MODEL G0998
10" X 30" VARIABLE-SPEED METAL LATHE
OWNER'S MANUAL
(For models manufactured since 12/24)

#CS23514 PRINTED IN CHINA V1.05.25

******Keep for Future Reference******

⚠ WARNING!

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

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

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

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

⚠ WARNING!

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

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

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

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INTRODUCTION

Contact Info

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

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

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

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

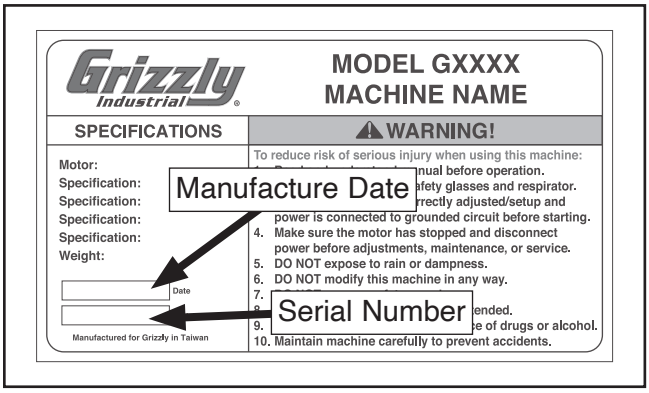
Manual Accuracy

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

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

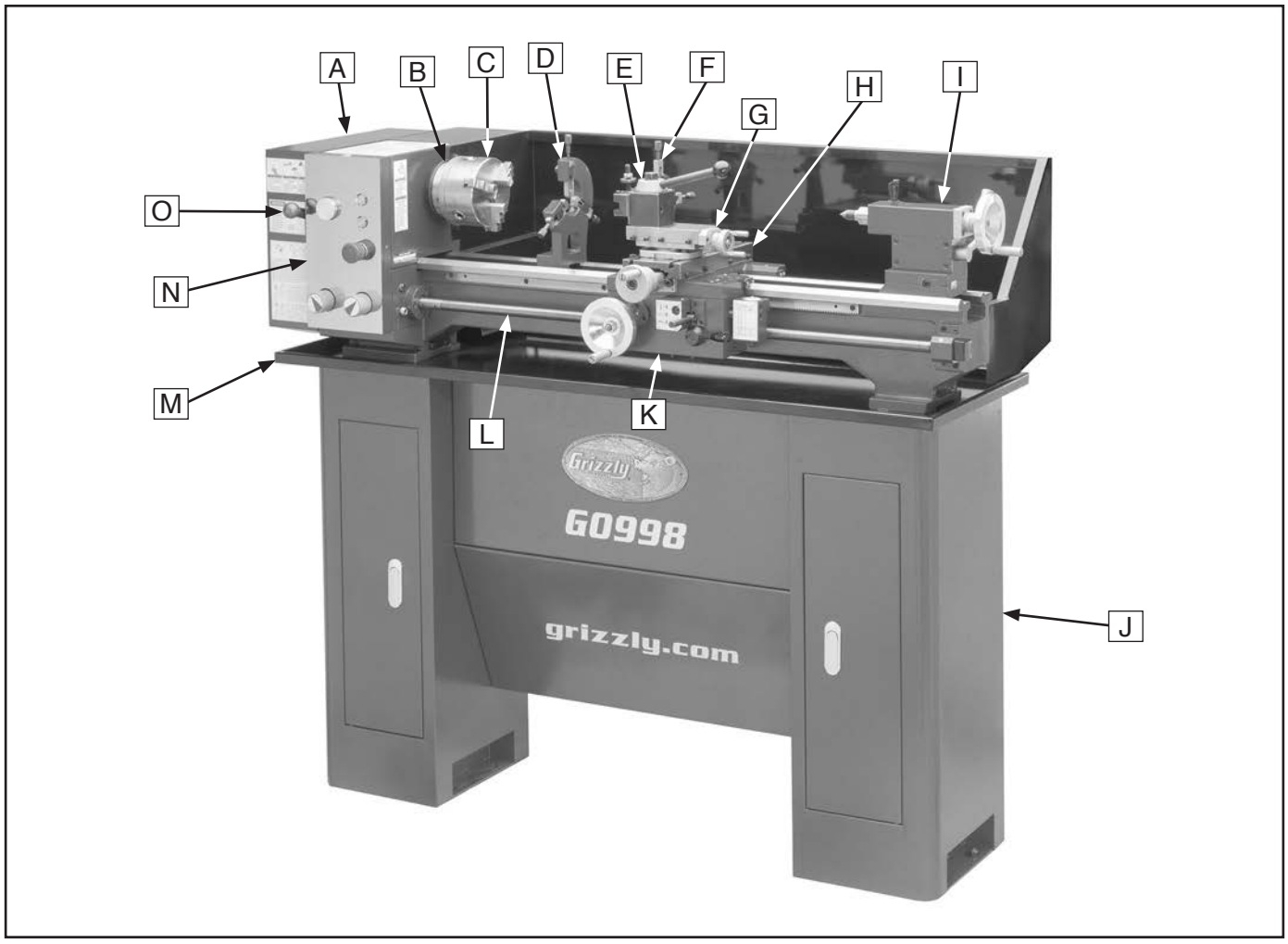
If you find this to be the case, and the difference between the manual and machine leaves you confused or unsure about something, check our website for an updated version. We post current manuals and manual updates for free on our website at **www.grizzly.com**.

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

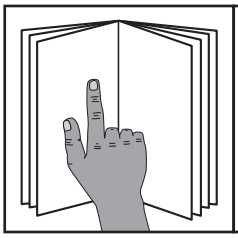


Identification

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



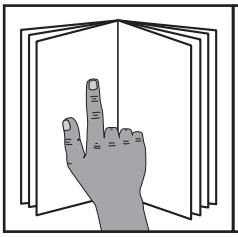
A. Headstock
B. MT#4 Spindle
C. 3-Jaw Chuck 5"
D. Steady Rest
E. Quick-Change Tool Post
F. Follow Rest
G. Compound Rest
H. Cross Slide
I. Tailstock
J. Storage Cabinet
K. Carriage
L. Longitudinal Leadscrew
M. Chip Tray
N. Control Panel
O. Feed Direction Lever



⚠WARNING

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

Controls & Components



⚠WARNING

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

Refer to the following figures and descriptions to become familiar with the basic controls and components of this machine. Understanding these items and how they work will help you understand the rest of the manual and minimize your risk of injury when operating this machine.

Headstock

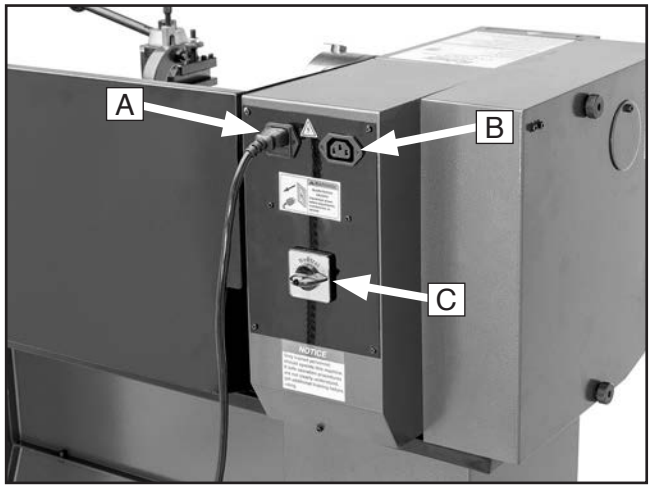


Figure 1. Rear headstock controls.

A. Power Receptacle: Connects incoming power cord and protects machine from overload with fuse.

B. Auxiliary Receptacle: Connects optional mill attachment to provide mill power.

C. Master Power Switch: Turns incoming power ***ON*** when turned to "Lathe," and turns incoming power ***OFF*** when turned to "Neutral."

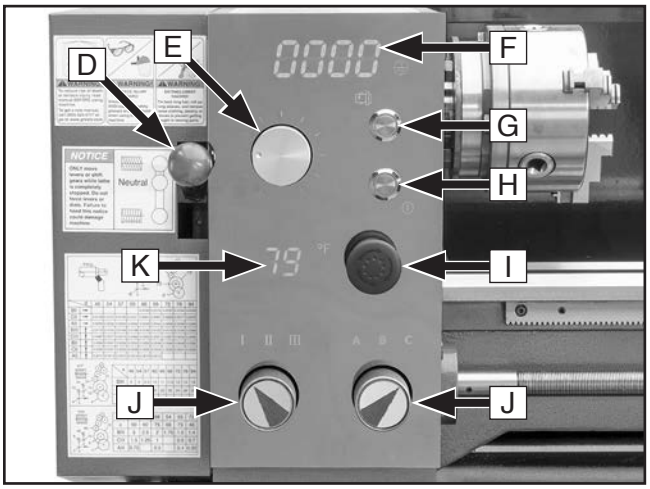


Figure 2. Front headstock controls.

D. Feed Direction Lever: Controls rotation direction of longitudinal leadscrew.

E. Spindle Speed Dial: Turn clockwise to increase spindle speed; turn counterclockwise to decrease spindle speed.

F. Spindle Speed Digital Readout: Shows spindle speed in rotations per minute (RPM).

G. Reverse Button: Changes spindle rotation direction. Illuminates when spindle rotates clockwise. Spindle rotation does not need to be stopped before rotation is reversed.

H. Start/Stop Button: Starts and stops spindle rotation. Illuminated while spindle is turning.

I. Emergency Stop Button: Stops machine and disables power until reset. Twist clockwise to reset.

J. Quick-Change Gearbox Dials: Control longitudinal leadscrew speed for threading and feeding operations.

K. Temperature Digital Readout: Shows current room temperature.

Carriage

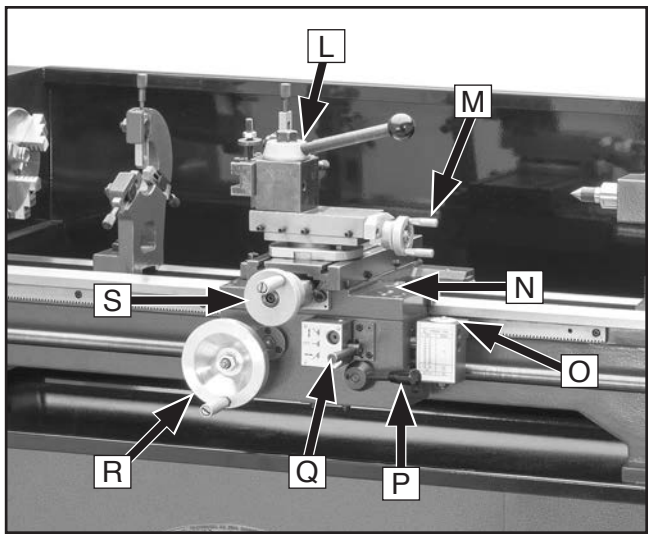


Figure 3. Carriage controls.

L. Quick-Change Tool Post: Allows operator to quickly load and unload tools/tool holders.

M. Compound Rest Handwheel: Moves cutting tool towards or away from workpiece at present angle of compound rest. Dial is graduated in increments of 0.001" (0.05" per full revolution).

N. Carriage Lock Screw: Secures carriage in place for greater rigidity when it should not move.

O. Thread Dial: Indicates when to engage half nut during inch threading operations.

P. Half Nut Lever: Engages/disengages half nut for threading operations.

Q. Feed Selection Lever: Selects power feed for carriage or cross slide.

R. Carriage Handwheel: Moves carriage longitudinally along bed. Dial is graduated in increments of 0.02" (0.68" per full revolution).

S. Cross Slide Handwheel: Moves cross slide towards and away from workpiece. Dial is graduated in increments of 0.001" (0.1" per full revolution).

Tailstock

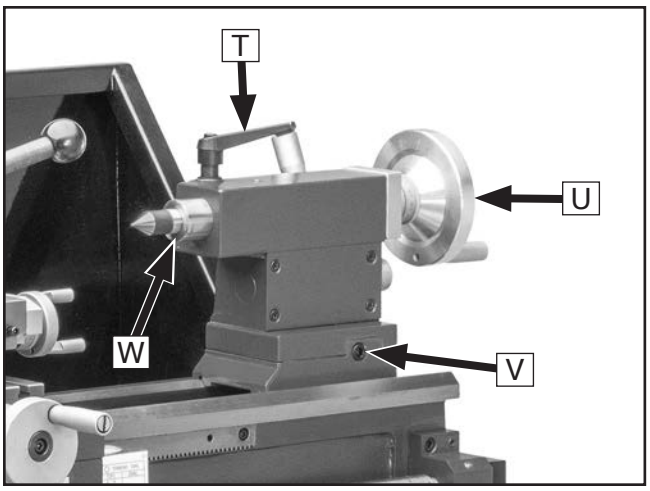


Figure 4. Front tailstock controls.

T. Quill Lock Lever: Secures quill in position.

U. Quill Handwheel: Moves quill toward or away from spindle. Dial is graduated in increments of 0.001" (0.1" per full revolution).

V. Tailstock Offset Screw (1 of 2): Adjusts tailstock offset left or right from spindle centerline.

W. Quill: Holds center or tooling.

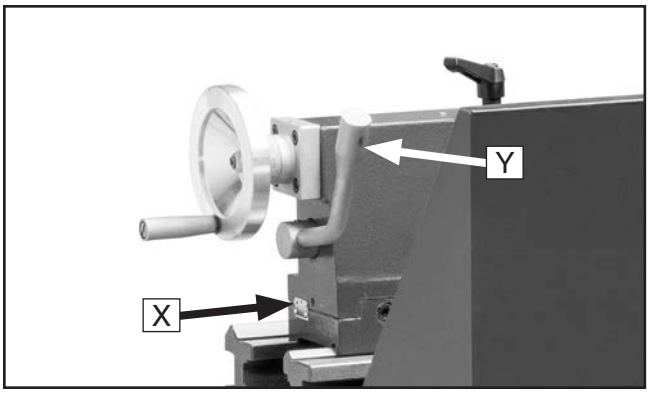


Figure 5. Rear tailstock controls.

X. Offset Scale: Indicates relative distance of tailstock offset left or right from spindle centerline.

Y. Tailstock Lock Lever: Secures tailstock in position along bedway.

Rests

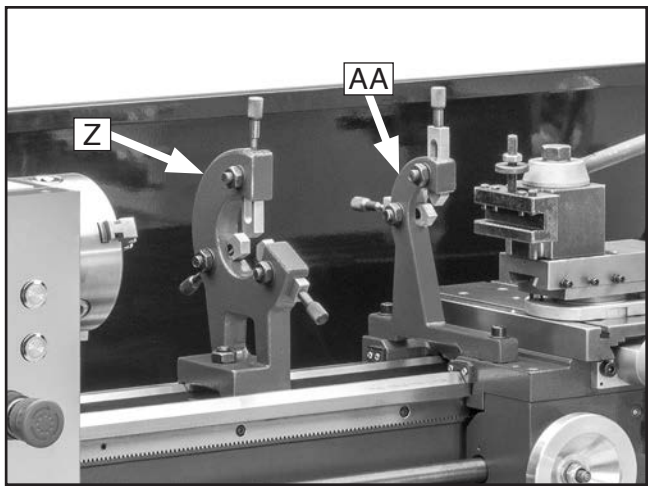


Figure 6. Steady and follow rests.

Z. Steady Rest: Positions along bedway to support long, small diameter shafts and prevent workpiece deflection.

AA. Follow Rest: Attaches to carriage to support long, small diameter shafts and prevent workpiece deflection.

End Gears

The configuration of the end gears (see **Figure 7**) controls the speed of the longitudinal leadscrew for threading and feeding operations.

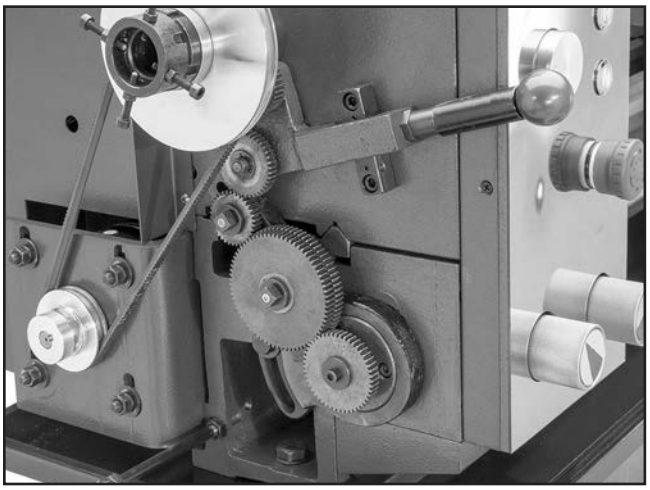


Figure 7. End gears.

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 metal 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 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 that shows on a dial the amount of error in size or alignment of a part.

Facing: 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 a 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 part that can be adjusted 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: An accessory with a 60º point which is inserted into the headstock or tailstock to support the workpiece.

Leadscrew: The long screw that is driven by the end 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 follow rest.

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

Tailstock: A moveable fixture opposite of the headstock used to support one end of a workpiece.

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

Turret: A fixture that holds multiple tools and can be removed and indexed to position.

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

MACHINE DATA SHEET

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

MODEL G0998 10" X 30" VARIABLE-SPEED METAL LATHE

Product Dimensions:

Weight..... 390 lbs.
Width (side-to-side) x Depth (front-to-back) x Height..... 56-1/2 x 24 x 48 in.
Footprint (Length x Width)..... 46-1/2 x 12 in.

Shipping Dimensions:

Carton #1

Type..... Wood Crate
Content..... Machine
Weight..... 364 lbs.
Length x Width x Height..... 56 x 27 x 24 in.
Must Ship Upright..... Yes

Carton #2

Type..... Cardboard Box
Content..... Stand
Weight..... 100 lbs.
Length x Width x Height..... 32 x 21 x 14 in.
Must Ship Upright..... No

Electrical:

Power Requirement..... 120V, Single-Phase, 60 Hz
Full-Load Current Rating..... 15A
Minimum Circuit Size..... 20A
Connection Type..... Cord & Plug
Power Cord Included..... Yes
Power Cord Length..... 72 in.
Power Cord Gauge..... 14 AWG
Plug Included..... Yes
Included Plug Type..... 5-20
Switch Type..... Push Button

Motors:

Main

Horsepower..... 1-1/2 HP
Phase..... Single-Phase
Amps..... 10.6A
Speed..... 5200 RPM
Type..... DC
Power Transfer ..... Belt
Bearings..... Shielded & Permanently Lubricated

Main Specifications:

Operation Info

Swing Over Bed	10 in.
Distance Between Centers	29-1/2 in.
Swing Over Cross Slide	5-1/2 in.
Swing Over Saddle	9 in.
Maximum Tool Bit Size	3/8 in.
Compound Travel	2-5/8 in.
Carriage Travel	26 in.
Cross Slide Travel	4-5/8 in.

Headstock Info

Spindle Bore	1 in.
Spindle Taper	MT#4
Spindle Threads	M32 X 1.5
Number of Spindle Speeds	Variable
Spindle Speeds	100–2200 RPM
Spindle Type	Intrinsic Back Plate
Spindle Bearings	Tapered Roller
Spindle Length	11-3/4 in.
Spindle Length with 3-Jaw Chuck	15-1/4 in.
Spindle Length with 4-Jaw Chuck	15-1/4 in.
Spindle Length with Faceplate	12-3/4 in.

Tailstock Info

Tailstock Quill Travel	2-1/2 in.
Tailstock Taper	MT#2
Tailstock Barrel Diameter	1.18 in.

Threading Info

Number of Longitudinal Feeds	23
Range of Longitudinal Feeds	0.0036 - 0.0183 in./rev.
Number of Cross Feeds	42
Range of Cross Feeds	0.0012 - 0.0173 in./rev.
Number of Inch Threads	27
Range of Inch Threads	8 - 56 TPI
Number of Metric Threads	15
Range of Metric Threads	0.35 - 3mm

Dimensions

Bed Width	5-3/8 in.
Carriage Leadscrew Diameter	3/4 in.
Leadscrew TPI	16 TPI
Carriage Leadscrew Length	39-1/8 in.
Steady Rest Capacity	1/16 - 1-3/16 in.
Follow Rest Capacity	1/16 - 1 in.
Faceplate Size	8-5/8 in.
Feed Rod Diameter	3/4 in.
Floor to Center Height	42-7/8 in.

Other

Carriage Handwheel Graduations	0.02 in.
Carriage Handwheel Revolution	0.68 in.
Cross Slide Handwheel Graduations	0.001 in.
Cross Slide Handwheel Revolution	0.1 in.
Compound Handwheel Graduations	0.001 in.
Compound Handwheel Revolution	0.05 in.
Tailstock Handwheel Graduations	0.001 in.
Tailstock Handwheel Revolution	0.1 in.

Construction

Base	Steel
Headstock	Cast Iron
End Gears	Cast Iron
Bed	Precision Ground Cast Iron
Body	Cast Iron
Stand	Steel
Paint Type/Finish	Enamel

Fluid Capacities

Gearbox Capacity	6-3/4 oz.
Gearbox Fluid Type	ISO 68

Other Specifications:

Country of Origin	China
Warranty	1 Year
Approximate Assembly & Setup Time	2 Hours
Serial Number Location	Machine ID Label

Features:

Digital Spindle RPM Readout
Variable Spindle Speed Control Through 2 Speed Ranges
100-Series Quick-Change Tool Post
Power Carriage & Cross Slide Travel
Cuts Right- and Left-Hand Threads
Full-Length Back Splash & Chip Tray
Stand Has Storage Cabinets & Shelves
Intrinsic Back Plate Spindle w/Bayonet Ring
Outboard Spindle Support Spider
Hardened & Ground V-Way Bed
Oil-Bath Gearbox

Accessories Included:

5" 3-Jaw & 4-Jaw Chucks
Steady & Follow Rests
8-5/8" Faceplate
MT#2 & MT#4 Dead Centers
MT#2 Drill Chuck 1 - 13mm B16

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.

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

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

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

NOTICE **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 loose clothing, gloves, neckties, 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 Safety for Chucks

⚠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.

⚠WARNING

Like all machinery there is potential danger when operating this machine. Accidents are frequently caused by lack of familiarity or failure to pay attention. Use this machine with respect and caution to decrease the risk of operator injury. If normal safety precautions are overlooked or ignored, serious personal injury may occur.

⚠CAUTION

No list of safety guidelines can be complete. Every shop environment is different. Always consider safety first, as it applies to your individual working conditions. Use this and other machinery with caution and respect. Failure to do so could result in serious personal injury, damage to equipment, or poor work results.

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.

⚠WARNING

Electrocution, fire, shock, or equipment damage may occur if machine is not properly grounded and connected to power supply.

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 120V ..... 15 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.

⚠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.

120V Circuit Requirements

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

Nominal Voltage 110V, 115V, 120V
Cycle ..... 60 Hz
Phase ..... Single-Phase
Power Supply Circuit ..... 20 Amps
Plug/Receptacle ..... NEMA 5-20

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

⚠CAUTION

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

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

Grounding & Plug Requirements

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.

This machine is equipped with a power cord that has an equipment-grounding wire and a grounding plug. Only insert plug into a matching receptacle (outlet) that is properly installed and grounded in accordance with all local codes and ordinances. DO NOT modify the provided plug!

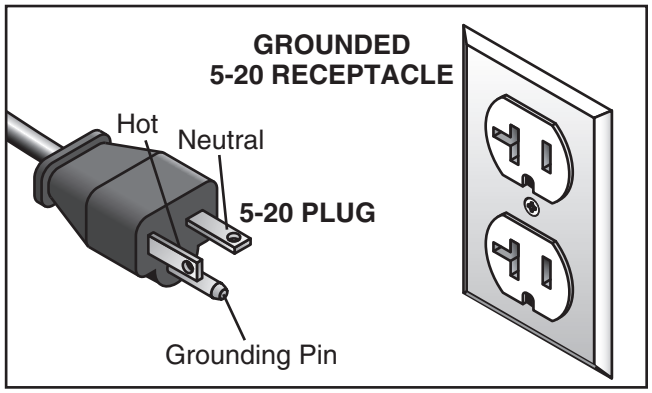
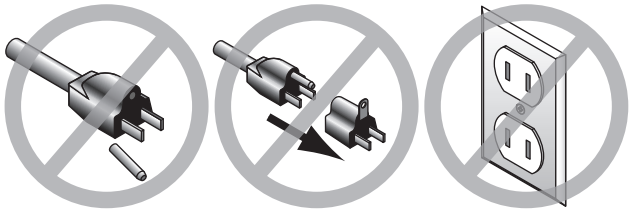


Figure 8. Typical 5-20 plug and receptacle.

⚠CAUTION



SHOCK HAZARD!

Two-prong outlets do not meet the grounding requirements for this machine. Do not modify or use an adapter on the plug provided—if it will not fit the outlet, have a qualified electrician install the proper outlet with a verified ground.

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 machine 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

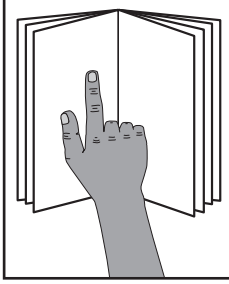
We do not recommend using an extension cord with this machine. If you must use an extension cord, only use it if absolutely necessary and only on a temporary basis.

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.....12 AWG
Maximum Length (Shorter is Better).....50 ft.

SECTION 3: SETUP

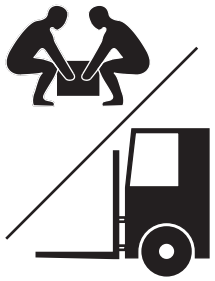


⚠WARNING

This machine presents serious injury hazards to untrained users. Read through this entire manual to become familiar with the controls and operations before starting the machine!

⚠WARNING

Wear safety glasses during the entire setup process!



⚠WARNING

HEAVY LIFT!

Straining or crushing injury may occur from improperly lifting machine or some of its parts. To reduce this risk, get help from other people and use a forklift (or other lifting equipment) rated for weight of this machine.

Needed for Setup

The following items are needed, but not included, for the setup/assembly of this machine.

Description	Qty
• Safety Glasses (for each person)	1 Pr.
• Disposable Rags	As Needed
• Cleaner/Degreaser	As Needed
• Disposable Gloves	As Needed
• Lifting Straps (Rated for at least 450 lbs.)	2
• Lifting Equipment (Rated for at least 450 lbs.)	1
• Another Person	1
• Pry Bar	1
• Phillips Head Screwdriver #2	1
• Silicone Caulk	As Needed
• Caulking Gun	1
• Wrench or Socket 18mm	1
• Mounting Hardware	As Needed
• Precision Level 12"	1
• ISO 68 Oil	As Needed

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.*

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.

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.

Box 1 (Figures 9–10) **Qty**

A. Lathe 1
- —3-Jaw Chuck (Installed) 1
- —Tailstock (Installed) 1
- —Follow Rest (Installed) 1
- —Steady Rest (Installed) 1
- —End Gears (Installed)
  34T, 72T, 75T, 84T ..... 1 Ea.
- —Tool Holder (Installed) 1

B. Chip Tray 1

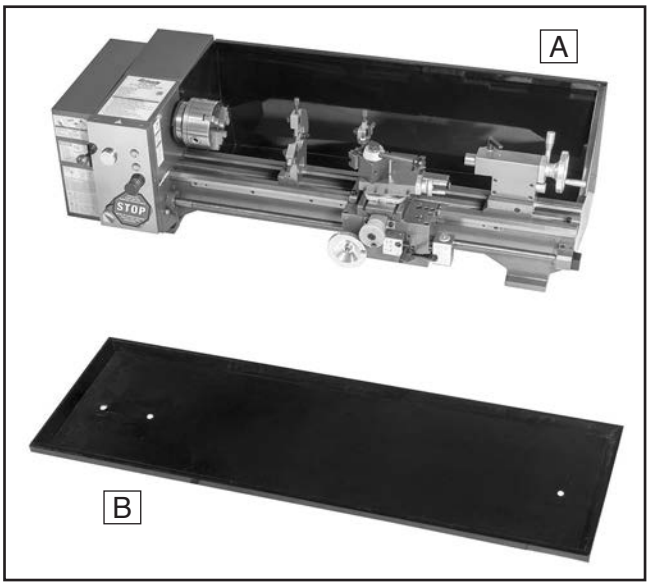


Figure 9. Lathe inventory.

C. End Gears 46T, 48T, 50T, 53T, 54T, 57T, 60T, 66T, 68T, 69T, 72T, 73T, 78T ..... 1 Ea.
D. Outside 3-Jaw Chuck Jaws 3
E. Faceplate 1
F. 3-Jaw Chuck Key 3
G. 4-Jaw Chuck 1
H. 4-Jaw Chuck Key 1
I. Oil Bottle 1
J. Dead Center MT#4 1
K. Dead Center MT#2 1
L. Drill Chuck Key 1
M. Tool Holders 3
N. Drill Chuck Arbor MT#2 x B16 1
O. Drill Chuck 1–13mm B16 1
P. Power Cord 1
Q. Handwheel Handles 2
R. Tool Box 1

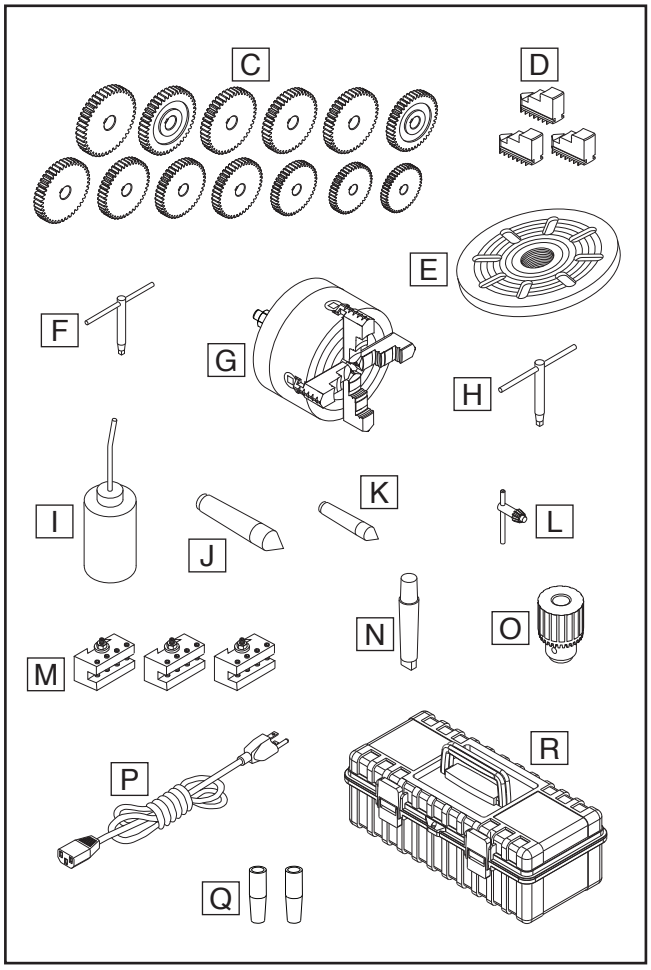


Figure 10. Loose inventory.

Box 2 (Figure 11) **Qty**

S. Left Cabinet 1
T. Right Cabinet 1
U. Front Plate 1
V. Bevel Plate 1

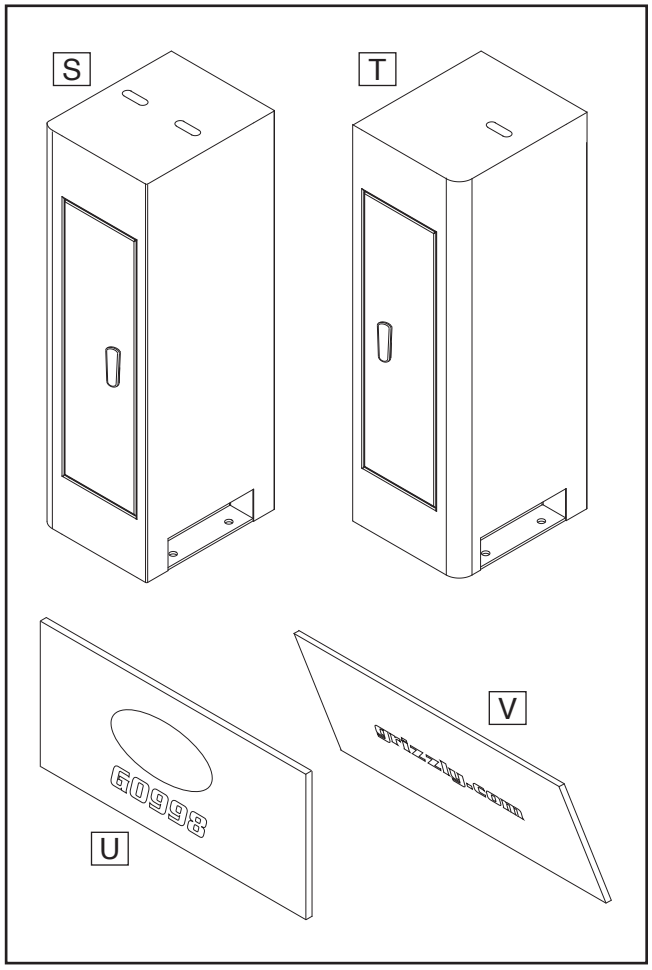


Figure 11. Stand inventory.

Fasteners (Figure 12) **Qty**

W. Shoulder Screws M6-1 x 54 2
X. Hex Bolts M12-1.75 x 35 3
Y. Flat Washers 12mm 3
Z. Lock Washers 12mm 3
AA. Hex Nuts M12-1.75 3
AB. Cap Screws M6-1 x 12 6
AC. Flat Washers 6mm 6
AD. Lock Washers 6mm 6
AE. Hex Nuts M6-1 2

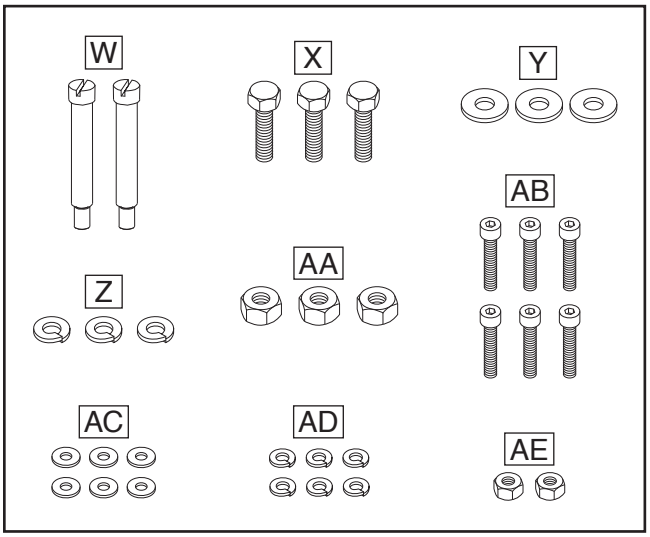


Figure 12. Fastener inventory.

Tools (Not Shown) **Qty**

AF. Spanner Wrench 45–52mm 1
AG. Hex Wrenches 3, 4, 5, 6, 8mm ..... 1 Ea.
AH. Open-End Wrenches 5.5 x 7, 8 x 10, 12 x 14, 17 x 19, 22 x 24mm ..... 1 Ea.
AI. Flat Head Screwdriver ¼" 1
AJ. Phillips Head Screwdriver #2 1

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.

⚠WARNING

Gasoline and petroleum products have low flash points and can explode or cause fire if used to clean machinery. Avoid using these products to clean machinery.

⚠CAUTION

Many cleaning solvents are toxic if inhaled. Only work in a well-ventilated area.

NOTICE

Avoid harsh solvents like acetone or brake parts cleaner that may damage painted surfaces. Always test on a small, inconspicuous location first.

T23692—Orange Power Degreaser
A great product for removing the waxy shipping grease from the ***non-painted*** parts of the machine during clean up.

Order online at www.grizzly.com OR Call 1-800-523-4777

Figure 13. T23692 Orange Power Degreaser.

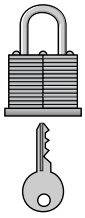
Site Considerations

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.**



⚠CAUTION

Children or untrained people may be seriously injured by this machine. Only install in an access restricted location.

Physical Environment

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

Electrical Installation

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

Lighting

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

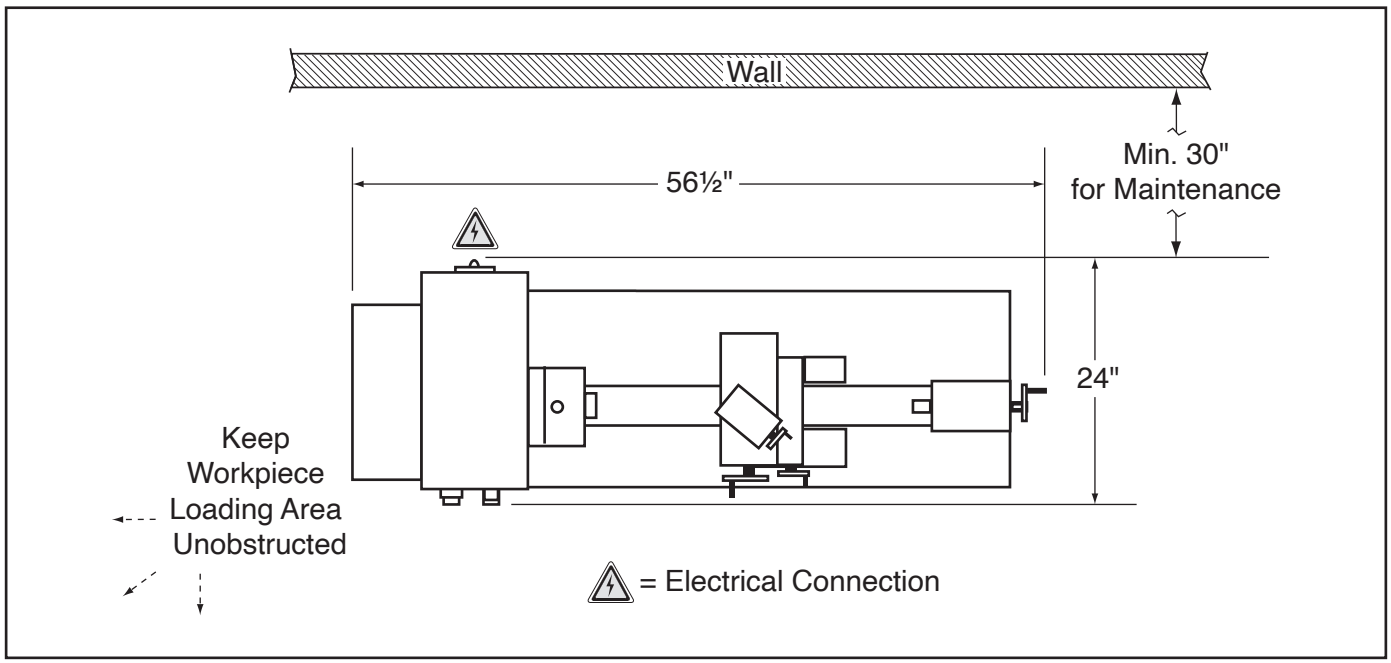


Figure 14. Minimum working clearances.

