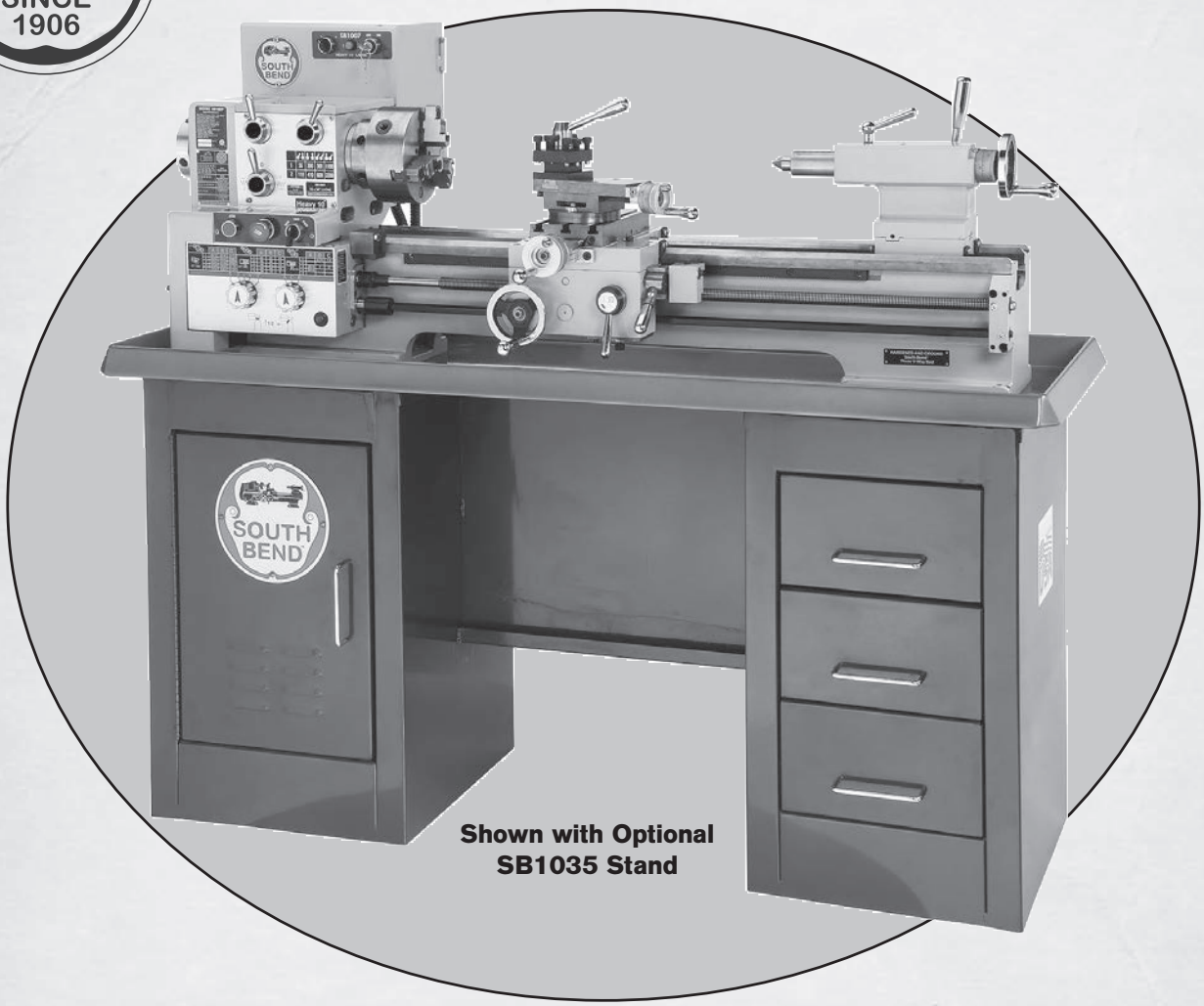
HEAVY 10™
10" X 30" GEARHEAD LATHE
MODEL SB1007



Shown with Optional SB1035 Stand

OWNER'S MANUAL

South Bend Tools®

A Tradition of Excellence

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177335

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For Machines Mfd. Since 12/21 (V2.12.21)

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?

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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.southbendtools.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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About These Machines

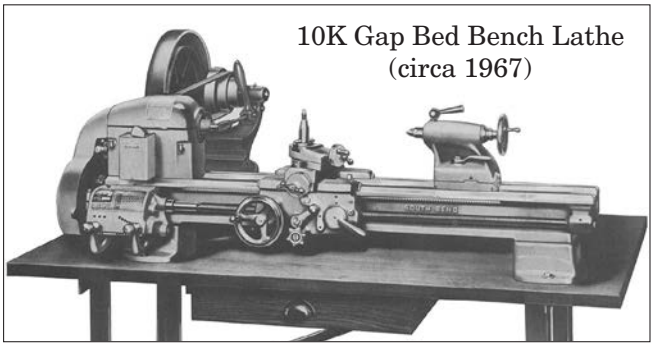
Foreword

"*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 lathes are a refined culmination of human ingenuity and knowledge embodied into the design and synergy of many different 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 carry on the tradition. As the operator of a South Bend Lathe, you join the ranks of some very famous and important customers, such as Henry Ford, who used his South Bend lathe to help him change the world.



10K Gap Bed Bench Lathe
(circa 1967)

Capabilities

This Heavy 10™ Gearhead Lathe is built for daily use. 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

This Heavy 10™ Gearhead Lathe is packed with standard features and equipment, including a powered carriage and cross feed, 3-jaw chuck, jog button, and spindle spider for outboard projects.

Spindle speeds are controlled by convenient headstock levers, which allow the operator to quickly set the spindle speed within the available range of 55–2200 RPM.

The bed of the lathe is constructed with FC30 cast iron that is 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 gearbox features quick-change gear knobs, and the feed rod includes a slip clutch that disables automatic carriage feed when it contacts the feed stop or in the event of a crash.

To further ensure a high degree of accuracy, this lathe is equipped with German spindle bearings. The spindle is a D1-4 camlock with an MT#5 taper and 1.358" bore. The tailstock has an MT#3 taper and 3⅛" of quill travel.

Identification

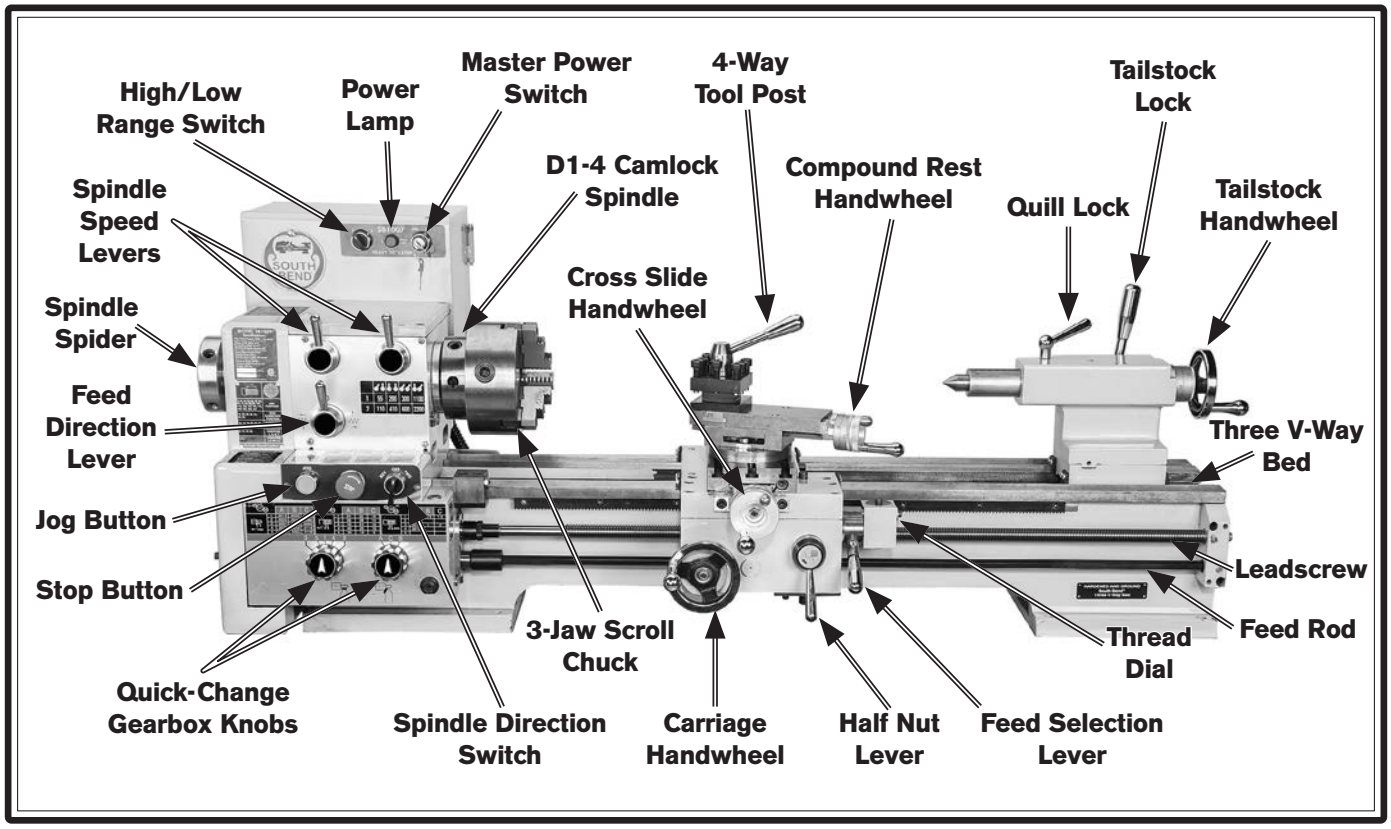


Figure 1. Model SB1007 Heavy 10™ Bench Lathe.

