MODEL SB1049F HEAVY-13
13" X 30" GEARHEAD LATHE w/DRO
Manual Insert

PHONE: (360) 734-1540 • www.southbendlathe.com

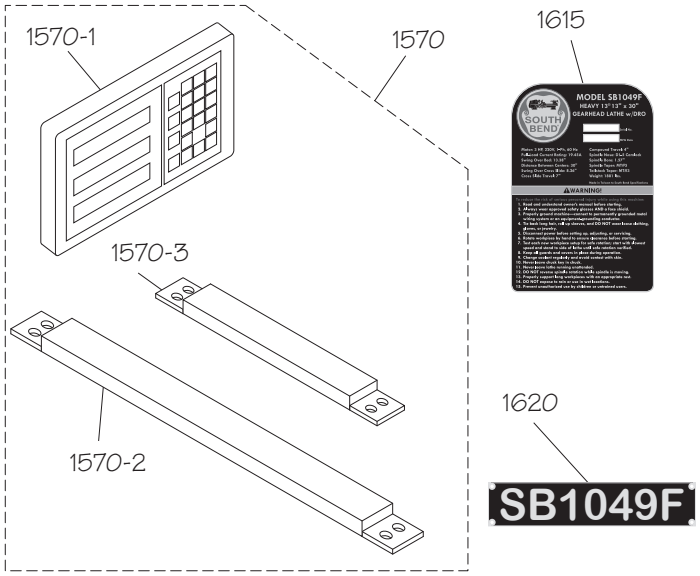
The Model SB1049F Lathe is the same machine as the Model SB1049 except for the following:

- Added a 2-Axis Fagor Digital Readout (DRO).

Except for the differences noted in this insert, all other content in the Model SB1049 Owner's Manual applies to this machine. Before operating your new lathe, you MUST read and understand this insert, the entire Model SB1049 Owner's Manual, and the Fagor DRO Owner's Manual to reduce the risk of injury when using this machine. Keep this insert for later reference.

If you have any further questions about this manual insert or the differences between the Model SB1049F and the Model SB1049, contact our Technical Support at (360) 734-1540 or email sales@southbendlathe.com.

New & Changed Parts



REF	PART #	DESCRIPTION
1570	PSB1049F1570	DRO ASSEMBLY FAGOR 2-AXIS
1570-1	PSB1049F1570-1	DRO DISPLAY FAGOR 20-iT
1570-2	PSB1049F1570-2	DRO X-AXIS SCALE FAGOR MKT-102

REF	PART #	DESCRIPTION
1570-3	PSB1049F1570-3	DRO Y-AXIS SCALE FAGOR MKT-27
1615	PSB1049F1615	MACHINE ID LABEL
1620	PSB1049F1620	MODEL NUMBER BRASS PLATE

#TS16215 Printed in Taiwan **V1.12.13**

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Product Specifications

Model SB1049F
Heavy 13 - 13" x 30" Gearhead Lathe with Fagor DRO

Product Dimensions

Weight	1881 lbs.
Width (side-to-side) x Depth (front-to-back) x Height	90 x 38 x 69 in.
Footprint (Length x Width)	80-3/4 x 19-1/2 in.

Shipping Dimensions

Type	Wood Crate
Content	Machine
Weight	2472 lbs.
Length x Width x Height	43 x 78 x 73 in.

Electrical

Power Requirement	220V, Single-Phase, 60 Hz
Full-Load Current Rating	19.45A
Minimum Circuit Size	30A
Connection Type	Cord & Plug
Power Cord Included	No
Recommended Power Cord	"S"-Type, 3-Wire, 12 AWG, 300 VAC
Plug Included	No
Recommended Plug Type	L6-30
Switch Type	Control Panel w/Magnetic Switch Protection

Motors

Main

Type	TEFC Capacitor-Start Induction
Horsepower	3 HP
Phase	Single-Phase
Amps	19A
Speed	1725 RPM
Power Transfer	V-Belt Drive
Bearings	Shielded & Permanently Lubricated

Coolant Pump

Type	TEFC Capacitor-Start Induction (Class F)
Horsepower	1/8 HP
Phase	Single-Phase
Amps	0.45A
Speed	3450 RPM
Power Transfer	Direct Drive
Bearings	Shielded & Permanently Lubricated

Main Specifications

Operation Info

Swing Over Bed	13.38 in.
Distance Between Centers	30 in.
Max Weight Between Centers	440 lbs.
Swing Over Cross Slide	8.26 in.
Swing Over Saddle	11.02 in.
Swing Over Gap	20 in.
Maximum Tool Bit Size	3/4 in.
Compound Travel	4 in.
Carriage Travel	26-1/2 in.
Cross Slide Travel	7 in.

Headstock Info

Spindle Bore	1.57 in.
Spindle Size	MT#5
Number of Spindle Speeds	8
Spindle Speeds	80 – 2000 RPM
Spindle Type	D1-5 Camlock
Spindle Bearings	Tapered Roller
Spindle Length	20-7/8 in.
Spindle Length with 3-Jaw Chuck	27 in.
Spindle Length with 4-Jaw Chuck	25 in.
Spindle Length with Faceplate	22-1/2 in.

Tailstock Info

Tailstock Quill Travel	4-1/2 in.
Tailstock Taper	MT#3
Tailstock Barrel Diameter	1.968 in.

Threading Info

Number of Longitudinal Feeds	17
Range of Longitudinal Feeds	0.002 – 0.067 in./rev.
Number of Cross Feeds	17
Range of Cross Feeds	0.001 – 0.034 in./rev.
Number of Inch Threads	45
Range of Inch Threads	2 – 72 TPI
Number of Metric Threads	39
Range of Metric Threads	0.2 – 14.0 mm
Number of Modular Pitches	18
Range of Modular Pitches	0.3 – 3.5 MP
Number of Diametral Pitches	21
Range of Diametral Pitches	8 – 44 DP

Dimensions

Bed Width	9 in.
Leadscrew Diameter	1-1/8 in.
Leadscrew TPI	4 TPI
Leadscrew Length	59 in.
Steady Rest Capacity	5/16 – 4-5/16 in.
Follow Rest Capacity	5/8 – 3-1/8 in.
Faceplate Size	10 in.
Feed Rod Diameter	3/4 in.
Floor to Center Height	42-1/4 in.
Height With Leveling Jacks	59 in.

Construction

Base	Cast Iron
Headstock	Cast Iron
End Gears	Flame Hardened Steel
Bed	Induction-Hardened, Precision-Ground Meehanite Cast Iron
Body	Cast Iron
Stand	Cast Iron
Paint	Urethane

Fluid Capacities

Headstock Capacity	6.4 qt.
Headstock Fluid Type	ISO 32 (eg. Grizzly T23963, Mobil DTE Light)
Gearbox Capacity	1.4 qt.
Gearbox Fluid Type	ISO 68 (eg. Grizzly T23962, Mobil Vactra 2)
Apron Capacity	1.2 qt.
Apron Fluid Type	ISO 68 (eg. Grizzly T23962, Mobil Vactra 2)
Coolant Capacity	11.1 qt.

Other

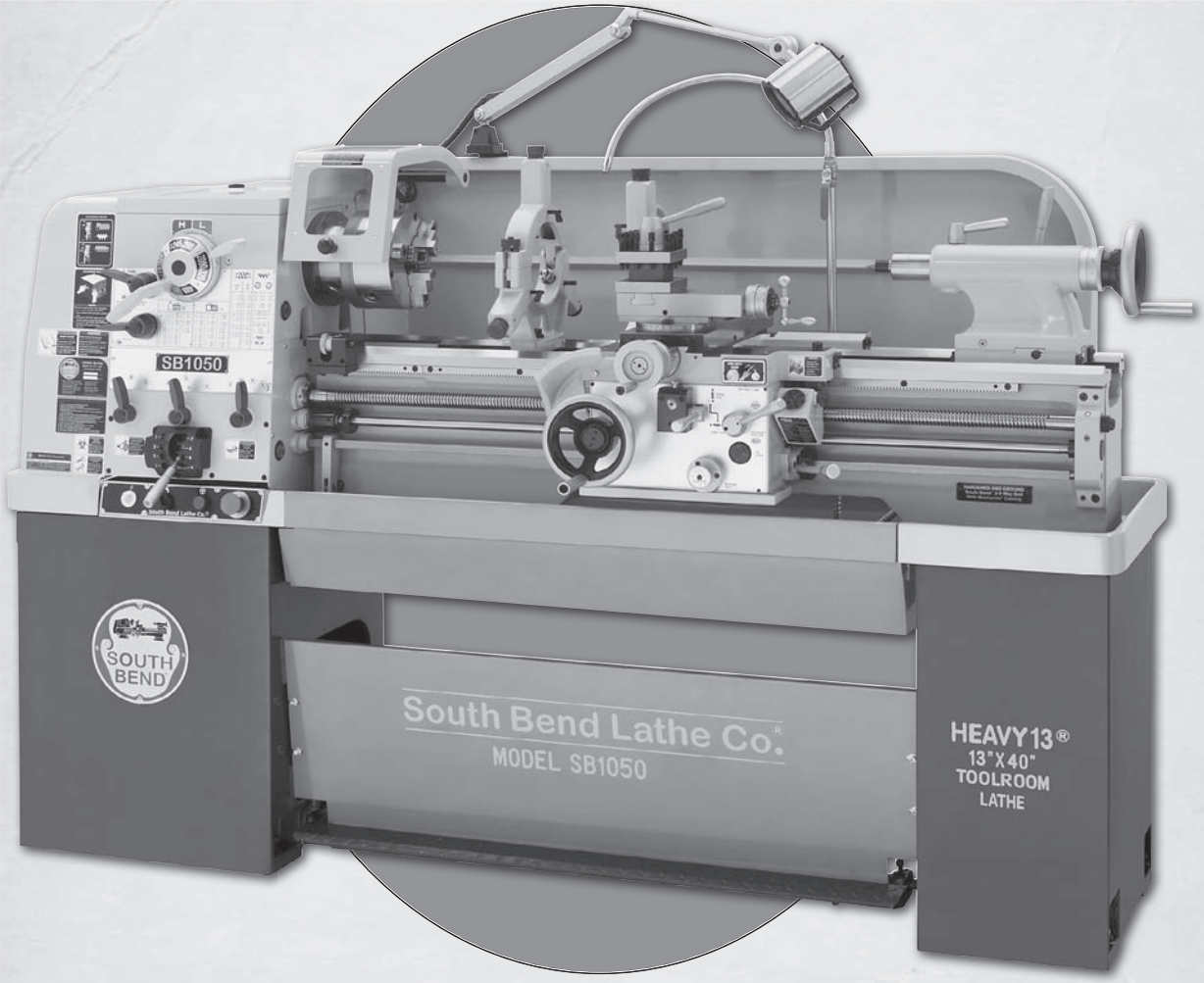
Country Of Origin	Taiwan
Warranty	1 Year
Approximate Assembly & Setup Time	1 Hour
Serial Number Location	ID Label on Rear Side of Left Stand
Sound Rating	71 dB
ISO 9001 Factory	No
CSA Certified	No

Features

Allen Bradley Electrical Components
Signature South Bend 3 V-Way Bed
Safety Chuck Guard with Micro-Switch Shut-Off
Meehanite Castings with Induction-Hardened Ways
Halogen Work Light
4-Way Tool Post
Complete Coolant System
Micrometer Carriage Stop
Threading Dial Indicator
NSK or NTN Japanese Spindle Bearings
Full Length Splash Guard with Rounded Corner
Front Removable Sliding Chip Tray
Completely Enclosed Universal Gearbox for Cutting Inch, Metric, Modular and Diametral Pitches
Jog Button and Emergency Stop
Foot Brake
Headstock Gears Run in and Oil Bath
Fagor DRO

13" HEAVY 13® GEARHEAD LATHE

MODEL SB1049 13" X 30"
MODEL SB1050 13" X 40"



OWNER'S MANUAL

South Bend Lathe Co.®

Hundreds of Thousands of Lathes Sold With a Tradition of Quality Since 1906!

For Machines Mfg. Since 5/11

Scope of Manual

This manual helps the reader understand the machine, how to prepare it for operation, how to control it during operation, and how to keep it in good working condition. We assume the reader has a basic understanding of how to operate this type of machine, but that the reader is not familiar with the controls and adjustments of this specific model. As with all machinery of this nature, learning the nuances of operation is a process that happens through training and experience. If you are not an experienced operator of this type of machinery, read through this entire manual, then learn more from an experienced operator, schooling, or research before attempting operations. Following this advice will help you avoid serious personal injury and get the best results from your work.

Manual Feedback

We've made every effort to be accurate when documenting this machine. However, errors sometimes happen or the machine design changes after the documentation process—so the manual may not exactly match your machine. If a difference between the manual and machine leaves you in doubt, contact our customer service for clarification.

We highly value customer feedback on our manuals. If you have a moment, please share your experience using this manual. What did you like about it? Is there anything you would change to make it better? Did it meet your expectations for clarity, professionalism, and ease-of-use?

South Bend Lathe, Inc.
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Updates

For your convenience, any updates to this manual will be available to download free of charge through our website at:

www.southbendlathe.com

Customer Service

We stand behind our machines. If you have any service questions, parts requests or general questions about your purchase, feel free to contact us.

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Table of Contents

About This Machine

Foreword

"*The screw cutting engine lathe is the oldest and most important of machine tools and from it all other machine tools have been developed. It was the lathe that made possible the building of the steamboat, the locomotive, the electric motor, the automobile and all kinds of machinery used in industry. Without the lathe our great industrial progress of the last century would have been impossible.*" —**How To Run a Lathe**, 15th Edition, South Bend Lathe.

The lathe represented in this manual is a modern day version of the screw cutting lathes that trace their roots back to the 1700's, which were themselves technological improvements of the bow lathe that can be traced back thousands of years to the ancient Egyptians.

Now, almost 300 years later, these modern "screw cutting" lathes are not just a piece of refined machinery, but a culmination of human ingenuity and knowledge embodied into the design and synergy of thousands of interworking parts—some of which represent the life's work and dreams of many inventors, mechanical engineers, and world-class machinists—including the likes of Leonardo da Vinci, Henry Maudsley, and the founders of South Bend Lathe, John and Miles O'Brien.

And now the torch is passed to you—to take the oldest and most important type of machine tool—and carry on the tradition. As the operator of a South Bend Lathe, you now join the ranks of some very famous and important customers, such as Henry Ford, who used the machines he purchased to help him change the world.

Capabilities

This Heavy 13® Gearhead Lathe is built for daily use in a busy industrial setting. Loaded with many nice features and high-precision parts, this lathe excels at making fine tools, dies, thread gauges, jigs, and precision test gauges—however, it is by no means delicate. Thick castings, heavy weight, and quality construction throughout provide the necessary brawn for demanding production and manufacturing tasks.

Features

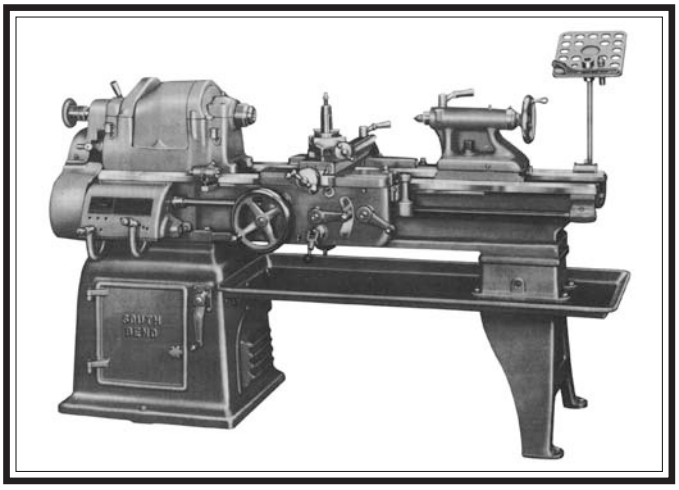
These Heavy 13® Gearhead Lathes are packed with standard features and equipment, such as a complete coolant system, easy-to-clean chip drawer, one-shot way lubrication system, included steady and follow rests, chuck guard, adjustable work lamp, foot brake, powered cross feed, 3- and 4-jaw chucks, faceplate, and premium Allen-Bradley contactors, thermal relays, and fuse system.

Spindle speeds are controlled by convenient headstock levers, which allow the operator to quickly set the spindle speed within the available range of 80–2000 RPM.

The beds of these lathes are constructed with Meehanite castings that are hardened and precision-ground in the traditional three V-way prismatic design—long used on South Bend Lathes for its accuracy, durability, and rigidity.

The headstocks feature quick-change gear levers and the carriages include an adjustable clutch that disables automatic carriage feed when it contacts the included feed stop or in the event of a crash.

To further ensure a high degree of accuracy, these lathes are equipped with Japanese spindle bearings. The spindles are D1-5 camlock with an MT#5 taper and 1.57" bore. The tailstocks have an MT#3 taper and 4.5" of quill travel.



South Bend Precision Toolroom Lathe
(*Circa 1958*)

General Identification

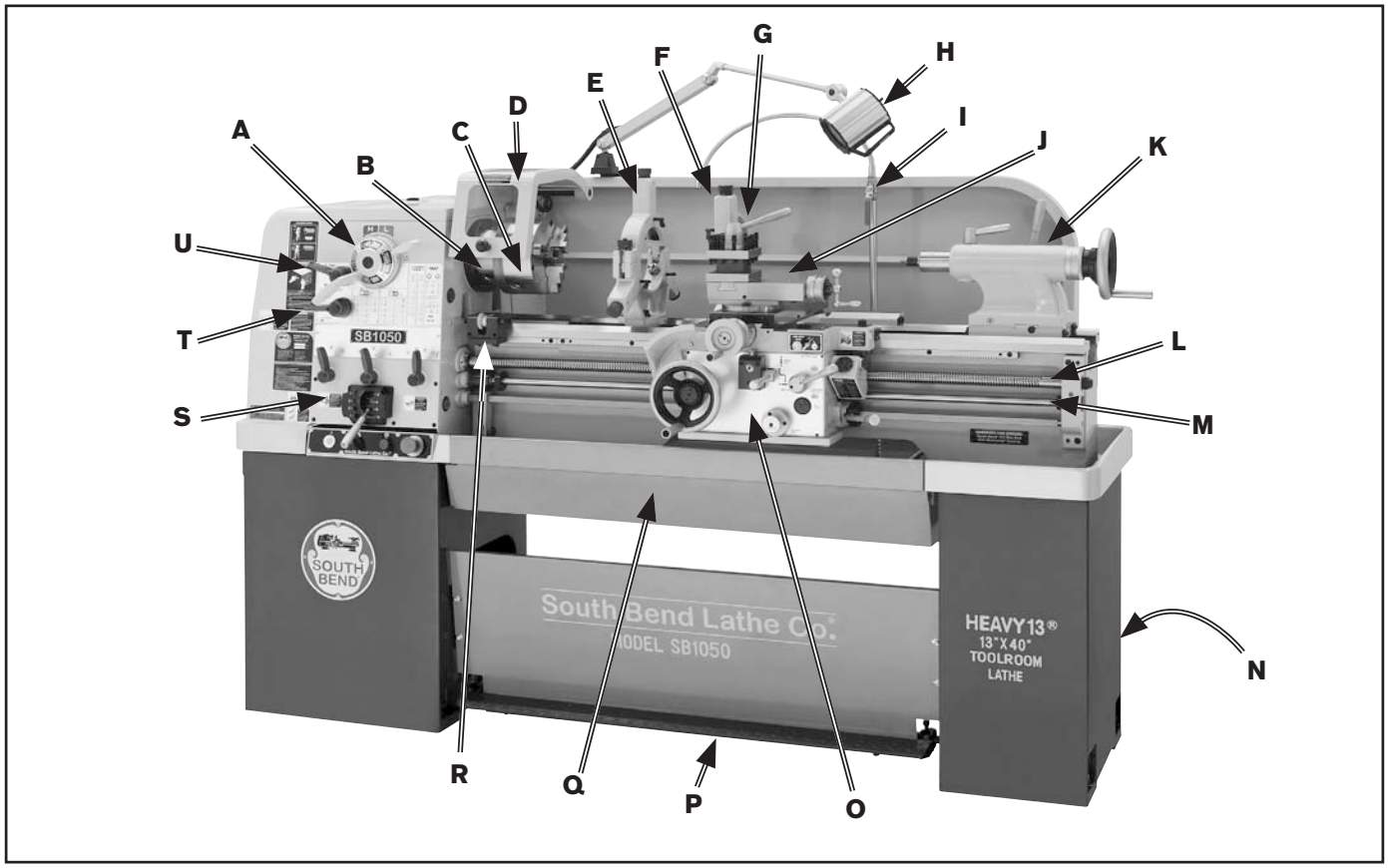


Figure 1. Identification.

- **A.** Spindle Speed Levers (see **Page 50** for details)
- **B.** D1-5 Camlock MT#5 Spindle
- **C.** 3-Jaw Chuck 8"
- **D.** Chuck Guard w/Safety Switch
- **E.** Steady Rest
- **F.** Follow Rest
- **G.** 4-Way Tool Post
- **H.** Halogen Work Lamp
- **I.** Coolant Nozzle & Valve
- **J.** Compound Rest
- **K.** Tailstock (see **Page 7** for details)
- **L.** Longitudinal Leadscrew
- **M.** Feed Rod
- **N.** Coolant Reservoir & Pump Access
- **O.** Carriage (see **Page 6** for details)
- **P.** Safety Foot Brake
- **Q.** Chip Drawer
- **R.** Micrometer Stop
- **S.** Quick-Change Gearbox Controls (see **Page 5** for details)
- **T.** Headstock Feed Direction Lever
- **U.** Gearbox Range Lever

⚠WARNING

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

⚠WARNING

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

Controls & Components

Refer to **Figures 2–6** and the following descriptions to become familiar with the basic controls of this lathe.

Master Power Switch

The rotary switch shown in **Figure 2** toggles incoming power ON and OFF to the lathe controls. It also prevents the electrical cabinet door from being opened when the switch is ***ON***.

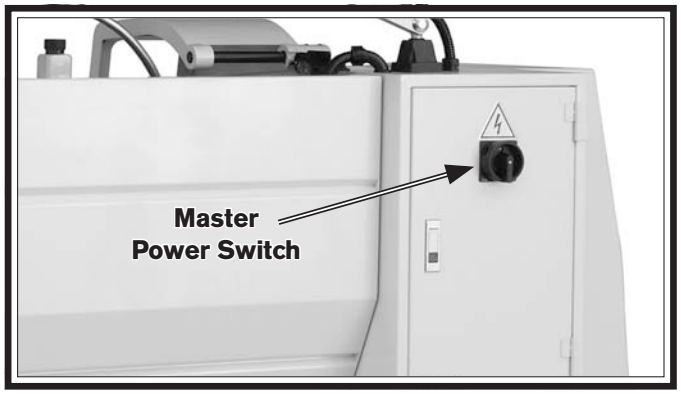


Figure 2. Location of the master power switch.

Headstock

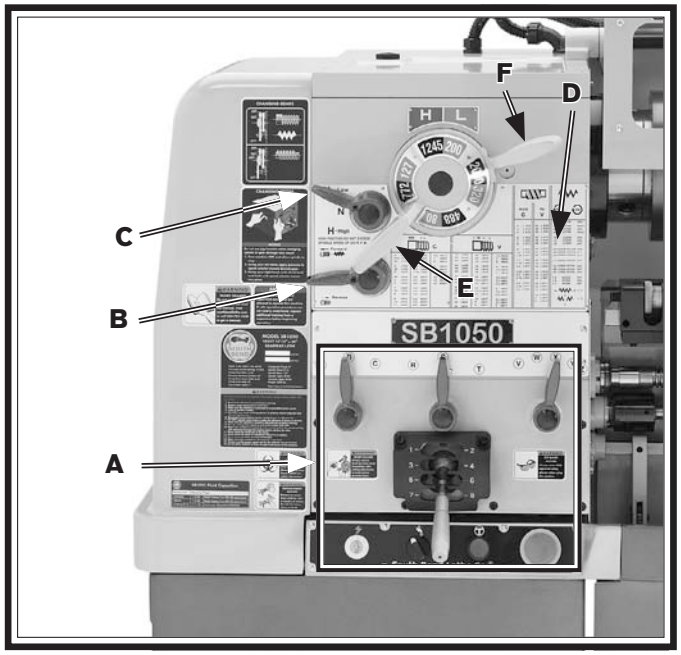


Figure 3. Headstock controls.

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

B. Headstock Feed Direction Lever: Controls the direction that the leadscrew and feed rod rotate.

C. Gearbox Range Lever: Shifts the quick-change gearbox into low range, neutral, or high range.

D. Threading and Feed Charts: Display the necessary configuration of the gearbox levers and end gears for different threading or feeding options.

E. Spindle Speed Lever: Selects one of the four available spindle speeds within the selected speed range.

F. Spindle Range Lever: Selects the spindle speed high range (to the left) or the low range (to the right).

Control Panel

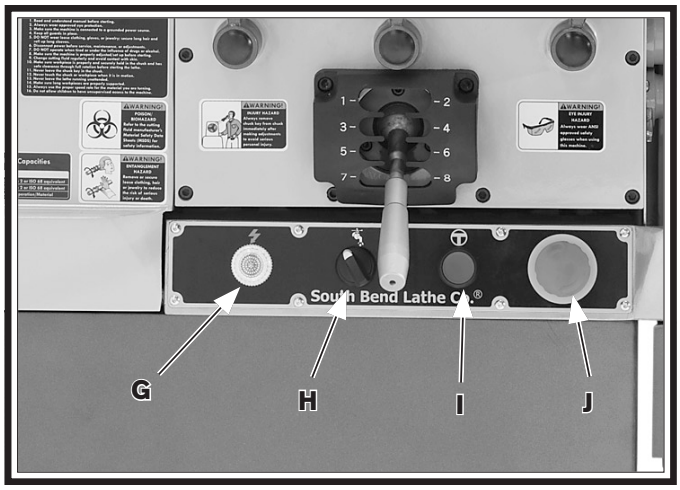


Figure 4. Control panel.

G. Power Light: Illuminates when lathe controls are receiving power.

H. Coolant Pump Switch: Controls the coolant pump motor.

I. Jog Button: Starts forward spindle rotation as long as it is pressed.

J. STOP Button: Stops all machine functions. Twist clockwise to reset.

Carriage

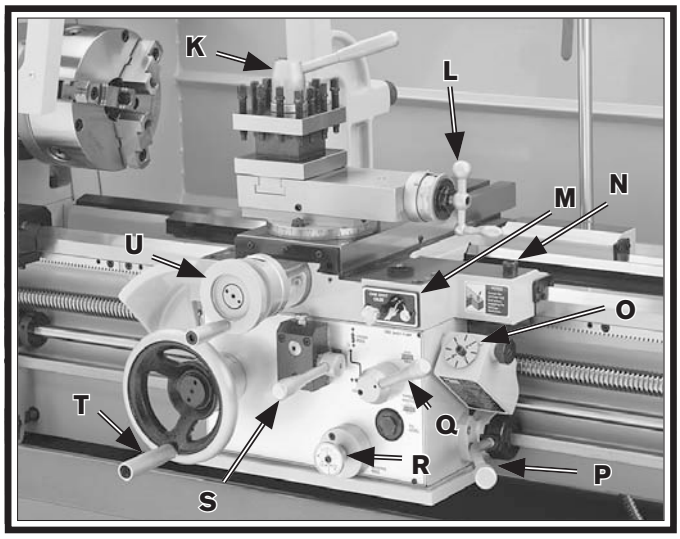


Figure 5. Carriage controls.

K. 4-Way Tool Post: Mounts up to four cutting tools at once that can be individually indexed to the workpiece.

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

M. One-Shot Oiler: Draws oil from the apron reservoir to lubricate the carriage ways through various oil ports.

N. Carriage Lock: Secures the carriage in place when to ensure accuracy during operations where it should not move.

O. Thread Dial and Chart: Dial indicates when to engage the half nut during inch threading operations. Chart indicates which thread dial reading to engage the half nut for specific inch thread pitches.

P. Spindle Lever: Starts and stops spindle rotation in either direction.

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

R. Apron Feed Direction Knob: Changes direction of the carriage or the cross slide feed without having to stop the lathe and move the headstock feed direction lever.

S. Feed Selection Lever: Selects the carriage or cross slide for power feed operations.

T. Carriage Handwheel: Moves the carriage along the bed.

U. Cross Slide Handwheel: Moves the cross slide toward and away from the workpiece.

Tailstock

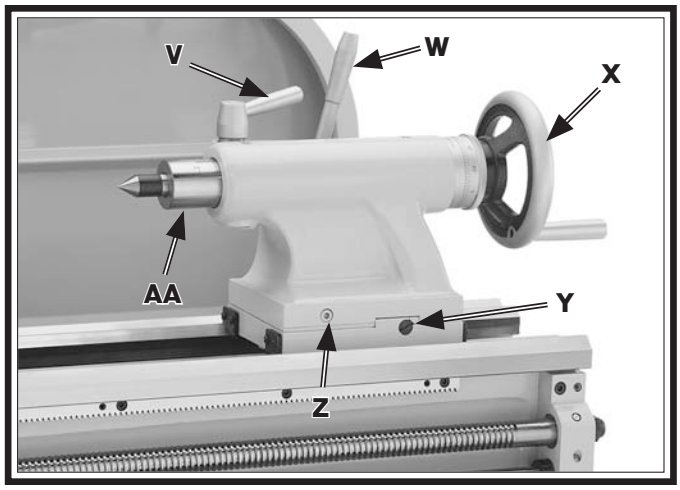


Figure 6. Tailstock controls.

V. Quill Lock Lever: Secures the quill in position.

W. Tailstock Lock Lever: Secures the tailstock in position along the bedway.

X. Quill Handwheel: Moves the quill toward or away from the spindle.

Y. Gib Adjustment Screw: Adjusts the tapered gib to control tailstock offset accuracy (1 of 2).

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

AA. Quill: Moves toward and away from the spindle and holds centers and tooling.

End Gears

Configuring the end gears shown in **Figure 7** will control the speed of the leadscrew for threading or the feed rod for power feed operations. The rotational speed of these components depends not only on the end gear configuration, but the spindle speed as well.

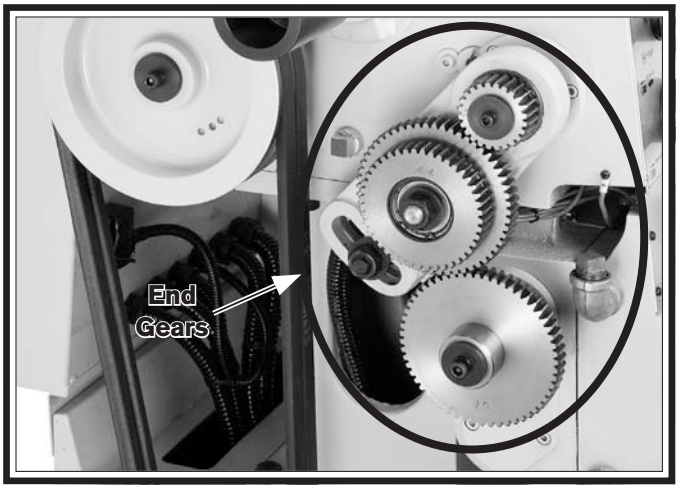


Figure 7. End gear components.

Safety Foot Brake

This lathe is equipped with a foot brake (see **Figure 8**) to quickly stop the spindle instead of allowing the spindle to coast to a stop on its own. Pushing the foot brake while the spindle is ***ON*** cuts power to the motor and stops the spindle.

After the foot brake is used, the spindle lever must be returned to the OFF (middle) position to reset the spindle switches before re-starting spindle rotation.

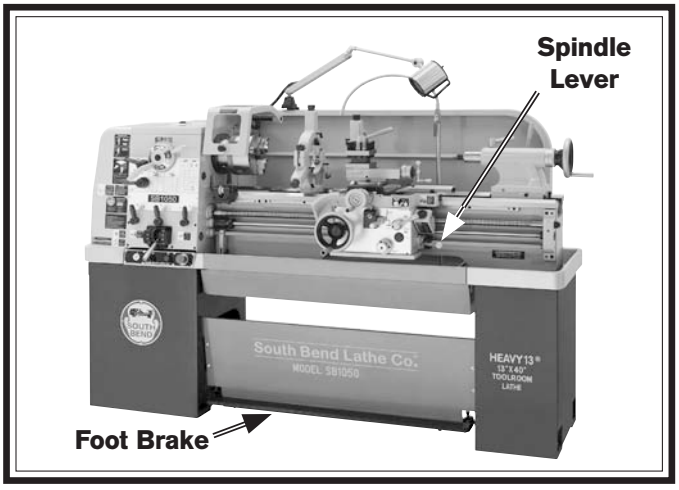


Figure 8. Foot brake and spindle lever.

Product Specifications

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MODEL SB1049 & SB1050
13" HEAVY 13® GEARHEAD LATHES

Model Number	SB1049	SB1050
Product Dimensions		
Weight	1870 lbs.	2205 lbs.
Width (side-to-side)/Depth (front-to-back)/Height	79" x 38" x 69"	90" x 38" x 69"
Foot Print (Width/Depth)	69¾" x 19½"	80¾" x 19½"
Shipping Dimensions		
Type	Wood Slat Crate	
Weight	2090 lbs.	2469 lbs.
Width (side-to-side)/Depth (front-to-back)/Height	79 x 38 x 69	79" x 45" x 69"
Electrical		
Power Requirement	220V, Single-Phase, 60Hz	
Full-Load Current Rating	19.5A	
Minimum Circuit Size	30A	
Switch	Magnetic with Thermal Protection	
Switch Voltage	220V	
Plug Included	No	
Recommended Plug/Outlet Type	NEMA L6-30	

Model Number	SB1049	SB1050
Main Motor		
Type	TEFC Induction	
Horsepower	3 HP	
Voltage	220V	
Phase	Single-Phase	
Amps	19A	
Speed	1720	
Cycle	60 Hz	
Power Transfer	V-Belt & Gear	
Bearings	Shielded & Permanently Sealed	
Coolant Motor		
Type	TEFC Induction	
Horsepower	⅛ HP	
Voltage	220V	
Phase	Single-Phase	
Amps	0.45A	
Speed	3450 RPM	
Cycle	60 Hz	
Power Transfer	Direct Drive	
Bearings	Shielded & Permanently Sealed	Shielded & Permanently Sealed
Operation Information		
Swing Over Bed	13.38"	
Distance Between Centers	30"	40"
Swing Over Cross Slide	8.26"	
Swing Over Saddle	11.02"	
Swing Over Gap	N/A	20"
Maximum Tool Bit Size	0.75"	
Compound Travel	4"	
Carriage Travel	36.5"	
Cross Slide Travel	7"	

Model Number	SB1049	SB1050
Headstock Information		
Spindle Bore	1.57"	
Spindle Taper	MT#5	
Number of Spindle Speeds	8	
Range of Spindle Speeds	80–2000 RPM	
Spindle Type	D1-5 Camlock	
Spindle Bearings	Tapered Roller	
Tailstock Information		
Tailstock Quill Travel	4.5"	
Tailstock Taper	MT#3	
Tailstock Barrel Diameter	1.968"	
Threading Information		
Number of Longitudinal Feeds	17	
Range of Longitudinal Feeds	0.002"–0.067"	
Number of Cross Feeds	17	
Range of Cross Feeds	0.001"–0.034"	
Number of Inch Threads	45	
Range of Inch Threads	2–72 TPI	
Number of Metric Threads	39	
Range of Metric Threads	0.2–14 mm	
Number of Modular Pitches	18	
Range of Modular Pitches	0.3–3.5 MP	
Number of Diametral Pitches	21	
Range of Diametral Pitches	8–44 DP	
Dimensions		
Bed Width	9"	
Leadscrew Diameter	1⅛"	
Leadscrew TPI	4 TPI	
Leadscrew Length	47"	59"
Steady Rest Capacity	5/16"–4 5/16"	
Follow Rest Capacity	⅝"–3⅛"	
Faceplate Size	10"	
Feed Rod Diameter	¾"	
Floor to Center Height	42.2"	
Height With Leveling Jacks	59.06"	

Model Number	SB1049	SB1050
Construction		
Headstock	Cast Iron	
Headstock Gears	Flame-Hardened Steel	
Bed	Meehanite Castings with Precision Hardened-and-Ground Ways	
Stand	Cast Iron	
Paint	Urethane	
Other		
Country of Origin	Taiwan (Some Components Made in USA & Japan)	
Warranty	1 Year	
Serial Number Location	ID Label on Front of Headstock	
Assembly Time	Approximately 1½ Hours	
Sound Rating at Idle	71 dB	

Understanding Risks of Machinery

Operating all machinery and machining equipment can be dangerous or relatively safe depending on how it is installed and maintained, and the operator's experience, common sense, risk awareness, working conditions, and use of personal protective equipment (safety glasses, respirators, etc.).

The owner of this machinery or equipment is ultimately responsible for its safe use. This responsibility includes proper installation in a safe environment, personnel training and usage authorization, regular inspection and maintenance, manual availability and comprehension, application of safety devices, integrity of cutting tools or accessories, and the usage of approved personal protective equipment by all operators and bystanders.

The manufacturer of this machinery or equipment will not be held liable for injury or property damage from negligence, improper training, machine modifications, or misuse. Failure to read, understand, and follow the manual and safety labels may result in serious personal injury, including amputation, broken bones, electrocution, or death.

The signals used in this manual to identify hazard levels are as follows:

⚠DANGER	***Death or catastrophic harm WILL occur.***	**⚠CAUTION**	***Moderate injury or fire MAY occur.***
⚠WARNING	***Death or catastrophic harm COULD occur.***	***NOTICE***	***Machine or property damage may occur.***

Basic Machine Safety

Owner's Manual: All machinery and machining equipment presents serious injury hazards to untrained users. To reduce the risk of injury, anyone who uses THIS item MUST read and understand this entire manual before starting.

Personal Protective Equipment: Operating or servicing this item may expose the user to flying debris, dust, smoke, dangerous chemicals, or loud noises. These hazards can result in eye injury, blindness, long-term respiratory damage, poisoning, cancer, reproductive harm or hearing loss. Reduce your risks from these hazards by wearing approved eye protection, respirator, gloves, or hearing protection.

Trained/Supervised Operators Only: Untrained users can seriously injure themselves or bystanders. Only allow trained and properly supervised personnel to operate this item. Make sure safe operation instructions are clearly understood. If electrically powered, use padlocks and master switches, and remove start switch keys to prevent unauthorized use or accidental starting.

Guards/Covers: Accidental contact with moving parts during operation may cause severe entanglement, impact, cutting, or crushing injuries. Reduce this risk by keeping any included guards/covers/doors installed, fully functional, and positioned for maximum protection.

Entanglement: Loose clothing, gloves, neckties, jewelry or long hair may get caught in moving parts, causing entanglement, amputation, crushing, or strangulation. Reduce this risk by removing/securing these items so they cannot contact moving parts.

Mental Alertness: Operating this item with reduced mental alertness increases the risk of accidental injury. Do not let a temporary influence or distraction lead to a permanent disability! Never operate when under the influence of drugs/alcohol, when tired, or otherwise distracted.

Safe Environment: Operating electrically powered equipment in a wet environment may result in electrocution; operating near highly flammable materials may result in a fire or explosion. Only operate this item in a dry location that is free from flammable materials.

Electrical Connection: With electically powered equipment, improper connections to the power source may result in electrocution or fire. Always adhere to all electrical requirements and applicable codes when connecting to the power source. Have all work inspected by a qualified electrician to minimize risk.

Disconnect Power: Adjusting or servicing electrically powered equipment while it is connected to the power source greatly increases the risk of injury from accidental startup. Always disconnect power BEFORE any service or adjustments, including changing blades or other tooling.

Secure Workpiece/Tooling: Loose workpieces, cutting tools, or rotating spindles can become dangerous projectiles if not secured or if they hit another object during operation. Reduce the risk of this hazard by verifying that all fastening devices are properly secured and items attached to spindles have enough clearance to safely rotate.

Chuck Keys or Adjusting Tools: Tools used to adjust spindles, chucks, or any moving/ rotating parts will become dangerous projectiles if left in place when the machine is started. Reduce this risk by developing the habit of always removing these tools immediately after using them.

Work Area: Clutter and dark shadows increase the risks of accidental injury. Only operate this item in a clean, non-glaring, and well-lighted work area.

Properly Functioning Equipment: Poorly maintained, damaged, or malfunctioning equipment has higher risks of causing serious personal injury compared to those that are properly maintained. To reduce this risk, always maintain this item to the highest standards and promptly repair/service a damaged or malfunctioning component. Always follow the maintenance instructions included in this documentation.

Unattended Operation: Electrically powered equipment that is left unattended while running cannot be controlled and is dangerous to bystanders. Always turn the power ***OFF*** before walking away.

Health Hazards: Certain cutting fluids and lubricants, or dust/smoke created when cutting, may contain chemicals known to the State of California to cause cancer, respiratory problems, birth defects, or other reproductive harm. Minimize exposure to these chemicals by wearing approved personal protective equipment and operating in a well ventilated area.

Difficult Operations: Attempting difficult operations with which you are unfamiliar increases the risk of injury. If you experience difficulties performing the intended operation, STOP! Seek an alternative method to accomplish the same task, ask a qualified expert how the operation should be performed, or contact our Technical Support for assistance.

Additional Metal Lathe Safety

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 injuries. Large or non-concentric workpieces must be turned at slow speeds. Always use the appropriate feed and speed rates.

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 machine.

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.

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.

Securing Workpiece. An improperly secured workpiece can fly off the lathe spindle with deadly force, which can result in a severe impact injury. Make sure the workpiece is properly secured in the chuck or faceplate before starting the lathe.

Chucks. Chucks are very heavy and difficult to grasp, which can lead to crushed fingers or hands if mishandled. Get assistance when handling chucks to reduce this risk. Protect your hands and the precision-ground ways by using a chuck cradle or piece of plywood over the ways of the lathe when servicing chucks. Use lifting devices when necessary.

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.

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.

Crashes. Aggressively driving the cutting tool or other lathe components into the chuck may cause an explosion of metal fragments, which can result in severe impact injuries and major damage to the lathe. Reduce this risk by releasing automatic feeds after use, not leaving lathe unattended during operation, and checking clearances before starting the lathe. Make sure no part of the tool, tool holder, compound rest, cross slide, or carriage will contact the chuck during operation.

Coolant Safety. Coolant is a very poisonous biohazard that can cause personal injury from skin contact alone, especially when it gets old or has been well-used. Incorrectly positioned coolant nozzles can splash on the operator or the floor, resulting in skin exposure or a slipping hazard. To decrease your risk, change coolant regularly and position the nozzle where it will not splash or end up on the floor.

Tool Selection. Cutting with an incorrect or dull tool increases the risk of accidental injury due to the extra force required for the operation, which increases the risk of breaking or dislodging components that can cause small shards of metal to become dangerous projectiles. Always select the right cutter for the job and make sure it is sharp. Using a correct, sharp tool decreases strain and provides a better finish.

Additional Chuck Safety

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

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

Using Correct Equipment. Many workpieces can only be safely turned in a lathe if additional support equipment, such as a tailstock or steady rest, is used. If the operation is too hazardous to be completed with the lathe or existing equipment, the operator must have enough experience to know when to use a different machine or find a safer way. If you do not have this experience, seek additional training (outside of this manual) from experienced lathe operators, books, or formal classes

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

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

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

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

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

Preparation Overview

The purpose of the preparation section is to help you prepare your machine for operation. The list below outlines this basic process. Specific steps for each of these points will be covered in detail later in this section.

The typical preparation process is as follows:

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

Things You'll Need

To complete the preparation process, you will need the following items:

For Lifting and Moving

- A forklift or other power lifting device rated for at least 25% more than the shipping weight of the lathe (see **Product Specifications** beginning on **Page 1**)
- Lifting straps, each rated for at least 25% more than the shipping weight of the lathe
- Guide rods for steading the load when lifting
- Two other people for assistance when moving machine
- Hardwood blocks (see **Page 22**)

For Power Connection

- A power source that meets the minimum circuit requirements for this machine (review **Power Supply Requirements** on the next page for details)
- An electrician or qualified service personnel to ensure a safe and code-compliant connection to the power source

For Cleaning & Assembly

- Cotton rags
- Mineral spirits
- Quality metal protectant oil
- Safety glasses
- Wrench or socket 21mm
- Wrench or socket 19mm
- Floor mounting hardware as needed
- Precision level
- Standard screwdriver #2

Power Supply Requirements

Availability

Before installing the machine, consider the availability and proximity of the required power supply circuit. If an existing circuit does not meet the requirements for this machine, a new circuit must be installed.

To minimize the risk of electrocution, fire, or equipment damage, installation work and electrical wiring must be done by an electrician or qualified service personnel in accordance with all applicable codes.

⚠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.

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.

SB1049 Full-Load Rating ..... 19.5 Amps
SB1050 Full-Load Rating ..... 19.5 Amps

⚠CAUTION

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

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

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 ..... Single-Phase
Circuit Rating..... 30 Amps
Cord ....."S" Type, 3-Wire, 12 AWG, 300 VAC
Plug/Receptacle ..... NEMA L6-30

A power supply circuit includes all electrical equipment between the main breaker box or fuse panel in your building and the incoming power connections inside the machine. This circuit must be safely sized to handle the full-load current that may be drawn from the machine for an extended period of time. (If this machine is

Note: The circuit requirements in this manual are for 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 the circuit is properly sized.

Grounding Requirements

This machine must be grounded! In the event of certain types of malfunctions or breakdowns, grounding provides a path of least resistance for electric current in order to reduce the risk of electric shock.

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 is necessary, do not connect the equipment-grounding wire to a live (current carrying) terminal.

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

The power cord and plug specified under **Circuit Requirements** section 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 9**).

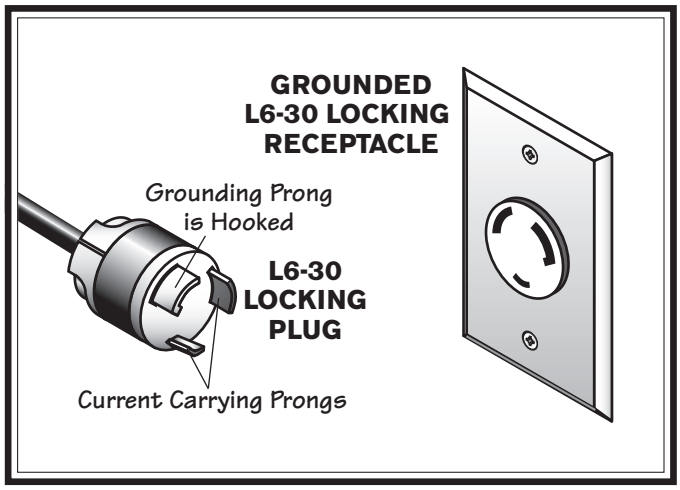


Figure 9. Typical NEMA L6-30 plug and receptacle.

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

Unpacking

This item was carefully packaged to prevent damage during transport. If you discover any damage, please immediately call Customer Service at (360) 734-1540 for advice. You may need to file a freight claim, so save the containers and all packing materials for possible inspection by the carrier or its agent.

Inventory

Main Inventory 1: (Figure 10)		Qty
A.	Steady Rest Assembly (Installed)	1
B.	10" Faceplate w/D1-5 Camlock Stud Set	1
C.	8" 4-Jaw Chuck w/Combo Jaws (SB1226)	1
D.	3-Jaw Chuck Key	1
E.	4-Jaw Chuck Key	1
F.	Follow Rest Assembly (Installed)	1

Tool Box Inventory: (Figure 11)		Qty
G.	Tool Box	1
H.	Open End Wrench 22/24mm	1
I.	Open End Wrench 14/17mm	1
J.	Open End Wrench 10/12mm	1
K.	Phillips Screwdriver #2	1
L.	Standard Screwdriver #2	1
M.	Hex Wrench 8mm	1
N.	Tapered Spindle Sleeve MT#5-#3	1
O.	Dead Center MT#3	1
P.	Carbide-Tipped Dead Center MT#3	1
Q.	Camlock Key D1-5	1
R.	Tool Post T-Wrench (Clamped on Tool Post)	1
S.	Hex Wrench Set 1.5-10mm	1
T.	Carriage Handwheel Handle	1
U.	Cross Slide Handwheel Handle	1
V.	Cast Iron Leveling Pads	6

Pre-Installed (Not Shown)	Qty
• 7" 3-Jaw Chuck (SB1308)	1
• 8¼" Back Plate D1-5 (SB1399)	1

Note: Some inventory components may be shipped inside of the lathe electrical box. These items MUST be removed before connecting the lathe to the power source.

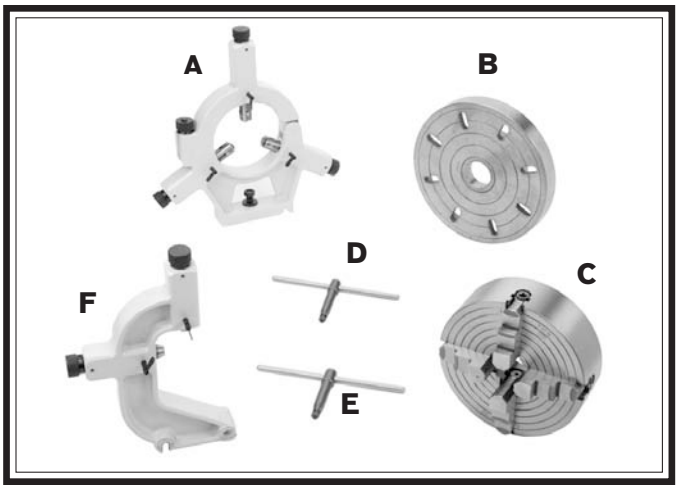


Figure 10. Main inventory.

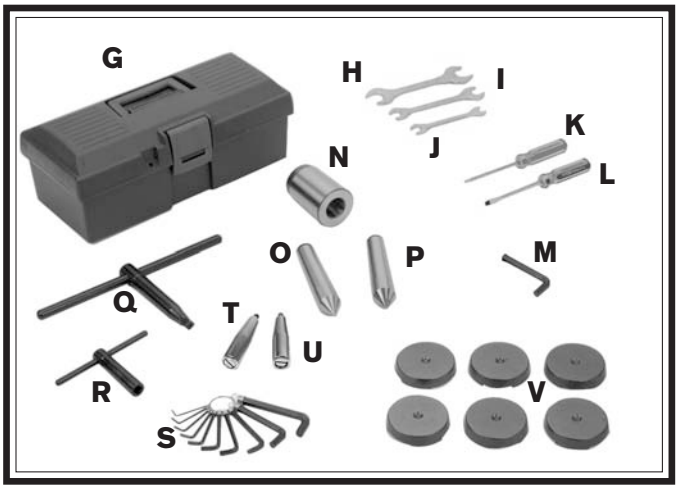


Figure 11. Toolbox inventory.

NOTICE

If you cannot find an item on this list, check the mounting location on the machine or the packaging materials. Sometimes parts are pre-installed for shipping, or they become hidden by packaging materials.

Cleaning & Protecting

The unpainted surfaces are coated at the factory with a heavy-duty rust preventative that prevents corrosion during shipment and storage. The benefit of this rust preventative is that it works very well. The downside is that it can be time-consuming to thoroughly remove.

Be patient and do a careful job when cleaning and removing the rust preventative. The time you spend doing this will reward you with smooth-sliding parts and a better appreciation for the proper care of the unpainted surfaces.

Although there are many ways to successfully remove the rust preventative, the following process works well in most situations.

Before cleaning, gather the following:

- Disposable rags
- Cleaner/degreaser (certain citrus-based degreasers work extremely well and they have non-toxic fumes)
- Safety glasses & disposable gloves

Note: Automotive degreasers, mineral spirits, or WD•40 can be used to remove rust preventative. Before using these products, though, test them on an inconspicuous area of a painted surface to make sure they will not damage it.

⚠WARNING

Gasoline and petroleum products have low flash points and can explode or cause fire if used for cleaning. Avoid using these products to remove rust preventative.

⚠CAUTION

Many cleaning solvents are toxic if inhaled. Minimize your risk by only using these products in a well ventilated area.

NOTICE

Avoid chlorine-based solvents, such as acetone or brake parts cleaner that may damage painted surfaces. Always follow the manufacturer's instructions when using any type of cleaning product.