Assembly

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

To assemble machine:

1. Position left and right cabinets approximately 27" apart in prepared location (see **Figure 15**).

2. Attach bevel plate to cabinets with (2) M6-1 x 12 cap screws, 6mm lock washers, and 6mm flat washers (see **Figure 15**). Hand-tighten screws for now.

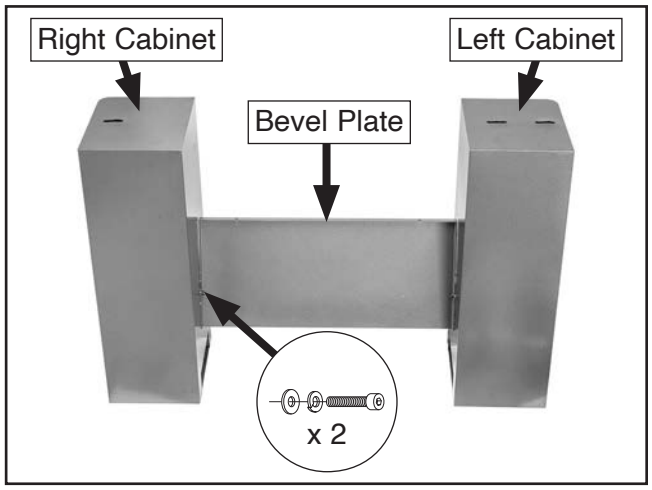


Figure 15. Bevel plate attached to left and right cabinets (shown from rear).

3. Attach front plate to cabinets with (2) M6-1 x 12 cap screws, 6mm lock washers, 6mm flat washers (see **Figure 16**). Hand-tighten screws for now.

4. Attach front plate to bevel plate with (2) M6-1 x 12 cap screws, 6mm lock washers, 6mm flat washers, M6-1 hex nuts (see **Figure 16**).

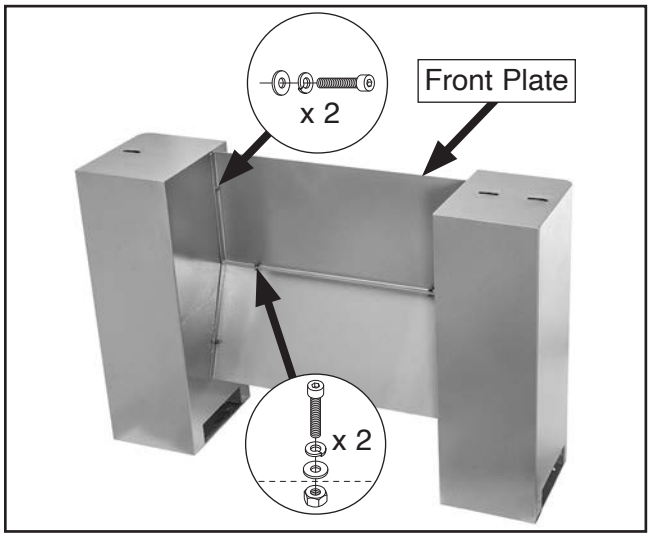


Figure 16. Front plate attached to cabinets and bevel plate (shown from rear).

5. Fully tighten fasteners from **Steps 2–4**.

6. Place chip tray on top of cabinet stand, and position tray to align (3) mounting holes with those in top of cabinets.

⚠WARNING

HEAVY LIFT!

Straining or crushing injury may occur from improperly lifting machine or some of its parts. To reduce this risk, get help from other people and use a forklift (or other lifting equipment) rated for weight of this machine.

NOTICE: During the following steps, DO NOT attempt to lift or move this lathe without using the proper lifting equipment (such as a forklift or crane) or the necessary assistance from other people. Each piece of lifting equipment must be rated for **at least 450 lbs.** to support the dynamic loads that may be applied while lifting.

7. Move lathe pallet near cabinet stand.

8. Remove lag bolts holding lathe to pallet.

9. Attach (2) handwheel handles to carriage handwheel and cross slide handwheel with (2) M6-1 x 54 shoulder screws (see **Figure 17**).

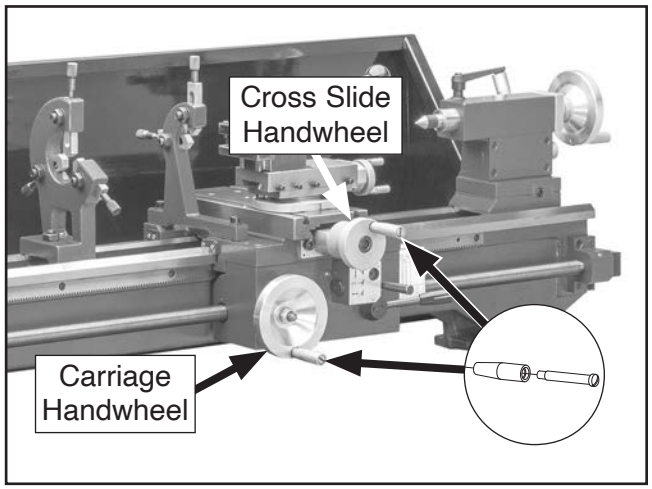


Figure 17. Handles attached to handwheels.

10. To balance load for lifting, move tailstock and carriage to right end of bedway, then lock them in place.

Note: *Before attempting to move carriage, make sure carriage lock screw is loose, half nut is disengaged, and feed selection lever is disengaged. Refer to* ***Page 7*** *to identify these controls.*

11. Wrap (2) lifting straps around bedway pedestals and route them behind leadscrew. Either attach them to safety hook (see **Figure 18**) or forklift forks (see **Figure 19**). This will keep lifting straps away from these critical components and prevent them from bending during lifting.

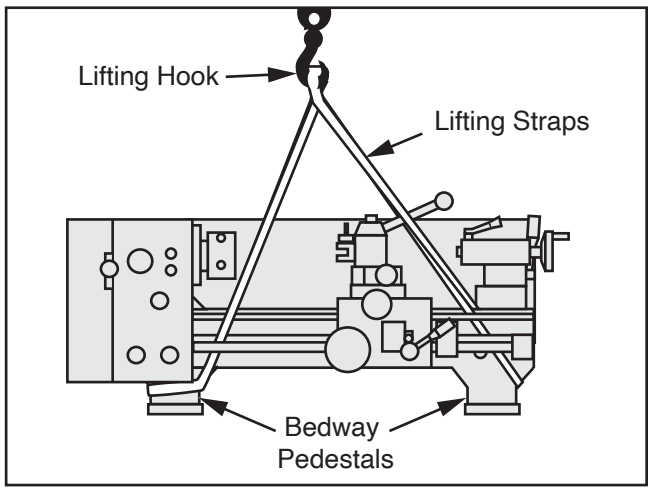


Figure 18. Lifting setup for hoist.

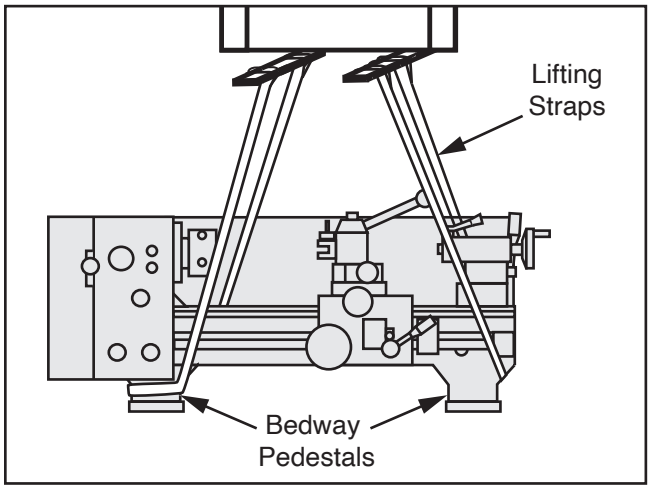


Figure 19. Lifting setup for forklift.

12. Slowly raise lathe from pallet and have another person hold onto lathe to prevent it from swinging as you move it over cabinet stand.

13. Apply ¼" bead of silicone caulk around bottom edge of bedway pedestals.

Note: *When lathe is placed onto chip tray, silicone caulk will form protective seal to help prevent fluid leaking into cabinets.*

14. Place lathe on stand while aligning mounting holes in bedway pedestals with holes in chip tray.

15. Remove gear cover lock knobs to remove gear cover (see **Figure 20**).

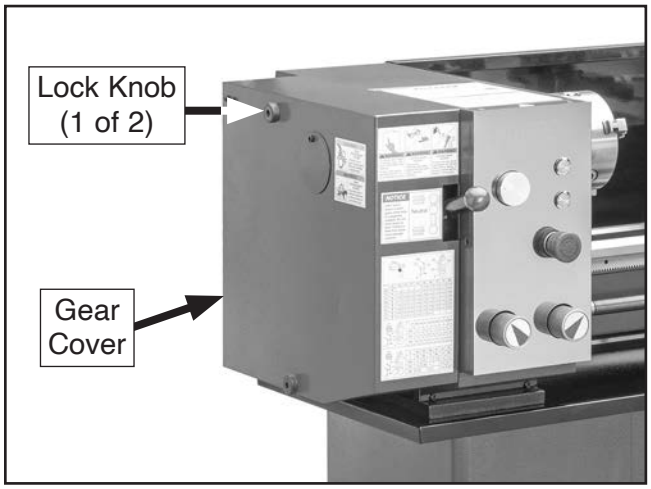


Figure 20. Location of gear cover and lock knobs.

16. Attach lathe to cabinets with (3) M12-1.75 x 35 hex bolts, 12mm flat washers, 12mm lock washers, and M12-1.75 hex nuts (see **Figure 21**). Hand-tighten screws for now.

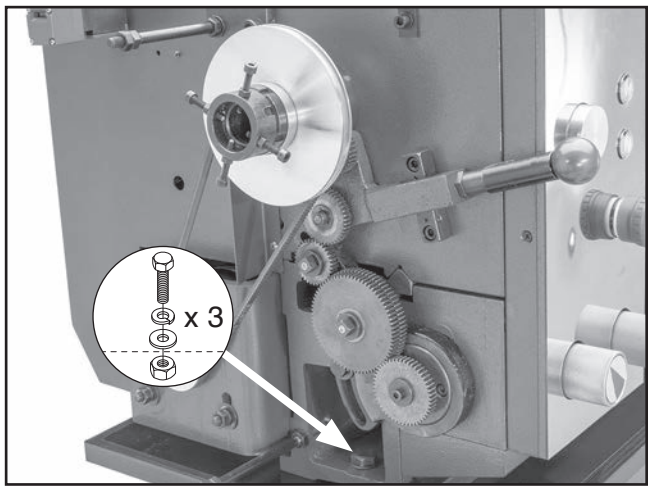


Figure 21. Lathe attached to cabinets.

17. Mount cabinet stand to floor (refer to **Anchoring to Floor**).

IMPORTANT: Use only hand tools to secure machine to floor. Do not tighten with impact tools, which can permanently twist and bend components and pull a level machine out of alignment.

18. Level lathe (refer to **Leveling** on **Page 27**), shimming between lathe and chip pan as necessary to level ways at all four corner locations.

19. Fully tighten fasteners from **Step 16**.

20. Apply bead of silicone caulk around each base pedestal where they contact chip tray to further reduce possibility of fluids leaking into cabinets.

21. Install gear cover.

Anchoring to Floor

Number of Mounting Holes 8
Diameter of Mounting Hardware..... ½"

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

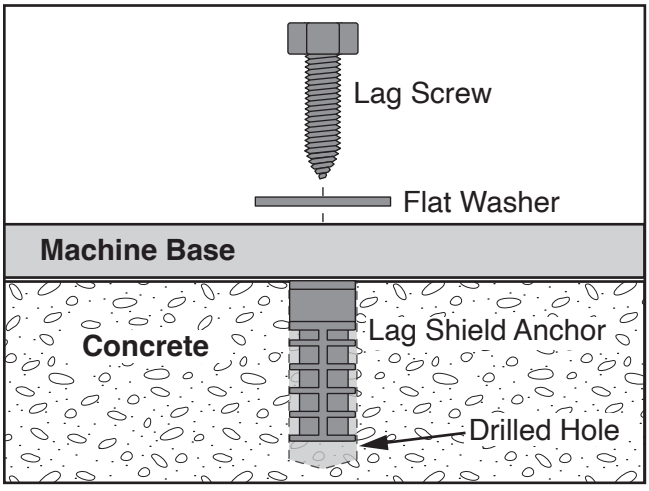


Figure 22. Popular method for anchoring machinery to a concrete floor.

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.

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

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

If needed, use metal shims between the lathe bed and chip tray 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.

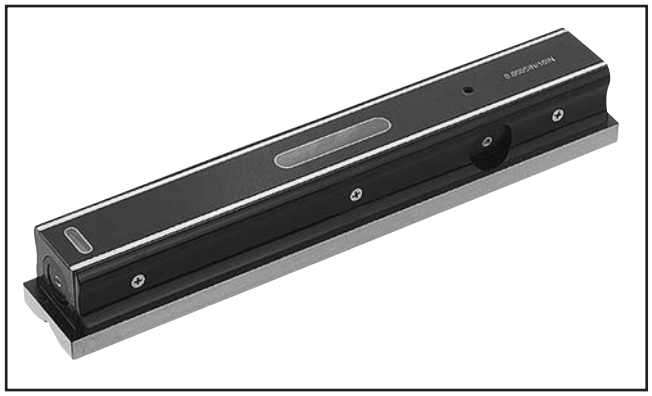


Figure 23. Model H2683 Master Machinist's Level.

Initial Lubrication

The gearbox reservoir must have the proper amount of oil in it before the lathe can be operated.

Damaged caused to the bearings and the gears from running the lathe without oil in gearbox reservoir will not be covered under warranty. In addition to the reservoirs, we also recommend that you lubricate all other lubrication points on the machine at this time. Refer to **Lubrication** section, beginning on **Page 64**, for maintenance schedule and instructions.

Note: *If this lathe was shipped with oil in the gearbox reservoir, do not change the oil until after the* ***Test Run*** *and* ***Spindle Break-In*** *procedures.*

Power Connection

Before the machine can be connected to the power source, an electrical circuit and connection device must be prepared per the **POWER SUPPLY** section in this manual, and all previous setup instructions in this manual must be complete to ensure that the machine has been assembled and installed properly.

To connect machine to power:

1. Press Emergency Stop button (see **Figure 24**).

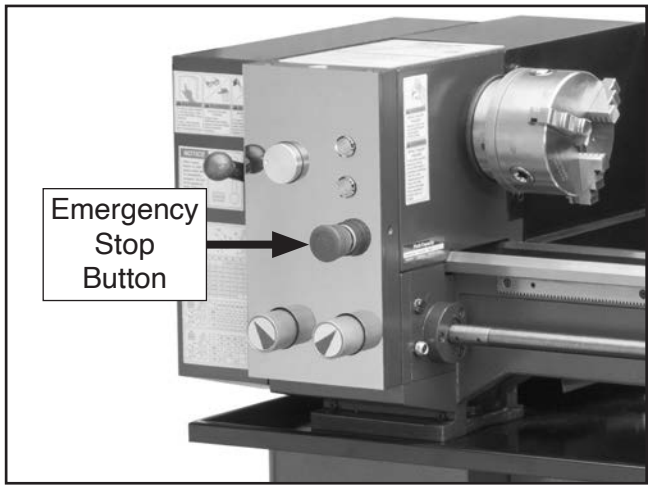


Figure 24. Location of Emergency Stop button.

2. Connect power cord to male receptacle at rear of machine (see **Figure 25**).

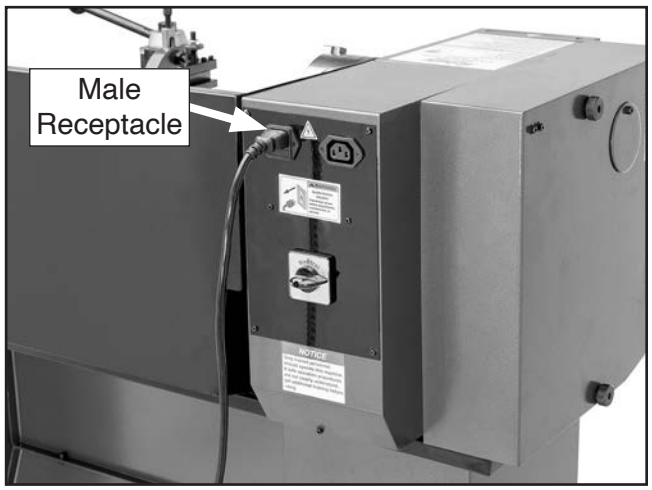


Figure 25. Power cord connected to lathe.

3. Insert power cord plug into matching power supply receptacle.

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.

The Test Run consists of verifying the following: 1) The motor powers up and runs correctly, 2) the Emergency Stop button safety feature works correctly, and 3) the gear cover safety switch disables the machine properly.

⚠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 machine:

1. Clear away all tools and objects used during assembly, lubrication, and preparation.

2. Make sure that chuck and chuck jaws are secure (refer to **Installing Chuck/Faceplate** on **Page 34** and **3-Jaw Chuck** on **Page 35**).

3. Turn master power switch to Neutral (OFF) position (see **Figure 26**).

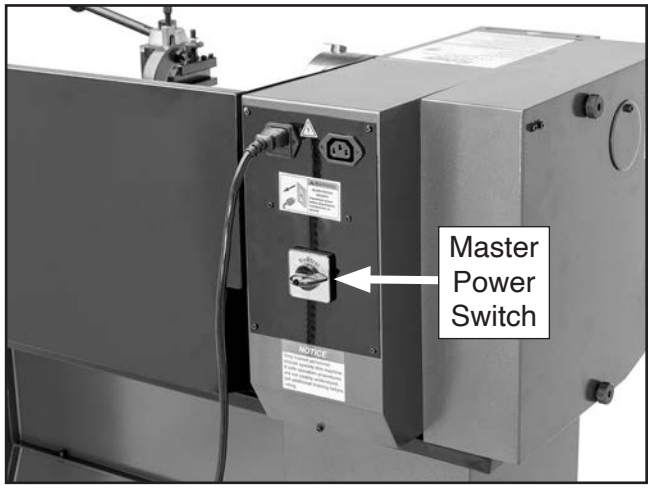


Figure 26. Location of master power switch.

4. Turn spindle speed dial (see **Figure 27**) all the way counterclockwise. This will prevent spindle from starting at a high speed.

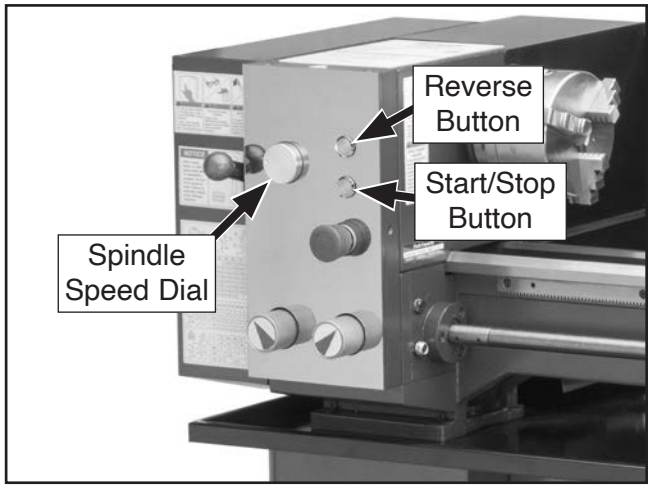


Figure 27. Control panel controls.

5. To ensure carriage components do not unexpectedly move during following steps, move feed direction lever to Neutral position (see **Figure 28**).

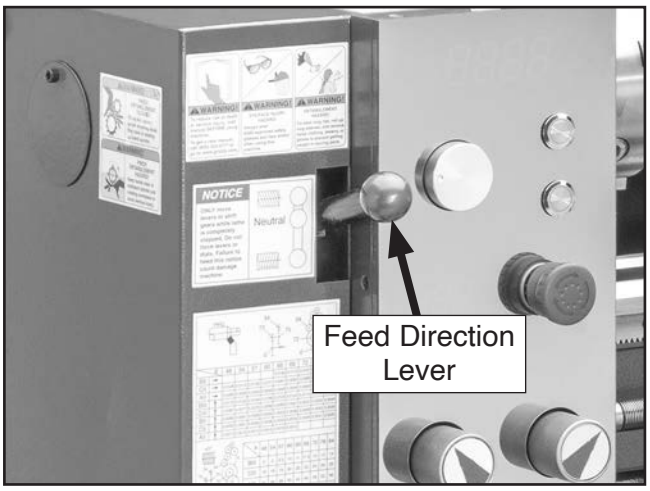


Figure 28. Feed direction lever in Neutral position.

6. Turn master power switch to Lathe (ON) position.

7. Twist Emergency Stop button clockwise until it springs out (see **Figure 29**). This resets button so machine can start. Control panel will illuminate.

Figure 29. Resetting Emergency Stop button.

8. Press Start/Stop button (see **Figure 27**) to start spindle rotation. Start/Stop button will illuminate. Verify motor starts up and runs smoothly without any unusual problems or noises.

9. Slowly turn spindle speed dial clockwise to verify variable-speed function, then turn it all the way counterclockwise.

10. Press Emergency Stop button to stop spindle rotation.

11. WITHOUT resetting Emergency Stop button, try to start spindle rotation by pressing Start/Stop button. Spindle should not rotate.

— If spindle *does not* rotate, safety feature of Emergency Stop button is working correctly. Proceed to **Step 12**.

— If spindle *does* rotate, immediately turn machine ***OFF*** and disconnect power. Safety feature of Emergency Stop button is NOT working properly and must be replaced before further using machine.

12. Reset Emergency Stop button.

13. Press Start/Stop button to start spindle rotation.

14. Press Reverse button (see **Figure 27** on **Page 29**) to reverse spindle rotation. Reverse button will illuminate and spindle rotation icon (see **Figure 30**) will change to display clockwise rotation. Verify motor changes directions and starts up and runs smoothly without any unusual problems or noises.

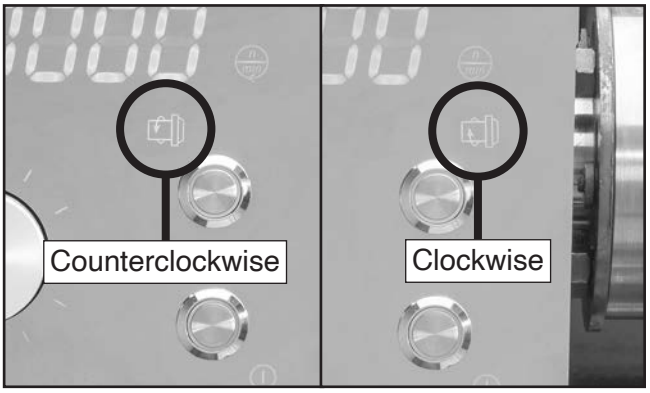


Figure 30. Spindle rotation icons.

15. Press Reverse button to disengage, then press Start/Stop button to stop spindle.

16. Remove gear cover lock knobs to remove gear cover (see **Figure 31**).

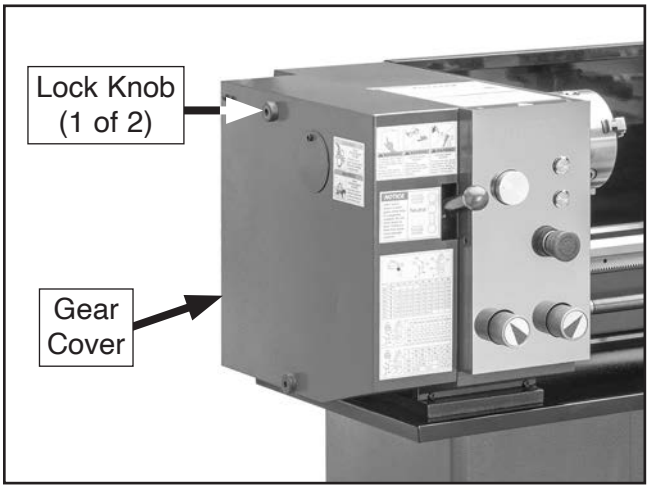


Figure 31. Location of gear cover and lock knobs.

17. WITHOUT installing gear cover, try to start spindle rotation by pressing Start/Stop button. Spindle should not rotate.

— If spindle *does not* rotate, safety feature of gear cover safety switch is working correctly. Proceed to **Step 17.**

— If spindle *does* rotate, immediately turn machine ***OFF*** and disconnect power. Safety feature of gear cover safety switch is NOT working properly and must be replaced before further using machine.

18. Install gear cover.

Congratulations! The Test Run is complete. Perform the **Spindle Break-In** procedure before proceeding with normal operations.

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 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 Test Run section. Lathe could be seriously damaged if controls are set differently than instructed in that section.

NOTICE

Complete spindle bearing break-in procedure to prevent rapid wear and tear of spindle components once machine is placed into operation.

To perform spindle break-in:

1. Successfully complete **Test Run** procedure beginning on **Page 28**.

2. Press Start/Stop button (see **Figure 32**) to start spindle and allow spindle to run counterclockwise at lowest speed for 10 minutes.

3. Press Reverse button (see **Figure 32**) to reverse spindle direction and allow it to run clockwise at lowest speed for 10 minutes.

4. Use spindle speed dial (see **Figure 32**) to adjust spindle to about 250 RPM, then run spindle in either direction for 10 minutes.

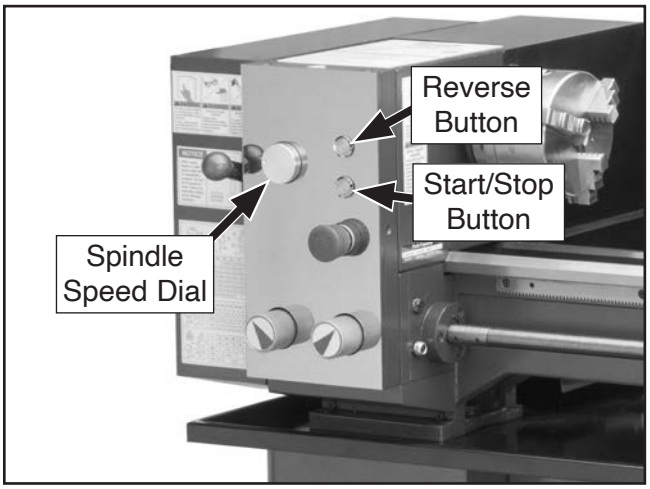


Figure 32. Control panel controls.

5. Repeat **Step 4** for each speed listed below in progressive order:

   a. 500 RPM
   b. 1000 RPM
   c. 2200 RPM

6. Press Emergency Stop button to stop spindle rotation, then DISCONNECT MACHINE FROM POWER!

7. Change gearbox oil before operating machine further to ensure full machine warranty (refer to **Changing Gearbox Oil** on **Page 68**).

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:

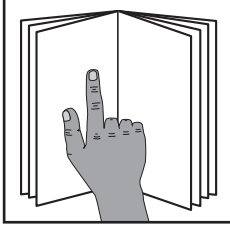
- Tailstock alignment (**Page 42**).
- Backlash adjustment (**Page 72**).
- Gib adjustments (**Page 73**).

SECTION 4: OPERATIONS

Operation Overview

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

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

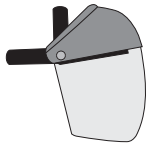


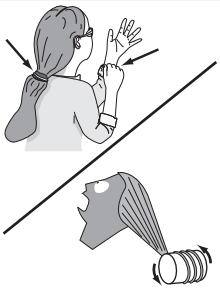
⚠WARNING

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

⚠WARNING

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





⚠WARNING

Keep hair, clothing, and jewelry away from moving parts at all times. Entanglement can result in death, amputation, or severe crushing injuries!

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

1. Puts on safety glasses and a face shield, rolls up sleeves, removes jewelry, and secures any clothing or hair that could get entangled in moving parts.
2. Examines workpiece to make sure it is suitable for turning, then securely mounts it in lathe.
3. Installs tooling, aligns it with workpiece, then backs it away to establish 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. If using power feed, selects proper feed rate for operation.
8. Connects machine to power.
9. Starts spindle rotation and sets correct spindle speed for operation.
10. Uses carriage, cross slide, and compound rest handwheels or power feed options to move tooling into workpiece for operation.
11. When finished cutting, presses Start/Stop button, and waits for spindle to come to complete stop.
12. Removes workpiece from lathe.

Mounting Chuck & Faceplate

This lathe is equipped with an intrinsic back plate spindle. This type of spindle uses hex nuts threaded onto male standoff studs and a locking flange (see **Figure 33**) to securely mount a chuck or faceplate with repeatable precision and ease.

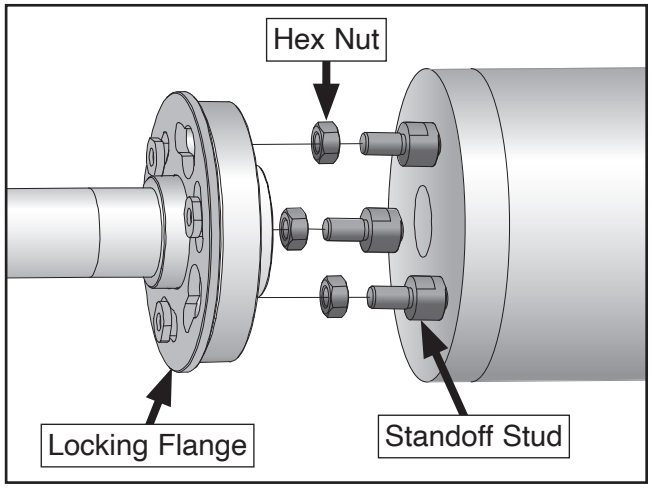


Figure 33. Intrinsic back plate spindle components.

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.

Chuck Installation 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 figures for examples).

⚠WARNING

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

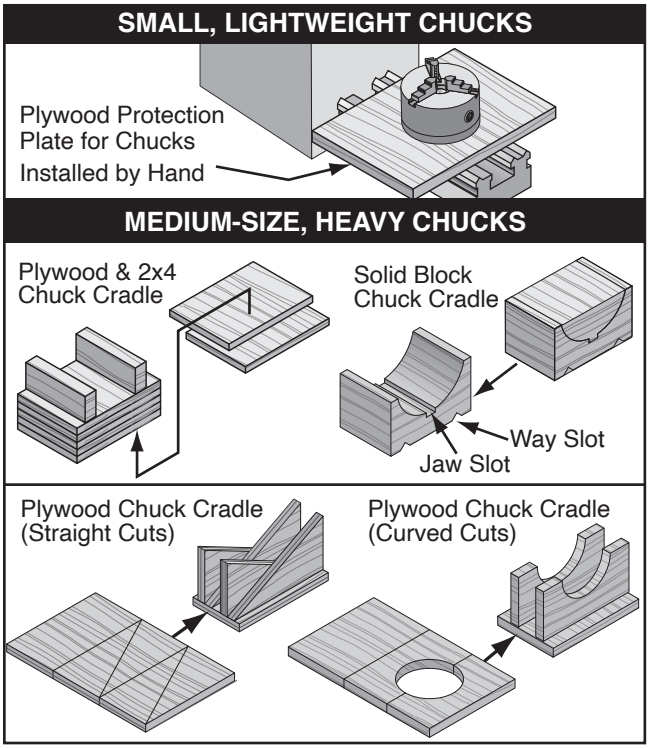


Figure 34. Examples of common devices used during chuck installation and removal.

Removing Chuck/Faceplate

Before installing a different chuck or faceplate, use the steps below to remove the existing holding fixture.

Tools Needed	Qty
Open-End Wrench 5/8"	1
Dead Blow Hammer	1

To remove chuck/faceplate:

1. DISCONNECT MACHINE FROM POWER!

2. Use appropriate lifting, support, or protective device to protect ways and support chuck during removal process (refer to **Chuck Installation Devices** for more details).

3. Loosen (3) hex nuts shown in **Figure 35**.

4. Turn locking flange counterclockwise to move hex nuts out of flange keyhole slots (see **Figure 35**).

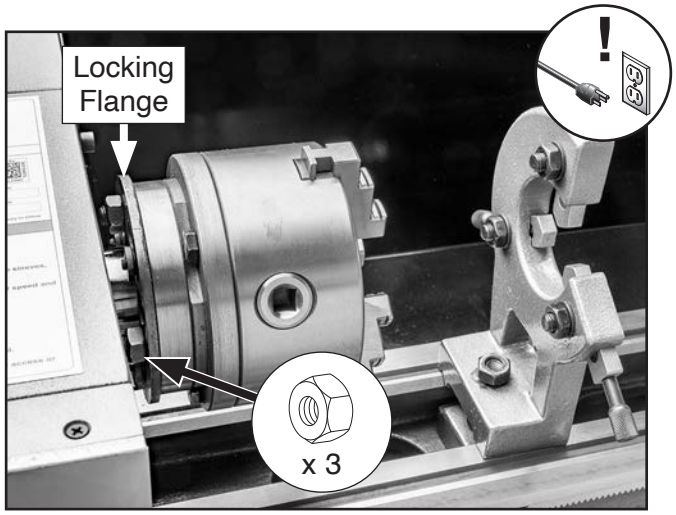


Figure 35. Location of intrinsic back plate hex nuts (chuck shown).

5. Use dead blow hammer or other soft mallet to lightly tap around outer circumference of chuck/faceplate body to loosen it from spindle.

6. Remove chuck/faceplate from spindle, using light rocking motion to carefully slide studs out of flange and spindle holes.

Installing Chuck/Faceplate

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

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

Items Needed	**Qty**
Open-End Wrenches 5/8", 17mm	1 Ea.
Disposable Rags	As Needed
Mineral Spirits	As Needed
Light Machine Oil	As Needed

To install chuck/faceplate:

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 Installation Devices** on **Page 33** for more details).

3. Ensure standoff studs are fully tightened into chuck/faceplate, then clean and lightly oil studs.

   Note: *Model G0998 has (2) sets of mounting standoff studs/hex nuts. If desired faceplate/chuck does not have these installed, use studs/hex nuts from another holding fixture.*

4. Clean mating surfaces of spindle and chuck/faceplate.

5. Install chuck/faceplate by inserting standoff studs straight into spindle and locking flange holes (see **Figure 36**).

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

   Note: *3-jaw chuck has a "0" registration mark on it that you should align with "0" mark on spindle. Installing chuck in same position helps ensure consistent chuck balance and turning results.*

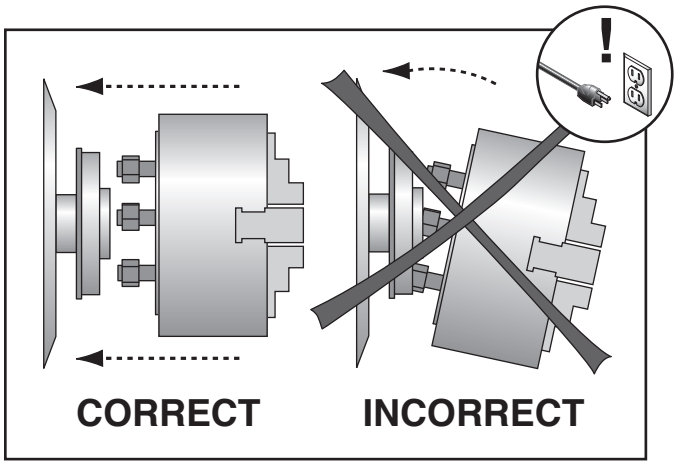


Figure 36. Inserting chuck standoff studs into spindle and locking flange holes.

6. Turn locking flange clockwise to seat stud hex nuts in flange keyhole slots (see **Figure 37**).

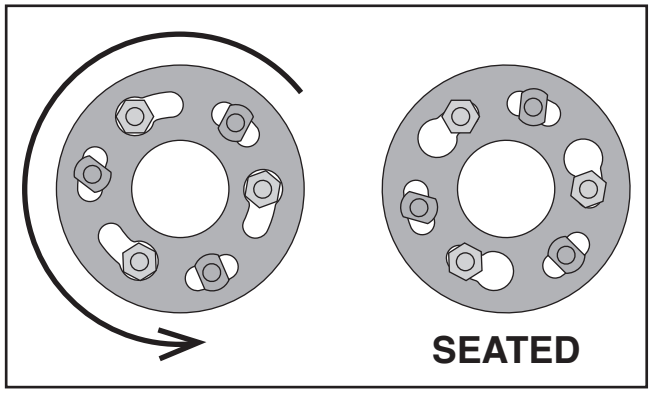


Figure 37. Stud hex nuts seated flange keyhole slots (shown from rear).

7. Incrementally tighten hex nuts to ensure that chuck/faceplate seats evenly against spindle.

8. Verify that chuck/faceplate fits spindle properly by checking for any gaps between mating surfaces.

   — If there *is not* a gap, proceed to **Step 9**.

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

9. Verify that chuck/spindle tapers are seated firmly together by removing chuck/faceplate (see **Removing Chuck/Faceplate** on **Page 33**). Pay close attention to how easily tapers release.

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

   — If tapers release easily with little intervention, they are not seated together firmly as required. Remove chuck/faceplate, re-clean mating surfaces carefully, and re-install. If problem persists, contact out Tech support.

3-Jaw Chuck

The 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. See **Figure 38** for examples of safe workpiece holding techniques based on workpiece type.

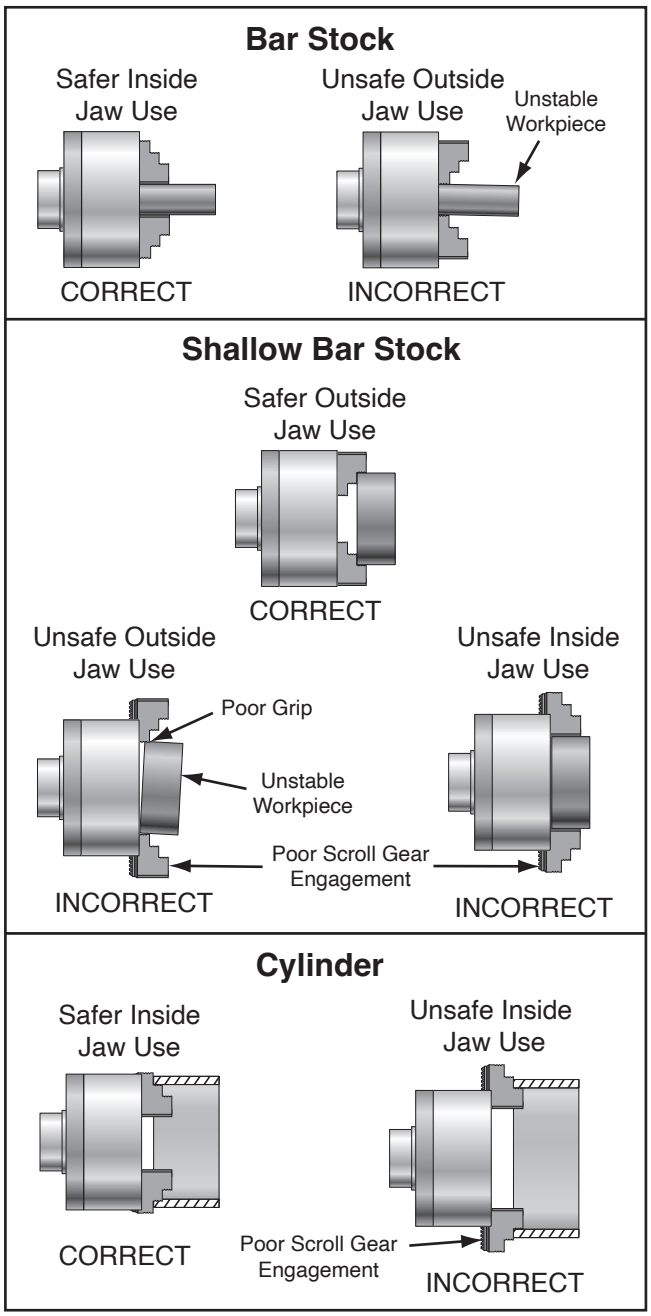


Figure 38. Safe and insufficient jaw selection and workpiece holding.

