Grizzly Industrial, Inc.®

MODEL G4003G
12" X 36" GUNSMITH'S LATHE
OWNER'S MANUAL
(For models manufactured since 03/20)

#CRTRTSMN9327 PRINTED IN CHINA
V4.03.22

******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

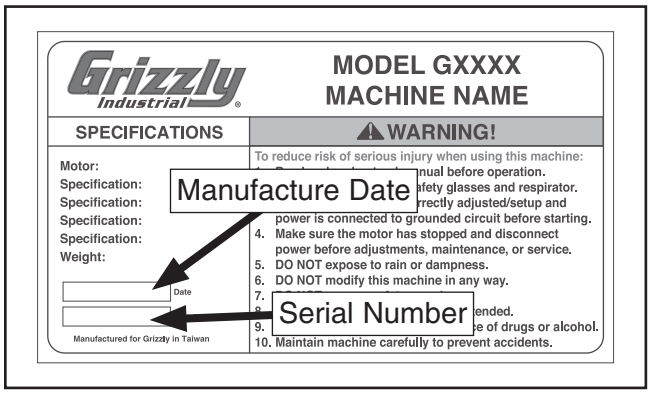
Manual Accuracy

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

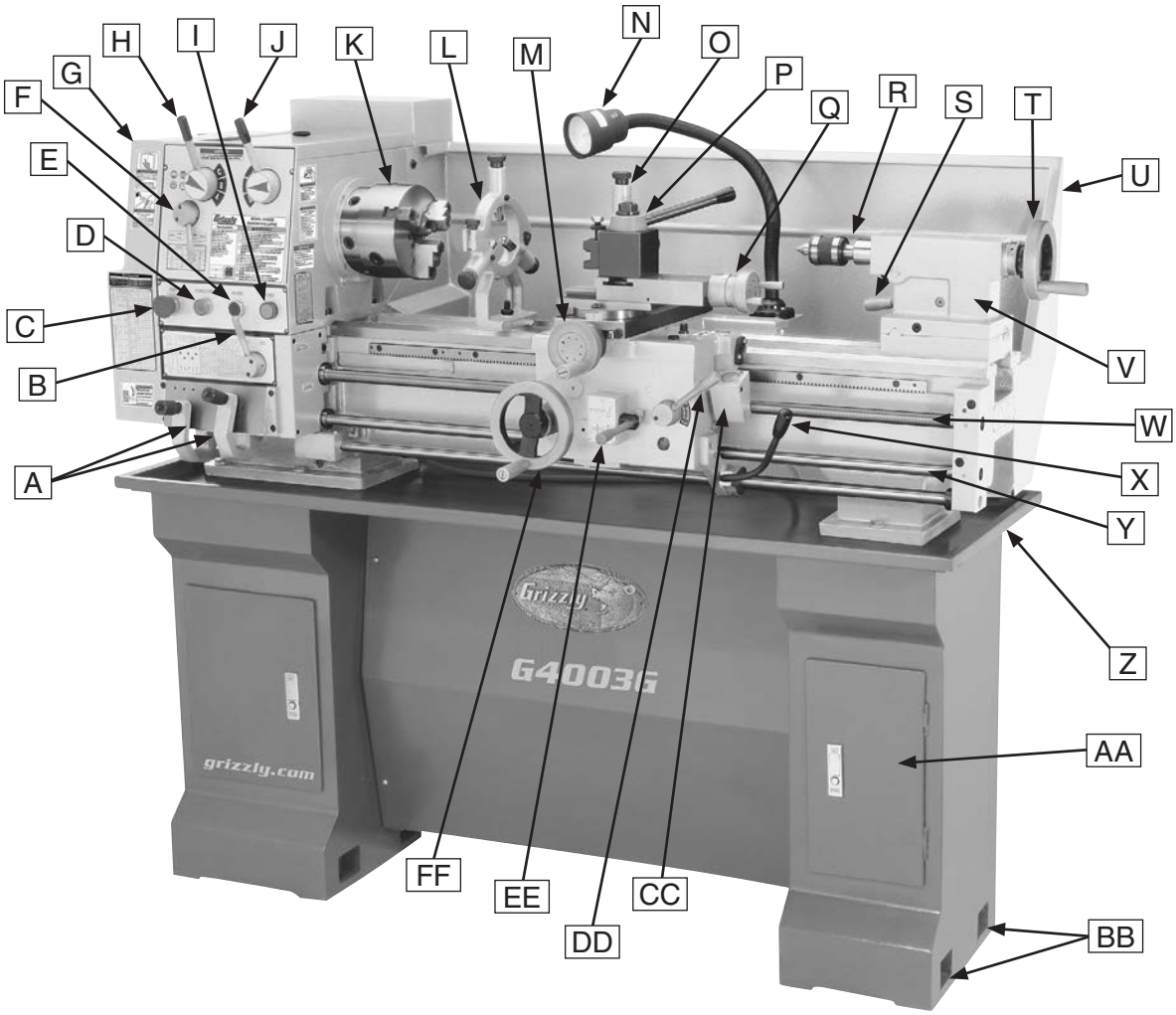
We made every effort to be exact with the instructions, specifications, drawings, and photographs in this manual. Sometimes we make mistakes, but our policy of continuous improvement also means that **sometimes the machine you receive is slightly different than shown in the manual**.

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



A. Quick-Change Gearbox Levers
B. Headstock Feed Selection Lever
C. Emergency Stop/RESET Button
D. Power Start Button
E. Inching (Jog) Button
F. Feed Direction Lever
G. End Gear and Belt Cover
H. Spindle Speed Lever (Alpha)
I. Power Light
J. Spindle Speed Lever (Numeric)
K. 3-Jaw Chuck
L. Steady Rest
M. Cross Feed Handwheel
N. LED Work Light
O. Follow Rest
P. Quick-Change Tool Post
Q. Compound Rest Handwheel
R. Tailstock Quill and Center
S. Tailstock Quill Lock Lever
T. Tailstock Quill Handwheel
U. Back Splash
V. Tailstock
W. Longitudinal Leadscrew
X. Spindle Lever
Y. Feed Rod
Z. Chip Tray
AA. Storage Cabinet
BB. Stand Mounting Points
CC. Thread Dial
DD. Half Nut Lever
EE. Apron Feed Selection Lever
FF. Carriage Handwheel

Basic Controls

Refer to **Figures 1–4** and the following descriptions to learn the basic controls of the lathe. This information is necessary to successfully complete the **SETUP** section.

Headstock & Quick-Change Gearbox

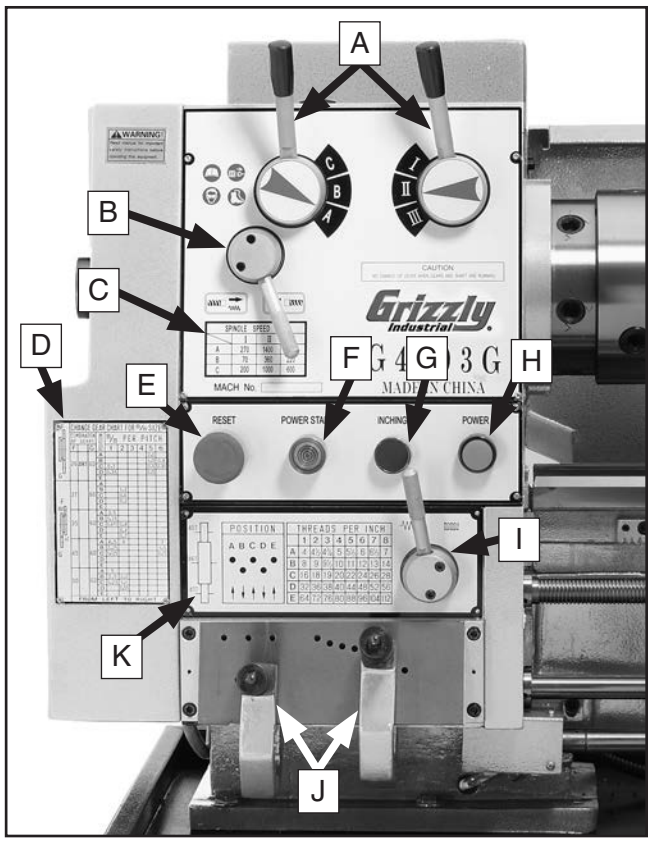


Figure 1. Headstock and quick-change gearbox controls.

A. Spindle Speed Levers: Used to select one of the nine spindle speeds.

B. Feed Direction Lever: Controls rotation direction of leadscrew and feed rod.

C. Spindle Speed Chart: Shows how to arrange spindle speed levers for each of the nine spindle speeds.

D. Metric Threading Chart: Displays the necessary configuration of gearbox levers and end gears for metric threading options.

E. Emergency Stop/RESET Button: Stops all machine functions. Twist clockwise to reset.

F. POWER START Button: Enables power to spindle motor after the emergency stop button is reset.

G. INCHING (Jog) Button: Rotates spindle as long as it is pressed.

H. POWER Lamp: Illuminates when lathe controls are receiving power (Emergency Stop/RESET button must be reset).

I. Headstock Feed Selection Lever: Selects leadscrew for threading operations or feed rod for power feed operations.

J. Quick-Change Gearbox Levers: Control the leadscrew and feed rod rotation speed for threading and power feed operations.

K. Inch Threading Chart: Displays the necessary configuration of gearbox levers and end gears for inch threading options.

Carriage

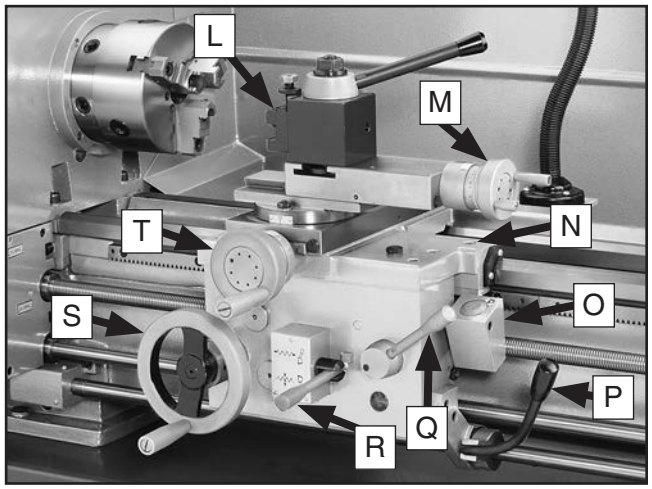


Figure 2. Carriage controls.

L. Quick-Change Tool Holder: Slides on or off tool post to allow the operator to quickly load and unload tools.

M. Compound Rest Handwheel: Moves tool toward or away from workpiece at the preset angle of compound rest.

N. Carriage Lock: Secures carriage in place for greater rigidity.

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

P. Spindle Lever: Starts, stops, and reverses direction of spindle rotation.

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

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

S. Carriage Handwheel: Moves carriage along bed.

T. Cross Slide Handwheel: Moves tooling toward or away from the workpiece.

U. Quill Lock Lever: Secures quill in position.

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

Tailstock

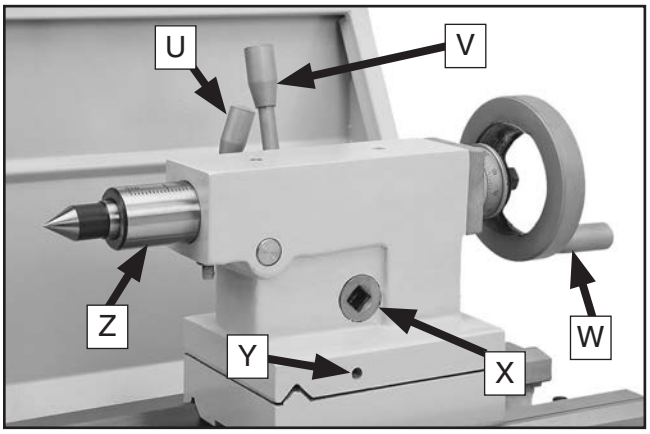


Figure 3. Tailstock controls.

W. Quill Handwheel: Moves quill toward or away from spindle.

X. **½" Square-Drive Lock-Down:** Can be used with a torque wrench for precise alignment of centers.

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

Z. Quill: Moves toward or away from spindle. Holds centers or tooling.

End Gears

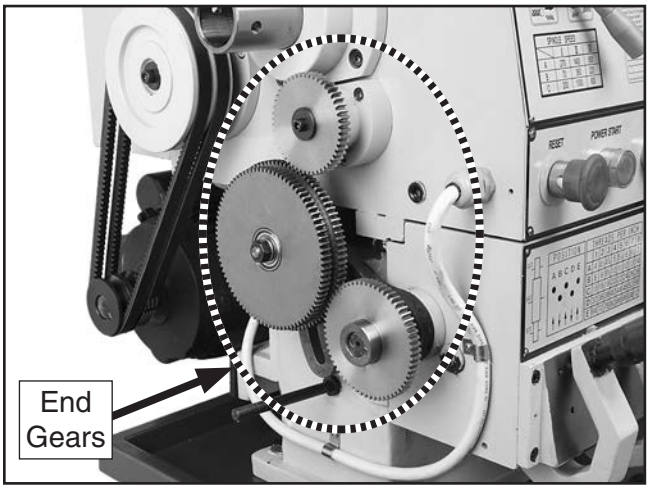


Figure 4. End gears.

Configuring the end gears will control the speed of the leadscrew for threading or the feed rod for power feed operations. The rotational speed of these components depends not only on the end gear configuration, but the spindle speed as well.

MACHINE DATA SHEET

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

MODEL G4003G 12" X 36" GUNSMITHING LATHE WITH STAND

Product Dimensions:

Weight..... 1213 lbs.
Width (side-to-side) x Depth (front-to-back) x Height..... 67-1/2 x 26 x 54-1/2 in.
Footprint (Length x Width)..... 57-1/2 x 14-1/2 in.

Shipping Dimensions:

Carton #1

Type..... Wood Crate
Content..... Machine
Weight..... 1022 lbs.
Length x Width x Height..... 66 x 30 x 29 in.
Must Ship Upright..... Yes

Carton #2

Type..... Cardboard Box
Content..... Stand
Weight..... 308 lbs.
Length x Width x Height..... 31 x 27 x 19 in.
Must Ship Upright..... No

Electrical:

Power Requirement..... 220V, Single-Phase, 60 Hz
Prewired Voltage..... 220V
Full-Load Current Rating..... 8.5A
Minimum Circuit Size..... 15A
Connection Type..... Cord & Plug
Power Cord Included..... No
Recommended Power Cord..... "S"-Type, 3-Wire, 14 AWG, 300 VAC
Plug Included..... No
Recommended Plug Type..... 6-15
Switch Type..... Control Panel w/Magnetic Switch Protection

Motors:

Main

Horsepower..... 2 HP
Phase..... Single-Phase
Amps..... 8.5A
Speed..... 1725 RPM
Type..... TEFC Capacitor-Start Induction
Power Transfer ..... Twin V-Belt Drive
Bearings..... Shielded & Permanently Lubricated
Centrifugal Switch/Contacts Type..... Internal

Main Specifications:

Operation Info

Swing Over Bed	12 in.
Distance Between Centers	36 in.
Swing Over Cross Slide	7 in.
Swing Over Saddle	11-11/32 in.
Maximum Tool Bit Size	5/8 in.
Compound Travel	3-1/4 in.
Carriage Travel	30-1/2 in.
Cross Slide Travel	6-1/4 in.

Headstock Info

Spindle Bore	1.57 in.
Spindle Taper	MT#5
Number of Spindle Speeds	9
Spindle Speeds	70 – 1400 RPM
Spindle Type	D1-5 Camlock
Spindle Bearings	High-Precision Tapered Roller
Spindle Length	17 in.
Spindle Length with 3-Jaw Chuck	21-3/4 in.
Spindle Length with 4-Jaw Chuck	21-1/4 in.
Spindle Length with Faceplate	18-1/2 in.

Tailstock Info

Tailstock Quill Travel	4 in.
Tailstock Taper	MT#3
Tailstock Barrel Diameter	1.563 in.

Threading Info

Number of Longitudinal Feeds	40
Range of Longitudinal Feeds	0.0011 – 0.0310 in./rev.
Number of Cross Feeds	40
Range of Cross Feeds	0.0004 – 0.0105 in./rev
Number of Inch Threads	40
Range of Inch Threads	4 – 112 TPI
Number of Metric Threads	29
Range of Metric Threads	0.2 – 4.5 mm

Dimensions

Bed Width	7-1/4 in.
Carriage Leadscrew Diameter	0.870 in.
Leadscrew TPI	8 TPI
Carriage Leadscrew Length	44 in.
Steady Rest Capacity	3/16 – 1-1/2 in.
Follow Rest Capacity	1/4 – 3/4 in.
Faceplate Size	10 in.
Feed Rod Diameter	3/4 in.
Floor to Center Height	46-1/4 in.
Height With Leveling Jacks	48-1/4 in.

Construction

Base	Cast Iron
Headstock	Cast Iron
End Gears	Flame Hardened Steel
Bed	Induction-Hardened, Precision-Ground Cast Iron
Body	Cast Iron
Stand	Steel
Paint Type/Finish	Epoxy

Fluid Capacities

Headstock Capacity..... 3.5 qt.
Headstock Fluid Type..... ISO 32 (eg. Grizzly T23963, Mobil DTE Light)
Gearbox Capacity..... 1 – 2 Pumps
Gearbox Fluid Type..... ISO 68 (SB1365, Grizzly T23962, Mobil Vactra 2)
Apron Capacity..... 0.5 qt.
Apron Fluid Type..... ISO 68 (eg. Grizzly T23962, Mobil Vactra 2)

Other Specifications:

Country of Origin ..... China
Warranty ..... 1 Year
Approximate Assembly & Setup Time ..... 1-1/2 Hours
Serial Number Location ..... ID Label on Headstock
ISO 9001 Factory ..... No
Certified by a Nationally Recognized Testing Laboratory (NRTL) ..... No

Features:

1/2" SQ. Drive in Tailstock for Using Torque Wrench to Lock Tailstock Down Precisely Every Time
Min. Gun Barrel Length Through Spindle w/4-Jaw Chuck - 23" (Allowing for Barrel Sticking Out for Threading)
Easy to Use Lever Controls
Full Length Splash Guard
On/Off Reverse Switch on Carriage
LED Work Light
Ball Bearing Steady/Follow Rests
Outboard End Support Screws
Socket for Tailstock Lock
Steel Stand with Extended Base
Cast Aluminum Gear Cover
V-Slide for Side Adjustment

Accessories Included:

1 MT#3 Live Center
1/2" Chuck with MT#3 Arbor
10" Face Plate
2 MT#3 Dead Centers (1 Carbide Tipped)
6" 3-Jaw Chuck with 2 Sets of Jaws
8" 4-Jaw Chuck with Reversible Jaws
Follow Rest with Roller Tips
Quick Change Tool Post with One Tool Holder
Steady Rest with Roller Tips
Toolbox
Set of Seven Change Gears

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 clothing, apparel or jewelry that can become entangled in moving parts. Always tie back or cover long hair. Wear non-slip footwear to reduce risk of slipping and losing control or accidentally contacting cutting tool or moving parts.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Additional Safety for Metal Lathes

⚠WARNING

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Additional Chuck Safety

⚠WARNING

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

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

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

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

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

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

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

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

SECTION 2: POWER SUPPLY

Availability

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

⚠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 220V .... 8.5 Amps

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

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

Circuit Requirements for 220V

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

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

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

⚠CAUTION

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

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

Grounding Instructions

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

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

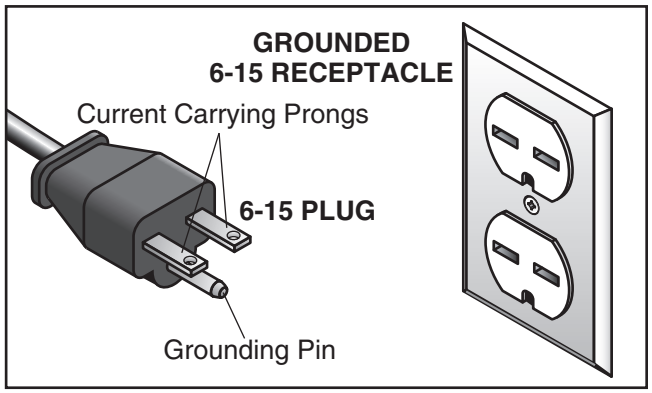
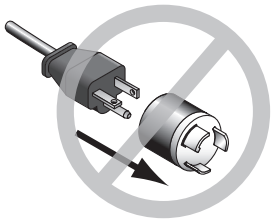


Figure 5. Typical 6-15 plug and receptacle.

⚠CAUTION



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

⚠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.

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

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

Extension Cords

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

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

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

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

SECTION 3: SETUP

Preparation

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

The typical preparation process is as follows:

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

Unpacking

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

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

Needed for Setup

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

- **For Lifting and Moving:**
  —A forklift or other power lifting device rated for at least 2000 lbs.
  —Two lifting straps rated for at least 2000 lbs. each
  —Lifting chain and safety hook rated for at least 2000 lbs. each
  —Another person to guide machine

- **For Power Connection:**
  —A power source that meets the minimum circuit requirements for this machine (review **Power Supply** on **Page 13** for details)
  —An electrician or qualified service personnel to ensure a safe and code-compliant connection to the power source

- **For Assembly:**
  —Shop rags
  —Cleaner/degreaser (see **Page 17**)
  —Quality metal protectant lubricant
  —Safety glasses for each person
  —Anchoring hardware as needed (see **Page 22**)
  —Precision level at least 12" long
  —Silicone sealant

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.

Major Components (Figure 6) **Qty.**

A. 6" Three-Jaw Chuck w/Jaws 1
B. Steady Rest 1
C. Follow Rest 1
D. Quick Change Tool Post 1
E. Stand:
Cabinets (Left & Right) 2
Front Panel 1
Front Panel Brackets 2

Loose Components (Figure 7)

F. 8" Four-Jaw Universal Chuck w/Camlock Studs and Cap Screws 1
G. 10" Faceplate 1
H. Bottle for Oil 1
I. Tool Box 1
J. Tailstock Wrench 1
K. 3- and 4-Jaw Chuck Wrenches ..... 1 Ea
L. Quick Change Tool Holder 1
M. Change Gears 1
—Gear 27-tooth 1
—Gear 26-tooth 1
—Gear 35-tooth 1
—Gear 36-tooth 1
—Gears 40-tooth (Installed) 2
—Gear 45-tooth 1
—Gear 50-tooth 1
—Gear 60-tooth 1
—Gear 86/91-tooth (Installed) 1
N. Hex Wrench Set 2, 4, 5, 6, 8, 10 mm ..... 1 Ea
O. Wrenches 9/11, 10/12, 12/14 ..... 1 Ea
P. Handwheel Handles 2
Q. Spindle Sleeve MT#5 to MT#3 1
R. Arbor B16 to MT#3 1
S. Standard Dead Center MT#3 1
T. Carbide Tipped Dead Center MT#3 1
U. Live Center MT#3 1
V. Phillips & Flat Screwdrivers #2 ..... 1 Ea
W. Drill Chuck B16 1.5-13mm 1
X. Drill Chuck Key 1
Y. Spider Bolts w/Nuts 4
Z. Fasteners (Not Shown):
—Hex Bolts M12-1.75 x 40 6
—Flat Washers 12mm 6
—Phillips Head Screws M6-1 x 10 12
—Hex Nuts M6-1 4
—Flat Washers 6mm 12

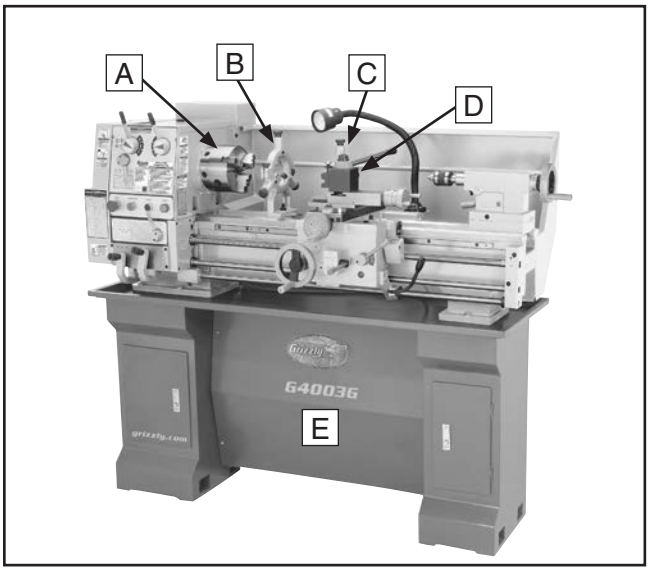


Figure 6. Major components.

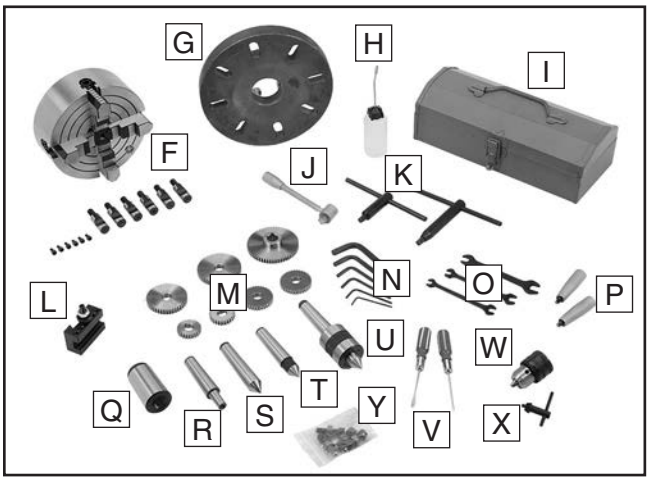


Figure 7. Loose components.

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.

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.

Figure 8. T23692 Orange Power Degreaser.

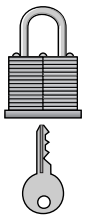
Site Considerations

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.

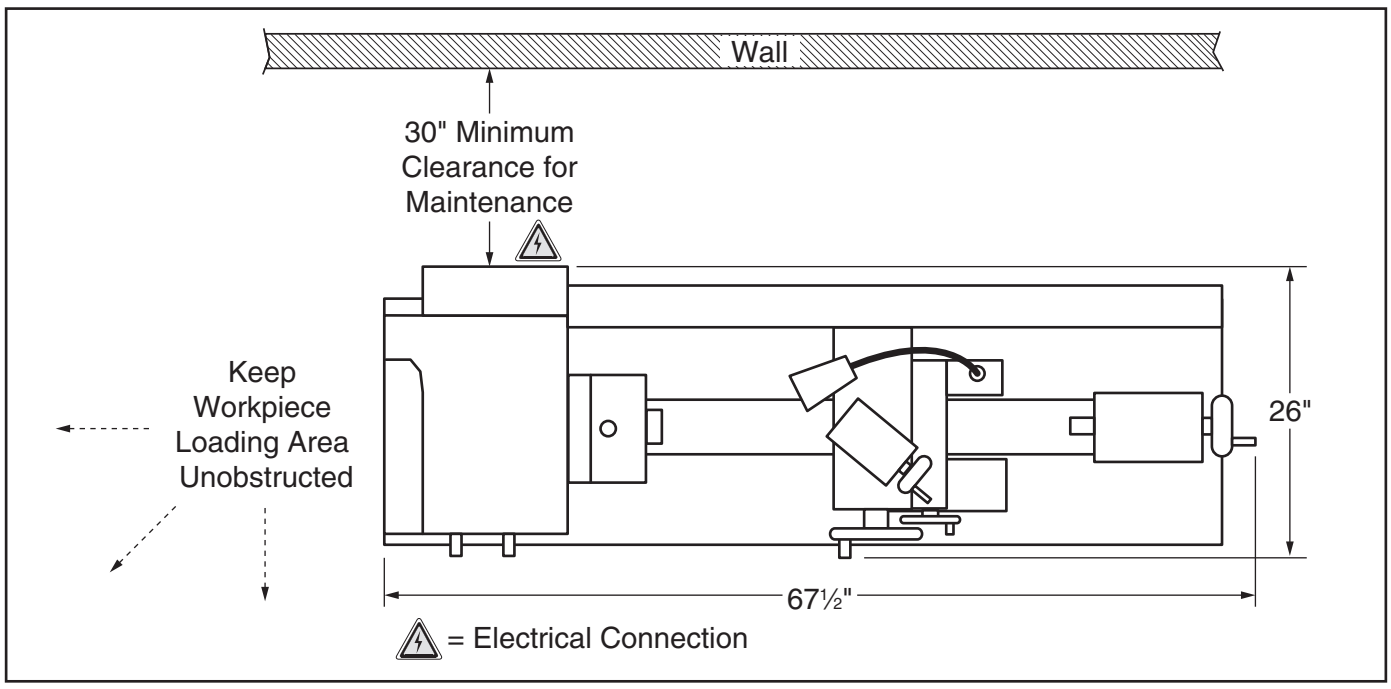
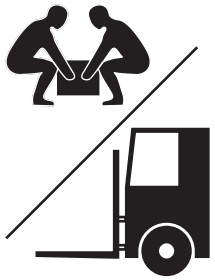


Figure 9. Minimum working clearances.

Assembly



⚠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.

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).

Assembling the Model G4003G consists of building the stand assembly, attaching the handwheel handles, placing and securing the lathe on the stand, anchoring the stand to the floor, and attaching the back splash.

To assemble the lathe:

1. Position left and right cabinets approximately 34" apart in prepared location.

2. Secure front panel brackets to cabinets with (4) M6-1 x 10 Phillips head screws and (4) 6mm flat washers (see **Figure 10**).

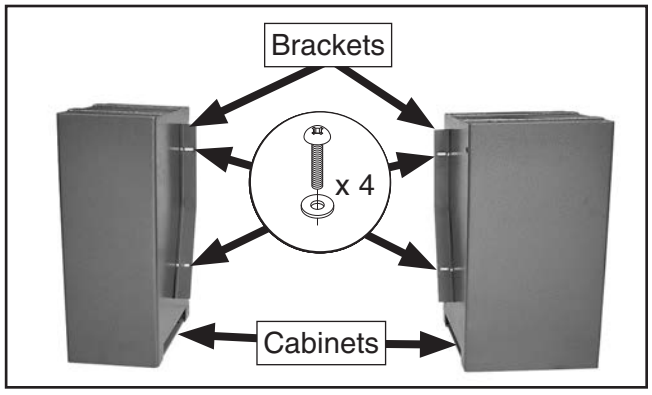


Figure 10. Brackets installed (rear view).

3. Install front panel on panel brackets with (4) M6-1 x 10 Phillips head screws, (4) 6mm flat washers, and (4) M6-1 hex nuts (see **Figure 11**).

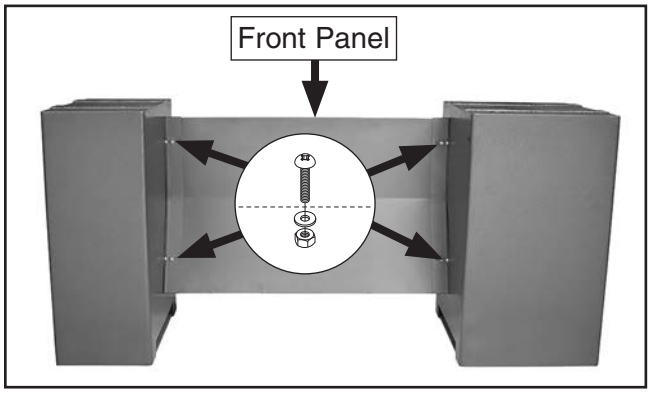


Figure 11. Front panel installed.

Recommended: *Use the mounting holes (approximately ⅜" in diameter) in the cabinets (see **Figure 12**) to mark and drill holes in the floor, then anchor the stand assembly to the floor. Use shims to level the assembly as needed. Refer to **Leveling** on **Page 22** and **Anchoring to Floor** on **Page 22** for detailed information.*

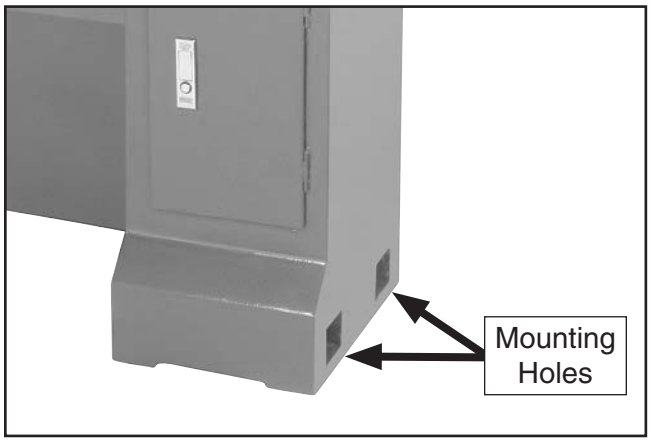


Figure 12. Locations of cabinet mounting holes (two on each cabinet).

4. Remove crate from lathe shipping pallet, then remove all loose items.

IMPORTANT: *Lifting and placing the lathe requires at least one other person for assistance and a forklift with two lifting straps, lifting chain, and a safety hook rated for at least 2000 lbs. each.*

5. Move lathe to its prepared location while it is still attached to the shipping pallet.

6. Unbolt lathe from the shipping pallet.

7. Attach handles to cross slide and carriage handwheels (see **Figure 13**).

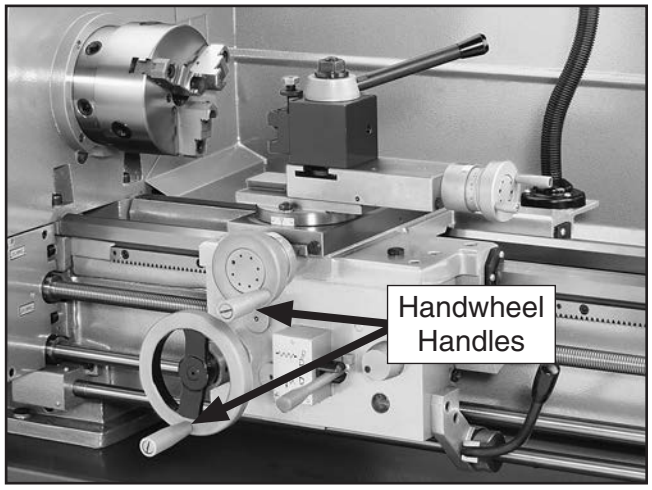


Figure 13. Handwheel handles attached.

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

   Note: *Before attempting to move the carriage, make sure the carriage lock is loose, the half nut is disengaged, and the feed selection lever is disengaged. Refer to* ***Basic Controls*** *beginning on* ***Page 4*** *to identify these components.*

9. Wrap two lifting straps around right bedway pedestal and left bedway under chuck.

   IMPORTANT: *To avoid damaging precision parts, route straps BEHIND control rod, feed rod, and lead screw, as illustrated in* ***Figure 14****. This will help prevent lifting straps from bending or damaging these parts during lifting.*

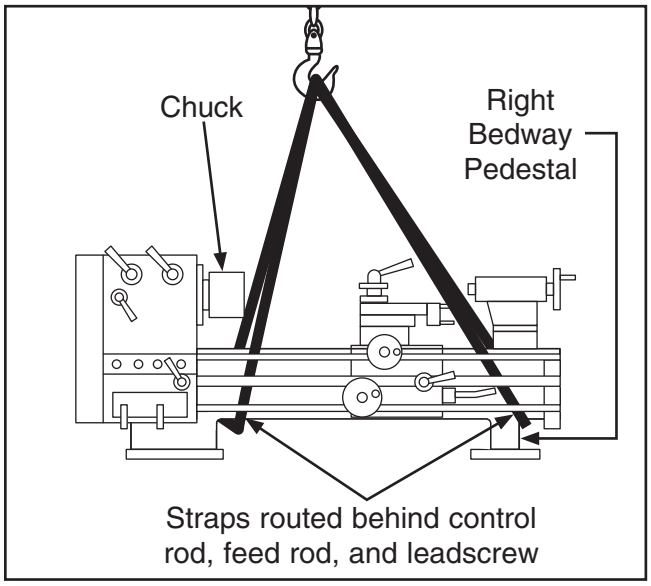


Figure 14. Lifting straps properly fitted on the lathe.

10. Position chip pan on top of cabinet stand and align six mounting holes with those in cabinets.

11. Have another person hold onto the lathe to prevent it from swinging as you slowly raise lathe from pallet and move it over stand.

12. Apply a ¼" bead of silicone around bottom edge of bedway pedestals.

    Note: *When the lathe is placed onto the chip pan the silicone will form a protective seal to help prevent fluid leaking into the cabinets.*

13. Place lathe on stand while aligning mounting holes in lathe bed with holes in chip pan.

14. Remove headstock end cover to gain better access to the headstock base pedestal (see **Figure 15**).

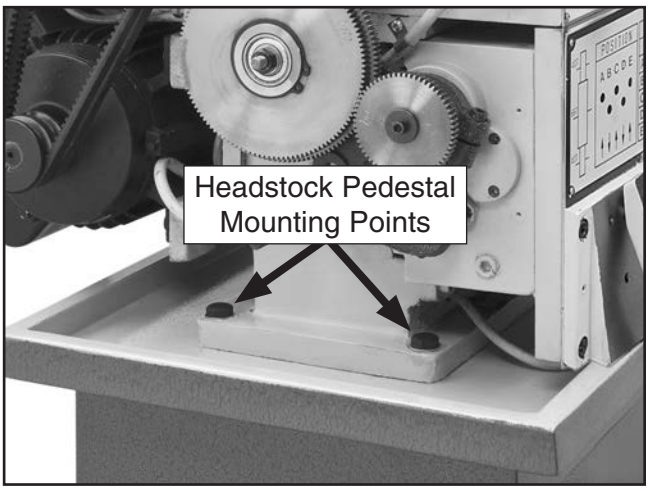


Figure 15. End cover removed to expose headstock pedestal mounting points.

15. Make sure lathe bedway is level side to side and front to back and, if necessary, shim between lathe pedestals and chip pan (refer to **Leveling** on **Page 22** for detailed information).

16. Insert (6) M12-1.75 x 40 hex bolts with (6) 6mm flat washers through pedestals and chip pan, then thread them into cabinet tops.

