Grizzly Industrial, Inc.®

MODEL G0709
14" x 40" GUNSMITHING LATHE
OWNER'S MANUAL

(FOR MODELS MANUFACTURED SINCE 5/11) #CR12646 PRINTED IN CHINA

⚠ WARNING!

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

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

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

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

⚠ WARNING!

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

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

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

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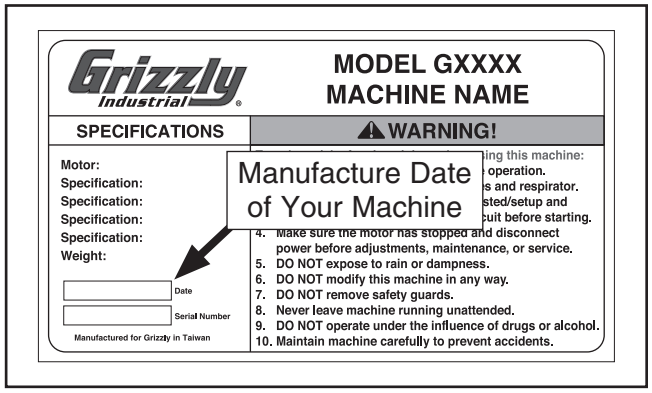
INTRODUCTION

Manual Accuracy

We are proud to offer this manual with your new machine! We've made every effort to be exact with the instructions, specifications, drawings, and photographs of the machine we used when writing this manual. However, sometimes we still make an occasional mistake.

Also, owing to our policy of continuous improvement, **your machine may not exactly match the manual**. If you find this to be the case, and the difference between the manual and machine leaves you in doubt, check our website for the latest manual update or call technical support for help.

Before calling, find the manufacture date of your machine by looking at the date stamped into the machine ID label (see below). This will help us determine if the manual version you received matches the manufacture date of your machine.



For your convenience, we post all available manuals and manual updates for free on our website at **www.grizzly.com**. Any updates to your model of machine will be reflected in these documents as soon as they are complete.

Contact Info

We stand behind our machines. If you have any questions or need help, use the information below to contact us. Before contacting, please get the serial number and manufacture date of your machine. This will help us help you faster.

Grizzly Technical Support
1203 Lycoming Mall Circle
Muncy, PA 17756
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

Machine Description

The purpose of a metal lathe is to face, turn, knurl, thread, bore, or cut tapers in a metal workpiece with perfect accuracy.

During typical operations, the lathe spindle rotates the workpiece at various speeds against a fixed cutting tool that is positioned at a particular angle for the desired type of cut.

The cutting tool is mounted on a tool post, which is positioned by three different slides that each move in different directions.

Opposite of the headstock and spindle is a support device called a tailstock. The tailstock can be slid along the lathe bed and locked in place to firmly support the end of a workpiece.

Identification

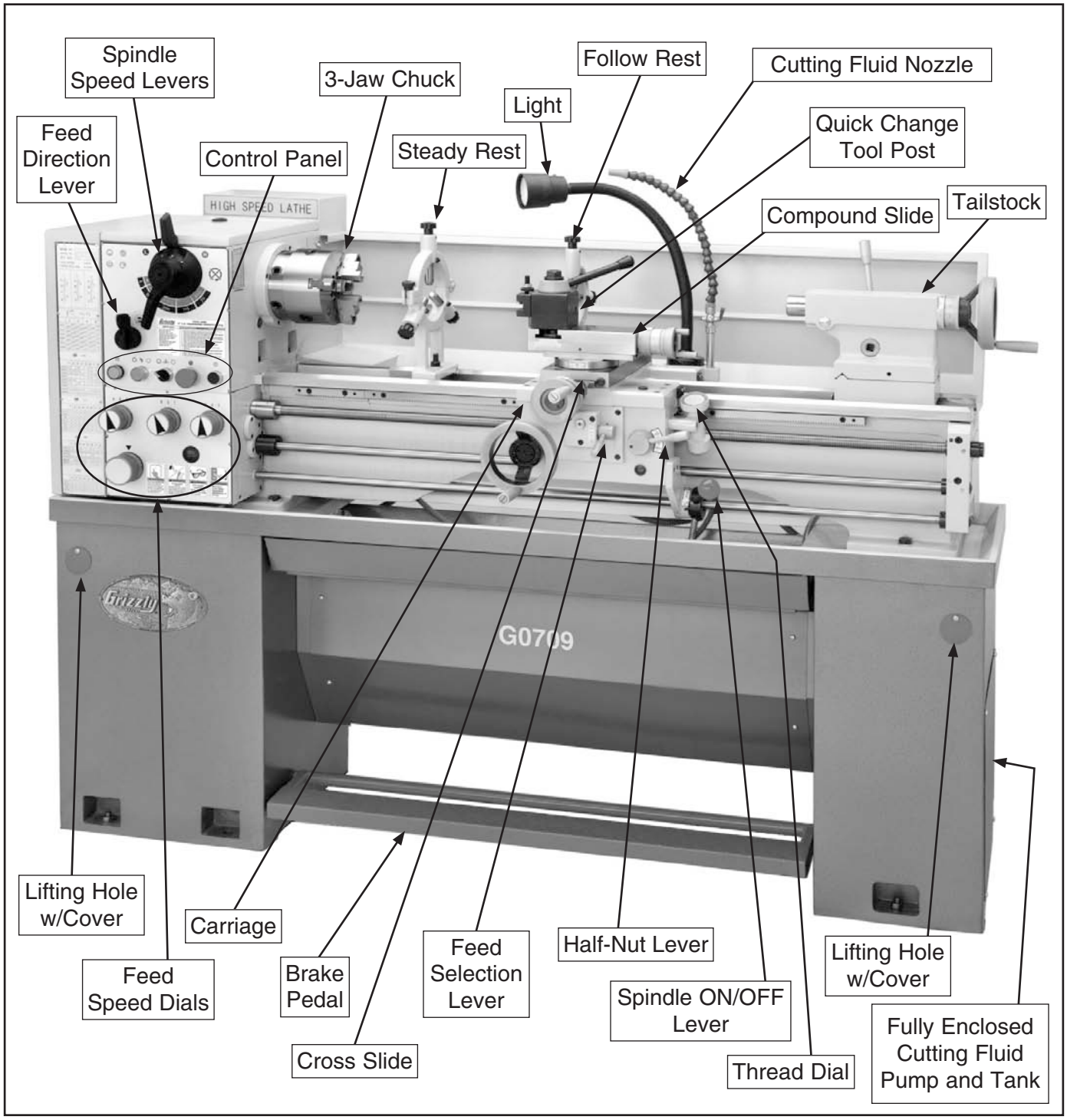


Figure 1. Lathe features.

MACHINE DATA SHEET

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

MODEL G0709 14 X 40 GUNSMITH'S GEARHEAD LATHE

Product Dimensions:

Weight	1300 lbs.
Length/Width/Height	71-1/2 x 26-3/16 x 52 in.
Foot Print (Length/Width)	70-3/8 x 15-3/4 in.

Shipping Dimensions:

Type	Wood Crate
Content	Machine
Weight	1550 lbs.
Length/Width/Height	76 x 30 x 60-1/4 in.

Electrical:

Power Requirement	220V, Single-Phase, 60 Hz
Minimum Circuit Size	15 Amp
Cord Length	4 ft.
Cord Gauge	14 AWG
Plug Included	No
Recommended Plug/Outlet Type	NEMA 6-15

Motors:

Spindle

Type	TEFC Capacitor Start Induction
Horsepower	2 HP
Voltage	220V
Phase	Single-Phase
Amps	10 Amps
Speed	1725 RPM
Cycle	60 Hz
Number Of Speeds	1
Power Transfer	V-Belt Drive
Bearings	Shielded & Permanently Sealed

Main Specifications:

Operation Info

Swing Over Bed	14 in.
Dist Between Centers	40 in.
Swing Over Cross Slide	8-13/16 in.
Swing Over Saddle	13-13/16 in.
Swing Over Gap	19-3/4 in.
Max Tool Bit Size	5/8 in.
Compound Travel	3-9/16 in.
Carriage Travel	36 in.
Cross Slide Travel	6-11/16 in.

Headstock Info

Spindle Bore	1-9/16 in.
Spindle Taper	MT#5
No Of Spindle Speeds	8
Spindle Speeds	70–2000 RPM
Spindle Type	D1-5 Camlock
Spindle Bearings	NSK High-Precision Tapered Roller
Spindle Length	17 in.
Spindle Length with 3-Jaw Chuck	21-1/8 in.
Spindle Length with 4-Jaw Chuck	21-3/16 in.

Tailstock Info

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

Threading Info

No Of Inch Threads	42
Range Of Inch Threads	4–112 TPI
Range Of Longitudinal Feeds	0.00168–0.1175 in./rev.
No Of Longitudinal Feeds	24
No Of Cross Feeds	32
Range Of Cross Feeds	0.00046–0.03231 in./rev.
No Of Metric Threads	44
Range Of Metric Threads	0.1–7 mm
No Of Modular Threads	34
Range Of Modular Threads	0.1-1.75 MP
No Of Diametrical Threads	25
Range Of Diametrical Threads	16–112 DP

Dimensions

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

Construction

Base Construction	Cast Iron
Headstock Construction	Cast Iron
Headstock Gears Construction	Flame-Hardened Steel
Bed Construction	Induction-Hardened Cast Iron
Body Construction	Cast Iron
Stand Construction	Cast Iron
Paint	Epoxy

Other

Gear Box	Yes

Other Specifications:

Country Of Origin	China
Warranty	1 Year
Serial Number Location	Machine ID Label on Front of Lathe
Sound Rating	82 dB

Features:

NSK precision tapered roller spindle bearings
Flame hardened headstock gears
Induction-hardened and precision ground cast iron bed
Coolant system
Adjustable halogen work light
Foot brake with motor shut-off switch
Full-length splash guard
Pull-out chip tray
200-Series quick-change tool post
Outboard spindle spider mount with 4 brass-tipped screws
Cast iron cabinet stands
Fully-enclosed quick-change gearbox
Tailstock offset V-slide with wrench locking socket
D1-5 Camlock Spindle

Accessories Included:

6" 3-Jaw chuck with reversible jaws
8" 4-Jaw chuck with independent jaws
11" Faceplate
MT#3 live center
Standard MT#3 dead center
Carbide-tipped MT#3 dead center
MT#5-MT#3 sleeve
1/2" Drill chuck with MT#3 arbor
Tailstock wrench
Service tools
Toolbox

SECTION 1: SAFETY

⚠WARNING

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.

⚠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 **This symbol is used to alert the user to useful information about proper operation of the machine.**

⚠WARNING

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

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

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

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

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

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

⚠WARNING

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

⚠WARNING
Additional Safety for Metal Lathes

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

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

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

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

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

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

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

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

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

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

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

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 a qualified electrician in accordance with all applicable codes and standards.

⚠WARNING

Electrocution, fire, or equipment damage may occur if machine is not correctly grounded and connected to the 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 ..... 10 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 requirements in the following section.

Circuit Requirements for 220V

This machine is prewired to operate on a 220V power supply circuit that has a verified ground and meets the following requirements:

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

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 a qualified electrician if you are unsure about wiring practices or electrical codes in your area.

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

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).

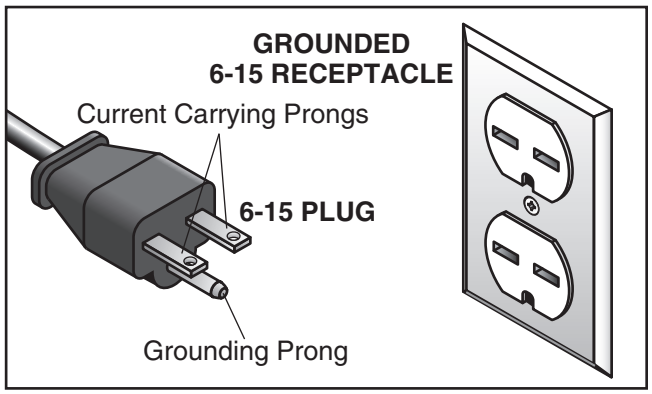


Figure 2. NEMA 6-15 plug and receptacle.

⚠WARNING

Serious injury could occur if you connect the machine to power before completing the 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

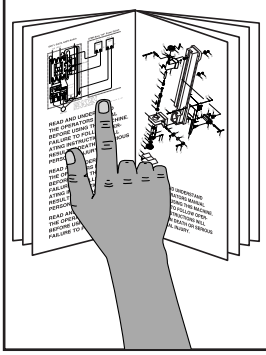
We do not recommend using an extension cord with this machine. If you must use an extension cord, only use it if absolutely necessary and only on a temporary basis.

Extension cords cause voltage drop, which may 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 contain a ground wire, match the required plug and receptacle, and meet the following requirements:

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

SECTION 3: SETUP

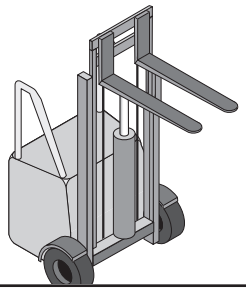


⚠WARNING

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

⚠WARNING

Wear safety glasses during the entire setup process!



⚠WARNING

This machine and its components are very heavy. Use power lifting equipment such as a fork lift or hoist to move heavy items.

Items Needed for Setup

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

Description	Qty
• Forklift or Hoist (Rated 2000 lbs.)	1
• Lifting Straps (Rated 2000 lbs.)	2
• Lifting Hooks (Rated 2000 lbs.)	2
• Machinist's Level	1
• Degreaser/Solvent Cleaner	as needed
• Shop Rags for Cleaning	as needed
• Stiff Brush for Cleaning	1

Unpacking

Your machine was carefully packaged for safe transportation. Disassemble the crate and remove the packaging materials from around your machine to inspect it. If you discover the machine is damaged, *please immediately call Customer Service at (570) 546-9663 for advice.*

Save the containers and all packing materials for possible inspection by the carrier or its agent. *Otherwise, filing a freight claim can be difficult.*

When you are completely satisfied with the condition of your shipment, inventory the contents.

Inventory

After all the parts have been removed from the boxes, the following items should be included with your machine:

Mounted Inventory Components	Qty
A. Three-Jaw Chuck 6"	1
B. Steady Rest	1
C. Follow Rest	1
D. Quick Change Tool Post w/Holder	1

Loose Inventory Components	Qty
E. Four-Jaw Chuck 8"	1
F. Toolbox	1
G. Four-Jaw Chuck Wrench	1
H. Faceplate 11"	1
I. Faceplate Camlock Set	1

Toolbox Inventory Components	Qty
J. Bottle for Oil	1
K. Spindle Sleeve MT#5/MT#3	1
L. Dead Center MT#3 Carbide Tip	1
M. Dead Center MT#3 HSS Tip	1
N. Live Center MT#3	1
O. Tailstock Lock Lever	1
P. Handles	2
Q. Chuck Arbor MT#3/JT3	1
R. Hex Wrench Set 6, 8mm	1 Each
S. "T" Wrench	1
T. Three-Jaw Chuck Key	1
U. Phillips and Standard Screwdriver #2	1
V. Open-End Wrench Set 9/11, 10/12, 12/14mm	1 Each
W. Drill Chuck Key	1
X. Drill Chuck ½"-JT3	1
Y. Tool Holder (One Installed)	2

NOTICE

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

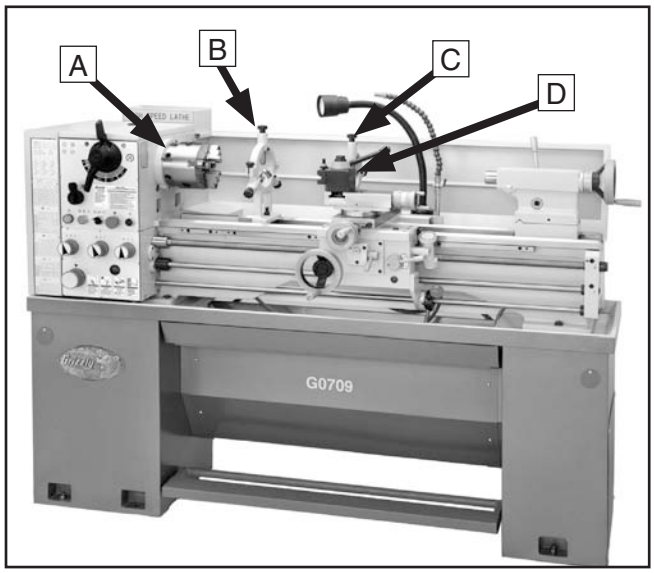


Figure 3. Mounted inventory components.

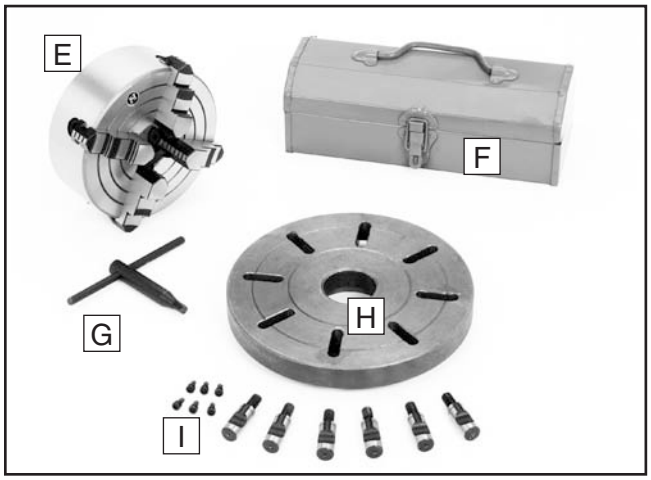


Figure 4. Loose inventory components.

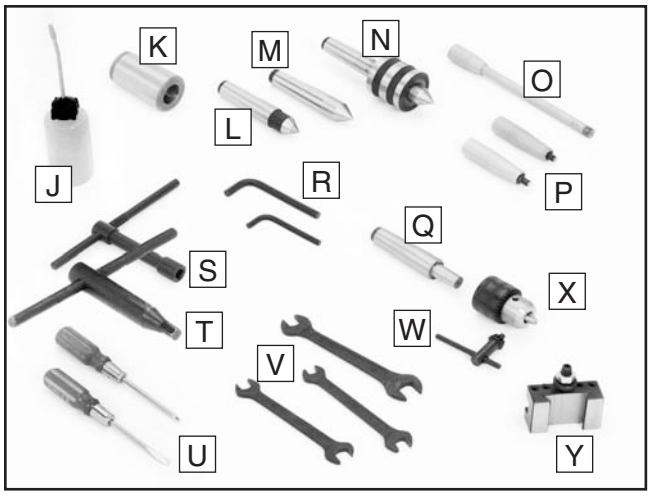
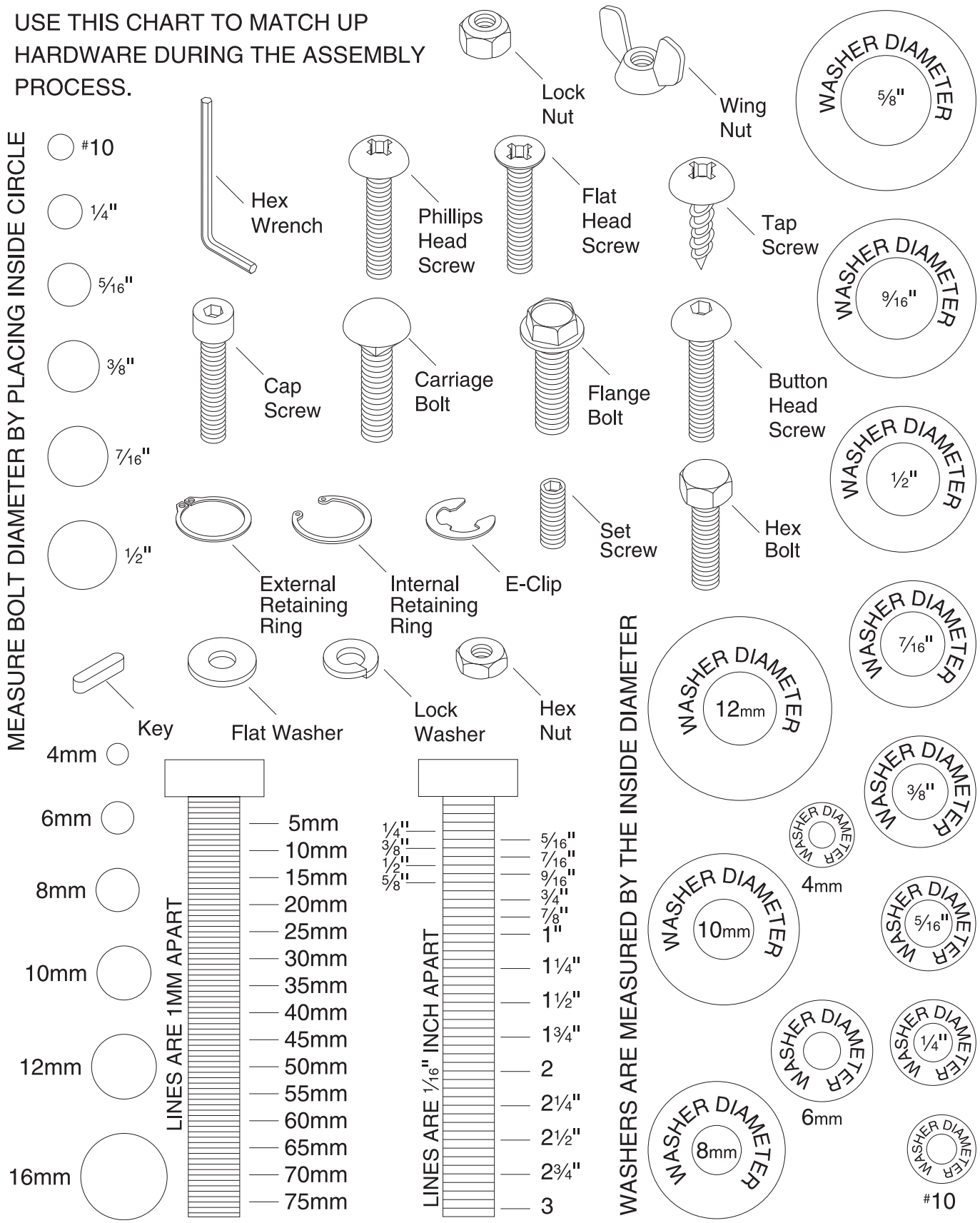


Figure 5. Toolbox inventory.

Hardware Recognition Chart



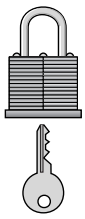
Site Considerations

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 your machine is operated is important for safe operation and the longevity of its 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 access to a means of disconnecting the power source or engaging a lockout/tagout device.

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.

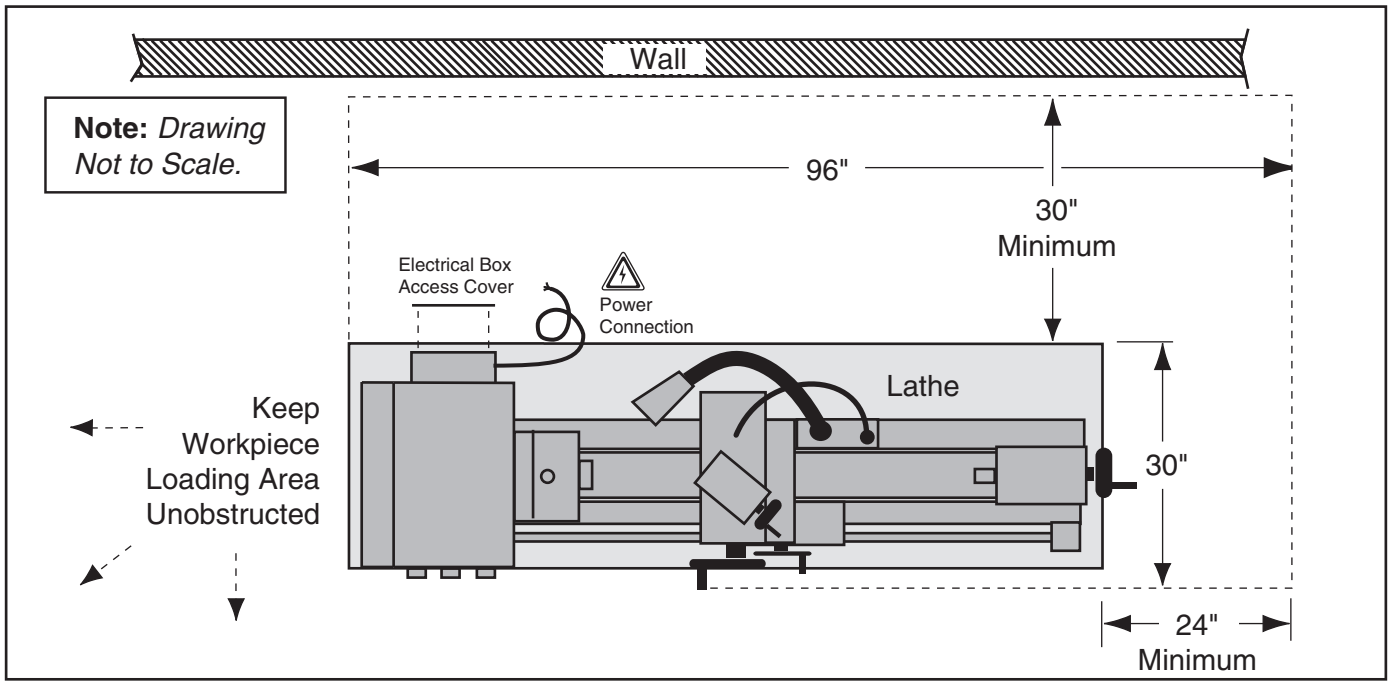


Figure 6. Minimum working clearances.

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.

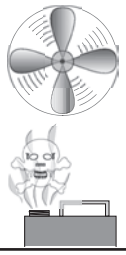
2. Coat the rust preventative with a liberal amount of cleaner/degreaser, then let it soak for 5–10 minutes.

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 or products with low flash points can explode or cause fire if used to clean machinery. Avoid cleaning with these products.



⚠CAUTION

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

NOTICE

Avoid chlorine-based solvents, such as acetone or brake parts cleaner, that may damage painted surfaces. Test all cleaners in an inconspicuous area before using to make sure they will not damage paint.

Additional Cleaning Tips

- For thorough cleaning, remove the steady rest, tool post, compound slide, and change-gears.
- Use a stiff brush when cleaning the threads on the leadscrew.
- Move the slides and tailstock back and forth to thoroughly clean/lubricate underneath them.
- After cleaning, wipe down the ways with a high-quality way oil, such as shown below.

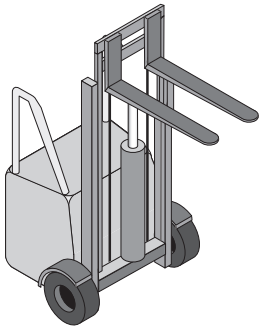
H8257—Primrose Armor Plate with Moly-D Machine and Way Oil 1 Quart
This superior machine and way lubricant prevents stick slip and chatter due to anti-friction capabilities resulting in greater precision machining capabilities. Forms a thin armor plate of oil that effectively lubricates sliding metal surfaces such as ways and gibs while guarding against and rust and corrosion. Adhesive/cohesive components are added for vertical surfaces. Resists squeeze out, running, dripping and non-gumming.

"This is good stuff! I use it on my lathes at home."
S. Balolia – President

Figure 7. Primrose Armor Plate Lubricant.

Lifting & Moving

⚠WARNING



You must use power lifting equipment and assistance to lift and move this machine. Inspect all lifting equipment to make sure it is in working order and rated for the load before attempting to lift. Ignoring this warning may lead to serious personal injury or death.

This lathe has a hole built into each end of the stand (see **Figure 8**) that is designed to accept a sturdy 1" diameter lifting bar. Each bar must extend far enough from the stand so that chains or lifting straps can be looped or connected to all four corners and the lathe can be lifted.

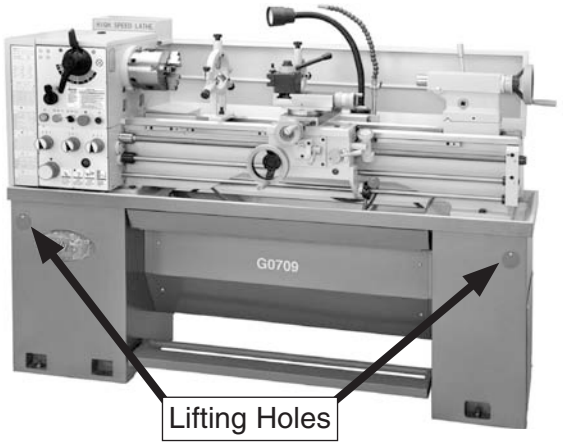


Figure 8. Lifting holes.

Mounting

Although not required, we recommend that you mount your new machine to the floor. Because this is an optional step and floor materials may vary, floor mounting hardware is not included. Generally, you can either bolt your machine to the floor or mount it on machine mounts. Both options are described below. Whichever option you choose, it is necessary to level your machine with a precision level.

Bolting to Concrete Floors

Lag shield anchors with lag screw and anchor studs (**Figure 9**) are two popular methods for anchoring an object to a concrete floor. We suggest you research the many options and methods for mounting your machine and choose the best that fits your specific application.

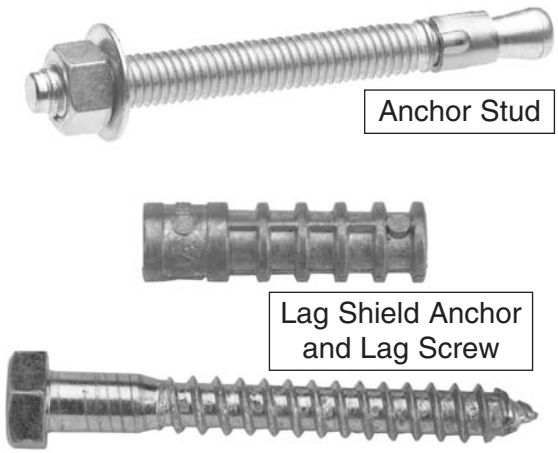


Figure 9. Typical fasteners for mounting to concrete floors.

NOTICE

Anchor studs are stronger and more permanent alternatives to lag shield anchors; however, they will stick out of the floor, which may cause a tripping hazard if you decide to move your machine.

Using Machine Mounts

Using machine mounts, shown in **Figure 10**, gives the advantage of fast leveling and vibration reduction. The large size of the foot pads distributes the weight of the machine to reduce strain on the floor.

Figure 10. Machine mount example.

NOTICE

We strongly recommend securing your machine to the floor if it is hardwired to the power source. Consult with your electrician to ensure compliance with local codes.

NOTICE

Most electrical codes require that machines connected to the power source by fixed conduit MUST be secured to the floor.

Check Gearbox Oil

It is critical that there is oil in the headstock, quick change gearbox, and the apron gearbox before proceeding with the test run. Refer to the **Lubrication** instructions on **Page 56** for more details on which type and how much oil to use in each gearbox.

Adding Cutting Fluid

For detailed instructions on where the cutting fluid tank is located and how to add fluid, refer to **Cutting fluid System** on **Page 58**.

Power Connection

⚠WARNING

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

Once all preparation steps previously described in this manual have been completed, the machine can be connected to the power source. In order to be connected to the power source, a circuit must be installed/prepared that meets the requirements of the lathe, and a power connection method must be established for that circuit.

Using an incorrectly sized cord causes machine electrical components and the cord to become very hot, which can lead to component failure or result in fire. For best results, use the shortest length of cord possible, and never use a smaller cord gauge than the specified minimum.

Test Run

Once assembly is complete, test run the machine to make sure it runs properly and is ready for regular operation. The test run consists of verifying the following: 1) The motor powers up and runs correctly and 2) the stop button safety feature works correctly.

If, during the test run, you cannot easily locate the source of an unusual noise or vibration, stop using the machine immediately, then review **Troubleshooting** on **Page 59**.

If you cannot find a remedy, contact our Tech Support at (570) 546-9663 for assistance.

To begin the test run:

1. Make sure you understand the safety instructions at the beginning of the manual and that all previous setup sections have been completed.

2. Make sure the lathe is lubricated and the oil levels are at the full mark. Refer to **Maintenance** on **Page 53** for details.

3. Make sure the chuck is correctly secured to the spindle. Refer to **Chuck and Faceplate Mounting** on **Page** for detailed installation instructions.

4. Make sure all tools and objects used during setup are cleared away from the machine.

NOTICE

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

5. Disengage the half-nut lever and the feed selection lever (see **Figure 11**), and make sure the saddle lock is loosened to allow the lead screw or feed rod to move the apron if required.

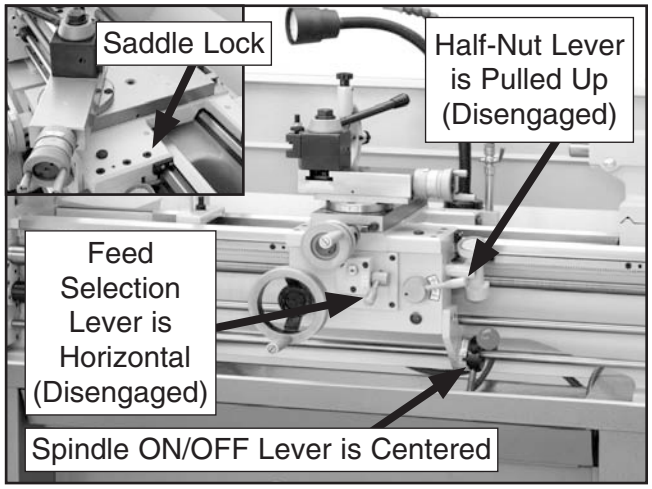


Figure 11. Apron controls.

6. Make sure the cutting fluid pump switch is ***OFF***, point the cutting fluid nozzle into the lathe chip pan.

⚠WARNING

Before starting the lathe, make sure you have performed any preceding assembly and adjustment instructions, and you have read through the rest of the manual and are familiar with the various functions and safety features on this machine. Failure to follow this warning could result in serious personal injury or even death!

7. Rotate the stop button (**Figure 12**) clockwise until it pops out.

8. Move the feed direction lever (see **Figure 12)** to the disengaged middle position.

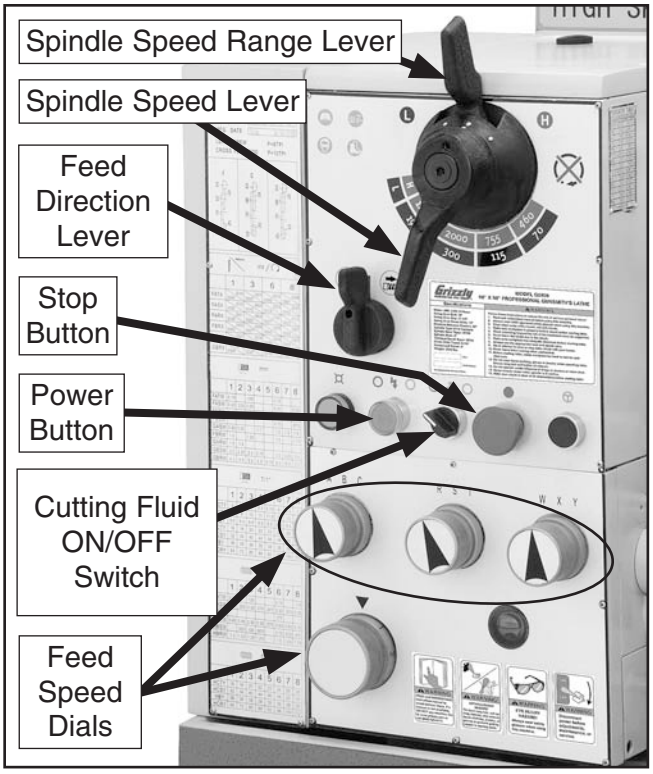


Figure 12. Headstock controls.

9. Move the spindle speed range lever to the "L" position and move the spindle speed lever to the "70" position.

Note: *As long as the feed direction lever shown in* ***Figure 12*** *is disengaged, no torque will be transmitted to the quick change gearbox or any other gear-driven component. As a result, the feed speed dials shown in* ***Figure 12*** *can be left engaged or disengaged for the test run.*

10. Push the power button (see **Figure 12**), then move the spindle ON/OFF lever (see **Figure 11**) downward to start the lathe. The spindle will rotate at 70 RPM.

—If the top of the chuck is rotating toward you, the lathe motor is rotating in the correct direction. Continue to the next **Step**.

—If the top of the chuck is rotating away from you, reverse the motor rotation. Refer to the **Motor Wiring** diagram on **Page 78,** and follow the ***NOTICE*** on that page.

—When operating correctly, the machine runs 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. If the problem is not readily apparent, refer to **Troubleshooting** on **Page 59**.

11. Move the spindle ON/OFF lever up to the center position, and press the stop button.

12. WITHOUT resetting the stop button, move the spindle ON/OFF lever down. The machine should not start.

—If the machine does not start, the stop button safety feature is working correctly. Continue to the next **Step**.

—If the machine starts (with the stop button pushed in), immediately disconnect power to the machine. The stop button safety feature is not working correctly. This safety feature must work properly before proceeding with regular operations. Call Tech Support for help.

13. Rotate the stop button clockwise until it pops out.

14. Make sure the lamp works.

15. Make sure that the cutting fluid nozzle is pointing toward the chip pan, then turn the cutting fluid pump switch ***ON***, and open the nozzle valve. After verifying that cutting fluid flows from the nozzle, turn the cutting fluid switch ***OFF***.**16.** Start the spindle, then step on the brake pedal. The power to the motor should be cut and the spindle should come to an immediate stop.

Spindle Break-In

DO NOT leave the lathe unattended during this break-in process, and be ready to react in the event of an emergency!

NOTICE

Do not place this machine into service and subject it to normal work loads until it is completely broken-in and the gearbox oils have been changed! Otherwise, bearings can improperly seat, and gears can develop excessive backlash and result in vibration or noisy operation.

To correctly break-in the spindle bearings:

1. DISCONNECT LATHE FROM POWER!
2. Make sure the **Test Run** is complete, and spindle speed is still set at 70 RPM.
3. Disengage the half-nut lever and the feed selection lever (see **Figure 11**).
4. Connect the lathe to power.
5. Push down on the spindle ON/OFF lever and run the lathe in forward for 10 minutes. Then, stop the lathe and run it in reverse for 10 minutes.
6. Repeat running the lathe in forward and reverse in this manner through the rest of the spindle speeds. Then stop the lathe.
7. Change the headstock oil immediately while it is warm from the break-in and any metal particles are still are suspended in the oil.

Recommended Adjustments

For your convenience, the adjustments listed below have been performed 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 your new machine.

Step-by-step instructions for these adjustments can be found in the **SERVICE** section starting on **Page 59**.

Factory adjustments that should be verified:

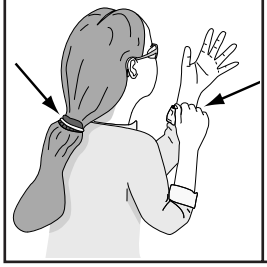
- Verify Three-Jaw Chuck Registration in **Chuck and Faceplate Removal/Installation** (**Page 27**)
- Camlock Stud Installation (**Page 29**)
- Gib Adjustments (**Page 61**)
- Tailstock Alignment (**Page 36**)
- Backlash Adjustment (**Page 63**)

SECTION 4: OPERATION

⚠WARNING

Damage to your eyes, lungs, and ears could result from using this machine without proper protective gear. Always wear safety glasses, a respirator, and hearing protection when operating this machine.





⚠WARNING

Loose hair and clothing could get caught in machinery and cause serious personal injury. Keep loose clothing and long hair away from moving machinery.

NOTICE

If you have never used this type of machine or equipment before, WE STRONGLY RECOMMEND that you read books, trade 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.

Operation Overview

This overview is the basic process that occurs when operating this machine. Familiarize yourself with these steps to better understand the remaining parts of the **Operation** section.

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 the workpiece to make sure it is suitable for turning, then mounts the workpiece required for the operation.

3. Mounts the tooling, aligns it with the workpiece, then adjusts it for a safe startup clearance.

4. Clears all tools from the lathe.

5. Sets the correct spindle speed for the operation.

6. Checks for safe clearances by rotating the workpiece by hand one full revolution.

7. Moves slides to where they will be used during operation. If using power feed, selects the proper feed rate for the operation.

8. Turns the main power switch ***ON***, resets the stop button so it pops out, then moves the spindle ON/OFF lever down to start spindle rotation. The spindle will rotate forward (the top of the chuck rotates toward the operator).

9. Uses the carriage handwheels or power feed options to move the tooling into the workpiece for operations.

10. **When finished cutting, moves the ON/OFF lever** to the center position to turn the lathe ***OFF***, then removes the workpiece.

Controls

Headstock Controls

Use the descriptions in this section and the controls shown in **Figure 13** to quickly understand the functions of the headstock and quick change gearbox controls, and to find their locations on the lathe.