Changing Jaw Sets

The 3-jaw scroll chuck included with the lathe features inside and outside hardened steel jaw sets (see **Figure 39**), which move in unison to center a concentric workpiece.

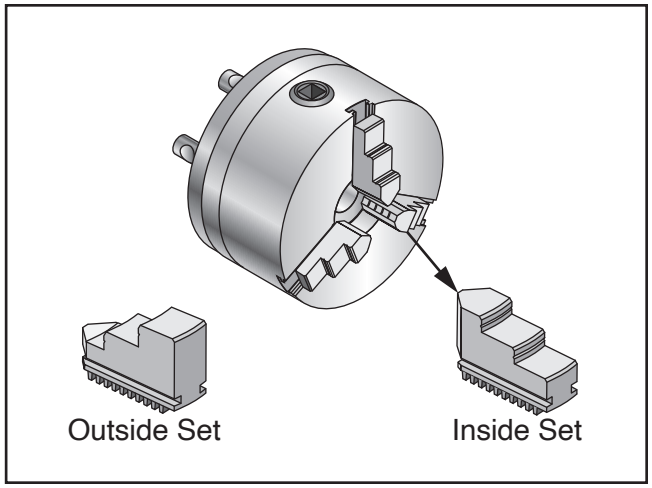


Figure 39. Example of chuck with inside and outside jaw sets.

When installing the jaws, it is important to make sure they are installed correctly. Incorrect installation will result in jaws that do not converge evenly and are unable to securely clamp a workpiece.

Jaws are numbered 1–3 (see **Figure 40**). The number is typically stamped on the side or bottom. Jaws are designed to be installed counterclockwise in numerical order in the jaw guides, so they will hold a concentric workpiece evenly.

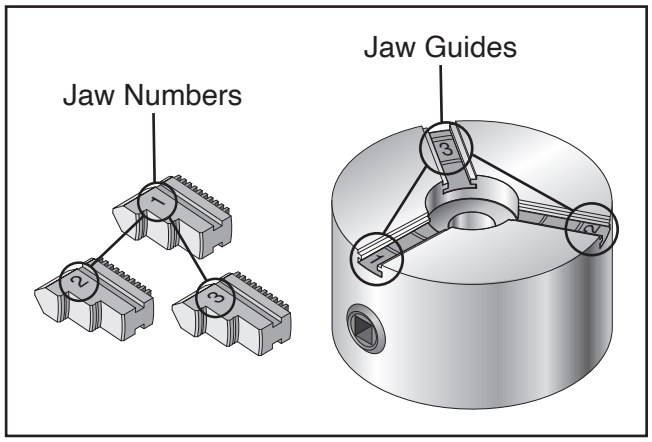


Figure 40. Jaw numbers and corresponding jaw guides.

⚠WARNING

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

Items Needed	Qty
3-Jaw Chuck Key	1
Mineral Spirits	As Needed
Disposable Rags	As Needed
T26419 or NLGI #2 Equivalent	As Needed

To change jaw set:

1. DISCONNECT MACHINE FROM POWER!
2. Use appropriate device to protect ways (refer to **Chuck Installation Devices** on **Page 33**).
3. Insert chuck key and turn it counterclockwise to back jaws out and remove them individually in descending order (i.e., 3, 2, 1).
4. Use mineral spirits to clean debris and grime from jaws and chuck jaw guides.
5. Apply thin coat of NLGI #2 grease to surfaces of removed jaw set. Store in safe place free from moisture and abrasives.
6. Rotate chuck key clockwise until you see tip of outer scroll-gear lead thread about to enter #1 jaw guide (see **Figure 41**).

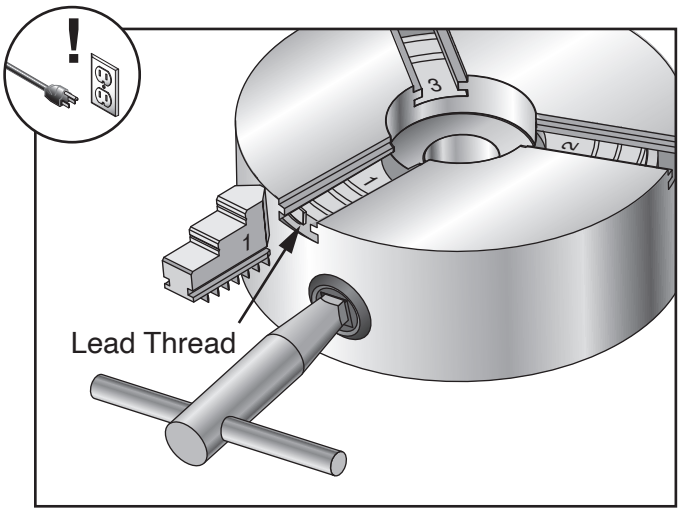


Figure 41. Lead thread on scroll gear.

7. Insert jaw #1 into #1 jaw guide and hold jaw against scroll-gear.

8. Rotate chuck key clockwise one turn to engage tip of scroll-gear lead thread into jaw. Pull jaw; it should be locked into jaw guide.

9. Install remaining jaws in ascending order (i.e., 1, 2, 3), in same manner. Jaws should converge evenly at center of chuck.

   — If jaws do not converge evenly, remove them. Install jaws sequentially 1–3, and make sure each one engages with scroll-gear lead thread during its first rotation.

Mounting Workpiece

Items Needed	Qty
Scrap Board	1
3-Jaw Chuck Key	1

To mount workpiece:

1. DISCONNECT MACHINE FROM POWER!

2. If workpiece is large and heavy, place scrap wood board over ways to protect them from potential damage.

3. Use chuck key to move jaws and mount workpiece into chuck (refer to **Figure 38** on **Page 35** for safe and insufficient mounting methods).

4. Rotate chuck by hand to make sure workpiece makes even contact with all three jaws and spins evenly without any visible wobble.

   — If workpiece is not evenly held or is off-center, repeat **Steps 3–4**.

5. After verifying that workpiece is properly centered, fully tighten jaws to make sure workpiece is held securely so it will not come loose during operation.

4-Jaw Chuck

Refer to **Mounting Chuck & Faceplate** on **Page 33** for instructions on installing or removing the 4-jaw chuck.

Reversing Jaws

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

Items Needed	Qty
4-Jaw Chuck Key	1
Mineral Spirits	As Needed
Disposable Rags	As Needed
T26419 or NLGI #2 Equivalent	As Needed

To reverse jaws:

1. DISCONNECT MACHINE FROM POWER!

2. Use appropriate device to protect ways (refer to **Chuck Installation Devices** on **Page 33**).

3. Insert chuck key into a jaw screw and turn it counterclockwise to back jaw completely out of chuck (see **Figure 42**).

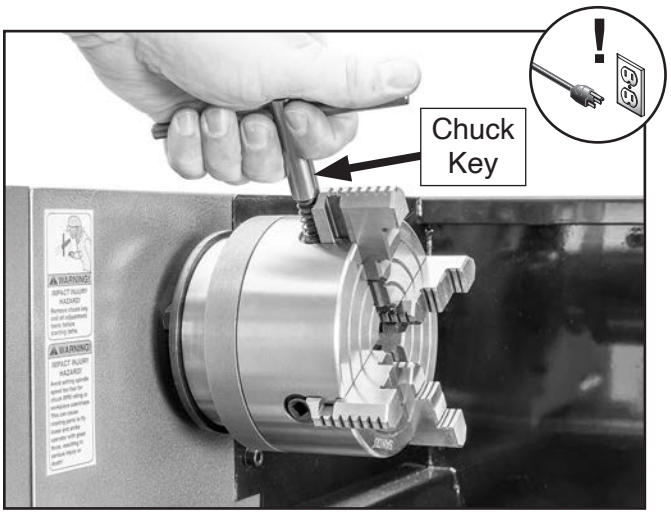


Figure 42. Backing jaw out of chuck.

4. Use mineral spirits to clean debris and grime from removed jaw and empty chuck jaw guide, then apply thin coat of NLGI #2 grease to surfaces.

5. Rotate jaw, insert it into jaw guide, then rotate chuck key clockwise to install jaw in chuck.

6. Repeat **Steps 3–5** for remaining (3) jaws.

Mounting Workpiece

Items Needed	Qty
Scrap Board	1
4-Jaw Chuck Key	1
Dial Indicator	1

⚠WARNING

Because of dynamic forces involved in machining non-concentric or off-center workpieces, always use 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:

1. DISCONNECT MACHINE FROM POWER!

2. Use appropriate device to protect ways (refer to **Chuck Installation Devices** on **Page 33**).

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. 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 in **Figure 43**.

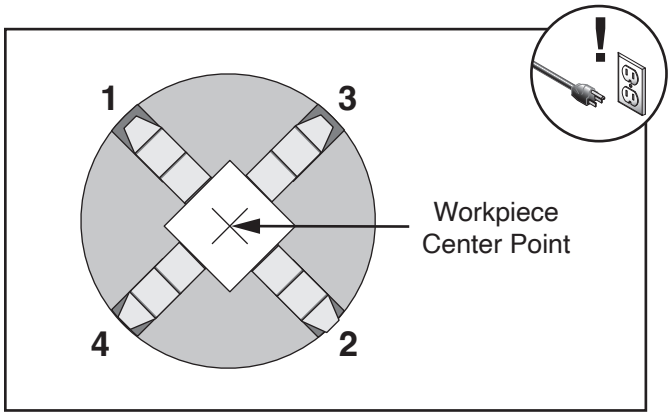


Figure 43. 4-jaw tightening sequence.

6. After workpiece is secured by jaws (see **Figure 44**), 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.

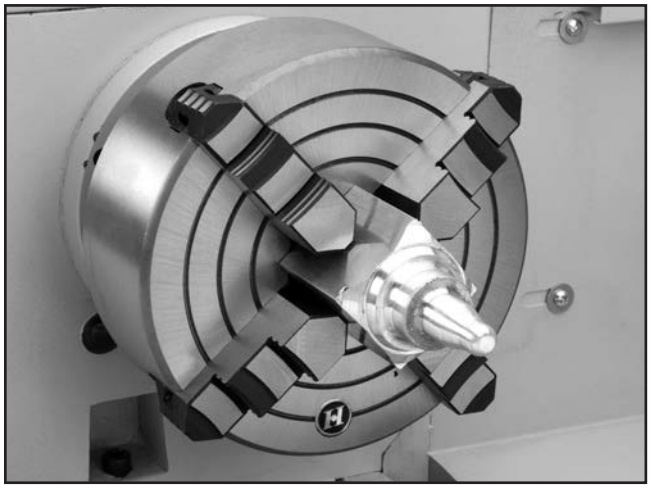


Figure 44. Example of non-cylindrical workpiece mounted in 4-jaw chuck.

Mounting Workpiece to Faceplate

Refer to **Mounting Chuck & Faceplate** on **Page 33** 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 low spindle RPM, and use counterweights 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 minimum of THREE independent clamping devices to hold workpiece onto faceplate.

Items Needed	**Qty**
Clamping Fixtures	At Least 3

To mount workpiece to faceplate:

1. DISCONNECT MACHINE FROM POWER!

2. Use appropriate device to protect ways (refer to **Chuck Installation Devices** on **Page 33**).

3. Position workpiece onto faceplate and clamp it in place with minimum of (3) independent clamping devices (see **Figure 45**).

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

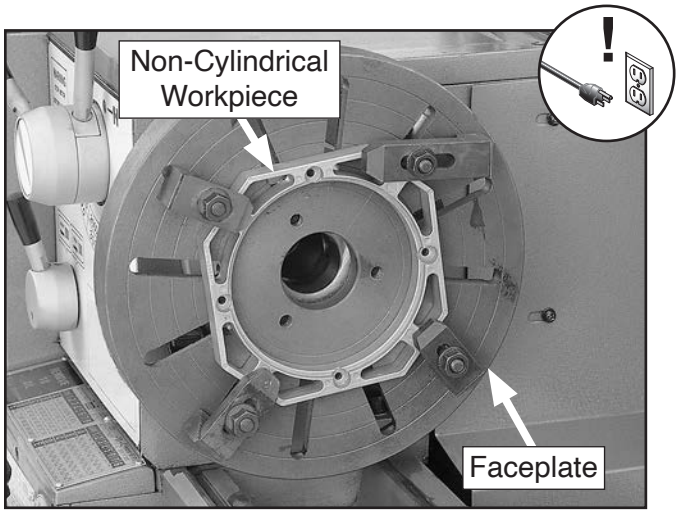


Figure 45. Example of workpiece clamped to faceplate.

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.

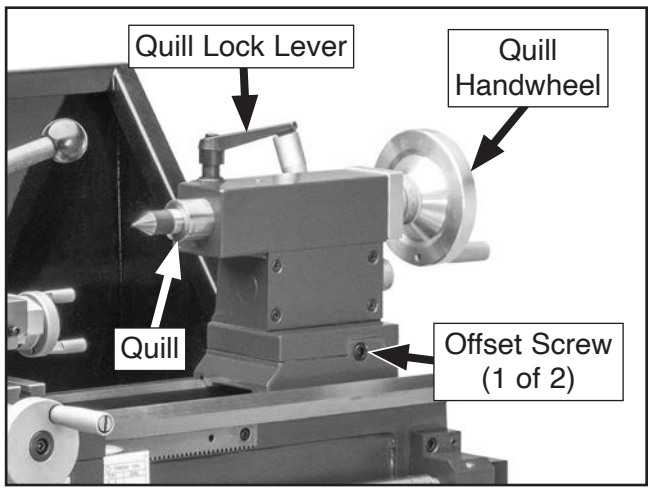


Figure 46. Front tailstock controls.

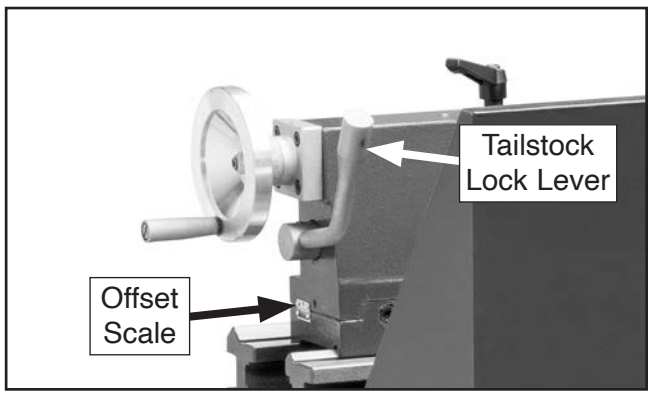


Figure 47. Rear tailstock controls.

Tailstock Quill Specifications

Graduated Dial

Increments ..... 0.001" (0.03mm)
One Full Revolution ..... 0.100" (2.54mm)

Increments on Quill

Inch ..... 0"–2½" in 0.1" Increments
Metric ..... 0–65mm in 1mm Increments

Positioning Tailstock

1. Lift tailstock lock lever to unlock tailstock from bedways.

2. Slide tailstock to desired position by pushing it along bedways.

3. Press tailstock lock lever down to lock tailstock against bedways.

Using Quill

1. Rotate quill lock lever counterclockwise to loosen quill.

2. Turn quill handwheel clockwise to move quill toward spindle or counterclockwise to move it away from spindle.

3. Rotate quill lock lever clockwise to secure quill.

Installing Tooling

This tailstock uses a quill with an MT#2 taper that accepts tapered arbors and drill bits, including those with a tang (see **Figure 48**).

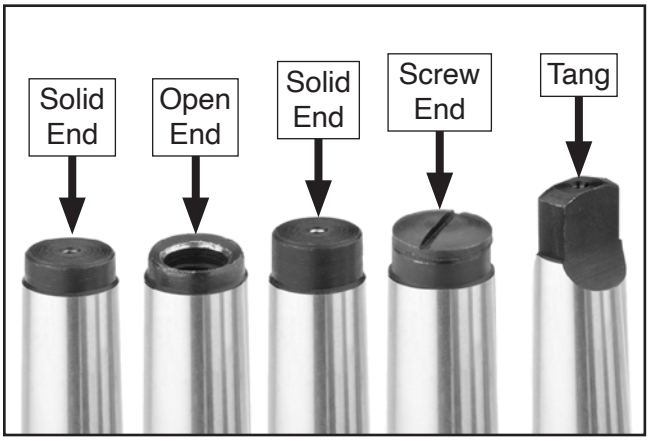


Figure 48. Types of tapered arbors and tooling.

See **Figures 49–50** below for examples of installing tapered tooling.

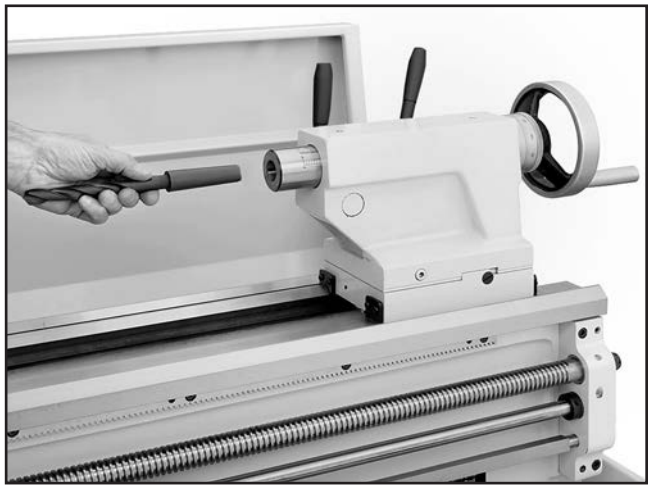


Figure 49. Example of inserting tapered tool into tailstock.

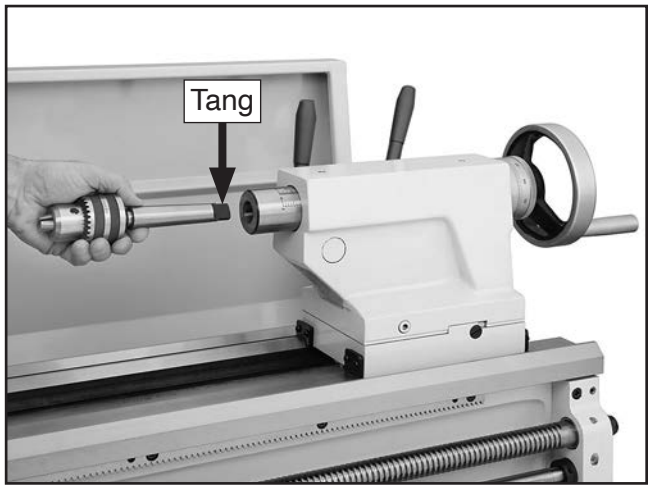


Figure 50. Example of inserting tapered tool with tang into tailstock.

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.*

Items Needed	Qty
Mineral Spirits	As Needed
Disposable Rags	As Needed

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

Items Needed	Qty
Disposable Rags	As Needed

To remove tooling from tailstock:

1. Use shop rag to hold tool.

2. Rotate quill handwheel counterclockwise to fully retract quill into tailstock until tool is forced out of 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 scale shown in **Figure 47** on **Page 40** are arbitrary. For a precise offset, use a dial indicator to check quill movement while adjusting the screws.*

Tool Needed	Qty
Hex Wrench 6mm	1

To offset tailstock:

1. Lift tailstock lock lever to unlock tailstock from bedways.

2. Rotate offset screws in opposite directions for desired offset (see **Figure 51**).

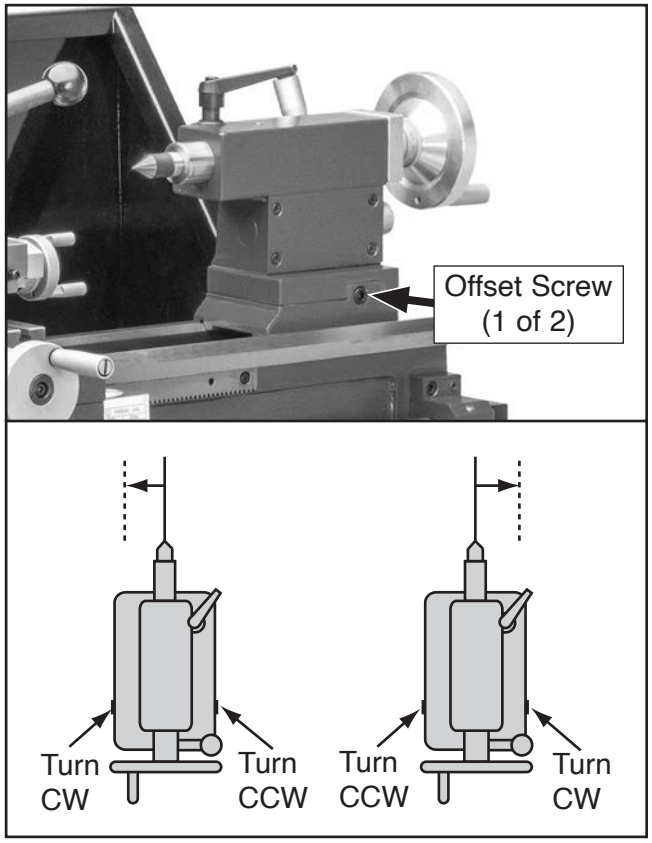


Figure 51. Offset screw adjustment in relation to tailstock movement.

3. Press tailstock lock lever down to lock tailstock against bedways.

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
Precision Level	1
Round Stock 2" x 6"	2
Lathe Dog	1
Dial Indicator	1
Calipers	1
Hex Wrench 6mm	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.

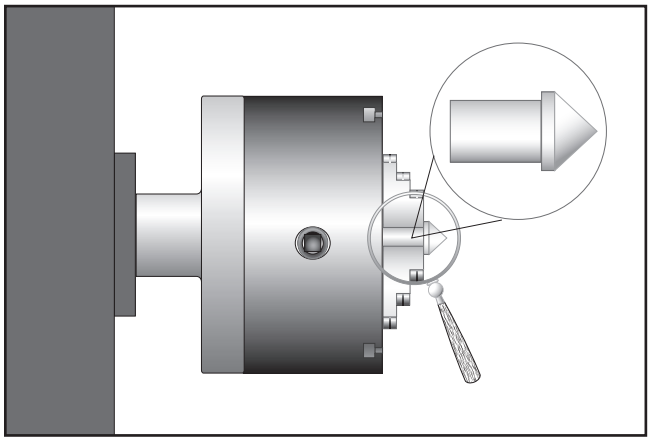


Figure 52. Turning a dead center.

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

4. Install center in tailstock.

5. Attach lathe dog to test stock from **Step 2**, then mount it between centers, as shown in **Figure 53**.

Figure 53. Example of stock mounted between centers.

6. Turn 0.010" off stock diameter.

7. Mount test or dial indicator so that plunger is on tailstock quill.

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

8. Use calipers to measure both ends of workpiece.

   — If test stock is *thicker* at tailstock end, move tailstock toward *front* of lathe ½ the distance of taper amount, as shown in **Figure 54**.

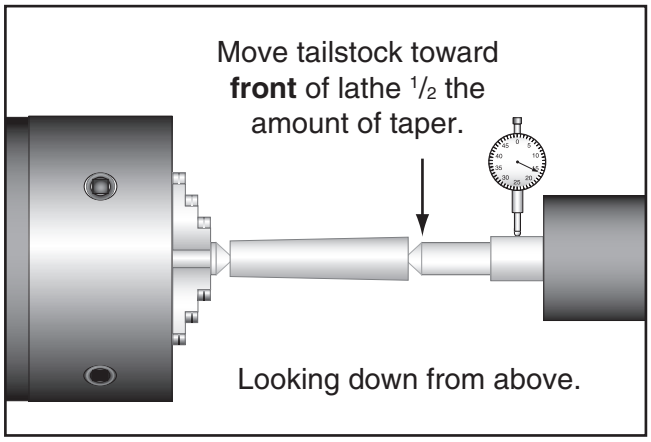


Figure 54. Adjust tailstock toward operator.

   — If test stock is *thinner* at tailstock end, move tailstock toward *back* of lathe ½ the distance of taper amount, as shown below.

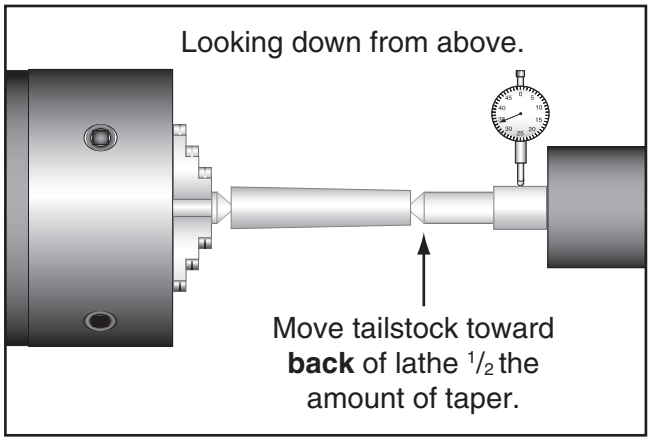


Figure 55. Adjust tailstock away from operator.

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

Centers

There are two types of centers. A live center (not included) has bearings that allow the center tip and the workpiece to rotate together; it can be installed in the tailstock quill for higher speeds. A dead center is a one-piece center that, when mounted to the tailstock, does not rotate with the workpiece and is used to support long, slender workpieces.

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

A carbide-tipped dead center (not included) can better withstand the effects of friction than a typical dead center and is best used in the tailstock where the workpiece will rotate against it. The tip of the dead 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.

The Model G0998 comes with two dead centers: one MT#4 tapered center for the spindle, and one MT#2 tapered center for the tailstock.

Mounting Dead Center in Spindle

1. DISCONNECT MACHINE FROM POWER!

2. Thoroughly clean and dry tapered mating surfaces of spindle bore and center, making sure that no lint or oil remains on tapers.

   Note: *This will prevent tapered surfaces from seizing due to operational pressures, which could make it very difficult to remove center.*

3. Mount faceplate onto spindle.

4. Insert center into spindle bore through faceplate.

Figure 56 shows example photo of dead center installed in spindle, using lathe dog and faceplate for turning between centers.

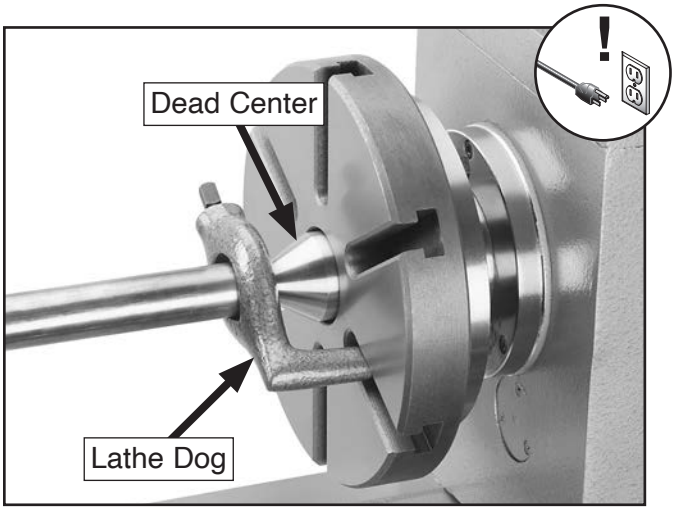


Figure 56. Example photo of using dead center with faceplate and lathe dog.

Removing Center from Spindle

To remove the 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 center loose.

Mounting Dead Center in Tailstock

1. DISCONNECT MACHINE FROM POWER!

2. Thoroughly clean and dry tapered mating surfaces of tailstock quill bore and center, making sure that no lint or oil remains on tapers.

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

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 or center.*

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.

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.

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.

   Note: *Tailstock center included with machine is a dead center with an HSS tip, so it cannot be used when mounting workpieces between centers because setup will produce too much heat and friction.*

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 **Figure 57**).

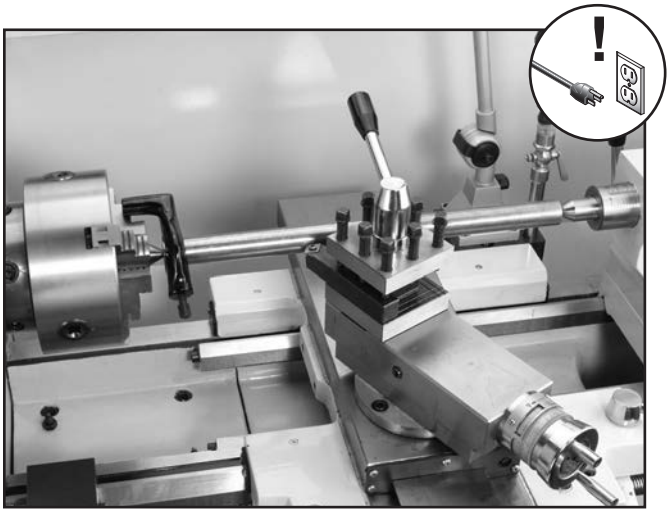


Figure 57. Example of stock mounted between centers.

Note: *Only apply enough pressure 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 or center.*

Drill Chuck & Arbor

The drill chuck attaches to the tailstock quill with the included B16 to MT#2 arbor. Matched tapers on the arbor and the inside of the chuck create a semi-permanent assembly when properly joined. The drill chuck can accept tooling from 1–13mm.

Joining Drill Chuck & Arbor

After the arbor is installed in the drill chuck, it is very difficult to separate the assembly. If you would like to use a different chuck in the future, we recommend obtaining a new arbor.

Items Needed	Qty
Acetone or Lacquer Thinner	As Needed
Disposable Rags	As Needed
Block of Wood	1

To join drill chuck and arbor:

1. Use acetone or lacquer thinner to thoroughly clean drill chuck and arbor mating surfaces, especially the bore.

2. Retract chuck jaws completely into chuck.

3. Insert short tapered end of arbor into socket in back of drill chuck.

4. Hold assembly by arbor and tap chuck onto block of wood with medium force, as shown in **Figure 58**.

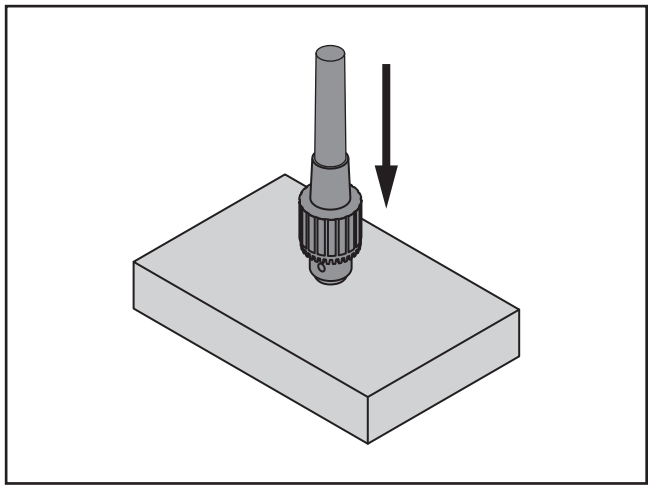


Figure 58. Tapping drill chuck/arbor on block of wood.

5. Attempt to separate drill chuck and arbor by hand—if they separate, repeat **Steps 5–6**.

Installing Drill Chuck in Tailstock

Before installing the drill chuck in the tailstock, refer to **Joining Drill Chuck and Arbor**.

Items Needed	Qty
Mineral Spirits	As Needed
Disposable Rags	As Needed
Rubber Mallet	1

To install drill chuck in tailstock:

1. DISCONNECT MACHINE FROM POWER!

2. Thoroughly clean and dry tapered mating surfaces of tailstock quill bore and drill chuck arbor, making sure that no lint or oil remains on tapers.

3. Rotate chuck on arbor until chuck jaws retract into drill chuck arbor.

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

5. Insert drill chuck arbor into tailstock quill.

6. Strike face of chuck with rubber-faced mallet to seat arbor in quill.

7. Advance tailstock to workpiece, lock tailstock position, then proceed with drilling operation, using quill handwheel to feed drill bit into rotating workpiece.

Removing Drill Chuck from Tailstock

To remove the drill chuck 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 drill chuck releases.

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.

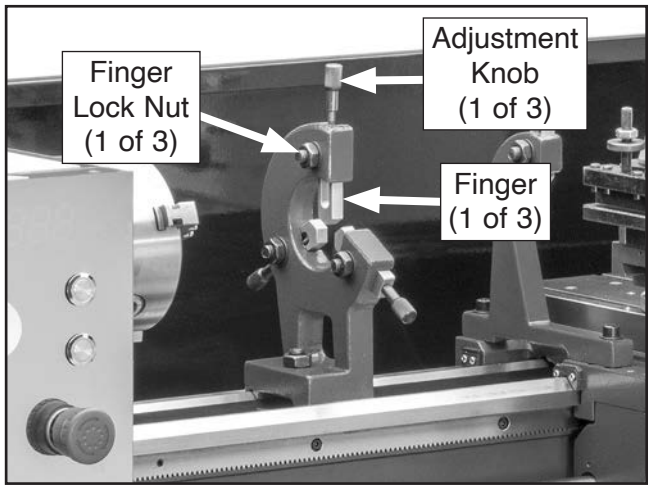


Figure 59. Steady rest components.

Tip: *To reduce the effects of friction, lubricate the finger tips with generous amounts of anti-sieze lubricant before operation.*

Tools Needed **Qty**
Wrench or Socket 17, 19mm.....1 Ea.

To install and use steady rest:

1. DISCONNECT MACHINE FROM POWER!

2. Thoroughly clean all mating surfaces, then place steady rest base on bedways and secure clamp plate with hex nut, flat washer, and clamp screw (see **Figure 60**).

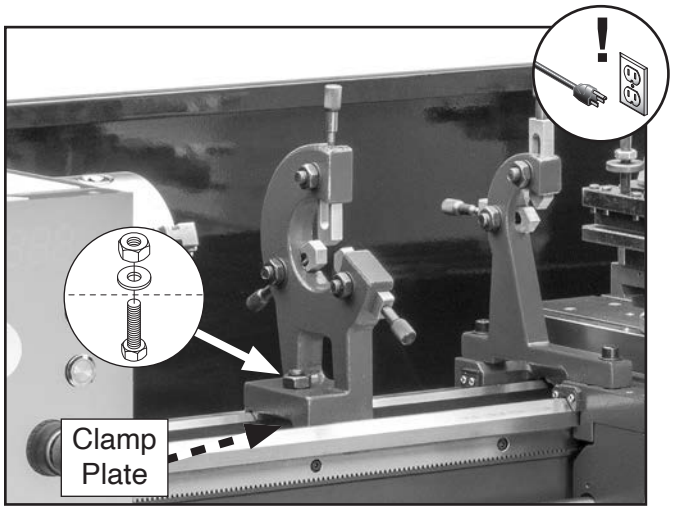


Figure 60. Steady rest clamping components.

3. Loosen (3) finger lock nuts so finger positions can be adjusted (see **Figure 59**).

4. Use finger adjustment knobs to position fingers so they just touch workpiece (see **Figure 61**) without causing deflection, then tighten finger lock nuts.

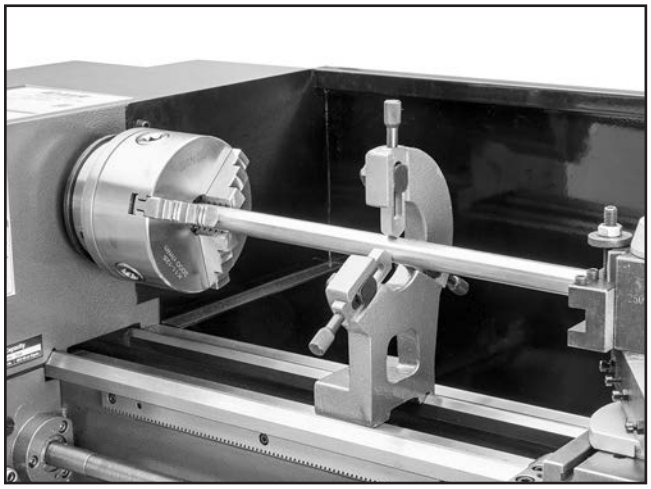


Figure 61. Fingers adjusted to touch workpiece.

Follow Rest

The follow rest mounts to the saddle and supports the workpiece near the cutting tool to prevent deflection from the pressure of the cutting tool. The follow rest fingers adjust in the same manner as the fingers on the steady rest.

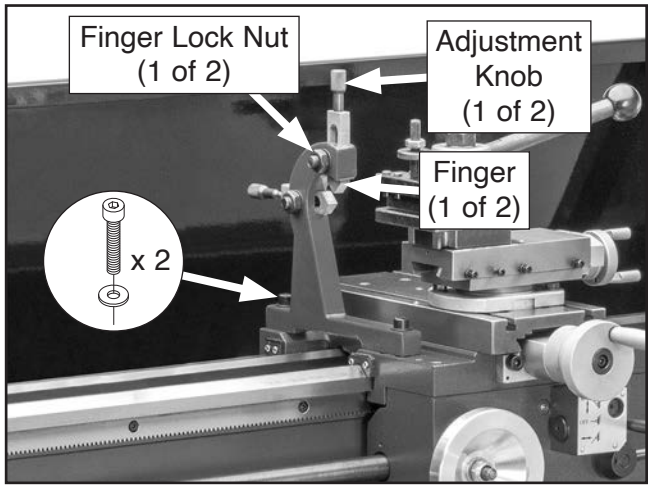


Figure 62. Follow rest components.

Tip: *To reduce the effects of friction, lubricate the finger tips with generous amounts of anti-sieze lubricant before operation.*

Tools Needed	**Qty**
Hex Wrench 6mm	1
Wrench or Socket 17mm	1

To install and use follow rest:

1. DISCONNECT MACHINE FROM POWER!

2. Place follow rest base on saddle and secure with (2) M8-1.25 x 25 cap screws and 8mm flat washers (see **Figure 62**).

3. Loosen (2) finger lock nuts so finger positions can be adjusted (see **Figure 62**).

4. Use finger adjustment knobs to position fingers so they just touch workpiece (see **Figure 63**) without causing deflection, then tighten finger lock nuts.

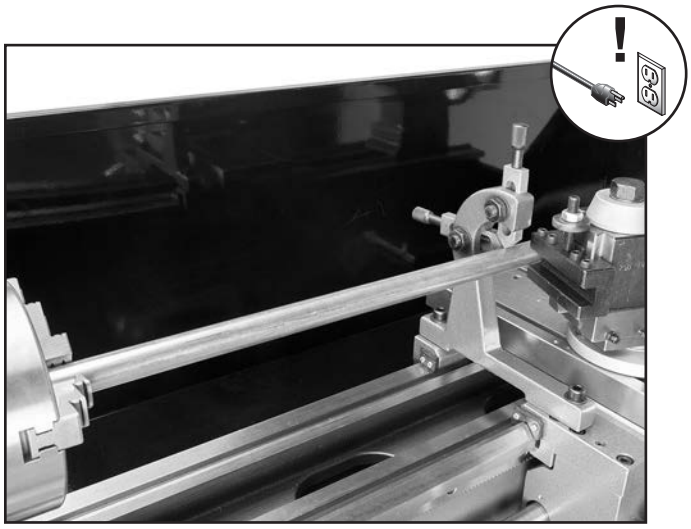


Figure 63. Fingers adjusted to touch workpiece.

