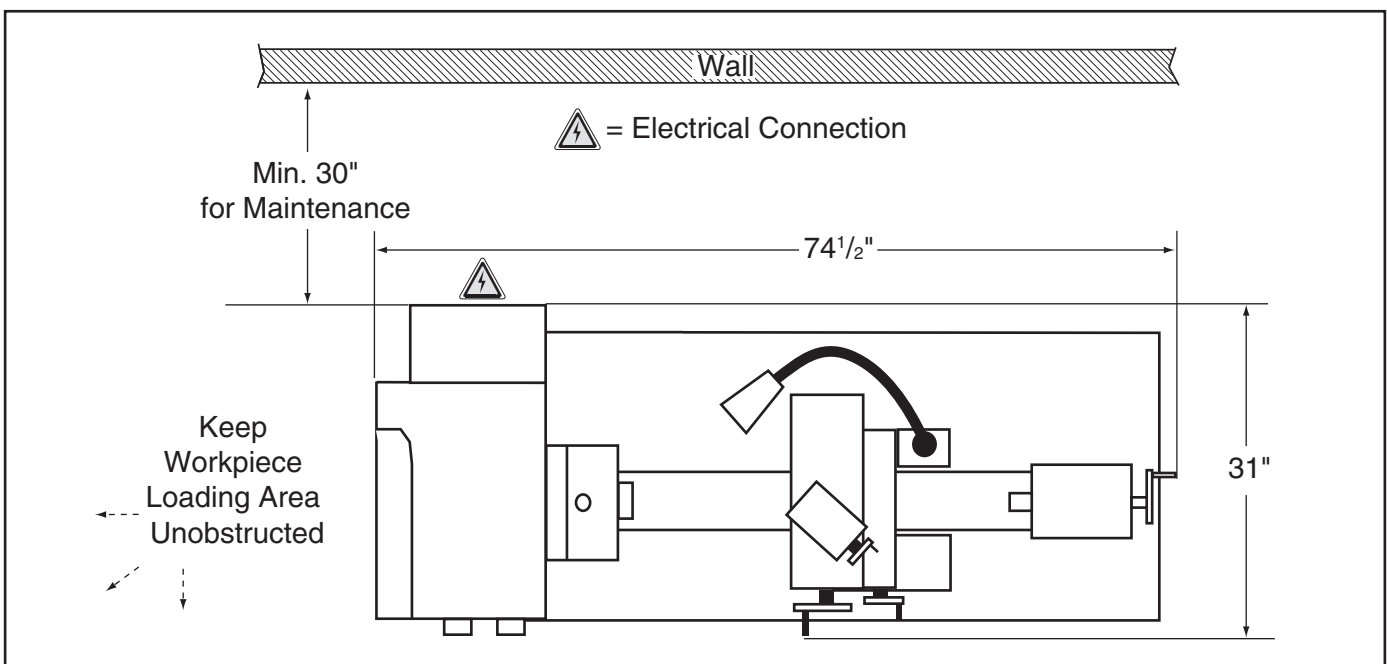
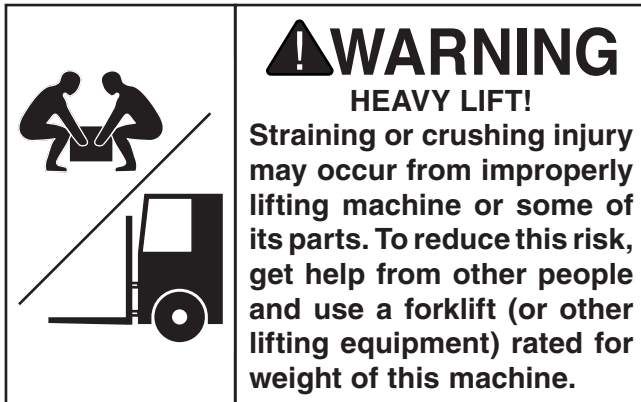


Figure 14. Minimum working clearances.



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 18** 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 (feed selection lever).

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

6. Insert round steel bar stock through four lifting holes (see **Figure 15**).

Note: To properly support the lathe and avoid damaging lathe components, bar stock should be at least 1" diameter thick and 49" long, so it projects 14" from both sides of the lathe when installed.

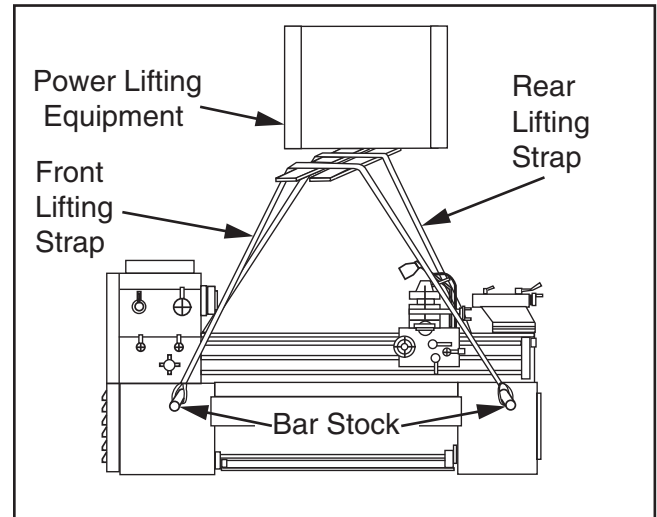


Figure 15. Example of lathe setup for lifting.

7. Attach lifting straps to bar stock and power lifting equipment (see **Figure 15**). 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 splash guard.



Anchoring to Floor

Number of Mounting Holes 6
Diameter of Mounting Hardware..... 5/8"

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

Lag shield anchors with lag screws (see below) are a popular way to anchor machinery to a concrete floor, because the anchors sit flush with the floor surface, making it easy to unbolt and move the machine later, if needed. However, anytime local codes apply, you **MUST** follow the anchoring methodology specified by the code.

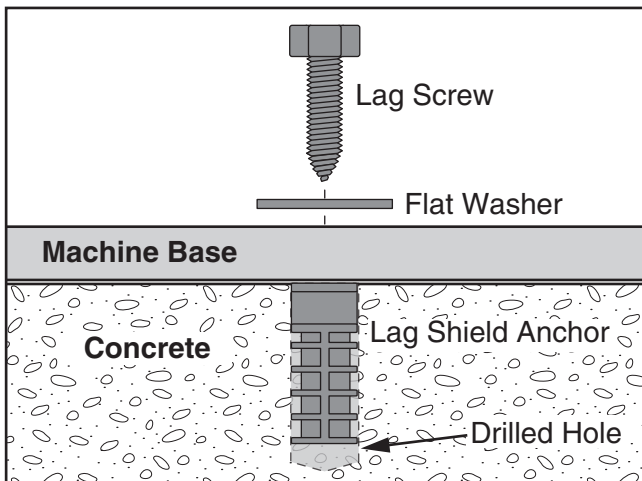


Figure 16. Popular method for anchoring machinery to a concrete floor.

Leveling

NOTICE

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

Recheck 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.

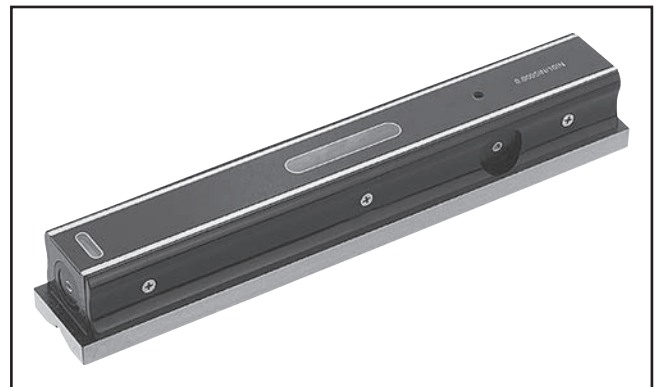


Figure 17. Model H2683 Precision Level.



Lubricating Lathe



The headstock, 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 66**, for checking and adding oil.

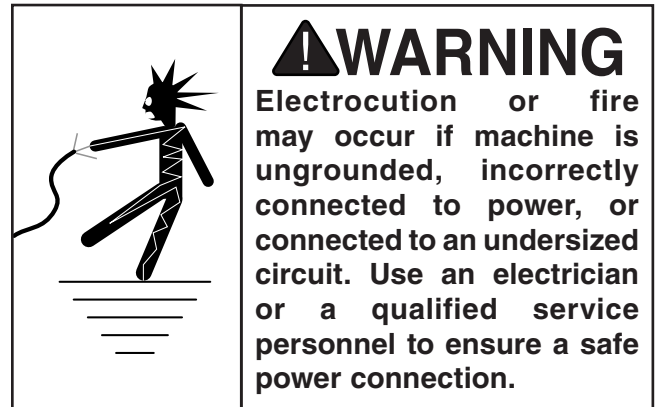
In addition to the reservoirs, we also recommend that you lubricate all other points on the machine at this time. To do this, follow the steps provided in the maintenance schedule on **Page 65**.

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 71**.

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 16**.

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 17** for more information.*



Assembly

With the exception of the V-belts and DRO unit, the Model G0776 is shipped fully assembled.

To install V-belts:

1. Open end gear cover to expose pulleys (see **Figure 18**).

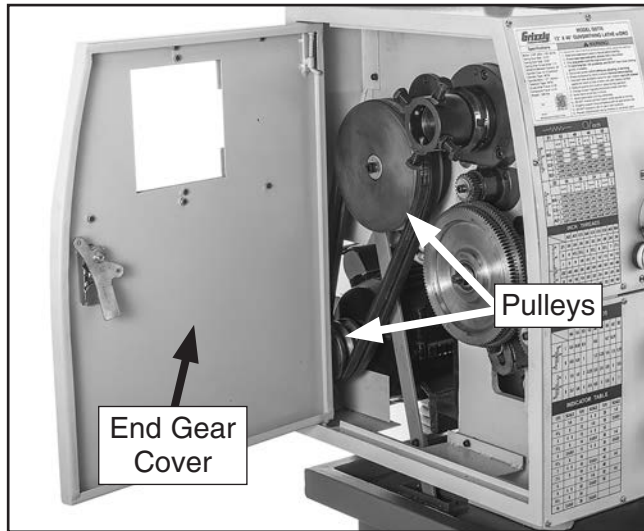


Figure 18. Location of end gear cover and pulleys.

2. Clean surfaces and grooves of pulleys, making sure to remove any oily residue (see **Page 20**).
3. Install and tension V-belts (refer to **Tensioning/Replacing V-Belts** on **Page 83** for detailed instructions).
4. Wipe face of pulleys with light layer of way oil to prevent rust. Take care to avoid leaving any excess oil that could get flung off or contact belts.

To mount DRO unit:

1. Secure DRO assembly to threaded mounting holes in headstock cover, using (2) pre-installed M5-.8 x 14 cap screws (see **Figure 19**).

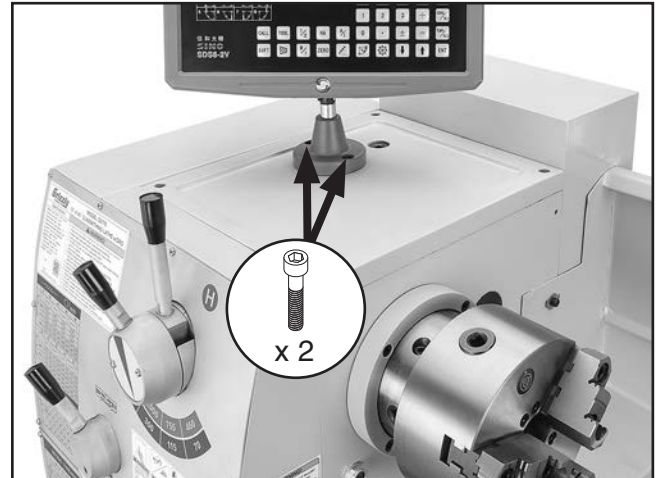


Figure 19. DRO unit mounted to headstock.

2. Connect X- and Z-axis cables and power cord to back of DRO unit, as shown in **Figure 20**.

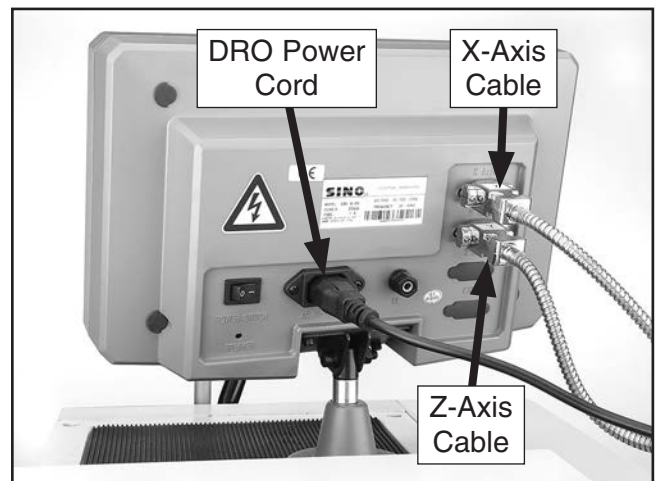


Figure 20. DRO electrical connections.



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.

To test run your machine:

1. Make sure the main power switch (see **Figure 21**) is turned OFF.

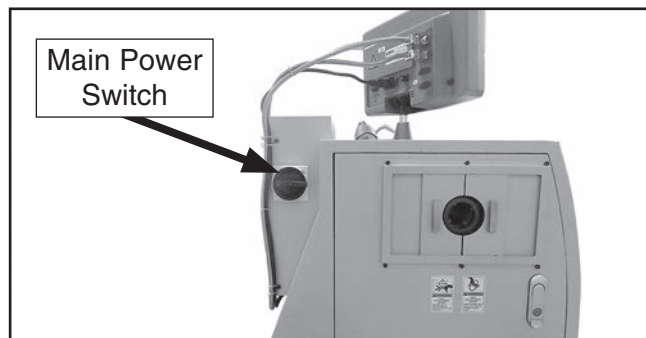


Figure 21. Location of the main power switch.

2. Read and follow safety instructions at beginning of manual, take all required safety precautions, and make sure all previous preparation steps discussed in this manual have been followed and completed.
3. Clear away all tools and objects used during assembly, lubrication, and preparation.
4. Make sure chuck and jaws, if installed, are secure (refer to **Chuck Installation** on **Page 31**).

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

NOTICE

NEVER shift lathe gears when lathe is operating, and make sure both half-nut lever and feed selection lever are disengaged before you start lathe! Otherwise carriage may feed into chuck or tailstock and cause severe damage.

5. Disengage half-nut lever and feed selection lever (see **Figure 22**), and make sure saddle lock is loosened to allow leadscrew or feed rod to move apron if required.

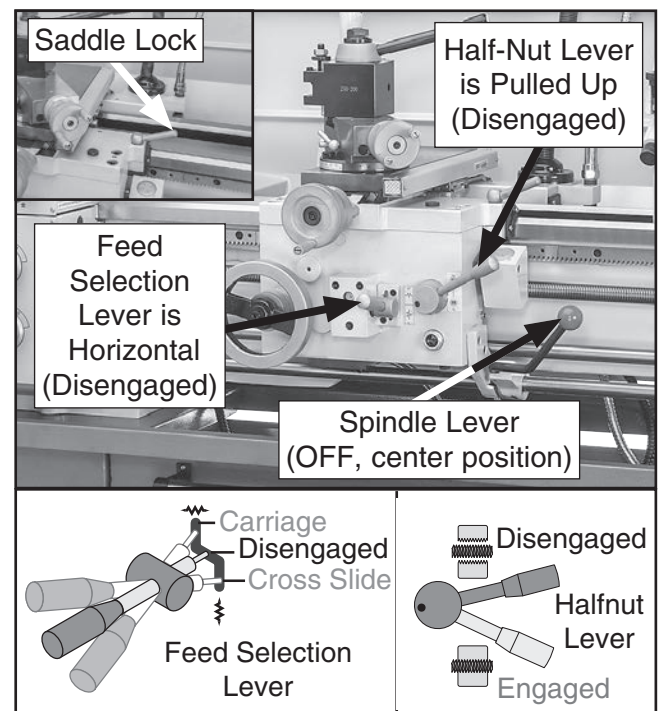


Figure 22. Apron controls.



6. Make sure spindle lever is in the OFF (middle) position (see **Figure 22**).
7. Make sure cutting fluid pump switch is OFF, and point cutting fluid nozzle into lathe chip pan.
8. Turn the main power switch ON and reset the EMERGENCY STOP button by twisting it clockwise until it pops out. The power lamp on the control panel should illuminate (see **Figure 23**).

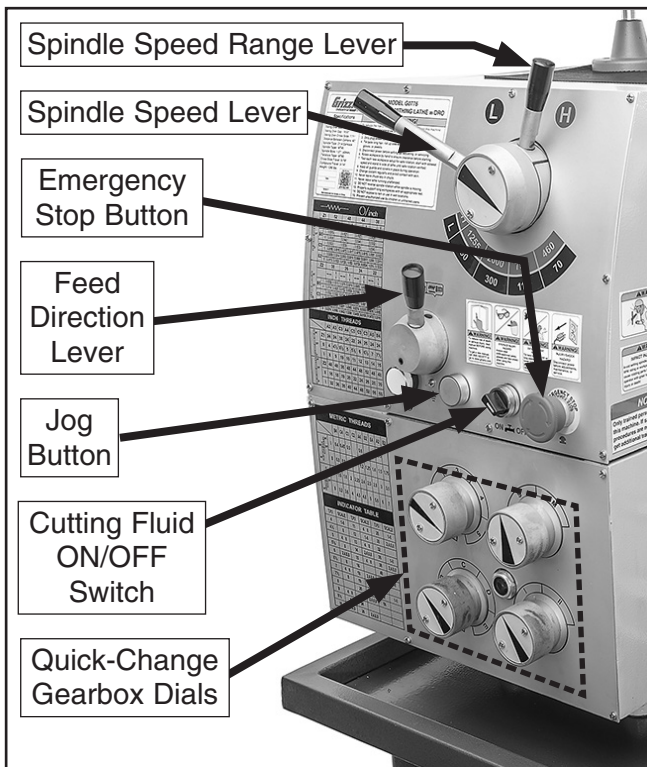


Figure 23. Headstock controls.

9. Move feed direction lever (see **Figure 23**) to middle position. This will disengage spindle.
10. Move spindle speed range lever to "L" position and move spindle speed lever to "70" position.

Note: As long as the feed direction lever shown in **Figure 23** is disengaged, no torque will be transmitted to the quick-change gearbox or any other gear-driven component. As a result, the quick change gearbox dials shown in **Figure 23** can be left engaged or disengaged for the test run.

11. Move spindle lever (see **Figure 22** on **Page 26**) downward to start lathe. Spindle will rotate at 70 RPM. Top of chuck should rotate down toward front of lathe.

—When operating correctly, machine runs 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. If problem is not readily apparent, refer to **Troubleshooting** on **Page 74**.

12. Press the EMERGENCY STOP button to turn lathe **OFF**, then without resetting the EMERGENCY STOP button, try to reset spindle rotation, as instructed in **Step 9**. Spindle should *not* start.

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

13. Move spindle lever to middle (OFF) position, and reset EMERGENCY STOP button by twisting it clockwise until it pops out.

14. Make sure lamp works.

15. Point cutting fluid nozzle at chip pan. Use cutting fluid pump switch on control panel to start pump (see **Figure 6** on **Page 7**). Verify that cutting fluid flows from nozzle, then turn pump **OFF**.

16. Restart spindle rotation.

17. Step on foot brake.

—If brake pedal has no effect on lathe, push the EMERGENCY STOP button and call tech support for help.

Congratulations! The test run is complete. 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 spindle break-in:

1. Successfully complete **Test Run** procedure beginning on **Page 26**.
2. Disengage half-nut lever and feed selection lever.
3. Run spindle at 70 RPM for 10 minutes in each direction (first forward, then reverse).
4. Repeat running lathe in this manner through rest of spindle speeds, progressively increasing in RPM to the highest speed.
5. Press EMERGENCY STOP button and DISCONNECT LATHE FROM POWER!

Congratulations! Spindle break-in is complete. Refer to **Page 66** for lubrication information.

Recommended Adjustments

The following adjustments have been made at the factory. However, because of the many variables involved with shipping, we recommend you verify these adjustments to ensure the best results:

Factory adjustments that should be verified:

- Tailstock alignment (see **Page 39**).
- Cross slide and compound slide backlash adjustment (see **Page 77**).
- Gib adjustments (see **Page 78**).

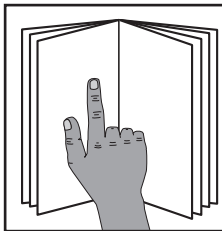


SECTION 4: OPERATION

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.

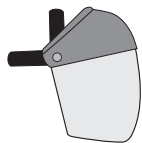


!WARNING

To reduce your risk of serious injury, read this entire manual **BEFORE** using machine.

!WARNING

To reduce risk of eye or face injury from flying chips, always wear approved safety glasses and face shield when operating this machine.



NOTICE

If you are not experienced with this type of machine, **WE STRONGLY RECOMMEND** that you seek additional training outside of this manual. Read books/magazines or get formal training before beginning any projects. Regardless of the content in this section, Grizzly Industrial will not be held liable for accidents caused by lack of training.

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. Moves slides to where they will be used during operation.
7. Sets correct spindle speed for operation.
8. If using power feed, selects proper feed rate for operation.
9. Turns main power switch ON, then resets EMERGENCY STOP button.
10. Uses spindle lever to start spindle rotation.
11. Uses carriage handwheels or power feed options to move tooling into workpiece for operations.
12. When finished cutting, moves spindle lever to OFF position, presses foot pedal brake to completely stop spindle, presses EMERGENCY STOP button, 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 chuck RPM rating or safe limits of your workpiece. Excessive spindle speeds greatly increase risk of workpiece or chuck being thrown from 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 runout.

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.

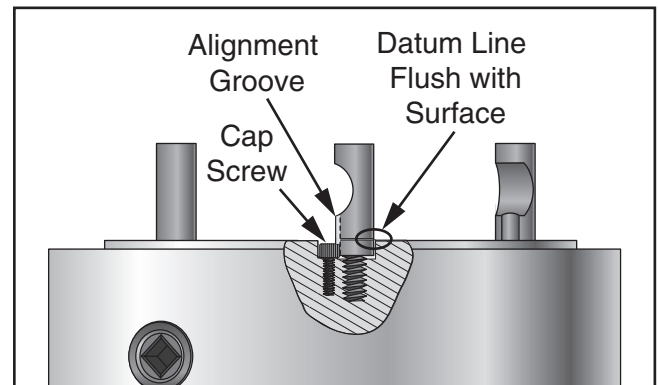


Figure 24. Camlock stud installation.

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
Accidentally dropping a chuck can cause amputation, crushing injuries, or property damage. To reduce this risk, always use some kind of lifting, support, or protective device during installation or removal.

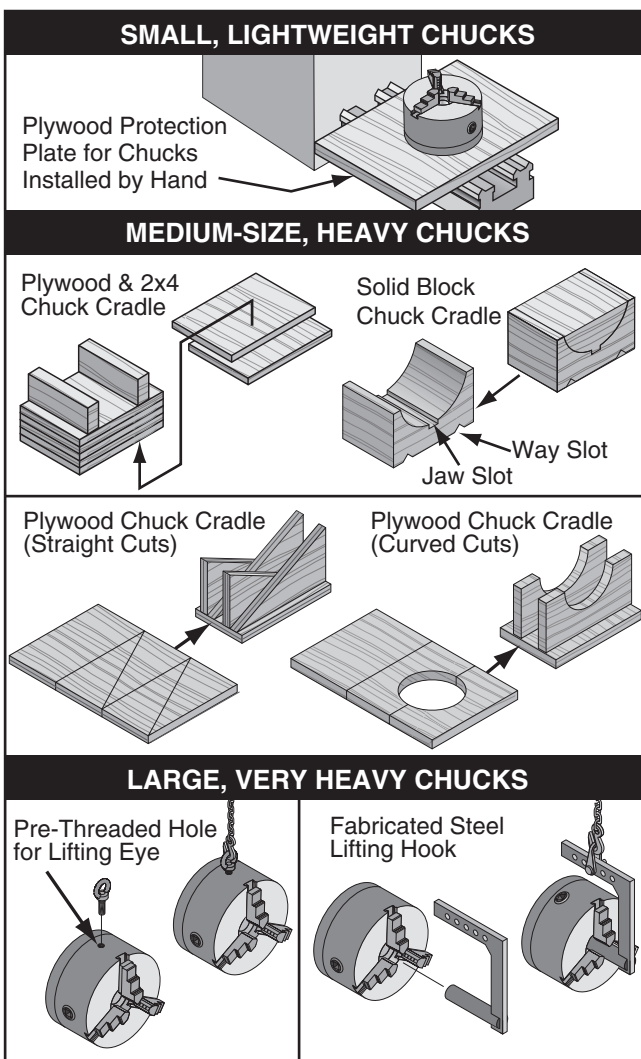


Figure 25. Typical lifting, support, and protective devices used when installing/removing chucks.

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.

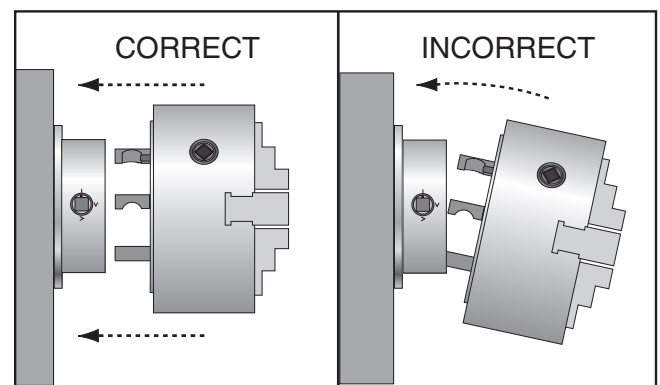


Figure 26. Inserting camlock studs into spindle cam holes.



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.

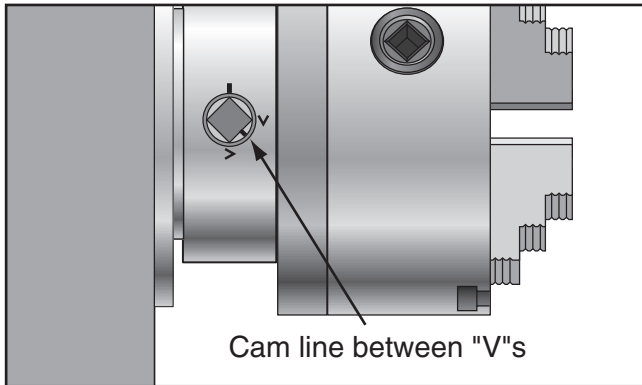


Figure 27. Cam line positioned between the "V" marks after the camlocks are fully tightened.

- 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.

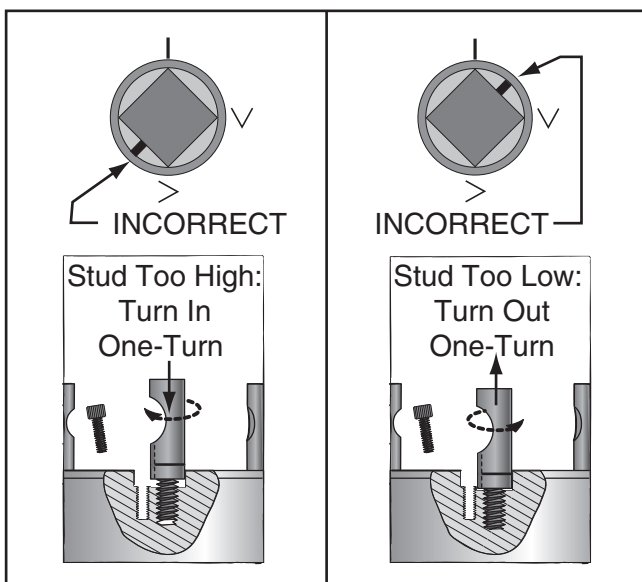


Figure 28. Correcting an improperly installed stud.

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

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.

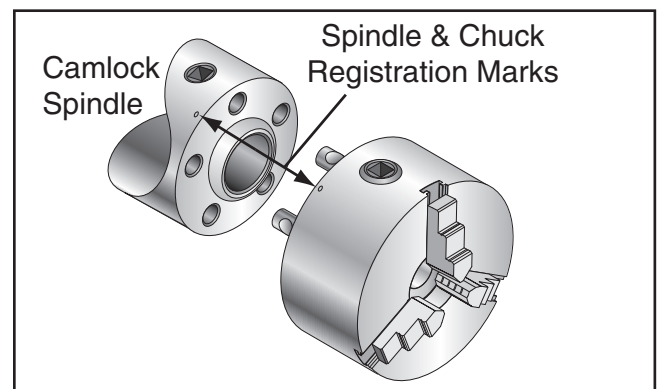


Figure 29. Registration mark locations.



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.

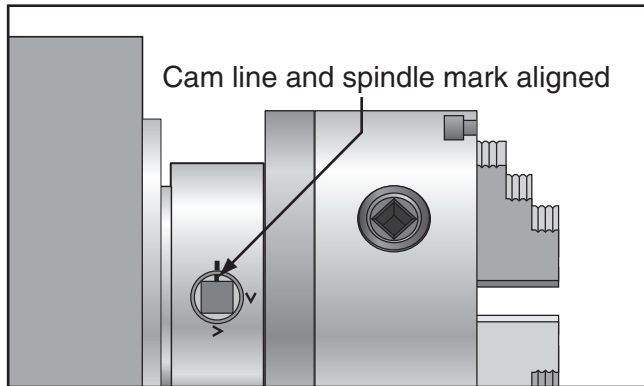


Figure 30. Camlock is fully loosened when the cam line is aligned with the spindle mark.

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.

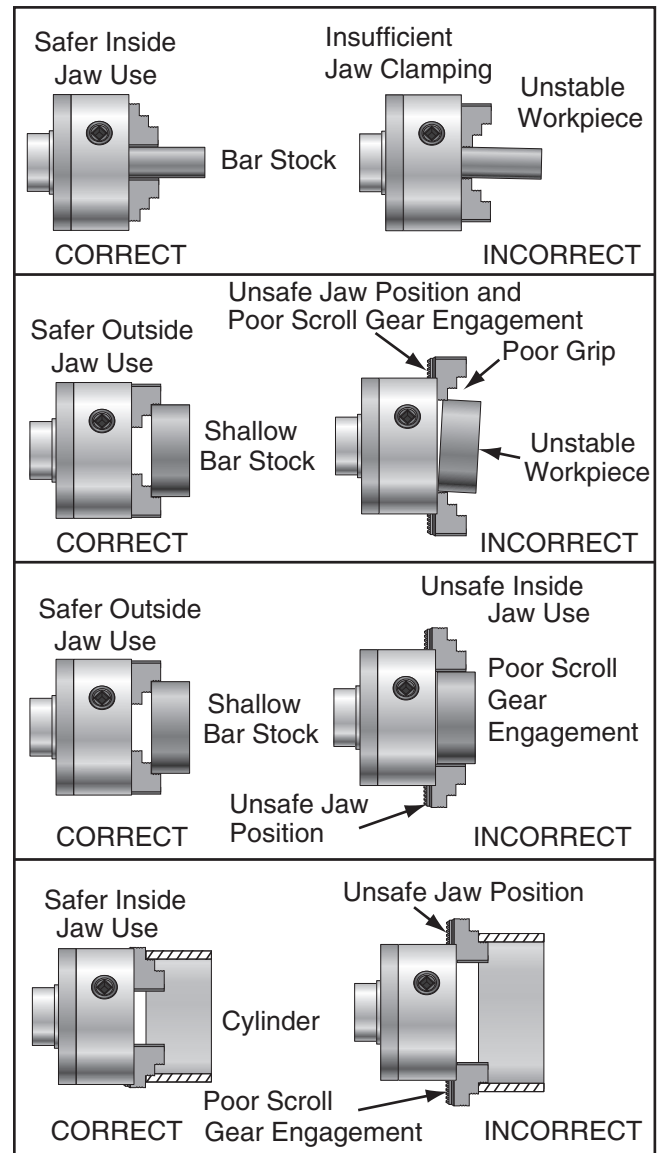


Figure 31. Jaw selection and workpiece holding.



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).

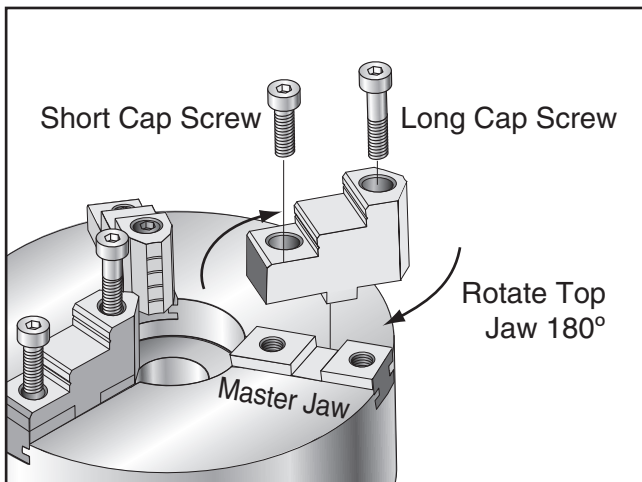


Figure 32. Reversing the chuck jaws.

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.

To mount workpiece in 4-jaw chuck:

1. DISCONNECT MACHINE FROM POWER!
2. Use an appropriate device to protect ways (refer to **Installation & Removal Device** subsection).
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.

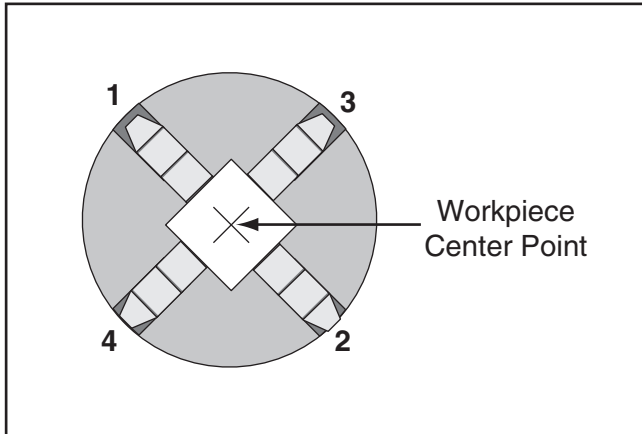


Figure 33. 4-jaw chuck tightening sequence.

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).

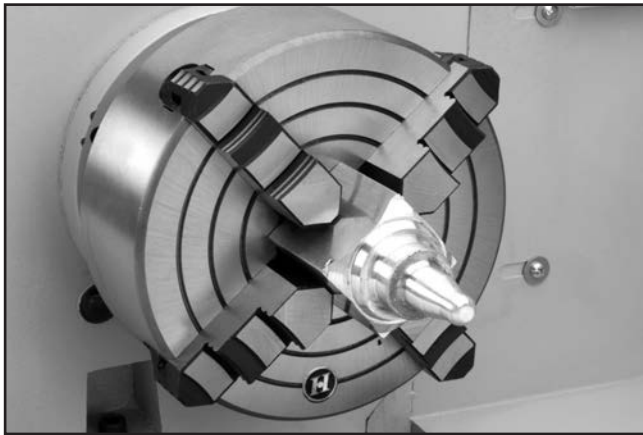


Figure 34. Example of a non-cylindrical workpiece mounted on a 4-jaw chuck.

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 workpiece to be thrown from lathe with deadly force. To reduce this risk, use a low RPM, and use counter-weights to balance faceplate or workpiece.

!WARNING

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

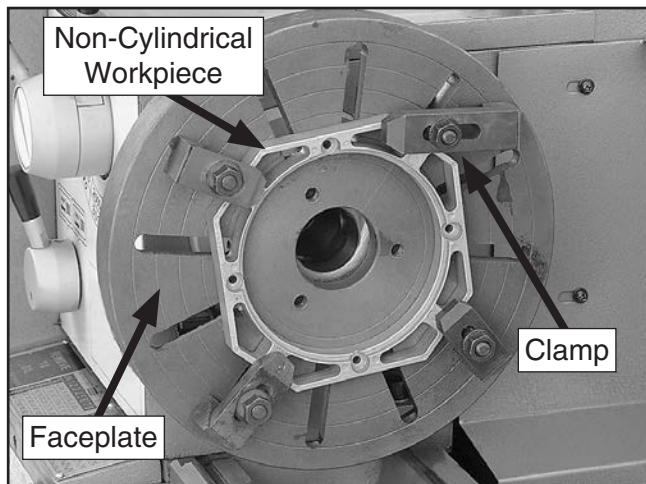


Figure 35. Example of a workpiece clamped in a faceplate.

Tailstock

The tailstock is typically used to support long workpieces at the side opposite the spindle, using a live or dead center. It can also hold a tapered drill bit (or a drill chuck with a regular drill bit) for boring holes. Unlike boring done with a drill press where the workpiece is fixed and the drill bit rotates, the drill bit in a tailstock remains stationary while the workpiece is rotated by the spindle.

The entire tailstock can be repositioned and locked in place along the length of the bed. An independently controlled offset adjustment allows the upper part of the tailstock to move perpendicular to the bedways so it can be aligned with the spindle center (for concentric turning) or offset from the spindle center (for tapered turning).

The tailstock quill also features independent adjustment controls that allow it to be advanced toward the spindle or locked firmly in position.

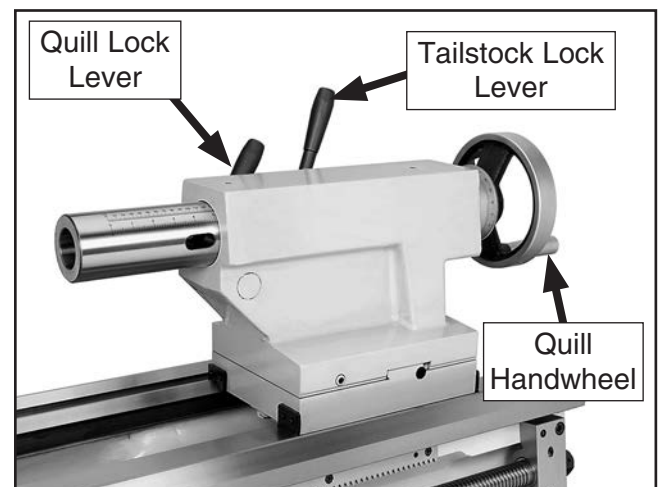


Figure 36. Tailstock and quill lock levers in locked position.



Tailstock Quill Specs

Graduated Dial

Increments..... 0.001"

One Full Revolution..... 0.100"

Increments on Quill

Inch 0"-4" in $\frac{1}{8}$ " Increments

Metric..... 0-102mm in 1mm 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.

Using Quill

1. Rotate quill lock lever clockwise 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 counterclockwise to secure quill.

Installing Tooling

This tailstock uses a quill that accepts tapered arbors and drill bits (see the **Figures** below for examples).

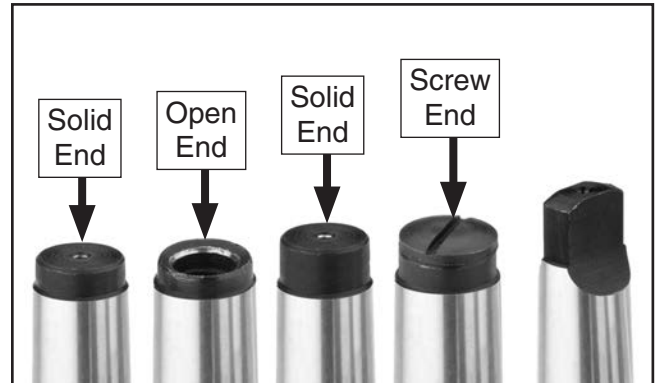


Figure 37. Types of tapered arbors and tooling.