Basic steps for removing rust preventative:

1. Put on safety glasses and disposable gloves.

2. Coat all surfaces that have rust preventative with a liberal amount of your cleaner or degreaser and let them soak for a few minutes.

3. Wipe off the surfaces. If your cleaner or degreaser is effective, the rust preventative will wipe off easily.

Note: To clean off thick coats of rust preventative on flat surfaces, such as beds or tables, use a PLASTIC paint scraper to scrape off the majority of the coating before wiping it off with your rag. (Do not use a metal scraper or it may scratch the surface.)

4. Repeat **Steps 2–3** as necessary until clean, then coat all unpainted surfaces with a quality metal protectant or light oil to prevent rust.

NOTICE

Remove the end gear cover and end gears, and use a stiff brush with mineral spirits to clean the rust preventative from the gears and shafts. DO NOT get any cleaner or rust preventative on the V-belts, as it could damage them or make them slip during operations. If the belts do become contaminated, replace them.

Location

Physical Environment

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

Electrical Installation

Place this machine near an existing power source that meets the minimum circuit requirements. Make sure all power cords are protected from traffic, material handling, moisture, chemicals, or other hazards. Leave access to disconnect the power source or engage a lockout/tagout device.

Lighting

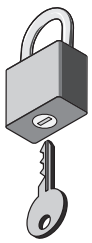
Lighting around the machine must be adequate enough that operations can be performed safely. Shadows, glare, or strobe effects that may distract or impede the operator must be eliminated.

Weight Load

Refer to the **Machine Specifications** 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.



⚠CAUTION

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

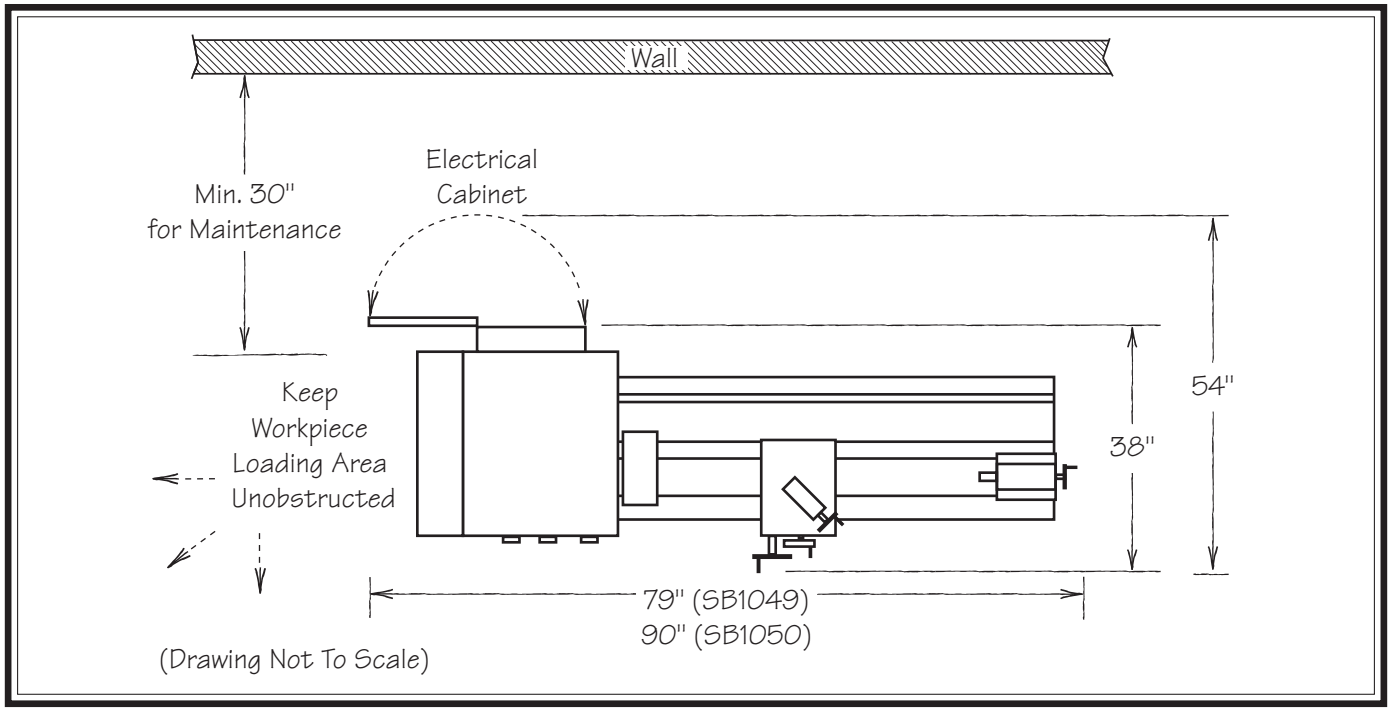
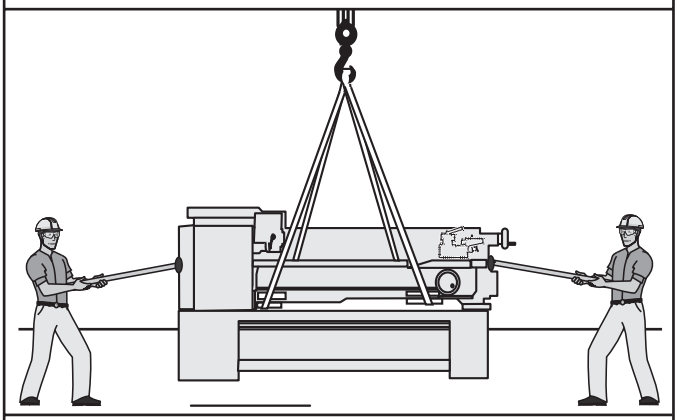


Figure 12. Space required for full range of movement.

Lifting & Moving

⚠WARNING



This machine and its parts are heavy! Serious personal injury may occur if safe moving methods are not used. To reduce the risk of a lifting or dropping injury, ask others for help, and use power equipment and guide rods.

Do not attempt to lift or move this lathe without using the proper lifting equipment (such as forklift or crane) or the necessary assistance from other people. Each piece of lifting equipment must be rated for at least 25% more than the shipping weight of your lathe to support dynamic loads that may be applied while lifting. Refer to **Things You'll Need** on **Page 16** for details.

To lift and move the lathe:

1. Remove the shipping crate top and sides, then remove the small components from the shipping pallet.

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

3. Unbolt the lathe from the shipping pallet

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

Note: Before attempting to move the carriage, make sure the carriage lock is loose, the half nut is disengaged, and the power feed is disengaged (feed selection lever).

5. Position hardwood blocks under each end of the bed as shown in **Figure 13**. This will keep the lifting straps away from the leadscrew, feed rod, and spindle rod to prevent bending them during lifting.

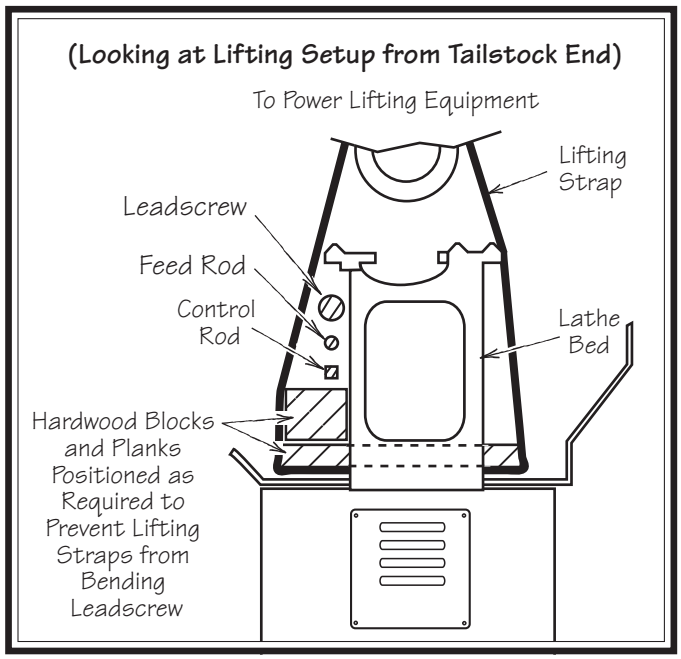


Figure 13. Lifting setup to keep straps from bending leadscrew or rods.

Note: Fasten a center support between the hardwood blocks so that they will stay spread apart and in place when lifting (see the example in **Figure 14**).

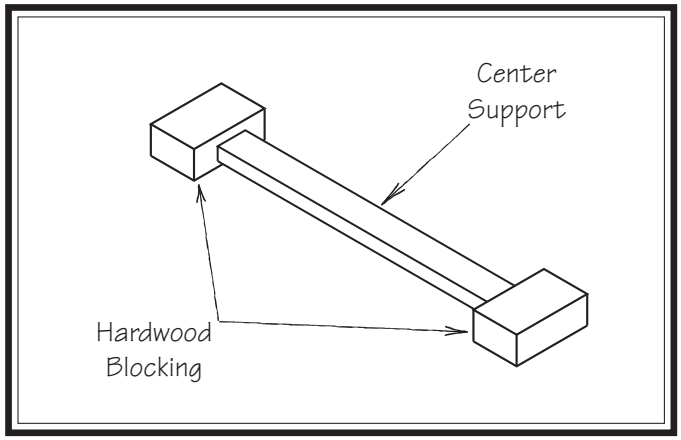


Figure 14. Example of blocking center support.

6. Attach the lifting straps to the power lifting equipment (see **Figure 15** for an example).

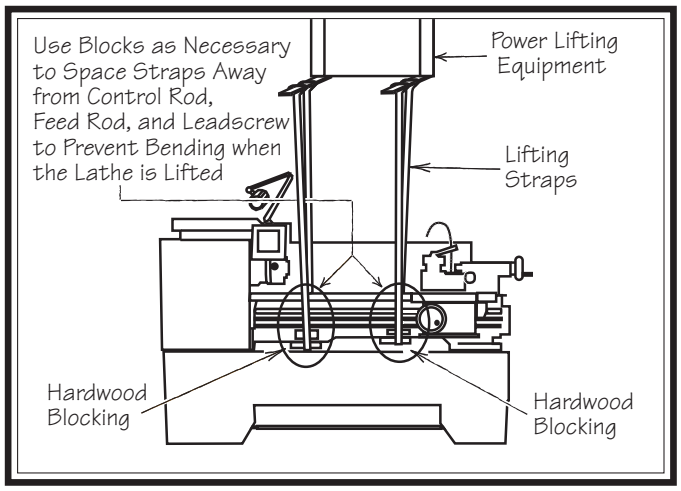


Figure 15. Example of lathe setup for lifting.

7. At each end of the lathe, have assistants connect guide rods to safely keep the lathe from swaying or tipping during lifting.

NOTICE

When lifting the lathe with straps, the load will be top heavy. Take extra care to keep the load balanced vertically and only lift the lathe far enough to remove the shipping pallet.

8. Raise the lathe a couple of inches and check the balance of the load.

— If the load is not safely balanced, immediately lower the lathe and resolve the issue before attempting to lift it again.

9. Raise the lathe enough to clear the shipping pallet, carefully remove the pallet, then lower the lathe into position.

Leveling & Mounting

You must level your machine and either use the included foot pads and leveling hardware or bolt and shim your lathe to the floor. Because mounting your lathe to the floor with permanent hardware is an optional step and floor materials may vary, floor mounting hardware is not included.

Leveling

NOTICE

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

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

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

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

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

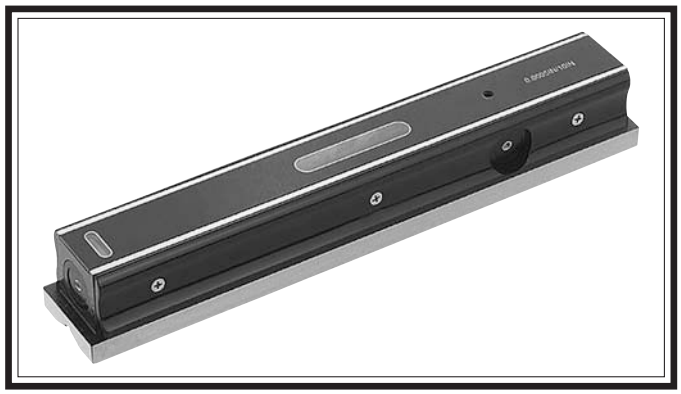


Figure 16. Example of a precision level.

To level the machine, use a precision level to make sure the bedways are level from side-to-side and from front-to-back.

— If using the included leveling pads (see **Figure 17**), place them under the six leveling jack bolt locations, then adjust the bolts to level the lathe.

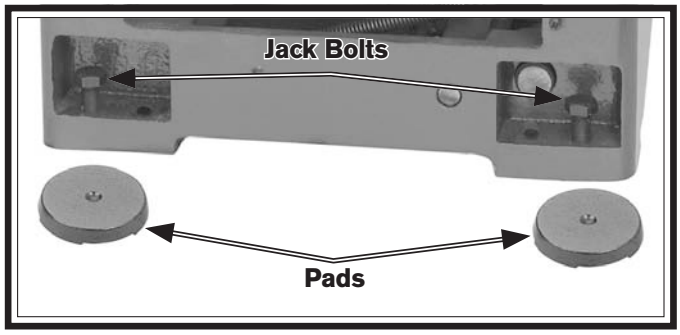


Figure 17. Leveling pads and screws.

— If using mounting hardware that does not allow for adjustment, level the lathe by placing metal shims between the lathe base and the floor before bolting it down.

Bolting to Concrete Floors

Lag screws and anchors, or anchor studs (**below**), are two popular methods for bolting machinery to a concrete floor. We suggest you research the many options and methods for mounting your machine and choose the best one for your specific application.

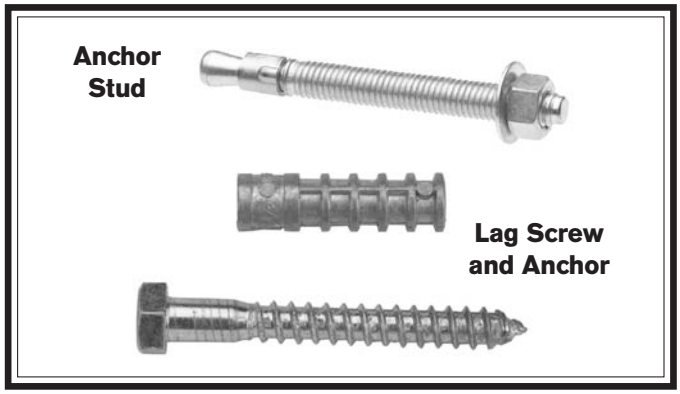


Figure 18. Common types of fasteners for bolting machinery to concrete floors.

NOTICE

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

Assembly

With the exception of the handwheel handles, the lathe is shipped fully assembled.

To install the handwheel handles, thread the large handle into the carriage handwheel and the small handle into the cross slide handwheel, as shown in **Figure 19**.

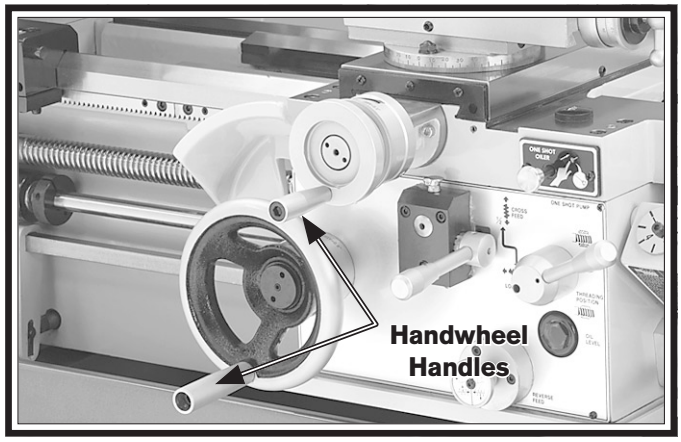


Figure 19. Handwheel handles installed.

Lubricating Lathe

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

Damage caused to the bearings and gears from running the lathe without oil in the reservoirs will not be covered under warranty. Refer to the **Lubrication** section, beginning on **Page 66**, for details on how to check, add oil, and prime the headstock oil pump.

In addition to the reservoirs, we also recommend that you lubricate all other points on the machine at this time. This can be accomplished by following the maintenance schedule on **Page 64**.

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

Adding Coolant

Add the coolant of your choice now. For detailed instructions on where the coolant tank is located and how to add fluid, refer to **Coolant System Service** on **Page 71**.

Power Connection

⚠WARNING

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

Once your machine is set up and assembled as previously described in this manual, it is ready to be connected to the power source.

Note About Extension Cords: Using an incorrectly sized extension cord may decrease the life of electrical components on your machine. Refer to **Extension Cords** on **Page 18** for more information.

To connect the power cord to the lathe:

1. Make sure the master power switch is turned to the OFF position, then open the electrical cabinet door.
2. Thread the power cord through the strain relief, and up to the master power switch shown in **Figure 20**.

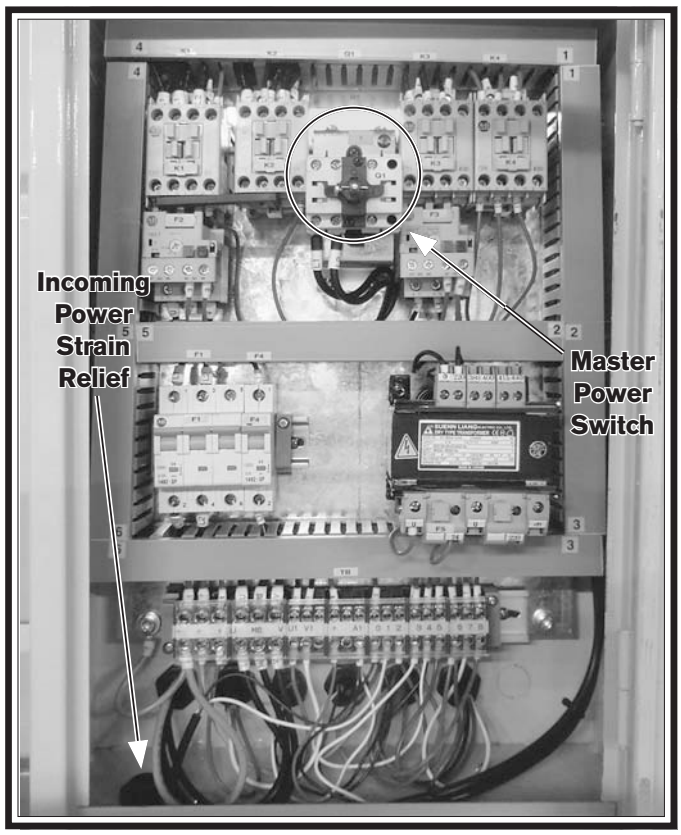


Figure 20. Location to connect power inside main electrical cabinet.

3. Connect the incoming hot wires to the upper master power switch terminals, as illustrated in **Figure 21**.

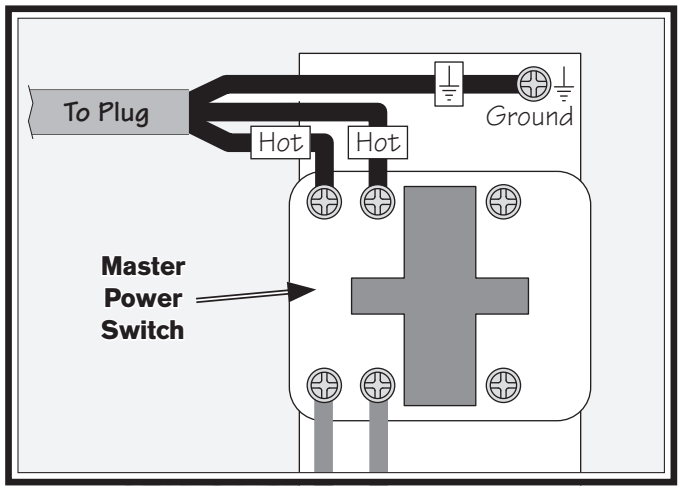


Figure 21. Power connection at master power switch.

4. Connect the incoming ground wire to the ground terminal on the switch bracket, as illustrated in **Figure 21**.

5. Make sure the power cord and wires have slack between the strain relief and terminal connections so that they do not bind, then tighten the strain relief to secure the cord.

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

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

7. Install a NEMA L6-30 plug on the other end of the power cord per the manufacturer's instructions.

8. Close and lock the main electrical box door.

9. Connect the plug to the matching receptacle and power source as specified in **Circuit Requirements** on **Page 17**.

NOTICE

To avoid unexpected start-up of lathe components, keep the master power switch turned OFF until instructed otherwise in the Test Run.

Test Run

After all preparation steps have been completed, the machine and its safety features must be tested to ensure correct operation. If you discover a problem with the operation of the machine or its safety components, shut the machine down, disconnect it from power, and do not operate it until you have resolved the problem.

A **Troubleshooting** section is provided, starting on **Page 84**, to assist you with solutions if a problem occurs or if the lathe does not function as described in this section.

If you need additional help after reviewing the troubleshooting section, or you are not confident troubleshooting the machine on your own, contact our Tech Support at (360) 734-1540.

To test run your machine:

1. Make sure the master power switch (see **Figure 22**) on the rear of the machine is turned ***OFF***.

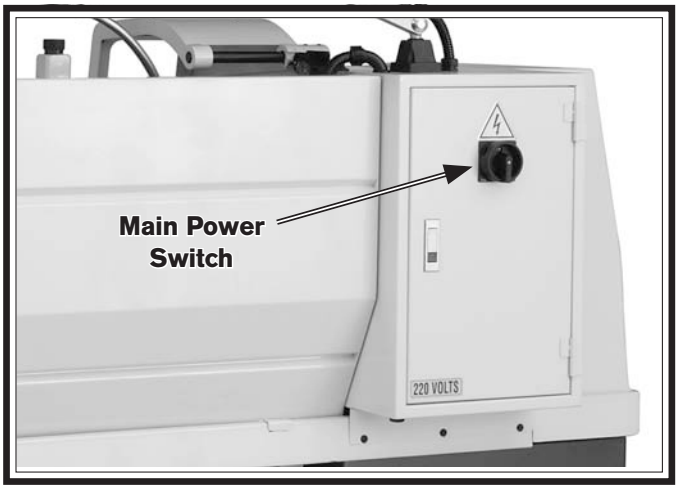


Figure 22. Location of the master power switch.

2. Read and follow the safety instructions at the beginning of the manual, take all required safety precautions, and make sure all previous preparation steps discussed in this manual have been followed and completed.

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

4. Make sure that the chuck and jaws, if installed, are secure (refer to **Chuck and Faceplate Mounting** on **Page 32**).

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

5. Push the STOP button on the control panel (see **Figure 23**), and point the coolant nozzle into the chip pan.

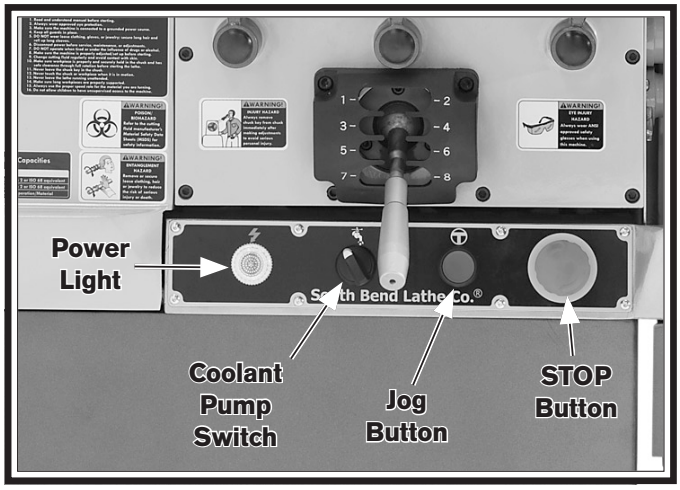


Figure 23. Control panel.

6. Disengage the quick-change gearbox by moving the feed range lever to the neutral (middle) position, as illustrated in **Figure 24**.

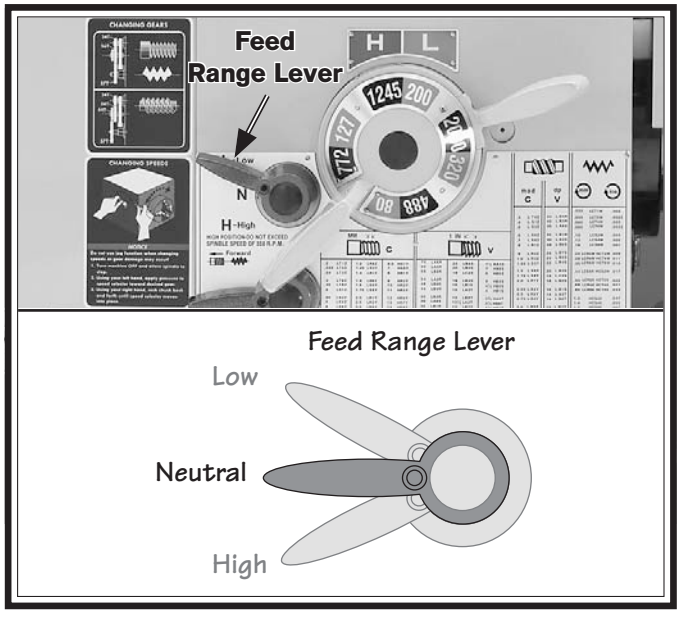


Figure 24. Feed range lever.

Note: During the next step, you may need to use the chuck key rock the spindle back and forth while attempting to shift so the gears will mesh. If you do this, be sure to remove the chuck key afterward.

7. Set the spindle speed to 80 RPM as follows:

   a. Move the spindle range lever so the arrow on the hub points toward the **L** (low) label (see **Figure 25**).

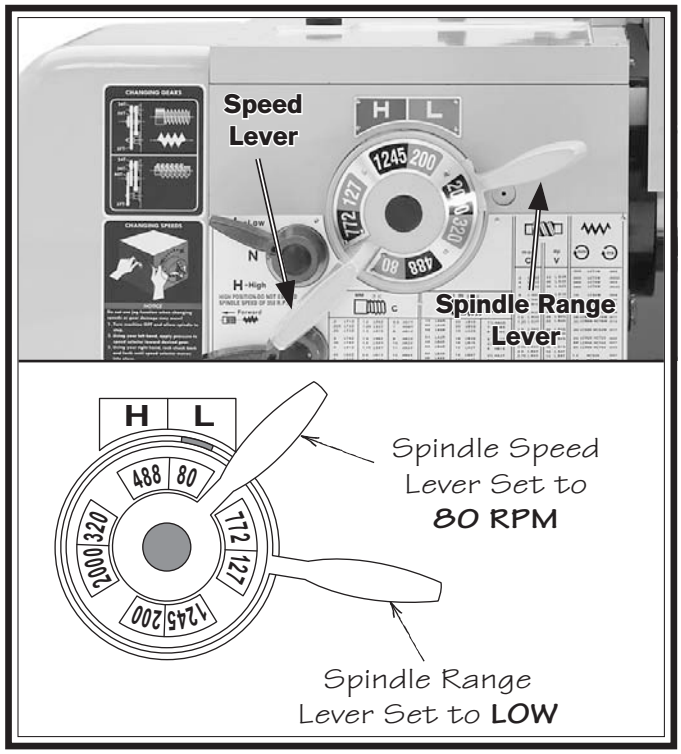


Figure 25. Spindle speed set to 80 RPM.

   b. Move the spindle speed lever so that the **80** on its hub is also pointing at the **L** label.

Note: You will hear a distinct click when the spindle speed lever is in the correct position.

8. Turn the master power switch on the electrical cabinet to the ON position.

9. Reset the STOP button by twisting it clockwise until it pops out. The power lamp on the control panel should illuminate.

10. To ensure the carriage components do not unexpectedly move during the following steps, disengage the half nut lever and feed selection lever (see **Figure 26**).

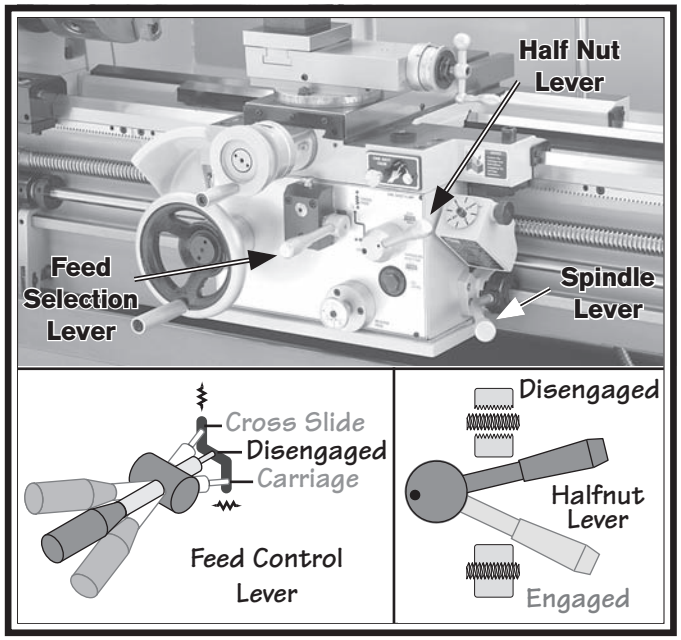


Figure 26. Disengaging carriage components.

11. Start the spindle by pulling the spindle lever out and moving it down (see **Figure 27**).

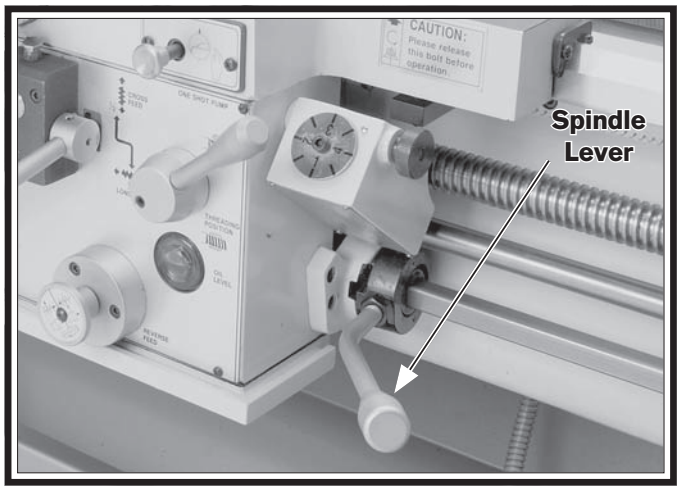


Figure 27. Spindle lever in down (forward) position.

— 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.

12. Press the STOP button to turn the lathe ***OFF***, then, without resetting the STOP button, try to restart spindle rotation. The spindle should *not* start.

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

13. Move the spindle lever to the OFF (middle) position, reset the STOP button by twisting it clockwise until it pops out, then restart spindle rotation.

14. Push the foot brake. The spindle should come to a quick stop.

— If the brake pedal has no effect on the lathe, push the STOP button, and refer to **Brake & Switch** on **Page 78** to make any required adjustments.

15. Move the spindle lever to the OFF (middle) position. Remove the end gear cover from the left side of the headstock. This activates a safety switch that should prevent the spindle from starting while this cover is removed.

16. Stand away from all the exposed gears on the side of the headstock, and attempt to start spindle rotation. The spindle should *not* start.

— If spindle rotation *does start* with the end cover removed, the safety switch is not operating correctly. This safety feature must operate properly before continuing operation. Press the STOP button to turn the lathe ***OFF***, disconnect it from power, and call Tech Support for help.

17. Push the STOP button in, move the spindle lever to the OFF position, then replace the end gear cover.

18. Lift the chuck guard up—this will activate the chuck guard safety switch. Reset the STOP button and attempt to start spindle rotation. The spindle should *not* start.

— If spindle rotation *does start* with the chuck guard in the up position, the safety switch is not operating correctly. This safety feature must operate properly before continuing operation. Press the STOP button to turn the lathe ***OFF***, disconnect it from power, and call Tech Support for help.

19. Re-start spindle rotation, use the cutting fluid pump switch on the control panel to start the pump, then open the valve. Verify that the cutting fluid flows from the nozzle, then turn the pump ***OFF***.

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

NOTICE

After the first 16 hours of use, the V-belts will stretch and seat into the pulley grooves. The V-belts must be properly re-tensioned after this period to ensure proper power transmission and avoid reducing the life of the belts. Refer to the V-Belts subsection on Page 77 for detailed instructions.

Spindle Break-In

Before subjecting the lathe to full loads, it is essential to complete the spindle break-in process as described below. This will ensure the best results and maximum life of the precision components inside the lathe.

The break-in procedure must be performed in succession with the **Test Run** procedure described in this manual, because many of the test run steps prepare the lathe controls for the break-in process.

Important: Do not perform the break-in procedure independently from the **Test Run** section—serious damage could occur to the lathe if the controls are set differently than instructed in that section.

NOTICE

Do not leave the lathe unattended during the Spindle Break-In procedure. If your attention is needed elsewhere during this procedure, stop the lathe and restart the procedure later from the beginning.

To perform the spindle break-in:

1. Successfully complete the **Test Run** procedure beginning on **Page 26**.

2. Using the spindle speed levers to set the spindle speed, run the lathe for 10 minutes at each of the spindle speeds starting with the lowest speed.

Note: If necessary, refer to **Setting Spindle Speed** on **Page 50** for detailed instructions.

3. Use the foot brake to stop spindle rotation, set the spindle speed at 2000 RPM, then use the spindle lever to reverse the spindle rotation and run the lathe for 10 minutes.

4. Use the foot brake to stop spindle rotation, then run the lathe at 200 RPM for 10 minutes with the gearbox range lever on the headstock in the **L** (low) position, and then run the lathe another 10 minutes with the lever in the **H** (high) position.

5. While the oil is still warm and any metal particles are still suspended in the oil, change the headstock and gearbox oil (refer to **Lubrication** beginning on **Page 66** for detailed instructions).

6. Check the V-belt tension, and if necessary, re-tension them (refer to **V-Belts** on **Page 77** for detailed instructions).

Congratulations! The spindle break-in is complete.

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 on the pages referenced below.

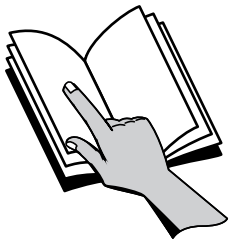
Factory adjustments that should be verified:

- Tailstock alignment (**Page 40**).
- Compound and cross slide backlash adjustment (**Page 74**).
- Gib adjustments (**Page 75**).

Operation Overview

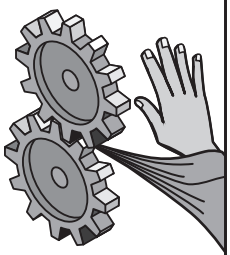
The purpose of this overview is to provide the novice machine operator with a basic understanding of how the machine is used during operation, so they can more easily understand the controls discussed later in this manual.

Note: Due to the generic nature of this overview, it is not intended to be an instructional guide for performing actual machine operations. To learn more about specific operations and machining techniques, seek training from people experienced with this type of machine, and do additional research outside of this manual by reading "how-to" books, trade magazines, or websites.



⚠WARNING

To reduce the risk of serious injury when using this machine, read and understand this entire manual before beginning any operations.



⚠WARNING

Loose hair, clothing, or jewelry could get caught in machinery and cause serious injury or death. Keep these items away from moving parts at all times to reduce this risk.

⚠WARNING

During operation, small metal chips may become airborne, leading to serious eye injury. Wear safety glasses to reduce this risk.

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 securely mounts the workpiece in one of the chucks or on the faceplate, and removes the chuck key from the chuck.
3. Mounts the tooling, aligns it with the workpiece, then backs it away to establish a safe startup clearance.
4. Clears all setup tools from the lathe.
5. Checks for safe clearances by rotating the workpiece by hand at least one full revolution.
6. Moves slides to where they will be used during operation.
7. Sets the correct spindle speed for the operation.
8. If using power feed, selects the proper feed rate for the operation.
9. Turns the master power switch ***ON***, resets the STOP button, then presses the spindle motor ON button.
10. Uses the spindle lever to start spindle rotation.
11. Uses the carriage handwheels or power feed options to move the tooling into the workpiece for operations.
12. When finished cutting, moves the spindle lever to the OFF position, presses the foot brake to completely stop the spindle, then removes the workpiece.

Chuck & Faceplate Mounting

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

⚠WARNING

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

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

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

If neither chuck can hold your workpiece, the cast iron faceplate has slots for T-bolts that hold standard or custom clamping hardware. With the correct clamping hardware, a faceplate offers a wide range of uses, including machining non-concentric workpieces, straight turning between centers, off-center turning, and boring.

Installation & Removal Devices

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

⚠WARNING

A dropped chuck can cause amputation, serious crushing injuries, or property damage. Always use a lifting, support, or protective device to reduce this risk when installing or removing a chuck.

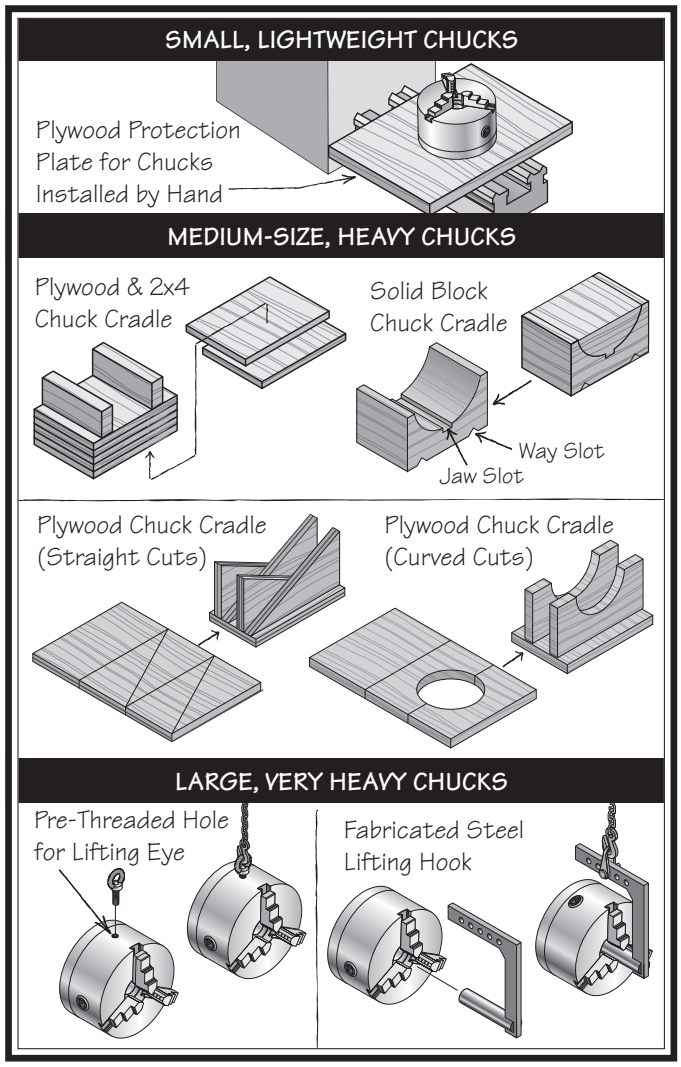


Figure 28. Examples of common devices used during chuck installation and removal.

Chuck Installation

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

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

To install the chuck:

1. DISCONNECT LATHE FROM POWER!

2. Use an appropriate lifting, support, or protective device to protect the ways and support the chuck during the installation process.

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

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

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

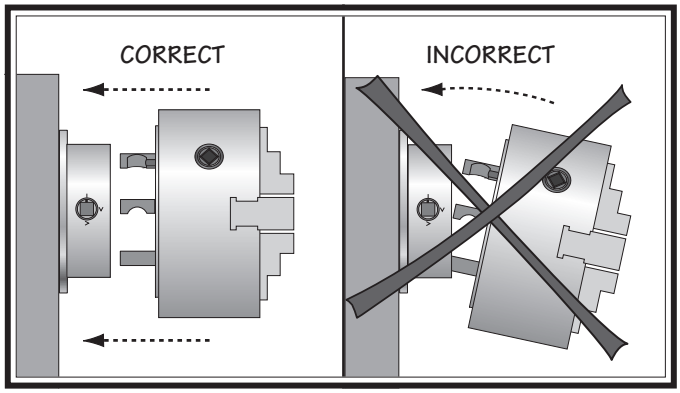


Figure 29. Inserting camlock studs into spindle cam holes.

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

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

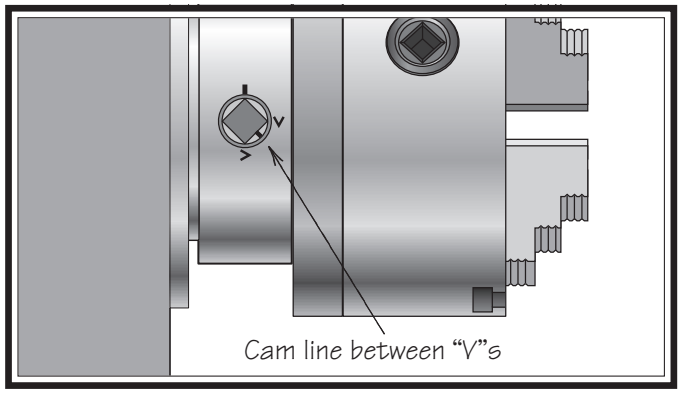


Figure 30. Cam line positioned between the "V" marks after the camlocks are fully tightened.

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

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

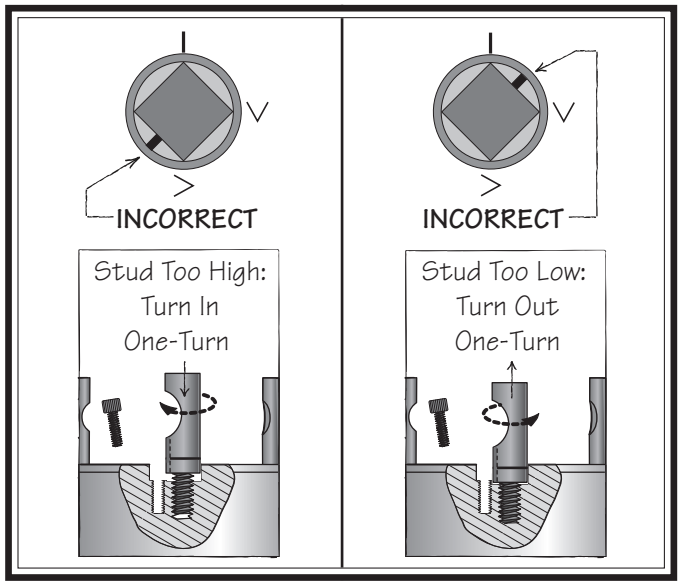


Figure 31. Correcting an improperly installed stud.

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

— If there are no gaps, proceed to **Step 8**.

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

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

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

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

Registration Marks

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

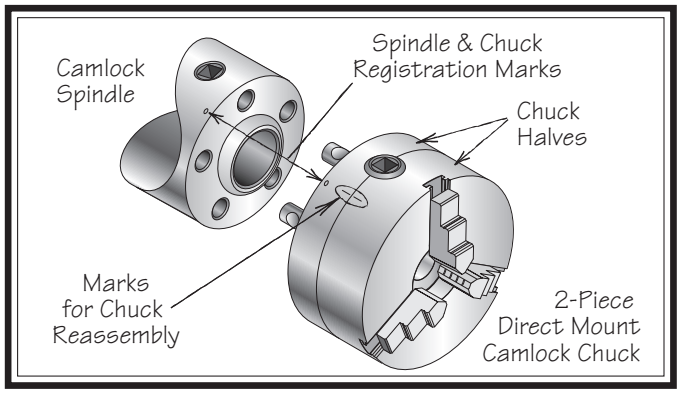


Figure 32. Registration mark locations.

Chuck Removal

To remove the chuck:

1. DISCONNECT LATHE FROM POWER!

2. Use an appropriate lifting, support, or protective device to protect the ways and support the chuck (refer to **Installation & Removal Devices** on **Page 32**).

3. Loosen the camlocks by turning the key counterclockwise until each of the cam lines are aligned with its corresponding spindle mark (see **Figure 33**).

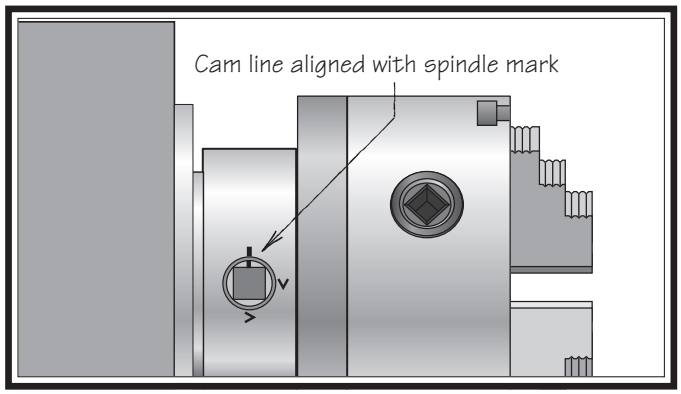


Figure 33. Camlock is fully loosened when the cam line is aligned with the spindle mark.

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

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

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

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

Scroll Chuck Clamping

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

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

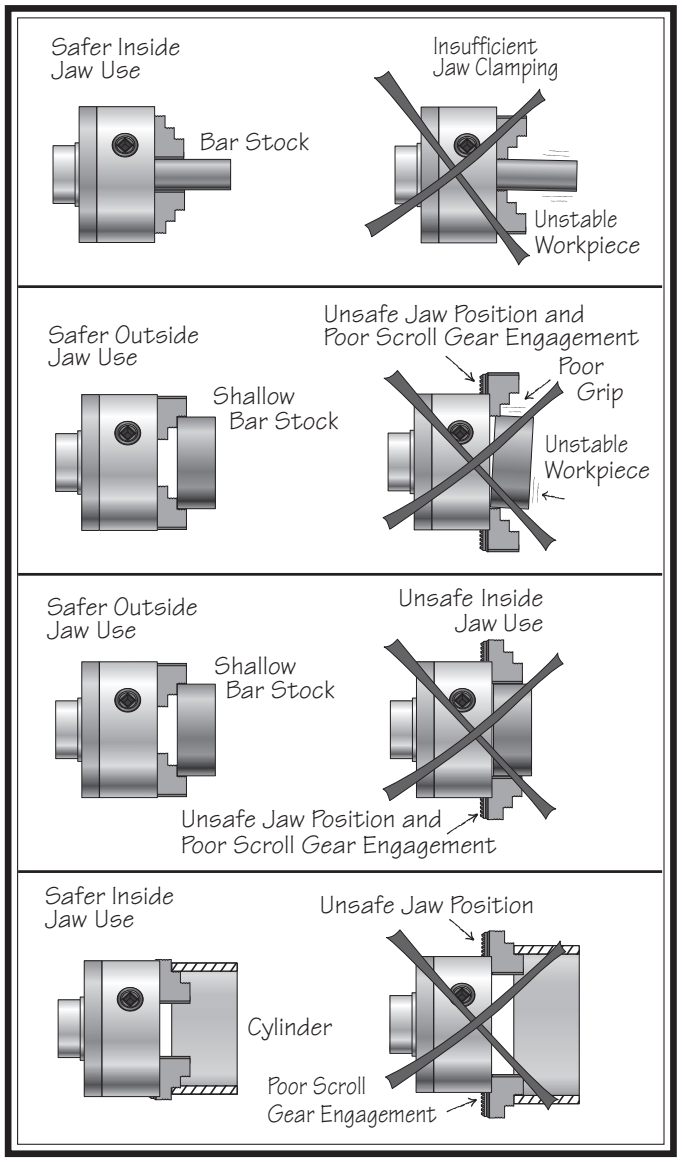


Figure 34. Jaw selection and workpiece holding.

4-Jaw Chuck

Refer to the **Chuck Installation** (see **Page 33**) and **Chuck Removal** (see **Page 34**) instructions to install or remove the 4-jaw chuck.

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

⚠WARNING

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

Mounting Workpiece

1. DISCONNECT LATHE FROM POWER!
2. Place a chuck cradle or plywood on the bedway below the chuck to protect the bedway surfaces.
3. Use the chuck key to open each jaw so the workpiece will lay flat against the chuck face, jaw steps, or into the spindle opening.
4. With help from another person or a holding device, position the workpiece so it is centered in the chuck.

5. Tighten each jaw in small increments. After you have adjusted the first jaw, continue tightening the remaining jaws in an opposing sequence, as shown by the sequential order in **Figure 35**.

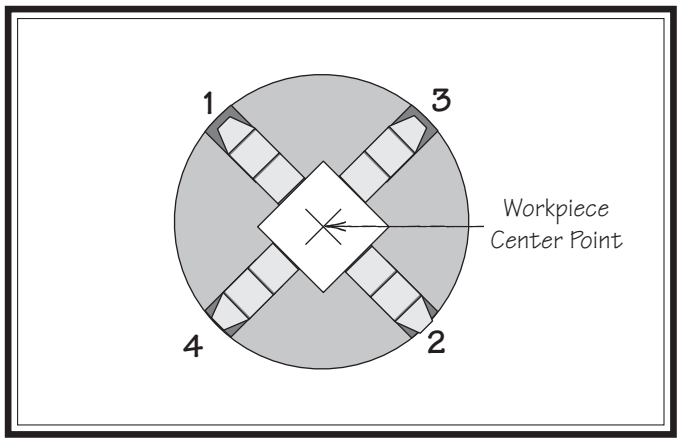


Figure 35. 4-jaw tightening sequence.

6. After the workpiece is held in place by the jaws, use a dial indicator to make sure the workpiece is centered in the chuck.

— If the workpiece is not correctly centered, make fine adjustments by slightly loosening one jaw and tightening the opposing jaw until the workpiece is correctly positioned (see **Figure 36** for an example).

Figure 36. Example photo of non-cylindrical workpiece correctly mounted on the 4-jaw chuck.

Faceplate

Refer to the **Chuck Installation** (see **Page 33**) and **Chuck Removal** (**see Page 34**) instructions to install or remove the faceplate.

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

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

⚠WARNING

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

⚠WARNING

Failure to properly secure a workpiece to the faceplate could cause the workpiece to be thrown from the lathe with deadly force at the operator or bystanders. Use a minimum of THREE independent clamping devices to hold the workpiece onto the faceplate.

To mount a non-concentric workpiece to the faceplate:

1. DISCONNECT LATHE FROM POWER!

2. Protect the bedway with a piece of plywood.

3. With help from another person or a holding device to support the workpiece, position it onto the faceplate and clamp it in place with a minimum of three independent clamping devices (see **Figure 37** for an example).

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

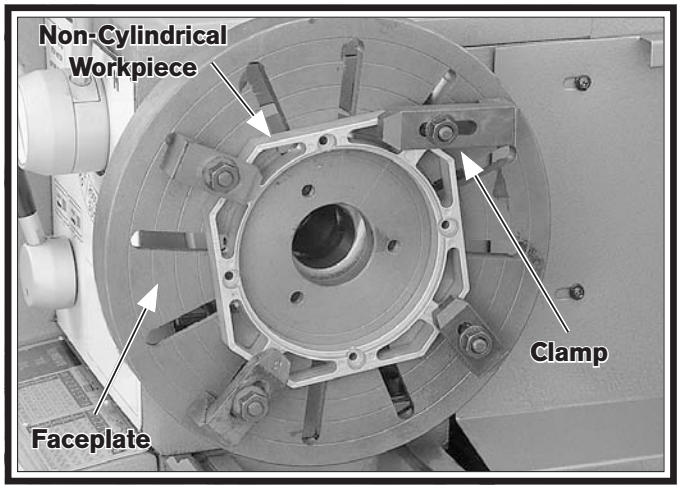


Figure 37. Example photo of workpiece clamped in a faceplate.

Tailstock

The tailstock (see **Figure 38**) is typically used to support long workpieces by means of a live or dead center (refer to **Centers** on **Page 41**). It can also be used to hold a drill or chuck to bore holes in the center of a part. Custom arbors and tapers can also be cut on your lathe by using the offset tailstock adjustment.