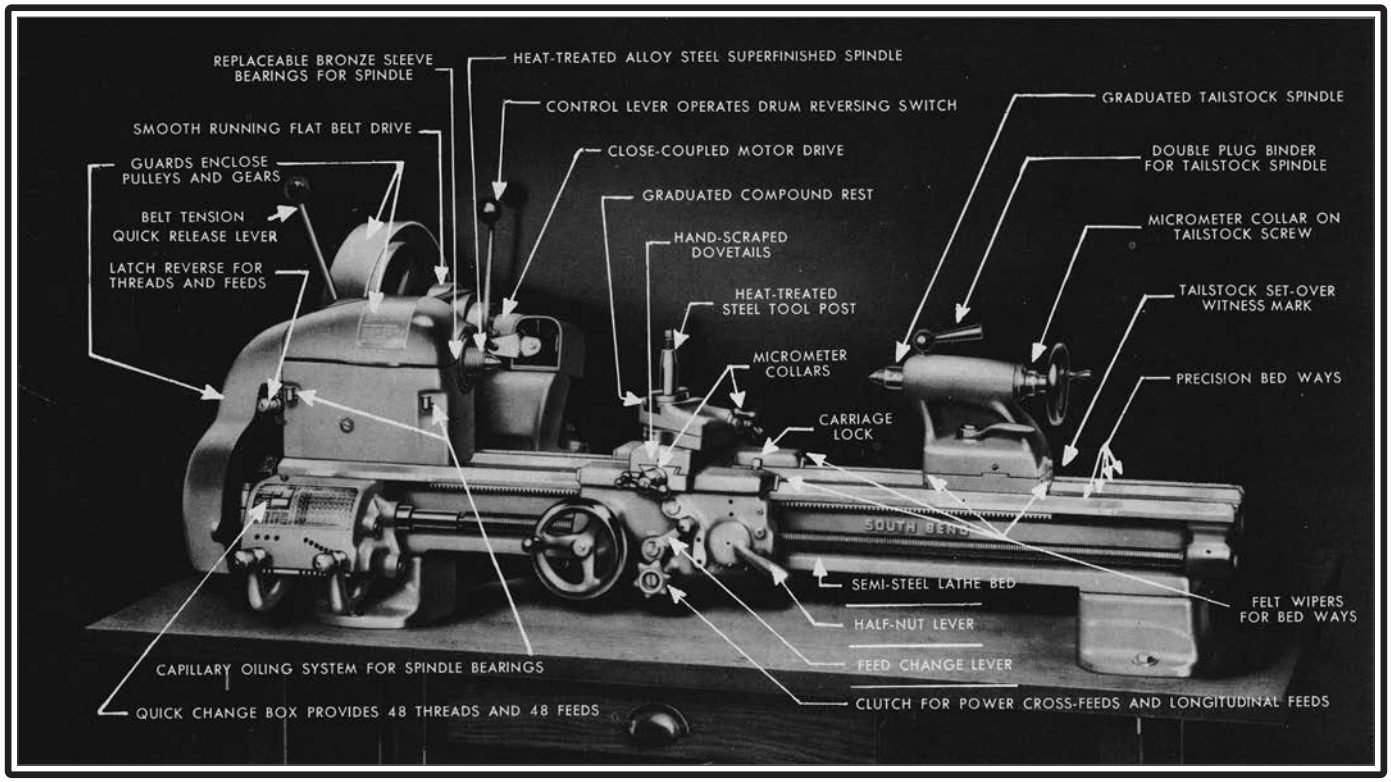


Figure 2. Model A South Bend 10K Precision Bench Lathe (circa 1958).

Controls & Components

Refer to **Figures 3–7** and the following descriptions to become familiar with the basic controls and components used to operate this lathe.

Headstock & Quick-Change Gearbox

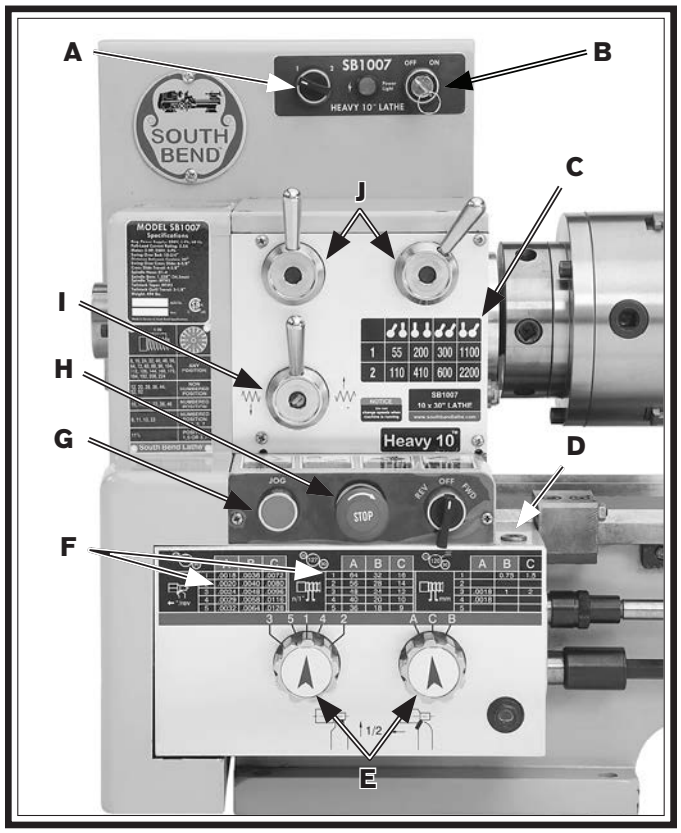


Figure 3. Headstock and quick-change gearbox controls.

A. High/Low Range Switch: Determines spindle speed within two speed ranges.

B. Master Power Switch: Regulates incoming power to the lathe controls.

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

D. Spindle Direction Switch: Selects forward and reverse spindle rotation.

E. Quick-Change Gearbox Knobs: Control leadscrew and feed rod speed for threading and feed operations.

F. Thread and Feed Rate Charts: Display position of quick-change gearbox knobs for threading and power feed operations.

G. Jog Button: Rotates spindle forward while it is pressed.

H. Stop Button: Stops all machine functions. Twist clockwise to reset.

I. Feed Direction Lever: Selects carriage or cross slide for power feed operations. The spindle must be completely stopped before using this control.

J. Spindle Speed Levers: Used in combination to select any one of eight spindle speeds.

K. Spindle Spider: Provides support for long workpieces that extend through the outboard side of the spindle.

Figure 4. Spindle spider components.

⚠WARNING

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

Carriage

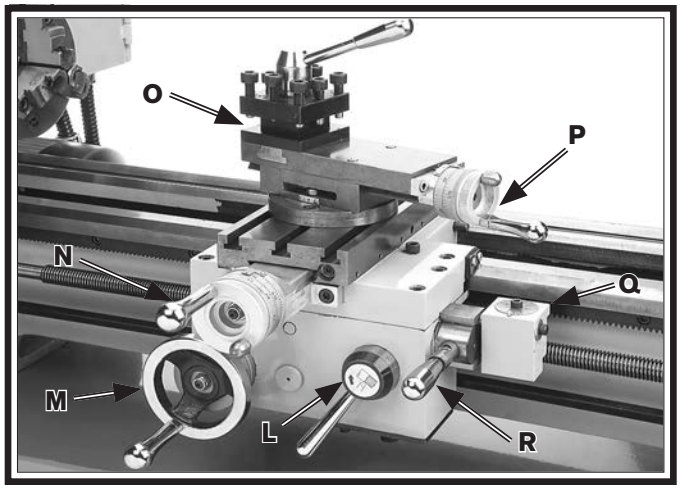


Figure 5. Carriage controls.

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

M. Carriage Handwheel: Moves carriage along bed.

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

O. 4-Way Tool Post: Mounts up to four cutting tools at once, which can be individually indexed to workpiece.

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

Q. Thread Dial: Dial indicates when to engage half nut during inch threading operations. Chart on headstock (not shown) indicates on which thread dial reading to engage half nut for specific thread pitches.