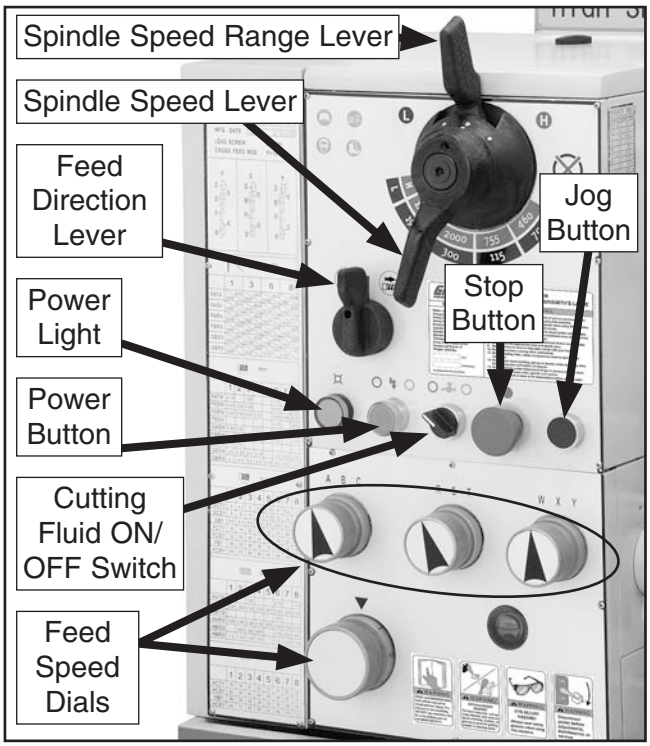


Figure 13. Headstock controls.

Spindle Speed Range Lever
Alternately engages drive gears to produce high or low range operation in the headstock.

Spindle Speed Lever
Controls the spindle speed only and has no effect on the gearbox speed or the apron feeds.

Feed Direction Lever
Controls the forward and reverse direction of the carriage and cross feed. When this lever moved left or right, the direction of the quick change gearbox, feed rod, and lead screw reverse direction, but spindle direction is unaffected.

Power Light
When the lathe is connected to power, it is not necessarily ready for use. Only when the stop button is twisted clockwise and popped-out, and the ON button has been pushed will the power light illuminate and indicate that all electrical controls are "LIVE" and ready for use. Just because the power light is OFF, do not assume that the lathe is safe for electrical work, general adjustments, or workpiece changes. You must always disconnect the lathe from power before attempting any of these tasks.

Power Button
Prevents accidental start up. Every time the stop button is pressed in and then reset, the power button must be pressed. If there has been a power outage while the lathe was operating, when power is resumed, the power button must be pressed to reactivate the power to the control panel. If the foot brake is pressed, a limit switch will cut power to the motor immediately.

Cutting fluid ON/OFF Switch
Toggles the cutting fluid pump ***ON*** or ***OFF***. Never turn the cutting fluid pump on and let it run while the reservoir is empty, or pump damage may occur.

Feed Speed Dials
Engage either the feed rod or leadscrew, and set the apron speed for threading, turning, or facing operations.

Stop Button
Cuts power to the spindle motor and the control panel. No braking occurs and the spindle, chuck, and workpiece wind-down naturally. After being pressed, the stop button stays pushed in until it is reset by twisting the knob clockwise until it pops back out.

Jog Button
Bumps the motor ***ON*** and ***OFF*** so partial spindle rotation occurs in reverse. Useful when the lathe is stopped in low range and the lathe gear reduction makes it difficult for the machinist to rotate the chuck by hand in order to reposition a chuck or workpiece.

Note: *In order to use the jog button, the Spindle ON/OFF lever must be in the central or **OFF** position.*

Apron Controls

Use the descriptions in this section and the controls shown in **Figure 14** to quickly understand the functions of the apron and its related controls.

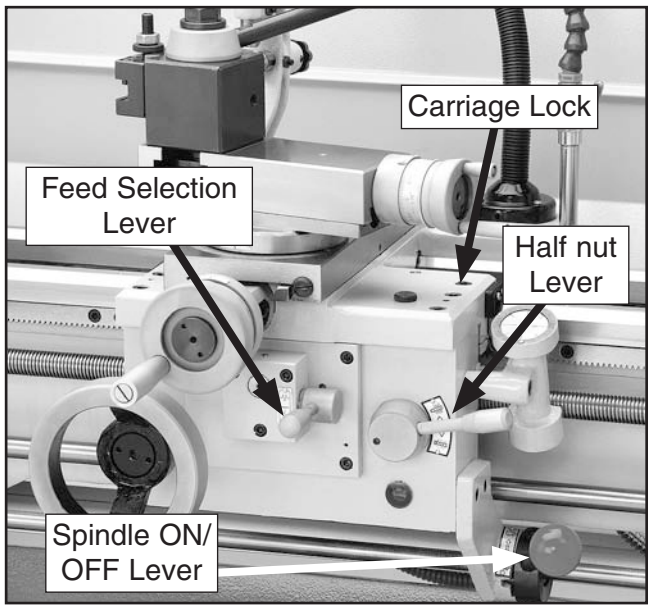


Figure 14. Carriage lever controls.

Spindle ON/OFF Lever
Starts and stops the spindle in forward and reverse.

- Moving the lever downward from the central OFF position spins the chuck forward (the top of the chuck moves toward the machinist).

- Moving the lever upward from the central OFF position spins the chuck in reverse (the top of the chuck moves away from the machinist).

Feed Selection Lever
Allows the machinist to engage or disengage the apron for longitudinal or cross feeding tasks.

Carriage Lock
Clamps the right front of the saddle to the lathe way for increased rigidity when facing a workpiece.

Half-Nut Lever
Clamps the halfnut to the leadscrew for inch-threading operations.

Thread Dial
Avoids cross-cutting inch threads by indicating to the machinist where to re-clamp the half nut in order to resume threading after a carriage return.

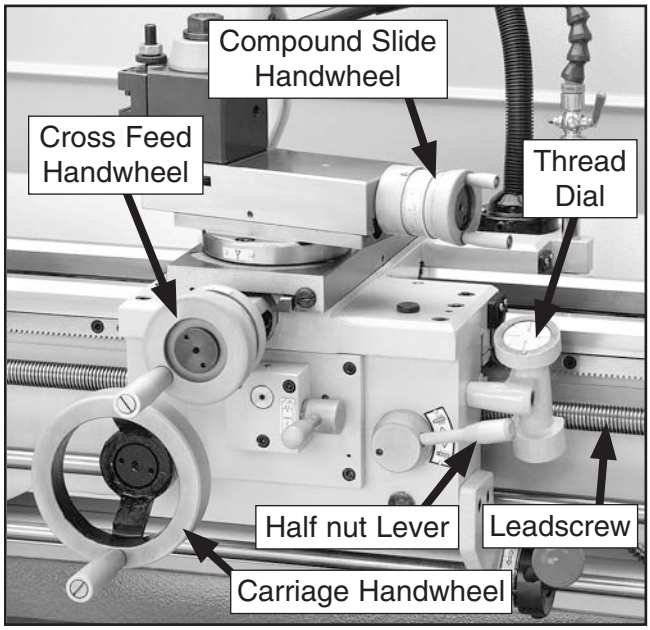


Figure 15. Apron controls.

Carriage Handwheel
For moves the carriage longitudinally left or right along the ways.

Cross Slide Handwheel
Moves the cross slide in or out perpendicular to carriage travel and is equipped with a "Standard Dial" that has a ratio of 1:2.

Compound Slide Handwheel
Moves the compound and cutting tool relative to the workpiece at various angles with fine-depth control.

Compound Slide Scale
The 110° rosette on the top of the compound indicates compound angles. Zero splits the scale into two ranges, 55° to the right and 55° to the left in 1° degree increments.

Tailstock

Use the descriptions in this section and the controls shown in **Figure 16** to quickly understand the functions of the tailstock controls.

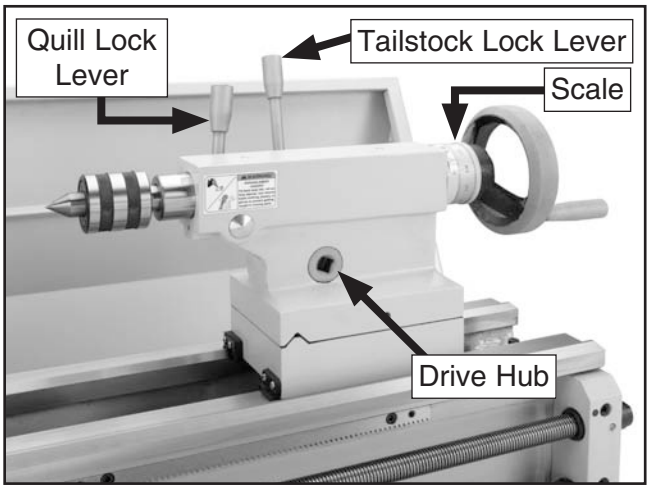


Figure 16. Tailstock controls.

Quill Lock Lever
Secures the quill in a locked or pre-loaded position.

Tailstock Lock Lever
Clamps the tailstock in place for general position locking along the lathe bed.

Drive Hub
Allows the tailstock to be locked in place using a ½" drive torque wrench to control amount of draw-down alignment with the spindle centerline.

Tailstock Handwheel
Advances or retracts the quill in the tailstock at a 1:1 ratio with the micrometer scale on the handwheel hub.

Micrometer Scale
Displays quill travel in increments of 0.001" with a total rotation value of 0.100", (for every full rotation of the handwheel, the quill moves 1/10"). The tailstock quill is broken down with an inch scale up to 4" and a metric scale up to 100mm.

Brake

When pressed, the brake pedal (see **Figure 17**) actuates mechanical linkage that expands brake shoes within the spindle drive pulley and stops the lathe spindle. At the same time the motor power supply circuit is cut by a linkage-controlled limit switch. To resume lathe operations after the brake has been used, return the spindle ON/OFF lever to the central position, and all lathe controls become "LIVE" again.

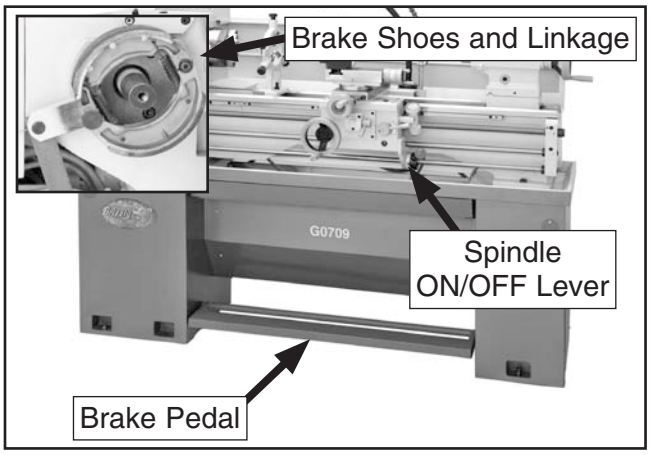


Figure 17. Spindle brake system.

Chuck & Faceplate Removal/Installation

This lathe is shipped with a 3-jaw chuck installed, but also includes a 4-jaw chuck and 12" faceplate. The chucks and faceplate mount to the spindle with a D1-5 camlock system, which uses a key to loosen and tighten camlocks for removal or installation (see **Figure 18**).

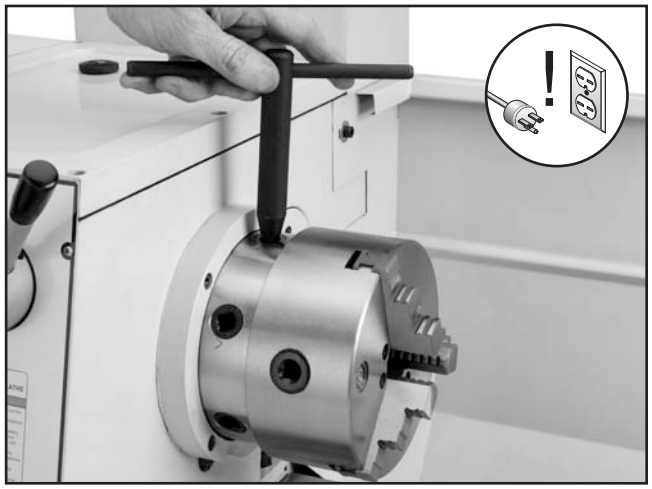


Figure 18. Chuck key positioned to remove a typical camlock mounted chuck.

Before the 4-jaw chuck and faceplate can be installed on the spindle, their respective cam studs must be installed and adjusted.

To maintain consistent removal and installation of the chucks and faceplate, each should have a timing mark that can be lined up with a matching one on the spindle, so it will be installed in the same position every time (see **Figure 19**). Before removing the 3-jaw chuck, verify that a timing mark exists. If a mark cannot be found, stamp your own on both the chuck and spindle.

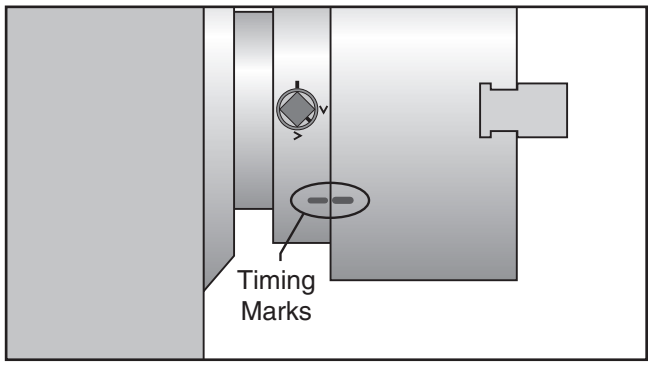


Figure 19. Chuck/spindle timing marks.

Chuck & Faceplate Removal

1. DISCONNECT LATHE FROM POWER!

2. Lay a chuck cradle (see **Figure 20**) or a layer of plywood over the bedways to protect the precision ground surfaces from damage and to prevent fingers from being pinched.

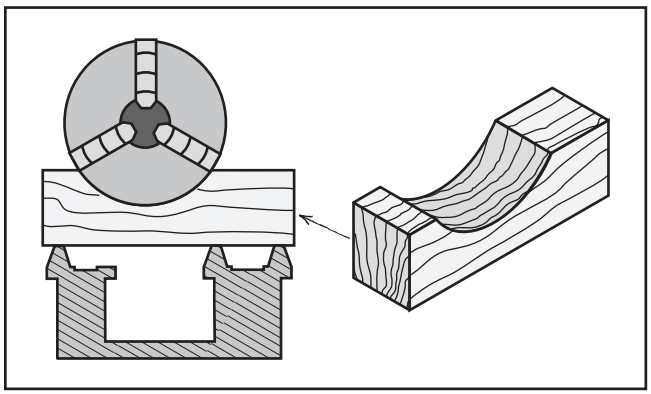
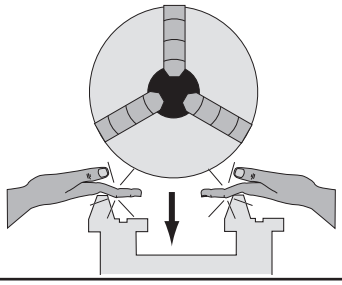


Figure 20. Simple chuck cradle made of scrap lumber.

⚠WARNING



PINCH HAZARD! Protect your hands and the precision ground bedways with plywood or a chuck cradle when removing the lathe chuck! The heavy weight of a falling chuck can cause serious injury.

3. Loosen the cam-locks by turning the key counterclockwise approximately one-third of a turn until the mark on the cam-lock aligns with the single mark on the spindle nose in **Figure 21.** If the cam-lock stud does not freely release from the cam-lock, wiggle the cam-lock until the cam-lock stud releases.

   Note: *These cam-locks may be very tight. A breaker bar may be used to add leverage.*

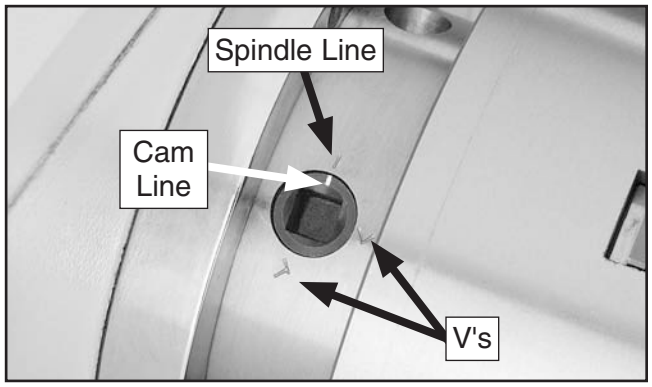


Figure 21. Indicator arrows.

4. Using a dead blow hammer or other soft mallet, lightly tap around the outer circumference of the chuck body to break the chuck free from the cam-locks and from the spindle nose taper.

   CAUTION: The chuck may come off at this point, so it is important you are ready to support its weight.

⚠WARNING

Large chucks are very heavy. Always get assistance when removing or installing large chucks to prevent personal injury or damage to the chuck or lathe.

5. Use a rocking motion to carefully remove the chuck from the spindle (see **Figure 22**).

   —If the chuck does not immediately come off, rotate the spindle approximately 60˚ and tap again. Make sure all the marks on the cams and spindle are in proper alignment.

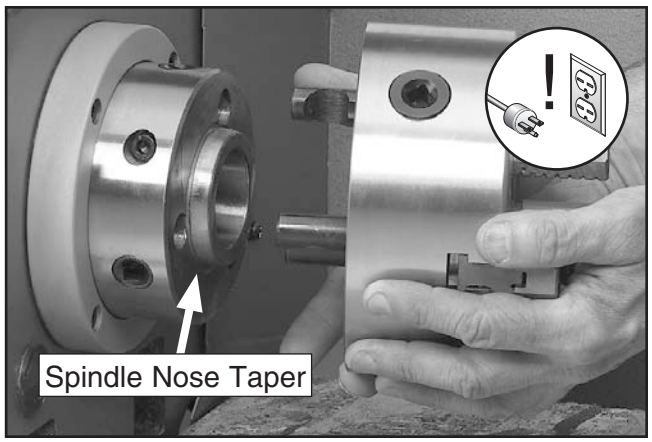


Figure 22. Installing and removing a typical camlock style chuck.

Chuck & Faceplate Installation

1. DISCONNECT LATHE FROM POWER!

2. Place a piece of plywood across the lathe ways just under the chuck, and use a chuck cradle if desired.

3. Make sure the chuck taper and spindle taper mating surfaces are perfectly clean.

4. Inspect and make sure that all camlock studs are undamaged, are clean and lightly oiled, and that the camlock stud cap screws are in place and snug.

   —If the camlock studs have not yet been installed in the chuck or faceplate, complete the **Camlock Stud Installation** on the next page**.**

NOTICE

Never install a chuck or faceplate without having the camlock cap screws in place or fully tightened. If you ignore this notice, once installed the chuck may never be able to be removed since the camlock studs will turn with the camlocks and never release.

5. Align the chuck-to-spindle timing marks (see **Figure 24**), and slide the chuck onto the spindle.

6. Turn a camlock with the chuck wrench until the cam mark falls between the "V" marks as shown in **Figure 23**.

   —If the cam lock mark stops outside of the “V” marks, remove the chuck and adjust the cam stud height of the offending studs one full turn up or down (see **Figure 23**).

Figure 23. Cam-lock in the locked position.

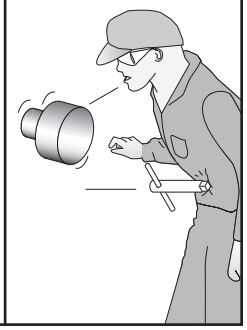
7. Lock the other cams in a star pattern so the chuck is drawn up evenly on all sides without any chance of misalignment.

   Note: *If any of the cam lock marks (see **Figure 24**) do not fall between the "V" marks when the cam lock is tight, you must adjust the offending camlock stud as discussed in **Camlock Stud Installation.***

8. Remove the chuck wrench.

⚠WARNING

When using this lathe, securely clamp your workpiece and remove the chuck wrench! Thrown objects from a lathe can cause serious injury or death to the operator and to bystanders.



Camlock Stud Installation

1. Oil and thread each cam stud into the chuck until the alignment groove is flush with the chuck surface as shown in **Figure 24**.

2. Install and tighten the locking cap screw for each stud, making sure that the camlock studs can slightly rotate back and forth.

3. Place the chuck onto the spindle and tighten the cam locks in an alternating manner to avoid cocking the chuck on the spindle. When tightened:

   —If the cam lock mark stops outside of the "V" marks, remove the chuck and adjust the cam stud height of the offending studs one full turn (see **Figure 24**).

   —If the final position of each cam mark is between the two "V" marks as shown in **Figure 24**, no stud adjustment is required.

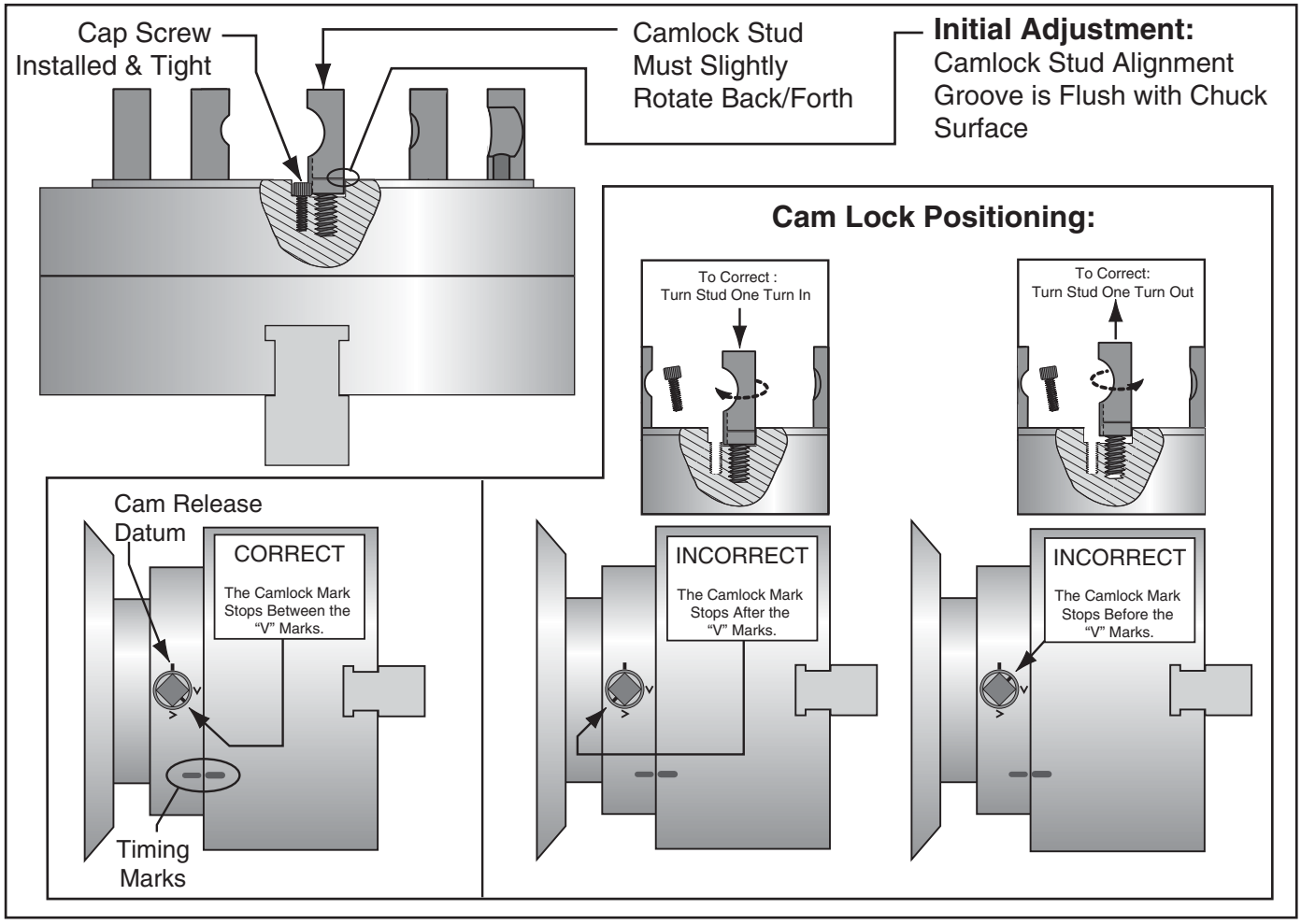


Figure 24. Camlock stud alignment.

Three-Jaw Chuck

This section outlines basic operation safety related to using the 3-jaw chuck included with your lathe. Use knowledge of safety and common sense when applying the steps on how to use this chuck. If you have any questions, feel free to contact our Technical Support Department.

The 3-jaw chuck shipped with this late has a two-piece reversible jaw design. An internal scroll-gear, moves all jaws in unison when adjusted. This chuck will hold cylindrical parts on-center with the axis of spindle rotation, and can be spun at high speeds if the workpiece is properly clamped and is balanced. If a workpiece must be held from the inside, rotate all three of the two-piece jaws 180° so the orientation of all jaws match. **Otherwise the chuck will spin out of balance an create an extreme thrown workpiece hazard!**

Reversing Jaw Positions & Clamping a Workpiece

Figure 25 shows a typical example of clamping options available with a 3-jaw chuck. The chuck included with this lathe has reversible jaws, which means the lower jaw or master jaw do not need to be removed to reverse the jaw position. Instead, the top jaw is fastened to the master jaw with cap screws that when removed allow for top jaw reversal. It is a good practice to keep the top jaws matched with their original master jaw, to ensure maximum quality of alignment and exact fit.

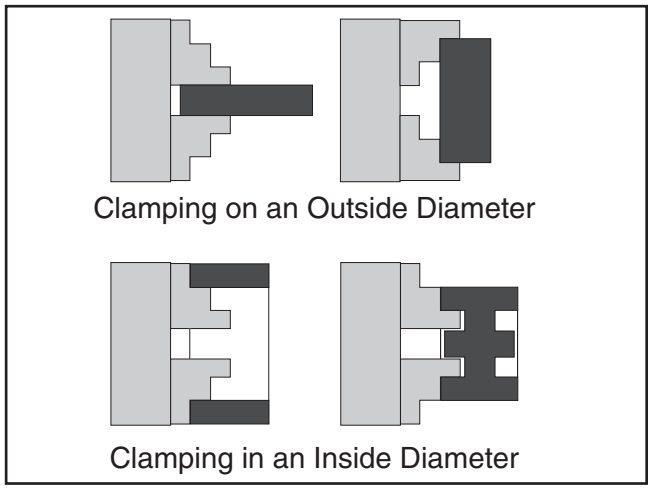


Figure 25. Three-jaw chuck OD & ID clamping.

To use the 3-jaw chuck:

1. DISCONNECT LATHE FROM POWER!

2. Remove the cap screws that retain the top portion of one of the jaws (see **Figure 26**), and remove the jaw.

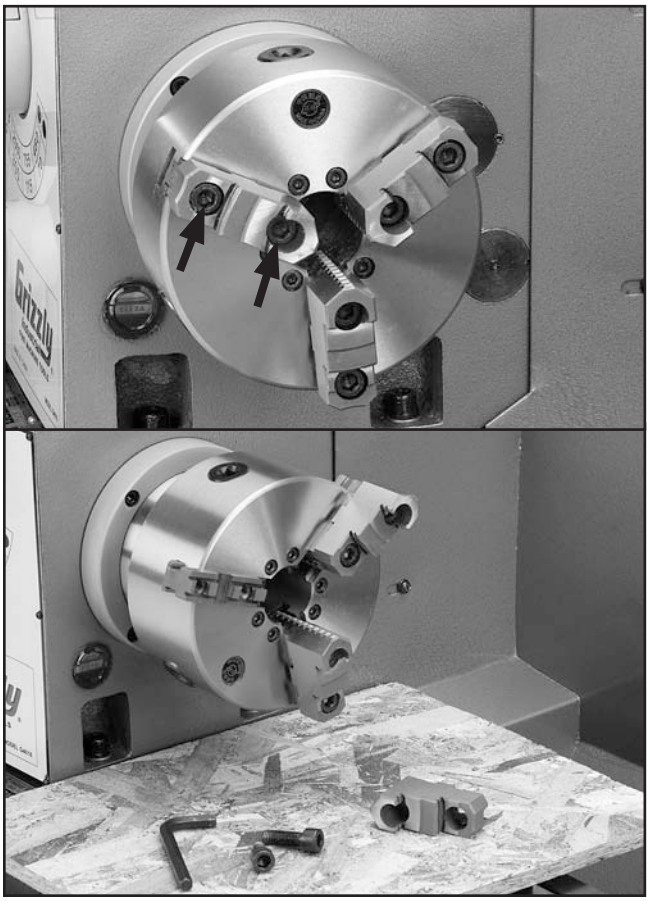


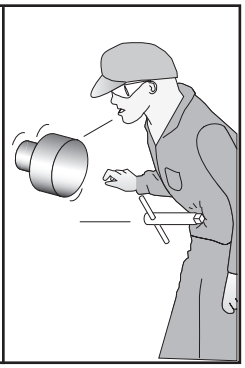
Figure 26. Reversing the chuck jaws.

3. Making sure the longer cap screw remains in the thicker part of the jaw, rotate the jaw 180˚ and reinstall it to the lower jaw (see **Figure 26**).

4. Repeat **Steps 2–3** on the remaining jaws

⚠WARNING

Always securely tighten jaws and remove all tools from the lathe before starting spindle! Thrown objects from a lathe can cause serious injury or death to the operator and to bystanders.



Four-Jaw Chuck

This section outlines basic operation safety related to using the 4-jaw chuck included with your lathe. Use knowledge of safety and common sense when applying the steps on how to use this chuck. If you have any questions, feel free to contact our Technical Support Department.

Select this chuck for low-speed lathe operations only. The 4-Jaw chuck uses independently adjustable jaws, meaning each is adjusted by an individual worm gear. Non-cylindrical parts can be held and brought into the spindle centerline for facing or boring. The other benefit is that the majority of a workpieces can be positioned out of the spindle rotation axis if a bore or step needs to be cut into a workpiece on an outlying edge.

For the best grip possible on odd-shaped workpieces, one or more jaws can also be rotated 180° to grab more surface area for clamping.

If all four jaws cannot be used to hold the workpiece, you must use the faceplate for improved clamping options. Otherwise, a severe out-of-balance condition will be created. If spun even at an average speed, this chuck will almost always be out of balance, and the machinist and bystanders will be at risk of being hit with a thrown workpiece. Being hit by an ejected workpiece can be fatal.

Reversing Jaw Positions & Clamping a Workpiece

Shown in **Figure 27** is an example of the independent jaws holding a non-cylindrical workpiece for off-center boring. One or more jaws can be reversed in any combination to get the best grip on the workpiece.

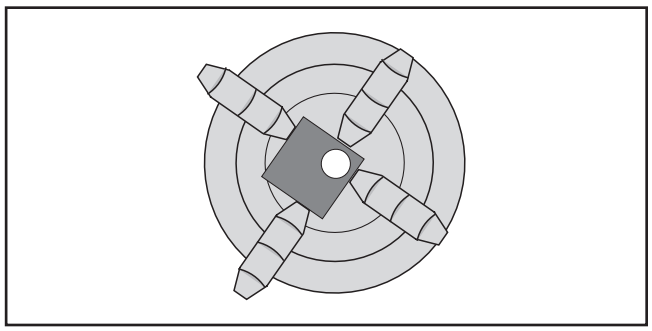


Figure 27. Four-jaw chuck independent jaw-clamping with two jaws reversed.

To use the 4-jaw chuck:

1. DISCONNECT LATHE FROM POWER!
2. Install a center in the tailstock.
3. Open each jaw with the chuck wrench and place the workpiece flat against the chuck face.
4. Support the workpiece and slide the tailstock forward so the tip of the dead center presses against the workpiece. Next, lock the tailstock in position. For more information, refer to the tailstock controls on **Page 67** and **Centers** on **Page 33**.
5. Turn the tailstock quill so the dead center applies enough pressure to the center point of your workpiece to hold it in place (see **Figure 28**), then lock the tailstock quill.

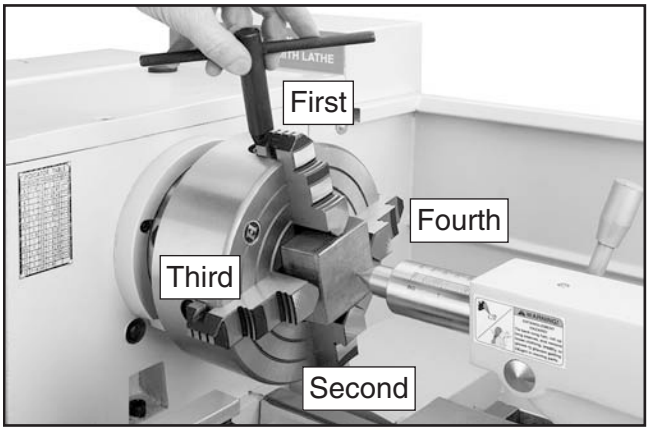


Figure 28. Centering workpiece (tool post removed for clarity).

6. Turn each jaw until it just makes contact with the workpiece.
7. Tighten each jaw in small increments. After adjusting the first jaw, continue tightening in opposing sequence (see **Figure 28**). Check frequently to make sure the required point on the workpiece has not wandered away from the spindle centerline due to applying too much pressure to a single jaw.

8. After the workpiece is held in place, back the tailstock away and rotate the chuck by hand. The center point will move if the workpiece is out of center (see **Figure 29**).

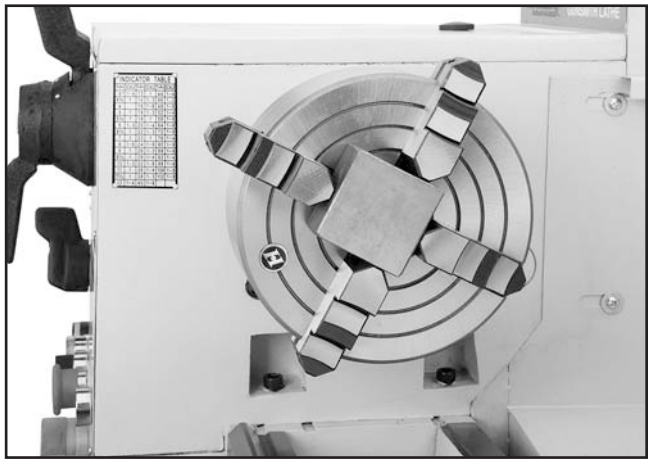


Figure 29. Properly held workpiece for low speed offset boring or machining.

9. Make fine adjustments by slightly loosening one jaw and tightening the opposing jaw until the workpiece is held securely and precisely aligned with the spindle centerline.

Faceplate

This section outlines basic operation safety related to using the faceplate included with your lathe. Use knowledge of safety and common sense when applying the steps on how to use this faceplate. If you have any questions, feel free to contact our Technical Support Department.

The faceplate is cast-iron and has multiple slots for T-bolts that hold clamping hardware. If you suspect that any of the chuck or jaw combinations may not hold a workpiece safely, remove the chuck and install the faceplate as outlined for special clamping options.

However, just as with the 4-Jaw chuck, not all workpieces can be safely held. Holding a workpiece off center or holding an irregular-shaped workpiece will cause the entire assembly to rotate out of balance. If spun at any speed higher than low, the workpiece can eject hitting the lathe operator or bystanders causing a severe or fatal injury.

Figure 30 shows an example of a workpiece being improperly held with the 4-jaw chuck. One jaw of the chuck interfered with the workpiece edge, and removing the jaw creates an extreme workpiece ejection hazard. The workpiece holding solution shown in **Figure 30** is to use the faceplate with a minimum of three clamps that are spaced as equally apart as possible for full support.

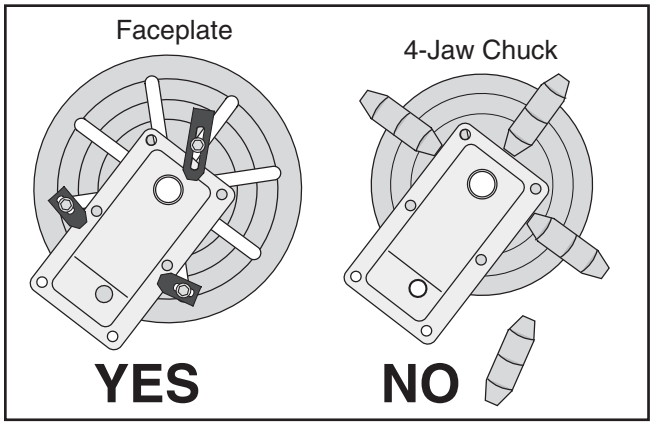


Figure 30. Workpiece to faceplate clamping.

To use the faceplate:

1. DISCONNECT LATHE FROM POWER!

2. Insert a dead center into the tailstock, slide the tailstock up to the faceplate, and lock the tailstock into position.

3. Place the workpiece against the faceplate and turn the tailstock quill so the point of the dead center touches and applies enough pressure to hold the workpiece in place.

4. Lock the quill when sufficient pressure is applied to hold the workpiece. Additional support may be needed, depending on the workpiece.

5. Clamp the workpiece at a minimum of three locations that are as close to being evenly spaced apart as possible as shown in **Figure 31.**

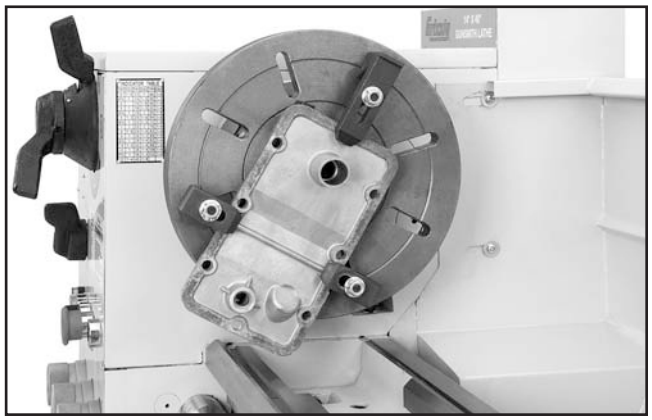


Figure 31. Workpiece properly clamped on the faceplate in a minimum of three locations (tailstock removed for clarity).

⚠WARNING

Use a minimum of three independent clamping devices when using faceplate. Failure to provide adequate clamping may cause workpiece to eject during operation.

6. Double check for safety and rotation clearance.

7. Slide the tailstock away from the workpiece and install the required tailstock tooling for drilling or boring, or position the tool bit for facing.

Centers

The Model G0709 lathe is supplied with two MT#3 dead centers, an MT#3 live center, and a MT#5–MT#3 adapter sleeve (see **Figure 32**) to adapt the centers into spindle bore. When installing centers verify that all mating surfaces are clean and free of nicks and burrs.

Tip: *Hand-held tapered bore wipers make this task very time efficient, and offer consistently clean bores.*

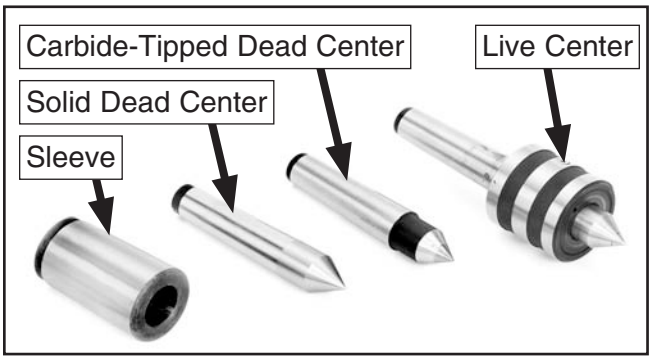


Figure 32. Included centers and sleeve.

Solid Dead Center

Dead centers are typically used in low speed turning operations to increase rigidity for close tolerances. The solid dead center is installed at the spindle end of the lathe because the workpiece, center, and spindle all turn together by the use of a lathe dog. One end of the lathe dog is clamped to the workpiece, and the other end the tail, is inserted into a faceplate slot shown in **Figure 33**).

Tip: *If the tail is too large for a slot, install the 3-jaw chuck, open the jaws so the workpiece can be supported by the center and the tail of the dog can rest against a jaw.*

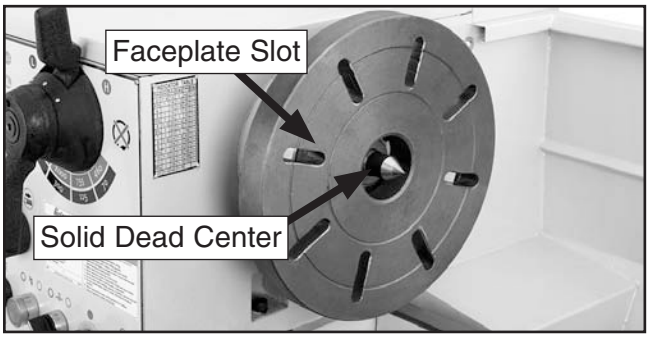


Figure 33. Faceplate and dead center setup.

Carbide-Tipped Dead Center

When the workpiece is supported at the tailstock end of the lathe, the workpiece will spin on the tip of the fixed center. To eliminate the tip of the center from wearing out at this point of contact, the carbide-tipped center is used. Nevertheless, during turning operations this tip must still be lubricated vigilantly, or the workpiece will wear, resulting in increased end play and poor turning results. Typically, when using centers, the tailstock quill should be locked and protrude at least ½", but not more than 3".