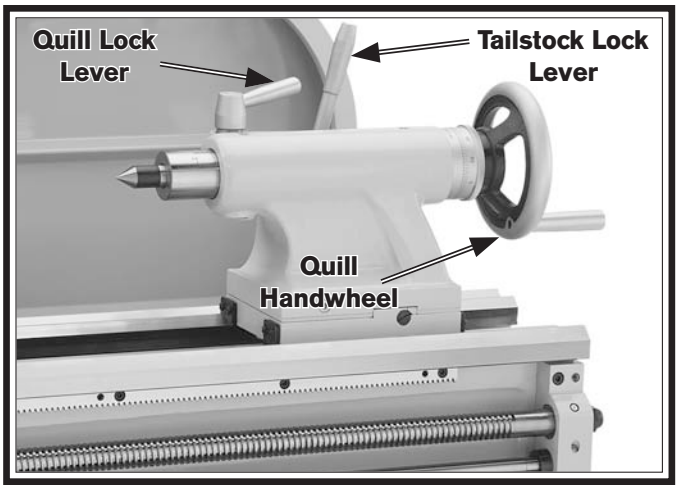


Figure 38. Tailstock and quill lock levers in locked position.

Graduated Dial

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

Increments on Quill

Inch.....0"-4⅜" in 1/16" Increments
Metric.....0–110mm in 1mm Increments

Positioning Tailstock

1. Pull the tailstock lock lever backward (away from the spindle) to unlock the tailstock from the bedway.

2. Slide the tailstock to the desired position.

3. Push the tailstock lock lever forward (toward the spindle) to lock the tailstock against the bedway.

Using Quill

1. Move the quill lock lever toward the spindle to unlock the quill.

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

3. Move the lock lever away from the spindle to secure the quill in place.

Installing Tooling

This tailstock uses a quill with an MT#5 taper that has a lock slot in the back of the bore that accepts tang arbors and drill bits (see **Figures 39–40** for examples).

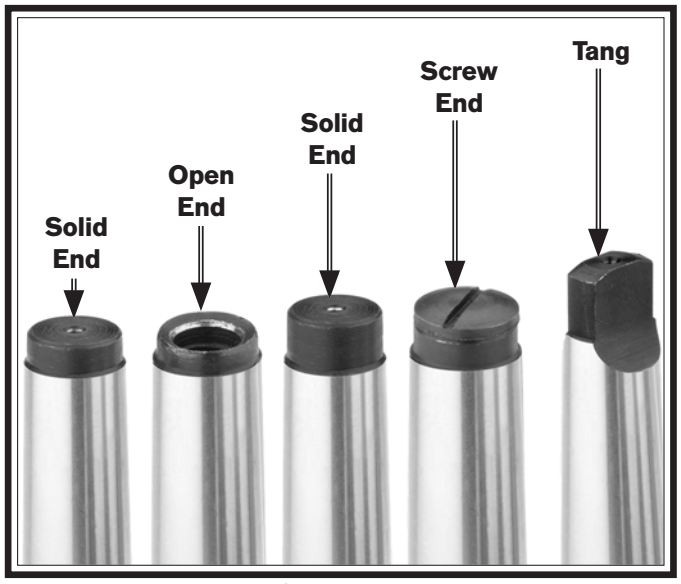


Figure 39. Types of tapered arbors and tooling.

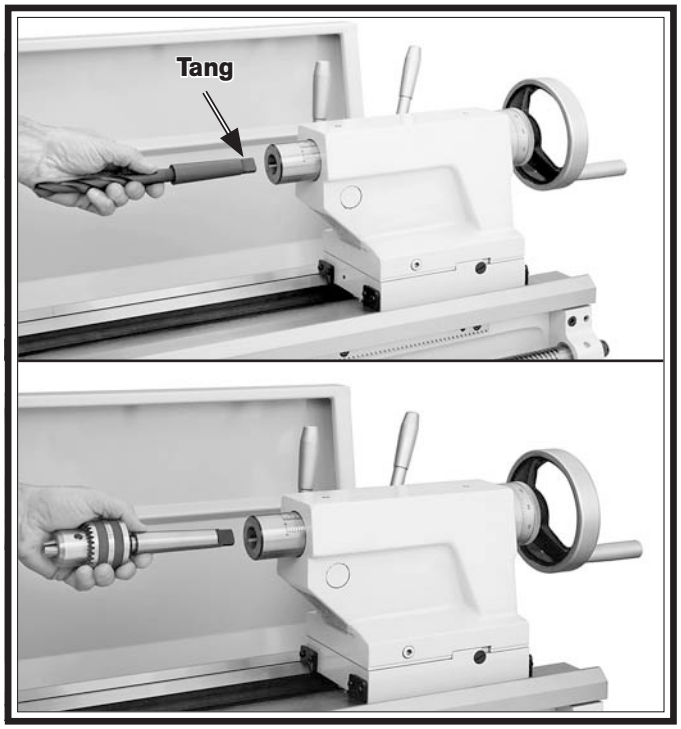


Figure 40. Example photos of inserting MT#5 tools with tangs into the tailstock.

However, other tooling without tangs, such as the four remaining tools shown in **Figure 39**, can still be used if the potential load will not exceed the strength of the tapered fit. For example, this includes smaller drill chucks, drill bits, and centers.

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

To install tooling in the tailstock:

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

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

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

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

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

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

Removing Tooling

1. Use a shop rag to hold the tool.

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

   — If the tool does not come loose by retracting the quill, extend the quill and use a drift key in the slot shown in **Figure 41** to remove the tool.

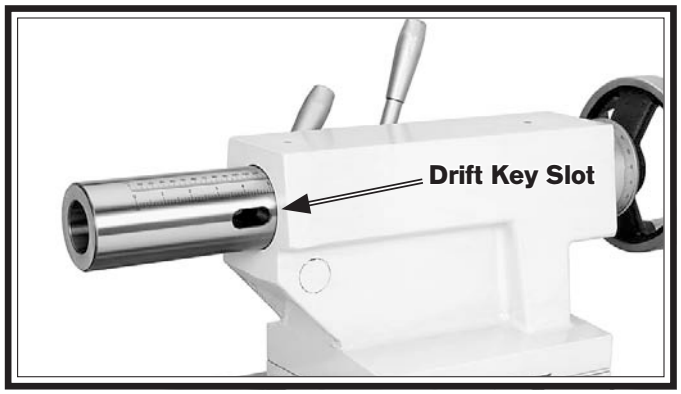


Figure 41. Drift key slot in the side of the quill.

Offsetting Tailstock

The tailstock can be offset from the spindle centerline for turning tapers. Move the tailstock top casting toward the front of the lathe to machine a taper at the tailstock end. Conversely, position the tailstock top casting toward the back of the lathe to machine a taper at the spindle end.

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

Tools Needed	Qty
Hex Wrench 6mm	1
Wrench 17mm	1

To offset the tailstock:

1. Loosen the hex bolts underneath both ends of the tailstock to release the clamping pressure between the top and bottom castings (see **Figure 42**).

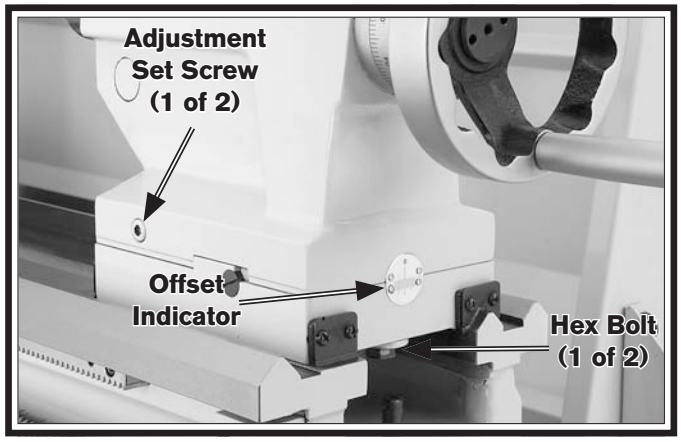


Figure 42. Tailstock offset controls.

2. Rotate the adjustment set screws in opposite directions for the desired offset (see the illustration in **Figure 43**).

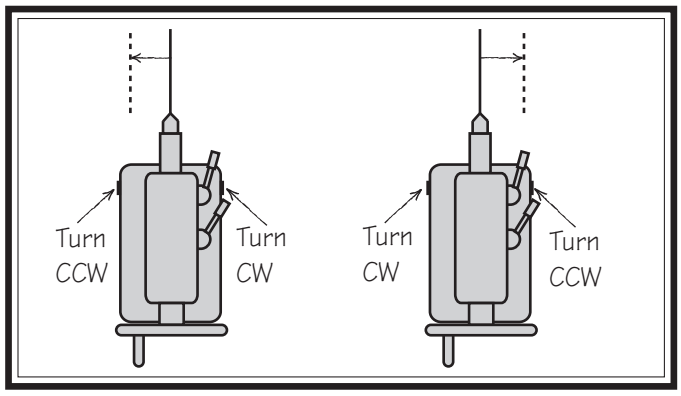


Figure 43. Set screw adjustment in relation to tailstock movement.

3. Retighten the clamping hex bolts underneath the tailstock to secure the offset.

Aligning Tailstock to Spindle Centerline

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

Items Needed	Qty
Hex Wrench 6mm	1
Wrench 17mm	1
Round Stock 2" x 6"	2
Precision Level	1

To align the tailstock to the spindle centerline:

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

   — If the bedway is not level, correct this condition before continuing with this procedure (refer to **Leveling & Mounting** on **Page 23**).

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

3. Use the other piece of round stock to make a dead center, and turn it to a 60° point, as illustrated in **Figure 44**.

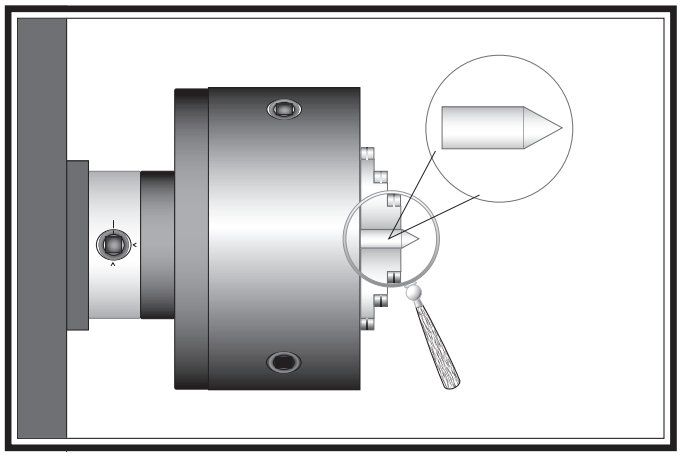


Figure 44. Turning a dead center.

Note: As long as this dead center remains in the chuck, the point of the center will remain true to the spindle centerline. The point will have to be refinished whenever the center is removed and then returned to the chuck.

4. Install a center in the tailstock.

5. Attach a lathe dog to the test stock from **Step 2**, then mount it between the centers (see **Figure 45** for an example).

Figure 45. Example photo of stock mounted between the centers.

6. Turn 0.010" off the stock diameter.

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

Note: If necessary in the following step, refer to **Offsetting Tailstock** on **Page 39** for detailed instructions.

8. Use calipers to measure both ends of the workpiece.

— If the test stock is *thicker* at the tailstock end, move the tailstock toward the *front* of the lathe ½ the distance of the amount of taper (see **Figure 46**).

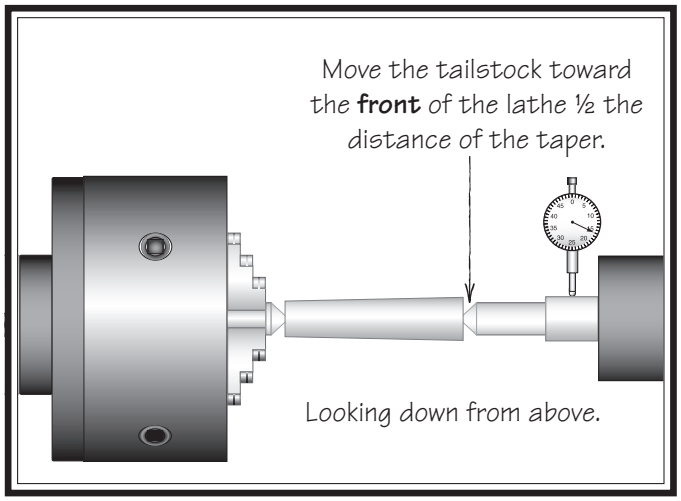


Figure 46. Adjust tailstock toward the operator.

— If the test stock is *thinner* at the tailstock end, move the tailstock toward the *back* of the lathe ½ the distance of the amount of taper (see **Figure 47**).

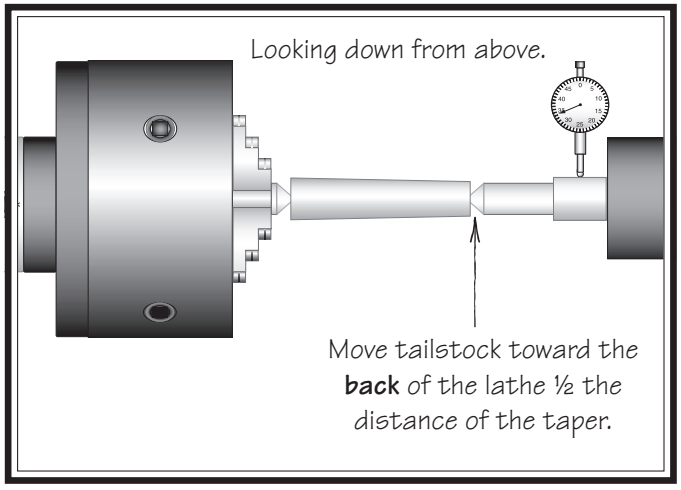


Figure 47. Adjust tailstock away from the operator.

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

Centers

Figure 48 shows the MT#5 dead centers included with the lathe. In addition, an MT#7–MT#5 tapered spindle sleeve is included for mounting centers in the spindle.

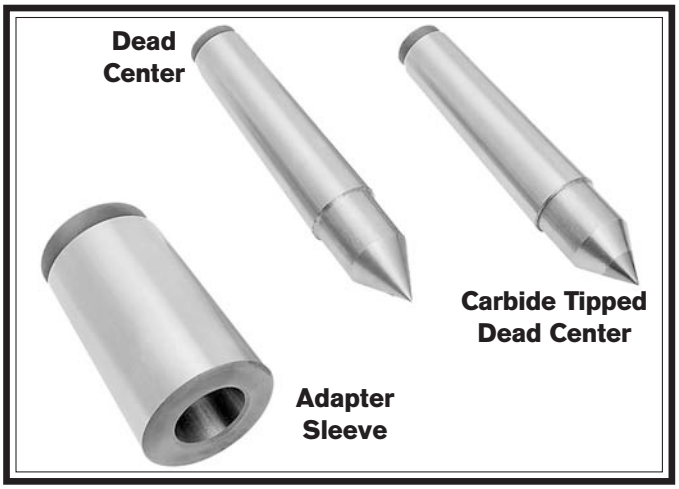


Figure 48. Adapter sleeve and dead centers.

Dead Centers

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

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

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

Live Centers

A live center has bearings that allow the center tip and the workpiece to rotate together; it can be installed in the spindle and the tailstock quill for higher speeds. However, a live center typically does not provide the same level of rigidity as a dead center, and final workpiece accuracy can suffer as a result.

Mounting Dead Center in Spindle

1. DISCONNECT LATHE FROM POWER!

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

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

3. Mount a chuck or faceplate onto the spindle, whichever is correct for your operation.

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

   Figure 49 shows an example photo of a dead center installed in the spindle, using a lathe dog and faceplate for turning between centers.

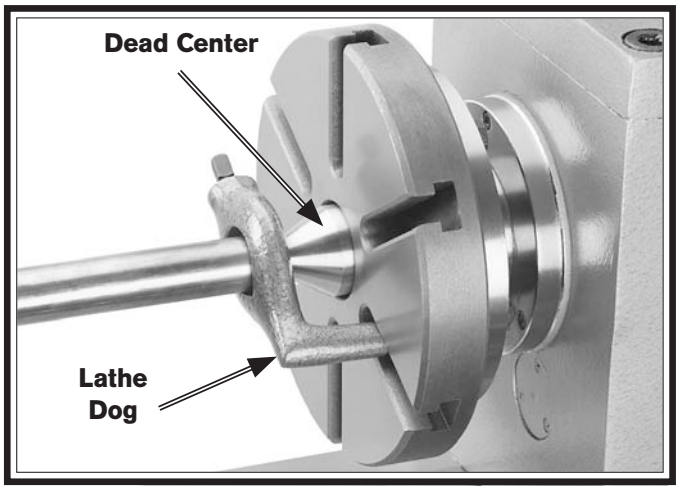


Figure 49. Example photo of using a dead center with a faceplate and lathe dog.

Removing Center from Spindle

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

NOTICE

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

Mounting Center in Tailstock

Either a carbide-tipped dead center or live center can be used in the tailstock. Mounting instructions are the same for both. **Figure 50** shows an example photo of a dead center mounted in a tailstock.

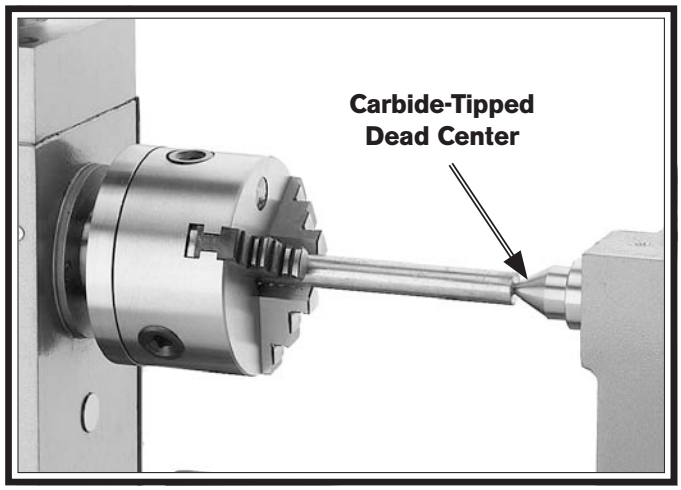


Figure 50. Example photo of using a carbide-tipped dead center installed in the tailstock.

To mount a center in the tailstock:

1. DISCONNECT LATHE FROM POWER!

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

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

Note: Do not extend the quill more than 2" or stability and accuracy will be reduced.

4. Insert the center into the tailstock quill.

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

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

Removing Center from Tailstock

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

If the center does not come loose by retracting the quill, extend the quill to expose the slot shown in **Figure 51**, then use a drift key to remove the center.

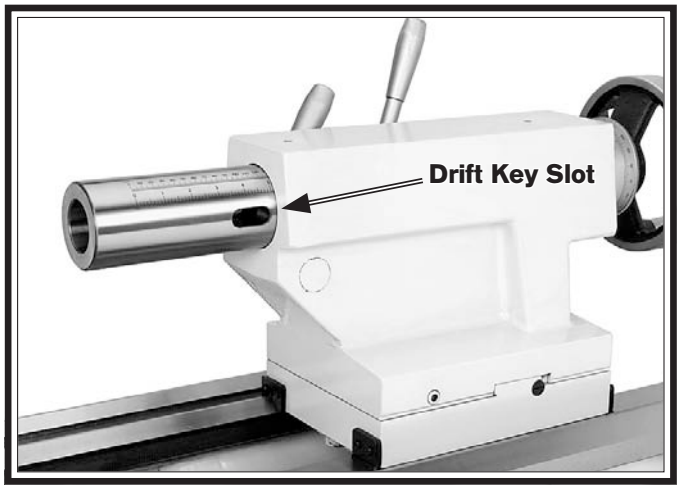


Figure 51. Drift key slot in the side of the quill.

Mounting Workpiece Between Centers

1. DISCONNECT LATHE FROM POWER!

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

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

4. Lubricate the workpiece center holes, then mount the workpiece between the centers and hold it in place with light pressure from the tailstock center.

5. Seat the center firmly into the quill by rotating the quill handwheel clockwise to apply pressure against the workpiece (see the example in **Figure 52**).

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

Figure 52. Example photo of a workpiece mounted between the centers.

Steady Rest

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

Familiarize yourself with the steady rest components shown in **Figure 53** to better understand its operation.

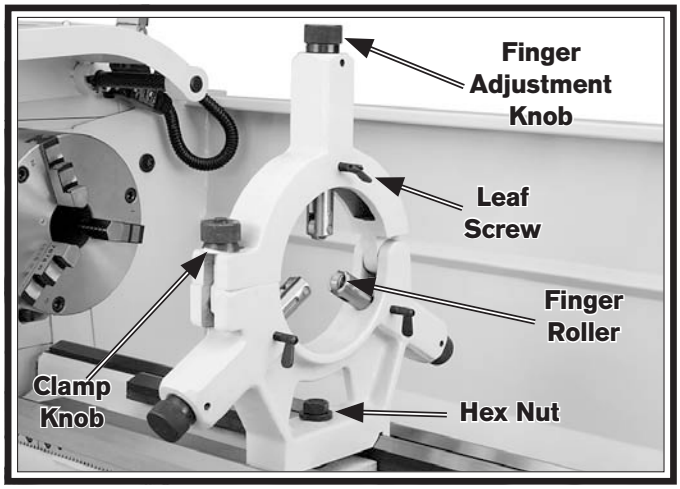


Figure 53. Steady rest components.

To install and use the steady rest:

1. DISCONNECT LATHE FROM POWER!

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

3. Position the steady rest where required to properly support the workpiece, then tighten the hex nut shown in **Figure 53** to secure it in place.

4. Loosen the clamp knob that secures the two halves of the steady rest and open the top portion, as shown in **Figure 54**.

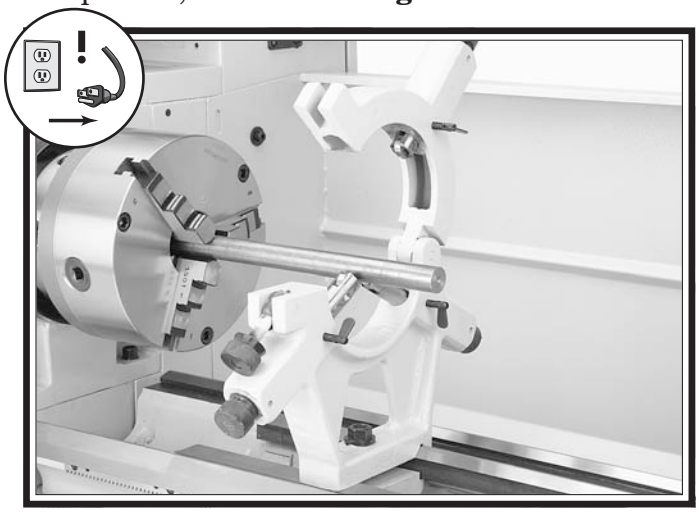


Figure 54. Workpiece mounted in the steady rest.

5. Loosen the three leaf screws so the finger roller positions can be adjusted.

6. Use the finger adjustment knobs to position the bottom two finger rollers against the workpiece, as shown in the example of **Figure 54**.

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

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

8. Tighten the three leaf screws to secure the settings.

Follow Rest

The follow rest mounts to the saddle with two cap screws (see **Figure 55**). It is used on long, slender parts to prevent workpiece deflection from the pressure of the cutting tool during operation. Adjust the follow rest fingers in the same manner as the those on the steady rest.

Note: To reduce the effects of friction, lubricate the brass finger tips with generous lubricant during operation.

Figure 55. Follow rest attachment.

Carriage & Slide Locks

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

See **Figures 56–57** to identify the locations of the locks for each device.

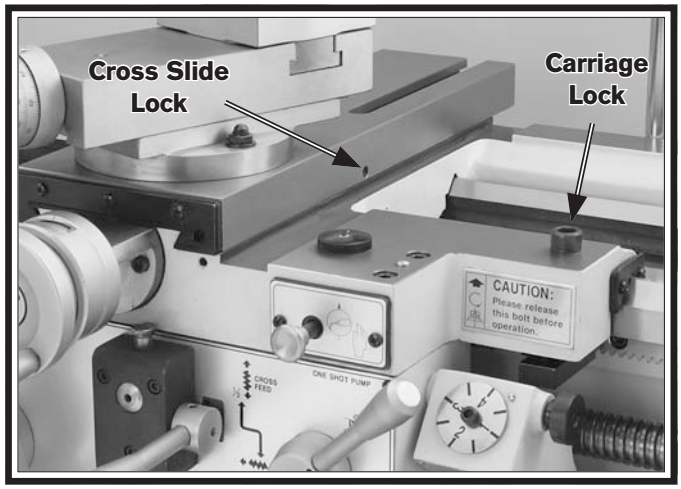


Figure 56. Location of carriage and cross slide locks.

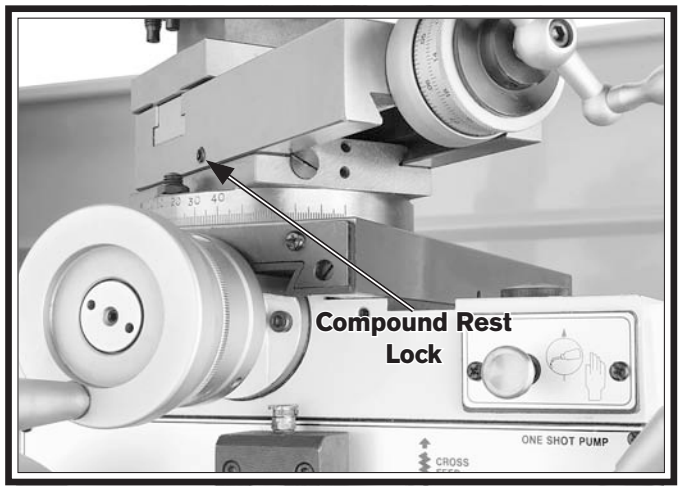


Figure 57. Location of compound rest lock.

Compound Rest

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

Graduated Dial

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

Tool Needed	Qty
Wrench 14mm	1

To set the compound rest at a certain angle:

1. Loosen the two hex nuts at the base of the compound rest (1 of 2 shown in **Figure 58**).

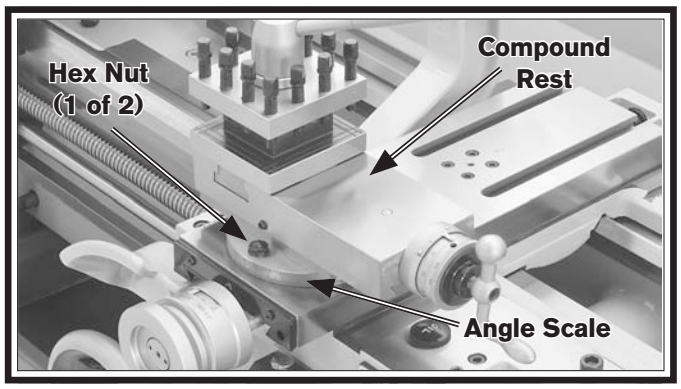


Figure 58. Compound rest.

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

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

Four-Way Tool Post

The four-way tool post is mounted on top of the compound rest and allows a maximum of four tools to be loaded simultaneously.

Each tool can be quickly indexed to the workpiece by loosening the top handle, rotating the tool post to the desired position, then re-tightening the handle to lock the tool into position.

Installing Tool

Tool Needed	Qty
Tool Post T-Wrench	1

To install a tool in the tool post:

1. Adjust the tool post bolts so that the cutting tool can fit underneath them (see **Figure 59**).

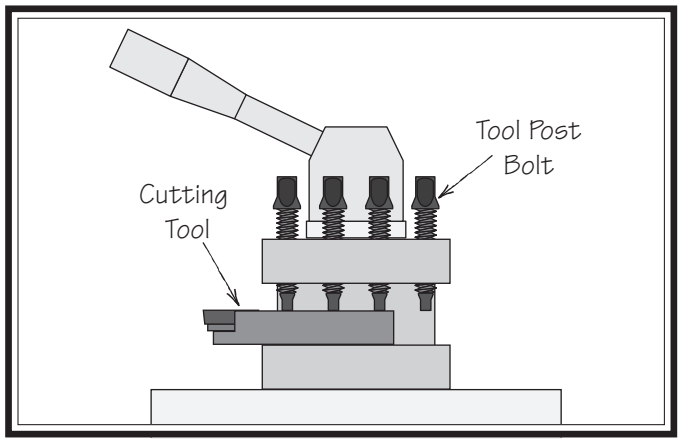


Figure 59. Example of tool mounted in tool post.

⚠WARNING

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

2. Firmly secure the cutting tool with at least two tool post bolts.

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

Aligning Cutting Tool with Spindle Centerline

For most operations, the cutting tool tip should be aligned with the spindle centerline, as illustrated in **Figure 60**.

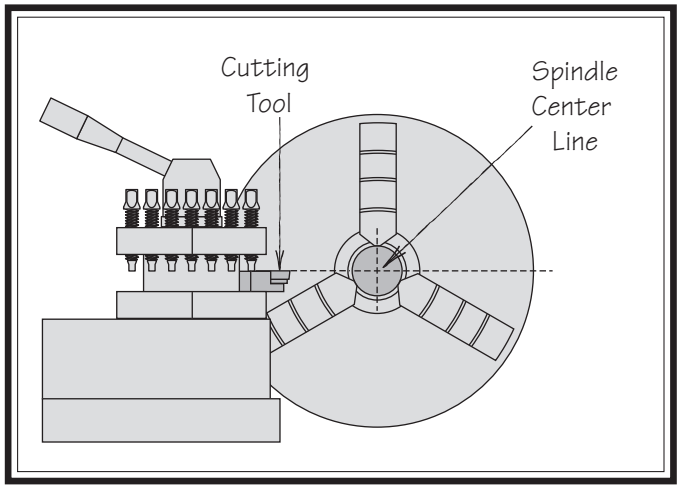


Figure 60. Cutting tool aligned with spindle centerline (viewed from tailstock).

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

Below are two common methods:

- Align the tip of the cutting tool with a center installed in the tailstock, as instructed on the next page. For this to work, the tailstock must be aligned to the spindle centerline (refer to **Aligning Tailstock To Spindle Centerline** on **Page 40** for detailed instructions).

- Make a facing cut on a piece of round bar stock. If the tool is above or below the spindle centerline, a nub will be left in the center of the workpiece. Adjust the height of the tool, then repeat the facing cut to check the adjustment. Repeat as necessary until the center of the workpiece face is smooth.

Tools Needed	Qty
Tool Post T-Wrench	1
Steel Shims	As Needed
Cutting Tool	1
Fine Ruler	1
Tailstock Center	1

To align the cutting tool with the tailstock center:

1. Mount the cutting tool in the tool post, then secure the post so the tool faces the tailstock.

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

3. Lock the tailstock and quill in place.

4. Adjust the height of the cutting tool so that the tool tip is aligned vertically and horizontally with the center tip, as shown in **Figure 61**.

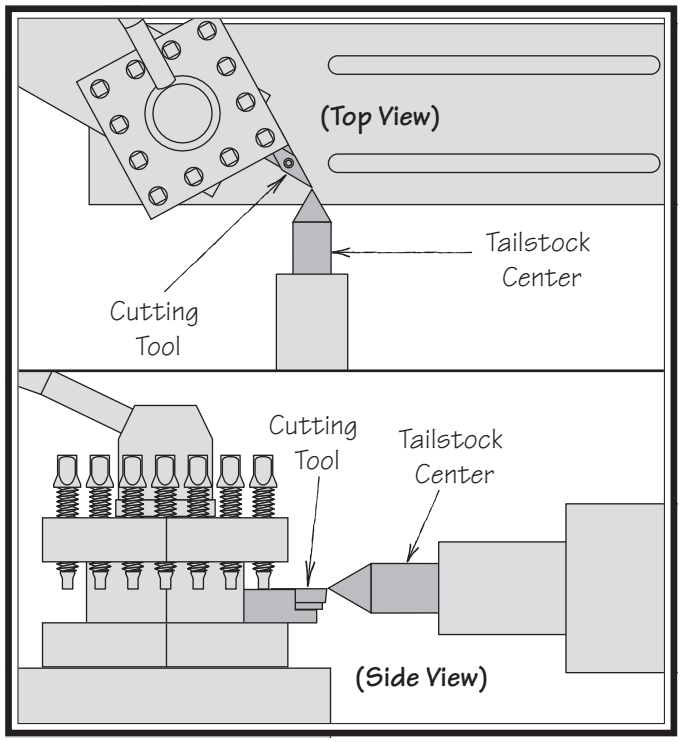


Figure 61. Cutting tool tip aligned with tailstock center.

Adjustable Feed Stop

Use the adjustable feed stop collar (shown in **Figure 62**) to set the location where the carriage should disengage from power feed.

When the apron stop plate contacts the stop collar during an operation that uses the feed rod, the clutch disengages the carriage from the feed rod and movement stops.

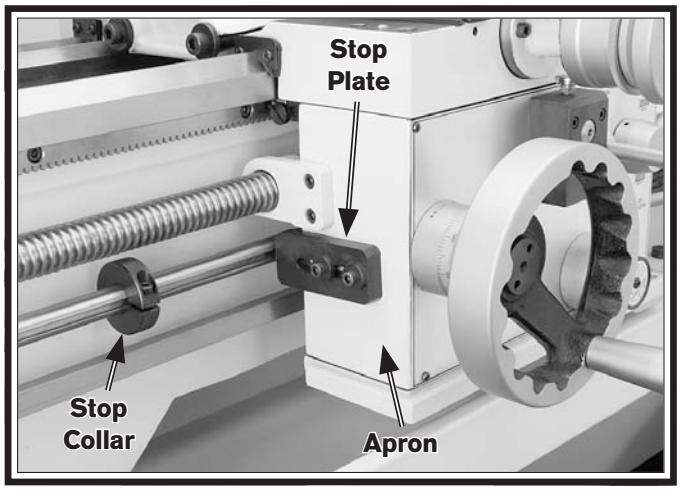


Figure 62. Adjustable feed rod stop collar.

NOTICE

The adjustable feed stop system is designed to stop longitudinal carriage movement at the desired location ONLY when the carriage is engaged with the feed rod.

When the carriage is engaged with the leadscrew for threading operations, the adjustable feed stop system WILL NOT stop carriage movement—you must use the half nut lever instead. Otherwise, the carriage can crash into the chuck, or if it contacts the stop, the leadscrew shear pin will break.

Before doing any threading operation, make sure to loosen the feed stop collar so it slides freely on the feed rod and will not interfere with carriage travel.

Micrometer Stop

The micrometer stop allows you to stop the carriage at the same position for repeat cuts, such as when turning up to a shoulder. The micrometer stop includes a graduated dial that allows you to precisely position the stop.

The micrometer stop is only designed to be used when feeding the carriage by hand—it should not be used as a stop for power feed or threading operations, because this lathe is not equipped with an automatic feed clutch.

NOTICE

The carriage stop on this lathe will NOT automatically stop the carriage during power feed or threading operations when the carriage is engaged with the leadscrew! Failure to heed this notice could result in the carriage crashing and causing severe machine or property damage.

Tools Needed	Qty
Hex Wrench 8mm	1

To set the micrometer stop:

1. DISCONNECT LATHE FROM POWER!

2. Loosen the cap screws shown in **Figure 63**, then use the carriage handwheel to position the carriage at the desired stopping point.

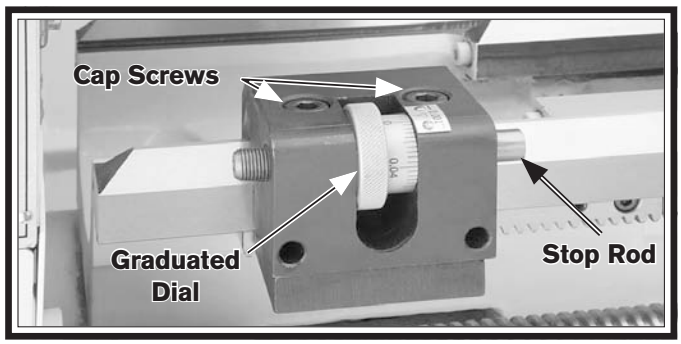


Figure 63. Micrometer stop.

3. Move the micrometer stop up to the carriage, use the graduated dial to fine tune the position, then retighten the cap screws loosened in **Step 2**.

4. Verify that tooling will not make contact with the chuck, jaws, or other components.

Manual Feed

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

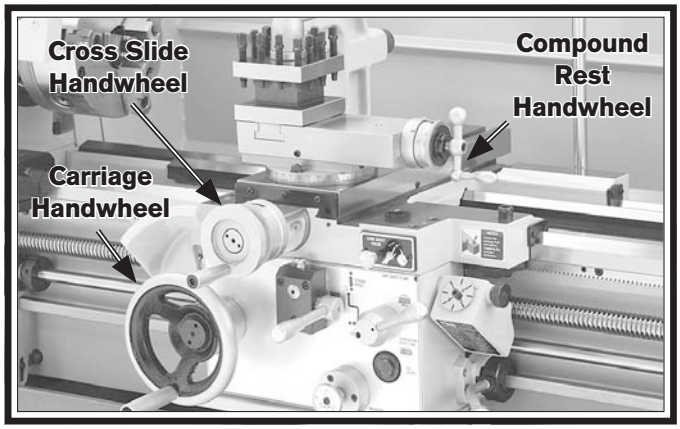


Figure 64. Carriage Controls.

Carriage Handwheel

The carriage handwheel moves the carriage left or right along the bed. It has a graduated dial with 0.01" increments, and one full revolution moves the carriage 0.80". Pull the handwheel out to disengage it during power feed operations—this will prevent entanglement hazards.

Cross Slide Handwheel

The cross slide handwheel moves the tool toward and away from the work. Adjust the position of the graduated scale by holding the handwheel with one hand and turning the dial with the other. The cross slide handwheel has a direct-read graduated dial which means that the distance on the dial reflects the amount removed from the diameter of the workpiece. The dial has 0.001" (0.02mm) increments, and one full revolution moves the slide 0.100" (5.08mm). Rotate the dial collar 180° to read in metric units.

Compound Rest Handwheel

The compound rest handwheel moves the cutting tool linearly along the set angle of the compound rest. The compound rest angle is set by hand-rotating it and securing in place with two hex nuts. The compound rest has an indirect-read graduated dial with 0.001" (0.02mm) increments. One full revolution of the handwheel moves the slide 0.100" (2.54mm). Rotate the dial collar 180° to read in metric units.

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 operation, but the two most important are the recommended cutting speed for the workpiece material and the diameter of the workpiece, as noted in the formula shown in **Figure 65**.

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

*Double if using carbide cutting tool

Figure 65. Spindle speed formula for lathes.

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

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

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

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

Setting Spindle Speed

Selecting one of the 8 spindle speeds available is a combination of configuring the spindle range lever and the spindle speed lever shown in **Figure 66**.

Figure 66. Spindle speed controls.

The spindle speed and range levers control the gear configuration in the headstock to produce the selected spindle speed. Refer to the chart below for the available spindle speeds available.

Low Range (RPM)	High Range (RPM)
80	488
127	772
200	1245
320	2000

NOTICE

ALWAYS make sure the spindle is completely stopped BEFORE using the headstock control levers to make changes. If the spindle is rotating when attempting to change the spindle speed, the headstock gears will suffer damage!

NOTICE

Operating the lathe at spindle speeds higher than 350 RPM when the high (H) gearbox range is selected could result in gearbox damage. Always use spindle speeds of 350 RPM or lower when using the high (H) gearbox range.

Configuration Examples

Using the controls on the lathe, follow along with these two examples for setting the spindle speed to gain a better understanding of this task.

Setting Spindle Speed of 200 RPM

1. Make sure the spindle is completely stopped and the spindle lever is in the OFF (middle) position.

2. Move the spindle range lever to the right so that the arrow on top of its hub points toward the **L** (low) label (see the illustrated in **Figure 67**).

Note: If necessary, use the chuck key to rock the spindle back-and-forth to help mesh the gears as you move the levers.

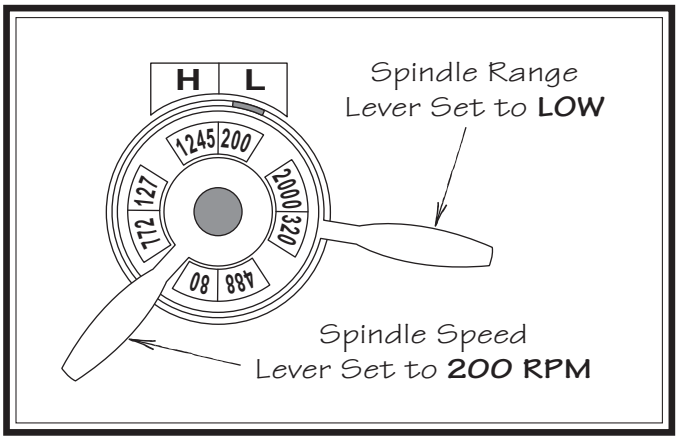


Figure 67. Setting the spindle speed to 200 RPM.

3. Move the spindle speed lever so that the **200** on its hub is also pointing at the **L** label.

Note: You will hear a distinctive click when the spindle speed lever is in the correct position.

The lathe is now set for a spindle speed of 200 RPM.

Setting Spindle Speed of 2000 RPM

1. Make sure the spindle is completely stopped and the spindle lever is in the OFF (middle) position.

2. Move the spindle range lever to the right so that the arrow on top of its hub points toward the **H** (high) label (see the illustrated in **Figure 68**).

Note: If necessary, use the chuck key to rock the spindle back-and-forth to help mesh the gears as you move the levers.

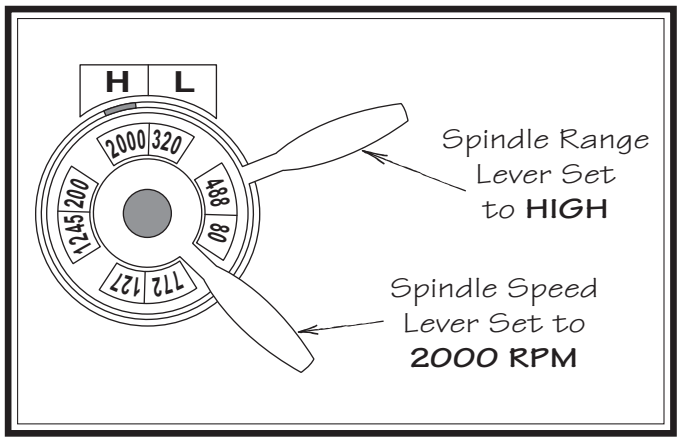


Figure 68. Setting the spindle speed to 2000 RPM.

3. Move the spindle speed lever so that the **2000** on its hub is also pointing at the **H** label.

Note: You will hear a distinctive click when the spindle speed lever is in the correct position.

The lathe is now set for a spindle speed of 2000 RPM.

Power Feed

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

Feed rate and spindle speed must be considered together. Keep in mind that the feed rate is expressed in the amount of travel per revolution of the spindle. The sources you use to determine the optimum spindle speed for an operation will also provide the optimal feed rate to use with that spindle speed.

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

The carriage can alternately be driven by the leadscrew for threading operations. However, this section only covers the use of the power feed option for the carriage and cross slide components for non-threading operations. To learn how to power the carriage for threading operations, refer to **Threading** on **Page 56**.

NOTICE

Operating the lathe at spindle speeds higher than 350 RPM when the high (H) gearbox range is selected could result in gearbox damage. Always use spindle speeds of 350 RPM or lower when using the high (H) gearbox range.

NOTICE

ALWAYS make sure the spindle is completely stopped BEFORE using the headstock control levers to make changes. If the spindle is rotating when attempting to change the configuration of the headstock feed controls, the gears in the headstock and quick-change gearbox will become damaged!

Power Feed Controls

Use **Figures 69–70** and the following descriptions to become familiar with the locations and functions of the controls that you will use to set up the correct power feed for your operation.

Note: Before using power feed, you may have to re-configure the end gears, depending on how they are set up. Refer to **End Gears** on **Page 54** for detailed instructions.

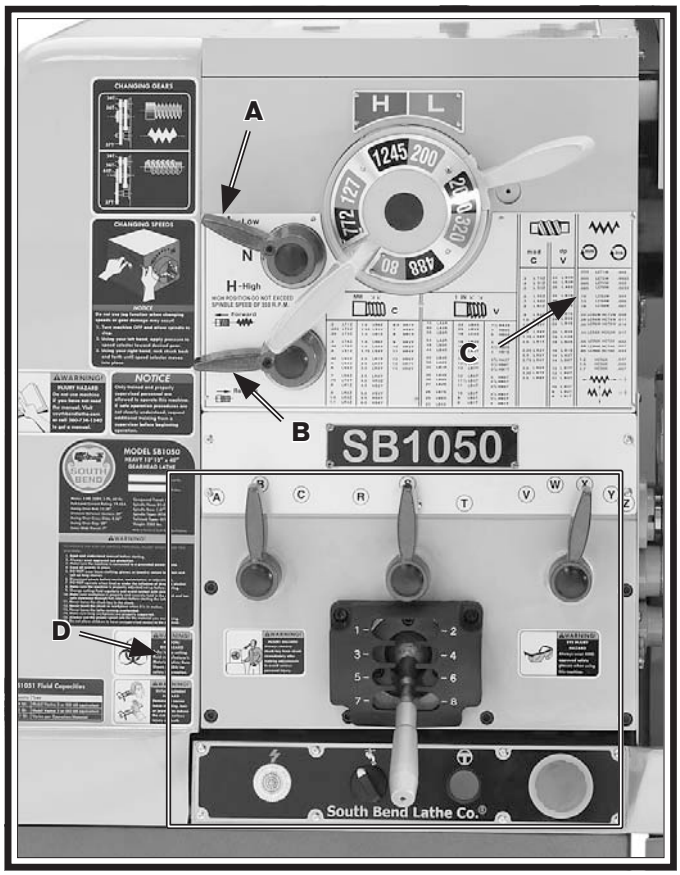


Figure 69. Power feed controls on the headstock.

A. Feed Range Lever: Selects the low or high feed rate range by re-aligning the headstock transfer gear. In the middle position, disables power feed.

B. Feed Direction Lever: When the lathe is stopped, selects the direction for power feed.

Note: When the lathe is running, use the quick-change feed direction knob on the apron.

C. Feed Rate Chart: Displays the settings for the headstock and quick-change gearbox controls for the selected feed rate. Refer to **Setting Feed Rate** subsection on the next page for detailed instructions.

D. Quick-change Gearbox Feed Levers: Configure the quick-change gearbox gears for the feed rate selected.

— Left Lever Positions: **A–C**

— Middle Lever Positions: **R–T**

— Right Lever Positions: **V–Z**

— Bottom Lever Positions: **1–8**

NOTICE

Even though there is a lock-out device in the apron to prevent the feed selection lever and the half nut lever from being engaged at the same time, this lock-out device could break if forced. Attempting to engage these levers at the same time could cause severe lathe damage and will void the warranty.

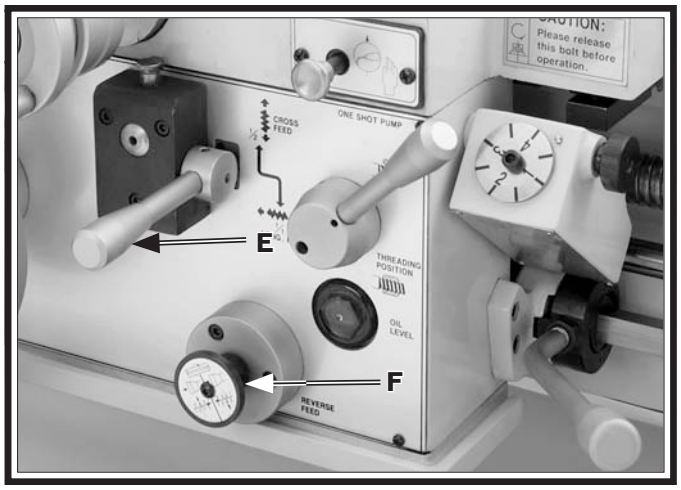


Figure 70. Apron power feed controls.

E. Feed Selection Lever: Directs the power feed to either the cross slide or the carriage.

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

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

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

F. Apron Feed Direction Knob: Changes the feed direction when the lathe is running.

The advantage of this knob is that you can quickly reverse power feed direction while the spindle is rotating—without having to turn the lathe off, waiting until the spindle is stopped, then using the feed direction lever on the headstock.

NOTICE

Depending on the combined configuration of the headstock feed direction lever and the apron feed direction knob, the actual direction of power feed may be different from the printed indicators on the machine!

Setting Power Feed Rate

The feed rate chart on the upper right of the headstock face displays the settings for the headstock feed controls for metric and inch feed rates.

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

Setting Power Feed Rate of 0.18mm/rev

1. Make sure the end gears are in the standard configuration, which is applicable for general feed operations (refer to **End Gears** on the next page for detailed instructions).

2. Locate the line in the feed rate chart that lists the setting for 0.18mm of feed per revolution of the spindle, as illustrated in **Figure 71**.

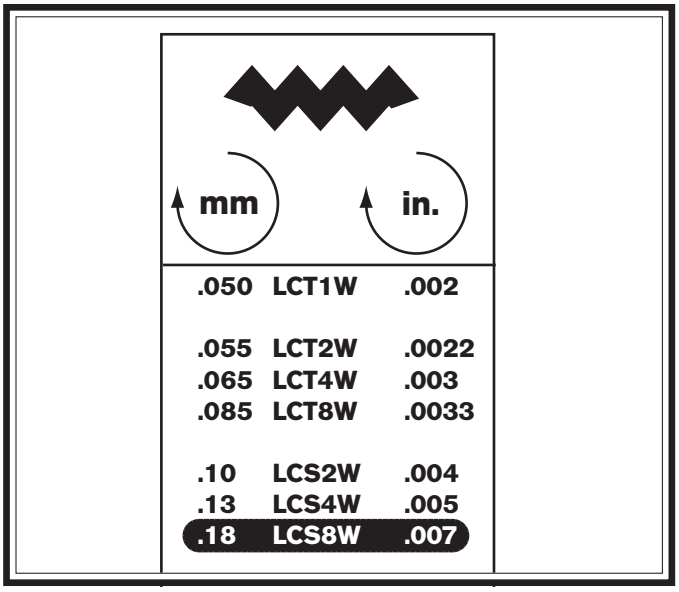


Figure 71. Feed rate chart.

NOTICE

When using power feed to move the cross slide, the feed rate is ½ the value stated in the feed rate chart.

3. The configuration string of characters to the right of the selected feed rate (**LCS8W**) displays the positions to set the feed controls for a feed rate of 0.18mm/rev. (see **Figure 71**).

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

4. Position the controls as directed by the configuration string as follows (see **Figure 72**):

L Move the feed range lever to the low (Low) position.

C Point the left quick-change gearbox lever to the C.

S Move the middle quick-change gearbox lever to the S.

8 Position the bottom gearbox lever in the 8 slot.

W Point the right gearbox lever to the W.

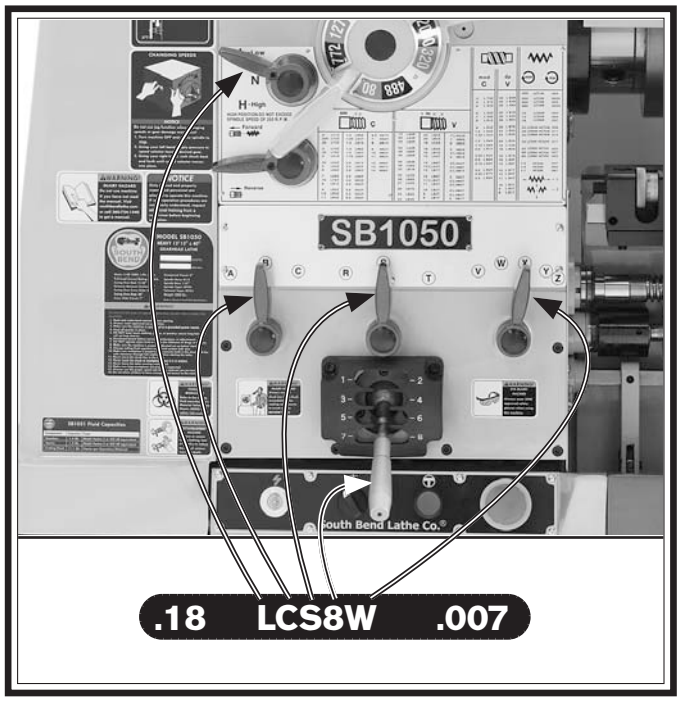


Figure 72. Power feed controls positioned for 0.18 mm/rev.