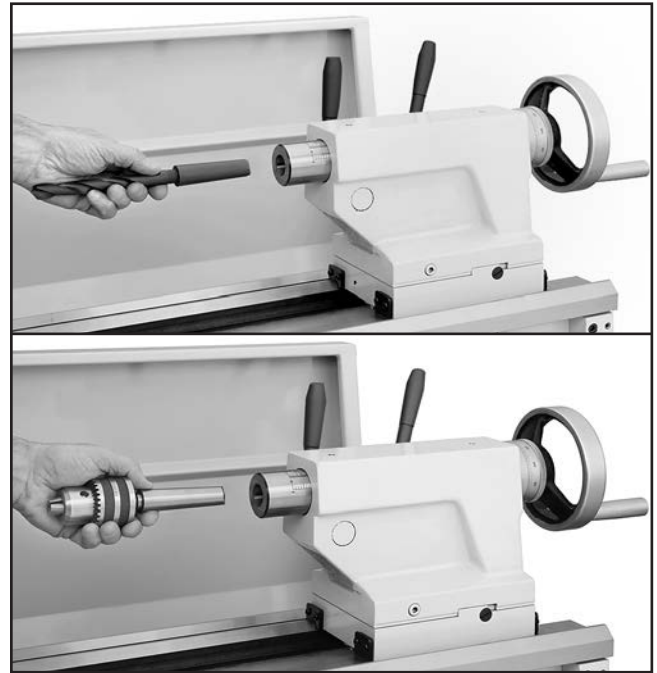


Figure 38. Example photos of inserting tools into the tailstock.



Note: *If the tooling has an open hole in the end, 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 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 no lint or oil remains on tapers.
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 lock 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.

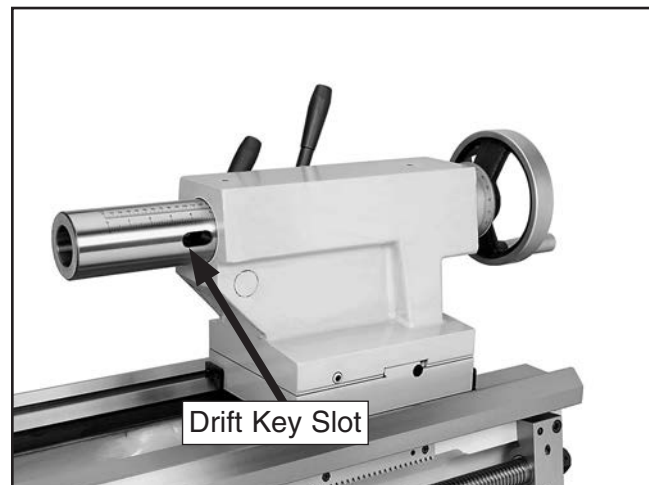


Figure 39. Drift key slot in the side of the quill.



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 are arbitrary. For a precise offset, use a dial indicator to check quill movement while adjusting the screws.*

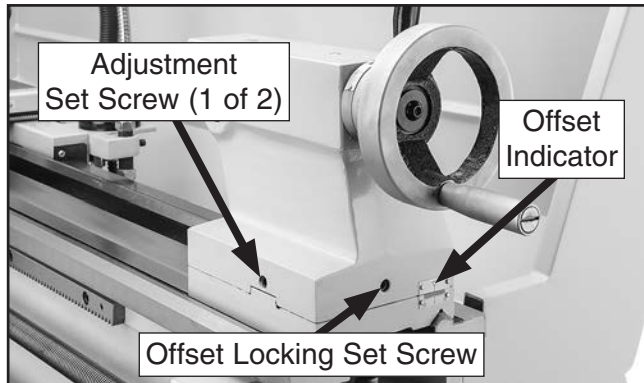


Figure 40. Left offset adjustment.

Tools Needed Qty
Hex Wrench 5mm..... 1

1. Loosen offset locking set screw to allow lateral movement of tailstock.
2. Loosen tailstock lock lever to release clamping pressure.
3. Rotate adjustment set screws in opposite directions for desired offset (see **Figure 41**).

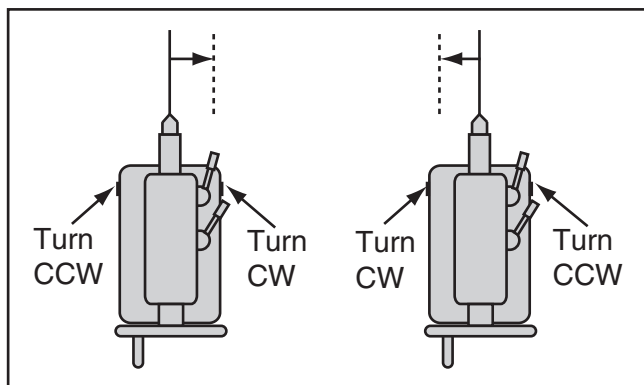


Figure 41. Example of set screw adjustment in relation to tailstock movement.

4. Retighten offset locking set screw to secure offset.

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 5mm..... 1
Round Stock 2" x 6" 2
Precision Level 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.

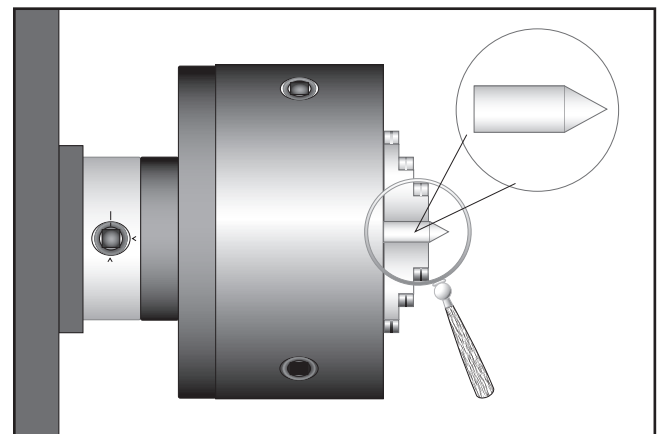


Figure 42. Turning a dead center.



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

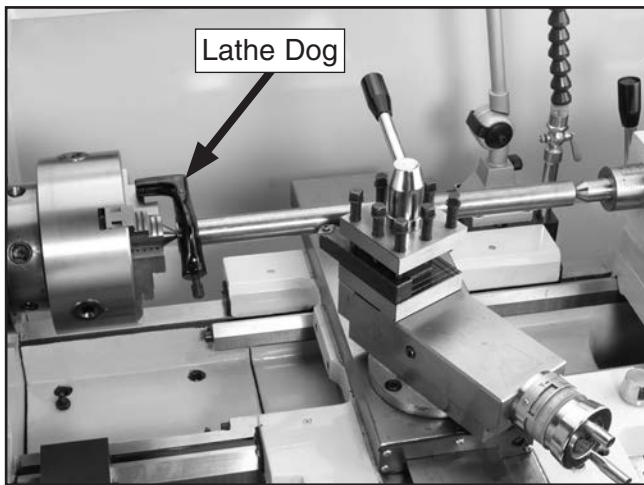


Figure 43. Example of stock mounted between the centers.

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 work-piece.

—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.

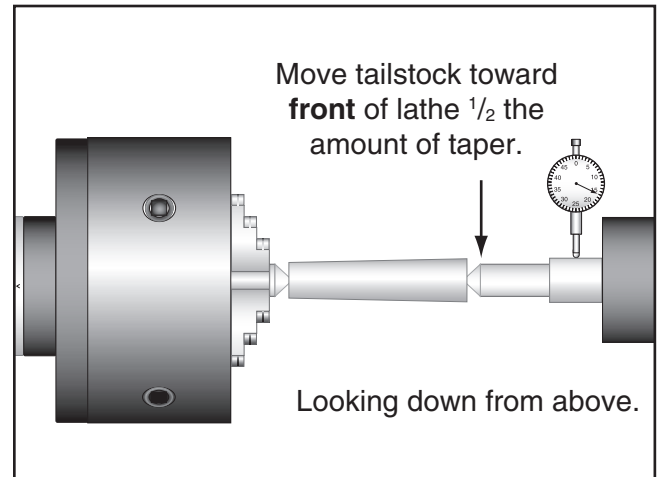


Figure 44. Adjust tailstock toward the operator.

—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.

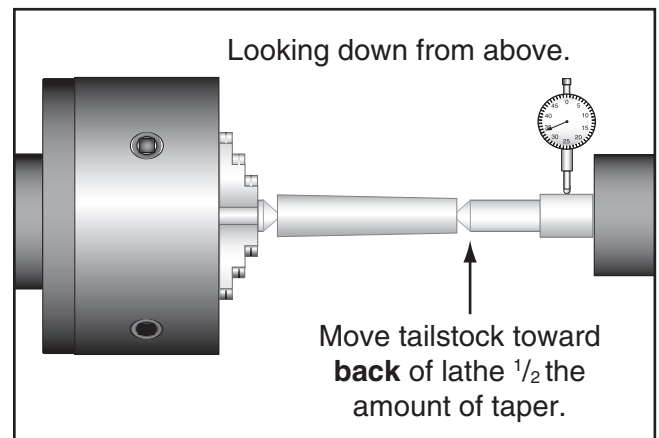


Figure 45. Adjust tailstock away from the operator.

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



Centers

Figure 46 shows the MT#3 dead centers included with the lathe. In addition, an MT#5–MT#3 tapered spindle sleeve is included for mounting in the spindle.

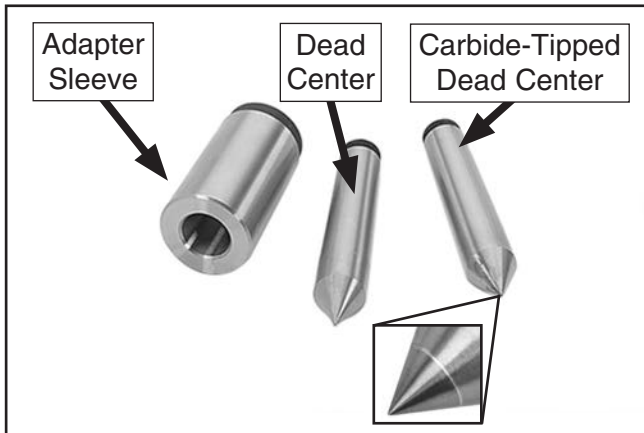


Figure 46. Adapter sleeve and centers.

Dead Centers

A dead center is a one-piece center that, when mounted in the tailstock, 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

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.

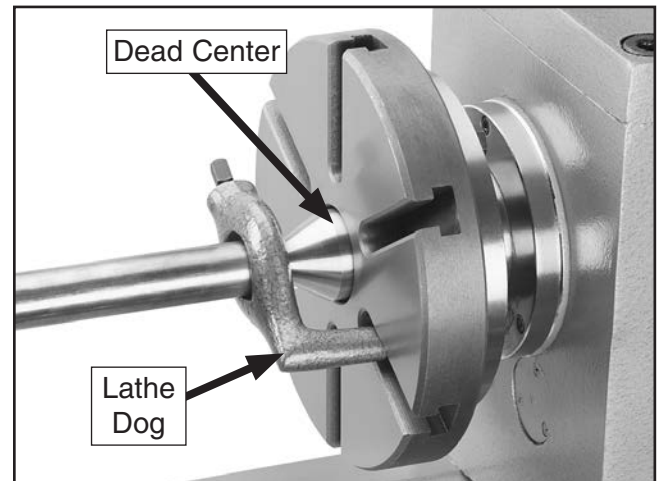


Figure 47. Example of using a dead center with a faceplate and lathe dog.



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.

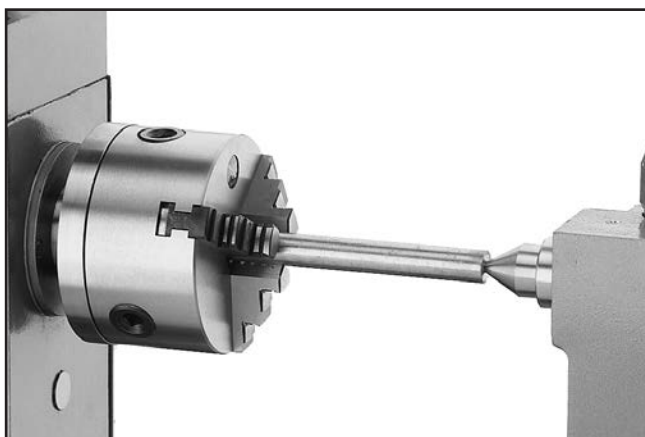


Figure 48. Example of using a carbide-tipped dead center installed in the tailstock.

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 4", 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 the **Figure** below, then use a drift key to remove the center.

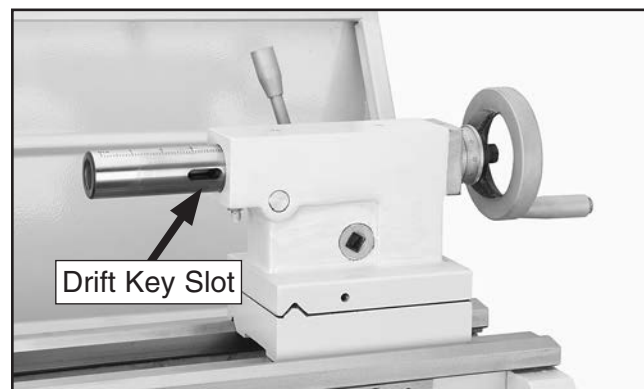


Figure 49. Drift key slot in the side of the quill.



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 50. 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.

Steady Rest

The steady rest supports long shafts and can be mounted anywhere along the length of the bedway. Familiarize yourself with the steady rest components shown below to better understand the controls before using it.

Items Needed	Qty
Open-End Wrench 27mm.....	1
Open-End Wrench 36mm	1

To install and use steady rest:

1. DISCONNECT MACHINE FROM POWER!
2. Loosen clamp knob that secures top half of steady rest (see **Figure 51**), and open top.

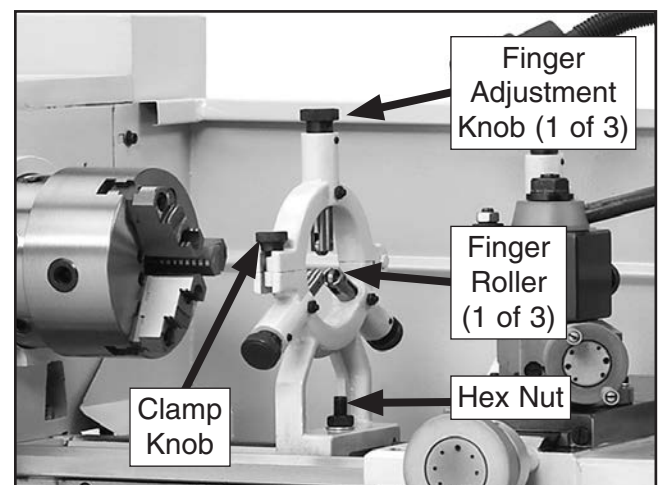


Figure 51. Steady rest components.



3. Install workpiece in chuck, then use finger adjustment knobs to position bottom two finger rollers so they barely touch workpiece, as shown in **Figure 52**.

Note: *If necessary, slightly loosen alignment set screw and jam nut (see **Figure 52**) to allow finger movement, then retighten jam nut.*

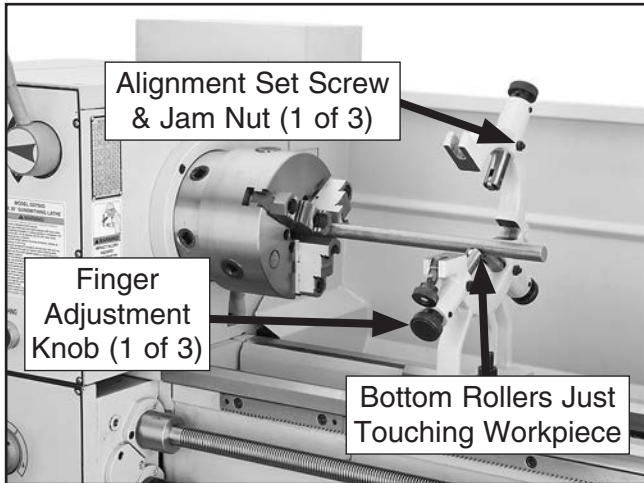


Figure 52. Example of workpiece mounted in steady rest.

4. Close steady rest and secure with clamp knob. If necessary, raise upper finger roller to allow steady rest to close.
5. Use finger adjustment knobs to adjust all three finger rollers so they just touch 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.*

Note: *You do not need to lubricate the steady rest finger rollers. They are permanently sealed and lubricated at the factory.*

Follow Rest

The follow rest mounts to the saddle with two cap screws (see **Figure 53**). 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: *You do not need to lubricate the follow rest finger rollers. They are permanently sealed and lubricated at the factory.*

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



Figure 53. Follow rest attachment.



Carriage & Slide Locks

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

See **Figures 54–55** to identify the locks for each device.

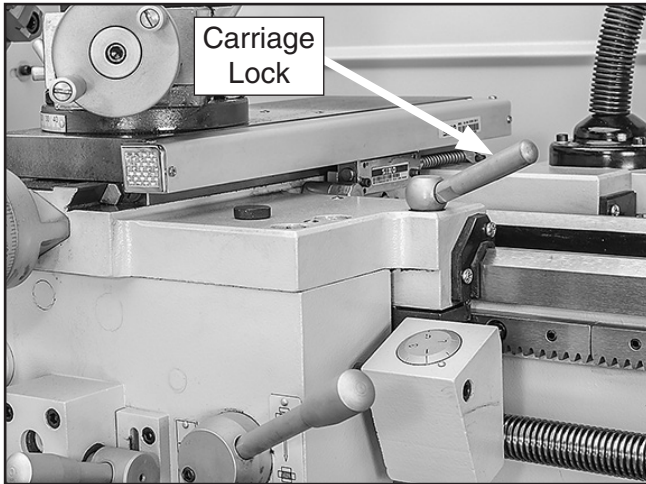


Figure 54. Location of carriage lock.

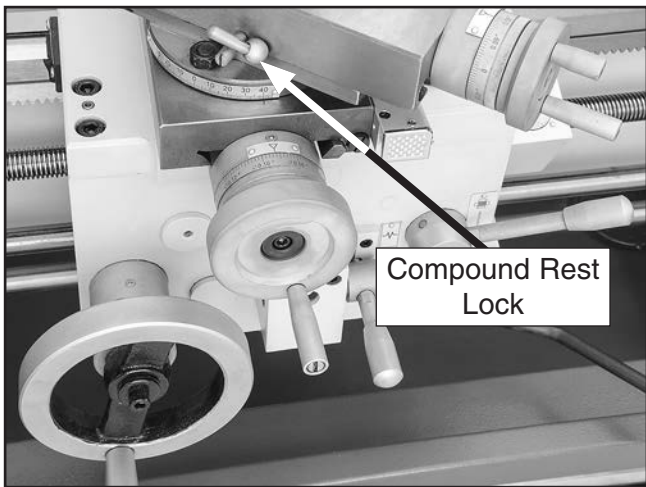


Figure 55. Location of compound rest lock.

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" (0.03mm)
 One Full Revolution..... 0.100" (2.54mm)

Items Needed

Qty

Open-End Wrench 19mm..... 1

To set compound rest at a certain angle:

1. Loosen two hex nuts at base of compound rest (1 of 2 shown in **Figure 56**).

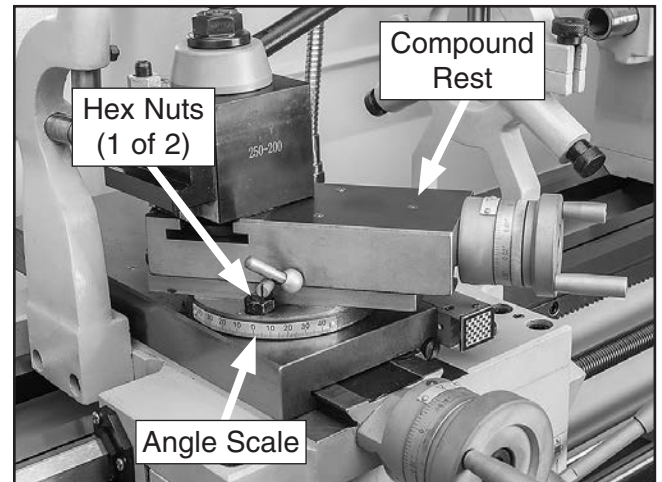


Figure 56. Compound rest angle adjustments.

2. Rotate rest to desired angle, as indicated by scale at base, then retighten the two hex nuts.

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

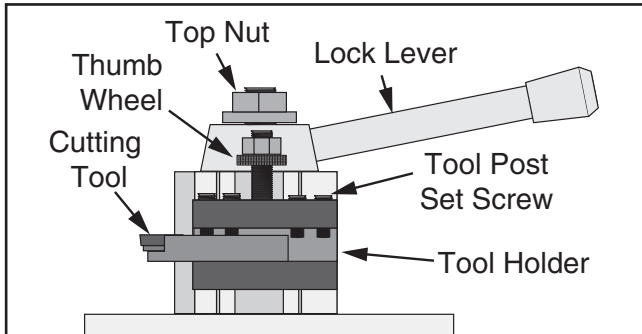


Figure 57. Example of tool mounted in tool post.

Tool holders can be quickly loaded and unloaded using the lock lever, and rotated by loosening the top nut. 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.

Installing Tool

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

To install tool in tool post:

1. Position tool in holder so cutting edge extends just enough to allow tool to cut freely—but no more. The 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 with the spindle centerline, as illustrated below.

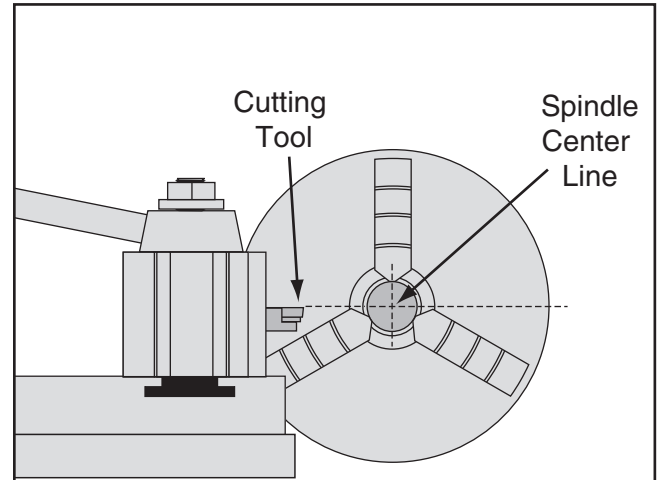


Figure 58. Cutting tool aligned with spindle centerline (viewed from tailstock).

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 instructed in the following procedure. For this to work, the tailstock must be aligned to the spindle centerline (refer to **Aligning Tailstock To Spindle Centerline** for detailed instructions).



Items 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 in tool post, then secure post so tool faces tailstock.
2. Install center in tailstock, and position center tip near cutting tool tip.
3. Lock tailstock and quill in place.
4. Adjust height of cutting tool so tool tip is aligned vertically with center tip, as illustrated below.

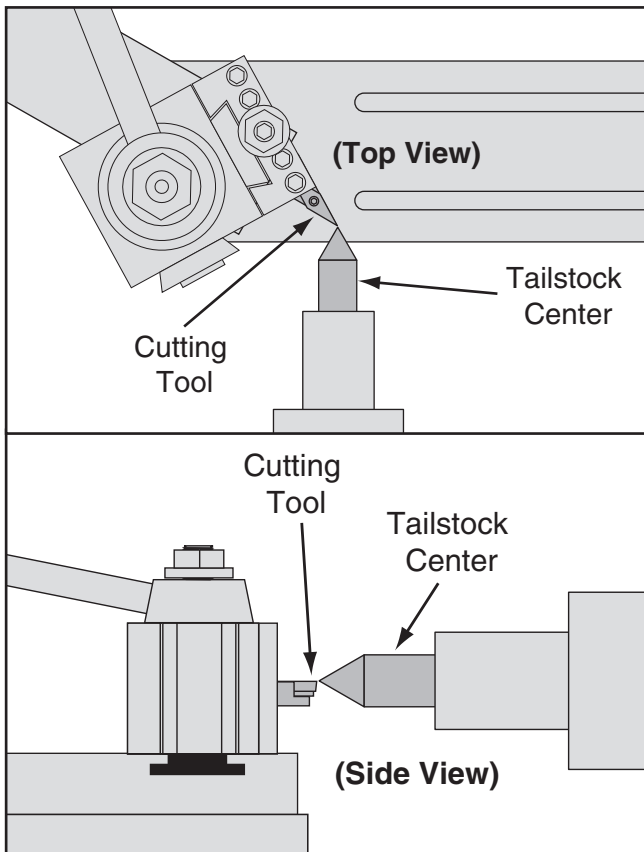


Figure 59. Cutting tool aligned to the tailstock center.

Manual Feed

The cutting tool can be manually fed into the workpiece using the carriage, cross slide, and compound rest handwheels shown below.

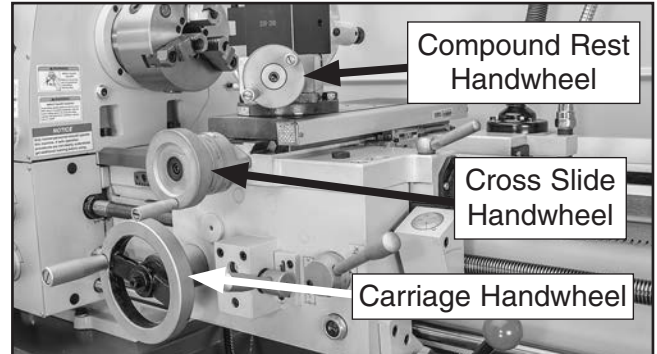


Figure 60. Manual feed controls.

Carriage Handwheel

Graduated Dial

Increments.....	0.02" (0.51mm)
One Full Revolution	0.66" (16.76mm)

Use the carriage handwheel to move the carriage left or right along the bed.

Cross Slide Handwheel

Graduated Dial

Increments.....	0.002" (0.05mm)
One Full Revolution	0.2" (5.08mm)

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 a direct-read graduated dial, which shows the total amount of material removed from the diameter of the workpiece.

Compound Rest Handwheel

Graduated Dial

Increments	0.001" (0.03mm)
One Full Revolution	0.1" (2.54mm)

Use this handwheel to move the cutting tool linearly along the set angle of the compound rest. Set the compound rest angle by hand-rotating it and securing it with the two hex nuts (see **Figure 56** on **Page 45**). The compound rest has an indirect-read graduated dial, which shows the actual distance the tool moves.



Spider

Your lathe is equipped with a set of outboard spindle supports otherwise known as a "spider" (see **Figure 61**).

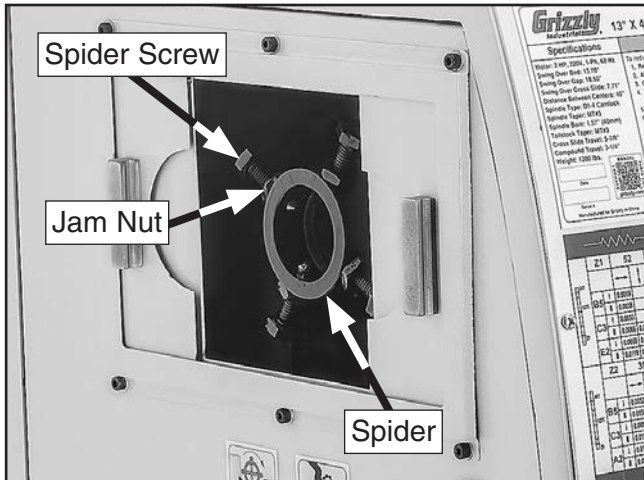


Figure 61. Spider assembly located on the outboard spindle.

! 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.

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 below.

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

*Double if using carbide cutting tool

Figure 62. 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 range lever and spindle speed lever, shown in **Figure 63**, are used to select one of the 8 spindle speeds.

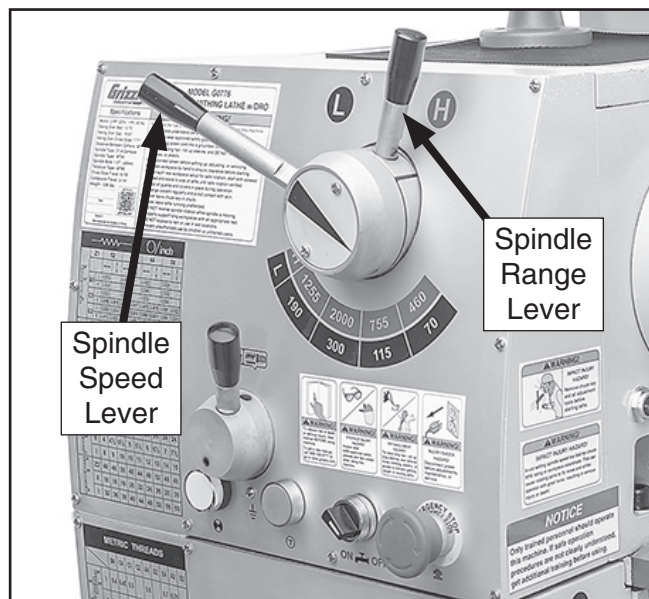


Figure 63. Spindle range and speed levers.

The spindle speed and range levers 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.

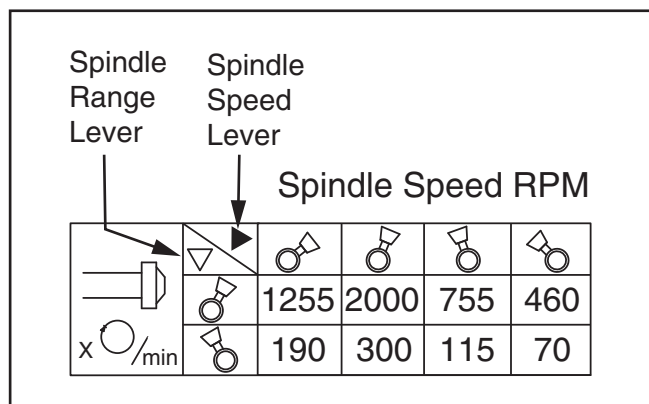


Figure 64. Spindle speed chart and applicable spindle lever positions.

Configuration Example

Figure 65 shows the 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 lever. When the gears align, the lever 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—be sure to remove the key when you are done.

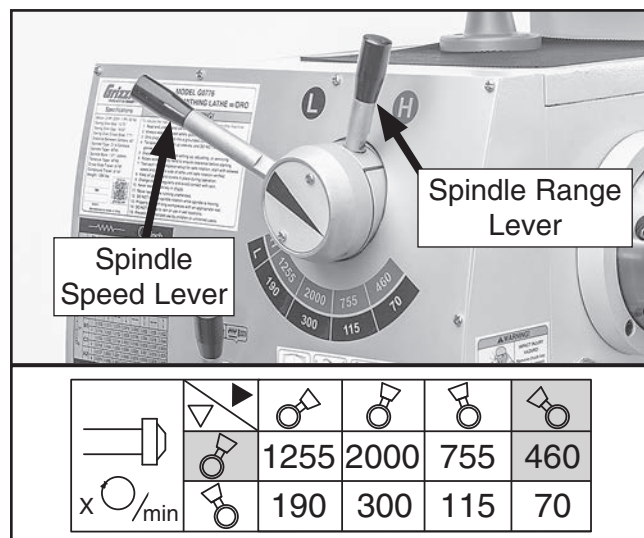


Figure 65. Spindle speed set to 460 RPM.



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 dial 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 55**.

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 66–67** and the following descriptions to understand the power feed controls.

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

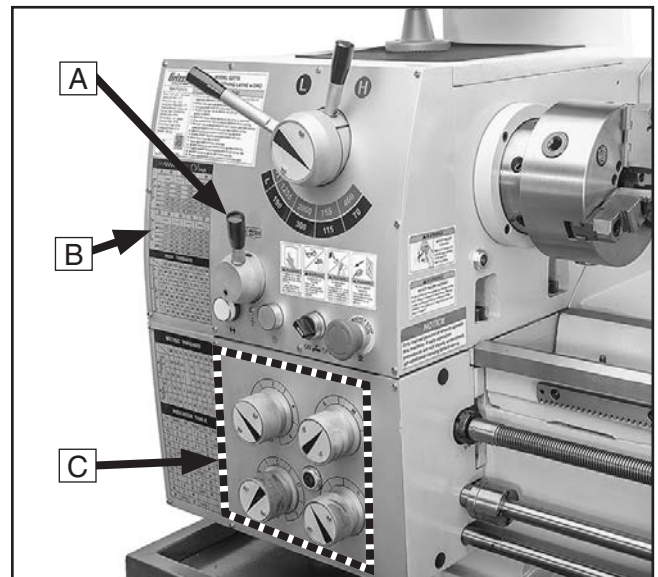


Figure 66. Power feed controls on the headstock.

- A. Feed Direction Lever:** Selects the direction for power feed. When the lever is positioned as shown in **Figure 66**, the carriage will move to the left along the bed, or the cross feed will travel toward the front 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 Dials:** Position these as indicated on the charts to choose different feed rates.



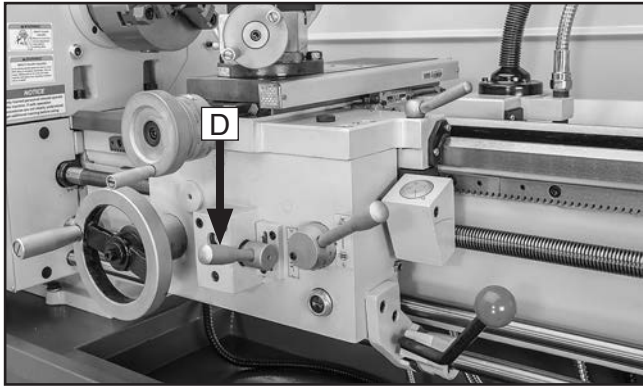


Figure 67. Apron power feed controls.

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

When the lever is up, the cross slide is selected. When the lever is down, the carriage is selected. In the middle position neither the cross slide nor the carriage will move.

Note: The feed selection lever must slide to the right before it can move downward. This is a safety feature designed to prevent the lever from engaging the cross feed when lifted to disengage the longitudinal feed.

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 66** on previous page for location) displays the settings for the headstock feed controls for feed rates.

Examining the chart, you will see two rows of Z Gear headings shaded in gray, indicating the tooth count of the gear in the "Z" position (see **Figure 68**).

		inch									
		Z1	52	48	44	38					
24T 127T Z1			↔ ↔	↕ ↕	↔ ↔	↕ ↕	↔ ↔	↕ ↕			
	B5	I	0.0019		0.0021		0.0023		0.0026		
		II	0.0038		0.0042		0.0046		0.0052		
	C3	I	0.0033		0.0036		0.0039		0.0046		
		II	0.0066	0.0016	0.0072	0.0017	0.0078	0.0019	0.0091	0.0022	
	E2	I	0.0059	0.0014	0.0063	0.0015	0.0069	0.0017	0.008	0.0019	
		II	0.0118	0.0028	0.0126	0.003	0.0138	0.0034	0.016	0.0038	
	48T 127T Z2			↔ ↔	↕ ↕	↔ ↔	↕ ↕	↔ ↔	↕ ↕		
		B5	I	0.0052	0.0013	0.0076	0.0019	0.0083	0.002	0.009	0.0022
			II	0.0104	0.0026	0.0152	0.0038	0.0166	0.004	0.018	0.0044
		C3	I	0.0092	0.0022	0.0134	0.0033	0.0146	0.0035	0.0157	0.0039
			II	0.0184	0.0044	0.0268	0.0066	0.0292	0.007	0.0314	0.0078
A2		I	0.0137	0.0033	0.0201	0.0049	0.0218	0.0053	0.0236	0.0058	
		II	0.0274	0.0066	0.0402	0.0098	0.0436	0.0106	0.0472	0.0116	
		Z2	38	26	24	22					

Figure 68. Feed rate chart/Z Gear headings.

↔ This symbol indicates longitudinal feed rates.

↕ This symbol indicates cross 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.

Setting Power Feed Rate of 0.0021 in./rev.

1. DISCONNECT LATHE FROM POWER!
2. Locate box on feed rate chart that lists 0.0021 in./rev., as shown in **Figure 69**.

		inch								
		Z1	52	48	44	38				
24T 127T Z1			↔ ↔	↕ ↕	↔ ↔	↕ ↕	↔ ↔	↕ ↕		
	B5	I	0.0019		0.0021		0.0023		0.0026	
		II	0.0038		0.0042		0.0046		0.0052	
	C3	I	0.0033		0.0036		0.0039		0.0046	
		II	0.0066	0.0016	0.0072	0.0017	0.0078	0.0019	0.0091	0.0022
	E2	I	0.0059	0.0014	0.0063	0.0015	0.0069	0.0017	0.008	0.0019
		II	0.0118	0.0028	0.0126	0.003	0.0138	0.0034	0.016	0.0038
			Z2	38	26	24	22			

Figure 69. 0.0021" location on feed chart.



3. Locate applicable change gear on chart in **Figure 69** on **Page 51** (in this case it is the 48T gear).
4. Install 48T gear in lower "Z" position so it meshes with 127T gear (refer to **Power Feed Configuration** for details).
5. Rotate spindle by hand to verify no binding exists.
6. Move quick-change gearbox dials to positions **B5SI**, as shown in **Figure 70**.

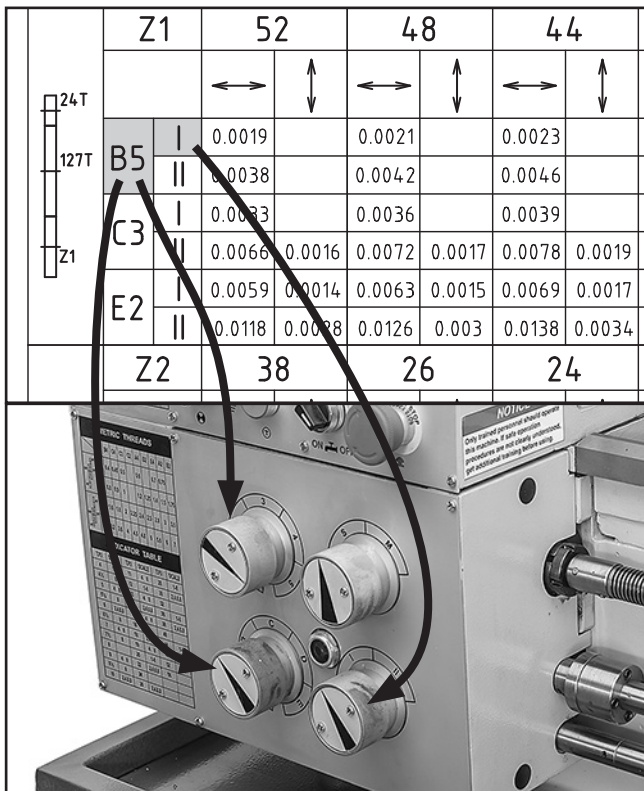


Figure 70. Feed control settings for a 0.0021" carriage feed rate.

- "B5" indicates that the dial marked **A-E** must be set to the "**B**" position, and the dial marked **1-5** must be set to the "**5**" position.
- The sub-row "**I**" indicates the dial marked **I-II** must be set to the "**I**" position.
- For feeding operations, the dial marked **S/M** must be set to the "**S**" position.