Live Center

If the workpiece must be spun at higher speeds, the live center is inserted into the tailstock (see **Figure 34**). Unlike a dead center, the tip of the live center is supported with precision bearings that allow it to support and spin with the workpiece. As a result, virtually no wear occurs, and the workpiece can be turned with less concern about developing end play from tip wear. However, when using live centers, accuracy can suffer as a result of having bearings support the end of the workpiece.

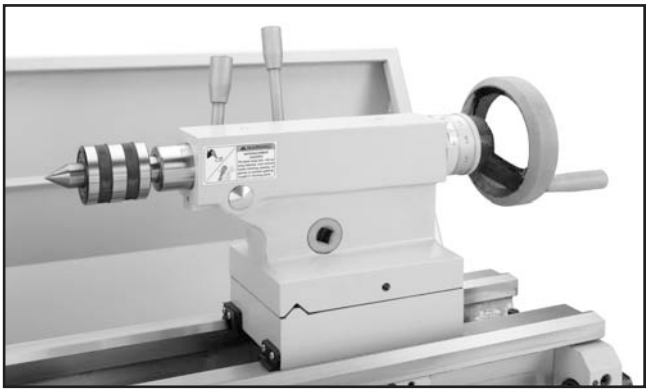


Figure 34. Live center installed in a tailstock.

Installing Center in Tailstock

\1. Center drill the end of the workpiece to be turned or threaded.

2. Feed the quill out about 1", wipe clean and insert the center into the quill bore (see **Figure 35**). To help prevent wear, place a dab of grease on the point of the center.

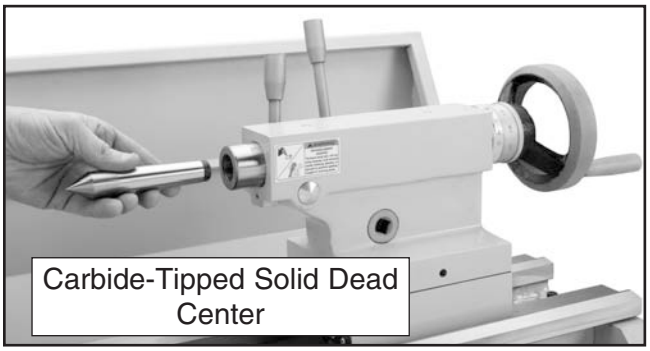


Figure 35. Inserting a carbide-tipped dead center in the tailstock.

3. Position the tailstock so the center presses against the workpiece, then lock the tailstock in place.

4. Preload the quill into the workpiece. The force against the workpiece will fully seat the tapered center.

5. Lock the quill into place. However, keep in mind that the quill may need to be adjusted during operation to remove any play that develops between the center and the workpiece.

Removing Center from Tailstock

To remove a center, hold the end of the center with a rag to prevent it from falling, and reverse the handwheel until the center is pressed free.

Installing Center in Spindle

1. Install the dead center into the spindle sleeve.

2. Install the sleeve into the spindle bore.

3. Determine whether to use the chuck or faceplate, and install the required unit.

4. Clamp the required lathe dog onto the workpiece and mount the workpiece between the lathe centers.

Removing Center from Spindle

To remove a center and sleeve, hold the end of the center with a rag to prevent it from falling, insert a wooden rod into the outboard side of the spindle, and tap the center and sleeve free.

Tailstock

Quill Lock Lever

The quill lock lever (see **Figure 36**) secures the quill in its current position. When drilling, or when tapping operations need to be done deep into a part, the quill can also be stabilized by slightly applying the lever to add drag and preload to the quill.

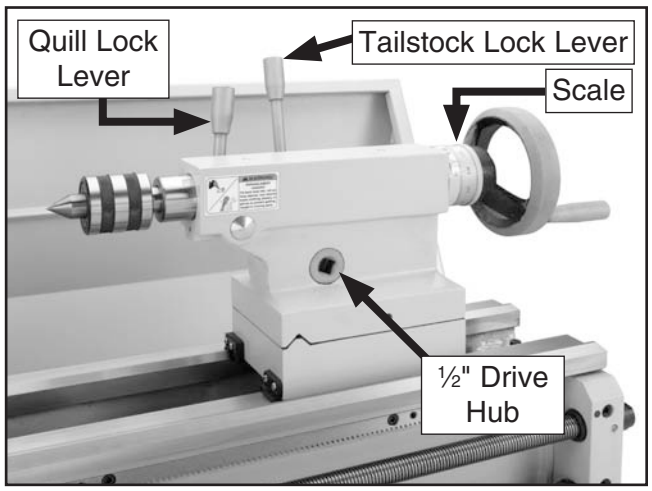


Figure 36. Tailstock controls.

Tailstock Lock Lever

When clamped in place, the forces draw a tailstock down into alignment with the spindle centerline. This distance is usually a few thousandths of an inch. When a tailstock lock lever is tightened by hand, the clamping pressure and tailstock alignment can be inconsistent. To eliminate this situation, a ½" drive ft/lb torque wrench can be inserted into the lock lever drive hub (see **Figure 36**). The tailstock then can be clamped in place at a pre-determined torque setting. As a result, all lathe operators can rely on the same draw-down alignment.

Tailstock Handwheel

The tailstock handwheel includes a micrometer collar in increments of 0.001"–0.100". Rotating the handwheel moves the quill at a 1:1 ratio with the collar. One full handwheel rotation moves the quill 1/10" for up to a maximum of 4" of travel. The quill also has a metric scale from 1mm–100mm.

Offsetting Tailstock

By offsetting the tailstock, the dead center can hold a workpiece at a particular away from the spindle centerline so tapers and pipe threads can be cut. For a quick visual tool in keeping track of tailstock movement, an offset scale (see **Figure 37**) with arbitrary increments is located at the rear of the tailstock. However, to achieve exact taper angles, or to adjust the tailstock back into the spindle centerline, angle gauges and a test indicator must be used.

To offset the tailstock:

1. Loosen the tailstock lock lever.

2. Using a 4mm hex wrench, loosen one of the front or rear adjustment screws shown in **Figure 37**.

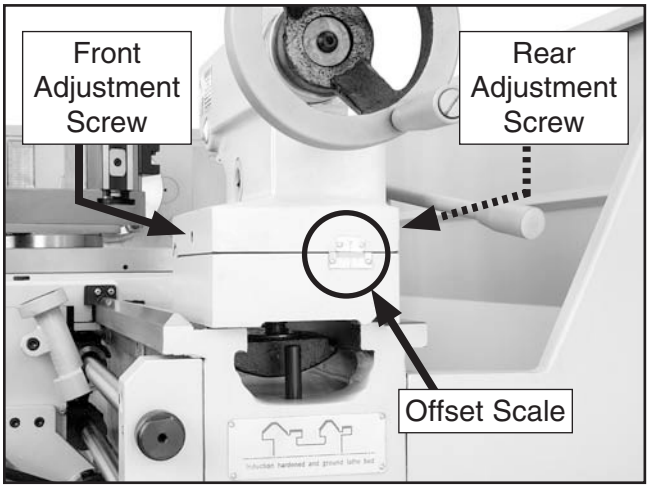


Figure 37. Tailstock off-set adjustments.

—To move the tailstock toward the rear of the lathe, loosen the front adjustment screw and tighten the rear screw.

—To move the tailstock toward the front of the lathe, loosen the rear adjustment screw and tighten the front screw.

3. Apply the tailstock lock lever, and check the amount of the tailstock offset. Unlock and readjust as required for fine tuning.

Aligning Tailstock

The tailstock alignment was set at the factory with the headstock. However, we recommend that you take the time to ensure that the tailstock is aligned to your own desired tolerances.

When clamped in place, a tailstock experiences compression that draws its centerline downward into alignment with the spindle centerline. This distance is usually a few thousandths of an inch. When a tailstock lock lever is used by feel, or when used by different machinists, this alignment can be inconsistent.

To eliminate this variable, a ½" drive ft/lb torque wrench can be inserted into the lock lever drive hub. The tailstock can then be clamped in place at a pre-determined torque setting. All operators can then rely on the same amount of draw-down alignment that is based on the same torque setting.

To align the tailstock:

1. Center drill a 6" long piece of bar stock on both ends. Set it aside for use in **Step 4.**

2. Make a dead center by turning a shoulder to make a shank. Flip the piece over in the chuck and turn a 60° point (see **Figure 38**). As long as it remains in the chuck, the point of your center will be accurate to the spindle axis.

   Note: *Keep in mind that the point will have to be refinished whenever it is removed and returned to the chuck.*

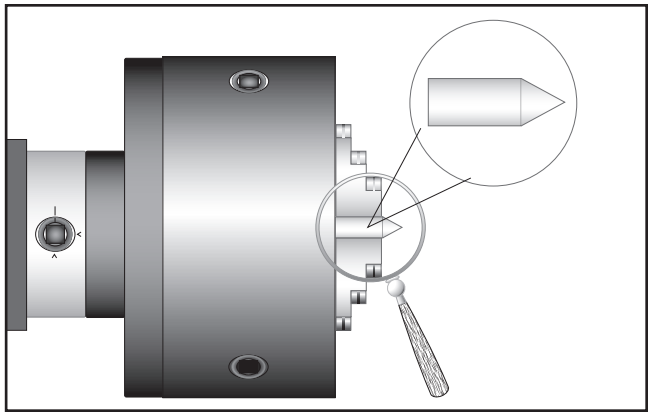


Figure 38. Finished dead center.

3. Place the live center in your tailstock.

4. Attach a lathe dog at the spindle end to the bar stock from **Step 1**, and mount it between the centers as shown in **Figure 39**.

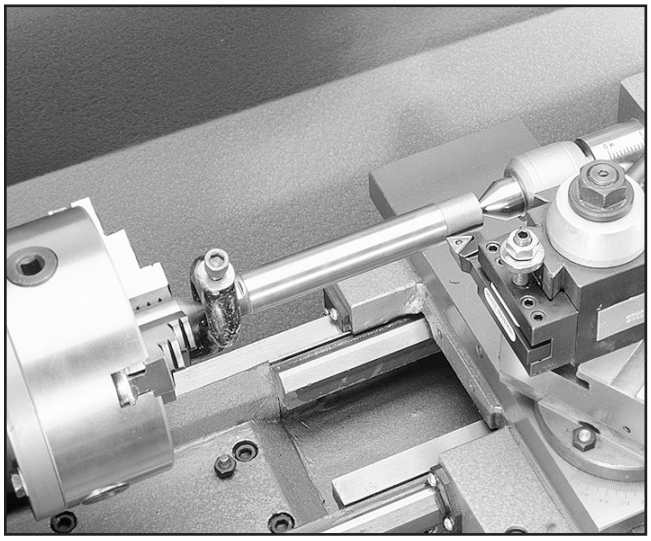


Figure 39. Bar stock mounted between centers.

5. Turn approximately 0.010" off the diameter.

6. Mount a dial indicator so that the plunger is on the tailstock quill (see **Figure 40**).

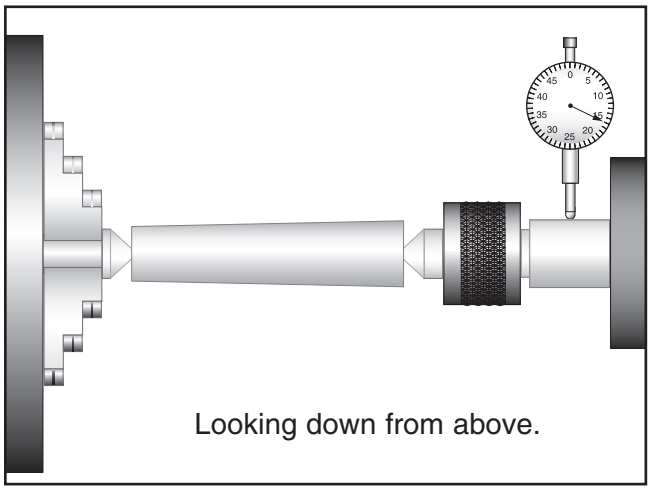


Figure 40. Adjusting for headstock end taper.

7. Measure the stock with a micrometer. If the stock is wider at the tailstock end, the tailstock needs to be moved toward the front of the lathe the amount of the taper (see **Figure 40**).

— If the stock is thinner at the tailstock end, the tailstock needs to be moved toward the rear of the lathe by at least the amount of the taper (see **Figure 41**).

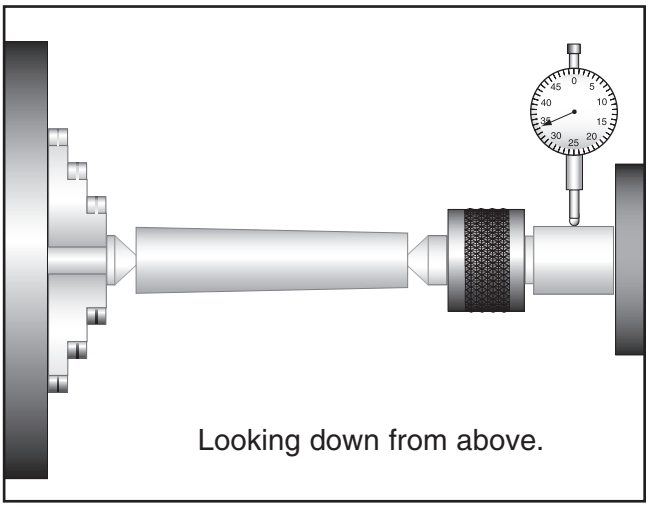


Figure 41. Adjusting for tailstock end taper.

NOTICE

DO NOT forget to lock the tailstock to the ways after each adjustment.

8. Loosen the tailstock lock lever and adjust the tailstock offset by the amount of the taper.

9. Turn another 0.010" off of the stock and check for any taper.

10. Repeat as necessary until the desired level of accuracy is achieved.

Drilling with Tailstock

The tailstock quill has an MT#3 taper with a lock slot at the bottom to accept tang-style tooling. If the tooling will experience high torque loads during operation, it is critical to use tanged-style to prevent the drill bit or arbor from spinning and galling the quill bore. Restoring a galled bore and taper can be time consuming or require quill replacement.

However, tooling without tang-styled arbors can be used if they meet the following criteria.

- Very little torque loads will be applied to the tooling such as with centers.
- The tap or drill bit is not larger than ½" in diameter.
- The end of the arbor is solid, or has a screw threaded into the hole making the end of the arbor solid. Installing an arbor with a solid end is important to avoid the arbor from becoming stuck in the quill. Some arbors equipped with the hole are too short to be exposed in the drift slot for removal, and the tailstock pin has no surface to push against when using the handwheel to remove the arbor. As a result, the arbor becomes stuck requiring the quill to be removed and the arbor driven out with a punch.

Tip: *When drilling or when tapping operations need to be done deep into a part, the quill can also be stabilized by slightly applying the lever to add drag and preload to the quill.*

To install a tanged drill or chuck:

1. Lock the tailstock in position, then unlock the quill.

2. Use the quill feed handwheel to extend the quill about 1" out of the tailstock.

3. Insert an MT#3 chuck arbor or drill bit into the quill just until the tang drops into the slot and the tapers just touch.

Tip: *For maximum locking of large diameter drill bits, push and seat the drill bit into the quill with a clockwise rotation as to load the tang against its slot.*

4. Tap the end of the tooling or drill bit with a wooden block or mallet to seat the tool.

5. Lock the quill.

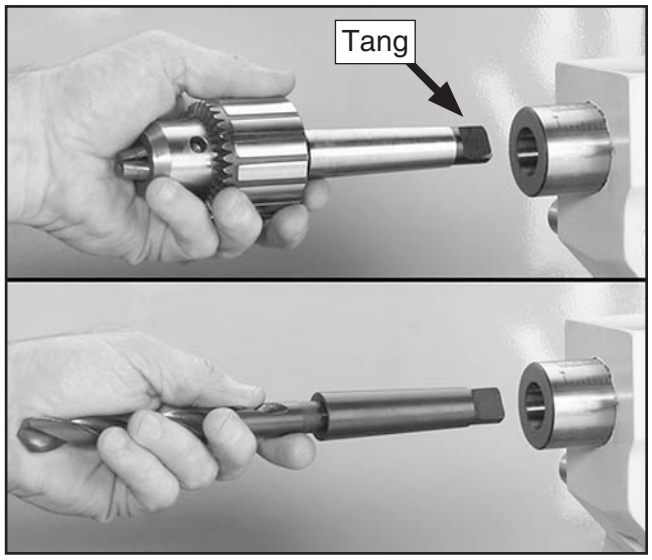


Figure 42. Typical drill chuck and arbor-style drill bit installation.

To remove a tapered drill or chuck:

1. Turn the handwheel counterclockwise until the arbor or drill bit is pushed out from the tailstock taper.

   —If the tool is stuck in the bore and cannot be removed by turning the handwheel with moderate force, extend the quill to expose the drift key slot, and use any standard drift key to remove the stuck tooling.

Cutting Fluid System

The cutting fluid system delivers cutting fluid via a flexible distribution hose and nozzle. The cutting fluid pump turns ON and OFF with a switch located on the control panel. Fluid flow is controlled by a manual flow control valve near the base of the distribution hose (see **Figure 43**).

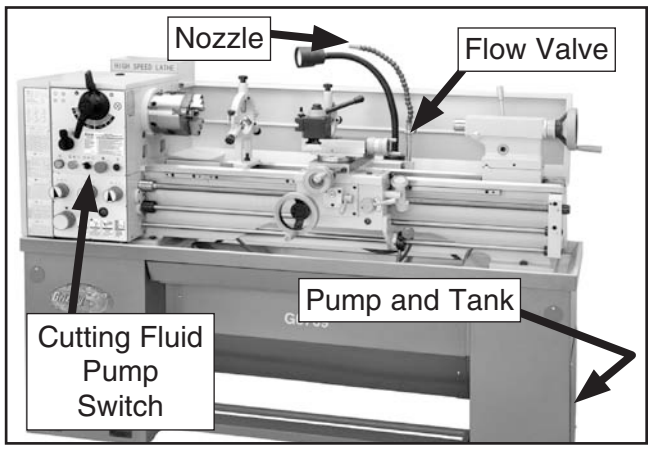


Figure 43. Cutting fluid system controls.

NOTICE

Running the pump without adequate cutting fluid in the reservoir may permanently damage it. This type of damage is not covered by the warranty.

Always use high quality cutting fluid and follow the manufacturer's instructions for diluting. Frequently check the cutting fluid condition and change it promptly when it becomes overly dirty or rancid. Refer to **Cutting Fluid** on **Page 58** for changing the fluid or filling for the first time.

To use the cutting fluid system:

1. Make sure the cutting fluid tank is properly serviced and filled.

2. Position the cutting fluid nozzle as desired for your operation.

3. Use the control panel switch to turn the cutting fluid pump ***ON***.

4. Adjust the flow of cutting fluid by using the valve lever at the base of the nozzle hose.

Steady Rest & Follow Rest

Selecting and Using Rests

To minimize deflection, in workpieces like rods, dowels, tubes, and small diameter solid shafts, the steady rest or follow rest is used.

The steady rest is clamped to the ways and supports the workpiece with three fingers at a single point between the chuck and the tailstock.

The follow rest is bolted to the carriage and travels with it during turning or threading operations. Two fingers support the workpiece while the tool tip acts as the third support during cutting.

Both the steady rest and the follow rest use ball bearing-tipped fingers instead of solid brass tips. The fingers have a guide slot where the tip of an adjustable set screw rides. These screws are held in place with jam nuts. The set screws must be tightened inward far enough so they bottom slightly, providing preload and keeping the finger in alignment with only slight rocking in its bore.

When using either of these rests, keep in mind that most machining operations must be done at low spindle speeds to prevent a workpiece ejection hazard.

To install the rests:

1. DISCONNECT LATHE FROM POWER!

2. Select the required rest (see **Figure 44**) for the operation, and wipe all mounting surfaces clean with a lightly oiled rag.

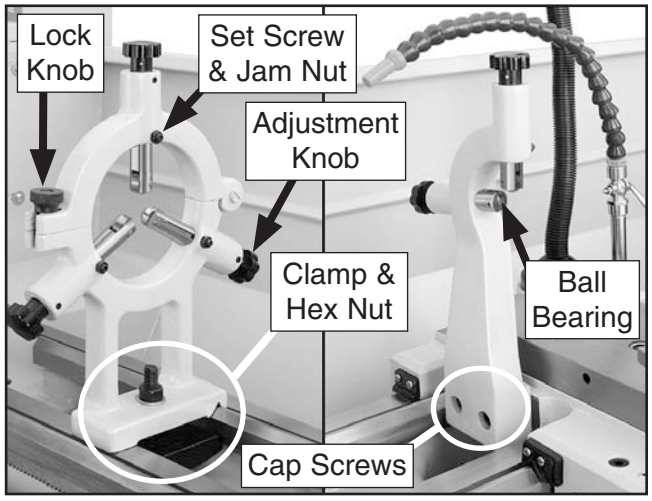


Figure 44. Steady rest and follow rest.

—To install the steady rest, place it on the lathe bed where workpiece support is needed. Engage the base clamp with the way underside and tighten the mounting nut with a 27mm wrench.

—To install the follow rest, fasten the base to the saddle with two provided M8-1.25 x 30 cap screws using a 6mm hex wrench.

3. Install the workpiece and support it at both ends.

4. Without causing deflection, adjust the fingers until the bearings just touch the workpiece.

5. Lock the fingers in place with the set screws and jam nuts.

Tool Post

The included tool post is a 200 series piston-type quick-change model. The quick-change lock lever allows for one or more tool holders to be quickly loaded and unloaded in two available dovetailed slots. By having extra tool holders and setting the tool height in advance, swapping between tooling is efficient for production-sensitive schedules. When loosened, the mounting hex nut shown in **Figure 39** allows the entire tool post to rotate 360° for angle adjustments.

To load a tool holder:

1. Install the required cutting tool in the tool holder.

2. Move the quick-change lever (see **Figure 45**) to recess the lock piston and provide an unobstructed slot for the tool holder to slide down into.

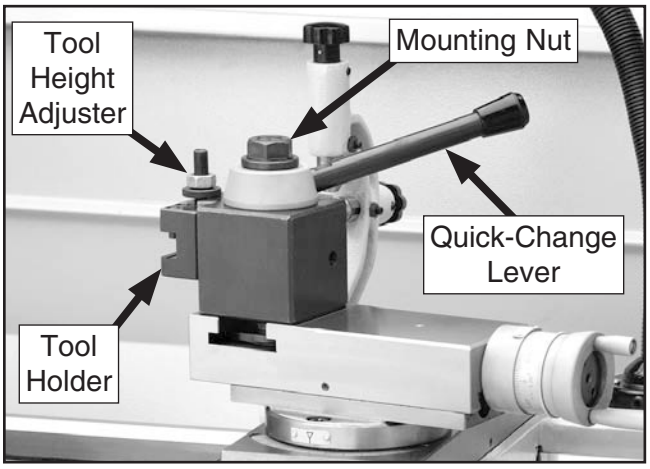


Figure 45. Tool post bolts.

3. Slide the tool holder into position, and tighten the quick-change lever.

4. Use the handwheels to bring the tool to the required position.

5. Double check that tool angle, height, and position are correct.

6. Make sure that all fasteners related to the tool, holder, and tool post are tight.

Spider

Your lathe is equipped with a set of outboard spindle supports known as a "spider," shown in **Figure 46**.

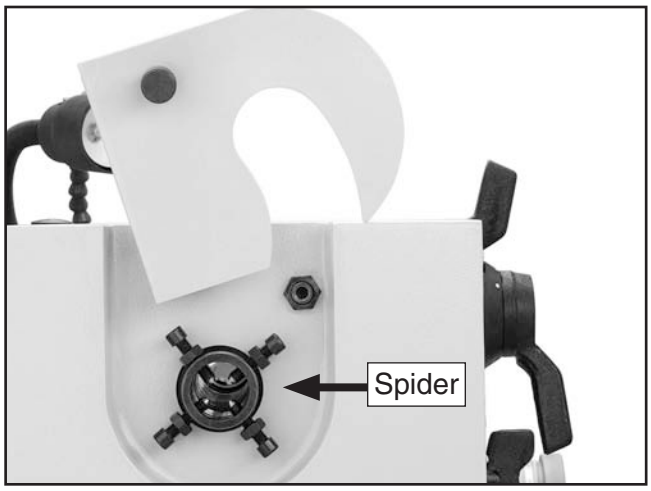


Figure 46. Spider assembly located on the outboard spindle.

Use the spider when a long workpiece has the potential to wobble or vibrate when it extends through the outboard side of the spindle.

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

When the spider screws are installed, and regardless if they are used to hold a workpiece or not, always lock each spider screw in place by tightening the jam nuts. If a workpiece is installed, merely tightening the spider screws against the workpiece and leaving the jam nuts loose is not safe. Spider screws that loosen during operation can crash into the lathe end cover.

⚠CAUTION

To avoid creating an entanglement hazard, remove the spider screws when not in use, and always disconnect the lathe from power when installing, removing, or adjusting the spider screws. Ignoring this warning can lead to personal injury or machine damage.

Spindle Speed

Using the correct spindle speed is important for 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 operations, 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 47**.

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

*Double if using carbide cutting tool

Figure 47. 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. All of these sources will help you take into account all the applicable variables in order to determine the best spindle speed for the operation.

Changing Spindle Speed

This lathe is equipped with two levers shown in **Figure 48** that are used to achieve eight spindle speeds. **Never move either lever while the spindle is rotating, or gear clash and tooth fracture may occur.** When the lathe is stopped, if the levers do not fully engage, the spindle must be slightly rotated by hand.

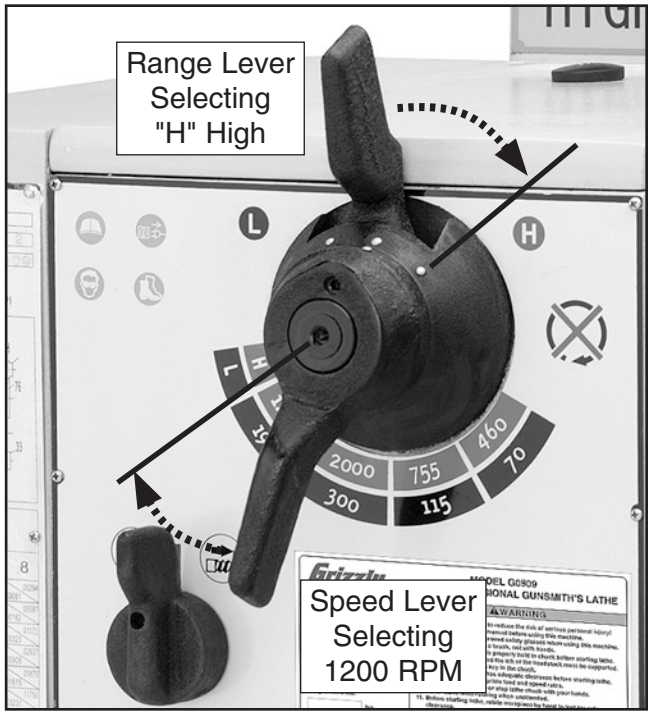


Figure 48. Spindle speed levers.

If the spindle speed range lever (see **Figure 48**) is positioned in low "L", the four spindle speeds listed in the black indicator are available. If the range lever is positioned in high "H", the four spindle speeds listed in the red indicator are available.

The spindle speed lever shown in **Figure 48** has eight speed selections depending on if the spindle speed range lever is in high or low.

When in low range, the available spindle speeds are 70, 115, 190, and 300, and when in high range, the available speeds are 460, 755, 1255, and 2000.

To change the spindle speed:

1. Determine the spindle speed required for the lathe operation.

2. Move the spindle speed range lever to the right for high range or left for low range.

3. Move the spindle speed lever to the left so it is over the required speed, for example 1200 RPM is being selected in **Figure 48**.

   —When the range lever is in high, the speeds in the red band are available.

   —When the range lever is in low, the speeds in the black band are available.

Manual Feed

You can manually move the cutting tool around the lathe for facing or turning operations using the handwheels shown in **Figure 49** and described below.

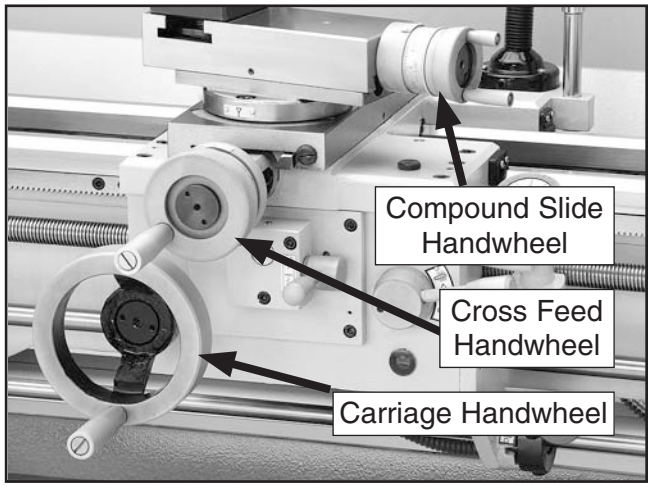


Figure 49. Manual feed controls.

Carriage Handwheel

For moves the carriage longitudinally left or right along the ways in increments of 0.006" for a total rotary distance of 0.564". One full rotation of this handwheel equates to approximately 9/16" of carriage longitudinal travel, thus establishing a 1:1 ratio between the two.

Cross Slide Handwheel

Moves the cross slide in or out perpendicular to carriage travel with a 10-TPI leadscrew. Movement is in increments of 0.001", where a total revolution of 0.100" equals 0.200" of cross slide movement. This micrometer scale is a "Standard Dial" that has a ratio of 1:2. For example, if the hand wheel is rotated clockwise 0.015" during a turning operation, 0.030" will be removed from the overall diameter of the workpiece, as the outside diameter is measured with a caliper.

Compound Slide Handwheel

Moves the compound and cutting tool relative to the workpiece at various angles with fine-depth control in inch calibrations. One full rotation equals 0.100" of compound movement or equates to a ratio of 1:1. The scale is broken down in increments of 0.001".

Power Feed

The feed selection lever (see **Figure 50**) allows the machinist to engage or disengage the apron for longitudinal or cross feeding tasks.

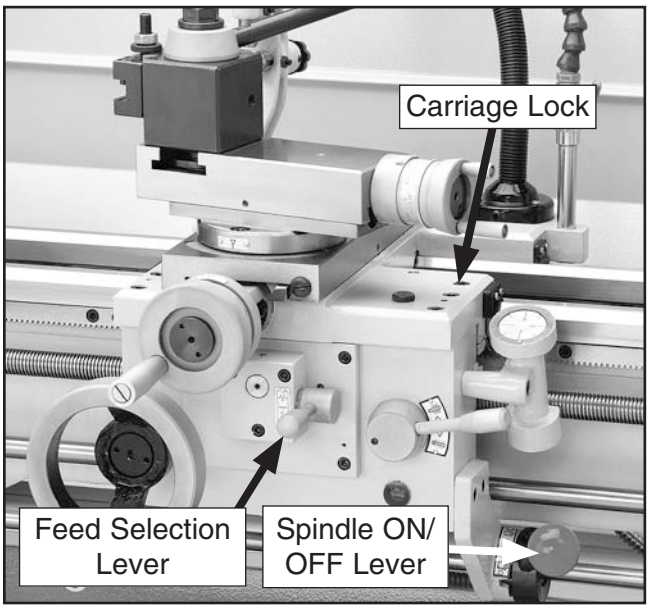


Figure 50. Power feed controls.

Sometimes it is necessary to rock the carriage handwheel or the cross feed handwheel to assist in fully engaging the chosen feed gears. To prevent inadvertent apron damage, the apron is equipped with an internal lockout system that prevents the feed selection lever and half-nut levers from being engaged at the same time. However, before engaging the apron for any longitudinal feed operations, make sure that the carriage lock is loose and the carriage is allowed to move freely, or the feed system may be damaged.

Moving the feed selection lever upwards from the central or disengaged position engages the cross slide for in-and-out facing operations.

Moving the feed selection lever downwards from the central disengaged position, engages the carriage for left-or-right longitudinal turning operations.

The speed at which the carriage travels is set with the feed speed dials (refer to **Feed Settings** on **Page 44**). The feed direction is changed by the feed direction lever on the headstock.

NOTICE

A high feed rate or threading at a high speed reduces your reaction time to disengage the apron or leadscrew to avoid a crash with the spinning chuck. When threading, making too deep of a cut can result in the half nut binding with the leadscrew causing an impaired ability to disengage the half nut to avoid a chuck crash. Pay close attention to the feed rate you have chosen and keep your foot poised over the brake pedal. Failure to fully understand this may cause the carriage to crash into the chuck.

Feed Settings

Various feed rates are achieved on this lathe by moving knobs, levers, and rearranging change gears according to the threading chart located on the headstock. *All required change gears are pre-installed on this lathe, and no external gears are required.*

To set up for a power feed operation:

1. DISCONNECT LATHE FROM POWER!

2. Remove the cover on the left-hand side of the headstock to expose the change gears.

3. Look at the lathe feed rate chart, and find the required feed rate for your turning or facing operation. In each box on the chart, two numbers are separated by a slash (see **Figure 51**). The top-right number is carriage feed, and the bottom-left number is cross feed. If for example, a carriage feed rate of 0.00168" is needed, the change gears and feed dials must be in the following positions **FATX1**.

   —"**F**" is the first letter in the sequence and indicates that the change gears must be rearranged in the "F" sequence as shown in **Figure 52**. The change gears are located on the left-hand side of the lathe, behind the headstock gear cover shown in.

   —"**ATX**" is the second group of letters that indicate which positions to turn the lettered-feed dials to.

   —"**1**" is the last digit and indicates which position to turn the numbered feed dial to.

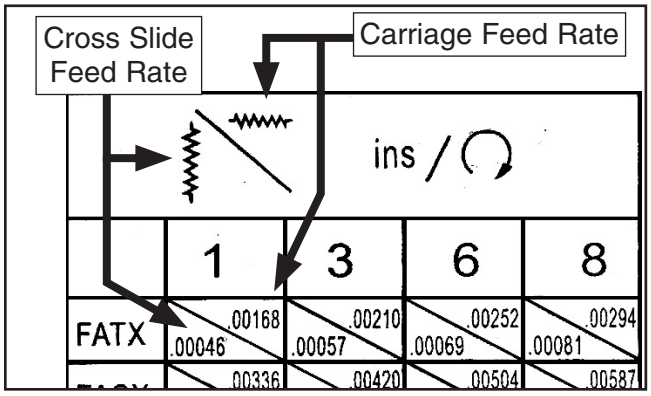


Figure 51. Feed rate chart.

4. Leaving 0.003"–0.005" backlash between gear teeth, arrange the change gears to match the order under "**F**" (see **Figure 52**).

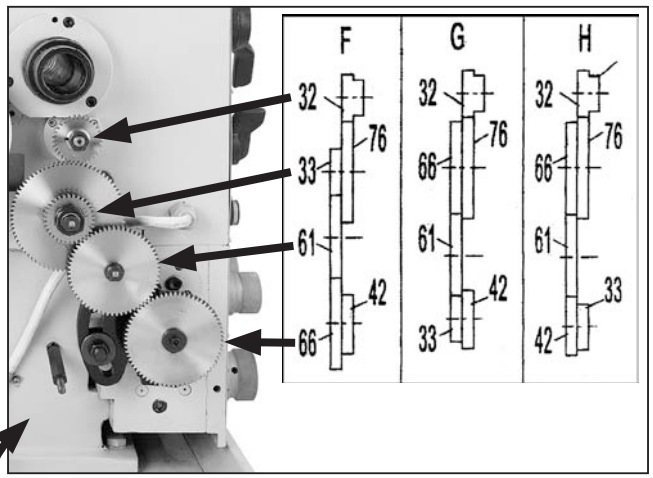


Figure 52. Change gear and chart relationship.

5. Rotate the spindle by hand to verify no binding exists, and reinstall the gear cover.

6. Move the feed dials to the combination of **FATX1**, as shown in **Figure 53.**

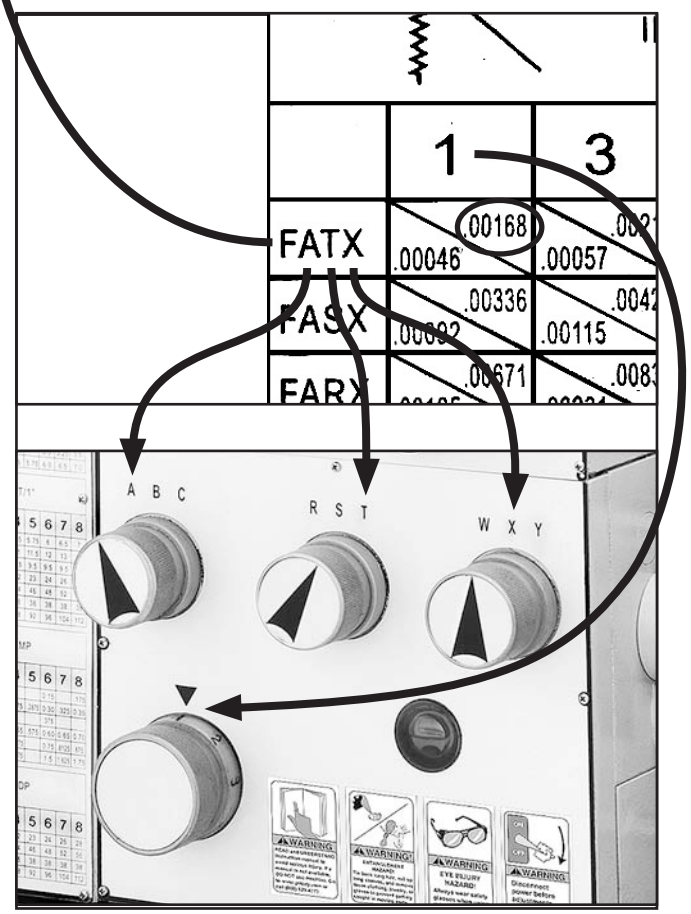


Figure 53. Feed control settings for a 0.00168" carriage feed rate.

Thread Settings

Regardless of the example given below, the setup procedure on this lathe is the same for metric, inch, module, or diametral pitch threads. These thread selections are indicated by a series of letters and numbers shown on the headstock threading charts. First, the change gear positions are checked and rearranged if indicated by the chart. Next, the quick change gearbox knobs and levers are moved to specific positions also indicated by the chart.

To set up for threading:

1. DISCONNECT LATHE FROM POWER!

2. Remove the cover on the left-hand side of the headstock to expose the change gears.

3. Review the threading chart for the required thread to be cut (see **Figure 54**). The chart indicates that to cut a 0.75 metric thread, the change gears and feed dials must be in the following positions **FBSW6**.

   —"**F**" is the first letter in the sequence and indicates that the change gears must be rearranged in the "F" order (see **Figure 55**).

   —"**BSW**" is the second group of letters that indicate which position to turn the lettered-feed dials to.

   —"**6**" is the last digit and indicates which position to turn the numbered feed dial to.

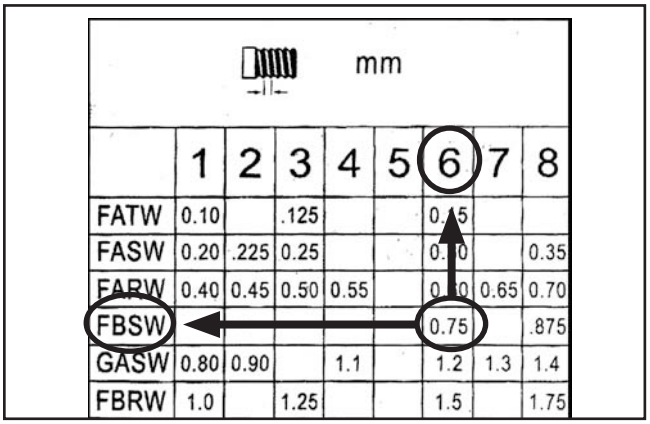


Figure 54. Metric thread pitch chart.

4. Leaving 0.003"–0.005" backlash between gear teeth, arrange the change gears to match the order under "F" (see **Figure 55**).

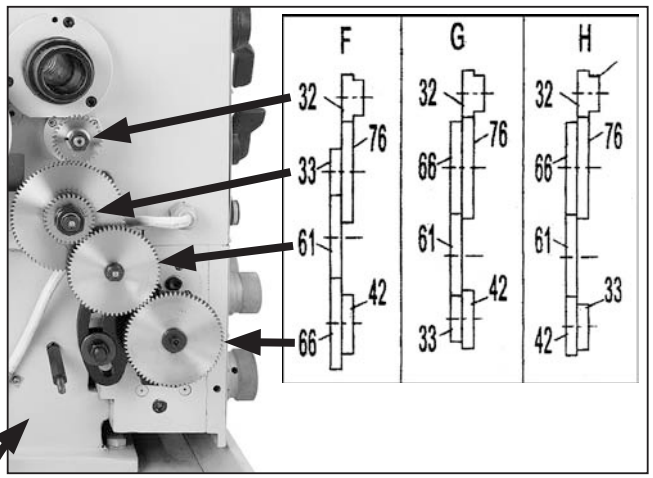


Figure 55. Change gear and chart relationship.