Note: *For best results, recheck the ways in 24 hours to make sure they are still level and have not twisted. Reshim as required.*

17. Apply a bead of silicone around each of the base pedestals where they contact chip tray, to further reduce possibility of fluids leaking into cabinets.

18. Attach back splash to rear of lathe with (4) M6-1 x 10 Phillips head screws and (4) 6mm flat washers, as shown in **Figure 16**.

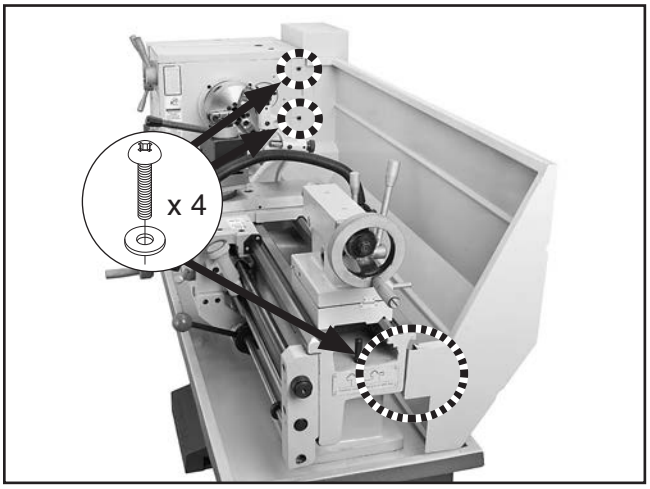


Figure 16. Locations to secure back splash.

Leveling

NOTICE

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

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

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

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

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

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

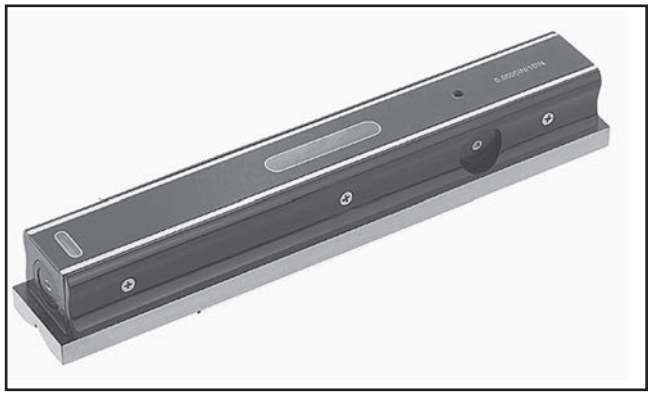


Figure 17. Model H2683 Master Machinist's Level.

Anchoring to Floor

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

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

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

Anchoring to Concrete Floors

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

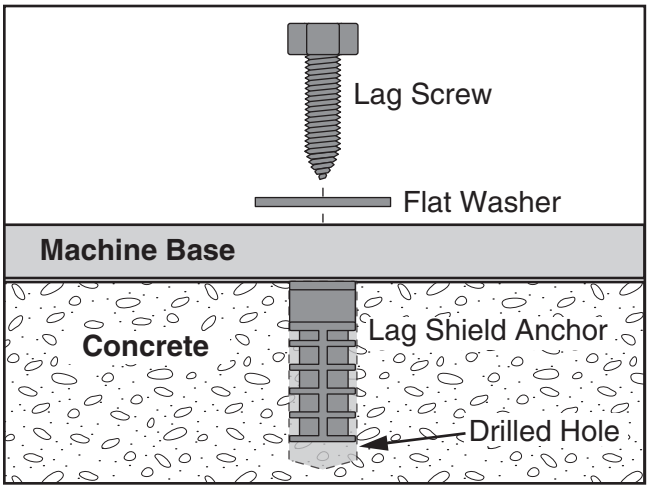


Figure 18. Popular method for anchoring machinery to a concrete floor.

Lubricating Lathe

The headstock, quick-change gearbox, and apron must be properly lubricated before the lathe can be operated.

Damage caused to the bearings and gears from running the lathe without proper lubrication will not be covered under warranty. Refer to the **Lubrication** section, beginning on **Page 60**, for checking and adding oil.

In addition to the components mentioned above, we also recommend that you lubricate all other points on the machine at this time.

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

Power Connection

⚠WARNING

Electrocution or fire may occur if machine is ungrounded, incorrectly connected to power, or connected to an undersized circuit. Use an electrician or a qualified service personnel to ensure a safe power connection.

Before the machine can be connected to the power supply, there must be an electrical circuit that meets the **Circuit Requirements for 220V** on **Page 13**.

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

Note About Extension Cords: *Using an incorrectly sized extension cord may decrease the life of electrical components on your machine. Refer to* ***Extension Cords*** *on* ***Page 14*** *for more information.*

To connect power cord to lathe:

1. Press Emergency Stop/RESET button on front of headstock, then remove electrical box cover from back.

2. Thread power cord through strain relief shown in **Figure 19**.

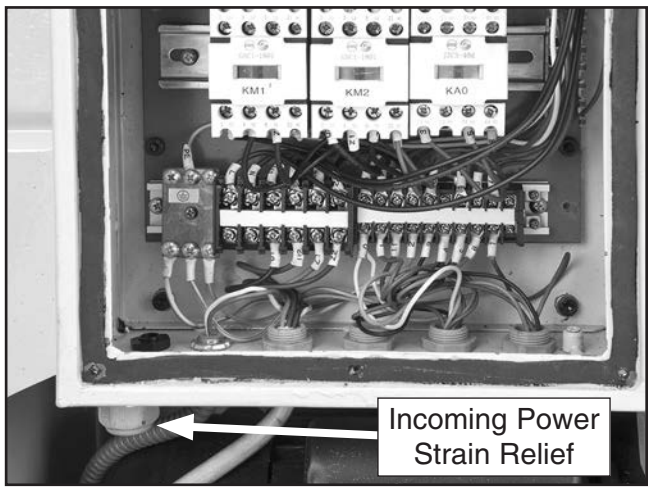


Figure 19. Location of incoming power strain relief.

3. Identify **L** and **N** terminals and grounding terminal (**PE**), illustrated in **Figure 20,** then connect incoming hot wires and ground wire to those terminals**.**

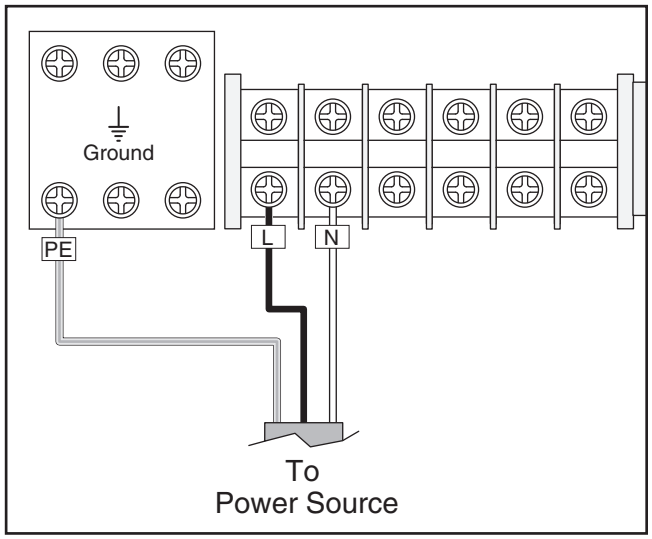


Figure 20. Incoming power wires connected inside electrical cabinet.

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

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

5. Test strain relief to ensure it is properly tightened by pulling cord from outside box with light-to-moderate force. When strain relief is properly tightened, cord will not move inside cabinet.

6. Install NEMA 6-15 plug on other end of power cord per plug manufacturer's instructions.

7. Re-install main electrical box cover.

NOTICE

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

8. Plug cord into matching power supply receptacle and power source as specified in **Circuit Requirements for 220V** on **Page 13**.

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, and 2) the emergency stop button safety feature, jog button, and work lamp all work correctly.

⚠WARNING

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

⚠WARNING

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

To test run your machine:

1. Make sure that chuck and jaws, if installed, are secure (refer to **Chuck Installation** on **Page 30**).

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

2. Make sure spindle lever is in OFF (center) position (see **Figure 21**).

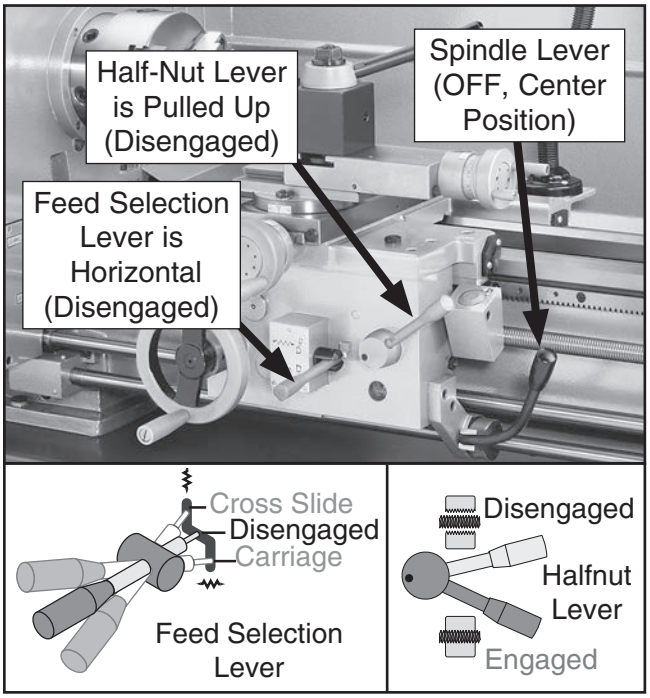


Figure 21. Disengaging carriage components.

3. To ensure carriage components do not unexpectedly move during following steps, disengage half nut lever and apron feed selection lever (see **Figure 21**).

4. Rotate Emergency Stop/RESET button clockwise so it pops out. The power lamp on control panel should illuminate.

5. Select spindle speed of 70 RPM by moving spindle speed levers to **B** and **I** (see **Figure 22**).

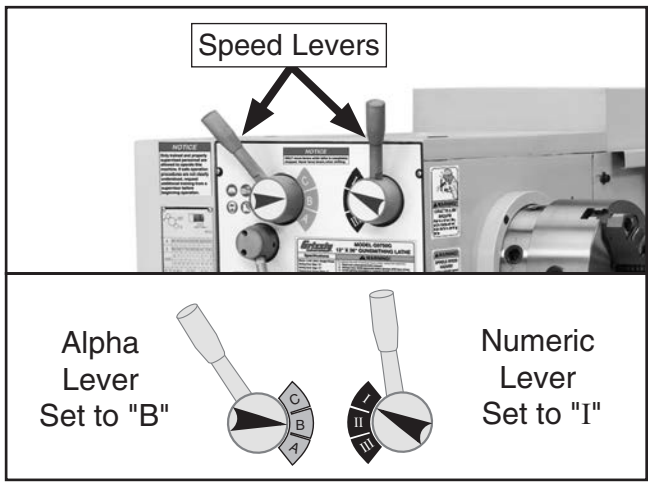


Figure 22. Spindle speed set to 70 RPM.

6. Push POWER START button, then move spindle lever (see **Figure 20**) down to start spindle forward rotation. The top of chuck should turn down and toward front of lathe.

   —When operating correctly, the machine will run smoothly with little or no vibration or rubbing noises.

   —Investigate and correct strange or unusual noises or vibrations before operating the machine further. Always disconnect the machine from power when investigating or correcting potential problems.

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

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

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

9. Press power button, then press and briefly hold the INCHING (jog) button (see **Figure 1** on **Page 4**), then release it. The spindle should rotate when the jog button is pressed and come to a complete stop when released.

10. Ensure work lamp functions properly.

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

Spindle Break-In

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

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

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

NOTICE

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

To perform the spindle break-in:

1. Successfully complete **Test Run** procedure beginning on **Page 25**.

2. Run spindle at 70 RPM for 10 minutes in each direction (first forward and then reverse).

3. Turn lathe ***OFF***. Move spindle speed levers to **C** and **1** for 200 RPM, and run lathe for 5 minutes in each direction.

4. Repeat **Step 3** for remaining spindle speeds, progressively increasing to highest speed.

5. Press Emergency Stop/RESET button to turn lathe ***OFF***.

Congratulations! The spindle break-in is complete. We recommend changing the headstock and gearbox oil before operating the machine further (refer to **Lubrication** on **Page 60**).

Recommended Adjustments

The following adjustments have been made at the factory. However, because of the many variables involved with shipping, we recommend that you at least verify the following adjustments to ensure the best possible results from the lathe.

Step-by-step instructions for these adjustments can be found on the pages referenced below.

Factory adjustments that should be verified:

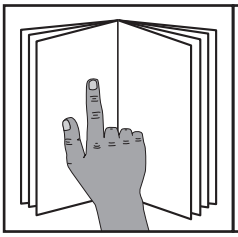
- Tailstock alignment (see **Page 37**).
- Backlash adjustment (see **Page 69**).
- Gib adjustments (see **Page 70**).

SECTION 4: OPERATIONS

Operation Overview

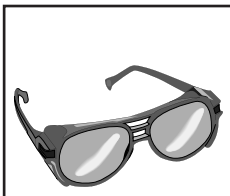
The purpose of this overview is to provide the novice machine operator with a basic understanding of how the machine is used during operation, so the machine controls/components discussed later in this manual are easier to understand.

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 the risk of eye injury from flying chips always wear safety glasses when operating lathe.

NOTICE

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

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

1. Puts on safety glasses, rolls up sleeves, removes jewelry, and secures any clothing, jewelry, 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 a safe startup clearance.
4. Removes all setup tools from lathe.
5. Checks for safe clearances by rotating workpiece by hand at least one full revolution.
6. Moves slides to where they will be used during operation.
7. Sets correct spindle speed for operation.
8. If using power feed, selects proper feed rate for the operation.
9. Resets Emergency Stop/RESET button, then starts spindle rotation.
10. Uses carriage handwheels or power feed options to move tooling into workpiece for operations.
11. When finished cutting, moves spindle lever to OFF position, waits for spindle to completely stop, then removes workpiece.

Chuck & Faceplate Mounting

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

⚠WARNING

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

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

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

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

⚠WARNING

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

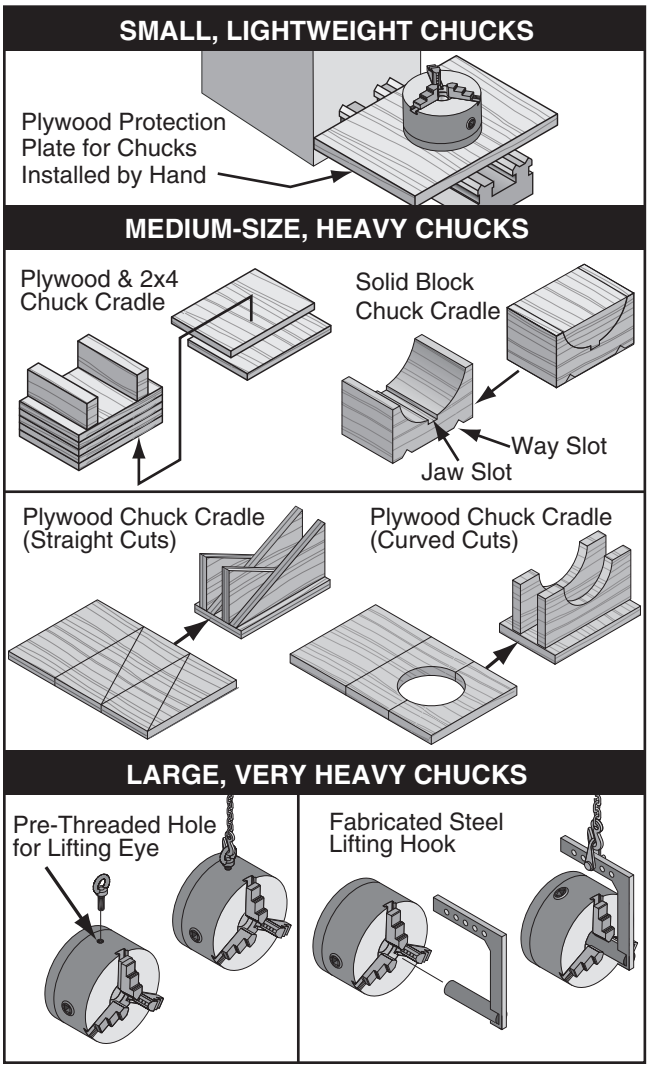


Figure 23. Examples of common devices used during chuck installation and removal.

Chuck Installation

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

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

To install chuck:

1. DISCONNECT MACHINE FROM POWER!

2. Use appropriate lifting, support, or protective device to protect ways and support chuck during installation process (refer to **Chuck Safety & Support Devices**).

3. Clean and lightly oil camlock studs, then thoroughly clean mating surfaces of spindle and chuck.

4. Install chuck by inserting camlock studs straight into spindle cam holes.

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

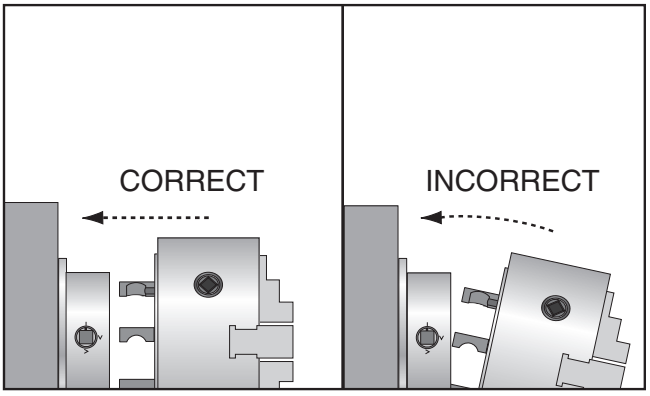


Figure 24. Inserting camlock studs into spindle cam holes.

5. Incrementally tighten camlocks in criss-cross or star pattern to ensure that chuck seats evenly against spindle.

6. When chuck is fully seated and all camlocks are tight, verify that cam line is between the two "V" marks on spindle nose, as shown in following figure.

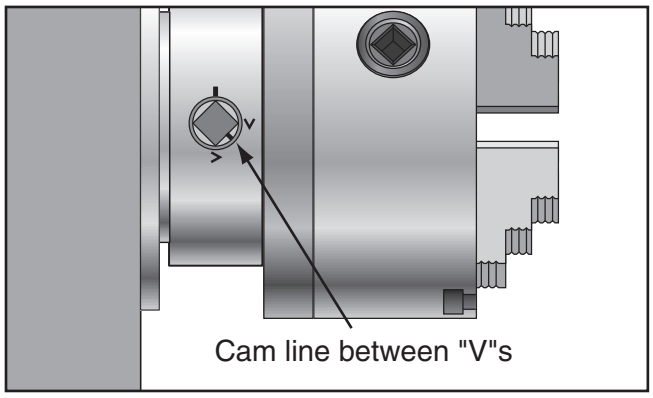


Figure 25. Cam line positioned between the "V" marks after the camlocks are fully tightened.

— If cam line is NOT between "V" marks when camlock is tight, stud may be installed at incorrect height. To fix this, adjust stud height as shown in following figure. Make sure to re-install stud cap screw afterward.

— If adjusting stud height does not correct problem, try swapping stud positions on chuck.

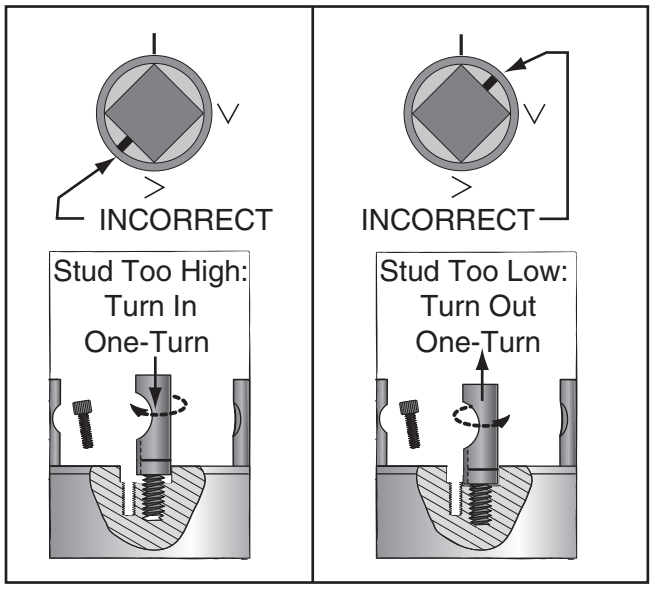


Figure 26. Correcting an improperly installed stud.

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

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

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

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

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

   — If tapers released easily with little intervention, they are not seated together firmly as required. Remove chuck, re-clean mating

Registration Marks

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

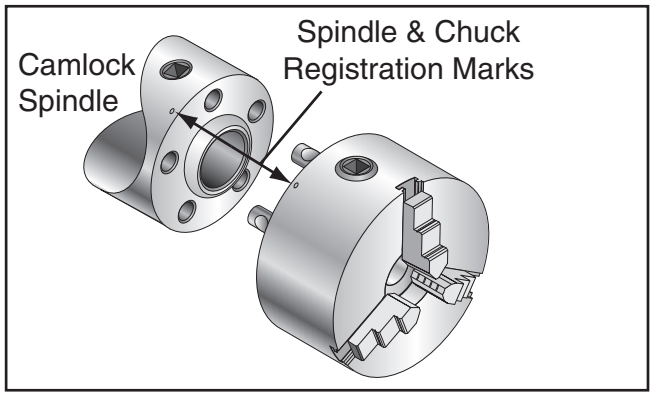


Figure 27. Registration mark locations.

Chuck Removal

To remove chuck:

1. DISCONNECT MACHINE FROM POWER!

2. Use appropriate lifting, support, or protective device to protect ways and support chuck (refer to **Chuck Safety & Support Devices** section for more details).

3. Loosen camlocks by turning key counterclockwise until each cam line is aligned with its corresponding spindle mark, as shown below.

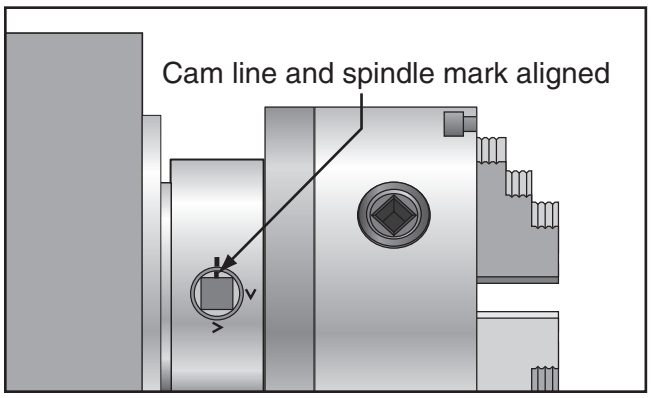


Figure 28. Camlock is fully loosened when the cam line is aligned with the spindle mark.

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

4. Using dead blow hammer or other soft mallet, lightly tap around outer circumference of chuck body to loosen it from spindle.

5. Remove chuck from spindle, using light rocking motion to carefully slide studs out of cam holes.

   — If chuck does not immediately come off, rotate it approximately 60° and tap it again. Make sure all marks on cams and spindle are properly aligned for removal.

Scroll Chuck Clamping

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

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

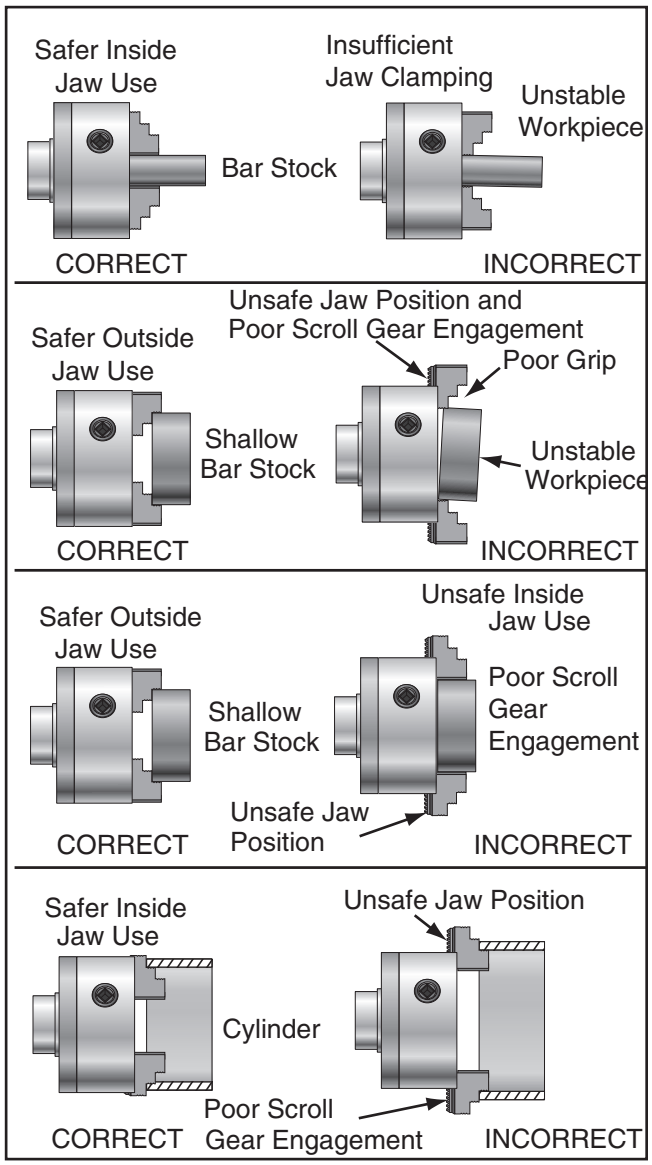


Figure 29. Jaw selection and workpiece holding.

Chuck Jaw Reversal

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

To reverse 2-piece jaws:

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

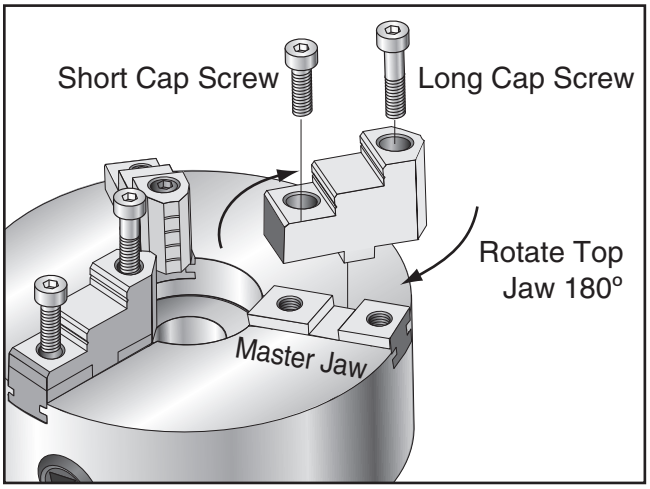


Figure 30. Reversing the chuck jaws.

4-Jaw Chuck

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

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

⚠WARNING

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

Mounting Workpiece

1. DISCONNECT MACHINE FROM POWER!

2. Use an appropriate device to protect ways (refer to **Chuck Safety & Support Devices** section for more details).

3. Use chuck key to open each jaw so workpiece will fit into spindle opening and lay flat against chuck face and jaw steps.

4. With help from another person or a holding device, position workpiece so it is centered in chuck.

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

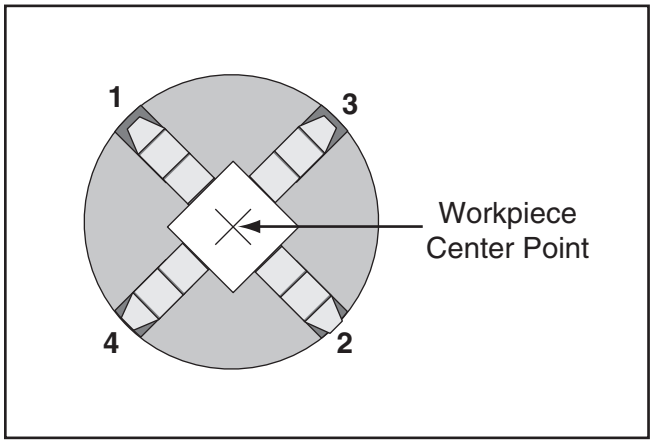


Figure 31. 4-jaw tightening sequence.

6. After workpiece is secured by jaws, use dial indicator to make sure workpiece is centered in chuck.

   — If workpiece is not correctly centered, make fine adjustments by slightly loosening one jaw and tightening opposing jaw until workpiece is correctly positioned (see below for an example).

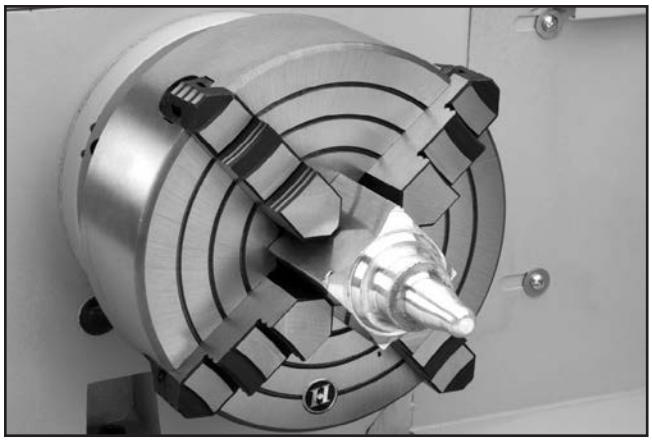


Figure 32. Generic picture of non-cylindrical workpiece correctly mounted on the 4-jaw chuck.

Faceplate

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

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

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

⚠WARNING

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

⚠WARNING

Failure to properly secure 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.

To mount a non-concentric workpiece to a faceplate:

1. DISCONNECT MACHINE FROM POWER!

2. Position appropriate device across bed ways to protect them from any potential damage from workpiece contact during installation.

3. With help from another person or holding device to support workpiece, position it onto faceplate and clamp it in place with a minimum of three independent clamping devices (see below for an example).

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

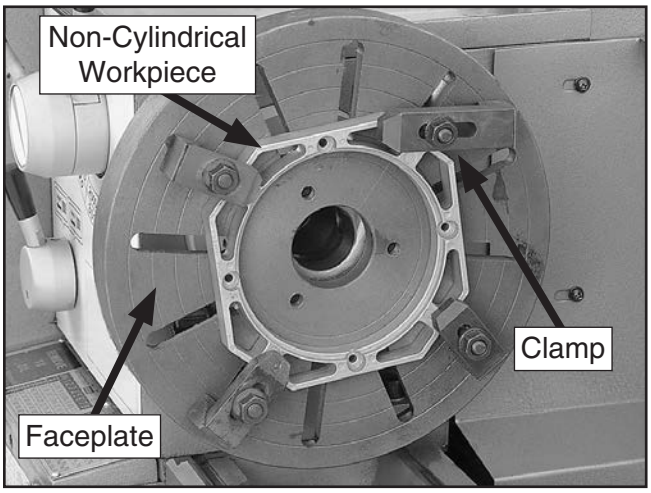


Figure 33. Generic picture of workpiece clamped in a faceplate.

Tailstock

The tailstock (see **Figure 34**) is typically used to support long workpieces by means of a live or dead center (refer to **Centers** on **Page 39** in the following section). It can also be used to hold a drill or chuck to bore holes in the center of a part. Custom arbors and tapers can also be cut on your lathe by using the offset tailstock adjustment.

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

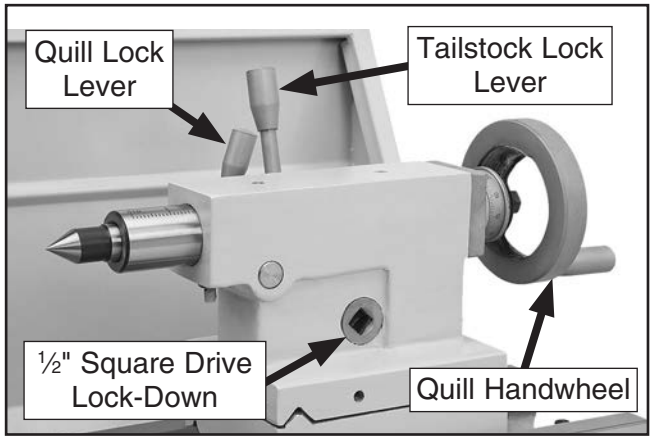


Figure 34. Tailstock and quill lock levers in locked position.

Quill Handwheel Graduated Dial
Increments ..... 0.001"
One Full Revolution ..... 0.100"

Increments on Quill
Inch .....0"–4" in 0.100" Increments

Positioning Tailstock

1. Rotate tailstock lock lever clockwise (facing machine) to unlock tailstock from bedways.

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

3. Rotate tailstock lock lever counterclockwise to lock tailstock against bedways.

Optional: To precisely secure the tailstock, mount a ½" drive torque wrench in the square drive shown in **Figure 34**, then tighten the tailstock to 40 lbs/ft of torque. The center point will be drawn down as much as 0.006". Do not exceed the max torque or damage to ways and tailstock will occur.

Using Quill

1. Rotate quill lock lever counterclockwise to loosen quill.

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

3. Rotate quill lock lever clockwise to secure quill.

Installing Tooling

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

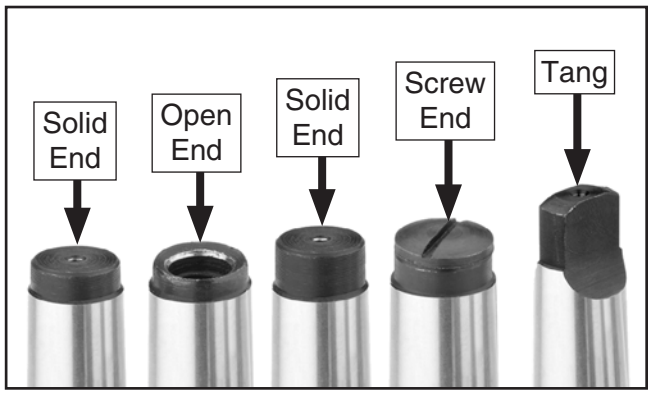


Figure 35. Types of tapered arbors and tooling.

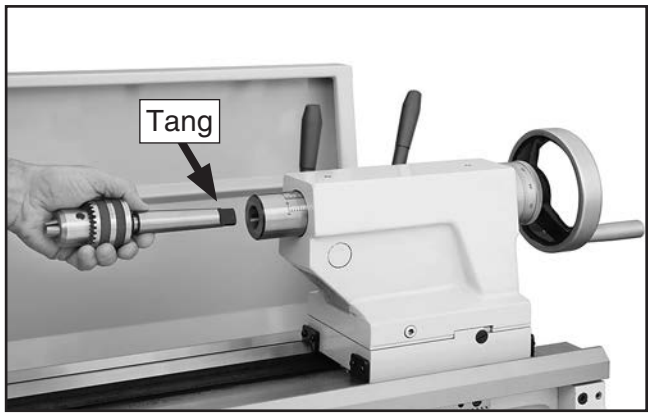


Figure 36. Example photo of inserting tool with tang into tailstock.

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

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

To install and use tooling in tailstock:

1. With tailstock locked in place, unlock quill, then use handwheel to extend it approximately 1".

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

   Note: *If tapered tool shaft has a tang, align it with slot in back of quill before seating it.*

3. With a firm and quick motion, insert tool into quill. Check to see if it is firmly seated by attempting to twist it—a firmly seated tool will not twist.

4. Unlock tailstock and move it until tip of tool is close to, but not touching workpiece, then relock tailstock.

5. Start spindle rotation, unlock quill lock lever, then turn quill handwheel clockwise to feed tool into workpiece.

Removing Tooling

1. Use shop rag to hold tool.

2. Rotate quill handwheel counterclockwise until tool is forced out of quill.

   — If tool does not come loose by retracting quill, extend quill and use drift key in slot shown in **Figure** below to remove tool.

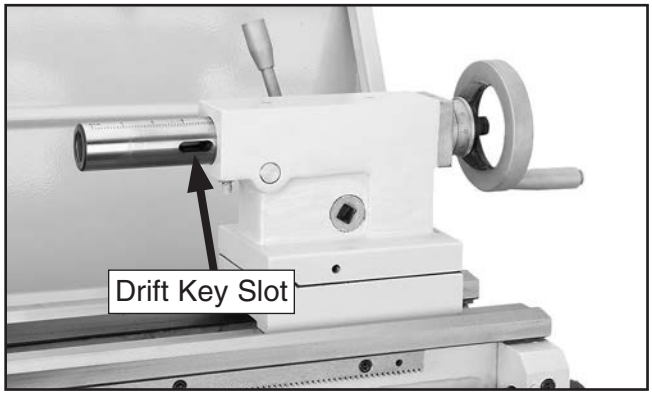


Figure 37. Drift key slot in the side of the quill.

Offsetting Tailstock

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

Tools Needed	Qty
Hex Wrench 4mm	1

To offset the tailstock:

1. Rotate the adjustment set screws (shown in **Figure 38**) in the opposite directions for the desired offset.

   Note: *The marks on the offset indicator (see **Figure 38**) are arbitrary. For a precise offset, use a dial indicator to check quill movement while adjusting the screws.*

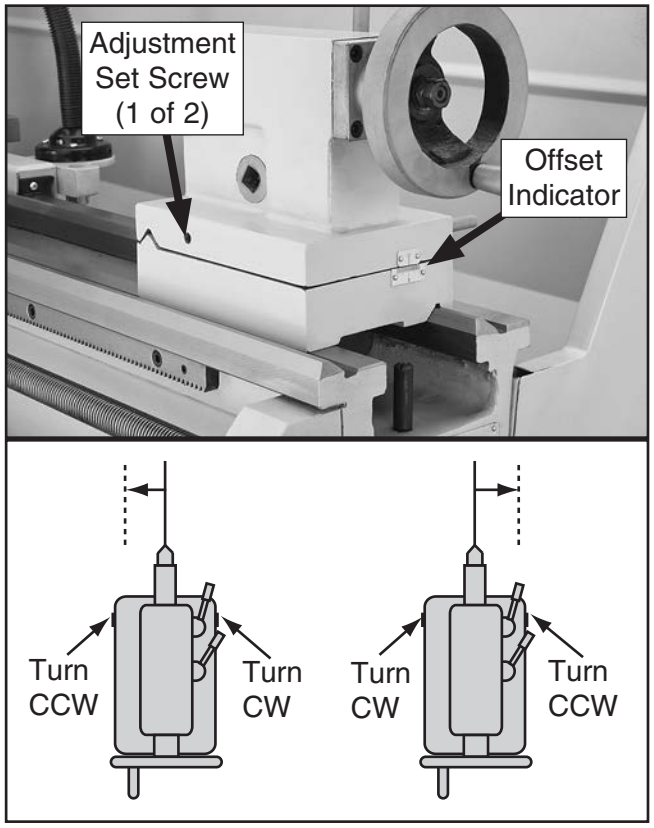


Figure 38. Set screw adjustment in relation to tailstock movement.