The lathe is now set up for a power feed rate of 0.18mm per spindle revolution.

End Gears

The end gears can be setup for the standard or alternate configuration, depending upon the type of operation to be performed. The lathe is shipped with the end gears in the standard configuration.

Standard End Gear Configuration

Use the standard end gear configuration for inch threading, metric threading, and all general feed operations.

In this configuration, the end gears are installed as follows: the 24T end gear is installed in the top position, the 44T/56T transposing gears in the middle position, and the 57T end gear in the bottom position, as shown in **Figure 73**. In this configuration the 56T and 57T gears are meshed.

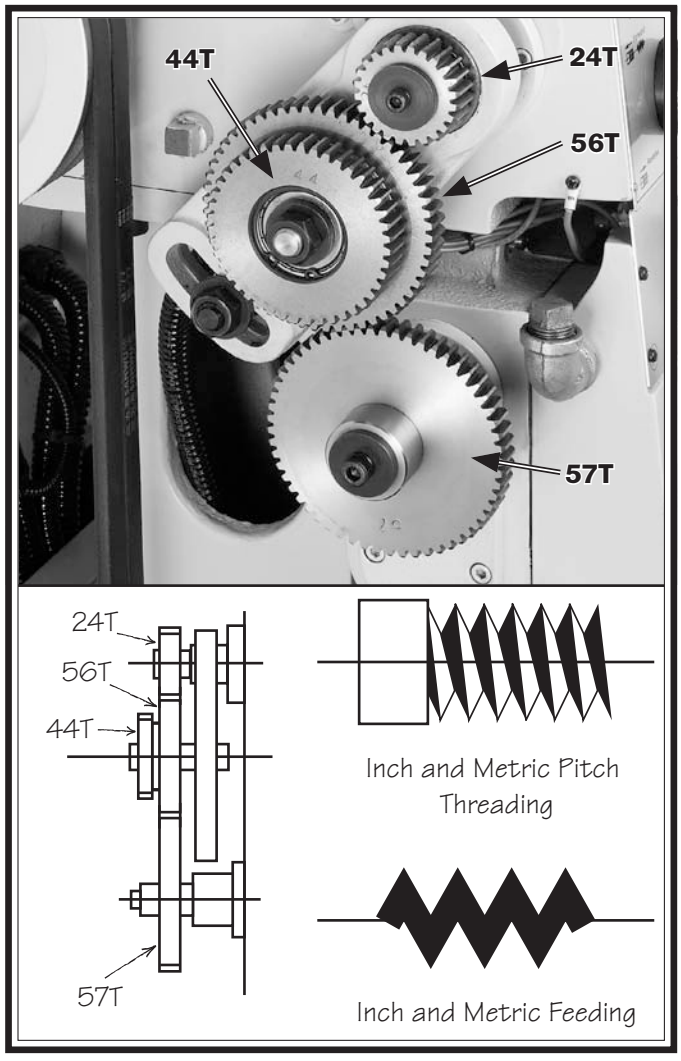


Figure 73. End gears in the standard configuration.

Alternate Configuration

The alternate end gear configuration is used when cutting modular or diametral threads. The 57T end gear is positioned on the outside so that it meshes with the 44T transposing gear instead of the 56T gear, as illustrated in **Figure 74**.

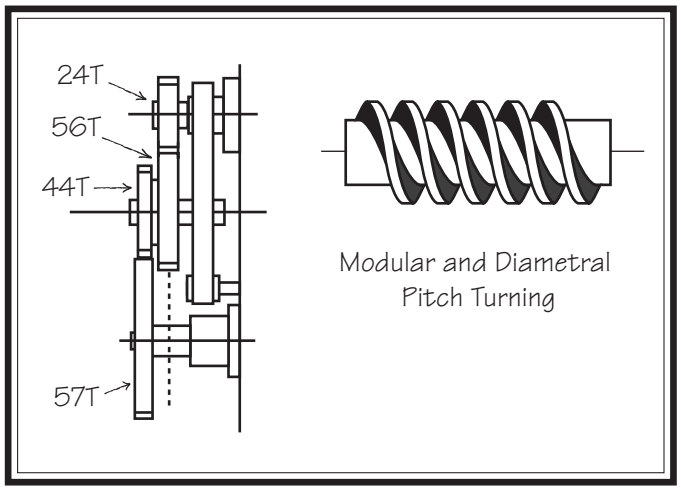


Figure 74. Alternate end gear configuration.

Configuring End Gears

Tools Needed	Qty
Hex Wrench 6mm	1
Wrench 22mm	1

To configure the end gears:

1. DISCONNECT LATHE FROM POWER!

2. Remove the headstock end gear cover.

3. Remove the cap screw, lock washer, and flat washer from the bottom 57T end gear (see **Figure 75**).

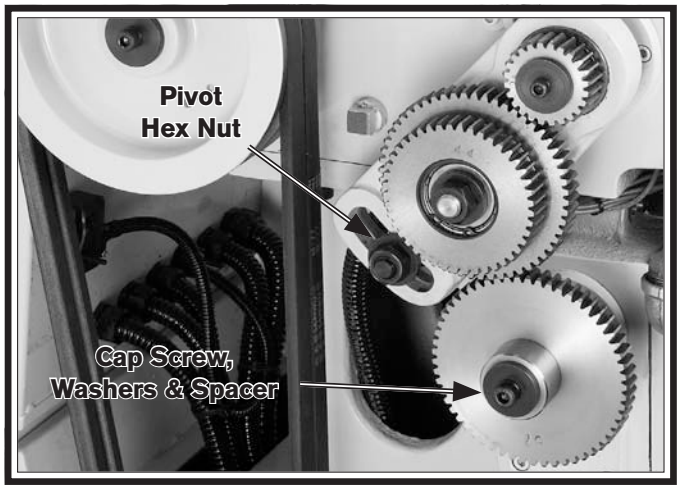


Figure 75. End gear components.

4. Loosen the pivot arm hex nut shown in **Figure 75**, then swing the pivot arm to the left so that 44T/56T gears are away from the 57T gear. Hand tighten the hex nut to keep the arm in place.

5. Use a stiff brush and mineral spirits to clean away the debris and grime from the gears and shafts, then lubricate these devices as instructed in the **End Gears** lubrication subsection on **Page 70**.

6. Making sure to keep the key seated in the shaft, remove the spacer and the 57T gear, then re-install them as follows:

   — For the standard end gear configuration, slide the 57T gear on first, then the spacer on the outside.

   — For the alternate end gear configuration, slide the spacer on first, then the gear.

7. Re-install the cap screw, lock washer, and flat washer you removed in **Step 3** to secure the spacer and 57T gear.

Note: DO NOT overtighten the cap screw—it merely holds the gear in place. Overtightening it will make it harder to remove later and may restrict the rotation of the gears.

8. Slide the pivot arm back so that either the 44T or the 56T meshes with the 57T gear, then retighten the pivot arm hex nut.

Note: Make sure to keep approximately 0.002" play between the gears.

9. Replace and secure the end gear cover before connecting the lathe to power.

Threading

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

Headstock Threading Controls

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

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

Setting Metric Thread Pitch of 1.75

1. Make sure the end gears are in the standard configuration, which is used for all metric threading (refer to **End Gears** on **Page 54** for detailed instructions).

2. Locate the line in the metric thread chart that lists the setting for 1.75 threads per millimeter, as illustrated in **Figure 76**.

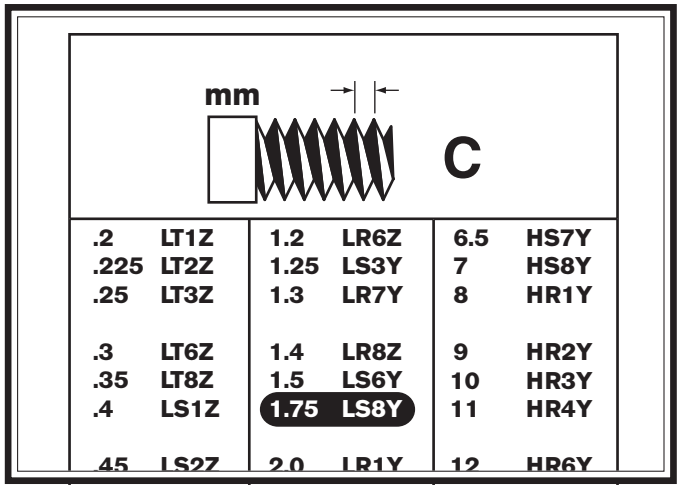


Figure 76. Metric thread chart with 1.75mm highlighted.

3. The configuration string of characters to the right of the selected thread pitch (**LS8Y**) displays the positions to set the threading controls for a metric thread pitch of 1.75 (see **Figure 76**).

4. Position the controls as follows:

   Note: Each of the thread charts has a **C** or **V** in the header that is to be used for all of the listings in that chart. For the **C**, use the left quick-change gearbox lever, and for the **V** use the right.

   L Move the feed range lever to the low (Low) position.

   S Point the middle quick-change gearbox lever to the **S**.

   8 Position the bottom gearbox lever in the **8** slot.

   Y Point the right gearbox lever to the **Y**.

The lathe is now set up to cut 1.75mm threads.

Apron Threading Controls

The half nut lever engages the carriage with the leadscrew which moves the carriage and cutting tool, along the length of the workpiece for threading operations (see **Figure 77**).

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

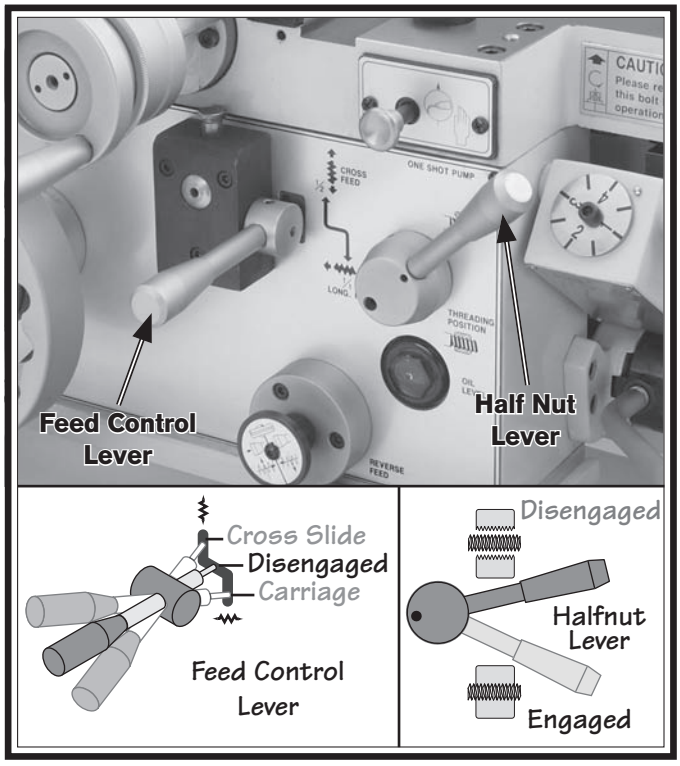


Figure 77. Apron threading controls.

Thread Dial

The numbers on the thread dial are used with the thread dial chart to show when to engage the half nut during inch threading. The thread dial gear must be engaged with the leadscrew for this to work. Loosen the knurled knob on the thread dial, pivot the dial gear toward the leadscrew so that it properly meshes with the leadscrew threads, then re-tighten the knob, as shown **Figure 78**.

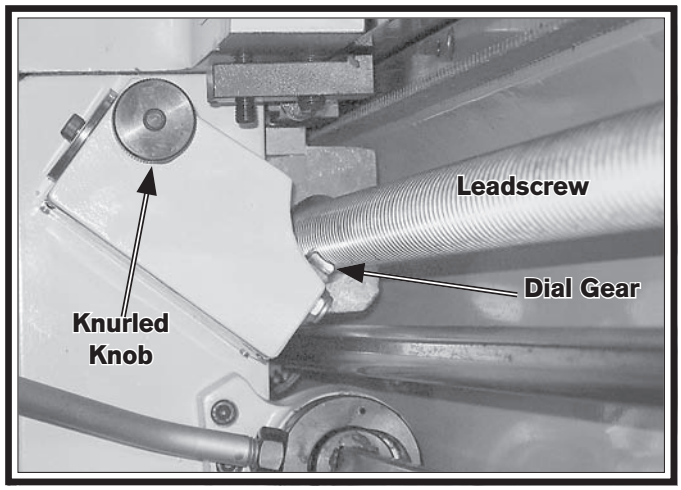


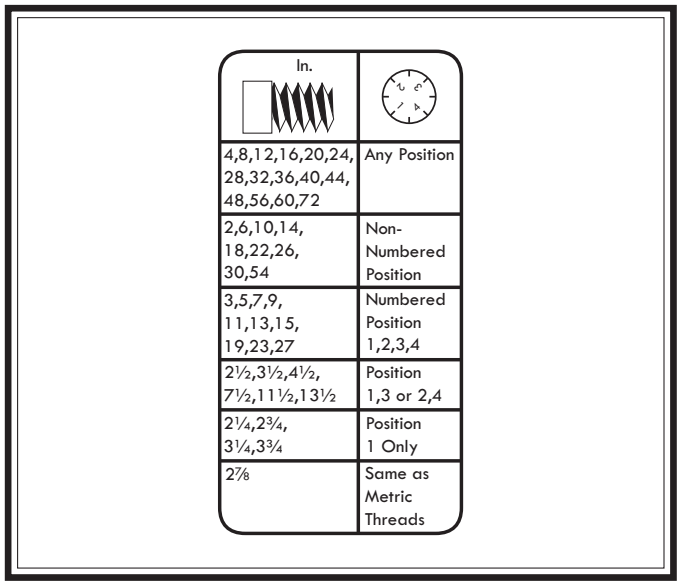
Figure 78. Thread dial engaged with the leadscrew.

NOTICE

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

Thread Dial Chart

Find the TPI (threads per inch) that you want to cut in the left column of the thread dial chart (see **Figure 79**), then reference the dial number to the right of it. The dial numbers indicate when to engage the half nut for a specific thread pitch. The thread dial chart can also be found on the front of the thread dial housing.



In.	
4,8,12,16,20,24, 28,32,36,40,44, 48,56,60,72	Any Position
2,6,10,14, 18,22,26, 30,54	Non-Numbered Position
3,5,7,9, 11,13,15, 19,23,27	Numbered Position 1,2,3,4
2½,3½,4½, 7½,11½,13½	Position 1,3 or 2,4
2¼,2¾, 3¼,3¾	Position 1 Only
2⅞	Same as Metric Threads

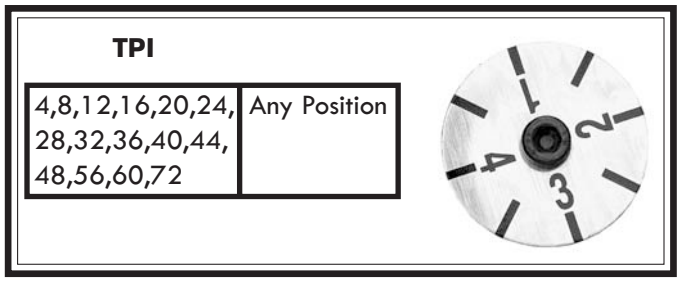
Figure 79. Thread dial chart.

Note: The thread dial is not used for metric threading, or diametral and modular pitches. You must leave the half nut engaged from the beginning until the turning is complete for these types of operations.

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

TPI Divisible By 4

For threading a TPI that is divisible by four, use any line on the thread dial (see **Figure 80**).

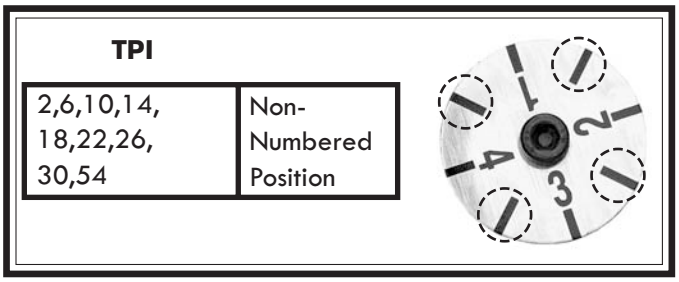


TPI	
4,8,12,16,20,24, 28,32,36,40,44, 48,56,60,72	Any Position

Figure 80. Any position on the dial for threading TPI divisible by 4.

Even TPI Not Divisible By 4

For threading a TPI that is even but not divisible by 4, use any of the non-numbered lines on the thread dial (see **Figure 81**).

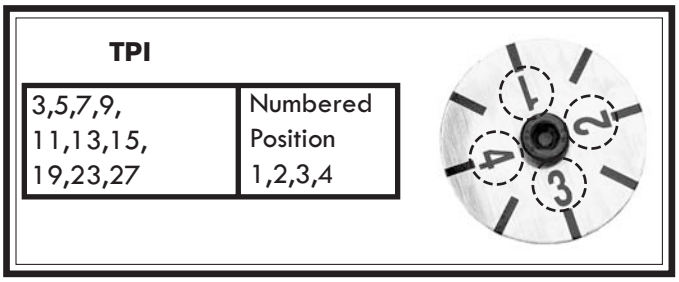


TPI	
2,6,10,14, 18,22,26, 30,54	Non-Numbered Position

Figure 81. Marks are selected on the dial for threading even TPI not divisible by 4.

Odd Numbered TPI

For odd numbered TPI, use any of the numbered lines on the thread dial (see **Figure 82**).

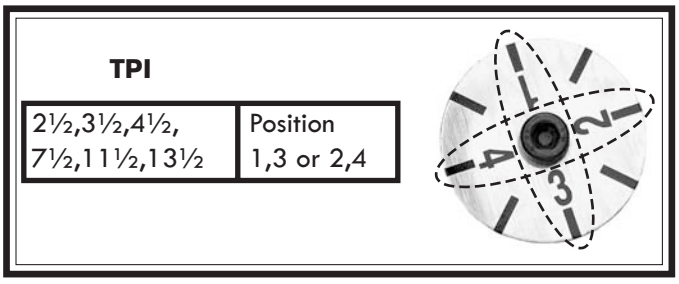


TPI	
3,5,7,9, 11,13,15, 19,23,27	Numbered Position 1,2,3,4

Figure 82. Numbers are selected on the dial for threading odd numbered TPI.

½ Fractional TPI

Use any opposing number pairs—2/4 or 1/3 on the thread dial for ½ fractional TPI (see **Figure 83**). For example, to cut a 3½ thread, select 1 or 3 on the dial.



TPI	
2½,3½,4½, 7½,11½,13½	Position 1,3 or 2,4

Figure 83. Opposing number group are selected on dial for cutting ½ thread TPI.

¼ or ¾ Fractional TPI

For TPI that have a ¼ or ¾ fraction, use position 1 on the thread dial (see **Figure 84**).

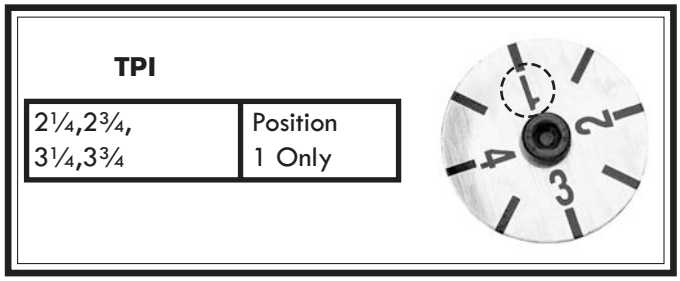


Figure 84. Position for ¼ or ¾ fractional TPI.

2⅞ TPI

The thread dial is not used for 2⅞ or metric threading, or diametral and modular pitches (see **Figure 85**). The half nut must stay engaged with the leadscrew throughout the entire threading operation.

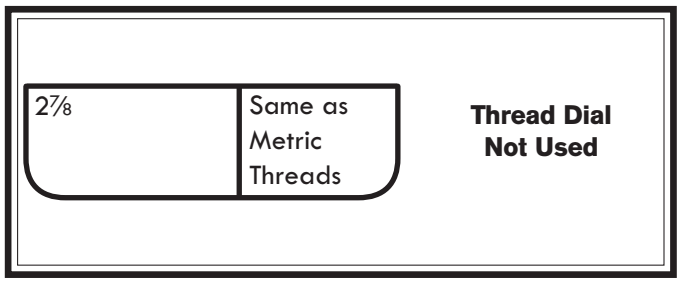


Figure 85. Half nut stays engaged for 2⅞ TPI.

Chip Drawer

The chip drawer catches swarf and metal chips during the machining process. It contains a screen that prevents large chips from returning to the reservoir with the run-off coolant and causing damage to the pump.

Also, it slides open and is removable for cleaning (see **Figure 86**).

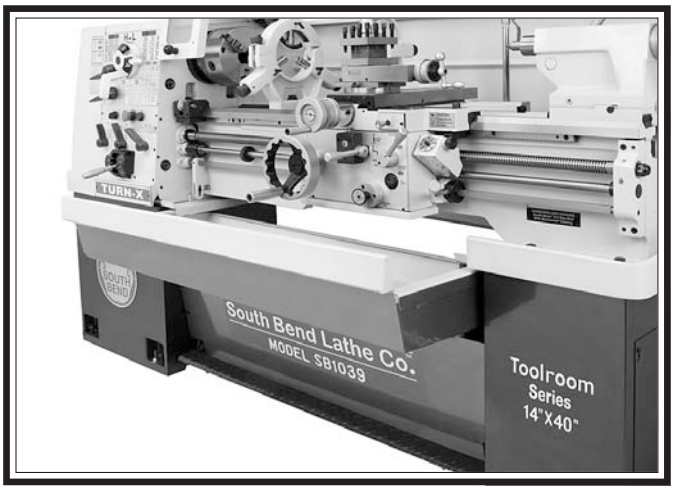


Figure 86. Chip drawer.

⚠CAUTION

The chip drawer is very heavy. Unless removing the chip drawer for cleaning, do not pull it out more than halfway; otherwise, it could fall out and cause a crushing injury. If removing the drawer for cleaning, get assistance!

Coolant System

When the coolant pump is turned ***ON***, the fluid is delivered through the nozzle attached to the carriage. The flow is controlled by the valve lever at the base of the nozzle (see **Figure 87**).

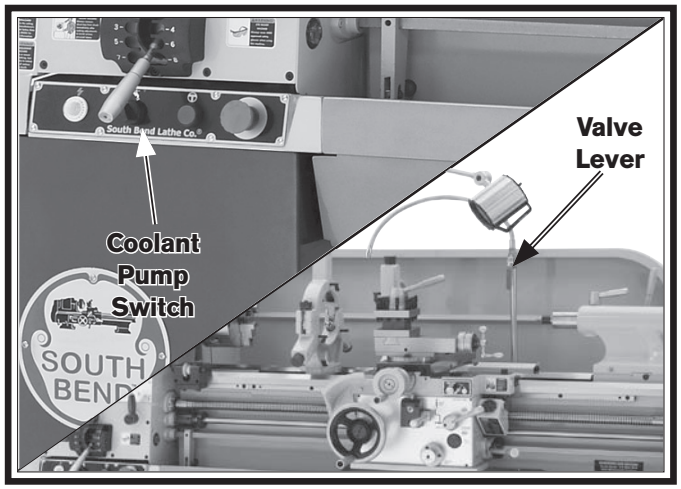
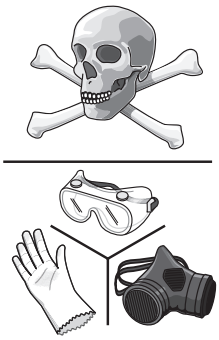


Figure 87. Coolant flow controls.

Always use high quality coolant and follow the manufacturer's instructions for diluting. The quick reference table shown in **Figure 88** can help you select the appropriate fluid.

Refer to **Coolant System Service** on **Page 71** for detailed instructions on how to add or change fluid. Check the coolant regularly and promptly change it when it becomes overly dirty or rancid, or as recommended by the fluid manufacturer.



⚠WARNING

BIOLOGICAL & POISON HAZARD!

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

NOTICE

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

To use the coolant system on your lathe:

1. Make sure the coolant tank is properly serviced and filled with the appropriate fluid, and that you are wearing the necessary personal protection equipment.

2. Position the coolant nozzle for your operation.

3. Use the coolant pump switch on the control panel to turn the pump ***ON***.

4. Adjust the flow of coolant by using the valve lever near the base of the nozzle hose.

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

Workpiece	Dry	Water Soluble Oil	Synthetic Coolants	Sulferized Oil	Mineral Oil
Aluminum		X	X		
Brass	X	X	X		
Bronze	X	X	X		X
Cast iron	X				
Low Carbon Steel		X	X		
Alloy Metals		X	X	X	X
Stainless Steel		X	X	X	X

General Note: Coolants are used for heavy-duty lathe operations and production turning. Oil-water emulsions and synthetic cutting fluids are the most common for typical lathe operations. Sulferized oils often are used for threading. For small projects, spot lubrications can be done with an oil can or brush, or omitted completely.

Figure 88. Coolant selection table.

Accessories

This section includes the most common accessories available for your lathe, which may be available through your local South Bend Lathe Co. dealer. If you do not have a dealer in your area, please call us at (360) 734-1540 or email us at **cs@southbendlathe.com**.

SB1279—10 Pc. Precision 5—C Collet Set

Set of 10 collets sized from ⅛" - ¾". Same quality as the individual collets, only packaged in one convenient set.

Figure 89. Model SB1279 10 Pc. 5-C Collet Set.

SB1264—Collect Attachment

This collet attachment takes advantage of the South Bend factory-made collet port in the lathe gear cover. This accessory installs easily on these South Bend Lathes without having to modify the gear cover. The Model SB1264 is capable of delivering years of trouble-free service. It is manufactured with the same high-quality workmanship, materials, and tolerances South Bend machinery is known for.

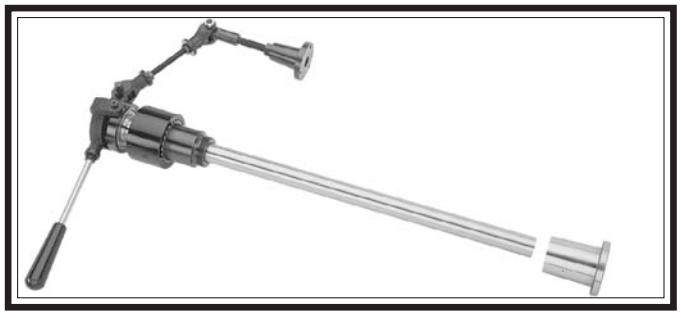


Figure 90. Model SB1264 Collect Attachment.

D1-5 Back Plates
SB1397—6¼"
SB1399—8¼"
SB1401—10½"

Sized to fit D1-5 chuck mounts, these back plates are precision made and mount to your chuck with minimal modifications.

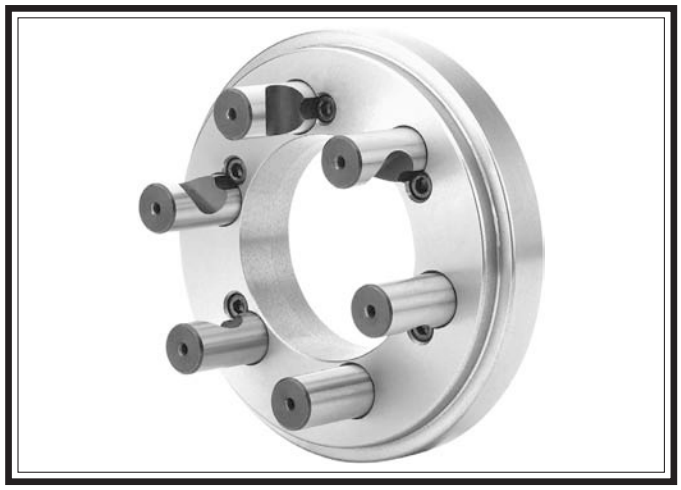


Figure 91. D1-5 Back Plate.

SB1263—Taper Attachment

This taper attachment mounts quickly to the back bedway of your lathe. Accurate tapers of up to 12" can be produced without repositioning the attachment, having to offset the tailstock, or disengaging the cross slide nut. The Model SB1263 features scales at both ends, reading inches-per-foot and degrees. An angle adjusting knob with fine threads achieves exacting control when setting tapers.

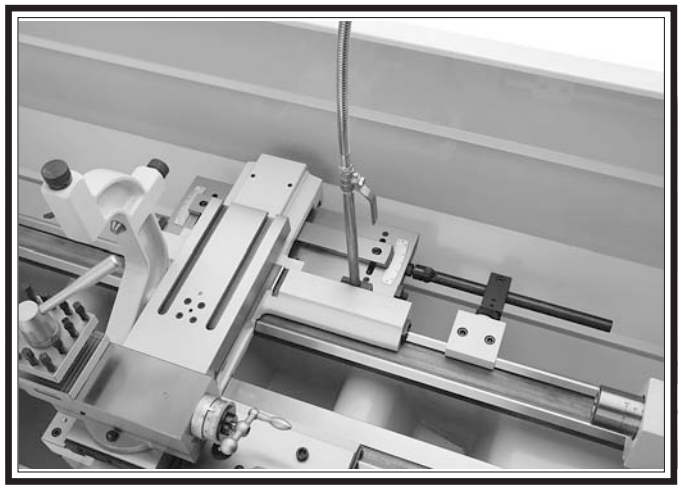


Figure 92. Model SB1263 Taper Attachment.

Keyless Integral Chucks
SB1379—MT #3 ½"
SB1380—MT #3 ⅝"
These keyless chucks are produced with an integral shank to maximize concentricity between the body, shank, and jaws. They start as a one-piece high-alloy body which is turned, then finish ground throughout, making them as close to zero TIR (Total Indicated Runout) as can be. Keyless chuck self-tighten, so a spanner is provided to ease tool removal.

Figure 93. MT #3 Keyless Chuck.

SB1298—SBL Bench Lathe Shop Clock
SB1299—SBL Toolroom Lathe Shop Clock
SB1300—SBL Lathe with Man
These fine traditional shop clocks are constructed with a metal antique-finished frame. They are easy to read from a distance and measure 14" in diameter. Pictures just don't do them justice. They are very nice quality clocks and perfect for the South Bend Lathe aficionado.

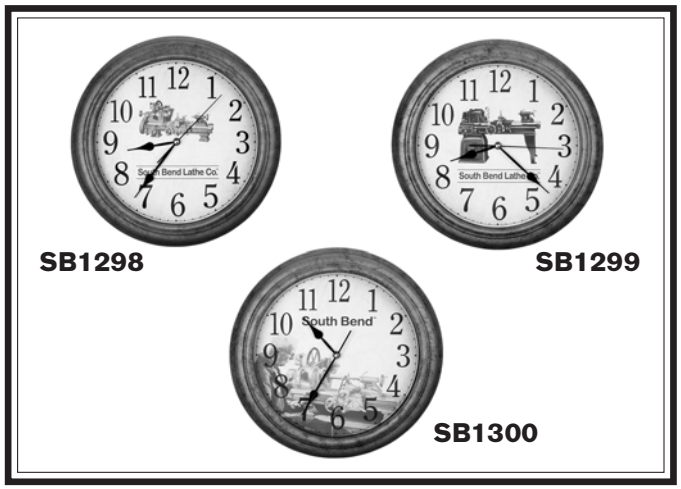


Figure 94. Antique-finished South Bend shop clocks.

SB1238—High Performance MT#3 Live Center
- Shafts are made of alloy steel and vacuum heat-treated to HRC60°±1 for high rigidity and durability.
- Centers use a combination of roller bearings, thrust bearings, and ball bearings.
- Waterproof design.

Figure 95. SB1238 High Performance Live Center.

SB1245—MT#2 Bull Nose Center
- Cr-Mo steel; hardened to HRC60 ± 1
- Taper roller & ball bearing construction
- Great for turning pipes

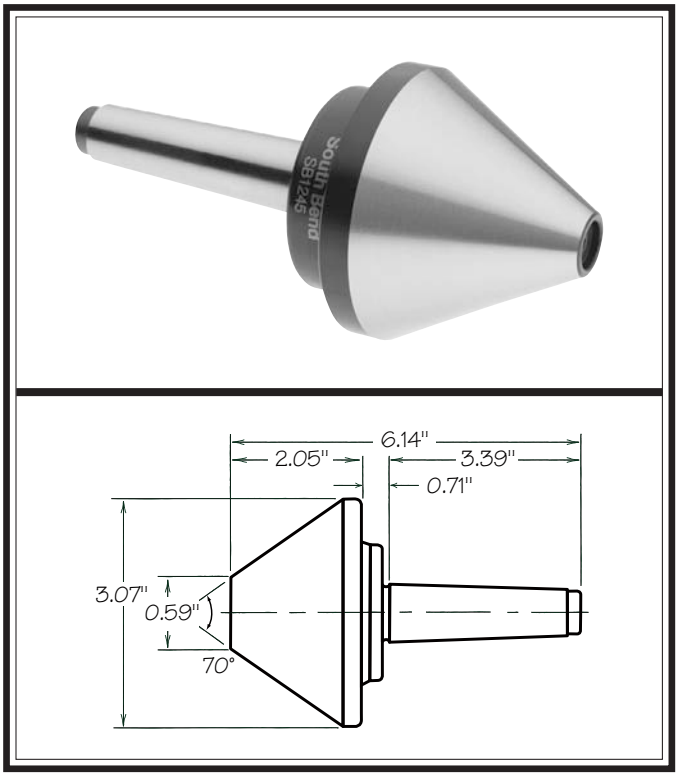


Figure . SB1245 MT#2 Bull Nose Center.

SB1365—Way Oil
Engineered for the high pressure exerted on horizontal or vertical ways and slides. Protects against rust and corrosion. Ensures stick-free, smooth motion which maximizes finishes and extends the life of your machine Won't gum up! 12 oz. AMGA#2 (ISO 68 equivalent)

Figure 96. SB1365 Way Oil.

SB1282—High Performance MT#3 Live Center Set
South Bend brand live centers are the best centers in the industry made with pride and uncompromising quality.

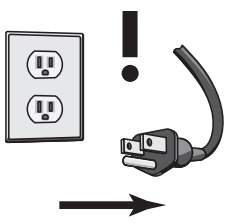
- Shafts are made of alloy steel and vacuum heat-treated to HRC60°±1 for high rigidity and durability.
- Centers use a combination of roller bearings, thrust bearings, and ball bearings.
- Waterproof design.

Figure 97. High Performance Live Center Set.

SB1251—Machinist's Oak Tool Box
Proudly made in the South Bend tradition, this heavy-duty oak tool chest will safeguard your finest tools for many years of dependable service. Solidly constructed with mortise and tenon joinery, this tool box features a locking top lid and front panel and 13 drawers of various sizes. Seven drawers even have removable dividers for organizing and protecting tools. All drawers and top compartment are felt-lined for added protection. The front panel secures all drawers when the top lid is latched or locked and neatly slides under the bottom drawer when accessing the drawers. All hardware is brass including the heavy-duty side handles. Weighs 65 lbs.

Figure 98. SB1251 Machinist's Oak Tool Box.

Maintenance Schedule



⚠WARNING

Always disconnect power to the machine before performing maintenance. Failure to do this may result in electrocution or accidental startup injury.

For optimum performance from this machine, this maintenance schedule must be strictly followed. We strongly recommend all operators make a habit of following the daily maintenance procedures. Use the chart provided on **Page 65** to ensure this is done.

Ongoing

The condition of machine components should be carefully observed at all times to minimize the risk of injury or machine damage. If any of the conditions below are observed, stop the lathe immediately, disconnect power, and correct the condition before resuming operations:

- Loose mounting bolts or fasteners.
- Worn, frayed, cracked, or damaged wires.
- Guards removed.
- STOP button not working correctly or not requiring you to reset it before starting the machine again.
- A reduction in braking speed or efficiency.
- Oil level not visible in the sight glasses.
- Coolant not flowing out.
- Damaged or malfunctioning components.

Daily, Before Operations

- Check/add headstock oil (**Page 66**).
- Check/add gearbox oil (**Page 67**).
- Check/add apron oil (**Page 67**).
- Check/add coolant (**Page 71**).
- Lubricate the ways (**Page 68**).
- Add oil to the ball oilers (**Page 69**).
- Clean/lubricate the leadscrew (**Page 68**).
- Disengage the feed selection lever on the apron (to prevent crashes upon startup).
- Ensure carriage lock bolt is loose.

Daily, After Operations

- Depress STOP button and shut ***OFF*** the master power switch (to prevent accidental startup).
- Vacuum/clean all chips and swarf from bed, slides, and chip drawer.
- Wipe down all unpainted or machined surfaces with an oiled rag.

Monthly

- Drain and clean the coolant tank, then add new fluid (**Page 71**).

Annually

- Change the headstock oil (**Page 66**).
- Change the apron oil (**Page 67**).
- Change the gearbox oil (**Page 67**).
- Lubricate end gears (**Page 70**).
- Check/level bedway (**Page 23**).

Cleaning & Protecting

Regular cleaning is one of the most important steps in taking care of this lathe. We recommend that the cleaning routine be planned into the workflow schedule, so that adequate time is set aside to do the job right.

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

Besides the ways, all other unpainted and machined surfaces should be wiped down daily to keep them rust-free and in top condition. This includes any surface that is vulnerable to rust if left unprotected (especially any parts that are exposed to water-soluble coolant). Typically, a thin film of oil is all that is necessary for protection.

South Bend Lathe Co.® Lathe Monthly Maintenance Chart

Item \ Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Lubrication																															
Ways																															
Ball Oilers																															
Leadscrew																															
Unpainted Surfaces																															
Inspection																															
Headstock Oil Level																															
Gearbox Oil Level																															
Apron Oil Level																															
Coolant Level																															
Coolant Condition		**Refer to the coolant manufacture's instructions for more information regarding coolant condition, replacement, disposal, and safety.**																													

Use this chart to keep track of the maintenance performed on your South Bend Lathe. Cross out or initial the "Day" box for each item on the list. If the box is blacked out, maintenance is not required for that item on that day. Use the maintenance poster included with your South Bend Lathe as a quick reference guide when performing the maintenance items.

Annual Service

Once every year, or more often with heavy use, perform these service items. Keep track of when you last performed your annual service and when you'll need to perform it again.

Date of last annual service:	
Date of next annual service:	

Service Item	☑
Change Gearbox Oil	
Change Headstock Oil	
Change Apron Oil	
Change Coolant	

Make copies of this page to use each month. Keep each chart as a maintenance record for your South Bend Lathe.

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NOTICE

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

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

Lubrication

Headstock

Oil Type .. Mobil DTE Light or ISO 32 Equivalent
Oil Amount ..... 6.4 Quarts
Check/Add Frequency ..... Daily
Change Frequency ..... Every 6 Months

The headstock gearing is lubricated by an oil bath that distributes the lubricant with the motion of the gears, much like an automotive manual transmission.

Checking Oil Level

The headstock reservoir has the proper amount of oil when the oil level in the sight glass is approximately halfway. The oil sight glass is located on the right side of the headstock, as shown in **Figure 99**.

Figure 99. Location of headstock oil sight glass.

Adding Oil

The oil fill plug is located on top of the headstock, as shown in **Figure 100**.

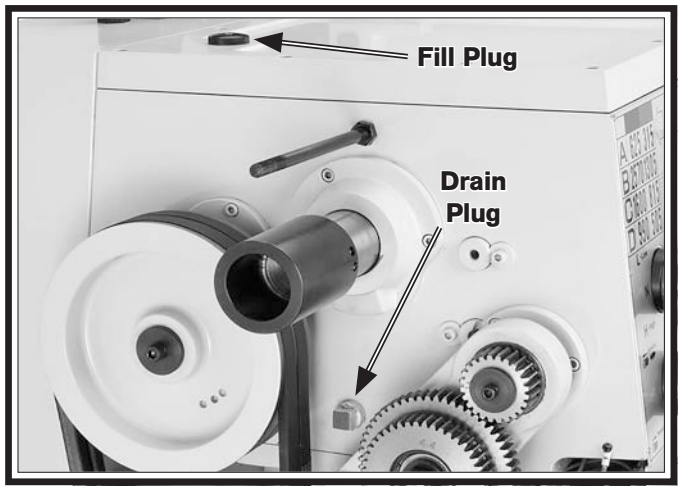


Figure 100. Headstock fill and drain plugs.

Changing Oil

Items Needed	Qty
Wrench ⅝"	1
Catch Pan 2-Gallon	1

To change the headstock oil:

1. DISCONNECT LATHE FROM POWER!
2. Remove the end gear cover.
3. Remove the V-belts so that oil does not get on them, necessitating their replacement (refer to the **V-Belt** subsection on **Page 77** for detailed instructions).
4. Remove the fill plug on top of the headstock to allow the oil to drain more freely.
5. Place the catch pan under the headstock drain plug (see **Figure 100**), then remove the plug.
6. When the headstock reservoir is empty, replace the drain plug and clean away any oil that may have spilled.
7. Fill the headstock reservoir until the oil level is approximately halfway in the sight glass.
8. Replace and re-tension the V-belts, then secure the end gear cover before re-connecting the power.

Quick-Change Gearbox

Oil Type ..... Mobil Vactra 2 or ISO 68 Equivalent
Oil Amount ..... 1.4 Quart
Check/Add Frequency ..... Daily
Change Frequency ..... Annually

Checking Oil Level

The gearbox reservoir has the proper amount of oil when the oil level in the sight glass is approximately halfway. The oil sight glass is located on the right side of the gearbox, as shown in **Figure 101**.

Figure 101. Location of quick-change gearbox oil sight glass.

Adding Oil

Use a 5/8" wrench to remove the gearbox fill plug (see **Figure 102**), then add the oil until the level is approximately halfway in the gearbox oil sight glass.

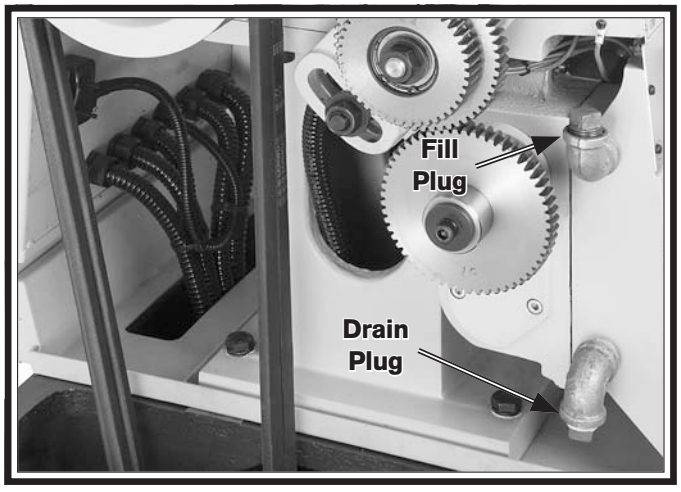


Figure 102. Locations of the quick-change gearbox fill and drain plugs.

Draining Oil

Place a catch pan under the quick-change gearbox drain plug (see **Figure 102**), use a 5/8" wrench to loosen the fill plug and remove the drain plug, then allow the gearbox reservoir to empty.

Apron

Oil Type ..... Mobil Vactra 2 or ISO 68 Equivalent
Oil Amount ..... 1.2 Quarts
Check/Add Frequency ..... Daily
Change Frequency ..... Annually

Checking Oil Level

The apron oil sight glass is on the front of the apron, as shown in **Figure 103**. Maintain the oil volume so that the level is approximately halfway in the sight glass.

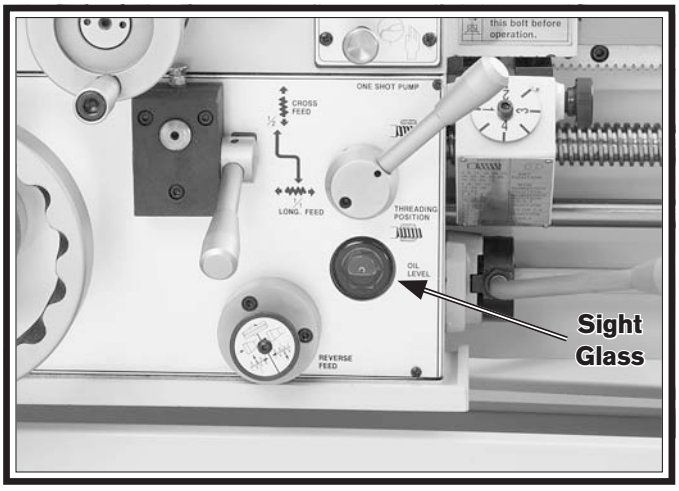


Figure 103. Location of apron oil sight glass.

Draining Oil & Flushing Reservoir

Since the apron oil reservoir supplies the one-shot oiler, the oil is constantly being refreshed when the reservoir is filled. However, small metal particles may accumulate at the bottom of the reservoir with normal use. Therefore, to keep the reservoir clean, drain and flush it at least once a year.

Place a catch pan under the apron drain plug shown in **Figure 104**, loosen the fill plug, then use a 6mm hex wrench to remove the drain plug and empty the reservoir.

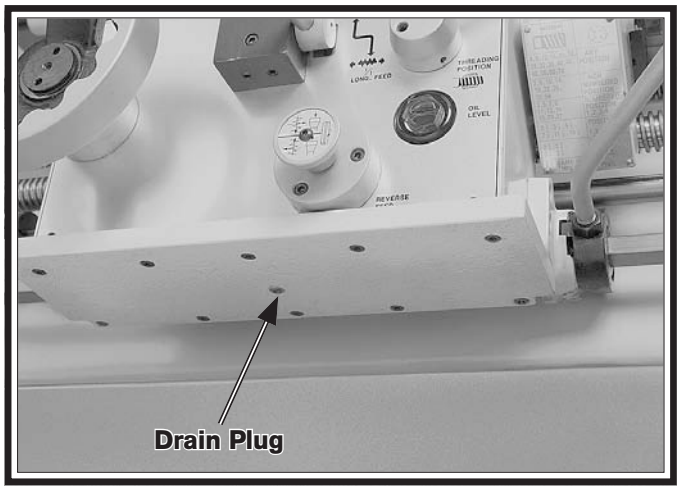


Figure 104. Location of apron drain plug.

Flush the reservoir by pouring a small amount of clean oil into the fill hole and allowing it to drain out the bottom.

Replace the drain plug and add oil as previously described.

One-Shot Oiler

The one-shot oiler shown in **Figure 105** lubricates the saddle ways with oil from the apron reservoir.

To use the one-shot oiler, pull the pump knob out for two or three seconds and then push it in. The pump draws oil from the apron reservoir and then forces it through drilled passages to the way guides.

Repeat this process while moving the carriage and cross slide through their full range of movement to distribute oil along the ways.

Lubricate the ways before and after operating the lathe. If the lathe is in a moist or dirty environment, increase the lubrication interval.

Check the apron oil level through the sight glass before using the one-shot oiler.

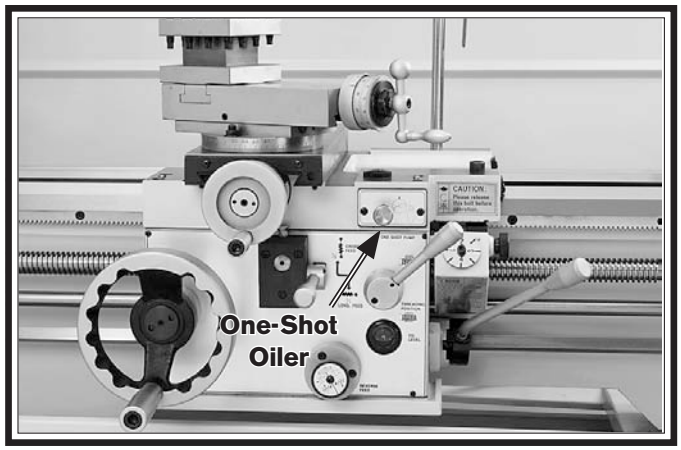


Figure 105. Location of one-shot oiler on the apron.

Longitudinal Leadscrew

Oil Type ..... Mobil Vactra 2 or ISO 68 Equivalent
Oil Amount ..... As Needed
Lubrication Frequency..... Daily

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

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

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

Ball Oilers & Oil Cup

Oil Type .. Mobil DTE Light or ISO 32 Equivalent
Oil Amount ..... 1 or 2 Squirts/Fill
Lubrication Frequency..... Daily

This lathe has seven ball oilers and one oil cup that should be oiled on a daily basis before beginning operation.

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

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

For the oil cup, lift the lid and fill the cup to the top. The oil will slowly drain into the gearing over time.

Refer to **Figures 106–108** and the following descriptions to identify the locations of each oil device.

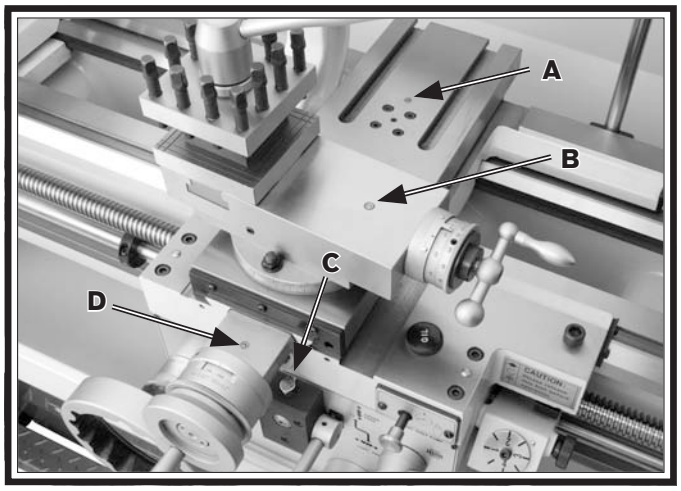


Figure 106. Carriage ball oilers and oil cup.

A. Cross Slide Leadscrew & Nut
B. Compound Rest Leadscrew & Nut
C. Feed Selection Lever Gearing
D. Cross Slide Leadscrew Bearing

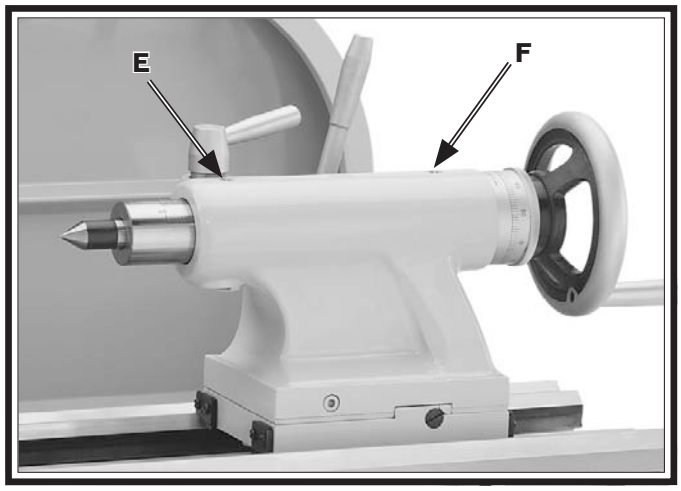


Figure 107. Tailstock ball oilers.

E. Quill Barrel
F. Quill Leadscrew & Nut

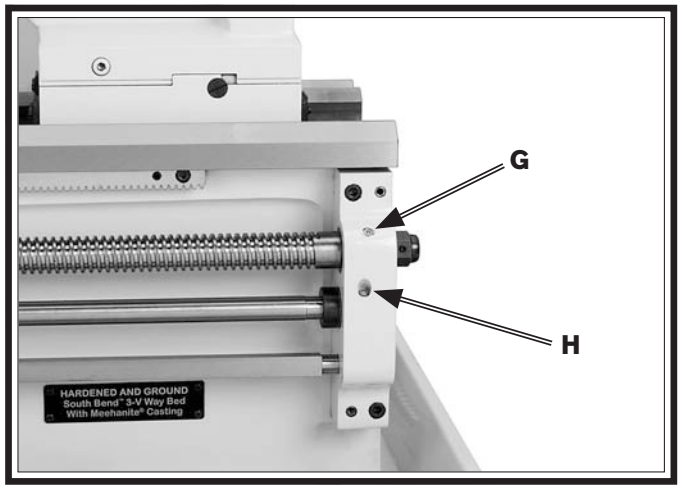


Figure 108. Leadscrew and feed rod end bearing ball oilers.