5. Rotate the spindle by hand to verify no binding exists, and reinstall the gear cover.

6. Move the threading dials to the combination of **FBSW6**, as shown in **Figure 56.**

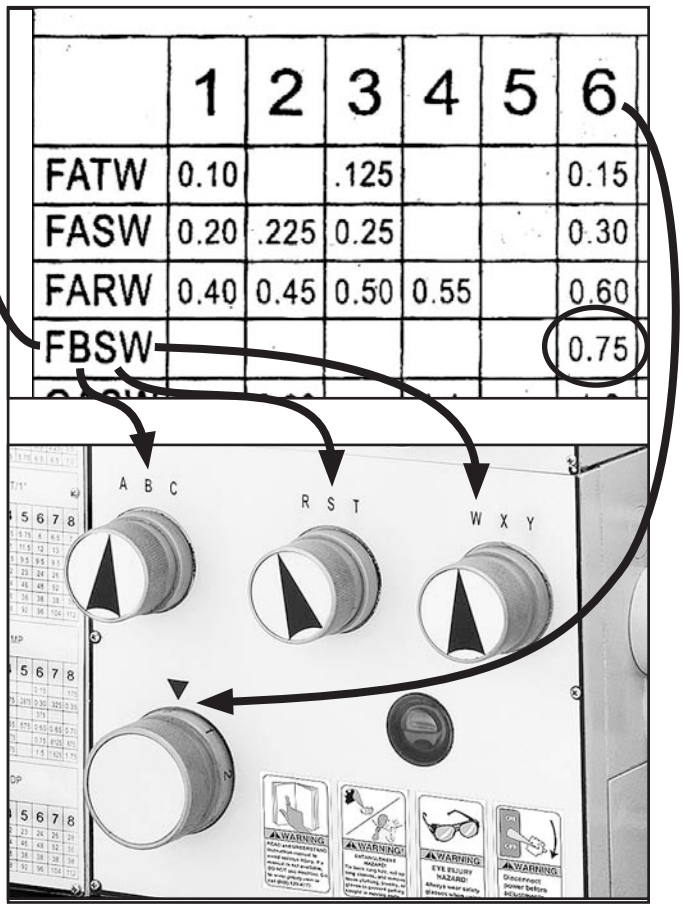


Figure 56. Thread control settings for 0.75 pitch.

Feed Direction Lever

When threading, the feed direction lever (see **Figure 57**) moves the carriage to the left toward the headstock (forward), and moves the carriage to the right toward the tailstock (reverse). The leadscrew will not turn when the feed direction lever is in the neutral position.

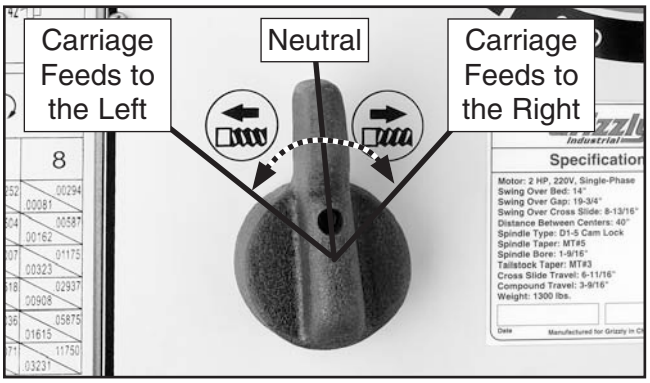


Figure 57. Feed direction controls for threading.

Feed Selection Lever

To prevent apron and drive system damage, the apron is equipped with an internal lockout, meaning that in order to engage the half nut for threading, this lever (see **Figure 57**) must be moved to the central or the disengaged position. Also keep in mind that just as with longitudinal feed operations, before any threading operation. You must first verify the carriage lock (see **Figure 57**) is disengaged, or the feed system may be damaged.

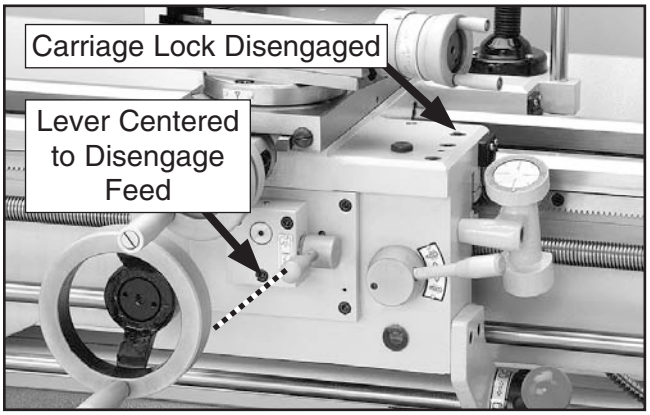


Figure 58. Feed selection lever disengaged.

Half-Nut Lever

When the feed selection lever and carriage lock are disengaged, the half-nut lever (**Figure 59**) can be moved downward from the disengaged upper position to clamp the half nut around the leadscrew for threading operations.

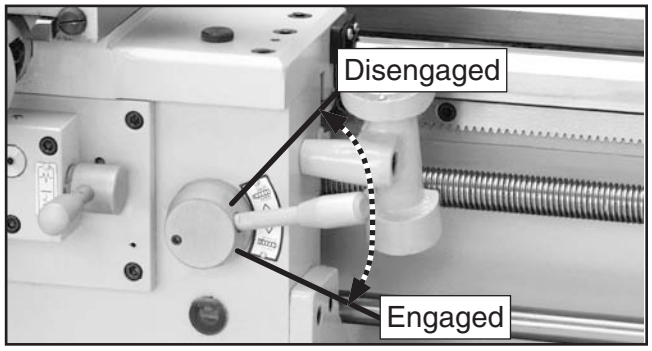


Figure 59. Half nut lever.

⚠CAUTION

DO NOT engage the half nut if the leadscrew will rotate over 200 RPM, or if the carriage lock is applied. Disregarding this warning may cause damage to the bearings or the leadscrew shear pin to break.

Thread Dial

When cutting inch threads and the pass has been completed, the thread dial (see **Figure 60**) allows the machinist to disengage the carriage from the leadscrew, and quickly return the carriage for the next pass. Based on the thread TPI being cut, and what is indicated on the thread chart, the dial indicates where the machinist must re-clamp the half nut in order to resume the same thread to avoid cross-cutting threads.

When cutting metric and other types of threads, the thread dial must be disengaged from the leadscrew, and the half nut clamped to the leadscrew until the threads are complete. Otherwise the path of the same thread will be lost. All carriage returns for non-inch threads are made by backing the tool point out of the thread, and reversing spindle rotation with the spindle ON/OFF lever.

To engage the thread dial, loosen the mounting cap screw, then pivot the dial into the leadscrew so the gear teeth mesh with the leadscrew. Retighten the cap screw to hold the thread dial in place.

Thread Chart

The thread dial chart is located on the headstock cover, as shown in **Figure 60** and **61**.

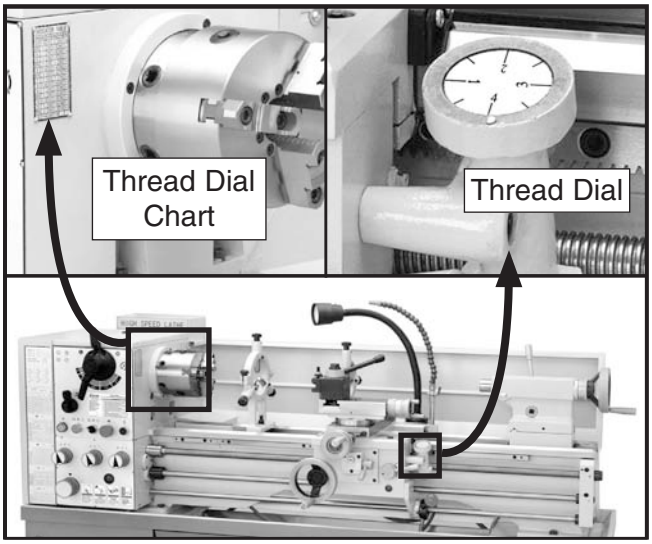


Figure 60. Thread dial chart and thread dial locations.

INDICATOR TABLE

T.P.I	SCALE	T.P.I	SCALE	T.P.I	SCALE
4	1-4	19	1	48	ALL
5	1	20	1-4	52	1-4
6	1&3	22	1&3	56	ALL
7	1	23	1	64	ALL
8	ALL	24	ALL	72	ALL
9	1	26	1&3	76	1-4
10	1&3	28	1-4	80	ALL
11	1	32	ALL	88	ALL
12	1-4	36	1-4	92	1-4
13	1	38	1&3	96	ALL
14	1&3	40	ALL	104	ALL
16	ALL	44	1-4	112	ALL
18	1&3	46	1&3		

Figure 61. Thread dial chart.

Find the TPI (threads per inch) that you want to cut in the left columns (under **TPI**), then reference the dial number in the right columns (under **Scale**). The dial number indicates when to engage the halfnut for a specific thread pitch as indicated by the thread dial (see **Figure 60**).

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

TPI Divisible by 8: For threading any inch TPI divisible by eight, use any of the lines on the thread dial (see the example in **Figure 62**).

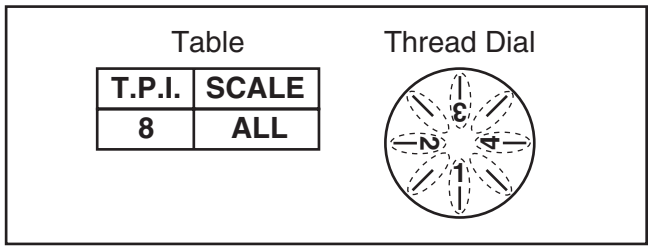


Figure 62. Example of an inch thread pitch divisible by 8.

TPI Divisible by 4 & Not by 8: For threading any inch TPI divisible by four but not by 8, use any numbered line on the thread dial (see the example in **Figure 63**).

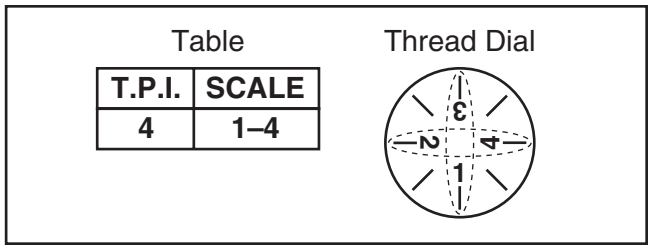


Figure 63. Example of an inch thread pitch divisible by 4, not by 8.

Important: *Once a number has been selected, continue using that number or its odd/even counterpart.*

For example:

- If you make the first threading pass and select 1, then all following passes you must select odd numbers 1, 3.
- If you make the first threading pass and select 2, then all following passes you must select even numbers 2, 4.

Odd Numbered TPI: For odd numbered inch TPI, use only the number 1 on the thread dial (see the example in **Figure 64**).

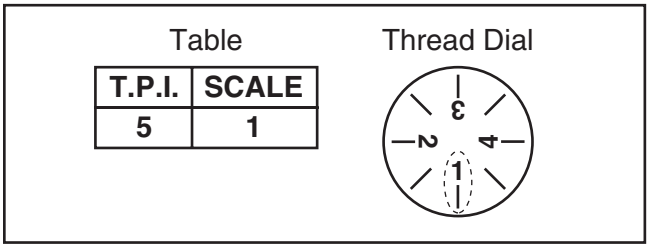


Figure 64. Example of an odd numbered inch thread pitch.

Even Numbered TPI Not Divisible by 4 or 8: For threading any even numbered TPI not divisible by 4 or 8, use the numbers 1 and 3 (see the example in **Figure 65**).

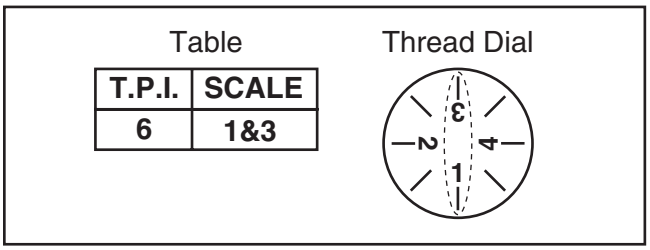


Figure 65. Example of even numbered inch thread pitch not divisible by 4 or 8.

SECTION 5: ACCESSORIES

H6879—Lathe Operation & Maintenance Book
This detailed metal lathe book provides extensive coverage of a wide variety of metalworking operations. Special emphasis is placed on lathe components, accessories, and operating procedures, including basic machine setup and routine maintenance. A "must have" reference for all metal lathe owners. 260 pages.

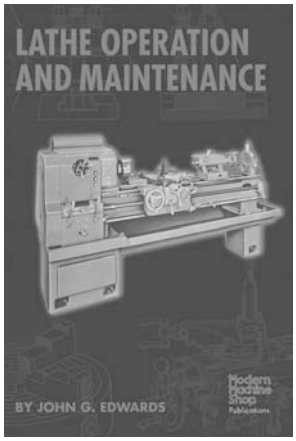


Figure 66. H6879 Lathe Operation & Maintenance Book.

G0688—Tool Post Grinder
This tool post grinder has what it takes to make your project to spec and look good, too! The heavy support casting is loaded with a precision spindle that will provide spectacular finishes on even the toughest jobs. Comes supplied with one external grinding wheel, one internal grinding wheel, and balanced mandrel pulleys and belts for each wheel.

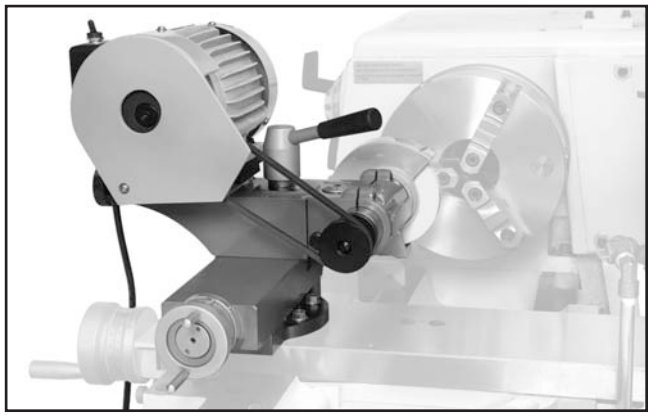


Figure 67. G0688 Tool Post Grinder.

H6095—Digital Readout (DRO)
This is one of the finest DRO's on the market today. Features selectable resolution down to 5µm, absolute/incremental coordinate display, arc function, radius/diameter function, master reference datum, 199 machinist defined tools, double sealed scales, inches/millimeters and linear error compensation. Don't be fooled by our low prices—this is only a reflection of the absence of any “middlemen” in the marketing structure—not a reflection of the quality.

Figure 68. H6095 Digital Readout.

T10118—Tailstock Digital Readout
Here’s the slickest setup for managing the exact depth of cut with your tailstock! Both the scale display and remote display come with a 0.0005" (five ten-thousandths of an inch) resolution, inch or millimeter display, zero keys and ON/OFF keys. The scale has an 8" range and its display features ABS or INC mode as well as a Hold key. Both displays read independently of each other, too!

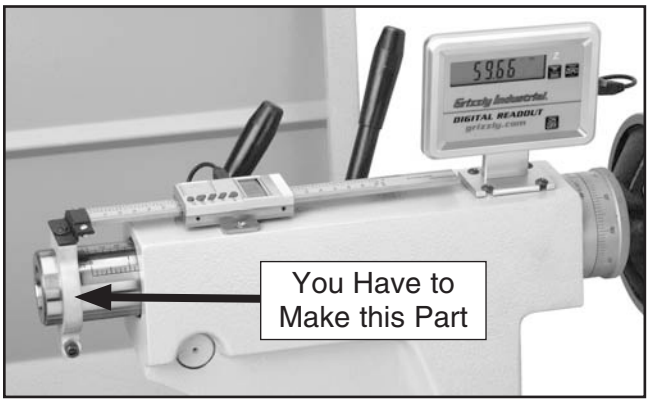


Figure 69. T10118 Tailstock Digital Readout.

H9240—Water Soluble Machining Oil
Rustlick water soluble machining oil contains effective chlorinated E.P. additive to provide excellent tool life. Guaranteed to protect neoprene seals. Great for general purpose or heavy duty applications. Can be used on all metals except titanium.

Figure 70. H9240 Rustlick Machining Oil.

H5786—MT#3 x 4" Bull Nose Rolling Center
H5902—MT#3 x 2" Bull Nose Rolling Center
Built with precision sealed bearings, designed for heavy-duty use on hollow workpieces.

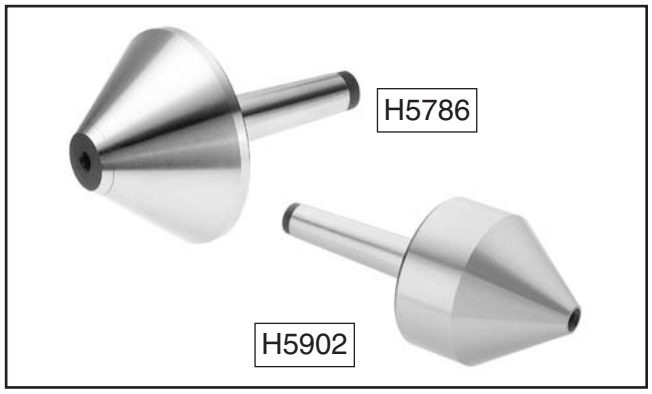


Figure 71. MT#3 bull nose rolling centers.

H5786—MT#3 Long Nose Precision Center
Provides critical tool clearance. Adjustable thrust bearings, 60° tip and 30° clearance relief angle.

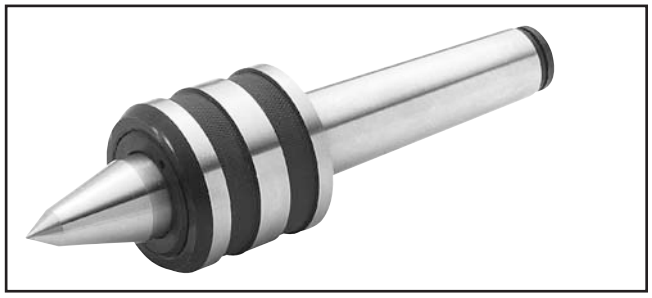


Figure 72. MT#3 Long Nose Center

G1070—MT3 Live Center Set
A super blend of quality and convenience, this live center set offers seven interchangeable tips. High-quality needle bearings prolong tool life and special tool steel body and tips are precision ground. Supplied in wooden box.

Figure 73. G1070 Live Center Set.

T20501—Face Shield Crown Protector 4"
T20502—Face Shield Crown Protector 7"
T20503—Face Shield Window
T20452—"Kirova" Anti-Reflective S. Glasses
T20451—"Kirova" Clear Safety Glasses
H0736—Shop Fox® Safety Glasses
H7194—Bifocal Safety Glasses 1.5
H7195—Bifocal Safety Glasses 2.0
H7196—Bifocal Safety Glasses 2.5

Figure 74. Eye protection assortment.

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"ø
G5699—Turning Holders ¼"~⅝"

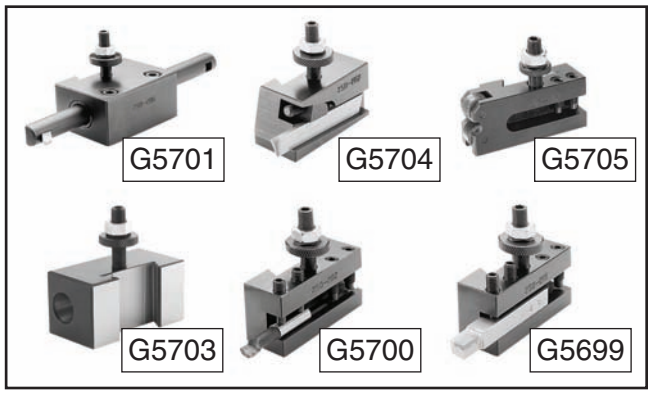


Figure 75. Quick change tool holders.

G5640—5-Pc. Indexable Carbide Tool Set
G6706—Replacement TiN Coated Carbide Indexable Insert

Five piece turning tool set features indexable carbide inserts with "spline" type hold-down screw that allow indexing without removing the screw. Each set includes AR, AL, BR, BL, and E style tools with carbide inserts, hex wrench, extra hold-down screws and a wooden case.

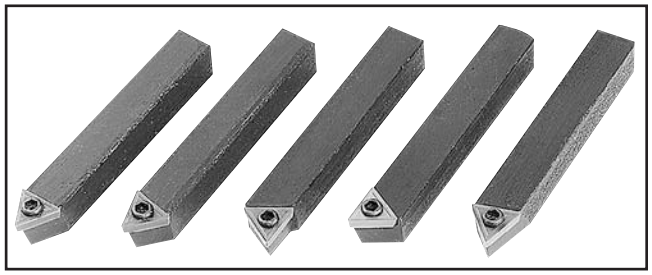


Figure 76. G5640 5 Pc. Indexable Tool Set.

Call 1-800-523-4777 To Order

G7038Z—Boring Bar
G7040—Carbide Inserts for Steel (5 pk)
G7048—Carbide Inserts for Cast Iron (5 pk)

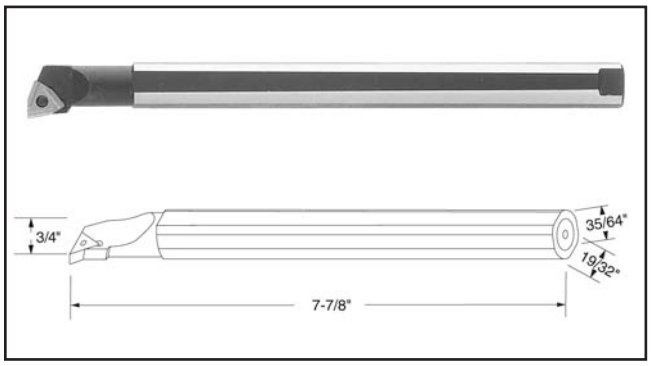


Figure 77. G7038Z Boring Bar.

G7033—Internal Threading Tool Holder
G7042—Carbide Inserts for Steel (5 pk)
G7050—Carbide Inserts for Cast Iron (5 pk)

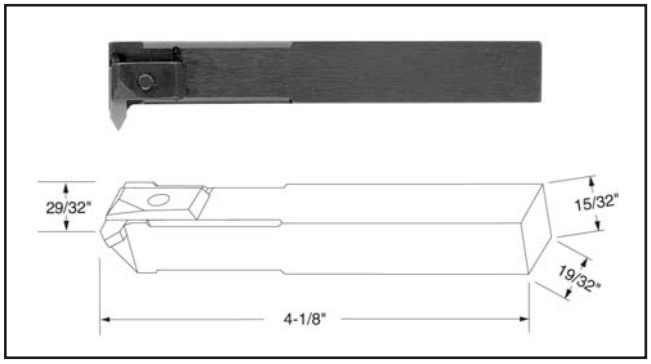


Figure 78. G7033 Int. Threading Tool Holder.

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

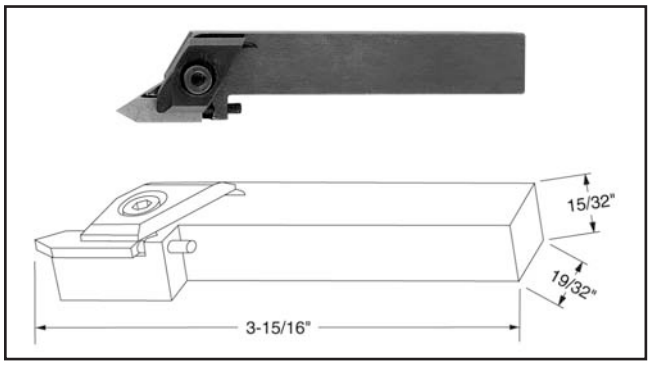


Figure 79. G7030 Threading Tool Holder.

MODEL	SIZE	BODY DIA.	DRILL DIA.	OVERALL LENGTH
H4456	1	1/8"	3/64"	1 1/4"
H4457	2	3/16"	5/64"	1 7/8"
H4458	3	1/4"	7/64"	2"
H4459	4	5/16"	1/8"	2 1/8"
H4460	5	7/16"	3/16"	2 3/4"
H4461	6	1/2"	7/32"	3"
H4462	7	5/8"	1/4"	3 1/4"
H4463	8	3/4"	5/16"	3 1/2"

These high speed steel center drills are precision ground for unsurpassed accuracy.

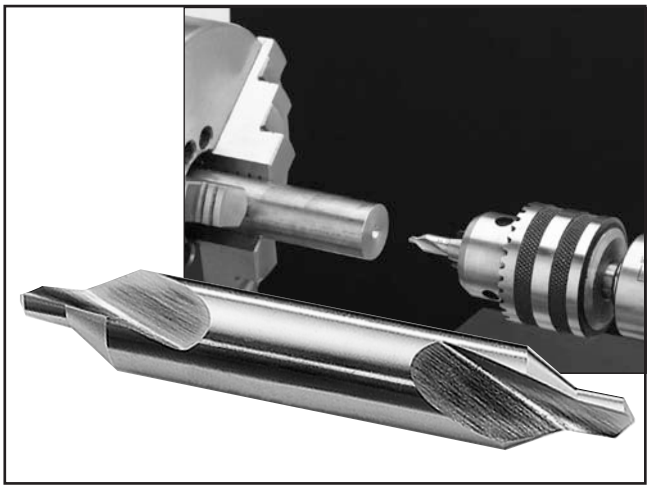


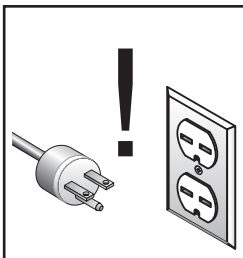
Figure 80. H4456-63 HSS Ground Center Drills.

H2987—½" Bent Lathe Dog
H2988—1" Bent Lathe Dog
H2989—1½" Bent Lathe Dog
H2990—2" Bent Lathe Dog
H2991—3" Bent Lathe Dog

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

Figure 81. H2987-91 Lathe Dogs.

SECTION 6: MAINTENANCE



⚠WARNING

Always disconnect power from the machine before performing maintenance. Ignoring this warning may result in serious personal injury.

Schedule

For optimum performance from your machine, follow this maintenance schedule and refer to any specific instructions given in this section.

Every 6–8 Hours of Running Time:
- Clean/vacuum lathe.
- Wipe down unpainted cast iron, including leadscrew, with way oil or other quality metal protectant.
- Lubricate ball oilers (**Page 54**).
- Check oil reservoirs (**Page 56**).

Each Week:
- Check cutting fluid system (**Page 58**). Clean tank and replace cutting fluid as necessary.

Each Month:
- Check/adjust V-belt tension (**Page 70**).

Every Six Months:
- Change oil in headstock, gearbox, and apron (**Page 57**).

Cleaning

Cleaning the Model G0709 is relatively easy. Disconnect the lathe before cleaning it. Remove chips as they accumulate. Vacuum excess metal chips and wipe off the remaining cutting fluid with a dry cloth when finished for the day. Chips left on the machine soaked with water-based cutting fluid will invite oxidation and gummy residue to build up around moving parts. Preventative measures like these will help keep your lathe running smoothly. Always be safe and responsible with the use and disposal of cleaning products.

Unpainted Cast Iron

Protect the unpainted cast iron surfaces on the lathe by wiping them clean after every use—this ensures moisture does not remain on bare metal surfaces.

Keep ways rust-free with regular applications of H8257—Primrose Armor Plate with Moly-D Machine and Way Oil.

Ball Oiler Lubrication

Always use an oil gun fitted with a rubber tip that is wide enough to seal the ball oiler inlet. This seal allows the gun to build hydraulic pressure and flush out contaminants and deliver oil to components at the end of long passages. Do not use oil guns equipped with a steel lance tip. These narrow tips to not seal with the ball oiler inlet and permanently dislodge the sealing ball, resulting in contamination, insufficient lubrication, and ball oiler replacement.

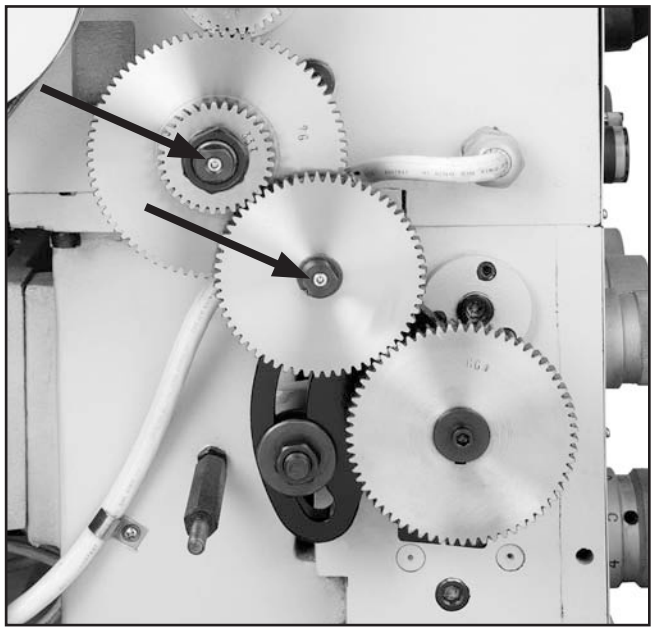


Figure 82. Change gear ball oilers.

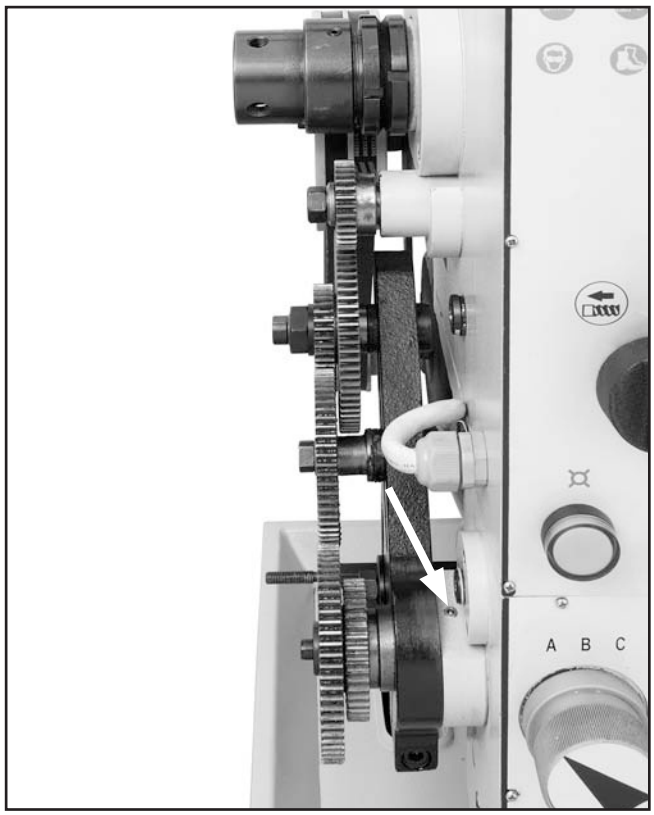


Figure 83. Change gear hub ball oiler.

Figure 84. Saddle and slide ball oilers.

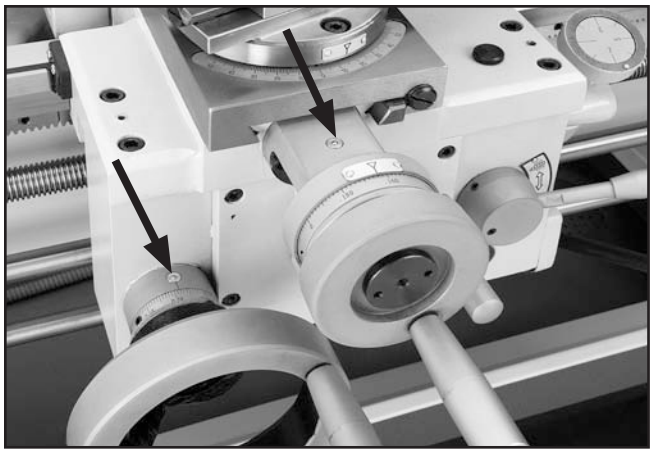


Figure 85. Handwheel ball oilers.

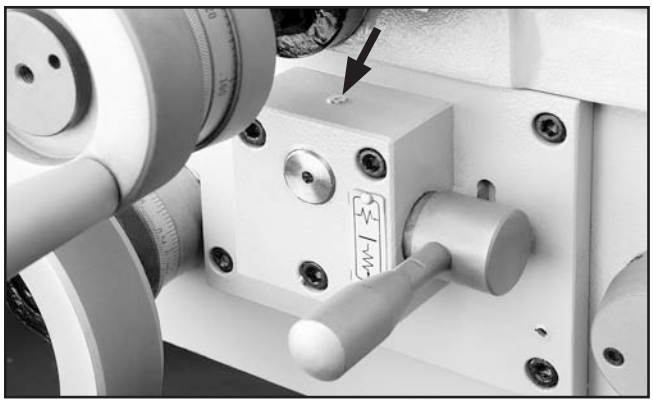


Figure 86. Feed selection lever ball oiler location.

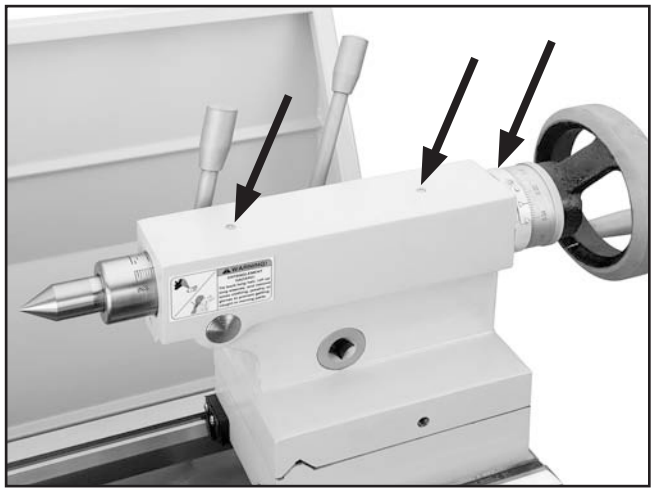


Figure 87. Tailstock ball oilers.

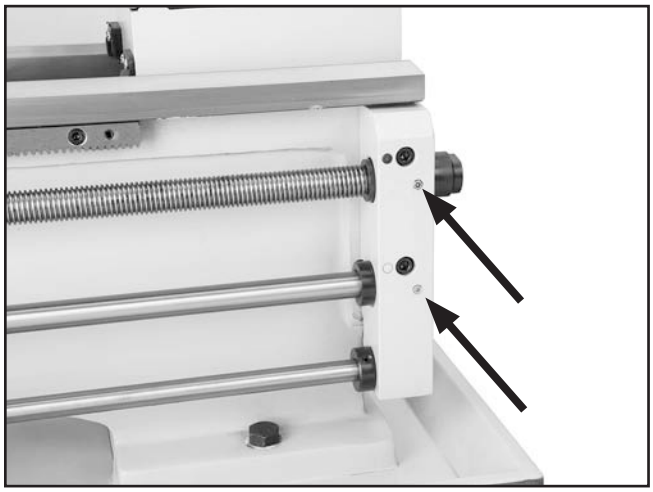


Figure 88. End cap ball oilers.

Oil Reservoirs

Checking & Adding Oil

The headstock, gearbox, and apron have oil reservoirs that are equipped with sight glasses for quickly checking oil levels. Before and after every use, make sure that the oil levels are correct. Shown in **Figures 89–91** are the gearbox locations of the sight glasses and the fill and drain plugs.

To add oil to the reservoirs:

1. Clean the area around the fill plug clean to prevent debris from falling in the reservoir when adding oil.

2. Remove the fill plug.

3. Slowly add oil until the oil level is centered in the sight glass.

4. Replace fill plug.

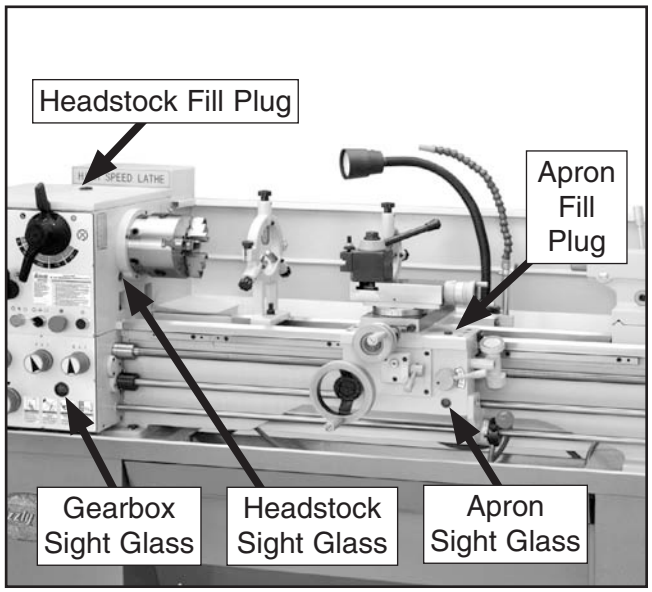


Figure 89. Location of oil sight glasses and exterior fill plugs.

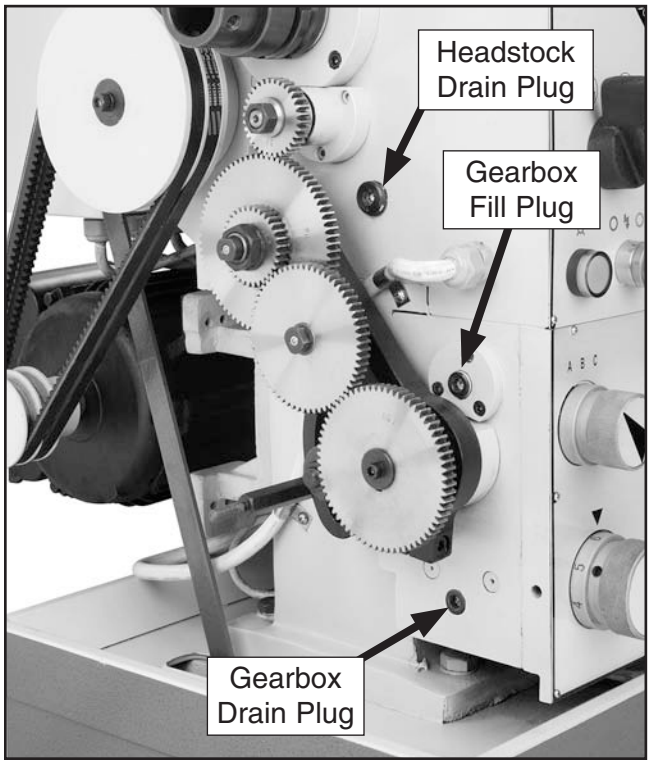


Figure 90. Gearbox fill and drain plugs.

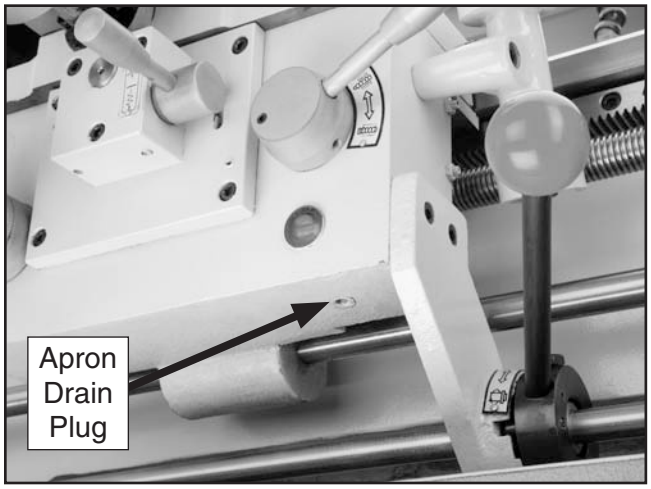


Figure 91. Apron drain plug.

Changing Oil

The oil in the reservoirs must be changed after the first three months of operation, then twice a year after that. If the lathe is under heavy use, more frequent oil changes will be required to keep the gearboxes clean and ensure long machine life. Some lathe owners believe that by using full synthetic oils in the gearboxes is a way to extend oil change intervals. We do not recommend this practice. While synthetic oils are superior this lathe does not use a filter to remove contaminants that are generated during normal use, such as when shifting gears. Changing the oils on a frequent basis to flush out moisture and contaminants is still the best option to ensure long gearbox life.

Headstock Oil Capacity ..... 7 Liters
Headstock Oil Type ..... VG32/ISO or L-FC15
or MOBIL Velocite10

Quick Change Gearbox Oil Capacity ..... 2 Liters
Quick Change Gearbox Oil Type HL32
or VG68 or L-HM46

Apron Oil Capacity ..... 1 Liter
Apron Oil Type..... HL32
or VG68 or L-HM46

Tools Needed	Qty
Drain Pan (at least 2 Gallon Capacity)	1
Hex Wrench 5mm	1
Hex Wrench 6mm	1
Wrench 24mm	1

To change the oil in the reservoirs:

1. Run the lathe to bring the lathe gearboxes to a warm temperature and turn ***OFF*** the lathe.
2. DISCONNECT LATHE FROM POWER!
3. Remove the headstock gear cover.
4. Using a funnel or cardboard ramp if desired to direct waste oil into the drain pan, position the drain pan under the gearbox drain plug.
5. Remove the fill plug and the drain plug from the selected oil reservoir, and allow all oil to drain.
6. Re-install the drain plug, add oil to the reservoir until the sight glass reads full. Then reinstall the fill plug.