Carriage & Compound Rest Locks

The carriage and compound rest each have a lock screw (see **Figure 64**) that can be tightened to provide additional rigidity during operation, especially during heavy cuts.

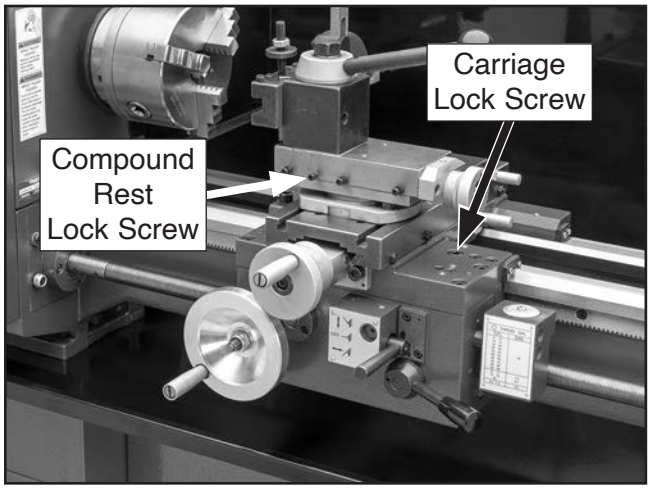


Figure 64. Location of carriage and compound rest lock screws.

Tools Needed	**Qty**
Hex Wrenches 3, 6mm	1 Ea.

Compound Rest

The compound rest has an indirect-read graduated scale. This means 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..... 0.05" (1.27mm)

Tool Needed	**Qty**
Open-End Wrench 10mm	1

To set compound rest to a certain angle:

1. Loosen (2) hex nuts at base of compound rest (see **Figure 65**).

2. Rotate rest to desired angle, as indicated by scale on base (see **Figure 65**), then tighten hex nuts to secure.

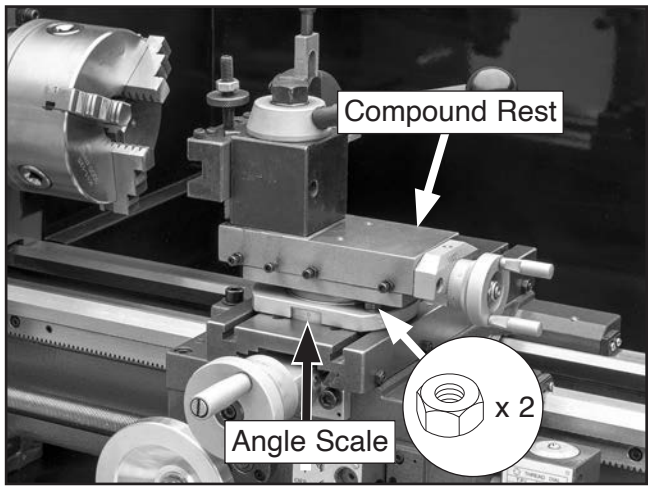


Figure 65. Location of compound rest base hex nuts.

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

Tool Post

The quick-change tool post (see **Figure 66**) is a 100-series design.

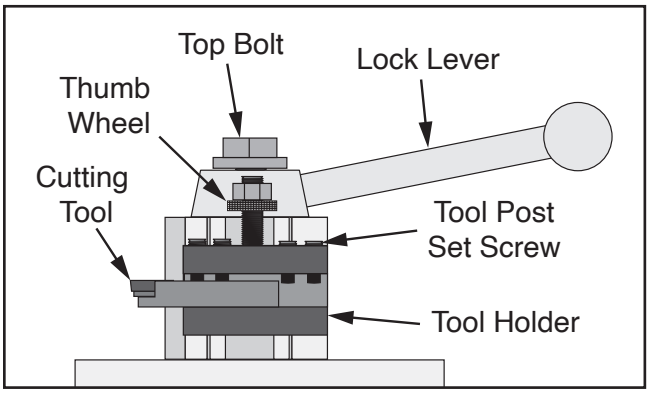


Figure 66. Example of tool mounted in tool post.

Tool holders can be quickly loaded and unloaded using the lock lever. Tools up to ⅜" can be secured by tightening the tool holder set screws. The thumb wheel rotates to adjust cutting tool height. The tool post is rotated by loosening the top bolt.

Installing Tool in Tool Holder

Tool Needed	**Qty**
Hex Wrench 4mm	1

To install tool in tool holder:

1. Position tool in tool holder so cutting edge extends just enough to allow tool to cut freely—but not more. Cutting edge must be well supported to ensure good cutting results and avoid chipping.

⚠WARNING

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

2. Firmly secure cutting tool with at least two tool post set screws.

3. Check and adjust cutting tool to spindle centerline, as instructed in next subsection.

Align Cutting Tool with Spindle Centerline

For most operations, the cutting tool tip should be aligned vertically with the spindle centerline, as illustrated in **Figure 67**.

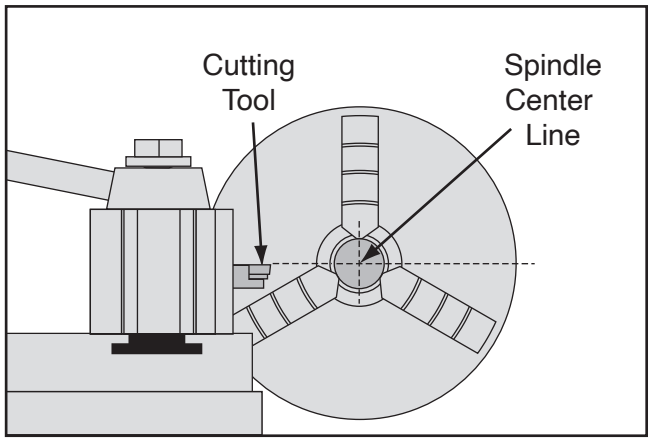


Figure 67. Cutting tool aligned with spindle centerline (as viewed from tailstock).

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 shims underneath it. The shims should be as long and as wide as the cutting tool to properly support it.

Below are two common methods:

- Move the tailstock center over the cross slide and use a fine ruler to measure the distance from the surface of the cross slide to the tip of the center. Adjust the cutting tool height so it is the same distance above the cross slide as the tailstock center.

- Align the tip of the cutting tool with a tailstock center, as described in the following procedure. For this to work, the tailstock must be aligned to the spindle centerline (refer to **Aligning Tailstock to Spindle Centerline** on **Page 42** for detailed instructions).

Items Needed	**Qty**
Tailstock Center	1
Wrench 9/16"	1

To align cutting tool with tailstock center:

1. Mount cutting tool and secure post so tool faces tailstock.

2. Install center in tailstock, and position tip near cutting tool.

3. Lock tailstock and quill in place.

4. Loosen thumb wheel jam nut (see **Figure 66** on **Page 49**).

5. Turn thumb wheel to adjust height of cutting tool tip to meet center tip, as shown in **Figure 68**, then tighten jam nut to secure.

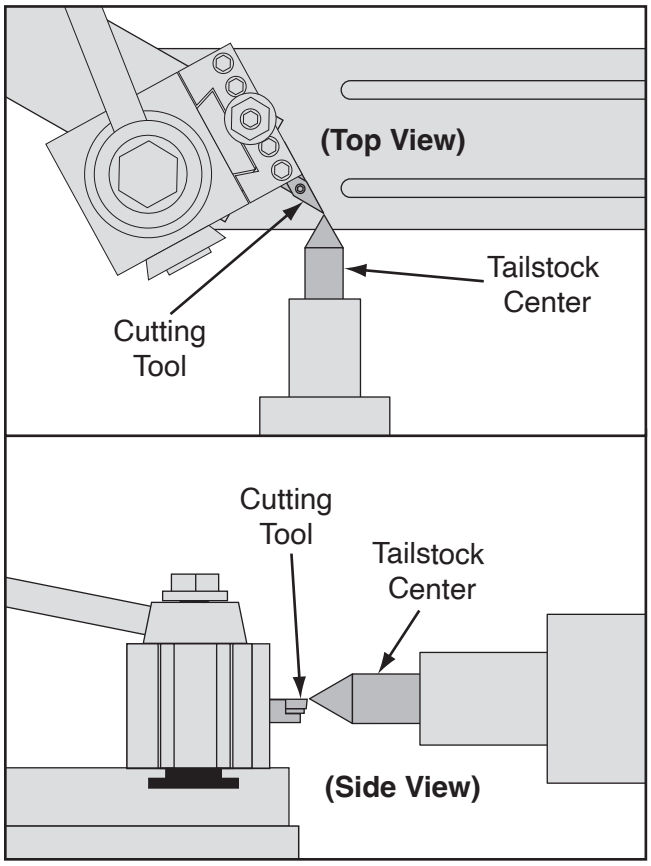


Figure 68. Cutting tool aligned to tailstock center.

Using Spindle Spider

The Model G0998 is equipped with a set of outboard spindle supports commonly referred to as a "spider" (see **Figure 69**).

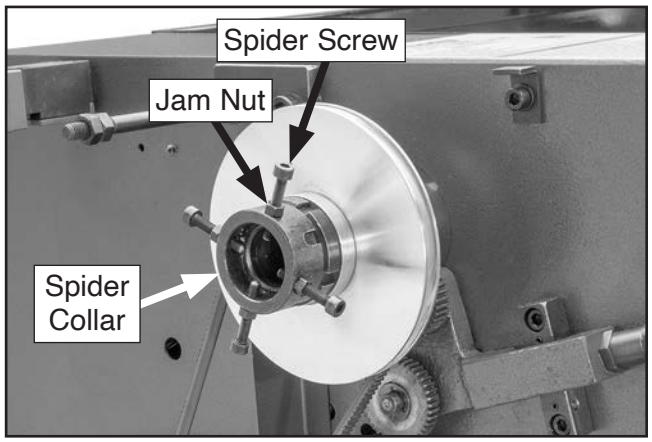


Figure 69. Spider components (shown with gear cover removed).

⚠CAUTION

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

The spider is specially 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 steel wear pads that hold the workpiece without causing indents in the finish.

When the spider collar and 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. Spider screws that loosen during the operation can crash into the lathe gear cover.

Tools Needed	**Qty**
Hex Wrench 4mm	1
Open-End Wrench 8mm	1

Manual Feed

The handwheels shown in **Figure 70** allow the operator to manually move the cutting tool.

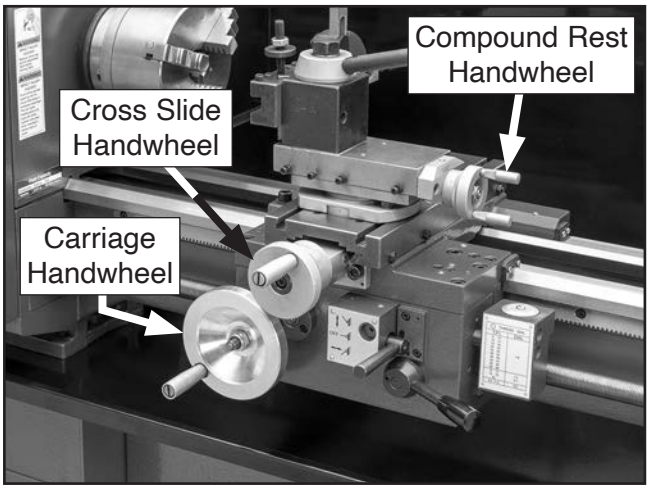


Figure 70. Carriage controls.

Carriage Handwheel

The carriage handwheel moves the carriage left or right along the bed. It has a graduated dial with 0.02" (0.5mm) increments. One full revolution moves the carriage 0.68".

Cross Slide Handwheel

The cross slide handwheel moves the tool towards and away from the workpiece. Adjust the position of the graduated scale by holding the handwheel with one hand and turning the dial with the other. The cross slide handwheel has an indirect-read graduated dial, which shows the actual distance the tool moves. The dial has 0.001" (0.03mm) increments. One full revolution moves the slide 0.1".

Compound Rest Handwheel

The compound rest handwheel moves the cutting tool linearly along the set angle of the compound rest. The compound rest angle is set by hand-rotating it and securing it in place with two hex nuts. The compound rest has an indirect-read graduated dial with 0.001" (0.03mm) increments. One full revolution of the handwheel moves the slide 0.05".

Determining 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.

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 71. 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 Range

This machine has two speed ranges: a low speed range that operates between 100–1100 RPM, and a high speed range that operates between 200–2200 RPM. The speed range is determined by how the V-belt is installed on the motor and spindle pulleys (see **Figure 72**).

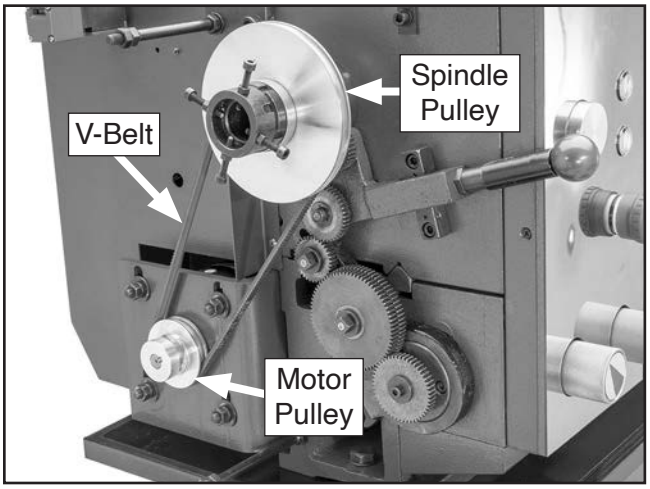


Figure 72. Location of V-belt and pulleys.

The low speed range is obtained when the V-belt is positioned on the outer pulley sheaves, and the high speed range is obtained when the V-belt is positioned on the inner pulley sheaves, as shown in **Figure 73**.

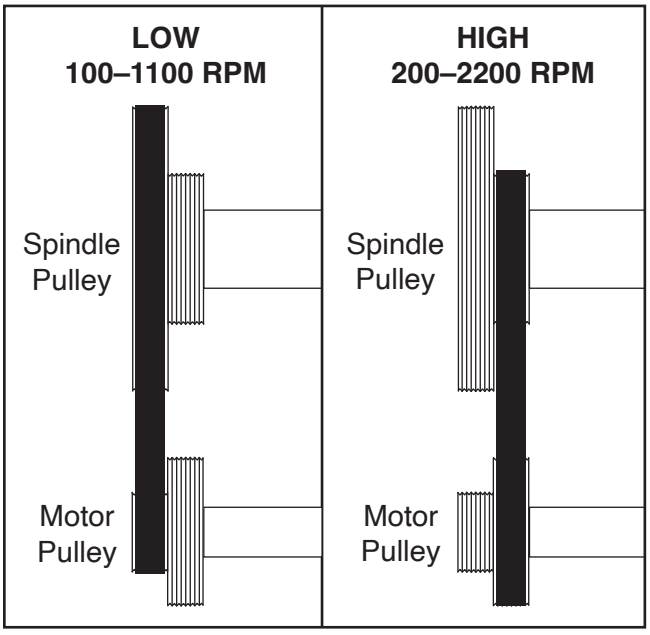


Figure 73. Belt configuration chart.

The V-belt transfers power from the motor to the spindle. If the V-belt is worn or damaged in any way, the lathe will not operate optimally, and unnecessary wear on the moving parts will occur. Whenever you are changing the spindle speed range, inspect the V-belt for damage or wear and replace it if necessary.

⚠CAUTION

Use care when handling V-belt as it could pinch your fingers. It may also be hot after extended use, so wait to touch V-belt if machine has been in use.

Tool Needed	Qty
Wrench or Socket 13mm	1

To set spindle speed range:

1. DISCONNECT MACHINE FROM POWER!

2. Determine correct spindle speed for operation.

3. Remove gear cover lock knobs to remove gear cover (see **Figure 74**).

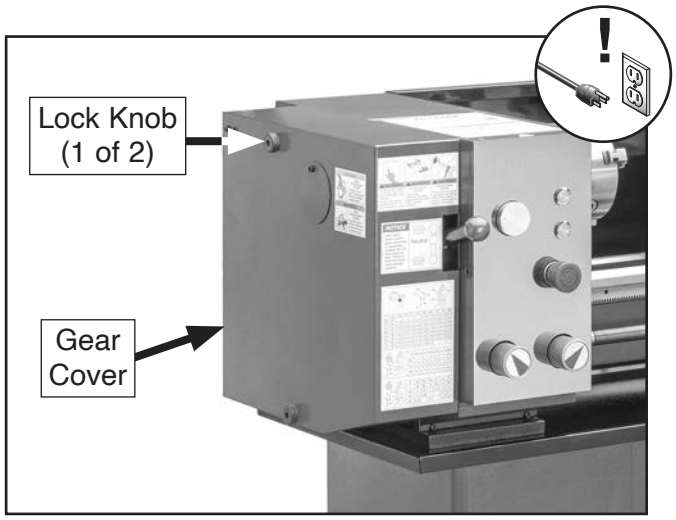


Figure 74. Location of gear cover and lock knobs.

4. Loosen (4) hex nuts shown in **Figure 75** to take tension off of V-belt.

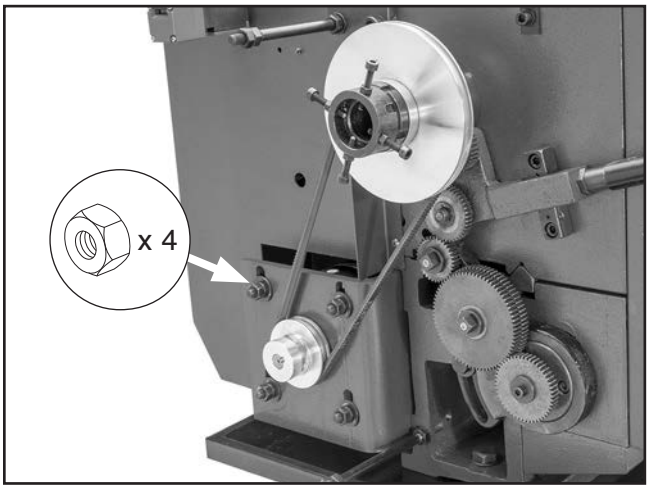


Figure 75. Location of V-belt tension hex bolts.

5. Move V-belt onto desired sheaves on motor and spindle pulleys (see **Figures 72–73** on **Page 52**).

   — If V-belt is cracked, torn, excessively worn, or damaged, replace it.

6. After belt is positioned on pulleys, push motor pulley away from spindle pulley to engage belt tension.

   Note: *Correct belt tension is set if belt flexes ¼" when thumb pressure is applied at mid-point of belt between pulleys (see **Figure 76**).*

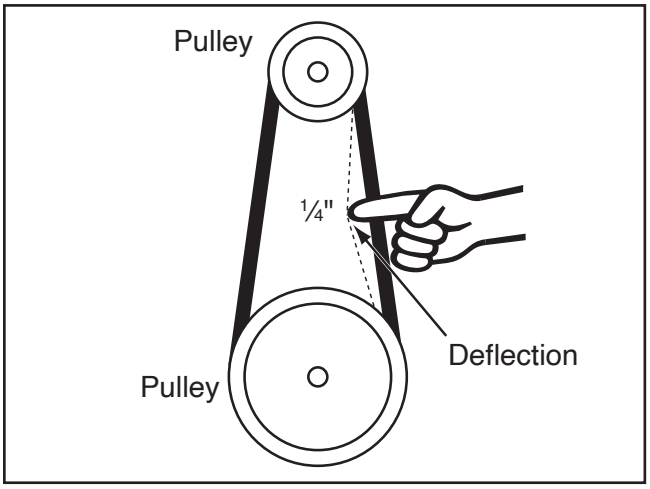


Figure 76. Checking belt tension.

7. Tighten (4) hex nuts from **Step 4** to secure.

8. Install gear cover.

Power Feed

Both the carriage and the cross slide have power feed capability when the carriage is engaged with the longitudinal leadscrew. The rate that these components move per revolution of the leadscrew 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.

This section only covers using the power feed option for the carriage for non-threading operations. To learn how to power the carriage for threading operations, refer to **Threading** on **Page 60**.

NOTICE

Avoid serious machine damage by following these precautions:

- **NEVER engage feed direction lever and half nut at the same time. Preventative lock-out device can break if forced.**
- **ALWAYS loosen carriage lock screw before any power feeding or threading operations.**
- **ALWAYS make sure spindle is completely stopped before making changes to feed direction lever or gearbox dials.**

Power Feed Controls

Use **Figures 77–78** and the following descriptions to understand the power feed controls.

Note: *Before using the power feed, you may have to reconfigure the end gears, depending on how they are set up. Refer to* ***Changing End Gears*** *on* ***Page 56*** *for detailed instructions.*

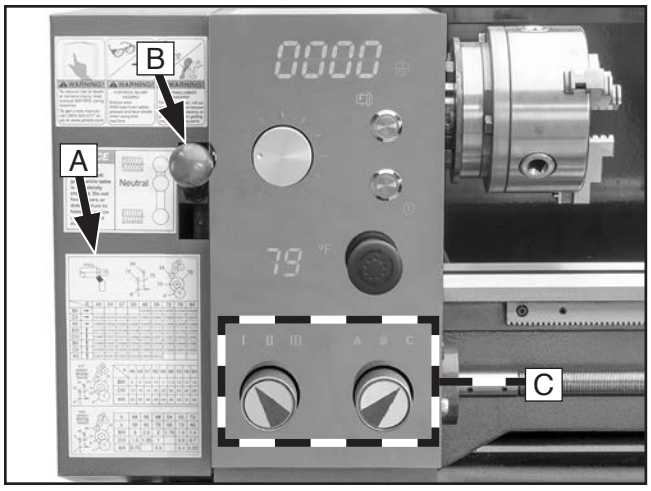


Figure 77. Headstock power feed controls.

A. Feed Rate Chart: Displays required settings for quick-change gearbox dials for selected feed rate. Refer to **Setting Power Feed Rate** subsection on **Page 55** for detailed instructions. A blown-up version of this chart can be found on **Page 101** of this manual.

B. Feed Direction Lever: Selects direction of carriage travel for power relative to rotation direction of spindle.

When spindle is rotating counterclockwise:

— Feed direction lever in upper position means carriage will move left (toward spindle), or cross feed will travel toward rear of lathe.

— Feed direction lever in lower position means carriage will move right (toward tailstock), or cross feed will travel toward front of lathe.

When spindle is rotating clockwise:

— Feed direction lever in upper position means carriage will move right (toward tailstock), or cross feed will travel toward front of lathe.

— Feed direction lever in lower position means carriage will move left (toward spindle), or cross feed will travel toward rear of lathe.

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

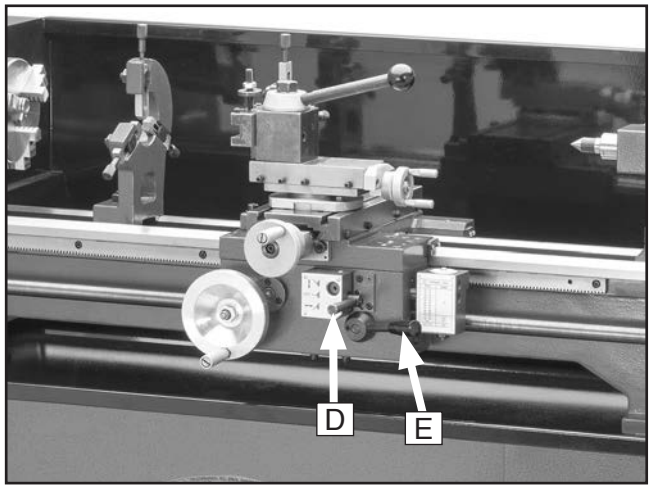


Figure 78. Apron power feed controls.

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

When lever is down and indent pin is pointing up, cross slide is selected. Conversely, when lever is up and pin is pointing down, carriage feed is selected. In middle position, neither cross slide or carriage will move.

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

E. Half Nut Lever: Engages/disengages half nut for threading operations.

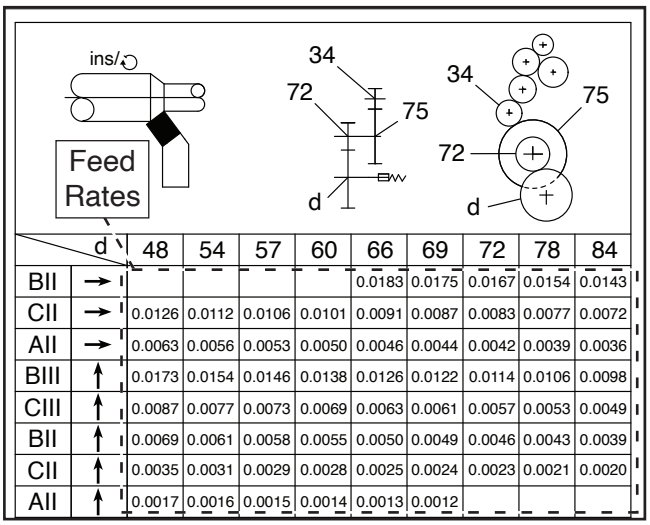
Setting Power Feed Rate

The feed rate chart displays the settings for the headstock feed controls for feed rates.

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

Examining the chart (see **Figure 79**), you will see a series of rows organized based on whether carriage (→) or cross slide (↑) is selected.

Once you have determined the correct feed rate for your operation in inches per revolution, find the feed rate in the chart (see **Figure 79**), then use the top row to determine which change gear should be installed in the "d" position. The far left column will identify how to position the quick-change gearbox dials for your desired feed rate.



d	48	54	57	60	66	69	72	78	84
BII →					0.0183	0.0175	0.0167	0.0154	0.0143
CII →	0.0126	0.0112	0.0106	0.0101	0.0091	0.0087	0.0083	0.0077	0.0072
AII →	0.0063	0.0056	0.0053	0.0050	0.0046	0.0044	0.0042	0.0039	0.0036
BIII ↑	0.0173	0.0154	0.0146	0.0138	0.0126	0.0122	0.0114	0.0106	0.0098
CIII ↑	0.0087	0.0077	0.0073	0.0069	0.0063	0.0061	0.0057	0.0053	0.0049
BII ↑	0.0069	0.0061	0.0058	0.0055	0.0050	0.0049	0.0046	0.0043	0.0039
CII ↑	0.0035	0.0031	0.0029	0.0028	0.0025	0.0024	0.0023	0.0021	0.0020
AII ↑	0.0017	0.0016	0.0015	0.0014	0.0013	0.0012			

Figure 79. Power feed rate chart.

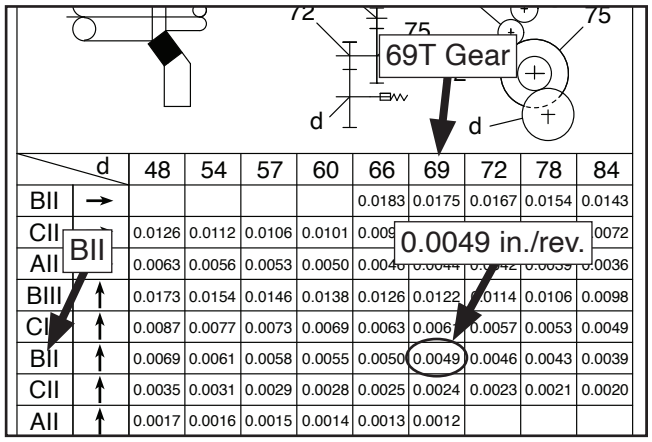
Note: *A blown-up version of the feed rate and threading chart can be found on* ***Page 101*** *of this manual.*

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

To set cross slide power feed rate to 0.0049 in./rev.:

1. Locate box on power feed rate chart that lists 0.0049 in./rev., as shown in **Figure 80**.

2. Refer to top row to determine correct change gear to install in "d" position—in this case, 69T gear is correct gear, as shown in **Figure 80**.



	d	48	54	57	60	66	69	72	78	84
BII	→					0.0183	0.0175	0.0167	0.0154	0.0143
CII	→	0.0126	0.0112	0.0106	0.0101	0.009				0072
AII	→	0.0063	0.0056	0.0053	0.0050	0.004				0.0036
BIII	↑	0.0173	0.0154	0.0146	0.0138	0.0126	0.0122	0114	0.0106	0.0098
CI	↑	0.0087	0.0077	0.0073	0.0069	0.0063	0.006	0.0057	0.0053	0.0049
BII	↑	0.0069	0.0061	0.0058	0.0055	0.0050	0.0049	0.0046	0.0043	0.0039
CII	↑	0.0035	0.0031	0.0029	0.0028	0.0025	0.0024	0.0023	0.0021	0.0020
AII	↑	0.0017	0.0016	0.0015	0.0014	0.0013	0.0012			

Figure 80. Location of 0.0049 in./rev. cross slide feed rate and correct change gear.

3. Install 69T gear in "d" position so it meshes with 72T gear (refer to **Changing End Gears** for details).

4. Position gearbox dials (see **Figure 81**) as directed by chart in **Figure 80**. If necessary, use chuck key to rock spindle back and forth to help mesh gears.

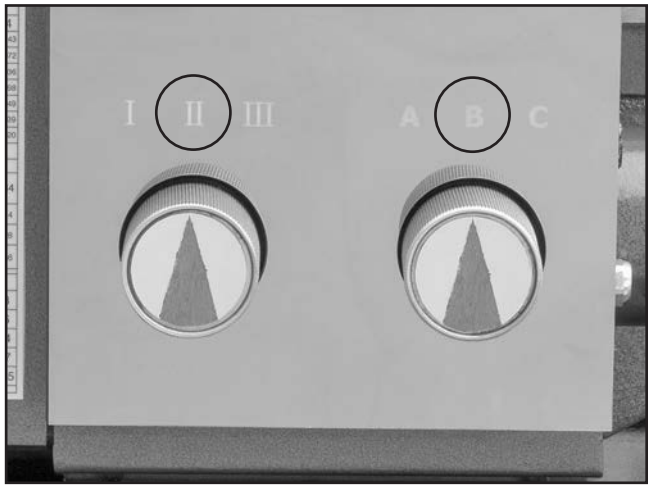


Figure 81. Gearbox dials positioned for 0.0049 in./rev. cross slide feed rate.

Changing End Gears

The end gears must be correctly set up for power feed, inch, or metric threading operations. Use the photo below (see **Figure 82**) to identify the upper gear, the middle inner and middle outer gears, and lower gear.

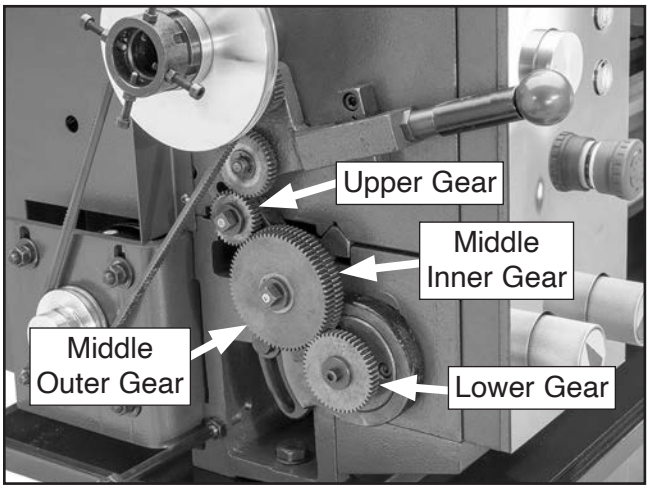


Figure 82. End gears.

The following subsections explain how to configure the end gears.

Power Feed Configuration

Install the 34T gear in the upper position and mesh it with the 75T middle inner gear. Middle outer gear should be 72T gear and will mesh with "d" gear installed in lower position. **Figure 83** shows 48T gear installed in "d" position, but this gear will depend on your desired power feed rate.

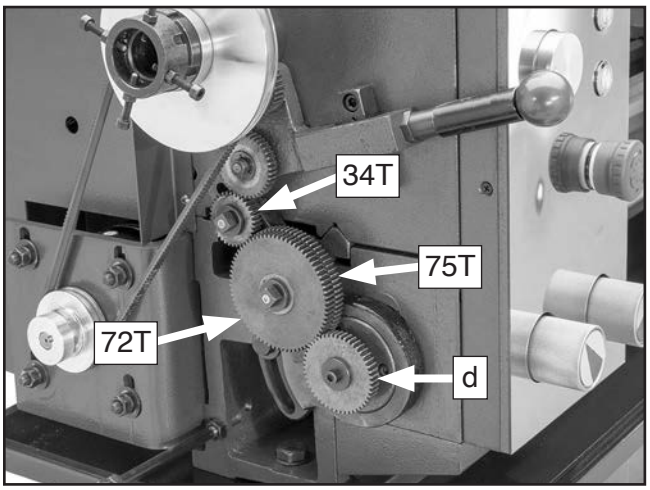


Figure 83. End gears configured for power feeding.

Inch Threading Configuration

Install the 34T gear in the upper position and mesh it with the 75T middle inner gear. Middle outer gear should be 72T gear and will mesh with "a" gear installed in lower position. **Figure 84** shows 48T gear installed in "a" position, but this gear will depend on your desired thread pitch.

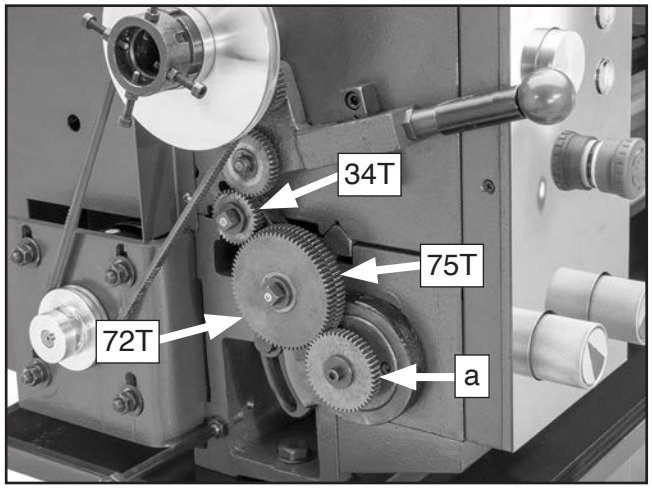


Figure 84. End gears configured for inch threading.

Metric Threading Configuration

Install the 48T gear in the upper position and mesh it with the 72T middle inner gear. Middle outer gear will be "b" gear and will mesh with "c" gear installed in lower position. **Figure 85** shows 54T gear installed in "b" position, and 68T gear installed in "c" position, but these gears will depend on your desired thread pitch.

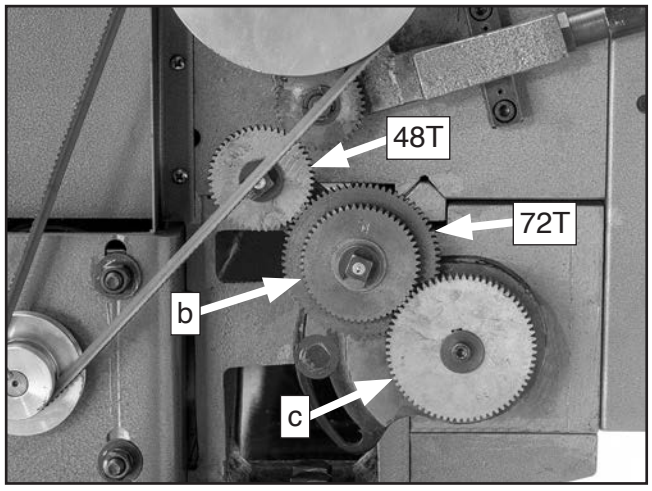


Figure 85. End gears configured for metric threading.

End Gear Configuration Example

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

Tools Needed	**Qty**
Hex Wrench 4mm	1
Wrench or Socket 10, 13mm	1 Ea.
Feeler Gauge Set or Dial Indicator	1

To configure end gears for threading 16 TPI:

1. Locate upper, middle inner, and middle outer gears on inch thread chart (see **Figure 86**). 34T, 75T, and 72T gears must always be installed in these positions for inch threading.

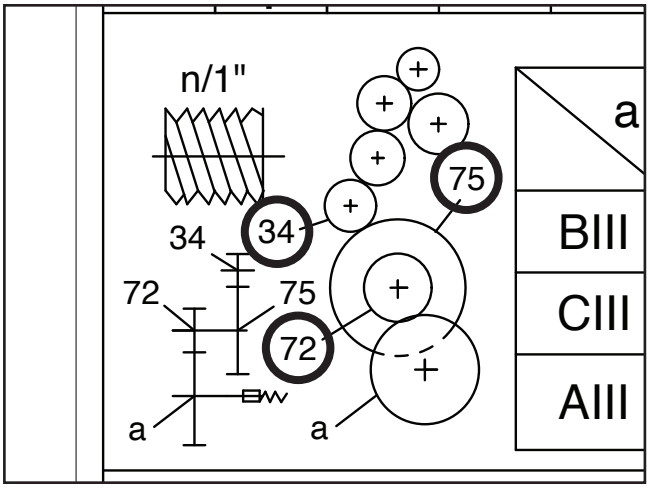


Figure 86. Locating constant inch threading gears.

2. Locate 16 on inch thread chart, then use chart to locate correct "a" position (lower) gear (see **Figure 87**), which correspond. In this case, 48T must be installed in "a" (lower) position.

a	48	54	57	60	66	69	72	78	84
BIII	8	9	9.5	10	11	11.5	12	13	14
CIII	16	18	19	20	22	23	24	26	28
AIII	32	36	38	40	44	46	48	52	56

Figure 87. Locating change gear for inch threading.

3. DISCONNECT MACHINE FROM POWER!

4. Remove gear cover lock knobs to remove gear cover (see **Figure 88**).

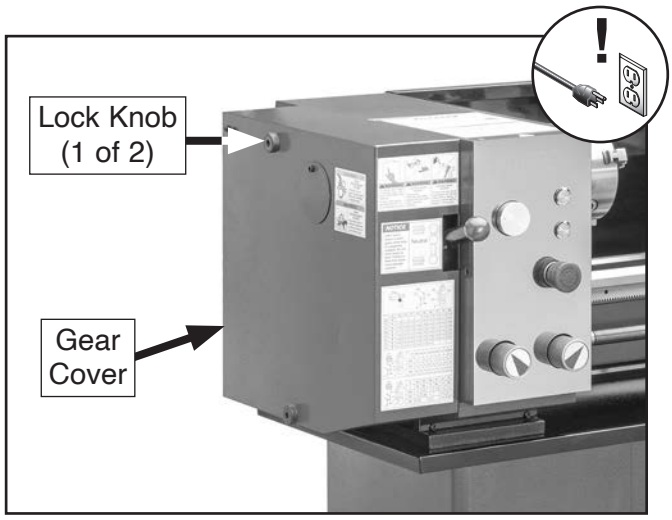


Figure 88. Location of gear cover and lock knobs.

5. While holding end gear arm, loosen hex bolt and slowly let arm swing down (see **Figure 89**).

6. Turn square-headed upper and middle shafts shown in **Figure 89** counterclockwise to release upper and middle gear positions.