G. Leadscrew End Bearing
H. Feed Rod End Bearing

End Gears

Grease Type..... NLGI#2
Frequency ..... Annually or When Changing

The end gears, shown in **Figure 109**, should always have a thin coat of heavy grease to minimize corrosion, noise, and wear. Wipe away excess grease that could be thrown onto the V-belts and reduce optimal power transmission from the motor.

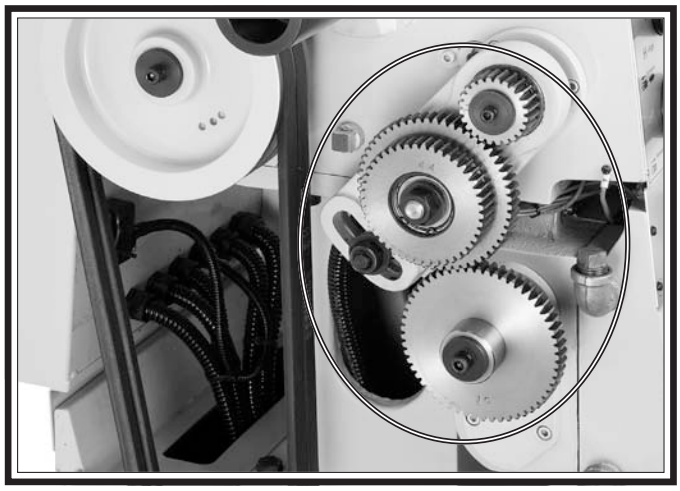


Figure 109. End gears.

Handling & Care

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

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

Lubricating

1. DISCONNECT LATHE FROM POWER!
2. Remove the end gear cover and all the end gears shown in **Figure 109**.
3. Clean the end gears thoroughly with mineral spirits to remove the old grease. Use a small brush if necessary to clean between the teeth.
4. Clean the shafts, and wipe away any grease splatters in the vicinity and on the inside of the end gear cover.
5. Using a clean brush, apply a thin layer of grease on the gears. Make sure to get grease between the gear teeth, but do not fill the teeth valleys.
6. Install the end gears and mesh them together with an approximate 0.002" backlash. Once the gears are meshed together, apply a small dab of grease between them where they mesh together—this grease will be distributed when the gears rotate and re-coat any areas scraped off during installation.
7. Re-install the end gear cover before re-connecting the lathe to power.

Coolant System Service

The coolant system consists of a fluid tank, pump, and flexible nozzle. The pump pulls fluid from the tank and sends it to the valve, which controls the flow of coolant to the nozzle. As the fluid leaves the work area, it drains back into the tank through the chip drawer and catch tray where the swarf is screened out.

Use **Figures 110–111** to identify the locations of the coolant system controls and components.

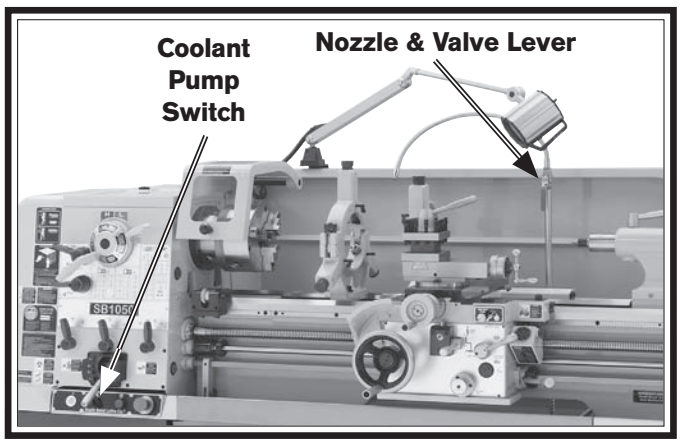


Figure 110. Coolant controls.

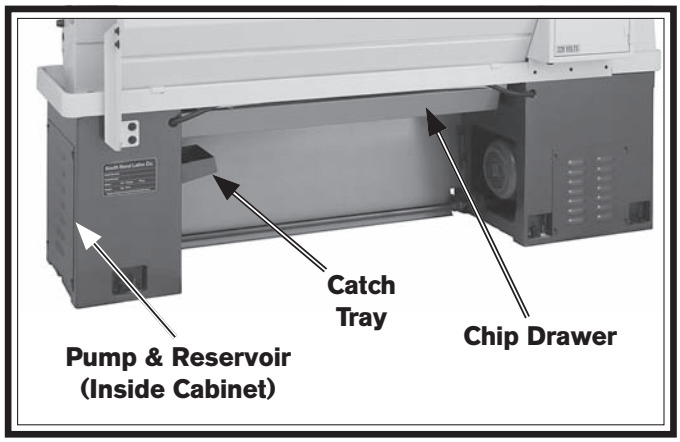


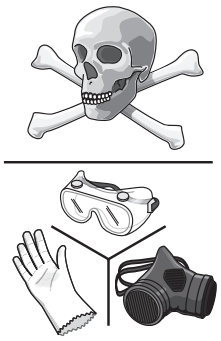
Figure 111. Additional coolant components.

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

Hazards

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

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



⚠WARNING

BIOLOGICAL & POISON HAZARD!

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

Adding Fluid

1. DISCONNECT LATHE FROM POWER!

2. Remove the vented access cover from the rear of the right stand, then slide the tank out, as shown in **Figure 112**.

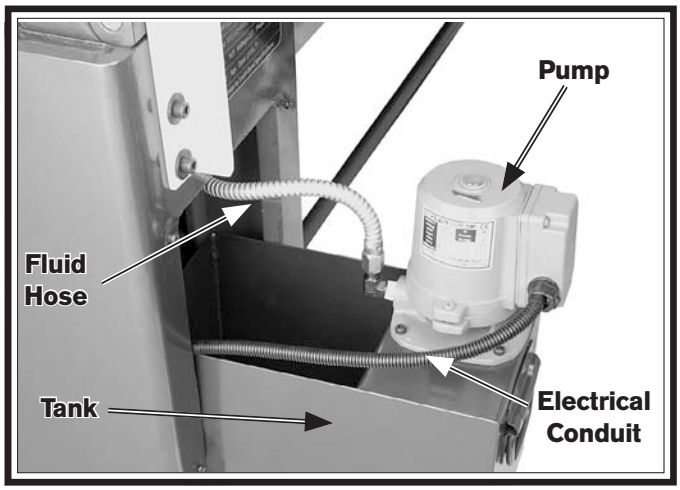


Figure 112. Coolant tank and pump.

3. Pour coolant into the tank until it is nearly full.

4. Slide the tank back into the cabinet and replace the access cover.

Changing Coolant

When you replace the old coolant, take the time to thoroughly clean out the chip drawer, catch tray, and fluid tank. The entire job only takes about a ½ hour when you are prepared with the proper materials and tools. Make sure to dispose of old fluid according to federal, state, and fluid manufacturer's requirements.

Items Needed:	**Qty**
Safety Wear	See **Hazards** on **Page 71**
New Coolant	11.1 Quarts
Empty 5-Gallon Bucket w/Lid	2
Phillips Screwdriver #2	1
Wrench ¾"	1
Disposable Shop Rags	As Needed
Hose or Tubing ⅝" x 60" (Optional)	1 Piece
Magnets (Optional)	As Many As Desired

To change the coolant:

1. Position the coolant nozzle over the back of the back splash so that it is pointing behind the lathe.

2. Place the 5-gallon bucket behind the lathe and under the coolant nozzle. If you are using the optional hose, connect it to the nozzle and place it in the bucket. Otherwise, you may need to have another person hold the bucket up to the nozzle to prevent coolant from splashing out.

3. Turn the coolant pump ***ON*** and pump the old fluid out of the reservoir. Turn the pump ***OFF*** immediately after the fluid stops flowing.

NOTICE

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

4. DISCONNECT LATHE FROM POWER!

5. Remove the vented access cover from the rear of the right stand, then slide the tank out.

6. To enable the remaining fluid to be poured out in the next step, disconnect the fluid hose from the pump (see **Figure 112**).

Note: The electrical conduit was purposely left long, so the tank can be removed and dumped out without disconnecting the wires from the pump.

7. Pour the remaining coolant into the 5-gallon bucket and close the lid.

8. Clean all the sludge out of the bottom of the tank and then flush it clean. Use the second bucket to hold the waste and make sure to seal the lid closed when done.

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

9. Slide the tank partially into the base and re-connect the fluid hose.

Tip: Leave one or more magnets at the bottom of the tank to collect metal chips and make cleanup easier next time. This will also help keep small metal chips out of the pump.

10. Refill the tank with new coolant, then slide it completely into the base.

11. Replace the access cover panel.

12. Re-connect the lathe to power and point the nozzle into the chip drawer.

13. Turn the master power switch ***ON***, then reset the STOP button.

14. Turn the coolant pump ***ON*** to verify that fluid cycles properly, then turn it ***OFF***.

Machine Storage

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

To prepare the lathe for storage:

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

2. Pump out the old coolant, then add a few drops of way oil and blow out the lines with compressed air.

3. DISCONNECT LATHE FROM POWER!

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

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

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

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

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

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

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

Backlash Adjustment

Backlash is the amount of free play felt while changing rotation directions with the handwheel. This can be adjusted on the compound rest and cross slide leadscrews. Before beginning any adjustment, make sure that all associated components have been cleaned and lubricated.

NOTICE

Reducing backlash to less than 0.002" is impractical and can lead to accelerated wear of the wedge, nut, and leadscrew. Avoid the temptation to overtighten the backlash set screw while adjusting.

Compound Rest

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

The compound rest backlash is adjusted by tightening the set screws shown in **Figure 113**. When these screws are adjusted against the leadscrew nut, they offset part of the nut to remove play between the nut and leadscrew.

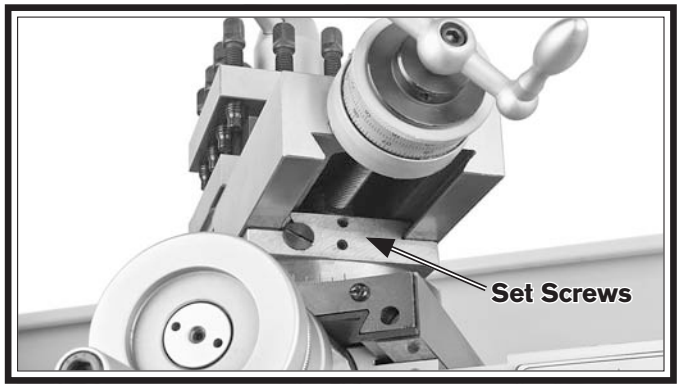


Figure 113. Compound rest backlash adjustment set screws.

To adjust the backlash, rock the handwheel back and forth, and tighten the screws slowly until the backlash is approximately 0.002"–0.003", as indicated on the graduated dial.

If you end up adjusting the nut too tight, loosen the set screws, tap the compound rest a few times with a rubber or wooden mallet, and turn the handwheel slowly back and forth until it moves freely—then try again.

Cross Slide

Tools Needed: **Qty**
Hex Wrench 3mm 1
Hex Wrench 5mm 1

The cross slide backlash is adjusted by loosening all four cap screws shown in **Figure 114**, then tightening the center set screw. This will push down on a wedge and force the leadscrew nut apart, taking up lash between the nut and leadscrew.

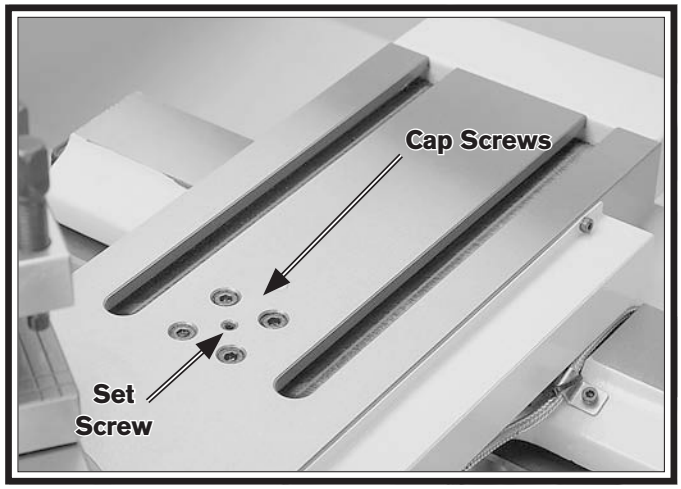


Figure 114. Cross slide backlash adjustment screws.

To adjust the backlash, remove the compound rest and loosen the four cap screws. Then, rock the cross slide handwheel back and forth, and tighten the set screw slowly until the backlash is at approximately 0.002"–0.003" as indicated on the graduated dial.

If you end up adjusting the nut too tight, loosen the set screw, tap the cross slide a few times with a rubber or wooden mallet, and turn the handwheel slowly back and forth, until the handle turns freely—then try again.

Remember to re-tighten the four cap screws when you are finished.

Leadscrew End Play Adjustment

After a long period of time, you may find that the leadscrew develops a small amount of end play. This end play can be removed with an easy adjustment.

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

To remove leadscrew end play:

1. DISCONNECT LATHE FROM POWER!

2. Loosen the two set screws in the leadscrew end nut (see **Figure 115**).

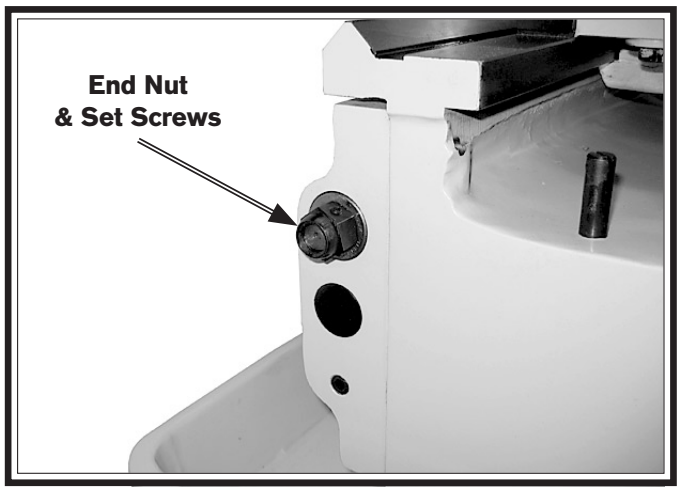


Figure 115. Leadscrew end nut.

3. Engage the half nut with the leadscrew.

4. Use the handwheel to move the carriage slightly toward the tailstock, then tighten the end nut at the same time until the end play is removed.

5. Retighten both set screws.

Gib Adjustment

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

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

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

The gibs are tapered and held in position by a screw at each end. To adjust the gib, turn one screw ¼ turn clockwise and the other screw ¼ turn counterclockwise, so both screws move in the same direction and the same amount. Test the feel of the sliding component by turning the handwheel, and adjust the gib screws as necessary to make it tighter or looser.

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

Figures 116–120 show the location of the adjustment screws for each gib on this machine.

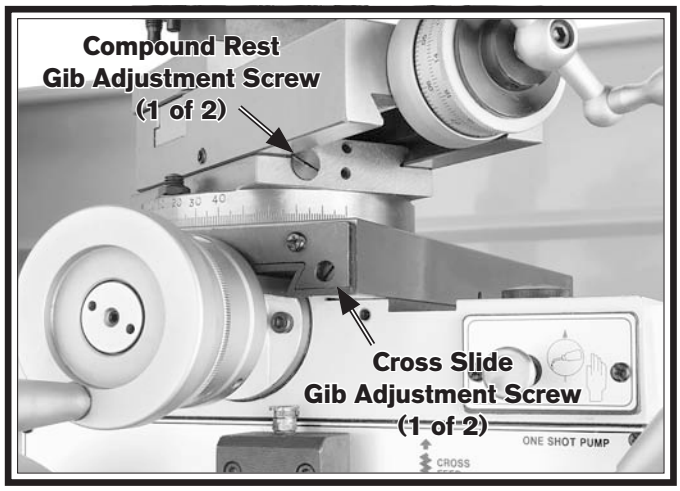


Figure 116. Compound and cross slide gib adjustment screws.

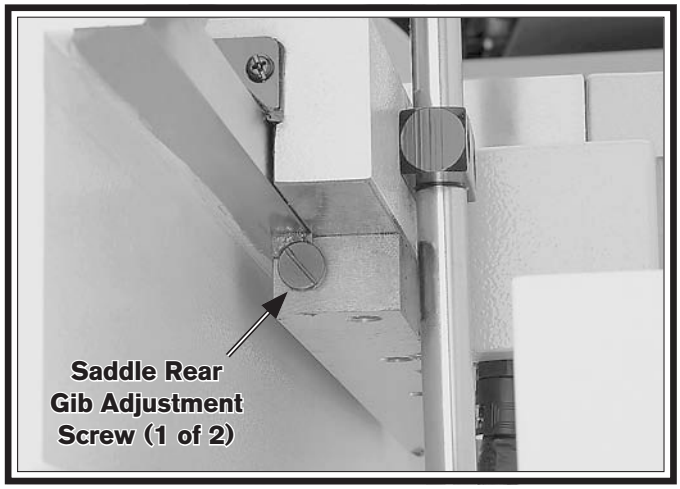


Figure 117. One of two rear saddle gib adjustment screws.

Figure 118. Front saddle gib adjustment screw.

Note: Remove the thread dial body and the carriage lock clamp to access the saddle gib adjustment screw on the tailstock side (see **Figure 119**).

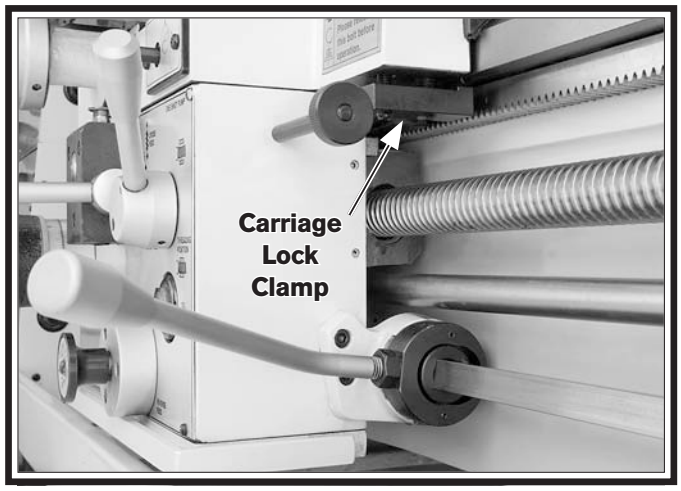


Figure 119. Carriage lock clamp.

Note: Before adjusting the tailstock gib, loosen the clamping hex bolts underneath both ends of the tailstock (see **Figure 120**) to release the clamping pressure between the upper and lower castings. Test the gib adjustment by using the offset adjustment screws. When you are satisfied with the setting, retighten the clamping hex bolts.

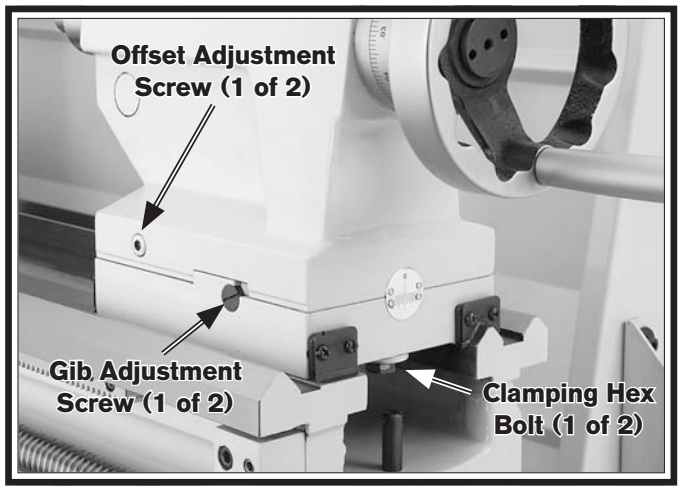


Figure 120. Tailstock gib adjustment controls.

Half Nut Adjustment

The clamping pressure of the half nut is fully adjustable with a gib that can be loosened or tightened by two set screws. Use this procedure to adjust the half nut if it becomes loose from wear, or it is too tight for your preferences. A half nut that is too loose will make it difficult to produce accurate work. A half nut that is too tight will increase the rate of wear on itself and the leadscrew.

Tool Needed: **Qty**
Hex Wrench 3mm 1

To adjust the half nut:

1. Disengage the half nut, then remove the thread dial.

2. Turn the two set screws (see **Figure 121**) clockwise to tighten the half nut and counterclockwise to loosen it.

Note: Make sure to turn the set screws in even amounts so that one end of the gib does not become tighter than the other.

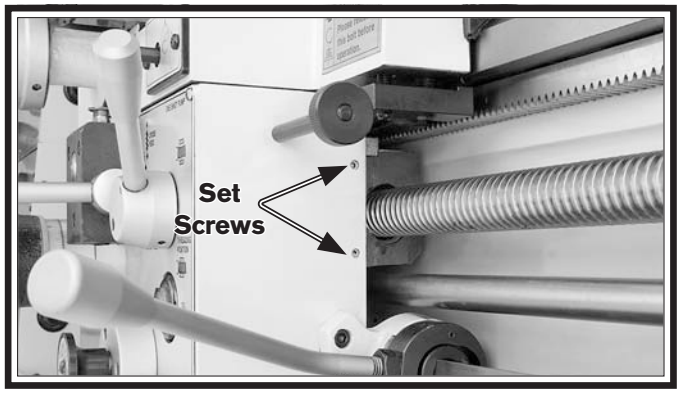


Figure 121. Half nut gib adjustment.

3. Engage/disengage the half nut several times and notice how it feels. The half nut is correctly adjusted when it has a slight drag while opening and closing. The movement should not be too stiff or too sloppy.

4. Repeat **Steps 2–3**, if necessary, until you are satisfied with the half nut pressure.

5. Re-install the thread dial.

V-Belts

V-belts stretch and wear with use, so check the tension on a monthly basis to ensure optimal power transmission. Replace all of the V-belts as a matched set if any of them show signs of glazing, fraying, or cracking.

Tools Needed: **Qty**
Phillips Screwdriver #2 1
Open End Wrench 24mm..... 1

To adjust the V-belts:

1. DISCONNECT LATHE FROM POWER!

2. Remove the end gear cover and the motor access panel to expose the V-belts and pulleys (see **Figure 122**).

Figure 122. End gear cover and motor access panel.

3. Adjust the hex nuts on the motor mount bolts shown in **Figure 123**, until there is approximately ¾" deflection of the V-belts when moderate pressure is applied midway between the pulleys.

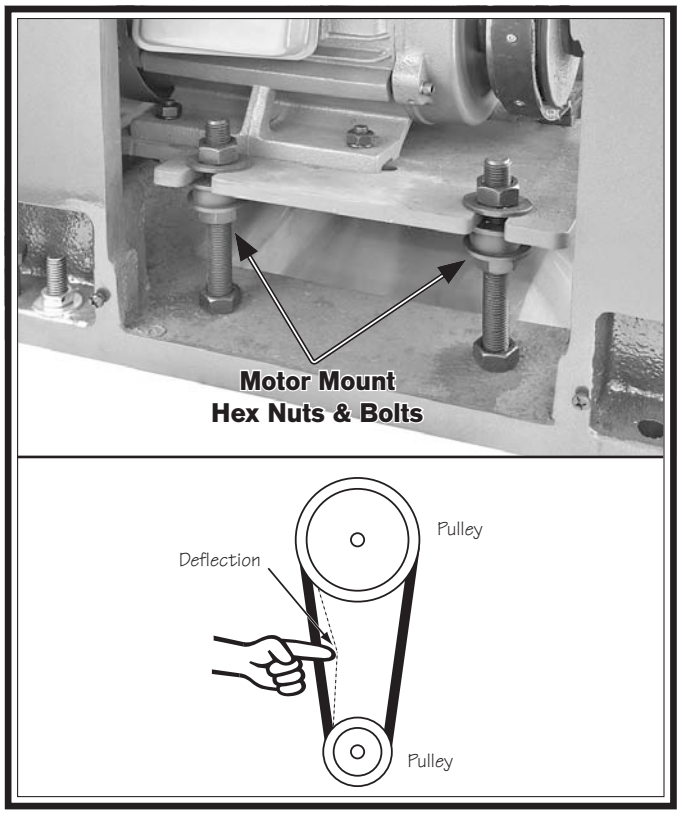


Figure 123. Adjusting V-belt tension.

4. Firmly tighten the hex nuts to secure the setting, then re-install the covers.

Brake & Switch

As the brake lining wears, the foot pedal develops more travel. If the brake band is not adjusted to compensate for normal wear, the limit switch will still turn the lathe off, but the spindle will not stop as quickly. It is especially important that the brake is kept properly adjusted so you can quickly stop the spindle in an emergency.

Tools Needed:	**Qty**
Phillips Screwdriver #2	1
Hex Wrench 6mm	1

To adjust the brake and brake switch:

1. DISCONNECT LATHE FROM POWER!

2. Put on a respirator and eye protection to protect yourself from hazardous brake dust.

3. Remove the motor access panel from the left cabinet.

4. Measure the remaining brake band lining at the thinnest point, which is usually at the 8 o'clock position, as shown in **Figure 124**.

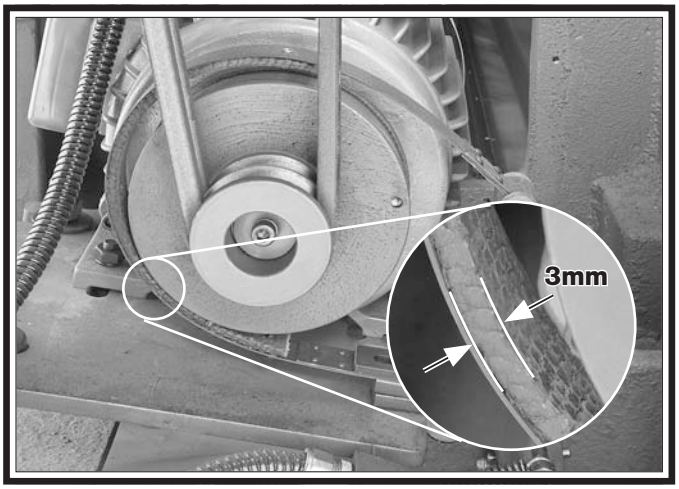


Figure 124. Minimum brake belt thickness.

When the brake band is new, the lining is approximately 6mm thick. If the lining thickness wears to 3mm or less, the brake band must be replaced. Otherwise, the rivets that secure the lining to the band will soon grind into the brake hub. If the hub becomes damaged, it must be replaced.

5. Remove the pedal stop shown in **Figure 125**.

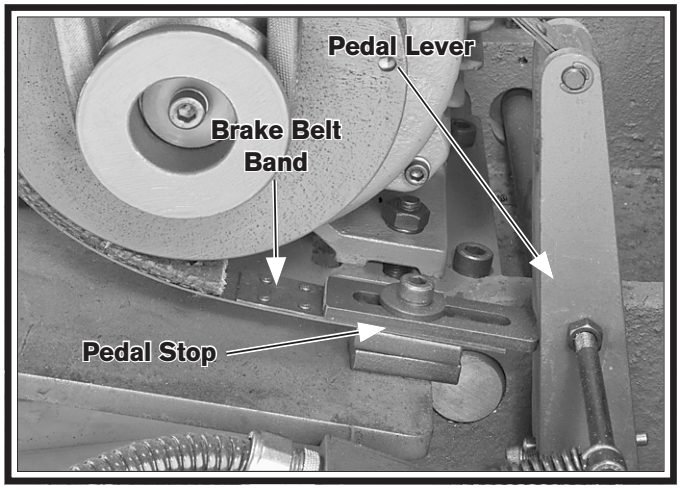


Figure 125. Brake belt adjustment components.

6. Move the brake band to the right one hole, and re-install the pedal stop, tightening the cap screw until it is just snug.

Note: If installing a new brake band, install the cap screw so there is one hole to the left for future brake adjustment.

7. Firmly push the pedal lever to the right until it stops and the brake band is fully clamped around the brake hub.

8. Tap the pedal stop into position so there is approximately a 25mm gap between the pedal lever and the stop (see **Figure 126**), then firmly tighten the pedal stop cap screw.

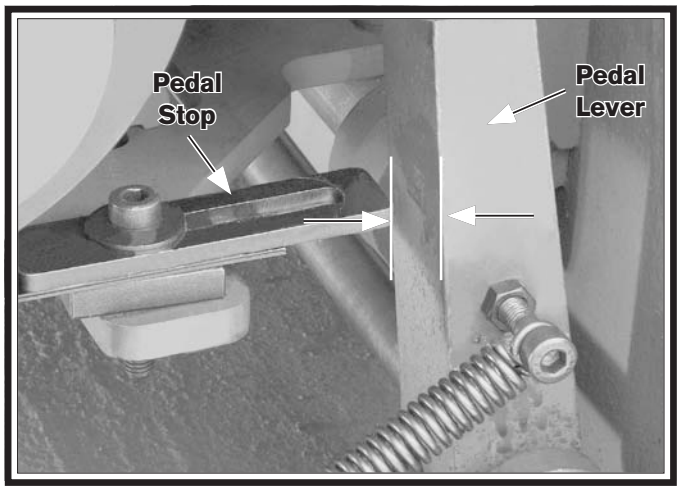


Figure 126. Brake pedal travel adjustment.

9. Locate the brake switch shown in **Figure 127**.

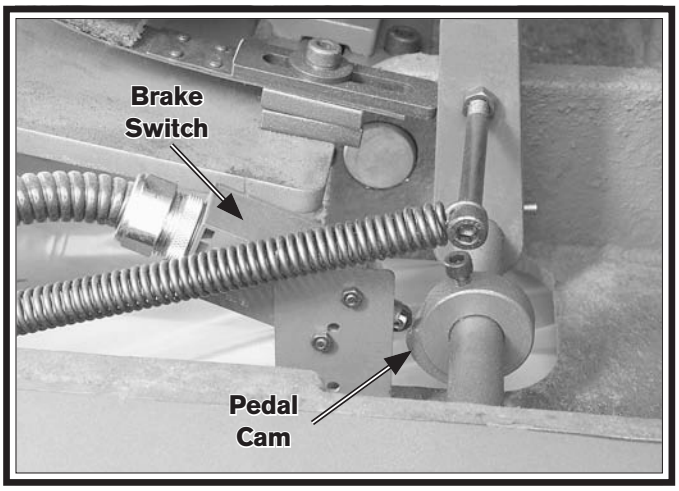


Figure 127. Brake switch and pedal cam.

10. Push the pedal lever down to verify that the cam lobe pushes the brake switch plunger in. When pushed in, the switch should click.

— If the switch does not click, loosen the switch mounting screws, push the brake pedal all the way down, and move the switch closer to the lobe until it clicks. Secure the switch in place at this location.

Note: In the released position, there should be an approximate 3mm gap between the switch plunger and the cam lobe.

11. Re-install the motor access panel, connect the lathe to power, then test the brake pedal. If you are not satisfied with the brake performance, repeat this procedure until you are.

Leadscrew Shear Pin Replacement

The leadscrew is secured to a connecting collar that is part of the headstock drivetrain with the use of a soft-metal shear pin. The shear pin is designed to break and disengage the power transfer to the leadscrew to help protect more expensive lathe components in the case of a carriage crash or the lathe is overloaded.

Contact South Bend to order a replacement shear pin (Part Number PSB10121234) or use the specifications in **Figure 128** to fabricate your own.

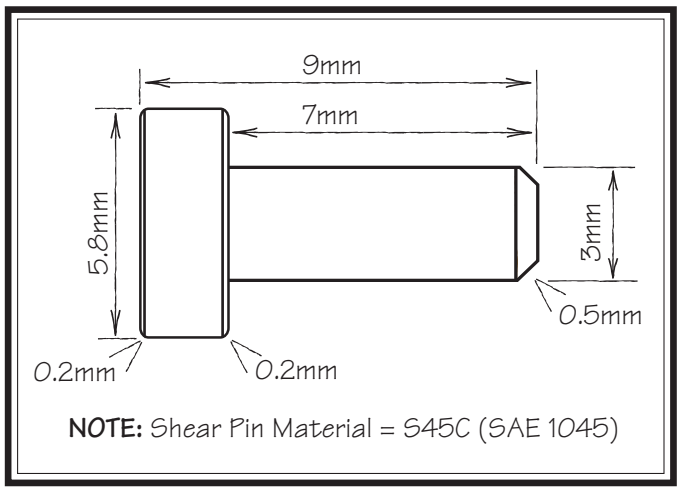


Figure 128. Shear pin specifications.

Tools Needed:	Qty
External Retaining Ring Pliers #1	1
Magnet	1
Safety Goggles	1
Blow Gun w/Compressed Air	1
Light Machine Oil	As needed

NOTICE

If you fabricate your own shear pin, make sure to use the material and dimensions specified in Figure 128. Otherwise, the shear pin may not provide the intended protection and lathe damage could result.

To replace the shear pin:

1. DISCONNECT LATHE FROM POWER!
2. Rotate the shroud washer on the leadscrew shown in **Figure 129**, so that the cutout lines up with the shear pin head.

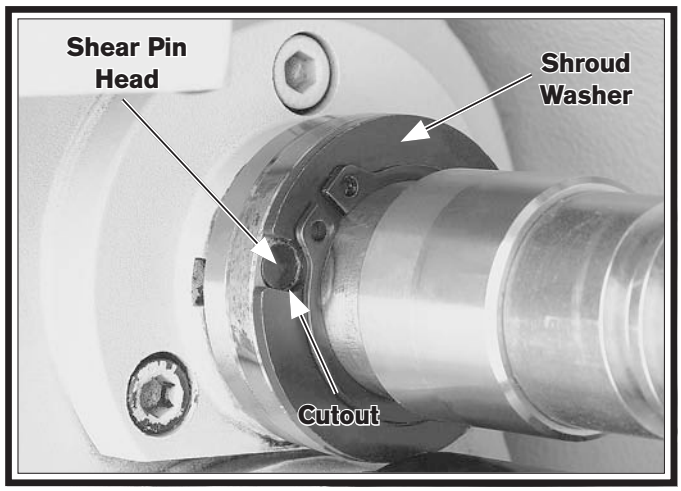


Figure 129. Shroud washer and shear pin alignment.

3. Put on safety glasses.
4. Move the retaining ring shown in **Figure 130** away from the shroud washer.

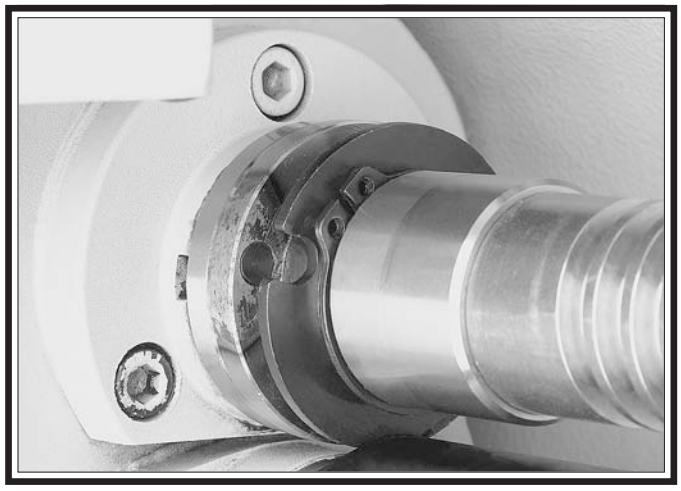


Figure 130. Shear pin access.

5. To make enough room to remove the shear pin, move the shroud washer away from the shear pin and against the retaining ring, as shown in **Figure 130**.

6. Use the magnet to remove the shear pin head, then rotate the lathe spindle to line up the inner and outer bores, as shown in **Figure 131**. Next, use the magnet to remove the other half of the broken shear pin when it becomes visible.

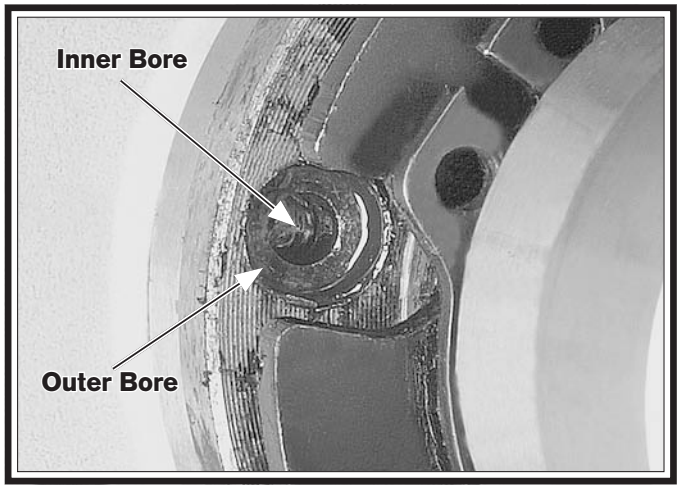


Figure 131. Shear pin bores aligned.

7. Insert the blow gun tip into the shear pin hole, blow out the hole with compressed air, then put a drop of oil in the hole.

8. Insert the new shear pin into the bore, as shown in **Figure 132**.

Note: If the pin does not freely slide into the bore, DO NOT use a hammer on the pin or you may permanently damage the shear mechanism and bore, which would make it nearly impossible to remove and install a new shear pin later.

Instead, take the time to carefully line up the two bores. You may need to file a slight chamfer on the end of the pin to make it easier to insert.

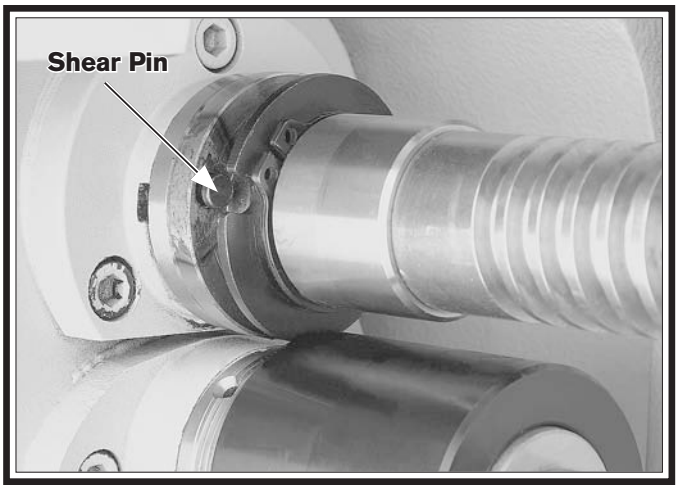


Figure 132. New shear pin installed in bore.

9. With the pin completely seated in the bore and the head flush with the leadscrew shoulder, slide the shroud washer against the shoulder, then rotate the washer 180° to completely cover the head of the shear pin, as shown in **Figure 133**.

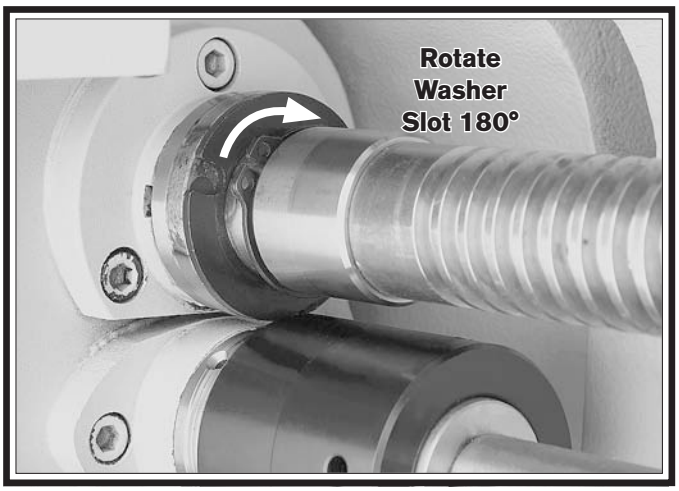


Figure 133. Shroud washer positioning.

10. Return the retaining ring against the shroud washer and position the retaining ring ears over the shear pin head, as shown in **Figure 134**. This will prevent the shear pin from falling out if the shroud washer should rotate during operation.

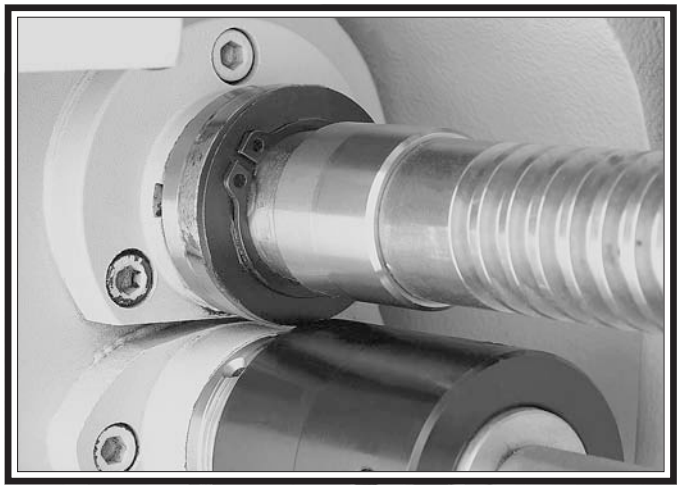


Figure 134. Retaining ring positioned with ears in front of pin access groove.

Gap Insert Removal & Installation

The gap insert directly under the spindle (see **Figure 135**) can be removed to create additional space for turning large diameter parts.

The gap insert was installed, then ground flush with the bed at the factory to ensure a precision fit and alignment. Therefore, if the gap insert is removed, it may be difficult to re-install with the same degree of accuracy.

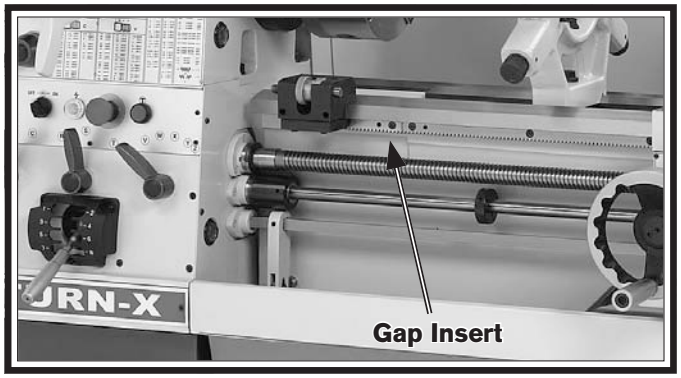


Figure 135. Gap insert.

Tools Needed: **Qty**

Hex Wrenches 6mm 1
Hex Wrench 8mm 1
Wrench 17mm 1
Dead Blow Hammer 1

Gap Removal

1. Remove the four gap-bed cap screws, shown in **Figure 136**.

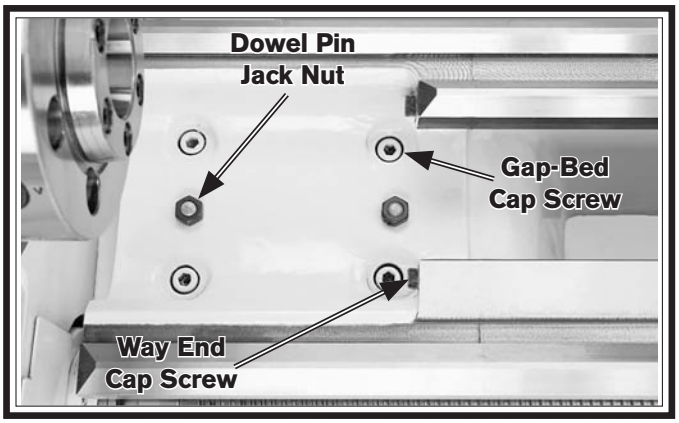


Figure 136. Fasteners holding gap in place.

2. Remove the two way-end cap screws.

3. Tighten the two dowel-pin jack nuts until the pins are pulled free from the gap insert.

4. Tap the outside of the gap insert with a dead blow hammer to loosen it, then remove it.

Gap Installation

1. Use mineral spirits and a clean lint-free rag to clean the mating surfaces of the gap, bed, and ways. If necessary, stone the mating surfaces to remove scratches, dings, or burrs.

2. Wipe a thin layer of light machine oil on the mating surfaces.

3. Place the gap insert into the gap and use a dead-blow hammer to align the insert with the lathe bed.

4. Back off the dowel pin jack nuts, and lightly tap the dowel pins back into their respective holes until they are seated. This process will further help align the gap insert and bed mating surfaces.

5. Install all fasteners and lightly snug them in place.

6. Mount a dial indicator with a magnetic base to the top of the saddle to indicate alignment.

7. First test the peak of the two prisms of the gap insert that the saddle rides on, then test the flanks of the prisms.

8. Tighten the gap bed cap screws in an alternating manner and tap the side of the gap insert into alignment.

9. Inspect the gap alignment 24 hours later to make sure the gap is still aligned. If necessary, loosen the gap bed cap screws and repeat **Steps 7–8** until the insert is properly aligned.

If you need replacement parts, or if you are unsure how to do any of the solutions given here, feel free to call us at (360) 734-1540.

Symptom	Possible Cause	Possible Solution
Machine does not start or a circuit breaker trips.	**1.** (First time operation only) Lathe is wired out of phase.	**1.** Swap two hot wire connections on master switch (see **Page 25**).
	2. STOP button is engaged or at fault.	**2.** Rotate button clockwise until it pops out to reset it for operation; replace if not working properly.
	3. Spindle switch(es) are at fault.	**3.** Replace bad switch(es).
	4. Power supply is switched **OFF** at master power switch or breaker.	**4.** Make sure master power switch and circuit breaker are turned **ON**.
	5. Wall fuse/circuit breaker is blown/ tripped; short in electrical system; start-up load too high for circuit.	**5.** Verify circuit is rated for machine amp load; troubleshoot and repair cause of overload; replace weak breaker; find/repair electrical short.
	6. Fuse has blown in machine electrical box.	**6.** Replace fuse; determine if overload is due to heavy operation; ensure power source has high enough voltage and power cord is correctly sized.
	7. One or more safety switches or brake switch are engaged.	**7.** Verify electrical box door, chuck guard, spindle, and brake switches are not engaged.
	8. Thermal overload relay has tripped.	**8.** Turn the thermal relay cut-out dial to increase working amps and push the reset pin. Replace if tripped multiple times (weak relay).
	9. Motor connection wired incorrectly.	**9.** Correct motor wiring connections.
	10. Safety/brake switch(es) at fault.	**10.** Test all switches and replace as necessary.
	11. Contactor not getting energized/has burned contacts.	**11.** Test for power on all legs and contactor operation. Replace unit if faulty.
	12. Wiring is open/has high resistance.	**12.** Check for broken wires or disconnected/corroded connections, and repair/replace as necessary.
	13. Motor is at fault.	**13.** Test/repair/replace.
Loud, repetitious noise coming from lathe at or near the motor.	**1.** Pulley set screws or keys are missing or loose.	**1.** Inspect keys and set screws. Replace or tighten if necessary.
	2. Motor fan is hitting the cover.	**2.** Tighten fan, shim cover, or replace items.
Motor overheats.	**1.** Motor overloaded.	**1.** Reduce load on motor.
Motor is loud when cutting, or bogs down under load.	**1.** Excessive depth of cut or feed rate.	**1.** Decrease depth of cut or feed rate.
	2. Spindle speed or feed rate wrong for cutting operation.	**2.** Refer to the feeds and speeds charts in **Machinery's Handbook** or a speeds and feeds calculator on the internet.
	3. Cutting tool is dull.	**3.** Sharpen or replace the cutting tool.

Symptom	Possible Cause	Possible Solution
Entire machine vibrates upon startup and while running.	**1.** Workpiece is unbalanced.	**1.** Re-install workpiece as centered with the spindle bore as possible.
	2. Loose or damaged V-belt(s).	**2.** Re-tension/replace the V-belt(s) as necessary (see **Page 77**).
	3. V-belt pulleys are not properly aligned.	**3.** Align the V-belt pulleys.
	4. Worn or broken gear present.	**4.** Inspect gears and replace if necessary.
	5. Chuck or faceplate is unbalanced.	**5.** Re-balance chuck or faceplate; contact a local machine shop for help.
	6. Gears not aligned in headstock or no backlash.	**6.** Adjust gears and establish backlash.
	7. Broken gear or bad bearing.	**7.** Replace broken gear or bearing.
	8. Workpiece is hitting stationary object.	**8.** Stop lathe immediately and correct interference problem.
	9. Spindle bearings at fault.	**9.** Reset spindle bearing preload or replace worn spindle bearings.
Bad surface finish.	**1.** Wrong spindle speed or feed rate.	**1.** Adjust for appropriate spindle speed and feed rate.
	2. Dull tooling or poor tool selection.	**2.** Sharpen tooling or select a better tool for the intended operation.
	3. Tool height not at centerline.	**3.** Adjust tool height to centerline (see **Page 47**).
	4. Too much play in gibs.	**4.** Tighten gibs (see **Page 75**).
Tapered tool difficult to remove from tailstock quill.	**1.** Quill is not retracted all the way back into the tailstock.	**1.** Turn the quill handwheel until it forces the tapered tool out of quill.
	2. Contaminants not removed from taper before inserting into quill.	**2.** Clean the taper and bore and re-install tapered tool.
Cross slide, compound, or carriage feed has sloppy operation.	**1.** Gibs are out of adjustment.	**1.** Adjust gib screw(s) (see **Page 75**).
	2. Handwheel is loose or backlash is high.	**2.** Tighten handwheel fasteners, adjust handwheel backlash to a minimum (see **Page 74**).
	3. Leadscrew mechanism worn or out of adjustment.	**3.** Adjust leadscrew to remove end play (see **Page 75**).
Cross slide, compound, or carriage feed handwheel is hard to move.	**1.** Dovetail slides loaded with shavings, dust, or grime.	**1.** Remove gibs, clean ways/dovetails, lubricate, and re-adjust gibs.
	2. Gib screws are too tight.	**2.** Loosen gib screw(s) slightly, and lubricate bedways (see **Page 75**).
	3. Backlash setting too tight (cross slide only).	**3.** Slightly loosen backlash setting (see **Page 75**).
	4. Bedways are dry.	**4.** Lubricate bedways and handles.
Cutting tool or machine components vibrate excessively during cutting.	**1.** Tool holder not tight enough.	**1.** Check for debris, clean, and retighten.
	2. Cutting tool sticks too far out of tool holder; lack of support.	**2.** Re-install cutting tool so no more than ⅓ of the total length is sticking out of tool holder.
	3. Gibs are out of adjustment.	**3.** Adjust gib screws at affected component (see **Page 75**)
	4. Dull cutting tool.	**4.** Replace or resharpen cutting tool.
	5. Incorrect spindle speed or feed rate.	**5.** Use the recommended spindle speed.

Symptom	Possible Cause	Possible Solution
Workpiece is tapered.	**1.** Headstock and tailstock are not properly aligned with each other.	**1.** Realign the tailstock to the headstock spindle bore centerline (see **Page 40**).
Chuck jaws will not move or do not move easily.	**1.** Chips lodged in the jaws or scroll plate.	**1.** Remove jaws, clean and lubricate scroll plate, then replace jaws.
Carriage will not feed, or is hard to move.	**1.** Gears are not all engaged. **2.** Loose screw on the feed handle. **3.** Carriage lock is tightened down. **4.** Chips have loaded up on bedways. **5.** Bedways are dry and in need of lubrication. **6.** Micrometer stop is interfering. **7.** Gibs are too tight. **8.** Gears or shear pin broken.	**1.** Adjust gear levers. **2.** Tighten. **3.** Check to make sure the carriage lock bolt is fully released. **4.** Frequently clean away chips that load up during turning operations. **5.** Lubricate bedways and handles. **6.** Check micrometer stop position, and adjust it as necessary (see **Page 48**). **7.** Loosen gib screw(s) slightly (see **Page 75**). **8.** Replace gears or shear pin (see **Page 80**).
Gear change levers will not shift into position.	**1.** Gears not aligned inside headstock.	**1.** Rotate spindle by hand with light pressure on the lever until gear falls into place.

Electrical Safety Instructions

These pages are accurate at the time of printing. In the constant effort to improve, however, we may make changes to the electrical systems of future machines. Study this section carefully. If you see differences between your machine and what is shown in this section, call Technical Support at (360) 734-1540 for assistance BEFORE making any changes to the wiring on your machine.

Shock Hazard: It is extremely dangerous to perform electrical or wiring tasks while the machine is connected to the power source. Touching electrified parts will result in personal injury including but not limited to severe burns, electrocution, or death. For your own safety, disconnect machine from the power source before servicing electrical components or performing any wiring tasks!

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.