Aligning Tailstock to Spindle Centerline

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

Items Needed	Qty
Hex Wrench 4mm	1
Round Stock 2" x 6"	2
Precision Level	1

To align tailstock to spindle centerline:

1. Use precision level to make sure bedway is level from side to side and from front to back.

   — If bedway is not level, correct this condition before continuing with this procedure (refer to **Leveling** section in this manual).

2. Center drill both ends of a piece of round stock, then set it aside for use in **Step 5**.

3. Use another piece of round stock to make a dead center. Turn it to a 60° point, as illustrated below.

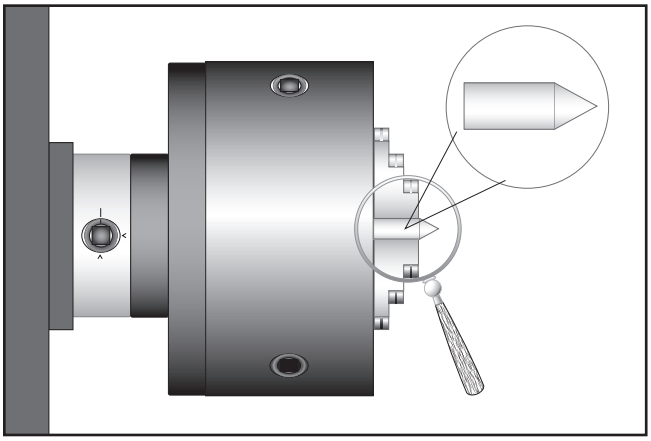


Figure 39. Turning a dead center.

4. Install center in tailstock.

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

Figure 40. Example photo of stock mounted between the centers.

6. Turn 0.010" off stock diameter.

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

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

8. Use calipers to measure both ends of workpiece.

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

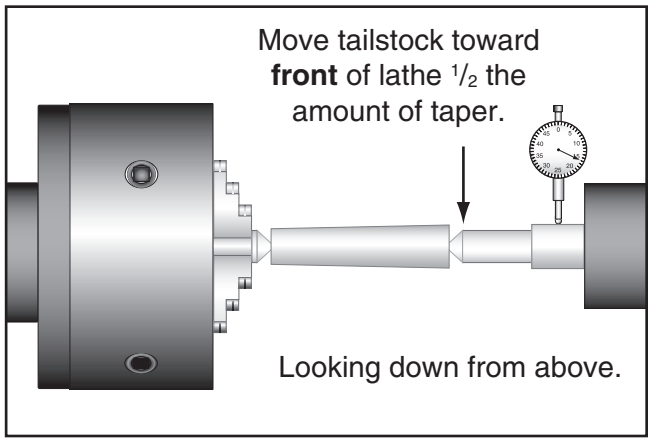


Figure 41. Adjust tailstock toward the operator.

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

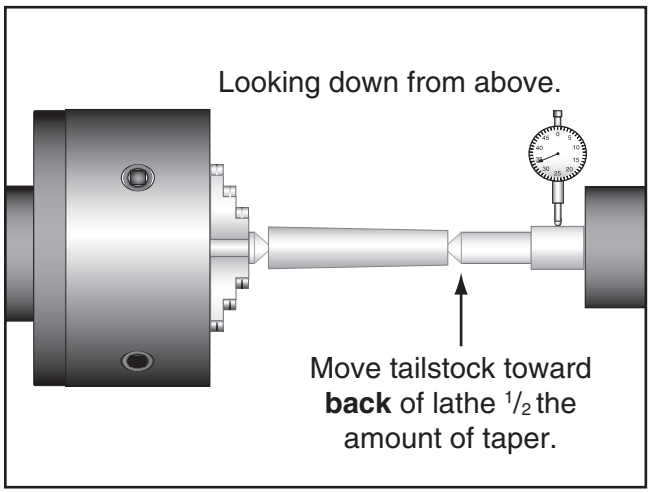


Figure 42. Adjust tailstock away from the operator.

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

Centers

Figure 43 shows the MT#3 dead centers and live center included with the lathe. In addition, an MT#5–MT#3 tapered spindle sleeve is included for mounting in the spindle.

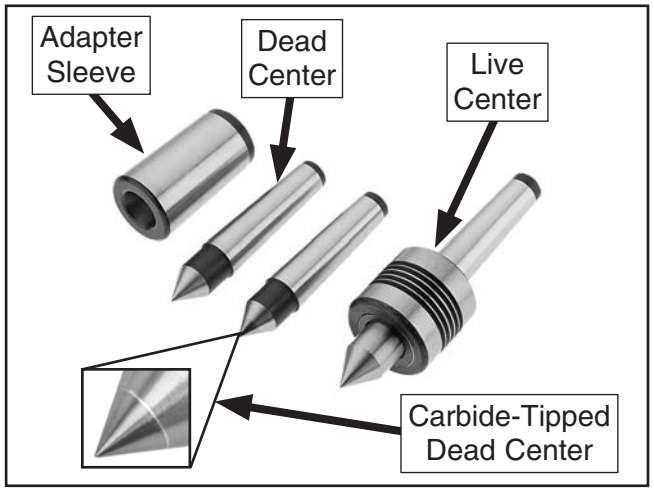


Figure 43. Adapter sleeve and centers.

Dead Centers

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

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

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

Live Centers

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

Mounting Dead Center in Spindle

1. DISCONNECT LATHE FROM POWER!

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

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

3. Mount faceplate onto spindle.

4. Insert center into sleeve, then insert sleeve into spindle bore through faceplate.

   Figure 44 shows an example photo of a dead center installed in spindle, using a lathe dog and faceplate for turning between centers.

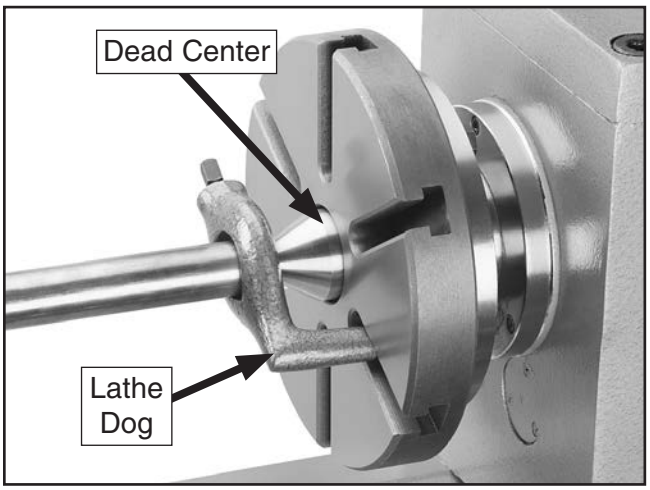


Figure 44. Example photo of using a dead center with a faceplate and lathe dog.

Removing Center from Spindle

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

Mounting Center in Tailstock

Either a carbide-tipped dead center or live center can be used in the tailstock. Mounting instructions are the same for both. **Figure 45** shows an example of a dead center mounted in a tailstock.

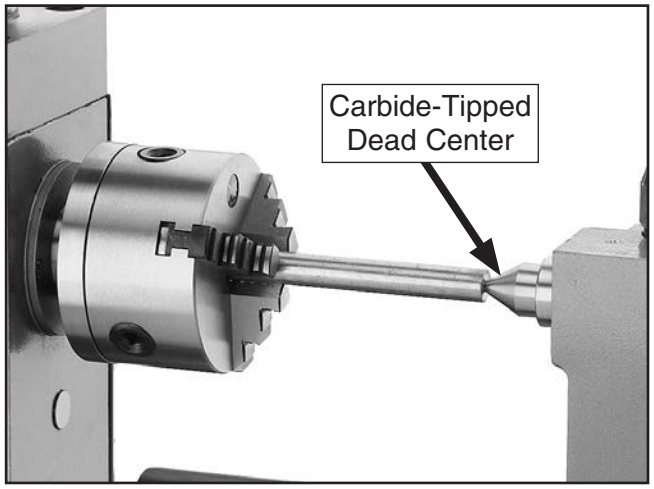


Figure 45. Example photo of using a carbide-tipped dead center installed in the tailstock.

NOTICE

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

To mount a center in the tailstock:

1. DISCONNECT LATHE 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".

   Note: *The maximum quill travel is 4", but we do not recommend extending the quill more than 2" or stability and accuracy will be reduced.*

4. Insert center into tailstock quill.

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

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

Removing Center from Tailstock

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

If the center does not come loose by retracting the quill, extend the quill to expose the slot shown in **Figure 46**, then use a drift key to remove the center.

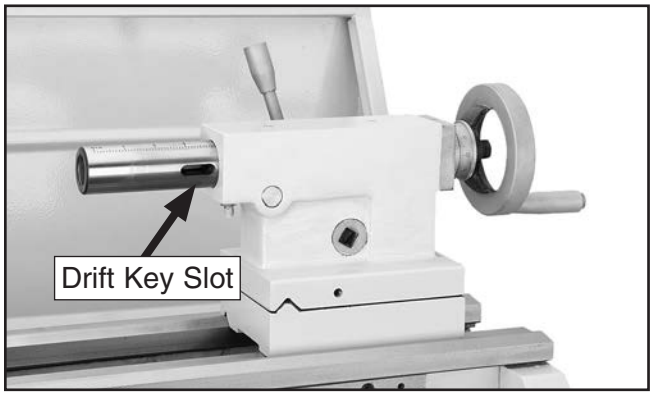


Figure 46. Drift key slot in the side of the quill.

Mounting Workpiece Between Centers

1. DISCONNECT LATHE FROM POWER!

2. Drill center holes in both ends of the workpiece.

3. Install dead center in spindle with a lathe dog and a chuck or faceplate, then install a live center or carbide-tipped dead center in tailstock.

4. Lubricate workpiece center holes, then mount it 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 the example in **Figure 47**).

Figure 47. Example photo of a workpiece mounted between the centers.

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

Joining Drill Chuck & Arbor

The drill chuck attaches to the tailstock quill with the included B16 to MT#3 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 1/16"–1/2". If you would like to use a different chuck in the future, we recommend obtaining a new arbor.

The procedure for mounting and removing the chuck and arbor from the tailstock quill is the same as for a center.

To join drill chuck and arbor:

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

2. Retract chuck jaws completely into chuck.

3. Insert small end of arbor into chuck.

4. Hold assembly by the arbor and tap chuck onto a block of wood with medium force, as illustrated in **Figure 48**.

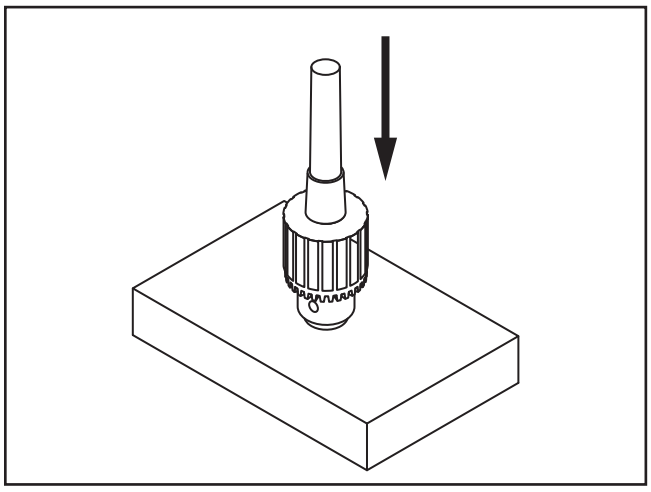


Figure 48. Tapping drill chuck/arbor on block of wood.

5. Attempt to separate drill chuck and arbor by hand—if they separate, repeat **Steps 3–4**.

Steady Rest

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

Familiarize yourself with the steady rest components shown in **Figure 49** to better understand the controls.

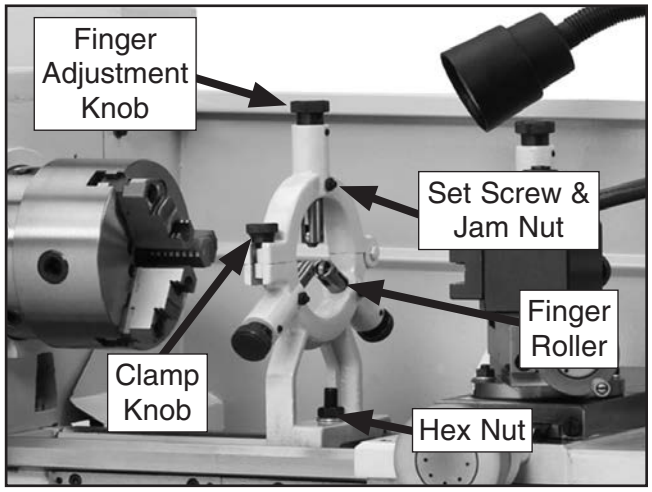


Figure 49. Steady rest components.

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

To install and use steady rest:

1. DISCONNECT LATHE FROM POWER!

2. Thoroughly clean all mating surfaces, then place steady rest base on bedways so triangular notch fits over bedway prism.

3. Position steady rest with base clamp where required to properly support workpiece, then tighten hex nut shown in **Figure 49** to secure it in place.

4. Loosen clamp knob that secures the two halves of steady rest and open top portion, as shown in **Figure 50**.

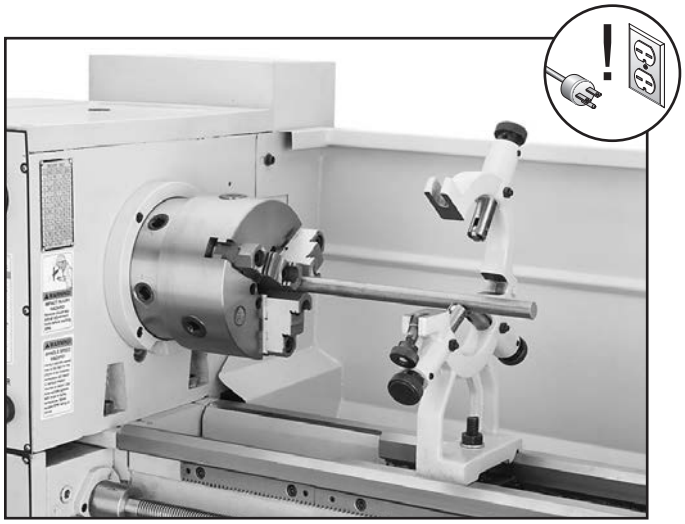


Figure 50. Workpiece mounted in the steady rest.

5. Loosen jam nuts and set screws so finger roller positions can be adjusted.

6. Use finger adjustment knobs to position bottom two finger rollers against workpiece.

7. Close steady rest, then use finger adjustment knobs to adjust all three finger rollers so that they just touch the workpiece without causing deflection.

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

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

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

Follow Rest

The follow rest mounts to the saddle with two cap screws (see **Figure 51**). It is used on long, slender parts to prevent workpiece deflection from the pressure of the cutting tool during operation. Adjust the follow rest fingers in the same manner as the those on the steady rest.

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

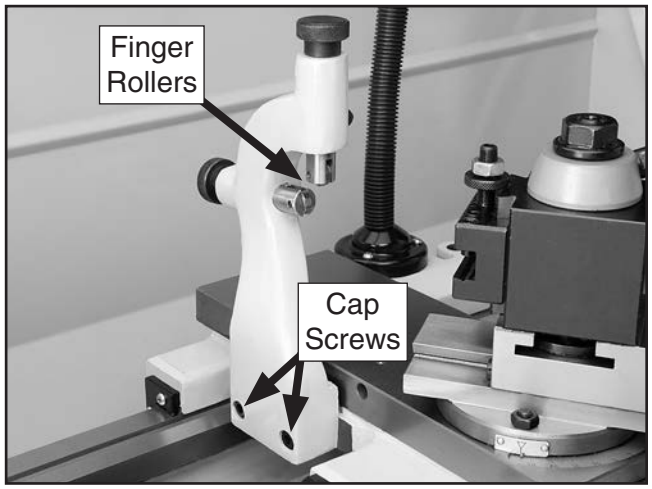


Figure 51. Follow rest attachment.

Carriage & Slide Locks

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

See **Figure 52** to identify the locations of the locks for each device.

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

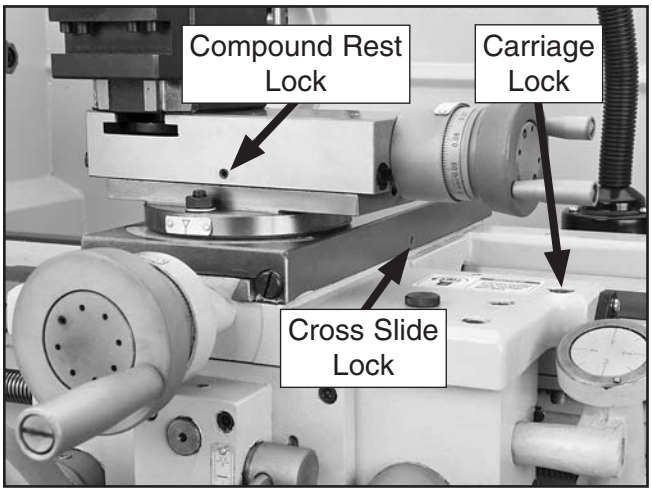


Figure 52. Location of compound rest lock.

Compound Rest

The compound rest is used to move the tool toward and away from the workpiece at the preset angle of the compound rest. The base of the compound rest has graduated scale used for setting the cutting tool to a specific angle.

Tool Needed	Qty
Wrench 14mm	1

To set compound rest at a certain angle:

1. Loosen two hex nuts at base of compound rest (see **Figure 53**).

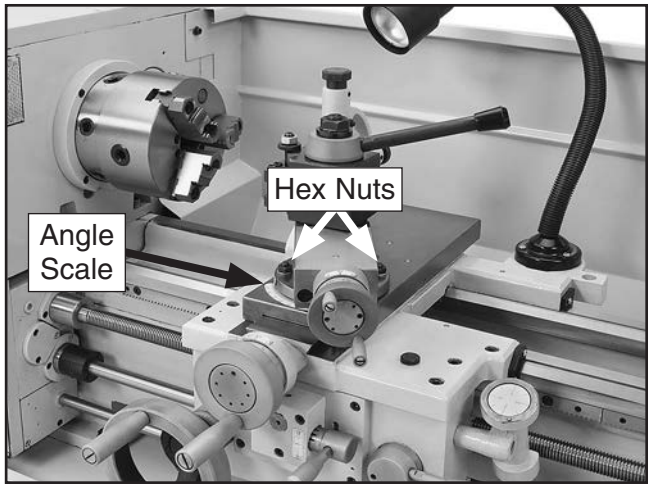


Figure 53. Compound rest.

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

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

Tool Post

The quick-change tool post (see **Figure 54**) is a 200-series design.

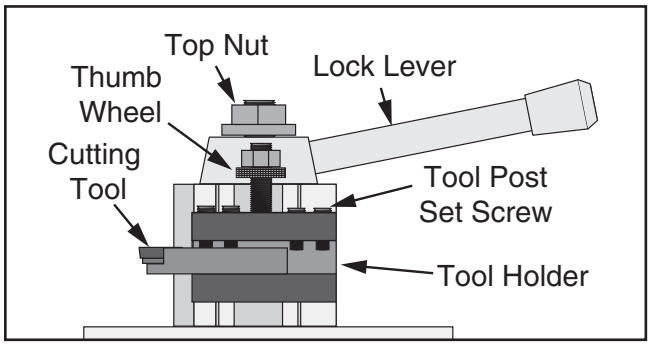


Figure 54. Example of tool mounted in tool post.

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

Installing Tool

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

To install tool in tool post:

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

⚠WARNING

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

2. Secure tool with at least two set screws.

3. Adjust cutting tool height to spindle centerline, as instructed in next subsection.

Aligning Cutting Tool with Spindle Centerline

For most operations, the cutting tool tip should be aligned vertically with the spindle centerline, as illustrated in **Figure 55**.

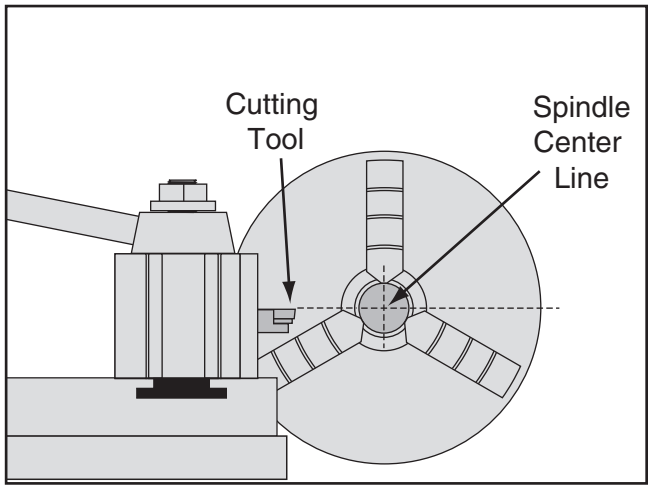


Figure 55. Cutting tool aligned with spindle centerline (viewed from tailstock).

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

Below are two common methods:

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

- Align the tip of the cutting tool with a tailstock center, as described in the following procedure. For this to work, the tailstock must be aligned to the spindle centerline (refer to **Aligning Tailstock To Spindle Centerline** on **Page 37** for detailed instructions).

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

To align cutting tool with tailstock center:

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

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

3. Lock tailstock and quill in place.

4. Adjust height of cutting tool tip to meet center tip, as shown in **Figure 56**.

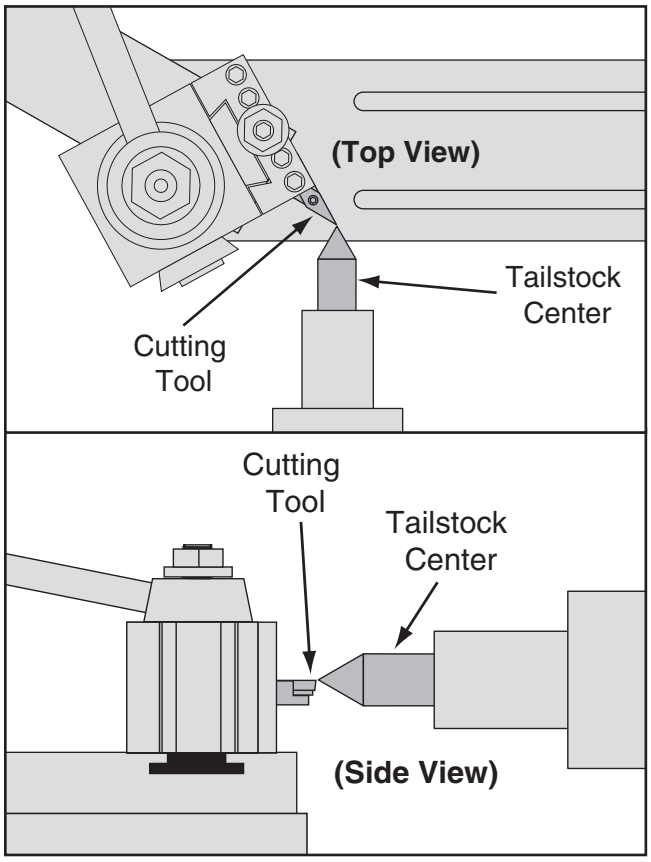


Figure 56. Cutting tool aligned to the tailstock center.

Spider

This lathe is equipped with a set of outboard spindle supports otherwise known as a "spider" (see **Figure 57**).

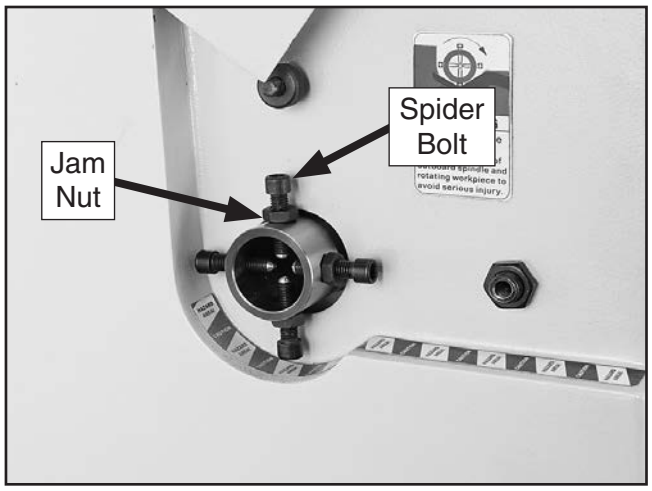


Figure 57. Spider components.

⚠CAUTION

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

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

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

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

Manual Feed

The handwheels shown in **Figure 58** allow the operator to manually move the cutting tool.

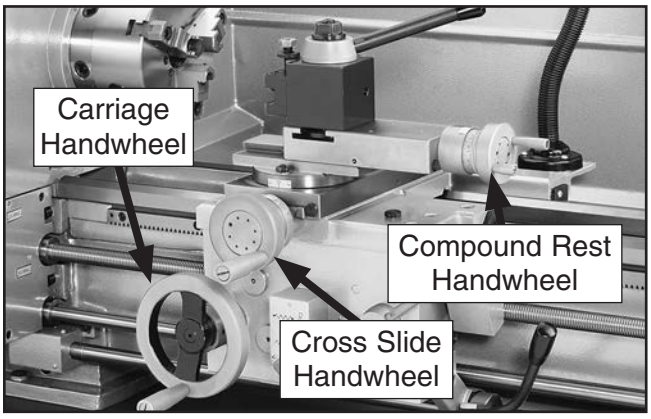


Figure 58. Carriage Controls.

Carriage Handwheel

The carriage handwheel moves the carriage left or right along the bed. It has a graduated dial with 0.01" increments. One full revolution moves the carriage 0.70".

Cross Slide Handwheel

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

Compound Rest Handwheel

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

Spindle Speed

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

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

Determining Spindle Speed

Many variables affect the optimum spindle speed to use for any given operation, but the two most important are the recommended cutting speed for the workpiece material and the diameter of the workpiece, as noted in the formula shown in **Figure 59**.

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

*Double if using carbide cutting tool

Figure 59. Spindle speed formula for lathes.

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

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

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

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

Setting Spindle Speed

The alpha and numeric spindle speed levers, shown in **Figure 60**, are used to select one of the nine spindle speeds.

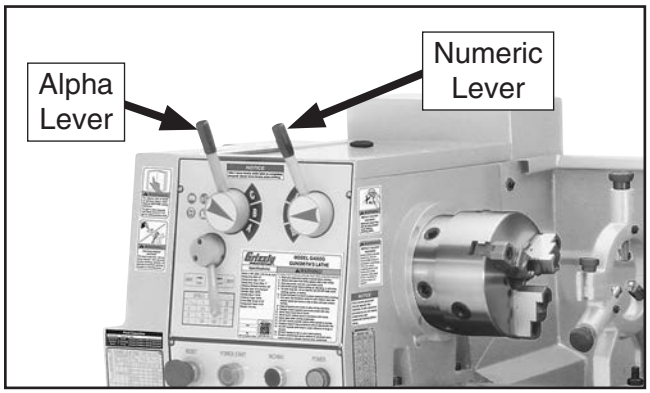


Figure 60. Spindle speed levers.

The spindle speed levers control the gear configuration in the headstock to produce the selected spindle speed.

NOTICE

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

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

Spindle Speed RPM

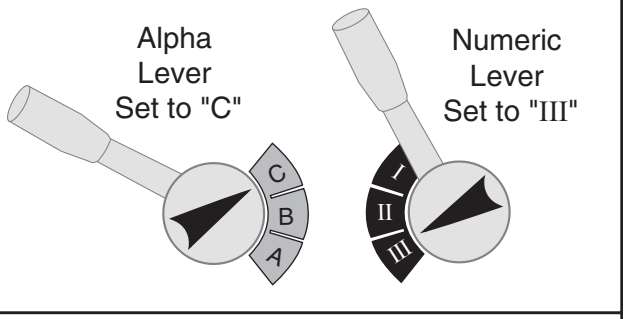
	I	II	III
A	270	1400	800
B	70	360	220
C	200	1000	600

Figure 61. Spindle speed chart.

Configuration Example

Figure 62 shows the levers positioned for a spindle speed of 600 RPM.

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



Spindle Speed RPM

	I	II	III
A	270	1400	800
B	70	360	220
C	200	1000	600

Figure 62. Setting the spindle speed to 600 RPM.

Power Feed

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

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

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

The carriage can alternately be driven by the leadscrew for threading operations. However, this section only covers the use of the power feed option for the carriage and cross slide components for non-threading operations. To learn how to power the carriage for threading operations, refer to **Threading** on **Page 52**.

NOTICE

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

NOTICE

To avoid damaging the lathe, the spindle MUST be completely stopped BEFORE using the power feed controls to make changes.

Power Feed Controls

Use **Figures 63–64** and the following descriptions to understand the power feed controls.

Note: *Before using power feed, you may have to reconfigure the end gears, depending on how they are set up. Refer to* ***End Gears*** *on* ***Page 51*** *for detailed instructions.*

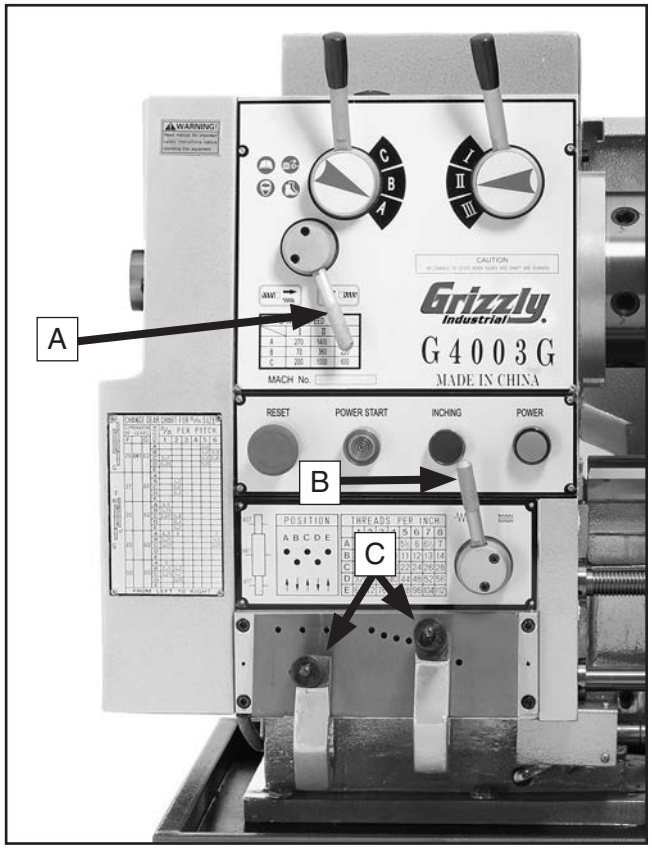


Figure 63. Headstock and quick-change gearbox controls for power feed.

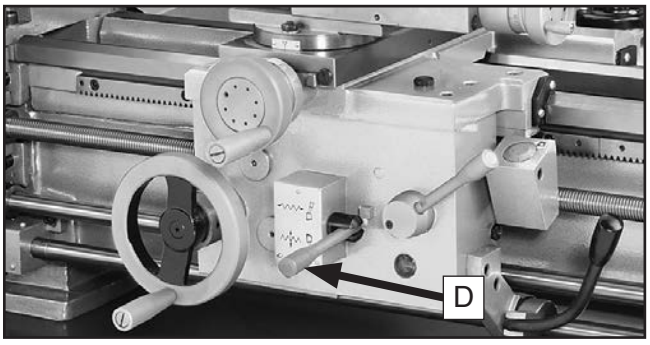


Figure 64. Apron feed selection lever.

A. Feed Direction Lever: Selects the direction of rotation for the leadscrew or feed rod. The center position is neutral and neither will rotate.

B. Headstock Feed Selection Lever: Selects the leadscrew or feed rod for powered rotation. The center position is neutral and neither will move.

C. Quick-Change Gearbox Levers: Selects the rate of power feed.

D. Apron Feed Selection Lever: Selects either the carriage or cross slide for power feed.

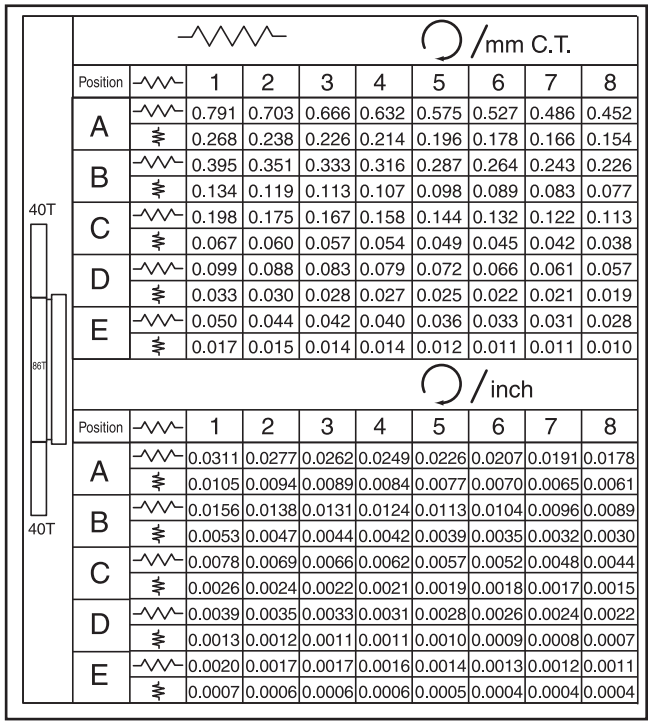
When the lever is down and the indent pin is pointing up, the cross slide is selected. Conversely, when the lever is up and the pin is pointing down, the carriage is selected.

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

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

Setting Power Feed Rate

The power feed rate chart in **Figure 65** (also located on end gear cover) displays the end gear and quick-change gearbox lever settings for available feed rates.



/mm C.T.

Position		1	2	3	4	5	6	7	8
A	∿	0.791	0.703	0.666	0.632	0.575	0.527	0.486	0.452
	≠	0.268	0.238	0.226	0.214	0.196	0.178	0.166	0.154
B	∿	0.395	0.351	0.333	0.316	0.287	0.264	0.243	0.226
	≠	0.134	0.119	0.113	0.107	0.098	0.089	0.083	0.077
C	∿	0.198	0.175	0.167	0.158	0.144	0.132	0.122	0.113
	≠	0.067	0.060	0.057	0.054	0.049	0.045	0.042	0.038
D	∿	0.099	0.088	0.083	0.079	0.072	0.066	0.061	0.057
	≠	0.033	0.030	0.028	0.027	0.025	0.022	0.021	0.019
E	∿	0.050	0.044	0.042	0.040	0.036	0.033	0.031	0.028
	≠	0.017	0.015	0.014	0.014	0.012	0.011	0.011	0.010

/inch

Position		1	2	3	4	5	6	7	8
A	∿	0.0311	0.0277	0.0262	0.0249	0.0226	0.0207	0.0191	0.0178
	≠	0.0105	0.0094	0.0089	0.0084	0.0077	0.0070	0.0065	0.0061
B	∿	0.0156	0.0138	0.0131	0.0124	0.0113	0.0104	0.0096	0.0089
	≠	0.0053	0.0047	0.0044	0.0042	0.0039	0.0035	0.0032	0.0030
C	∿	0.0078	0.0069	0.0066	0.0062	0.0057	0.0052	0.0048	0.0044
	≠	0.0026	0.0024	0.0022	0.0021	0.0019	0.0018	0.0017	0.0015
D	∿	0.0039	0.0035	0.0033	0.0031	0.0028	0.0026	0.0024	0.0022
	≠	0.0013	0.0012	0.0011	0.0011	0.0010	0.0009	0.0008	0.0007
E	∿	0.0020	0.0017	0.0017	0.0016	0.0014	0.0013	0.0012	0.0011
	≠	0.0007	0.0006	0.0006	0.0006	0.0005	0.0004	0.0004	0.0004

Figure 65. Feed rate chart.

∿ This symbol indicates longitudinal feed.
≠ This symbol indicates cross feed rates.

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

Setting Cross Slide Power Feed Rate of 0.0021 in./rev.

1. Make sure end gears are set up as displayed on left side of chart (refer to **End Gears** on **Page 51** for detailed instructions).

Note: *The top half of the chart displays feed rates in mm/rev., while the bottom half displays feed rates in in./rev.*

2. Locate box in chart that lists a feed rate of 0.0021" in./rev. for cross slide (see **Figure 66**).

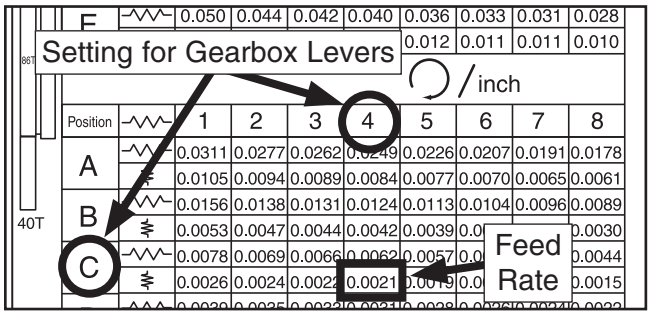


Figure 66. 0.0021 In./rev feed rate displayed in chart.

NOTICE

To prevent damage to gearbox components, NEVER move levers while lathe is running, and NEVER force any lever when shifting. If lever will not engage, rotate chuck by hand while keeping light pressure on lever. As chuck rotates it aligns gears and lever will engage.

3. Position lever pins in the gearbox holes indicated on chart.

—Pull knurled knob out which releases lever pin from hole.

—Lower lever below gearbox and slide it directly under desired hole.

—While pulling knurled knob out, raise lever so that pin is directly over hole, then release knob to seat pin (see **Figure 67** for an example).