The carriage is now set up for a power feed rate of 0.0021 in./rev.

End Gears

The end gears must be correctly setup for power feed, inch, or metric threading operations. Use the photo below to identify the upper 24T/48T gear, middle 120T/127T change gears, and lower "Z" gear, which are also referenced on the headstock feed and threading charts.

The following subsections explain how to configure the end gears.

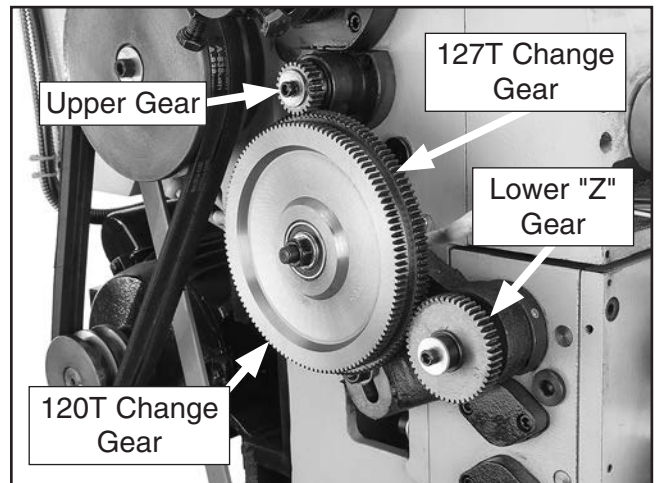


Figure 71. Change gear identification.

Power Feed Configuration

Install either a 24T or 48T gear in the upper position and mesh it with the 127T gear. Install the appropriate gear in the "Z" position for the desired feed rate and mesh it with the 127T gear (see **Figure 72**).

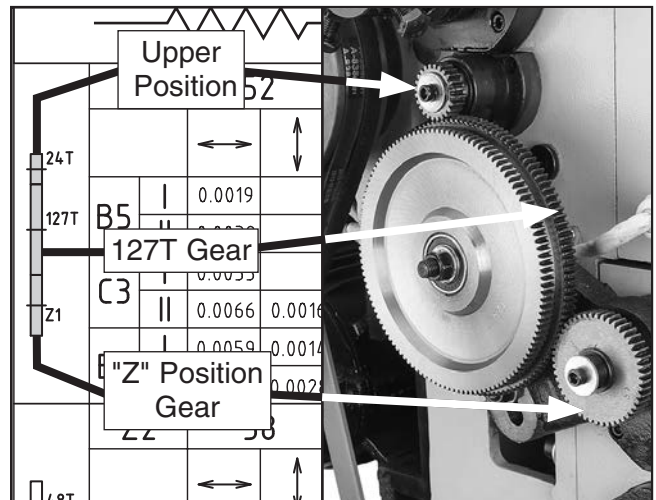


Figure 72. Power feed chart change gears.



Inch Threading Configuration

The end gears for inch threading are set up the same as for power feeding (see **Figure 73**).

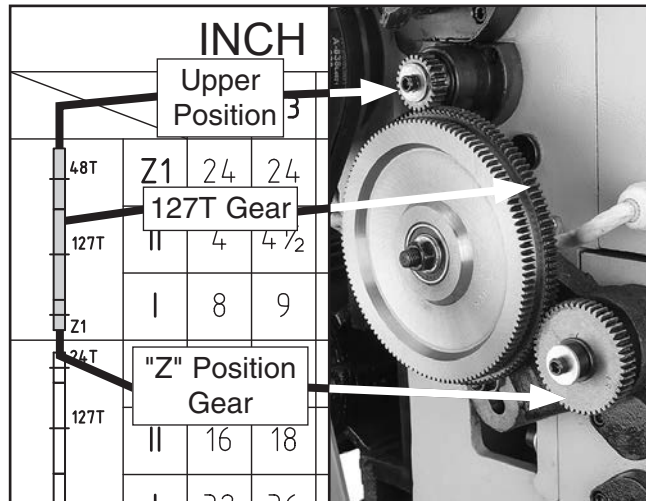


Figure 73. Inch feed chart change gears.

Metric Threading Configuration

Install either a 24T or 48T gear in the upper position and mesh it with the 127T gear. Install the appropriate gear in the "Z" position for the desired thread pitch and mesh it with the 120T gear (see **Figure 74**).

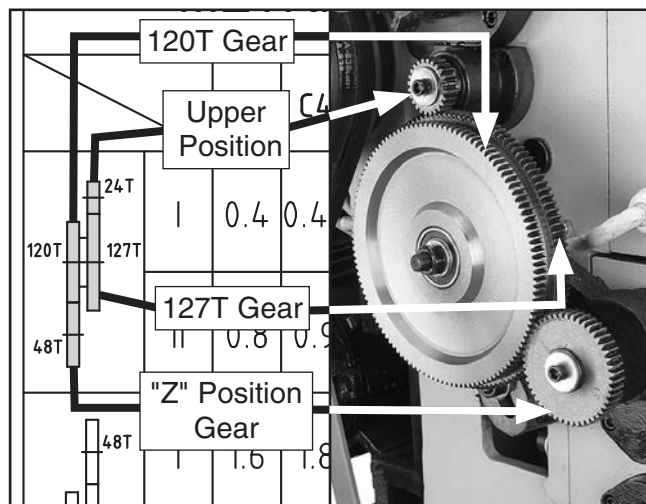


Figure 74. Metric feed chart change gears.

End Gear Configuration Example

Follow the example below to better understand how to configure the end gears for inch threading.

Items Needed

Qty

Hex Wrench 5mm.....	1
Open-End Wrench 16mm.....	1

To configure end gears for threading 32 TPI:

1. Locate **32 TPI** on inch thread chart, then locate **24T** upper position gear and **48T "Z"** position gear (see **Figure 75**), which correspond to 32 TPI. Gather **24T** and **48T** gears.

	Z1	I	8	9	19	10
24T Gear	24T	Z2	48	48	38	48
	127T	II	16	18	19	20
	Z2		32	36	38	40

Labels in image: 48T "Z" Gear, 32 TPI

Figure 75. Locating change gears for 32 TPI.

2. DISCONNECT LATHE FROM POWER!
3. Remove headstock end gear cover.
4. While holding **120T/127T** gears, loosen arm support hex nut (see **Figure 76**) and slowly let gears pivot down and away from upper position gear.

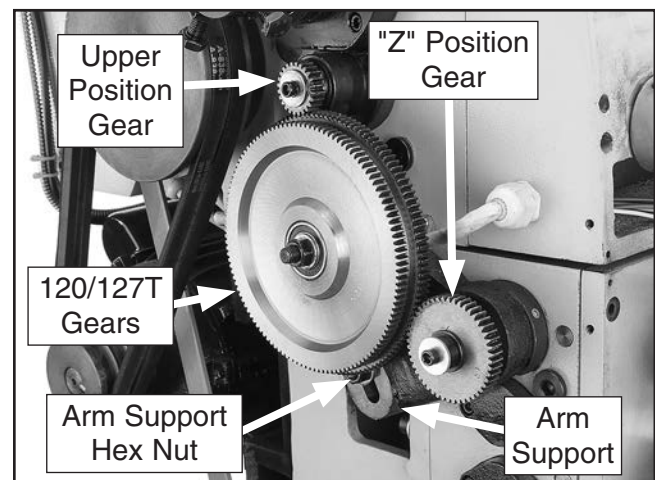


Figure 76. Arm support and end gears.



- Loosen **120T/127T** gear support hex nut and slide the middle gear away from the lower "Z" position gear, as shown in **Figure 77**.

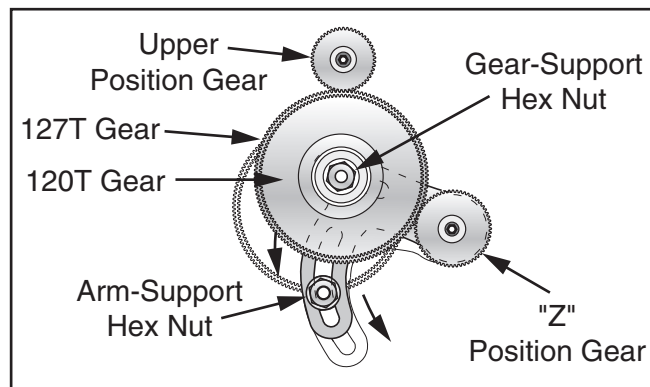


Figure 77. End gear placement.

- Remove cap screw and flat washer from upper position and "Z" position gears, then slide gears off of shafts.
- Slide **24T** gear onto upper position shaft and **48T** gear onto "Z" position shaft, making sure to align keys and keyways.

Note: Position flat, non-stepped face of gears away from the headstock so they will mesh with the 127T gear in **Step 11**.

- Secure **24T** and **48T** gears with flat washers and cap screws removed earlier.

- Slide **127T** gear against lower **48T** gear (see **Figure 78**) until they mesh with 0.002" to 0.004" backlash, then tighten gear support hex nut.

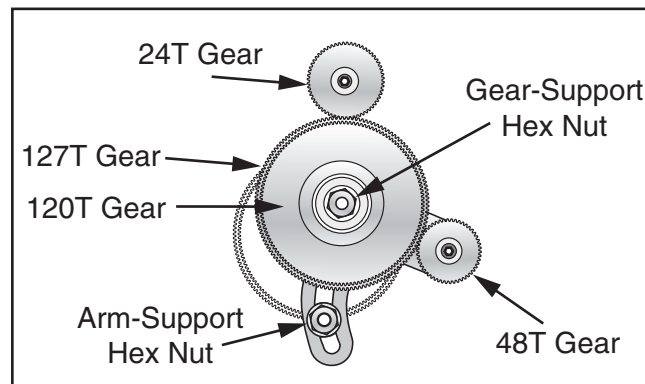


Figure 78. 60T & 54T gears installed.

- Rotate **127T** gear up against **24T** gear until they mesh with 0.002" to 0.004" backlash.
- Tighten arm support hex nut.
- Re-install the end gear cover.



Threading

The following subsections will describe how to use the threading controls and charts 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 32 TPI:

1. DISCONNECT MACHINE FROM POWER!
2. Locate **32 TPI** and **A2** in chart below.

		INCH THREADS									
		A2	A3	C3	A4	C3	C3	C3	A5	B4	
A & 2 Dials	48T	71	24	24	38	24	22	24	26	24	24
	127T	II	4	4½	9½	5	5½	6	6½	7	7½
Gears	I	8	9	19	10	11	12	13	14	15	
	24T	ZZ	48	48	38	48	44	48	52	48	48
Sub Row "I"	127T	II	16	18	19	20	22	24	26	28	30
	I	32	36	38	40	44	48	52	56	60	

Figure 79. 32 TPI and corresponding dial positions.

3. As shown in chart, install 24T and 48T gears, as instructed in **End Gear Configuration Example** on **Page 53**.
4. Move quick-change gearbox dials to positions **A2MI**, as shown in **Figure 80**.

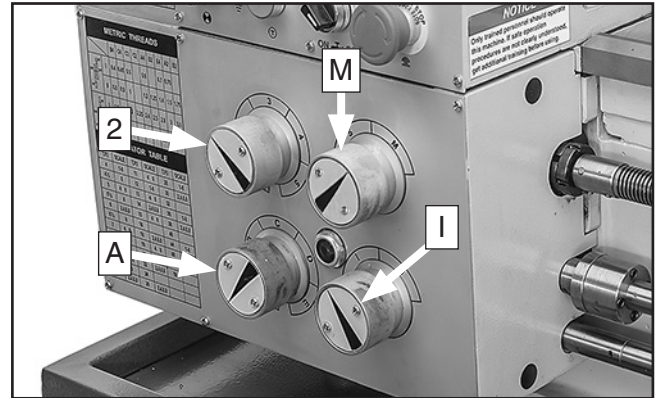


Figure 80. Gearbox dial settings for 32 TPI.

—"A2" indicates that the dial marked **A-E** must be set to the "A" position, and the dial marked **1-5** must be set to the "2" position.

—For threading operations, the dial marked **S/M** must be set to the "M" position.

—The sub-row "I" indicates the dial marked **I-II** must be set to the "I" position.

The lathe is now setup to cut 32 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 81**).

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

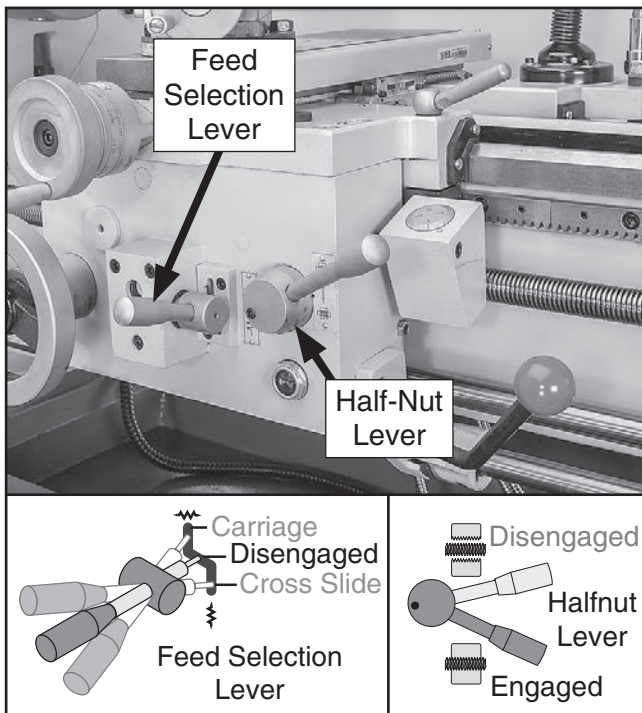


Figure 81. Apron threading controls.

Thread Dial

Items Needed	Qty
Hex Wrench 5mm.....	1

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 82**), 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 or pitch turning. You must leave the half nut engaged from the beginning until the turning is complete for this type of operation.

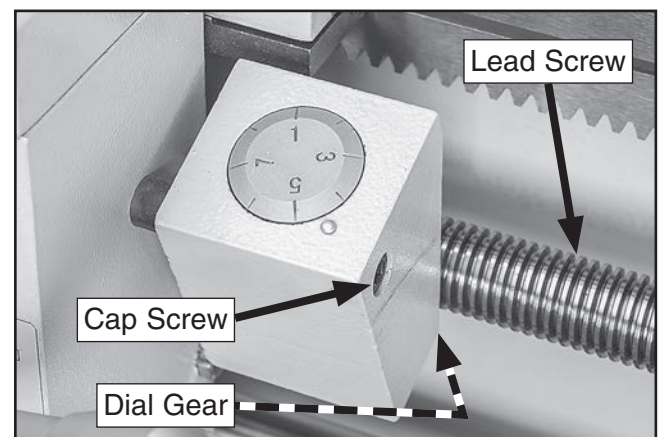


Figure 82. Thread dial engaged.

NOTICE

When threading, we recommend using slowest speed possible and avoiding deep cuts, so you are able to disengage 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 cover, as shown in **Figure 83**.

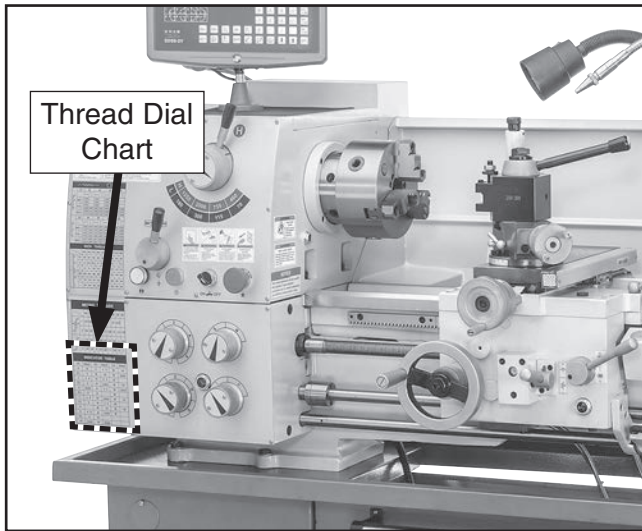


Figure 83. Thread dial chart and thread dial locations.

Find the TPI (threads per inch) that you want to cut (under **T.P.I.**, shown in **Figure 84**), then reference the dial number in the right columns (under **Scale**). The dial number indicates when to engage the half nut for a specific thread pitch as indicated by the thread dial (see **Figure 82** on **Page 56**).

INDICATOR TABLE

T.P.I.	SCALE	T.P.I.	SCALE	T.P.I.	SCALE
4	1-8	11	4 8	28	1-8
4½	8	12	1-8	30	2,4,6,8
5	4 8	13	4 8	32	
5½	8	14	2,4,6,8	36	1-8
6	2,4,6,8	15	4 8	38	2,4,6,8
6½	8	16		40	
7	4 8	18	2,4,6,8	44	1-8
7½	8	19	4 8	48	
8		20	1-8	52	1-8
9	4 8	22	2,4,6,8	56	
9½	8	24			
10	2,4,6,8	26	2,4,6,8		

Figure 84. Thread dial chart.

Note: The blanks in the chart indicate that the half nut may be engaged in any position, even in between marks. Refer to **Figures 85–89** on the following page for examples of matching the indicator table scale to the thread dial.



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

Note: You can choose to use only the number 1 to cut any thread if you do not want to use the chart, or if you forget any of the following rules.

TPI Ending in 1/2: For threading TPI ending in 1/2, use only the mark at number 8 on the thread dial (see the example in **Figure 85**).

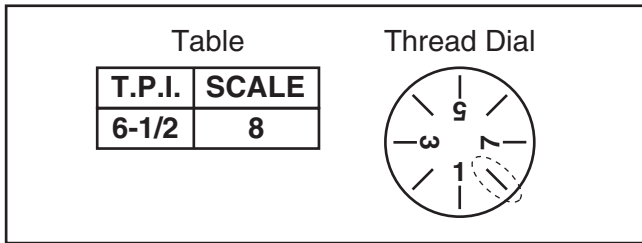


Figure 85. Example of TPI ending in 1/2.

Odd-Numbered TPI: For odd-numbered TPI, use only the marks at numbers 4 and 8 on the thread dial (see the example in **Figure 86**).

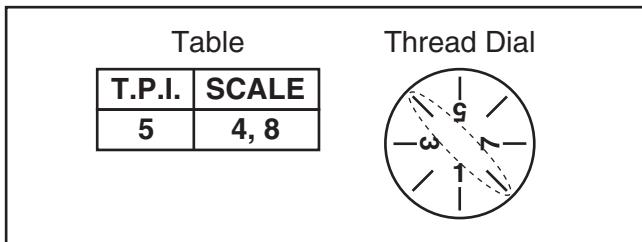


Figure 86. Example of odd numbered TPI.

TPI Divisible by 2: For threading a TPI divisible by 2, use any unnumbered line on the thread dial (see the example in **Figure 87**).

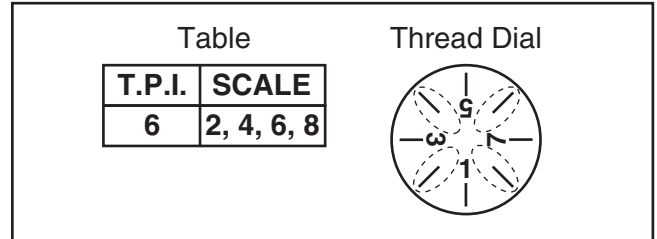


Figure 87. Thread dial positions for TPI divisible by 2.

TPI Divisible by 4: For threading a TPI divisible by 4, use any number or line on the thread dial (see the example in **Figure 88**).

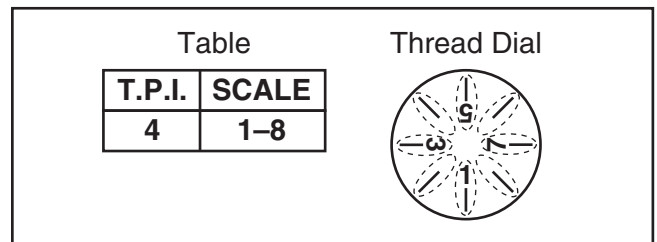


Figure 88. Any mark on dial for threading TPI divisible by 4.

TPI Divisible by 8: For threading a TPI divisible by 8, any position on the thread dial may be used, even in between the marks (see **Figure 89**).

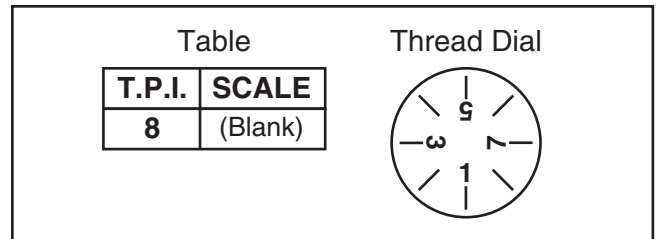


Figure 89. Any position on dial for threading TPI divisible by 8.



Coolant System

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

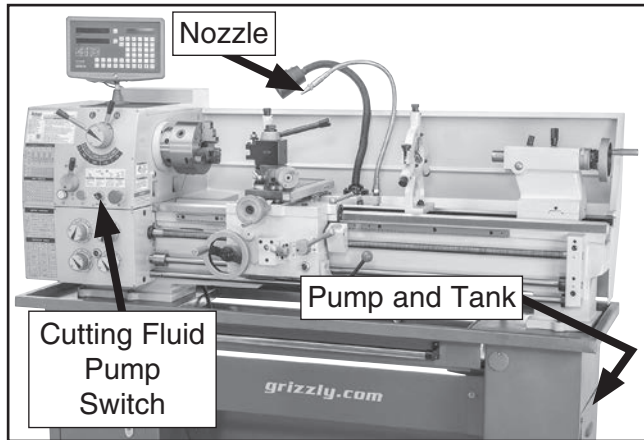



Figure 90. Cutting fluid system controls.

Always use high quality coolant and follow the manufacturer's instructions for diluting.

Refer to **Coolant System Service** on **Page 71** 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.

NOTICE

Only use water-soluble oil in coolant system. Other oil types may damage coolant pump, which will not be covered under warranty.

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

NOTICE

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

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.

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 91. ISO 68 and ISO 32 machine oil.

T23964—Armor Plate with Moly-D Multi-purpose Grease, 14.5 oz.

A rich green moly grease that provides excellent stability and unsurpassed performance under a wide range of temperatures and conditions.



Figure 92. T23964 Armor Plate.

T10295—7-Pc. Indexable Carbide Set $\frac{5}{8}$ "

This turning tool set is ideal for a wide variety of projects. Supplied with right hand and left hand turning/facing tool holders, the set is complimented with one threading and cut-off tool too. Indexable inserts ensure cutting surfaces stay sharp.

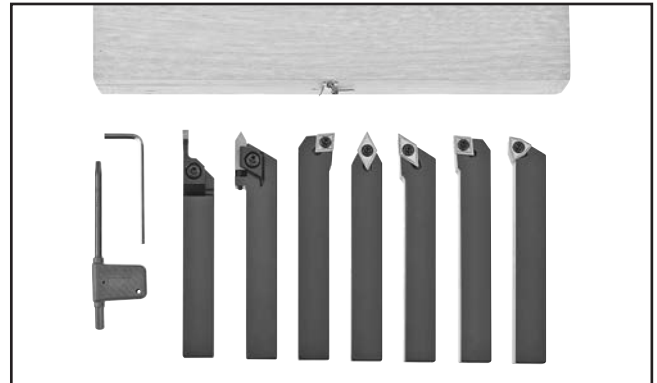


Figure 93. T10295 Indexable Carbide Set.

T27400—Tool Post Grinder

Every lathe owner should have a tool post grinder as part of their arsenal of tooling options. Grinding allows you to produce a super finish, work hardened materials, and hold extremely tight tolerances on long shafts (such as ten thousands of an inch). Mounts directly onto the tool post of your lathe. An excellent quality unit!

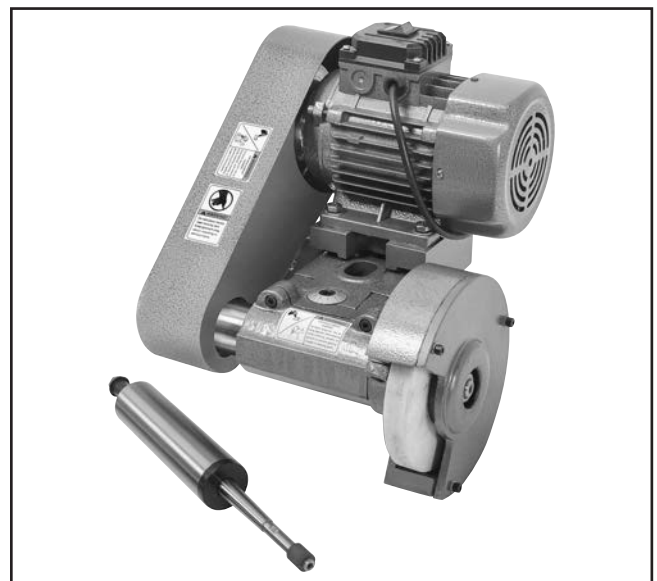


Figure 94. T27400 Tool Post Grinder.

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G4985—Machine Shop Practice-Vol. 1 - Book
G4986—Machine Shop Practice-Vol. 2 - Book
 Karl Hans Moltrecht's two-volume work on metal-working operations delivers the ultimate teaching and reference tool for basic cutting operations, layout work, lathe turning, drilling operations, taper and angle turning, and boring work. Written to aid the beginner as well as the experienced machinist or engineer. Due to their nature, books are non-returnable. Defective books will be replaced.

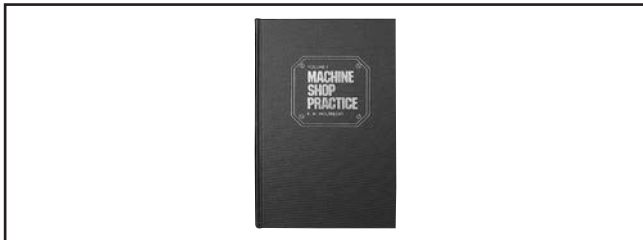


Figure 95. G4985 Machine Shop Practice Book.

H8396—Chambering a Championship Match Barrel DVD

Follow master gunsmith, Gordy Gritters, as he gives step-by-step instructions in the highly precise area of chambering a rifle barrel worthy of championship match shooting. Gordy Gritters is a Benchrest Gunsmith who specializes in building 1000 yard rifles. He has built several rifles that hold world records and have won National Championships. He is extremely meticulous and gives up many of his "secrets" on this video!

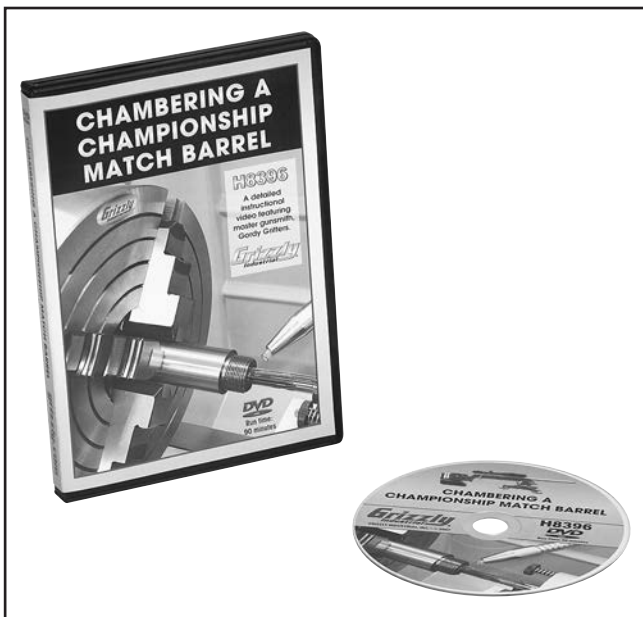


Figure 96. H8396 Chambering a Championship Match Barrel DVD.

G1070—MT3 Live Center Set

This live center set offers seven interchangeable tips. High-quality needle bearings prolong tool life and special tool steel body and tips are precision ground. Supplied in wooden box.



Figure 97. G1070 Live Center Set.

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 $\frac{1}{4}$ "~ $\frac{5}{8}$ "

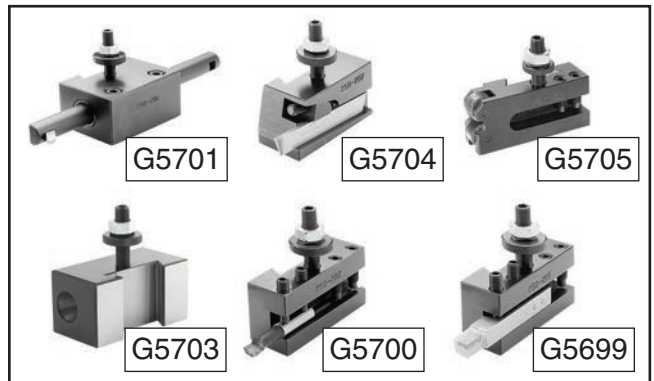


Figure 98. Quick change tool holders.

G7038Z—Boring Bar

G7040—Carbide Inserts for Steel (5 pk)

G7048—Carbide Inserts for Cast Iron (5 pk)

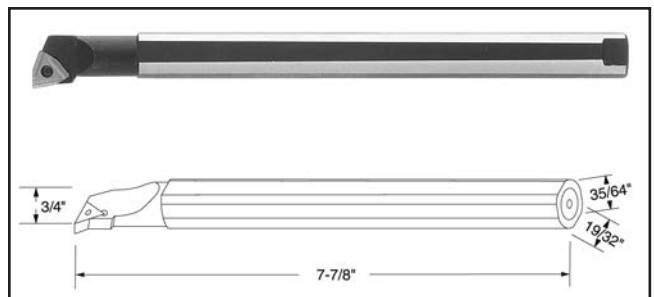


Figure 99. G7038Z Boring Bar.

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- T20501—Face Shield Crown Protector 4"
- T20502—Face Shield Crown Protector 7"
- T20503—Face Shield Window
- T20452—"Kirova" Anti-Reflective S. Glasses
- T20451—"Kirova" Clear Safety Glasses
- T20456—"Dakura" Safety Glasses Clear



Figure 100. Eye protection assortment.

- G7033—Internal Threading Tool Holder
- G7042—Carbide Inserts for Steel (5 pk)

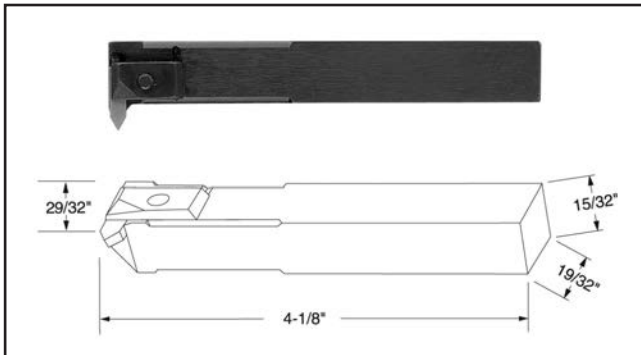


Figure 101. G7033 Internal Threading Tool Holder.

- G7030—Threading Tool Holder
- G7041—Carbide Inserts for Steel (5 pk)
- G7049—Carbide Inserts for Cast Iron (5 pk)

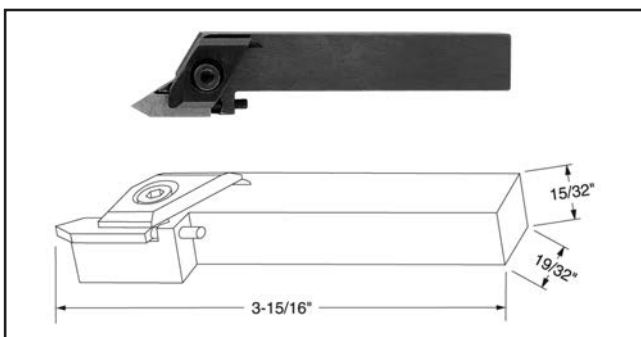


Figure 102. G7030 Threading Tool Holder.

- 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 Ø	DRILL Ø	OL LENGTH
1	1/8"	3/64"	1 1/4"
2	3/16"	5/64"	1 7/8"
3	1/4"	7/64"	2"
4	5/16"	1/8"	2 1/8"

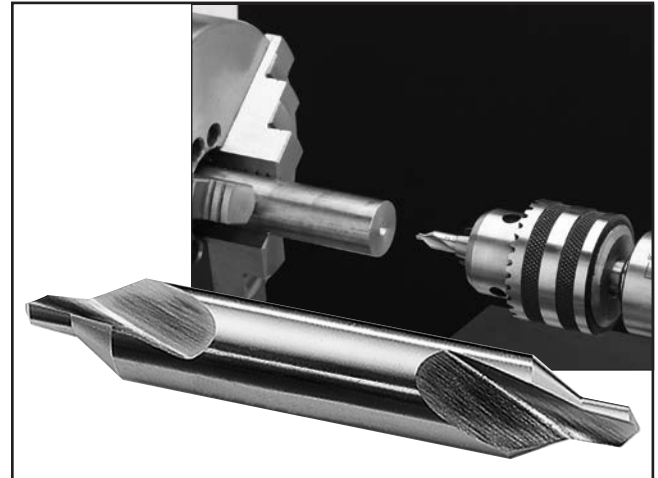


Figure 103. HSS Ground Center-Drill Sets.

- T10719—Crown Savers for .17 to .45 Caliber Barrels (10 Pk.)
- T10720—Crown Savers for .50 Caliber Barrels (3 Pk.)

With crown savers you never have to recrown the barrel when installing muzzle brakes or doing any job requiring a center in the end of the barrel crown.

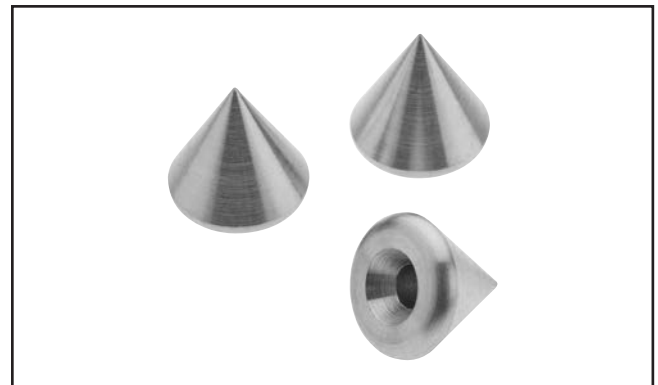


Figure 104. T10720 Crown Savers.

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- H2987—1/2" Bent Lathe Dog**
- H2988—1" Bent Lathe Dog**
- H2989—1 1/2" Bent Lathe Dog**
- H2990—2" Bent Lathe Dog**
- H2991—3" Bent Lathe Dog**

Just the thing for precision machining between centers! These bent tail lathe dogs are made of durable cast iron and feature square head bolts.



Figure 105. H2987-91 Lathe Dogs.

T10665—Adjustable Reamer Holder MT#3

Mount this Pacific Tool and Gauge Adjustable Reamer Holder in your lathe tailstock, secure a barrel chambering reamer in the holder for free floating reamer movement. A knurled wheel adjustment controls the amount of tension, which also limits free-floating movement.

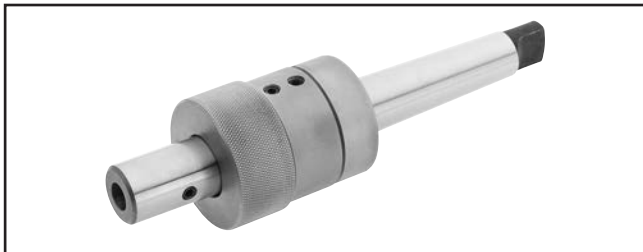


Figure 106. PTG reamer holder MT#3.

T10667—Bald Eagle Reamer Holder MT#3

Holder is designed to allow free movement of a floating reamer in 3 directions: vertical, horizontal and angular, as required for proper performance of any floating reamer.



Figure 107. Bald Eagle reamer holder MT#3.

T10459—5-C Quick-Change Collet Chuck

Mount this 5-C Quick Change Collet Chuck accepts all 5-C collets. T-handle chuck key ensures uniform holding power and quick collet changes.

G1238—15 pc. Precision 5-C Collet Set

Made from high grade collet steel and precision ground to exacting tolerances. Complete 15 pc. set. Includes: 1/8" thru 1" in 1/16" increments.



Figure 108. 5-C quick-change collet chuck and 15 pc. 5-C collet set.

G9788—4-Pc. Measuring Tool Set

This is the set you need for accurate measurements. Includes a stainless steel 6" dial caliper, a 6" scale with inch scale on one side and a metric scale on the other, a 1" carbide tipped micrometer with vernier scale and a 4" precision square with beveled edge. Comes with molded case and micrometer adjustment wrench.



Figure 109. 4-Pc. Measuring Tool Set.

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H6202— $\frac{1}{32}$ "- $\frac{1}{2}$ " x JT3 Precision Drill Chuck
G1677—Drill Chuck Arbor MT3/JT3
H8261— $\frac{1}{32}$ "- $\frac{1}{2}$ " x MT3 #3 Keyless Drill Chuck



Figure 110. Accessory drill chucks and arbor.

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 111. G9849 Magnetic base/dial indicator combo.

H7617—**Oil Can w/Flex Nozzle**
 This high-pressure oil can is perfect for lubricating the ball oilers found on your machine. Holds 5 ounces of oil.



Figure 112. High-pressure oil can for ball oilers.

H8185—**Indexable Boring Bar 4-Pc. Set**
 This precision-made Indexable Boring Bar Set features 80° diamond CCMT inserts with negative 5° end- and side-cutting angles. The set includes a fitted wooden box, two Torx® wrenches and 3/8" x 6", 1/2" x 7", 5/8" x 8", and 3/4" x 10" boring bars. Replacement inserts: H8332 (large) and T20669 (small).



Figure 113. H8185 indexable boring bar set.

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SECTION 6: MAINTENANCE



Schedule

For optimum performance from this machine, this maintenance schedule must be strictly followed.

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 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 headstock oil (**Page 66**).
- Check/add gearbox oil (**Page 67**).
- Check/add apron oil (**Page 68**).
- Lubricate the bedways (**Page 70**).
- Add oil to the ball oilers (**Page 68**).
- Clean/lubricate the leadscrew (**Page 70**).
- Disengage the feed lever and feed selection lever on the apron (to prevent crashes upon startup).
- Ensure carriage lock handle is loose.
- Check/add coolant (**Page 59**).

Daily, After Operations

- Press the EMERGENCY STOP 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.

Every 50 Hours

- Lubricate end gears (**Page 69**).

Every 1000 Operating Hours

- Change the headstock oil (**Page 66**).
- Change the gearbox oil (**Page 67**).
- Change the apron oil (**Page 68**).

Annually

- 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 a quality ISO 68 way oil (see **Page 60** for offerings from Grizzly) to prevent corrosion.



Lubrication

Use the information in the charts below as a daily guide for lubrication tasks. We recommend using Grizzly T23962 (ISO 68) or T23963 (ISO 32) lubricants (see **Accessories, Page 60**) for most of the lubrication tasks.

Lubrication Frequency

Lubrication Task	Frequency	Page Ref.
Headstock	Daily	63
Quick-Change Gearbox	Daily	67
Apron	Daily	68
Bedways	Daily	70
Longitudinal Leadscrew	Daily	70
Ball Oilers	Daily	68
End Gears	Every 1000 Hours	69

Lubrication Amount & Type

Lubrication Task	Oil Type	Amount
Headstock	ISO 32	2.3 Qt.
Quick-Change Gearbox	ISO 68	0.68 Qt.
Apron	ISO 68	0.23 Qt.
Bedways	ISO 68	As Needed
Longitudinal Leadscrew	ISO 68	As Needed
Ball Oilers	ISO 32	1-2 Squirts
End Gears	NLGI #2	Dab

Items Needed	Qty
Hex Wrench 6mm.....	1
Open-End Wrench 13mm.....	1
Open-End Wrench 14mm.....	1
Open-End Wrench 24mm.....	1
2-Gallon Catch Pan.....	1
Pump-Type Oil Can w/Plastic Cone Tip.....	1

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..... 2.3 Quarts
 Check/Add Frequency..... Daily
 Change..... Every 1000 Operating Hours

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 300 hours of use, then every 1000 hours.