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

Tailstock

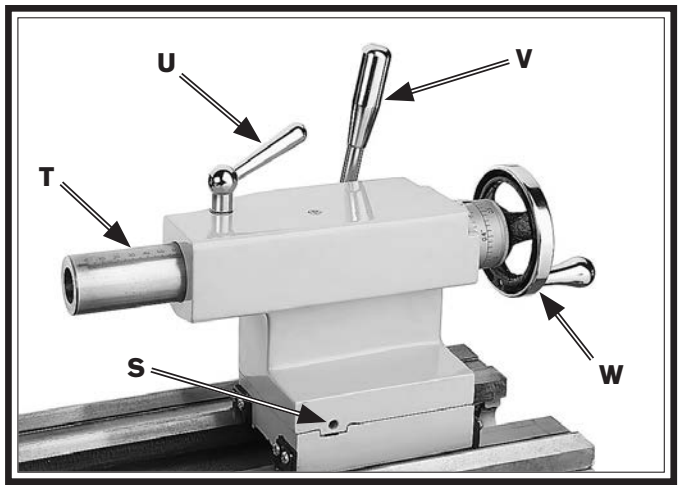


Figure 6. Tailstock controls.

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

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

U. Quill Lock Lever: Secures quill in position.

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

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

⚠WARNING

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

End Gears

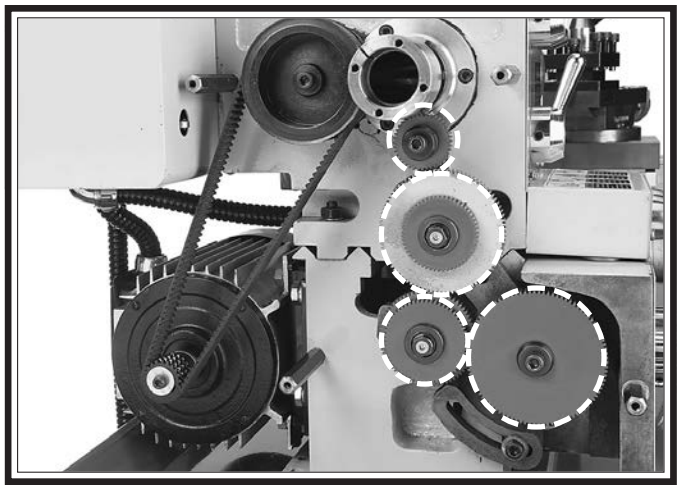
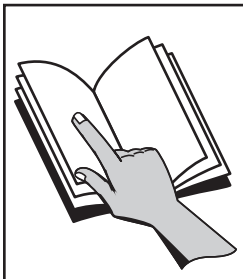


Figure 7. End gears.

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



⚠WARNING

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

SOUTH BEND SINCE 1906

Product Specifications

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SOUTH BEND SINCE 1906

Model SB1007
Heavy 10, 10" x 30" Gearhead Lathe

Product Dimensions

Weight	543 lbs.
Width (side-to-side) x Depth (front-to-back) x Height	61 x 28-1/2 x 22 in.
Footprint (Length x Width)	51-1/2 x 8-3/8 in.

Shipping Dimensions

Type	Wood Slat Crate
Content	Machine
Weight	645 lbs.
Length x Width x Height	63 x 34 x 30 in.
Must Ship Upright	Yes

Electrical

Power Requirement	240V, Single-Phase, 60 Hz
Full-Load Current Rating	6.2A
Minimum Circuit Size	15A
Connection Type	Cord & Plug
Power Cord Included	Yes
Power Cord Length	6 ft.
Power Cord Gauge	16 AWG
Plug Included	Yes
Included Plug Type	6-15
Switch Type	ON/OFF Switch w/Lockout Key
Inverter (VFD) Type	Delta VFD022E21A

Motors

Main

Horsepower	2 HP
Phase	3-Phase
Amps	5.5A
Speed	1750 RPM
Type	TEFC
Power Transfer	Belt Drive
Bearings	Shielded & Permanently Sealed
Centrifugal Switch/Contacts Type	N/A

Main Specifications

Operation Info

Swing Over Bed	10-3/4 in.
Distance Between Centers	30 in.
Max Weight Between Centers	80 lbs.
Swing Over Cross Slide	6-5/8 in.
Swing Over Saddle	9-1/4 in.
Maximum Tool Bit Size	1/2 in.
Compound Travel	4 in.
Carriage Travel	27-3/8 in.
Cross Slide Travel	4-5/8 in.

Headstock Info

Spindle Bore	1.358 in. (34.5 mm)
Spindle Taper	MT#5
Number of Spindle Speeds	8
Spindle Speeds	55 – 2200 RPM
Spindle Type	D1-4 Camlock
Spindle Bearings	Tapered Roller
Spindle Length	13-5/8 in.
Spindle Length with 3-Jaw Chuck	17-11/16 in.

Tailstock Info

Tailstock Quill Travel	3-1/8 in.
Tailstock Taper	MT#3
Tailstock Barrel Diameter	1.574 in.

Threading Info

Number of Longitudinal Feeds	15
Range of Longitudinal Feeds	0.0018 – 0.0128 in./rev.
Number of Cross Feeds	15
Range of Cross Feeds	0.0009 – 0.0064 in./rev.
Number of Inch Threads	37
Range of Inch Threads	4-1/2 – 128 TPI
Number of Metric Threads	15
Range of Metric Threads	0.25 – 2 mm

Dimensions

Bed Width	7 in.
Carriage Leadscrew Diameter	20 mm
Leadscrew TPI	18 TPI
Carriage Leadscrew Length	41 in.
Feed Rod Diameter	13 mm

Other

Carriage Handwheel Graduations	0.01 in. (0.2 mm)
Carriage Handwheel Revolution	0.75 in. (19 mm)
Cross Slide Handwheel Graduations	0.002 in. (0.04 mm)
Cross Slide Handwheel Revolution	0.158 in. (4 mm)
Compound Handwheel Graduations	0.001 in. (0.025 mm)
Compound Handwheel Revolution	0.49 in. (1.25 mm)
Tailstock Handwheel Graduations	0.002 in. (0.05 mm)
Tailstock Handwheel Revolution	0.8 in. (2 mm)
Optional Stand	SB1035

Construction

Base..... Cast Iron
Headstock..... Cast Iron
End Gears..... Hardened Steel
Bed..... Hardened & Ground 3 V-Way Cast Iron
Body..... Cast Iron
Paint Type/Finish..... Urethane

Fluid Capacities

Headstock Capacity..... 0.79 qt.
Headstock Fluid Type..... ISO VG32 (eg. Grizzly T23963, Mobil DTE Light)
Gearbox Capacity..... 0.37 qt.
Gearbox Fluid Type..... ISO VG32 (eg. Grizzly T23963, Mobil DTE Light)

Other

Country of Origin ..... Taiwan
Warranty ..... 2 Years
Serial Number Location ..... ID Label
ISO 9001 Factory ..... No
Certified by a Nationally Recognized Testing Laboratory (NRTL) ..... Yes

Features

Signature South Bend 3 V-Way Bed
2-Speed Motor with Inverter for Single-Phase Power Supply
All Gearhead Headstock
4-Way Tool Post
Spindle Spider Included for Gunsmithing
Quick-Change Gearbox for Cutting Inch and Metric Pitches
Carriage and Cross Slide Power Feed
Thread Dial Indicator
3HP Delta VFD-EL Inverter

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

⚠WARNING

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

Clothing, Jewelry & Long Hair. Tie back long hair, remove jewelry, and do not wear loose clothing or gloves. These can easily get caught on rotating parts and pull you into lathe.

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

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

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

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

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

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

Chucks. Chucks can be heavy and difficult to hold. During installation and removal, protect your hands and precision bed ways by using a chuck cradle or piece of plywood over the bed ways.

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

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

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

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

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

Tool Selection. Cutting with incorrect or dull tooling increases risk of injury from broken or dislodged components. Always use sharp tooling that is right for the job.

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 lathe for operation. The list below outlines the 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 lathe and inventory contents of the box/crate.
2. Clean lathe and its components.
3. Identify an acceptable location for lathe and move it to that location.
4. Level lathe and either bolt it to workbench or stand.
5. Assemble loose components and make any necessary adjustments or inspections to ensure lathe is ready for operation.
6. Ensure headstock and quick-change gearbox are properly lubricated.
7. Connect lathe to power source.
8. Test run lathe to make sure it functions properly and is ready for operation.

Required for Setup

The items listed below are required to successfully set up and prepare this lathe for operation.

For Lifting

- A forklift or other power lifting device rated for the weight of the lathe.
- Lifting slings (rated for at least 750 lbs. each).

For Power Connection

- A power source that meets the minimum circuit requirements for this lathe. (Refer to **Power Supply Requirements** section for details.)
- A qualified electrician to ensure a safe and code-compliant connection to the power source.