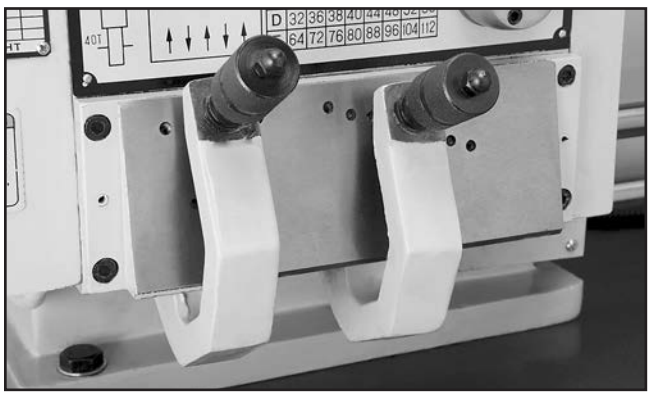


Figure 67. Example photo of gearbox lever pins seated in holes.

4. Move headstock feed selection lever to left—this selects feed rod rotation.

5. Use headstock feed direction lever to select direction of cross feed travel.

   When this lever is to right, cross slide will travel away from operator; conversely, when lever is to left, cross slide will travel toward operator.

6. Push apron feed selection lever toward spindle, then shift it down to select cross slide for power feed.

End Gears

The end gears must be correctly setup for power feed, inch, or metric threading operations. Use **Figure 68** to identify the upper **F** gear, middle 86T/91T change gears, and lower **G** gear, which are also referenced on the feed rate and threading charts.

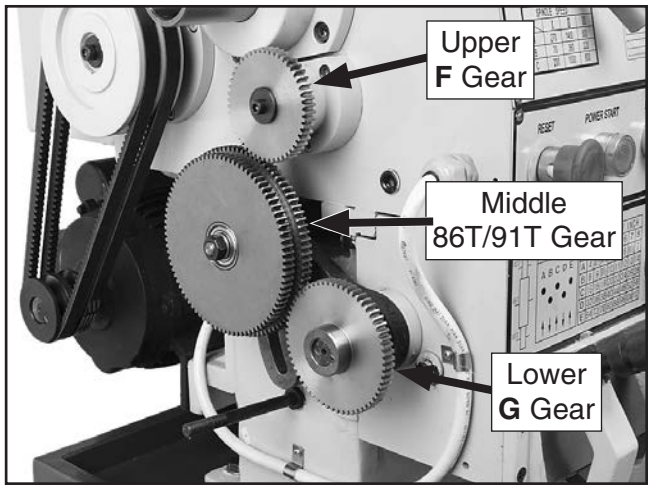


Figure 68. End gear identification.

Tools Needed	**Qty**
Hex Wrench 3mm	1
Hex Wrench 5mm	1
Wrench or Socket 17mm	1

To change end gears:

1. DISCONNECT MACHINE FROM POWER!

2. Remove end gear cover.

3. While holding middle 86T/91T gear assembly (see **FIgure 69**), loosen the support arm hex nut and slowly let assembly pivot down.

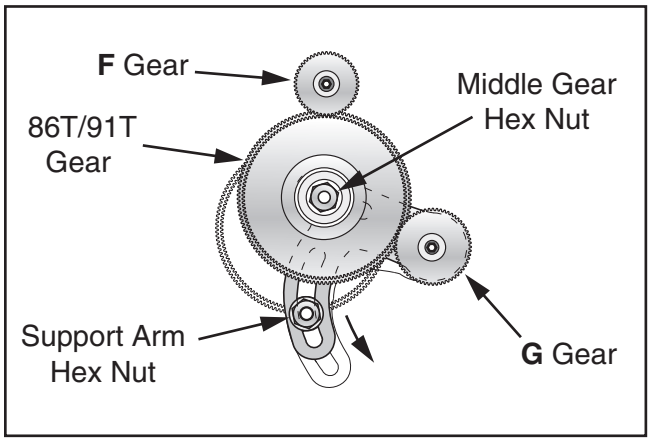


Figure 69. End gear components.

4. Remove middle gear, then **F** and **G** gears.

   Note: *Make sure the keys stay inserted in the shafts as you slide the **F** and **G** gears off.*

5. Replace **F** and **G** gears with correct gears for operation as directed by charts.

   Note: *The 40T and 60T gear used as the **G** gear have a stepped face that allows the gear to mesh with either the outside or inside teeth of the middle gear, depending upon the configuration needed.*

6. Secure **F** and **G** gears with fasteners, but do not overtighten. The fasteners merely keep them in place and overtightening may hinder rotation.

7. Slide middle gear against **G** gear until it meshes with a 0.002"–0.004" backlash, then tighten middle gear hex nut.

8. Pivot middle gear up against **F** gear until it meshes with same backlash, then tighten support arm hex nut.

9. Re-install end gear cover.

Threading

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

Headstock Threading Controls

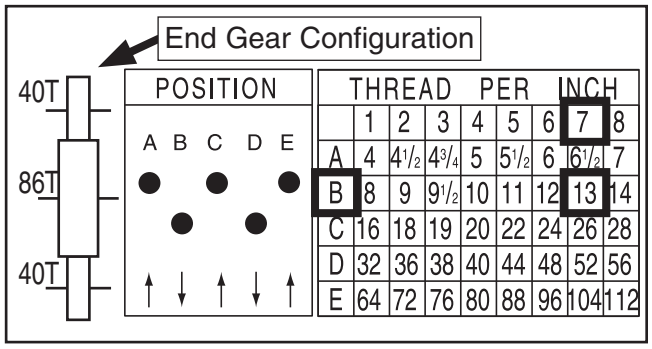
The threading charts on the headstock face display the settings for inch and metric threading.

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

To set up for a thread pitch of 13 TPI:

1. DISCONNECT MACHINE FROM POWER!

2. Install end gears as directed on inch thread chart (see **Figure 70** or the chart on gearbox).



THREAD PER INCH								
	1	2	3	4	5	6	7	8
A	4	4½	4¾	5	5½	6	6½	7
B	8	9	9½	10	11	12	13	14
C	16	18	19	20	22	24	26	28
D	32	36	38	40	44	48	52	56
E	64	72	76	80	88	96	104	112

Figure 70. End gear and gearbox lever configuration for 13 TPI.

3. Position gearbox lever pins in gearbox holes indicated on chart—**B** and **7**.

   —Pull knurled knob out which releases lever pin from hole.

   —Lower lever below gearbox and slide it directly under desired hole.

   —While pulling knurled knob out, raise lever so that pin is directly over hole, then release knob to seat pin.

4. Move headstock feed selection to left for leadscrew rotation.

Apron Threading Controls

The half nut lever engages the carriage with the leadscrew, which moves the carriage and cutting tool along the length of the workpiece for threading operations (see **Figure 71**).

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

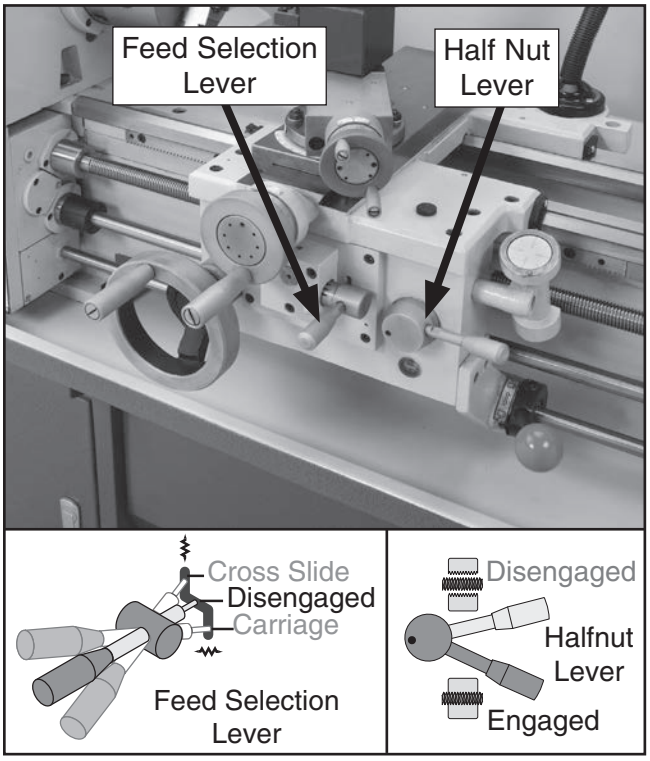


Figure 71. Apron threading controls.

Thread Dial

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

The numbers on the thread dial are used with the thread dial chart to show when to engage the half nut during inch threading. Loosen the cap screw on the thread dial (see **Figure 72**), pivot the gear teeth so they mesh with the leadscrew threads, then retighten the cap screw.

IMPORTANT: *The thread dial is not used for metric threading. You must leave the half nut engaged from the beginning until the threading is complete for metric threading.*

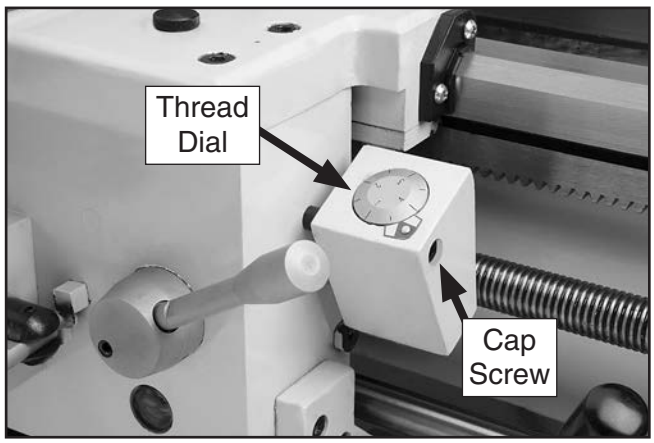


Figure 72. Thread dial engaged with the leadscrew.

NOTICE

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

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

Thread Dial Chart

The thread dial chart is located on the headstock, as shown in **Figure 73**.

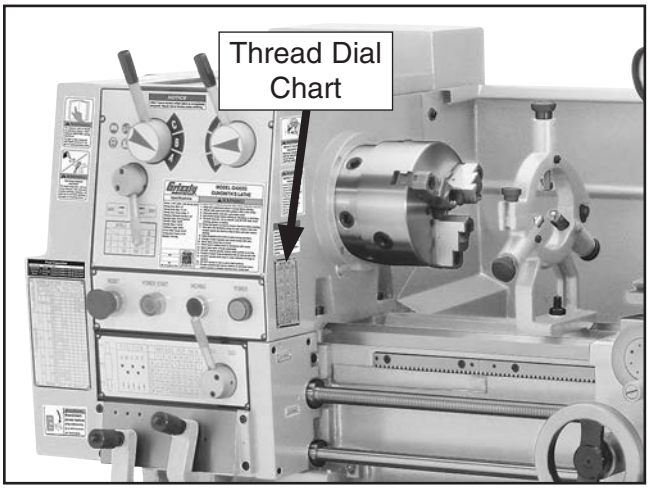


Figure 73. Location of thread dial chart.

Find the TPI (threads per inch) that you want to cut in the left columns (under **T.P.I.**), then reference the dial number in the right columns (under **Scale**). The dial numbers indicate when to engage the half nut for a specific thread pitch as indicated by the thread dial chart (see **Figure 74**).

INDICATOR TABLE

TPI	SCALE	TPI	SCALE	TPI	SCALE
4	1–8	13	1, 3	44	1–8
4.5	1	14	1-2-3-4	48	1–8
4.75	1	16	1–8	52	1–8
5	1, 3	18	1-2-3-4	56	1–8
5.5	1	19	1, 3	64	1–8
6	1-2-3-4	20	1–8	72	1–8
6.5	1	22	1-2-3-4	76	1–8
7	1, 3	24	1–8	80	1–8
8	1–8	26	1-2-3-4	88	1–8
9	1, 3	28	1–8	96	1–8
9.5	1	32	1–8	104	1–8
10	1-2-3-4	36	1–8	112	1–8
11	1, 3	38	1-2-3-4		
12	1–8	40	1–8		

Figure 74. Thread dial chart.

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

Even TPI: For threading an even number TPI, use any numbered line on the thread dial (see the example in **Figure 75**).

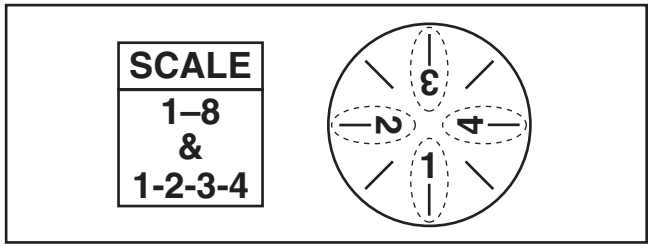


Figure 75. Any numbered line on dial for threading even TPI.

Note: *For TPI divisible by 4, this rule still applies. The Indicator Table on the lathe shows that lines 1–8 may be used, which means that lines 1–4 and any of the half marks may be used.*

Odd TPI: For threading an odd number TPI, use the **1** or **3** line on the thread dial (see the example in **Figure 76**).

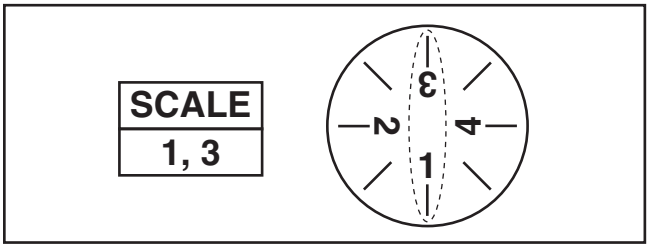


Figure 76. 1 or 3 line on dial for threading odd TPI.

IMPORTANT: *Once the **1** or **3** has been selected, continue using that same numbered line.*

Fractional TPI: For threading a fractional TPI with a half number (4.5, 5.5, 6.5, 9.5), only use the **1** line on the thread dial (see the example in **Figure 77**).

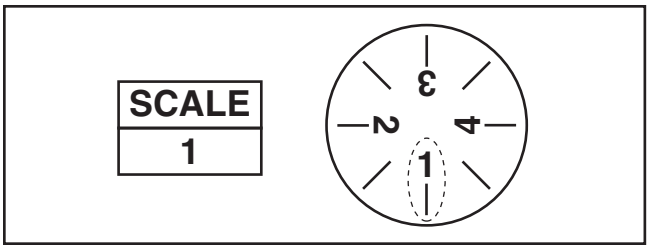


Figure 77. 1 line on dial for threading fractional TPI.

IMPORTANT: *For cutting 4.75 TPI, proceed as though cutting a metric thread and do not disengage the half nut until the threading operation is complete. Stop the spindle at the end of each cut, retract the cutting tool, and return the cutting tool to the start of the thread.*

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.

T26419—Syn-O-Gen Synthetic Grease
Formulated with 100% pure synthesized hydrocarbon basestocks that are compounded with special thickeners and additives to make Syn-O-Gen non-melt, tacky, and water resistant. Extremely low pour point, extremely high temperature oxidation, and thermal stability produce a grease that is unmatched in performance.

Figure 78. T26419 Syn-O-Gen Synthetic Grease.

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 79. High-pressure oil can for ball oilers.

T23962—ISO 68 Moly-D Way Oil, 5 gal.
T23963—ISO 32 Moly-D Machine Oil, 5 gal.
Moly-D oils are some of the best we've found for maintaining the critical components of machinery because they tend to resist run-off and maintain their lubricity under a variety of conditions—as well as reduce chatter or slip. Buy in bulk and save with 5-gallon quantities.

Figure 80. ISO 68 and ISO 32 machine oil.

Quick-Change Tool Holders
All models are Series 200
G5701—Boring Bar Holder ¾"
G5704—Parting Tool Holder ⅝"
G5705—Knurling Tool Holder ¼"–⅝"
G5703—Morse Taper Holder MT#3
G5700—Turning/Boring Holder ¼"~⅝"; ½"
G5699—Turning Holders ¼"~⅝"

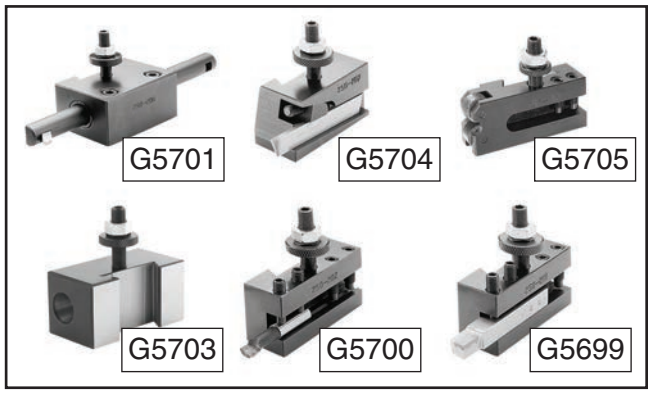


Figure 81. Quick-change tool holders.

H8314—Threading Tool Holder, Left-Hand
H8315—Threading Tool Holder, Right-Hand
For threading tough to machine materials. Made of high quality alloy steel, these holders offer maximum rigidity because of the "on edge" design of the cutter and double fastening system. Inserts not included. 20 x 20mm shank. Overall length: 4 15/16".

Figure 82. H8314 & H8315 Tool Holders.

T10295—7-Pc. Indexable Carbide Set 5/8"
This 7-piece turning tool set is ideal for just about any project. Supplied with right-hand and left-hand turning tool holders, the set is complimented with one threading and cut-off tool too. Indexable inserts ensure cutting surfaces stay sharp.

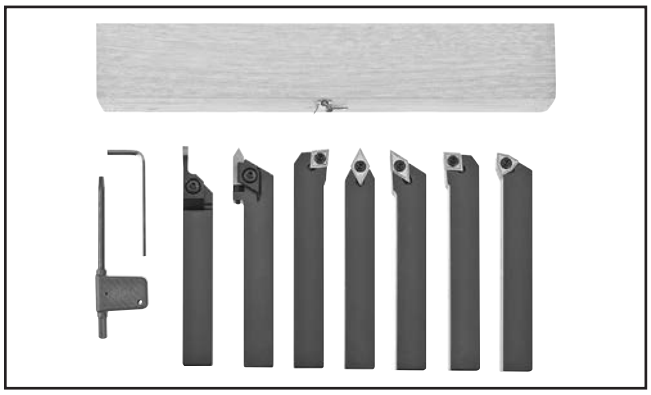


Figure 83. T10295 17-Pc. Indexable Carbide Tool Set.

T10439—4-Pc. Carbide Insert CCMT Boring Bar Set
These right-hand indexable solid steel Boring Bars use ¼" and ⅜", 80° diamond inserts and feature a negative 7° end and side cutting angle. Includes ⅜" x 6", ½" x 7", ⅝" x 8", and ¾" x 10" boring bars. Set comes with Torx® wrenches and fitted aluminum case with handle.

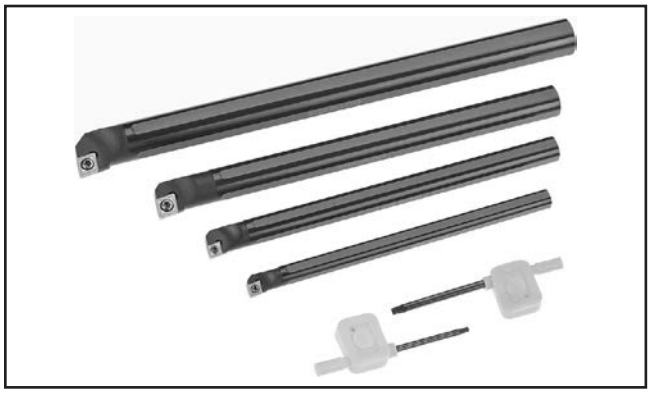


Figure 84. T10439 Carbide Insert CCMT Boring Bar Set.

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

Figure 85. G4985 Machine Shop Practice Book.

H5930—4-Pc. Center Drill Set 60°
H5931—4-Pc. Center Drill Set 82°
Double ended HSS Center Drills are precision ground. Each set includes sizes 1-4.

SIZE	BODY DIA.	DRILL DIA.	OVERALL LENGTH
1	1/8"	3/64"	1 1/4"
2	3/16"	5/64"	1 7/8"
3	1/4"	7/64"	2"
4	5/16"	1/8"	2 1/8"

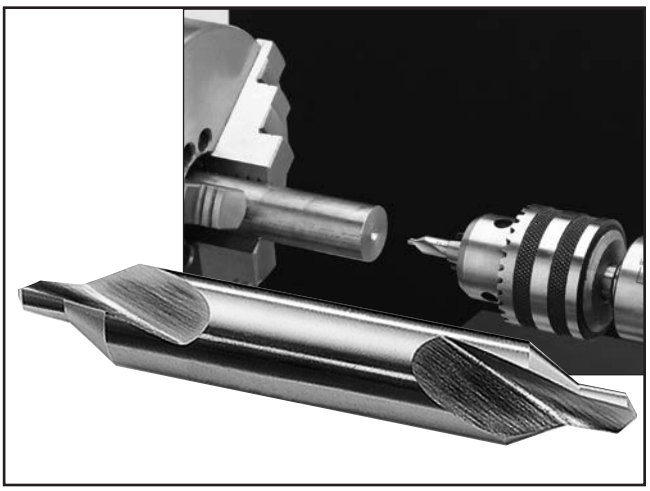


Figure 86. HSS Ground Center-Drill Sets.

SBCE3450—How to Run a Lathe
First printed in 1907, this 56th edition is an exact reprint from 1966. Well illustrated with vintage photos and drawings, this 128-page book is written specifically about the care and operation of a metal lathe. "This book is to aid the beginner or apprentice in the machine shop and the student in the school shop to secure a better understanding of the fundamental operations of modern lathe practice in use in modern industries in the United States." Also available in Spanish.

Figure 87. SBCE3450 How to Run a Lathe.

T10665—Adjustable Reamer Holder MT#3
This Pacific Tool and Gauge Adjustable Reamer Holder secures a barrel chambering reamer in the holder for free floating reamer movement. A knurled wheel adjustment controls the amount of tension, which also limits free-floating movement.

Figure 88. T10665 PTG Reamer Holder MT#3.

T10414—5-C Quick-Change Collet Chuck D1-5
This 5-C Quick Change Collet Chuck accepts all 5-C collets. Provides quick collet changes and concentricity of 0.0004". Fits D1-5 spindles.

G1238—15 pc. Precision 5-C Collet Set
Made from high grade collet steel and precision ground to exacting tolerances. Complete 15 pc. set. Includes: ⅛" thru 1" in 1/16" increments.

Figure 89. 5-C quick-change collet chuck and 15 pc. 5-C collet set.

T10556—Taper Attachment for Model G4003G
The Model T10556 Taper Attachment provides precision outside and inside tapers up to 12" without having to offset the tailstock or disengage the cross slide. This allows the taper attachment to be used at any time by simply tightening the bed clamp bracket. However, the taper attachment does not interfere with other turning operations. The T10556 features scales at both ends, reading inches-of-taper per foot and angle of taper. An adjustment knob with fine threads achieves precise control when setting tapers.

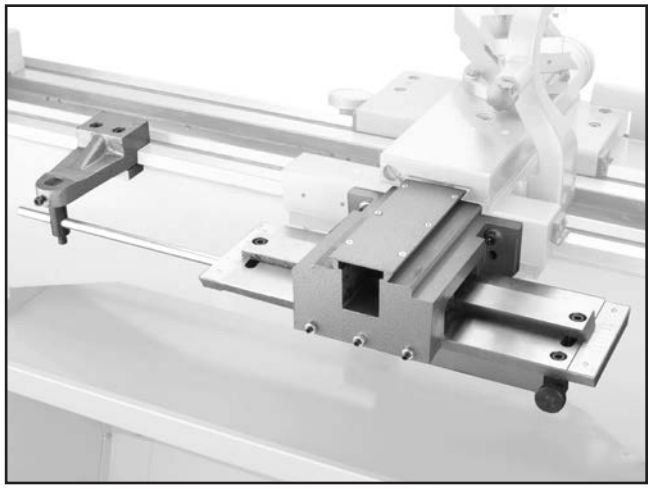


Figure 90. T10556 Taper Attachment.

H8396—Chambering a Championship Match Barrel DVD
This video will show you how to setup and maintain tight tolerances during the chambering process as well as some mistakes that can be avoided. This is a professional, high dollar production! Run time: 90 minutes. Until now, there has been no other chambering video that shows you so many techniques used by master gunsmiths!

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

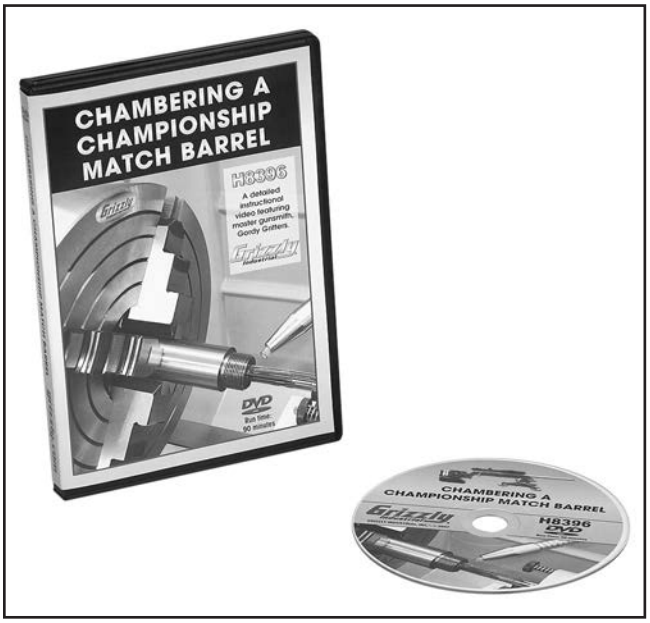
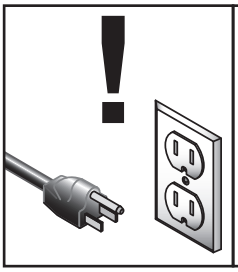


Figure 91. H8396 Chambering a Championship Match Barrel DVD.

SECTION 6: MAINTENANCE



⚠WARNING

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

Schedule

Ongoing

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

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

Daily, Before Operations

- Check/add headstock oil (**Page 60**).
- Add quick-change gearbox oil (**Page 623**).
- Check/add apron oil (**Page 62**).
- Lubricate the bedways (**Page 634**).
- Add oil to the ball oilers (**Page 63**).
- Clean/lubricate the leadscrew (**Page 62**).
- Check/retension V-belts (**Page 72**).
- Disengage the apron feed selection lever (to prevent crashes upon startup).
- Ensure carriage lock bolt is loose.

Daily, After Operations

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

Semi-Annually

- Change the headstock oil (**Page 61**).

Annually

- Change the apron oil (**Page 62**).
- Lubricate end gears (**Page 64**).
- Check/level bedway (**Page 22**).

Cleaning/Protecting

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

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

All unpainted and machined surfaces should be wiped down daily to keep them rust free and in top condition. This includes any surface that is vulnerable to rust if left unprotected (especially parts that are exposed to water-soluble cutting fluid). Use way oil to prevent corrosion (see **Page 60** for an offering from Grizzly).

Lubrication

Use the information in the charts below as a daily guide for lubrication tasks. We recommend using Grizzly Model T23962, T23963, or T23964 lubricants (see **Pages 55** and **60**) for most of the lubrication tasks.

Lubrication Frequency

Lubrication Task	Frequency	Page Ref.
Headstock	Daily	**60**
Quick-Change Gearbox	Daily	**61**
Apron	Daily	**62**
Bedways	Daily	**62**
Longitudinal Leadscrew	Daily	**62**
Ball Oilers	Daily	**63**
End Gears	Annually	**64**

Lubrication Amount & Type

Lubrication Task	Oil Type	Amount
Headstock	ISO 32 (T23963)	**3.5 Qts.**
Quick-Change Gearbox	ISO 68 (T23962)	**2 Pumps Per Port**
Apron	ISO 68 (T23962)	**0.5 Qt.**
Bedways	ISO 68 (T23962)	**As Needed**
Longitudinal Leadscrew	ISO 68 (T23962)	**As Needed**
Ball Oilers	ISO 32 (T23963)	**1–2 Squirts**
End Gears	NLGI #2	**Dab**

NOTICE

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

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

Headstock

Oil Type .... Grizzly T23963 or ISO 32 Equivalent
Oil Amount..... 3.5 Quarts
Check/Add Frequency..... Daily
Change Frequency..... Semi-Annually

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

Checking Oil Level

The headstock reservoir has the proper amount of oil when the oil level in the sight glass is approximately halfway. The oil sight glass is located below the chuck, as shown in **Figure 92**.

Figure 92. Location of headstock oil sight glass.

Adding Oil

The oil fill plug is located on top of the headstock, as shown in **Figure 93**.

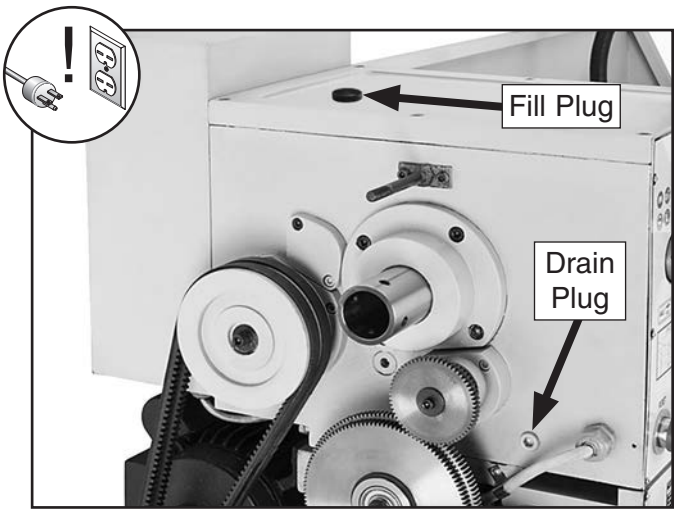


Figure 93. Locations of headstock fill and drain plugs.

To change headstock oil:

1. DISCONNECT MACHINE FROM POWER!
2. Remove end gear cover.
3. Remove V-belts so that oil does not get on them, necessitating their replacement (refer to the **V-Belt Tension & Replacement** on **Page 72** for detailed instructions).
4. Remove fill plug to allow oil to drain more freely.
5. Place a funnel and a 2-gallon catch pan under drain plug, then use 8mm hex wrench to remove drain plug.
6. When headstock reservoir is empty, replace drain plug and clean away any spilled oil.
7. Fill headstock reservoir until oil level is approximately halfway in sight glass, then replace fill plug.
8. Replace and retension V-belts, then secure end-gear cover before reconnecting lathe to power.

Quick-Change Gearbox

Oil Type .... Grizzly T23962 or ISO 68 Equivalent
Oil Amount.....2 Pumps Each Port
Check/Add Frequency..... Daily

The quick-change gearbox uses a drip-type lubrication through two ports on the right side of the gearbox (see **Figure 94**).

Figure 94. Locations of gearbox oil ports.

Use a pump-type oil can to add two pumps to each oil port, then wipe away any spilled oil.

Apron

Oil Type .... Grizzly T23962 or ISO 68 Equivalent
Oil Amount..... 0.5 Quarts
Check/Add Frequency..... Daily
Change Frequency..... Annually

Checking Oil Level

The apron oil sight glass is on the front of the apron, as shown in **Figure 95**. Maintain the oil volume so that the level is approximately halfway in the sight glass.

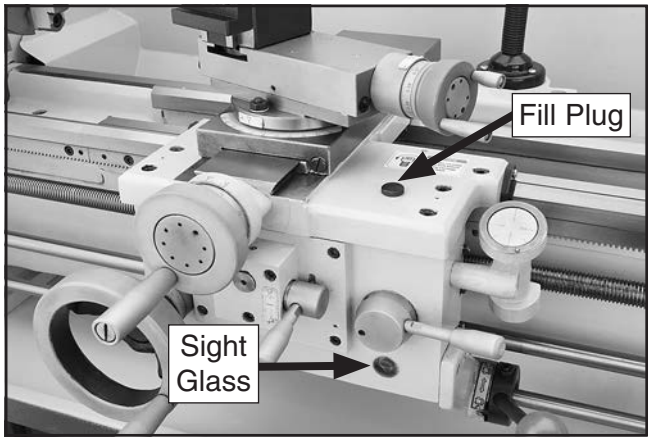


Figure 95. Location of apron oil sight glass.

Changing Oil & Flushing Reservoir

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

Place a catch pan under the apron drain plug shown in **Figure 96**, remove the fill plug, then use a 6mm hex wrench to remove the drain plug and empty the reservoir.

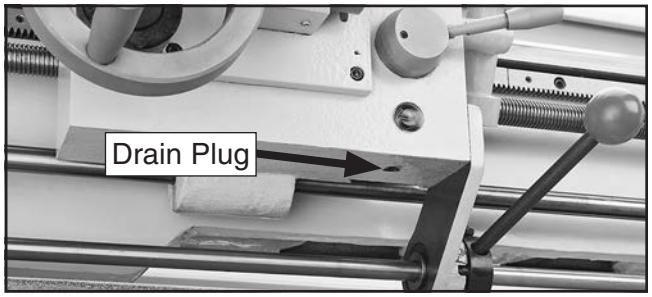


Figure 96. Location of apron drain plug.

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

Bedways

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

Before lubricating the bedways (see **Figure 97**), clean them with mineral spirits. Apply a thin coat of oil along the length of the bedway. Move the steady rest, carriage, and tailstock to access the entire length of the bedways. If the lathe is in a moist or dirty environment, increase the lubrication interval.

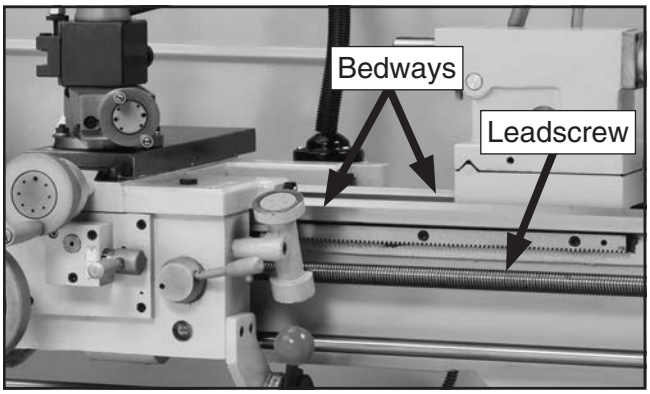


Figure 97. Bedways.

Longitudinal Leadscrew

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

Before lubricating the leadscrew (see **Figure 97**), clean it first with mineral spirits. A stiff brush works well to help clean out the threads. Make sure to move the carriage out of the way, so you can clean the entire length of the leadscrew.

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

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

Ball Oilers

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

This lathe has 14 ball oilers that should be oiled on a daily basis before beginning operation. Refer to **Figures 98**–**1006** for their locations.

Ball Oilers
Proper lubrication of ball oilers is done with a pump-type oil can that has a plastic or rubberized cone tip (see **Page 55** for offerings from Grizzly). We do not recommend using metal needle or lance tips, as they can push the ball too far into the oiler, break the spring seat, and lodge the ball in the oil galley.

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

A. Compound-rest leadscrew & slides
B. Cross-slide leadscrew & slides
C. Saddle slides
D. Carriage handwheel
E. Tailstock ball oilers
F. Leadscrew end bearing
G. Feed rod end bearing

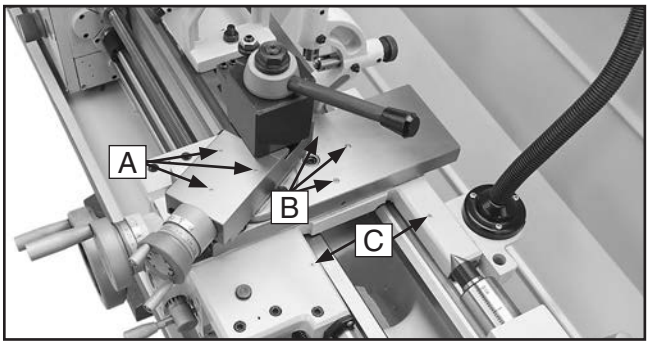


Figure 98. Saddle and slide ball oilers.

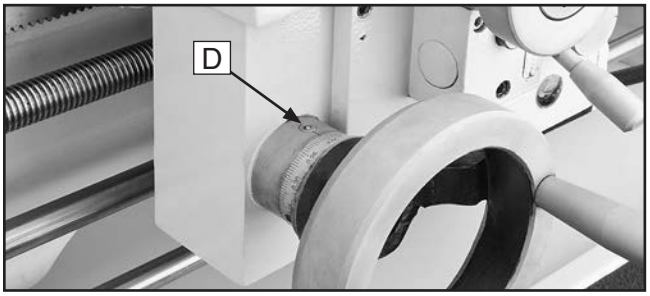


Figure 99. Carriage handwheel ball oiler.

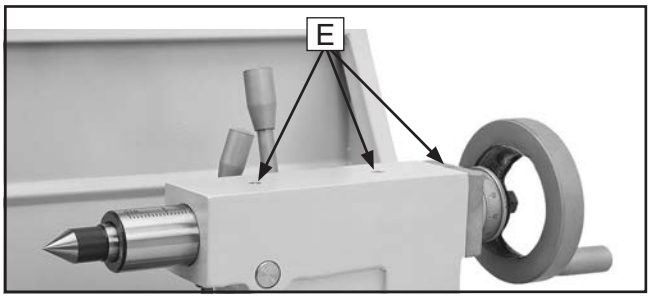


Figure 100. Tailstock ball oilers.

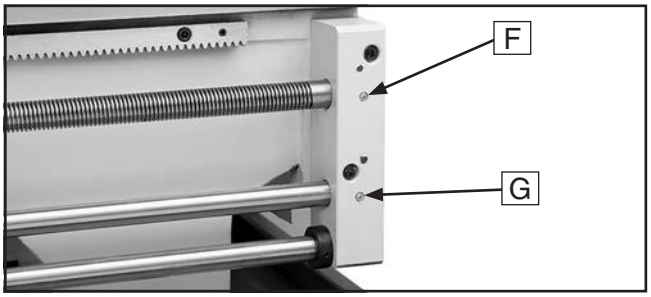


Figure 101. Leadscrew & feed rod ball oilers.