V-Belt Tension

After initial break in, the V-belts slightly stretch and seat into the pulley. It is important to check and adjust them to compensate for this initial wear. Check the tension thereafter on a monthly basis.

Tools Needed	Qty
Hex Wrench 17mm	1

To check the V-belt tension:

1. DISCONNECT LATHE FROM POWER!
2. Remove the headstock gear cover.
3. Push the center of the V-belts with moderate pressure. The V-belt deflection should be approximately ¼".

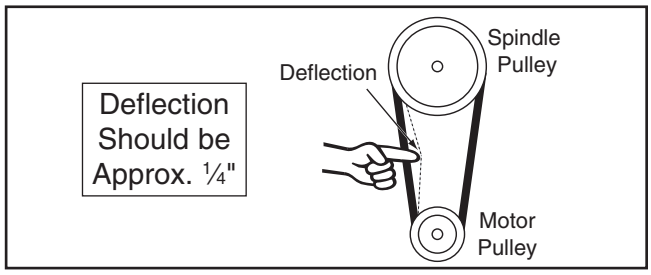


Figure 92. Belt deflection.

—If the belt deflection is greater than ¼", use the 24mm wrench to loosen the motor mount bolts (**Figure 93**) and slide the motor downward until the deflection is correct.

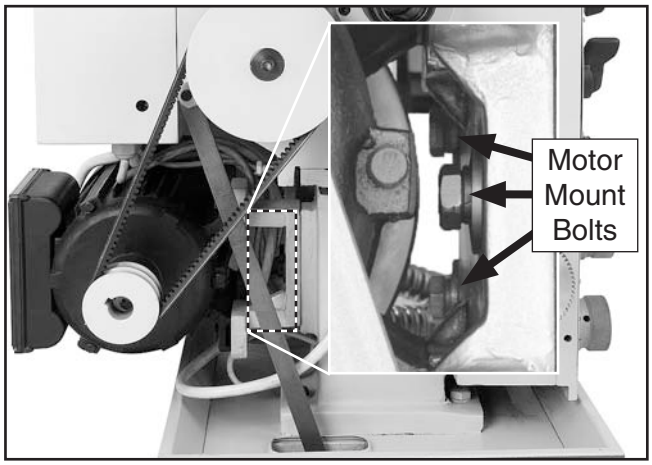


Figure 93. Checking V-belt deflection.

4. Tighten the bolts and recheck the belts.

Cutting Fluid System

⚠WARNING

BIOLOGICAL AND POISON HAZARD! Use the correct personal protection equipment when handling cutting fluid and by follow federal, state, and fluid manufacturer requirements to properly dispose of cutting fluid.

Located at the tailstock end of the lathe is an access cover where the pump and a cutting fluid tank are located. A screen in the chip drawer prevents large metal chips from entering the tank. The small metal chips wash down into the cutting fluid tank that is split into two chambers by means of a baffle. The first chamber allows the small chips to settle to the bottom, and lets clean cutting fluid overflow the baffle and enter the second chamber where the pump draws clean fluid. Inspect the tank often to verify that metal chips are not overflowing into the second chamber where, if left for a period of time, pump damage may occur.

Tip: *For speedy chip removal from the tank, a metal catch basket with handles can be made to lift out the metal chip buildup in the first chamber.*

Tools Needed	Qty
Phillips Screwdriver #2	1
5-Gallon Drain Bucket	1
Drain Hose 3/8" x 4'	1

Checking Cutting fluid System

When checking the cutting fluid system, the goal is to make sure there is enough cutting fluid, the chip level in the first chamber is not too high, and the cutting fluid has not become rancid or contaminated.

To check the cutting fluid system:

1. DISCONNECT LATHE FROM POWER!
2. At the tailstock end of the lathe, remove the pump access cover.
3. Inspect the level of cutting fluid inside the tank. The cutting fluid should be approximately an inch below the top of the tank.
4. Using a wooden stick, check the level of the metal chips in the first chamber (see **Figure 94**). If the chips are ¾ the height of the baffle, then remove the chips.

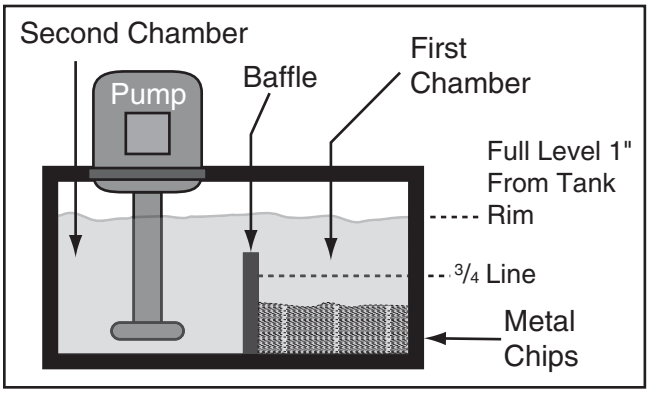


Figure 94. Diagram of cutting fluid tank.

5. Inspect the cutting fluid quality as outlined by the fluid manufacturer and replace as recommended.

Cleaning Cutting fluid System

1. Place the drain hose on the end of the coolant nozzle, and pump the used cutting fluid into the drain bucket. As soon as pumping is complete turn ***OFF*** pump immediately.
2. DISCONNECT LATHE FROM POWER!
3. Lift the tank assembly from the lathe stand.
4. Remove all metal shavings, any remaining cutting fluid, and clean out the tank using rags and mineral spirits.
5. Clean the intake screen on the pump.
6. Reinstall the cutting fluid tank into the lathe stand.
7. Mix 2.5 gallons of cutting fluid to the manufacturer's required specific gravity, and fill the cutting fluid tank with the cutting fluid.
8. Reinstall the pump access cover.

SECTION 7: SERVICE

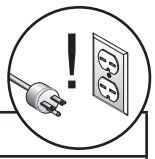
Troubleshooting

Review the troubleshooting and procedures in this section to fix your machine if a problem develops. If you need replacement parts or you are unsure of your repair skills, then feel free to call our Technical Support at (570) 546-9663.

Motor & Gearbox

Symptom	Possible Cause	Possible Solution
Motor will not start.	1. Stop button not reset. 2. Main power panel switch is ***OFF***. 3. Circuit breaker or fuse has tripped. 4. No voltage or open connection. 5. Capacitor is at fault. 6. Spindle ON/OFF switch is at fault. 7. Power switch or magnetic contactor is at fault. 8. Motor is at fault.	1. Reset stop button. 2. Turn the main power panel switch ***ON***. 3. Seek an electrician to troubleshoot and repair the power supply. 4. Test circuit, replace wires and connections as required (Refer to **Wiring**, **Page 74**). 5. Replace capacitor. 6. Replace switch. 7. Replace power switch or magnetic contactor. 8. Replace motor.
Fuses or circuit breakers trip open.	1. Short circuit in power cord or plug. 2. Short circuit in motor or loose connections. 3. Incorrect fuses or circuit breakers in power supply.	1. Inspect cord or plug for damaged insulation and shorted wires, repair or replace as required. 2. Inspect all connections on motor for loose or shorted terminals or worn insulation. Repair as required (refer to **Wiring**, **Page 74**). 3. Install correct fuses or circuit breakers.
Machine is loud; belt slips when cutting. Overheats or bogs down in the cut.	1. Excessive depth of cut. 2. RPM or feed rate wrong for operation. 3. Dull bit. 4. Belt is slipping. 5. Belt is at fault.	1. Decrease depth of cut. 2. Refer to RPM feed rate chart for appropriate rates, (**Page 41**). 3. Sharpen or replace bit. 4. Remove grease or oil on belt tighten belt adjustment (**Page 70**). 5. Replace belt.
Gear change levers will not shift into position.	1. Gears not aligned in headstock.	1. Rotate spindle by hand until gear falls into place.
Loud, repetitious noise coming from machine 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. Replace fan and cover as required.

Operation and Work Results



Symptom	Possible Cause	Possible Solution
Entire machine vibrates excessively upon startup and while running.	1. Workpiece is unbalanced. 2. Worn or broken gear present. 3. Chuck or faceplate has become unbalanced. 4. Spindle bearings at fault.	1. Reinstall workpiece so it is as centered with spindle centerline. 2. Inspect gears and replace if necessary. 3. Rebalance chuck or faceplate; contact a local machine shop for help. 4. Adjust or replace spindle bearings.
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. Reinstall cutting tool so no more than ⅓ of the total length is sticking out of tool holder. 3. Tighten gib screws at affected slide (**Page 61**). 4. Replace or re sharpen cutting tool. 5. Use the recommended spindle speed or feed rate (**Page 41**).
Can't remove tapered tool from tailstock quill.	1. Quill had not retracted all the way back into the tailstock. 2. Debris is binding arbor in quill. 3. Incorrect arbor or tooling inserted into quill.	1. Turn the quill handwheel until it forces taper out of quill. 2. Extend quill to expose drift slot and use drift key to remove arbor. 3. Remove quill and drive out tooling or arbor with punch.
Cross slide, compound rest, or carriage feed has sloppy operation.	1. Gibs are out of adjustment. 2. Handwheel is loose or has excessive backlash. 3. Leadscrew mechanism worn or out of adjustment.	1. Tighten gib (**Page 61**). 2. Tighten screws and adjust backlash (**Page 63**). 3. Tighten any loose fasteners on leadscrew mechanism.
Cross slide, compound rest, or carriage feed handwheel is hard to move.	1. Gibs are loaded up with shavings or grime. 2. Gibs are too tight, gib lock or carriage lock is applied. 3. Backlash setting too tight (cross slide only). 4. Bedways are dry.	1. Remove gibs, clean ways/dovetails, lubricate, and readjust gibs. 2. Loosen gib adjustment and gib locks, release carriage lock (**Page 61**). 3. Slightly loosen backlash setting (**Page 63**). 4. Lubricate bedways and handles.
Bad surface finish.	1. Wrong RPM or feed rate. 2. Dull tooling or poor tool selection. 3. Too much play in gibs. 4. Tool too high.	1. Adjust for appropriate RPM and feed rate. 2. Sharpen tooling or select a better tool for the intended operation. 3. Tighten gibs (**Page 61**). 4. Lower the tool position.
Inaccurate turning results from one end of the workpiece to the other.	1. Headstock and tailstock are not properly aligned with each other.	1. Realign the tailstock to the headstock spindle bore center line (**Page 36**).
Chuck jaws won't move or don't move easily.	1. Chips lodged in the jaws.	1. Remove jaws, clean and lubricate chuck threads, and replace jaws.
Carriage won't auto feed, or overloads the spindle motor.	1. Carriage or gib lock is applied. 2. Gears are not all engaged or broken. 3. Gibs are too tight. 4. Leadscrew shear pin has sheared.	1. Release locks. 2. Adjust gear positions or replace. 3. Loosen gib screw(s) slightly (**Page 61**). 4. Correct the cause of shear pin breakage, and replace shear pin.
Tailstock quill will not feed out of tailstock.	1. Quill lock lever is tightened down.	1. Turn lever counterclockwise.

Gib Adjustments

The cross-slide and compound slide on this lathe each use a long steel wedge called a gib that is positioned between the component and its dovetailed-ways. At the end of each gib is a gib screw one of which is shown in **Figure 95**. The screws at each end of the gib oppose one another to move and hold the gib in a forward or aft position. Depending which direction the gib is moved and held, the space between the sliding ways is increased or decreased to control the rigidity of the cross slide and compound slide.

Before adjusting gibs, consider the lathe operation that you will perform because the cross slide and compound rest leadscrew nuts may also have to be adjusted.

- For heavy turning and facing loads, tighten gibs for maximum rigidity, and loosen the leadscrew nuts for shock loading protection.

- For high-tolerance turning and facing, and light-loads, loosen the gibs to allow for small slide movements without binding or tool bit leap, and tighten the leadscrew nuts for fine handwheel control.

Most lathe operations exist between the two examples above. Finding the optimum combination for your requirements may take practice, and trial and error before you are satisfied.

NOTICE

When adjusting gibs, keep in mind that the goal of gib adjustment is to remove unnecessary sloppiness from the slide without causing binding and excessive half nut wear.

Tip: *The compound and cross slide gibs have a gib lock screw that are shown in **Figures 95–96**. This screw allows the machinist to quickly tighten the locks to hold a gib and slide in a rigid position without having to tighten the gibs. When finished with the need for increased rigidity, the gibs then are quickly unloaded back to their normal state by loosening the screw.*

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

Cross Slide Gib

Make sure the ways and leadscrew have been cleaned and re-lubricated before beginning any adjustments. Refer to **Ball Oiler Lubrication** on **Page 54** for instructions and lubricant specifications.

To adjust the cross slide gib:

1. DISCONNECT LATHE FROM POWER!

2. Loosen the gib lock shown in **Figure 95**.

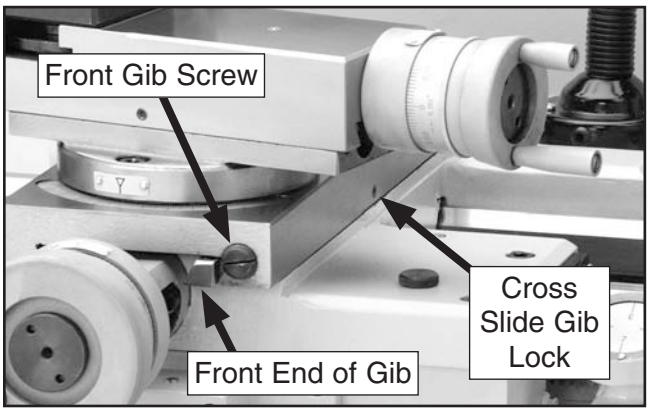


Figure 95. Cross slide gib components.

3. Loosen gib screw and adjust as required.

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

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

4. Repeat adjustments as necessary until the gib screw drag is acceptable.

Compound Slide Gib

Figure 96 shows the gib arrangement for the compound slide. The compound slide gib adjusts in the same manner and with the same tools as the cross slide gib. However, in this case, to increase or decrease tension, the gib adjustment screw directions are reversed.

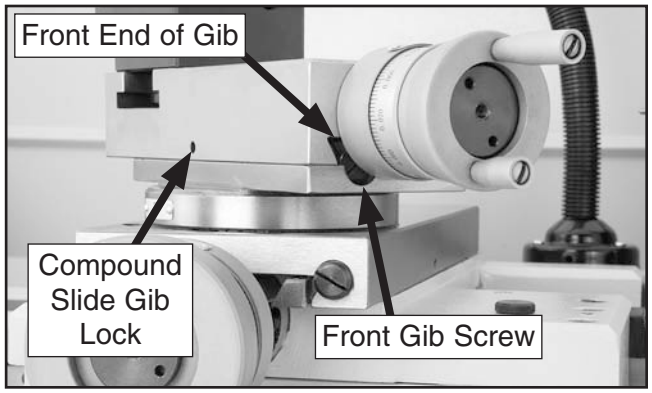


Figure 96. Compound slide gib components.

Saddle Gib

The saddle is supplied with a carriage lock on the front right-hand side of the slide (see **Figure 97**). This bolt locks the saddle in place for increased rigidity when making face cuts. Before making adjustments to the saddle gib, make sure that this lock is loose by turning it counterclockwise one full turn.

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

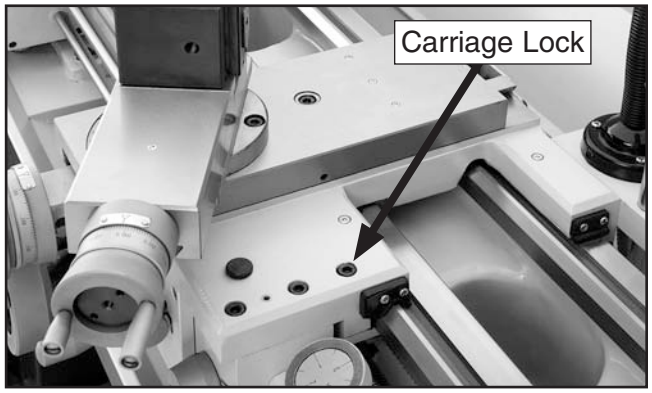


Figure 97. Location of carriage lock.

The saddle gib is located on the bottom of the back edge of the slide (**Figure 98**). 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.

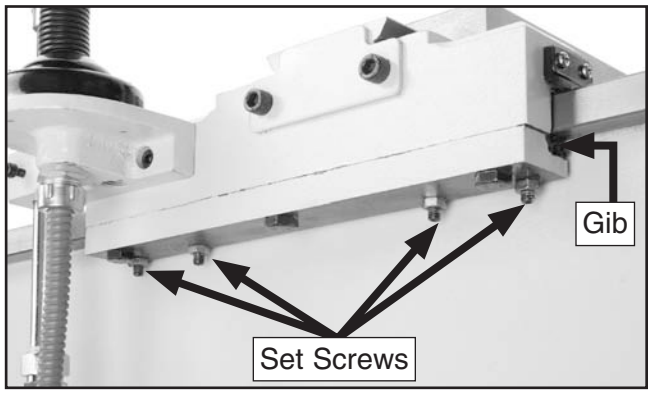


Figure 98. Saddle gib components.

Tools Needed	Qty
Wrench 10mm	1
Hex 3mm	1
Hex 6mm	1

To adjust the saddle slide gib:

1. DISCONNECT LATHE FROM POWER!

2. Clean and lubricate the lathe ways, slide, and leadscrew (refer to **Ball Oiler Lubrication** on **Page 53** for instructions and lubricant specifications).

3. If the carriage lock (**Figure 87**) is tight, loosen it two turns.

4. Loosen the jam nuts on the four set screws shown in **Figure 98**, and adjust the set screws as follows:

   —To tighten the carriage gib, tighten the set screws.

   —To loosen the gib, loosen the set screws.

5. Repeat adjustments as necessary until the carriage adjustment is acceptable.

6. Hold the set screws in place and tighten the jam nuts.

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 micrometer-collar.

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

Tools Needed	**Qty**
Hex Wrench 6mm	1
Hex Wrench 5mm	1

To adjust the cross slide backlash:

1. Feed the cross slide backwards (toward the front of the machine) until it reaches the end of its travel.

2. Remove the cap screw that secures the cross slide leadscrew nut (see **Figure 99**).

Figure 99. Location of cap screw that secures the leadscrew nut.

3. Rotate the cross slide handle clockwise to feed the leadscrew nut out from under the cross slide, as shown in **Figure 100**.

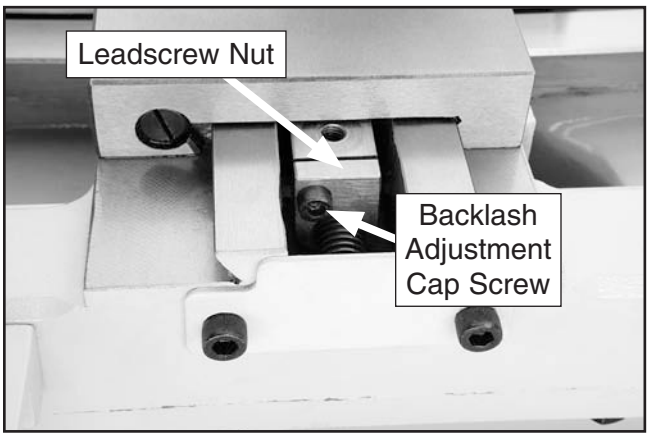


Figure 100. Leadscrew nut.

4. Tighten the backlash adjustment cap screw shown in **Figure 100** in small increments.

5. Hold the leadscrew nut and test after each adjustment by rotating the handwheel back-and-forth until the backlash amount is acceptable.

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

Half Nut Adjustment

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

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

To adjust the half nut:

1. DISCONNECT LATHE FROM POWER!

2. Open the half nut and remove the thread dial.

3. Loosen the hex nuts on the set screws shown in **Figure 101**.

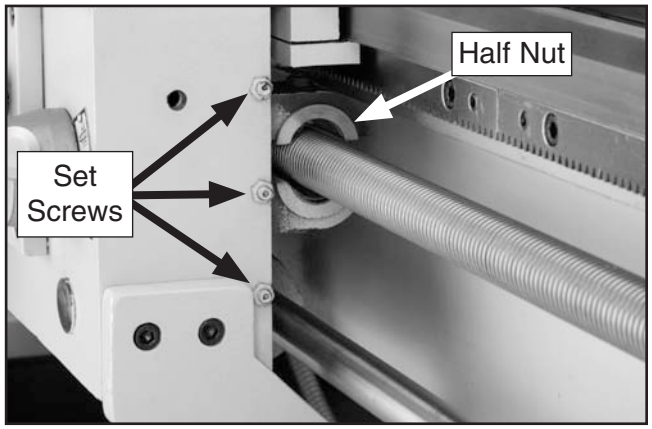


Figure 101. Half nut gib set screws.

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

5. Move the carriage handwheel until the half nut can fully close, then open/close the 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 the half nut adjustment, then reinstall the thread dial.

Leadscrew Endplay Adjustment

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

Tools Needed	Qty
Hex Wrench 3mm	1
Wrench 24mm	1

To remove leadscrew end play:

1. DISCONNECT LATHE FROM POWER.

2. Back out the leadscrew set screw approximately five turns (see **Figure 102**).

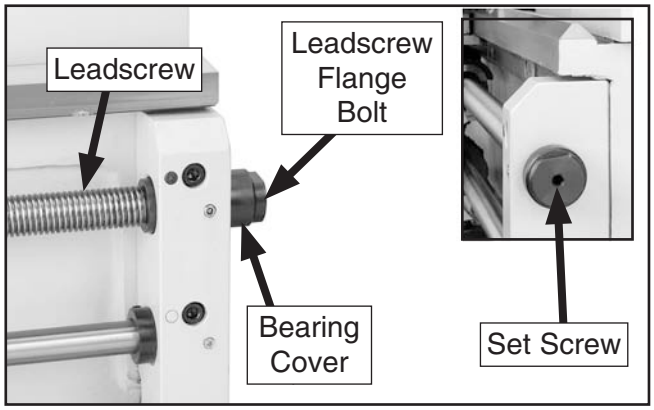


Figure 102. Leadscrew end play bearings.

3. Un-thread the leadscrew flange bolt (**Figure 102**), and slide the bearing cover off the end of the leadscrew.

4. Clean the bearings with minerals spirits, then dry and repack them with Grade GL2 bearing grease. Reinstall the bearing cover.

5. With your left hand, pull the leadscrew toward the tailstock, and thread the leadscrew flange bolt back on until it is finger tight and no leadscrew end play exists.

6. Hold the leadscrew flange bolt with the 24mm wrench, and tighten the set screw until it is snug at the bottom of its bore.

Shear Pin Replacement

A straight 4 x 42mm brass shear pin (**Figure 103**) holds the leadscrew and the drive hub together. The pin is designed to shear and help protect the lathe drivetrain from damage if an overload is encountered.

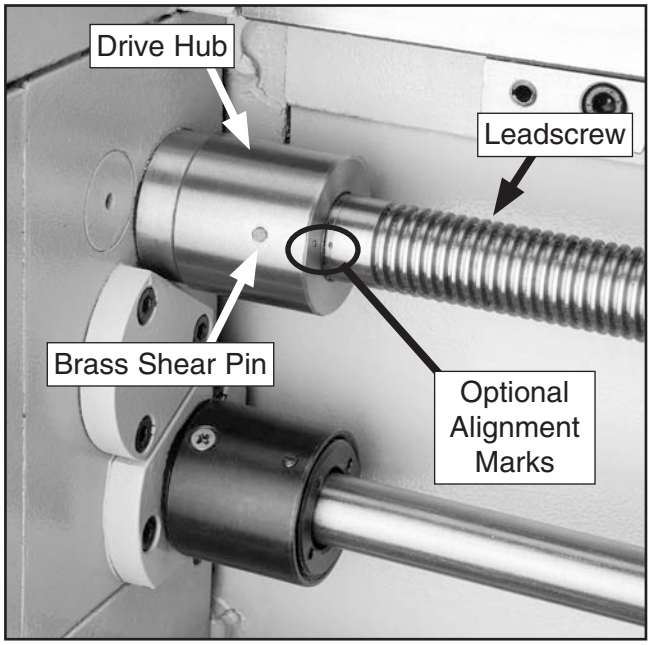


Figure 103. Leadscrew shear pin.

For example, the pin may shear if the carriage path is obstructed during threading, the tool bit crashes into a workpiece shoulder, the carriage lock is left applied when the half nut is engaged, or too deep of a cut is taken, causing a sudden binding of the tool and workpiece.

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

Always have a few extra pins on hand in case of an emergency. If a replacement is not on hand, do not improvise by inserting a roll pin, cotter pin, steel dowel, or nail. Doing so will void the warranty, and can lead to a non-shearing pin, resulting in catastrophic gearbox damage.

Tools Needed	Qty
Hammer	1
Dowel Punch 3/16"	1
Drill Bit 1/8"	1
Hand Drill	1
Wood Screw #8 x 1" (or longer)	1
Pointed Center Punch	1
Standard Pliers	1

To replace the shear pin:

1. DISCONNECT LATHE FROM POWER!

2. Unlock the half-nut lever and disengage the gearbox so the leadscrew can be rotated by hand.

3. Rotate the drive hub, and inspect it to see if the pin is still stuck in both sides of it.

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

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

4. Align the holes in the drive hub with the hole in the leadscrew, and tap the new shear pin into position until it is flush.

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

Feed Clutch Adjustment

This lathe is equipped with a feed rod clutch, shown in **Figure 104**, that connects the feed drive hub with the feed rod through a set of spring-loaded internal discs. This clutch helps protect the apron feed system from overload. The feed rod clutch comes set from the factory, and unless there is a problem, it needs no adjustment.

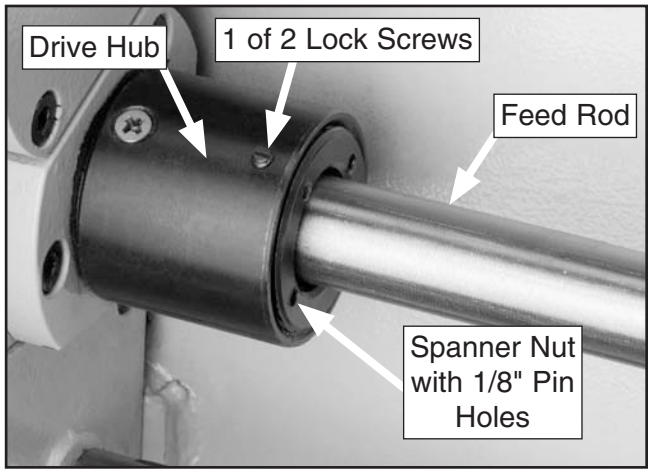


Figure 104. Feed rod clutch.

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

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

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

Tools Needed	**Qty**
Standard #1 Screwdriver	1
Adjustable Spanner Wrench with ⅛" Pins	1

To adjust the feed rod clutch:

1. DISCONNECT LATHE FROM POWER!

2. Rotate the feed rod hub shown in **Figure 104** to access and remove the two lock screws.

3. Engage the apron longitudinal feed selection lever and the gearbox and headstock levers so the feed rod does not move.

   —If the clutch slips during normal work loads and no problem exists with the feed system, the clutch spring pressure must be increased. Using the spanner wrench, tighten the spanner nut ⅛-turn and recheck for slippage.

   —If for any reason the clutch is bound up or locked, and does not slip when it should, the clutch spring pressure must be reduced. Using the spanner wrench, loosen the spanner nut ⅛-turn, and recheck for slippage.

   —If the clutch was dissembled or replaced for any reason, use the spanner wrench to tighten the spanner nut until a noticeable increase in torque is felt in the wrench. The increase will be quite abrupt. At this point, stop and install the lock screws.

Tailstock Lock

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

Tools Needed	Qty
Wrench 24mm	1

To adjust the tailstock lock lever:

1. Unthread the stop pin (see **Figure 105**), and carefully slide the tailstock from the lathe.

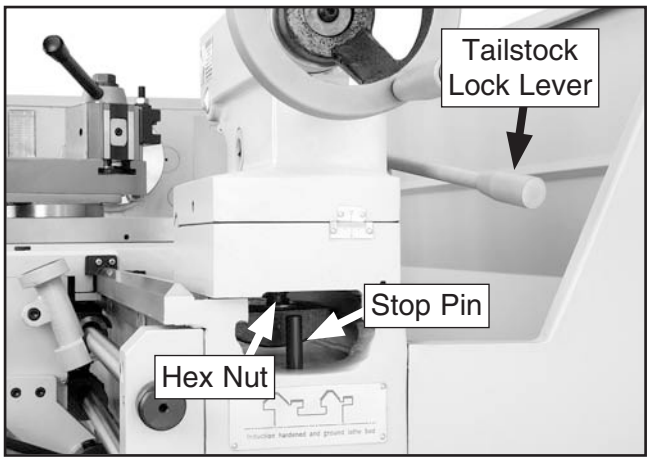


Figure 105. Tailstock locking hex nut and plate.

2. Tighten the hex nut ¼-turn and reinstall the tailstock.

3. Apply the tailstock lock lever and verify that the tailstock is locked and the lever is where desired. Readjust as necessary.

Bearing Preload

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

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

To adjust the preload:

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

2. DISCONNECT LATHE FROM POWER!

3. Remove the chuck and spider bolts, then shift the spindle to neutral and remove the headstock gear cover to access the outboard end of the spindle (see **Figure 106**).

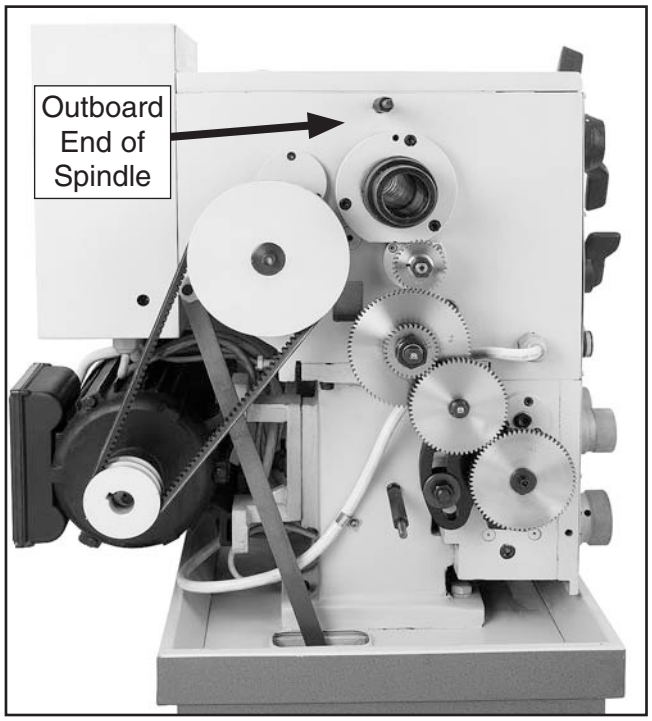


Figure 106. Location of outboard end of spindle.

4. Place the chuck wrench in the cam-lock socket to keep the spindle from rotating, and loosen the outer spanner nut (see **Figure 107**) two turns. Removing the spider hub is not necessary.

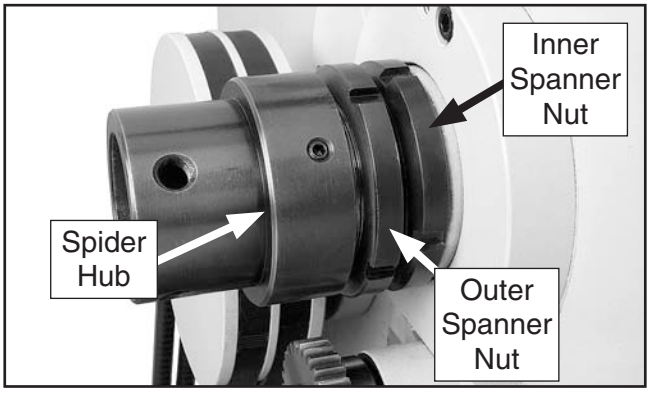


Figure 107. Spindle spanner nuts.

5. Loosen the inner spanner nut one turn. If the spanner nut is too difficult to break loose easily, you may have to tap on the outboard spindle tube as explained in **Step 6** to help unseat the spindle bearings.

NOTICE

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

6. Since the spindle bearings may unseat easily without great force, hold a wood block against the outboard end of the spindle, and tap the block a few times with a three or four pound hammer (see **Figure 108**). Your goal is to slide the spindle forward just enough to introduce spindle end-play that can be heard or felt by hand.

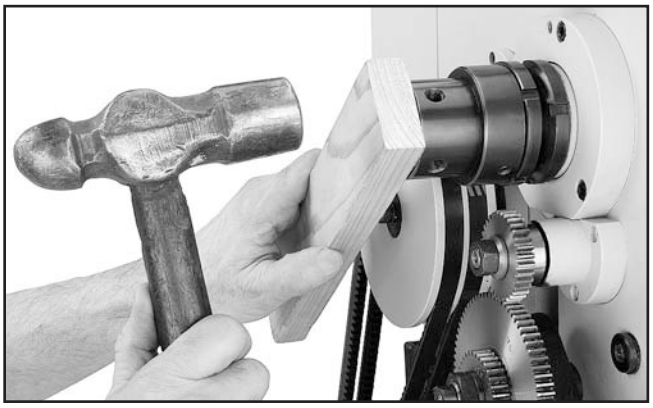


Figure 108. Un-seating spindle bearings to introduce spindle end-play.

7. Place a dial indicator on the cross slide and move the carriage toward the headstock until the contact point of the indicator touches the spindle face (see **Figure 109**).

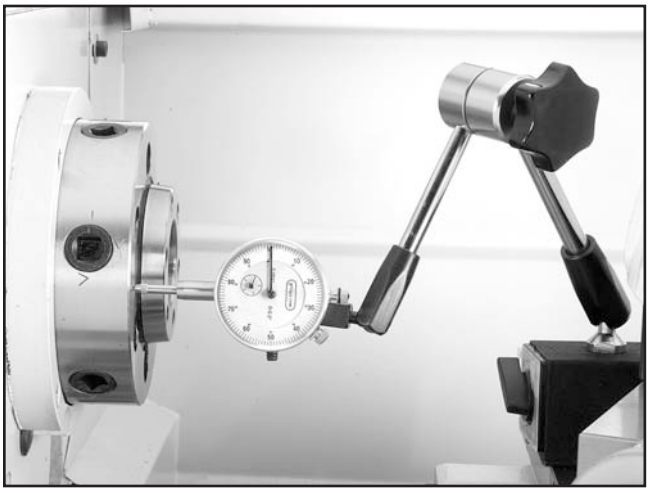


Figure 109. Dial indicator setup.

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

9. Insert the chuck wrench into a cam socket to prevent the spindle from turning, then tighten the inner spanner nut until the dial indicator needle just stops moving (see **Figure 110**).

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

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

Figure 110. Adjusting spindle bearings.

Since it takes great effort to turn the inner spanner nut, you may find it difficult to know if you have gone past the zero end-play point or not. It is easiest to have someone watch the dial while you tighten the inner spanner nut. If you think you may have gone past the zero end-play point, take the time to unload the bearings as described earlier, then re-tighten the inner spanner nut until it has reached the zero end play position.

10. Tighten the spanner nut an additional 1/16-turn.

11. Without allowing the inner spanner nut, to tighten any farther, tighten the outer spanner nut against the inner nut.

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

To confirm that the bearings are correctly preloaded:

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

2. Install the chuck and tighten the jaws.

3. Set the spindle speed to its highest setting.

4. Connect the lathe to power and turn the lathe spindle ***ON***.

5. Periodically shutting down the lathe a few times and checking temperature, let the lathe run for 20 minutes.

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

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

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

V-Belt Replacement

Tools Needed	Qty
Phillips Screwdriver #2	1
Wrench 17mm	1

To replace the V-belts on the lathe:

1. DISCONNECT LATHE FROM POWER!

2. Remove the headstock gear cover.

3. Loosen the motor mount bolts shown in **Figure 111**, and slide the motor up, remove the belts.

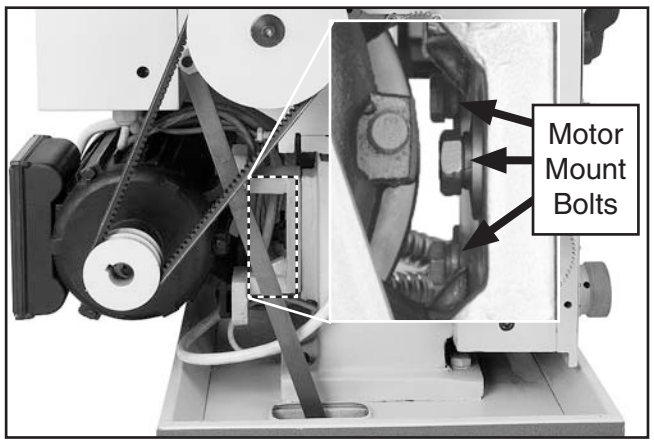


Figure 111. Location of motor mount bolts.

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

5. Push down on the motor with one hand to tension the belts.

6. Tighten the motor mount bolts and check the belt deflection, as shown in **Figure 112**, and re-adjust if necessary.

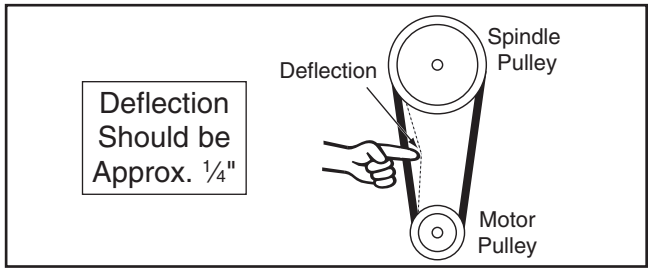


Figure 112. Belt deflection.

7. Replace the headstock gear cover.

Gap Insert Removal & Installation

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

Tools Needed	Qty
Open End Wrench 14mm	1
Hex Wrench 8mm	1
Heavy Dead Blow Hammer	1
Miscellaneous C-Clamps	As Required
Wooden Blocks	As Required

To remove the gap:

1. DISCONNECT LATHE FROM POWER!

2. Remove the four cap screws that secure the gap to the bed (see **Figure 113**).

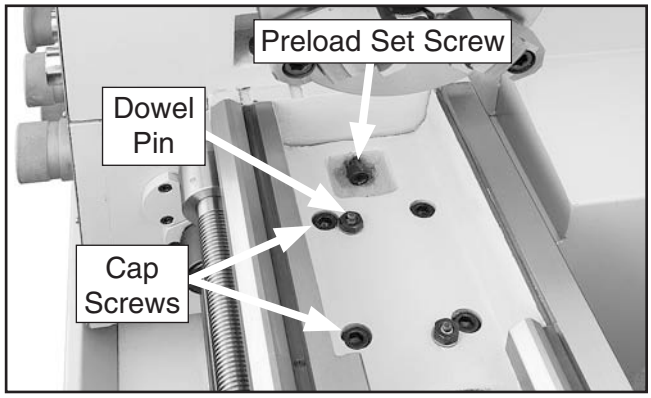


Figure 113. Gap retaining fasteners.

3. Tighten the dowel-pin jack nut (see **Figure 113**) to draw the pins from the gap.

4. Loosen the preload set screw (see **Figure 113**) a few turns until it no longer contacts the headstock.

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

To reinstall the gap:

1. Clean all mating surfaces completely with mineral spirits and inspect and remove any burrs. ALL MATING SURFACES MUST BE ABSOLUTELY CLEAN!

2. Lightly oil a lint-free cloth with way oil, and rub a thin film into the pores of the freshly cleaned gap surfaces. Next, place the gap in position on the lathe bed.

3. Back off the threaded dowel pin jam nuts until they are flush with the end of the pins, and drop the pins into the pin holes in the gap.

4. Jostle the gap closer to its final alignment until the pins seat naturally.

5. Install and lightly snug the four cap screws in an order that will draw the gap closer into alignment. Using blocks of wood and clamps to get mating surfaces into alignment can also be helpful.

6. When alignment and flush mating is acceptable, tighten the four cap screws in a pattern that will maintain or improve the alignment.

7. Wait 24 hours, and check for quality of mating. If unacceptable, use clamps and blocks of wood, and loosen and tighten the appropriate cap screws to draw-in and release certain areas of the gap to achieve the required alignment.

8. When satisfied with the alignment, tap the dowel pins the rest of the way into the gap until they are in a fully seated position, and thread the jack nuts down until they just contact the gap.

9. Tighten the preload set screw inward until it contacts the headstock and resistance can be felt, then tighten it an additional ¾-turn.

Brake Shoes

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

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

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

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

Tools Needed	**Qty**
Hex Wrench 5mm	1
Wrench 17mm	1
Needle-Nose Pliers	1
Basic Caliper	1

To check/replace the brake linings:

1. DISCONNECT LATHE FROM POWER!

2. Remove the headstock gear cover.

3. Loosen the motor mount bolts (**Figure 114**) and remove the belts.

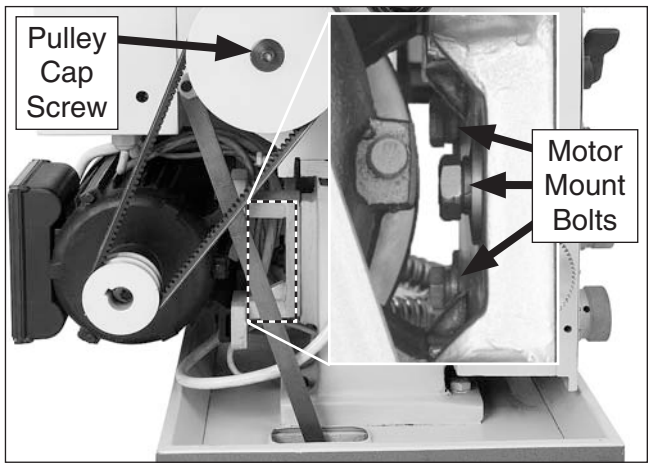


Figure 114. Pulley cap screw.