For Assembly

- Cotton Rags
- Mineral Spirits
- Safety Glasses
- Quality Metal Protectant Oil
- Workbench/Stand Mounting Hardware (As Needed)
- Precision Level

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 applicable electrical codes and safety standards.

⚠WARNING

Electrocution or fire may occur if lathe is not correctly grounded and attached to the power supply. Use a qualified electrician to ensure a safe power connection.

Full-Load Current Rating

The full-load current rating is the amperage a machine draws at 100% of the rated output power. On machines with multiple motors, this is the amperage drawn by the largest motor or sum of all motors and electrical devices that might operate at one time during normal operations.

Full-Load Rating at 240V ..... 6.2 Amps

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

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

⚠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.

Circuit Requirements

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

Nominal Voltage 208V, 220V, 230V, 240V
Cycle ..... 60 Hz
Phase ..... Single-Phase
Circuit Rating..... 15A
Plug/Receptacle ..... NEMA 6-15

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 connected to a circuit protected by fuses, use a time delay fuse marked D.)

⚠CAUTION

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

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.

This machine is equipped with a power cord that has an equipment-grounding wire and a grounding plug (similar to the figure below). 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.

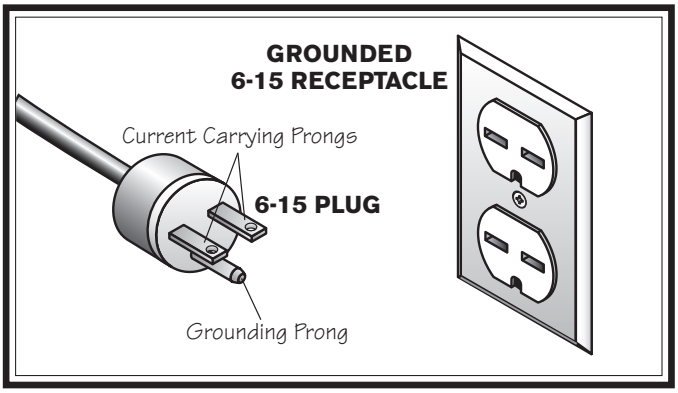
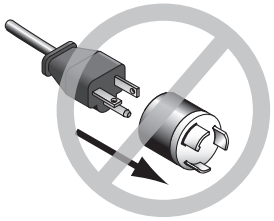


Figure 8. NEMA 6-15 plug and receptacle.

⚠CAUTION



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

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

Check with an electrician or qualified service personnel if you do not understand these grounding requirements, or if you are in doubt about whether the tool is properly grounded.

If you ever notice that a cord or plug is damaged or worn, disconnect it from power, and immediately replace it with a new one.

Extension Cords

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

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

Any extension cord used with this machine must contain a ground wire, match the required plug and receptacle listed in the **Circuit Requirements** for the applicable voltage, and meet the following requirements:

Minimum Gauge Size.....14 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 9)	Qty
A. 3-Jaw Chuck 6" w/Back Plate	1
B. Outside Jaw Set (3-Pc)	1
C. 3-Jaw Chuck Key	1

Toolbox Inventory: (Figure 10)	Qty
D. Toolbox	1
E. Tapered Spindle Sleeve MT#5-#3	1
F. Oil Can	1
G. Open-End Wrench 13mm	1
H. Open-End Wrench Set 6-Pc. (8-23mm)	1
I. Flat Head Screwdriver #2	1
J. Phillips Head Screwdriver #2	1
K. Hex Wrench Set 9-Pc. (1.5-10mm)	1
L. Handwheel Handles	2
M. Electrical Box Key	1
N. Master Power Key	1
O. Gear Drive Shaft	1
P. Change Gear Set	1
—Change Gear (95T)	1
—Change Gear (80T)	1
—Change Gear (70T)	1
—Change Gear (65T)	1
—Change Gear (60T)	1
—Change Gear (55T)	1
—Change Gear (50T)	1
—Change Gear (45T)	1
—Change Gear (40T)	1
—Change Gear (35T)	1
Q. Headstock Top Cover (Not Shown)	1

NOTICE

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.

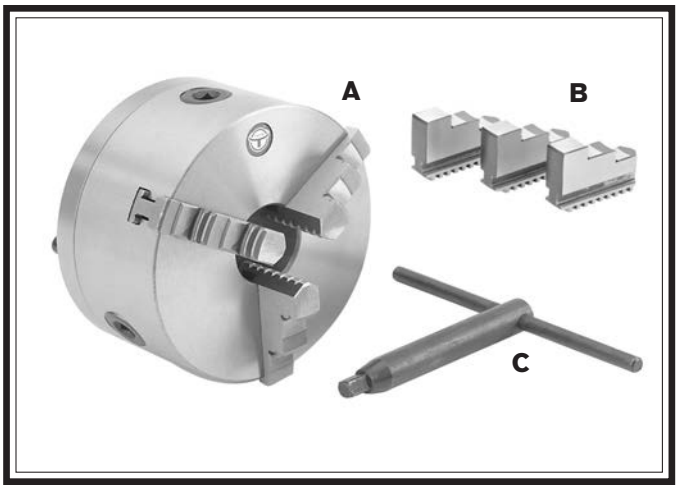


Figure 9. Main inventory.

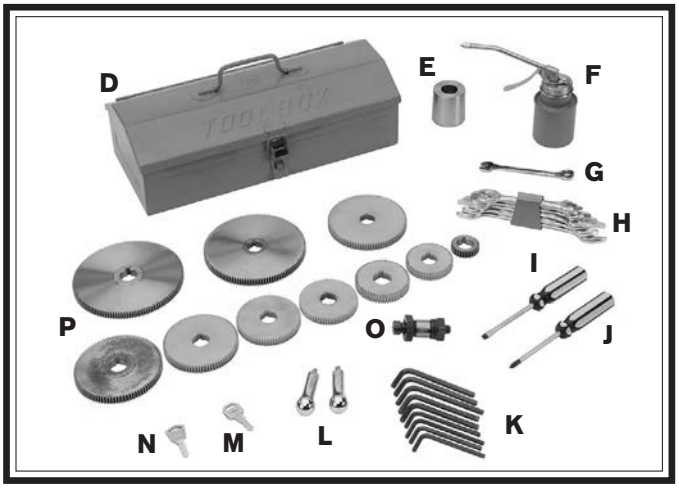


Figure 10. Toolbox inventory.

NOTICE

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

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.

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. Make sure all power cords are protected from traffic, material handling, moisture, chemicals, or other hazards. Make sure to leave access to a means of disconnecting the power source or engaging a lockout/tagout device.

Lighting

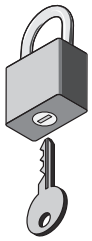
Lighting around the machine must be adequate enough to perform operations safely. Shadows, glare, or strobe effects that may distract or impede the operator must be eliminated.

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. Only install in an access restricted location.

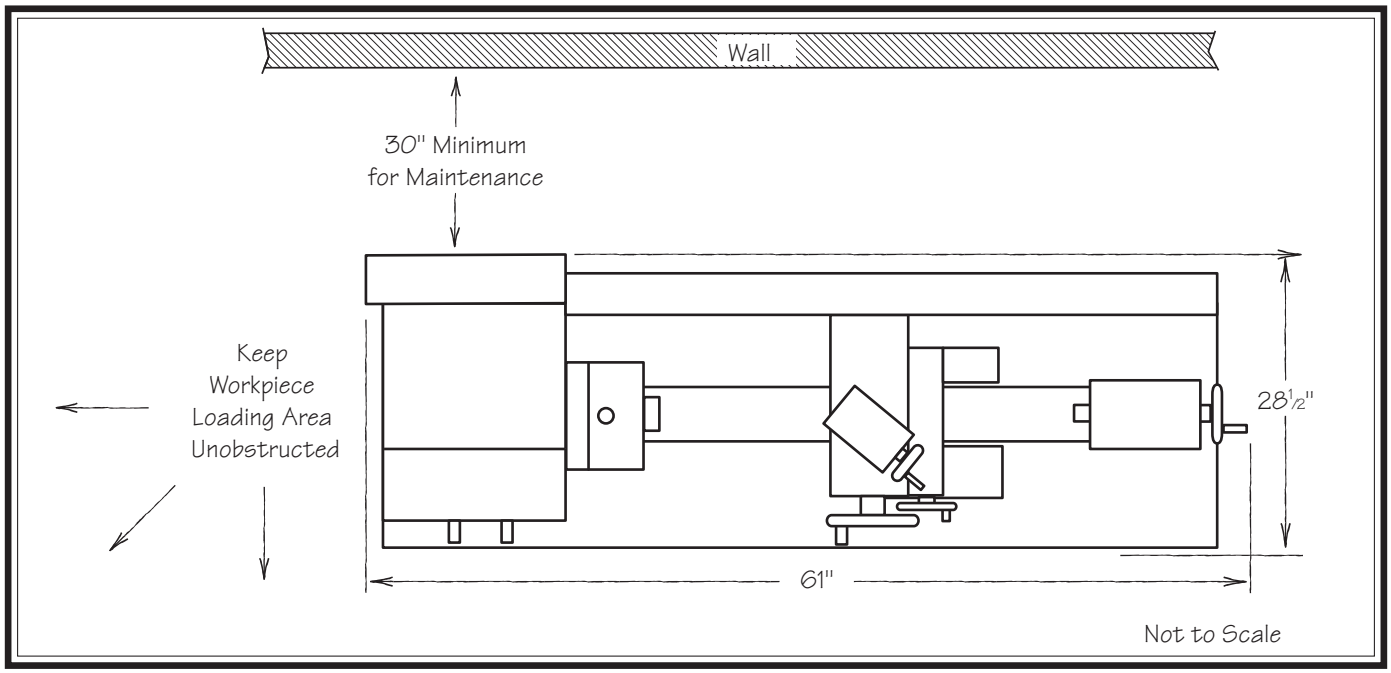
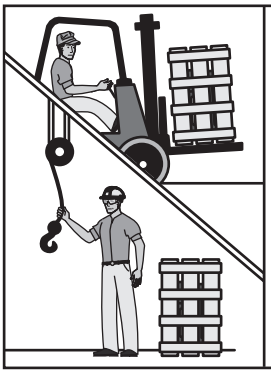