End Gears

Grease..... Grizzly T23964 or NLGI#2 Equivalent
Frequency..... Annually or When Changing

The end gears, shown in **Figure 102**, should always have a thin coat of heavy grease to minimize corrosion, noise, and wear. Wipe away excess grease that could be thrown onto the V-belts and reduce optimal power transmission from the motor.

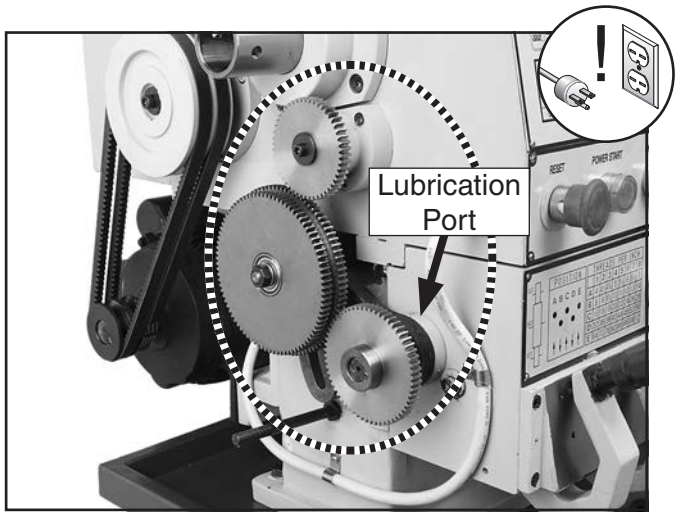


Figure 102. End gears.

Handling & Care

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

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

Lubricating

1. DISCONNECT LATHE FROM POWER!

2. Remove end gear cover and all end gears shown in **Figure 102**.

3. Clean end gears thoroughly with mineral spirits to remove old grease. Use a small brush if necessary to clean between teeth.

4. Clean shafts, and wipe away any grease splatters in vicinity and on inside of end gear cover.

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

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

7. Re-install end gear cover before reconnecting lathe to power.

Machine Storage

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

Preparing Lathe for Storage

1. Run lathe and bring headstock and apron reservoirs to operating temperature, then drain and refill them with clean oil.

2. DISCONNECT LATHE FROM POWER!

3. Thoroughly clean all unpainted, bare metal surfaces, then apply a liberal coat of way oil, heavy grease, or rust preventative. Take care to ensure these surfaces are completely covered but that rust preventative or grease is kept off of painted surfaces.

4. Lubricate machine as outlined in **Lubrication** section beginning on **Page 60**. Be sure to use an oil can to purge all ball oilers and oil passages with fresh oil.

5. Loosen or remove V-belts so they do not become stretched during storage period. (Be sure to place a maintenance note near power button as a reminder that the belts have been loosened or removed.)

6. Place a few moisture absorbing desiccant packs inside of electrical box.

7. Cover lathe and place it in a dry area that is out of direct sunlight and away from hazardous fumes, paint, solvents, or gas. Fumes and sunlight can bleach or discolor paint.

8. Every few months, rotate by hand all gear-driven components a few times in several gear selections. This will keep the bearings, bushings, gears, and shafts well lubricated and protected from corrosion—especially during the winter months.

   Slide carriage, tailstock, and steady rest down lathe bed to make sure that way spotting is not beginning to occur.

Bringing Lathe Out of Storage

1. Re-install V-belts and retension them (refer to **Page 72** for detailed instructions) if you removed them for storage purposes.

2. Remove moisture absorbing desiccant packs from electrical box.

3. Repeat **Test Run** and **Spindle Break-In** procedures, beginning on **Page 25**.

SECTION 7: SERVICE

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

Troubleshooting

Motor & Electrical

Symptom	Possible Cause	Possible Solution
Machine does not start or a circuit breaker trips.	1. Emergency Stop\RESET button engaged or at fault. 2. Fuse has blown in machine electrical box. 3. Power supply switched OFF or at fault. 4. Motor/plug wired incorrectly. 5. Thermal overload relay has tripped. 6. Wall fuse/circuit breaker is blown/tripped; short in electrical system; start-up load too high for circuit. 7. Start capacitor at fault. 8. Contactor not getting energized/has burned contacts. 9. Wiring is open/has high resistance. 10. Motor is at fault.	1. Rotate button clockwise until it pops out to reset it for operation; replace if not working properly. 2. Replace fuse/ensure no; determine if overload is due to heavy operation; ensure power source has high enough voltage and power cord is correctly sized. 3. Ensure power supply is ON/has correct voltage. 4. Correct motor/plug wiring connections (**Pages 80** and **82**). 5. Turn the thermal relay cut-out dial to increase working amps and push the reset pin. Replace if tripped multiple times (weak relay). 6. Verify circuit is rated for machine amp load; troubleshoot and repair cause of overload; replace weak breaker; find/repair electrical short. 7. Test/replace if faulty. 8. Test for power on all legs and contactor operation. Replace unit if faulty. 9. Check for broken wires or disconnected/corroded connections, and repair/replace as necessary. 10. Test/repair/replace.
Motor stalls or is underpowered.	1. V-belt(s) slipping. 2. Run capacitor at fault. 3. Plug/receptacle at fault. 4. Gearbox at fault. 5. Contactor not energized/has poor contacts. 6. Motor bearings at fault. 7. Motor at fault.	1. Tension/replace V-belt(s) (**Page 72**); ensure pulleys are aligned. 2. Test/repair/replace. 3. Test for good contacts/correct wiring. 4. Select appropriate gear ratio; replace broken or slipping gears. 5. Test all legs for power/replace if faulty. 6. Test/repair/replace. 7. Test/repair/replace.
Loud, repetitious noise coming from lathe at or near the motor.	1. Pulley set screws or keys are missing or loose. 2. Motor fan is hitting the cover.	1. Inspect keys and set screws. Replace or tighten if necessary. 2. Tighten fan, shim cover, or replace items.
Motor overheats.	1. Motor overloaded.	1. Allow motor to cool; reduce load on motor.
Motor is loud when cutting, or bogs down under load.	1. Excessive depth of cut or feed rate. 2. Spindle speed or feed rate wrong for cutting operation. 3. Cutting tool is dull.	1. Decrease depth of cut or feed rate. 2. Refer to feed/speed charts in **Machinery's Handbook** or feed/speed calculator on the internet. 3. Sharpen or replace the cutting tool.

Lathe Operation

Symptom	Possible Cause	Possible Solution
Entire machine vibrates upon startup and while running.	1. Workpiece is unbalanced. 2. Loose or damaged V-belt(s). 3. V-belt pulleys are not properly aligned. 4. Worn or broken gear present. 5. Chuck or faceplate is unbalanced. 6. Gears not aligned in headstock or no backlash. 7. Broken gear or bad bearing. 8. Workpiece is hitting stationary object. 9. Spindle bearings at fault.	1. Re-install workpiece as centered with the spindle bore as possible. 2. Retension/replace the V-belt(s) as necessary (see **Page 72**). 3. Align the V-belt pulleys. 4. Inspect gears, and replace if necessary. 5. Rebalance chuck or faceplate; contact a local machine shop for help. 6. Adjust change gears and establish backlash. 7. Replace broken gear or bearing. 8. Stop lathe immediately and correct interference problem. 9. Reset spindle bearing preload (**Page 73**) or replace worn spindle bearings.
Bad surface finish.	1. Wrong spindle speed or feed rate. 2. Dull tooling or poor tool selection. 3. Tool height not at spindle centerline. 4. Too much play in gibs.	1. Adjust for appropriate spindle speed and feed rate. 2. Sharpen tooling or select a better tool for the intended operation. 3. Adjust tool height to spindle centerline (see **Page 37**). 4. Tighten gibs (see **Page 70**).
Tapered tool difficult to remove from tailstock quill.	1. Quill is not retracted all the way back into the tailstock. 2. Contaminants not removed from taper before inserting into quill.	1. Turn the quill handwheel until it forces the tapered tool out of quill. 2. Clean the taper and bore, then re-install tool.
Cross slide, compound rest, or carriage feed has sloppy operation.	1. Gibs are out of adjustment. 2. Handwheel is loose or backlash is high. 3. Leadscrew mechanism worn.	1. Adjust gibs (see **Page 70**). 2. Tighten handwheel fasteners, adjust hanhdwheel backlash to a minimum (see **Page 69**). 3. Replace leadscrew mechanism.
Cross slide, compound, or carriage handwheels hard to move.	1. Dovetail ways loaded with shavings, dust, or grime. 2. Gib screws are too tight. 3. Backlash setting too tight. 4. Bedways are dry.	1. Remove gibs, clean ways, lubricate, and re-adjust gibs. 2. Loosen gib screw(s) slightly (see **Page 70**), and lubricate bedways. 3. Slightly loosen backlash setting (see **Page 69**). 4. Lubricate bedways/ball oilers (**Page 62**).
Cutting tool or machine components vibrate excessively during cutting.	1. Tool holder not tight enough. 2. Cutting tool sticks too far out of tool holder; lack of support. 3. Gibs are out of adjustment. 4. Dull cutting tool. 5. Incorrect spindle speed or feed rate.	1. Check for debris, clean, and retighten. 2. Re-install cutting tool so no more than ⅓ of the total length is sticking out of tool holder. 3. Adjust gibs (see **Page 70**). 4. Replace or resharpen cutting tool. 5. Use the recommended spindle speed and feed rate.

Symptom	Possible Cause	Possible Solution
Workpiece is tapered.	1. Headstock and tailstock are not properly aligned with each other.	1. Re-align the tailstock to the headstock spindle centerline (see **Page 37**).
Chuck jaws will not move or do not move easily.	1. Chips lodged in the jaws or scroll plate.	1. Remove jaws, clean and lubricate scroll plate, then replace jaws.
Carriage will not feed or is hard to move.	1. Gears are not all engaged. 2. Half nut lever engaged. 3. Loose screw on the feed handle. 4. Carriage lock is tightened down. 5. Chips have loaded up on bedways. 6. Bedways are dry and in need of lubrication. 7. Gibs are too tight. 8. Gears broken.	1. Adjust gear levers. 2. Disengage half nut lever. 3. Tighten. 4. Check to make sure the carriage lock bolt is fully released. 5. Frequently clean away chips that load up during turning operations. 6. Lubricate bedways/ball oilers. 7. Loosen gibs screw(s) slightly (see **Page 70**). 8. Replace gears.
Gear change levers will not shift into position.	1. Gears not aligned inside headstock/quick-change gearbox.	1. Rotate spindle by hand with light pressure on the lever until gear falls into place.

Backlash Adjustment

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

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

Tools Needed	Qty
Hex Wrench 2mm	1
Hex Wrench 5mm	1
Hex Wrench 6mm	1
Punch Pin 2mm	1

Cross Slide Backlash

1. Feed cross slide toward operator until it reaches end of its travel.

2. Remove cap screw that secures cross slide leadscrew nut (see **Figure 103**).

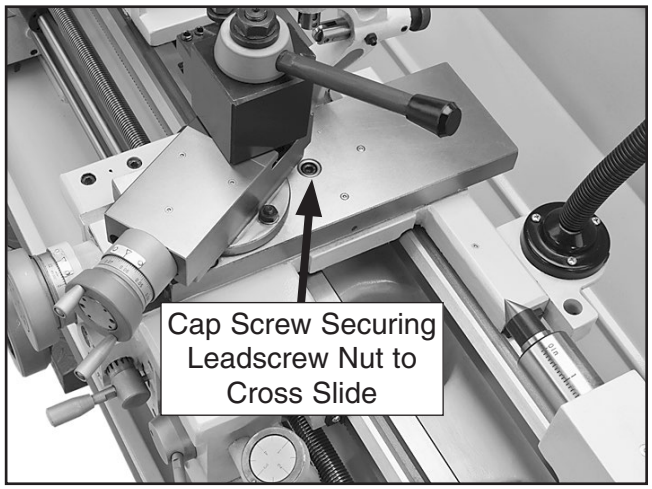


Figure 103. Location of cap screw that secures the leadscrew nut.

3. Rotate cross slide handwheel clockwise to feed leadscrew nut out from under cross slide, as shown in **Figure 104**.

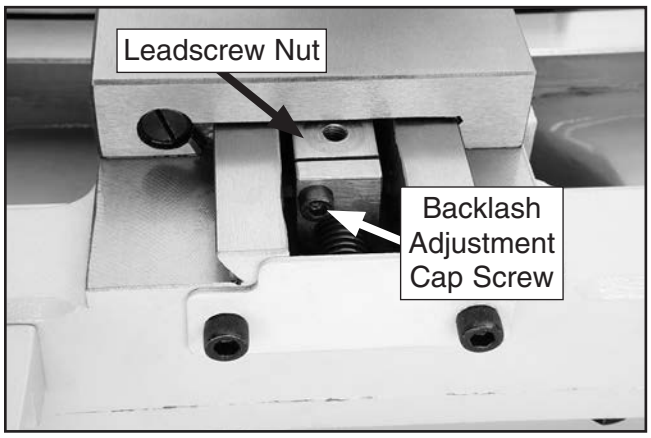


Figure 104. Cross slide leadscrew nut.

4. Tighten backlash adjustment cap screw shown in **Figure 104** in small increments.

5. Hold leadscrew nut and test after each adjustment by rotating handwheel back-and-forth until backlash amount is approximately 0.002"–0.004".

6. Feed leadscrew nut back under cross slide and replace cap screw removed in **Step 2**.

Compound Rest Backlash

1. Turn compound rest handwheel counterclockwise several turns.

2. Loosen set screws on compound rest faceplate several turns (see **Figure 105**).

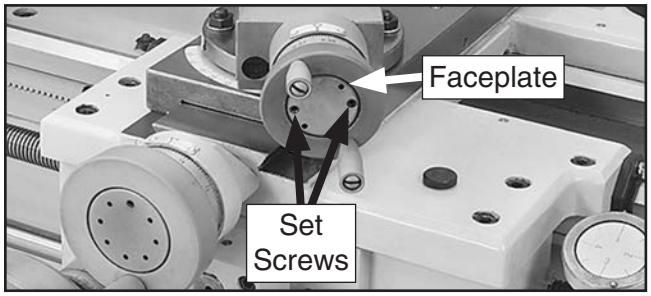


Figure 105. Compound rest backlash adjustments.

3. Use punch pin to loosen faceplate and adjust it until backlash is approximately 0.002"–0.004", as indicated on graduated dial.

4. Secure setting with set screws.

5. Repeat adjustments above if necessary.

Gib Adjustment

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

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

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

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

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

Tools Needed	**Qty**
Standard Screwdriver #2	1
Hex Wrench 3mm	1
Hex Wrench 6mm	1
Wrench 10mm	1

Make sure the bedways and leadscrew have been cleaned and relubricated before beginning any adjustments. Refer to **Lubrication** beginning on **Page 60** for instructions and lubricant specifications.

Cross Slide Gib

1. DISCONNECT LATHE FROM POWER!

2. Loosen locking set screw shown in **Figure 106**.

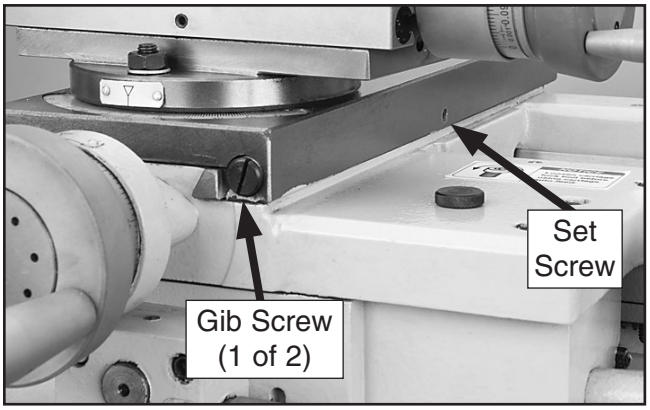


Figure 106. Cross slide gib components.

3. Adjust gib screws as follows:

   —To increase slide tension, loosen rear gib screw ⅛ turn, and tighten front gib screw ⅛ turn.

   —To decrease slide tension, loosen front gib screw ⅛ turn, and tighten rear gib screw ⅛ turn.

4. After each adjustment, use cross slide handwheel to test cross slide movement.

5. Repeat **Steps 3–4** until cross slide movement is acceptable.

Compound Rest Gib

Figure 107 shows the gib location on the compound rest. The compound rest gib adjusts in the same manner and with the same tools as the cross slide gib. However, in this case, to increase or decrease tension, the gib adjustment screw directions are reversed.

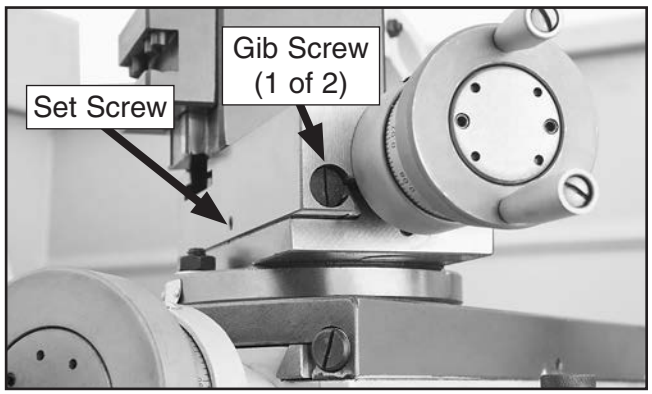


Figure 107. Compound rest gib components.

Saddle Gib

Before making adjustments to the saddle gib, make sure that the carriage lock (see **Figure 108**) is loose by turning it counterclockwise one full turn.

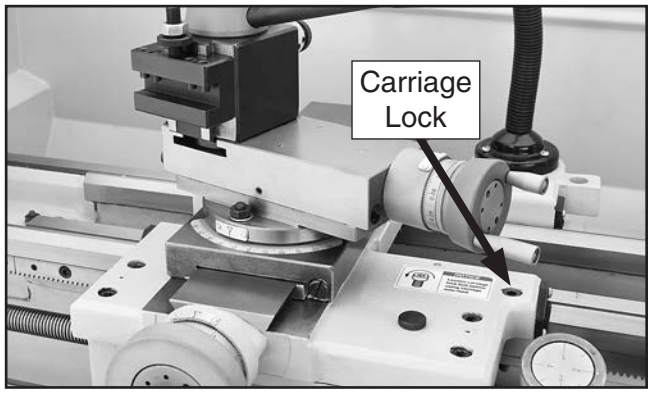


Figure 108. Location of carriage lock.

The saddle gib is located on the bottom of the back edge of the slide (see **Figure 109**). This gib is designed differently than the cross or compound slide gibs. Instead of being a wedge-shaped plate, it is a flat bar. The gib pressure is applied by four set screws. Hex nuts secure these set screws in place, so they will not loosen during operation.

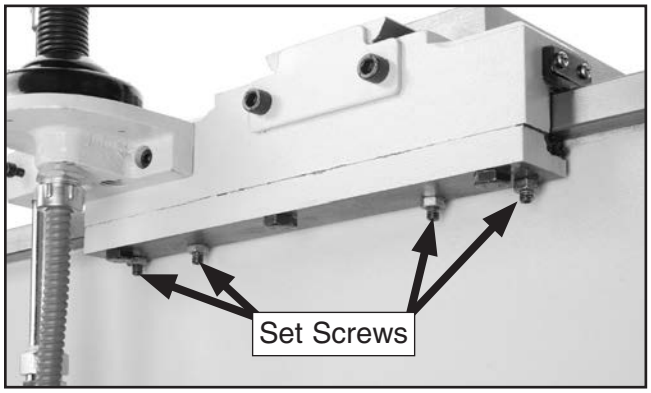


Figure 109. Saddle gib components (viewed from rear of saddle).

To adjust saddle slide gib:

1. DISCONNECT LATHE FROM POWER!

2. Loosen jam nuts on four set screws shown in **Figure 109**, and adjust set screws same amount as follows:

   —To tighten carriage gib, tighten set screws.

   —To loosen gib, loosen set screws.

3. Move carriage back and forth and repeat adjustments as necessary until gib pressure is acceptable.

4. Hold set screws in place and tighten jam nuts.

Half Nut Adjustment

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

Tools Needed	Qty
Hex Wrench 4mm	1
Hex Wrench 5mm	1
Wrench 13mm	1

To adjust half nut:

1. DISCONNECT MACHINE FROM POWER!

2. Disengage half nut and remove thread dial.

3. Loosen hex nuts on set screws shown in **Figure 110**.

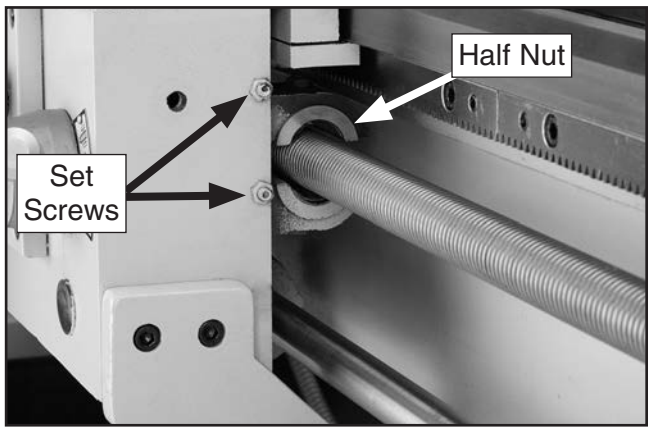


Figure 110. Half nut gib set screws.

4. Tighten each set screw approximately ⅛ of a turn, then retighten the hex nuts without moving the set screws.

5. Move carriage handwheel until half nut can fully close, then open/close half nut several times and notice how it feels. The half nut is correctly adjusted when you feel a slight drag while opening and closing it. It should not feel too stiff or too loose.

6. Repeat **Steps 3–5**, if necessary, until you are satisfied with half nut adjustment, then re-install thread dial.

V-Belt Tension & Replacement

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

Tools Needed	Qty
Hex Wrench 17mm	1

Tensioning V-Belts

1. DISCONNECT MACHINE FROM POWER!

2. Remove end gear cover.

3. Loosen motor mount hex bolts (see **Figure 111**).

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

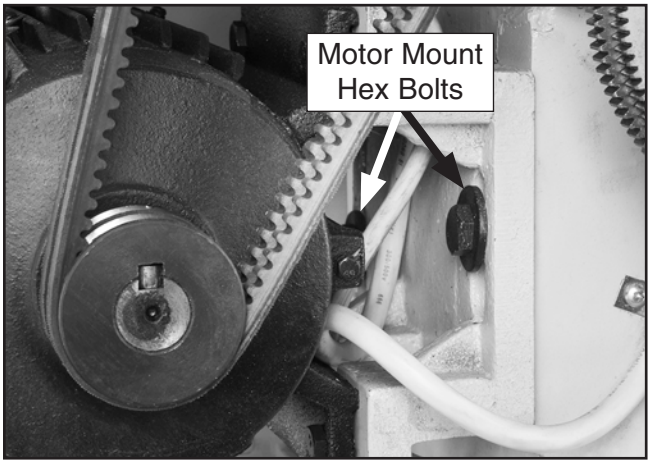


Figure 111. Locations of motor mount hex bolts.

4. Push down on motor until there is approximately ¼" deflection in V-belts when moderate pressure is applied between pulleys, as shown in **Figure 112**.

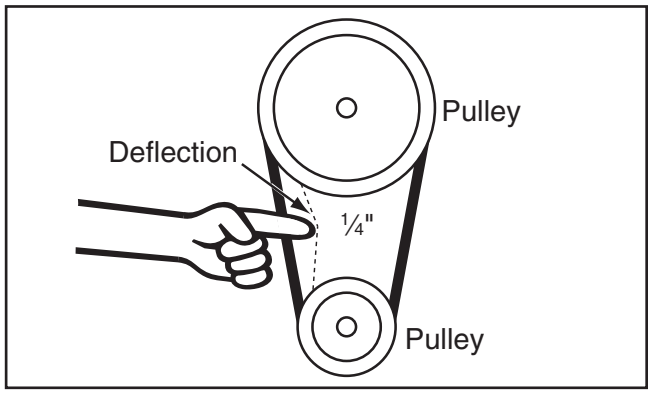


Figure 112. Correct timing-belt deflection.

5. When V-belt tension is correct, retighten motor mount hex bolts.

6. Secure end gear cover.

Replacing V-Belts

1. DISCONNECT MACHINE FROM POWER!

2. Remove end gear cover.

3. Loosen motor mount bolts (see **Figure 111** on the previous page), slide motor up, and remove V-belts.

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

4. Install new V-belts as a matched set so they equally share the load.

5. Tension belts (refer to **Tensioning V-Belts** on the previous page.)

6. Secure end gear cover.

Spindle Bearing Preload

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

Adjusting the bearing preload requires using a spanner wrench or a punch and hammer. You can either purchase the spanner wrench at a tool store or fabricate one, using the diagram shown in **Figure 113**.

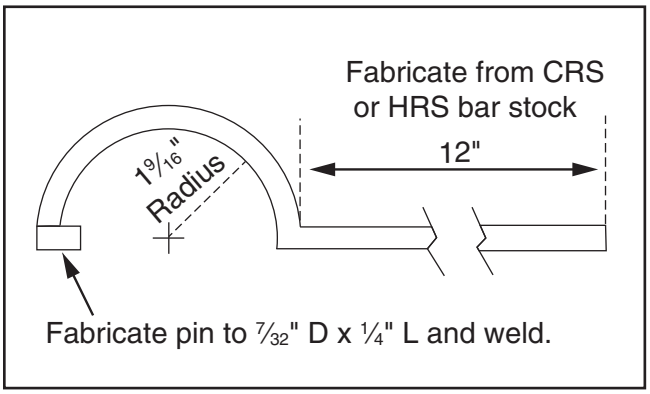


Figure 113. Spanner wrench diagram.

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

To adjust preload:

1. Run lathe for 20 minutes on high speed to bring lathe to a normal temperature.

2. DISCONNECT MACHINE FROM POWER!

3. Remove chuck, then shift spindle to neutral by positioning alpha spindle speed lever between **C** and **B** and numeric spindle speed lever between the **I** and **II**, as shown in **Figure 114**.

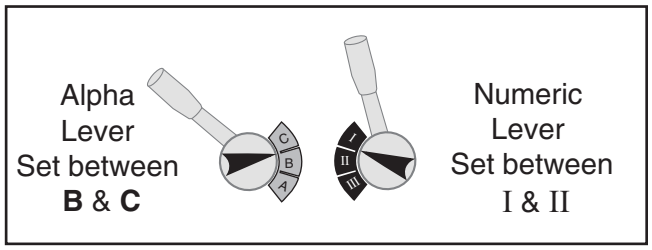


Figure 114. Spindle speed levers set to neutral.

4. Remove end gear cover, then removethe outboard spindle cover (see **Figure 115**).

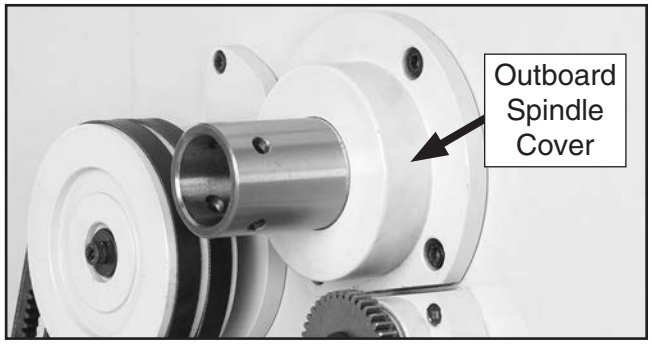


Figure 115. Outboard spindle cover.

5. Place chuck key in cam-lock socket and keep spindle from rotating.

6. Using a spanner wrench, or hammer-and-punch, loosen outer spanner nut (**Figure 116**) counterclockwise and remove it.

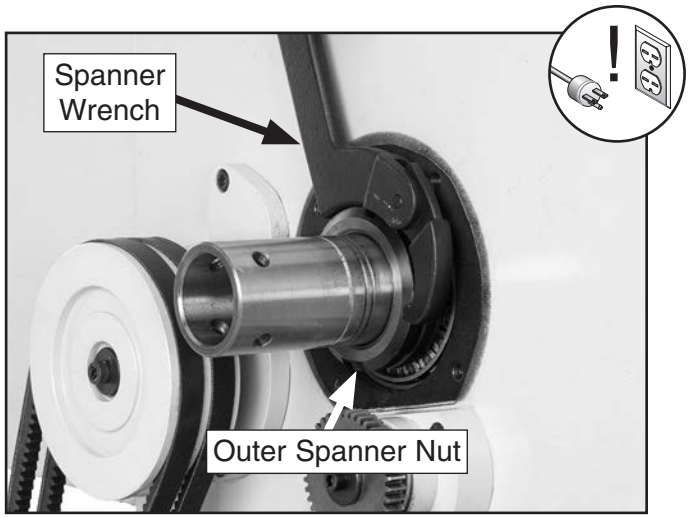


Figure 116. Loosening outer spanner nut.

7. Loosen inner spanner nut one turn.

   Note: *You may have to tap on the outboard end of the spindle as explained in **Step 8**, to help unload the spindle and break the spanner nut loose.*

8. Place wooden block over outboard end of spindle, tap it a few times with small sledge or heavy dead blow hammer (**Figure 117**). Your goal is to slide spindle forward just enough to introduce spindle end-play that you can feel by hand.

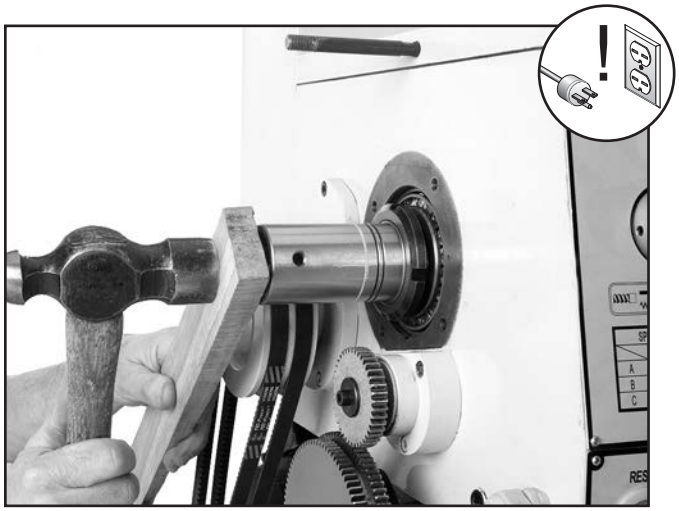


Figure 117. Introducing detectable end-play.

9. Place dial indicator on cross slide and move carriage toward headstock until contact point of indicator touches spindle face, as shown in **Figure 118**.

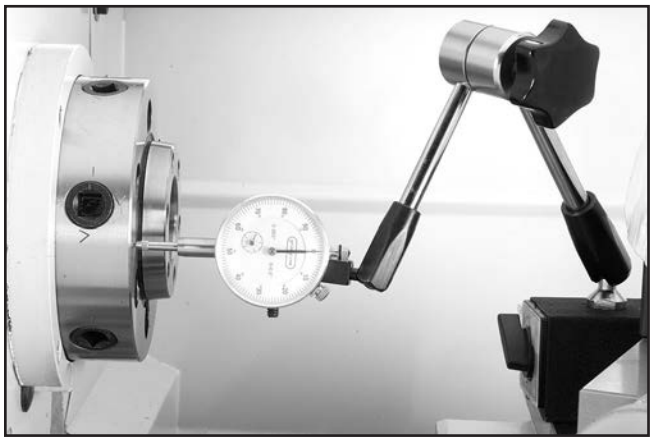


Figure 118. Dial indicator setup.

10. Move carriage an additional 0.100" toward headstock.

11. Insert chuck key into a cam socket to prevent spindle from turning, then tighten inner spanner nut until dial indicator needle just stops moving (see **Figure 119**).

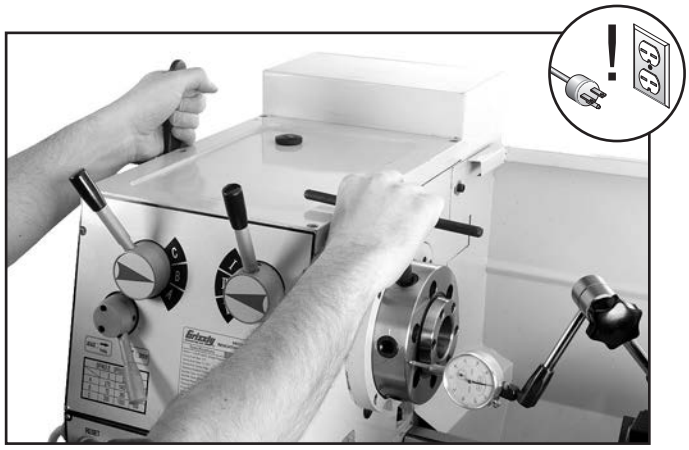


Figure 119. Adjusting spindle bearings.

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

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

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

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

12. Tighten spanner nut an additional 1/16" along its circumference. See **Figure 120** for example of this measurement.

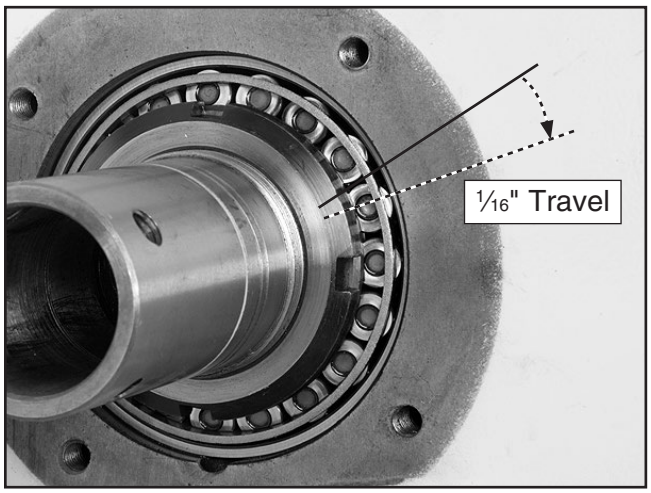


Figure 120. Final spanner nut rotation.

13. Without allowing inner spanner nut to tighten any further, install and tighten outer spanner nut against theinner nut.

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

14. Re-install outboard spindle cover.

Continued on next page ⟶

To confirm that the bearings are correctly preloaded:

1. Re-attach all removed lathe components and prepare it for operation.

2. Install chuck and tighten jaws.

3. Set spindle speed to its highest setting.

4. Connect lathe to power and start spindle rotation at a medium speed.

5. Let lathe run for 20 minutes, periodically checking temperature of spindle nose (refer to the next step).

6. Turn spindle ***OFF***, disconnect lathe from power, and check temperature of spindle.

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

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

SECTION 8: WIRING

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

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

⚠WARNING
Wiring Safety Instructions

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

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

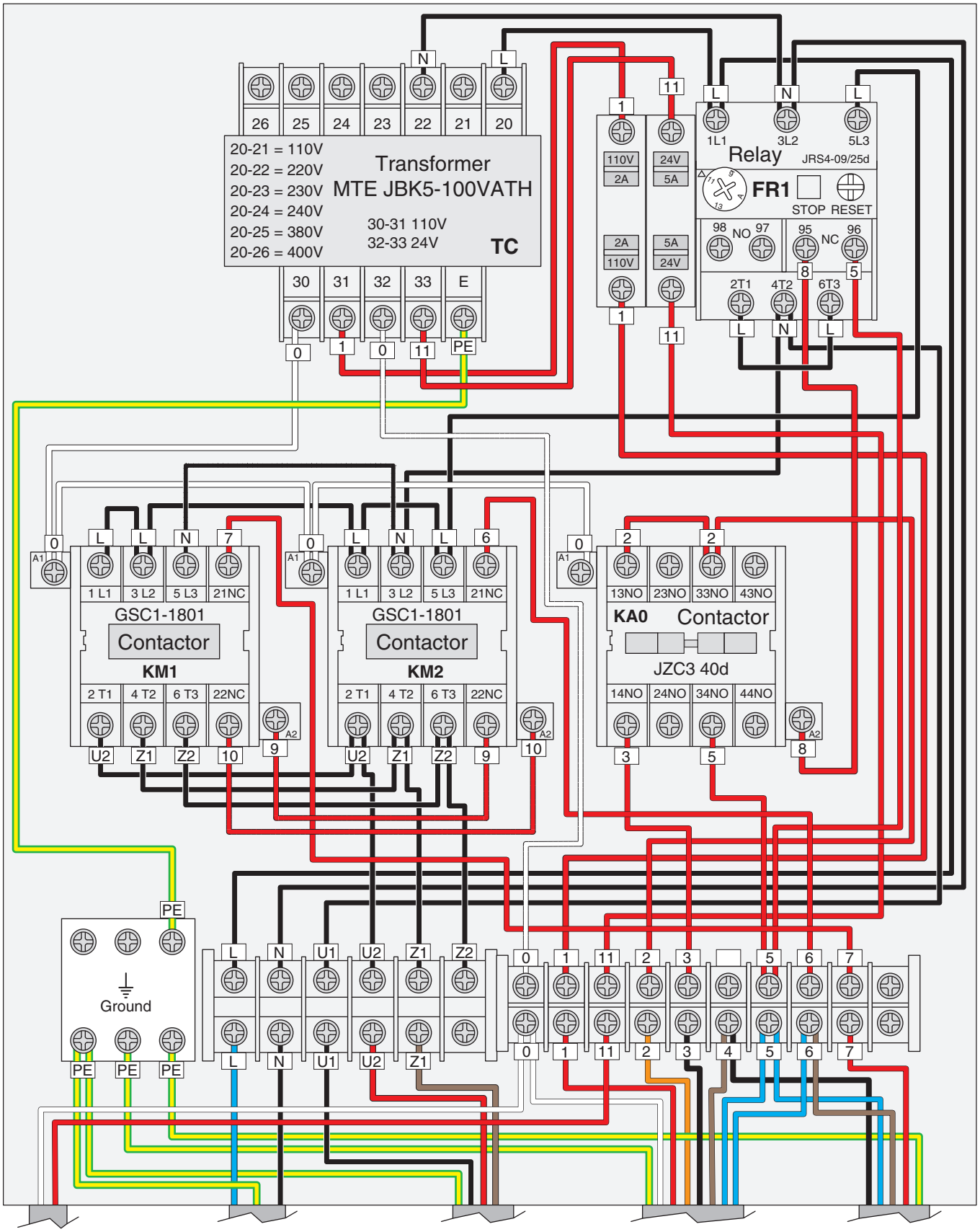
NOTICE

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		

Electrical Cabinet Wiring Diagram



To Work Light (**Page 82**)

To Power Source (**Page 82**)

To Motor (**Page 80**)

To Control Panel (**Page 80**)

To Spindle Switch (**Page 82**)

READ ELECTRICAL SAFETY ON PAGE 77!