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 on the right side of the headstock, as shown in **Figure 114**.



Figure 114. Location of headstock oil sight glass.



Adding Oil

The oil fill plug is located on top of the headstock, as shown in **Figure 115**.

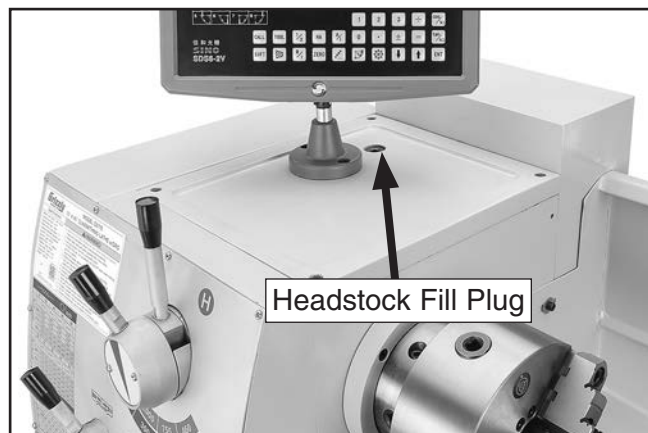


Figure 115. Location of headstock fill plug.

To change headstock oil:

1. DISCONNECT MACHINE FROM POWER!
2. Open end gear cover.
3. Remove V-belts so that oil does not get on them, necessitating their replacement (refer to **Replacing V-Belts** on **Page 83** for detailed instructions).
4. Remove fill plug from top of headstock.
5. Place catch pan under headstock drain plug (see **Figure 116**), then remove drain plug with 6mm hex wrench.

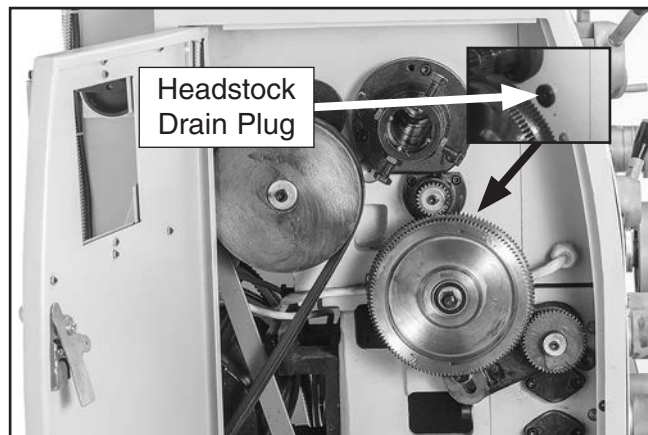


Figure 116. Location of headstock drain plug.

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 the V-belts (refer to **Replacing V-Belts** on **Page 83**), then close end gear cover before re-connecting lathe to power.

Quick-Change Gearbox

Oil Type.... Grizzly T23962 or ISO 68 Equivalent
Oil Amount..... 0.68 Quarts
Check/Add Frequency..... Daily
Change..... Every 1000 Operating Hours

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 below the end gears, as shown in **Figure 117**.

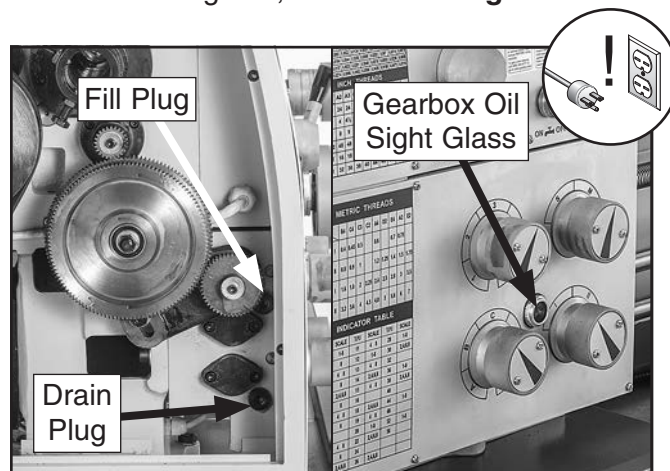


Figure 117. Location of quick-change oil sight glass fill and drain plugs.

Changing Oil

Change the quick-change gearbox oil after the first 300 hours of use, then after every 1000 hours of use. Place a catch pan under the quick-change gearbox drain plug (see **Figure 117**). Use a 6mm hex wrench to remove the gearbox fill plug (see **Figure 117**), then remove the drain plug with a 6mm hex wrench 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..... 0.23 Quarts
Check/Add Frequency..... Daily
Change Every 1000 Operating Hours

Checking Oil Level

The apron oil sight glass is on the front of the apron, as shown in **Figure 118**. Maintain the oil volume so that the level is approximately halfway in the sight glass.

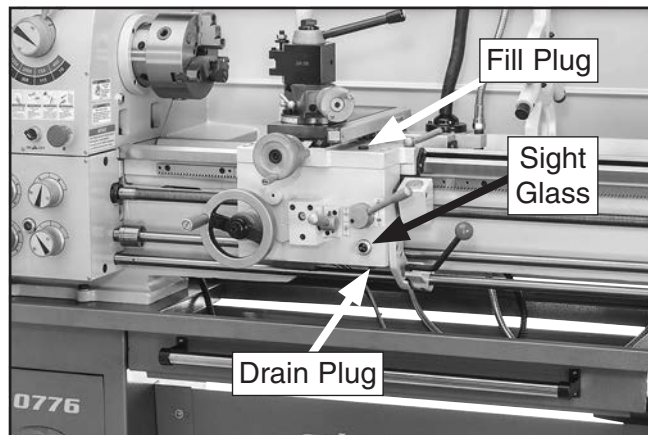


Figure 118. Location of apron oil sight glass.

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 after the first 300 hours, then after every 1000 hours.

Place a catch pan under the apron drain plug shown in **Figure 118**, then use a 24mm open-end wrench to remove the fill plug and drain plug, then empty the reservoir.

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.

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 119–124** 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. See **Accessories** for a recommended oil can on **Page 64**.

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
- C. Saddle Slides
- D. Carriage handwheel
- E. Cross slide handwheel
- F. Tailstock ball oilers
- G. Change Gear Hub
- H. Leadscrew end bearings

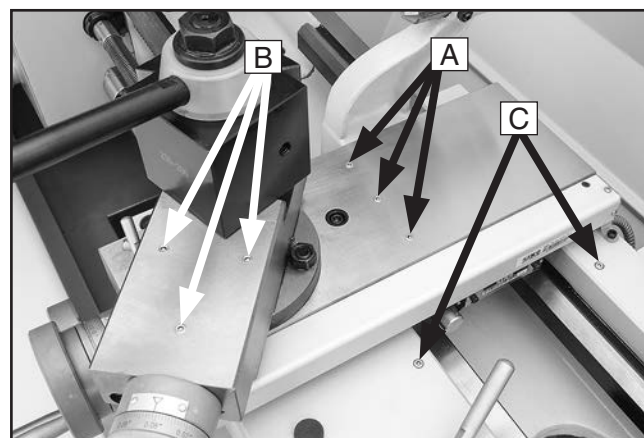


Figure 119. Saddle and slide ball oiler locations.



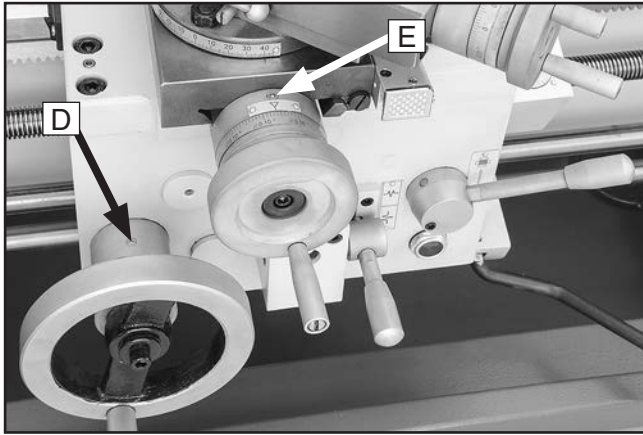


Figure 120. Handwheel ball oiler locations.

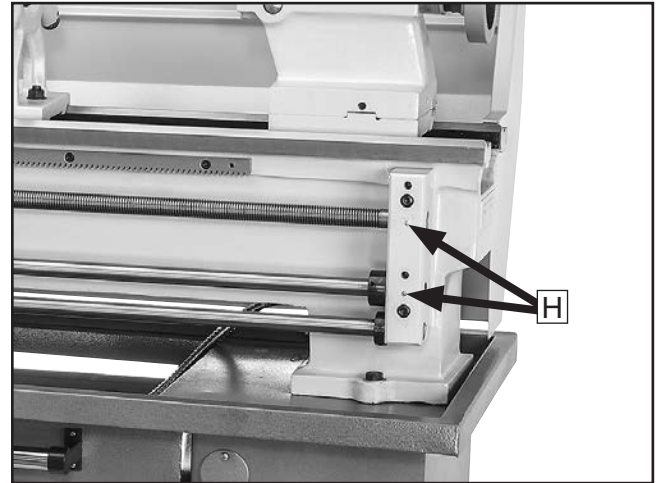


Figure 123. End cap ball oiler locations.

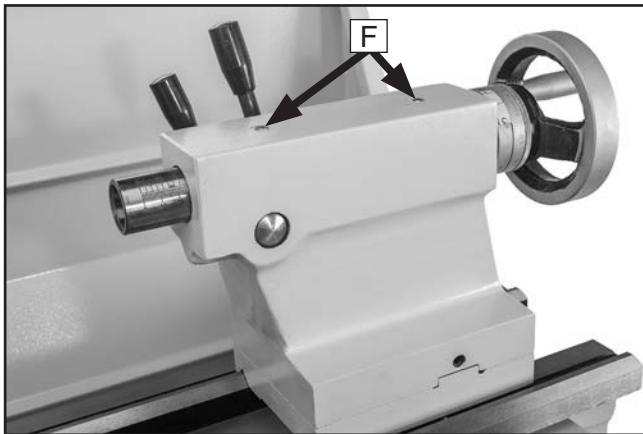


Figure 121. Tailstock ball oiler locations.

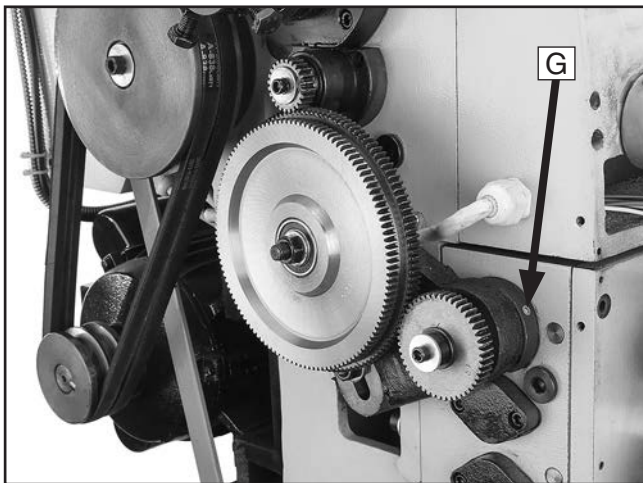


Figure 122. Change gear hub ball oiler location.

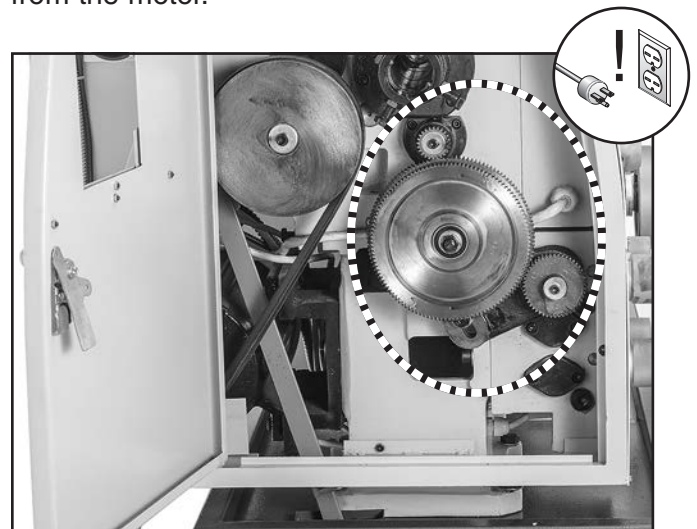


Figure 124. End gears.

End Gears

Grease Type..... T23964 or NLGI#2 Equivalent
 Lubrication..... Every 50 Operating Hours

The end gears, shown in **Figure 124**, 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.

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 closed whenever possible to keep the gears free of dust or debris from the outside environment.



Lubricating

1. DISCONNECT MACHINE FROM POWER!
2. Open end gear cover and remove all end gears shown in **Figure 124**.
3. Clean end gears thoroughly with mineral spirits to remove the 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 recoat any areas scraped off during installation.
7. Close end gear cover before reconnecting lathe to power.

Bedways

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

Before lubricating the bedways (see **Figure 125**), 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.

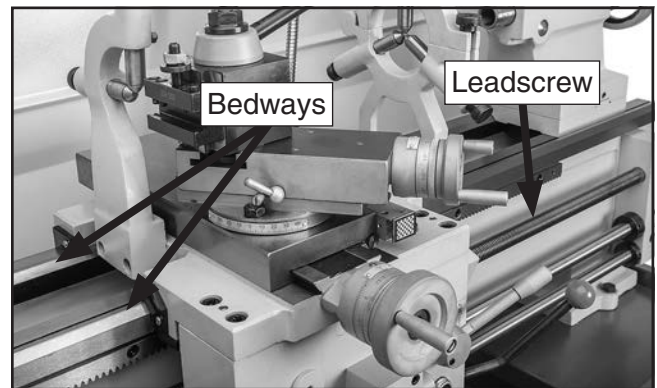


Figure 125. Bedways.

Longitudinal Leadscrew

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

Before lubricating the leadscrew (see **Figure 125**), 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.*



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 back into the tank through the chip drawer where the swarf and metal chips are screened out. The chip drawer slides open and is removable for cleaning.

Use **Figures 126–127** to identify the locations of the coolant system controls and components.

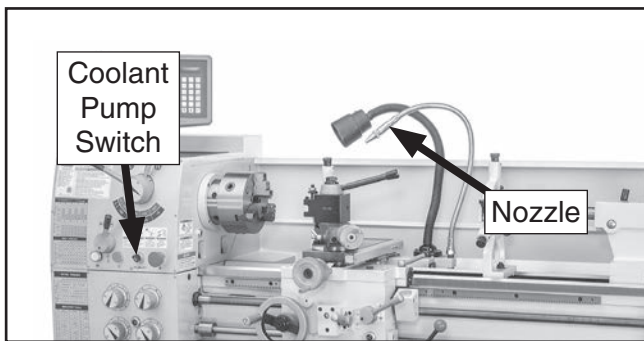


Figure 126. Coolant controls.

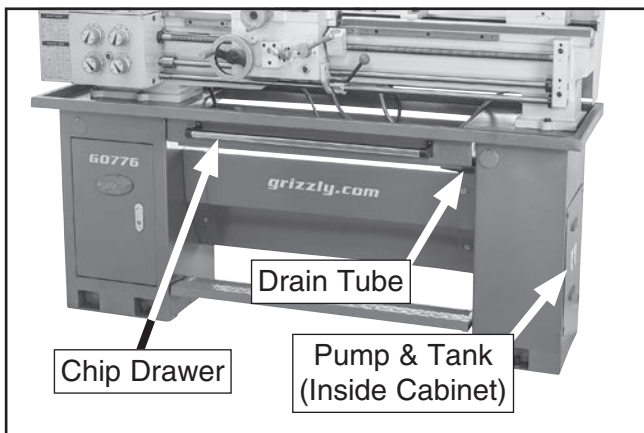



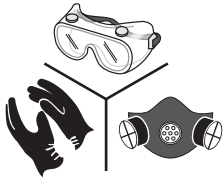
Figure 127. Additional coolant components.

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 a couple inches from the bottom of the tank. This works well when the tank is regularly cleaned; however, if too much sludge is allowed to accumulate before the tank is cleaned, 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.

The important thing to keep in mind when working with the coolant is to 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 the correct personal protection equipment when handling coolant. Follow federal, state, and fluid manufacturer requirements for proper disposal.

! CAUTION

The chip drawer is very heavy. Unless removing the chip drawer for cleaning, do not pull it out more than halfway to prevent it falling and causing impact injuries. If removing the drawer for cleaning, get assistance!



Adding Coolant

Items Needed	Qty
Safety Wear.....	See Hazards on Page 71
New Coolant.....	7.4 Quarts
Slotted Screwdriver #2	1
Disposable Shop Rags.....	As Needed

To add coolant:

1. DISCONNECT MACHINE FROM POWER!
2. Remove access cover from side of right stand, then slide tank out, as shown in **Figure 128**.

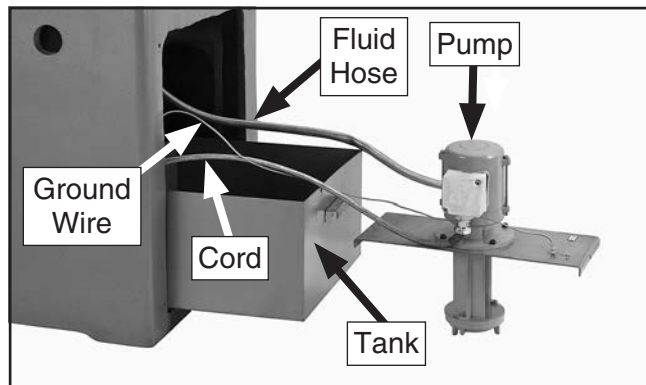


Figure 128. Typical coolant tank and pump.

3. Pour coolant into tank until it is approximately 1" from top.
4. Slide tank back into cabinet and replace access cover.

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 ½ 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.

NOTICE

Only use water-soluble oil in coolant system. Other oil types may damage coolant pump, which will not be covered under warranty.

Items Needed

Items Needed	Qty
Safety Wear.....	See Hazards on Page 71
New Coolant.....	7.4 Quarts
Empty 2-Gallon Buckets w/Lids	2
Slotted Screwdriver #2	1
Disposable Shop Rags.....	As Needed
Magnets (Optional)	As Many As Desired

To change coolant:

1. Position coolant nozzle over back of back splash so that it is pointing behind lathe.
2. Place 2-gallon bucket behind lathe and under coolant nozzle. Have another person hold bucket up to nozzle to prevent coolant from splashing out.
3. Turn coolant pump **ON** and 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. Remove access cover from side of right stand, then slide tank out.

Note: *The fluid hose, pump cord, and ground wire (see **Figure 128**) were left long so the tank can be removed and emptied without disconnection from the tank. However, the drain tube (see **Figure 127** on **Page 71**) may come out of the tank when you empty it.*

6. 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.



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 the lathe and bring all reservoirs to operating temperature, then drain and refill them with clean oil.
2. Pump out the old coolant, then add a few drops of way oil and blow out the 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 the machine as outlined in the lubrication section. Be sure to use an oil can to purge all ball oilers and oil passages with fresh oil.
6. Loosen or remove the V-belts so they do not become stretched during the storage period. (Be sure to place a maintenance note near the power button as a reminder that the belts have been loosened or removed.)

7. Place a few moisture absorbing desiccant packs inside of the electrical box.
8. Cover the 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 the bearings, bushings, gears, and shafts well lubricated and protected from corrosion—especially during the winter months.
10. Slide the carriage, tailstock, and steady rest down the lathe bed to make sure that way spotting is not beginning to occur.

Bringing Lathe Out of Storage

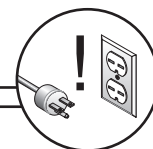
1. Re-install the V-belts and re-tension them (refer to **Page 83**) if you removed them for storage purposes.
2. Remove the moisture-absorbing desiccant packs from the electrical box.
3. Repeat the **Test Run** and **Spindle Break-In** procedures, beginning on **Page 28**.
4. Add coolant, as described in **Coolant System Service** on **Page 71**.



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.	<ol style="list-style-type: none"> Emergency stop button depressed/at fault. Main power switch OFF or at fault. OFF button not reset. Plug/receptacle at fault/wired wrong. Incorrect power supply voltage/circuit size. Power supply circuit breaker tripped or fuse blown. Motor wires connected incorrectly. Wiring open/has high resistance. Start capacitor at fault. Spindle rotation switch at fault. Motor at fault. 	<ol style="list-style-type: none"> Rotate button head to reset. Replace. Turn main power switch ON or replace if at fault. Press OFF button completely until it clicks. Test for good contacts; correct the wiring. Ensure correct power supply voltage/circuit size. Ensure circuit is sized correctly and free of shorts. Reset circuit breaker or replace fuse. Correct motor wiring connections. Check/fix broken, disconnected, or corroded wires. Test/replace. 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. Wrong workpiece material. Belt(s) slipping. Motor wired incorrectly. Plug/receptacle at fault. Gearbox at fault. Motor overheated. Run capacitor at fault. Pulley/sprocket slipping on shaft. 	<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 correct type/size of metal. Tension/replace belt(s) (Page 83); ensure pulleys are aligned. Wire motor correctly. Test for good contacts/correct wiring. Select appropriate gear ratio; replace broken or slipping gears. Clean motor, let cool, and reduce workload. Test/repair/replace. Replace loose pulley/shaft.
Machine has vibration or noisy operation.	<ol style="list-style-type: none"> Motor or component loose. V-belt(s) worn, loose, or misaligned. Bit chattering. Pulley loose. Motor mount loose/broken. Motor fan rubbing on fan cover. Machine incorrectly mounted. Workpiece or chuck at fault. Motor bearings at fault. 	<ol style="list-style-type: none"> Inspect/replace damaged bolts/nuts, and retighten with thread-locking fluid. Inspect/replace belts with a new matched set (Page 83); re-align pulleys if necessary. Replace/sharpen bit; index bit to workpiece; use correct feed rate and cutting RPM; retract tool holder and position workpiece closer. Re-align/replace shaft, pulley set screw, and key. Tighten/replace. Fix/replace fan cover; replace loose/damaged fan. Tighten mounting bolts; relocate/shim machine. Center workpiece; replace defective chuck. Test by rotating shaft; rotational grinding/loose shaft requires bearing replacement.



Operations

Symptom	Possible Cause	Possible Solution
Entire machine vibrates upon startup and while running.	<ol style="list-style-type: none"> 1. Workpiece is unbalanced. 2. Loose or damaged V-belt(s). 3. V-belt pulleys are not properly aligned. 4. Worn or broken gear present. 5. Chuck or faceplate is unbalanced. 6. Gears not aligned in headstock or no backlash. 7. Broken gear or bad bearing. 8. Workpiece is hitting stationary object. 9. Spindle bearings at fault. 	<ol style="list-style-type: none"> 1. Re-install workpiece as centered with the spindle bore as possible. 2. Re-tension/replace the V-belt(s) as necessary (Page 83). 3. Align the V-belt pulleys. 4. Inspect gears, and replace if necessary. 5. Re-balance chuck or faceplate; contact a local machine shop for help. 6. Adjust change gears and establish backlash (Page 53). 7. Replace broken gear or bearing. 8. Stop lathe immediately and correct interference problem. 9. Reset spindle bearing preload (Page 84) or replace worn spindle bearings.
Bad surface finish.	<ol style="list-style-type: none"> 1. Spindle speed or feed rate is wrong. 2. Dull tooling or wrong tool selection. 3. Tool height is not at spindle centerline. 4. Too much play in gibs. 5. Spindle bearings are bad. 6. Bearing preload needs to be adjusted. 7. Belts are bad. 8. Workpiece is flexing. 	<ol style="list-style-type: none"> 1. Adjust for appropriate spindle speed (Page 48) and feed rate (Page 51). 2. Sharpen tooling or select a better tool for intended operation. 3. Adjust tool holder so tool is even with spindle centerline (Page 46). 4. Tighten gibs (Page 78). 5. Change spindle bearings. 6. Adjust bearing preload (Page 84). 7. Replace belts (Page 83). 8. Change setup to properly support workpiece.
Tapered tool difficult to remove from tailstock quill.	<ol style="list-style-type: none"> 1. Quill is not retracted all the way back into tailstock. 2. Tool has spun inside of bore and seized. 3. Debris not removed from tool taper before inserting into quill. 	<ol style="list-style-type: none"> 1. Turn 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. 3. 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 is loose or too much backlash. 3. Leadscrew mechanism is worn or out of adjustment. 	<ol style="list-style-type: none"> 1. Adjust gibs (Page 78). 2. Tighten handwheel fasteners or adjust handwheel backlash to a minimum (Page 77). 3. Adjust leadscrew to remove end play.
Cross slide, compound, or carriage handwheels hard to move.	<ol style="list-style-type: none"> 1. Ways are loaded with shavings, dust, or grime. 2. Gibs are too tight. 3. Backlash setting is too tight. 4. Bedways are dry and in need of lubricant. 	<ol style="list-style-type: none"> 1. Remove gibs, clean ways, lubricate, and re-adjust gibs. 2. Loosen gibs slightly (Page 78), and lubricate bedways. 3. Slightly loosen backlash setting (Page 77). 4. Lubricate bedways/ball oilers (Page 70).



Operations (Cont.)

Symptom	Possible Cause	Possible Solution
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; lack of support. 3. Gibs are out of adjustment. 4. Cutting tool is dull. 5. Spindle speed or feed rate is wrong. 6. Workpiece is deflecting. 7. Workpiece is unbalanced. 	<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. Adjust gibs (Page 78). 4. Replace or resharpen cutting tool. 5. Use recommended spindle speed (Page 48) and feed rate (Page 51). 6. Change chucking length or diameter. Use support on tailstock end. 7. Balance workpiece.
Workpiece is tapered.	<ol style="list-style-type: none"> 1. Spindle and tailstock are not properly aligned with each other. 2. Lathe bed is twisted. 	<ol style="list-style-type: none"> 1. Re-align the tailstock to spindle centerline (Page 39). 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 is in jaw slot of chuck body. 	<ol style="list-style-type: none"> 1. Remove jaws, clean and lubricate scroll plate, then replace 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/adjust belts (Page 83).
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 gear falls into place.
Workpiece slips in chuck.	<ol style="list-style-type: none"> 1. Chuck jaws do not match workpiece diameter. 2. Cutting force is too high. 3. Speed is too high. 4. Jaws are worn. 	<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. 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. Screw is loose on feed handle. 4. Carriage lock is tightened down. 5. Chips have loaded up on ways. 6. Ways are dry and in need of lubrication. 7. Gibs are too tight. 8. Gears or shear pin is broken. 9. Feed clutch is slipping. 	<ol style="list-style-type: none"> 1. Engage gears using gear dials. 2. Disengage half-nut lever. 3. Tighten. 4. Check to make sure carriage lock is fully released. 5. Frequently clean away chips that load up during turning operations. 6. Lubricate bedways/ball oilers. 7. Loosen gib screw(s) slightly (Page 78). 8. Replace gears or shear pin (Page 80). 9. Increase clutch spring pressure (Page 82).



Adjusting Backlash

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 the 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.

Items Needed	Qty
Hex Wrenches 2, 5mm.....	1 Ea.

To adjust cross slide backlash:

1. Feed cross slide toward back of machine until it reaches end of its travel.
2. Remove backslash to access leadscrew nut.

3. Tighten backlash adjustment set screws shown in **Figure 129** in small increments.

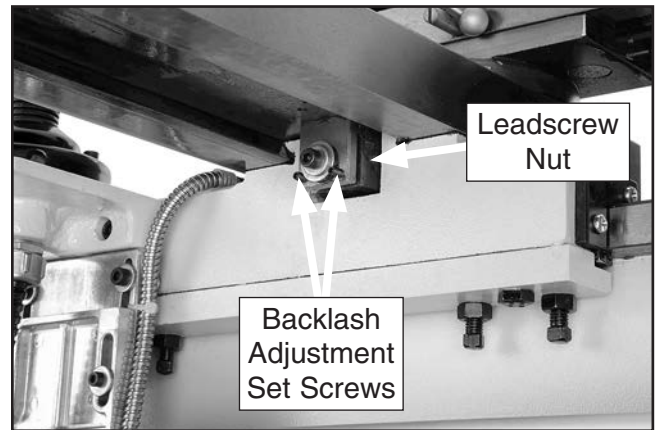


Figure 129. Leadscrew nut (viewed from back of machine).

4. Test after each adjustment by rotating handwheel back-and-forth until backlash amount is acceptable.
5. Re-install backslash.



Adjusting Gib

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 dovetailed-ways. Gib screws at each end move 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 devices so the gibs can slide freely during adjustment, then lubricate the ways.

The gib adjustment process usually requires some trial-and-error. Repeat the 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 Gib

Make sure the ways and leadscrew have been cleaned and re-lubricated before beginning any adjustments. Refer to **Ball Oiler Lubrication** on **Page 68** for instructions and lubricant specifications.

Items Needed	Qty
Standard Screwdriver #2.....	1

To adjust cross slide gib:

1. DISCONNECT MACHINE FROM POWER!
2. Loosen gib screws (see **Figure 130**) and adjust as required.

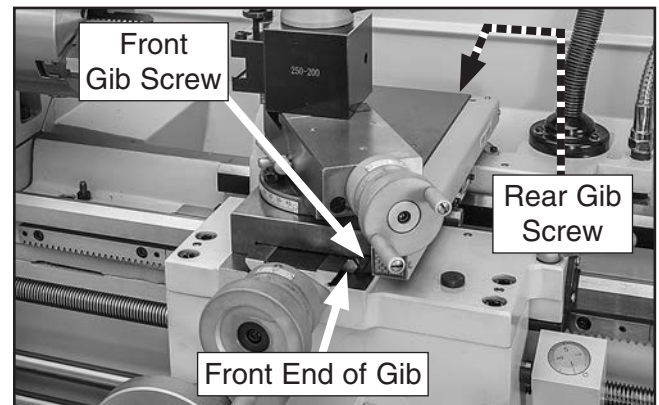


Figure 130. Cross slide gib components.

—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.

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



Compound Slide Gib

Figure 131 shows the gib arrangement for 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.

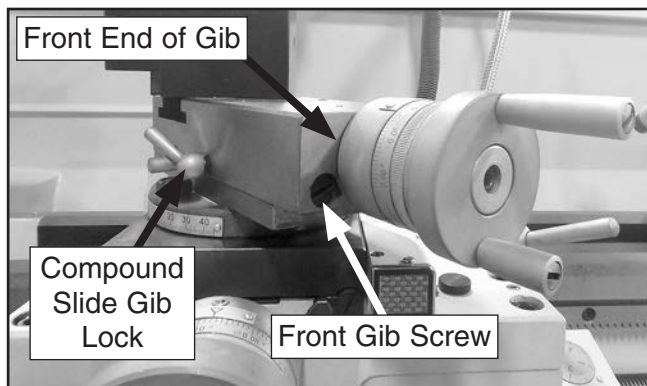


Figure 131. Compound slide gib components.

Saddle Gib

The saddle is supplied with a carriage lock on the front right-hand side of the slide (see **Figure 132**). This lock secures the saddle 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 the carriage lock more than a couple of turns or the components inside will come apart. Re-installing these components is difficult and time consuming.*

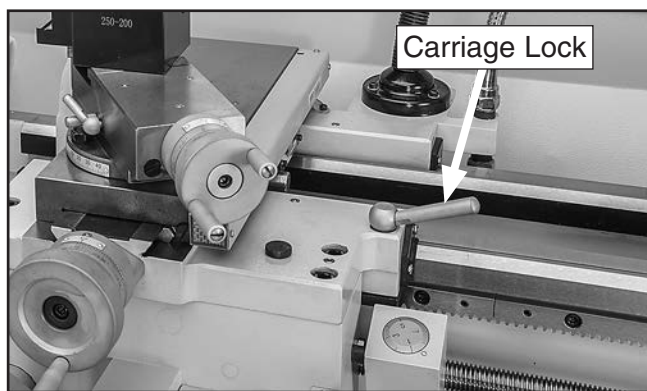


Figure 132. Location of carriage lock.

The saddle gib is located on the bottom of the back edge of the slide (**Figure 133**). 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.

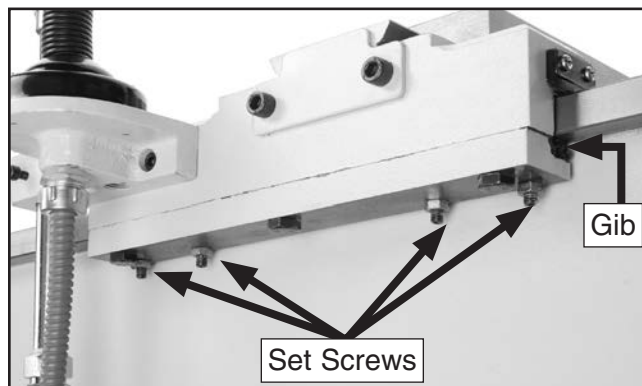


Figure 133. Typical saddle gib components.

Items Needed	Qty
Open-End Wrench 8mm.....	1
Open-End Wrench 13mm.....	1

To adjust saddle slide gib:

1. DISCONNECT MACHINE FROM POWER!
2. Clean and lubricate lathe ways, slide, and leadscrew (refer to **Ball Oiler Lubrication** on **Page 68** for instructions and lubricant specifications).
3. If carriage lock (**Figure 87**) is tight, loosen it two turns.
4. Loosen jam nuts on four set screws shown in **Figure 133**, and adjust set screws as follows:
 - To tighten the carriage gib, tighten the set screws.
 - To loosen the gib, loosen the set screws.
5. Repeat adjustments as necessary until carriage adjustment is acceptable.
6. Hold set screws in place and tighten jam nuts.



Adjusting Half Nut

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.

Items Needed	Qty
Hex Wrenches 3, 5mm.....	1 Each
Open-End Wrench 10mm.....	1

To adjust half nut:

1. DISCONNECT MACHINE FROM POWER!
2. Open half nut and remove thread dial.
3. Loosen hex nuts on set screws shown in **Figure 134**.

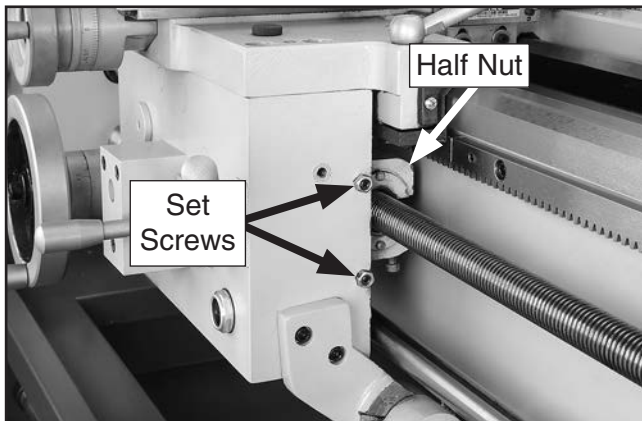


Figure 134. Typical half nut gib set screws.

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.

Replacing Shear Pin

A straight 4 x 25mm brass shear pin (**Figure 135**) 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 P07761102).

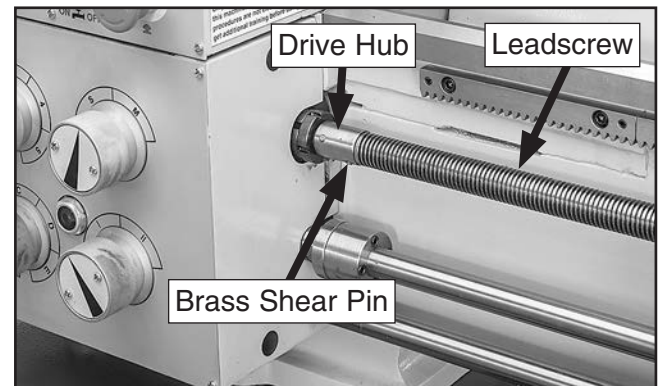


Figure 135. Location of leadscrew shear pin.

Items 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 shear pin:

1. DISCONNECT MACHINE FROM POWER!
2. Unlock half-nut lever and disengage gearbox so leadscrew can be rotated by hand.
3. Rotate drive hub, and inspect it to see if pin is still stuck in both sides of it.



—If one half of the shear pin has fallen out and the leadscrew shaft can be seen through the pin hole, rotate the leadscrew until the end of the inner sheared pin can be seen. Next, insert the $\frac{3}{16}$ " dowel punch into the hole and tap the pin out through the other side.

—If the shear pin halves are still stuck in both sides of the drive hub, center punch one of the pins and drill an $\frac{1}{8}$ " hole in the pin approximately $\frac{1}{4}$ " deep. Next, thread the #8 wood screw into the hole until the screw begins to thread into the brass. Using pliers, pull the pin from the hole, and drive the rest of the pin out as outlined above.

4. Align holes in drive hub with hole in leadscrew, and tap 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 timing mark to indicate where true hole alignment is located. 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.

Adjusting Feed Clutch

This lathe is equipped with a feed rod clutch, shown in **Figure 136**, that connects the feed drive hub with the feed rod through a set of spring-loaded internal steel balls. 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.

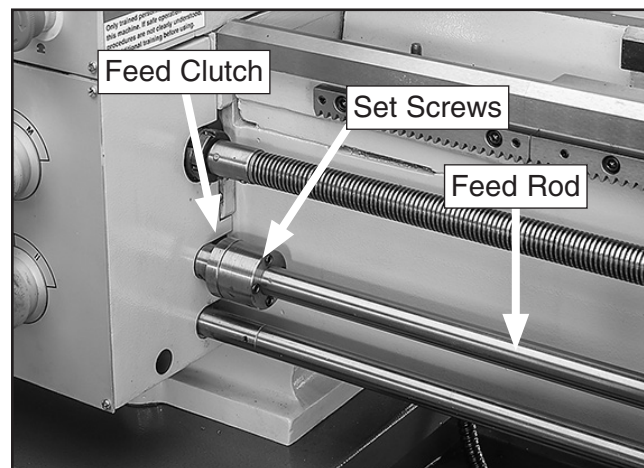


Figure 136. Feed rod clutch.

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 left applied 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.

It is imperative to recognize however, the clutch is not a foolproof way of protecting your lathe from damage if an operational mistake is made, a chuck-carriage crash occurs, or general machine overloading occur on a regular basis.

Never completely tighten the feed clutch set screws past the normal setting outlined in this procedure 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.



Items Needed	Qty
Hex Wrench 4mm.....	1

To adjust feed rod clutch:

1. DISCONNECT MACHINE FROM POWER!
2. Engage apron longitudinal feed selection lever and gearbox and headstock levers so feed rod does not move.

—If the clutch slips during normal work loads and no problem exists with the feed system, the clutch spring pressure must be increased. Using the 4mm hex wrench, tighten the (4) set screws $\frac{1}{8}$ -turn and recheck for slippage.

—If for any reason the clutch is bound up or locked, and does not slip when it should, the clutch spring pressure must be reduced. Using the 4mm hex wrench, loosen the (4) set screws $\frac{1}{8}$ -turn, and recheck for slippage.