Figure 11. SB1007 working clearances.

Lifting & Moving



⚠WARNING

This lathe 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.

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 750 lbs. to support dynamic loads that may be applied while lifting. Refer to **Required For Setup** on **Page 14** for details.

To lift and move lathe:

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

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

3. Unbolt lathe from shipping pallet.

4. Push tailstock lock handle (see **Figure 12**) forward—toward headstock—and move tailstock to end of bedway. Then retighten lock handle.

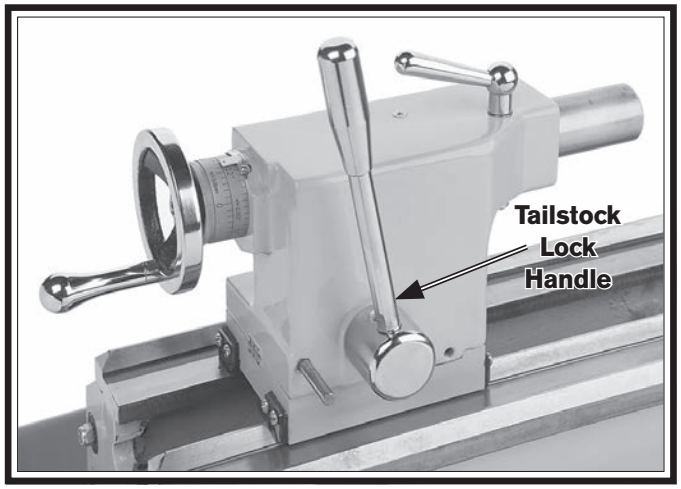


Figure 12. Location of tailstock lock handle.

5. To further balance the load, move carriage next to tailstock, as follows:

   — Loosen carriage lock (see **Figure 13**).

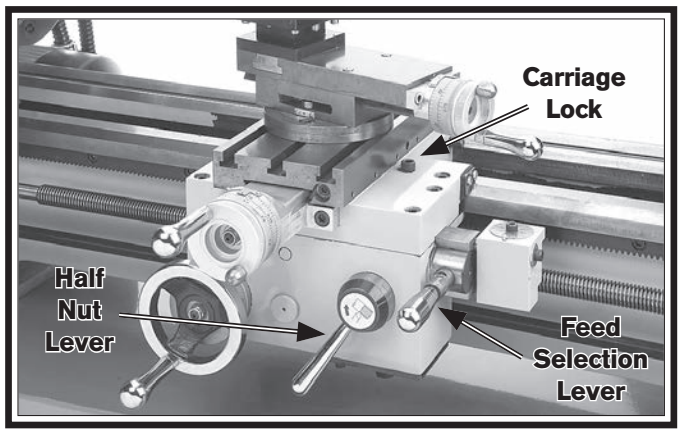


Figure 13. Location of carriage controls.

   — Push half nut lever down to disengage carriage from leadscrew.

   — Place handle of feed selection lever in neutral (middle) position. This disengages power feed mechanism from leadscrew.

   —Use handwheel to move carriage next to tailstock.

6. Wrap one lifting strap around bed connector between ways and next to saddle (see **Figure 14)**, then attach it forklift.

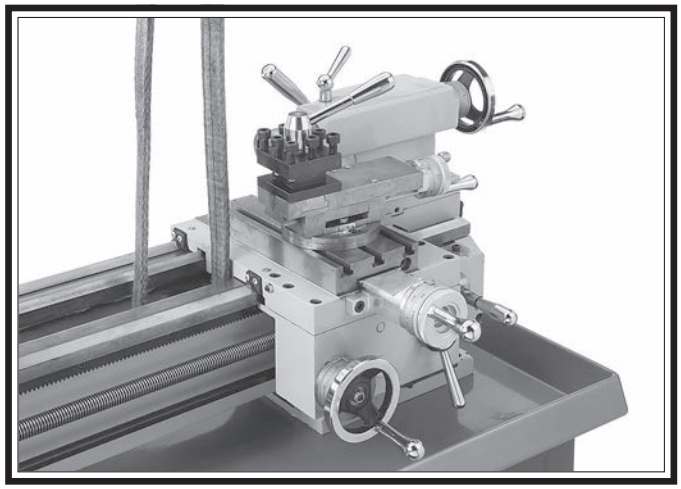


Figure 14. Tailstock, carriage, and one of the lifting straps in position for lifting lathe.

7. Open end gear cover and feed lifting strap through cavity of headstock and behind chuck (see **Figure 15)**, then attach to forklift.

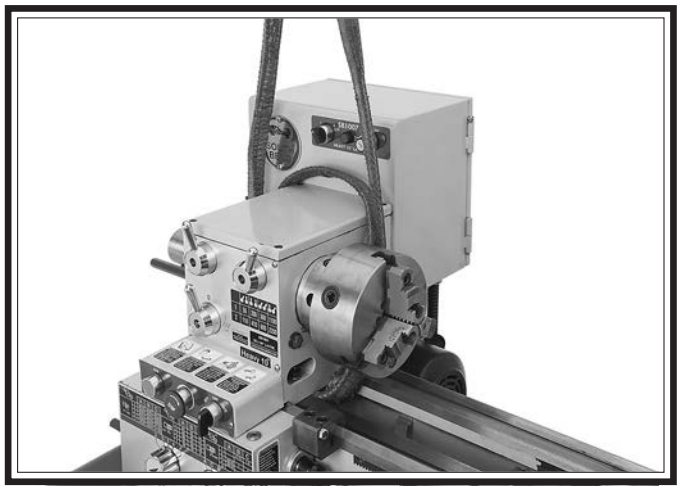


Figure 15. Lifting strap properly positioned around headstock.

NOTICE

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

Note: See **Figure 16** for an example photo of lifting the lathe with the straps positioned as instructed above.

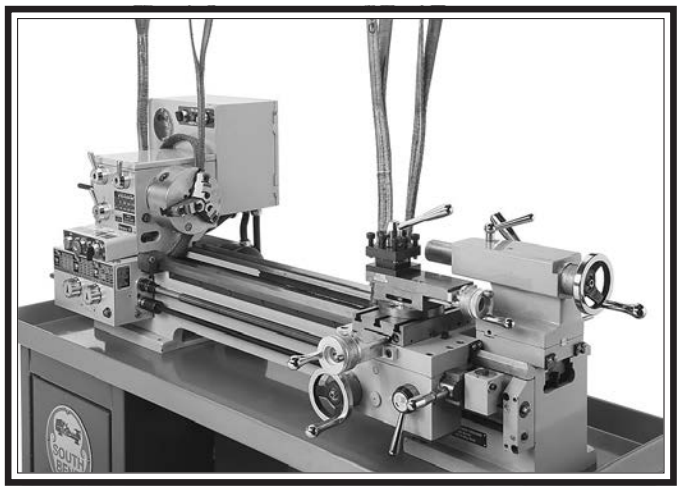


Figure 16. Example photo of lifting lathe with straps properly positioned.

8. With two other people to help keep lathe from swaying, raise it a couple of inches.

— If load is not well balanced, or if you see any other difficulties with lifting equipment, immediately lower lathe to pallet again. Resolve any lifting or balancing issues, then repeat this step.

9. Lift lathe enough to clear shipping pallet and any small floor obstacles, then move it to prepared location and lower it into place.

Leveling & Mounting

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.

Use metal shims between the lathe base and the mounting surface when making the bedway level.

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.