Electrical Cabinet Wiring

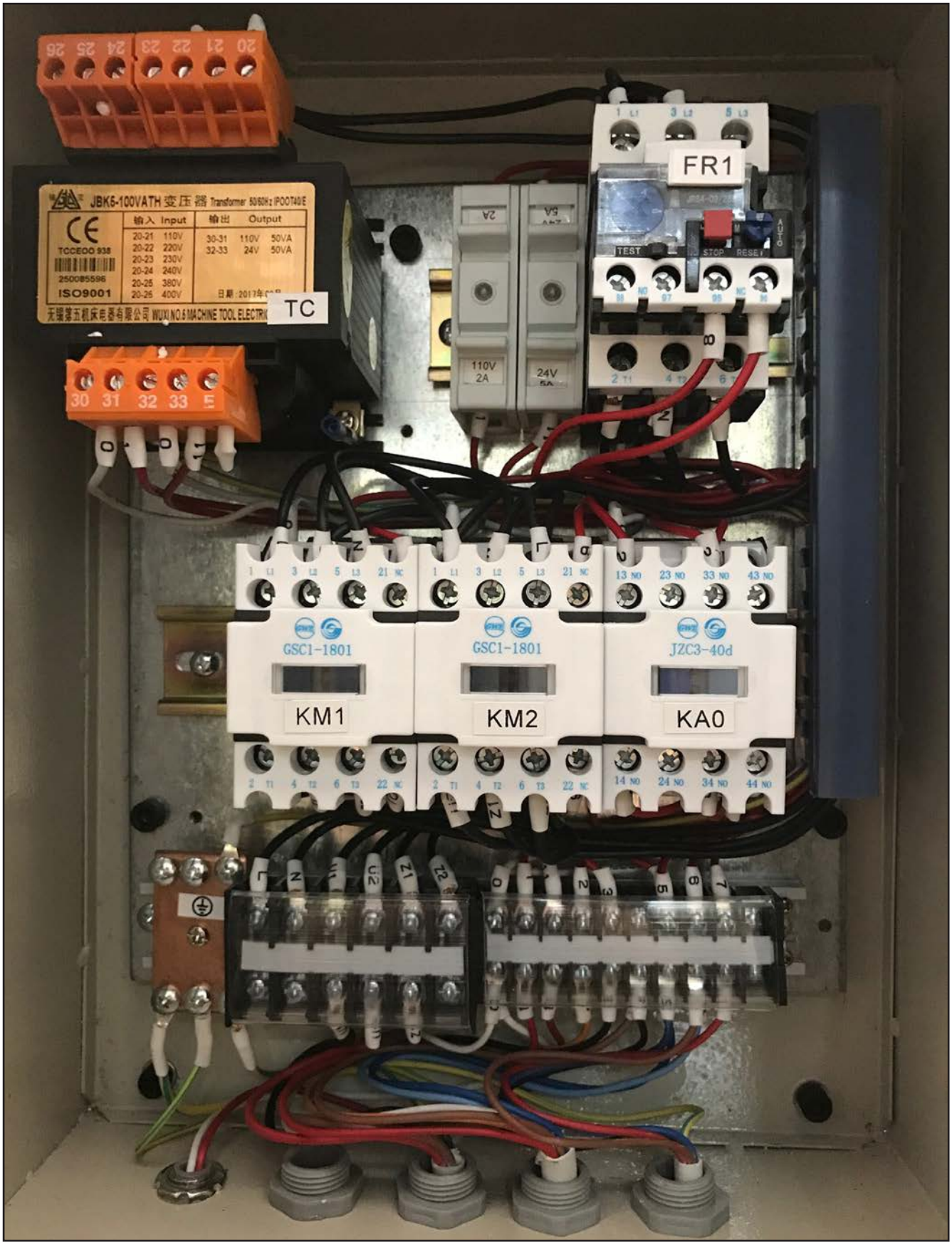
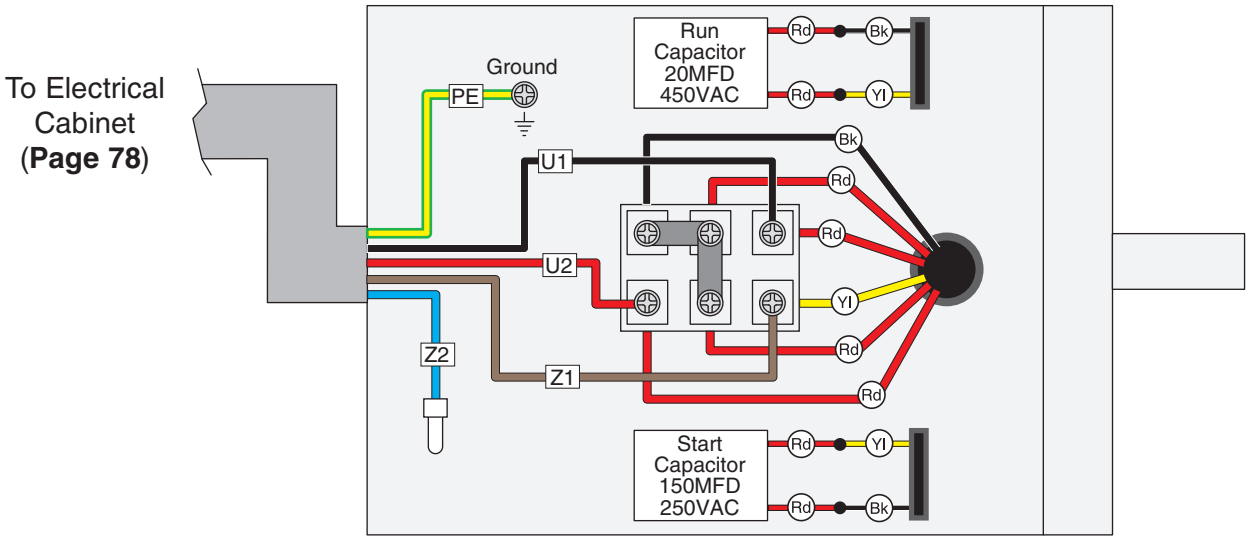


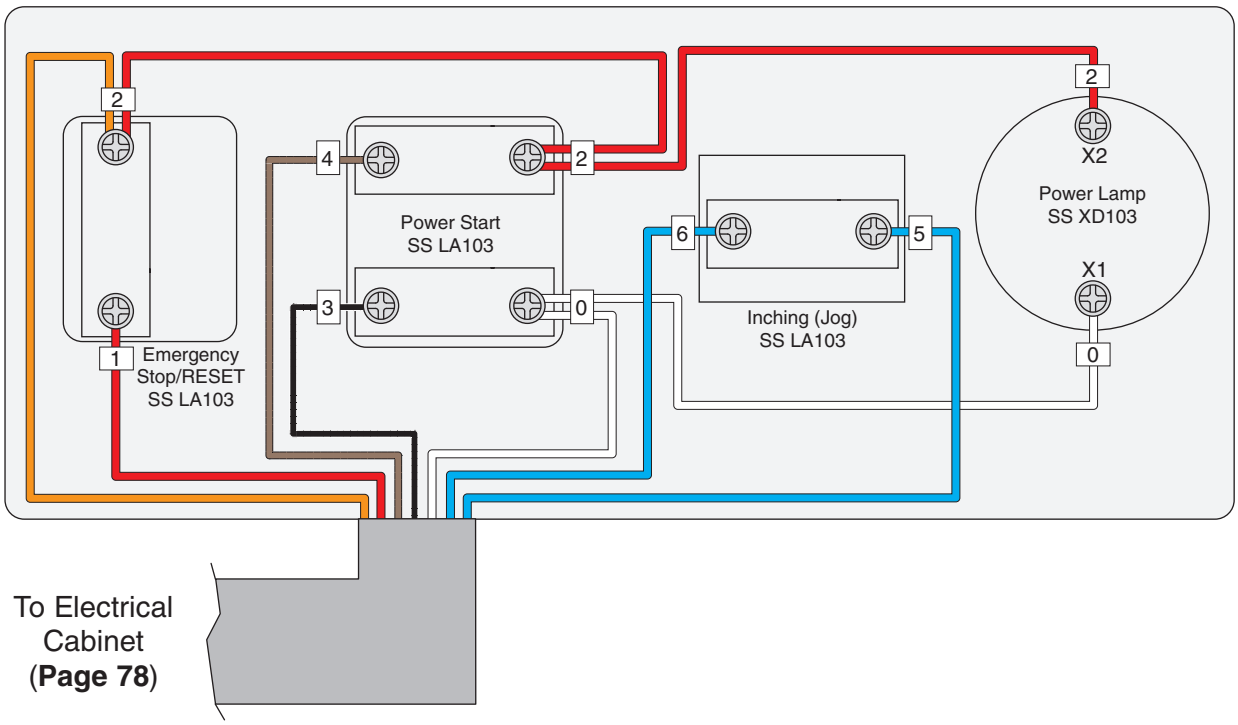
Figure 121. Electrical cabinet wiring.

Motor & Control Panel Wiring Diagrams

Motor



Control Panel



READ ELECTRICAL SAFETY ON PAGE 77!

Motor & Control Panel Wiring

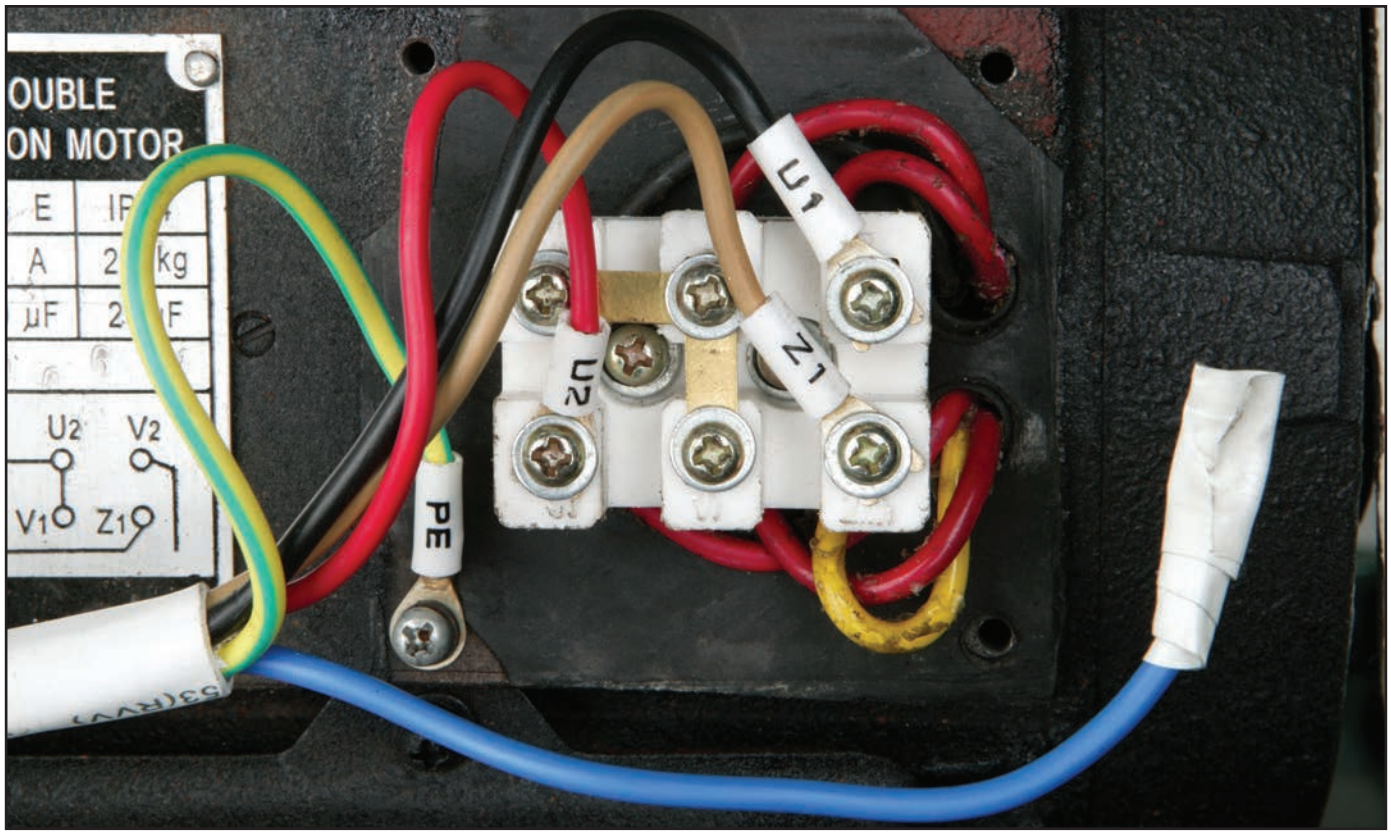


Figure 122. Motor wiring.

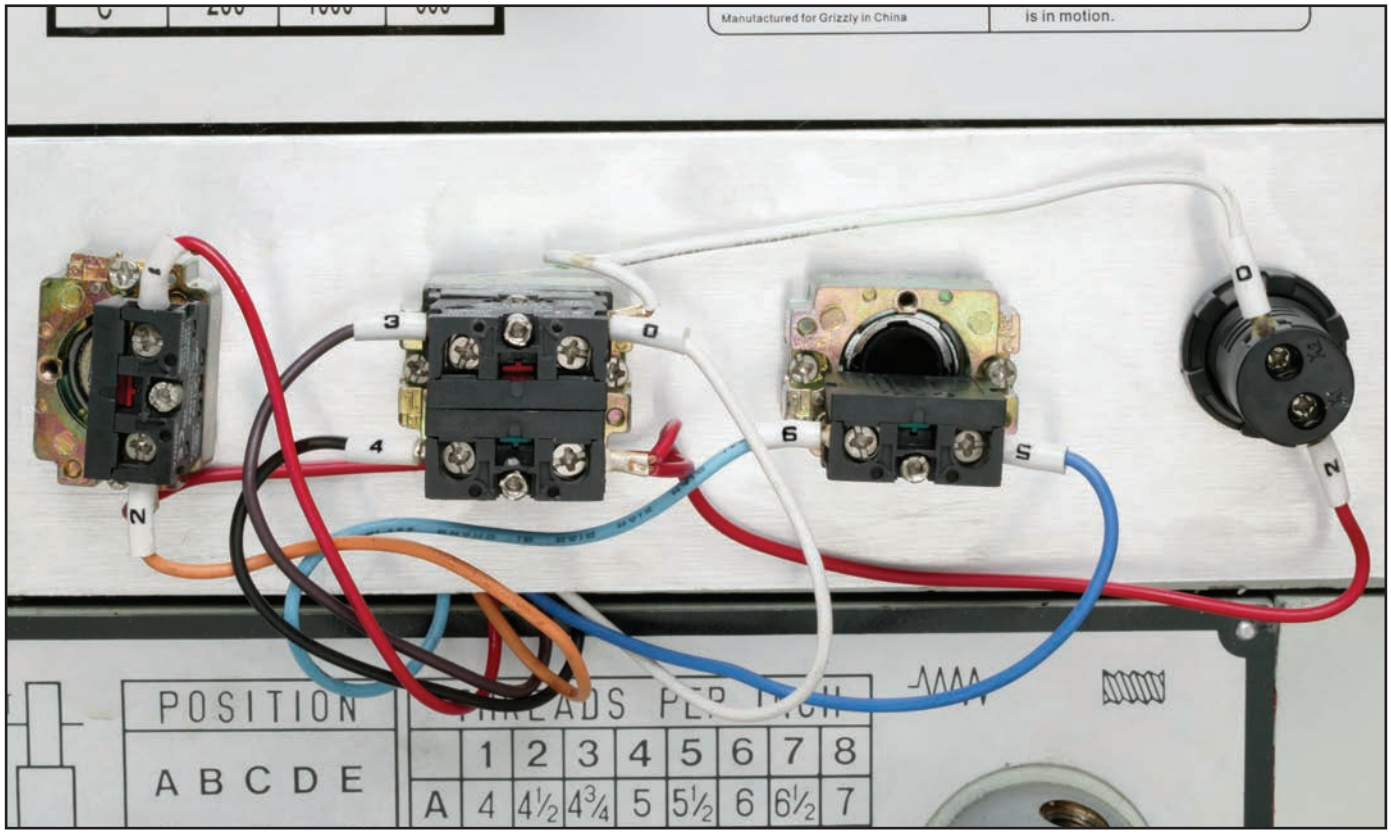
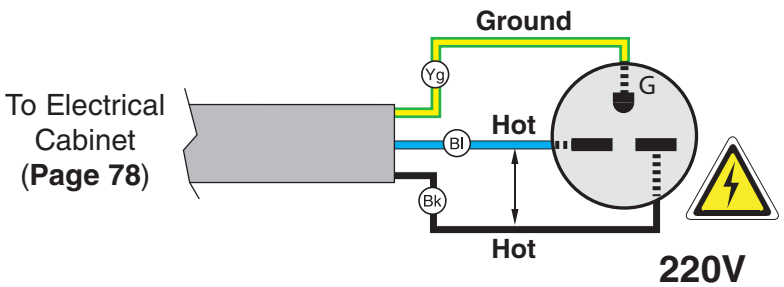
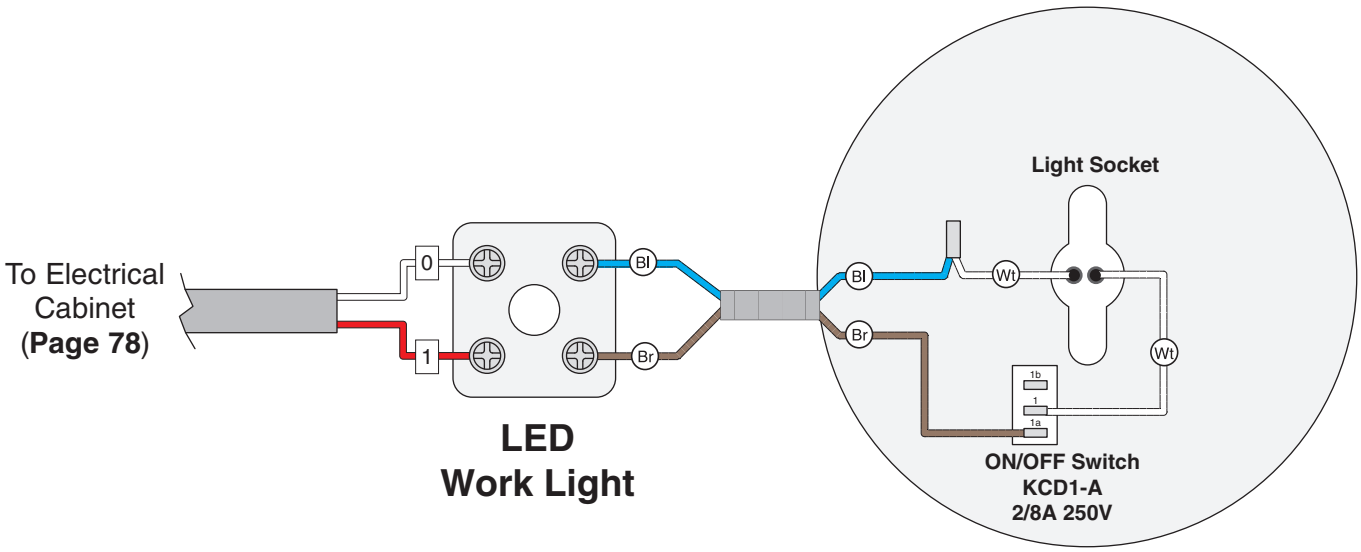


Figure 123. Control panel wiring.

Other Component Wiring Diagrams

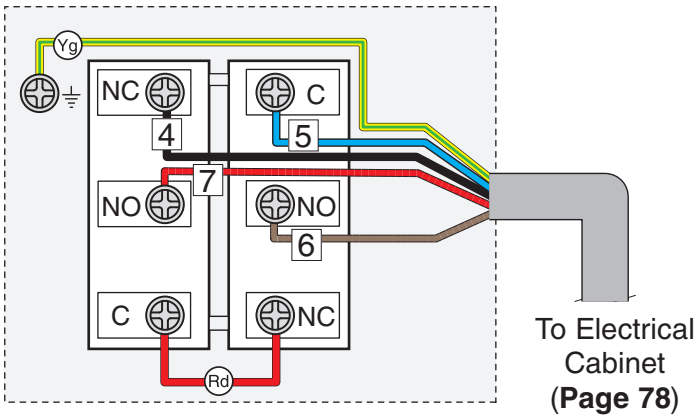


220V
NEMA 6-15 Plug
(As Recommended)



LED
Work Light

Spindle Rotation Switch



To Electrical
Cabinet
(Page 78)

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

Other Component Wiring

Figure 124. Work light wiring.

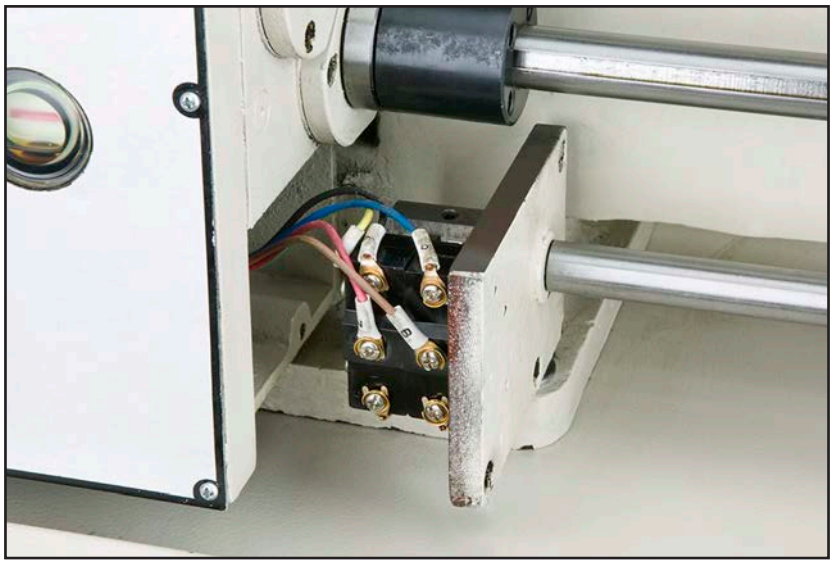
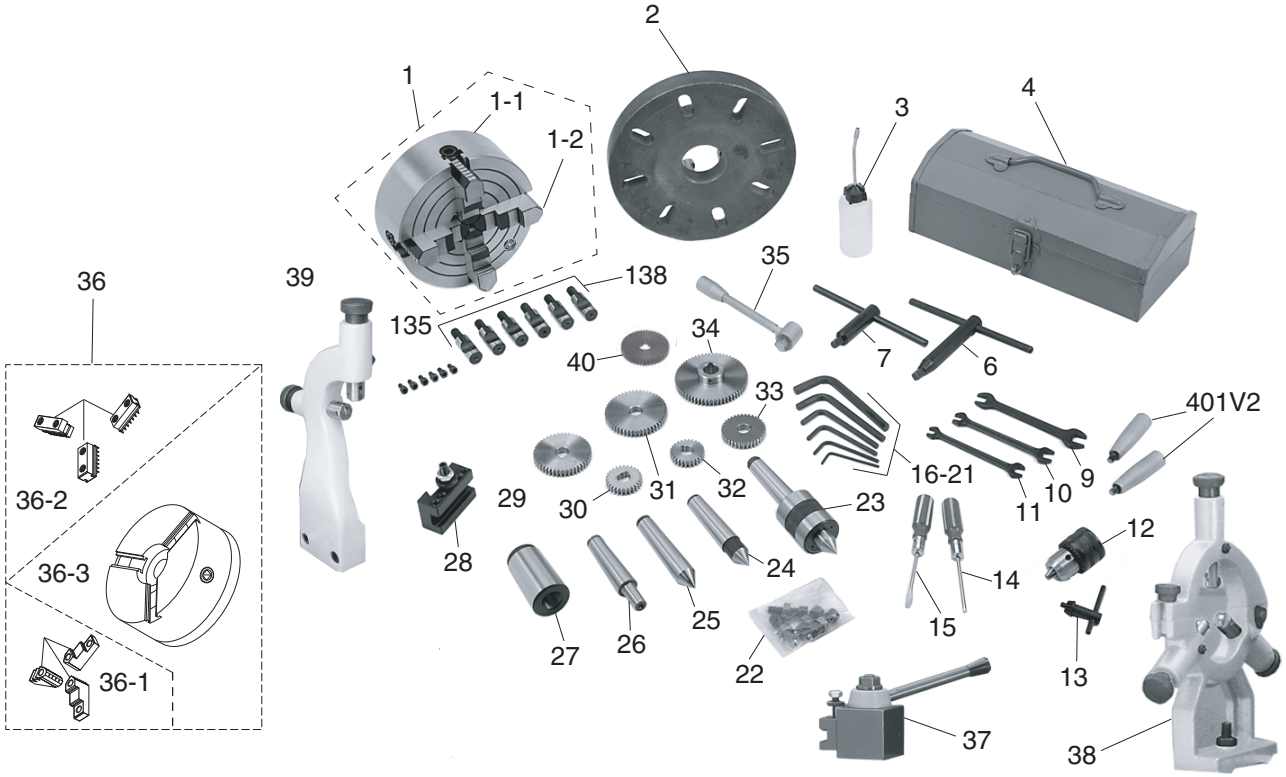


Figure 125. Spindle switch.

SECTION 9: PARTS

Accessories

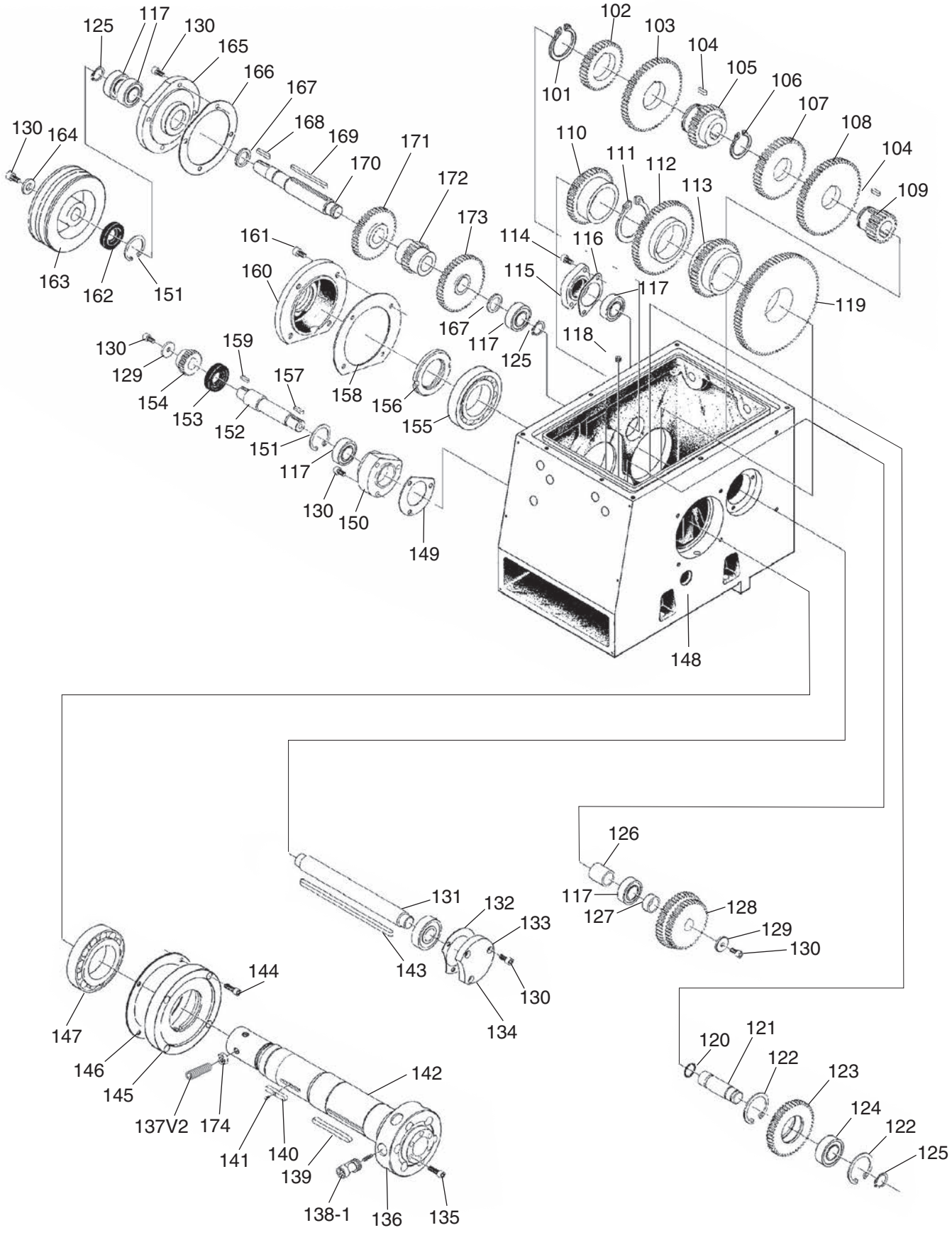


REF	PART #	DESCRIPTION
1	P4003G0001	4-JAW INDEPENDENT CHUCK ASSEMBLY
1-1	P4003G0001-1	4-JAW INDEPENDENT CHUCK BODY 8"
1-2	P4003G0001-2	4-JAW CHUCK REVERSIBLE JAW
2	P4003G0002	FACEPLATE 10" D1-5
3	P4003G0003	BOTTLE FOR OIL
4	P4003G0004	TOOLBOX
6	P4003G0006	CHUCK WRENCH 4-JAW
7	P4003G0007	CHUCK WRENCH 3-JAW
9	P4003G0009	WRENCH 12 X 14MM OPEN-ENDS
10	P4003G0010	WRENCH 10 X 12MM OPEN-ENDS
11	P4003G0011	WRENCH 9 X 11MM OPEN-ENDS
12	P4003G0012	DRILL CHUCK B16 1.5-13MM
13	P4003G0013	DRILL CHUCK KEY
14	P4003G0014	SCREWDRIVER PHILLIPS #2
15	P4003G0015	SCREWDRIVER FLAT #2
16	P4003G0016	HEX WRENCH 10MM
17	P4003G0017	HEX WRENCH 8MM
18	P4003G0018	HEX WRENCH 6MM
19	P4003G0019	HEX WRENCH 5MM
20	P4003G0020	HEX WRENCH 4MM
21	P4003G0021	HEX WRENCH 2MM
22	P4003G0022	SPIDER BOLT SET SCREW (4-PK)
23	P4003G0023	LIVE CENTER MT#3

REF	PART #	DESCRIPTION
24	P4003G0024	DEAD CENTER MT#3 CARBIDE TIPPED
25	P4003G0025	DEAD CENTER MT#3 HSS
26	P4003G0026	DRILL CHUCK ARBOR MT#3/B16
27	P4003G0027	SPINDLE SLEEVE MT#5-MT#3
28	P4003G0028	QUICK-CHANGE TOOL HOLDER ASSY
29	P4003G0029	GEAR 45T
30	P4003G0030	GEAR 27T
31	P4003G0031	GEAR 50T
32	P4003G0032	GEAR 26T
33	P4003G0033	GEAR 35T
34	P4003G0034	GEAR 60T
35	P4003G0035	TAILSTOCK WRENCH
36	P4003G0036	3-JAW CHUCK ASSEMBLY 6" D1-5 SCROLL
36-1	P4003G0036-1	3-JAW CHUCK TOP JAW SET
36-2	P4003G0036-2	3-JAW CHUCK BOTTOM JAW SET
36-3	P4003G0036-3	3-JAW CHUCK BODY 6"
37	P4003G0037	QUICK-CHANGE TOOL POST ASSY
38	P4003G0038	STEADY REST ASSEMBLY
39	P4003G0039	FOLLOW REST ASSEMBLY
40	P4003G0040	GEAR 36T
135	P4003G0135	CAP SCREW M6-1 X 16 DOG-PT
138	P4003G0138	CAMLOCK STUD D1-5
401V2	P4003G0401V2	HANDWHEEL HANDLE M8-1.25 X 8 V2.04.12

Please Note: *We do our best to stock replacement parts whenever possible, but we cannot guarantee that all parts shown here are available for purchase. Call* ***(800) 523-4777*** *or visit our online parts store at* ***www.grizzly.com*** *to check for availability.*

Headstock Gearing

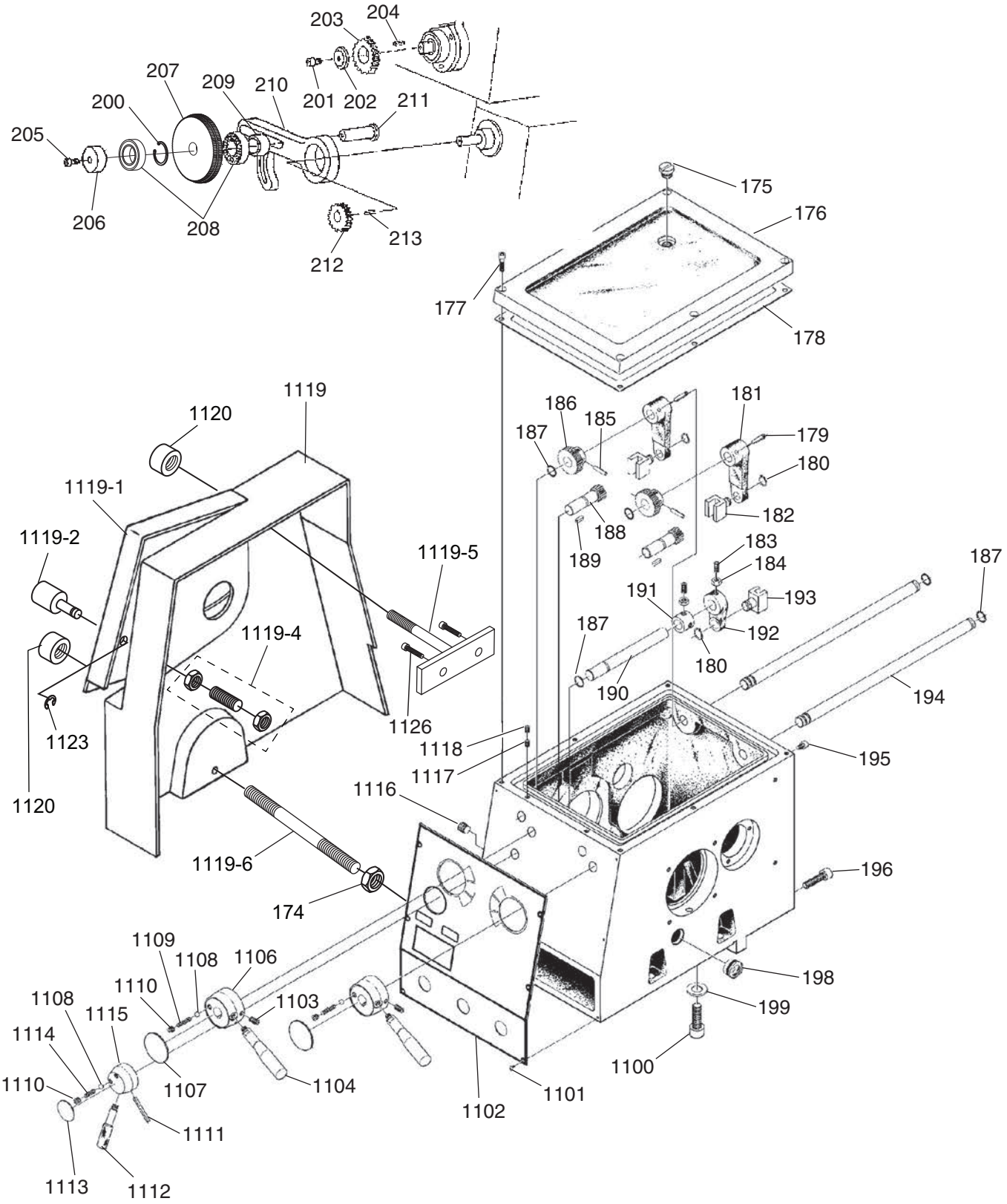


Headstock Gearing Parts List

REF	PART #	DESCRIPTION
101	P4003G0101	EXT RETAINING RING 45MM
102	P4003G0102	GEAR 36T
103	P4003G0103	GEAR 55T
104	P4003G0104	KEY 5 X 5 X 18
105	P4003G0105	GEAR 35T
106	P4003G0106	EXT RETAINING RING 36MM
107	P4003G0107	GEAR 45T
108	P4003G0108	GEAR 58T
109	P4003G0109	GEAR 21T
110	P4003G0110	GEAR 45T
111	P4003G0111	EXT RETAINING RING 58MM
112	P4003G0112	GEAR 59T
113	P4003G0113	GEAR 46T
114	P4003G0114	CAP SCREW M6-1 X 14
115	P4003G0115	GEAR SHAFT COVER (L)
116	P4003G0116	GEAR SHAFT COVER (L) GASKET
117	P4003G0117	BALL BEARING 6004-2RS
118	P4003G0118	SET SCREW M8-1.25 X 6
119	P4003G0119	GEAR 83T
120	P4003G0120	O-RING 17 X 2.65
121	P4003G0121	GEAR SHAFT
122	P4003G0122	INT RETAINING RING 47MM
123	P4003G0123	COMBO GEAR 40/45T
124	P4003G0124	BALL BEARING 6004-2RS
125	P4003G0125	EXT RETAINING RING 20MM
126	P4003G0126	BUSHING
127	P4003G0127	SPACER C5 X 20 STEEL
128	P4003G0128	COMBO GEAR 45/40T
129	P4003G0129	FLAT WASHER 6MM
130	P4003G0130	CAP SCREW M6-1 X 16
131	P4003G0131	GEAR SHAFT
132	P4003G0132	BALL BEARING 6004-2RS
133	P4003G0133	GEAR SHAFT COVER (R) GASKET
134	P4003G0134	GEAR SHAFT COVER (R)
135	P4003G0135	CAP SCREW M6-1 X 16 DOG-PT
136	P4003G0136	COMPRESSION SPRING
137V2	P4003G0137V2	SPIDER BOLT SET SCREW M10-1.5 X 30