4. Have another person step on the brake pedal to lock the pulley in place, and remove the pulley cap screw shown in **Figure 114**.

5. Step off the brake pedal and remove the pulley. **Figure 115** shows the pulley removed and the brake shoes exposed.

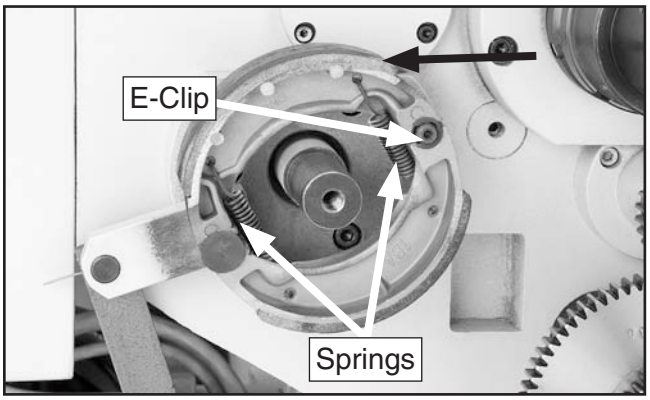


Figure 115. Brake assembly.

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

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

—If linings are oil-soaked from over lubrication of the adjacent gearing, clean and properly lubricate the gears as outlined in **Maintenance** on **Page 53**. Then proceed to **Step 7**.

—If the brakes linings are 3/16" or thinner, proceed to **Step 7**.

7. Put on safety glasses and remove the E-clip, springs, and brake shoes shown in **Figure 115.**

8. Replace or dress the drum pulley as required.

9. Install the brake shoes, springs, and E-clip.

10. Install the pulley and re-assemble in the opposite manner that you disassembled it in **Steps 2–5**.

11. Start the lathe and test the brake operation.

Machine Storage

If the machine is not properly prepared for storage, it may develop rust or corrosion. Use the recommendations in this section to ensure that the lathe remains in good condition for later use.

To prepare your machine for short-term storage (up to a year):

1. Pump out the old cutting fluid, and remove and blow out lines with compressed air and a few drops of way oil.

2. DISCONNECT LATHE FROM POWER!

3. Thoroughly clean all unpainted, bare metal surfaces, then apply a liberal coat of way oil.

4. Lubricate the machine as outlined in the lubrication section. Be sure to use the oil gun to purge all ball oilers and the oil passages with oil.

5. Cover and place the machine 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 and make plastic guards cloudy.

6. Once or twice a month, depending on the ambient humidity levels in the storage environment, wipe down the machine as outlined in **Step 3**. Slide the carriage, tailstock, and steady rest down the lathe bed to make sure that way spotting is not beginning to occur.

7. Every few months, manually rotate 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.

To prepare your machine for long-term storage (a year or more):

1. Run the lathe and bring all gearboxes to operating temperature, then drain and refill the all gearboxes with fresh oil.

2. Pump out the old cutting fluid, remove the lines, add a few drops of way oil into the lines, and blow out the lines with compressed air.

3. DISCONNECT LATHE FROM POWER!

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

5. Lubricate the machine as outlined in the lubrication section. Be sure to use the oil gun to purge all ball oilers and the oil passages with oil.

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

7. Place a few moisture-absorbing desiccant bags inside of the electrical box.

8. Cover and place the machine 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 and make plastic guards cloudy.

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

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. 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.

⚠WARNING
Wiring Safety Instructions

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

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

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

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

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

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

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

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

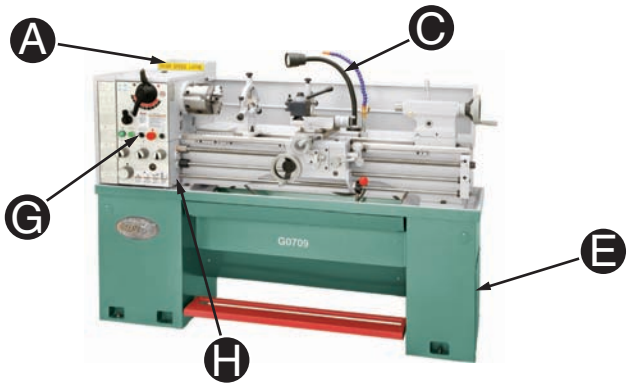
NOTICE

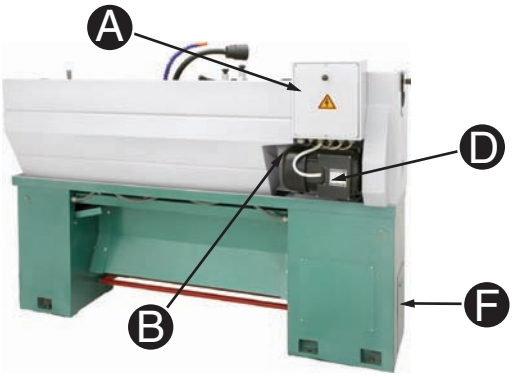
The photos and diagrams included in this section are best viewed in color. You can view these pages in color at www.grizzly.com.

COLOR KEY

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

Wiring Overview





A Page 76

ELECTRICAL BOX

Page 77

E PUMP MOTOR

Page 77

B PLUG and CORD (NOT INCLUDED)

Page 77

F BRAKE SWITCH

Page 77

C WORK LAMP

Page 77

G CONTROL PANEL

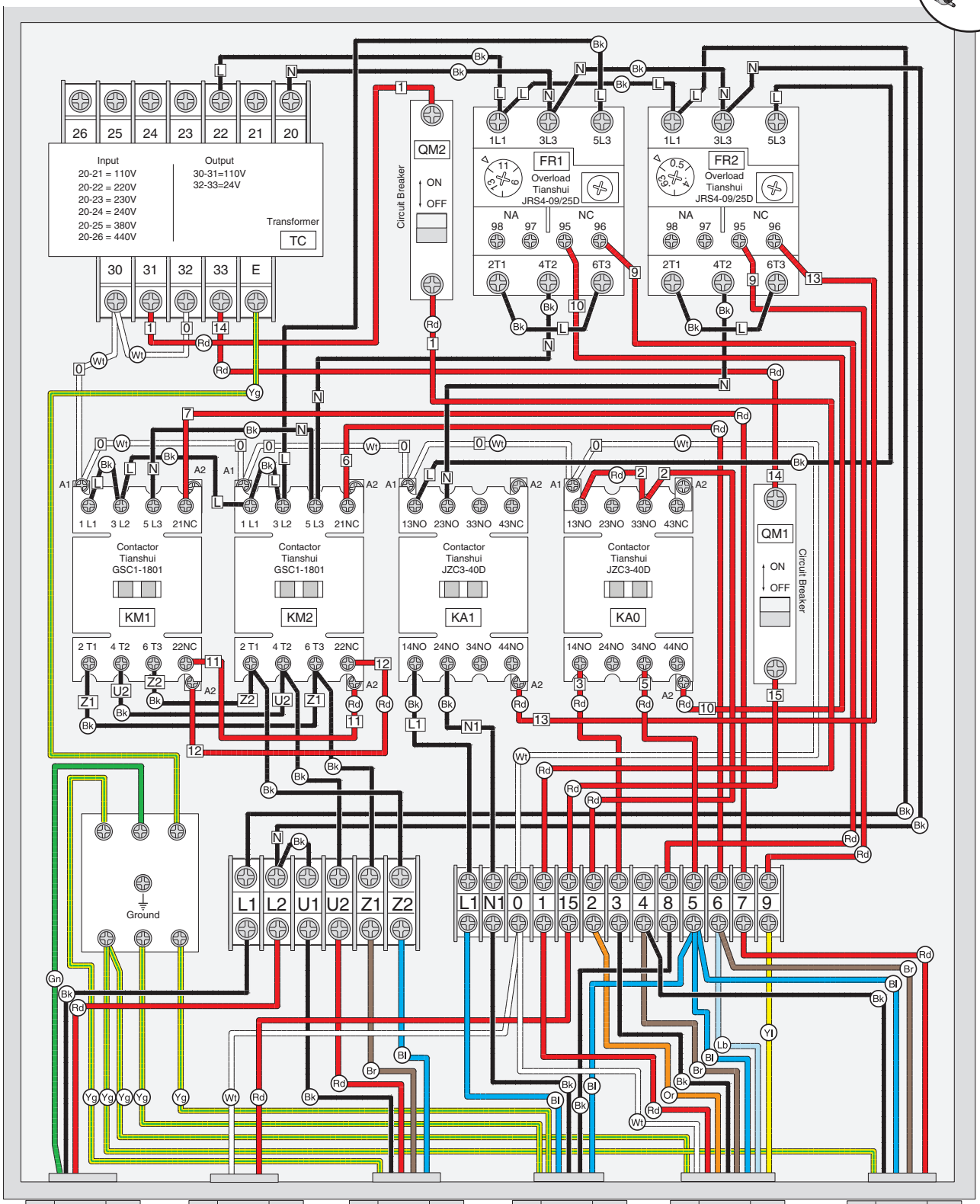
Page 78

D MAIN MOTOR

Page 77

H SPINDLE ON/OFF SWITCH

Electrical Box Wiring



b To Page 77

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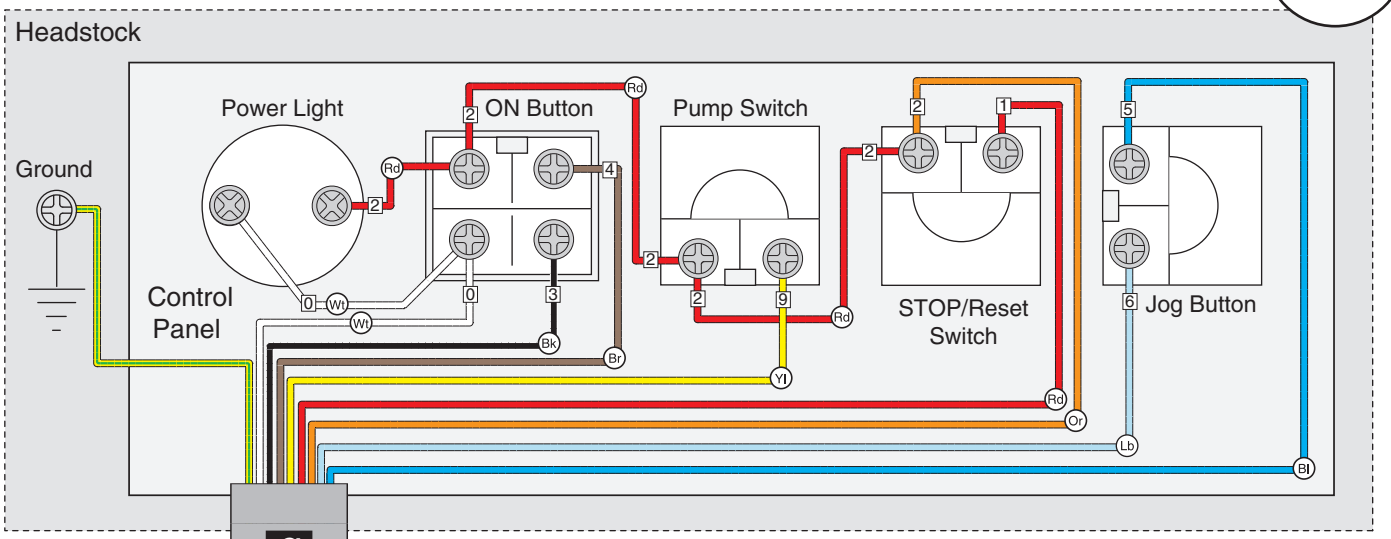
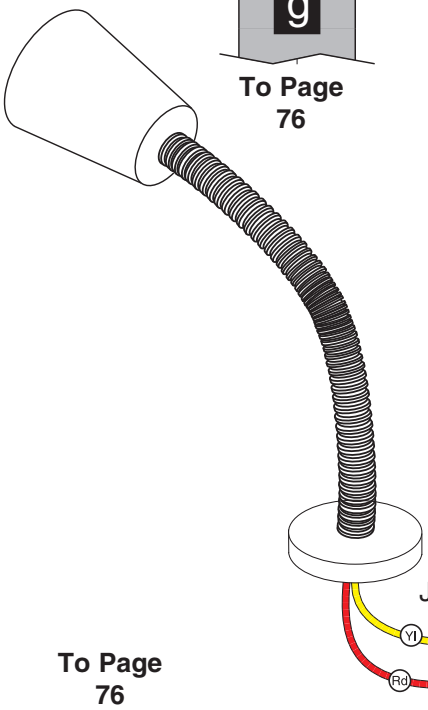
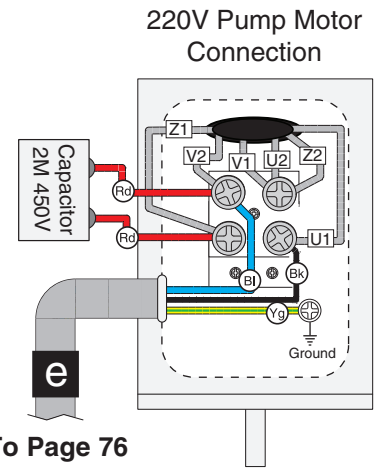
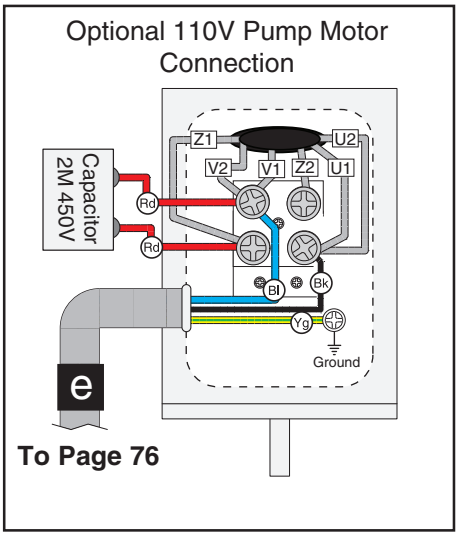
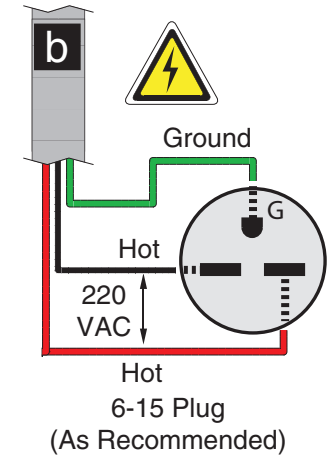
Switches and Pump Motor

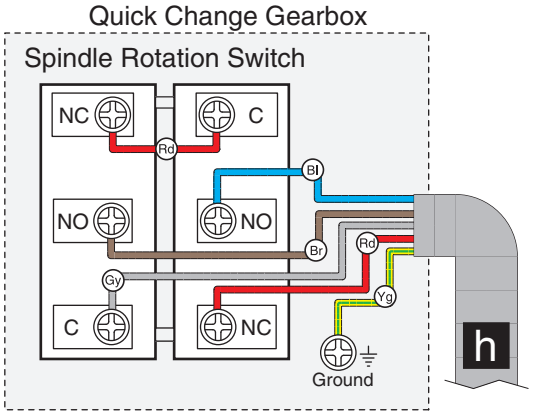


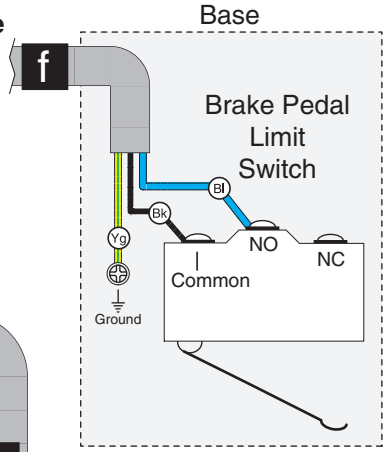








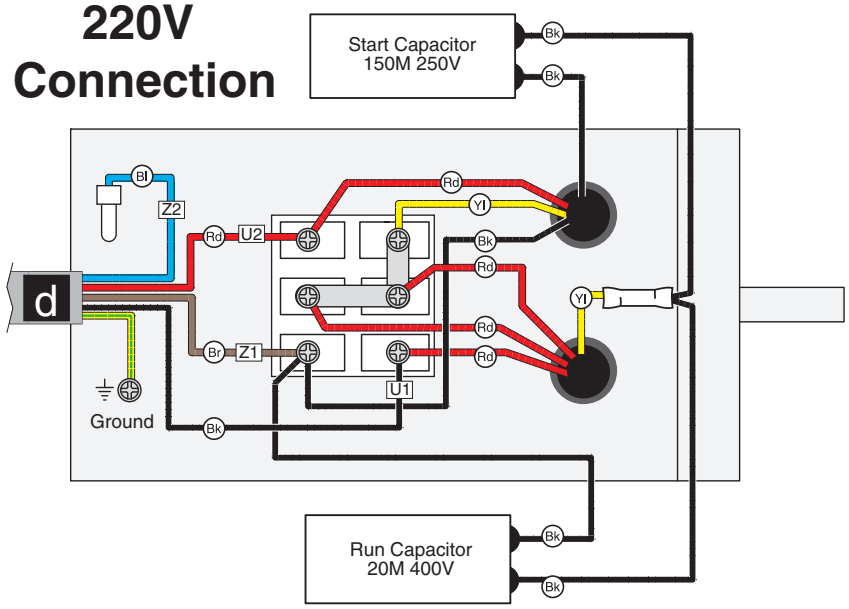




READ ELECTRICAL SAFETY ON PAGE 74!

Spindle Motor 110V & 220V Connection

220V Connection



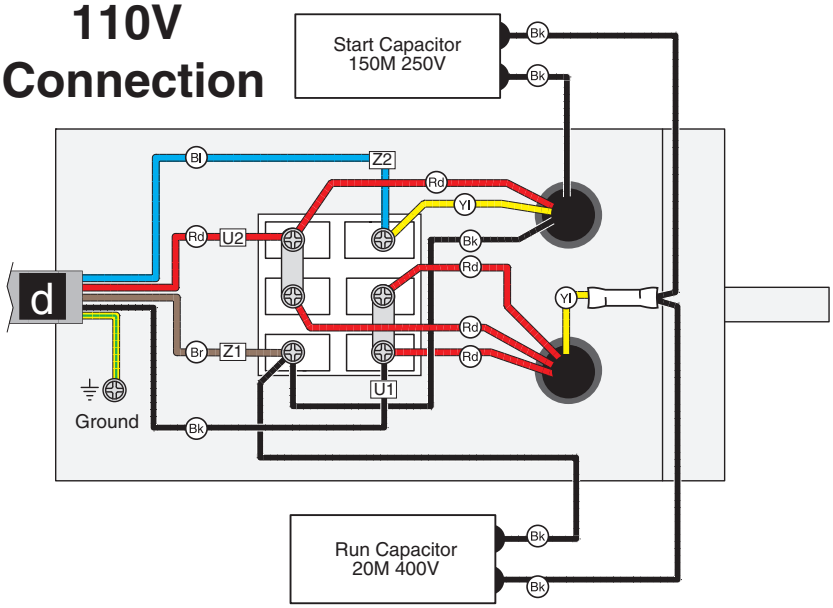
To Page 76

MOTOR DIRECTION 220V

NOTICE

If the lathe chuck rotates in the opposite direction of what the spindle ON/OFF lever indicates, disconnect the lathe from power. At the motor junction box, swap the positions of the wires marked U_1 and U_2. This will match the motor and spindle rotation to what is indicated at the spindle ON/OFF lever.

Optional 110V Connection



To Page 76

MOTOR DIRECTION 110V

NOTICE

If the lathe chuck rotates in the opposite direction of what the spindle ON/OFF lever indicates, disconnect the lathe from power. At the motor junction box, swap the positions of the wires marked Z_1 and Z_2. This will match the motor and spindle rotation to what is indicated at the spindle ON/OFF lever.

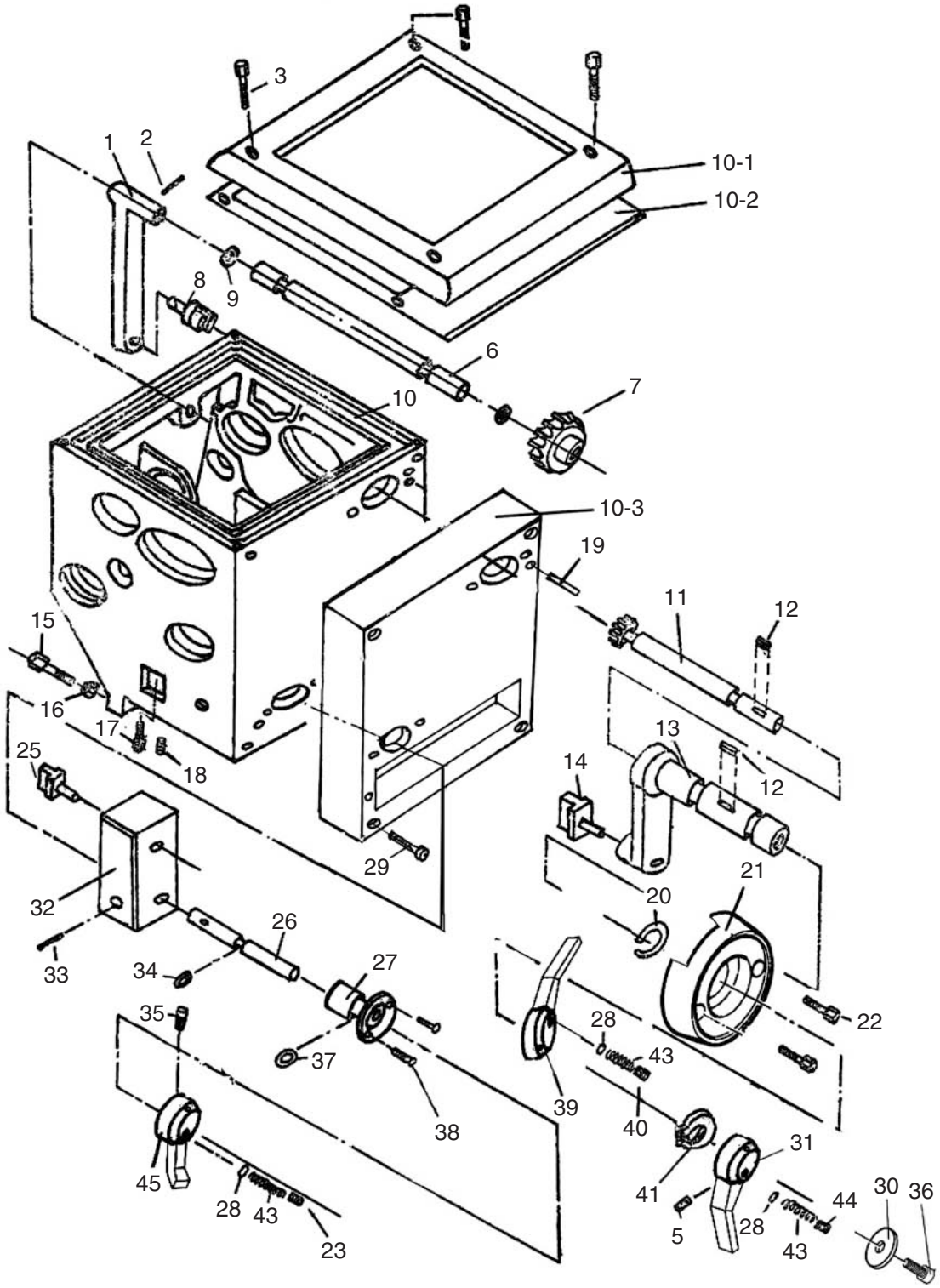
STOP *READ ELECTRICAL SAFETY ON PAGE 74!*

Electrical Box Photo

READ ELECTRICAL SAFETY ON PAGE 74!

SECTION 9: PARTS

Headstock Case and Shift

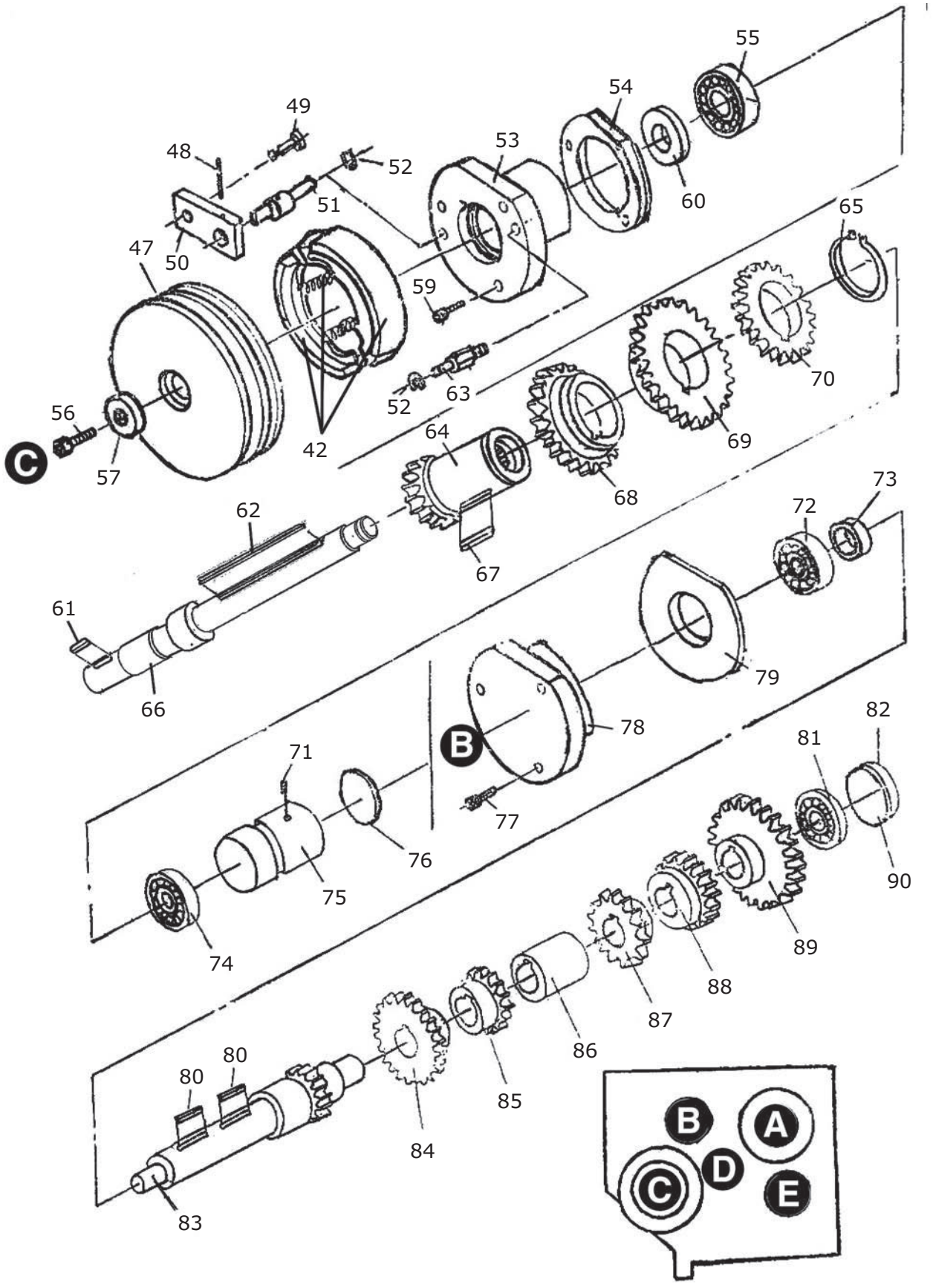


Headstock Parts List

REF	PART #	DESCRIPTION
1	P07090001	SHIFT LEVER
2	PRP45M	ROLL PIN 5 X 32
3	PCAP74M	CAP SCREW M6-1 X 18
5	PSS14M	SET SCREW M8-1.25 X 12
6	P07090006	SHAFT
7	P07090007	GEAR 51T
8	P07090008	SHIFT FORK
9	P07090009	O-RING 13.8 X 2.4 P14
10	P07090010	HEADSTOCK CASTING
10-1	P07090010-1	HEADSTOCK COVER
10-2	P07090010-2	GASKET
10-3	P07090010-3	HEADSTOCK FRAME
11	P07090011	GEARED SHAFT
12	PK20M	KEY 5 X 5 X 15
13	P07090013	SHIFT CRANK
14	P07090014	SHIFT CLAW
15	PCAP45M	CAP SCREW M8-1.25 X 45
16	PN03M	HEX NUT M8-1.25
17	PCAP84M	CAP SCREW M10-1.5 X 35
18	PSS14M	SET SCREW M8-1.25 X 12
19	P07090019	TAPER PIN 6 X 60
20	P07090020	O-RING 30 X 3.1
21	P07090021	COVER

REF	PART #	DESCRIPTION
22	PCAP48M	CAP SCREW M6-1 X 35
23	PSS11M	SET SCREW M6-1 X 16
25	P07090025	SHIFT CLAW
26	P07090026	SHAFT
27	P07090027	LEVER HUB
28	PSTB003M	STEEL BALL 6MM
29	PCAP37M	CAP SCREW M6-1 X 50
30	P07090030	HUB WASHER
31	P07090031	SPINDLE SPEED SHIFT LEVER
32	P07090032	SHIFT BLOCK
33	PRP01M	ROLL PIN 4 X 18
34	P07090034	O-RING 9.8 X 1.9 P10
35	PSS11M	SET SCREW M6-1 X 16
36	PFH21M	FLAT HD SCR M8-1.25 X 20
37	P07090037	O-RING 19.8 X 2.4 P20
38	PCAP18M	CAP SCREW M4-.7 X 8
39	P07090039	HEADSTOCK RANGE SHIFT LEVER
40	PSS20M	SET SCREW M8-1.25 X 8
41	PR15M	EXT RETAINING RING 30MM
43	P07090043	COMPRESSION SPRING
44	PSS16M	SET SCREW M8-1.25 X 10
45	P07090045	FEED DIRECTION LEVER

Headstock Drive

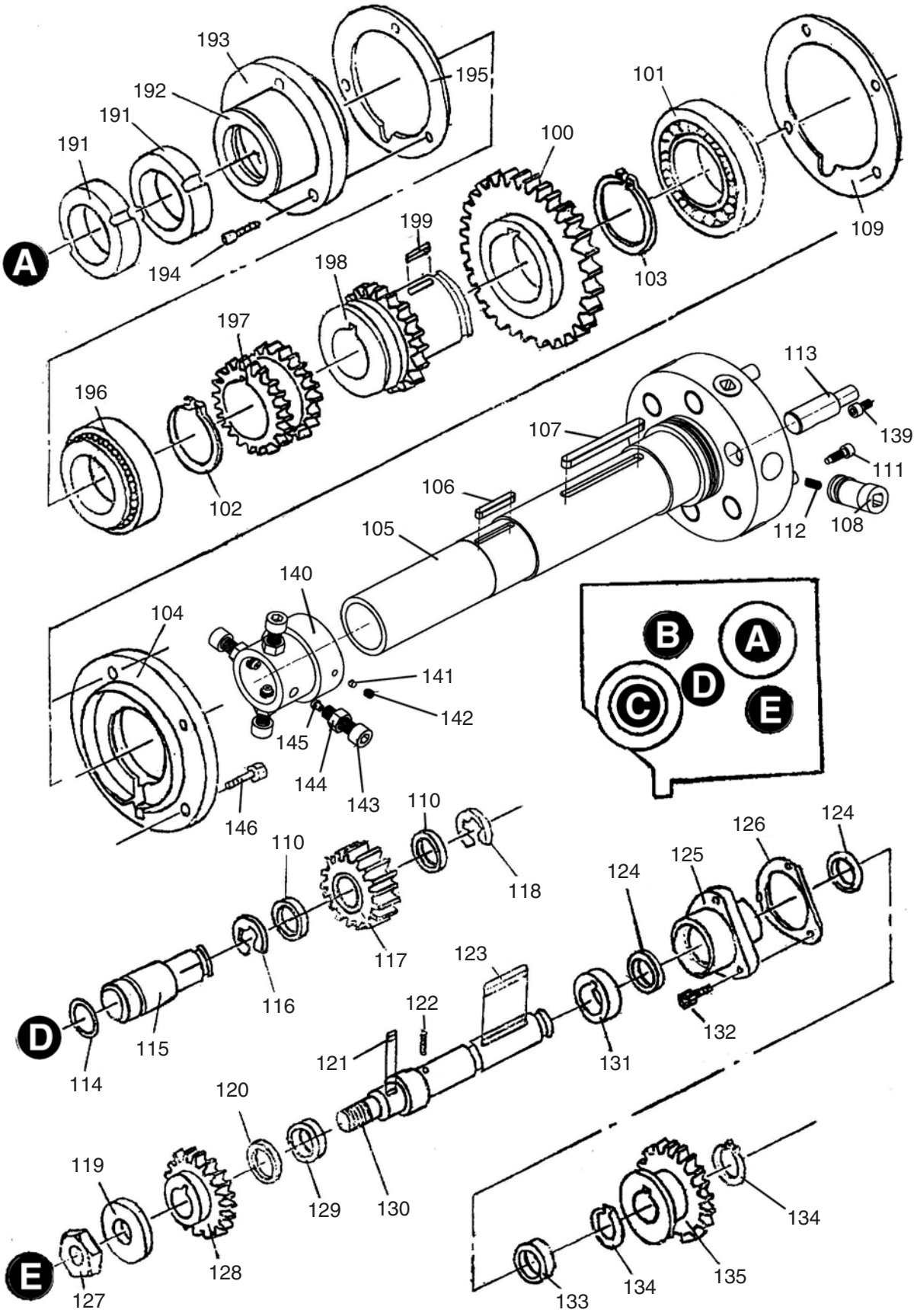


Headstock Drive Parts List

REF	PART #	DESCRIPTION
42	P07090042	BRAKE SHOE ASSEMBLY
47	P07090047	DRUM PULLEY
48	PRP49M	ROLL PIN 5 X 25
49	P07090049	ANCHOR PIN
50	P07090050	ROCKER BAR
51	P07090051	ROCKER PIN
52	PR39M	EXT RETAINING RING 8MM
53	P07090053	BEARING RETAINER
54	P07090054	GASKET
55	P6005Z	BALL BEARING 6005Z
56	PCAP11M	CAP SCREW M8-1.25 X 16
57	P07090057	SHOULDER WASHER
59	PCAP01M	CAP SCREW M6-1 X 16
60	P07090060	OIL SEAL
61	PK107M	KEY 8 X 8 X 20
62	PK50M	KEY 6 X 6 X 120
63	P07090063	ROCKER PIN
64	P07090064	TOOTHED COLLAR
65	PR12M	EXT RETAINING RING 35MM
66	P07090066	SHAFT
67	PK36M	KEY 5 X 5 X 50
68	P07090068	GEAR 29T

REF	PART #	DESCRIPTION
69	P07090069	GEAR 46T
70	P07090070	GEAR 38T
71	PSS06M	SET SCREW M8-1.25 X 16
72	P6203Z	BALL BEARING 6203Z
73	P07090073	SPACER
74	P6204-OPEN	BALL BEARING 6204 OPEN
75	P07090075	FRONT PLUG
76	P07090076	O-RING 40 X 3
77	PCAP23M	CAP SCREW M4-.7 X 12
78	P07090078	COVER
79	P07090079	GASKET
80	PK49M	KEY 6 X 6 X 55
81	P6204-OPEN	BALL BEARING 6204 OPEN
82	P07090082	O-RING 45.7 X 3.5 P46
83	P07090083	TOOTHED SHAFT
84	P07090084	GEAR 51T
85	P07090085	GEAR 43T
86	P07090086	SPACER
87	P07090087	GEAR 26T
88	P07090088	GEAR 34T
89	P07090089	GEAR 53T
90	P07090090	FRONT PLUG

Headstock Spindle

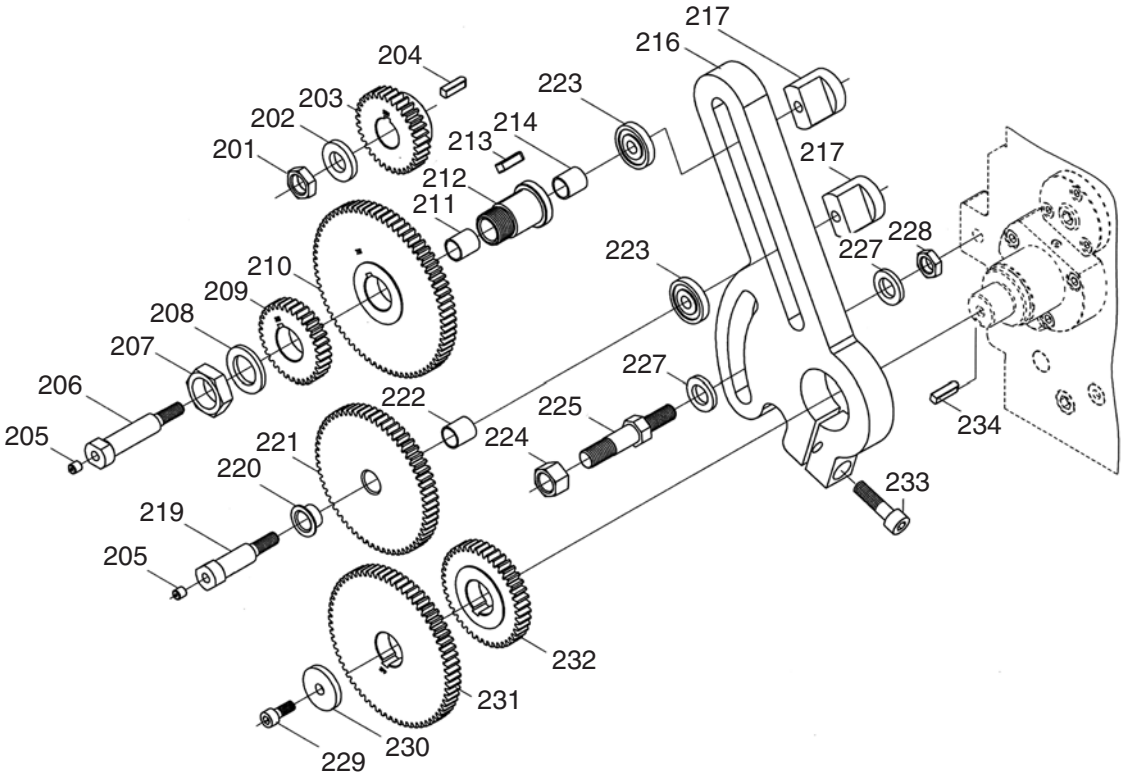


Headstock Spindle Parts List

REF	PART #	DESCRIPTION
100	P07090100	GEAR 74T
101	P30212-P5	TAPERED ROLLER BEARING P30212-P5
102	PR43M	EXT RETAINING RING 50MM
103	PR44M	EXT RETAINING RING 72MM
104	P07090104	BEARING RETAINER
105	P07090105	SPINDLE
106	PK11M	KEY 6 X 6 X 40
107	PK167M	KEY 8 X 8 X 85
108	P07090108	CAM LOCK
109	P07090109	GASKET
110	P16004	BALL BEARING 16004
111	PCAP02M	CAP SCREW M6-1 X 20
112	P07090112	COMPRESSION SPRING
113	P07090113	CAM LOCK STUD
114	P07090114	O-RING 23.7 X 2.5
115	P07090115	SHAFT
116	PEC20M	E-CLIP 42MM
117	P07090117	GEAR 30T
118	PEC20M	E-CLIP 42MM
119	P07090119	SPACER WASHER
120	P07090120	SPACER
121	PK14M	KEY 5 X 5 X 18
122	P07090122	DOWEL PIN 3 X 10
123	PK44M	KEY 6 X 6 X 50
124	P07090124	COLLAR
125	P07090125	FLANGE HUB
126	P07090126	GASKET

REF	PART #	DESCRIPTION
127	PN09M	HEX NUT M12-1.75
128	P07090128	GEAR 32T
129	P07090129	OIL SEAL
130	P07090130	SHAFT
131	P07090131	SPACER
132	PCAP24M	CAP SCREW M5-.8 X 16
133	P07090133	SPACER
134	PR09M	EXT RETAINING RING 20MM
135	P07090135	GEAR 37T
139	PCAP26M	CAP SCREW M6-1 X 12
140	P07090140	SPIDER SLEEVE
141	P07090141	BRASS CUSHION
142	PSS02M	SET SCREW M6-1 X 6
143	P07090143	SPIDER SCREW M10-1.5 X 35
144	PN02M	HEX NUT M10-1.5
145	P07090145	BRASS TIP
146	PCAP06M	CAP SCREW M6-1 X 25
191	P07090191	SPANNER NUT
192	P07090192	COLLAR
193	P07090193	OUTBOARD COVER
194	PCAP06M	CAP SCREW M6-1 X 25
195	P07090195	GASKET
196	P30210-P6	TAPERED ROLLER BEARING P30210-P6
197	P07090197	COMBO GEAR 37T
198	P07090198	GEARED HUB 37T
199	PK51M	KEY 8 X 8 X 18