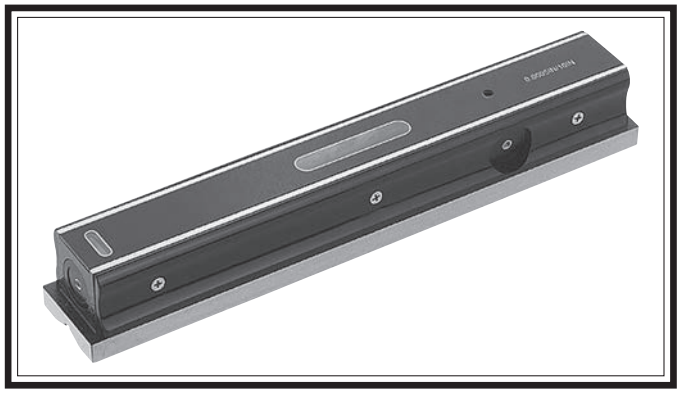


Figure 17. Example of a precision level.

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

The base of this machine has holes that allow it to be mounted to a workbench or the optional Model SB1035 Lathe Stand. We strongly recommend that you bolt the lathe to a workbench or stand to prevent it from moving during operation. An unexpected movement could result in an injury or property damage.

The strongest mounting option is a "Through Mount" (see **Figure 18**) where holes are drilled all the way through the workbench, and hex bolts, washers, and hex nuts are used to secure the lathe to the workbench.

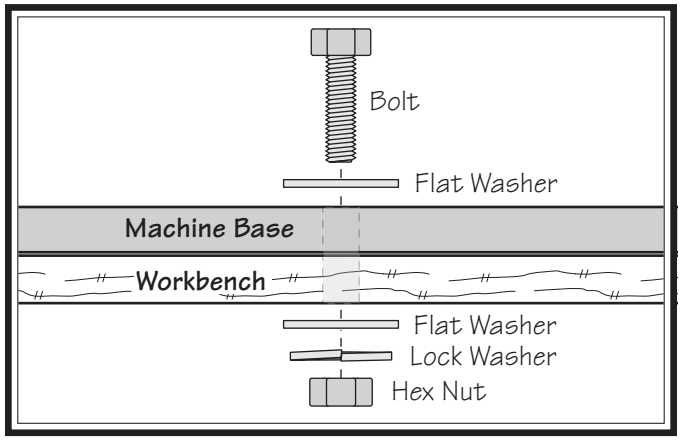


Figure 18. Example of a "Through Mount" setup.

Another option for mounting is a "Direct Mount" (see **Figure 19**) where the machine is simply secured to the workbench with a lag screw.

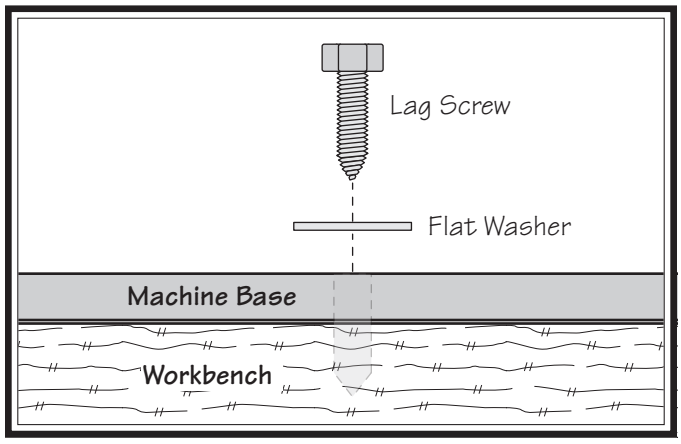


Figure 19. Example of a "Direct Mounting" setup.

Assembly

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

To install the handwheel handles, thread the large handle onto the carriage handwheel and the small handle onto the cross slide handwheel, as shown in **Figure 20**.

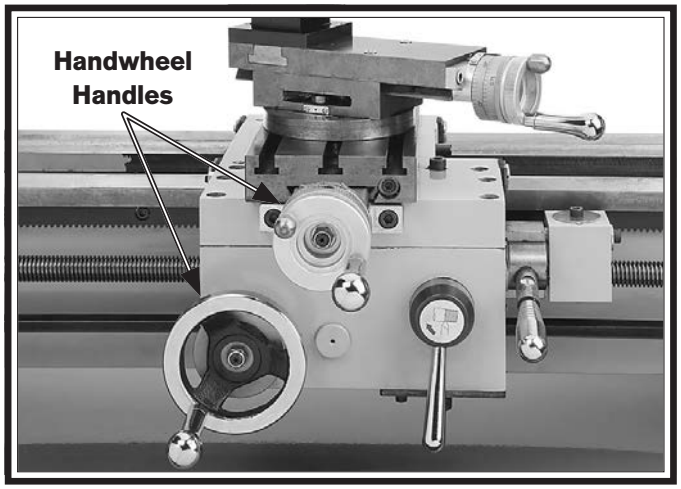


Figure 20. Handwheel handles installed.

Initial Lubrication

Your lathe was lubricated at the factory, but we strongly recommend that you inspect all lubrication points yourself and provide additional lubrication if necessary. Refer to **Lubrication** on **Page 52** for specific details.

The headstock and quick-change gearbox 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 52**, for details on how to check and add oil.

In addition to checking the oil level in the reservoirs, we also recommend that you lubricate all other points on the lathe at this time. The section on **Lubrication** points out each of the oiling mechanisms on this lathe.

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.

Power Connection

⚠WARNING

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

Before the lathe can be connected to the power supply, an electrical circuit must be prepared that meets the **Circuit Requirements** for 220V on **Page 15**. All previous instructions in this manual must be complete to ensure that the lathe has been assembled and properly installed.

Once your lathe is set up and assembled, it is ready to be connected to the power source.

NOTICE

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

Always make sure that both the master power switch and the spindle direction switch are in the OFF positions.

Insert the power cord into a matching receptacle. The lathe is now connected to the power source.

Note About Extension Cords: Using an incorrectly sized extension cord may decrease the life of electrical components on your lathe. Refer to the section on **Extension Cords** on **Page 16** for more information.

Test Run

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

Note: Refer to **Troubleshooting** on **Page 62** for solutions to common problems that occur with all metal lathes.

To test run lathe:

1. Read and follow safety instructions at beginning of manual, take required safety precautions, and make sure lathe is set up and adjusted properly.

2. Clear away all tools and objects used during assembly and preparation.

3. Make sure master power switch is in OFF position (see **Figure 21**).

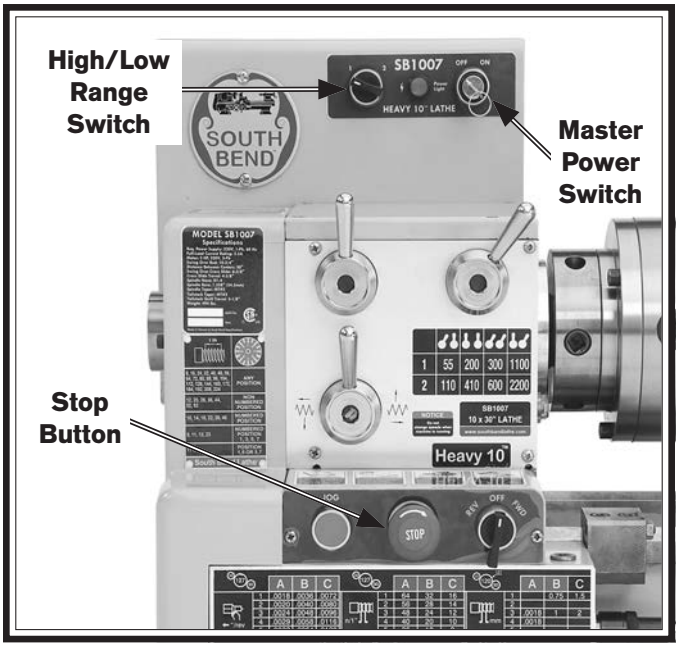


Figure 21. Control panel components.

4. Ensure that chuck and jaws, if installed, are secure (refer to **Chuck Installation** on **Page 29**).

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

5. Push STOP button on control panel (see **Figure 21**).

6. Turn high/low range switch to position 1 (see **Figure 21**). This will make lower spindle speed range available.

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

7. Rotate left-hand spindle speed lever full right, and leave right-hand lever in middle position. As indicated on spindle speed chart (see **Figure 22**), lathe will operate at a speed of 55 RPM in this configuration.

8. Disengage quick-change gearbox by moving feed direction lever to neutral (middle) position (see **Figure 22**).

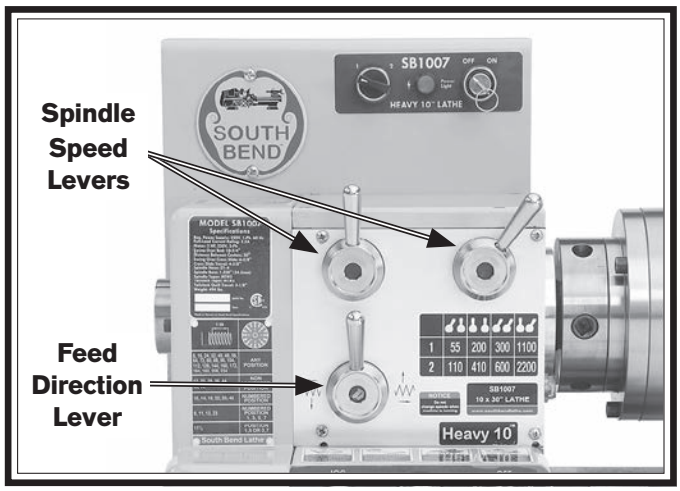


Figure 22. Spindle speed levers and feed direction lever.