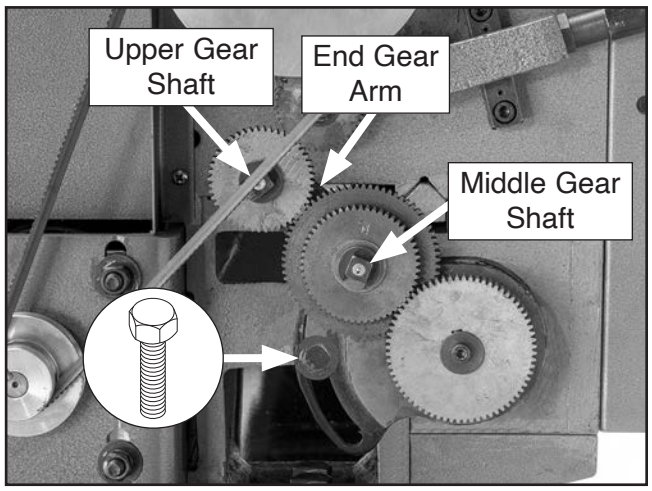


Figure 89. Location of end gear arm and hex bolt.

7. Check which gear is installed in upper position (see **Figure 90**).

   — If 34T gear *is* installed in upper position, gear does not need to be changed, proceed to **Step 9**.

   — If 34T gear *is not* installed in upper position, proceed to **Step 8**.

8. Slide retaining plate out of upper gear shaft slot (see **Figure 90**), replace installed gear with 34T gear, making sure to align key and keyway, then slide retaining plate back in place to secure.

   Note: *Move upper gear shaft in end gear arm slot as needed for clearance.*

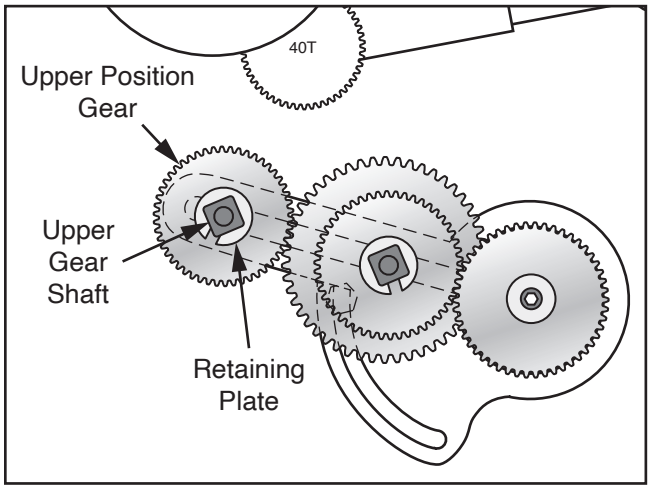


Figure 90. Upper position gear.

9. Check which gears are installed in inner middle and outer middle positions (see **Figure 91** on **Page 59**).

   — If 75T gear *is* installed in inner middle position, and 72T gear *is* installed in outer middle position, gears do not need to be changed, proceed to **Step 11**.

   — If 75T gear *is not* installed in inner middle position, or 72T gear *is not* installed in outer middle position, proceed to **Step 10**.

10. Slide retaining plate out of middle gear shaft slot (see **Figure 91**), replace installed gears so 75T gear is in inner position and 72T is in outer position, making sure to align keys and keyways, then slide retaining plate back in place to secure.

Note: *Move middle gear shaft in end gear arm slot as needed for clearance.*

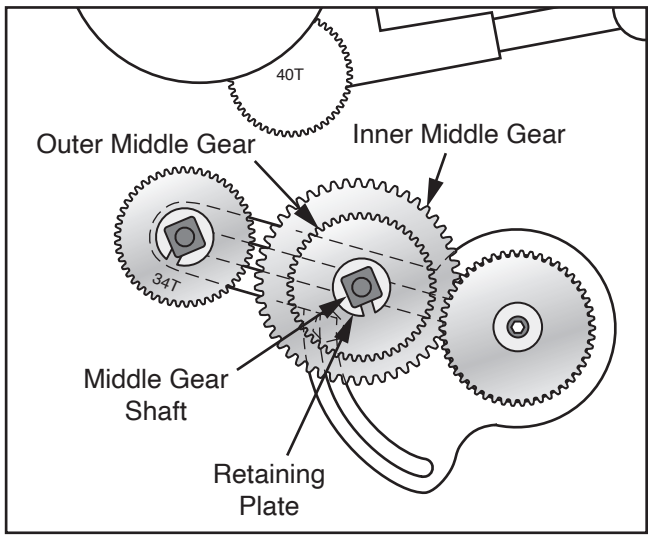


Figure 91. Middle position gears.

11. Check which gear is installed in "a" (lower) position (see **Figure 92**).

— If 48T gear *is* installed in "a" (lower) position, gear does not need to be changed, proceed to **Step 13**.

— If 48T gear *is not* installed in "a" (lower) position, proceed to **Step 12**.

12. Remove cap screw and flat washer from lower shaft (see **Figure 92**), replace installed gear with 48T gear, making sure to align key and keyway, then secure with flat washer and cap screw.

Note: *Move upper and middle gear shafts in end gear arm slot as needed for clearance.*

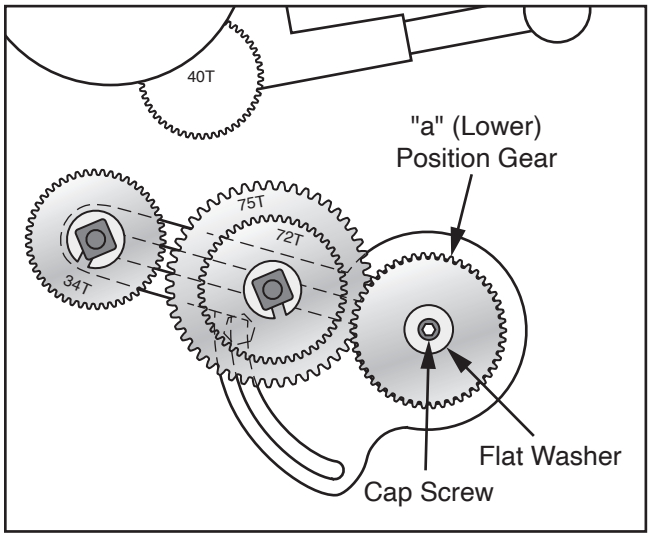


Figure 92. "a" (lower) position gear.

13. Slide middle gear assembly against lower 48T gear (see **Figure 93**) until 72T gear meshes with 48T gear with 0.002"–0.004" backlash, then tighten middle gear shaft to secure.

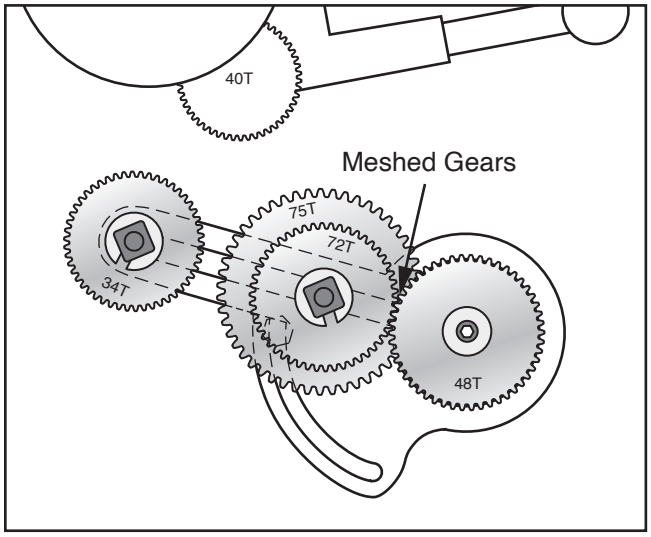


Figure 93. 72T gear meshed with 48T gear.

14. Slide upper 34T gear against middle gear assembly (see **Figure 94**) until 34T gear meshes with 75T gear with 0.002"–0.004" backlash, then tighten upper gear shaft to secure.

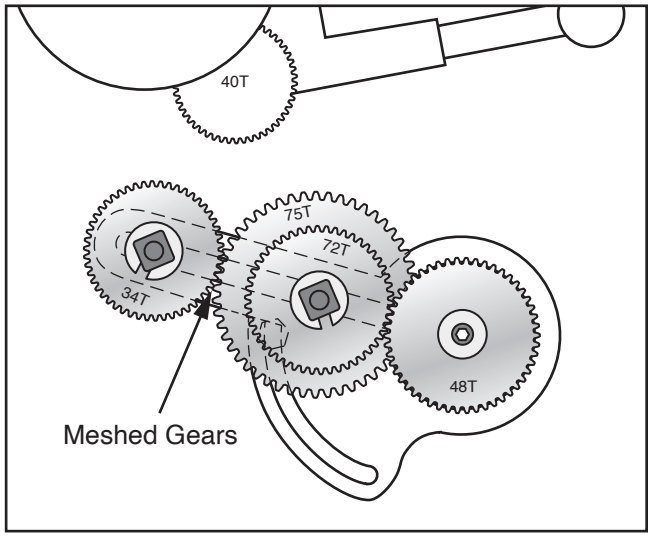


Figure 94. 34T gear meshed with 75T gear.

15. Swing end gear arm up until 34T gear meshes with permanent 40T shown in **Figure 95** with 0.002"–0.004" backlash, then tighten end gear arm hex bolt to secure.

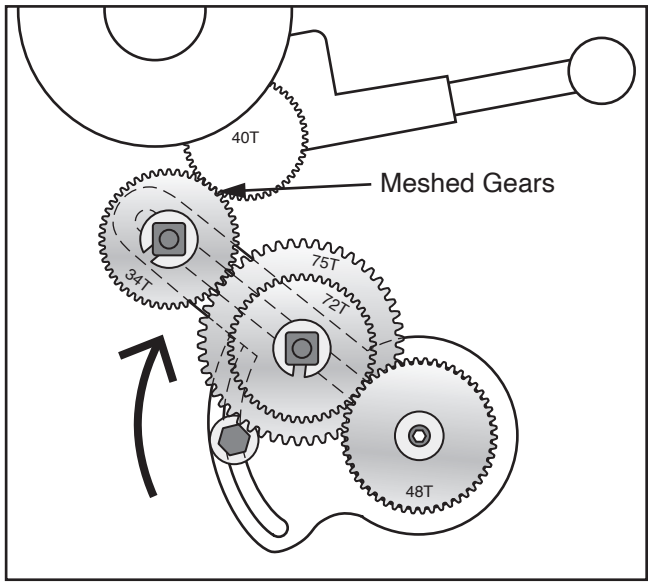


Figure 95. 34T gear meshed with permanent 40T gear.

16. Install 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 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 16 TPI:

1. Install 34T, 75T, 72T, and 48T gears, as instructed in **End Gear Configuration Example** on **Page 57**.

2. Connect machine to power.

3. Locate 16 on inch thread chart, then use chart to locate correct gear dial setting (see **Figure 96**), which corresponds.

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

a	48	54	57	60	66	69	72	78	84
BIII	8	9	9.5	10	11	11.5	12	13	14
CIII	16	18	19	20	22	23	24	26	28
AIII	32	36	38	40	44	46	48	52	56

Figure 96. Locating gear dial setting for 16 TPI inch threading.

4. Position left gearbox dial to point to "III" and right gearbox dial to point to "C" (see **Figure 97**).

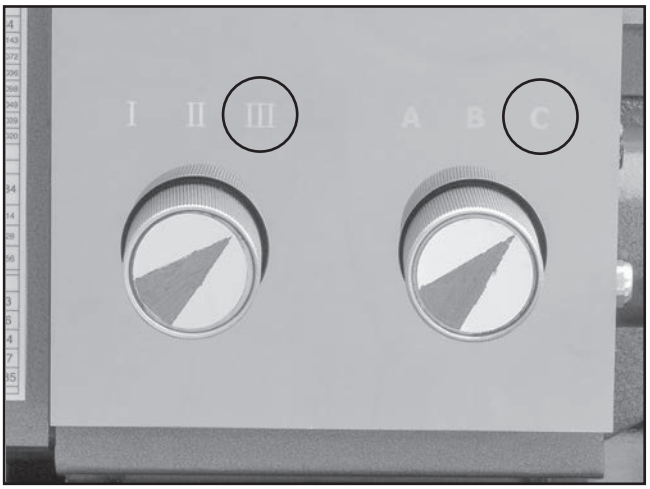


Figure 97. Gearbox dials positioned for 16 TPI.

Apron Threading Controls

The half nut lever engages the carriage with the longitudinal leadscrew, which moves the carriage and cutting tool along the length of the workpiece for threading operations.

IMPORTANT: Make sure the feed selection lever is in the disengaged (middle) position before engaging the half nut.

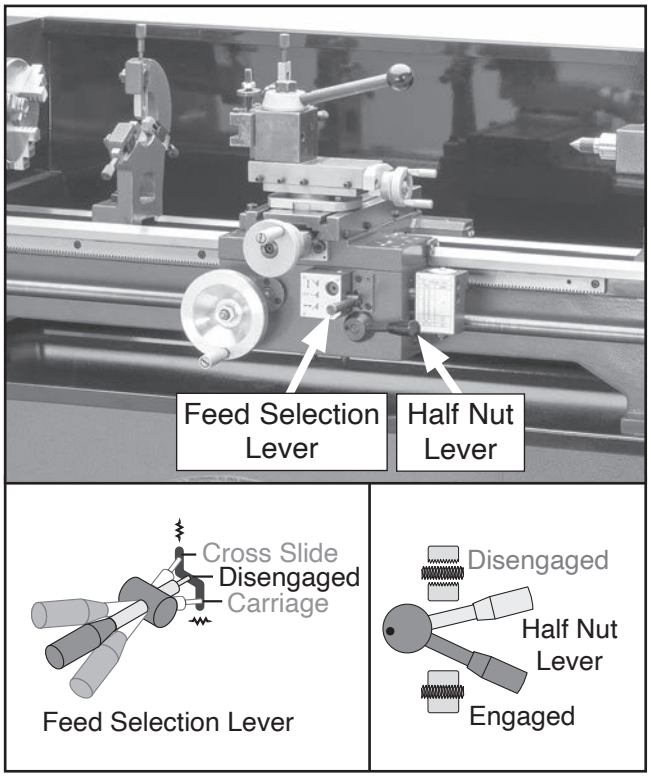


Figure 98. Apron threading controls.

Thread Dial

Tool 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 shown in **Figure 99**, pivot the gear teeth so they mesh with the longitudinal leadscrew threads, then tighten the cap screw.

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

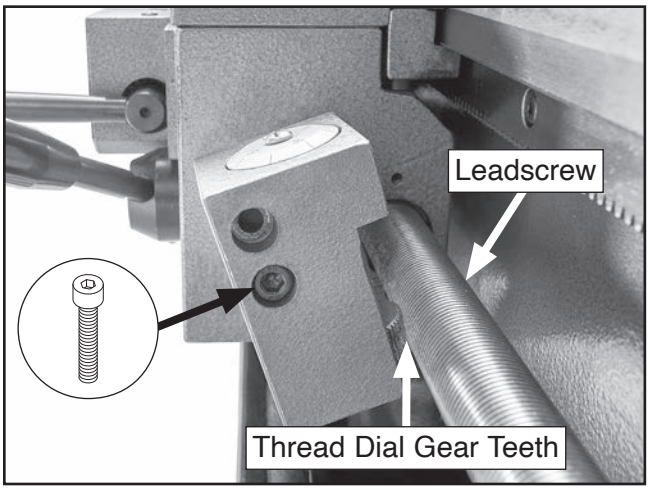


Figure 99. Thread dial engaged with longitudinal leadscrew.

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 reengages 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 face of the thread dial (see **Figure 100**).

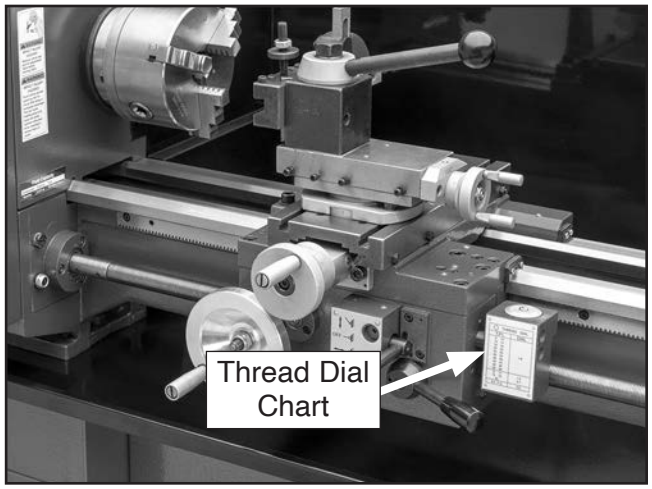


Figure 100. Thread dial chart location.

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

For example, if you are cutting 13 TPI threads, the chart shows "1, 3, 5, 7" in the "DIAL" column next to 13 TPI (see **Figure 101**).

THREAD DIAL	
T.P.I.	DIAL
8 10 12 14 16 18 20 22 24 26 28 30 36 38 40 44 46 48 52 56	1-8
9 11 13 19 23	1.3 5.7
9.5 11.5	2.6

Figure 101. Thread dial chart.

Note: *A blown-up version of the thread dial chart can be found on* ***Page 102*** *of this manual.*

The following examples explain how to use the thread dial and the thread dial chart (see Figure 101).

Even TPI: For threading even numbered TPI, use any mark on the thread dial (see example in **Figure 102**).

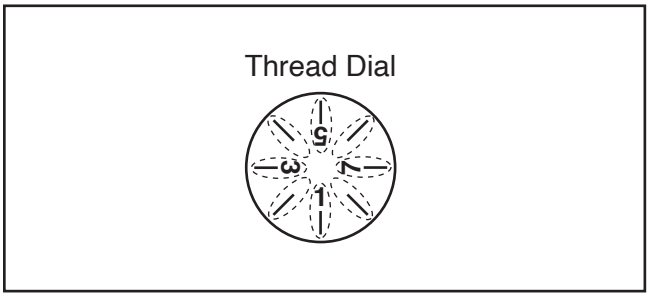


Figure 102. Using thread dial for even threads.

Odd TPI: For threading odd numbered TPI, use any numbered line on the thread dial (see example in **Figure 103**).

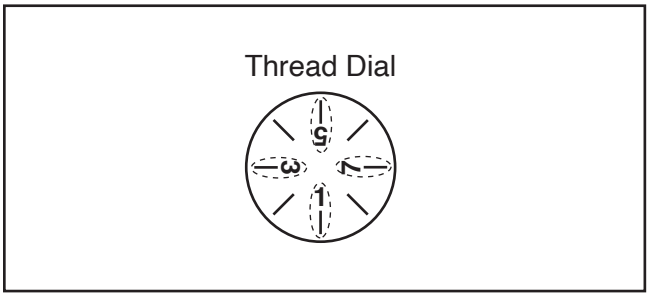


Figure 103. Using thread dial for odd threads.

9.5 or 11.5 TPI: For threading 9.5 or 11.5 TPI, use 2 or 6 on the thread dial (see example in **Figure 104**).

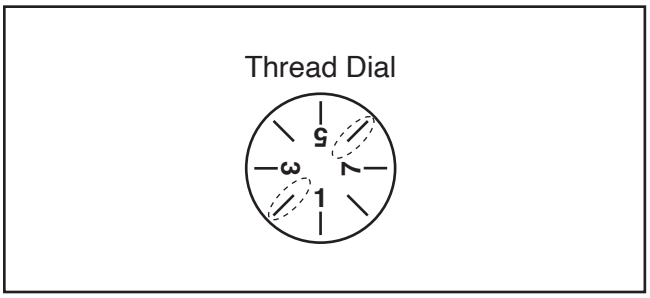


Figure 104. Using thread dial for 9.5 or 11.5 TPI threads.

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.

Recommended Metal Protectants

G5562—SLIPIT® 1 Qt. Gel
G5563—SLIPIT® 11 Oz. Spray

Figure 105. Recommended products for protecting unpainted cast iron/steel parts on machinery.

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

Figure 106. High-pressure oil can for ball oilers.

T10456—Heavy-Duty Anti-Fatigue Mat 3' x 5'
This Heavy-Duty Anti-Fatigue Mat features beveled edges and no-slip tread for safety and comfort. Open-hole design allows liquid to drain through, so it's perfect for wet or oily conditions. Measures 3' wide x 5' long x ⅜" thick.

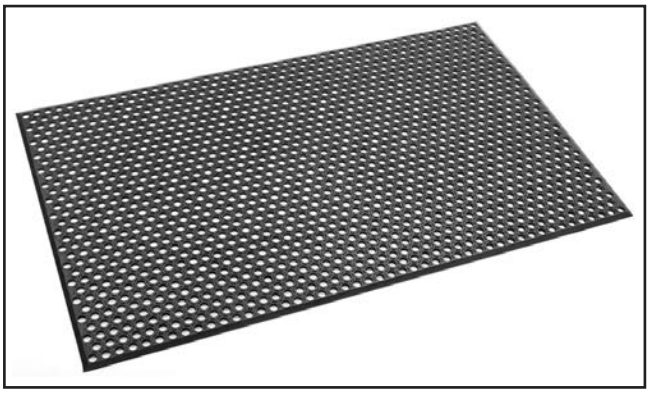
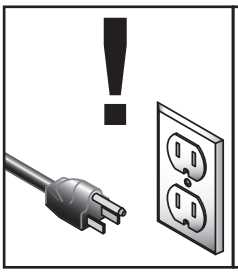


Figure 107. T10456 Anti-Fatigue Mat.

SECTION 6: MAINTENANCE



⚠WARNING
To reduce risk of shock or accidental startup, always disconnect machine from power before adjustments, maintenance, or service.

Schedule

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

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

- Loose mounting bolts.
- Worn or damaged wires.
- Low gearbox oil (**Page 65**).
- Dry bedways (**Page 65**).
- Dry slides (**Page 66**).
- Dry longitudinal leadscrew (**Page 65**).
- Any other unsafe condition.

Weekly Maintenance
- Lubricate end gears (**Page 67**).
- Lubricate ball oilers (**Page 66**).
- Check V-belt for tension/wear (see **Page 52**).

Yearly Maintenance
- Change gearbox oil (**Page 68**).
- Check/level bedway (**Page 27**).

Cleaning & Protecting

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

Typically, the easiest way to clean swarf from the machine is 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 lightly 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.

Protect the unpainted machined surfaces by wiping them clean after every use. Keep these surfaces rust-free with regular applications of products like SLIPIT® (see **Page 63** for more details).

Lubrication

The bearings on your machine are factory lubricated and sealed. Leave them alone unless they need to be replaced.

Use the following schedule and instructions to lubricate the components that require lubrication.

Lubrication Task	Frequency (Hours of Operation)	Page Ref.
Gearbox Oil Check	8 Hrs.	**65**
Bedways	8 Hrs.	**65**
Longitudinal Leadscrew	8 Hrs.	**65**
Ball Oilers	8 Hrs.	**66**
End Gears	40 Hrs.	**67**
Gearbox Oil Change	2000 Hrs.	**68**

Figure 108. Recommended lubrication tasks.

NOTICE

Recommended lubrication is based on light-to-medium usage. These lubrication tasks may need to be performed more frequently than recommended here, depending on usage. Failure to follow lubrication practices instructed in manual could lead to premature failure of components and will void warranty.

Checking Gearbox Oil

Items Needed	Qty
Phillips Head Screwdriver #2	1
Flat Head Screwdriver ¼"	1
Model SB1365 or ISO 68 Equiv.	As Needed

The gearbox reservoir has the proper amount of oil when the oil level in the sight glass is approximately halfway full (see **Figure 109**).

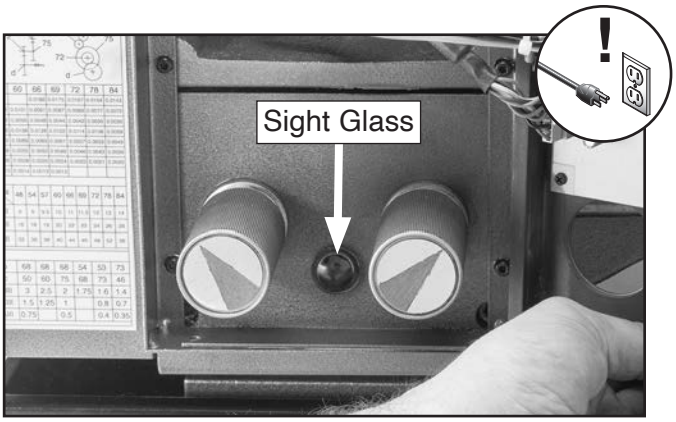


Figure 109. Location of gearbox oil sight glass (behind control panel).

If oil is low, remove the fill plug (see **Figure 110**), add oil until oil sight glass is halfway full, then install fill plug.

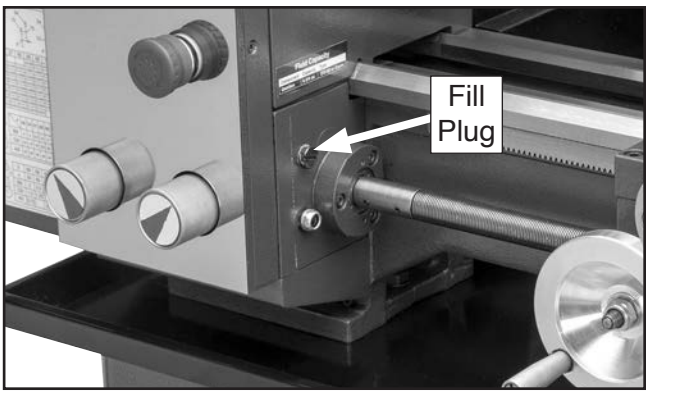


Figure 110. Location of gearbox oil fill plug.

Bedways

Items Needed	Qty
Mineral Spirits.	As Needed
Disposable Rags.	As Needed
Model SB1365 or ISO 68 Equiv.	As Needed

Before lubricating the bedways (see **Figure 111**), clean them with mineral spirits. Apply a thin coat of oil along the length of the bedway. Move the steady rest (if installed), 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.

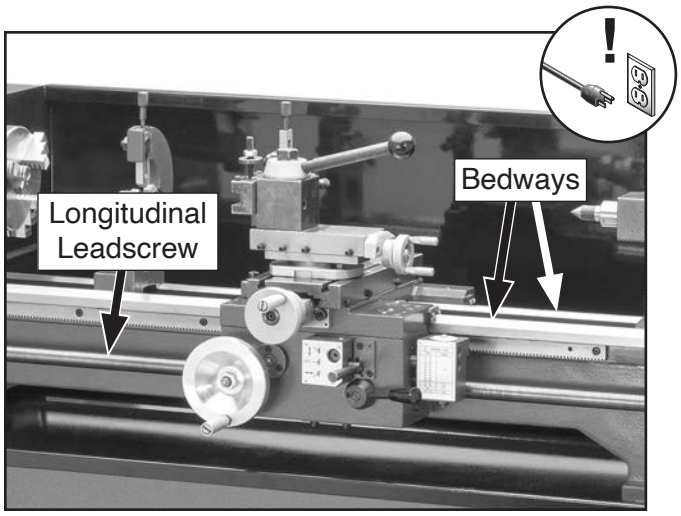


Figure 111. Location of bedways and longitudinal leadscrew.

Longitudinal Leadscrew

Items Needed	Qty
Model SB1365 or ISO 68 Equiv.	As Needed
Disposable Rags.	As Needed
Mineral Spirits.	As Needed
Stiff Brushes.	2

Before lubricating the longitudinal leadscrew (see **Figure 111**), 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 it reaches down into the threads.

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

Ball Oilers

Items Needed	Qty
Disposable Rags	As Needed
Mineral Spirits	As Needed
Model T23963 or ISO 32 Equiv	As Needed

This lathe has 22 ball oilers that should be oiled on a weekly basis before beginning operations. Refer to **Figures 112–115** for their locations.

When lubricating ball oilers, we recommend using an oil gun with a rubber tip wide enough to seal against the ball oiler inlet. A good seal allows the gun to build enough hydraulic pressure to flush out contaminants and deliver oil at the end of long passages. We do not recommend using oil guns with a steel lance tip, because they do not create a seal and the narrow tip can easily dislodge the ball—resulting in contamination, insufficient lubrication, and a damaged ball oiler.

First clean the outside surface to remove any dust or grime. Push the 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 or other contaminants coming out of the lubrication area, keep pumping the oil can until the oil runs clear. When finished, wipe away extra oil.

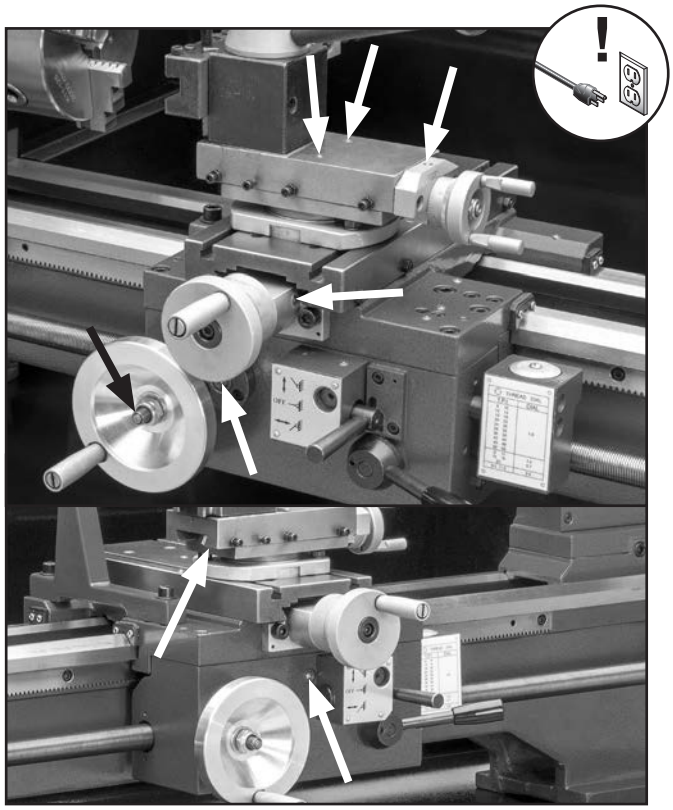


Figure 112. Apron, handwheel, and compound rest ball oilers.

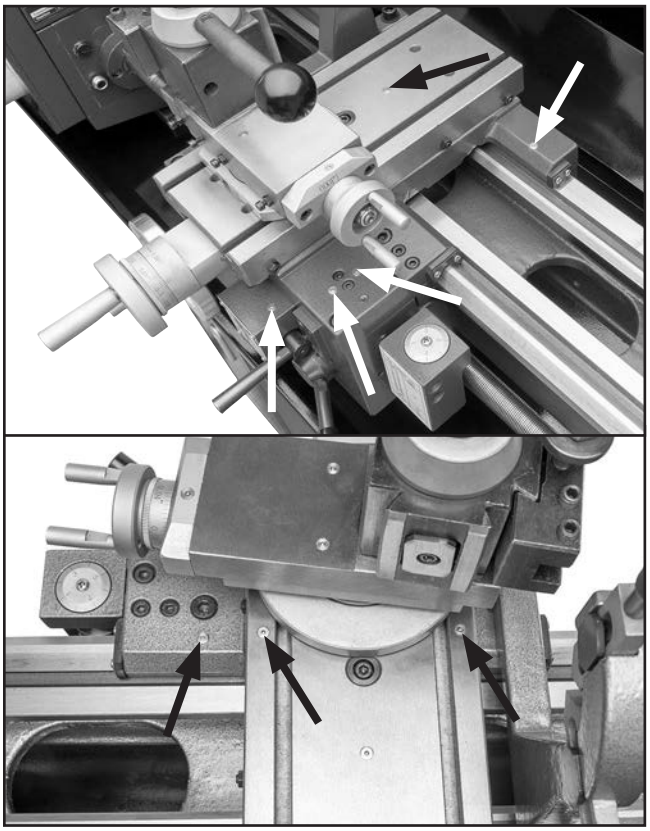


Figure 113. Carriage, cross slide, and feed selection lever ball oilers.

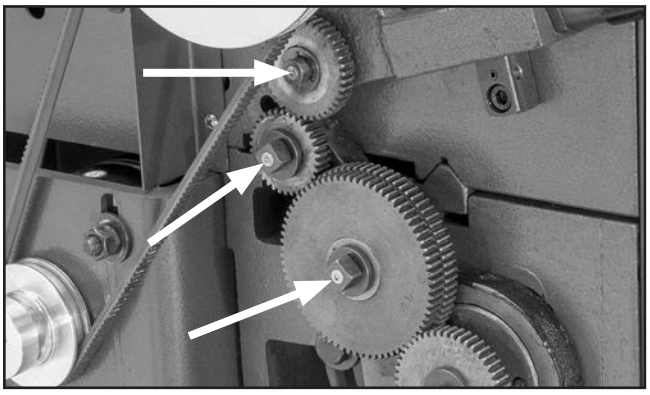


Figure 114. End gear ball oilers.

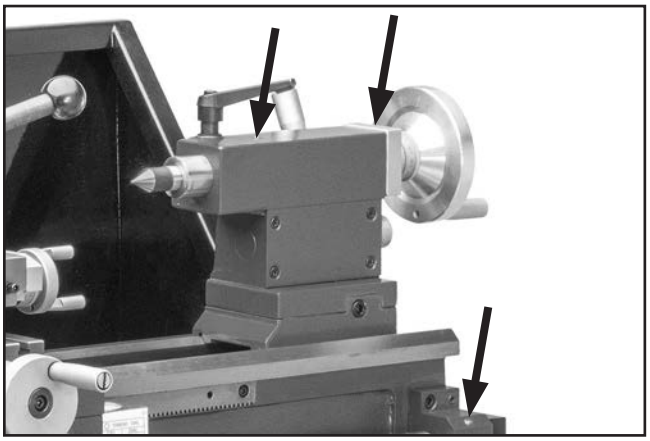


Figure 115. Tailstock and leadscrew ball oilers.

End Gears

Items Needed	Qty
Hex Wrench 4mm	1
Wrenches or Sockets 10, 13mm	1 Ea.
Spanner Wrench 45–52mm	1
Disposable Rags.	As Needed
Stiff Brushes.	2
Mineral Spirits.	As Needed
Model T26419 or NLGI#2 Equiv.	As Needed
Feeler Gauge Set or Dial Indicator	1

The end gears should always have a thin coat of heavy grease to minimize corrosion, noise, and wear. Make sure to lubricate any gears you install or change. Be very careful during handling and storage—the grease coating on the gears will easily pick up dirt or debris, which can then spread to the other gears and increase the rate of wear.

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

To lubricate end gears:

1. DISCONNECT MACHINE FROM POWER!

2. Remove gear cover.

3. Remove spider, if installed (see **Using Spindle Spider** on **Page 51**).

4. Remove spindle pulley lock collar (see **Figure 116**).

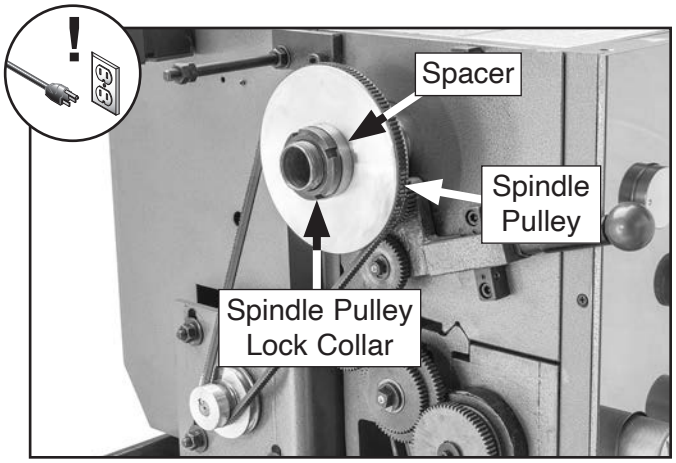


Figure 116. Location of spindle pulley and spindle pulley lock collar.

5. Remove V-belt (see **Setting Spindle Speed Range** on **Page 52**).

6. Remove spacer and spindle pulley from spindle (see **Figure 116**).

7. Remove installed change gears (see **Figure 117**), then thoroughly clean all gears with mineral spirits to remove old grease. Use small brush if necessary to clean between teeth.

   Note: *Refer to **End Gear Configuration Example** on **Page 57** for more information on removing change gears.*

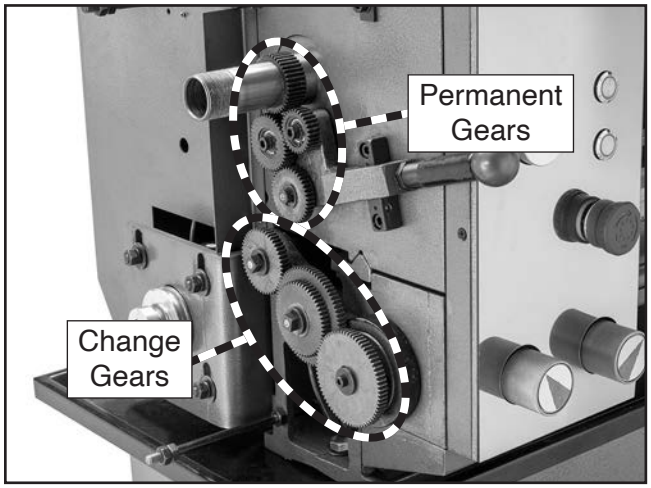


Figure 117. End gears.

8. Clean shafts, and wipe away any grease splatters in vicinity and on side of gear cover.

9. Using clean brush, apply thin layer of grease to gears. Make sure to get grease between gear teeth, but do not fill teeth valleys.

10. Install end gears and mesh them together with approximately 0.002"–0.004" backlash. Once gears are meshed together, apply small dab of grease between them where they mesh together—this grease will be distributed when gears rotate and re-coat any areas scraped off during installation.

11. Wipe away any excess grease that could be thrown onto V-belt and reduce optimal power transmission from motor.

12. Install spindle pulley, spacer, and spindle lock collar.

13. Install V-belt and gear cover.

Changing Gearbox Oil

Items Needed	Qty
Flat Head Screwdriver ¼"	1
Hex Wrenches 4, 5mm	1 Ea.
Drain Pan (8 oz.)	1
Thread-Sealing Tape	As Needed
Phillips Head Screwdriver #2	1
Model SB1365 or ISO 68 Equiv.	6¾ oz.

The gearbox oil should be drained and refilled after the first 300 hours (about three months) of use, then every 2000 hours (about once a year).

To change gearbox oil:

1. Run machine for 10 minutes to warm up oil in gearbox.

2. DISCONNECT MACHINE FROM POWER!

3. Remove fill plug (see **Figure 118**).

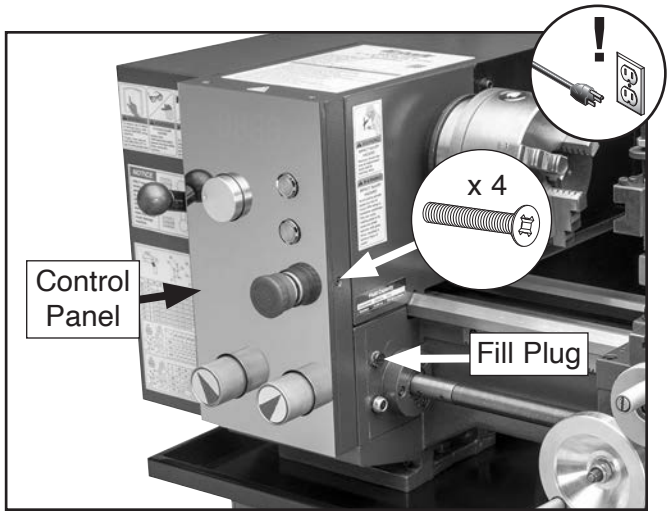


Figure 118. Location of gearbox oil fill plug, control panel, and control panel screws.