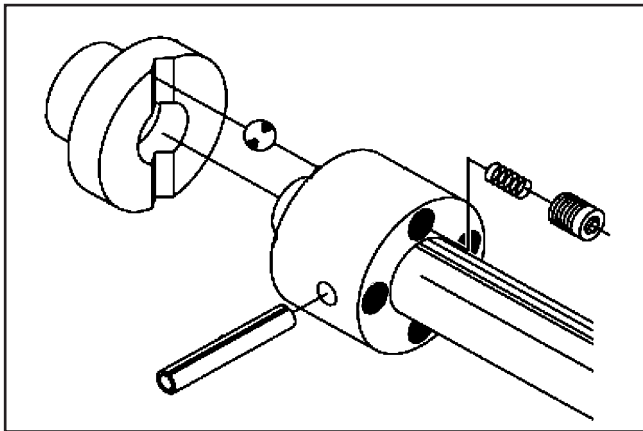


Figure 137. Feed clutch details.

Adjusting Tailstock Lock Lock

When pushed toward the spindle, the tailstock lock holds the tailstock firmly in place on the bedway with a locking plate underneath. If the position of the lock lever is difficult to use, the lever can be adjusted for the best leverage.

Items Needed	Qty
Open-End Wrench 19mm.....	1

To adjust tailstock lock lever:

1. Unthread stop screw (see **Figure 138**), and carefully slide tailstock from lathe.

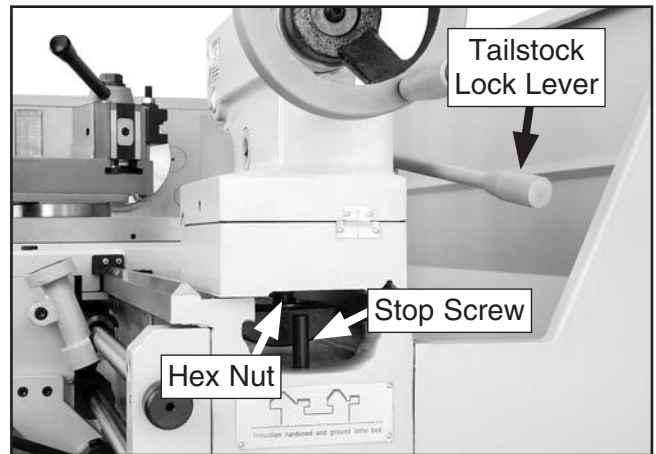


Figure 138. Tailstock locking hex nut and plate.

2. Tighten hex nut $\frac{1}{4}$ -turn and re-install tailstock.
3. Apply tailstock lock lever and verify tailstock is locked and lever is where desired. Readjust as necessary.



Tensioning/ Replacing V-Belts

V-belts stretch and wear with use, so check the tension after the first three months and then every six months to ensure optimal power transmission. Replace all of the V-belts as a matched set if any of them show signs of glazing, fraying, or cracking.

Tensioning V-Belts

Items Needed:	Qty
Phillips Head Screwdriver #2	1
Open-End Wrench 16mm.....	1

To tension V-Belts:

1. DISCONNECT MACHINE FROM POWER!
2. Open end gear cover to expose V-belts, pulleys, and motor (see **Figure 139**).

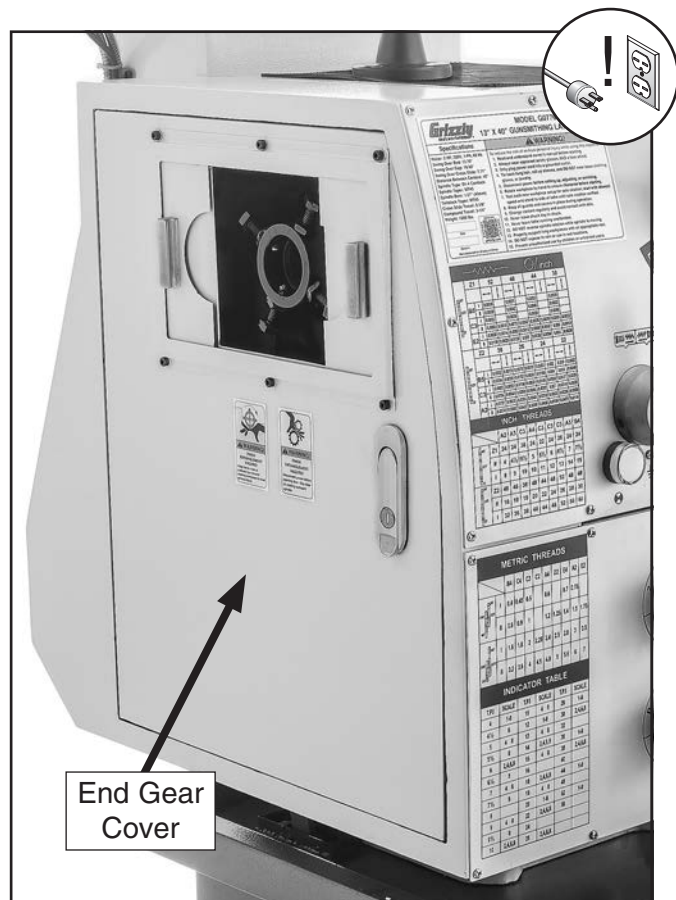


Figure 139. End gear cover location.

3. Adjust hex nuts on motor mount bolts (see **Figure 140**) until there is approximately $\frac{3}{4}$ " deflection in each V-belt when it is pushed with moderate pressure.

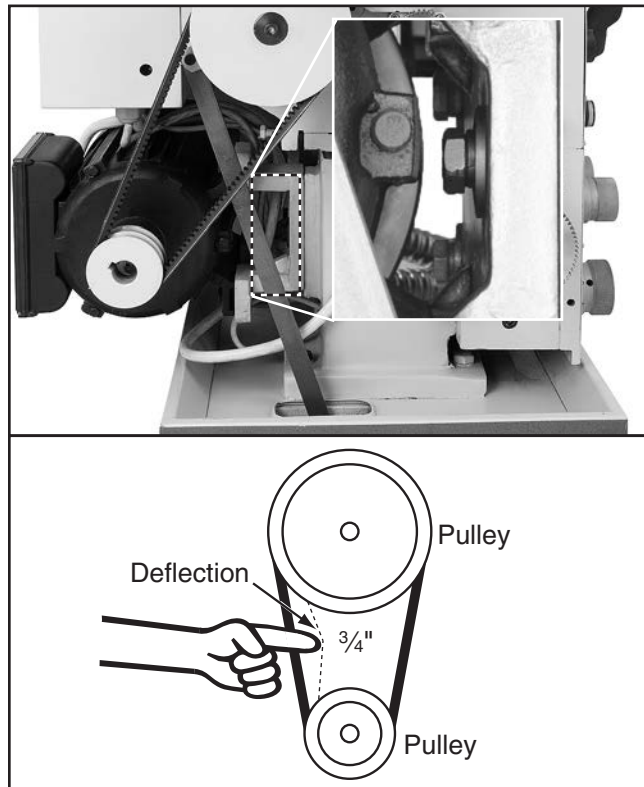


Figure 140. Location of motor mount bolts.

4. Firmly tighten hex nuts to secure setting, then re-install motor access panel and close end gear cover.

Replacing V-Belts

1. DISCONNECT MACHINE FROM POWER!
2. Open end gear cover.
3. Loosen motor mount bolts (see **Figure 140**), slide motor up, and remove V-belts.

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

4. Install new V-belts as a matched set so they equally share the load.
5. Tension belts.
6. Re-install and secure end gear cover.



Adjusting Spindle Bearing Preload

This lathe is shipped from the factory with the spindle bearing preload set. If the spindle ever develops end-play and the workpiece finish suffers, you can re-establish the bearing preload, remove the end-play, and correct the workpiece finish issue.

Items Needed	Qty
Hook-Style Spanner Wrench 68-75mm.....	1
Dial Indicator with Magnetic Base	1
Heavy Dead Blow Hammer.....	1
Wooden Block	1

Adjusting Preload

1. Run lathe for 20 minutes on high speed to bring lathe to normal operating temperature.
2. DISCONNECT MACHINE FROM POWER!
3. Remove chuck and spider bolts, then shift spindle to neutral and remove headstock gear cover to access outboard end of spindle (see **Figure 141**).

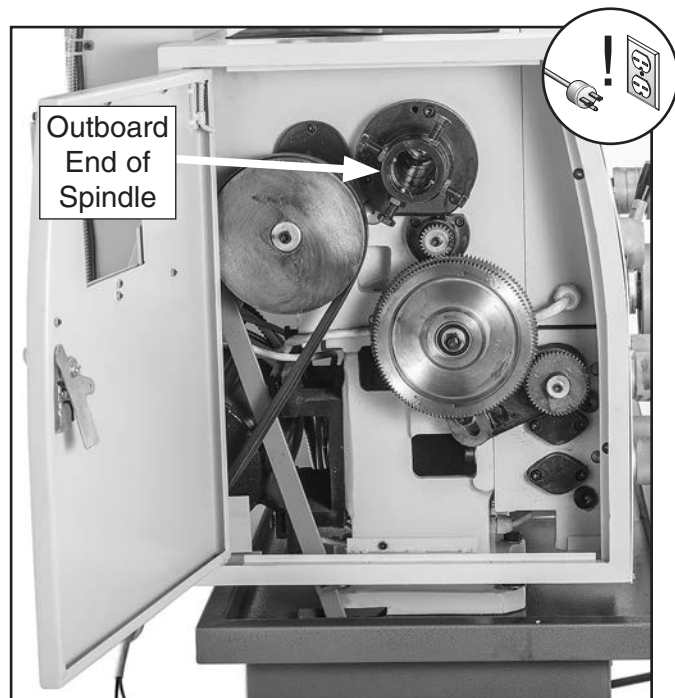


Figure 141. Location of outboard end of spindle.

4. Place chuck wrench in camlock socket to keep spindle from rotating, and loosen outer spanner nut (see **Figure 142**) two turns. Removing spider hub is not necessary.

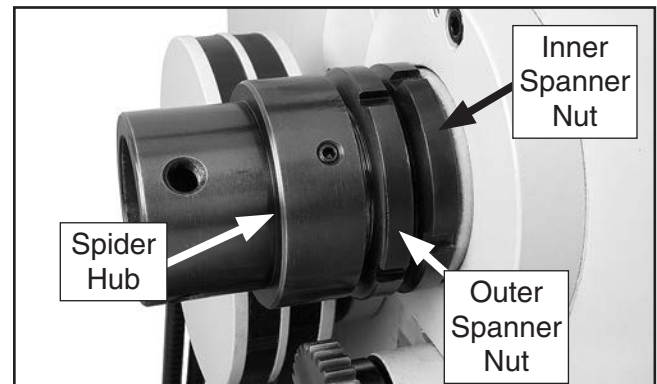


Figure 142. Spindle spanner nuts.

5. Loosen inner spanner nut one turn.

Note: You may have to tap on the outboard end of the spindle as explained in **Step 6**, to help unload the spindle and break the spanner nut loose.

NOTICE

For the next step, **DO NOT** strike the wooden block with excessive force. If you do, you can cause the tapered roller bearings to indent the mating races. If this damage occurs, one or more spindle bearings will have to be replaced, as this damage will generate vibration at higher spindle speeds.



6. Place wood block over outboard end of spindle. Tap it a few times with dead blow hammer (see **Figure 143**). Your goal is to slide spindle forward just enough to introduce spindle end-play that you can feel by hand.



Figure 143. Unseating spindle bearings to introduce spindle end-play.

7. Place dial indicator on cross slide and move carriage toward headstock until contact point of indicator touches spindle face (see **Figure 144**).



Figure 144. Dial indicator setup.

8. Move carriage an additional 0.100" toward headstock, and zero dial indicator.

9. Insert chuck wrench into a cam socket to prevent spindle from turning, then tighten inner spanner nut until dial indicator needle just stops moving (see **Figure 145**).

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



Figure 145. Adjusting spindle bearings.

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

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

If you think you have gone past zero end-play point, unload bearings by repeating **Steps 5–6**, then re-tighten inner spanner nut until it has reached zero end play position.

10. Tighten spanner nut an additional $\frac{1}{16}$ -turn.
11. Without allowing inner spanner nut to tighten any farther, tighten outer spanner nut against inner nut.

Do not overtighten outer spanner nut because additional preload can force bearings even tighter against races in headstock and cause headstock to compress or crack, or bearing may quickly fail.

12. Re-install outboard gear cover.



Confirming Bearing Preload

1. Re-attach all removed lathe components and prepare it for operation.
2. Install chuck and tighten jaws.
3. Set spindle speed to its highest setting.
4. Connect lathe to power and turn lathe spindle **ON**.
5. Periodically shutting down lathe a few times and checking temperature, let lathe run for 20 minutes. DO NOT leave lathe unattended.
6. Turn spindle **OFF**, disconnect lathe from power, and check temperature of spindle.

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

—If the spindle nose is hotter than you can comfortably keep your hand on, the preload is too tight and you must repeat the bearing preload adjustment procedure. When repeating the procedure, rotate the inner spanner nut a little less during **Step 10** in the preceding instructions.

Removing/Installing Gap Insert

This lathe is equipped with a removable gap insert that will allow for turning large diameter workpieces. The gap was seated, pre-loaded, and then ground for precise mating and alignment at the factory. Removing the gap can cause the lathe insert to slightly spring out of shape. When re-installed, there is no guarantee that original alignment and flush mating will be the same. For this reason, removing the gap is considered a permanent alteration to the lathe, even if it is later re-installed.

Items Needed

Qty

Open-End Wrench 13mm.....	1
Hex Wrench 10mm.....	1
Heavy Dead Blow Hammer.....	1
Miscellaneous C-Clamps	As Required
Wooden Blocks	As Required

Removing Gap

1. DISCONNECT MACHINE FROM POWER!
2. Remove four cap screws that secure gap to bed (see **Figure 146**).

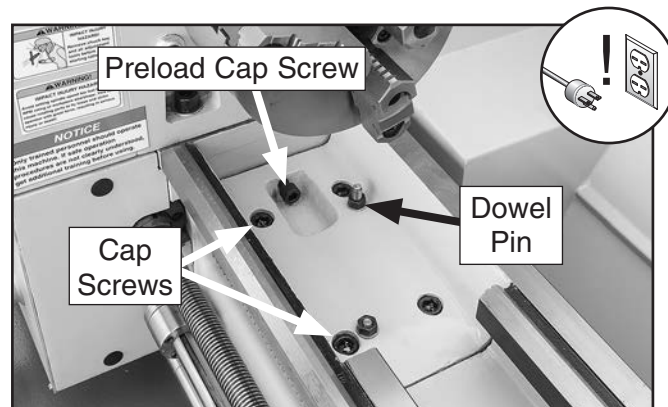


Figure 146. Gap retaining fasteners.

3. Tighten dowel-pin jack nut (see **Figure 146**) to draw pins from gap.
4. Loosen preload cap screw (see **Figure 146**) a few turns until it no longer contacts headstock.



5. Tap outside of gap piece with a dead blow hammer to loosen it, and, with the help of another person, remove gap piece.

Re-installing Gap

1. Clean all mating surfaces completely with mineral spirits and inspect and remove any burrs. ALL MATING SURFACES MUST BE ABSOLUTELY CLEAN!
2. Lightly oil a lint-free cloth with way oil, and rub a thin film into pores of freshly cleaned gap surfaces. Next, place gap in position on lathe bed.
3. Back off threaded dowel pin jam nuts until they are flush with end of pins, then drop pins into pin holes in gap.
4. Jostle gap closer to its final alignment until pins seat naturally.
5. Install and lightly snug four cap screws in an order that will draw gap closer into alignment. Using blocks of wood and clamps to get mating surfaces into alignment can also be helpful.
6. When alignment and flush mating is acceptable, tighten four cap screws in a pattern that will maintain or improve the alignment.
7. Wait 24 hours, and check for quality of mating. If unacceptable, use clamps and blocks of wood, and loosen and tighten appropriate cap screws to draw-in and release certain areas of gap to achieve the required alignment.
8. When satisfied with alignment, tap dowel pins the rest of the way into the gap until they are in a fully seated position, and thread jack nuts down until they just contact the gap.
9. Tighten preload cap screw inward until it contacts headstock and resistance can be felt, then tighten it an additional $\frac{3}{4}$ -turn.

Checking/Replacing Brake Shoes

If the brake responds poorly, verify that the all linkage is tight and that the belts are tight and free of oil or grease. Replace the brake shoe set if the lining thickness is $\frac{3}{16}$ " or less. When inspecting for amount of brake wear measure from the following locations:

- If riveted linings are used, the measurement is taken from the rivet heads to the lining surface as viewed from the brake pad surface.
- If bonded linings are used, the measurement is taken from the metal shoe surface to the surface of the lining as viewed from the side of the brake shoe.

When inspecting the drum, if the drum pulley is bell-mouthed, cracked, or shows deep groves, replace it. For minor scoring, the drum pulley can be dressed with sandpaper or turned on a lathe.

Items Needed	Qty
Hex Wrench 5mm.....	1
Open-End Wrench 16mm.....	1
Needle-Nose Pliers	1
Basic Caliper	1

To check/replace brake linings:

1. DISCONNECT MACHINE FROM POWER!
2. Remove headstock gear cover.



3. Loosen motor mount bolts (**Figure 147**) and remove belts.

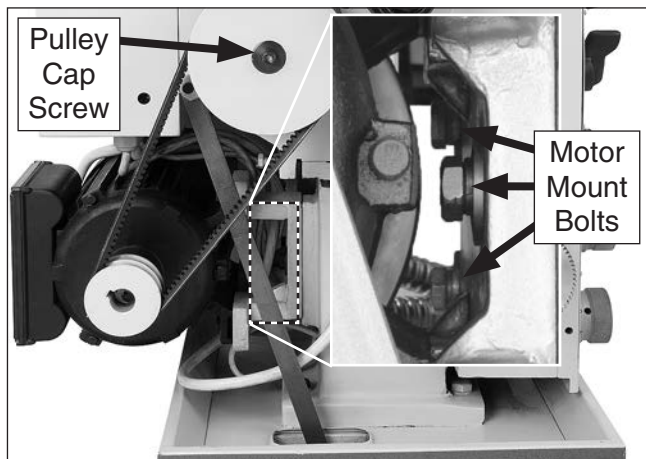


Figure 147. Pulley cap screw.

4. Have another person step on brake pedal to lock pulley in place, and remove pulley cap screw shown in **Figure 147**.
5. Step off brake pedal and remove pulley. **Figure 148** shows pulley removed and brake shoes exposed.

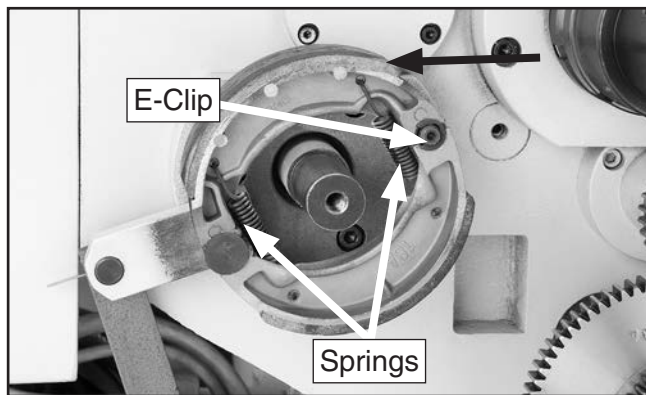


Figure 148. Brake assembly.

6. Using your calipers, measure thickness of brake linings.

—If linings are thicker than $\frac{3}{16}$ " as described earlier, then replacement is not required. Re-assemble lathe in the opposite manner as outlined in **Steps 2–5**.

—If linings are oil-soaked from over lubrication of adjacent gearing, clean and properly lubricate gears as outlined in **Maintenance** on **Page 69**. Then proceed to **Step 7**.

—If brake linings are $\frac{3}{16}$ " or thinner, proceed to **Step 7**.

7. Put on safety glasses and remove E-clip, springs, and brake shoes shown in **Figure 148**.
8. Replace or dress drum pulley as required.
9. Install brake shoes, springs, and E-clip.
10. Install pulley and re-assemble in opposite manner that you disassembled it in **Steps 2–5**.
11. Start lathe and test brake operation.



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

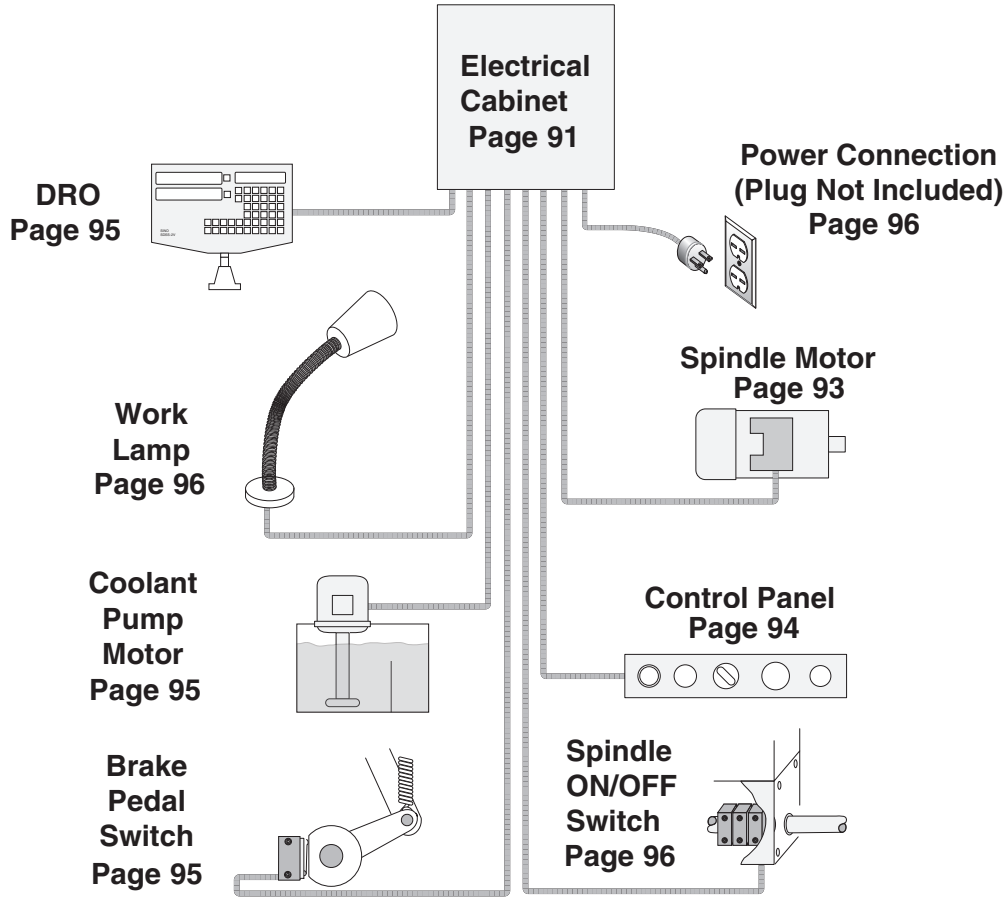
The photos and diagrams included in this section are best viewed in color. You can view these pages in color at www.grizzly.com.

COLOR KEY

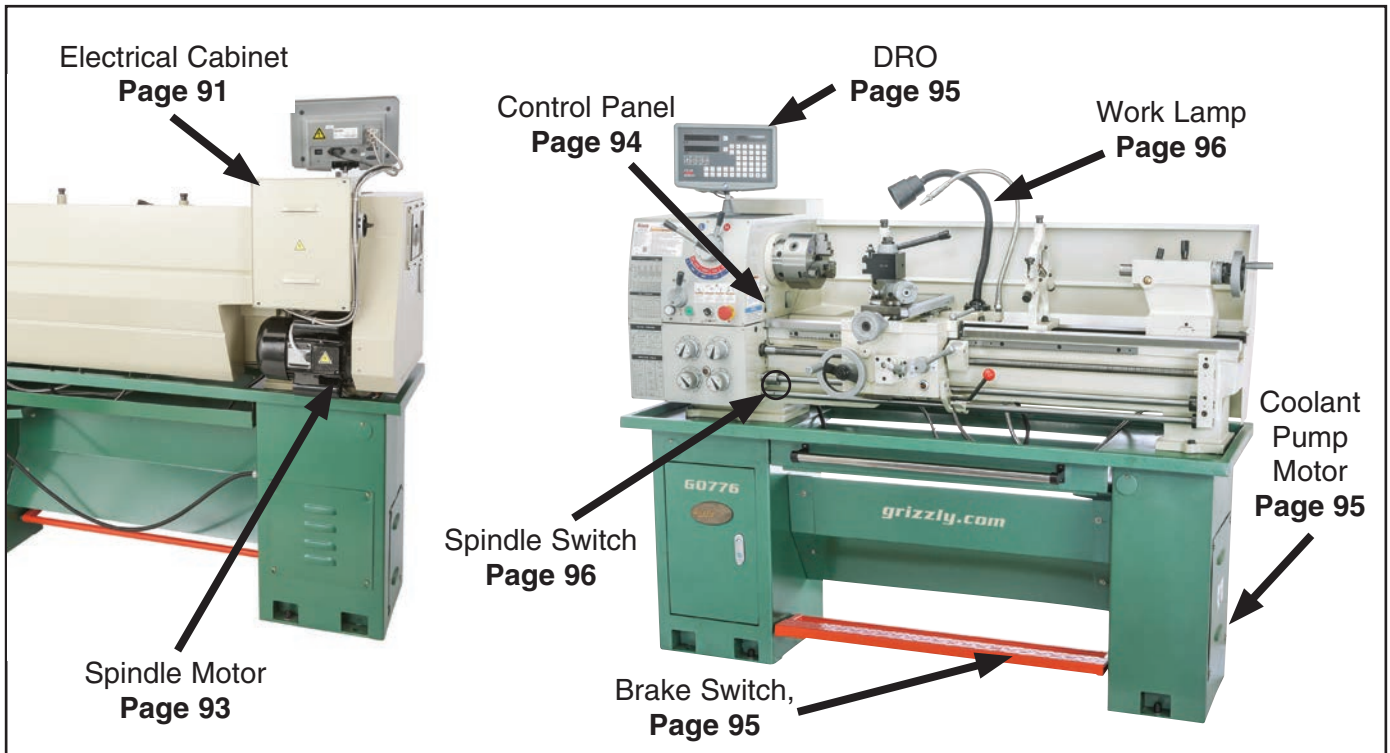
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WHITE 	BROWN 	YELLOW GREEN 	BLUE WHITE 
GREEN 	GRAY 	PURPLE 	TURQUOISE 
RED 	ORANGE 	PINK 	



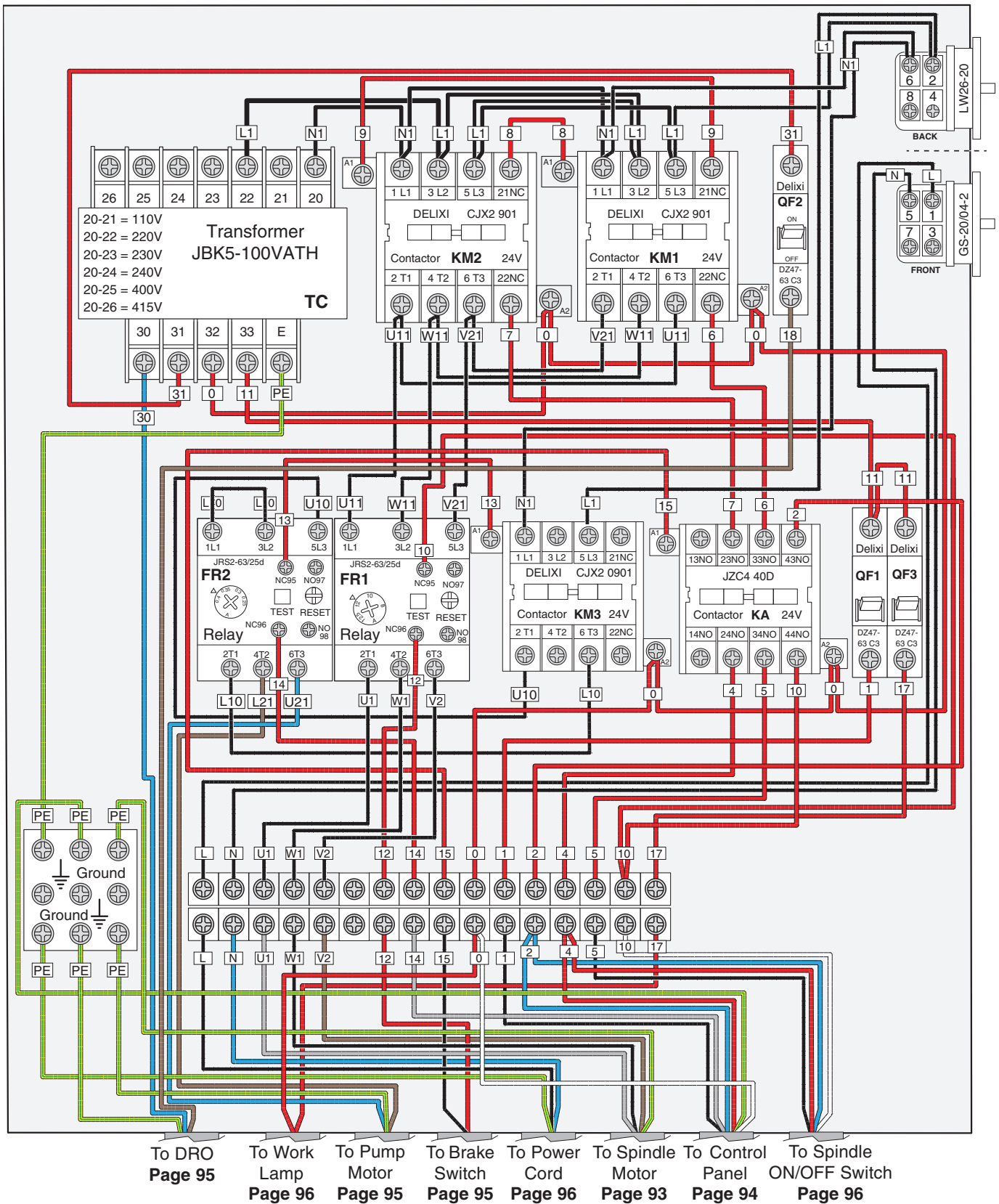
Wiring Overview



Component Location Index



Electrical Cabinet Wiring



Electrical Cabinet

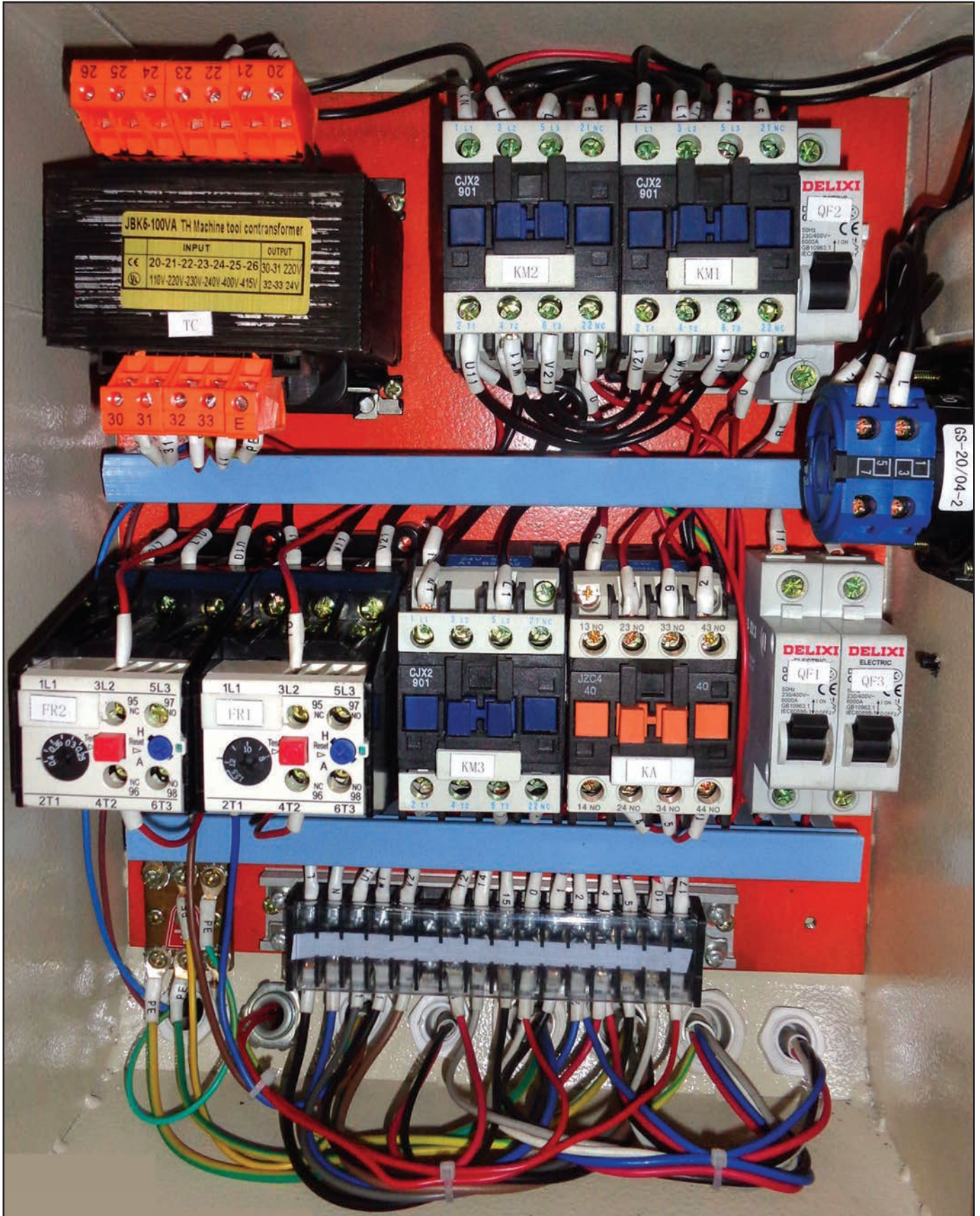


Figure 149. Electrical cabinet wiring.



Spindle Motor Wiring

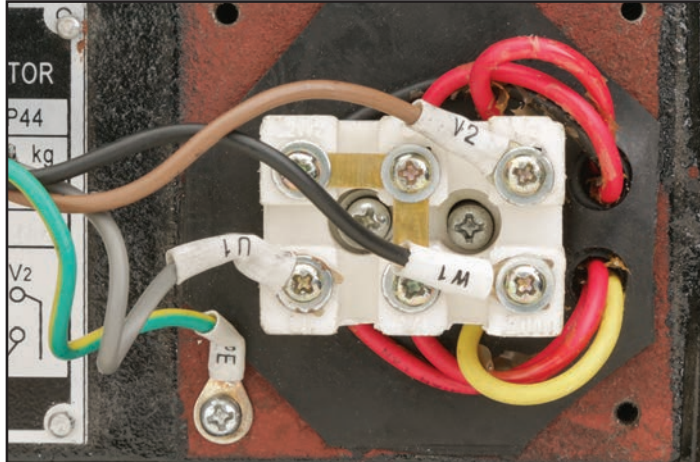
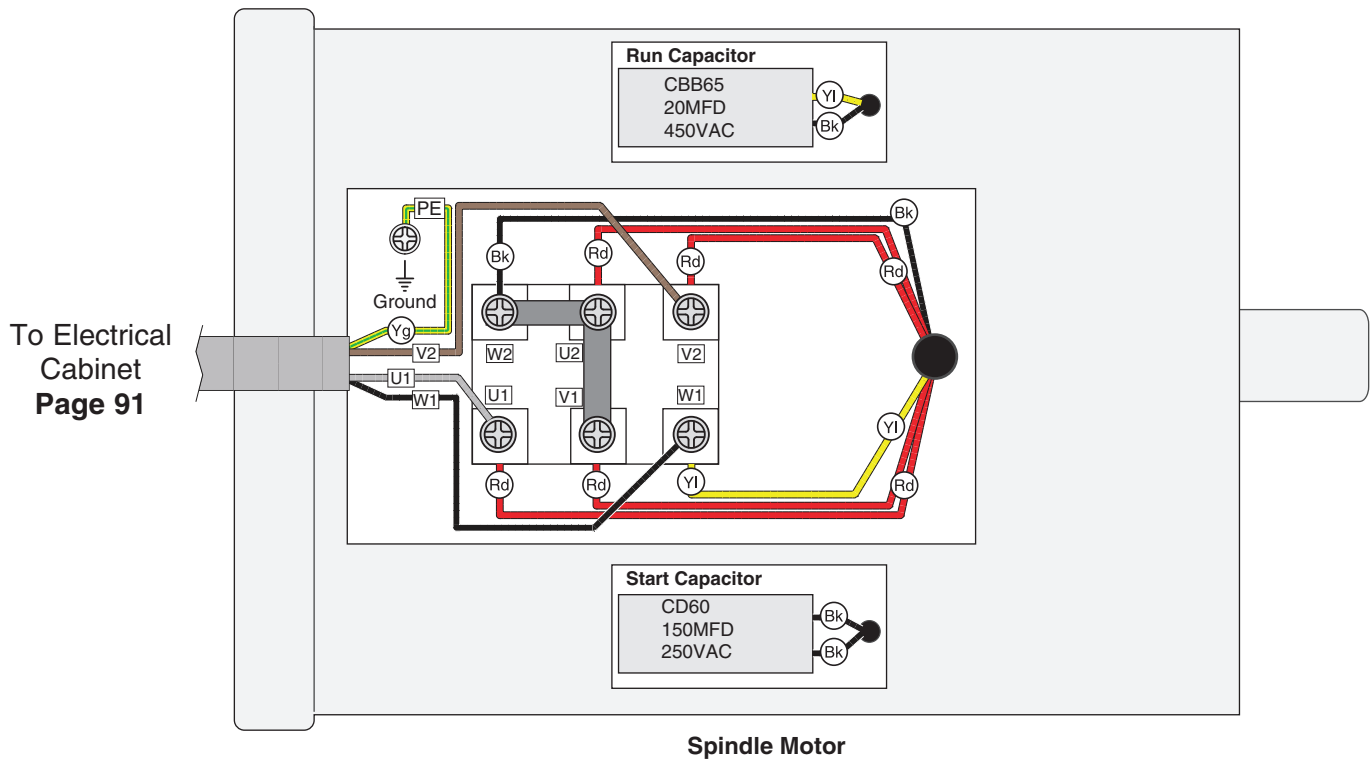


Figure 150. Spindle motor junction box.



Spindle Motor

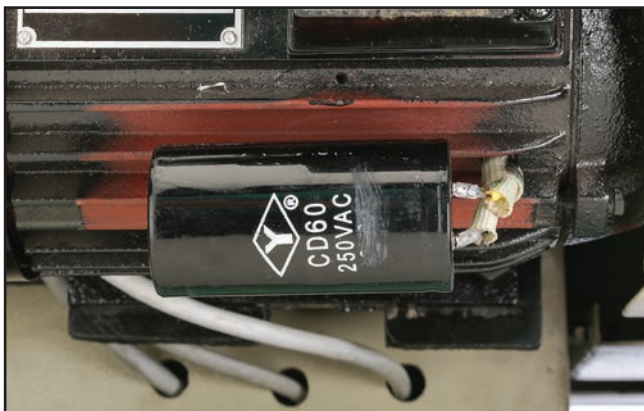


Figure 151. Start capacitor.



Figure 152. Run capacitor.