9. To ensure carriage components do not move unexpectedly during following steps, disengage half nut lever and feed selection lever (see **Figure 23**).

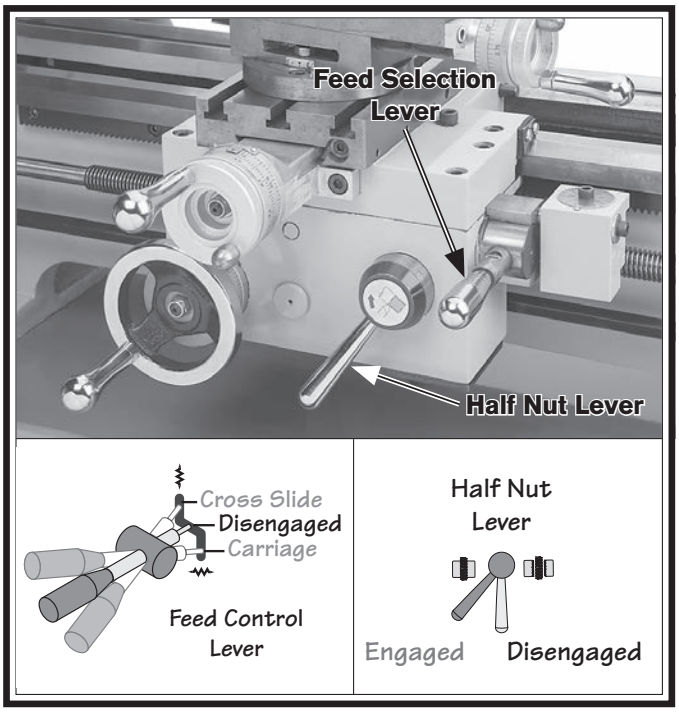


Figure 23. Carriage components disengaged.

10. Turn master power switch to ON position. The power lamp should light up.

11. Reset STOP button by twisting it clockwise until it pops out.

NOTICE

DO NOT use jog button to help mesh gears when changing spindle speeds or speed range! Doing so could damage gears and connected components.

12. Start lathe by turning spindle direction switch to FWD (forward) position (see **Figure 24**).

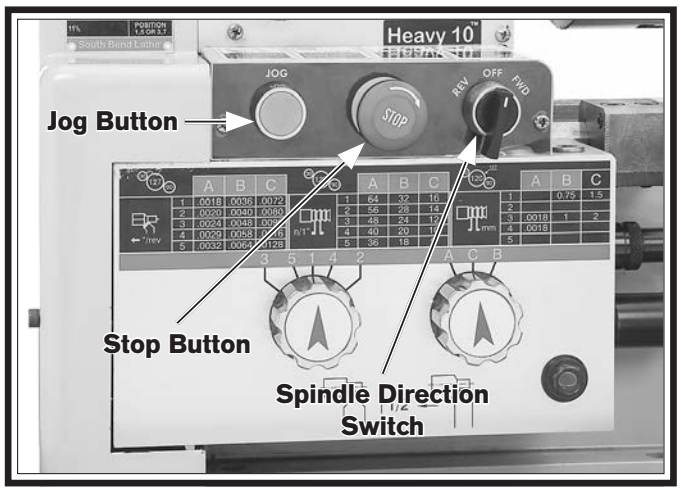


Figure 24. Control buttons.

— When operating correctly, lathe will run smoothly with little or no vibration or rubbing noise.

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

13. Move spindle direction switch to OFF position. Push STOP button to turn lathe ***OFF***. Then, without resetting STOP button, try to restart spindle rotation by moving spindle direction switch to FWD (forward) position. Spindle *should not* start.

— If spindle rotation *does* start with STOP button pressed in, STOP button safety is not operating correctly. This safety feature must operate properly before continuing operation. Turn spindle direction switch to OFF to stop lathe. Then turn master power switch to OFF, disconnect lathe from power, and call Tech Support for help.

—If spindle rotation does not start, continue with **Step 14**.

⚠WARNING

Machine will automatically restart when Emergency Stop switch is reset if spindle direction switch is not in the OFF position. To avoid injury due to unexpected spindle startup, always turn spindle direction switch to OFF position after stopping machine with Emergency Stop switch.

14. Move spindle direction switch to OFF position, reset STOP button by twisting it clockwise, then remove end gear cover. This activates a safety switch that should prevent lathe from starting.

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

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

16. Push STOP button, move spindle direction switch to OFF position, then replace end gear cover.

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

Spindle Break-In

The spindle break-in procedure distributes lubrication throughout the bearings to reduce the risk of early bearing failure if there are any "dry" spots or areas where lubrication has settled in the bearings. You must complete this procedure before placing operational loads on the spindle for the first time when the machine is new or if it has been sitting idle for longer than 6 months.

Always start the spindle break-in at the lowest speed to minimize wear if there are dry spots. Allow the spindle to run long enough to warm up and distribute the bearing grease, then incrementally increase spindle speeds, allowing the spindle to run the same amount of time at each speed, until reaching the maximum spindle speed. Following the break-in procedure in this progressive manner helps minimize any potential wear that could occur until lubrication is fully distributed.

NOTICE

You must complete this procedure to maintain the warranty. Failure to do this could cause rapid wear-and-tear of spindle bearings once they are placed under load.

To perform spindle break-in:

1. Successfully complete **Test Run** procedure beginning on **Page 24**.

2. Use high/low range switch, spindle speed levers, and spindle direction switch (see **Setting Spindle Speed** on **Page 42**) to run lathe at 55 RPM for 10 minutes in each direction (first forward, then reverse).

3. Turn spindle direction switch to OFF position. Shift spindle speed levers into position for 200 RPM, then run lathe for 5 minutes in each direction.

4. Repeat **Step 3** for following speeds, progressing from lower to higher RPMs:

   - 410 RPM
   - 600 RPM
   - 1100 RPM
   - 2200 RPM

5. Turn lathe ***OFF***.

Congratulations! The **Spindle Break-In** is complete. We recommend changing the headstock and gearbox oil before operating the machine further (refer to **Lubrication** on **Page 52**).

Inspections & Adjustments

The following list of adjustments were performed at the factory before your lathe was shipped:

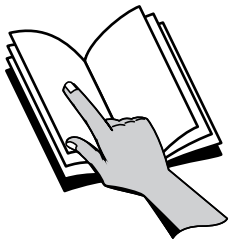
- Tailstock alignment (**Page 36**).
- Compound rest and cross slide backlash adjustment (**Page 57**).
- Gib adjustments (**Page 58**).

Be aware that lathe components can shift during the shipping process. Pay careful attention to these adjustments as you test run your lathe. If you find that the adjustments are not set according to the procedures in this manual or your personal preferences, re-adjust them.

Operation Overview

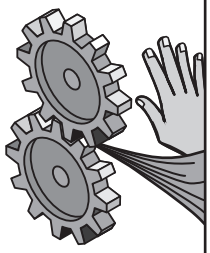
The purpose of this overview is to provide the novice machine operator with a basic understanding of how the machine is used during operation, so they can more easily understand the controls discussed later in this manual.

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 lathe and cause serious personal injury. 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 or face injury. Wear safety glasses and faceshield to reduce this risk.

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

1. Examines workpiece to make sure it is suitable for turning, then securely mounts workpiece in chuck or on faceplate, and removes chuck key from chuck.
2. Mounts tooling, aligns it with workpiece, then backs it away to establish a safe startup clearance.
3. Clears all setup tools from lathe.
4. Checks for safe clearances by rotating workpiece by hand at least one full revolution.
5. Moves slides to where they will be used during operation.
6. Sets correct spindle speed for operation.
7. If using power feed, selects proper feed rate for operation.
8. Puts on safety glasses and a faceshield, rolls up sleeves, removes jewelry, and secures any clothing, jewelry, or hair that could get entangled in moving parts.
9. Turns master power switch to ON position, then resets STOP button.
10. Uses spindle direction switch to start spindle rotation.
11. Uses carriage handwheels or power feed options to move tooling into workpiece for operation.
12. When finished cutting, turns spindle direction switch to OFF position, presses STOP button to completely stop spindle, then removes workpiece.

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.