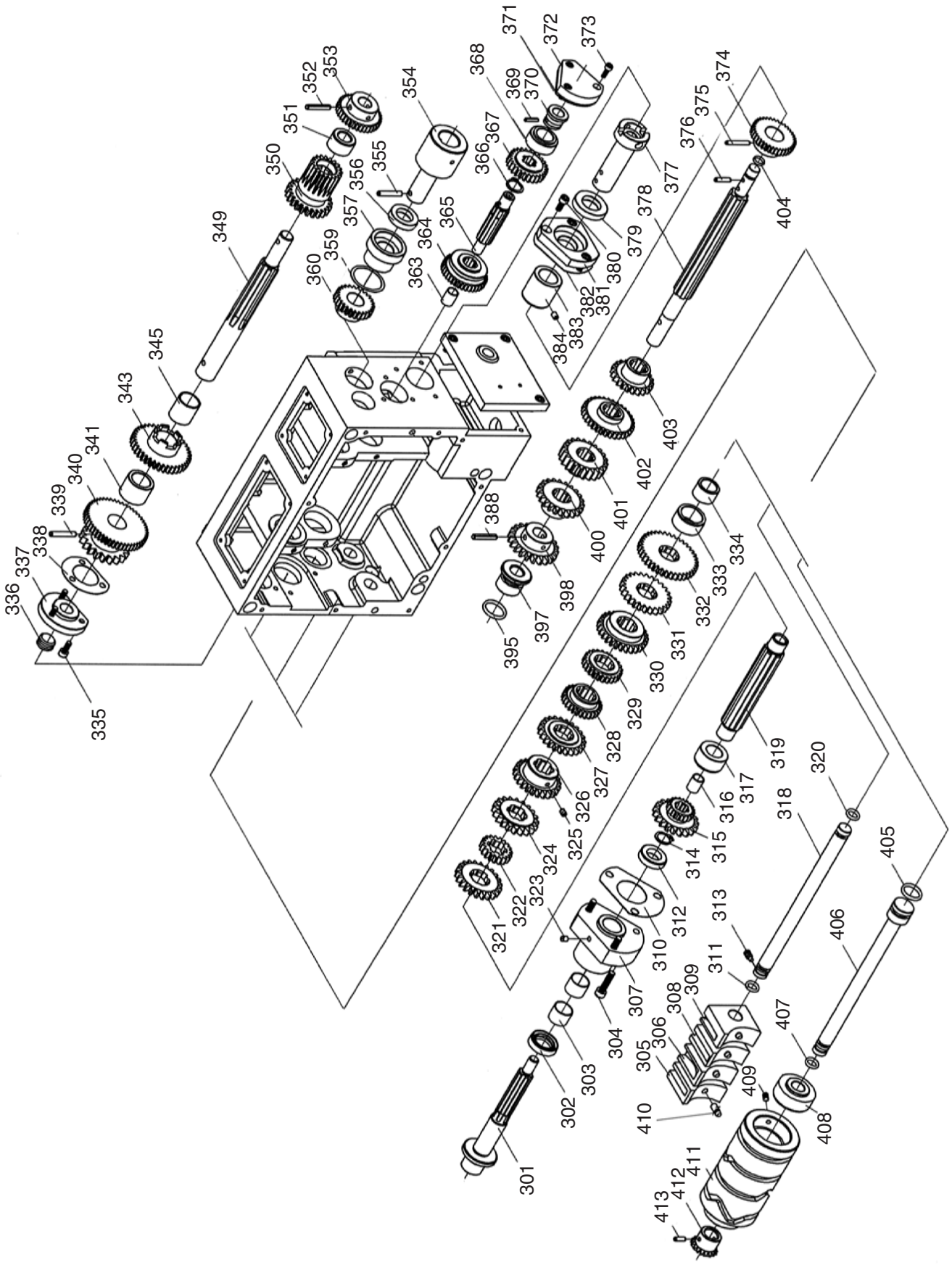
Change Gears



REF	PART #	DESCRIPTION
201	PN31M	HEX NUT M12-1.5
202	PW06M	FLAT WASHER 12MM
203	P07090203	CHANGE GEAR 33T
204	PK14M	KEY 5 X 5 X 18
205	PLUBE001M	TAP-IN BALL OILER 6MM
206	P07090206	SPINDLE
207	P07090207	HEX NUT M20 X 1.5
208	P07090208	THRUST WASHER
209	P07090209	CHANGE GEAR 33T
210	P07090210	CHANGE GEAR 72T
211	P07090211	BUSHING
212	P07090212	REDUCER BUSHING
213	PK34M	KEY 5 X 5 X 20
214	P07090214	BUSHING
216	P07090216	CHANGE GEAR PIVOT BRACKET
217	P07090217	T-NUT

REF	PART #	DESCRIPTION
219	P07090219	SPINDLE
220	P07090220	BUSHING
221	P07090221	GEAR 61T
222	P07090222	BUSHING
223	P07090223	SUPPORT WASHER
224	PN31M	HEX NUT M12-1.5
225	P07090225	CLAMP SHAFT
227	PW04M	FLAT WASHER 10MM
228	PN02M	HEX NUT M10-1.5
229	PCAP01M	CAP SCREW M6-1 X 16
230	PW03M	FLAT WASHER 6MM
231	P07090231	CHANGE GEAR 66T
232	P07090232	CHANGE GEAR 42T
233	PCAP13M	CAP SCREW M8-1.25 X 30
234	PK34M	KEY 5 X 5 X 20

Quick Change Gearbox Drive

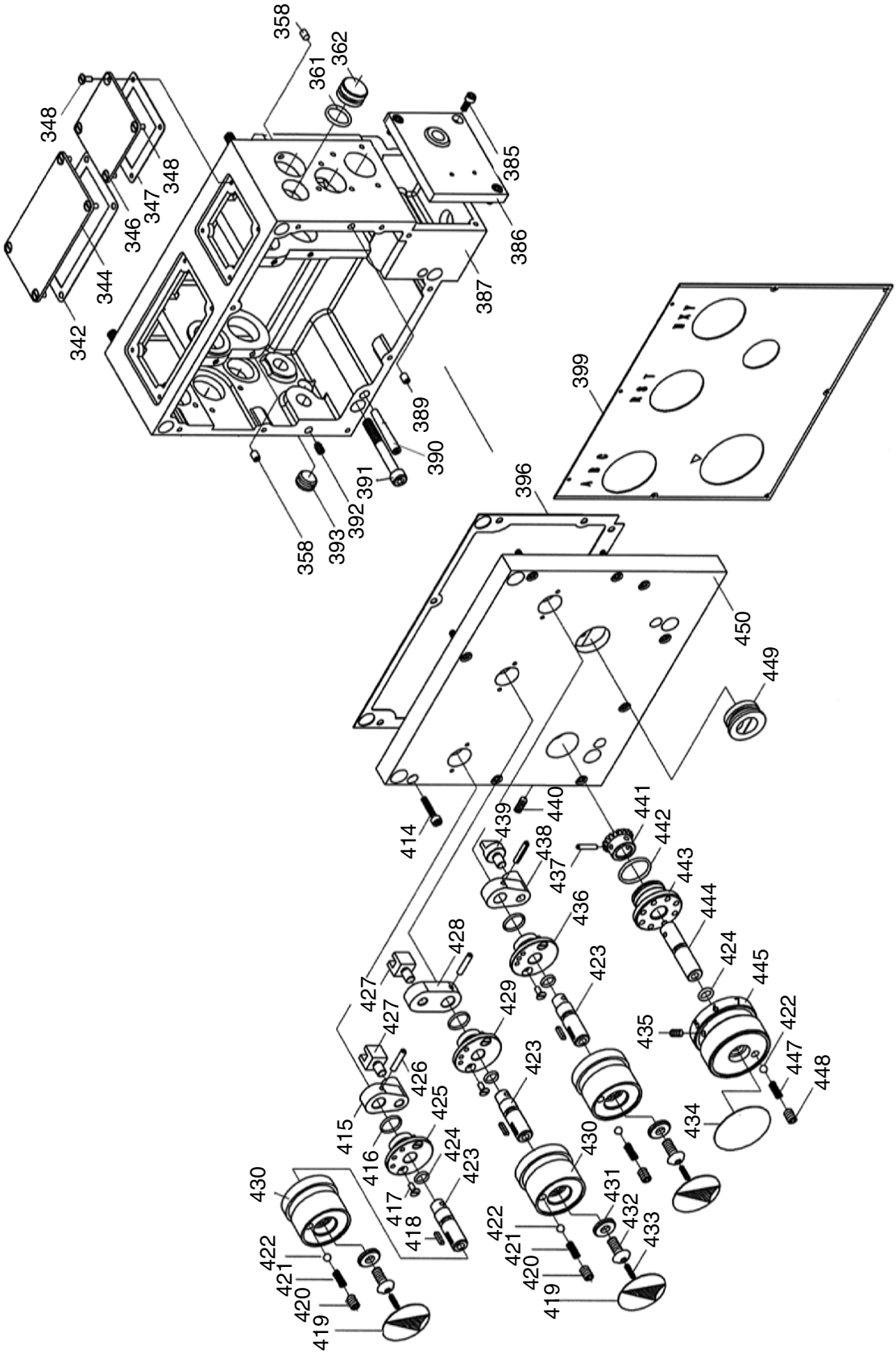


Quick Change Gearbox Drive Parts List

REF	PART #	DESCRIPTION
301	P07090301	SHAFT
302	P07090302	OIL SEAL
303	P07090303	BUSHING
304	PCAP06M	CAP SCREW M6-1 X 25
305	P07090305	SHIFT FORK A
306	P07090306	SHIFT FORK B
307	P07090307	BUSHING HOUSING
308	P07090308	SHIFT FORK C
309	P07090309	SHIFT FORK D
310	P07090310	GASKET
311	P07090311	O-RING 9.8 X 2.4 P10A
312	P07090312	SPACER WASHER
313	PSS53M	SET SCREW M5-.8 X 12
314	PR06M	EXT RETAINING RING 16MM
315	P07090315	COMBO GEAR 19T-20T
316	P07090316	BUSHING
317	P07090317	BUSHING
318	P07090318	SHAFT
319	P07090319	SPLINED SHAFT
320	P07090320	O-RING 9.8 X 2.4 P10A
321	P07090321	GEAR 22T
322	P07090322	GEAR 19T
323	PLUBE001M	TAP-IN BALL OILER 6MM
324	P07090324	GEAR 20T
325	PSS31M	SET SCREW M5-.8 X 8
326	P07090326	GEAR 24T
327	P07090327	GEAR 23T
328	P07090328	GEAR 27T
329	P07090329	GEAR 24T
330	P07090330	GEAR 28T
331	P07090331	GEAR 26T
332	P07090332	GEAR 38T
333	P07090333	BUSHING
334	P07090334	BUSHING
335	PCAP33M	CAP SCREW M5-.8 X 12
336	P07090336	OIL PLUG 3/8 NPT
337	P07090337	END COVER
338	P07090338	GASKET
339	PRP05M	ROLL PIN 5 X 30
340	P07090340	COMBO GEAR 19T-50T
341	P07090341	BUSHING
343	P07090343	COMBO GEAR 38T-16T
345	P07090345	BUSHING
349	P07090349	SHAFT
350	P07090350	COMBO GEAR 23T-19T
351	P07090351	BUSHING
352	PRP27M	ROLL PIN 5 X 28

REF	PART #	DESCRIPTION
353	P07090353	GEAR 35T
354	P07090354	SHAFT
355	PRP27M	ROLL PIN 5 X 28
356	P07090356	OIL SEAL
357	P07090357	SHOULDER BUSHING
359	P07090359	GASKET
360	P07090360	GEAR 26T
363	P07090363	BUSHING
364	P07090364	GEAR 36T
365	P07090365	SPLINE SHAFT
366	PR06M	EXT RETAINING RING 16MM
367	P07090367	GEAR 26T
368	P07090368	BUSHING
369	PRP02M	ROLL PIN 3 X 16
370	P07090370	SLEEVE
371	P07090371	GASKET
372	P07090372	END COVER
373	PCAP23M	CAP SCREW M4-.7 X 12
374	P07090374	GEAR 36T
375	PRP73M	ROLL PIN 4 X 30
376	PRP01M	ROLL PIN 4 X 18
377	P07090377	SHAFT
378	P07090378	SPLINED SHAFT
379	P07090379	OIL SEAL
380	PCAP33M	CAP SCREW M5-.8 X 12
381	P07090381	SUPPORT BOSS
382	P07090382	GASKET
383	P07090383	BUSHING
384	PSS91M	SET SCREW M6-1 X 14
395	P07090395	O-RING 19.8 X 2.4 P20
397	P07090397	BUSHING
398	P07090398	GEAR 22T
400	P07090400	GEAR 22T
401	P07090401	GEAR 22T
402	P07090402	GEAR 33T
403	P07090403	GEAR 22T
404	P07090404	O-RING 8.8 X 1.9 P9
405	P07090405	O-RING 17.8 X 2.4 P18
406	P07090406	SHAFT
407	P07090407	O-RING 25.2 X 3.5 P25.5
408	P07090408	BUSHING
409	PSS05M	SET SCREW M5-.8 X 10
410	P07090410	BALL HEAD PIN
411	P07090411	CAM
412	P07090412	BEVEL GEAR 18T
413	PRP18M	ROLL PIN 4 X 12

Quick Change Gearbox Shift

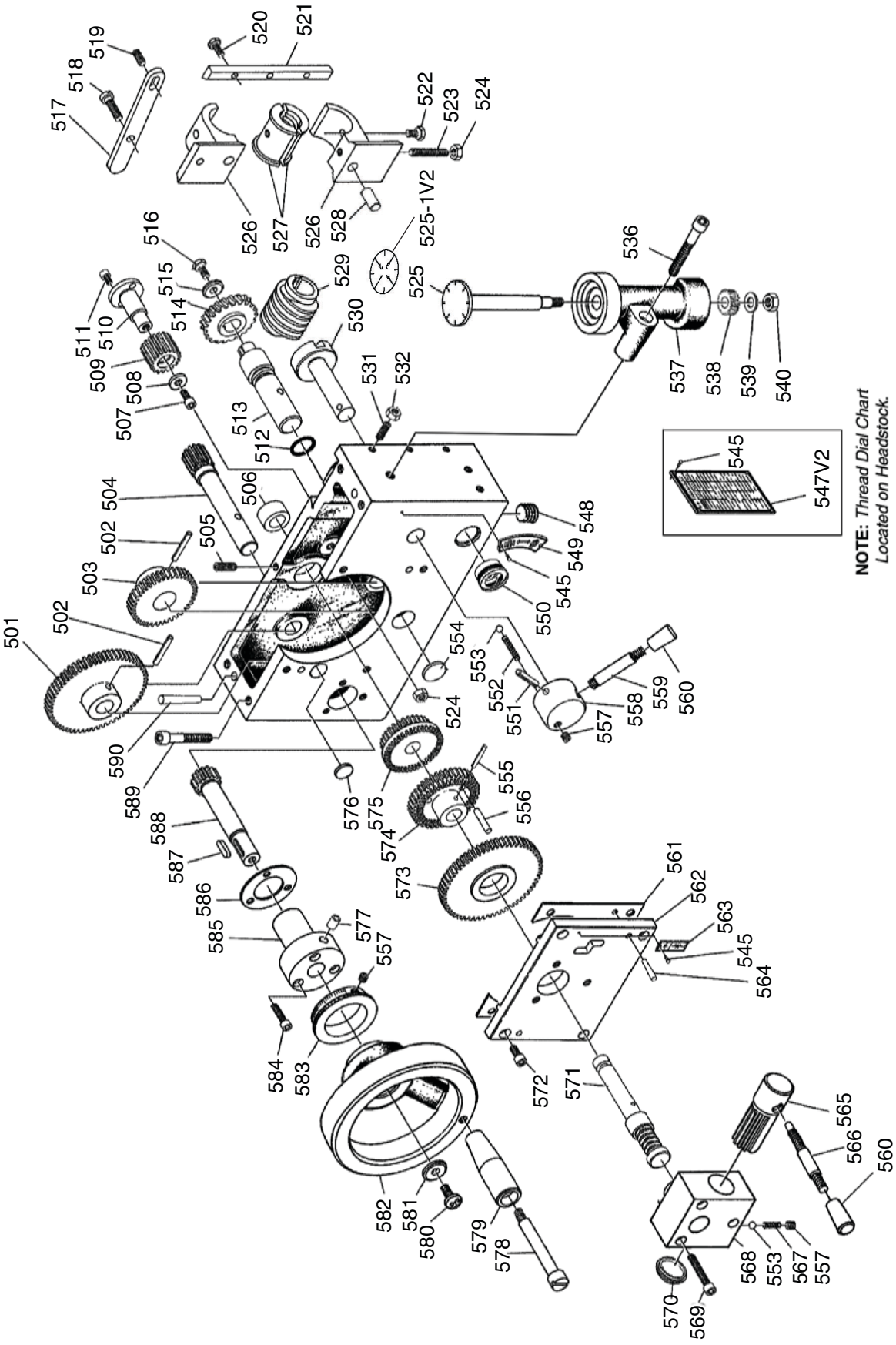


Quick Change Gearbox Shift Parts List

REF	PART #	DESCRIPTION
342	P07090342	GASKET
344	P07090344	LEFT COVER
346	P07090346	RIGHT COVER
347	P07090347	GASKET
348	PFH19M	FLAT HD SCR M4-.7 X 10
358	PSS01M	SET SCREW M6-1 X 10
361	P07090361	O-RING 23.7 X 2.5
362	P07090362	PLUG
385	PCAP33M	CAP SCREW M5-.8 X 12
386	P07090386	CASE COVER
387	P07090387	GEARBOX CASE
388	PRP27M	ROLL PIN 5 X 28
389	PSS91M	SET SCREW M6-1 X 14
390	P07090390	TAPER PIN 6 X 50
391	PCAP66M	CAP SCREW M8-1.25 X 65
392	PSS53M	SET SCREW M5-.8 X 12
393	P07090393	PLUG 1/2 NPT
396	P07090396	GASKET
399	P07090399	GEARBOX FACE PLATE
414	PCAP38M	CAP SCREW M5-.8 X 25
415	P07090415	ARM
416	P07090416	O-RING 17.5 X 1.5 S18
417	PFH19M	FLAT HD SCR M4-.7 X 10
418	PK146M	KEY 3 X 3 X 14
419	P07090419	ARROW PLATE
420	PSS14M	SET SCREW M8-1.25 X 12
421	P07090421	COMPRESSION SPRING
422	PSTB001	STEEL BALL 1/4

REF	PART #	DESCRIPTION
423	P07090423	SHIFT SHAFT
424	P07090424	O-RING 9.8 X 2.4 P10A
425	P07090425	SHAFT SLEEVE
426	PRP04M	ROLL PIN 4 X 24
427	P07090427	SHIFT FORK
428	P07090428	ARM
429	P07090429	SHAFT SLEEVE
430	P07090430	DIAL HUB
431	PW01M	FLAT WASHER 8MM
432	P07090432	DOME HD SCR M8-1.25 x 20 BLK
433	PSS50M	SET SCREW M4-.7 X 20
434	P07090434	COVER PLATE
435	PSS91M	SET SCREW M6-1 X 14
436	P07090436	SHAFT SLEEVE
437	PRP39M	ROLL PIN 4 X 20
438	P07090438	ARM
439	P07090439	SHIFT CLAW
440	PSS11M	SET SCREW M6-1 X 16
441	P07090441	BEVEL GEAR 18T
442	P07090442	O-RING 19.8 X 2.4 P20
443	P07090443	SHAFT SLEEVE
444	P07090444	SHIFT SHAFT
445	P07090445	DIAL HUB
447	P07090447	COMPRESSION SPRING
448	PSS14M	SET SCREW M8-1.25 X 12
449	P07090449	OIL SIGHT GLASS
450	P07090450	GEARBOX FACE CASTING

Apron

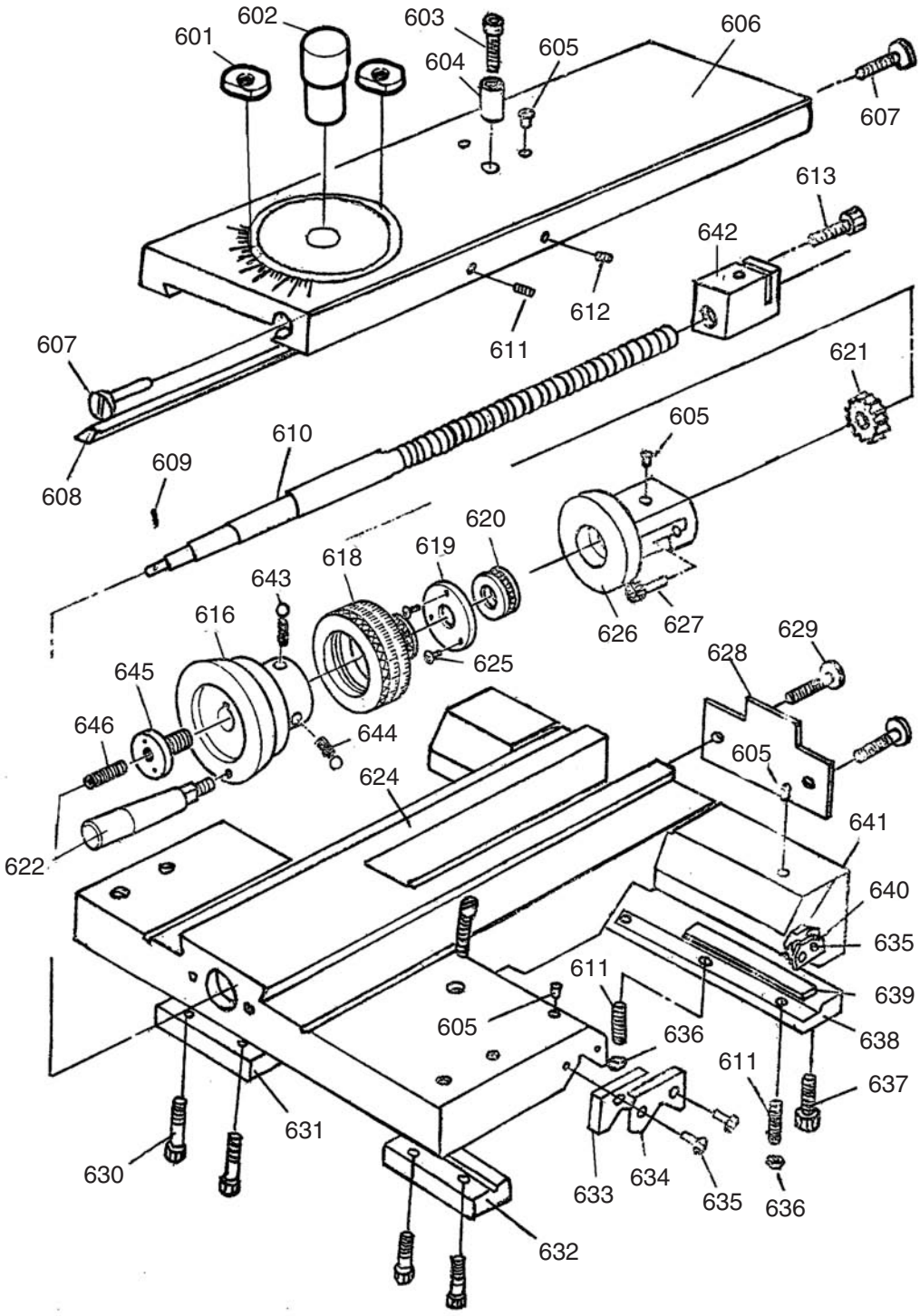


Apron Parts List

REF	PART #	DESCRIPTION
501	P07090501	GEAR 60T
502	PRP05M	ROLL PIN 5 X 30
503	P07090503	GEAR 18T
504	P07090504	PINION 11T
505	PSS11M	SET SCREW M6-1 X 16
506	P07090506	BUSHING
507	PCAP26M	CAP SCREW M6-1 X 12
508	PW03M	FLAT WASHER 6MM
509	P07090509	GEAR 18T
510	P07090510	IDLER SHAFT
511	PCAP33M	CAP SCREW M5-.8 X 12
512	P07090512	O-RING 20 X 2.4
513	P07090513	SHAFT
514	P07090514	WORM GEAR
515	PW03M	FLAT WASHER 6MM
516	PCAP26M	CAP SCREW M6-1 X 12
517	P07090517	INTERLOCK LEVER
518	PCAP26M	CAP SCREW M6-1 X 12
519	PSS04M	SET SCREW M6-1 X 12
520	PB42M	HEX BOLT M5-.8 X 20
521	P07090521	GIB
522	PB04M	HEX BOLT M6-1 X 10
523	PSS29M	SET SCREW M6-1 X 35
524	PN01M	HEX NUT M6-1
525	P07090525	DIAL INDICATOR
525-1V2	P07090525-1V2	THREAD DIAL LABEL V2.05.11
526	P07090526	HALF NUT RETAINER
527	P07090527	HALF NUT ASSEMBLY
528	P07090528	DOWEL PIN 8 X 16
529	P07090529	WORM
530	P07090530	CAM SHAFT
531	PSS34M	SET SCREW M5-.8 X 16
532	PN06M	HEX NUT M5-.8
536	PCAP05M	CAP SCREW M8-1.25 X 50
537	P07090537	THREAD DIAL BODY
538	P07090538	HELICAL GEAR 24T
539	PW01M	FLAT WASHER 8MM
540	PN03M	HEX NUT M8-1.25
545	PRIV014M	STEEL FLUTED RIVET 3 X 5
547V2	P07090547V2	THREAD DIAL CHART V2.05.11
548	P07090548	DRAIN PLUG 1/8 NPT
549	P07090549	HALF NUT INDICATOR PLATE

REF	PART #	DESCRIPTION
550	P07090550	OIL SIGHT GLASS
551	PRP91M	ROLL PIN 5 X 35
552	P07090552	COMPRESSION SPRING
553	PSTB004	STEEL BALL 3/16
554	P07090554	PLUG
555	PRP16M	ROLL PIN 3 X 25
556	PRP49M	ROLL PIN 5 X 25
557	PSS02M	SET SCREW M6-1 X 6
558	P07090558	LEVER HUB
559	P07090559	LEVER
560	P07090560	KNOB M8-1.25
561	P07090561	SPACER
562	P07090562	FRONT COVER
563	P07090563	FEED INDICATOR PLATE
564	P07090564	TAPER PIN 5 X 20
565	P07090565	CAM SHAFT
566	P07090566	CHANGE LEVER
567	P07090567	COMPRESSION SPRING
568	P07090568	BRACKET
569	PCAP48M	CAP SCREW M6-1 X 35
570	P07090570	PLUG
571	P07090571	TOOTHED SHIFT SHAFT
572	PCAP01M	CAP SCREW M6-1 X 16
573	P07090573	CLUTCH GEAR 63T
574	P07090574	CLUTCH GEAR 40T
575	P07090575	COMBO CLUTCH GEAR 30T
576	P07090576	PLUG
577	PLUBE002M	TAP-IN BALL OILER 8MM
578	P07090578	HANDLE SHOULDER SCREW
579	P07090579	HANDLE
580	PFH38M	FLAT HD SCR M6-1 X 16
581	PW03M	FLAT WASHER 6MM
582	P07090582	HANDWHEEL
583	P07090583	CALIBRATED RING
584	PCAP38M	CAP SCREW M5-.8 X 25
585	P07090585	SUPPORT HUB
586	P07090586	SPACER
587	PK34M	KEY 5 X 5 X 20
588	P07090588	GEARED SHAFT 14T
589	PCAP13M	CAP SCREW M8-1.25 X 30
590	P07090590	TAPER PIN 8 X 40

Cross Slide

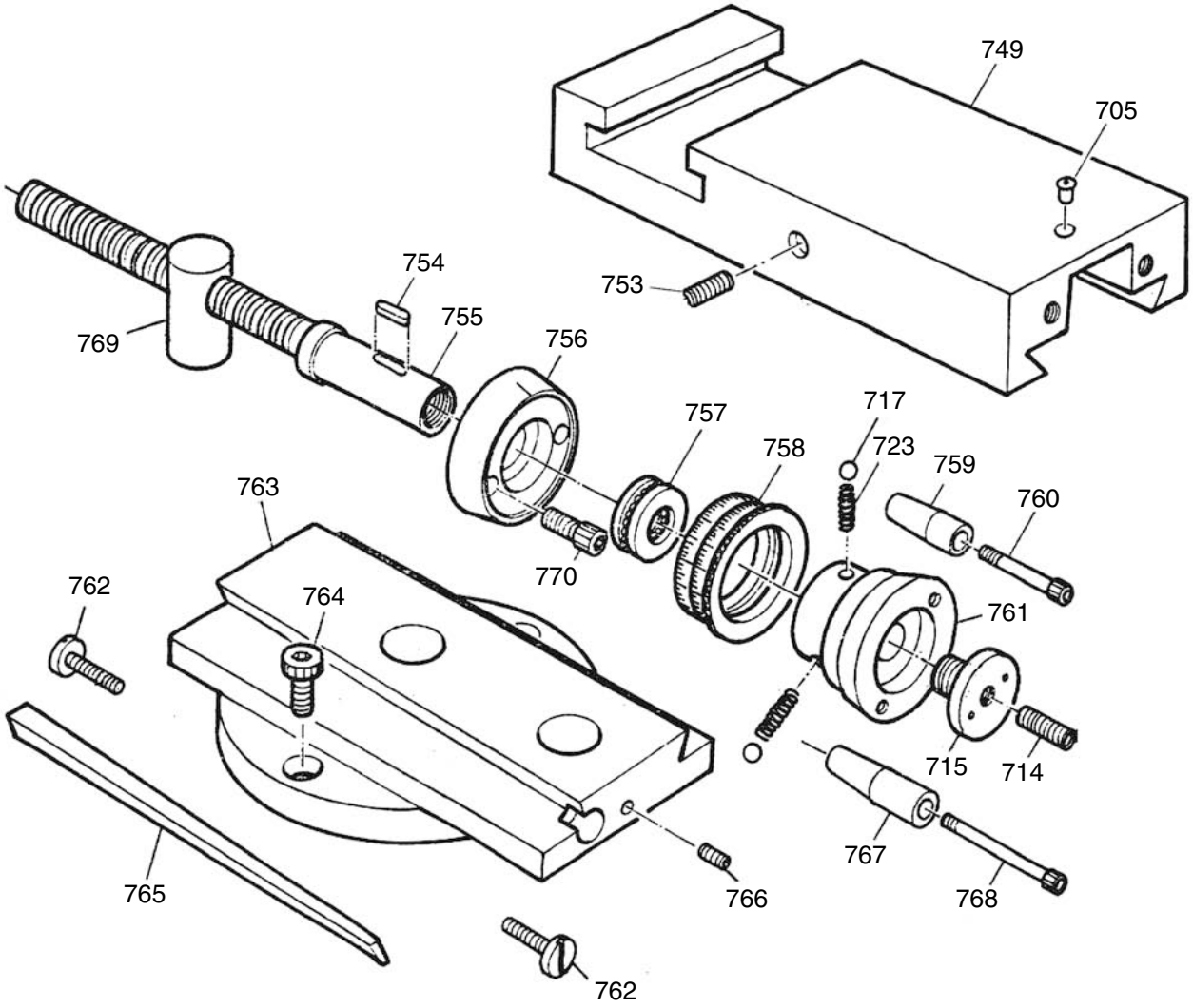


Cross Slide Parts List

REF	PART #	DESCRIPTION
601	P07090601	T-NUT
602	P07090602	PIVOT PIN
603	PCAP01M	CAP SCREW M6-1 X 16
604	P07090604	BUSHING
605	PLUBE002M	TAP-IN BALL OILER 8MM
606	P07090606	CROSS SLIDE
607	P07090607	GIB SCREW
608	P07090608	GIB
609	PRP02M	ROLL PIN 3 X 16
610	P07090610	CROSS-SLIDE LEADSCREW
611	PSS12M	SET SCREW M6-1 X 25
612	PSS16M	SET SCREW M8-1.25 X 10
613	PCAP01M	CAP SCREW M6-1 X 16
616	P07090616	HANDWHEEL HUB
618	P07090618	CALIBRATED RING
619	P07090619	BACKING PLATE
620	P8102	THRUST BEARING 8102
621	P07090621	GEAR 19T
622	P07090622	HANDLE
624	P07090624	SADDLE CASTING
625	PS09M	PHLP HD SCR M5-.8 X 10

REF	PART #	DESCRIPTION
626	P07090626	SUPPORT HUB
627	PCAP06M	CAP SCREW M6-1 X 25
628	P07090628	DUST PLATE
629	PCAP58M	CAP SCREW M8-1.25 X 12
630	PCAP14M	CAP SCREW M8-1.25 X 20
631	P07090631	LEFT GIB SLIDE
632	P07090632	RIGHT GIB SLIDE
633	P07090633	WIPER
634	P07090634	WIPER SUPPORT PLATE
635	PS02M	PHLP HD SCR M4-.7 X 12
636	PN01M	HEX NUT M6-1
637	PCAP31M	CAP SCREW M8-1.25 X 25
638	P07090638	GIB SUPPORT
639	P07090639	GIB STRIP
640	P07090640	WIPER SUPPORT PLATE
641	P07090641	WIPER
642	P07090642	CROSS-SLIDE LEADSCREW NUT
643	PSTB003M	STEEL BALL 6MM
644	P07090644	COMPRESSION SPRING
645	P07090645	INNER HUB
646	PSS12M	SET SCREW M6-1 X 25

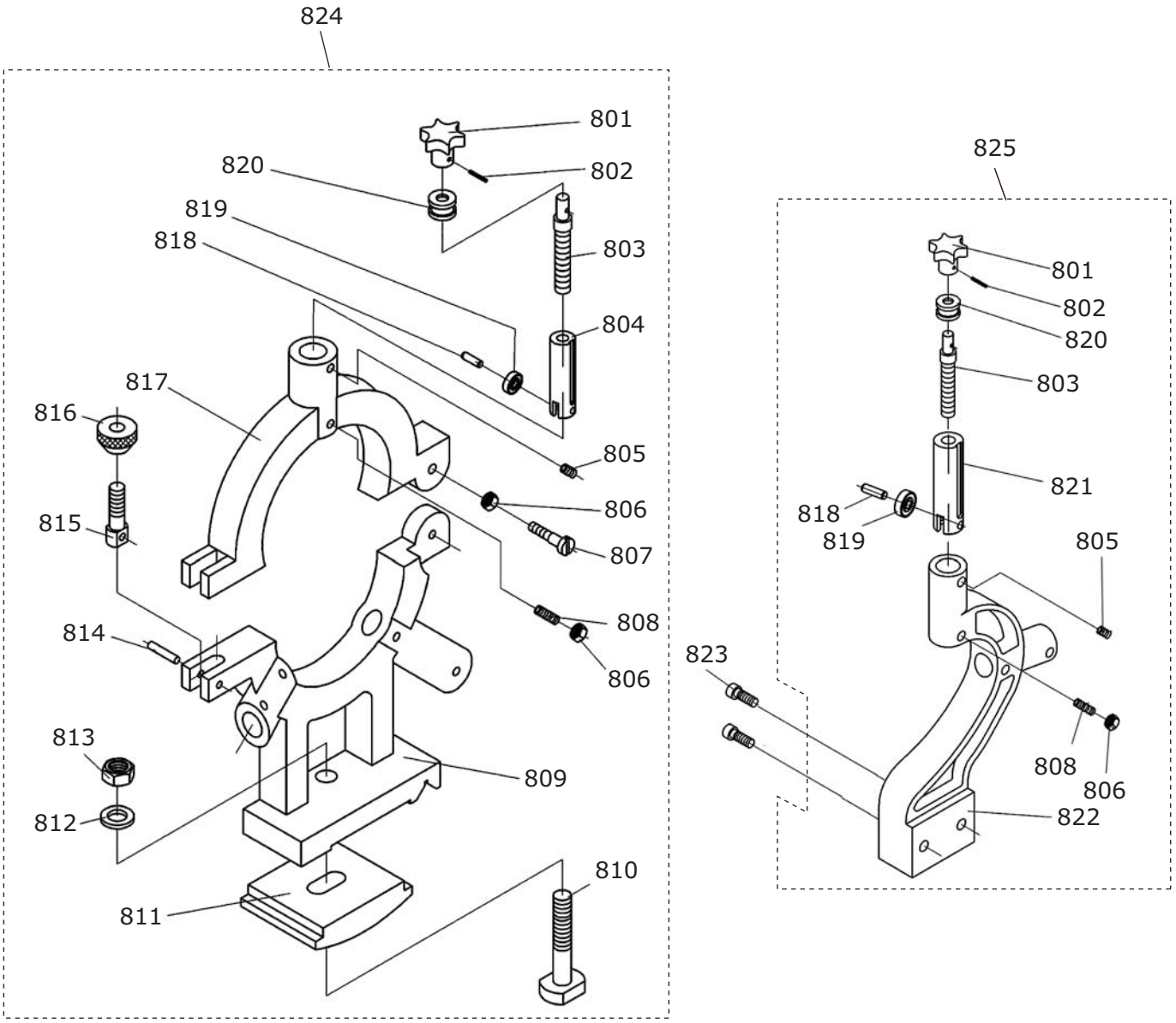
Compound Slide



REF	PART #	DESCRIPTION
705	PLUBE001M	TAP-IN BALL OILER 6MM
714	PSS12M	SET SCREW M6-1 X 25
715	P07090715	INNER HUB
717	PSTB003M	STEEL BALL 6MM
723	P07090723	COMPRESSION SPRING
749	P07090749	COMPOUND SLIDE
753	PSS09M	SET SCREW M8-1.25 X 20
754	PK134M	KEY 4 X 4 X 14
755	P07090755	COMPOUND LEADSCREW
756	P07090756	BEARING HOUSING
757	P8103	THRUST BEARING 8103
758	P07090758	CALIBRATED RING

REF	PART #	DESCRIPTION
759	P07090759	HANDLE
760	P07090760	HANDLE SHOULDER SCREW
761	P07090761	HANDWHEEL HUB
762	P07090762	GIB SCREW
763	P07090763	SWIVEL SLIDE
764	PCAP11M	CAP SCREW M8-1.25 X 16
765	P07090765	GIB
766	PSS11M	SET SCREW M6-1 X 16
767	P07090767	HANDLE
768	P07090768	HANDLE SHOULDER SCREW
769	P07090769	COMPOUND LEADSCREW NUT
770	PCAP02M	CAP SCREW M6-1 X 20

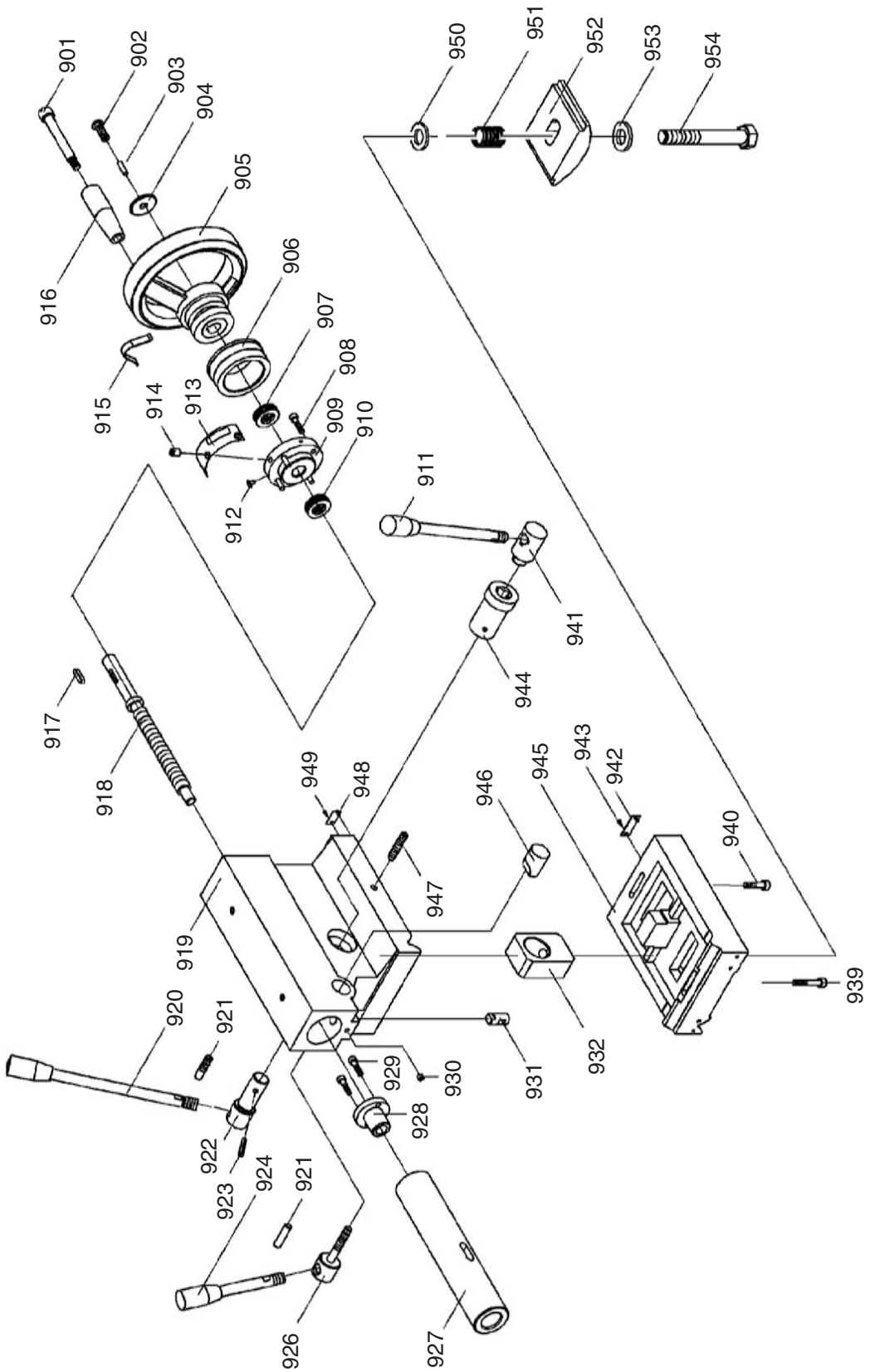
Rests



REF	PART #	DESCRIPTION
801	P07090801	PINNED KNOB
802	PRP64M	ROLL PIN 3 X 18
803	P07090803	JACK SCREW
804	P07090804	FINGER SLIDE
805	PSS02M	SET SCREW M6-1 X 6
806	PN01M	HEX NUT M6-1
807	P07090807	SLOTTED SCREW M6-1 X 30
808	PSS58M	SET SCREW M6-1 X 18
809	P07090809	LOWER STEADY REST CASTING
810	P07090810	T-BOLT M12-1.75 X 65
811	P07090811	CLAMP BLOCK
812	PW06M	FLAT WASHER 12MM
813	PN09M	HEX NUT M12-1.75