Control Panel Wiring

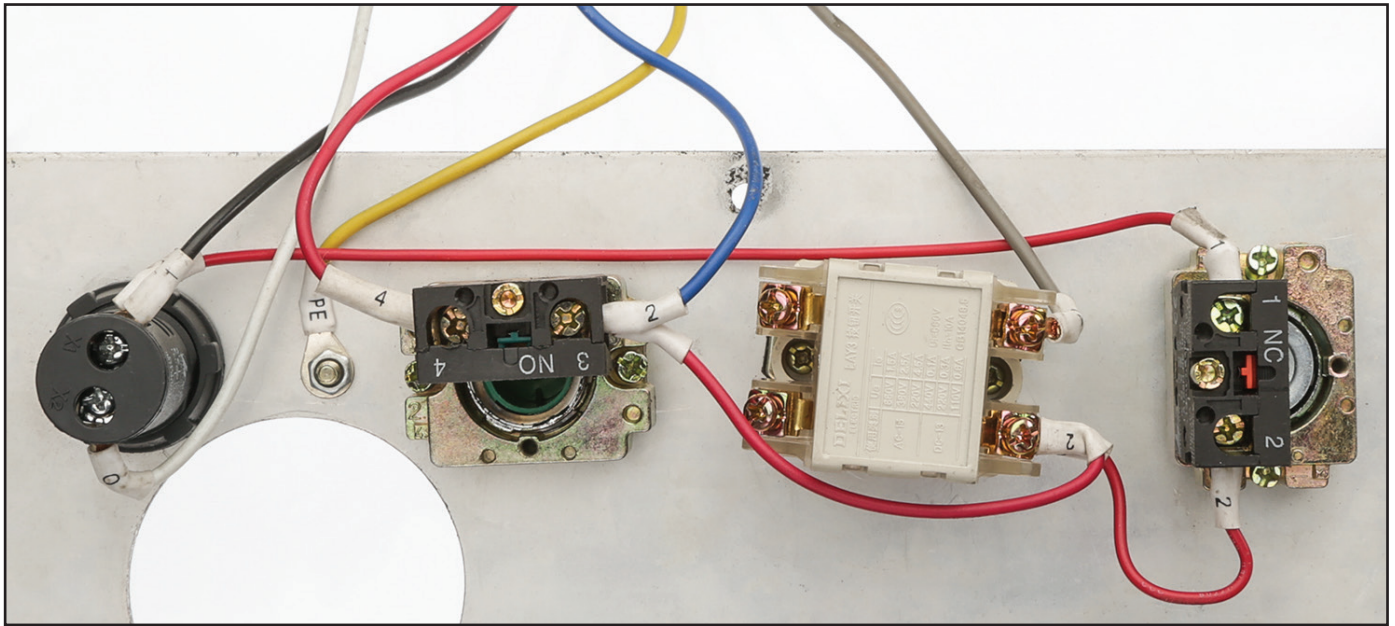
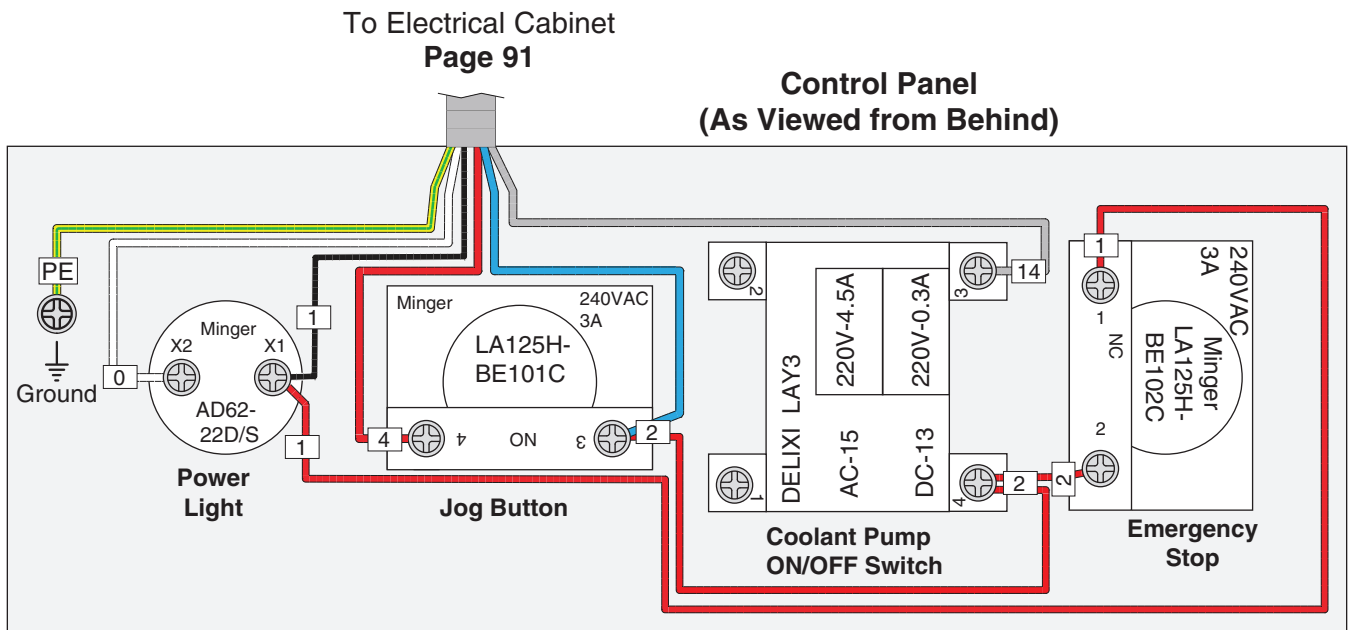


Figure 153. Control panel wiring.



Coolant Pump & Brake Wiring

Coolant Pump Motor

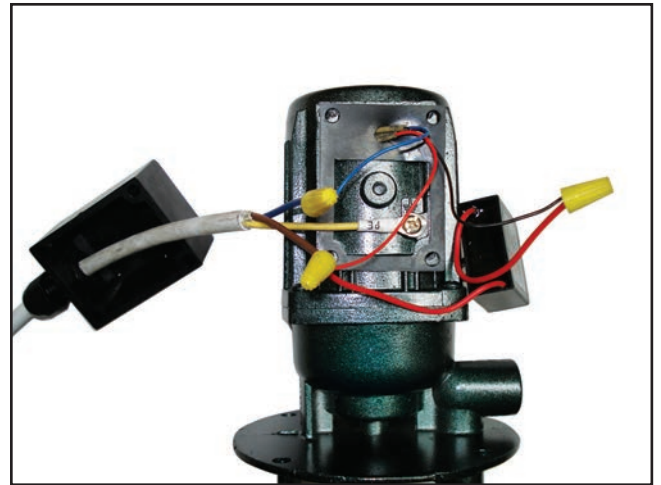
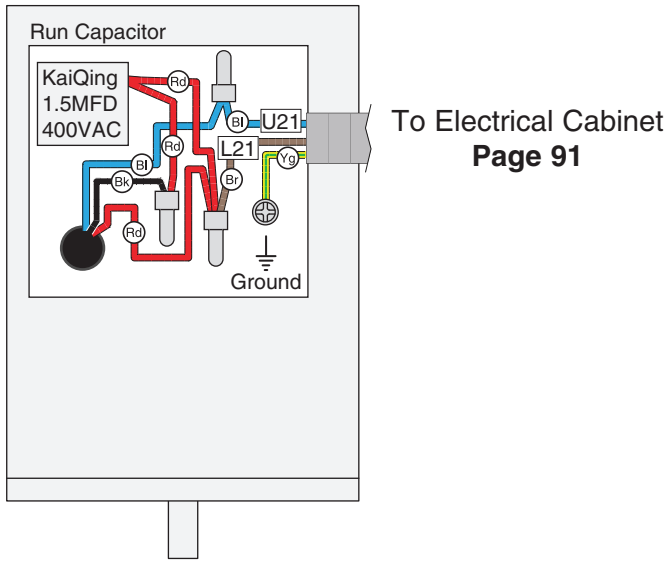


Figure 154. Coolant pump motor.

To Electrical Cabinet
Page 91

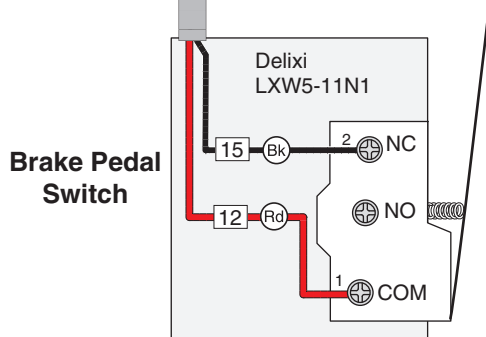


Figure 155. Brake pedal switch.

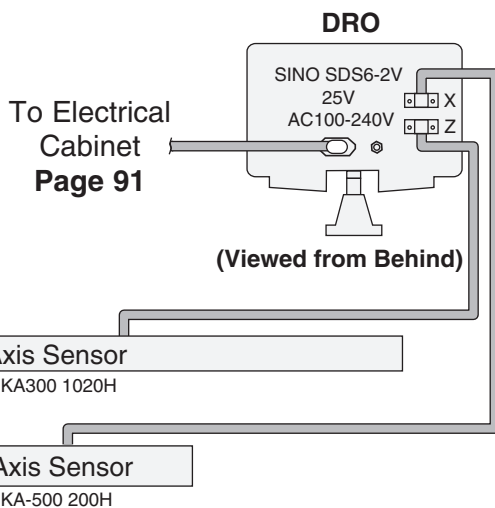


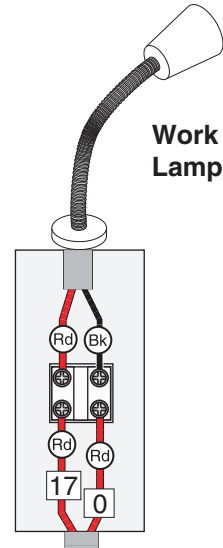
Figure 156. DRO wiring.



Additional Component Wiring



Figure 157. Work lamp wiring.



To Electrical Cabinet
Page 91

Spindle ON/OFF Switch

To Electrical
Cabinet
Page 91

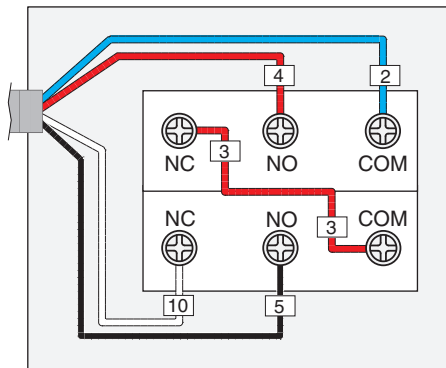
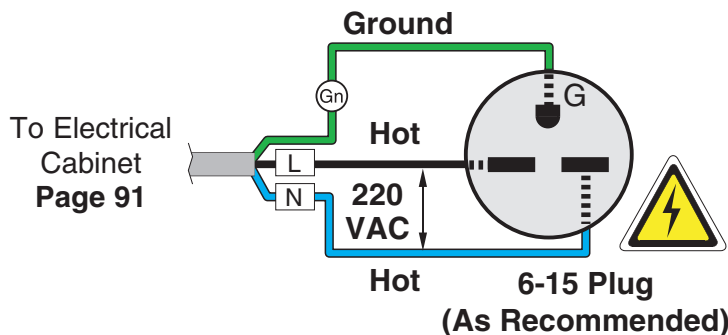


Figure 158. Spindle ON/OFF switch.

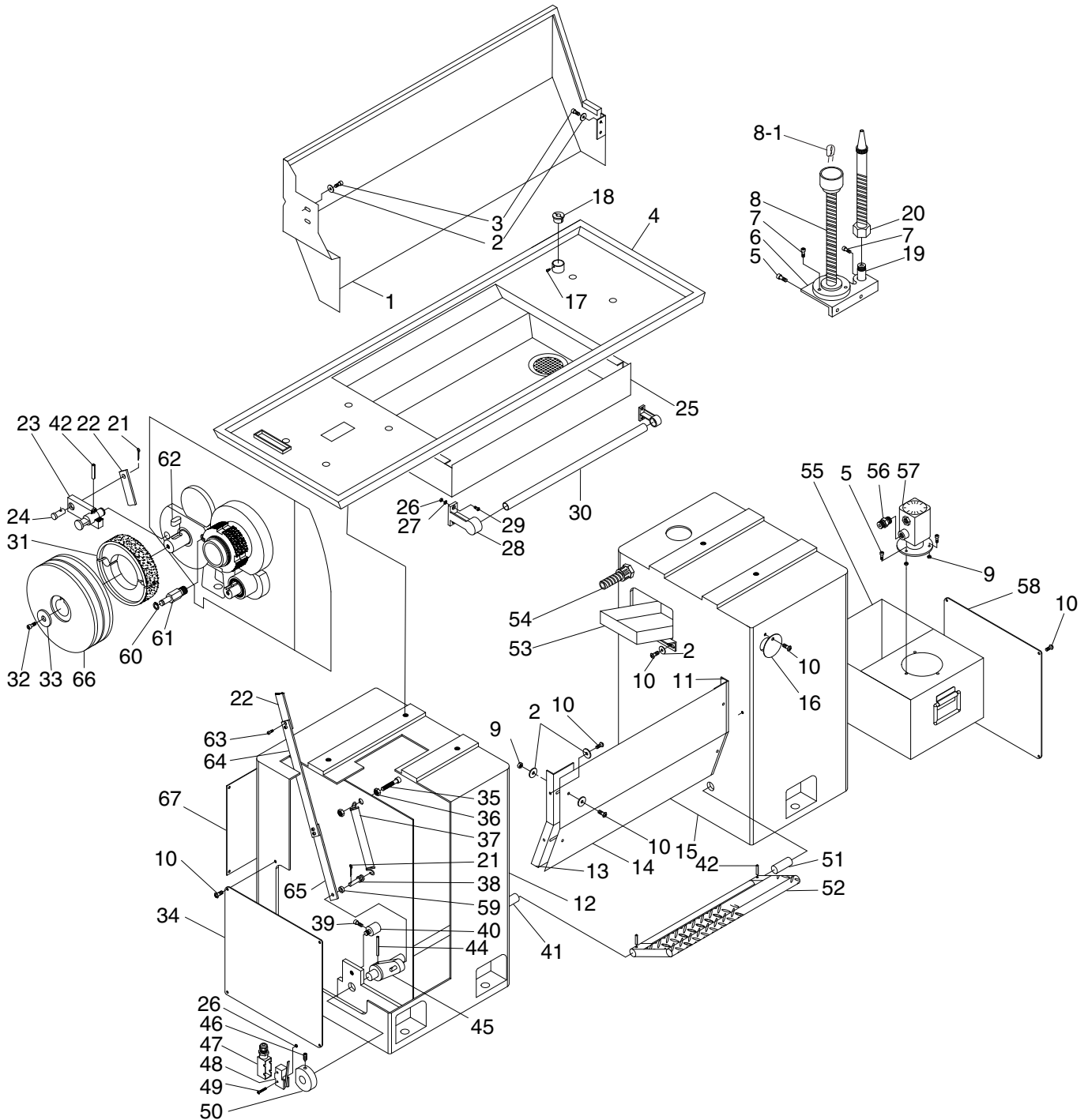
Power Connection Wiring



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.

Stand/Brake/Coolant Pump



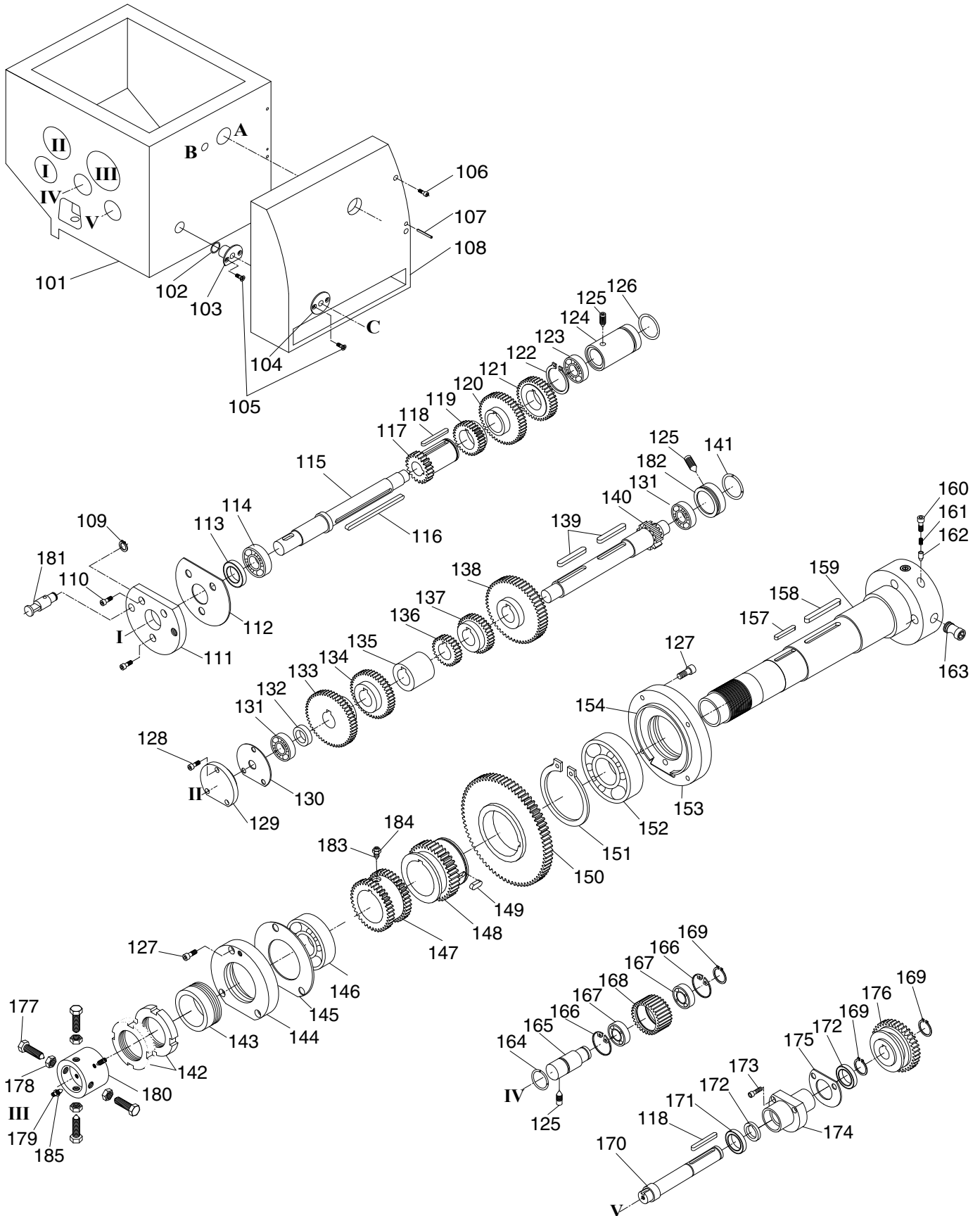
Stand/Brake/Coolant Pump Parts List

REF PART #	DESCRIPTION
1	P07760001 SPLASH GUARD
2	P07760002 FLAT WASHER 6MM
3	P07760003 CAP SCREW M6-1 X 10
4	P07760004 CHIP PAN
5	P07760005 CAP SCREW M6-1 X 20
6	P07760006 WORKLIGHT BRACKET
7	P07760007 CAP SCREW M5-.8 X 15
8	P07760008 WORK LAMP
8-1	P07760008-1 HALOGEN BULB 50W 24V
9	P07760009 HEX NUT M6-1
10	P07760010 PHLP HD SCR M6-1 X 10
11	P07760011 STAND PLATE BRACKET (R)
12	P07760012 LEFT CABINET
13	P07760013 STAND PLATE BRACKET (L)
14	P07760014 STAND PLATE
15	P07760015 RIGHT CABINET
16	P07760016 LIFTING HOLE COVER
17	P07760017 CAP SCREW M4-.7 X 6
18	P07760018 COOLANT HOSE COLLAR
19	P07760019 COOLANT FITTING
20	P07760020 COOLANT NOZZLE
21	P07760021 COTTER PIN 3 X 16MM
22	P07760022 BRAKE LINKAGE (UPPER)
23	P07760023 ROCKER
24	P07760024 ROCKER SHAFT
25	P07760025 REMOVABLE CHIP TRAY
26	P07760026 HEX NUT M4-.7
27	P07760027 FLAT WASHER 4MM
28	P07760028 CHIP TRAY HANDLE BRACKET
29	P07760029 PHLP HD SCR M4-.7 X 10
30	P07760030 CHIP TRAY HANDLE
31	P07760031 PULLEY BRAKE ASSEMBLY 25 X 125
32	P07760032 CAP SCREW M8-1.25 X 16
33	P07760033 FENDER WASHER 8MM

REF PART #	DESCRIPTION
34	P07760034 LEFT CABINET COVER (SIDE)
35	P07760035 CAP SCREW M10-1.5 X 30
36	P07760036 HEX NUT M10-1.5
37	P07760037 EXTENSION SPRING
38	P07760038 SPRING RETENTION PIN
39	P07760039 CAP SCREW M6-1 X 40
40	P07760040 BRAKE HARD STOP
41	P07760041 BRAKE PEDAL SHAFT (LEFT)
42	P07760042 ROLL PIN 5 X 28
44	P07760044 ROLL PIN 5 X 40
45	P07760045 BRAKE ROCKER
46	P07760046 SET SCREW M6-1 X 12 CONE-PT
47	P07760047 LIMIT SWITCH COVER
48	P07760048 LIMIT SWITCH YBLXW-5/11N1
49	P07760049 PHLP HD SCR M4-.7 X 40
50	P07760050 BRAKE RETAINING COLLAR
51	P07760051 BRAKE PEDAL SHAFT (RIGHT)
52	P07760052 BRAKE PEDAL
53	P07760053 COOLANT CHUTE
54	P07760054 LOCK CONNECTOR
55	P07760055 COOLANT TANK
56	P07760056 COOLANT PIPE FITTING
57	P07760057 COOLANT PUMP DALEI DOB-12/40 0.2HP 220V
58	P07760058 RIGHT CABINET COVER (SIDE)
59	P07760059 FLAT WASHER 10MM
60	P07760060 EXT RETAINING RING 8MM
61	P07760061 ROCKER PIN
62	P07760062 KEY 8 X 8 X 20
63	P07760063 CAP SCREW M6-1 X 10
64	P07760064 BRAKE LINKAGE (MIDDLE)
65	P07760065 BRAKE LINKAGE (LOWER)
66	P07760066 SPINDLE PULLEY
67	P07760067 LEFT CABINET COVER (REAR)



Headstock



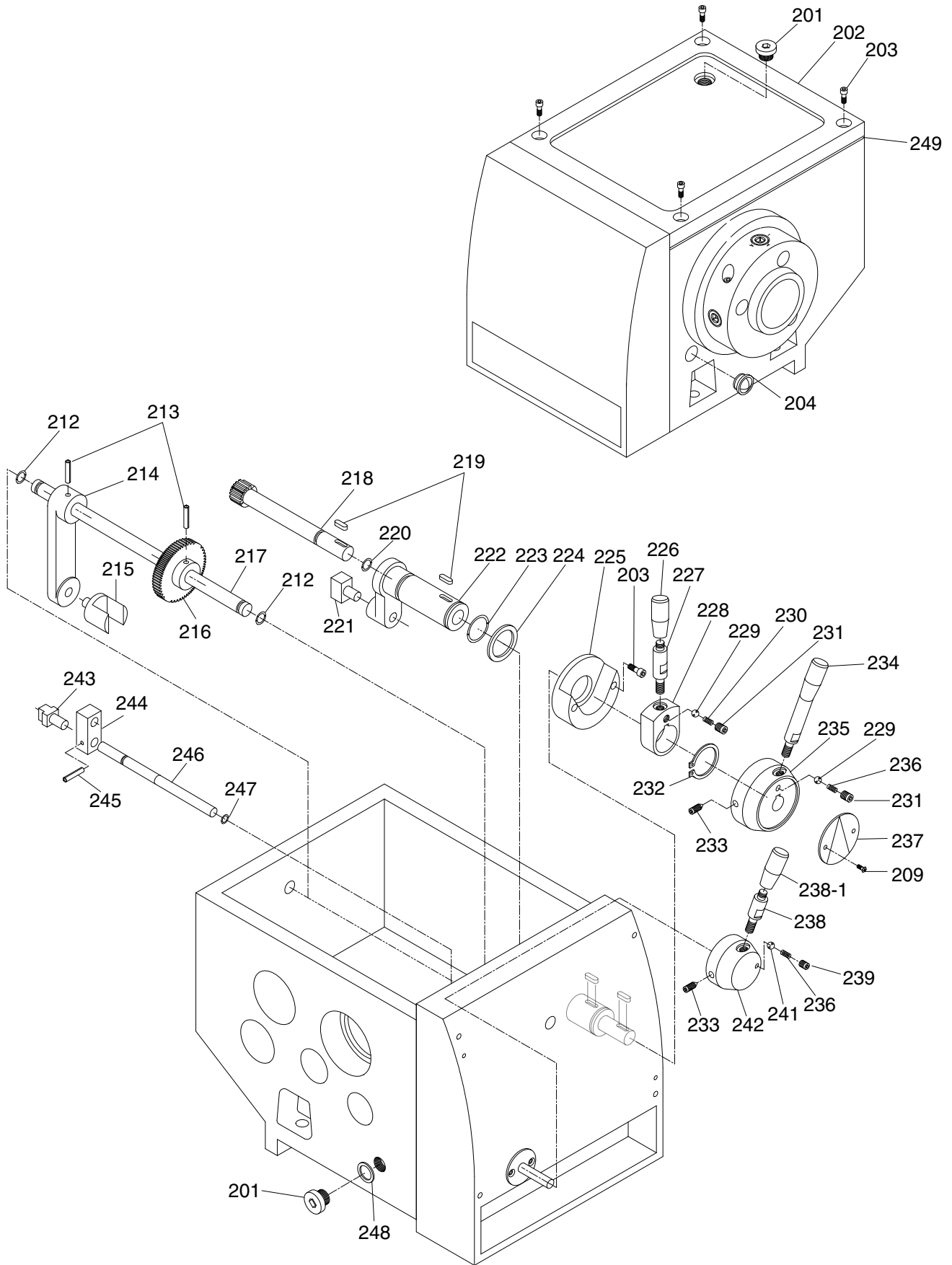
Headstock Parts List

REF PART #	DESCRIPTION
101	P07760101 HEADSTOCK
102	P07760102 O-RING 19.8 X 2.4 P20
103	P07760103 THREADING SELECTOR SLEEVE (INNER)
104	P07760104 THREADING SELECTOR SLEEVE (OUTER)
105	P07760105 FLAT HD SCR M4-.7 X 8
106	P07760106 CAP SCREW M6-1 X 40
107	P07760107 ROLL PIN 5 X 40
108	P07760108 CASE FRAME
109	P07760109 EXT RETAINING RING 12MM
110	P07760110 CAP SCREW M6-1 X 20
111	P07760111 PULLEY SHAFT COVER
112	P07760112 PULLEY SHAFT COVER GASKET
113	P07760113 OIL SEAL 25 X 40 X 7MM
114	P07760114 BALL BEARING 6005-OPEN
115	P07760115 SPINDLE PULLEY SHAFT
116	P07760116 KEY 6 X 6 X 120
117	P07760117 GEAR 21T
118	P07760118 KEY 6 X 6 X 50
119	P07760119 GEAR 29T
120	P07760120 GEAR 46T
121	P07760121 GEAR 38T
122	P07760122 EXT RETAINING RING 35MM
123	P07760123 BALL BEARING 6203-OPEN
124	P07760124 FRONT PLUG
125	P07760125 SET SCREW M8-1.25 X 16 CONE-PT
126	P07760126 O-RING 39.7 X 3.5 P40
127	P07760127 CAP SCREW M6-1 X 25
128	P07760128 CAP SCREW M4-.7 X 12
129	P07760129 GEARSHAFT COVER
130	P07760130 GASKET
131	P07760131 BALL BEARING 6204-OPEN
132	P07760132 SPACER
133	P07760133 GEAR 51T
134	P07760134 GEAR 43T
135	P07760135 SPACER
136	P07760136 GEAR 26T
137	P07760137 GEAR 34T
138	P07760138 GEAR 53T
139	P07760139 KEY 8 X 8 X 55
140	P07760140 GEARED SHAFT 16T
141	P07760141 O-RING 47 X 3.1
142	P07760142 SPANNER NUT

REF PART #	DESCRIPTION
143	P07760143 COLLAR
144	P07760144 OUTBOARD SPINDLE COVER
145	P07760145 OUTBOARD SPINDLE COVER GASKET
146	P07760146 TAPERED ROLLER BEARING 30210
147	P07760147 GEAR 37T
148	P07760148 GEAR 37T
149	P07760149 KEY 8 X 8 X 18
150	P07760150 GEAR 74T
151	P07760151 EXT RETAINING RING 72MM
152	P07760152 TAPERED ROLLER BEARING 30212
153	P07760153 FRONT COVER
154	P07760154 GASKET
157	P07760157 KEY 6 X 6 X 40
158	P07760158 KEY 8 X 8 X 85
159	P07760159 SPINDLE
160	P07760160 CAP SCREW M8-1.25 X 16
161	P07760161 COMPRESSION SPRING 0.8 X 4.5 X 16
162	P07760162 CAM PIN
163	P07760163 CAM
164	P07760164 O-RING 25.2 X 2.4
165	P07760165 SHAFT
166	P07760166 INT RETAINING RING 42MM
167	P07760167 BALL BEARING 16004-OPEN
168	P07760168 GEAR 30T
169	P07760169 EXT RETAINING RING 20MM
170	P07760170 SHAFT
171	P07760171 OIL SEAL 24 X 32 X 5
172	P07760172 SPACER
173	P07760173 CAP SCREW M5-.8 X 16
174	P07760174 SHAFT COVER
175	P07760175 SHAFT COVER GASKET
176	P07760176 GEAR 37T
177	P07760177 SPIDER SCREW M10-1.5 X 33
178	P07760178 HEX NUT M10-1.5
179	P07760179 SET SCREW M6-1 X 8 CONE-PT
180	P07760180 SPIDER SLEEVE
181	P07760181 ROCKER SHAFT
182	P07760182 FRONT PLUG
183	P07760183 SET SCREW M4-.7 X 10 CONE-PT
184	P07760184 HEX NUT M4-.7
185	P07760185 HEX NUT M6-1



Headstock Controls



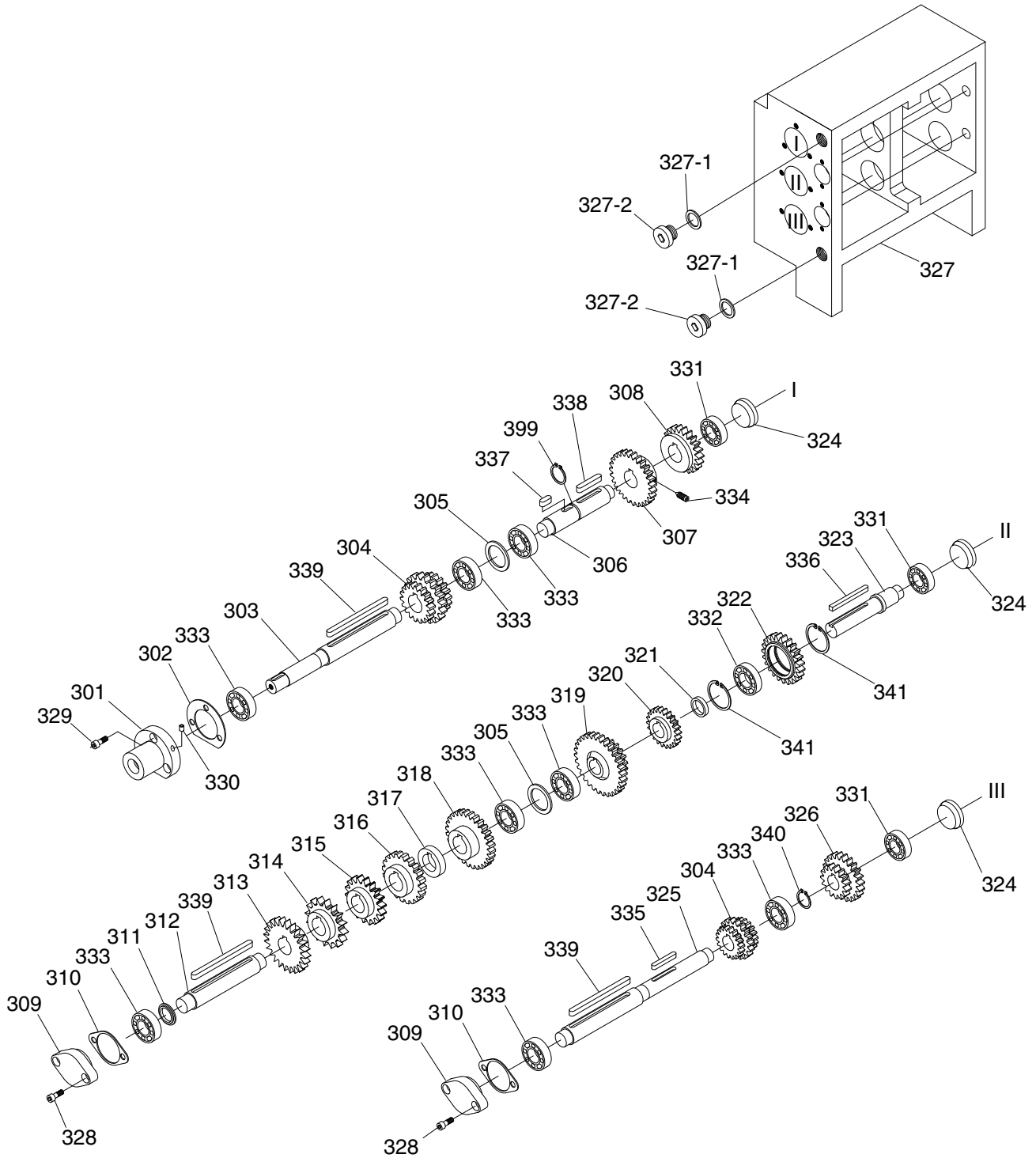
Headstock Controls Parts List

REF PART #	DESCRIPTION
201	P07760201 HEADSTOCK OIL FILL PLUG M16-2 X 1.5
202	P07760202 HEADSTOCK TOP COVER
203	P07760203 CAP SCREW M6-1 X 25
204	P07760204 HEADSTOCK OIL SIGHT M16-2 X 1.5
209	P07760209 CAP SCREW M4-.7 X 12
212	P07760212 O-RING 14 X 2.4
213	P07760213 ROLL PIN 5 X 30
214	P07760214 SWING SHIFT LEVER
215	P07760215 SHIFT FORK
216	P07760216 GEAR 51T
217	P07760217 SHAFT
218	P07760218 GEARED SHAFT 17T
219	P07760219 KEY 5 X 5 X 14
220	P07760220 O-RING 16 X 2.4
221	P07760221 SHIFT FORK
222	P07760222 SHIFT COLLAR
223	P07760223 OIL SEAL 30 X 3.1
224	P07760224 FLAT WASHER 30MM
225	P07760225 HANDLE HUB
226	P07760226 RANGE ADJUST LEVER HANDLE M8-1.25
227	P07760227 RANGE ADJUST LEVER STUD M8-1.25 X 6
228	P07760228 RANGE ADJUST LEVER HUB

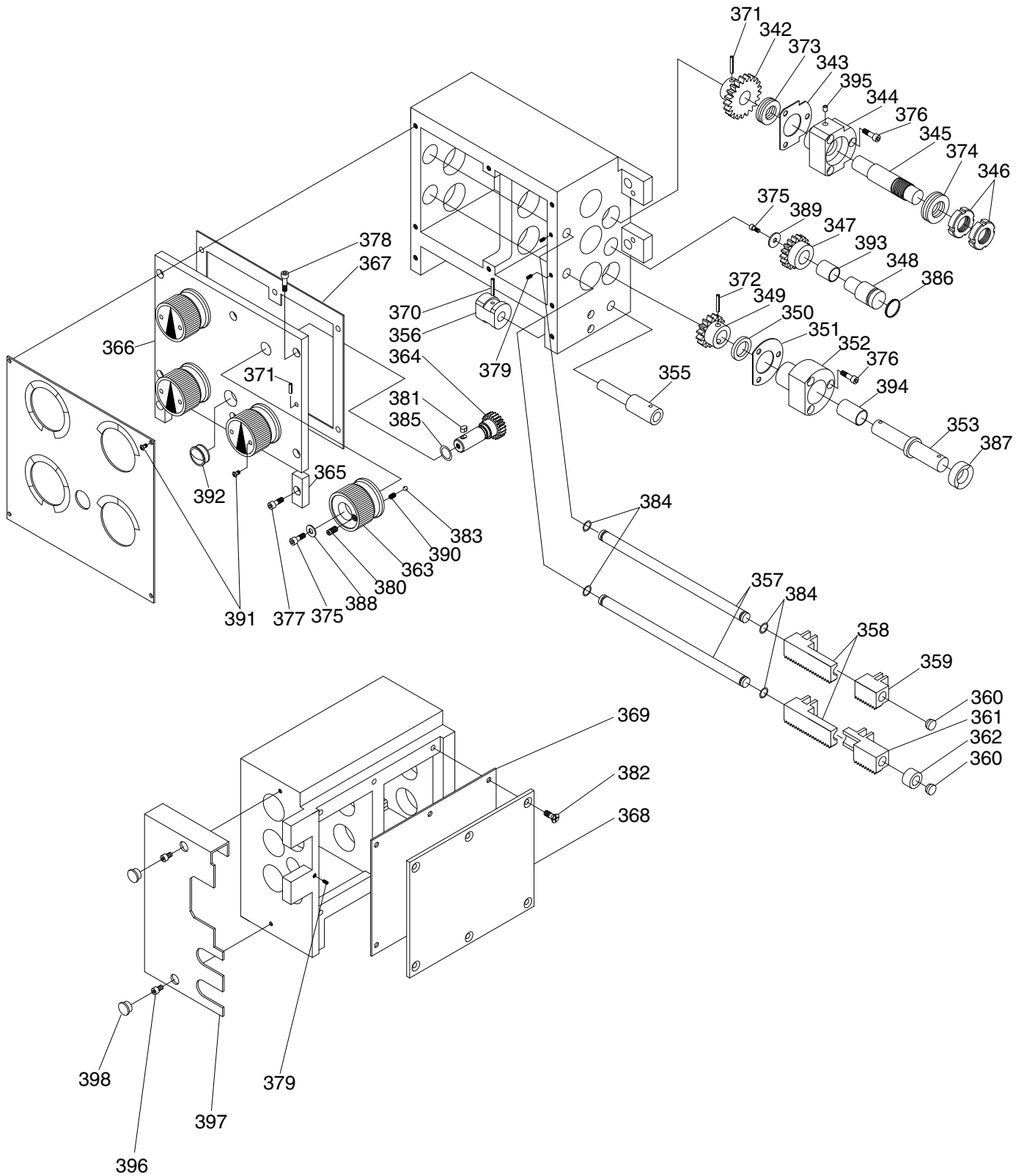
REF PART #	DESCRIPTION
229	P07760229 STEEL BALL 6MM
230	P07760230 COMPRESSION SPRING 1 X 6 X 13
231	P07760231 SET SCREW M8-1.25 X 8
232	P07760232 EXT RETAINING RING 30MM
233	P07760233 SET SCREW M6-1 X 16
234	P07760234 SPEED ADJUST LEVER M8-1.25 X 6
235	P07760235 SPEED ADJUST BASE LEVER M8-1.25
236	P07760236 COMPRESSION SPRING 1 X 6 X 26
237	P07760237 POSITION INDICATOR PLATE
238	P07760238 FEED DIRECTION LEVER STUD M8-1.25 X 6
238-1	P07760238-1 FEED DIRECTION LEVER HANDLE M8-1.25
239	P07760239 SET SCREW M6-1 X 8
241	P07760241 STEEL BALL 5MM
242	P07760242 FEED DIRECTION LEVER HUB
243	P07760243 SHIFT FORK
244	P07760244 ROCKER
245	P07760245 ROLL PIN 4 X 18
246	P07760246 SHAFT
247	P07760247 O-RING 10 X 1.9
248	P07760248 FLAT WASHER 16MM (COPPER)
249	P07760249 HEADSTOCK COVER GASKET



Gearbox



Gearbox Cont.