4. Remove (2) cap screws shown in **Figure 119** to remove control box cover.

5. Place drain pan under drain plug (behind control box cover shown in **Figure 119**), then remove drain plug to drain oil.

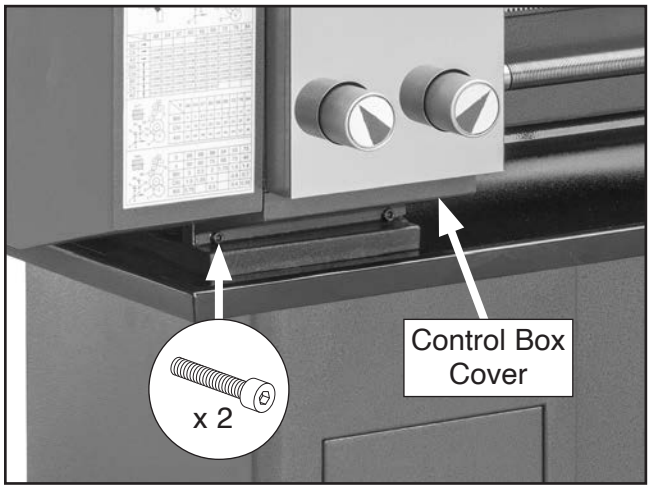


Figure 119. Location of control box cover.

6. When oil is drained, clean threads of drain plug, wrap threads with thread-sealing tape, then install drain plug.

7. Install control box cover.

8. Remove (4) Phillips head screws shown in **Figure 118** to remove control panel.

9. Add oil to fill plug hold until oil level is at halfway point in sight glass (see **Figure 120**), then install fill plug.

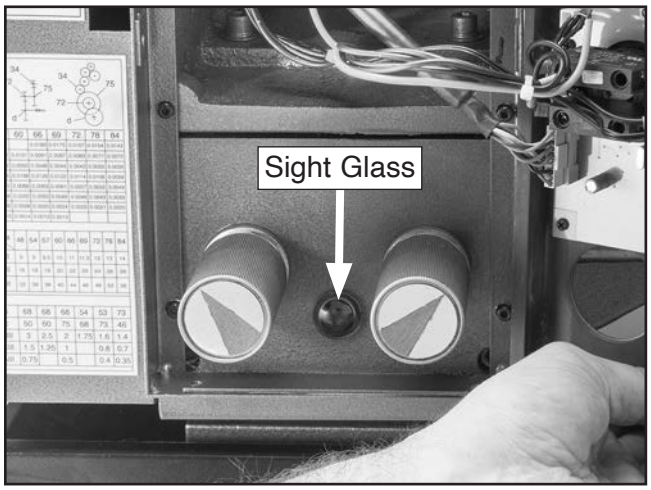


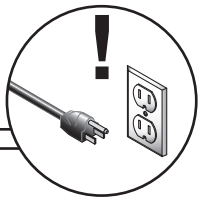
Figure 120. Location of gearbox oil sight glass.

10. Install control panel.

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 power supply breaker immediately trips after startup.	1. Master power switch in OFF position. 2. Emergency Stop button depressed. 3. Blown machine fuse. 4. Incorrect power supply voltage or circuit size. 5. Power supply circuit breaker tripped or fuse blown. 6. Wiring broken, disconnected, or corroded. 7. Motor brushes worn out. 8. Gear cover removed/safety switch engaged. 9. Motor or motor bearings at fault.	1. Turn master power switch to ON (Lathe) position. 2. Rotate Emergency Stop button head to reset. 3. Replace fuse/ensure no shorts. 4. Ensure correct power supply voltage and circuit size (**Page 17**). 5. Ensure circuit is free of shorts. Reset circuit breaker or replace fuse. 6. Fix broken wires or disconnected/corroded connections (**Page 77**). 7. Replace motor brushes (**Page 76**). 8. Install gear cover. 9. Replace motor.
Machine stalls or is underpowered.	1. Motor brushes worn out. 2. Motor overheated. 3. Extension cord too long. 4. Motor or motor bearings at fault.	1. Replace motor brushes (**Page 76**). 2. Clean motor, let cool, and reduce workload. 3. Move machine closer to power supply; use shorter extension cord (**Page 18**). 4. Replace motor.
Machine has vibration or noisy operation.	1. Motor or component loose. 2. Motor mount loose/broken. 3. Motor bearings at fault.	1. Replace damaged or missing bolts/nuts or tighten if loose. 2. Tighten/replace. 3. Test by rotating shaft; rotational grinding/loose shaft requires bearing replacement.
Accessory machine plugged into auxiliary receptacle will not turn ***ON***.	1. Wiring broken, disconnected, or corroded.	1. Fix broken wires or disconnected/corroded connections (**Page 77**).

Operation

Symptom	Possible Cause	Possible Solution
Entire machine or workpiece vibrates upon startup/while running or machine has noisy operation.	1. Workpiece deflecting. 2. Workpiece unbalanced. 3. Workpiece hitting stationary object. 4. V-belt worn, loose, pulleys misaligned or belt slapping cover. 5. Pulley loose. 6. Worn/broken gear or bad bearing. 7. Chuck or faceplate at fault. 8. Spindle bearings at fault.	1. Use steady rest (**Page 47**) or follow rest (**Page 48**). 2. Install workpiece as centered with spindle bore as possible. 3. Stop machine immediately and correct interference problem. 4. Inspect/replace belt (**Page 52**). Realign pulleys if necessary. 5. Secure pulley on shaft. 6. Replace broken gear or bearing. 7. Replace unbalanced/defective chuck or faceplate. 8. Reset spindle bearing preload or replace spindle bearings.
Bad surface finish.	1. Incorrect spindle speed or feed rate. 2. Dull tooling or wrong tool selection. 3. Workpiece deflecting. 4. Excessive play in gibs. 5. Material build up on cutting tool. 6. Bearing preload is out of adjustment. 7. V-belt worn or loose. 8. Spindle bearings at fault. 9. Tool height not at center line.	1. Use correct spindle speed (**Page 52**) and feed rate. 2. Sharpen tooling; use correct tool for operation. 3. Change setup to properly support workpiece. 4. Tighten gibs (**Page 73**). 5. Use coolant on tool and workpiece during operation. 6. Replace spindle thrust bearing(s). 7. Inspect/replace belt (**Page 52**). 8. Replace spindle bearings. 9. Adjust tool height to center line (**Page 49**).
Tapered tool difficult to remove from tailstock quill.	1. Quill not fully retracted into tailstock.	1. Rotate quill handwheel until it forces tapered tool out of quill.
Tapered tool will not lock in quill.	1. Debris not removed from tool taper before inserting into quill.	1. Remove debris from tapered tool before inserting into quill.
Cross slide, compound rest, or carriage feed has sloppy operation.	1. Gibs out of adjustment. 2. Handwheel loose or has excessive backlash. 3. Leadscrew mechanism worn or out of adjustment.	1. Adjust gibs (**Page 73**). 2. Tighten handwheel fasteners or adjust handwheel backlash to a minimum (**Page 72**). 3. Adjust leadscrew to remove end play (**Page 72**).
Cross slide, compound rest, or carriage handwheels hard to move.	1. Ways dry and in need of lubricant. 2. Ways loaded with shavings, dust, or grime. 3. Gibs too tight. 4. Backlash setting too tight.	1. Lubricate ways/ball oilers (**Page 66**). 2. Remove gibs, clean ways, lubricate, install, and adjust (**Page 73**). 3. Loosen gibs slightly (**Page 73**), and lubricate ways (**Page 66**). 4. Slightly loosen backlash setting (**Page 72**).
Cutting tool vibrates excessively during cutting.	1. Tool holder not tight enough. 2. Cutting tool protrudes too far out of tool holder; lacks support. 3. Spindle speed or feed rate incorrect. 4. Cutting tool dull. 5. Gibs out of adjustment.	1. Tighten tool holder (**Page 49**). 2. Install cutting tool so no more than ⅓ of total length protrudes out of tool holder. 3. Use recommended spindle speed (**Page 52**) and feed rate. 4. Replace or sharpen cutting tool. 5. Adjust gibs (**Page 73**).
Workpiece tapered.	1. Spindle and tailstock centers not properly aligned with each other. 2. Lathe bed twisted.	1. Align tailstock to headstock spindle centerline. 2. Level lathe (**Page 27**).

Operation (Cont.)

Symptom	Possible Cause	Possible Solution
Chuck jaws will not move or do not move easily.	1. Chips lodged in jaws or scroll plate. 2. Dent/ridge in jaw slot of chuck body.	1. Remove jaws, clean and lubricate scroll plate, then install jaws. 2. Stone or file off high spot in jaw slots.
Spindle lacks turning power or stalls.	1. Wrong workpiece material (metal). 2. Feed rate/cutting speed too fast. 3. Cutting tool is dull. 4. V-belt slipping/pulleys misaligned. 5. Pulley slipping on shaft. 6. Machine undersized for task. 7. Gearbox at fault.	1. Use correct type/size of metal. 2. Decrease feed rate/cutting speed (**Page 52**). 3. Sharpen or replace cutting tool. 4. Clean/tension/replace belt (**Page 52**); ensure pulleys are aligned. 5. Tighten/replace loose pulley/shaft. 6. Use sharp cutting tools at correct angle; reduce feed rate/depth of cut; use cutting fluid if possible. 7. Select appropriate gear ratio; replace broken or slipping gears.
Gear change dials will not shift into position.	1. Gears not aligned inside gearbox.	1. Rotate spindle by hand with light pressure on dial until gears fall into place.
Workpiece slips in chuck.	1. Cutting pressure/feed rate too high. 2. Jaws worn or not installed properly.	1. Reduce cutting force. 2. Remove/install properly; turn jaws with cutting tool so they are concentric; replace jaws as matched set or chuck.
Carriage will not feed or hard to move.	1. Gears not all engaged. 2. Half nut lever engaged. 3. Carriage lock screw tightened down. 4. Chips loaded up on ways. 5. Ways dry and in need of lubrication. 6. Gibs too tight. 7. Gear(s) broken.	1. Engage gears using gear dials. 2. Disengage half nut lever (**Page 61**). 3. Make sure carriage lock screw is fully released (**Page 48**). 4. Frequently clear away chips that load up during turning operations. 5. Lubricate ways/ball oilers (**Page 66**). 6. Loosen gib screw(s) slightly (**Page 73**). 7. Replace gear(s).

Adjusting Cross Slide Backlash

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

When adjusting the 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.

Tool Needed	Qty
Hex Wrench 4mm	1

To adjust cross slide backlash:

1. DISCONNECT MACHINE FROM POWER!

2. Adjust cap screw shown in **Figure 121** in small increments. Test after each adjustment by rotating handwheel back and forth until backlash amount if acceptable.

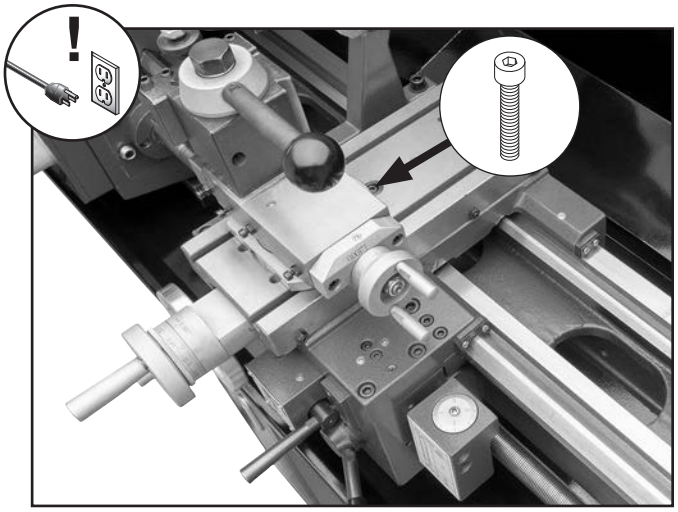


Figure 121. Location of cross slide leadscrew nut cap screw.

Removing Longitudinal Leadscrew End Play

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

Tools Needed	Qty
Hex Wrench 3mm	1
Spanner Wrench 28–32mm	1
Feeler Gauge Set or Dial Indicator	1

To remove longitudinal leadscrew end play:

1. DISCONNECT MACHINE FROM POWER!

2. Remove (2) cap screws shown in **Figure 122** to remove leadscrew end cover.

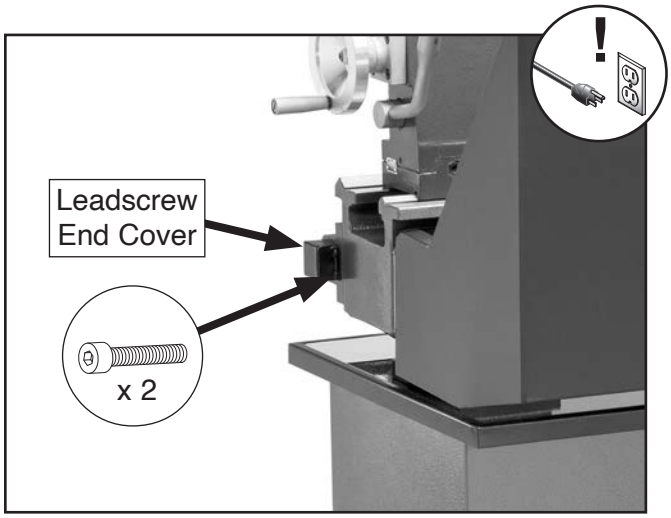


Figure 122. Location of leadscrew end cover and screws.

3. Loosen outer spanner nut shown in **Figure 123**.

4. While holding inner spanner nut in place (see **Figure 123**), rotate carriage handwheel to move carriage toward tailstock until there is 0.001"–0.002" of end play.

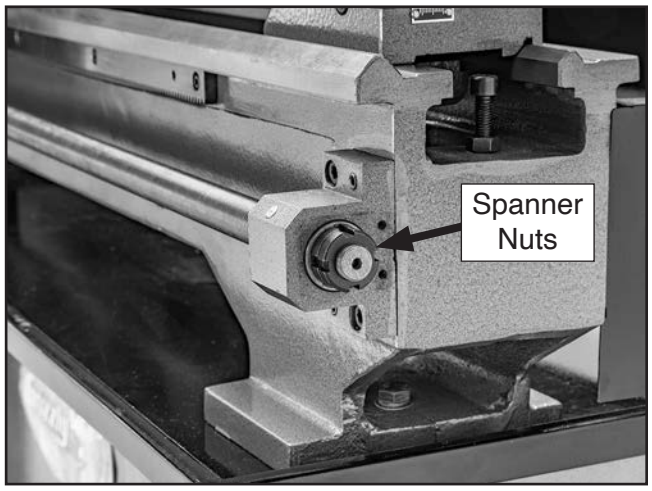


Figure 123. Location of leadscrew spanner nuts.

5. Tighten outer spanner nut until it is snug against inner spanner nut to secure setting.

6. Install leadscrew end cover.

Adjusting Gibs

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

Make sure the ball oilers have been lubricated before adjusting. Refer to **Ball Oilers** on **Page 66** for lubrication instructions.

Note: *Turning gib screws clockwise will tighten the gib; turning the gib screws counterclockwise will loosen the gib.*

Tools Needed	**Qty**
Wrenches 7, 8mm	1 Ea.
Hex Wrenches 2, 2.5, 3, 6mm	1 Ea.

Adjusting Cross Slide Gib

1. DISCONNECT MACHINE FROM POWER!

2. Loosen compound slide lock cap screw (see **Figure 124**).

3. Without turning gib set screws, loosen (4) gib jam nuts shown in **Figure 124**.

4. Make adjustments in small and equal increments to (4) gib set screws (see **Figure 124**), then test movement of slide by rotating handwheel.

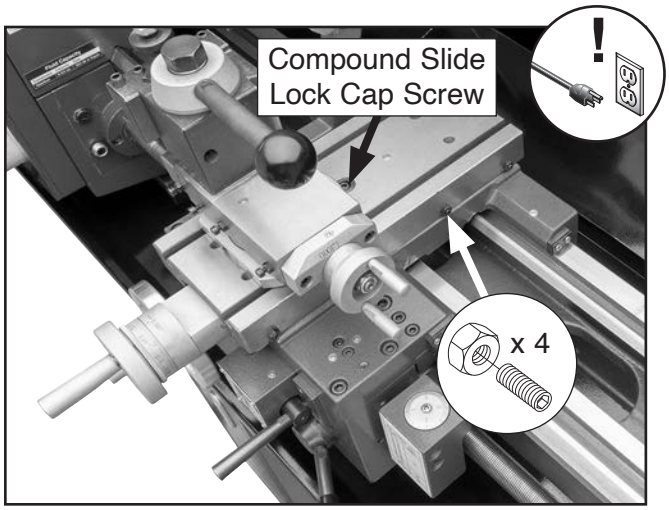


Figure 124. Location of cross slide gib set screws and jam nuts.

5. When satisfied with gib adjustment, hold gib set screws in place while you tighten jam nuts to secure setting.

Adjusting Compound Rest Gib

1. DISCONNECT MACHINE FROM POWER!

2. Loosen compound rest lock cap screw (see **Figure 125**).

3. Without turning gib cap screws, loosen (3) gib jam nuts shown in **Figure 125**.

4. Make adjustments in small and equal increments to (3) gib cap screws (see **Figure 125**), then test movement of slide by rotating handwheel.

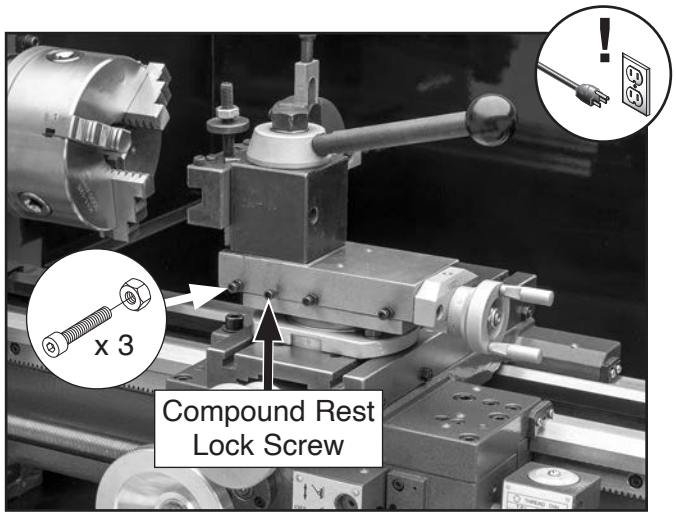


Figure 125. Location of compound rest gib cap screws and jam nuts.

5. When satisfied with gib adjustment, hold gib cap screws in place while you tighten jam nuts to secure setting.

Adjusting Saddle Gib

The saddle gib is located on the bottom of the back edge of the slide. It is easier to access if you remove cap screws and washers shown in **Figure 126** to remove the backsplash.

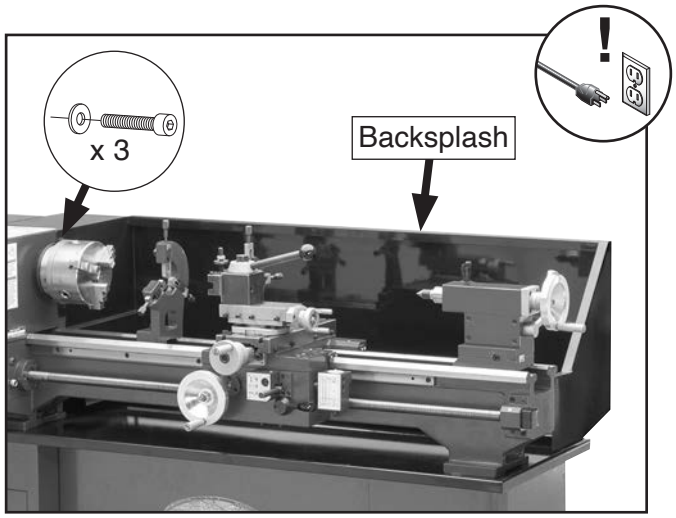


Figure 126. Location of backsplash and securing fasteners.

To adjust saddle gib:

1. DISCONNECT MACHINE FROM POWER!

2. Loosen carriage lock screw (see **Figure 127**).

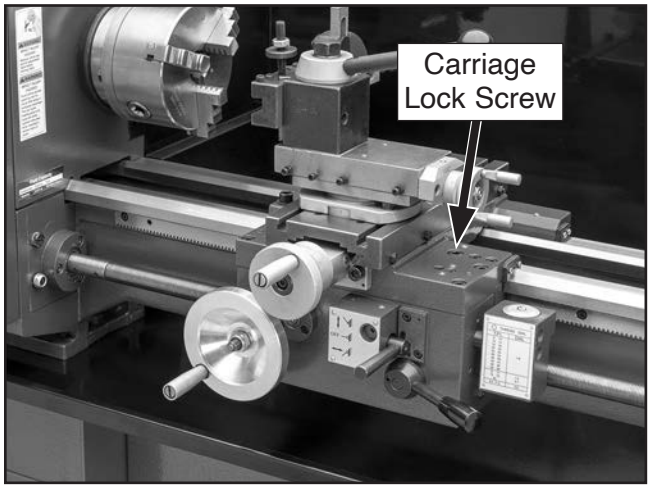


Figure 127. Location of carriage and compound rest lock screws.

3. Without turning gib set screws, loosen (4) gib jam nuts shown in **Figure 128**.

4. Make adjustments in small and equal increments to (4) gib set screws (see **Figure 128**), then test movement of slide by rotating handwheel.

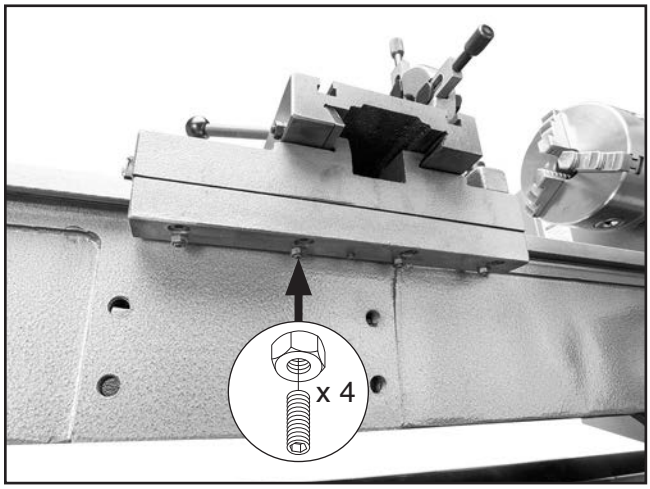


Figure 128. Location of saddle gib set screws and jam nuts.

5. When satisfied with gib adjustment, hold gib set screws in place while you tighten jam nuts to secure setting.

Adjusting Half Nut

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

Tools Needed	**Qty**
Wrench 8mm	1
Hex Wrenches 2.5, 5mm	1 Ea.

To adjust half nut:

1. DISCONNECT MACHINE FROM POWER!

2. Disengage half nut.

3. Remove cap screw shown in **Figure 129** to remove thread dial.

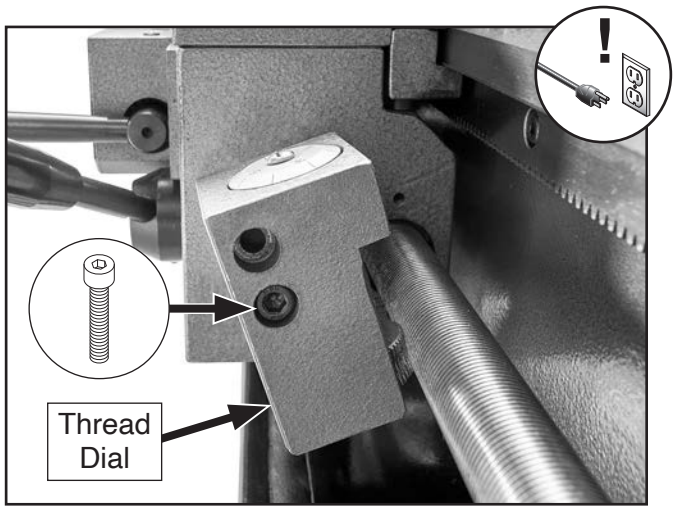


Figure 129. Location of thread dial and cap screw.

4. Without turning gib set screws, loosen (3) gib jam nuts shown in **Figure 130**.

5. Tighten each gib set screw (see **Figure 130**) approximately ⅛ of a turn.

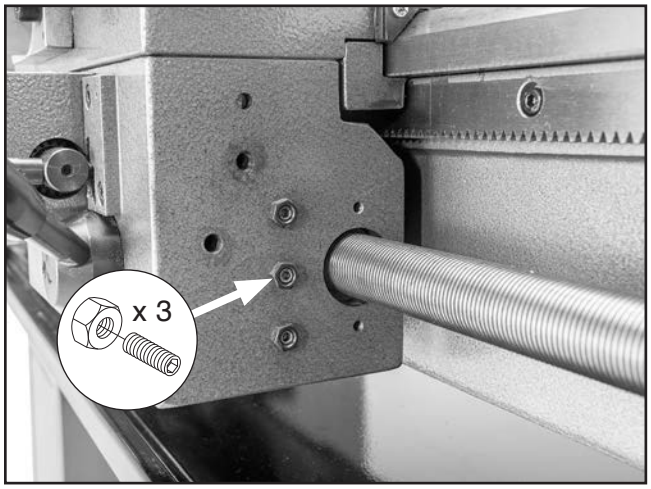


Figure 130. Location of half nut gib set screws and jam nuts.

6. Move carriage handwheel until half nut can fully close, then engage and disengage half nut several times to test how it feels. Half nut is correctly adjusted when you feel a slight drag while opening and closing. It should not feel too stiff or too loose.

7. When satisfied with half nut adjustment, hold gib set screws in place while you tighten jam nuts to secure setting.

8. Install thread dial.

Replacing Motor Brushes

The motor uses carbon brushes to transmit electrical current inside the motor. These brushes are considered to be regular "wear items" or "consumables" that will need to be replaced during the life of the motor. The frequency of required replacement is often related to how much the motor is used and how hard it is pushed.

Replace the carbon brushes at the same time when the motor no longer reaches full power, or when brushes measure less than ½" (new brushes are ⅝" long). If your machine is used frequently, we recommend keeping an extra set of replacement brushes on-hand to avoid any downtime.

Items Needed	**Qty**
Hex Wrench 5mm	1
Penny/Dime	1
Replacement Brush Pair (P09981101-2)	1

To replace motor brushes:

1. DISCONNECT MACHINE FROM POWER!

2. Remove (3) cap screws and flat washers shown in **Figure 131** to remove backsplash.

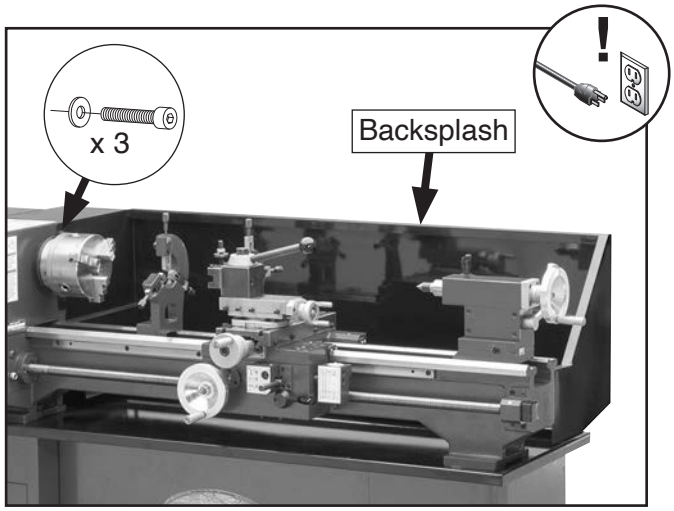


Figure 131. Location of backsplash and securing fasteners.

3. Remove (2) brush caps and worn brushes (see **Figures 132–133**) from motor.

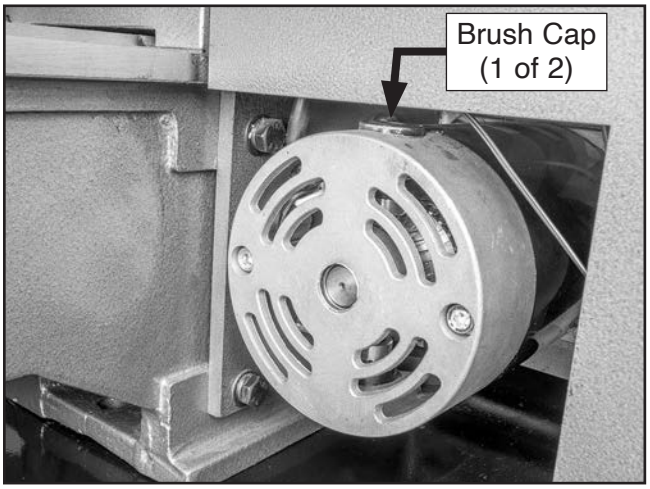


Figure 132. Location of brush caps.

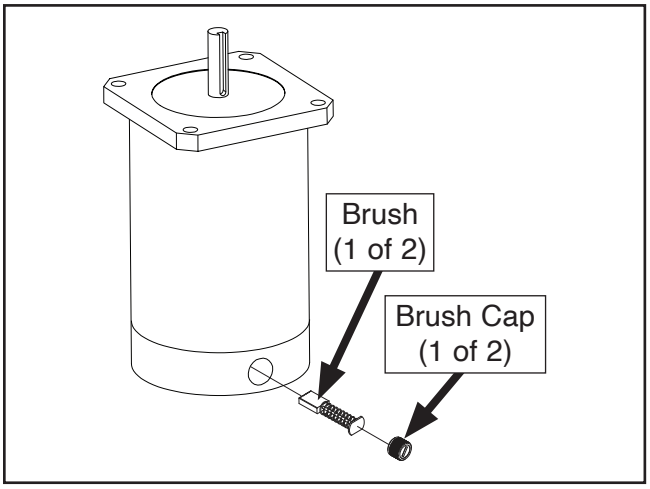


Figure 133. Location of brushes under brush caps.

4. Replace both motor brushes and install brush caps.

5. Install backsplash.

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 aftermarket 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.

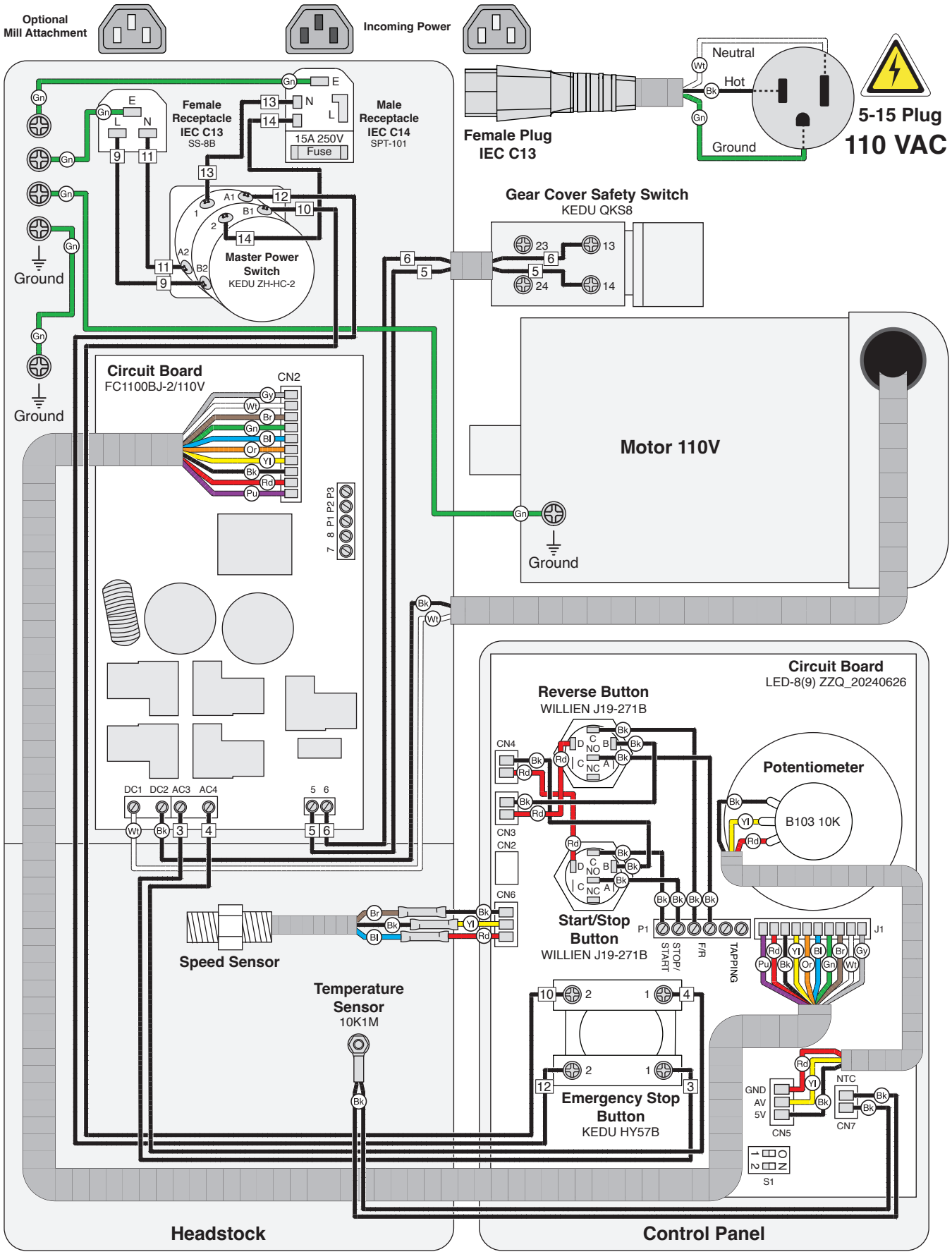
NOTICE

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

BLACK	Bk	BLUE	Bl	YELLOW	Yl	LIGHT BLUE	Lb
WHITE	Wt	BROWN	Br	YELLOW GREEN	Yg	BLUE WHITE	Bw
GREEN	Gn	GRAY	Gy	PURPLE	Pu	TURQUOISE	Tu
RED	Rd	ORANGE	Or	PINK	Pk		

Wiring Diagram



STOP ***READ ELECTRICAL SAFETY ON PAGE 77!***

Electrical Components

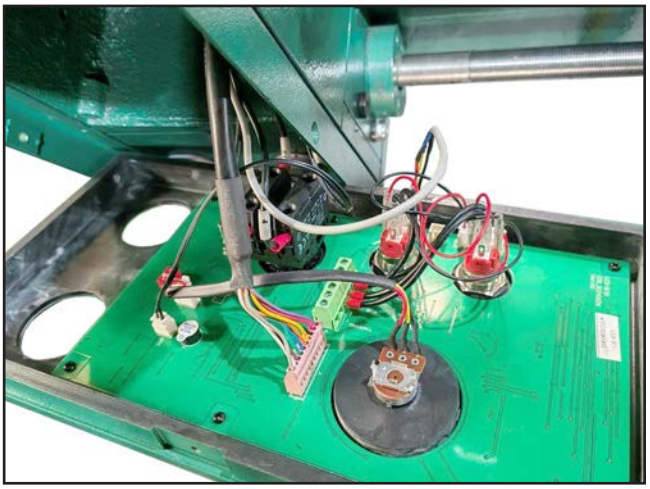


Figure 134. Control panel wiring.

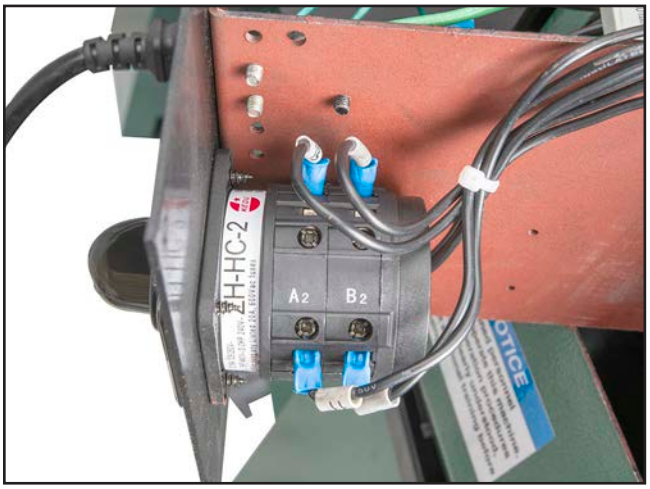


Figure 137. Master power switch wiring.

Figure 135. Electrical panel wiring.