Modifications: Using aftermarket parts or modifying the wiring beyond what is shown in the diagram may lead to unpredictable results, including serious injury or fire.

Motor Wiring: The motor wiring shown in these diagrams is current at the time of printing, but it may not match your machine. Always use the wiring diagram inside the motor junction box.

Circuit Requirements: Connecting the machine to an improperly sized circuit will greatly increase the risk of fire. To minimize this risk, only connect the machine to a power circuit that meets the minimum requirements given in this manual.

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.

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 before completing the task.

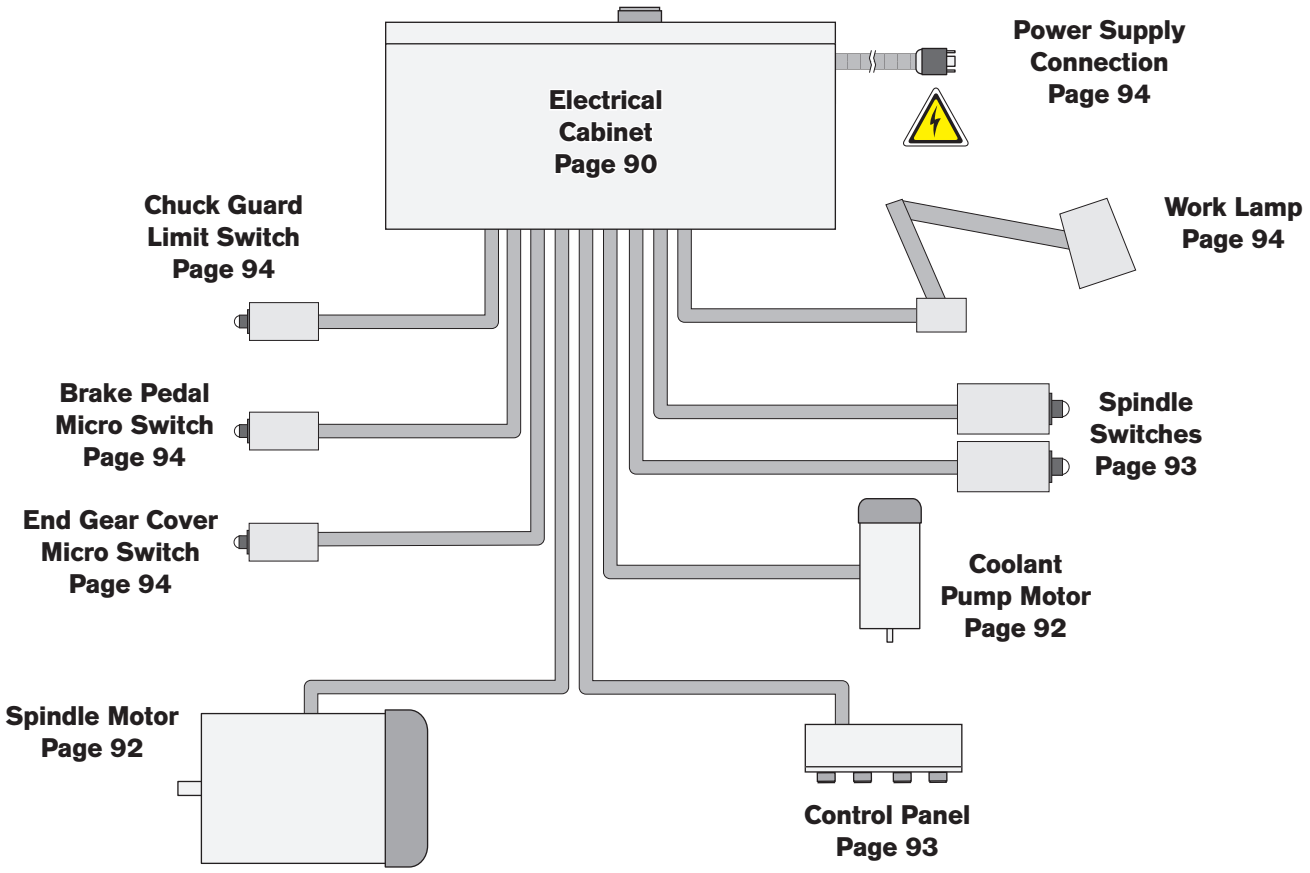
Experiencing Difficulties: If you are experiencing difficulties understanding the information included in this section, contact our Technical Support at (360) 734-1540.

WIRING DIAGRAM COLOR KEY

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

NOTICE: **The photos and diagrams included in this section are best viewed in color. You can see them in color at www.southbendlathe.com.**

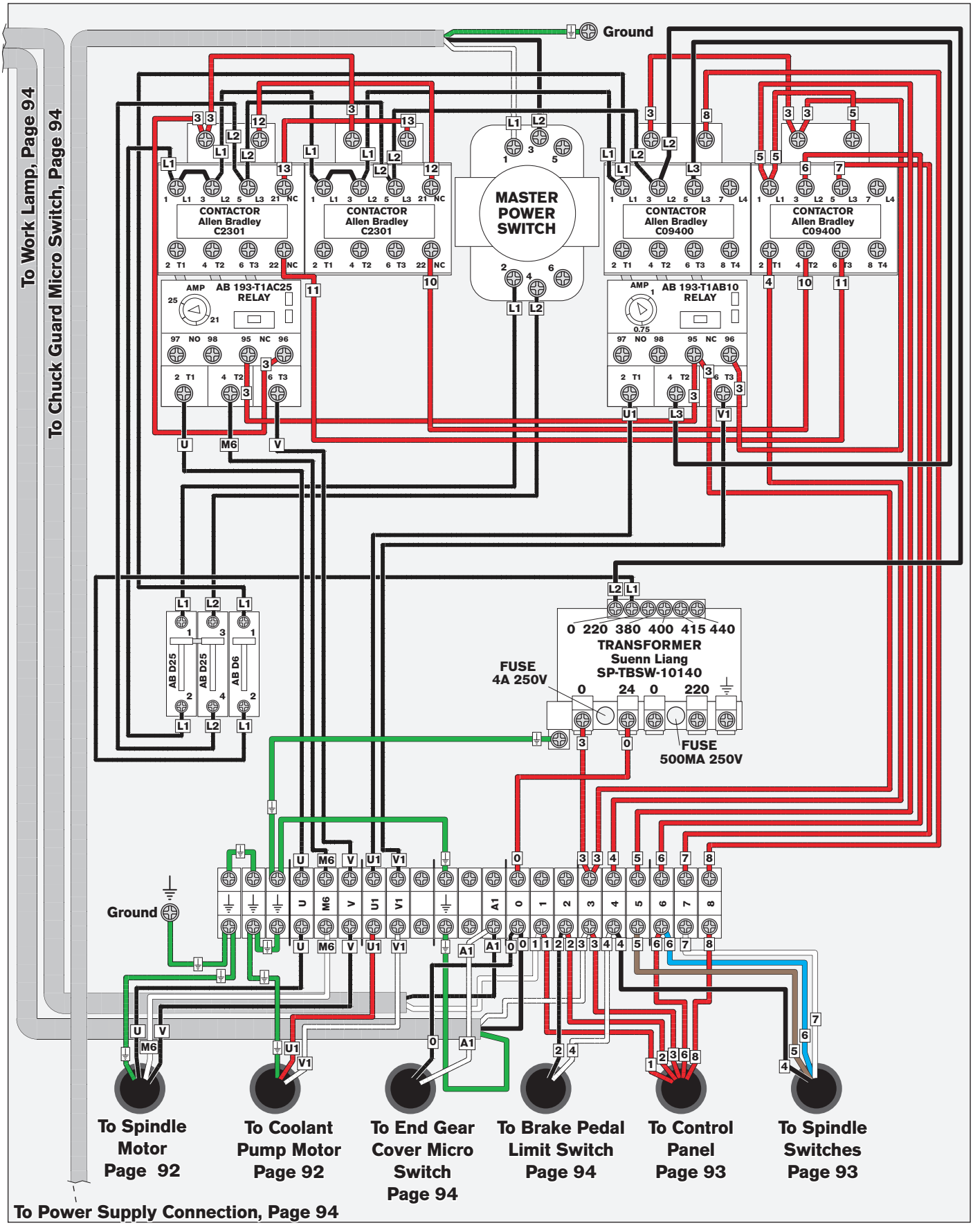
Wiring Overview



Component Location Index

Figure 137. Component location index.

Electrical Cabinet Wiring



Electrical Box

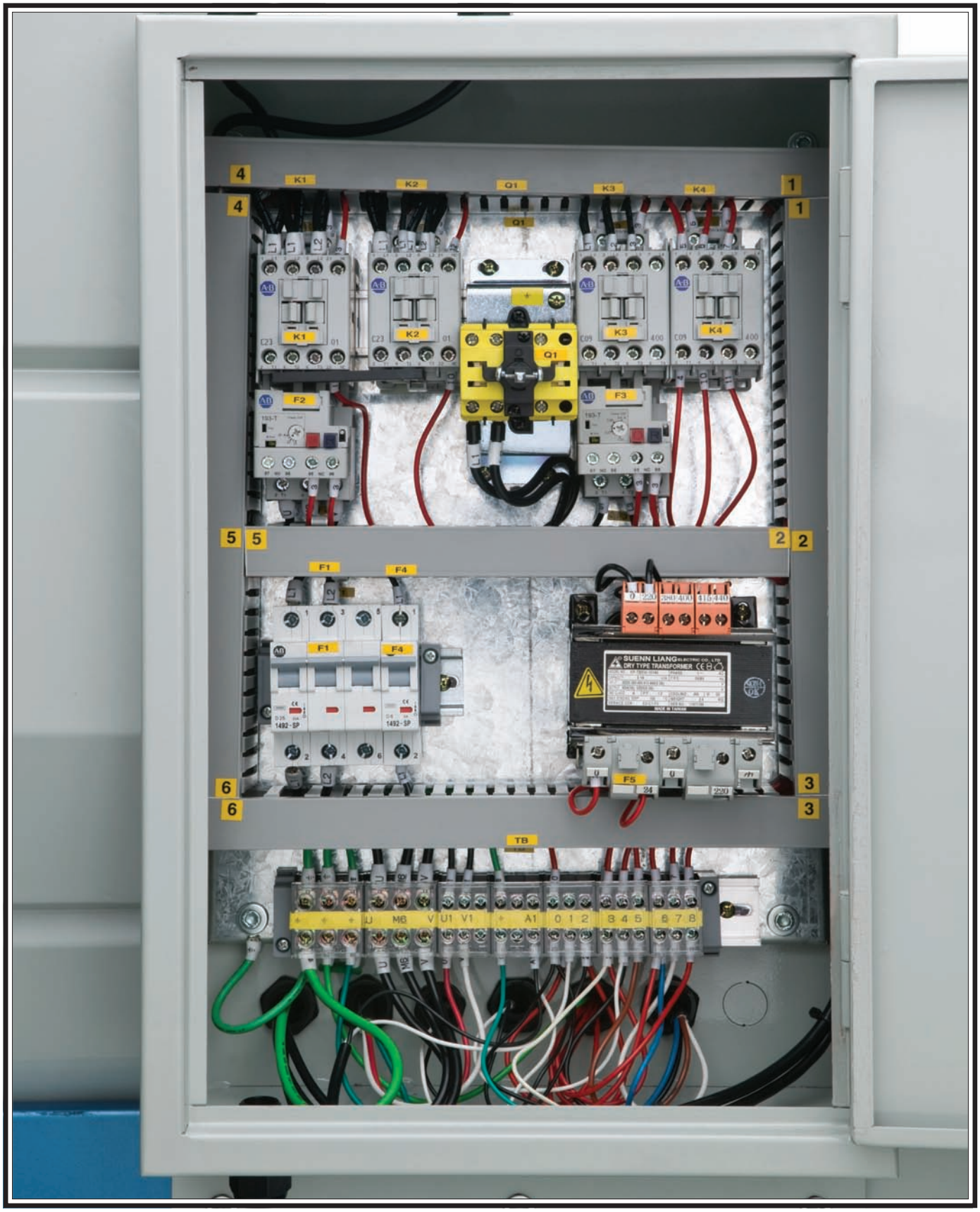
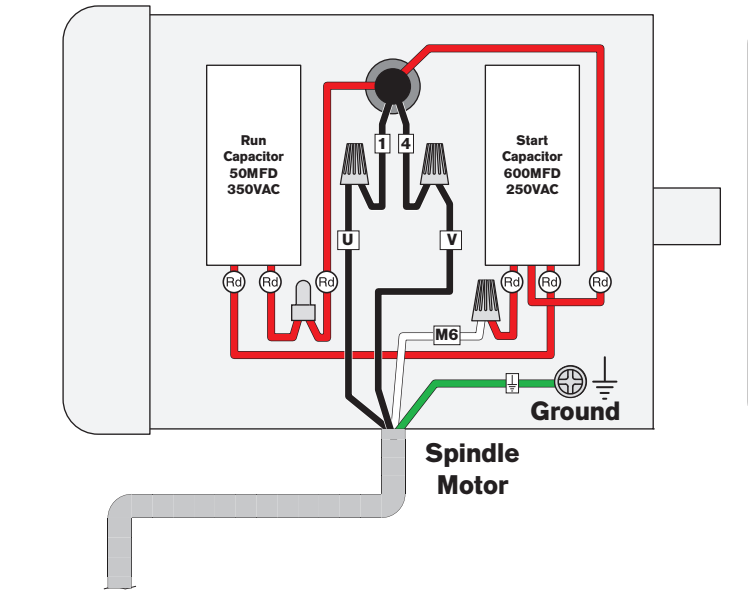


Figure 138. Electrical box.

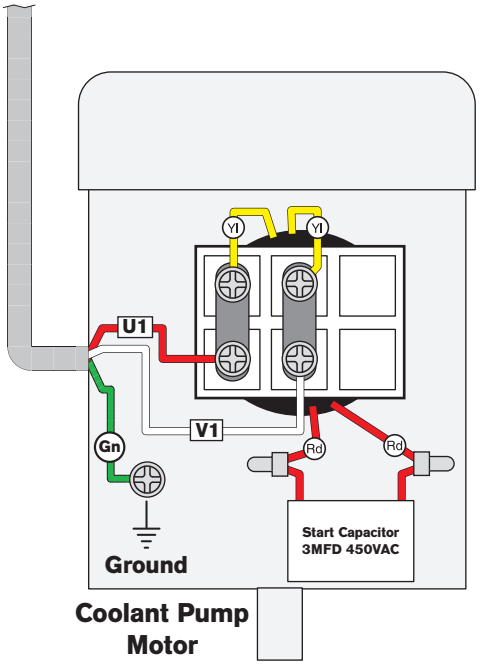
Spindle Motor



To Electrical Cabinet Page 90

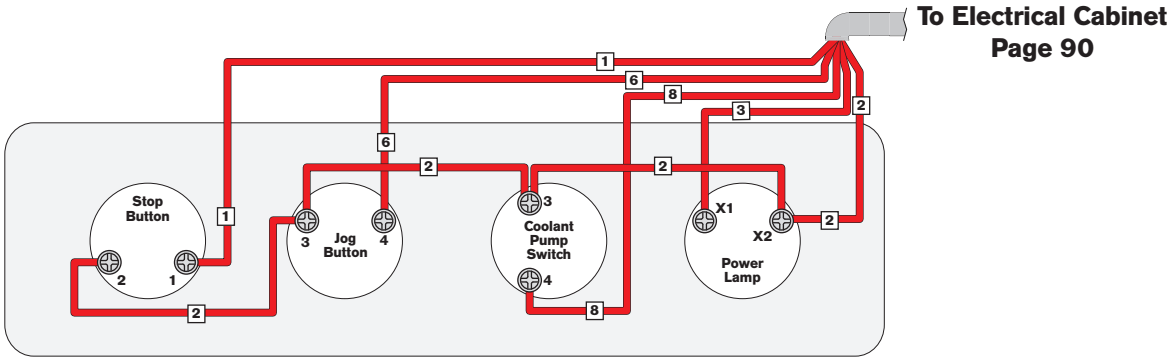
Coolant Pump Motor Wiring

To Electrical Cabinet Page 90



Control Panel Wiring

Figure 139. Control panel location.



Spindle Switches

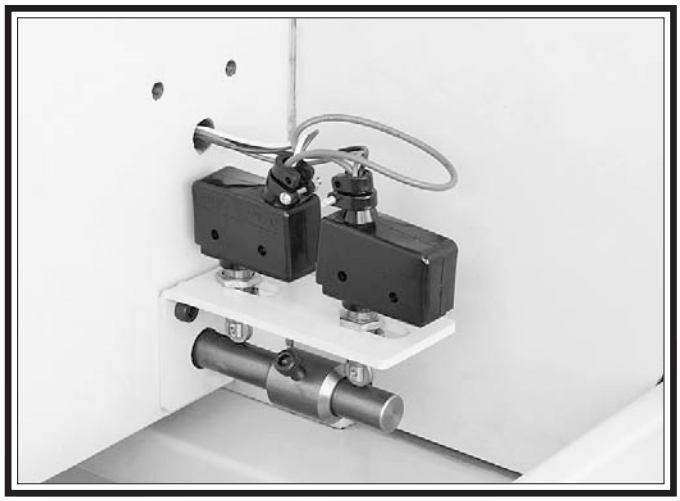
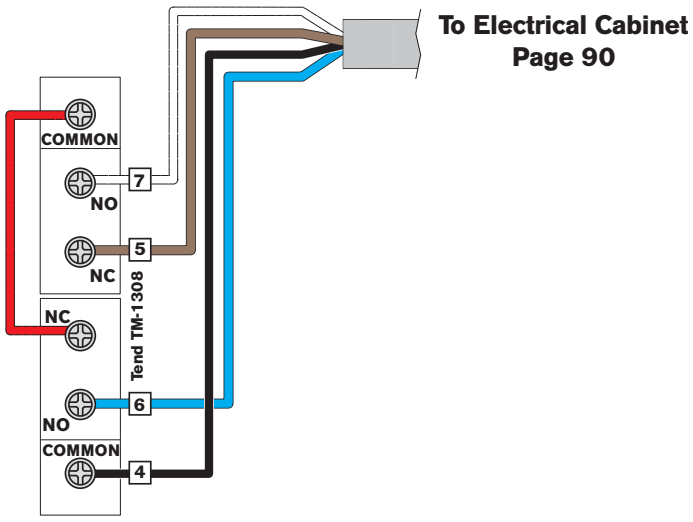


Figure 140. Spindle rotation switch location.



Additional Component Wiring

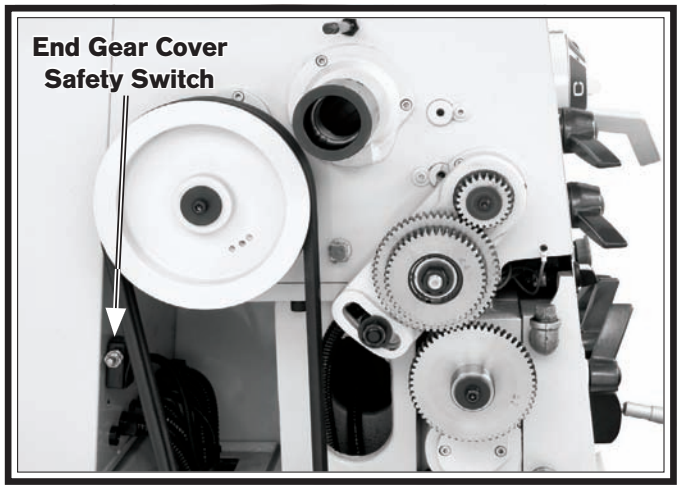


Figure 141. End Gear Cover Safety switch location.

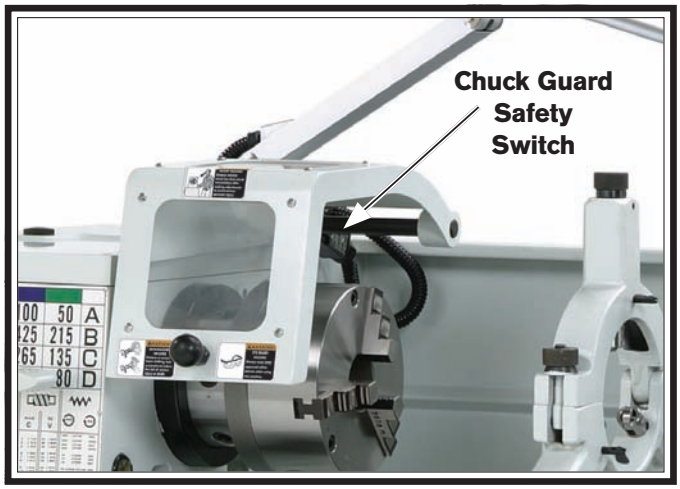
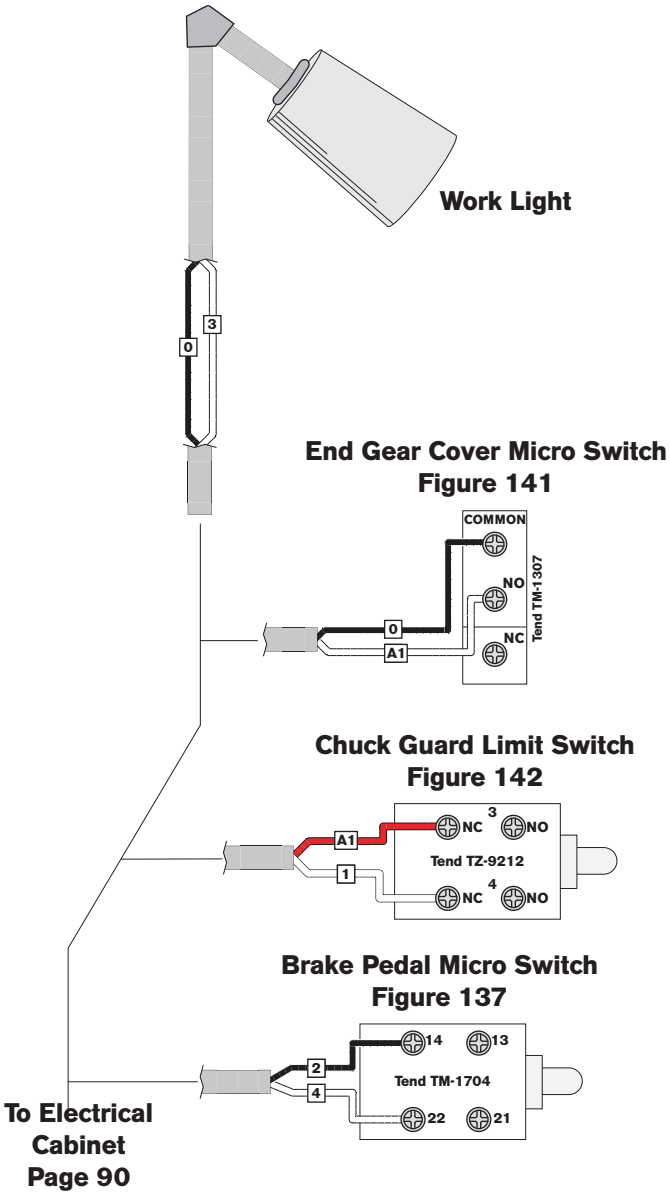
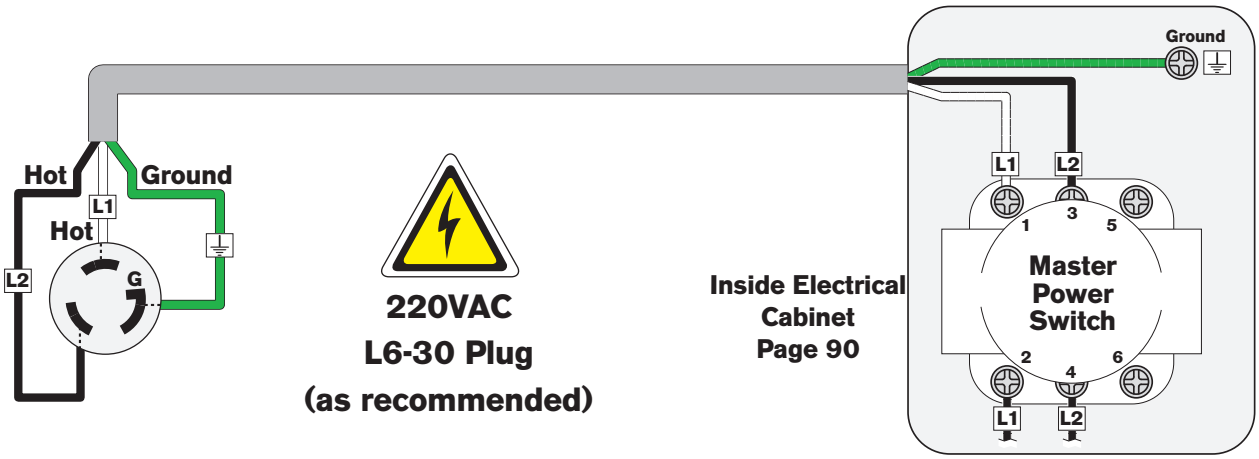


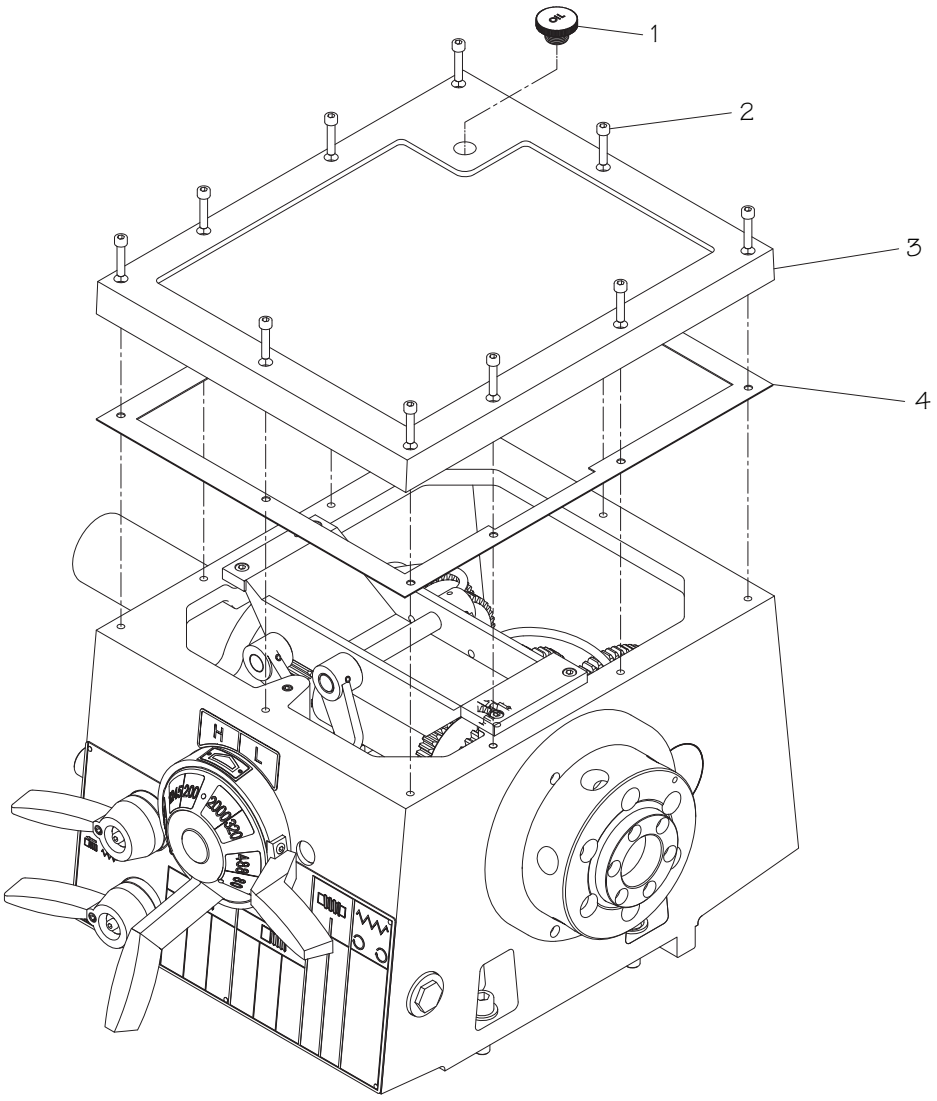
Figure 142. Chuck Guard Safety switch location.



Power Connection



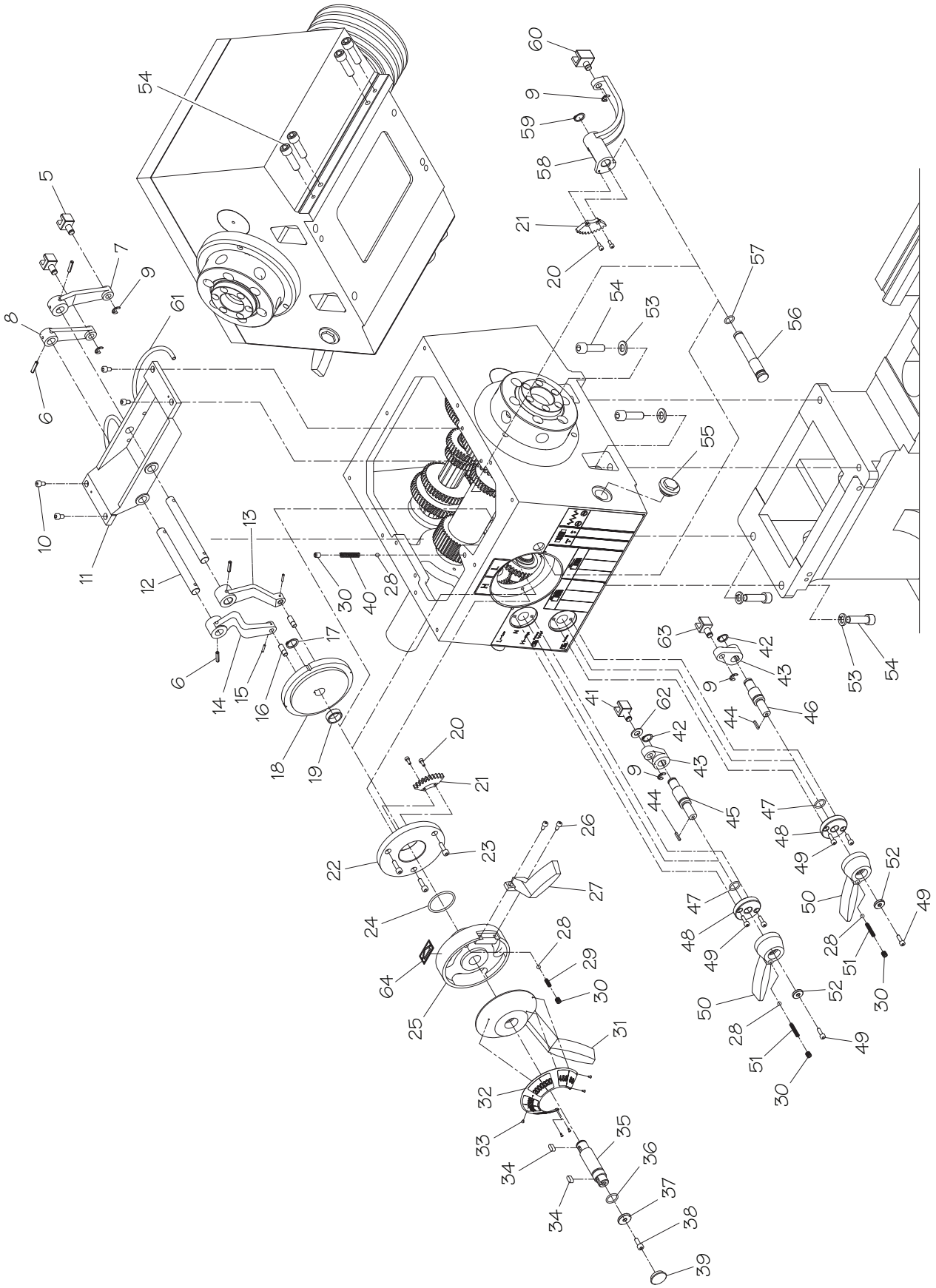
Headstock Cover



REF	PART #	DESCRIPTION
1	PSB10490001	HEADSTOCK OIL FILL CAP
2	PCAP29M	CAP SCREW M6-1 X 40

REF	PART #	DESCRIPTION
3	PSB10490003	HEADSTOCK TOP COVER
4	PSB10490004	TOP COVER GASKET

Headstock Controls

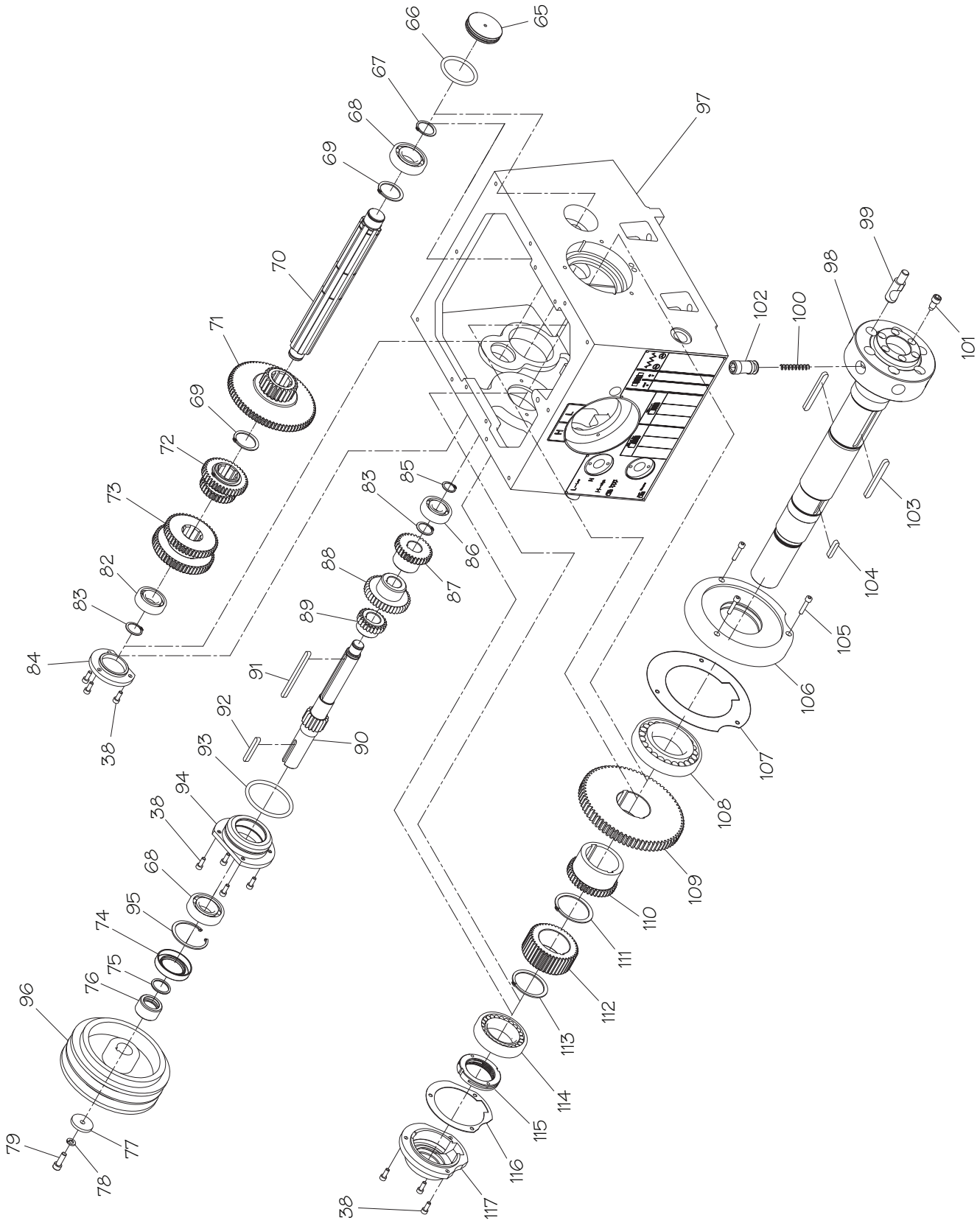


Headstock Controls Parts List

REF	PART #	DESCRIPTION
5	PSB10490005	SHIFT FORK
6	PRP06M	ROLL PIN 5 X 24
7	PSB10490007	RIGHT REAR SHIFT LEVER
8	PSB10490008	LEFT REAR SHIFT LEVER
9	PEC015M	E-CLIP 8MM
10	PCAP04M	CAP SCREW M6-1 X 10
11	PSB10490011	SHIFT LEVER FRAME
12	PSB10490012	SHIFT LEVER ROD
13	PSB10490013	RIGHT FRONT SHIFT LEVER
14	PSB10490014	LEFT FRONT SHIFT LEVER
15	PRP02M	ROLL PIN 3 X 16
16	PSB10490016	STEP PIN
17	PR07M	EXT RETAINING RING 18MM
18	PSB10490018	SHIFT CAM
19	PSB10490019	SPACER
20	PCAP17M	CAP SCREW M4-.7 X 10
21	PSB10490021	GEAR 40T
22	PSB10490022	SELECTOR BRACKET
23	PCAP02M	CAP SCREW M6-1 X 20
24	PORP044	O-RING 43.7 X 3.5 P44
25	PSB10490025	SPEED RANGE SELECTOR
26	PCAP50M	CAP SCREW M5-.8 X 10
27	PSB10490027	SPEED RANGE HANDLE
28	PSTB001	STEEL BALL 1/4
29	PSB10490029	COMPRESSION SPRING
30	PSS20M	SET SCREW M8-1.25 X 8
31	PSB10490031	SPEED SELECTOR
32	PSB10490032	SPEED SELECTOR LABEL PLATE
33	PRIV001M	STEEL FLUTED RIVET 2 X 5MM
34	PK101M	KEY 6 X 6 X 14

REF	PART #	DESCRIPTION
35	PSB10490035	SHAFT
36	PORP018	O-RING 17.8 X 2.4 P18
37	PSB10490037	SHAFT FLAT WASHER 6MM
38	PCAP01M	CAP SCREW M6-1 X 16
39	PSB10490039	SHAFT END PLUG
40	PSB10490040	COMPRESSION SPRING
41	PSB10490041	FEED RANGE SHIFT FORK
42	PR05M	EXT RETAINING RING 15MM
43	PSB10490043	ROCKER ARM
44	PK155M	KEY 3 X 3 X 18
45	PSB10490045	FEED RANGE SHAFT
46	PSB10490046	FEED DIRECTION SHAFT
47	PORP016	O-RING 15.8 X 2.4 P16
48	PSB10490048	LEVER BRACKET
49	PCAP10M	CAP SCREW M5-.8 X 15
50	PSB10490050	LEVER
51	PSB10490051	COMPRESSION SPRING
52	PSB10490052	LEVER FLAT WASHER 5MM
53	PLW05M	LOCK WASHER 12MM
54	PCAP92M	CAP SCREW M12-1.75 X 40
55	PSB10490055	OIL SIGHT GLASS 3/4"
56	PSB10490056	SHAFT
57	PORP014	O-RING 13.8 X 2.4 P14
58	PSB10490058	SWING SHIFT LEVER
59	PR06M	EXT RETAINING RING 16MM
60	PSB10490060	SHIFT FORK
61	PSB10490061	OIL TUBE 6 X 270MM
62	PW04M	FLAT WASHER 10MM
63	PSB10490063	FEED DIRECTION SHIFT FORK
64	PSB10490064	SPEED RANGE INDICATOR

Headstock Internal Gears

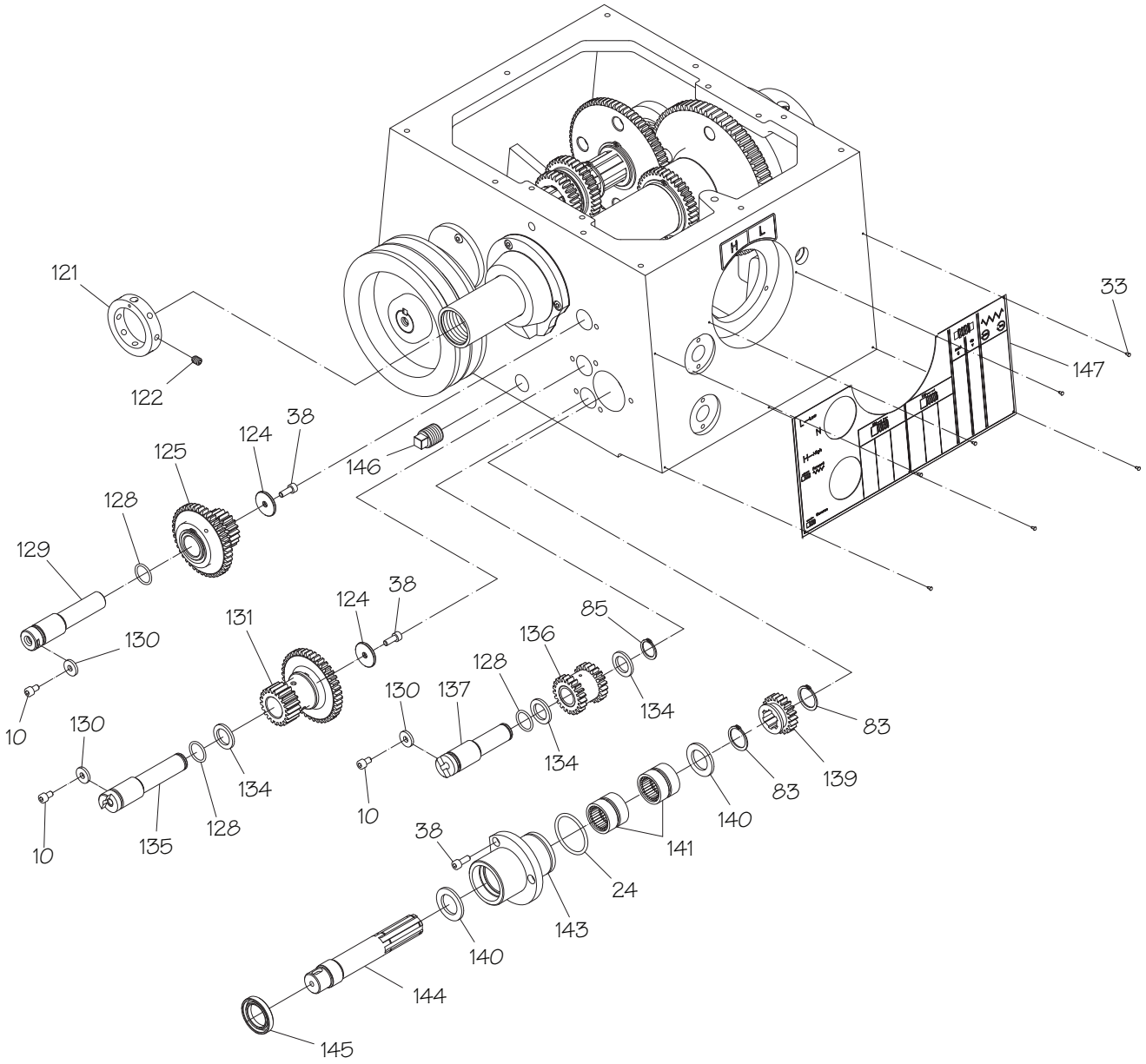


Headstock Internal Gears Parts List

REF	PART #	DESCRIPTION
38	PCAP01M	CAP SCREW M6-1 X 16
65	PSB10490065	CASTING PLUG
66	PORP055	O-RING 54.6 X 5.7 P55
67	PR15M	EXT RETAINING RING 30MM
68	P6206-OPEN	BALL BEARING 6206 OPEN
69	PR31M	EXT RETAINING RING 38MM
70	PSB10490070	SPLINE SHAFT
71	PSB10490071	COMBO GEAR ASSEMBLY 22T/76T
72	PSB10490072	COMBO GEAR ASSEMBLY 30T/38T
73	PSB10490073	COMBO GEAR ASSEMBLY 45T/52T
74	PSB10490074	OIL SEAL 40 X 62 X 12
75	PORP028	O-RING 27.7 X 3.5 P28
76	PSB10490076	SPACER
77	PSB10490077	PULLEY FLAT WASHER 8MM
78	PLW04M	LOCK WASHER 8MM
79	PCAP31M	CAP SCREW M8-1.25 X 25
82	P6205-OPEN	BALL BEARING 6205 OPEN
83	PR11M	EXT RETAINING RING 25MM
84	PSB10490084	FLANGE COVER
85	PR09M	EXT RETAINING RING 20MM
86	P6304-OPEN	BALL BEARING 6304 OPEN
87	PSB10490087	GEAR 30T
88	PSB10490088	GEAR 38T
89	PSB10490089	GEAR 22T
90	PSB10490090	GEAR SHAFT 16T
91	PSB10490091	KEY 7 X 7 X 104

REF	PART #	DESCRIPTION
92	PSB10490092	KEY 7 X 7 X 53
93	PORP075	O-RING 74.6 X 5.7 P75
94	PSB10490094	FLANGE BEARING
95	PR38M	INT RETAINING RING 62MM
96	PSB10490096	SPINDLE PULLEY
97	PSB10490097	HEADSTOCK HOUSING
98	PSB10490098	SPINDLE
99	PSB10490099	CAMLOCK STUD
100	PSB10490100	CAM SPRING
101	PSB10490101	CAMLOCK CAP SCREW
102	PSB10490102	CAMLOCK
103	PSB10490103	KEY 10 X 6 X 85
104	PK109M	KEY 7 X 7 X 35
105	PCAP07M	CAP SCREW M6-1 X 30
106	PSB10490106	BEARING COVER
107	PSB10490107	BEARING COVER GASKET
108	P30213-T	TAPERED ROLLER BEARING 30213 NTN
109	PSB10490109	GEAR 72T
110	PSB10490110	GEAR 41T
111	PR71M	EXT RETAINING RING 60MM
112	PSB10490112	GEAR 42T
113	PR91M	EXT RETAINING RING 56MM
114	P32011-T	TAPERED ROLLER BEARING 32011 NTN
115	PSB10490115	SPANNER NUT
116	PSB10490116	COVER GASKET
117	PSB10490117	OUTBOARD SPINDLE COVER

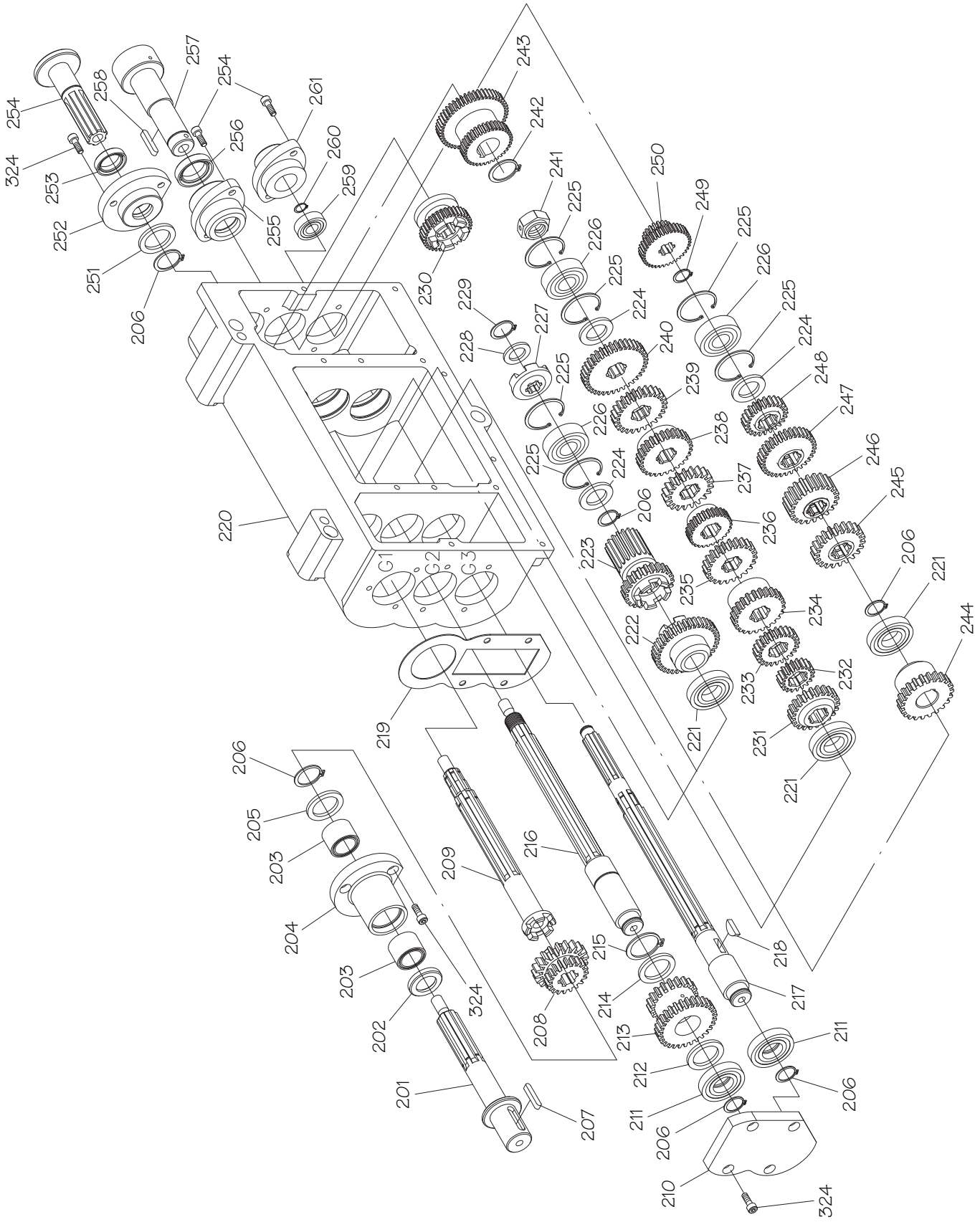
Headstock Transfer Gears



REF	PART #	DESCRIPTION
10	PCAP04M	CAP SCREW M6-1 X 10
24	P0RP044	O-RING 43.7 X 3.5 P44
33	PRIV001M	STEEL FLUTED RIVET 2 X 5MM
38	PCAP01M	CAP SCREW M6-1 X 16
83	PR11M	EXT RETAINING RING 25MM
85	PR09M	EXT RETAINING RING 20MM
121	PSB10490121	SPEED SENSOR RING
122	PSS30M	SET SCREW M10-1.5 X 10
124	PSB10490124	GEAR FLAT WASHER 6MM
125	PSB10490125	COMBO GEAR ASSY 21T/42T
128	P0RP021	O-RING 20.8 X 2.4 P21
129	PSB10490129	SHAFT
130	PSB10490130	SHAFT FLAT WASHER 6MM

REF	PART #	DESCRIPTION
131	PSB10490131	COMBO GEAR ASSY 21T/42T
134	PSB10490134	SPACER
135	PSB10490135	SHAFT
136	PSB10490136	GEAR 21T
137	PSB10490137	SHAFT
139	PSB10490139	GEAR 21T
140	PSB10490140	SPACER
141	PSB10490141	NEEDLE BEARING RNA-6904
143	PSB10490143	BEARING HOUSING
144	PSB10490144	SPLINE SHAFT
145	PSB10490145	OIL SEAL 28 X 44 X 7MM
146	PSB10490146	PIPE PLUG 1/2"
147	PSB10490147	HEADSTOCK FRONT PANEL