REF	PART #	DESCRIPTION
814	P07090814	DOWEL PIN 5 X 24
815	P07090815	PIVOT STUD
816	P07090816	KNURLED THUMB KNOB M10-1.5
817	P07090817	UPPER STEADY REST CASTING
818	P07090818	DOWEL PIN 5 X 16
819	P625ZZ	BALL BEARING 625ZZ
820	P07090820	COLLAR
821	P07090821	FINGER SLIDE
822	P07090822	FOLLOW REST CASTING
823	PCAP45M	CAP SCREW M8-1.25 X 45
824	P07090824	STEADY REST ASSEMBLY
825	P07090825	FOLLOW REST ASSEMBLY

Tailstock

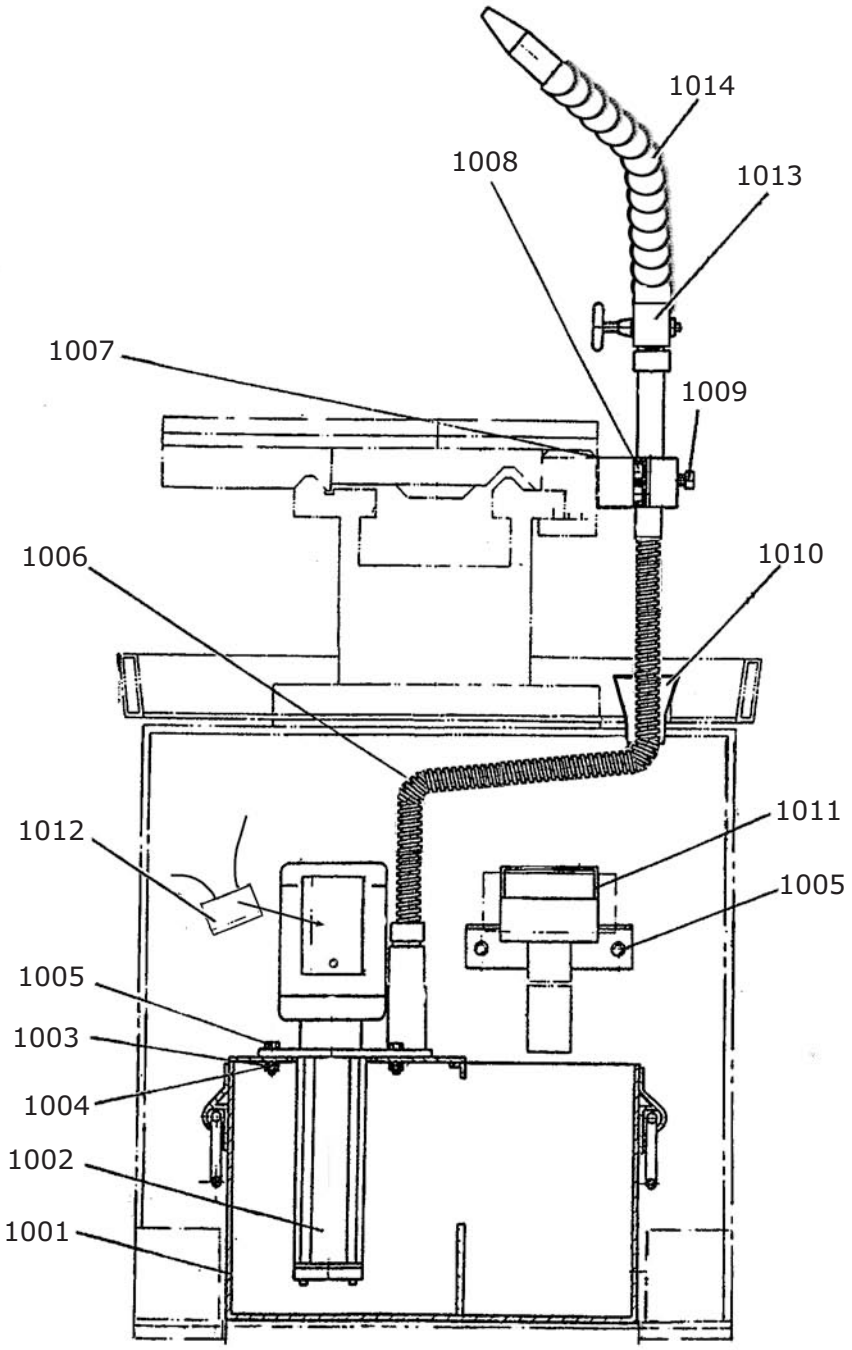


Tailstock Parts List

REF	PART #	DESCRIPTION
901	P07090901	HANDLE SHOULDER SCREW
902	P07090902	DUAL THREAD CAP SCREW
903	PSS57M	SET SCREW M5-.8 X 20
904	PW02M	FLAT WASHER 5MM
905	P07090905	HANDWHEEL
906	P07090906	INDEX RING
907	P8102	THRUST BEARING 8102
908	PCAP15M	CAP SCREW M5-.8 X 20
909	P07090909	FLANGE HUB
910	P8102	THRUST BEARING 8102
911	P07090911	LEVER
912	PFH27M	FLAT HD SCR M4-.7 X 6
913	P07090913	CALIBRATED PLATE
914	PLUBE001M	TAP-IN BALL OILER 6MM
915	P07090915	FLAT SPRING
916	P07090916	HANDLE
917	PK34M	KEY 5 X 5 X 20
918	P07090918	TAILSTOCK LEADSCREW
919	P07090919	TAILSTOCK CASTING
920	P07090920	TAILSTOCK LOCK LEVER
921	P07090921	STOP PIN
922	P07090922	LEVER HUB
923	PRP05M	ROLL PIN 5 X 30
924	P07090924	QUILL LOCK LEVER

REF	PART #	DESCRIPTION
926	P07090926	HUB LOCK
927	P07090927	QUILL MT#3
928	P07090928	COLLAR
929	PCAP15M	CAP SCREW M5-.8 X 20
930	PSS02M	SET SCREW M6-1 X 6
931	P07090931	GUIDE
932	P07090932	BLOCK
939	PCAP48M	CAP SCREW M6-1 X 35
940	PCAP06M	CAP SCREW M6-1 X 25
941	P07090941	DRIVE HUB
942	P07090942	SCALE PLATE
943	PRIV001M	RIVET 2 X 5
944	P07090944	SUPPORT COLLAR
945	P07090945	TAILSTOCK BASE
946	P07090946	LOCK BLOCK
947	PCAP12M	CAP SCREW M8-1.25 X 40
948	P07090948	SCALE PLATE
949	PRIV001M	RIVET 2 X 5
950	PW08M	FLAT WASHER 16MM
951	P07090951	COMPRESSION SPRING
952	P07090952	BLOCK
953	PW08M	FLAT WASHER 16MM
954	PB113M	HEX BOLT M16-2 X 120

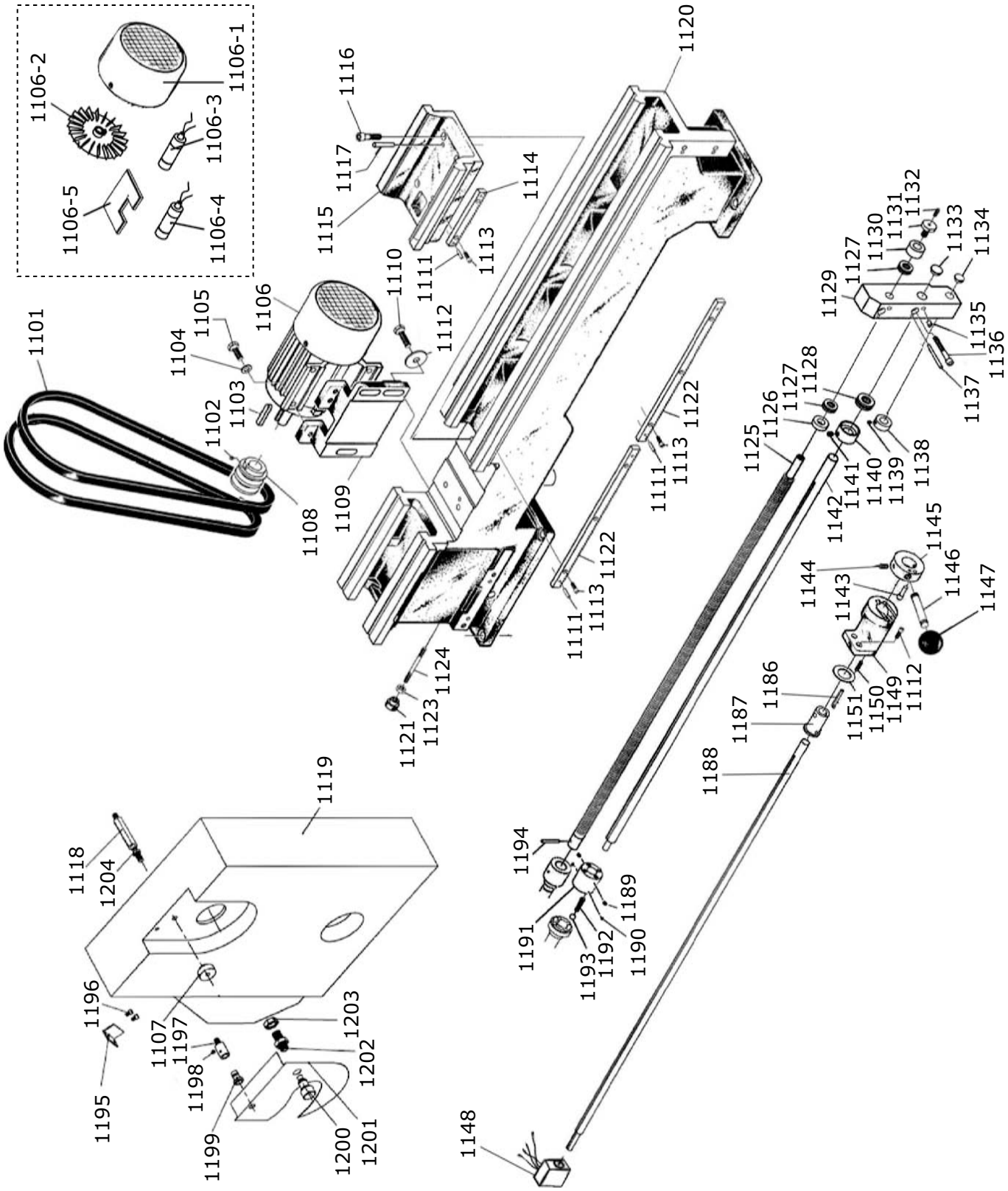
Pump



REF	PART #	DESCRIPTION
1001	P07091001	COOLANT TANK
1002	P07091002	COOLANT PUMP 0.8HP 110V/220V 1-PH
1003	PN01M	HEX NUT M6-1
1004	PLW03M	LOCK WASHER 6MM
1005	PB18M	HEX BOLT M6-1 X 15
1006	P07091006	COOLANT PIPE ASSEMBLY
1007	P07091007	MOUNTING BASE

REF	PART #	DESCRIPTION
1008	PCAP38M	CAP SCREW M5-.8 X 25
1009	PCAP24M	CAP SCREW M5-.8 X 16
1010	P07091010	RUBBER BUSHING
1011	P07091011	RETURN SPOUT
1012	P07091012	SQUARE CAPACITOR 2M/450V
1013	P07091013	CONTROL VALVE
1014	P07091014	COOLANT TUBE W/NOZZLE

Motor and Feed Rod

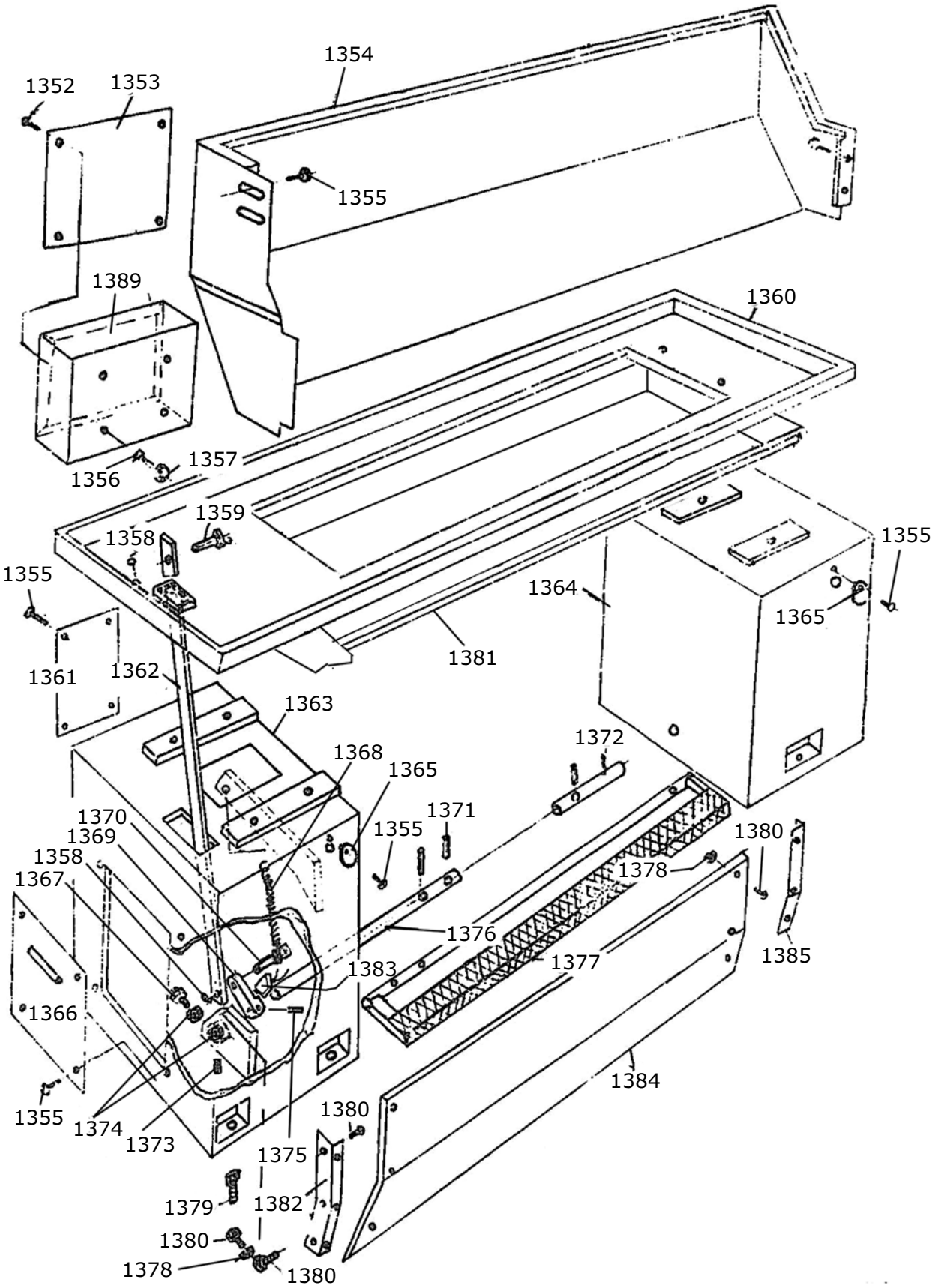


Motor and Feed Rod Parts List

REF	PART #	DESCRIPTION
1101	P07091101	GATES TRUE-POWER V13 X 890
1102	PSS04M	SET SCREW M6-1 X 12
1103	PK41M	KEY 8 x 8 X 40
1104	PLW04M	LOCK WASHER 8MM
1105	PB07M	HEX BOLT M8-1.25 X 25
1106	P07091106	MOTOR 2HP 110V/220V 1-PH
1106-1	P07091106-1	FAN COVER
1106-2	P07091106-2	FAN
1106-3	PC150D	S CAPACITOR 150M 250V 1-3/8 X 2-3/4
1106-4	PC20A	R CAPACITOR 20M 400V 1-5/8 X 2-3/4
1106-5	P07091106-5	ELECTRICAL BOX COVER
1107	P07091107	KNURLED KNOB M8-1.25
1108	P07091108	MOTOR PULLEY
1109	P07091109	MOTOR MOUNT
1110	PB01M	HEX BOLT M10-1.5 X 30
1111	PRP93M	ROLL PIN 6 X 25
1112	PW04M	FLAT WASHER 10MM
1113	PCAP06M	CAP SCREW M6-1 X 25
1114	P07091114	GAP RACK
1115	P07091115	GAP INSERT
1116	PCAP47M	CAP SCREW M10-1.5 X 40
1117	P07091117	TAPER PIN 8 X 60
1118	P07091118	HEX STUD M8-1.25
1119	P07091119	GEAR COVER
1120	P07091120	LATHE BED
1121	P07091121	KNURLED KNOB M10-1.5
1122	P07091122	RACK
1123	PN02M	HEX NUT M10-1.5
1124	P07091124	STUD M10-1.5
1125	P07091125	LONGITUDINAL LEADSCREW
1126	P07091126	SLEEVE
1127	P8102	THRUST BEARING 8102
1128	P8104	THRUST BEARING 8104
1129	P07091129	HOUSING
1130	P07091130	BEARING COVER
1131	P07091131	SHOULDER FLANGE SCREW
1132	PSS25M	SET SCREW M6-1 X 20
1133	P07091133	END PLUG

REF	PART #	DESCRIPTION
1134	P07091134	END PLUG
1135	PLUBE001M	TAP-IN BALL OILER 6MM
1136	PCAP35M	CAP SCREW M8-1.25 X 60
1137	P07091137	TAPER PIN 5 X 60
1138	P07091138	LOCK COLLAR
1139	PSS03M	SET SCREW M6-1 X 8
1140	P07091140	LOCKING BEARING COVER
1141	PSS16M	SET SCREW M8-1.25 X 10
1142	P07091142	FEED ROD
1143	P07091143	INDEX LUG PIN
1144	PSS06M	SET SCREW M8-1.25 X 16
1145	P07091145	RETAINER COLLAR
1146	P07091146	SPINDLE ON/OFF LEVER
1147	P07091147	PLASTIC BALL KNOB M10-1.5
1148	P07091148	SPINDLE ON/OFF SWITCH ASSEMBLY
1149	P07091149	HOUSING
1150	P07091150	COMPRESSION SPRING
1151	P07091151	THRUST WASHER
1186	PK68M	KEY 4 X 4 X 40
1187	P07091187	FLANGED SLEEVE
1188	P07091188	CONTROL ROD
1189	P07091189	CONE SET SCREW M4-.7 X 4.5
1190	PFH27M	FLAT HD SCR M4-.7 X 6
1191	P07091191	CLUTCH ASSEMBLY
1192	P07091192	COMPRESSION SPRING
1193	PSTB003M	STEEL BALL 6MM
1194	P07091194	SHEAR PIN
1195	P07091195	SHUT-OFF SUPPORT
1196	PS05M	PHLP HD SCR M5-.8 X 8
1197	P07091197	PIVOT SHAFT SOCKET
1198	PSS26M	SET SCREW M5-.8 X 6
1199	P07091199	PIVOT SHAFT
1200	P07091200	KNURLED KNOB M8-1.25
1201	P07091201	SPIDER SAFETY GUARD
1202	P07091202	THREADED RECEIVER M16-2
1203	PN13M	HEX NUT M16-2
1204	PN03M	HEX NUT M8-1.25

Cabinet and Brake

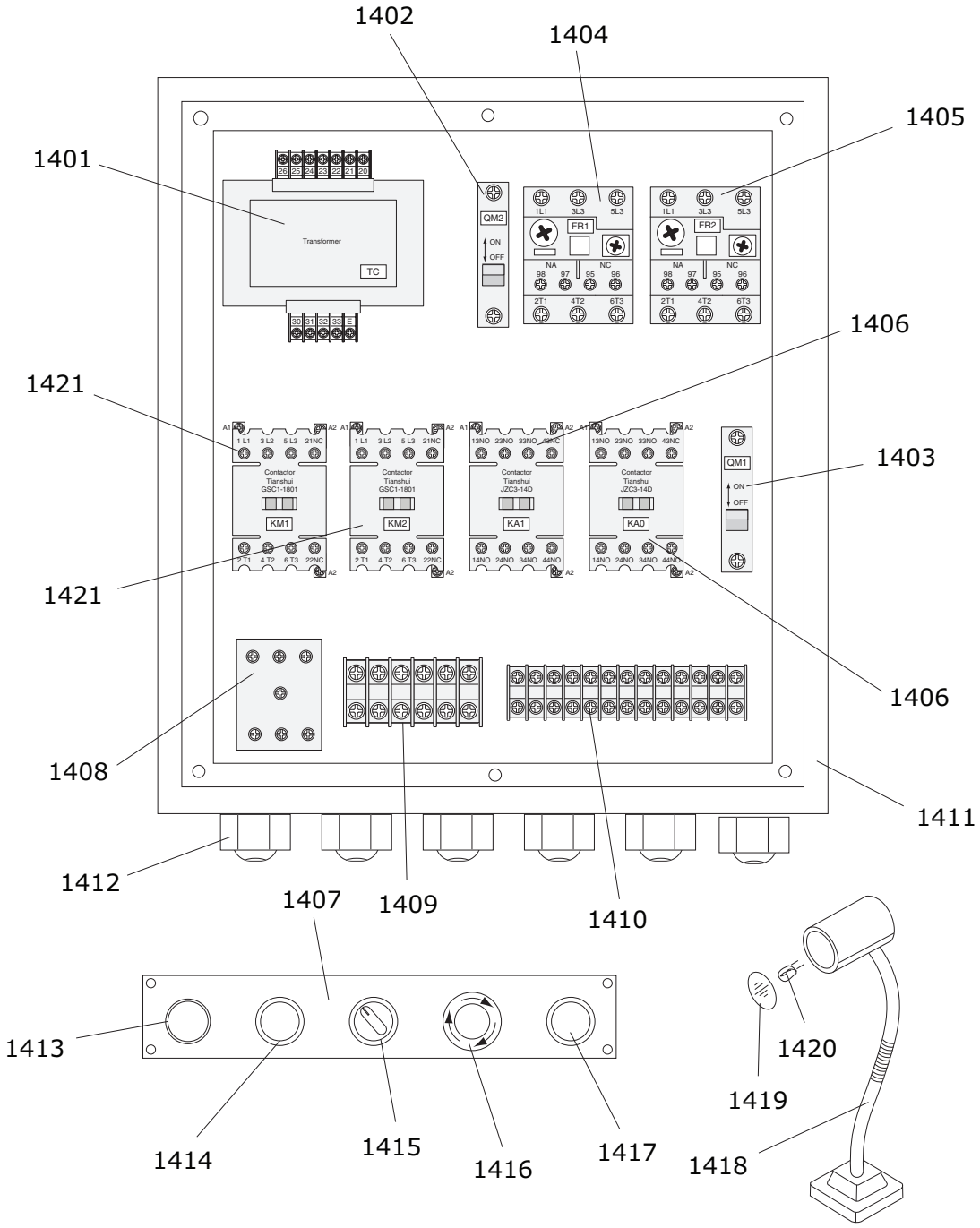


Cabinet and Brake Parts List

REF	PART #	DESCRIPTION
1352	PS19M	PHLP HD SCR M5-.8 X 6
1353	P07091353	COVER
1354	P07091354	SPLASH GUARD
1355	PS68M	PHLP HD SCR M6-1 X 10
1356	PCAP02M	CAP SCREW M6-1 X 20
1357	PW03M	FLAT WASHER 6MM
1358	P07091358	COTTER PIN 2 X 12
1359	P07091359	CLEVIS PIN
1360	P07091360	BASE PAN
1361	P07091361	REAR ACCESS PLATE
1362	P07091362	BRAKE PULL ROD
1363	P07091363	LEFT BASE
1364	P07091364	RIGHT BASE
1365	P07091365	ROUND COVER
1366	P07091366	LEFT ACCESS PLATE
1367	P07091367	DOME SCREW
1368	P07091368	EXTENSION SPRING
1369	P07091369	PEDAL ARM

REF	PART #	DESCRIPTION
1370	P07091370	CLEVIS PIN
1371	PRP16M	ROLL PIN 3 X 25
1372	P07091372	SHAFT
1373	PSS17M	SET SCREW M8-1.25 X 6
1374	PN03M	HEX NUT M8-1.25
1375	PRP28M	ROLL PIN 5 X 40
1376	P07091376	PEDAL SHAFT
1377	P07091377	BRAKE PEDAL
1378	PN01M	HEX NUT M6-1
1379	PCAP73M	CAP SCREW M12-1.75 X 50
1380	PCAP04M	CAP SCREW M6-1 X 10
1381	P07091381	CHIP DRAWER
1382	P07091382	LEFT CORNER PLATE
1383	P07091383	LIMIT SWITCH
1384	P07091384	FRONT PLATE
1385	P07091385	RIGHT CORNER PLATE
1389	P07091389	MAIN ELECTRICAL BOX

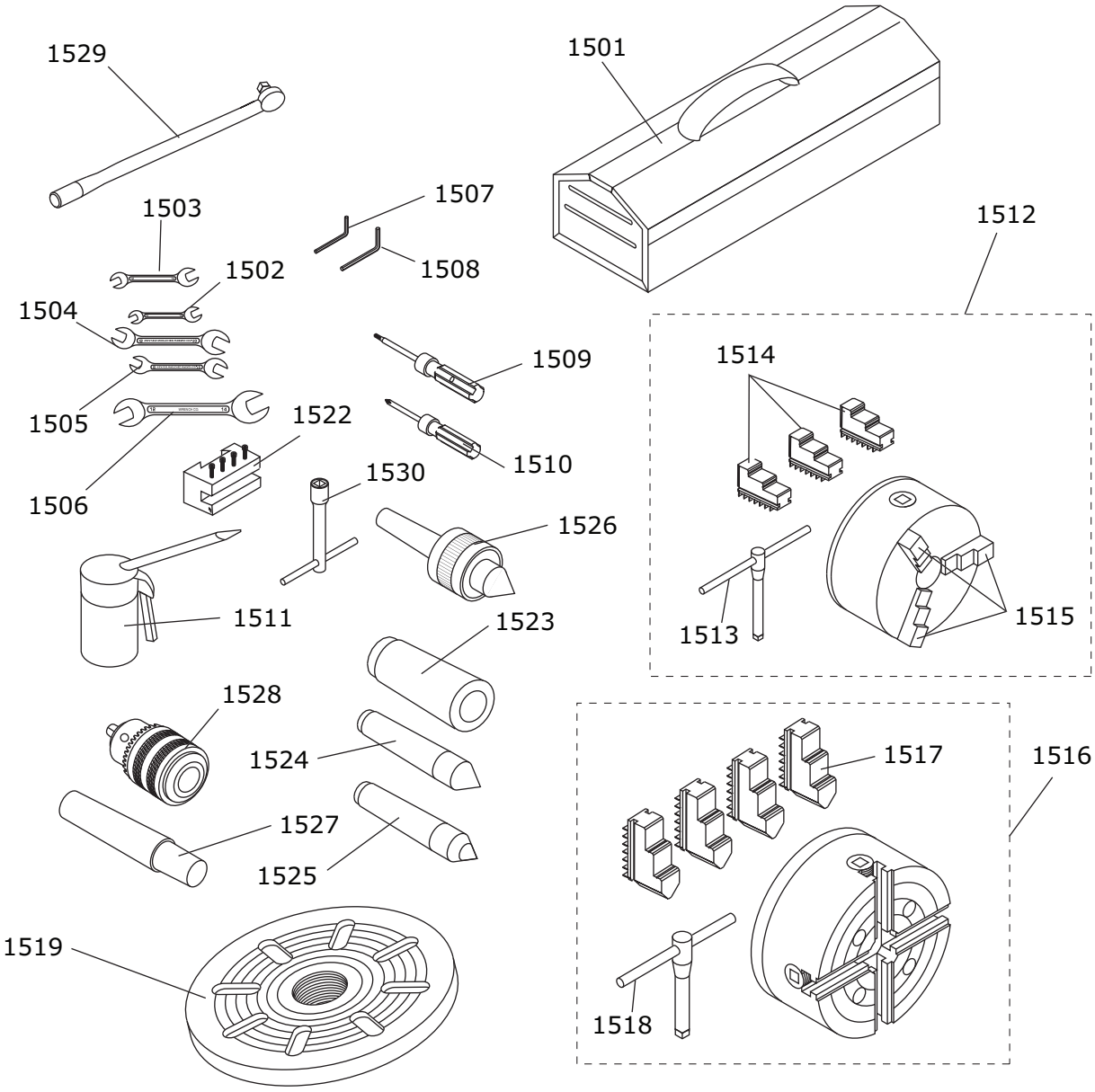
Main Electrical Breakdown



REF	PART #	DESCRIPTION
1401	P07091401	TRANSFORMER WUXI JBK5-100VATH
1402	P07091402	CIRCUIT BREAKER 3A TIANSHUI, DZ451-63
1403	P07091403	CIRCUIT BREAKER 5A TIANSHUI, DZ451-63
1404	P07091404	OL RELAY TIANSHUI JRS4-09/25D 9-13A
1405	P07091405	OL RELAY TIANSHUI JRS4-09/25D 0.4-0.63A
1406	P07091406	CONTACTOR TIAN JZC3-40D 110V
1407	P07091407	CONTROL PANEL PLATE
1408	P07091408	COPPER GROUND BLOCK
1409	P07091409	TERMINAL BAR 12 P
1410	P07091410	TERMINAL BAR 26 P
1411	P07091411	ELECTRICAL BOX ASSEMBLY

REF	PART #	DESCRIPTION
1412	P07091412	STRAIN RELIEF
1413	P07091413	POWER INDICATOR LIGHT
1414	P07091414	POWER BUTTON
1415	P07091415	PUMP ON/OFF SWITCH
1416	P07091416	EMERGENCY STOP SWITCH
1417	P07091417	JOG BUTTON
1418	P07091418	WORK LAMP ASSEMBLY
1419	P07091419	LAMP LENS
1420	P07091420	HALOGEN BULB 50W 24V
1421	P07091421	CONTACTOR TIANSHUI GSC1-1801 110V

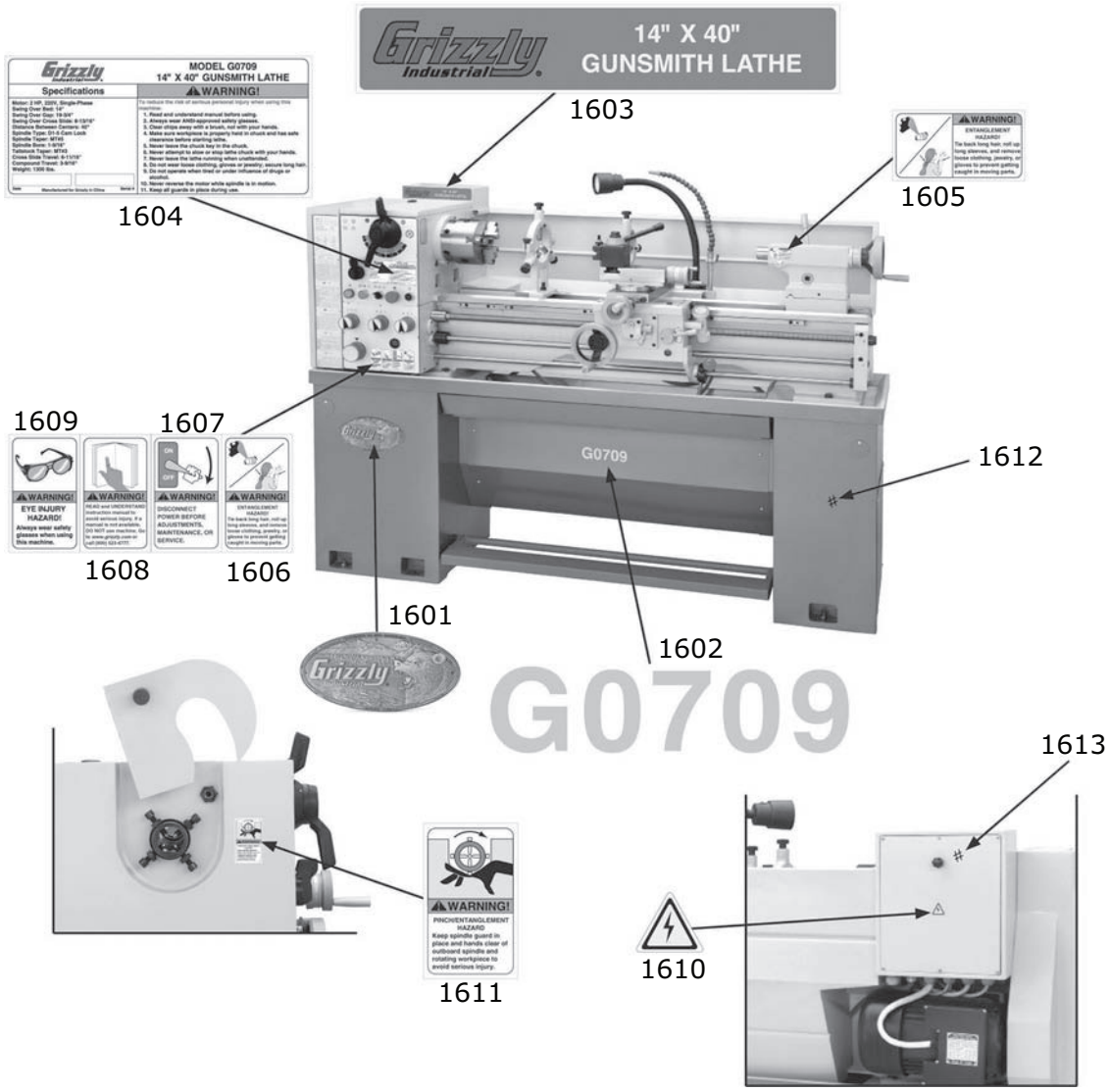
Accessories



REF	PART #	DESCRIPTION
1501	P07091501	TOOL BOX
1502	PWR911	OPEN END WRENCH 9/11MM
1503	PWR1214	COMBO WRENCH 12 X 14MM
1504	PWR1316	COMBO WRENCH 13 X 16MM
1505	PWR1719	COMBO WRENCH 17 X 19MM
1506	PWR2427	COMBO WRENCH 24 X 27MM
1507	PAW06M	HEX WRENCH 6MM
1508	PAW08M	HEX WRENCH 8MM
1509	PSDP2	PHLP HD SCREWDRIVER #2
1510	PSDF2	SCREWDRIVER FLAT #2
1511	P07091511	OIL GUN
1512	P07091512	3-JAW CHUCK 6" D1-5 ASSEMBLY
1513	P07091513	3-JAW CHUCK WRENCH
1514	P07091514	3-JAW ID CHUCK JAW SET

REF	PART #	DESCRIPTION
1515	P07091515	3-JAW OD CHUCK JAW SET
1516	P07091516	4-JAW CHUCK 8" D1-5
1517	P07091517	4-JAW CHUCK REVERSIBLE JAW
1518	P07091518	4-JAW CHUCK WRENCH
1519	P07091519	FACEPLATE 11" D1-5
1522	P07091522	TOOL HOLDER 200-SERIES
1523	P07091523	SPINDLE SLEEVE MT#5-MT#3
1524	P07091524	DEAD CENTER MT#3 SOLID
1525	P07091525	DEAD CENTER MT#3 CARBIDE-TIPPED
1526	P07091526	LIVE CENTER MT#3
1527	P07091527	DRILL CHUCK ARBOR MT#3/B16
1528	P07091528	DRILL CHUCK B16 1.5-13MM
1529	P07091529	TAILSTOCK LEVER 1/2 DRIVE
1530	P07091530	TOOL HOLDER WRENCH

Labels Breakdown



REF	PART #	DESCRIPTION
1601	G8589	GRIZZLY NAMEPLATE-LARGE
1602	P07091602	MODEL NUMBER LABEL
1603	P07091603	GUNSMITH LATHE LABEL
1604	P07091604	MACHINE ID LABEL
1605	PSBLABEL08HS	ENTANGLEMENT LABEL 2.5 X 1.5
1606	PSBLABEL08VS	ENTANGLEMENT LABEL 1.5 X 2.5
1607	PLABEL-53A	DISCONNECT POWER 1.5W X 2.5H

REF	PART #	DESCRIPTION
1608	PLABEL-12C	READ MANUAL 1.5W X 2.5H
1609	PLABEL-11B	SAFETY GLASSES 1.5W X 2.5H
1610	PSBLABEL15S	ELECTRICITY LABEL 1.4
1611	P07091611	SPIDER ENTANGLEMENT LABEL
1612	PPAINT-1	N/S GRIZZLY GREEN
1613	PPAINT-11	GREY PUTTY REF

⚠WARNING

Safety labels warn about machine hazards and ways to prevent injury. The owner of this machine MUST maintain the original location and readability of the labels on the machine. If any label is removed or becomes unreadable, REPLACE that label before using the machine again. Contact Grizzly at (800) 523-4777 or www.grizzly.com to order new labels.

WARRANTY CARD

Name _____

Street _____

City _____ State _____ Zip _____

Phone # _____ Email _____ Invoice # _____

Model # _____ Order # _____ Serial # _____

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

1. How did you learn about us?

____ Advertisement ____ Friend ____ Catalog
____ Card Deck ____ Website ____ Other:

2. Which of the following magazines do you subscribe to?

____ Cabinetmaker & FDM
____ Family Handyman
____ Hand Loader
____ Handy
____ Home Shop Machinist
____ Journal of Light Cont.
____ Live Steam
____ Model Airplane News
____ Old House Journal
____ Popular Mechanics
____ Popular Science
____ Popular Woodworking
____ Precision Shooter
____ Projects in Metal
____ RC Modeler
____ Rifle
____ Shop Notes
____ Shotgun News
____ Today's Homeowner
____ Wood
____ Wooden Boat
____ Woodshop News
____ Woodsmith
____ Woodwork
____ Woodworker West
____ Woodworker's Journal
____ Other:

3. What is your annual household income?

____ $20,000-$29,000 ____ $30,000-$39,000 ____ $40,000-$49,000
____ $50,000-$59,000 ____ $60,000-$69,000 ____ $70,000+

4. What is your age group?

____ 20-29 ____ 30-39 ____ 40-49
____ 50-59 ____ 60-69 ____ 70+

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

____ 0-2 Years ____ 2-8 Years ____ 8-20 Years ____ 20+ Years

6. How many of your machines or tools are Grizzly?

____ 0-2 ____ 3-5 ____ 6-9 ____ 10+

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

8. Would you recommend Grizzly Industrial to a friend? _____Yes _____No

9. Would you allow us to use your name as a reference for Grizzly customers in your area?
Note: *We never use names more than 3 times.* _____Yes _____No

10. Comments: _____

_____

_____

_____

CUT ALONG DOTTED LINE

FOLD ALONG DOTTED LINE

Place
Stamp
Here

GRIZZLY INDUSTRIAL, INC.
P.O. BOX 2069
BELLINGHAM, WA 98227-2069

FOLD ALONG DOTTED LINE

Send a Grizzly Catalog to a friend:

Name_____

Street_____

City_____State_____Zip_____

TAPE ALONG EDGES--PLEASE DO NOT STAPLE

WARRANTY AND 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.

To take advantage of 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.

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.

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.