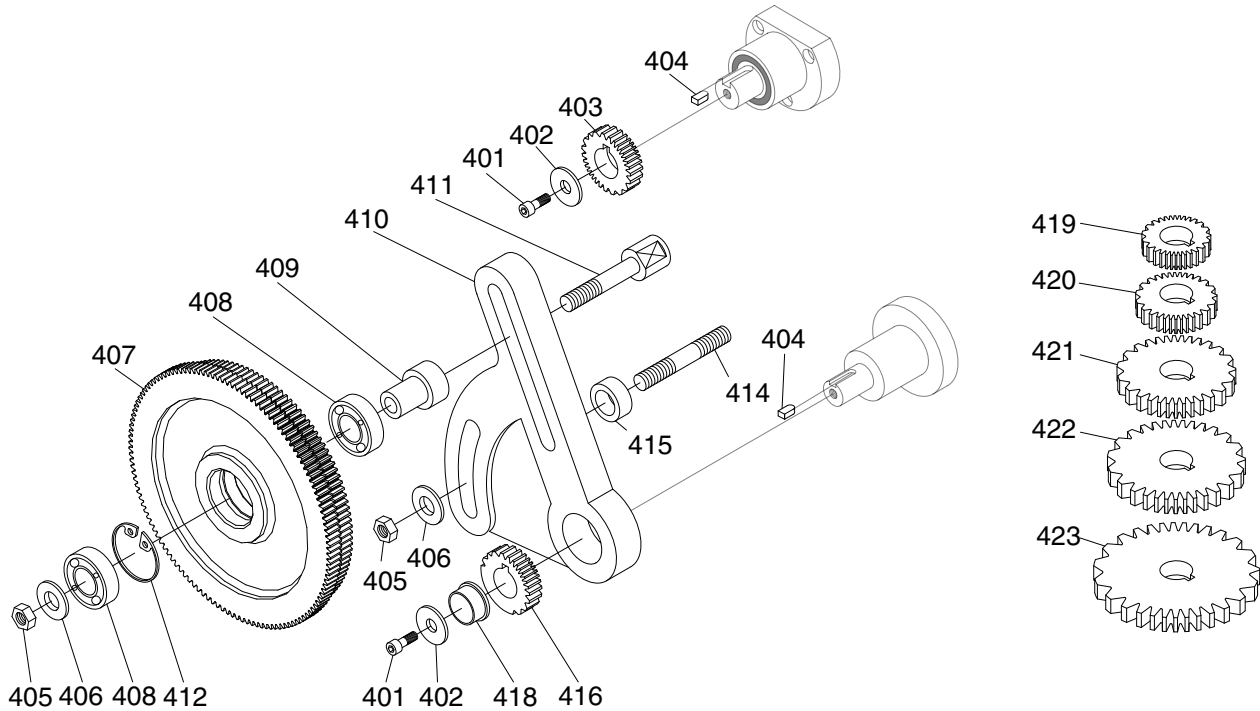
Gearbox Parts List

REF	PART #	DESCRIPTION
301	P07760301	SHAFT HUB COVER
302	P07760302	SHAFT HUB COVER GASKET
303	P07760303	SHAFT
304	P07760304	COMBO GEAR 18T/18T/18T
305	P07760305	SPACER
306	P07760306	SHAFT
307	P07760307	GEAR 27T
308	P07760308	GEAR 21T
309	P07760309	SHAFT COVER
310	P07760310	SHAFT COVER GASKET
311	P07760311	SPACER
312	P07760312	SHAFT
313	P07760313	GEAR 24T
314	P07760314	GEAR 16T
315	P07760315	GEAR 18T
316	P07760316	GEAR 20T
317	P07760317	KEYED SPACER
318	P07760318	GEAR 28T
319	P07760319	GEAR 30T/18T
320	P07760320	GEAR 22T
321	P07760321	SPACER
322	P07760322	GEAR 23T
323	P07760323	SHAFT
324	P07760324	COVER
325	P07760325	SHAFT
326	P07760326	GEAR 15T/22T
327	P07760327	GEARBOX
327-1	P07760327-1	FLAT WASHER 16MM (COPPER)
327-2	P07760327-2	OIL PLUG M16 X 1.5
328	P07760328	CAP SCREW M6-1 X 12
329	P07760329	CAP SCREW M6-1 X 16
330	P07760330	BALL OILER 6MM PRESS-IN
331	P07760331	BALL BEARING 6002-OPEN
332	P07760332	BALL BEARING 16003-OPEN
333	P07760333	BALL BEARING 6003-OPEN
334	P07760334	SET SCREW M6-1 X 8 CONE-PT
335	P07760335	KEY 5 X 5 X 35
336	P07760336	KEY 5 X 5 X 40
337	P07760337	KEY 6 X 6 X 15
338	P07760338	KEY 6 X 6 X 35
339	P07760339	KEY 6 X 6 X 90
340	P07760340	EXT RETAINING RING 17MM
341	P07760341	INT RETAINING RING 35MM
342	P07760342	GEAR 21T
343	P07760343	GASKET
344	P07760344	COVER
345	P07760345	SHAFT
346	P07760346	SPANNER NUT
347	P07760347	GEAR 17T
348	P07760348	SHAFT

REF	PART #	DESCRIPTION
349	P07760349	GEAR 15T
350	P07760350	BUSHING
351	P07760351	OIL SEAL
352	P07760352	SHAFT HOUSING
353	P07760353	SHAFT
355	P07760355	SHAFT
356	P07760356	CAM
357	P07760357	SHAFT
358	P07760358	INNER GEAR RACK
359	P07760359	OUTER GEAR RACK (UPPER)
360	P07760360	COVER
361	P07760361	OUTER GEAR RACK (LOWER)
362	P07760362	BUSHING
363	P07760363	DIAL HUB
364	P07760364	GEARED SHAFT 23T
365	P07760365	SPACER
366	P07760366	CONTROL PANEL
367	P07760367	CONTROL PANEL GASKET
368	P07760368	BACK COVER PLATE
369	P07760369	BACK COVER PLATE GASKET
370	P07760370	ROLL PIN 4 X 28
371	P07760371	ROLL PIN 5 X 26
372	P07760372	ROLL PIN 5 X 28
373	P07760373	THRUST BEARING 51103
374	P07760374	THRUST BEARING 51104
375	P07760375	CAP SCREW M6-1 X 12
376	P07760376	CAP SCREW M6-1 X 25
377	P07760377	CAP SCREW M8-1.25 X 16
378	P07760378	CAP SCREW M8-1.25 X 20
379	P07760379	SET SCREW M5-.8 X 8 CONE-PT
380	P07760380	SET SCREW M8-1.25 X 6
381	P07760381	KEY 5 X 5 X 8
382	P07760382	FLAT HD SCR M6-1 X 10
383	P07760383	STEEL BALL 6MM
384	P07760384	O-RING 12 X 1.8
385	P07760385	O-RING 16 X 2.4
386	P07760386	O-RING 22 X 2.4
387	P07760387	OIL SEAL 18 X 30 X 10MM
388	P07760388	FLAT WASHER 6MM
389	P07760389	FENDER WASHER 6MM
390	P07760390	COMPRESSION SPRING .8 X 6 X 18
391	P07760391	PHLP HD SCR M4-.7 X 6
392	P07760392	GEARBOX SIGHT GLASS 22 X 1.5MM
393	P07760393	BUSHING 16 X 18 X 20MM COPPER
394	P07760394	BUSHING 17 X 19 X 30MM COPPER
395	P07760395	BALL OILER 6MM PRESS-IN
396	P07760396	CAP SCREW M5-.8 X 8
397	P07760397	COWLING
398	P07760398	COVER
399	P07760399	EXT RETAINING RING 20MM



Change Gears



REF PART # DESCRIPTION

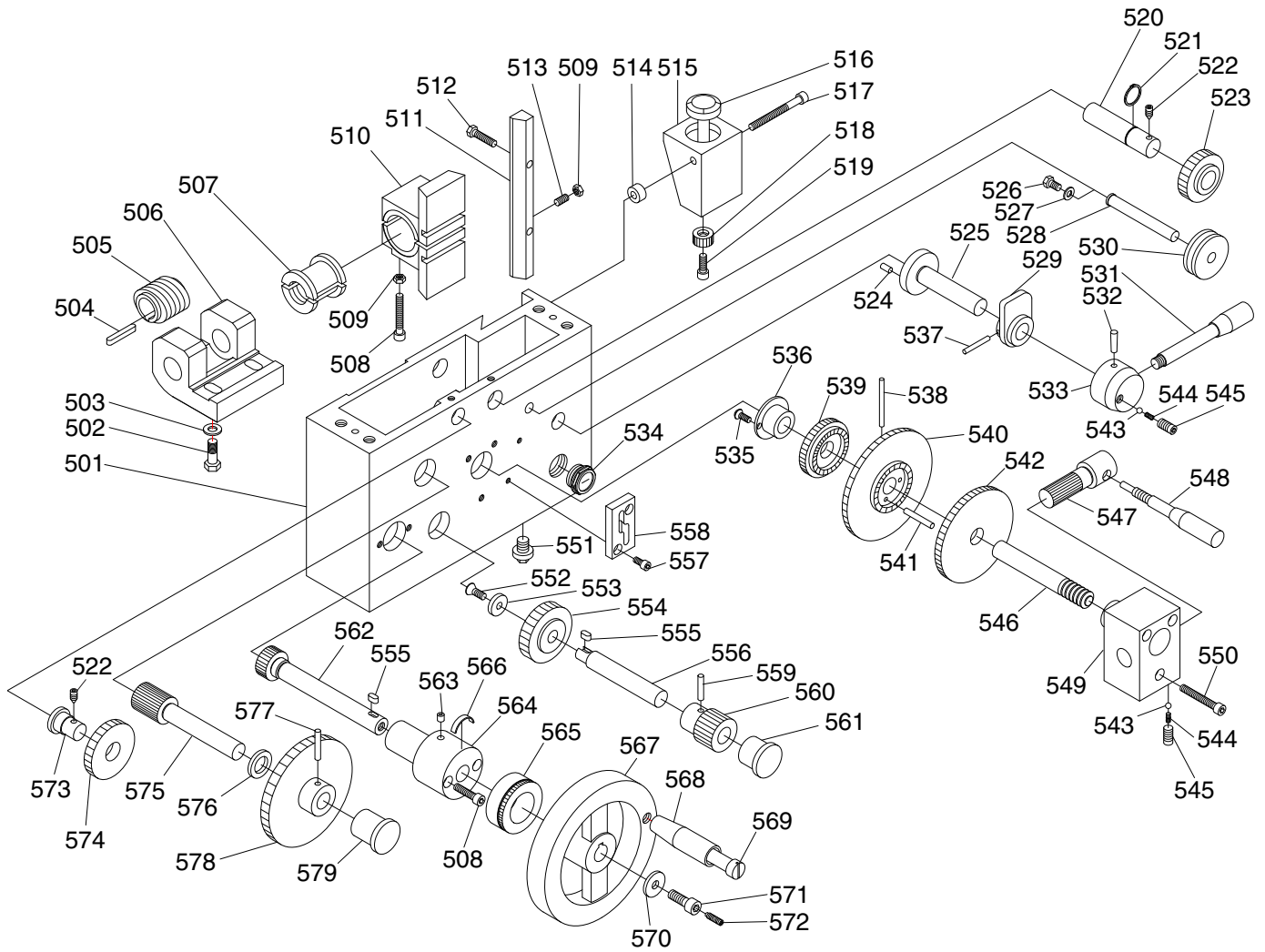
401	P07760401	CAP SCREW M6-1 X 12
402	P07760402	FENDER WASHER 6MM
403	P07760403	GEAR 24T
404	P07760404	KEY 5 X 5 X 8
405	P07760405	HEX NUT M10-1.5
406	P07760406	FLAT WASHER 10MM
407	P07760407	GEAR 120T/127T
408	P07760408	BALL BEARING 6003-2RS
409	P07760409	IDLER GEAR BUSHING
410	P07760410	CHANGE GEAR PIVOT BRACKET
411	P07760411	CHANGE GEAR SPINDLE M10-1.5 X 80

REF PART # DESCRIPTION

412	P07760412	INT RETAINING RING 35MM
414	P07760414	STUD-DE M10-1.5 X 60, 40
415	P07760415	BUSHING
416	P07760416	GEAR 48T
418	P07760418	END COVER
419	P07760419	CHANGE GEAR 22T
420	P07760420	CHANGE GEAR 26T
421	P07760421	CHANGE GEAR 38T
422	P07760422	CHANGE GEAR 44T
423	P07760423	CHANGE GEAR 52T



Apron



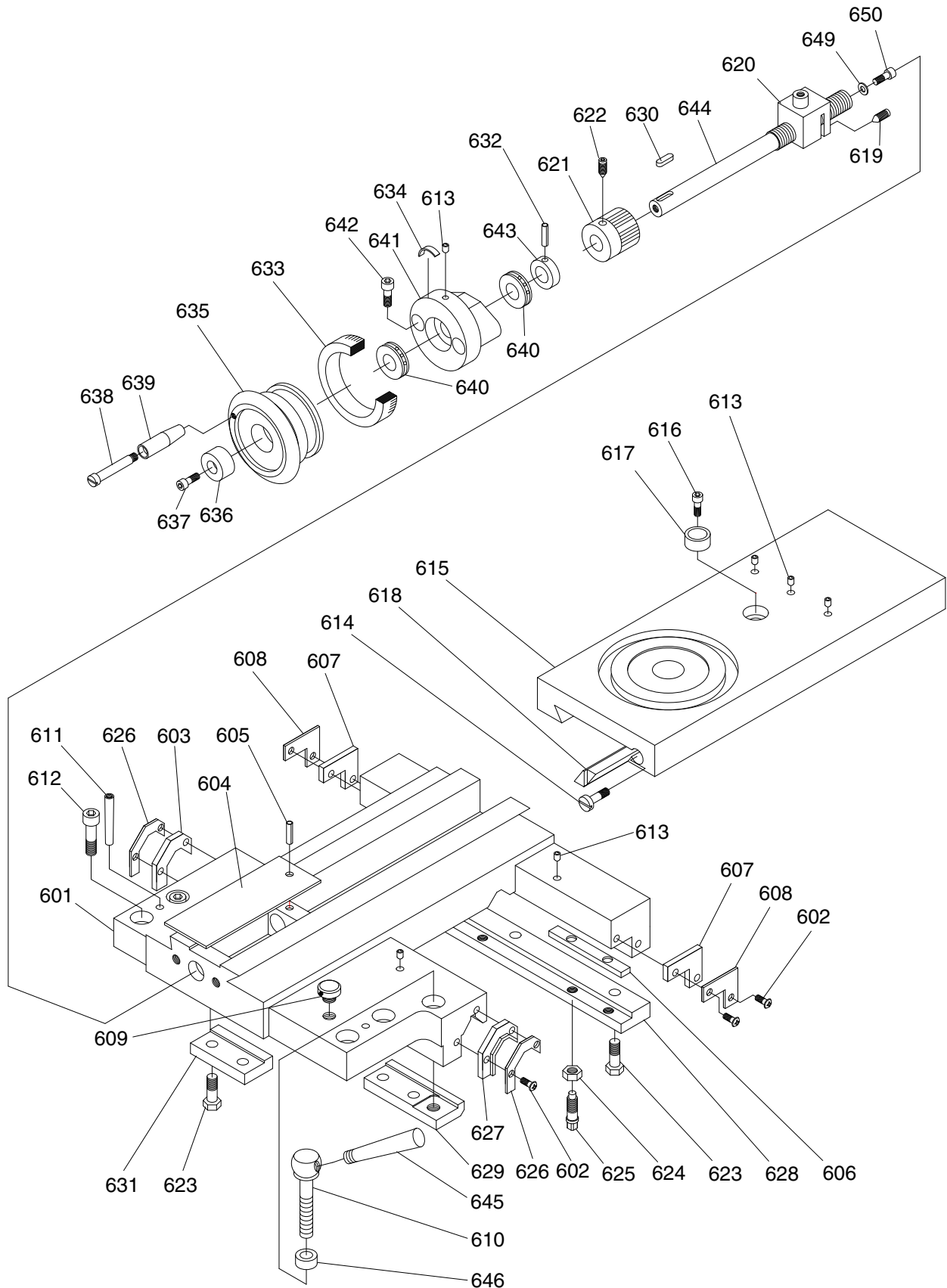
Apron Parts List

REF PART #	DESCRIPTION
501	P07760501 APRON CASTING
502	P07760502 HEX BOLT M8-1.25 X 30
503	P07760503 FLAT WASHER 8MM
504	P07760504 KEY 5 X 5 X 36
505	P07760505 WORM
506	P07760506 WORM BRACKET
507	P07760507 HALF NUT
508	P07760508 CAP SCREW M6-1 X 40
509	P07760509 HEX NUT M6-1
510	P07760510 HALF NUT HOUSING
511	P07760511 APRON GIB
512	P07760512 HEX BOLT M6-1 X 25
513	P07760513 SET SCREW M6-1 X 15
514	P07760514 SPACER
515	P07760515 THREAD DIAL BRACKET
516	P07760516 THREAD DIAL INDICATOR
517	P07760517 CAP SCREW M6-1 X 60
518	P07760518 GEAR 16T
519	P07760519 CAP SCREW M6-1 X 15
520	P07760520 SHAFT
521	P07760521 EXT RETAINING RING 18MM
522	P07760522 SET SCREW M6-1 X 6 CONE-PT
523	P07760523 GEAR 21T
524	P07760524 DOWEL PIN 5 X 10
525	P07760525 CAM SHAFT
526	P07760526 HEX BOLT M6-1 X 10
527	P07760527 FLAT WASHER 6MM
528	P07760528 SHAFT
529	P07760529 LOCATING BLOCK
530	P07760530 PULLEY
531	P07760531 HALF NUT LEVER
532	P07760532 TAPER PIN 5 X 40
533	P07760533 LEVER HUB
534	P07760534 SIGHT GLASS M22-1.5
535	P07760535 PHLP HD SCR M5-.8 X 12
536	P07760536 RACE
537	P07760537 ROLL PIN 4 X 30
538	P07760538 ROLL PIN 4 X 50
539	P07760539 GEAR 25T
540	P07760540 GEAR 51T

REF PART #	DESCRIPTION
541	P07760541 DOWEL PIN 5 X 33
542	P07760542 GEAR 43T
543	P07760543 STEEL BALL 6MM
544	P07760544 COMPRESSION SPRING
545	P07760545 SET SCREW M8-1.25 X 8
546	P07760546 SHAFT
547	P07760547 GEARED SHAFT 10T
548	P07760548 FEED SELECTION LEVER
549	P07760549 FEED SELECTION BRACKET
550	P07760550 CAP SCREW M6-1 X 45
551	P07760551 APRON DRAIN PLUG M10-1.5 X 1
552	P07760552 FLAT HD SCR M6-1 X 12
553	P07760553 FLANGE WASHER 6MM
554	P07760554 GEAR 24T
555	P07760555 KEY 5 X 5 X 10
556	P07760556 SHAFT
557	P07760557 CAP SCREW M5-.8 X 10
558	P07760558 LOCATING BLOCK
559	P07760559 ROLL PIN 5 X 25
560	P07760560 GEAR 14T
561	P07760561 SHAFT CAP
562	P07760562 GEARED SHAFT
563	P07760563 BALL OILER 6MM PRESS-IN
564	P07760564 SUPPORT HUB
565	P07760565 GRADUATED DIAL
566	P07760566 LEAF SPRING
567	P07760567 HANDWHEEL TYPE-16 136D X 13B-K X M10-1.5
568	P07760568 HOLLOW HANDLE 20 X 70, 12D
569	P07760569 SHOULDER SCREW M10-1.5 X 9, 12 X 63
570	P07760570 FLANGE WASHER 9MM
571	P07760571 CAP SCREW M8-1.25 X 24 HOLLOW
572	P07760572 SET SCREW M5-.8 X 30 DOG-PT
573	P07760573 SHAFT
574	P07760574 GEAR 25T
575	P07760575 GEARED SHAFT 11T
576	P07760576 SPACER
577	P07760577 ROLL PIN 5 X 30
578	P07760578 GEAR 50T
579	P07760579 SHAFT CAP



Cross Slide



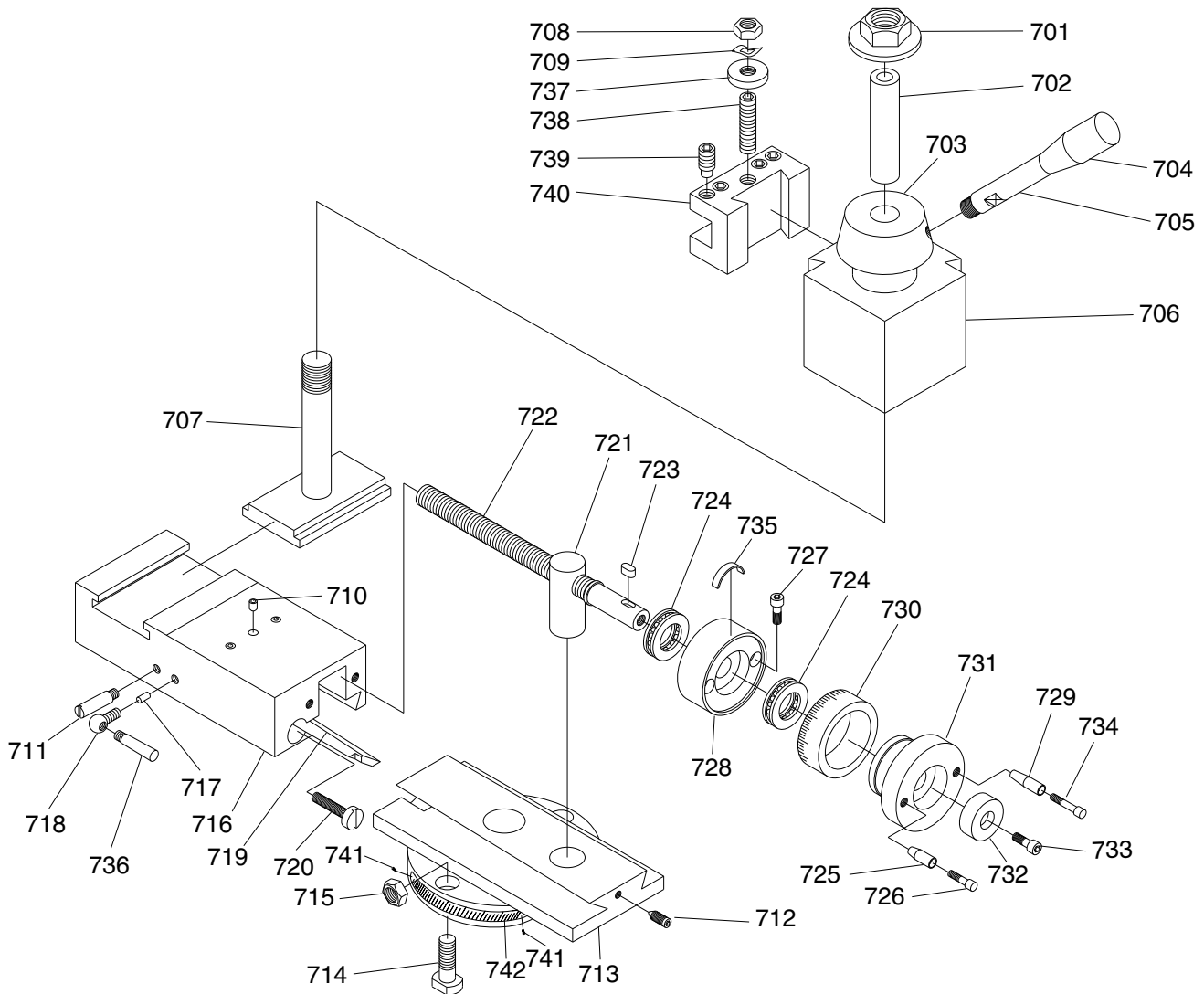
Cross Slide Parts List

REF PART #	DESCRIPTION
601	P07760601 SADDLE CASTING
602	P07760602 PHLP HD SCR M5-.8 X 12
603	P07760603 WIPER (FRONT LEFT)
604	P07760604 CROSS SLIDE LEADSCREW COVER
605	P07760605 ROLL PIN 3 X 10
606	P07760606 GIB STRIP
607	P07760607 WIPER SUPPORT PLATE (REAR)
608	P07760608 WIPER (REAR)
609	P07760609 APRON FILL PLUG M10-1.5 X 7
610	P07760610 CARRIAGE LOCK HANDLE SCREW
611	P07760611 TAPER PIN 6 X 45 INT THREADED
612	P07760612 CAP SCREW M10-1.5 X 30
613	P07760613 BALL OILER 6MM PRESS-IN
614	P07760614 GIB SCREW M6-1 X 30
615	P07760615 CROSS SLIDE
616	P07760616 CAP SCREW M6-1 X 12
617	P07760617 BUSHING
618	P07760618 CROSS SLIDE GIB
619	P07760619 SET SCREW M4-.7 X 12 CONE-PT
620	P07760620 CROSS SLIDE LEADSCREW NUT
621	P07760621 GEAR 13T
622	P07760622 SET SCREW M6-1 X 8 CONE-PT
623	P07760623 HEX BOLT M8-1.25 X 25
624	P07760624 HEX NUT M8-1.25

REF PART #	DESCRIPTION
625	P07760625 TOOLPOST SCREW M8-1.25 X 25
626	P07760626 WIPER SUPPORT PLATE (FRONT)
627	P07760627 WIPER (FRONT RIGHT)
628	P07760628 GIB SLIDE (REAR)
629	P07760629 GIB SLIDE (FRONT RIGHT)
630	P07760630 KEY 5 X 5 X 20
631	P07760631 GIB SLIDE (FRONT LEFT)
632	P07760632 ROLL PIN 4 X 25
633	P07760633 GRADUATED COLLAR
634	P07760634 PLATE SPRING
635	P07760635 HANDWHEEL TYPE-15 80D X 7B-K X M6-1
636	P07760636 BUSHING
637	P07760637 CAP SCREW M6-1 X 16
638	P07760638 SHOULDER SCREW M6-1 X10, 8 X 45
639	P07760639 HOLLOW HANDLE 15 X 50, 8D
640	P07760640 THRUST BEARING 51102
641	P07760641 HANDWHEEL BRACKET
642	P07760642 CAP SCREW M8-1.25 X 30
643	P07760643 BUSHING
644	P07760644 CROSS SLIDE LEADSCREW
645	P07760645 CARRIAGE LOCK HANDLE
646	P07760646 BUSHING
649	P07760649 FLAT WASHER 5MM
650	P07760650 CAP SCREW M5-.8 X 12



Compound Rest & Tool Post

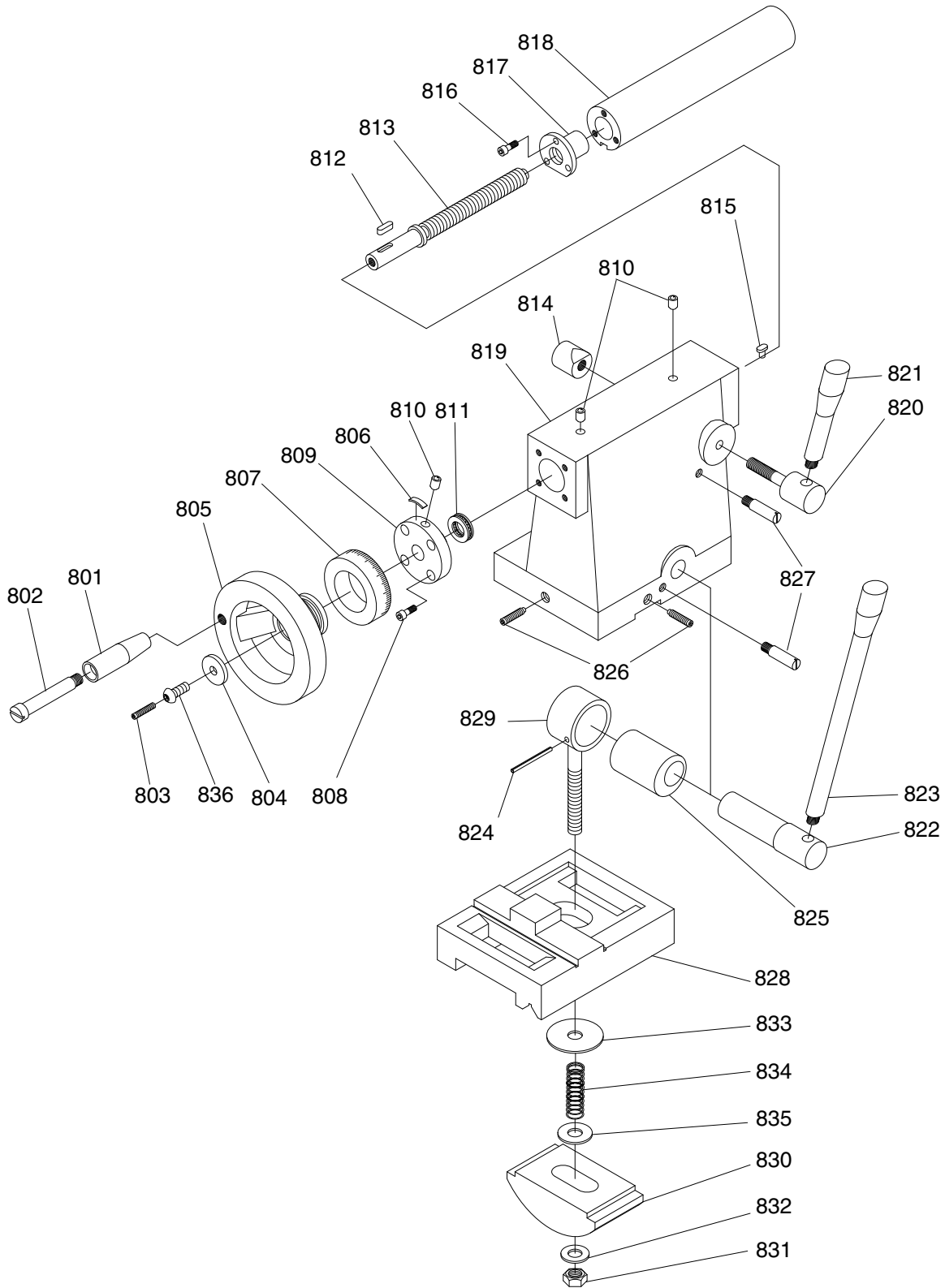


REF PART #	DESCRIPTION
701	P07760701 FLANGE NUT M16-2
702	P07760702 TOOLPOST SHAFT BUSHING
703	P07760703 TOOL POST LEVER HUB
704	P07760704 TOOL POST LEVER HANDLE
705	P07760705 TOOL POST LEVER
706	P07760706 QUICK CHANGE TOOLPOST BODY (200 SERIES)
707	P07760707 TOOL POST MOUNTING SHAFT
708	P07760708 HEX NUT M10-1 THIN
709	P07760709 WAVY WASHER 10MM
710	P07760710 BALL OILER 6MM PRESS-IN
711	P07760711 THREADED RETAINING PIN M6-1 X 6
712	P07760712 SET SCREW M6-1 X 16 CONE-PT
713	P07760713 COMPOUND REST
714	P07760714 T-BOLT M10-1.5 X 45, 12MM HEAD
715	P07760715 HEX NUT M10-1.5
716	P07760716 COMPOUND REST BODY
717	P07760717 LOCKING PIN
718	P07760718 LOCK HANDLE SCREW M6-1 X 12
719	P07760719 COMPOUND REST GIB
720	P07760720 GIB RETAINING SCREW M6-1 X 15
721	P07760721 LEADSCREW NUT

REF PART #	DESCRIPTION
722	P07760722 COMPOUND LEADSCREW
723	P07760723 KEY 4 X 4 X 8
724	P07760724 THRUST BEARING 51101
725	P07760725 HOLLOW HANDLE 12 X 25, 6D
726	P07760726 SHOULDER SCREW M5-.8 X 6, 6 X 20
727	P07760727 CAP SCREW M6-1 X 25
728	P07760728 BEARING HOUSING
729	P07760729 HOLLOW HANDLE 12 X 40, 6D
730	P07760730 COMPOUND REST GRADUATED COLLAR
731	P07760731 HANDWHEEL TYPE-15 60D X 7B-K X M5-.8
732	P07760732 BUSHING
733	P07760733 CAP SCREW M6-1 X 12
734	P07760734 SHOULDER SCREW M5-.8 X 6, 6 X 34
735	P07760735 LEAF SPRING
736	P07760736 COMPOUND REST LOCK HANDLE M6-1 X 6
737	P07760737 ROUND THUMB NUT M10-1
738	P07760738 SET SCREW M10-1 X 45
739	P07760739 SET SCREW M10-1.5 X 20 DOG-PT
740	P07760740 TURNING FACING TOOL HOLDER (200 SERIES)
741	P07760741 2 x 3MM, NAMEPLATE
742	P07760742 DEGREE SCALE



Tailstock



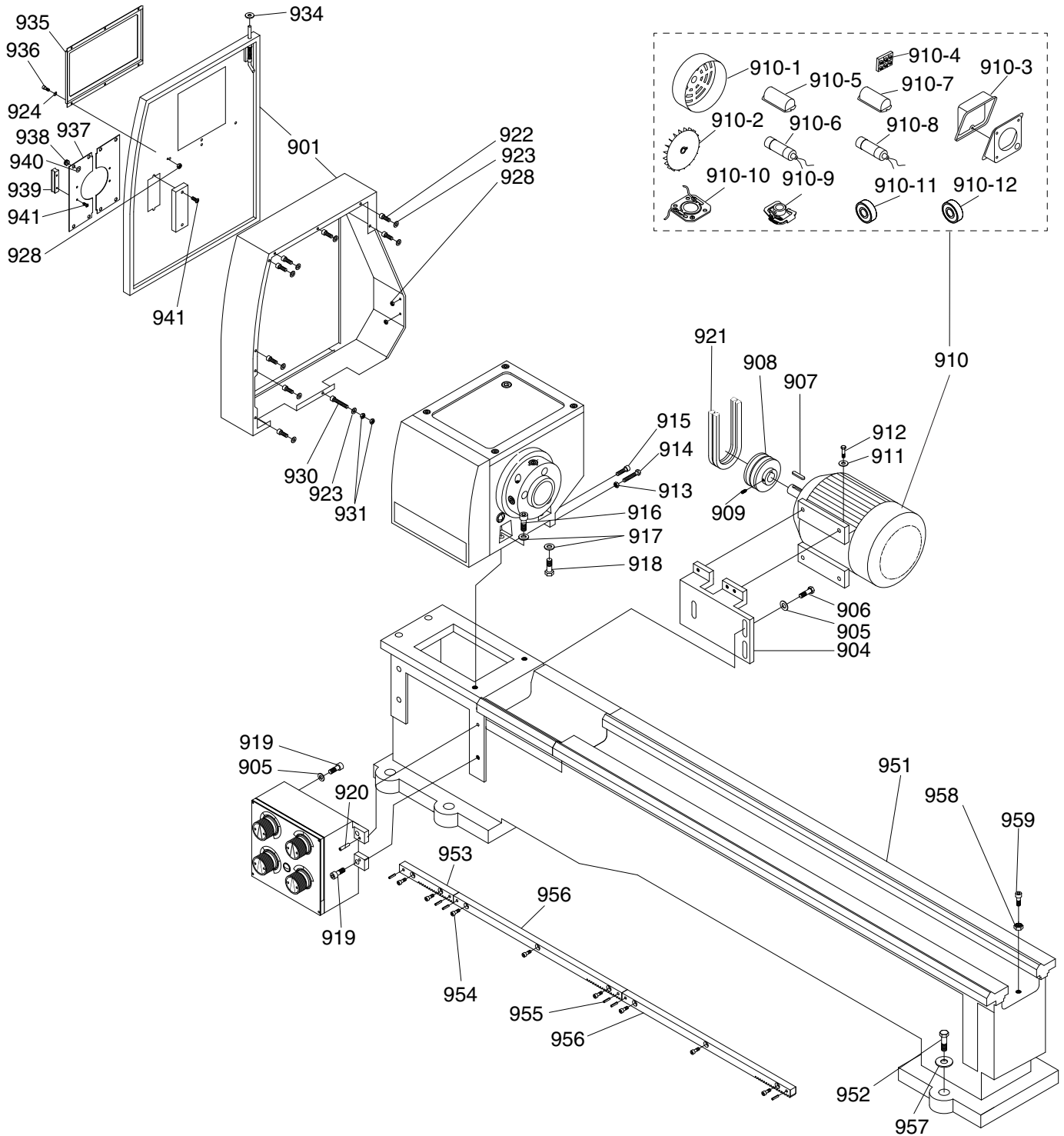
Tailstock Parts List

REF PART #	DESCRIPTION
801	P07760801 HOLLOW HANDLE 20 X 70, 12D
802	P07760802 SHOULDER SCREW M10-1.5 X 10, 12 X 63
803	P07760803 SET SCREW M5-.8 X 25
804	P07760804 FLAT WASHER 8MM
805	P07760805 HANDWHEEL TYPE-4 120D X 9B-K X M10-1.5
806	P07760806 LEAF SPRING
807	P07760807 TAILSTOCK GRADUATED COLLAR
808	P07760808 CAP SCREW M6-1 X 16
809	P07760809 QUILL LEADSCREW BRACKET
810	P07760810 BALL OILER 6MM PRESS-IN
811	P07760811 THRUST BEARING 51102
812	P07760812 KEY 4 X 4 X 15
813	P07760813 TAILSTOCK QUILL LEADSCREW
814	P07760814 TAILSTOCK QUILL LOCK NUT M8-1.25
815	P07760815 STEP KEY 4 x 4 x 6
816	P07760816 CAP SCREW M4-.7 X 12
817	P07760817 CAM
818	P07760818 TAILSTOCK QUILL

REF PART #	DESCRIPTION
819	P07760819 TAILSTOCK CASTING
820	P07760820 QUILL LOCK LEVER BASE M8-1.25 X 32
821	P07760821 QUILL LOCK LEVER HANDLE M8-1.25 X 8
822	P07760822 TAILSTOCK LOCK LEVER SHAFT
823	P07760823 TAILSTOCK LOCK LEVER HANDLE M8-1.5 X 10
824	P07760824 DOWEL PIN 5 X 30MM
825	P07760825 CAM SLEEVE
826	P07760826 SET SCREW M10-1.5 X 50 DOG-PT
827	P07760827 TAILSTOCK LOCKING SCREW
828	P07760828 TAILSTOCK BASE
829	P07760829 TAILSTOCK BLOCK M12-1.75 X 100
830	P07760830 TAILSTOCK CLAMP BLOCK
831	P07760831 HEX NUT M12-1.75
832	P07760832 FLAT WASHER 12MM
833	P07760833 FENDER WASHER 12MM
834	P07760834 COMPRESSION SPRING
835	P07760835 FENDER WASHER 12MM
836	P07760836 CAP SCREW M8-1.25 X 15 HOLLOW