Gearbox Gears

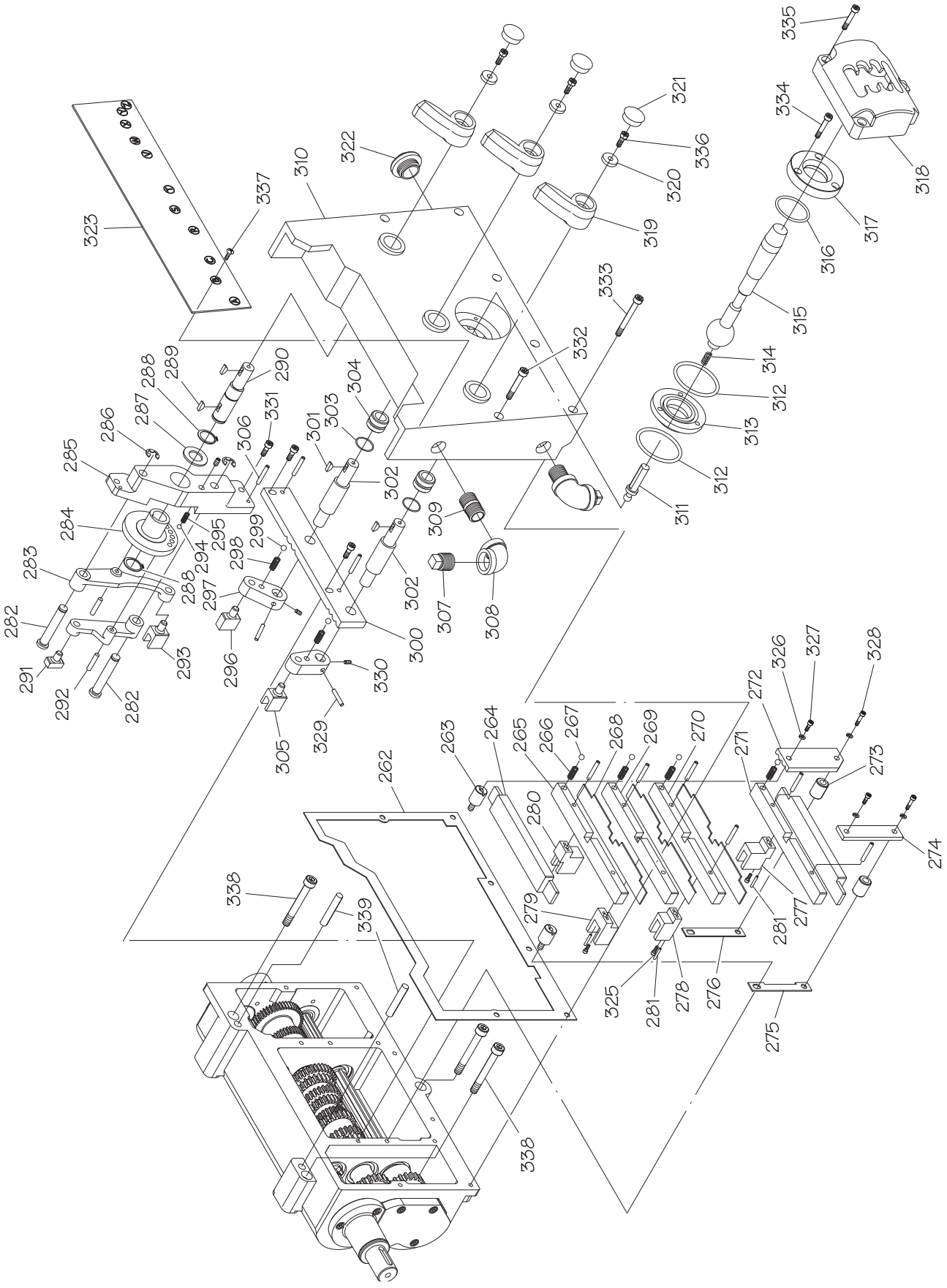


Gearbox Gears Parts List

REF	PART #	DESCRIPTION
201	PSB10490201	SPLINE SHAFT
202	PSB10490202	OIL SEAL 20 X 32 X 5MM
203	PSB10490203	NEEDLE ROLLER BEARING TAF202820
204	PSB10490204	FLANGE BEARING
205	PSB10490205	SPACER
206	PR09M	EXT RETAINING RING 20MM
207	PK109M	KEY 7 X 7 X 35
208	PSB10490208	COMBO GEAR 19T/20T
209	PSB10490209	SPLINE SHAFT
210	PSB10490210	SIDE COVER
211	P16004	BALL BEARING 16004 OPEN
212	PSB10490212	SPACER
213	PSB10490213	GEAR 19T/30T
214	PSB10490214	SPACER
215	PR11M	EXT RETAINING RING 25MM
216	PSB10490216	SPLINE SHAFT
217	PSB10490217	SPLINE SHAFT
218	PSB10490218	WOODRUFF KEY 5 X 19
219	PSB10490219	SIDE COVER GASKET
220	PSB10490220	GEARBOX HOUSING
221	P16004	BALL BEARING 16004 OPEN
222	PSB10490222	GEAR 38T
223	PSB10490223	GEAR 23T/19T
224	PSB10490224	SPACER
225	PR23M	INT RETAINING RING 40MM
226	P6203-OPEN	BALL BEARING 6203 OPEN
227	PSB10490227	CLUTCH
228	PSB10490228	SPACER
229	PR06M	EXT RETAINING RING 16MM
230	PSB10490230	GEAR 35T
231	PSB10490231	GEAR 22T

REF	PART #	DESCRIPTION
232	PSB10490232	GEAR 19T
233	PSB10490233	GEAR 20T
234	PSB10490234	GEAR 24T
235	PSB10490235	GEAR 23T
236	PSB10490236	GEAR 27T
237	PSB10490237	GEAR 24T
238	PSB10490238	GEAR 28T
239	PSB10490239	GEAR 26T
240	PSB10490240	GEAR 38T
241	PSB10490241	SPANNER NUT
242	PR10M	EXT RETAINING RING 22MM
243	PSB10490243	COMBO GEAR 36T/50T
244	PSB10490244	GEAR 22T
245	PSB10490245	GEAR 22T
246	PSB10490246	GEAR 22T
247	PSB10490247	GEAR 33T
248	PSB10490248	GEAR 22T
249	PR18M	EXT RETAINING RING 17MM
250	PSB10490250	COMBO GEAR 20T/36T
251	PSB10490251	SPACER
252	PSB10490252	FLANGE BEARING
253	PSB10490253	OIL SEAL 20 X 32 X 5MM
254	PSB10490254	SPLINE SHAFT
255	PSB10490255	FLANGE BEARING
256	PSB10490256	OIL SEAL 24 X 35 X 8
257	PSB10490257	SHAFT
258	PK15M	KEY 5 X 5 X 35
259	P6001-OPEN	BALL BEARING 6001 OPEN
260	PR03M	EXT RETAINING RING 12MM
261	PSB10490261	FLANGE BEARING
324	PCAP26M	CAP SCREW M6-1 X 12

Gearbox Controls

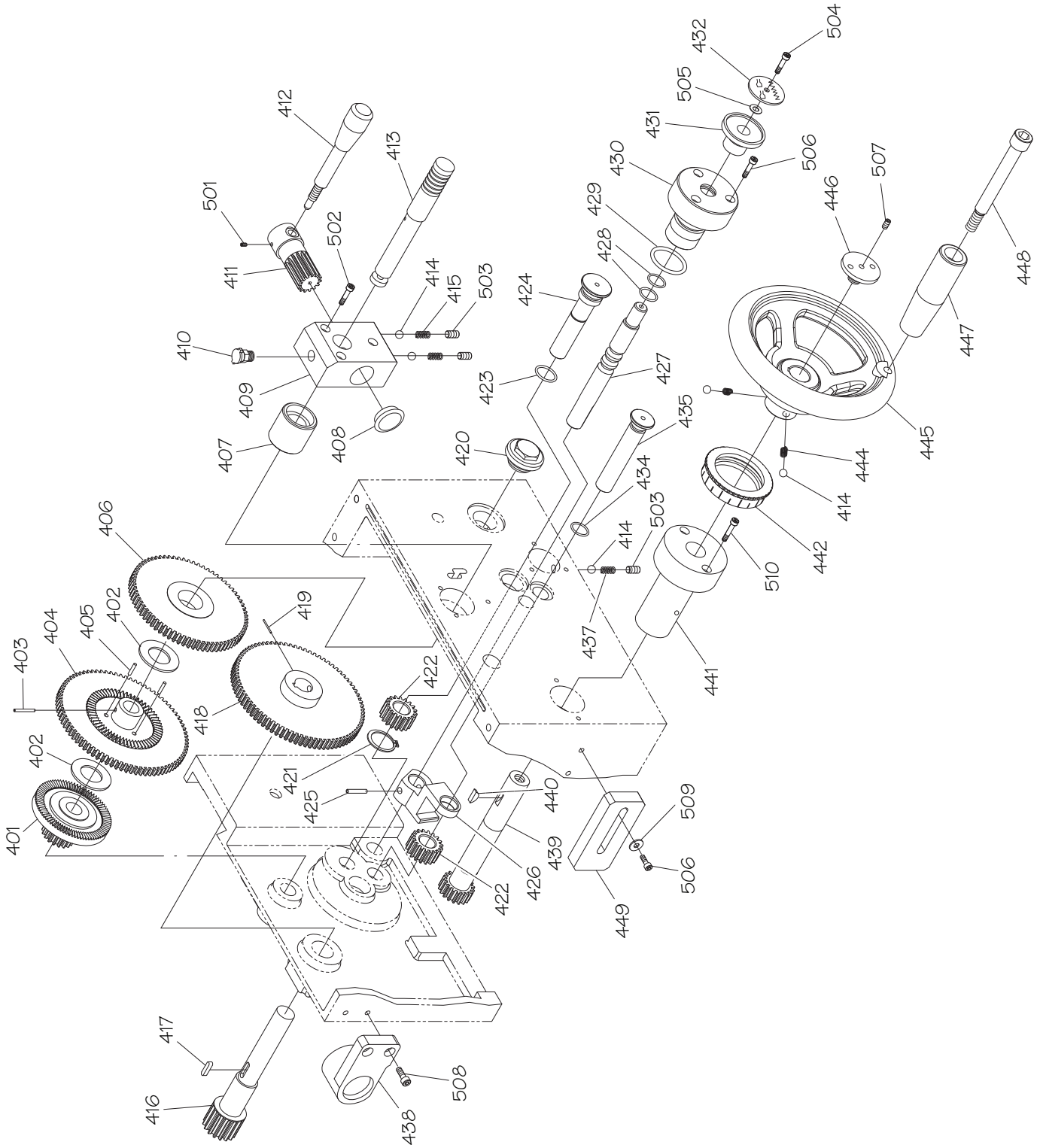


Gearbox Controls Parts List

REF	PART #	DESCRIPTION
262	PSB10490262	GEARBOX FRONT COVER GASKET
263	PSB10490263	PARTITION SCREW
264	PSB10490264	UPPER PARTITION SUPPORT
265	PSB10490265	UPPER FORK SUPPORT
266	PSB10490266	COMPRESSION SPRING 4 X 19
267	PSTB001	STEEL BALL 1/4
268	PSB10490268	PARTITION PLATE
269	PSB10490269	UPPER MIDDLE PARTITION SUPPORT
270	PSB10490270	LOWER MIDDLE PARTITION SUPPORT
271	PSB10490271	LOWER PARTITION SUPPORT
272	PSB10490272	REVERSE-STOP PLATE
273	PSB10490273	SPACER
274	PSB10490274	SHOULDER PLATE
275	PSB10490275	INDENTED ALIGNMENT PLATE
276	PSB10490276	ALIGNMENT PLATE
277	PSB10490277	SHIFT FORK
278	PSB10490278	SHIFT FORK
279	PSB10490279	SHIFT FORK
280	PSB10490280	SHIFT FORK
281	PRP02M	ROLL PIN 3 X 16
282	PSB10490282	CAPTIVE PIN
283	PSB10490283	ROCKER ARM
284	PSB10490284	SHIFT CAM
285	PSB10490285	CAM BRACKET
286	PEC015M	E-CLIP 8MM
287	PSB10490287	SPACER
288	PR18M	EXT RETAINING RING 17MM
289	PSB10490289	WOODRUFF KEY 4 X 13
290	PSB10490290	SHAFT
291	PSB10490291	SHIFT PAD
292	PSB10490292	DOWEL PIN 5 X 25
293	PSB10490293	SHIFT FORK
294	PSTB001	STEEL BALL 1/4
295	PSB10490295	COMPRESSION SPRING 4 X 19
296	PSB10490296	SHIFT PAD
297	PSB10490297	PIVOT ARM
298	PSB10490298	COMPRESSION SPRING 6 X 13
299	PSTB001	STEEL BALL 1/4
300	PSB10490300	SELECTOR BAR

REF	PART #	DESCRIPTION
301	PSB10490301	WOODRUF KEY 4 X 13
302	PSB10490302	SHAFT
303	PORP018	O-RING 17.8 X 2.4 P18
304	PSB10490304	BUSHING
305	PSB10490305	SHIFT FORK
306	PRP24M	ROLL PIN 5 X 16
307	PSB10490307	PIPE PLUG 1/2"PT
308	PSB10490308	PIPE ELBOW 1/2"PT
309	PSB10490309	PIPE NIPPLE 1/2" X 1"
310	PSB10490310	GEARBOX FRONT COVER
311	PSB10490311	SELECTOR SHAFT
312	PORG040	O-RING 39.4 X 3.1 G40
313	PSB10490313	SELECTOR LEVER SUPPORT
314	PSB10490314	COMPRESSION SPRING 9 X 38
315	PSB10490315	SELECTOR LEVER
316	PORG030	O-RING 3.1 X 29.4 G30
317	PSB10490317	SELECTOR LEVER COVER
318	PSB10490318	SELECTOR FRAME
319	PSB10490319	SHIFT LEVER
320	PSB10490320	LEVER FLAT WASHER 5MM
321	PSB10490321	LEVER END CAP
322	PSB10490055	OIL SIGHT GLASS 3/4"
323	PSB10490323	GEARBOX FRONT PANEL
325	PCAP15M	CAP SCREW M5-.8 X 20
326	PLW03M	LOCK WASHER 6MM
327	PCAP26M	CAP SCREW M6-1 X 12
328	PCAP48M	CAP SCREW M6-1 X 35
329	PRP04M	ROLL PIN 4 X 24
330	PSS03M	SET SCREW M6-1 X 8
331	PCAP02M	CAP SCREW M6-1 X 20
332	PCAP167M	CAP SCREW M6-1 X 70
333	PCAP190M	CAP SCREW M6-1 X 80
334	PCAP38M	CAP SCREW M5-.8 X 25
335	PCAP26M	CAP SCREW M6-1 X 12
336	PCAP33M	CAP SCREW M5-.8 X 12
337	PS17M	PHLP HD SCR M4-.7 X 6
338	PCAP66M	CAP SCREW M8-1.25 X 65
339	PSB10490339	TAPER PIN #7 X 3-1/4"

Apron Front View

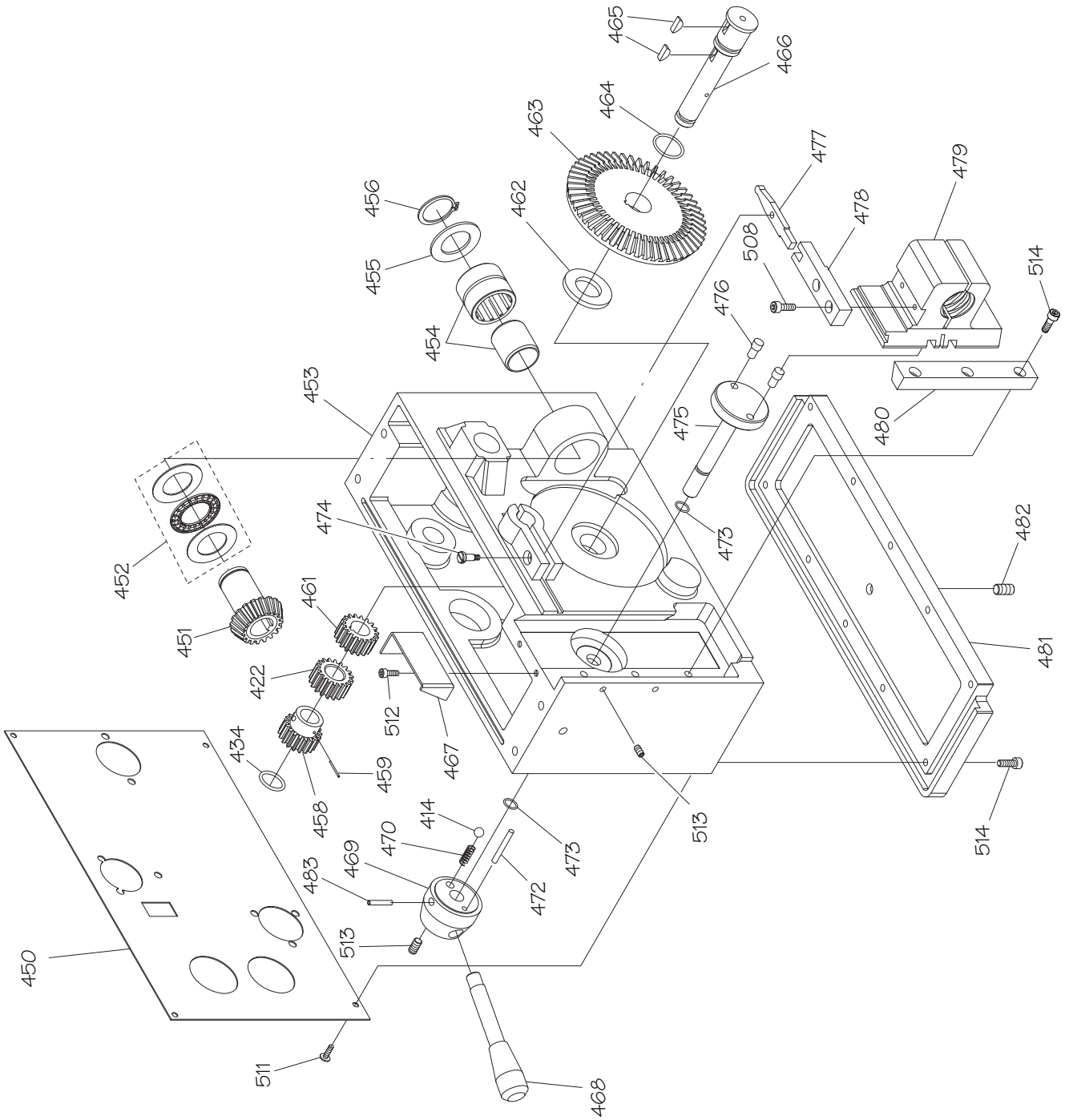


Apron Front View Parts List

REF	PART #	DESCRIPTION
401	PSB10490401	COMBO GEAR 18T/60T
402	PSB10490402	THRUST WASHER AS3047
403	PRP20M	ROLL PIN 4 X 22
404	PSB10490404	COMBO GEAR 60T/81T
405	PSB10490405	DOWEL PIN 4 X 17
406	PSB10490406	COMBO GEAR 60T/72T
407	PSB10490407	SPACER
408	PSB10490408	CASTING PLUG
409	PSB10490409	GEAR BRACKET
410	PSB10490410	OIL CAP
411	PSB10490411	CAM SHAFT
412	PSB10490412	LEVER
413	PSB10490413	SHAFT
414	PSTB001	STEEL BALL 1/4
415	PSB10490415	COMPRESSION SPRING 6 X 13
416	PSB10490416	GEAR SHAFT 16T
417	PK14M	KEY 5 X 5 X 18
418	PSB10490418	GEAR 81T
419	PRP10M	ROLL PIN 5 X 36
420	PSB10490055	OIL SIGHT GLASS 3/4"
421	PR06M	EXT RETAINING RING 16MM
422	PSB10490422	GEAR 18T
423	PORP018	O-RING 17.8 X 2.4 P18
424	PSB10490424	SHAFT
425	PRP04M	ROLL PIN 4 X 24
426	PSB10490426	FEED SELECTOR PIVOT ARM
427	PSB10490427	SHAFT
428	PORP016	O-RING 15.8 X 2.4 P16

REF	PART #	DESCRIPTION
429	PORP026	O-RING 25.7 X 3.5 P26
430	PSB10490430	SHAFT BRACKET
431	PSB10490431	FEED SELECTOR KNOB
432	PSB10490432	SELECTOR INDICATOR PLATE
434	PORP012	O-RING 11.8 X 2.4 P12
435	PSB10490435	SHAFT
437	PSB10490437	COMPRESSION SPRING 4 X 19
438	PSB10490438	LEADSCREW SUPPORT
439	PSB10490439	GEAR SHAFT 18T
440	PSB10490440	WOODRUFF KEY 5 X 19
441	PSB10490441	SHAFT BRACKET
442	PSB10490442	GRADUATED DIAL
444	PSB10490444	COMPRESSION SPRING
445	PSB10490445	HANDWHEEL
446	PSB10490446	HANDWHEEL END CAP
447	PSB10490447	HANDWHEEL HANDLE
448	PSB10490448	HANDLE CAP SCREW
449	PSB10490449	CARRIAGE STOP PLATE
501	PSS26M	SET SCREW M5-.8 X 6
502	PCAP79M	CAP SCREW M5-.8 X 35
503	PSS20M	SET SCREW M8-1.25 X 8
504	PS08M	PHLP HD SCR M5-.8 X 12
505	PW03M	FLAT WASHER 6MM
506	PCAP06M	CAP SCREW M6-1 X 25
507	PSS12M	SET SCREW M6-1 X 25
508	PCAP01M	CAP SCREW M6-1 X 16
509	PW03M	FLAT WASHER 6MM
510	PCAP38M	CAP SCREW M5-.8 X 25

Apron Rear View

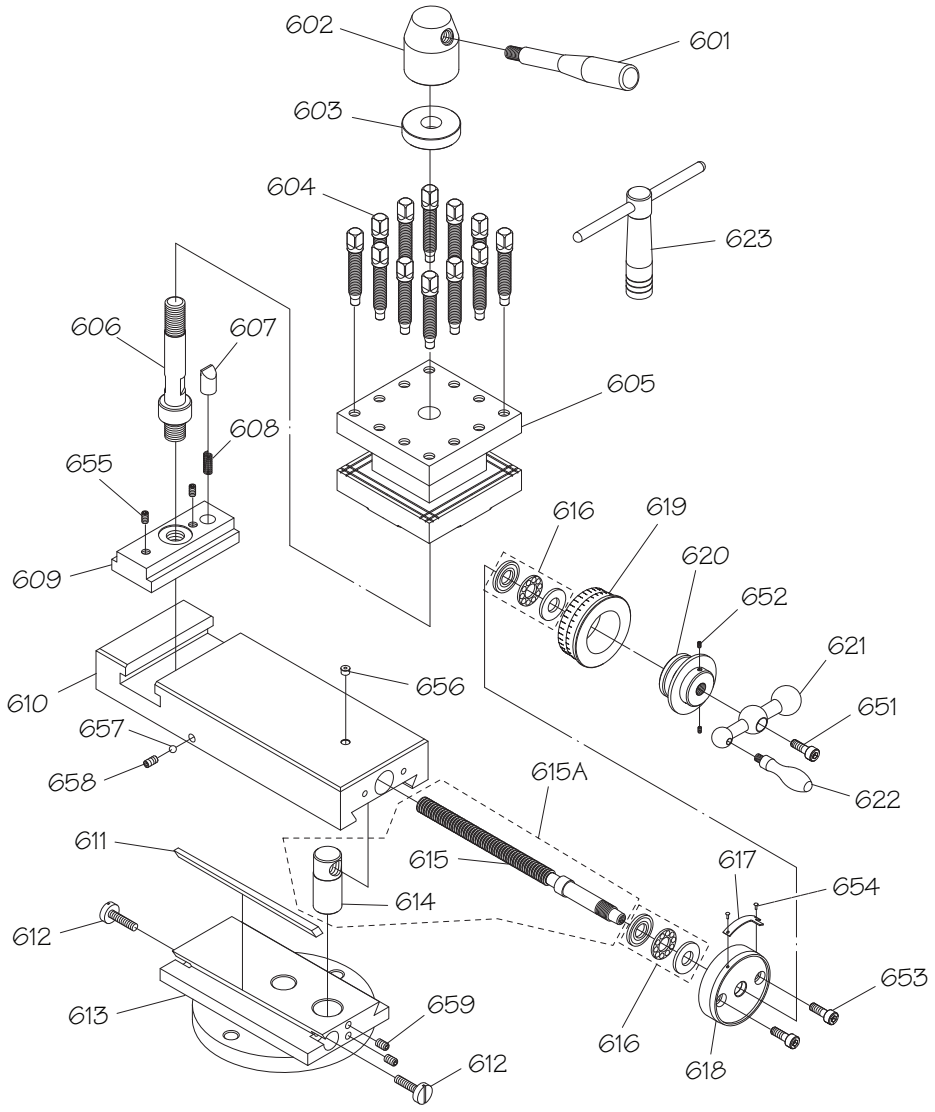


Apron Rear View Parts List

REF	PART #	DESCRIPTION
414	PSTB001	STEEL BALL 1/4
422	PSB10490422	GEAR 18T
434	PORP012	O-RING 11.8 X 2.4 P12
450	PSB10490450	APRON PANEL
451	PSB10490451	BEVEL GEAR 23T
452	PSB10490452	THRUST BEARING NTB/AS-2542
453	PSB10490453	APRON
454	PSB10490454	NEEDLE ROLLER BEARING NK29/30
455	PSB10490455	SPACER
456	PR11M	EXT RETAINING RING 25MM
458	PSB10490458	GEAR 18T
459	PRP88M	ROLL PIN 5 X 22
461	PSB10490461	GEAR 18T
462	PSB10490462	SPACER
463	PSB10490463	BEVEL GEAR
464	PSB10490464	SPACER
465	PSB10490465	WOODRUFF KEY 4 X 13
466	PSB10490466	SHAFT
467	PSB10490467	OIL FENCE
468	PSB10490468	HALF NUT LEVER

REF	PART #	DESCRIPTION
469	PSB10490469	LEVER HUB
470	PSB10490470	COMPRESSION SPRING 6 X 27
472	PRP04M	ROLL PIN 4 X 24
473	PORP009	O-RING 8.8 X 1.9 P9
474	PSB10490474	STEP SCREW
475	PSB10490475	HALF NUT PIVOT ROD
476	PSB10490476	STEP PIN
477	PSB10490477	PIVOT ARM
478	PSB10490478	PIVOT STOP
479	PSB10490479	HALF NUT
480	PSB10490480	HALF NUT GIB
481	PSB10490481	APRON BASE PLATE
482	PSB10490482	PIPE PLUG 1/8"PT
483	PRP102M	ROLL PIN 4 X 36
508	PCAP01M	CAP SCREW M6-1 X 16
511	PS17M	PHLP HD SCR M4-.7 X 6
512	PCAP03M	CAP SCREW M5-.8 X 8
513	PSS02M	SET SCREW M6-1 X 6
514	PCAP24M	CAP SCREW M5-.8 X 16

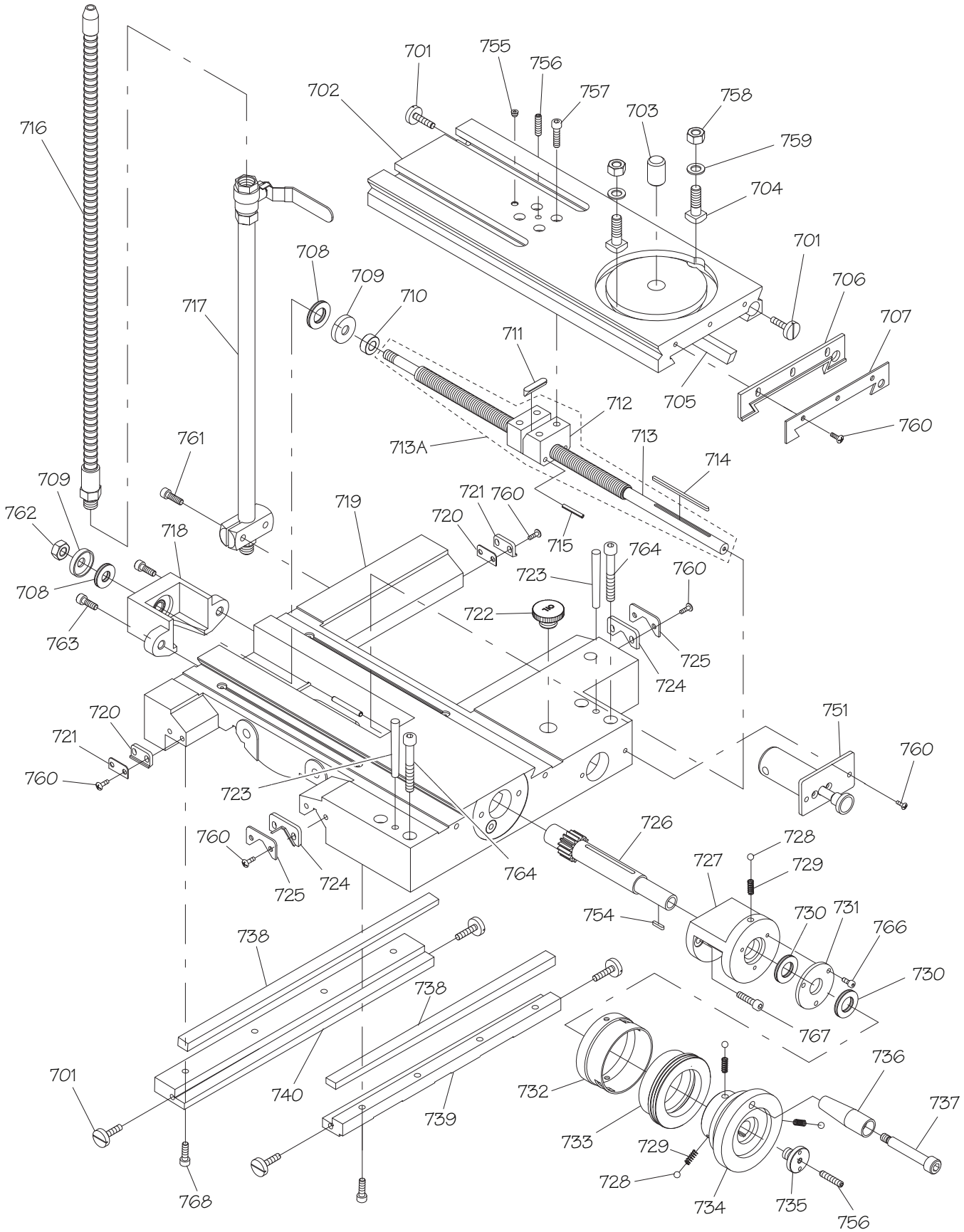
Compound Rest & Tool Post



REF	PART #	DESCRIPTION
601	PSB10490601	TOOL POST LEVER
602	PSB10490602	LEVER HUB
603	PSB10490603	HUB COLLAR
604	PSB10490604	TOOL HOLDER BOLT
605	PSB10490605	TOOL POST BODY
606	PSB10490606	TOOL POST SHAFT
607	PSB10490607	PLUNGER
608	PSB10490608	COMPRESSION SPRING 6 X 27
609	PSB10490609	TOOL POST BASE
610	PSB10490610	COMPOUND REST
611	PSB10490611	COMPOUND REST GIB
612	PSB10490612	GIB ADJUSTMENT SCREW
613	PSB10490613	COMPOUND REST SWIVEL BASE
614	PSB10490615A	LEADSCREW NUT
615A	PSB10490615A	LEADSCREW W/NUT ASSEMBLY
615	PSB10490615A	COMPOUND REST LEADSCREW
616	P51101	THRUST BEARING 51101

REF	PART #	DESCRIPTION
617	PSB10490617	INDICATOR PLATE
618	PSB10490618	LEADSCREW BRACKET
619	PSB10490619	GRADUATED DIAL
620	PSB10490620	DIAL BUSHING
621	PSB10490621	BALL HANDLE
622	PSB10490622	HANDLE
623	PSB10490623	TOOL POST WRENCH
651	PCAP04M	CAP SCREW M6-1 X 10
652	PSS03M	SET SCREW M6-1 X 8
653	PCAP02M	CAP SCREW M6-1 X 20
654	PRIV001M	STEEL FLUTED RIVET 2 X 5MM
655	PSS14M	SET SCREW M8-1.25 X 12
656	PLUBE001	TAP-IN BALL OILER 1/4
657	PSTB001	STEEL BALL 1/4
658	PSS16M	SET SCREW M8-1.25 X 10
659	PSS03M	SET SCREW M6-1 X 8

Saddle Top View

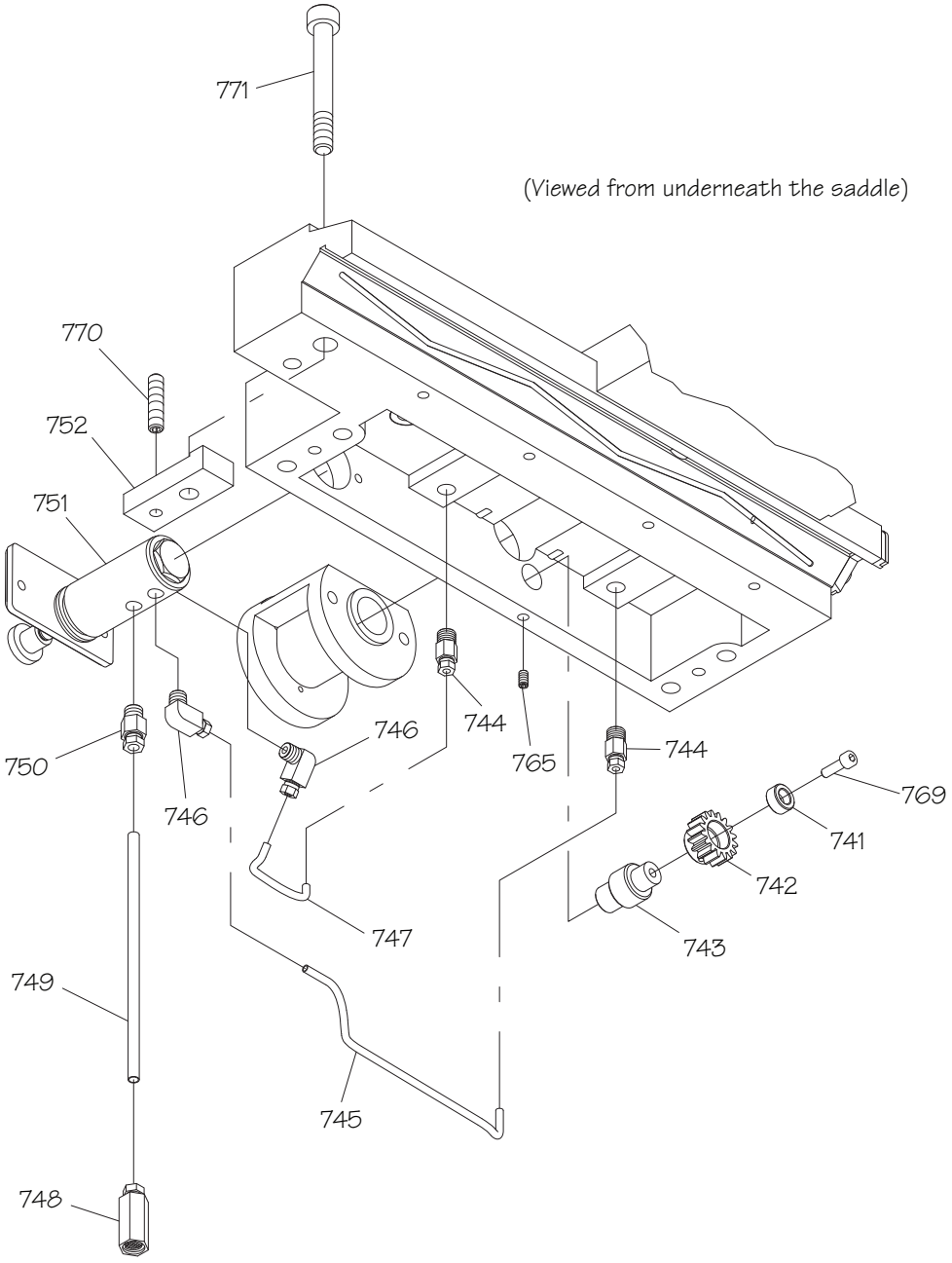


Saddle Top View Parts List

REF	PART #	DESCRIPTION
701	PSB10490701	GIB ADJUSTMENT SCREW
702	PSB10490702	CROSS SLIDE
703	PSB10490703	PIVOT PIN
704	PSB10490704	COMPOUND REST T-BOLT
705	PSB10490705	CROSS SLIDE GIB
706	PSB10490706	SADDLE WAY WIPER
707	PSB10490707	WAY WIPER PLATE
708	PSB10490708	THRUST BEARING NTB/AS2-1226
709	PSB10490709	BEARING COLLAR
710	PSB10490710	SPACER
711	PSB10490711	WEDGE KEY 7 X 7 X 30
712	PSB10490713A	LEADSCREW NUT
713A	PSB10490713A	LEADSCREW W/NUT ASSEMBLY
713	PSB10490713A	CROSS SLIDE LEADSCREW
714	PK168M	KEY 3 X 3 X 80
715	PRP28M	ROLL PIN 5 X 40
716	PSB10490716	COOLANT NOZZLE 3/8"PT X 24"
717	PSB10490717	COOLANT STAND PIPE W/VALVE 3/8"PT
718	PSB10490718	LEADSCREW END BRACKET
719	PSB10490719	SADDLE
720	PSB10490720	STRAIGHT WAY WIPER
721	PSB10490721	STRAIGHT WIPER PLATE
722	PSB10490722	OIL CAP 3/4"NF
723	PSB10490723	TAPER PIN #6 X 2-1/2"
724	PSB10490724	V-WAY WIPER
725	PSB10490725	V-WAY WIPER P LATE
726	PSB10490726	PINION SHAFT
727	PSB10490727	PINION SHAFT BRACKET

REF	PART #	DESCRIPTION
728	PSTB001	STEEL BALL 1/4
729	PSB10490729	COMPRESSION SPRING 6 X 15
730	PSB10490730	THRUST BEARING NTB/AS2-1730
731	PSB10490731	BRACKET END COVER
732	PSB10490732	DIAL RING
733	PSB10490733	GRADUATED DIAL
734	PSB10490734	CARRIAGE HANDWHEEL
735	PSB10490735	HANDWHEEL END CAP M12-1.75
736	PSB10490736	HANDLE
737	PSB10490737	HANDLE CAP SCREW
738	PSB10490738	SADDLE GIB
739	PSB10490739	FRONT GIB SUPPORT
740	PSB10490740	REAR GIB SUPPORT
751	PSB10490751	ONE-SHOT OILER ASSEMBLY
754	PK52M	KEY 3 X 3 X 15
755	PLUBE001	TAP-IN BALL OILER 1/4
756	PSS28M	SET SCREW M6-1 X 30
757	PCAP07M	CAP SCREW M6-1 X 30
758	PN02M	HEX NUT M10-1.5
759	PW04M	FLAT WASHER 10MM
760	PS08M	PHLP HD SCR M5-.8 X 12
761	PCAP06M	CAP SCREW M6-1 X 25
762	PN02M	HEX NUT M10-1.5
763	PCAP02M	CAP SCREW M6-1 X 20
764	PCAP35M	CAP SCREW M8-1.25 X 60
766	PCAP17M	CAP SCREW M4-.7 X 10
767	PCAP02M	CAP SCREW M6-1 X 20
768	PCAP02M	CAP SCREW M6-1 X 20

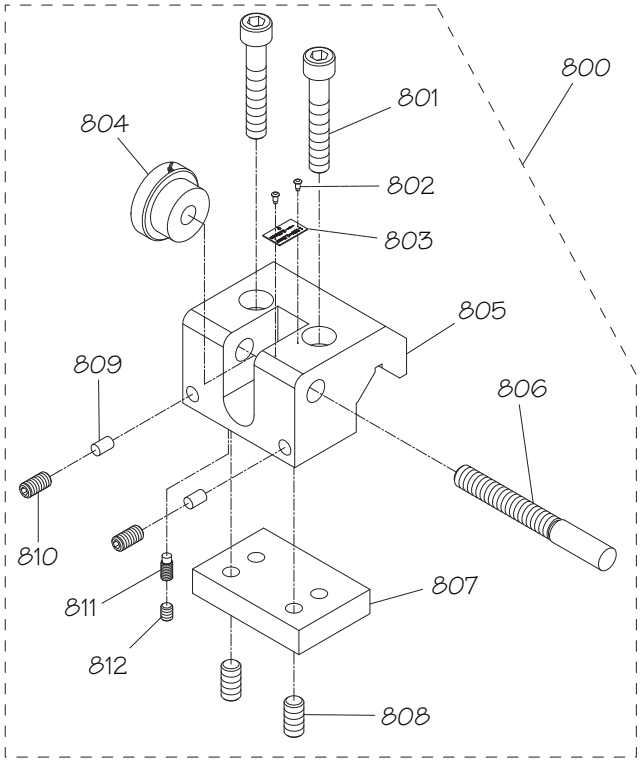
Saddle Bottom View



REF	PART #	DESCRIPTION
741	PSB10490741	SPACER
742	PSB10490742	GEAR 16T
743	PSB10490743	GEAR SHAFT
744	PSB10490744	STRAIGHT ADAPTER 1/8"PT X 4MM
745	PSB10490745	OIL TUBE 4 X 260MM ALUMINUM
746	PSB10490746	ELBOW ADAPTER 1/8"PT X 4MM
747	PSB10490747	OIL TUBE 4 X 120MM ALUMINUM
748	PSB10490748	OIL FILTER 6MM

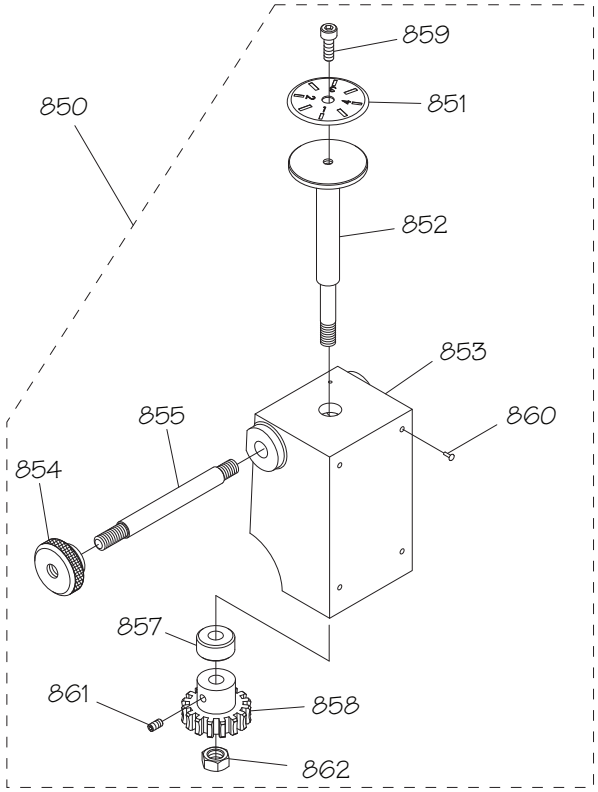
REF	PART #	DESCRIPTION
749	PSB10490749	OIL TUBE 6 X 160MM ALUMINUM
750	PSB10490750	STRAIGHT ADAPTER 1/8" X 6MM
751	PSB10490751	ONE-SHOT OILER ASSEMBLY
752	PSB10490752	CLAMP PLATE
765	PSS03M	SET SCREW M6-1 X 8
769	PCAP24M	CAP SCREW M5-.8 X 16
770	PSS74M	SET SCREW M8-1.25 X 35
771	PCAP169M	CAP SCREW M12-1.75 X 75

Micrometer Stop



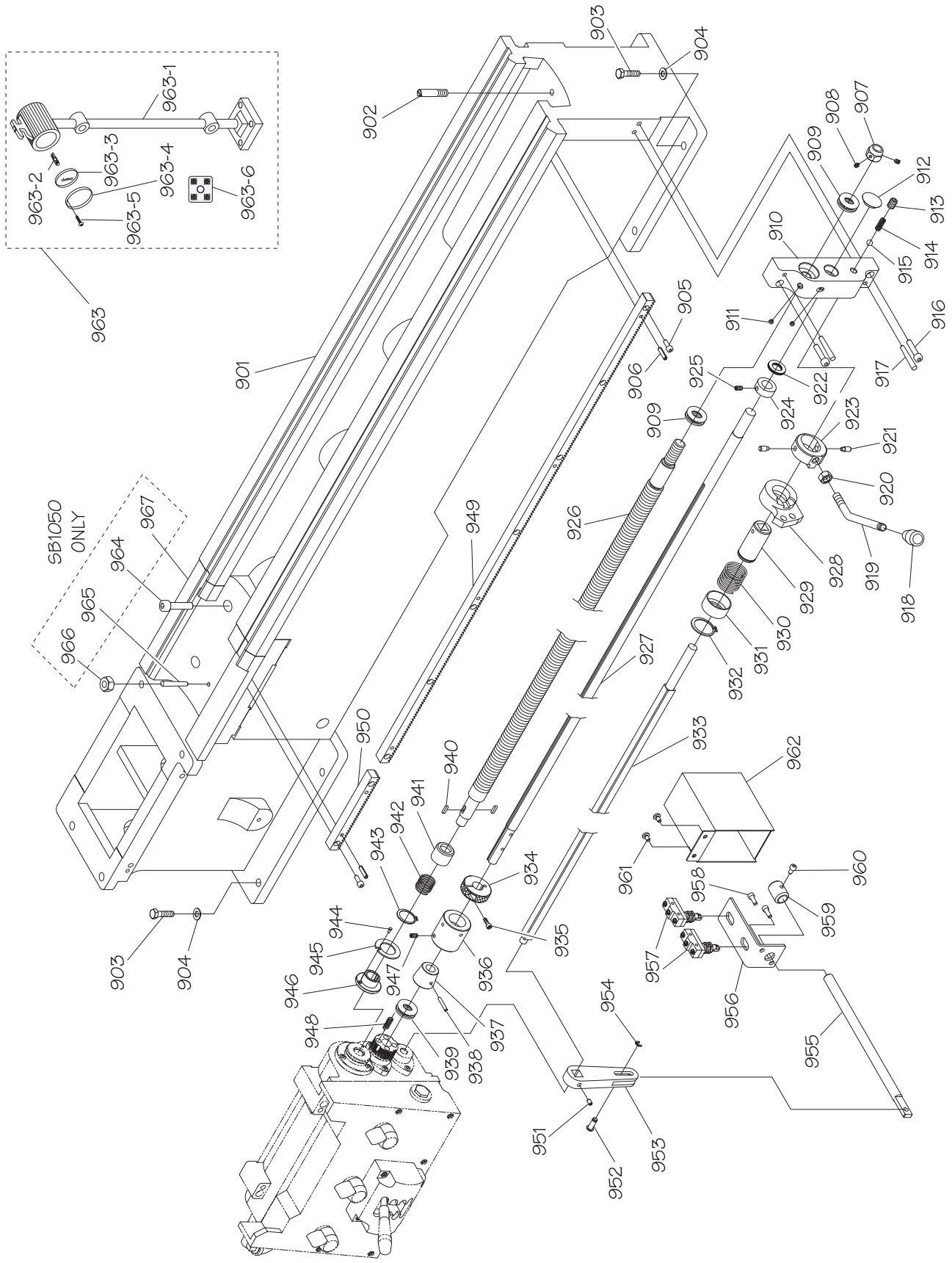
REF	PART #	DESCRIPTION
800	PSB10490800	MICROMETER STOP ASSEMBLY
801	PCAP71M	CAP SCREW M10-1.5 X 60
802	PRIV001M	STEEL FLUTED RIVET 2 X 5MM
803	PSB10490803	INDICATOR PLATE
804	PSB10490804	MICROMETER DIAL
805	PSB10490805	MICROMETER BODY
806	PSB10490806	STOP ROD
807	PSB10490807	CLAMP PLATE
808	PSS10M	SET SCREW M10-1.5 X 20
809	PSB10490809	COPPER PLUNGER
810	PSS06M	SET SCREW M8-1.25 X 16
811	PSB10490811	DOG POINT SET SCREW M8-1.25 X 12
812	PSS14M	SET SCREW M8-1.25 X 12

Dial Indicator



REF	PART #	DESCRIPTION
850	PSB1049850	DIAL INDICATOR ASSEMBLY
851	PSB10490851	DIAL PLATE
852	PSB10490852	PIVOT ROD
853	PSB10490853	BODY
854	PSB10490854	KNURLED KNOB
855	PSB10490855	STUD-UDE M8-1.25 X 110 20/30
857	PSB10490857	SPACER
858	PSB10490858	DIAL GEAR 16T
859	PCAP04M	CAP SCREW M6-1 X 10
860	PRIV001M	STEEL FLUTED RIVET 2 X 5MM
861	PSS02M	SET SCREW M6-1 X 6
862	PN03M	HEX NUT M8-1.25

Bed & Shafts

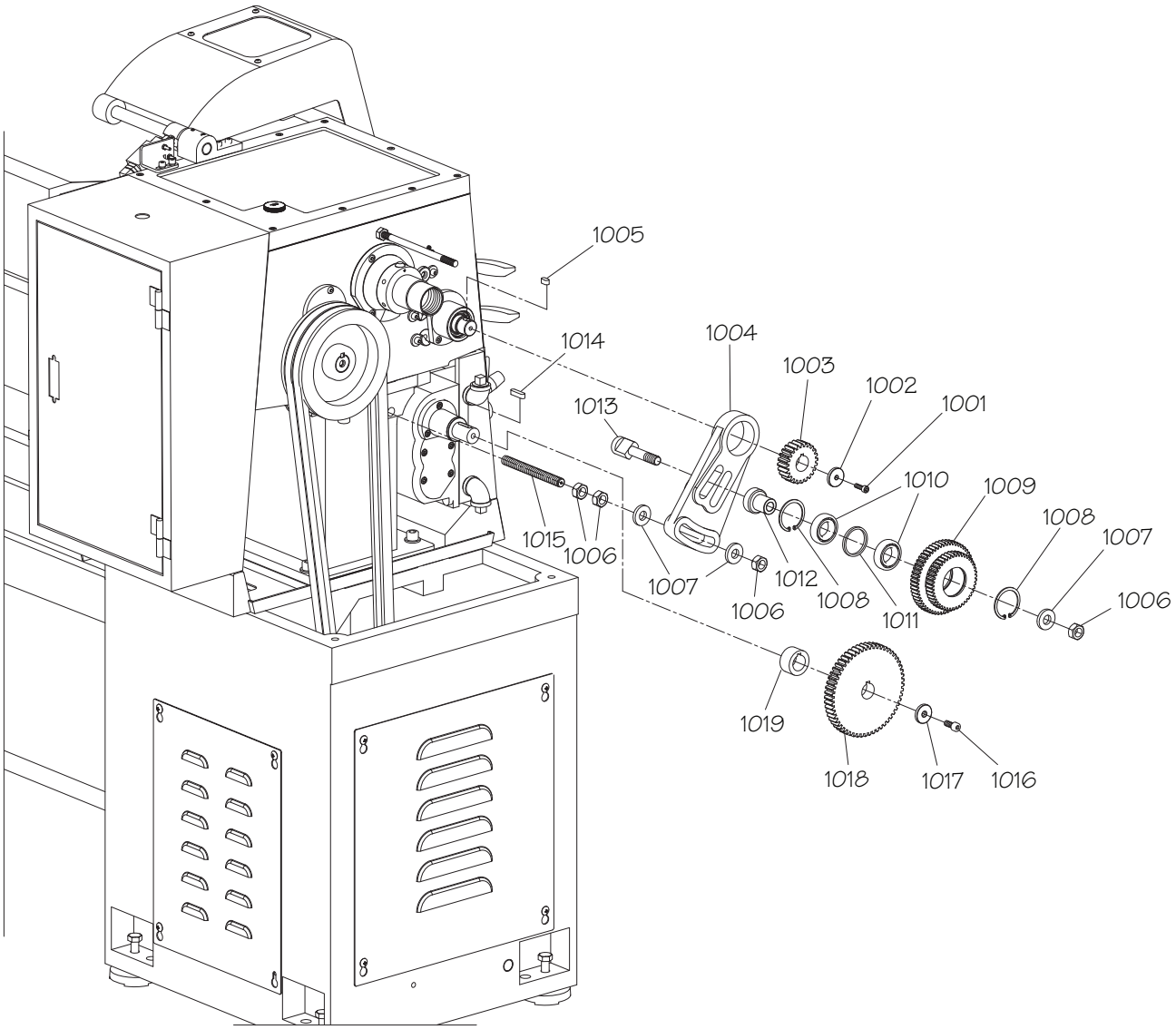


Bed & Shafts Parts List

REF	PART #	DESCRIPTION
901	PSB10490901	BED (SB1049)
901	PSB10500901	BED (SB1050)
902	PSB10490902	BED STOP BOLT
903	PB24M	HEX BOLT M12-1.75 X 45
904	PW06M	FLAT WASHER 12MM
905	PCAP02M	CAP SCREW M6-1 X 20
906	PRP93M	ROLL PIN 6 X 25
907	PSB10490907	LEADSCREW LOCK NUT
908	PSS03M	SET SCREW M6-1 X 8
909	P51203	THRUST BEARING 51203
910	PSB10490910	SHAFT END BRACKET
911	PLUBE001	TAP-IN BALL OILER 1/4
912	PSB10490912	CASTING PLUG
913	PSS15M	SET SCREW M12-1.75 X 12
914	PSB10490914	COMPRESSION SPRING
915	PSTB003	STEEL BALL 3/8"
916	PCAP40M	CAP SCREW M8-1.25 X 35
917	PSB10490917	TAPER PIN #6 X 2"
918	PSB10490918	KNOB
919	PSB10490919	SPINDLE LEVER
920	PN09M	HEX NUT M12-1.75
921	PSB10490921	STEP PIN
922	PSB10490922	THRUST BEARING NTB/AS21831
923	PSB10490923	SPINDLE LEVER HUB
924	PSB10490924	LOCK COLLAR
925	PSS03M	SET SCREW M6-1 X 8
926	PSB10490926	LONGITUDINAL LEADSCREW (SB1049)
926	PSB10500926	LONGITUDINAL LEADSCREW (SB1050)
927	PSB10490927	FEED ROD (SB1049)
927	PSB10500927	FEED ROD (SB1050)
928	PSB10490928	SPINDLE ROD BRACKET
929	PSB10490929	SPINDLE ROD SLEEVE
930	PSB10490930	COMPRESSION SPRING
931	PSB10490931	SPRING HOUSING
932	PR37M	EXT RETAINING RING 32MM
933	PSB10490933	SPINDLE ROD (SB1049)
933	PSB10500933	SPINDLE ROD (SB1050)
934	PSB10490934	CARRIAGE STOP COLLAR
935	PCAP02M	CAP SCREW M6-1 X 20