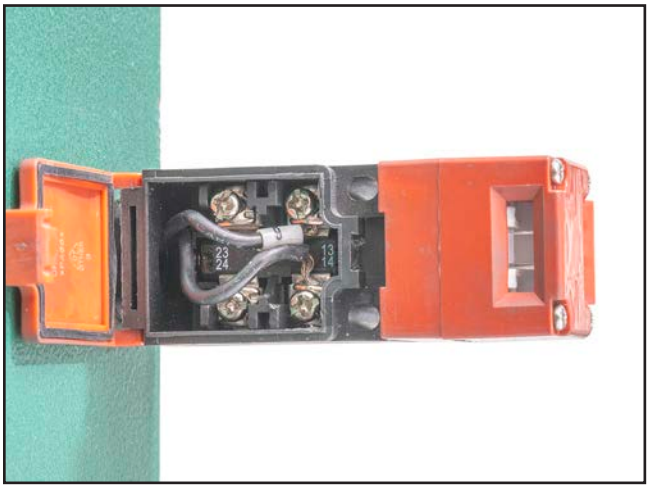


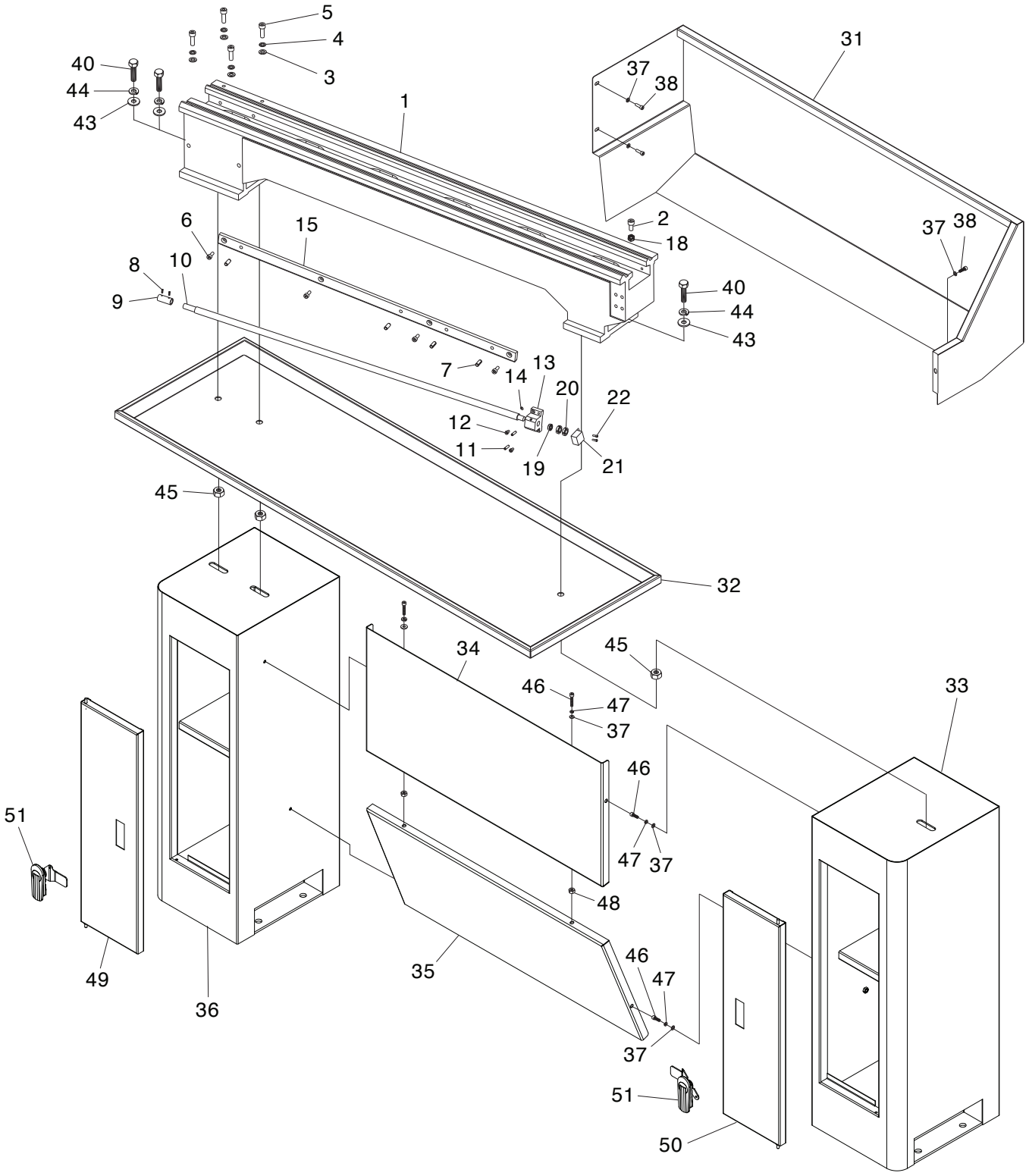
Figure 138. Gear cover safety switch wiring.

Figure 136. Spindle speed sensor.

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.

Bed & Stand

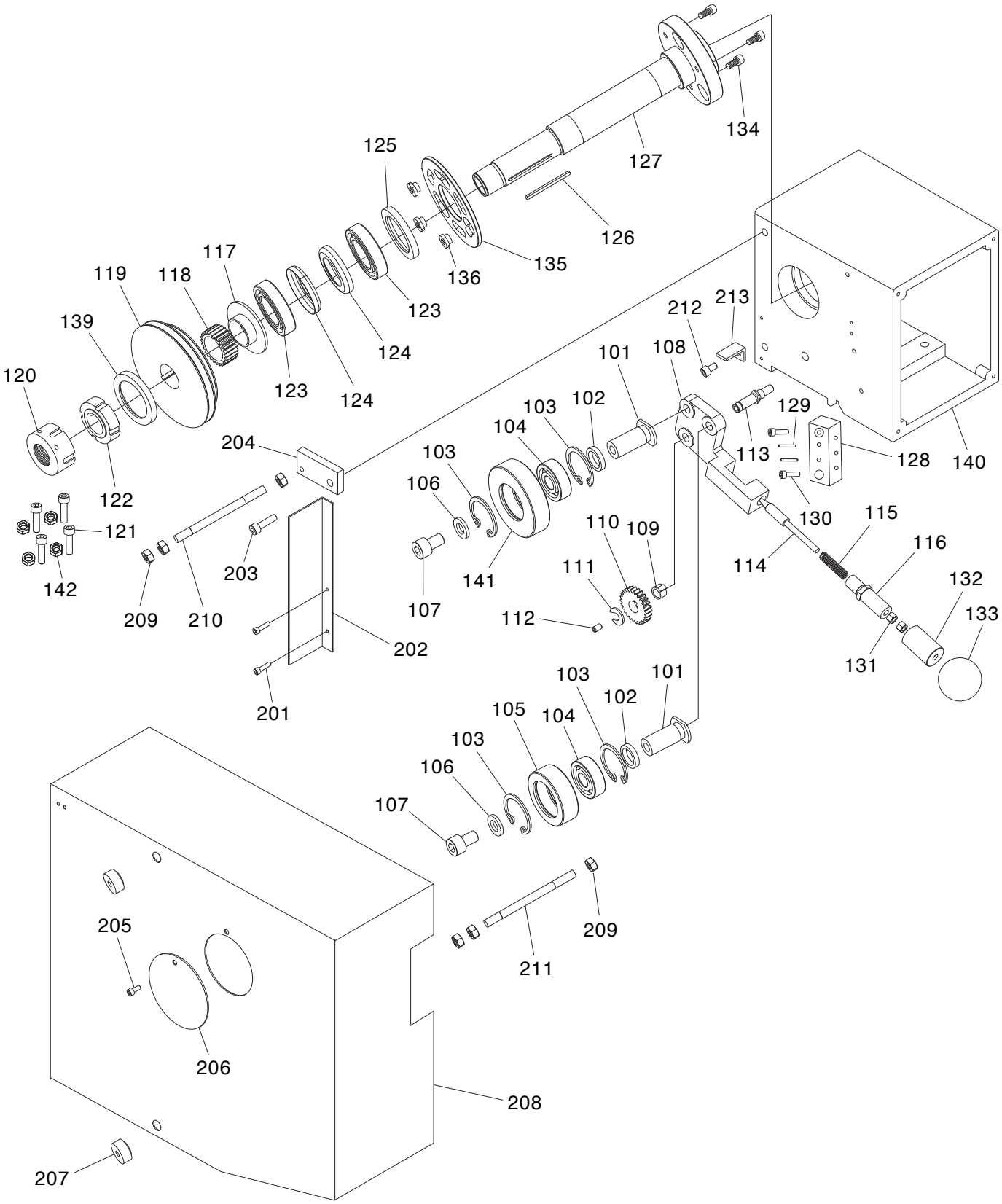


Bed & Stand Parts List

REF	PART #	DESCRIPTION
1	P09980001	BED
2	P09980002	CAP SCREW M8-1.25 X 16
3	P09980003	FLAT WASHER 8MM
4	P09980004	LOCK WASHER 8MM
5	P09980005	CAP SCREW M8-1.25 X 25
6	P09980006	CAP SCREW M4-.7 X 12
7	P09980007	ROLL PIN 5 X 16
8	P09980008	ROLL PIN 4 X 20
9	P09980009	CLUTCH
10	P09980010	LONGITUDINAL LEADSCREW
11	P09980011	DOWEL PIN 6 X 25
12	P09980012	CAP SCREW M6-1 X 16
13	P09980013	END BRACKET
14	P09980014	BALL OILER 6MM PRESS-IN
15	P09980015	RACK
18	P09980018	HEX NUT M8-1.25
19	P09980019	THRUST BEARING 51102
20	P09980020	SPANNER NUT M14-1.5
21	P09980021	END COVER

REF	PART #	DESCRIPTION
22	P09980022	CAP SCREW M4-.7 X 8
31	P09980031	BACK SPLASH
32	P09980032	CHIP TRAY
33	P09980033	CABINET RIGHT
34	P09980034	PLATE FRONT
35	P09980035	BEVEL PLATE
36	P09980036	CABINET LEFT
37	P09980037	FLAT WASHER 6MM
38	P09980038	CAP SCREW M6-1 X 8
40	P09980040	HEX BOLT M12-1.75 X 35
43	P09980043	FLAT WASHER 12MM
44	P09980044	LOCK WASHER 12MM
45	P09980045	HEX NUT M12-1.75
46	P09980046	CAP SCREW M6-1 X 12
47	P09980047	LOCK WASHER 6MM
48	P09980048	HEX NUT M6-1
49	P09980049	CABINET DOOR LEFT
50	P09980050	CABINET DOOR RIGHT
51	P09980051	DOOR LATCH

Headstock

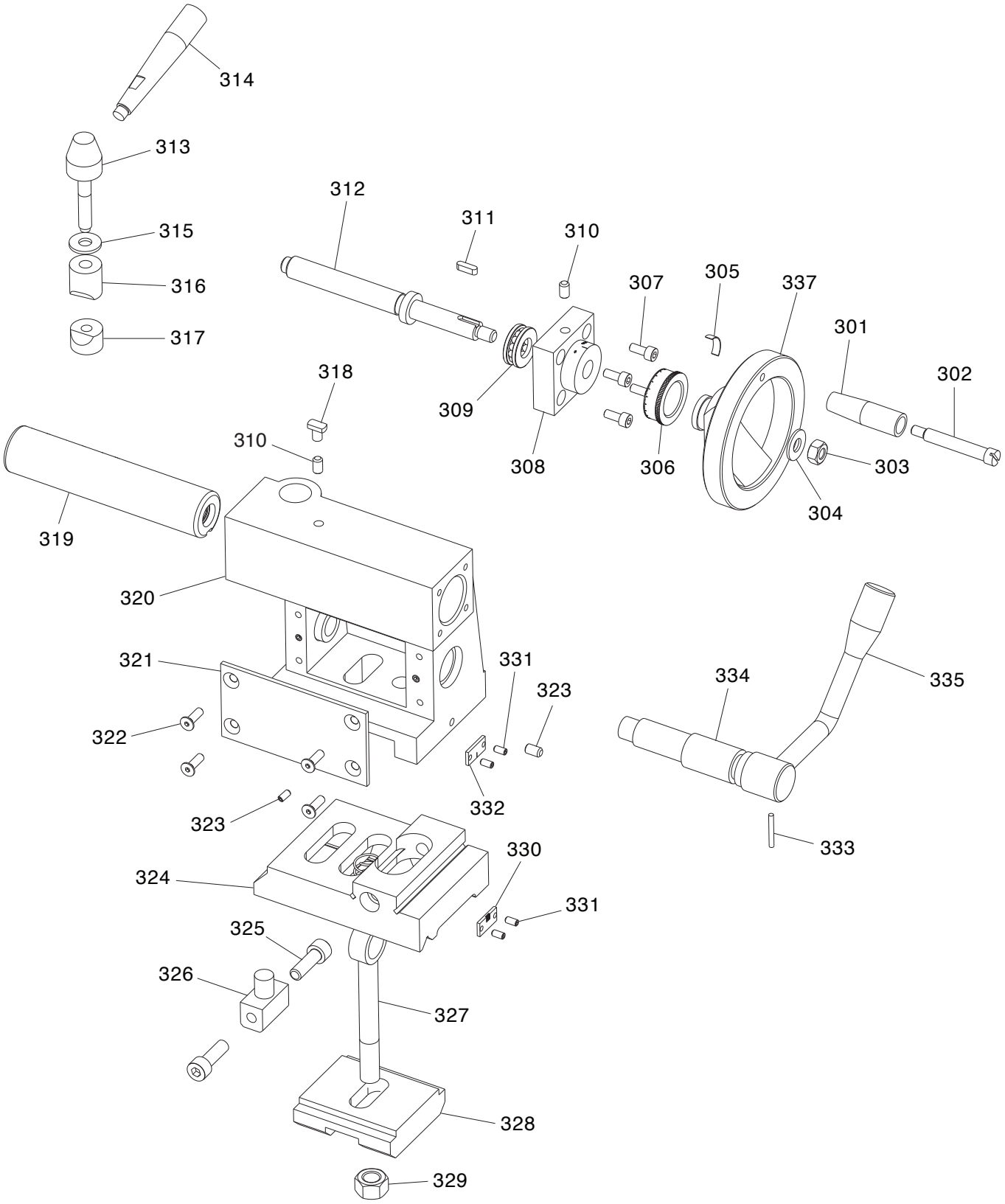


Headstock Parts List

REF	PART #	DESCRIPTION
101	P09980101	GEAR SHAFT 23.5MM
102	P09980102	SPACER 10 X 13.5 X 2.5MM
103	P09980103	INT RETAINING RING 22MM
104	P09980104	BALL BEARING 61900ZZ
105	P09980105	GEAR 30T
106	P09980106	FLAT WASHER 6MM
107	P09980107	CAP SCREW M6-1 X 8
108	P09980108	SHIFT ARM
109	P09980109	KEYED BUSHING 8MM
110	P09980110	GEAR 40T
111	P09980111	RETAINING WASHER 20 X 9MM
112	P09980112	BALL OILER 6MM PRESS-IN
113	P09980113	GEAR SHAFT 52.5MM
114	P09980114	LOCATING PIN
115	P09980115	COMPRESSION SPRING 1 X 9 X 40
116	P09980116	STANDOFF-RD HEX MF M14-1.5 X 17, 5 X 7.5
117	P09980117	SPACER PLATE
118	P09980118	GEAR 40T
119	P09980119	SPINDLE PULLEY
120	P09980120	SPIDER SPANNER NUT M32-1.5
121	P09980121	CAP SCREW M5-.8 X 35 STEEL-TIPPED
122	P09980122	SPANNER NUT M32-1.5
123	P09980123	TAPERED ROLLER BEARING 32007
124	P09980124	BEARING COVER
125	P09980125	GASKET 35.5 X 56 X 9MM
126	P09980126	KEY 4 X 4 X 59 RE
127	P09980127	SPINDLE MT#2 M32-1.5

REF	PART #	DESCRIPTION
128	P09980128	LOCATING BLOCK
129	P09980129	ROLL PIN 3 X 20
130	P09980130	CAP SCREW M6-1 X 16
131	P09980131	HEX NUT M6-1
132	P09980132	SPACER 7 X 18 X 70MM
133	P09980133	KNOB M6-1
134	P09980134	CAP SCREW M6-1 X 12
135	P09980135	INTRINSIC BACK PLATE FLANGE
136	P09980136	BACK PLATE BUSHING
139	P09980139	SPACER 30 X 49 X 9MM
140	P09980140	HEADSTOCK
141	P09980141	GEAR 40T
142	P09980142	HEX NUT M5-.8
201	P09980201	CAP SCREW M4-.7 X 8
202	P09980202	HEADSTOCK BRACKET
203	P09980203	CAP SCREW M10-1.5 X 20
204	P09980204	STUD MOUNTING BLOCK
205	P09980205	CAP SCREW M5-.8 X 6
206	P09980206	SPIDER COVER
207	P09980207	THUMB NUT M8-1.25
208	P09980208	GEAR COVER
209	P09980209	HEX NUT M8-1.25
210	P09980210	STUD-DE M8-1.25 X 110, 27
211	P09980211	STUD-DE M8-1.25 X 120, 24
212	P09980212	CAP SCREW M6-1 X 12
213	P09980213	COVER SUPPORT

Tailstock

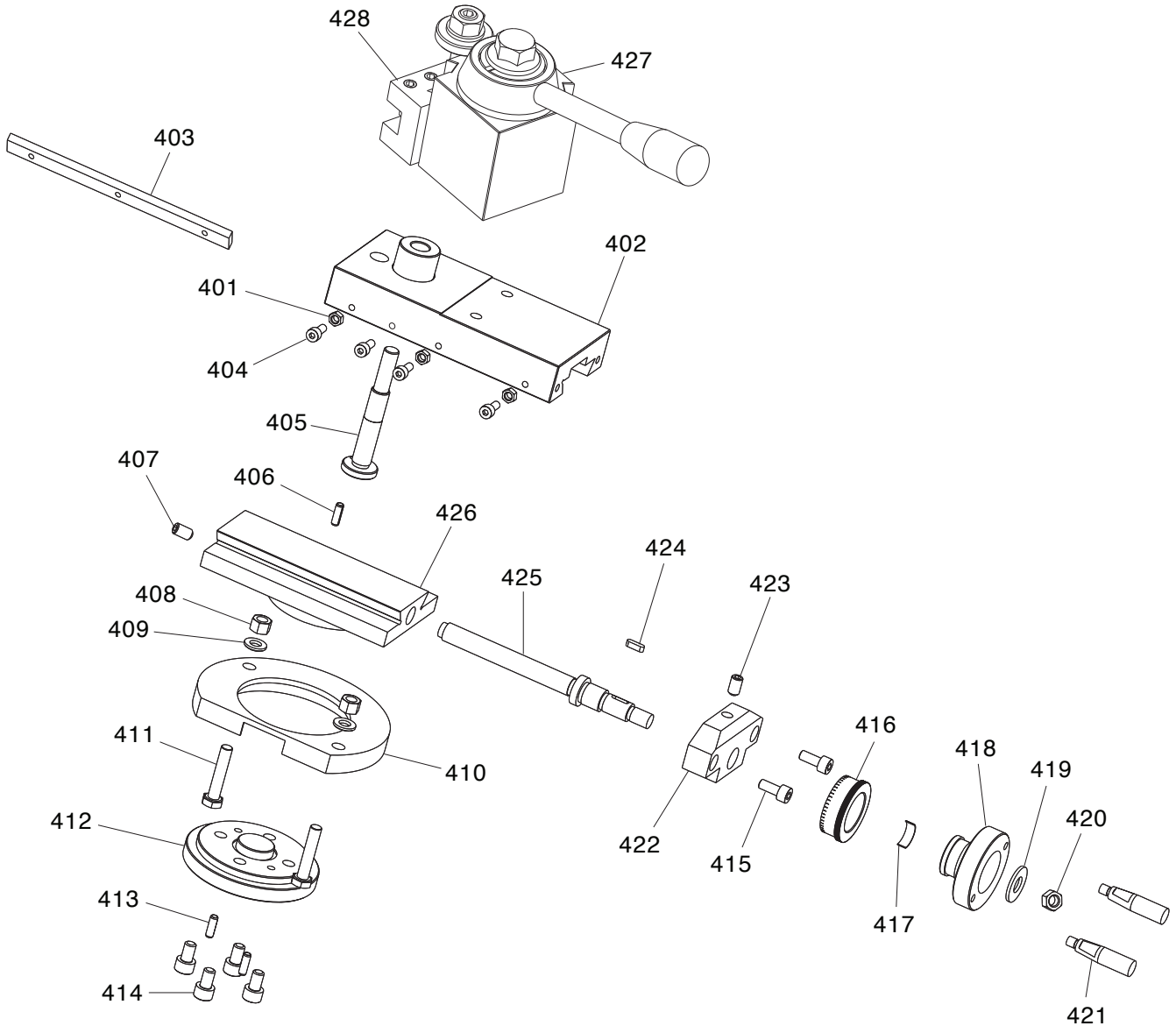


Tailstock Parts List

REF	PART #	DESCRIPTION
301	P09980301	HOLLOW HANDLE
302	P09980302	SHOULDER SCREW M6-1 X 10, 10 X 60
303	P09980303	HEX NUT M6-1
304	P09980304	FLAT WASHER 6MM
305	P09980305	FLAT SPRING
306	P09980306	GRADUATED DIAL
307	P09980307	CAP SCREW M5-.8 X 25
308	P09980308	HANDWHEEL BRACKET
309	P09980309	THRUST BEARING 51101
310	P09980310	BALL OILER 6MM PRESS-IN
311	P09980311	KEY 4 X 4 X 12 RE
312	P09980312	TAILSTOCK LEADSCREW
313	P09980313	QUILL LOCK SCREW M8-1.25 X 70
314	P09980314	FIXED HANDLE M8-1.25 X 90
315	P09980315	FLAT WASHER 8MM
316	P09980316	CLAMP BLOCK
317	P09980317	CLAMP BLOCK M8-1.25
318	P09980318	ALIGNMENT KEY

REF	PART #	DESCRIPTION
319	P09980319	QUILL
320	P09980320	TAILSTOCK BODY
321	P09980321	TAILSTOCK COVER
322	P09980322	FLAT HD CAP SCR M4-.7 X 5
323	P09980323	SET SCREW M6-1 X 16
324	P09980324	TAILSTOCK BASE
325	P09980325	CAP SCREW M8-1.25 X 30
326	P09980326	OFFSET ADJUSTMENT BLOCK
327	P09980327	CLAMP SCREW M12-1.75 X 117
328	P09980328	CLAMP PLATE
329	P09980329	HEX NUT M12-1.75
330	P09980330	OFFSET SCALE
331	P09980331	RIVET 2 X 5 NAMEPLATE AL
332	P09980332	SCALE INDICATOR
333	P09980333	ROLL PIN 3 X 24
334	P09980334	LOCK SHAFT 117MM
335	P09980335	TAILSTOCK LOCK HANDLE
337	P09980337	HANDWHEEL 12MM, M6-1

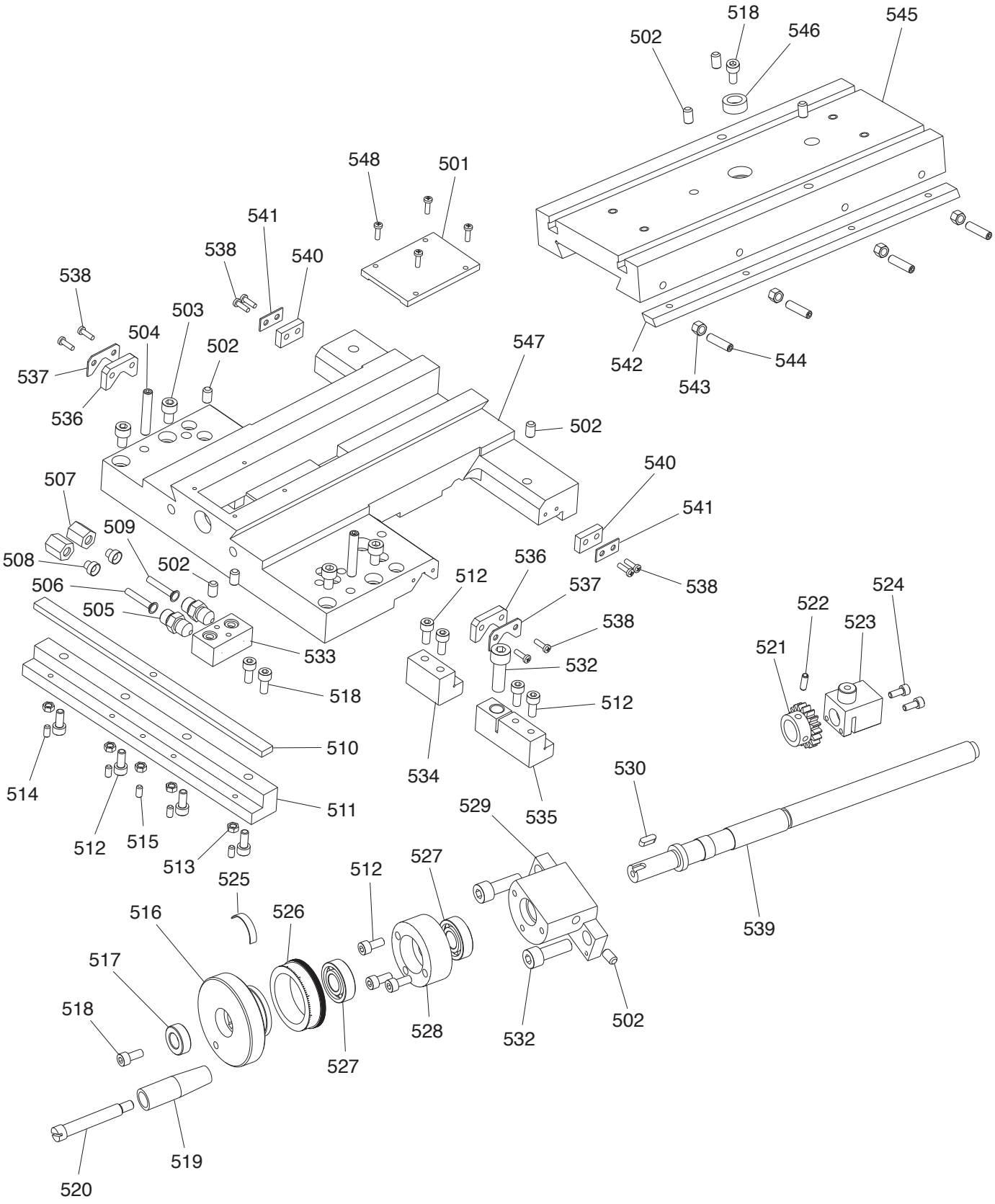
Compound Rest



REF	PART #	DESCRIPTION
401	P09980401	HEX NUT M4-.7
402	P09980402	COMPOUND REST
403	P09980403	COMPOUND REST GIB
404	P09980404	CAP SCREW M4-.7 X 20
405	P09980405	TOOL POST BOLT M8-1.25 X 73
406	P09980406	DOWEL PIN 3 X 10
407	P09980407	BALL OILER 10MM PRESS-IN
408	P09980408	HEX NUT M6-1
409	P09980409	FLAT WASHER 6MM
410	P09980410	SCALE COVER
411	P09980411	HEX BOLT M6-1 X 25
412	P09980412	ANGLE SCALE
413	P09980413	DOWEL PIN 4 X 16
414	P09980414	CAP SCREW M6-1 X 16

REF	PART #	DESCRIPTION
415	P09980415	CAP SCREW M5-.8 X 16
416	P09980416	GRADUATED DIAL
417	P09980417	FLAT SPRING
418	P09980418	HANDWHEEL 10MM, M5-.8
419	P09980419	FLAT WASHER 8MM
420	P09980420	LOCK NUT M8-1.25
421	P09980421	FIXED HANDLE M5-.8 X 39
422	P09980422	LEADSCREW BRACKET
423	P09980423	BALL OILER 6MM PRESS-IN
424	P09980424	KEY 3 X 3 X 10 RE
425	P09980425	COMPOUND REST LEADSCREW
426	P09980426	SWIVEL BASE
427	P09980427	QUICK-CHANGE TOOL POST ASSEMBLY
428	P09980428	TOOL HOLDER ASSEMBLY

Carriage

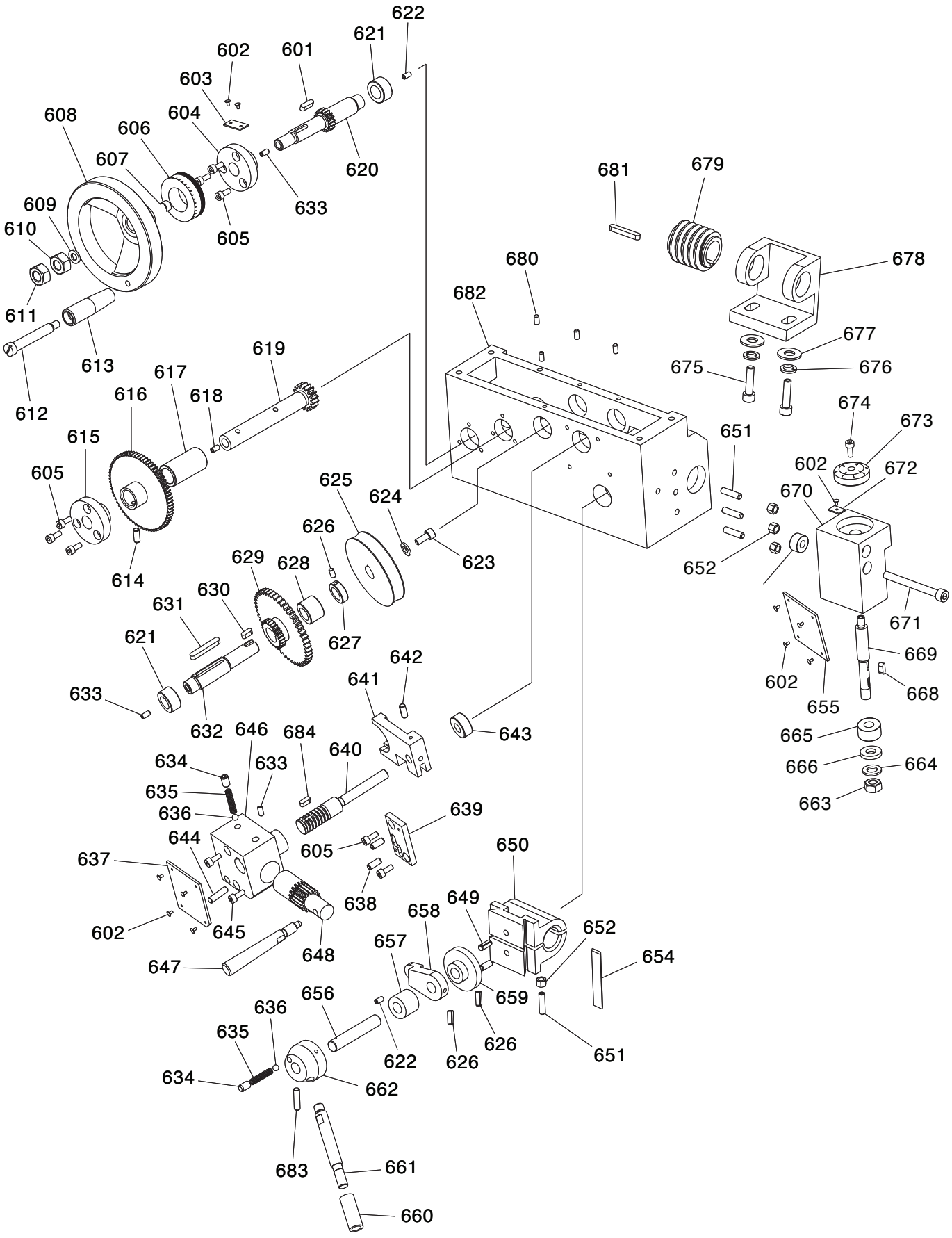


Carriage Parts List

REF	PART #	DESCRIPTION
501	P09980501	LEADSCREW COVER
502	P09980502	BALL OILER 6MM PRESS-IN
503	P09980503	CAP SCREW M6-1 X 35
504	P09980504	SET SCREW M6-1 X 35
505	P09980505	GREASE FITTING M10-1 STRAIGHT
506	P09980506	PIPE FITTING 40MM COPPER
507	P09980507	PIPE ADAPTER M10-1
508	P09980508	PIPE FITTING 8MM COPPER
509	P09980509	PIPE FITTING 55MM COPPER
510	P09980510	CARRIAGE GIB
511	P09980511	SADDLE CLAMP SLIDE
512	P09980512	CAP SCREW M5-.8 X 20
513	P09980513	HEX NUT M4-.7
514	P09980514	SET SCREW M4-.7 X 16
515	P09980515	SET SCREW M4-.7 X 20
516	P09980516	HANDWHEEL 12MM, M6-1
517	P09980517	SPACER 6.5 X 20 X 8MM
518	P09980518	CAP SCREW M5-.8 X 10
519	P09980519	HOLLOW HANDLE
520	P09980520	SHOULDER SCREW M6-1 X 10, 10 X 60
521	P09980521	GEAR 18T
522	P09980522	DOWEL PIN 4 X 20
523	P09980523	LEADSCREW NUT
524	P09980524	CAP SCREW M4-.7 X 10

REF	PART #	DESCRIPTION
525	P09980525	FLAT SPRING
526	P09980526	GRADUATED DIAL
527	P09980527	THRUST BEARING 51101
528	P09980528	BACKING PLATE
529	P09980529	LEADSCREW BRACKET
530	P09980530	KEY 4 X 4 X 8 RE
532	P09980532	CAP SCREW M8-1.25 X 20
533	P09980533	MANIFOLD
534	P09980534	SLIDE BLOCK
535	P09980535	LOCK SLIDE BLOCK
536	P09980536	WAY WIPER FRONT
537	P09980537	WIPER PLATE FRONT
538	P09980538	PHLP HD SCR M3-.5 X 10
539	P09980539	CROSS SLIDE LEADSCREW
540	P09980540	WAY WIPER REAR
541	P09980541	WIPER PLATE REAR
542	P09980542	CROSS SLIDE GIB
543	P09980543	HEX NUT M5-.8
544	P09980544	SET SCREW M5-.8 X 25
545	P09980545	CROSS SLIDE
546	P09980546	SPACER 5.5 X 16 X 6.5MM
547	P09980547	SADDLE
548	P09980548	CAP SCREW M3-.5 X 6

Apron

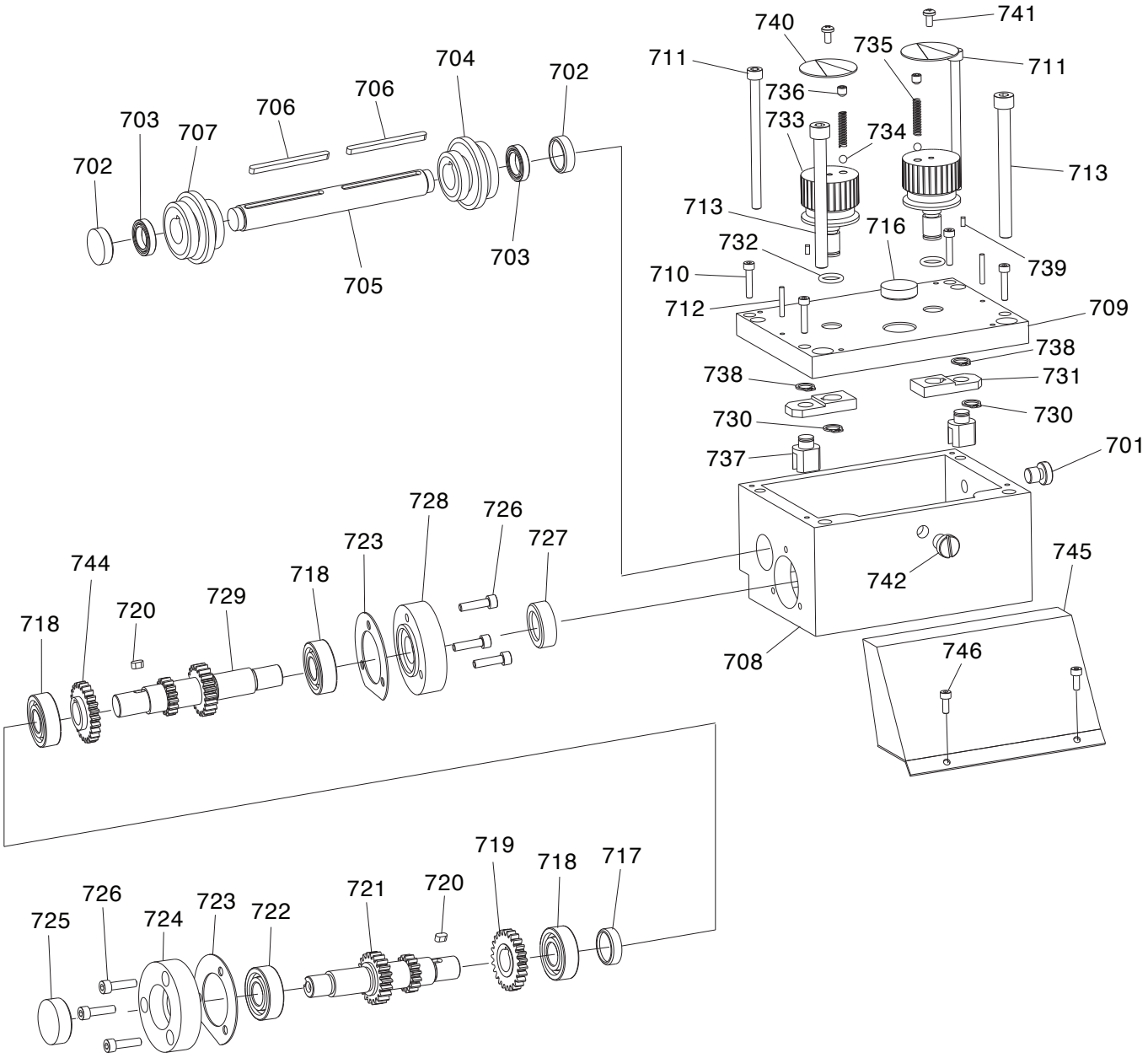


Apron Parts List

REF	PART #	DESCRIPTION
601	P09980601	KEY 4 X 4 X 14 RE
602	P09980602	RIVET 2 X 4 NAMEPLATE AL
603	P09980603	INDICATOR PLATE
604	P09980604	SUPPORT HUB
605	P09980605	CAP SCREW M4-.7 X 10
606	P09980606	GRADUATED DIAL
607	P09980607	FLAT SPRING
608	P09980608	HANDWHEEL 12MM, M6-1
609	P09980609	FLAT WASHER 10MM
610	P09980610	HEX NUT M10-1.5
611	P09980611	HEX NUT M10-1.5
612	P09980612	SHOULDER SCREW M6-1 X 10, 10 X 60
613	P09980613	HOLLOW HANDLE
614	P09980614	DOWEL PIN 4 X 20
615	P09980615	FLANGE
616	P09980616	GEAR 70T
617	P09980617	SPACER 14 X 20 X 38MM
618	P09980618	BALL OILER 8MM PRESS-IN
619	P09980619	GEAR SHAFT 17T 100MM
620	P09980620	GEAR SHAFT 18T 98MM
621	P09980621	BUSHING 12 X 20 X 10MM
622	P09980622	SET SCREW M4-.7 X 6
623	P09980623	CAP SCREW M5-.8 X 12
624	P09980624	FENDER WASHER 5MM
625	P09980625	GEAR 30T
626	P09980626	DOWEL PIN 3 X 18
627	P09980627	LOCK COLLAR
628	P09980628	BUSHING 12 X 20 X 14MM
629	P09980629	GEAR 47T/25T
630	P09980630	KEY 4 X 4 X 10 SE
631	P09980631	KEY 5 X 5 X 30 RE
632	P09980632	SHAFT 72MM
633	P09980633	BALL OILER 6MM PRESS-IN
634	P09980634	SET SCREW M6-1 X 6
635	P09980635	COMPRESSION SPRING 0.7 X 4.5 X 25
636	P09980636	STEEL BALL 5MM
637	P09980637	FEED SELECTION COVER PLATE
638	P09980638	DOWEL PIN 3 X 12
639	P09980639	LOCATING BLOCK
640	P09980640	WORM SHAFT 91MM
641	P09980641	SHIFTING FORK
642	P09980642	DOWEL PIN 3 X 26