Lathe Bed & Motor



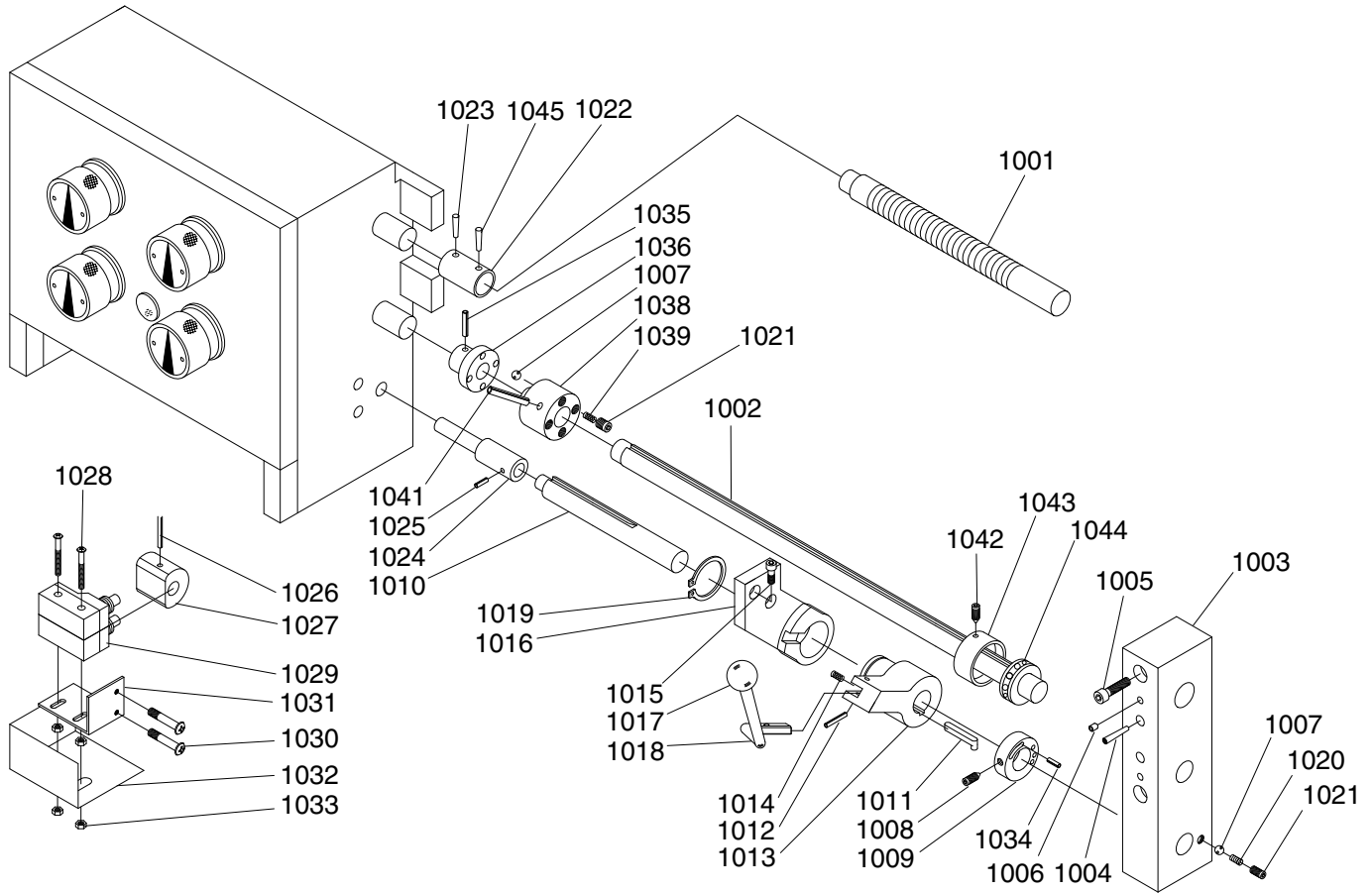
Lathe Bed & Motor Parts List

REF	PART #	DESCRIPTION
901	P07760901	GEAR ENCLOSURE W/DOOR
904	P07760904	MOTOR MOUNTING PLATE
905	P07760905	FLAT WASHER 10MM
906	P07760906	HEX BOLT M10-1.5 X 30
907	P07760907	KEY 8 X 8 X 35
908	P07760908	MOTOR PULLEY
909	P07760909	SET SCREW M6-1 X 8 CONE-PT
910	P07760910	MOTOR 2HP 220V 1-PH
910-1	P07760910-1	MOTOR FAN COVER
910-2	P07760910-2	MOTOR FAN
910-3	P07760910-3	MOTOR JUNCTION BOX
910-4	P07760910-4	MOTOR TERMINAL BLOCK
910-5	P07760910-5	S CAPACITOR COVER
910-6	P07760910-6	S CAPACITOR 150M 250V 1-5/8 X 3-1/8
910-7	P07760910-7	R CAPACITOR COVER
910-8	P07760910-8	R CAPACITOR 20M 450V 1-5/8 X 2-3/4
910-9	P07760910-9	CENTRIFUGAL SWITCH
910-10	P07760910-10	CONTACT PLATE
910-11	P07760910-11	FRONT BEARING
910-12	P07760910-12	REAR BEARING
911	P07760911	FLAT WASHER 8MM
912	P07760912	HEX BOLT M8-1.25 X 25
913	P07760913	HEX NUT M8-1.25
914	P07760914	HEX BOLT M8-1.25 X 45
915	P07760915	CAP SCREW M8-1.25 X 30
916	P07760916	CAP SCREW M12-1.75 X 35
917	P07760917	FLAT WASHER 12MM

REF	PART #	DESCRIPTION
918	P07760918	HEX BOLT M12-1.75 X 30
919	P07760919	CAP SCREW M10-1.5 X 30
920	P07760920	TAPER PIN 6 X 30
921	P07760921	V-BELT A33
922	P07760922	CAP SCREW M5-.8 X 8
923	P07760923	FLAT WASHER 5MM
924	P07760924	FLAT WASHER 4MM
928	P07760928	HEX NUT M4-.7
930	P07760930	CAP SCREW M5-.8 X 30
931	P07760932	HEX NUT M5-.8
934	P07760934	FENDER WASHER 5MM
935	P07760935	SPIDER SHIELD FLANGE
936	P07760936	CAP SCREW M4-.7 X 8
937	P07760937	SPIDER COVER
938	P07760938	DOOR SLIDE
939	P07760939	SPIDER DOOR HANDLE
940	P07760940	FLAT WASHER 6MM
941	P07760941	PHLP HD SCR M3-.5 X 6
951	P07760951	LATHE BED
952	P07760952	HEX BOLT M12-1.75 X 40
953	P07760953	BED GAP RACK
954	P07760954	CAP SCREW M6-1 X 15
955	P07760955	ROLL PIN 6 X 25
956	P07760956	BED LONGITUDINAL RACK
957	P07760957	FLAT WASHER 12MM
958	P07760958	HEX NUT M10-1.5
959	P07760959	CAP SCREW M10-1.5 X 35



Feed Rod



REF PART # DESCRIPTION

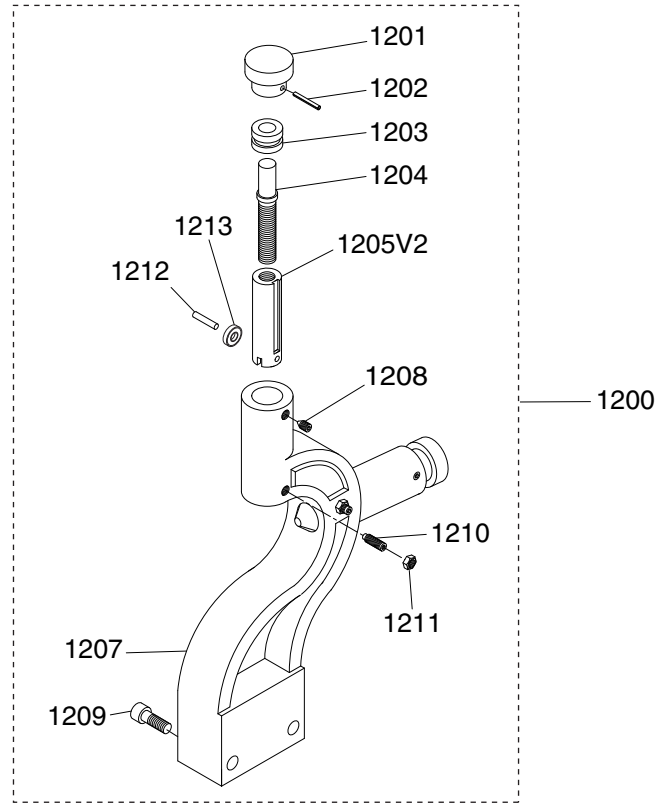
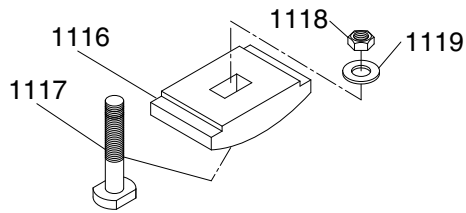
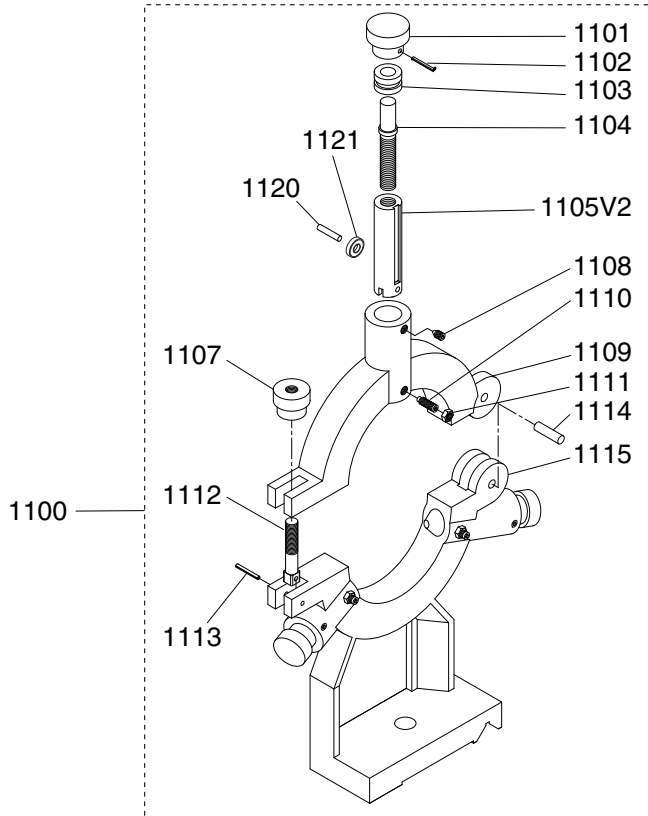
1001	P07761001	LEADSCREW
1002	P07761002	FEED ROD
1003	P07761003	SHAFT END BRACKET
1004	P07761004	TAPER PIN 6 X 45 INT THREADED
1005	P07761005	CAP SCREW M8-1.25 X 60
1006	P07761006	BALL OILER 6MM PRESS-IN
1007	P07761007	STEEL BALL 6MM
1008	P07761008	SET SCREW M6-1 X 10 CONE-PT
1009	P07761009	LOCK COLLAR
1010	P07761010	SPINDLE ROD
1011	P07761011	KEY 4 X 4 X 20
1012	P07761012	ROLL PIN 4 X 25
1013	P07761013	SPINDLE ROD HANDLE HUB
1014	P07761014	COMPRESSION SPRING 1 X 10 X 12
1015	P07761015	CAP SCREW M6-1 X 12
1016	P07761016	SPINDLE ROD HUB BRACKET
1017	P07761017	HANDLE BALL 32MM DIA X M10-1.5
1018	P07761018	SPINDLE ON/OFF LEVER
1019	P07761019	EXT RETAINING RING 32MM
1020	P07761020	COMPRESSION SPRING 1 X 5 X 30
1021	P07761021	SET SCREW M8-1.25 X 8
1022	P07761022	LEADSCREW COUPLER SLEEVE

REF PART # DESCRIPTION

1023	P07761023	TAPER PIN 4 X 24
1024	P07761024	COUPLER SHAFT
1025	P07761025	ROLL PIN 4 X 20
1026	P07761026	ROLL PIN 4 X 30
1027	P07761027	SPINDLE ROD CONTROL CAM
1028	P07761028	PHLP HD SCR M4-.7 X 50
1029	P07761029	SPINDLE ON/OFF SWITCH LXW5-11M
1030	P07761030	PHLP HD SCR M4-.7 X 20
1031	P07761031	BRACKET
1032	P07761032	COVER
1033	P07761033	HEX NUT M4-.7
1034	P07761034	ROLL PIN 4 X 12
1035	P07761035	ROLL PIN 5 X 25
1036	P07761036	CLUTCH COLLAR
1038	P07761038	CLUTCH
1039	P07761039	COMPRESSION SPRING 1 X 6 X 25
1041	P07761041	ROLL PIN 4 X 22
1042	P07761042	SET SCREW M6-1 X 10 CONE-PT
1043	P07761043	BEARING COVER
1044	P07761044	THRUST BEARING 51104
1045	P07761045	TAPER PIN 4 X 24 COPPER



Steady Rest & Follow Rest



REF	PART #	DESCRIPTION
1100	P07761100	COMPLETE STEADY REST
1101	P07761101	PINNED KNOB
1102	P07761102	ROLL PIN 3 X 20
1103	P07761103	COLLAR
1104	P07761104	JACK SCREW M10-1.5 X 30
1105V2	P07761105V2	FINGER SLIDE 63MM V2.06.15
1107	P07761107	KNURLED THUMB KNOB M10-1.5
1108	P07761108	SET SCREW M6-1 X 10 CONE-PT
1109	P07761109	STEADY REST UPPER BODY
1110	P07761110	SET SCREW M6-1 X 16 DOG-PT
1111	P07761111	HEX NUT M6-1

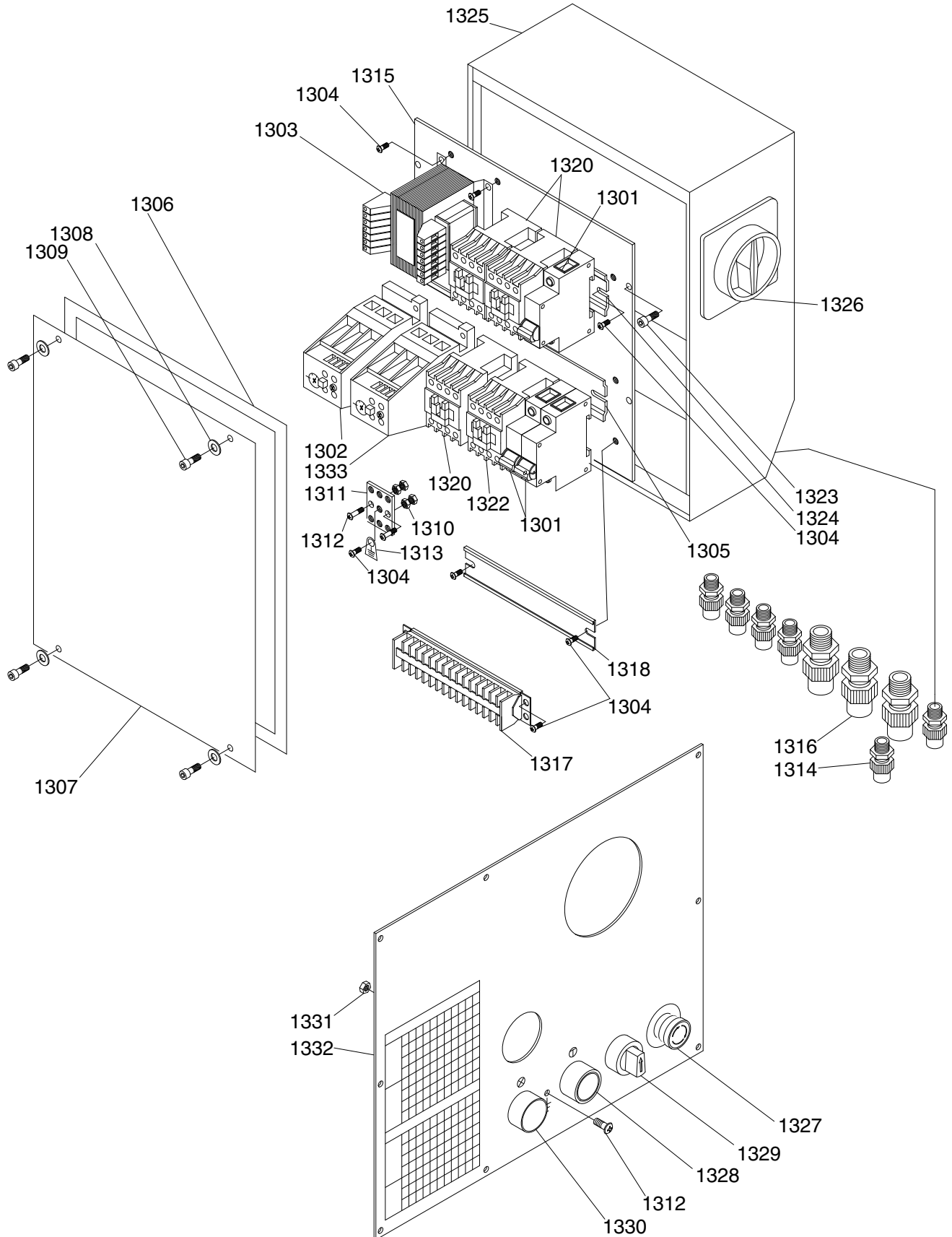
REF	PART #	DESCRIPTION
1112	P07761112	PIVOT STUD M10-1.5 X 25
1113	P07761113	DOWEL PIN 4 X 20
1114	P07761114	DOWEL PIN 6 X 20
1115	P07761115	STEADY REST BASE BODY
1116	P07761116	CLAMP BLOCK
1117	P07761117	T-BOLT M12-1.75 X 65
1118	P07761118	HEX NUT M12-1.75
1119	P07761119	FLAT WASHER 12MM
1120	P07761120	DOWEL PIN 5 X 16
1121	P07761121	BALL BEARING 625ZZ

REF	PART #	DESCRIPTION
1200	P07761200	COMPLETE FOLLOW REST
1201	P07761201	PINNED KNOB
1202	P07761202	ROLL PIN 3 X 20
1203	P07761203	COLLAR
1204	P07761204	JACK SCREW M10-1.5 X 30
1205V2	P07761205V2	FINGER SLIDE 52MM V2.06.15
1207	P07761220	FOLLOW REST BODY

REF	PART #	DESCRIPTION
1208	P07761208	SET SCREW M6-1 X 10 CONE-PT
1209	P07761209	CAP SCREW M8-1.25 X 40
1210	P07761210	SET SCREW M6-1 X 16 DOG-PT
1211	P07761211	HEX NUT M6-1
1212	P07761212	DOWEL PIN 5 X 16
1213	P07761213	BALL BEARING 625ZZ



Electrical



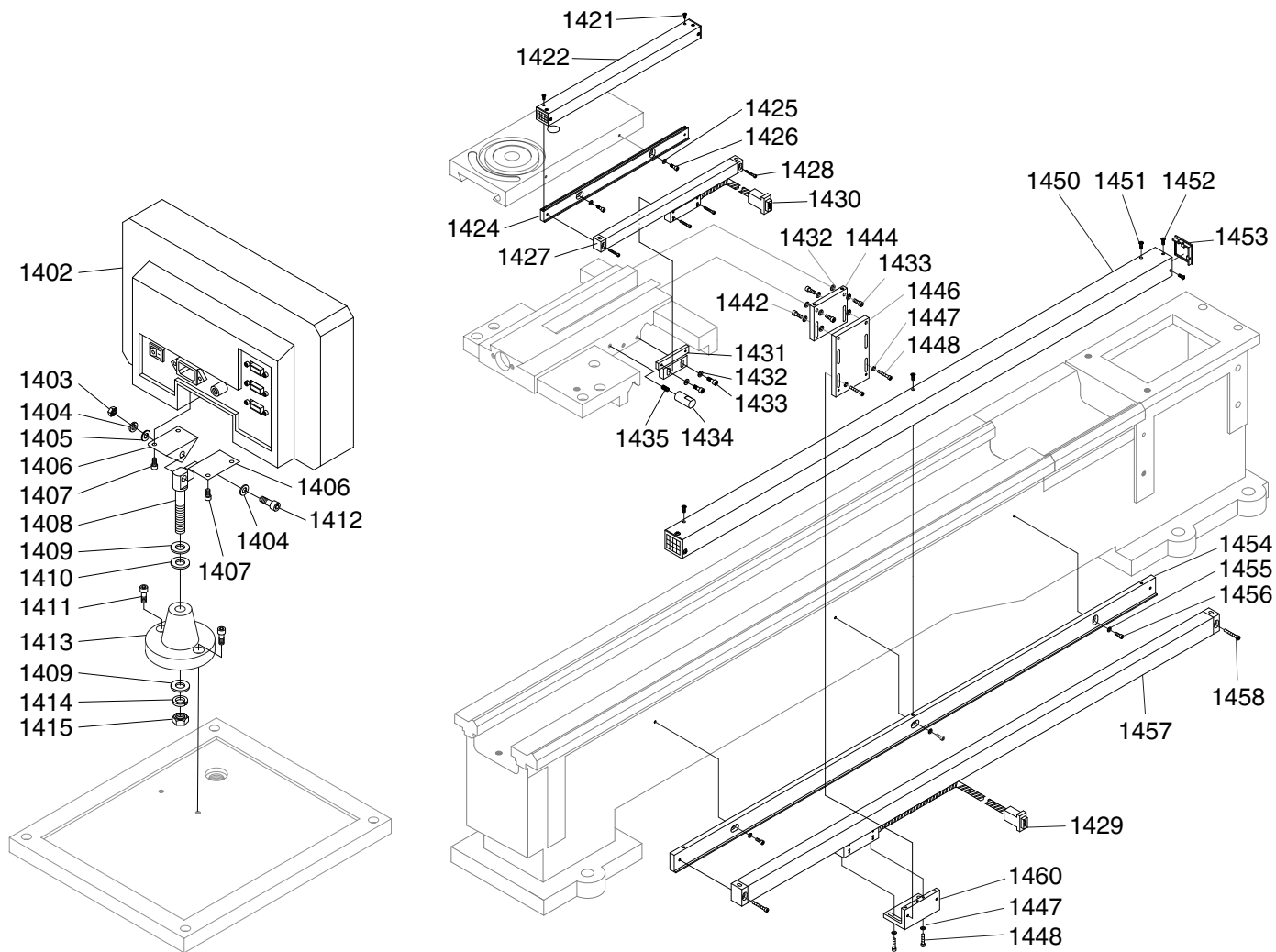
Electrical Parts List

REF	PART #	DESCRIPTION
1301	P07761301	CIRCUIT BREAKER 3A DZ47-63C3 1P
1302	P07761302	OL RELAY JRS2-63 0.25-0.4A
1303	P07761303	TRANSFORMER JBK5-100VA-TH
1304	P07761304	PHLP HD SCR M4-.7 X 6
1305	P07761305	DIN RAIL LOWER
1306	P07761306	RUBBER GASKET
1307	P07761307	ELECTRICAL ENCLOSURE COVER
1308	P07761308	FLAT WASHER 4MM
1309	P07761309	CAP SCREW M4-.7 X 10
1310	P07761310	HEX NUT M5-.8
1311	P07761311	GROUNDING BLOCK
1312	P07761312	PHLP HD SCR M4-.7 X 12
1313	P07761313	EARTH GROUND LABEL
1314	P07761314	STRAIN RELIEF TYPE-3 M16-2
1315	P07761315	ELECTRICAL BOX MOUNTING PLATE
1316	P07761316	STRAIN RELIEF TYPE-3 M20-2.5 ST

REF	PART #	DESCRIPTION
1317	P07761317	TERMINAL BAR 16P
1318	P07761318	DIN RAIL GROUND
1320	P07761320	CONTACTOR DELIXI CJX2-0901 24V
1322	P07761322	CONTACTOR JZC4-40 24V
1323	P07761323	CAP SCREW M5-.8 X 12
1324	P07761324	DIN RAIL UPPER
1325	P07761325	ELECTRICAL BOX
1326	P07761326	MAIN POWER SWITCH LW26-20 GS-20/04-2
1327	P07761327	E-STOP BUTTON MINGER LA125H-BE1022
1328	P07761328	JOG BUTTON MINGER LA125H-BE101C
1329	P07761329	COOLANT PUMP SWITCH DELIXI LAY3-11/2
1330	P07761330	POWER LIGHT MINGER AD62-22D/S 23/24V
1331	P07761331	HEX NUT M4-.7
1332	P07761332	HEADSTOCK FACEPLATE
1333	P07761333	OL RELAY JRS2-63/25D 8-12.5A



Digital Readout



REF PART # DESCRIPTION

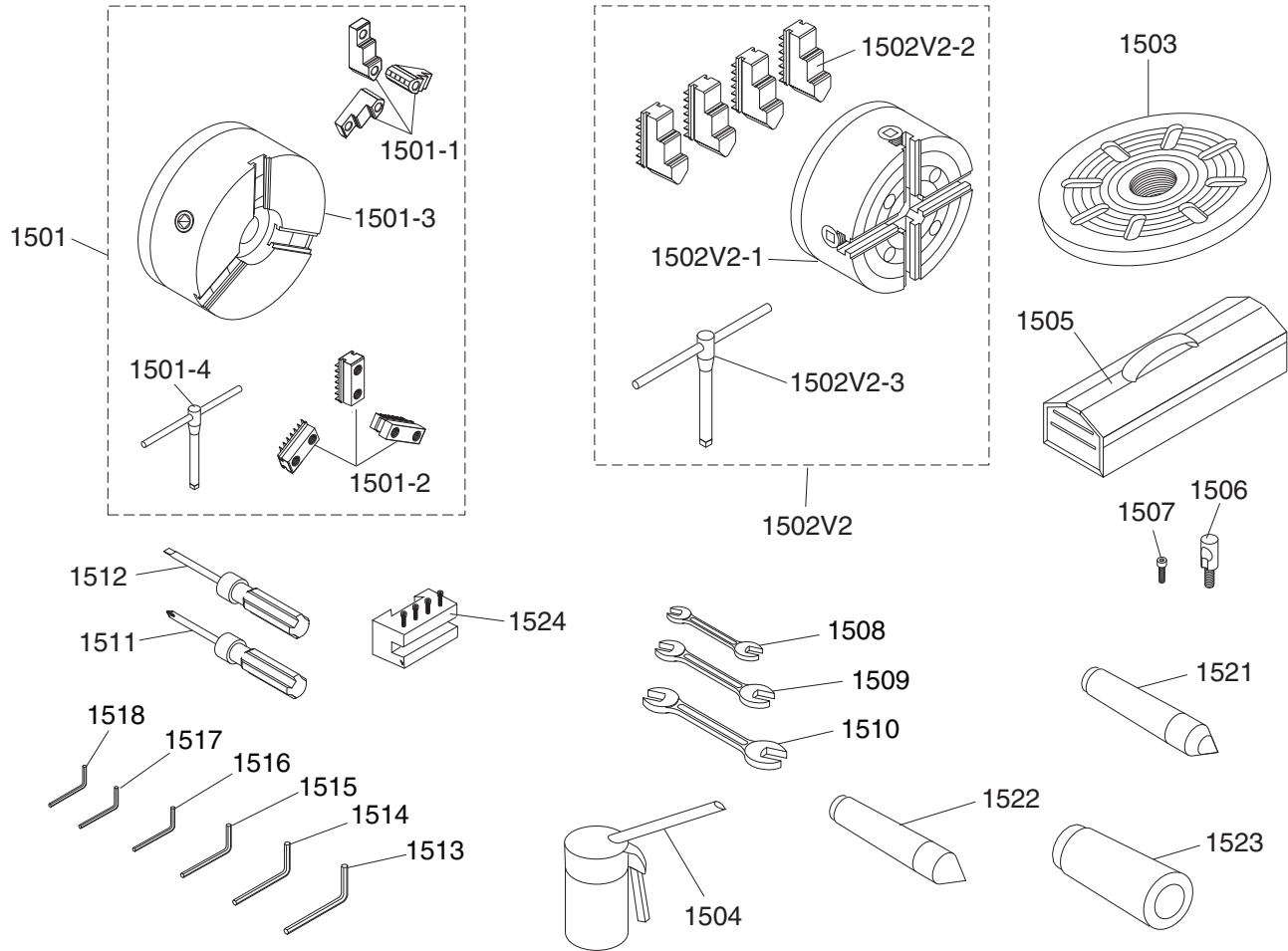
1402	P07761402	DRO DISPLAY
1403	P07761403	HEX NUT M6-1
1404	P07761404	FLAT WASHER 6MM
1405	P07761405	LOCK WASHER 6MM
1406	P07761406	DISPLAY MOUNT PLATE
1407	P07761407	CAP SCREW M4-.7 X 10
1408	P07761408	DISPLAY MOUNT POST
1409	P07761409	FLAT WASHER 10MM
1410	P07761410	FLAT WASHER 10MM PLASTIC
1411	P07761411	CAP SCREW M5-.8 X 14
1412	P07761412	CAP SCREW M6-1 X 30
1413	P07761413	DISPLAY MOUNT BASE
1414	P07761414	LOCK WASHER 10MM
1415	P07761415	HEX NUT M10-1.5
1421	P07761421	PHLP HD SCR M3-.5 X 6
1422	P07761422	DRO CROSS SLIDE SENSOR COVER
1424	P07761424	DRO CROSS SLIDE ADAPTER PLATE
1425	P07761425	FLAT WASHER 4MM
1426	P07761426	CAP SCREW M4-.7 X 12
1427	P07761427	DRO CROSS SLIDE POSITION SENSOR 220MM
1428	P07761428	CAP SCREW M3-.5 X 20
1429	P07761429	BNC CONNECTOR (KA300)

REF PART # DESCRIPTION

1430	P07761430	BNC CONNECTOR (KA500)
1431	P07761431	SADDLE ADAPTER PLATE
1432	P07761432	FLAT WASHER 5MM
1433	P07761433	CAP SCREW M5-.8 X 20
1434	P07761434	HARD STOP
1435	P07761435	SET SCREW M6-1 X 15
1442	P07761442	CAP SCREW M5-.8 X 25
1444	P07761444	DRO ADAPTER PLATE
1446	P07761446	DRO SENSOR PLATE
1447	P07761447	FLAT WASHER 4MM
1448	P07761448	CAP SCREW M4-.7 X 20
1450	P07761450	DRO POSITION SENSOR COVER
1451	P07761451	FLAT HD SCR M4-.7 X 6
1452	P07761452	TAP SCREW M4 X 35
1453	P07761453	END CAP
1454	P07761454	DRO POSITION SENSOR MOUNTING PLATE
1455	P07761455	FLAT WASHER 4MM THIN
1456	P07761456	CAP SCREW M4-.7 X 25
1457	P07761457	DRO POSITION SENSOR 1020MM
1458	P07761458	CAP SCREW M4-.7 X 30
1460	P07761460	DRO POSITION SENSOR ANGLE BRACKET



Accessories

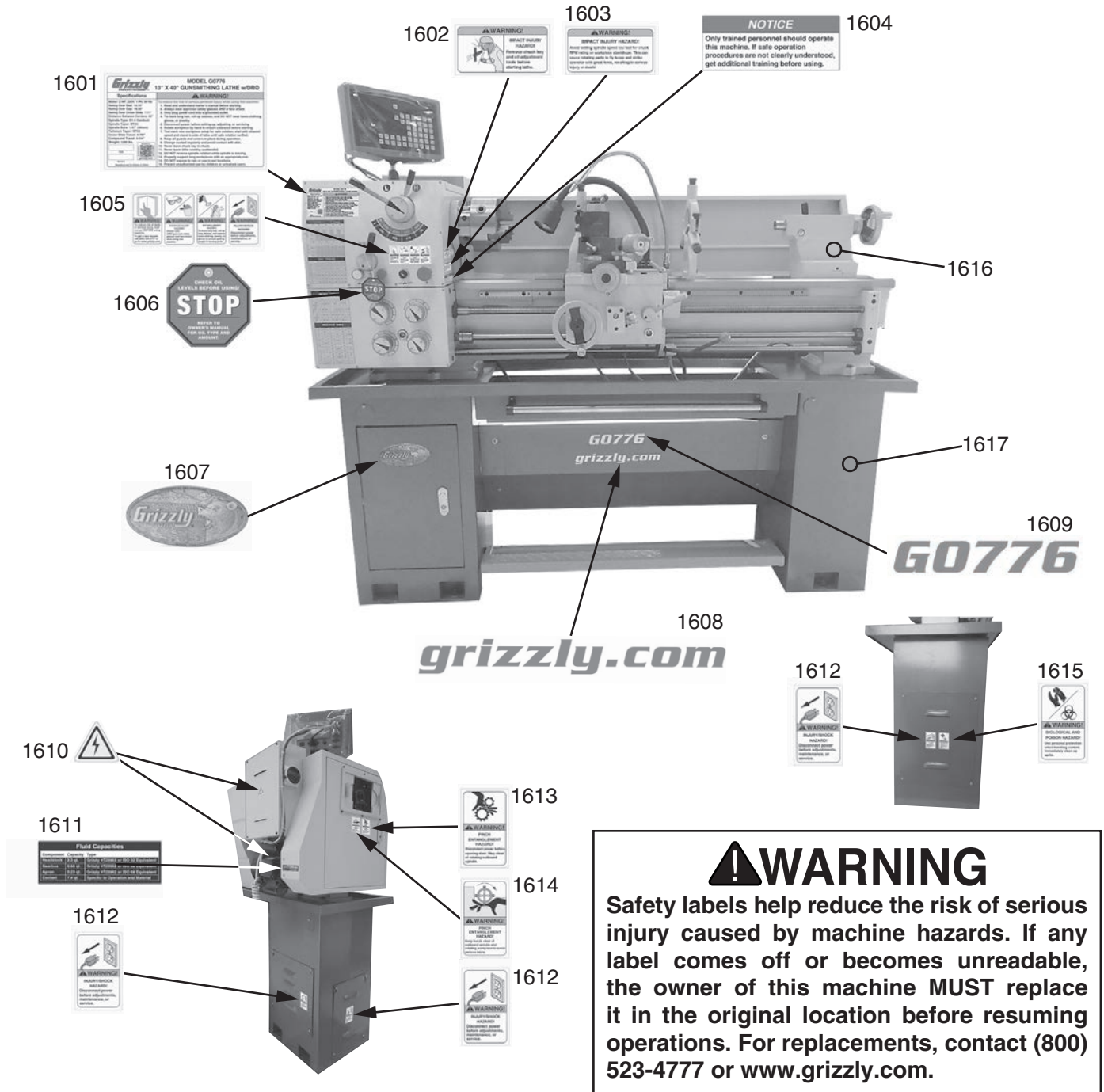


REF	PART #	DESCRIPTION
1501	P07761501	3-JAW SCROLL CHUCK ASSEMBLY
1501-1	P07761501-1	3-JAW SCROLL CHUCK TOP JAW SET
1501-2	P07761501-2	3-JAW SCROLL CHUCK BTM JAW SET
1501-3	P07761501-3	3-JAW CHUCK 6" D1-4
1501-4	P07761501-4	3-JAW CHUCK WRENCH
1502V2	P07761502V2	4-JAW UNIV CHUCK ASSY V2.08.16
1502V2-1	P07761502V2-1	4-JAW UNIV CHUCK 8" D1-4 V2.08.16
1502V2-2	P07761502V2-2	4-JAW CHUCK REV JAW SET V2.08.16
1502V2-3	P07761502V2-3	4-JAW CHUCK WRENCH V2.08.16
1503	P07761503	FACEPLATE 10" D1-4
1504	P07761504	BOTTLE FOR OIL
1505	P07761505	TOOLBOX
1506	P07761506	CAMLOCK STUD D1-4
1507	P07761507	CAP SCREW M6-1 X 14
1508	P07761508	WRENCH 9 X 11MM OPEN-ENDS

REF	PART #	DESCRIPTION
1509	P07761509	WRENCH 10 X 12MM OPEN-ENDS
1510	P07761510	WRENCH 12 X 14MM OPEN-ENDS
1511	P07761511	SCREWDRIVER PHILLIPS #2
1512	P07761512	SCREWDRIVER FLAT #2
1513	P07761513	HEX WRENCH 10MM
1514	P07761514	HEX WRENCH 8MM
1515	P07761515	HEX WRENCH 6MM
1516	P07761516	HEX WRENCH 5MM
1517	P07761517	HEX WRENCH 4MM
1518	P07761518	HEX WRENCH 3MM
1521	P07761521	DEAD CENTER MT#3 CARBIDE-TIP
1522	P07761522	DEAD CENTER MT#3 HSS
1523	P07761523	SPINDLE SLEEVE MT#3-MT#5
1524	P07761524	TOOL HOLDER 200-SERIES



Labels & Cosmetics



REF	PART #	DESCRIPTION
1601	P07761601	MACHINE ID LABEL
1602	P07761602	IMPACT INJURY LABEL
1603	P07761603	SPINDLE SPEED HAZARD LABEL
1604	P07761604	TRAINED PERSONNEL NOTICE LABEL
1605	P07761605	SAFETY WARNING LABEL 1-PC
1606	P07761606	STOP OIL FILL TAG
1607	P07761607	GRIZZLY NAMEPLATE - MINI
1608	P07761608	GRIZZLY.COM LABEL
1609	P07761609	MODEL NUMBER LABEL

REF	PART #	DESCRIPTION
1610	P07761610	ELECTRICITY LABEL
1611	P07761611	FLUID CAPACITY LABEL
1612	P07761612	DISCONNECT POWER LABEL
1613	P07761613	PINCH/ENTANGLEMENT LABEL
1614	P07761614	SPIDER ENTAGLEMENT LABEL
1615	P07761615	BIOLOGICAL/POISON LABEL
1616	P07761616	TOUCH-UP PAINT, GRIZZLY PUTTY
1617	P07761617	TOUCH-UP PAINT, GRIZZLY GREEN





WARRANTY CARD

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<input type="checkbox"/> Handy	<input type="checkbox"/> Projects in Metal	<input type="checkbox"/> Woodwork
<input type="checkbox"/> Home Shop Machinist	<input type="checkbox"/> RC Modeler	<input type="checkbox"/> Woodworker West
<input type="checkbox"/> Journal of Light Cont.	<input type="checkbox"/> Rifle	<input type="checkbox"/> Woodworker's Journal
<input type="checkbox"/> Live Steam	<input type="checkbox"/> Shop Notes	<input type="checkbox"/> Other:
<input type="checkbox"/> Model Airplane News	<input type="checkbox"/> Shotgun News	
<input type="checkbox"/> Old House Journal	<input type="checkbox"/> Today's Homeowner	
<input type="checkbox"/> Popular Mechanics	<input type="checkbox"/> Wood	

3. What is your annual household income?

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4. What is your age group?

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 50-59 60-69 70+

5. How long have you been a woodworker/metalworker?

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

Yes No

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Yes No

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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.

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