REF	PART #	DESCRIPTION
138-1	P4003G0138-1	CAMLOCK STUD D1-5
139	P4003G0139	KEY 8 X 8 X 80
140	P4003G0140	KEY 8 X 8 X 45 W/1 HOLE
141	P4003G0141	BUTTON HD CAP SCR M3-.5 X 8
142	P4003G0142	SPINDLE D1-5
143	P4003G0143	KEY 8 X 8 X 210
144	P4003G0144	CAP SCREW M6-1 X 20
145	P4003G0145	INBOUND SPINDLE BEARING COVER
146	P4003G0146	INBOARD BEARING COVER GASKET
147	P4003G0147	TAPER ROLLER BEARING HR 30212J NSK
148	P4003G0148	HEADSTOCK HOUSING
149	P4003G0149	BEARING BLOCK GASKET
150	P4003G0150	BEARING BLOCK
151	P4003G0151	INT RETAINING RING 42MM
152	P4003G0152	SHAFT
153	P4003G0153	OIL SEAL PD25 X 45 X 10
154	P4003G0154	GEAR 40T
155	P4003G0155	TAPER ROLLER BEARING HR 30211J NSK
156	P4003G0156	SPANNER NUT
157	P4003G0157	KEY 5 X 5 X 8
158	P4003G0158	OUTBOARD BEARING COVER GASKET
159	P4003G0159	KEY 5 X 5 X 8
160	P4003G0160	OUTBOUND SPINDLE BEARING COVER
161	P4003G0161	CAP SCREW M8-1.25 X 12
162	P4003G0162	OIL SEAL PD20 X 45 X 10
163	P4003G0163	SPINDLE PULLEY
164	P4003G0164	FENDER WASHER 6MM
165	P4003G0165	PULLEY SHAFT COVER
166	P4003G0166	PULLEY SHAFT COVER GASKET
167	P4003G0167	SPINDLE PULLEY SHAFT SPACER
168	P4003G0168	KEY 5 X 5 X 30
169	P4003G0169	KEY 5 X 5 X 80
170	P4003G0170	SPINDLE PULLEY SHAFT
171	P4003G0171	GEAR 42T
172	P4003G0172	GEAR 23T
173	P4003G0173	GEAR 47T
174	P4003G0174	HEX NUT M10-1.5

Headstock Controls

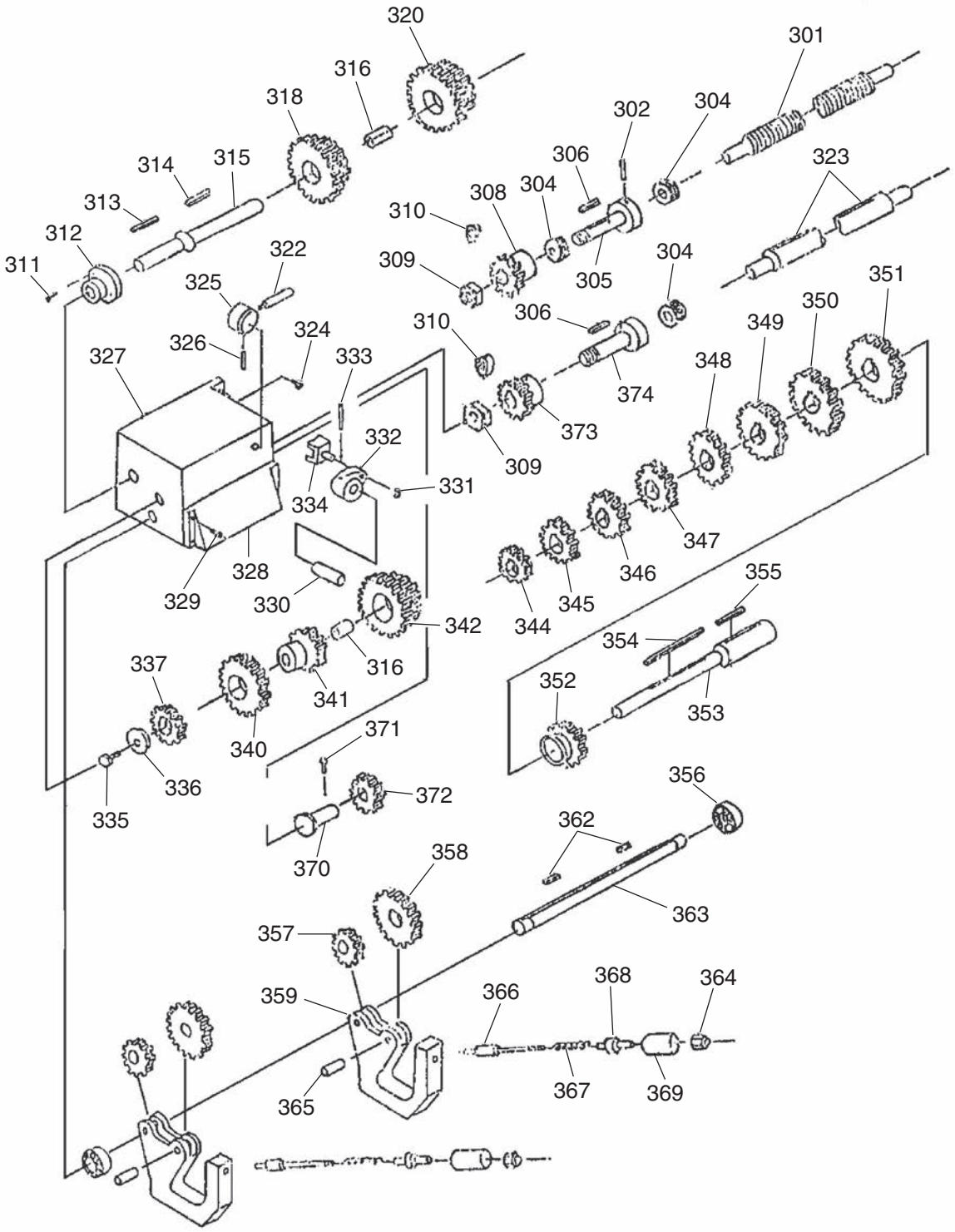


Headstock Controls Parts List

REF	PART #	DESCRIPTION
174	P4003G0174	HEX NUT M10-1.5
175	P4003G0175	OIL FILL PLUG 3/4" NPT PLASTIC
176	P4003G0176	HEADSTOCK TOP COVER
177	P4003G0177	CAP SCREW M6-1 X 25
178	P4003G0178	HEADSTOCK TOP COVER GASKET
179	P4003G0179	ROLL PIN 5 X 30
180	P4003G0180	EXT RETAINING RING 12MM
181	P4003G0181	SPINDLE SPEED SHIFTING ARM
182	P4003G0182	SPINDLE SPEED SHIFTING FORK
183	P4003G0183	SET SCREW M8-1.25 X 16
184	P4003G0184	HEX NUT M8-1.25
185	P4003G0185	ROLL PIN 5 X 25
186	P4003G0186	GEAR 38T
187	P4003G0187	O-RING 11.2 X 2.65
188	P4003G0188	PINION SHAFT
189	P4003G0189	KEY 5 X 5 X 8
190	P4003G0190	SHAFT
191	P4003G0191	LOCK COLLAR
192	P4003G0192	FEED DIRECTION SHIFTING ARM
193	P4003G0193	FEED DIRECTION SHIFTING FORK
194	P4003G0194	SPINDLE SPEED SHAFT
195	P4003G0195	CAP SCREW M6-1 X 10
196	P4003G0196	CAP SCREW M8-1.25 X 30
198	P4003G0198	OIL SIGHT GLASS M20-1.5
199	P4003G0199	FLAT WASHER 12MM
200	P4003G0200	INT RETAINING RING 35MM
201	P4003G0201	CAP SCREW M6-1 X 12
202	P4003G0202	GEAR FLAT WASHER 6MM
203	P4003G0203	GEAR 40T
204	P4003G0204	KEY 5 X 5 X 30
205	P4003G0205	CAP SCREW M6-1 X 12
206	P4003G0206	COMBO GEAR FLAT WASHER 6MM
207	P4003G0207	COMBO GEAR 86T/91T

REF	PART #	DESCRIPTION
208	P4003G0208	BALL BEARING 6003-2RS
209	P4003G0209	BUSHING 42 X 25 X 17MM
210	P4003G0210	PIVOT ARM
211	P4003G0211	SHAFT
212	P4003G0212	GEAR 40T
213	P4003G0213	KEY 5 X 5 X 30
1100	P4003G1100	CAP SCREW M12-1.75 X 30
1101	P4003G1101	PHLP HD SCR M3-.5 X 6
1102	P4003G1102	HEADSTOCK CONTROL PLATE 2-PC ASSY
1103	P4003G1103	SET SCREW M6-1 X 12
1104	P4003G1104	SPINDLE SPEED HANDLE M8-1.25 X 40
1106	P4003G1106	SPINDLE SPEED HANDLE HUB
1107	P4003G1107	SPINDLE SPEED INFORMATION PLATE
1108	P4003G1108	STEEL BALL 6MM
1109	P4003G1109	COMPRESSION SPRING 1.2 X 4.8 X 27
1110	P4003G1110	SET SCREW M8-1.25 X 8
1111	P4003G1111	ROLL PIN 5 X 40
1112	P4003G1112	FEED DIRECTION HANDLE M10-1.5 X 10
1113	P4003G1113	FEED DIRECTION INFORMATION PLATE
1114	P4003G1114	COMPRESSION SPRING 1 X 5 X 16
1115	P4003G1115	FEED DIRECTION HANDLE HUB
1116	P4003G1116	HEADSTOCK OIL DRAIN PLUG 3/8" NPT
1117	P4003G1117	SET SCREW M6-1 X 10
1118	P4003G1118	SET SCREW M6-1 X 6
1119	P4003G1119	END GEAR COVER
1119-1	P4003G1119-1	SPIDER SAFETY COVER
1119-2	P4003G1119-2	SPIDER COVER KNOB BOLT M16-2.0
1119-4	P4003G1119-4	STUD-FT M10-1.5 X 35 W/NUTS
1119-5	P4003G1119-5	END GEAR COVER TOP BOLT M10-1.5 X 78
1119-6	P4003G1119-6	STUD-DE M10-1.5 X 122 30RH
1120	P4003G1120	KNURLED KNOB M10-1.5
1123	P4003G1123	E-CLIP 15MM
1126	P4003G1126	CAP SCREW M6-1 X 8

Quick-Change Gearbox

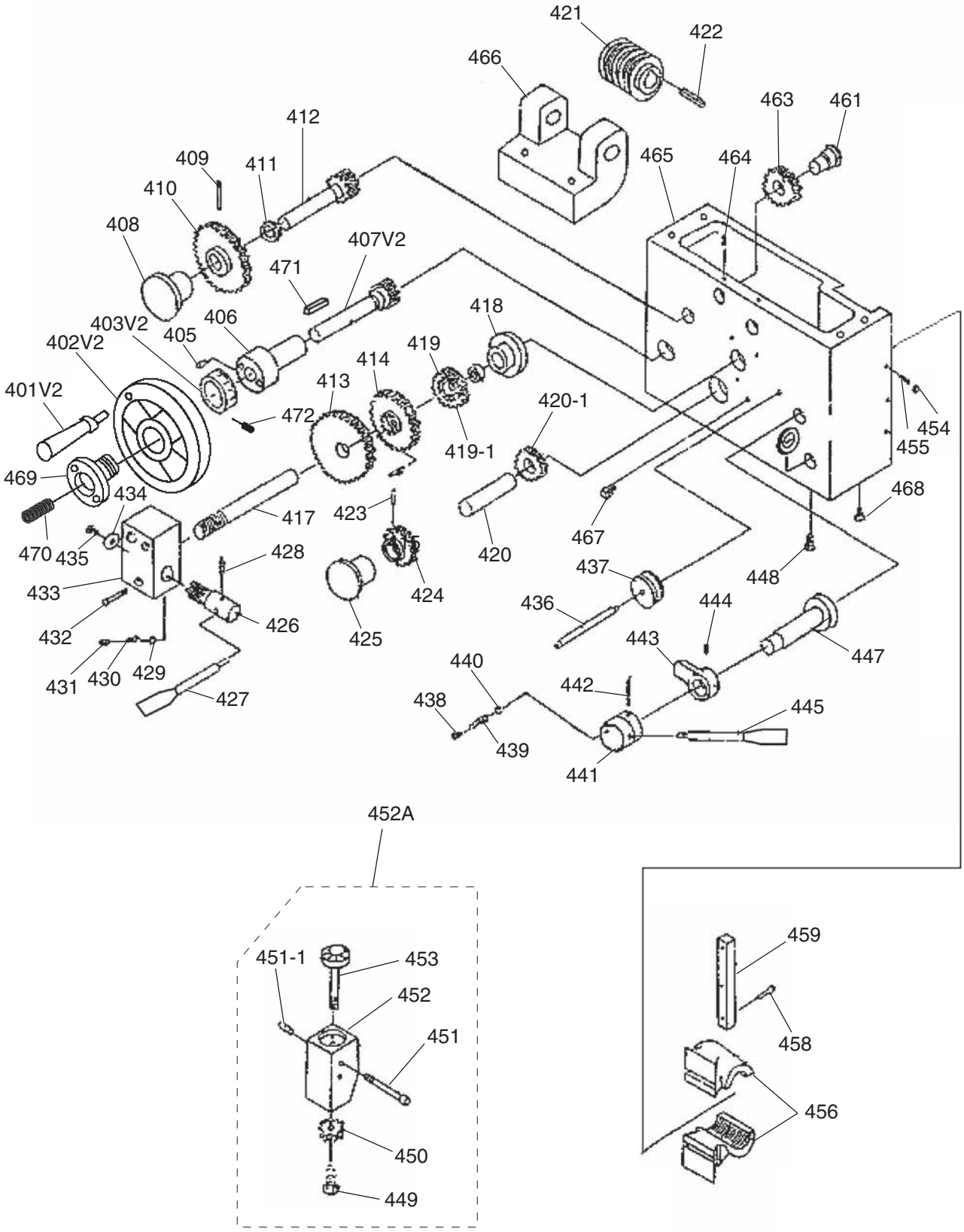


Quick-Change Gearbox Parts List

REF	PART #	DESCRIPTION
301	P4003G0301	LONGITUDINAL LEADSCREW
302	P4003G0302	ROLL PIN 5 X 36
304	P4003G0304	THRUST BEARING 8103
305	P4003G0305	LEADSCREW CONNECTOR
306	P4003G0306	KEY 5 X 5 X 14
308	P4003G0308	GEAR 24T
309	P4003G0309	HEX NUT M12-1.75
310	P4003G0310	GEAR FLAT WASHER 12MM
311	P4003G0311	CAP SCREW M6-1 X 16
312	P4003G0312	END CAP
313	P4003G0313	KEY 5 X 5 X 30
314	P4003G0314	KEY 5 X 5 X 10
315	P4003G0315	SHAFT
316	P4003G0316	BUSHING
318	P4003G0318	COMBO GEAR 32/16T
320	P4003G0320	COMBO GEAR 32/16T
322	P4003G0322	FEED SELECTION HANDLE
323	P4003G0323	FEED ROD
324	P4003G0324	HEX BOLT M10-1.5 X 30
325	P4003G0325	FEED SELECTION HUB
326	P4003G0326	ROLL PIN 5 X 40
327	P4003G0327	GEARBOX CASTING
328	P4003G0328	QUICK-CHANGE SELECTION PLATE
329	P4003G0329	CAP SCREW M6-1 X 16
330	P4003G0330	SHAFT
331	P4003G0331	E-CLIP 13MM
332	P4003G0332	SHIFT PIVOT
333	P4003G0333	ROLL PIN 4 X 30
334	P4003G0334	SHIFT FORK
335	P4003G0335	CAP SCREW M6-1 X 12
336	P4003G0336	GEAR FLAT WASHER 6MM
337	P4003G0337	GEAR 16T

REF	PART #	DESCRIPTION
340	P4003G0340	GEAR 32T
341	P4003G0341	GEAR 16T
342	P4003G0342	COMBO GEAR 3PC SET
344	P4003G0344	GEAR 16T
345	P4003G0345	GEAR 18T
346	P4003G0346	GEAR 19T
347	P4003G0347	GEAR 20T
348	P4003G0348	GEAR 22T
349	P4003G0349	GEAR 24T
350	P4003G0350	GEAR 26T
351	P4003G0351	GEAR 28T
352	P4003G0352	GEAR 24T
353	P4003G0353	SHAFT
354	P4003G0354	KEY 5 X 5 X 75
355	P4003G0355	KEY 5 X 5 X 40
356	P4003G0356	BALL BEARING 6002-2RS
357	P4003G0357	GEAR 16T
358	P4003G0358	GEAR 32T W/BUSHING
359	P4003G0359	QUICK-CHANGE SHIFT LEVER
362	P4003G0362	KEY 5 X 5 X 32
363	P4003G0363	SHIFT ROD
364	P4003G0364	HEX NUT M6-1
365	P4003G0365	SHAFT
366	P4003G0366	SHAFT
367	P4003G0367	EXTENSION SPRING
368	P4003G0368	SPRING RETAINER
369	P4003G0369	SPRING HOUSING
370	P4003G0370	SHAFT
371	P4003G0371	SET SCREW M8-1.25 X 8
372	P4003G0372	GEAR 15T
373	P4003G0373	GEAR 24T
374	P4003G0374	SHAFT

Apron

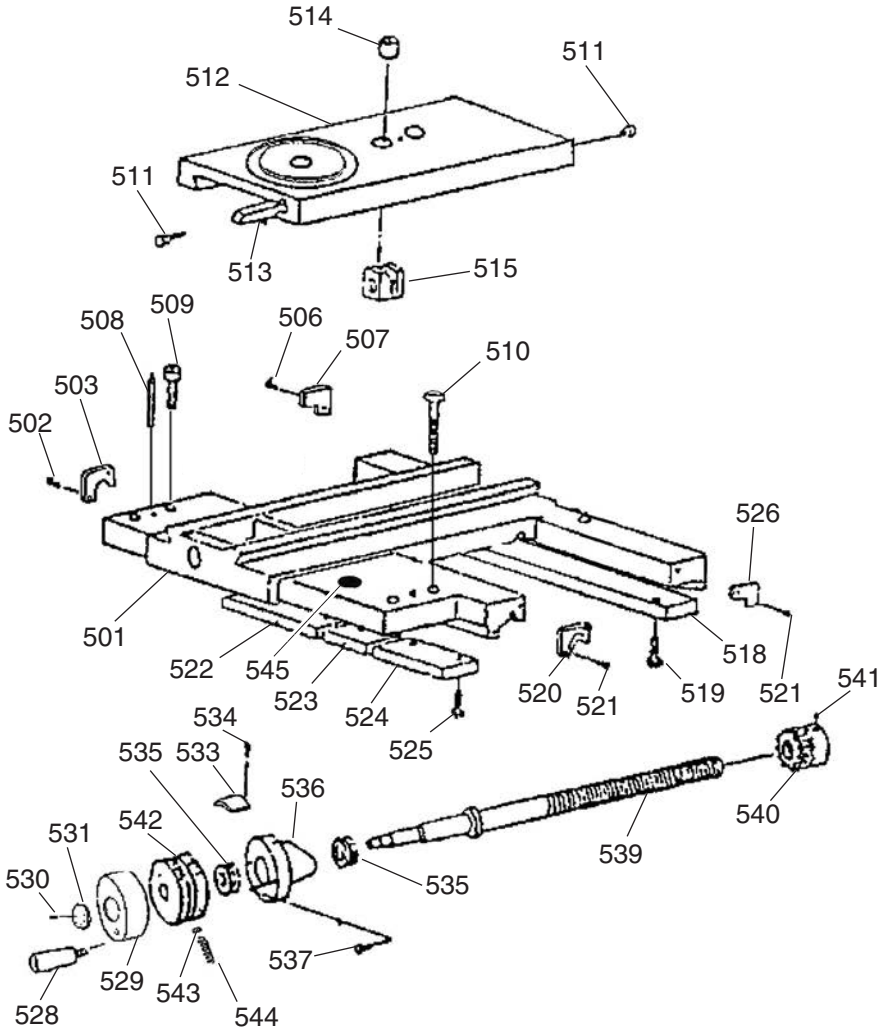


Apron Parts List

REF	PART #	DESCRIPTION
401V2	P4003G0401V2	HANDWHEEL HANDLE M8-1.25 X 8 V2.04.12
402V2	P4003G0402V2	CARRIAGE HANDWHEEL V2.04.12
403V2	P4003G0403V2	GRADUATED DIAL V2.04.12
405	P4003G0405	SET SCREW M6-1 X 20
406	P4003G0406	HANDWHEEL BRACKET
407V2	P4003G0407V2	GEAR SHAFT 12T W/KEYWAY V2.04.12
408	P4003G0408	CASTING PLUG
409	P4003G0409	ROLL PIN 5 X 30
410	P4003G0410	GEAR 50T
411	P4003G0411	EXT RETAINING RING 19MM
412	P4003G0412	GEAR SHAFT 11T
413	P4003G0413	GEAR 48T
414	P4003G0414	GEAR 51T
415	P4003G0415	ROLL PIN 5 X 30
417	P4003G0417	WORM SHAFT
418	P4003G0418	END CAP
419	P4003G0419	GEAR 25T
419-1	P4003G0419-1	SPACER
420	P4003G0420	SHAFT
420-1	P4003G0420-1	GEAR 24T
421	P4003G0421	WORM GEAR
422	P4003G0422	KEY 5 X 5 X 45
423	P4003G0423	ROLL PIN 5 X 24
424	P4003G0424	GEAR 14T
425	P4003G0425	CASTING PLUG
426	P4003G0426	GEAR SHAFT 10T
427	P4003G0427	FEED SELECTION LEVER M8-1.25 X 8
428	P4003G0428	ROLL PIN 5 X 24
429	P4003G0429	STEEL BALL 6MM
430	P4003G0430	COMPRESSION SPRING
431	P4003G0431	SET SCREW M6-1 X 8
432	P4003G0432	CAP SCREW M6-1 X 45
433	P4003G0433	FEED SELECTION BRACKET
434	P4003G0434	FLAT WASHER 6MM
435	P4003G0435	CAP SCREW M6-1 X 40

REF	PART #	DESCRIPTION
436	P4003G0436	SHAFT
437	P4003G0437	SAFETY SHIFTER
438	P4003G0438	SET SCREW M8-1.25 X 6
439	P4003G0439	COMPRESSION SPRING
440	P4003G0440	STEEL BALL 6MM
441	P4003G0441	HALF NUT LEVER HUB
442	P4003G0442	ROLL PIN 6 X 40
443	P4003G0443	HALF NUT DOG
444	P4003G0444	SET SCREW M8-1.25 X 30
445	P4003G0445	HALF NUT LEVER M8-1.25 X 8 155L
447	P4003G0447	SHAFT
448	P4003G0448	CAP SCREW M6-1 X 65
449	P4003G0449	CAP SCREW M6-1 X 15
450	P4003G0450	GEAR 16T
451	P4003G0451	CAP SCREW M6-1 X 60 BLK C12.9 USA
451-1	P4003G0451-1	SLEEVE
452	P4003G0452	THREAD DIAL BODY
452A	P4003G0452A	THREADED DIAL ASSEMBLY
453	P4003G0453	THREAD DIAL
454	P4003G0454	HEX NUT M6-1
455	P4003G0455	SET SCREW M6-1 X 16
456	P4003G0456	HALF NUT 2-PC
458	P4003G0458	CAP SCREW M6-1 X 25
459	P4003G0459	HALF NUT GIB
461	P4003G0461	SHAFT
463	P4003G0463	GEAR 25T
464	P4003G0464	SET SCREW M6-1 X 6
465	P4003G0465	APRON HOUSING
466	P4003G0466	WORM BRACKET
467	P4003G0467	OIL SIGHT GLASS M20-1.5
468	P4003G0468	CAP SCREW M10-1.5 X 20
469	P4003G0469	HANDWHEEL RETAINER
470	P4003G0470	SET SCREW M6-1 X 20
471	P4003G0471	KEY 5 X 5 X 20
472	P4003G0472	SET SCREW M6-1 X 8

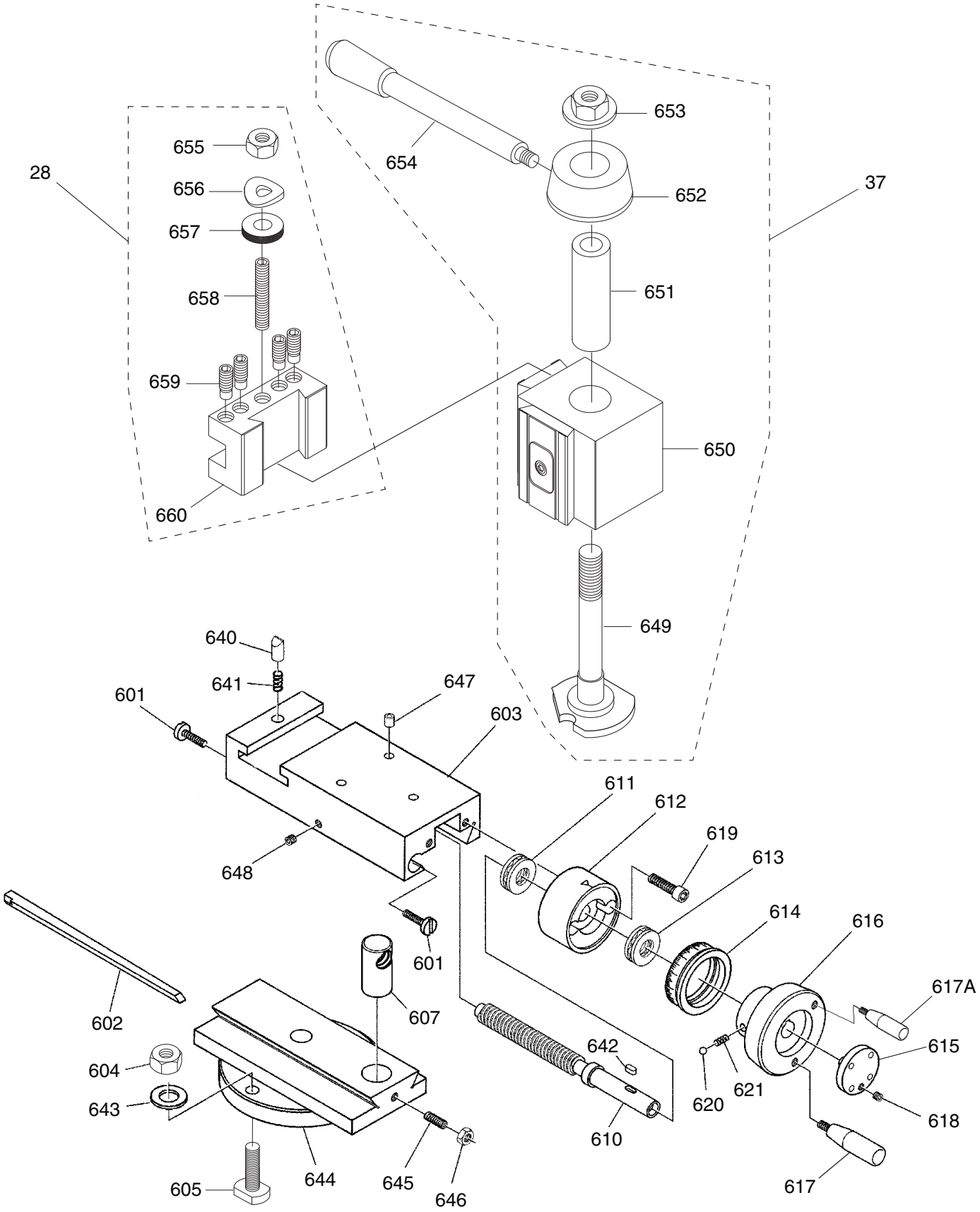
Saddle & Cross Slide



REF	PART #	DESCRIPTION
501	P4003G0501	SADDLE
502	P4003G0502	PHLP HD SCR M3-.5 X 14
503	P4003G0503	SADDLE WIPER W/PLATE LEFT FRONT
506	P4003G0506	PHLP HD SCR M5-.8 X 14
507	P4003G0507	SADDLE WIPER W/PLATE LEFT REAR
508	P4003G0508	ROLL PIN 5 X 45
509	P4003G0509	CAP SCREW M8-1.25 X 35
510	P4003G0510	CAP SCREW M8-1.25 X 60
511	P4003G0511	GIB SCREW
512	P4003G0512	CROSS SLIDE
513	P4003G0513	CROSS SLIDE GIB
514	P4003G0514	BUSHING
515	P4003G0515	LEADSCREW NUT M8-1.25 BRASS
518	P4003G0518	SADDLE GIB REAR
519	P4003G0519	FLAT HD SCR M8-1.25 X 25
520	P4003G0520	SADDLE WIPER W/PLATE RIGHT FRONT
521	P4003G0521	PHLP HD SCR M5-.8 X 14
522	P4003G0522	SADDLE GIB LEFT FRONT
523	P4003G0523	SADDLE GIB CENTER FRONT

REF	PART #	DESCRIPTION
524	P4003G0524	SADDLE GIB RIGHT FRONT
525	P4003G0525	HEX BOLT M8-1.25 X 24
526	P4003G0526	SADDLE WIPER W/PLATE RIGHT REAR
528	P4003G0528	HANDWHEEL HANDLE M8-1.25 X 10 V2.04.12
529	P4003G0529	CROSS SLIDE HANDWHEEL
530	P4003G0530	SET SCREW M10-1.5 X 12
531	P4003G0531	BACKLASH ADJUSTMENT NUT
533	P4003G0533	INDICATOR PLATE
534	P4003G0534	RIVET 2 X 5MM NAMEPLATE, STEEL
535	P4003G0535	THRUST BEARING 8102
536	P4003G0536	HANDWHEEL BRACKET
537	P4003G0537	CAP SCREW M6-1 X 25
539	P4003G0539	CROSS SLIDE LEADSCREW
540	P4003G0540	GEAR 13T
541	P4003G0541	SET SCREW M8-1.25 X 8
542	P4003G0542	GRADUATED DIAL
543	P4003G0543	STEEL BALL 6MM
544	P4003G0544	COMPRESSION SPRING 6 X 16MM
545	P4003G0545	OIL FILL CAP 3/8 NPT PLASTIC

Compound Rest & Tool Holder

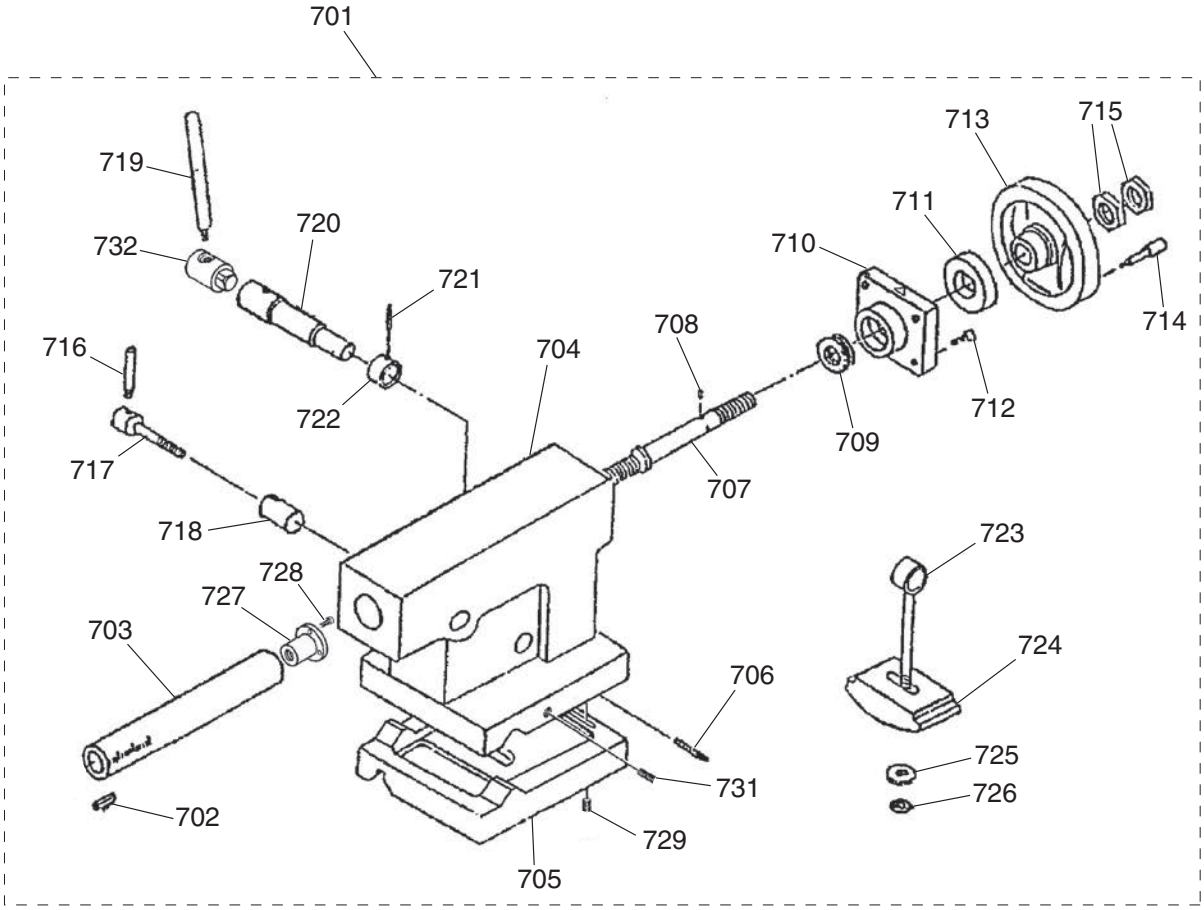


Compound Rest & Tool Holder Parts List

REF	PART #	DESCRIPTION
28	P4003G0028	QUICK-CHANGE TOOL HOLDER ASSY
37	P4003G0037	QUICK-CHANGE TOOL POST ASSY
601	P4003G0601	GIB SCREW
602	P4003G0602	COMPOUND REST GIB
603	P4003G0603	COMPOUND REST
604	P4003G0604	HEX NUT M8-1.25
605	P4003G0605	COMPOUND REST MOUNTING BOLT
607	P4003G0607	COMPOUND REST LEADSCREW NUT
610	P4003G0610	COMPOUND REST LEADSCREW
611	P4003G0611	THRUST BEARING 8101
612	P4003G0612	HANDWHEEL BRACKET
613	P4003G0613	THRUST BEARING 8101
614	P4003G0614	GRADUATED DIAL
615	P4003G0615	BACKLASH ADJUSTMENT NUT
616	P4003G0616	COMPOUND REST HANDWHEEL
617	P4003G0617	HANDLE LARGE M5-.8 X 10 50L
617A	P4003G0617A	HANDLE SMALL M5-.8 X 10 35L
618	P4003G0618	SET SCREW M5-.8 X 5
619	P4003G0619	CAP SCREW M6-1 X 15
620	P4003G0620	STEEL BALL 6MM
621	P4003G0621	COMPRESSION SPRING 6 X 16MM

REF	PART #	DESCRIPTION
640	P4003G0640	PLUNGER
641	P4003G0641	COMPRESSION SPRING
642	P4003G0642	KEY 4 X 4 X 10
643	P4003G0643	FLAT WASHER 8MM
644	P4003G0644	SWIVEL SLIDE
645	P4003G0645	SET SCREW M6-1 X 16
646	P4003G0646	HEX NUT M6-1
647	P4003G0647	BALL OILER 8MM TAP-IN
648	P4003G0648	SET SCREW M6-1 X 8
649	P4003G0649	TOOL POST BOLT M16-1.5 X 35
650	P4003G0650	QUICK CHANGE TOOL POST BLOCK
651	P4003G0651	TOOL POST BUSHING
652	P4003G0652	TOOL POST HANDLE HUB
653	P4003G0653	FLANGE NUT M16-1.5
654	P4003G0654	TOOL POST HANDLE M12-1.75 X 8
655	P4003G0655	HEX NUT M10-1
656	P4003G0656	WAVY WASHER 10MM
657	P4003G0657	KNURLED THUMB NUT M10-1
658	P4003G0658	SET SCREW M10-1 X 45
659	P4003G0659	SET SCREW M10-1.5 X 14 DOG-PT
660	P4003G0660	TOOL HOLDER BODY