REF	PART #	DESCRIPTION
643	P09980643	BUSHING 8.5 X 20 X 8.5MM
644	P09980644	DOWEL PIN 3 X 35
645	P09980645	CAP SCREW M4-.7 X 35
646	P09980646	WORM BRACKET
647	P09980647	FEED SELECTION HANDLE
648	P09980648	WORM GEAR SHAFT 18T 64MM
649	P09980649	ROLL PIN 5 X 12
650	P09980650	HALF NUT
651	P09980651	SET SCREW M5-.8 X 30
652	P09980652	HEX NUT M5-.8
653	P09980653	SPACER 6.5 X 15 X 8MM
654	P09980654	HALF NUT GIB
655	P09980655	THREAD DIAL PLATE
656	P09980656	HALF NUT SHAFT 56MM
657	P09980657	BUSHING 10 X 20 X 16MM
658	P09980658	LOCATING BLOCK
659	P09980659	LOCKING CAM
660	P09980660	KNOB M8-1.25
661	P09980661	STUD-UDE M8-1.25 X 78, 6, 15
662	P09980662	HALF NUT LEVER HUB
663	P09980663	HEX NUT M8-1.25
664	P09980664	FLAT WASHER 8 X 18 X 3MM
665	P09980665	GEAR 45T
666	P09980666	FLAT WASHER 8.5 X 18 X 3MM
668	P09980668	KEY 3 X 3 X 8 RE
669	P09980669	THREAD DIAL SHAFT 78MM
670	P09980670	THREAD DIAL BODY
671	P09980671	CAP SCREW M6-1 X 60
672	P09980672	INDICATOR PLATE
673	P09980673	THREAD DIAL
674	P09980674	CAP SCREW M4-.7 X 8
675	P09980675	CAP SCREW M6-1 X 25
676	P09980676	LOCK WASHER 6MM
677	P09980677	FENDER WASHER 6MM
678	P09980678	WORM BRACKET
679	P09980679	WORM
680	P09980680	SET SCREW M4-.7 X 8
681	P09980681	KEY 5 X 5 X 35 RE
682	P09980682	APRON BODY
683	P09980683	DOWEL PIN 3 X 30
684	P09980684	KEY 4 X 4 X 12 RE

Gearbox

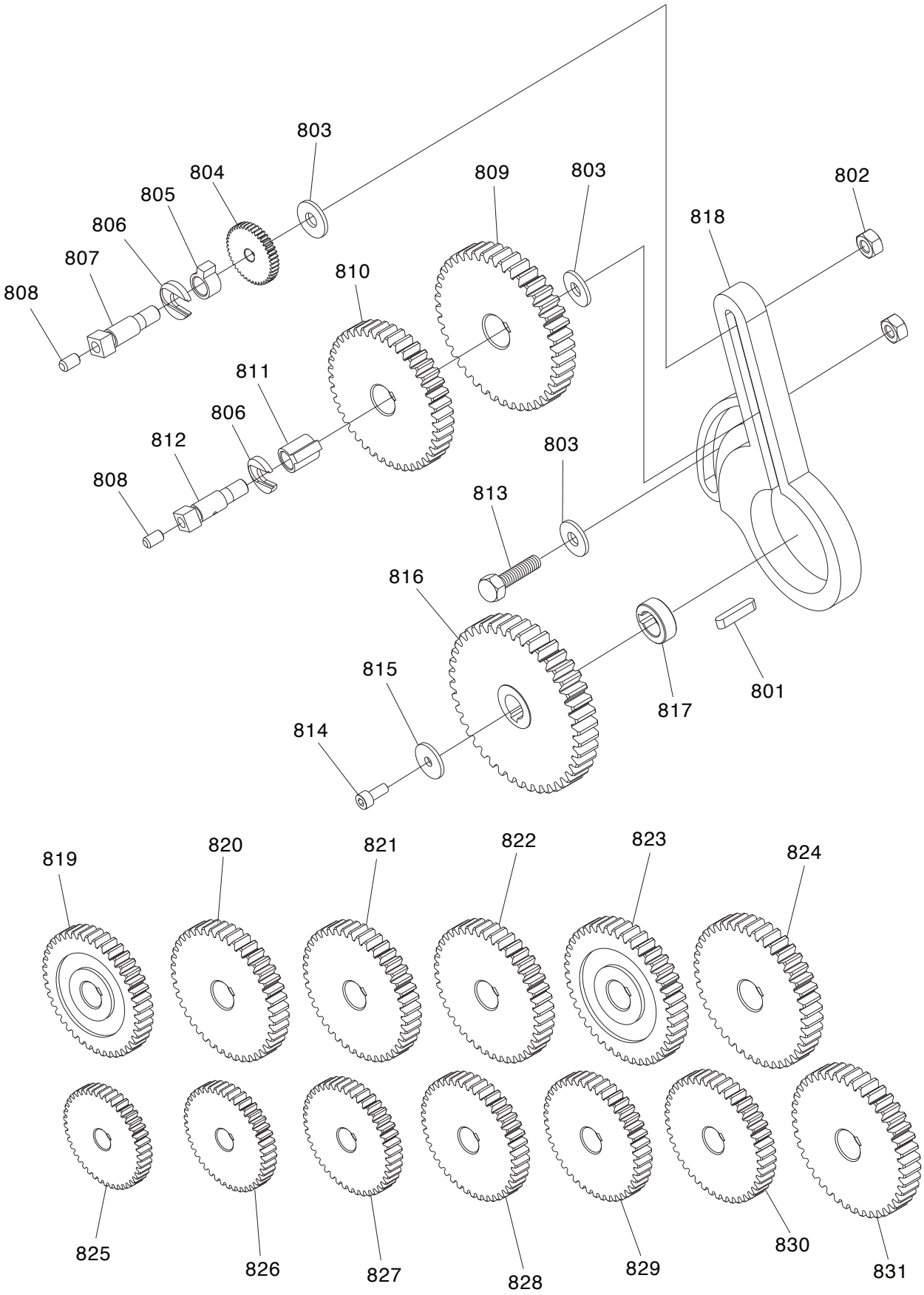


Gearbox Parts List

REF	PART #	DESCRIPTION
701	P09980701	FILL PLUG M10-1
702	P09980702	PLUG 24MM
703	P09980703	BALL BEARING 6901ZZ
704	P09980704	GEAR 22T/30T/18T
705	P09980705	SHAFT 147MM
706	P09980706	KEY 4 X 4 X 55 RE
707	P09980707	GEAR 24T/30T/20T
708	P09980708	GEARBOX
709	P09980709	GEARBOX COVER
710	P09980710	CAP SCREW M5-.8 X 20
711	P09980711	CAP SCREW M6-1 X 90
712	P09980712	DOWEL PIN 3 X 20
713	P09980713	CAP SCREW M8-1.25 X 90
716	P09980716	SIGHT GLASS 20MM
717	P09980717	SPACER 28 X 35 X 2MM
718	P09980718	BALL BEARING 6202ZZ
719	P09980719	GEAR 25T
720	P09980720	KEY 4 X 4 X 8 RE
721	P09980721	GEAR SHAFT 21T/15T
722	P09980722	BALL BEARING 6003ZZ
723	P09980723	GASKET
724	P09980724	FLANGE LEFT

REF	PART #	DESCRIPTION
725	P09980725	OIL SEAL 17 X 30 X 10MM
726	P09980726	CAP SCREW M5-.8 X 20
727	P09980727	OIL SEAL 15 X 30 X 10MM
728	P09980728	FLANGE RIGHT
729	P09980729	GEAR SHAFT 15T/22T 115MM
730	P09980730	EXT RETAINING RING 12MM
731	P09980731	ROCKER ARM
732	P09980732	O-RING 9 X 1.8
733	P09980733	GEARBOX DIAL
734	P09980734	STEEL BALL 5MM
735	P09980735	COMPRESSION SPRING 0.7 X 4.5 X 25MM
736	P09980736	SET SCREW M6-1 X 6
737	P09980737	SHIFT FORK
738	P09980738	EXT RETAINING RING 10MM
739	P09980739	KEY 4 X 4 X 16 RE
740	P09980740	DIAL LABEL
741	P09980741	PHLP HD SCR M4-.7 X 8
742	P09980742	DRAIN PLUG M10-1
744	P09980744	GEAR 36T
745	P09980745	GEARBOX COVER
746	P09980746	CAP SCREW M4-.7 X 8

End Gears

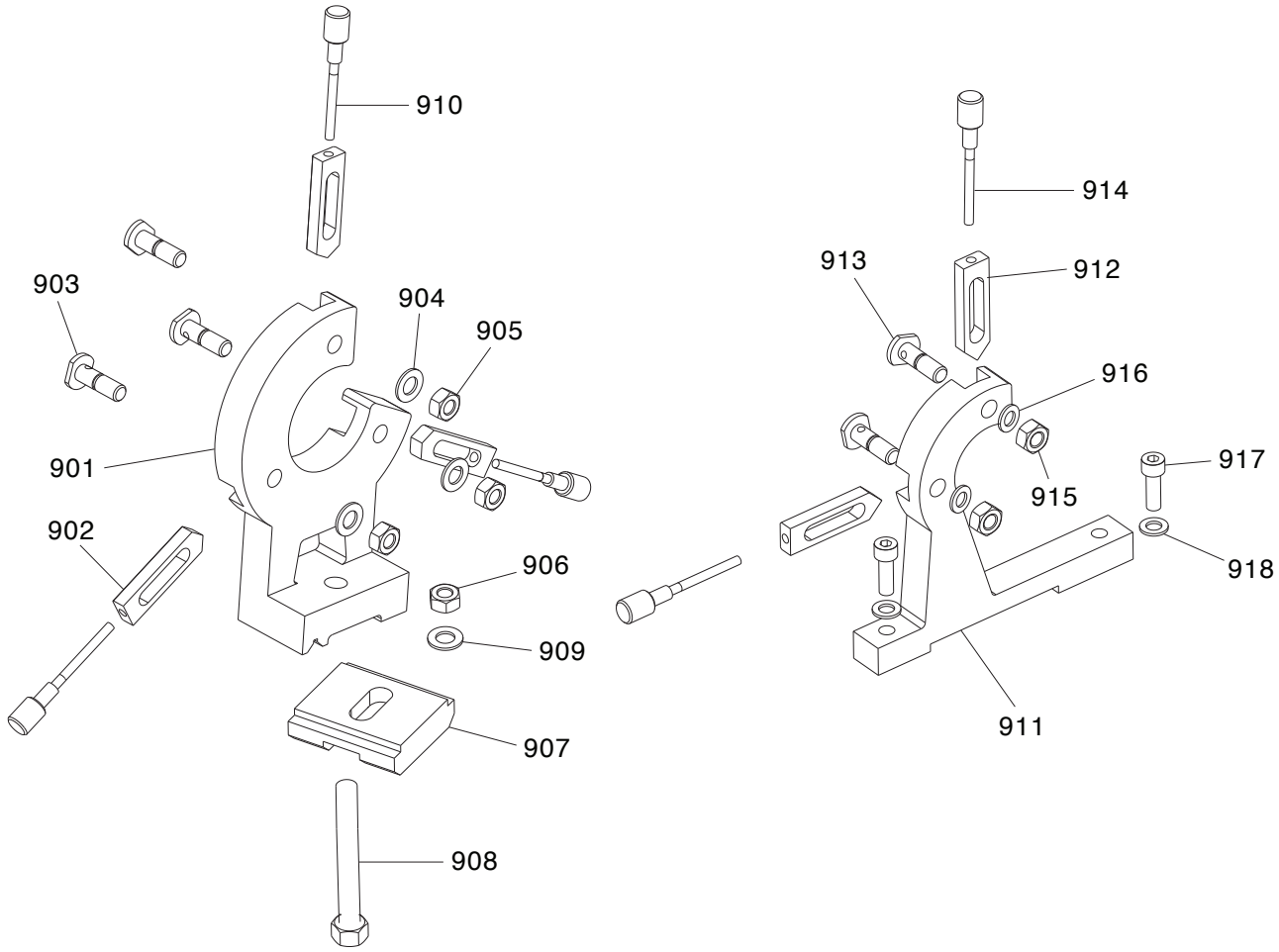


End Gears Parts List

REF	PART #	DESCRIPTION
801	P09980801	KEY 5 X 5 X 14 RE
802	P09980802	HEX NUT M8-1.25
803	P09980803	FLAT WASHER 8 X 20 X 2MM
804	P09980804	GEAR 34T
805	P09980805	KEYED BUSHING 8MM
806	P09980806	RETAINING WASHER 20MM
807	P09980807	UPPER SHAFT 33MM
808	P09980808	BALL OILER 6MM PRESS-IN
809	P09980809	GEAR 75T
810	P09980810	GEAR 72T
811	P09980811	KEYED BUSHING 8MM
812	P09980812	LOWER SHAFT 41MM
813	P09980813	HEX BOLT M8-1.25 X 20
814	P09980814	CAP SCREW M5-.8 X 12
815	P09980815	FLAT WASHER 6.5 X 20 X 2.5MM
816	P09980816	GEAR 84T

REF	PART #	DESCRIPTION
817	P09980817	KEYED SPACER 14 X 23 X 9MM
818	P09980818	END GEAR ARM
819	P09980819	GEAR 60T
820	P09980820	GEAR 66T
821	P09980821	GEAR 68T
822	P09980822	GEAR 69T
823	P09980823	GEAR 72T
824	P09980824	GEAR 73T
825	P09980825	GEAR 46T
826	P09980826	GEAR 48T
827	P09980827	GEAR 50T
828	P09980828	GEAR 53T
829	P09980829	GEAR 54T
830	P09980830	GEAR 57T
831	P09980831	GEAR 78T

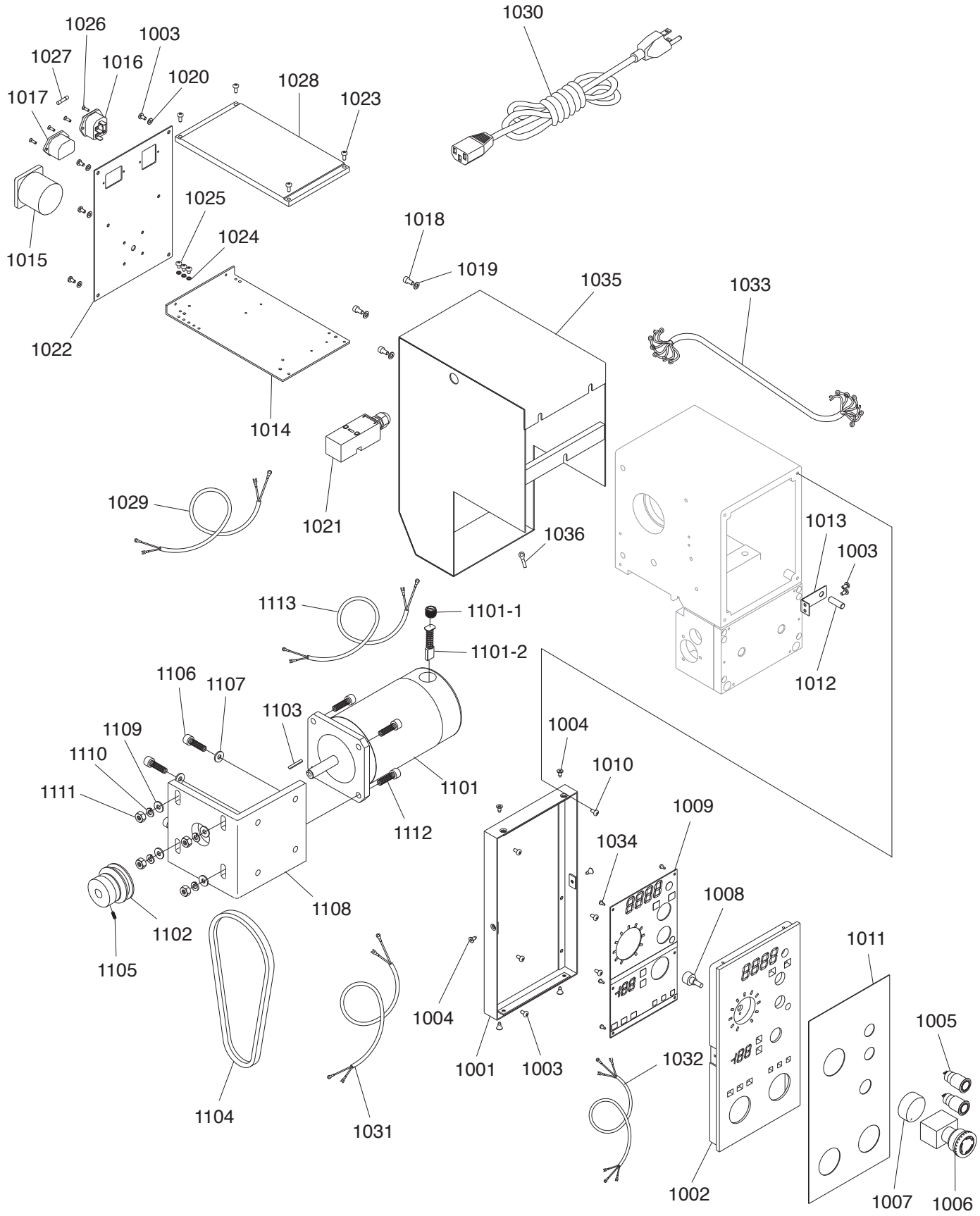
Rests



REF	PART #	DESCRIPTION
901	P09980901	STEADY REST CASTING
902	P09980902	FINGER JAW
903	P09980903	FINGER SCREW M10-1.5 X 36
904	P09980904	FLAT WASHER 10MM
905	P09980905	HEX NUT M10-1.5
906	P09980906	HEX NUT M12-1.75
907	P09980907	CLAMP PLATE
908	P09980908	HEX BOLT M12-1.75 X 70
909	P09980909	FLAT WASHER 12MM

REF	PART #	DESCRIPTION
910	P09980910	THUMB SCREW M5-.8 X 78
911	P09980911	FOLLOW REST CASTING
912	P09980912	FINGER JAW
913	P09980913	FINGER SCREW M10-1.5 X 36
914	P09980914	THUMB SCREW M5-.8 X 70
915	P09980915	HEX NUT M10-1.5
916	P09980916	FLAT WASHER 10MM
917	P09980917	CAP SCREW M8-1.25 X 30
918	P09980918	FLAT WASHER 8MM

Motor & Electricals

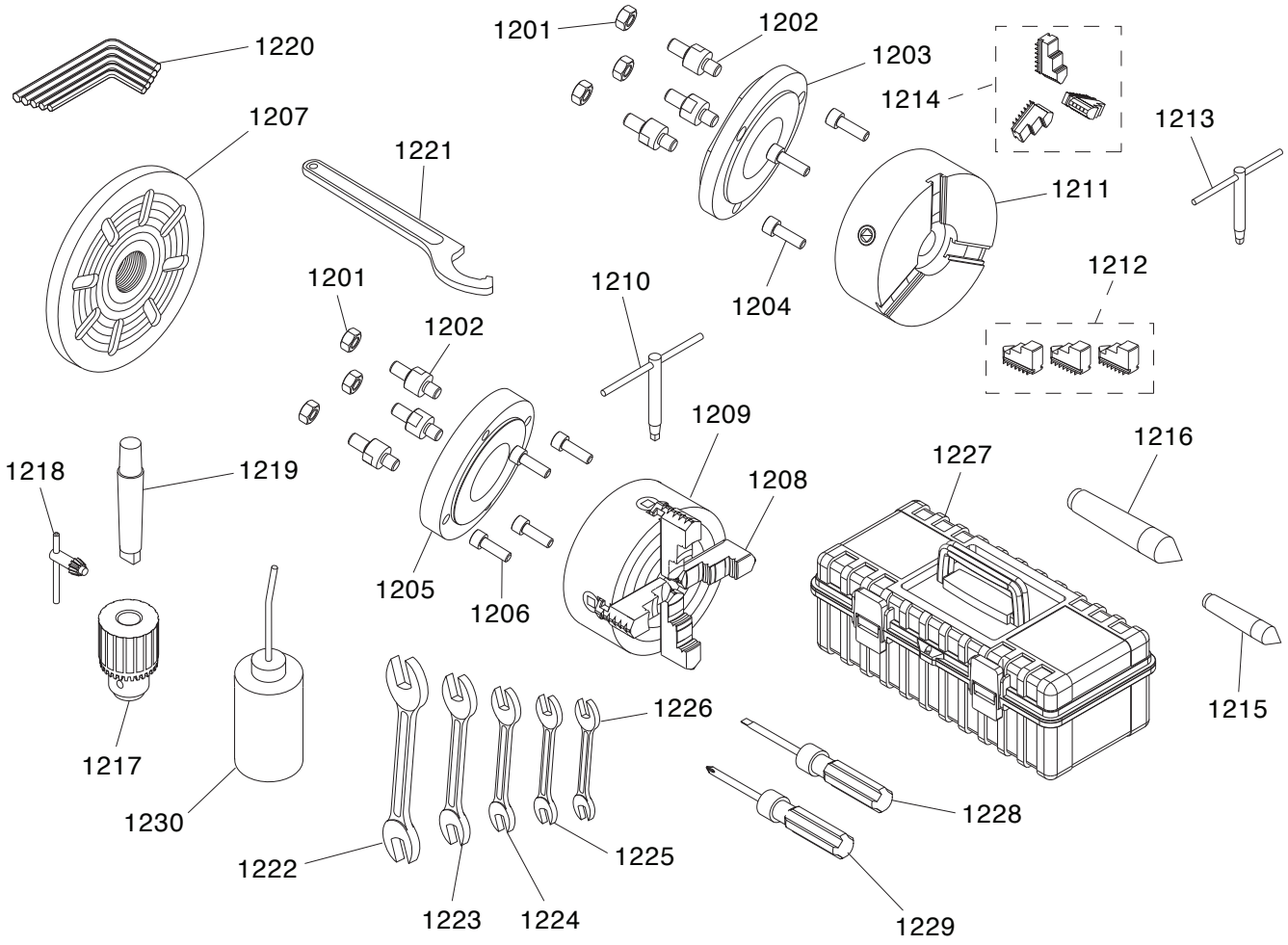


Motor & Electricals Parts List

REF	PART #	DESCRIPTION
1001	P09981001	CONTROL PANEL FRAME
1002	P09981002	CONTROL PANEL
1003	P09981003	PHLP HD SCR M4-.7 X 8
1004	P09981004	TAP SCREW M4 X 10 FLAT HD
1005	P09981005	PUSH BUTTON WILLIEN J19-271B
1006	P09981006	E-STOP BUTTON KEDU HY57B
1007	P09981007	SPEED DIAL
1008	P09981008	POTENTIOMETER B103
1009	P09981009	LED CIRCUIT BOARD LED-8
1010	P09981010	TAP SCREW M4 X 10
1011	P09981011	MIRROR PANEL
1012	P09981012	SPEED SENSOR
1013	P09981013	SENSOR BRACKET
1014	P09981014	ELECTRICAL MOUNTING PLATE
1015	P09981015	POWER SWITCH KEDU ZH-HC-2
1016	P09981016	RECEPTACLE W/FUSE MALE IEC C14 SPT-101
1017	P09981017	RECEPTACLE FEMALE IEC C13 SS-8B
1018	P09981018	CAP SCREW M5-.8 X 10
1019	P09981019	FLAT WASHER 5MM
1020	P09981020	FLAT WASHER 4MM
1021	P09981021	SAFETY SWITCH KEDU QKS8
1022	P09981022	ELECTRICAL PANEL
1023	P09981023	PHLP HD SCR M4-.7 X 10
1024	P09981024	LOCK WASHER 4MM
1025	P09981025	PHLP HD SCR M4-.7 X 6
1026	P09981026	FLAT HD SCR M3-.5 X 10

REF	PART #	DESCRIPTION
1027	P09981027	FUSE 15A 250V GLASS
1028	P09981028	CIRCUIT BOARD FC1100BJ-1/110V
1029	P09981029	SAFETY SWITCH CORD 16G 2W 16"
1030	P09981030	POWER CORD 14G 3W 72" C13 5-15P
1031	P09981031	SENSOR CORD 17G 3W 20"
1032	P09981032	POTENTIOMETER CORD 24G 3W 6"
1033	P09981033	CONTROL PANEL CORD 24G 10W 28"
1034	P09981034	TAP SCREW M2.9 X 6.5
1035	P09981035	ELECTRICAL CABINET
1036	P09981036	TEMPERATURE SENSOR 10K1M
1101	P09981101	MOTOR 1-1/2HP 110VDC
1101-1	P09981101-1	BRUSH CAP
1101-2	P09981101-2	CARBON BRUSH (2-PC SET)
1102	P09981102	MOTOR PULLEY
1103	P09981103	KEY 4 X 4 X 32 RE
1104	P09981104	V-BELT 7M730
1105	P09981105	SET SCREW M5-.8 X 8
1106	P09981106	CAP SCREW M8-1.25 X 25
1107	P09981107	FLAT WASHER 8MM
1108	P09981108	MOTOR BRACKET
1109	P09981109	FLAT WASHER 8MM
1110	P09981110	LOCK WASHER 8MM
1111	P09981111	HEX NUT M8-1.25
1112	P09981112	CAP SCREW M8-1.25 X 30
1113	P09981113	MOTOR CORD 14G 2W 20"

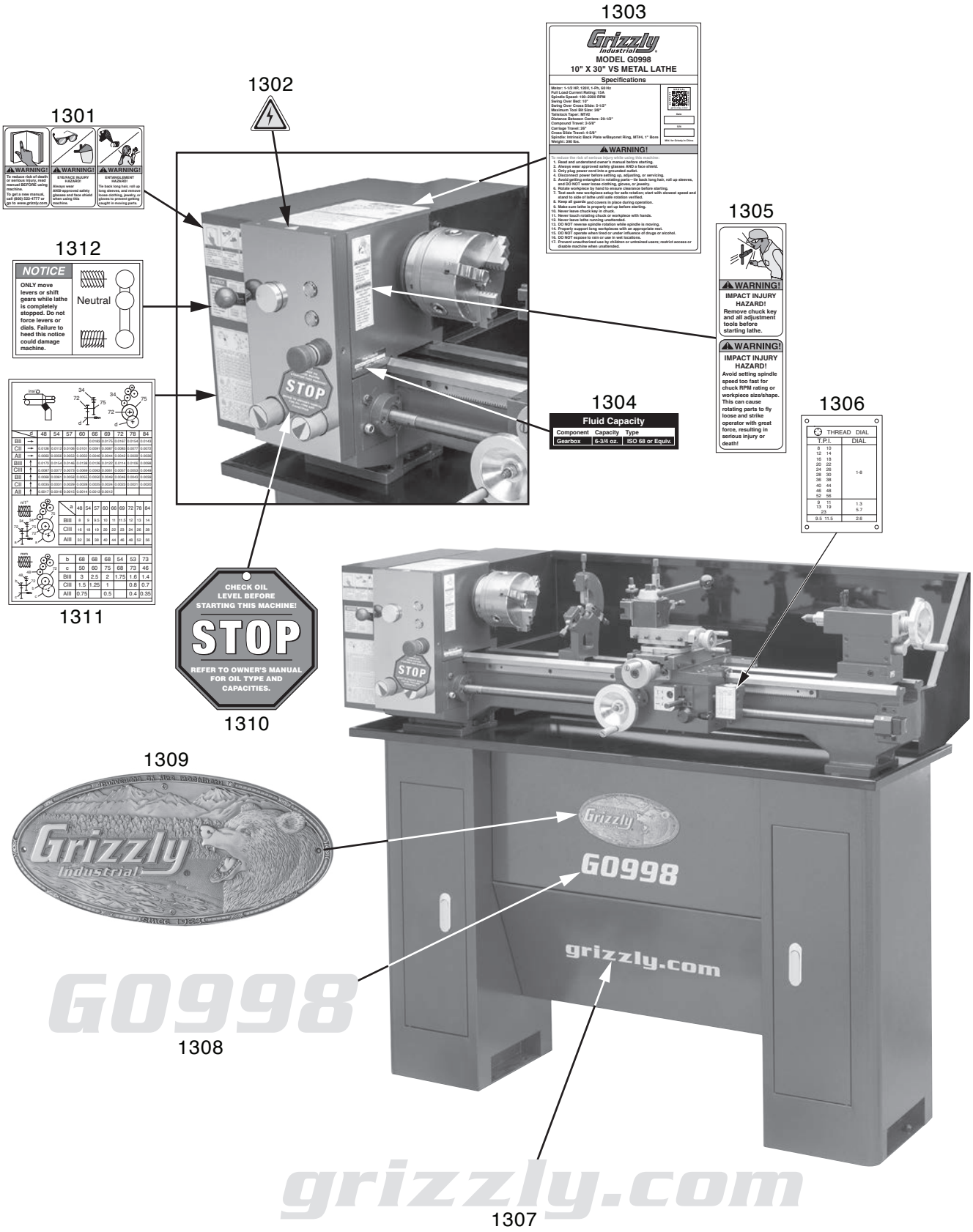
Accessories



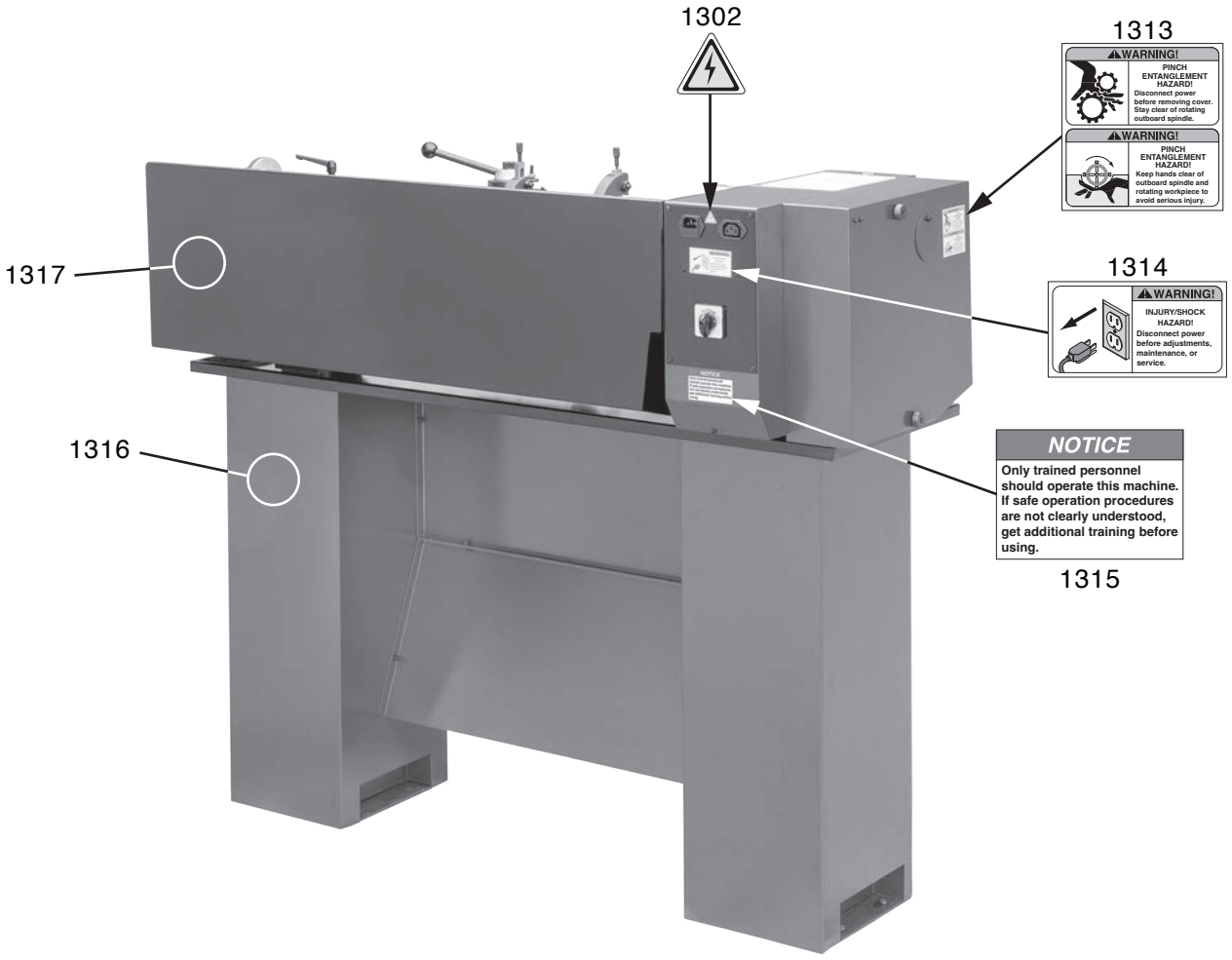
REF	PART #	DESCRIPTION
1201	P09981201	HEX NUT M10-1.25
1202	P09981202	STANDOFF-RD MM M10-1.5 X 17, M10-1.5 X 12
1203	P09981203	BACKPLATE 3-JAW
1204	P09981204	CAP SCREW M8-1.25 X 25
1205	P09981205	BACKPLATE 4-JAW
1206	P09981206	CAP SCREW M8-1.25 X 20
1207	P09981207	FACEPLATE 8-5/8"
1208	P09981208	REVERSIBLE CHUCK JAW SET (4-PC)
1209	P09981209	4-JAW CHUCK BODY 5"
1210	P09981210	LATHE CHUCK KEY 7MM AH 4-JAW
1211	P09981211	3-JAW CHUCK BODY 5"
1212	P09981212	OUTSIDE CHUCK JAW SET (3-PC)
1213	P09981213	LATHE CHUCK KEY 7MM AH 3-JAW
1214	P09981214	INSIDE CHUCK JAW SET (3-PC)
1215	P09981215	DEAD CENTER MT#2 HSS

REF	PART #	DESCRIPTION
1216	P09981216	DEAD CENTER MT#4 HSS
1217	P09981217	DRILL CHUCK B16 1-13MM
1218	P09981218	DRILL CHUCK KEY 8MM STD 11T SD-15.5MM
1219	P09981219	ARBOR MT#2 B16
1220	P09981220	HEX WRENCH SET (3, 4, 5, 6, 8MM)
1221	P09981221	SPANNER WRENCH 45-52MM
1222	P09981222	WRENCH 22 X 24MM OPEN-ENDS
1223	P09981223	WRENCH 17 X 19MM OPEN-ENDS
1224	P09981224	WRENCH 12 X 14MM OPEN-ENDS
1225	P09981225	WRENCH 8 X 10MM OPEN-ENDS
1226	P09981226	WRENCH 5.5 X 7MM OPEN-ENDS
1227	P09981227	TOOL BOX (EMPTY)
1228	P09981228	SCREWDRIVER FLAT 1/4"
1229	P09981229	SCREWDRIVER PHILLIPS #2
1230	P09981230	OIL BOTTLE

Labels & Cosmetics



Labels & Cosmetics (Cont.)



REF	PART #	DESCRIPTION
1301	P09981301	COMBO WARNING LABEL
1302	P09981302	ELECTRICITY LABEL
1303	P09981303	MACHINE ID LABEL
1304	P09981304	FLUID CAPACITY LABEL
1305	P09981305	IMPACT INJURY LABEL
1306	P09981306	THREAD DIAL CHART
1307	P09981307	GRIZZLY.COM LABEL 15", GRAY
1308	P09981308	MODEL NUMBER LABEL
1309	P09981309	NAMEPLATE GRIZZLY SMALL

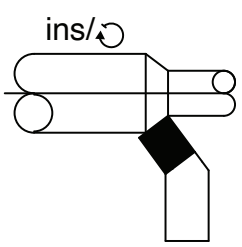
REF	PART #	DESCRIPTION
1310	P09981310	STOP HANG TAG
1311	P09981311	FEED/THREADING CHART
1312	P09981312	FEED DIRECTION LEVER LABEL
1313	P09981313	PINCH/ENTANGLEMENT LABEL
1314	P09981314	INJURY/SHOCK LABEL
1315	P09981315	TRAINED PERSONNEL LABEL
1316	P09981316	TOUCH-UP PAINT, GRIZZLY GREEN
1317	P09981317	TOUCH-UP PAINT, GLOSSY BLACK

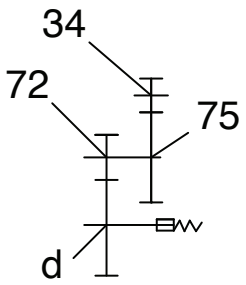
⚠WARNING

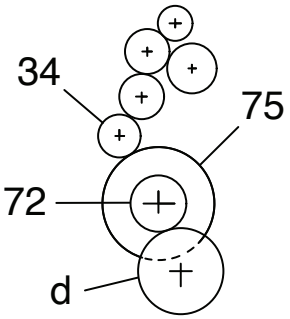
Safety labels help reduce the risk of serious injury caused by machine hazards. If any label comes off or becomes unreadable, the owner of this machine MUST replace it in the original location before resuming operations. For replacements, contact (800) 523-4777 or www.grizzly.com.

SECTION 10: APPENDIX

Feed Rate & Threading Chart







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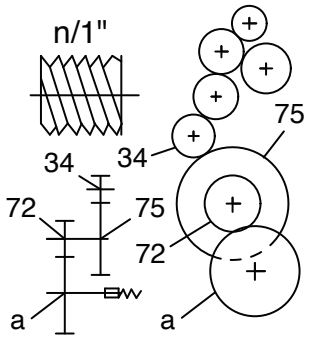
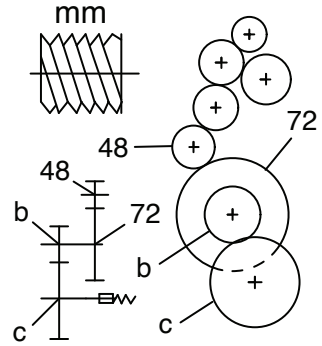
BII →					0.0183	0.0175	0.0167	0.0154	0.0143
CII →	0.0126	0.0112	0.0106	0.0101	0.0091	0.0087	0.0083	0.0077	0.0072
AII →	0.0063	0.0056	0.0053	0.0050	0.0046	0.0044	0.0042	0.0039	0.0036
BIII ↑	0.0173	0.0154	0.0146	0.0138	0.0126	0.0122	0.0114	0.0106	0.0098
CIII ↑	0.0087	0.0077	0.0073	0.0069	0.0063	0.0061	0.0057	0.0053	0.0049
BII ↑	0.0069	0.0061	0.0058	0.0055	0.0050	0.0049	0.0046	0.0043	0.0039
CII ↑	0.0035	0.0031	0.0029	0.0028	0.0025	0.0024	0.0023	0.0021	0.0020
AII ↑	0.0017	0.0016	0.0015	0.0014	0.0013	0.0012			



a	48	54	57	60	66	69	72	78	84
BIII	8	9	9.5	10	11	11.5	12	13	14
CIII	16	18	19	20	22	23	24	26	28
AIII	32	36	38	40	44	46	48	52	56



b	68	68	68	54	53	73
c	50	60	75	68	73	46
BIII	3	2.5	2	1.75	1.6	1.4
CIII	1.5	1.25	1		0.8	0.7
AIII	0.75		0.5		0.4	0.35

Thread Dial Chart

THREAD DIAL	
T.P.I.	DIAL
8 10 12 14 16 18 20 22 24 26 28 30 36 38 40 44 46 48 52 56	1-8
9 11 13 19 23	1.3 5.7
9.5 11.5	2.6

WARRANTY & RETURNS

Grizzly Industrial, Inc. warrants every product it sells for a period of **1 year** to the original purchaser from the date of purchase. This warranty does not apply to defects due directly or indirectly to misuse, abuse, negligence, accidents, repairs or alterations or lack of maintenance. This is Grizzly's sole written warranty and any and all warranties that may be implied by law, including any merchantability or fitness, for any particular purpose, are hereby limited to the duration of this written warranty. We do not warrant or represent that the merchandise complies with the provisions of any law or acts unless the manufacturer so warrants. In no event shall Grizzly's liability under this warranty exceed the purchase price paid for the product and any legal actions brought against Grizzly shall be tried in the State of Washington, County of Whatcom.

We shall in no event be liable for death, injuries to persons or property or for incidental, contingent, special, or consequential damages arising from the use of our products.

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

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

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

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

For further information about the warranty, visit **https://www.grizzly.com/forms/warranty** or scan the QR code below to be automatically directed to our warranty page.

WARRANTY

grizzly.com