REF	PART #	DESCRIPTION
936	PSB10490936	CLUTCH COLLAR
937	PSB10490937	CLUTCH BUSHING
938	PSB10490938	TAPER PIN #4 X 1-1/4"
939	P51203	THRUST BEARING 51203
940	PK20M	KEY 5 X 5 X 15
941	PSB10490941	SPRING HOUSING
942	PSB10490942	SPRING
943	PR37M	EXT RETAINING RING 32MM
944	PSB10490944	SHEAR PIN
945	PSB10490945	SHROUD WASHER
946	PSB10490946	SHEAR PIN COLLAR
947	PSS02M	SET SCREW M6-1 X 6
948	PSB10490948	SPRING 8 X 32
949	PSB10490949	BED RACK (SB1049)
949	PSB10500949	BED RACK (SB1050)
950	PSB10500950	GAP RACK (SB1050)
951	PSS14M	SET SCREW M8-1.25 X 12
952	PSB10490952	CAPTIVE PIN
953	PSB10490953	PIVOT ARM
954	PEC09M	E-CLIP 6MM
955	PSB10490955	SPINDLE SWITCH LINKAGE
956	PSB10490956	SPINDLE SWITCH BRACKET
957	PSB10490957	MICRO SWITCH TEND TM-1308
958	PCAP01M	CAP SCREW M6-1 X 16
959	PSB10490959	LOCK COLLAR
960	PCAP04M	CAP SCREW M6-1 X 10
961	PS68M	PHLP HD SCR M6-1 X 10
962	PSB10490962	SPINDLE SWITCH COVER
963	PSB10490963	HALOGEN LAMP ASSEMBLY
963-1	PSB10490963-1	LAMP BODY
963-2	PBULB3	HALOGEN BULB 24V
963-3	PSB10490963-3	LENS
963-4	PSB10490963-4	LENS RETAINER
963-5	PS55M	PHLP HD SCR M3-.5 X 10
963-6	PSB10490963-6	LAMP TERMINAL BLOCK 2P
964	PCAP64M	CAP SCREW M10-1.5 X 25 (SB1050)
965	PSB10500965	GAP INSERT TAPER PIN (SB1050)
966	PN03M	HEX NUT M8-1.25 (SB1050)
967	PSB10500967	GAP INSERT (SB1050)

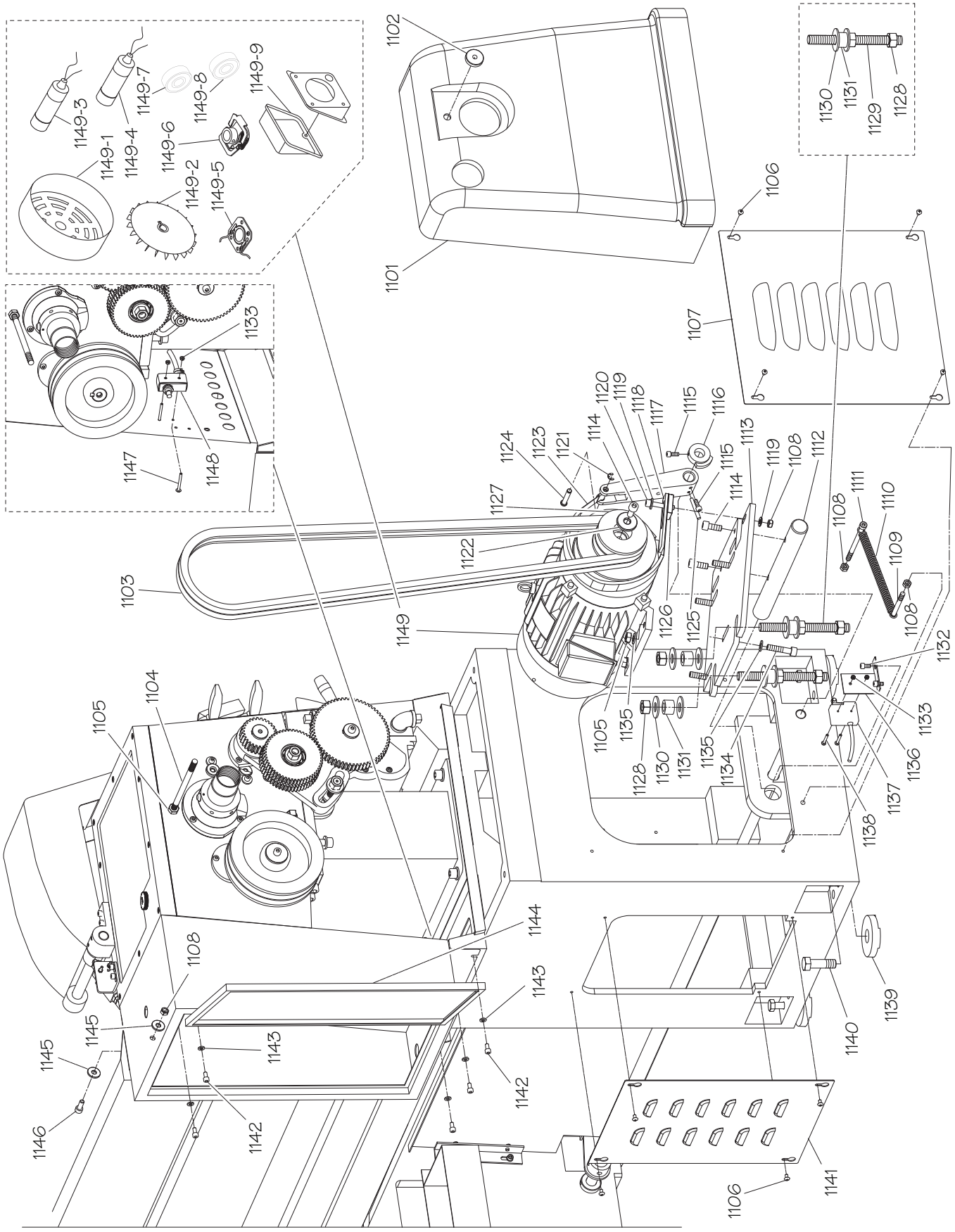
End Gears



REF	PART #	DESCRIPTION
1001	PCAP02M	CAP SCREW M6-1 X 20
1002	PSB10491002	GEAR FLAT WASHER 6MM
1003	PSB10491003	GEAR 24T
1004	PSB10491004	PIVOT FRAME
1005	PK166M	KEY 7 X 7 X 15
1006	PN32M	HEX NUT M14-2
1007	PSB10491007	GEAR FLAT WASHER 14MM
1008	PR25M	INT RETAINING RING 47MM
1009	PSB10491009	COMBO GEAR 44T/56T
1010	P6005ZZ	BALL BEARING 6005ZZ

REF	PART #	DESCRIPTION
1011	PSB10491011	SPACER
1012	PSB10491012	SHAFT COLLAR
1013	PSB10491013	GEAR SHAFT
1014	PK28M	KEY 7 X 7 X 30
1015	PSB10491015	STUD-FT M14-2 X 180
1016	PCAP14M	CAP SCREW M8-1.25 X 20
1017	PSB10491017	GEAR FLAT WASHER 8MM
1018	PSB10491018	GEAR 57T
1019	PSB10491019	SPACER

Main Motor

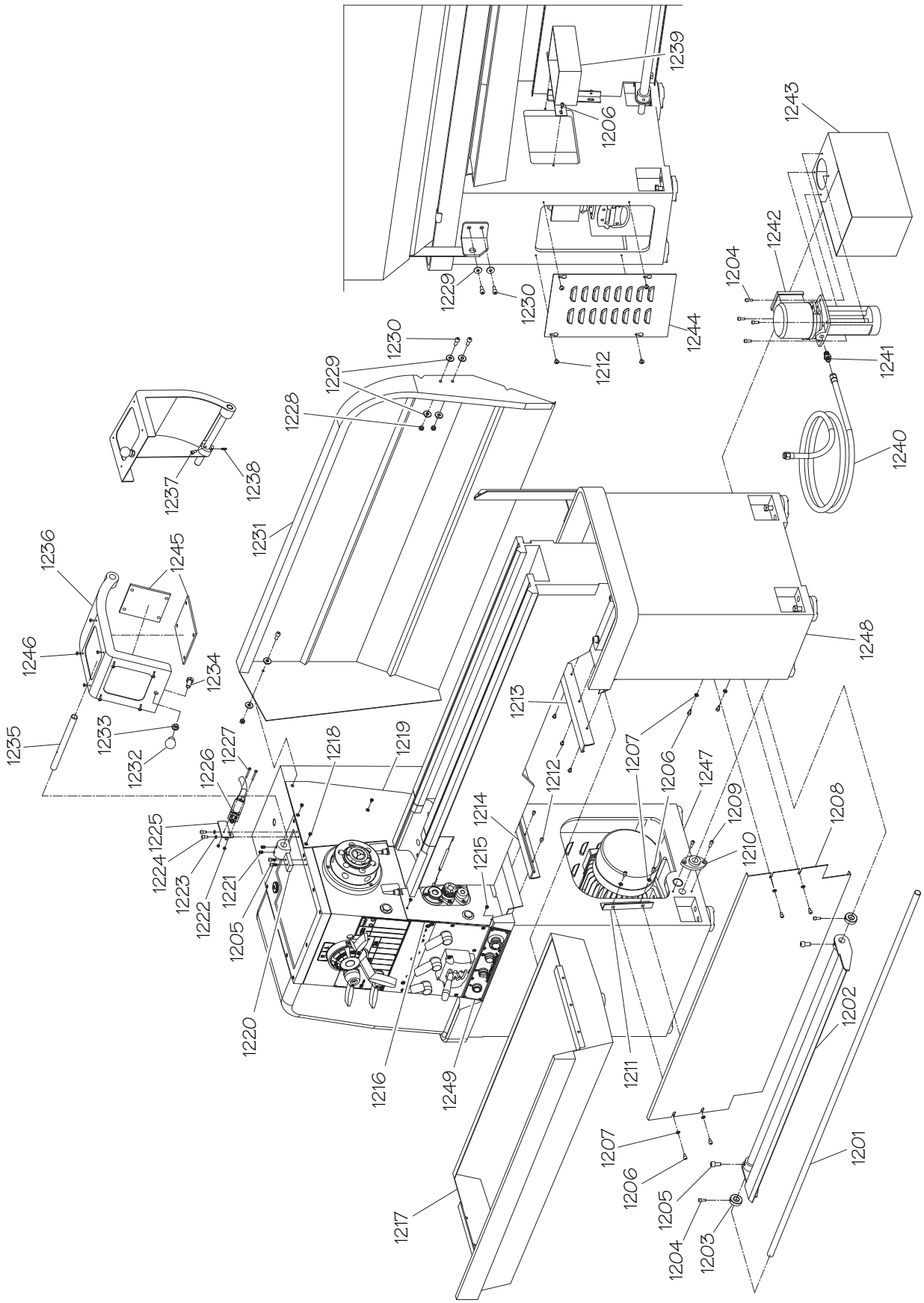


Main Motor Parts List

REF	PART #	DESCRIPTION
1101	PSB10491101	END GEAR COVER
1102	PSB10491102	KNURLED KNOB M10-1.5
1103	PVB76	V-BELT B76
1104	PSB10491104	STUD-DE M10-1.5 X 200
1105	PN02M	HEX NUT M10-1.5
1106	PS68M	PHLP HD SCR M6-1 X 10
1107	PSB10491107	SIDE MOTOR ACCESS COVER
1108	PN03M	HEX NUT M8-1.25
1109	PSB10491109	SPRING CAPTIVE BOLT
1110	PSB10491110	EXTENSION SPRING
1111	PCAP191M	CAP SCREW M8-1.25 X 120
1112	PSB10491112	MOTOR MOUNT SHAFT
1113	PSB10491113	MOTOR MOUNT
1114	PCAP64M	CAP SCREW M10-1.5 X 25
1115	PCAP01M	CAP SCREW M6-1 X 16
1116	PSB10491116	BRAKE CAM
1117	PSB10491117	BRAKE LEVER
1118	PSB10491118	BRAKE BELT MOUNT
1119	PW01M	FLAT WASHER 8MM
1120	PCAP45M	CAP SCREW M8-1.25 X 45
1121	PEC015M	E-CLIP 8MM
1122	PSB10491122	PULLEY FLAT WASHER 10MM
1123	PSB10491123	BRAKE BELT
1124	PSB10491124	CAPTIVE PIN
1125	PSB10491125	TAPER PIN #4 X 3/4"
1126	PSB10491126	BRAKE BELT BRACKET
1127	PSB10491127	MOTOR PULLEY
1128	PN13M	HEX NUT M16-2
1129	PSB10491129	STUD-FT M16-2 X 170

REF	PART #	DESCRIPTION
1130	PW08M	FLAT WASHER 16MM
1131	PSB10491131	RUBBER SHOCK ABSORBER
1132	PCAP26M	CAP SCREW M6-1 X 12
1133	PN04M	HEX NUT M4-.7
1134	PCAP70M	CAP SCREW M10-1.5 X 45
1135	PW04M	FLAT WASHER 10MM
1136	PSB10491136	BRAKE SWITCH BRACKET
1137	PSB10491137	MICRO SWITCH TEND TM-1704
1138	PS51M	PHLP HD SCR M4-.7 X 30
1139	PSB10491139	FOOT PAD
1140	PB51M	HEX BOLT M16-2 X 50
1141	PSB10491141	REAR MOTOR ACCESS COVER
1142	PCAP04M	CAP SCREW M6-1 X 10
1143	PW03M	FLAT WASHER 6MM
1144	PSB10491144	ELECTRICAL CABINET W/DOOR ASSY
1145	PW01M	FLAT WASHER 8MM
1146	PCAP14M	CAP SCREW M8-1.25 X 20
1147	PS65M	PHLP HD SCR M4-.7 X 40
1148	PSB10491148	MICRO SWITCH TEND TM-1307
1149	PSB10491149	MOTOR 3HP 220V 1PH
1149-1	PSB10491149-1	MOTOR FAN COVER
1149-2	PSB10491149-2	MOTOR FAN
1149-3	PSB10491149-3	S CAPACITOR 600M 250V 1-3/4 X 4
1149-4	PSB10491149-4	R CAPACITOR 50M 350V 2 X 3-3/8
1149-5	PSB10491149-5	CONTACT PLATE
1149-6	PSB10491149-6	CENTRIFUGAL SWITCH
1149-7	PSB10491149-7	FRONT MOTOR BEARING
1149-8	PSB10491149-8	REAR MOTOR BEARING
1149-9	PSB10491149-9	MOTOR JUNCTION BOX

Stands & Panels

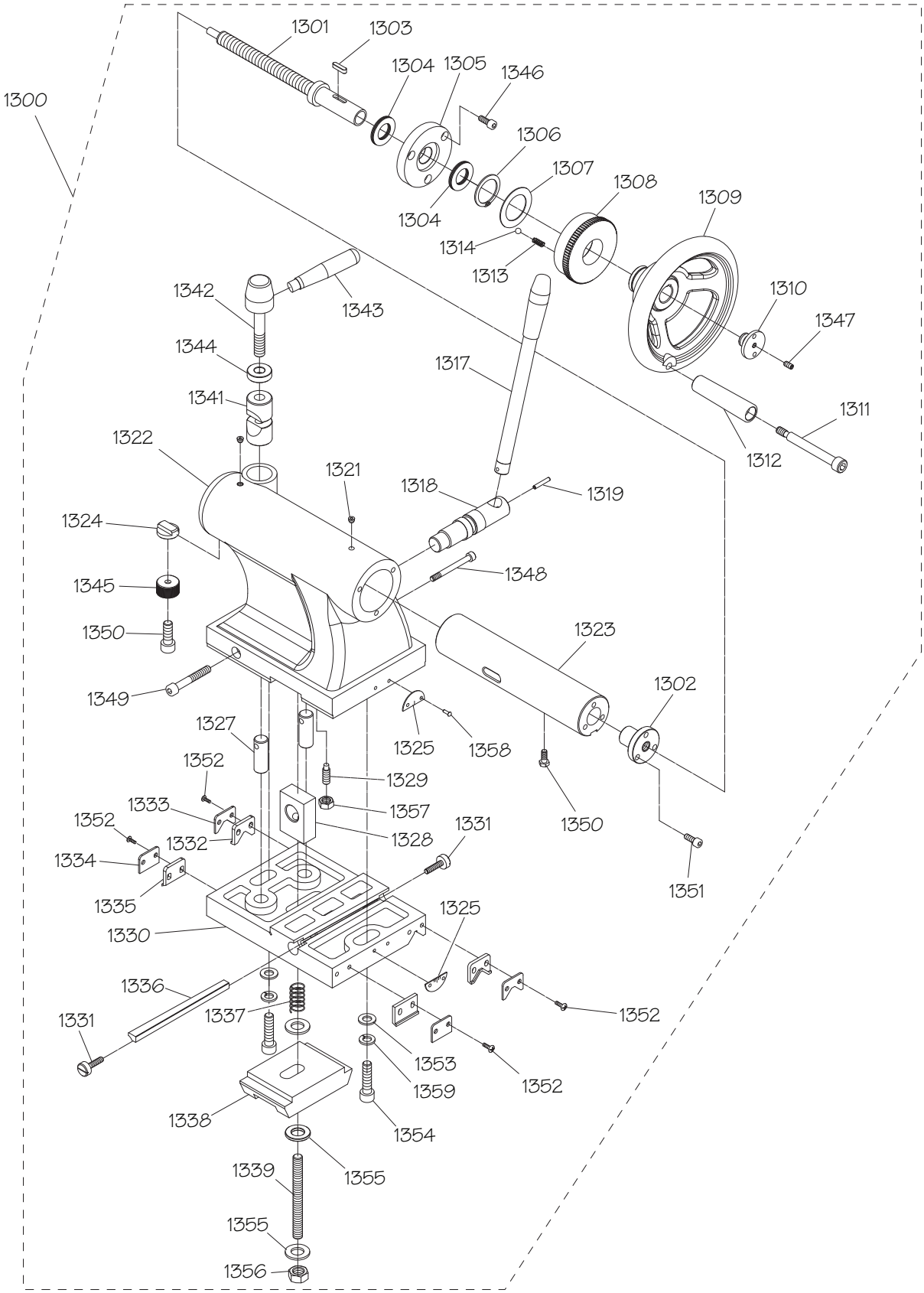


Cabinets & Panels Parts List

REF	PART #	DESCRIPTION
1201	PSB10491201	BRAKE PEDAL ROD (SB1049)
1201	PSB10501201	BRAKE PEDAL ROD (SB1050)
1202	PSB10491202	BRAKE PEDAL (SB1049)
1202	PSB10501202	BRAKE PEDAL (SB1050)
1203	PSB10491203	LOCK COLLAR
1204	PCAP01M	CAP SCREW M6-1 X 16
1205	PB56M	CAP SCREW M10-1.5 X 20
1206	PCAP04M	CAP SCREW M6-1 X 10
1207	PW03M	FLAT WASHER 6MM
1208	PSB10491208	CENTER PANEL (SB1049)
1208	PSB10501208	CENTER PANEL (SB1050)
1209	PCAP02M	CAP SCREW M6-1 X 20
1210	PSB10491210	FLANGE BEARING
1211	PSB10491211	CENTER PANEL BRACKET
1212	PS68M	PHLP HD SCR M6-1 X 10
1213	PSB10491213	RIGHT CHIP TRAY SLIDE
1214	PSB10491214	LEFT CHIP TRAY SLIDE
1215	PS05M	PHLP HD SCR M5-.8 X 8
1216	PSB10491216	RIGHT FRONT HEADSTOCK COVER
1217	PSB10491217	CHIP TRAY (SB1049)
1217	PSB10501217	CHIP TRAY (SB1050)
1218	PFH71M	FLAT HD CAP SCR M5-.8 X 8
1219	PSB10491219	RIGHT REAR HEADSTOCK COVER
1220	PSB10491220	CHIP GUARD PIVOT BRACKET
1221	PSS14M	SET SCREW M8-1.25 X 12
1222	PN04M	HEX NUT M4-.7
1223	PLW03M	LOCK WASHER 6MM

REF	PART #	DESCRIPTION
1224	PCAP26M	CAP SCREW M6-1 X 12
1225	PSB10491225	SAFETY SWITCH BRACKET
1226	PSB10491226	LIMIT SWITCH TEND TZ-9212
1227	PS65M	PHLP HD SCR M4-.7 X 40
1228	PN03M	HEX NUT M8-1.25
1229	PW01M	FLAT WASHER 8MM
1230	PCAP14M	CAP SCREW M8-1.25 X 20
1231	PSB10491231	BACK SPLASH (SB1049)
1231	PSB10501231	BACK SPLASH (SB1050)
1232	PSB10491232	KNOB M12-1.75
1233	PN09M	HEX NUT M12-1.75
1234	PCAP129M	CAP SCREW M12-1.75 X 20
1235	PSB10491235	CHUCK GUARD PIVOT ROD
1236	PSB10491236	CHUCK GUARD FRAME
1237	PCAP26M	CAP SCREW M6-1 X 12
1238	PSS34M	SET SCREW M5-.8 X 16
1239	PSB10491239	COOLANT CHUTE
1240	PSB10491240	COOLANT HOSE 3/8" X 72"
1241	PSB10491241	STRAIGHT ADAPTER 3/8"PT X 3/8"PH
1242	PSB10491242	COOLANT PUMP MOTOR 1/8HP 220V 1PH
1243	PSB10491243	COOLANT TANK
1244	PSB10491244	COOLANT PUMP ACCESS COVER
1245	PSB10491245	CHUCK GUARD PLEXIGLAS WINDOW
1246	PBHS09M	BUTTON HD CAP SCR M6-1 X 12
1247	PSB10491247	LEFT STAND
1248	PSB10491248	RIGHT STAND
1249	PSB10491249	CONTROL PANEL PLATE

Tailstock

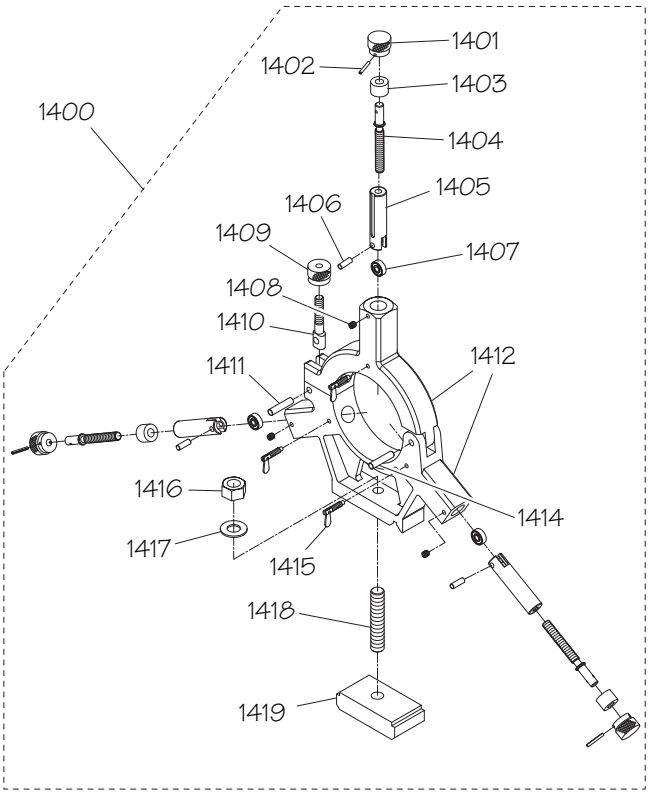


Tailstock Parts List

REF	PART #	DESCRIPTION
1300	PSB10491300	TAILSTOCK ASSEMBLY
1301	PSB10491301	TAILSTOCK LEADSCREW
1302	PSB10491302	LEADSCREW NUT
1303	PK34M	KEY 5 X 5 X 20
1304	PSB10491304	THRUST BEARING NTB/AS2035
1305	PSB10491305	BEARING SEAT
1306	PR37M	EXT RETAINING RING 32MM
1307	PSB10491307	SPACER
1308	PSB10491308	GRADUATED RING
1309	PSB10491309	HANDWHEEL
1310	PSB10491310	HANDWHEEL END CAP
1311	PSB10491311	HANDLE CAP SCREW M8-1.25 X 90
1312	PSB10491312	HANDLE
1313	PSB10491313	COMPRESSION SPRING 6.2 X 16
1314	PSTB001	STEEL BALL 1/4"
1317	PSB10491317	TAILSTOCK LOCK LEVER
1318	PSB10491318	CAM SHAFT
1319	PRP04M	ROLL PIN 4 X 24
1321	PLUBE001	TAP-IN BALL OILER 1/4"
1322	PSB10491322	TAILSTOCK CASTING
1323	PSB10491323	QUILL
1324	PSB10491324	QUILL GUIDE KEY
1325	PSB10491325	OFFSET SCALE 2PC
1327	PSB10491327	OFFSET ALIGNMENT PIN
1328	PSB10491328	ALIGNMENT BLOCK
1329	PSB10491329	DOG POINT SET SCREW
1330	PSB10491330	TAILSTOCK BASE
1331	PSB10491331	GIB ADJUSTMENT SCREW

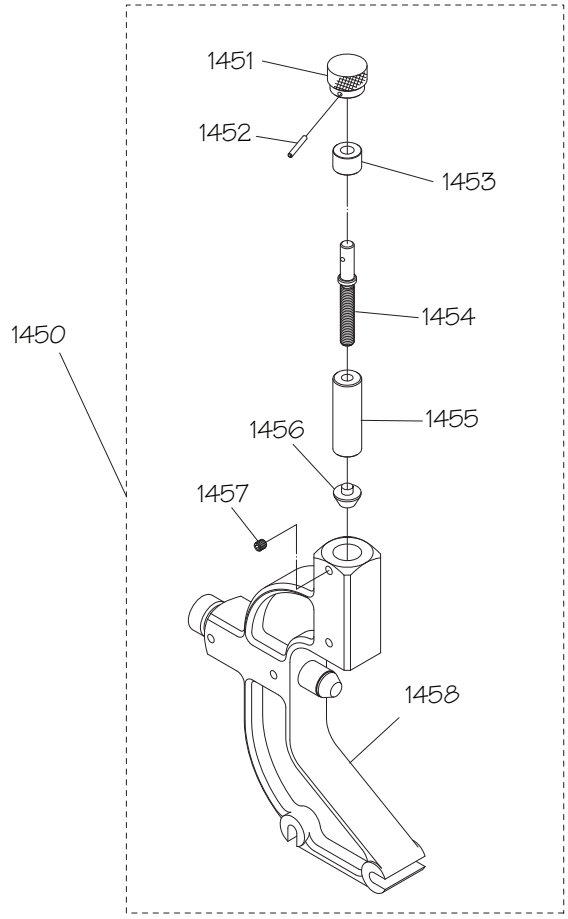
REF	PART #	DESCRIPTION
1332	PSB10491332	V-WAY WIPER
1333	PSB10491333	V-WAY WIPER PLATE
1334	PSB10491334	STRAIGHT WAY WIPER PLATE
1335	PSB10491335	STRAIGHT WAY WIPER
1336	PSB10491336	TAILSTOCK GIB
1337	PSB10491337	COMPRESSION SPRING 25 X 45
1338	PSB10491338	CLAMP PLATE
1339	PSB10491339	STUD-FT M14-2 X 110
1341	PSB10491341	QUILL LOCK SHAFT 2PC
1342	PSB10491342	QUILL LOCK BOLT
1343	PSB10491343	QUILL LOCK LEVER
1344	PSB10491344	LOCK SHAFT FLAT WASHER 12MM
1345	PSB10491345	GUIDE KEY BASE
1346	PCAP01M	CAP SCREW M6-1 X 16
1347	PSS04M	SET SCREW M6-1 X 12
1348	PCAP128M	CAP SCREW M8-1.25 X 70
1349	PCAP35M	CAP SCREW M8-1.25 X 60
1350	PCAP68M	CAP SCREW M6-1 X 8
1351	PCAP01M	CAP SCREW M6-1 X 16
1352	PS08M	PHLP HD SCR M5-.8 X 12
1353	PW04M	FLAT WASHER 10MM
1354	PCAP47M	CAP SCREW M10-1.5 X 40
1355	PW10M	FLAT WASHER 14MM
1356	PN32M	HEX NUT M14-2
1357	PN03M	HEX NUT M8-1.25
1358	PRIV001M	STEEL FLUTED RIVET 2 X 5MM
1359	PLW06M	LOCK WASHER 10MM

Steady Rest



REF	PART #	DESCRIPTION
1400	PSB10491400	STEADY REST ASSEMBLY
1401	PSB10491401	FINGER ADJUSTMENT KNOB
1402	PRP51M	ROLL PIN 4 X 40
1403	PSB10491403	SPACER
1404	PSB10491404	FINGER SCREW
1405	PSB10491405	FINGER
1406	PSB10491406	DOWEL PIN
1407	P627ZZ	BALL BEARING 627ZZ
1408	PSS20M	SET SCREW M8-1.25 X 8
1409	PSB10491409	KNURLED KNOB
1410	PSB10491410	CLAMPING SCREW
1411	PSB10491411	DOWEL PIN
1412	PSB10491412	STEADY REST CASTING 2PC
1414	PSB10491414	HINGE PIN
1415	PSB10491415	DOG POINT LEAF SCREW
1416	PN09M	HEX NUT M12-1.75
1417	PLW05M	LOCK WASHER 12MM
1418	PSB10491418	STUD-FT M12-1.75 X 75
1419	PSB10491419	CLAMP PLATE

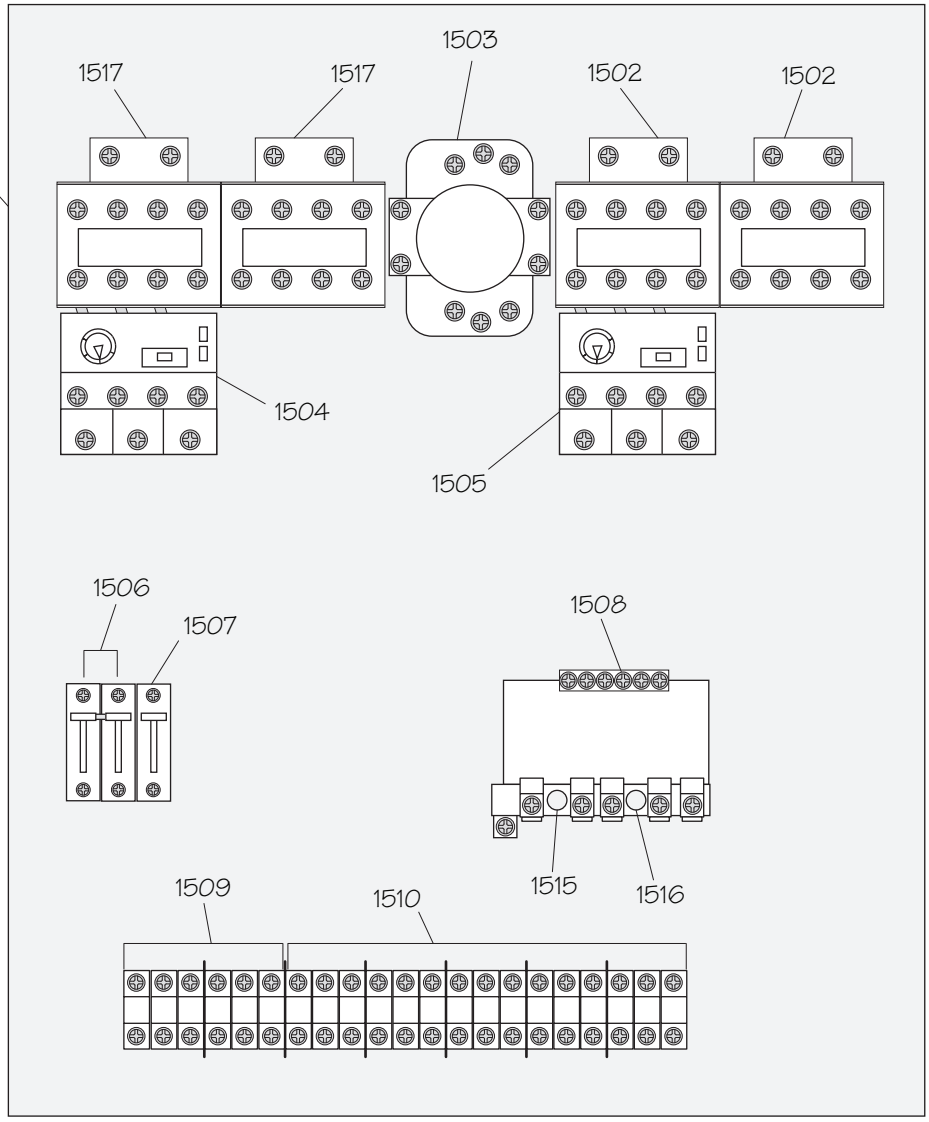
Follow Rest



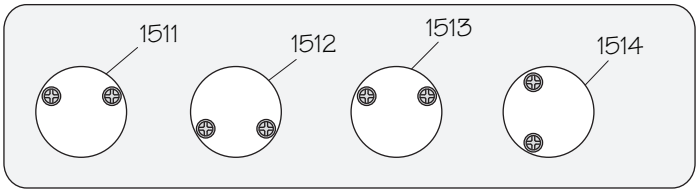
REF	PART #	DESCRIPTION
1400	PSB10491400	STEADY REST ASSEMBLY
1451	PSB10491451	FINGER ADJUSTMENT KNOB
1452	PRP51M	ROLL PIN 4 X 40
1453	PSB10491453	SPACER
1454	PSB10491454	FINGER SCREW
1455	PSB10491455	FINGER
1456	PSB10491456	FINGER BRASS TIP
1457	PSS20M	SET SCREW M8-1.25 X 8
1458	PSB10491458	FOLLOW REST CASTING

Electrical Cabinet & Control Panel

Electrical Cabinet



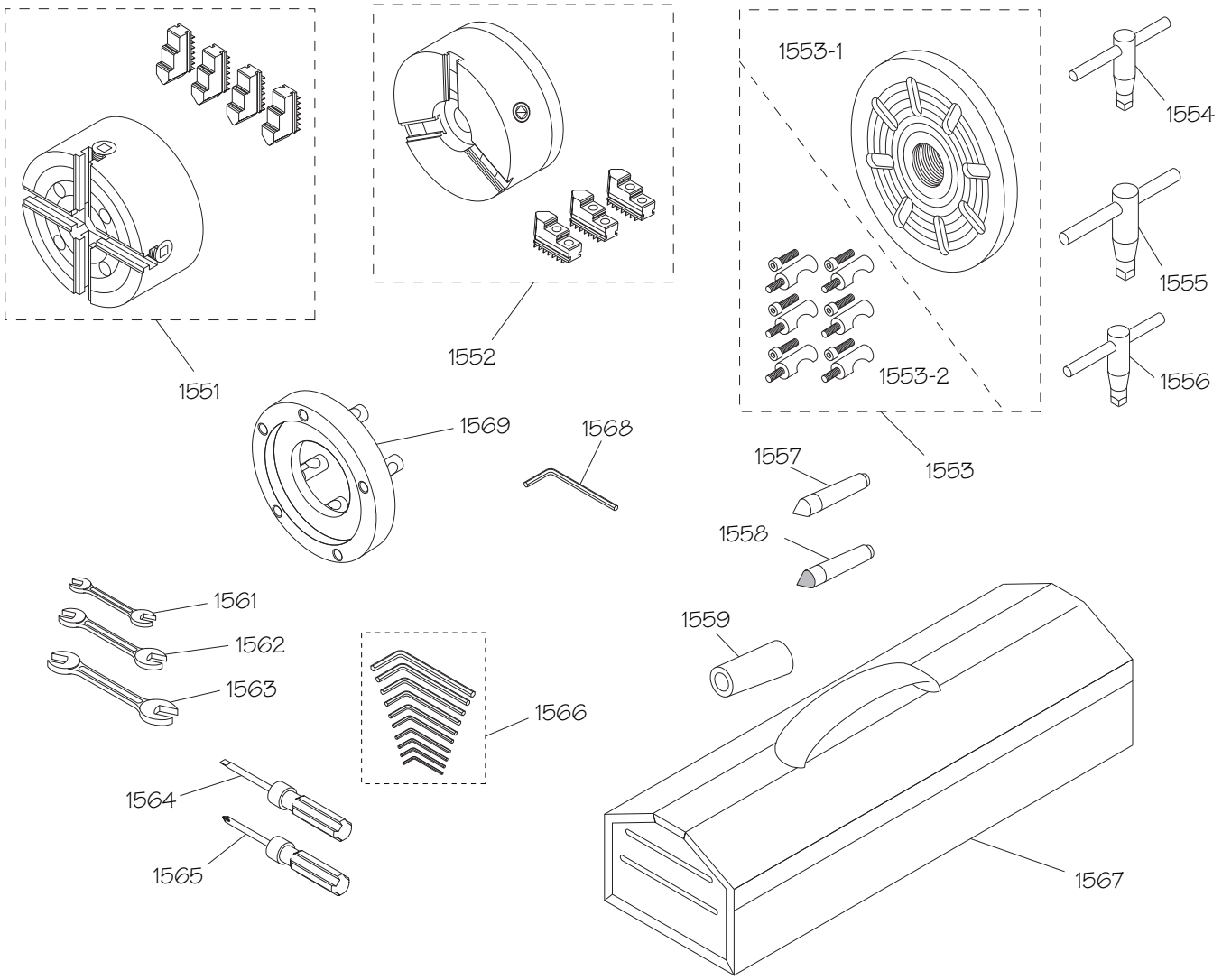
Control Panel



REF	PART #	DESCRIPTION
1501	PSB10491501	ELECTRICAL CABINET BACK PLATE
1502	PSB10491502	CONTACTOR AB C09400 220V
1503	PSB10491503	MASTER POWER SWITCH GZ SE16
1504	PSB10491504	OL RELAY AB 193T1AC25 21-25A
1505	PSB10491505	OL RELAY AB 193T1AB10 0.75-1A
1506	PSB10491506	CIRCUIT BREAKER AB D25
1507	PSB10491507	CIRCUIT BREAKER AB D6
1508	PSB10491508	TRANSFORMER SL SPTBSW10140
1509	PSB10491509	TERMINAL BLOCK MACK IN20C 3-POST

REF	PART #	DESCRIPTION
1510	PSB10491510	TERMINAL BLOCK MACK IN13C 3-POST
1511	PSB10491511	STOP BUTTON ASSEMBLY
1512	PSB10491512	JOG BUTTON ASSEMBLY
1513	PSB10491513	COOLANT PUMP SWITCH ASSEMBLY
1514	PSB10491514	POWER LIGHT ASSEMBLY
1515	PSB10491515	FUSE HOLDER W/4A FUSE
1516	PSB10491516	FUSE HOLDER W/0.5 FUSE
1517	PSB10491517	CONTACTOR AB C2301 220V

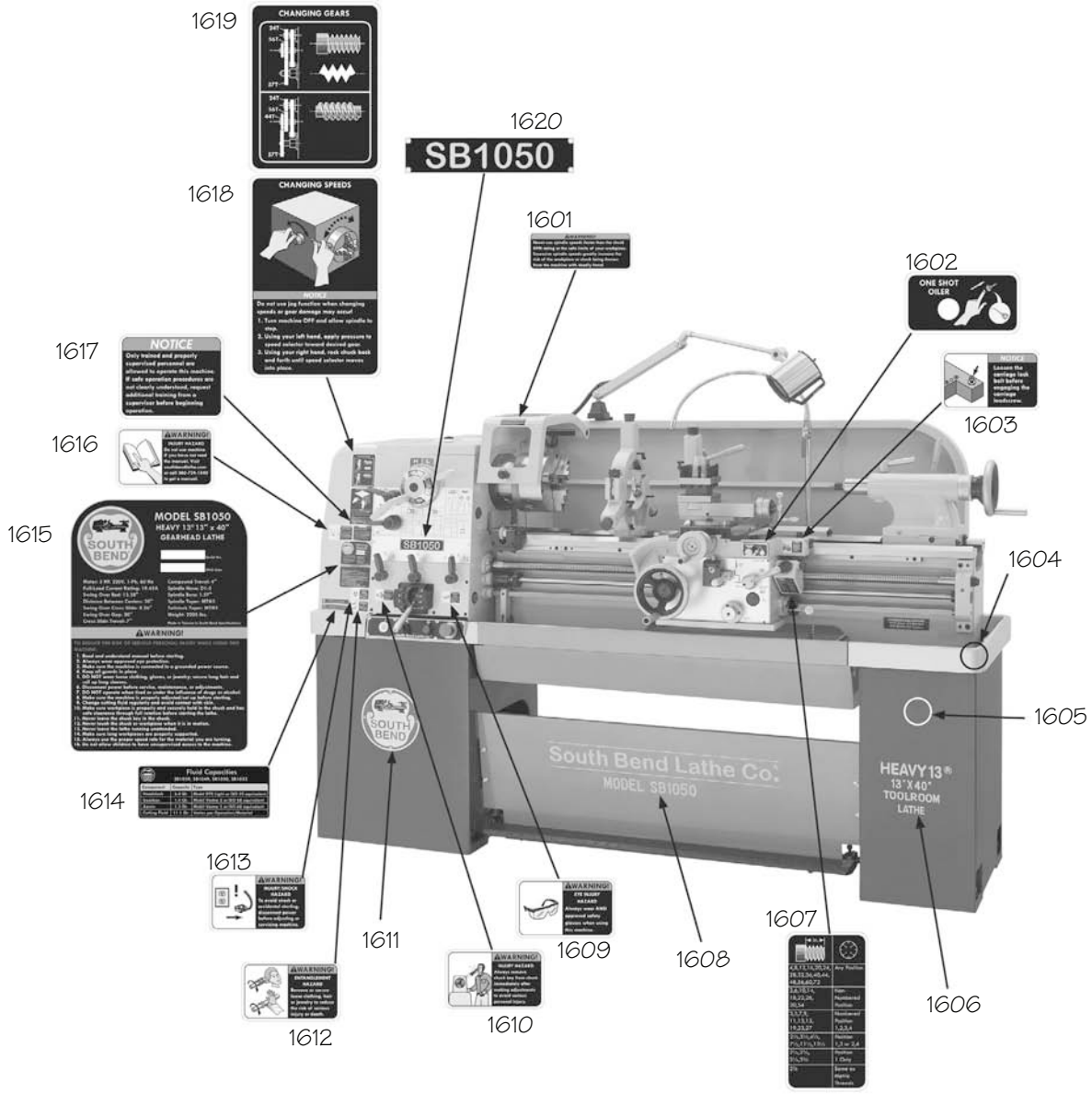
Accessories



REF	PART #	DESCRIPTION
1551	SB1226	4-JAW CHUCK 8" ASSEMBLY
1552	SB1308	3-JAW CHUCK 7" W/2PC JAW SET
1553	PSB10491553	FACEPLATE ASSEMBLY 10"
1553-1	PSB10491553-1	FACEPLATE BODY 10"
1553-2	PSB10491553-2	FACEPLATE CAMLOCK STUD SET
1554	PSB10491554	3-JAW CHUCK KEY
1555	PSB10491555	4-JAW CHUCK KEY
1556	PSB10491556	CAMLOCK KEY D1-5
1557	PSB10491557	DEAD CENTER MT#3 HSS TIP
1558	PSB10491558	DEAD CENTER MT#3 CARBIDE TIP

REF	PART #	DESCRIPTION
1559	PSB10491559	SPINDLE SLEEVE MT#3/MT#5
1561	PWR1012	WRENCH 10/12MM
1562	PWR1417	WRENCH 14/17MM
1563	PWR2224	WRENCH 22/24MM
1564	PSDF2	SCREWDRIVER FLAT #2
1565	PSDP2	SCREWDRIVER PHILLIPS #2
1566	PAW1510M	HEX WRENCH SET 10PC 1.5-10MM
1567	PSB10491567	TOOLBOX
1568	PAW08	HEX WRENCH 8MM
1569	SB1399	BACK PLATE D1-5 8-1/4"

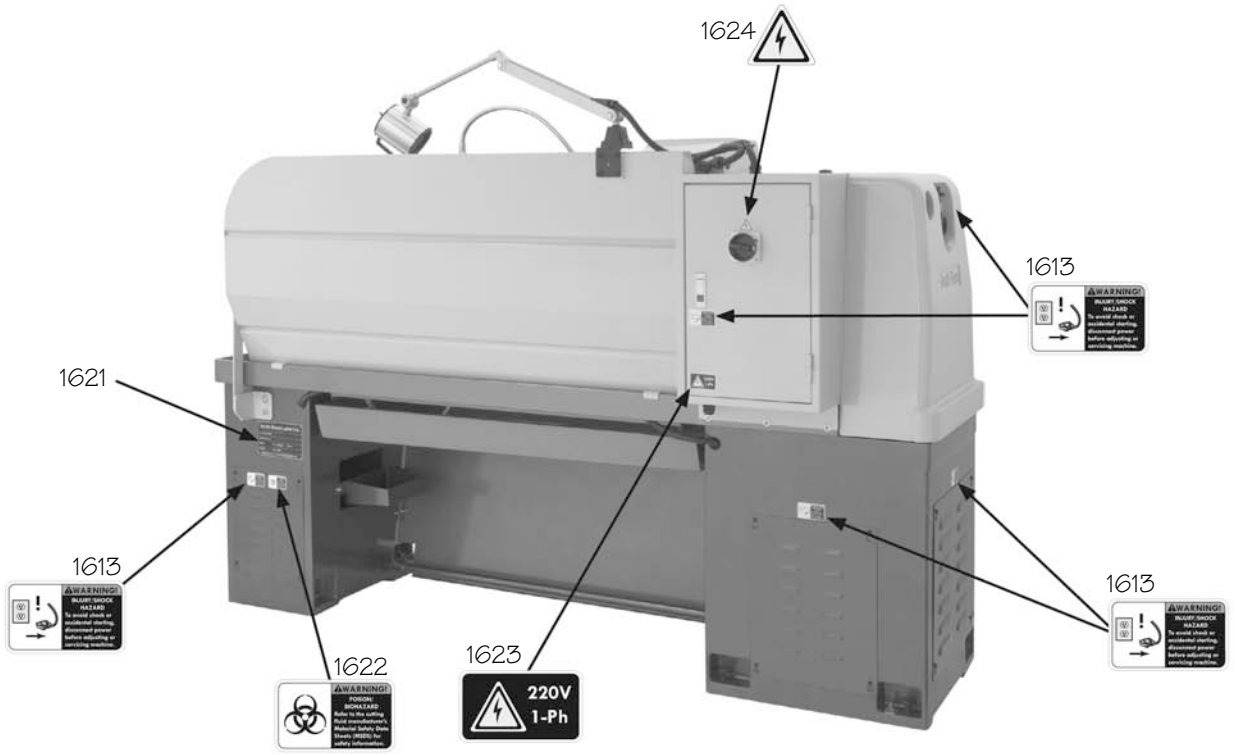
Front Machine Labels



⚠WARNING

The safety labels provided with your machine are used to make the operator aware of the machine hazards and ways to prevent injury. The owner of this machine MUST maintain the original location and readability of these safety labels. If any label is removed or becomes unreadable, REPLACE that label before using the machine again. Contact South Bend Lathe Co. at (360) 734-1540 or www.southbendlathe.com to order new labels.

Rear & Side Machine Labels



REF	PART #	DESCRIPTION
1601	PSB10491601	SPINDLE SPEED WARNING LABEL
1602	PSB10491602	ONE-SHOT OILER LABEL
1603	PSB10491603	CARRIAGE LOCK LABEL
1604	PSBPAINT02	SB LIGHT BLUE TOUCH-UP PAINT
1605	PSBPAINT03	SB DARK BLUE TOUCH-UP PAINT
1606	PSB10491606	HEAVY 13 LABEL (SB1049)
1606	PSB10501606	HEAVY 13 LABEL (SB1050)
1607	PSB10491607	DIAL INDICATOR LABEL
1608	PSB10491608	SB MODEL NUMBER LABEL (SB1049)
1608	PSB10501608	SB MODEL NUMBER LABEL (SB1050)
1609	PSBLABEL04HL	SAFETY GLASSES LABEL
1610	PSB10491610	CHUCK KEY WARING LABEL
1611	SB1321	SB NAMEPLATE
1612	PSBLABEL08HS	ENTANGLEMENT WARNING LABEL

REF	PART #	DESCRIPTION
1613	PSBLABEL02HS	DISCONNECT WARNING LABEL
1614	PSB10391624	FLUID CAPACITIES LABEL
1615	PSB10491615	MACHINE ID LABEL (SB1049)
1615	PSB10501615	MACHINE ID LABEL (SB1050)
1616	PSBLABEL08HS	READ MANUAL WARNING LABEL
1617	PSB10491617	TRAINED PERSONNEL LABEL
1618	PSB10491618	CHANGING SPEEDS LABEL
1619	PSB10491619	CHANGING END GEARS LABEL
1620	PSB10491620	MODEL NUMBER BRASS PLATE (SB1049)
1620	PSB10501620	MODEL NUMBER BRASS PLATE (SB1050)
1621	PSB10491621	MACHINE INFORMATION LABEL
1622	PSBLABLE06HS	BIOHAZARD WARNING LABEL
1623	PSB10491623	VOLTAGE-PHASE LABEL 220V 1PH
1624	PSBLABEL15M	ELECTRICITY LABEL

Warranty

This quality product is warranted by South Bend Lathe Company to the original buyer for one year from the date of purchase. This warranty does not apply to consumable parts, or defects due to any kind of misuse, abuse, negligence, accidents, repairs, alterations or lack of maintenance. We do not reimburse for third party repairs. In no event shall we be liable for death, injuries to persons or property, or for incidental, contingent, special or consequential damages arising from the use of our products.

We do not warrant or represent that this machine complies with the provisions of any law, act, code, regulation, or standard of any domestic or foreign government, industry, or authority. In no event shall South Bend's liability under this warranty exceed the original purchase price paid for this machine. Any legal actions brought against South Bend Lathe Company shall be tried in the State of Washington, County of Whatcom.

This is the sole written warranty for this machine. Any and all warranties that may be implied by law, including any merchantability or fitness, for any purpose, are hereby limited to the duration of this warranty. To take advantage of this warranty, contact us by mail or phone to give us the details of the problem you are having.

Thank you for your business and continued support.

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