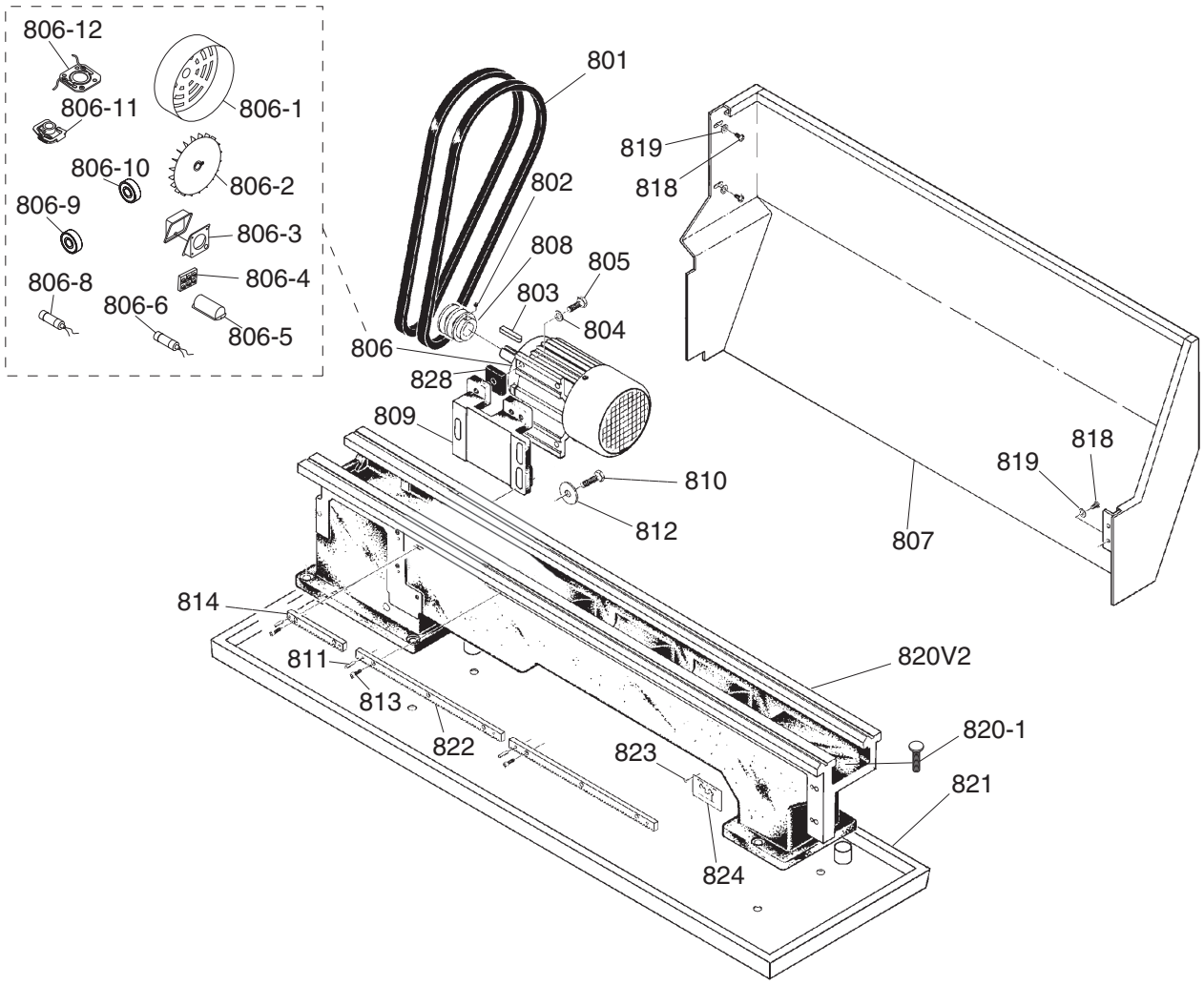
Tailstock



REF	PART #	DESCRIPTION
701	P4003G0701	TAILSTOCK ASSEMBLY
702	P4003G0702	KEY 8 X 8 X 30
703	P4003G0703	QUILL
704	P4003G0704	TAILSTOCK BODY
705	P4003G0705	CLAMPING BASE
706	P4003G0706	SET SCREW M10-1.5 X 50
707	P4003G0707	QUILL LEADSCREW
708	P4003G0708	ROLL PIN 4 X 10
709	P4003G0709	THRUST BEARING 8101
710	P4003G0710	HANDWHEEL BRACKET
711	P4003G0711	GRADUATED DIAL
712	P4003G0712	CAP SCREW M6-1 X 20
713	P4003G0713	QUILL HANDWHEEL
714	P4003G0714	HANDWHEEL HANDLE M8-1.25 X 14 88L
715	P4003G0715	HEX NUT M12-1.75
716	P4003G0716	QUILL LOCK HANDLE M12-1.75 X 16 170L

REF	PART #	DESCRIPTION
717	P4003G0717	QUILL LOCK BOLT
718	P4003G0718	LOCK SHAFT
719	P4003G0719	TAILSTOCK LOCK HANDLE M10-1.5 X 12 90L
720	P4003G0720	TAILSTOCK LOCK SHAFT
721	P4003G0721	ROLL PIN 5 X 30
722	P4003G0722	LOCK COLLAR
723	P4003G0723	CLAMP BOLT 3-7/8"
724	P4003G0724	CLAMP SHOE
725	P4003G0725	FLAT WASHER 12MM
726	P4003G0726	HEX NUT M12-1.75
727	P4003G0727	QUILL LEADSCREW NUT
728	P4003G0728	CAP SCREW M4-.7 X 10
729	P4003G0729	SET SCREW M6-1 X 30
731	P4003G0731	SET SCREW M8-1.25 X 50
732	P4003G0732	HANDLE BASE

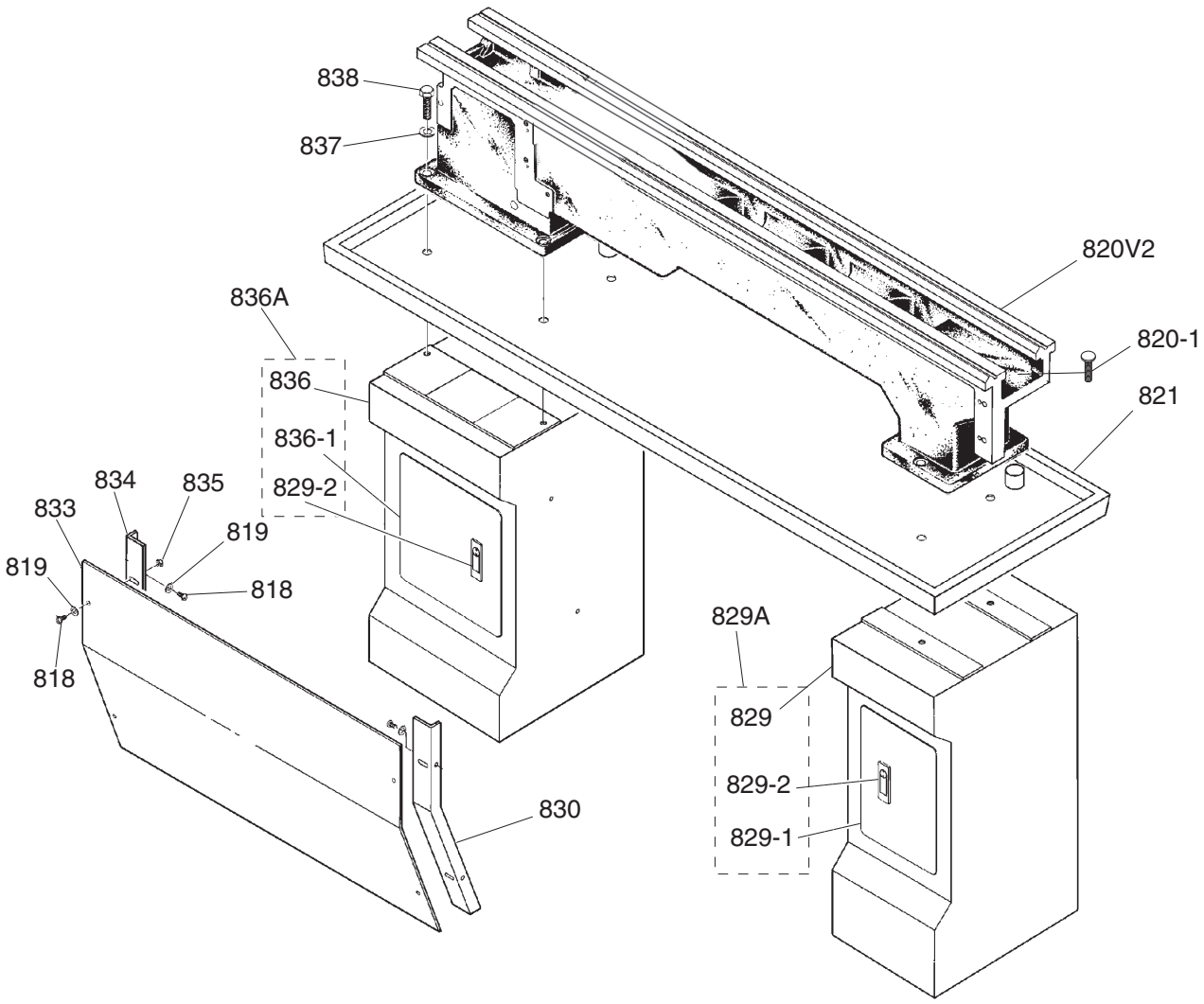
Bed & Motor



REF	PART #	DESCRIPTION
801	P4003G0801	COGGED V-BELT V13X795 185 P10 3606
802	P4003G0802	SET SCREW M5-.8 X 10
803	P4003G0803	KEY 8 X 8 X 60
804	P4003G0804	FLAT WASHER 10MM
805	P4003G0805	HEX BOLT M10-1.5 X 25
806	P4003G0806	MOTOR 2HP 220V 1-PH
806-1	P4003G0806-1	MOTOR FAN COVER
806-2	P4003G0806-2	MOTOR FAN
806-3	P4003G0806-3	MOTOR JUNCTION BOX
806-4	P4003G0806-4	MOTOR TERMINAL BLOCK
806-5	P4003G0806-5	MOTOR CAPACITOR COVER
806-6	P4003G0806-6	S CAPACITOR 150M 250V
806-8	P4003G0806-8	R CAPACITOR 20M 450V
806-9	P4003G0806-9	BALL BEARING 5205ZZ
806-10	P4003G0806-10	BALL BEARING 5205ZZ
806-11	P4003G0806-11	CENT SWITCH
806-12	P4003G0806-12	CONTACT PLATE

REF	PART #	DESCRIPTION
807	P4003G0807	SPLASH GUARD
808	P4003G0808	MOTOR PULLEY
809	P4003G0809	MOTOR MOUNT
810	P4003G0810	HEX BOLT M10-1.5 X 30
811	P4003G0811	ROLL PIN 5 X 25
812	P4003G0812	FLAT WASHER 10MM
813	P4003G0813	CAP SCREW M6-1 X 25
814	P4003G0814	GAP RACK
818	P4003G0818	PHLP HD SCR M6-1 X 10
819	P4003G0819	FLAT WASHER 6MM
820V2	P4003G0820V2	LATHE BED V2.03.20
820-1	P4003G0820-1	TAILSTOCK STOP BOLT M12-1.75 X 50
821	P4003G0821	CHIP PAN
822	P4003G0822	BED RACK
823	P4003G0823	RIVET 2 X 5MM NAMEPLATE, STEEL
824	P4003G0824	INFORMATION PLATE
828	P4003G0828	MOTOR MOUNT SPACER BLOCK

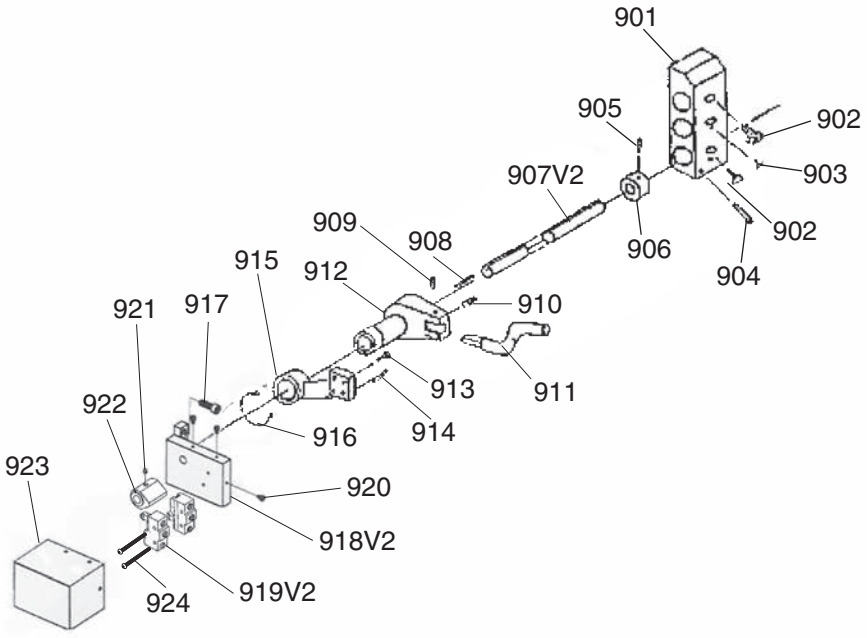
Stand



REF	PART #	DESCRIPTION
818	P4003G0818	PHLP HD SCR M6-1 X 10
819	P4003G0819	FLAT WASHER 6MM
820V2	P4003G0820V2	LATHE BED V2.03.20
820-1	P4003G0820-1	TAILSTOCK STOP BOLT M12-1.75 X 50
821	P4003G0821	CHIP PAN
829	P4003G0829	RIGHT STAND
829-1	P4003G0829-1	RIGHT STAND DOOR
829-2	P4003G0829-2	DOOR LATCH
829A	P4003G0829A	RIGHT STAND ASSEMBLY

REF	PART #	DESCRIPTION
830	P4003G0830	PANEL BRACKET RIGHT
833	P4003G0833	CENTER PANEL
834	P4003G0834	PANEL BRACKET LEFT
835	P4003G0835	HEX NUT M6-1
836	P4003G0836	LEFT STAND
836-1	P4003G0836-1	LEFT STAND DOOR
836A	P4003G0836A	LEFT STAND ASSEMBLY
837	P4003G0837	FLAT WASHER 14MM
838	P4003G0838	HEX BOLT M14-2 X 50

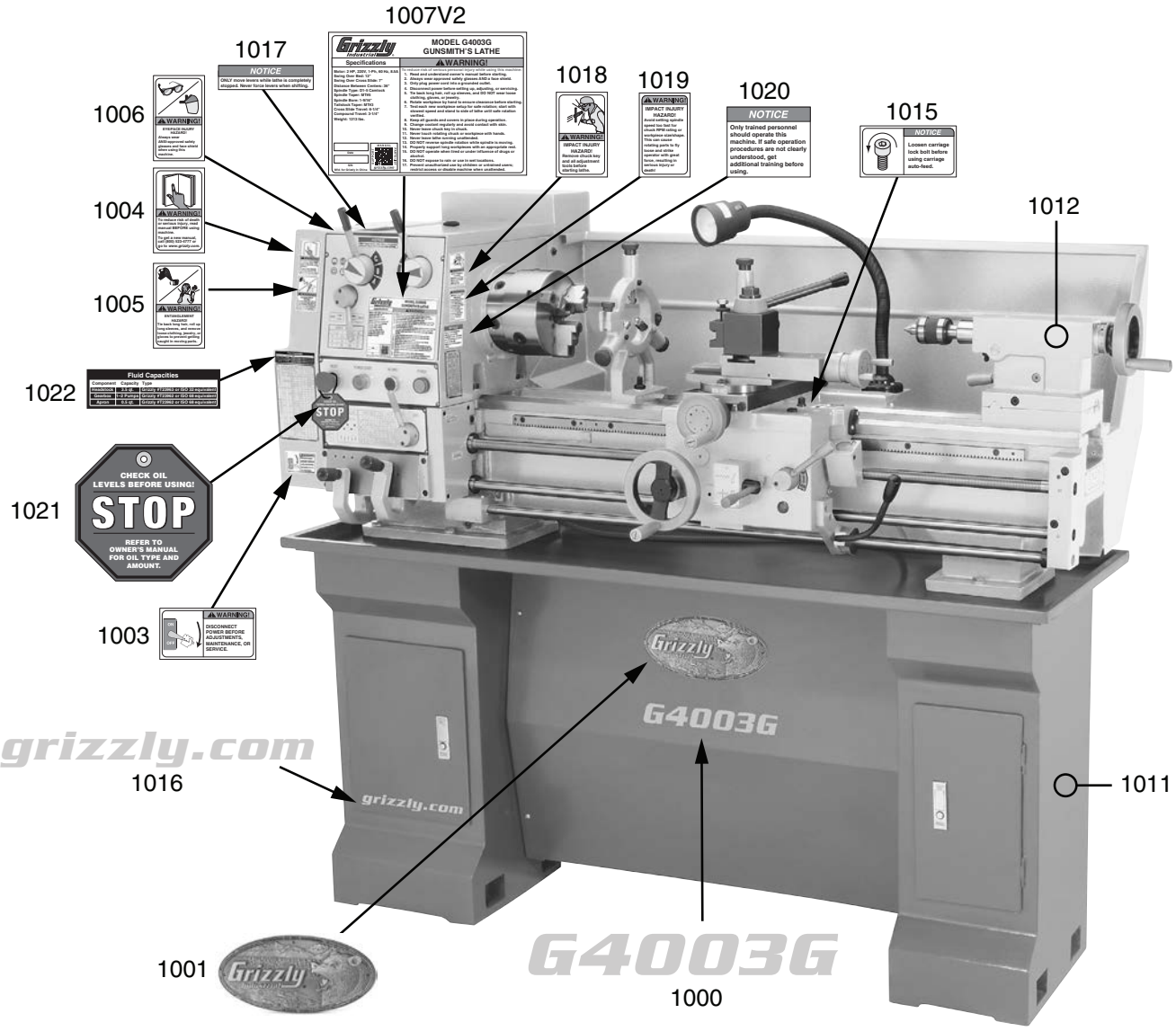
Feed Rod



REF	PART #	DESCRIPTION
901	P4003G0901	END BRACKET
902	P4003G0902	CAP SCREW M6-1 X 12
903	P4003G0903	BALL OILER 8MM TAP-IN
904	P4003G0904	ROLL PIN 6 X 55
905	P4003G0905	SET SCREW M6-1 X 6
906	P4003G0906	LOCK COLLAR 12 X 20 X 34MM
907V2	P4003G0907V2	SPINDLE ROD V2.12.14
908	P4003G0908	KEY 5 X 5 X 35
909	P4003G0909	ROLL PIN 4 X 20
910	P4003G0910	COMPRESSION SPRING 7020
911	P4003G0911	SPINDLE SWITCH HANDLE M10-1.5 X 16
912	P4003G0912	HANDLE BRACKET

REF	PART #	DESCRIPTION
913	P4003G0913	CAP SCREW M6-1 X 14
914	P4003G0914	ROLL PIN 5 X 25
915	P4003G0915	SUPPORT BRACKET
916	P4003G0916	EXT RETAINING RING 30MM
917	P4003G0917	CAP SCREW M8-1.25 X 25
918V2	P4003G0918V2	CONNECTION BRACKET V2.12.14
919V2	P4003G0919V2	SPINDLE ON/OFF SWITCH V2.12.14
920	P4003G0920	CAP SCREW M4-.7 X 6
921	P4003G0921	SET SCREW M6-1 X 8
922	P4003G0922	SPINDLE SWITCH ARM
923	P4003G0923	SPINDLE SWITCH BOX
924	P4003G0924	BUTTON HD CAP SCR M4-.7 X 45

Labels & Cosmetics, Front



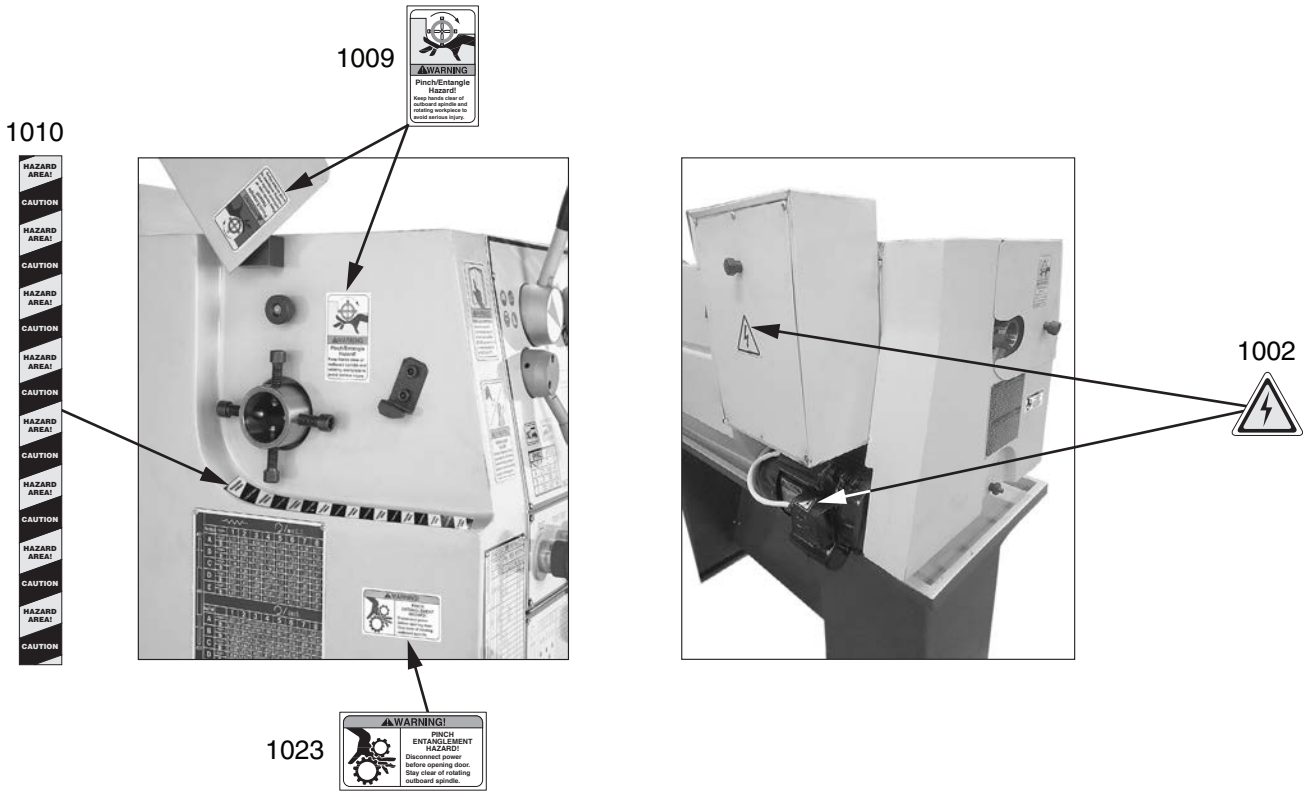
REF	PART #	DESCRIPTION
1000	P4003G1000	MODEL NUMBER LABEL
1001	P4003G1001	GRIZZLY NAMEPLATE-MINI
1003	P4003G1003	DISCONNECT LABEL
1004	P4003G1004	READ MANUAL LABEL
1005	P4003G1005	ENTANGLEMENT HAZARD LABEL
1006	P4003G1006	FACESHIELD/GLASSES LABEL
1007V2	P4003G1007V2	MACHINE ID LABEL V2.03.20
1011	P4003G1011	TOUCH-UP PAINT, GRIZZLY GREEN
1012	P4003G1012	TOUCH-UP PAINT, GRIZZLY PUTTY

REF	PART #	DESCRIPTION
1015	P4003G1015	CARRIAGE LOCK BOLT NOTICE
1016	P4003G1016	GRIZZLY.COM LABEL
1017	P4003G1017	LEVERS NOTICE LABEL
1018	P4003G1018	IMPACT INJURY WARNING LABEL
1019	P4003G1019	SPINDLE SPEED WARNING LABEL
1020	P4003G1020	TRAINED OPERATORS NOTICE LABEL
1021	P4003G1021	CHECK OIL LEVEL TAG
1022	P4003G1022	FLUID CAPACITIES LABEL

⚠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.

Labels & Cosmetics, Rear & Side



REF	PART #	DESCRIPTION
1002	P4003G1002	ELECTRICITY LABEL
1009	P4003G1009	PINCH/ENTANGLEMENT HAZARD LABEL

REF	PART #	DESCRIPTION
1010	P4003G1010	OUTBOARD WARNING STRIP LABEL
1023	P4003G1023	END GEAR ENTANGLEMENT LABEL

⚠WARNING

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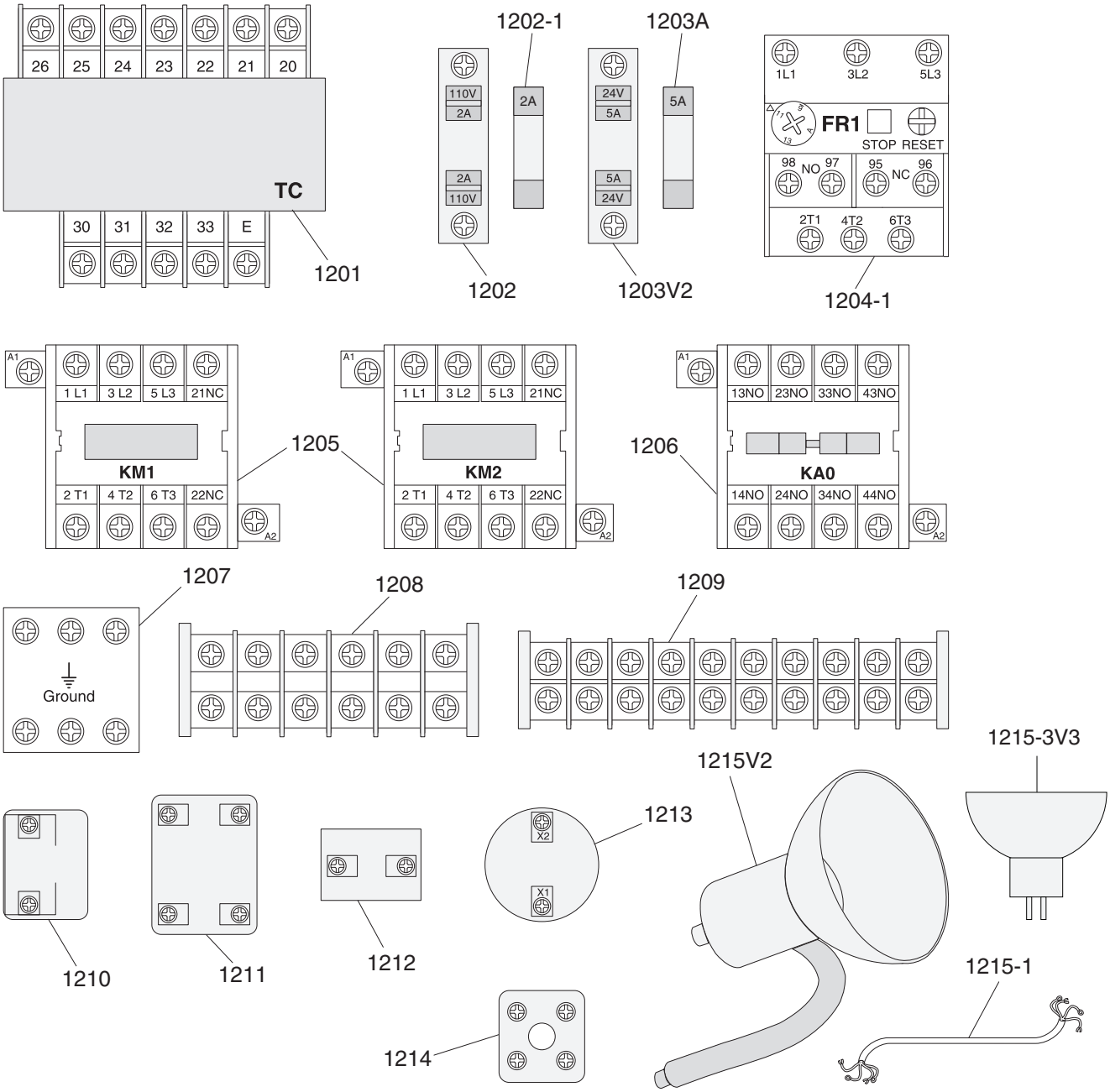
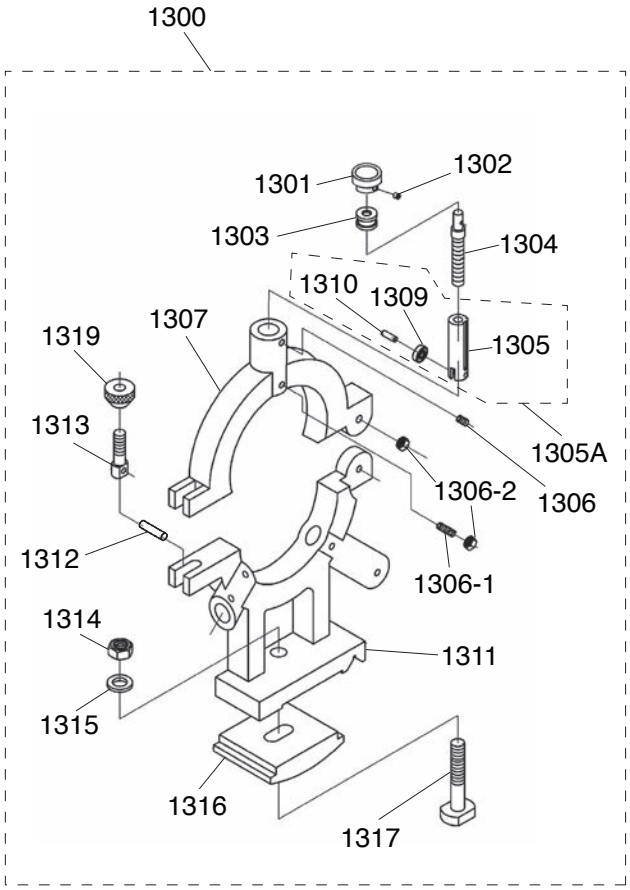
Electrical Components



REF	PART #	DESCRIPTION
1201	P4003G1201	TRANSFORMER MTE JBK5-100VATH
1202	P4003G1202	FUSE HOLDER 2A
1202-1	P4003G1202-1	FUSE 2A 500V 8.5 X 31.5MM
1203A	P4003G1203A	FUSE 5A 500V 8.5 X 31.5MM
1203V2	P4003G1203V2	FUSE HOLDER 5A V2.10.06
1204-1	P4003G1204-1	OL RELAY TIANSHUI JR58-09/25D 110V
1205	P4003G1205	CONTACTOR TIANSHUI GSC1-1801
1206	P4003G1206	CONTACTOR TIANSHUI JZC3 40D
1207	P4003G1207	GROUND TERMINAL BLOCK
1208	P4003G1208	TERMINAL BLOCK 12-POLE

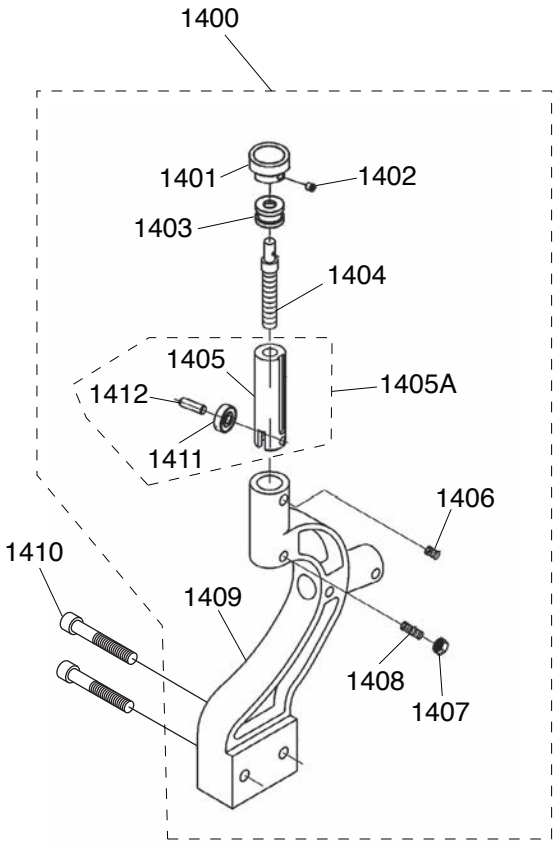
REF	PART #	DESCRIPTION
1209	P4003G1209	TERMINAL BLOCK 20-POLE
1210	P4003G1210	E-STOP RESET BUTTON SS LA103
1211	P4003G1211	POWER START BUTTON SS LA103
1212	P4003G1212	JOG BUTTON SS LA103
1213	P4003G1213	POWER LAMP SS XD103
1214	P4003G1214	WORK LIGHT TERMINAL BLOCK
1215V2	P4003G1215V2	LED WORK LAMP ASSY
1215-1	P4003G1215-1	CORD FOR WORK LIGHT
1215-3V3	P4003G1215-3V3	LED BULB 24V MR16 (1W X 3) V3.05.15

Steady Rest



REF	PART #	DESCRIPTION
1300	P4003G1300	STEADY REST ASSEMBLY
1301	P4003G1301	KNURLED FINGER KNOB
1302	P4003G1302	SET SCREW M6-1 X 6 CONE-PT
1303	P4003G1303	BUSHING
1304	P4003G1304	FINGER ADJUSTMENT SCREW
1305	P4003G1305	FINGER SLEEVE 3"
1305A	P4003G1305A	FINGER 3" W/BEARING ASSEMBLY
1306	P4003G1306	SET SCREW M6-1 X 8
1306-1	P4003G1306-1	SET SCREW M6-1 X 16 DOG-PT
1306-2	P4003G1306-2	HEX NUT M6-1
1307	P4003G1307	UPPER STEADY REST CASTING
1309	P4003G1309	BALL BEARING 625ZZ
1310	P4003G1310	DOWEL PIN 5 X 16
1311	P4003G1311	LOWER STEADY REST CASTING
1312	P4003G1312	LOCK PIN
1313	P4003G1313	LOCK BOLT M10-1.5 X 18
1314	P4003G1314	HEX NUT M12-1.75
1315	P4003G1315	FLAT WASHER 12MM
1316	P4003G1316	CLAMP PLATE
1317	P4003G1317	T-BOLT M12-1.75 X 75
1319	P4003G1319	KNURLED THUMB KNOB M10-1.5

Follow Rest



REF	PART #	DESCRIPTION
1400	P4003G1400	FOLLOW REST ASSEMBLY
1401	P4003G1401	KNURLED FINGER KNOB
1402	P4003G1402	SET SCREW M6-1 X 6 CONE-PT
1403	P4003G1403	BUSHING
1404	P4003G1404	FINGER ADJUSTMENT SCREW
1405	P4003G1405	FINGER SLEEVE 3"
1405A	P4003G1405A	FINGER 3" W/BEARING ASSEMBLY
1406	P4003G1406	SET SCREW M6-1 X 8
1407	P4003G1407	HEX NUT M6-1
1408	P4003G1408	SET SCREW M6-1 X 16 DOG-PT
1409	P4003G1409	FOLLOW REST CASTING
1410	P4003G1410	CAP SCREW M8-1.25 x 35
1411	P4003G1411	BALL BEARING 625ZZ
1412	P4003G1412	DOWEL PIN 5 X 16

SECTION 10: APPENDIX

Feed Chart

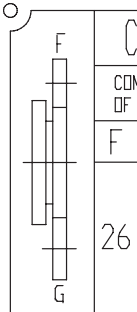
Position		1	2	3	4	5	6	7	8
		/mm C.T.							
A	~	0.791	0.703	0.666	0.632	0.575	0.527	0.486	0.452
	≠	0.268	0.238	0.226	0.214	0.196	0.178	0.166	0.154
B	~	0.395	0.351	0.333	0.316	0.287	0.264	0.243	0.226
	≠	0.134	0.119	0.113	0.107	0.098	0.089	0.083	0.077
C	~	0.198	0.175	0.167	0.158	0.144	0.132	0.122	0.113
	≠	0.067	0.060	0.057	0.054	0.049	0.045	0.042	0.038
D	~	0.099	0.088	0.083	0.079	0.072	0.066	0.061	0.057
	≠	0.033	0.030	0.028	0.027	0.025	0.022	0.021	0.019
E	~	0.050	0.044	0.042	0.040	0.036	0.033	0.031	0.028
	≠	0.017	0.015	0.014	0.014	0.012	0.011	0.011	0.010
		/inch							
Position		1	2	3	4	5	6	7	8
A	~	0.0311	0.0277	0.0262	0.0249	0.0226	0.0207	0.0191	0.0178
	≠	0.0105	0.0094	0.0089	0.0084	0.0077	0.0070	0.0065	0.0061
B	~	0.0156	0.0138	0.0131	0.0124	0.0113	0.0104	0.0096	0.0089
	≠	0.0053	0.0047	0.0044	0.0042	0.0039	0.0035	0.0032	0.0030
C	~	0.0078	0.0069	0.0066	0.0062	0.0057	0.0052	0.0048	0.0044
	≠	0.0026	0.0024	0.0022	0.0021	0.0019	0.0018	0.0017	0.0015
D	~	0.0039	0.0035	0.0033	0.0031	0.0028	0.0026	0.0024	0.0022
	≠	0.0013	0.0012	0.0011	0.0011	0.0010	0.0009	0.0008	0.0007
E	~	0.0020	0.0017	0.0017	0.0016	0.0014	0.0013	0.0012	0.0011
	≠	0.0007	0.0006	0.0006	0.0006	0.0005	0.0004	0.0004	0.0004

Thread Dial Chart

INDICATOR TABLE

TPI	SCALE	TPI	SCALE	TPI	SCALE
4	1–8	13	1, 3	44	1–8
4.5	1	14	1-2-3-4	48	1–8
4.75	1	16	1–8	52	1–8
5	1, 3	18	1-2-3-4	56	1–8
5.5	1	19	1, 3	64	1–8
6	1-2-3-4	20	1–8	72	1–8
6.5	1	22	1-2-3-4	76	1–8
7	1, 3	24	1–8	80	1–8
8	1–8	26	1-2-3-4	88	1–8
9	1, 3	28	1–8	96	1–8
9.5	1	32	1–8	104	1–8
10	1-2-3-4	36	1–8	112	1–8
11	1, 3	38	1-2-3-4		
12	1–8	40	1–8		

Metric Threading Chart

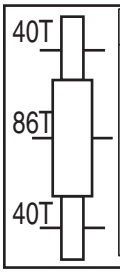


CHANGE GEAR CHART FOR m/m SIZE

COMBINATION OF GEARS F		G	POSITION	m/m PER PITCH 1	2	3	4	5	6
26	ANY	60	A					2.0	
			B					1.0	0.9
			C	0.7				0.5	0.45
			D	0.35				0.25	
			E						
27	ANY	60	A						
			B		1.2				
			C		0.6				
			D		0.3				
			E						
35	ANY	60	A	3.5					
			B	1.75					
36	ANY	60	C	0.9	0.8				
			D		0.4				
			E		0.2				
45	ANY	60	A	4.5	4.0				3.0
			B	2.25					1.5
			C	1.125					0.75
			D						
			E						
50	ANY	60	A	5					
			B	2.5	2.2				
			C	1.25	1.1				
			D		0.55				
			E						

FROM LEFT TO RIGHT

Inch Threading Chart



POSITION

A B C D E

THREAD PER INCH	1	2	3	4	5	6	7	8
A	4	4½	4¾	5	5½	6	6½	7
B	8	9	9½	10	11	12	13	14
C	16	18	19	20	22	24	26	28
D	32	36	38	40	44	48	52	56
E	64	72	76	80	88	96	104	112

WARRANTY & RETURNS

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

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

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

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

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

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

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