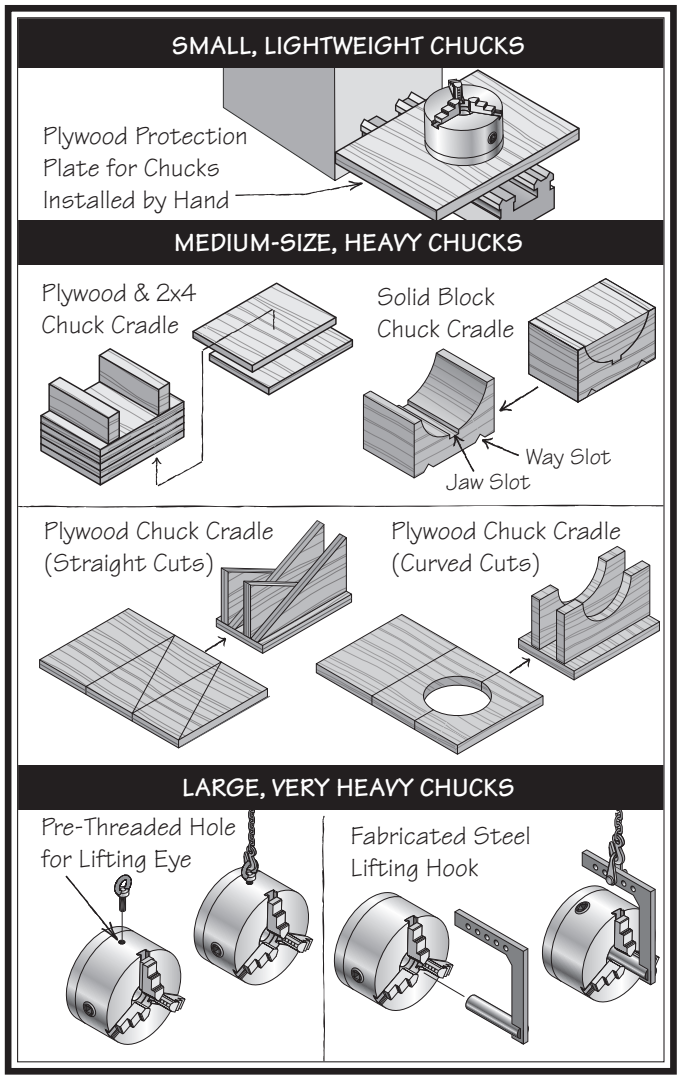


Figure 25. Examples of common devices used during chuck installation and removal.

Chuck Installation

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

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

To install chuck:

1. DISCONNECT LATHE FROM POWER!
2. Use an appropriate lifting, support, or protective device to protect ways and support chuck during installation process.
3. Clean and lightly oil camlock studs, then thoroughly clean mating surfaces of spindle and chuck.
4. Install chuck by inserting camlock studs straight into spindle cam holes.

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

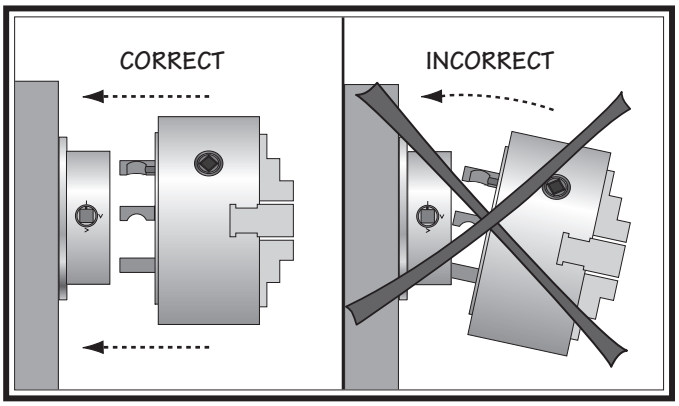


Figure 26. Inserting camlock studs into spindle cam holes.

5. Incrementally tighten camlocks to ensure chuck seats evenly against spindle.

6. When chuck is fully seated and all camlocks are tight, verify cam line is between the two "V" marks on spindle nose (see **Figure 27**).

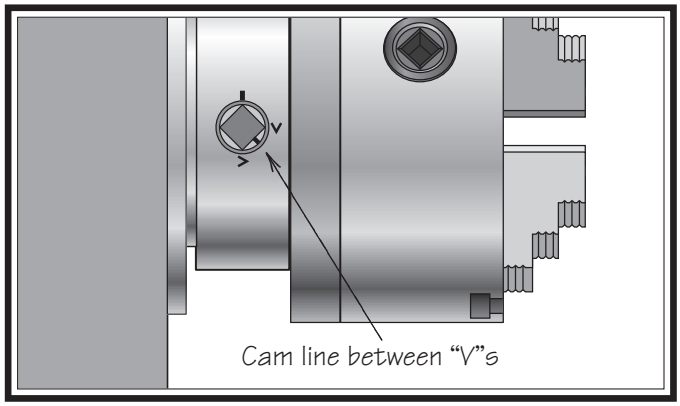


Figure 27. Cam line positioned between "V" marks after camlocks are fully tightened.

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

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

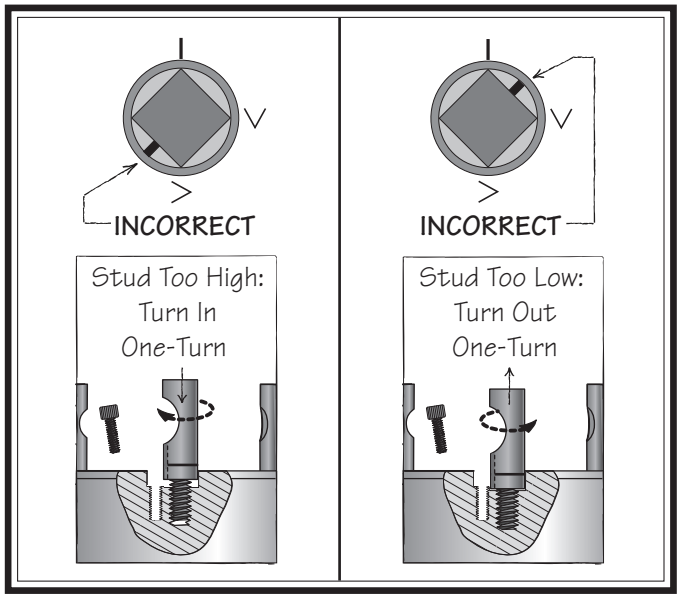


Figure 28. Correcting an improperly installed stud.

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

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

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

8. Verify that chuck/spindle tapers are seated firmly together by removing chuck, per **Chuck Removal** instructions on **Page 31**, and pay close attention to how easily 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 tapers released easily with little intervention, they are not seated together as firmly as required. Remove chuck, carefully re-clean mating surfaces, and re-install. If 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.

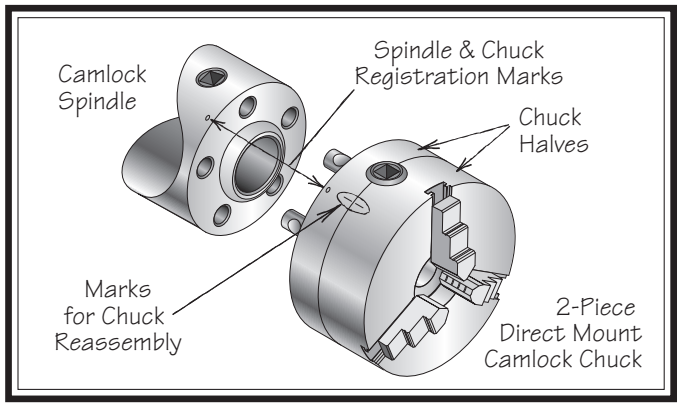


Figure 29. Registration mark locations.

Chuck Removal

To remove chuck:

1. DISCONNECT LATHE FROM POWER!

2. Use an appropriate lifting, support, or protective device to protect ways and support chuck (refer to **Installation & Removal Devices** on **Page 29**).

3. Loosen camlocks by turning key counterclockwise until each of the cam lines is aligned with its corresponding spindle mark (see **Figure 30**).

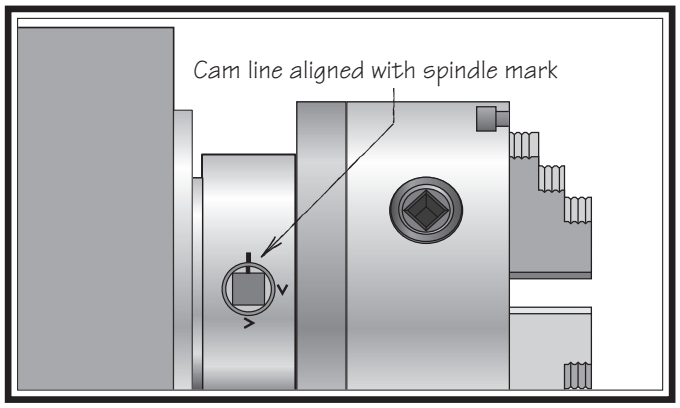


Figure 30. Camlock is fully loosened when cam line is aligned with spindle mark.

Note: 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 outer circumference of chuck body to loosen it from spindle.

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

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

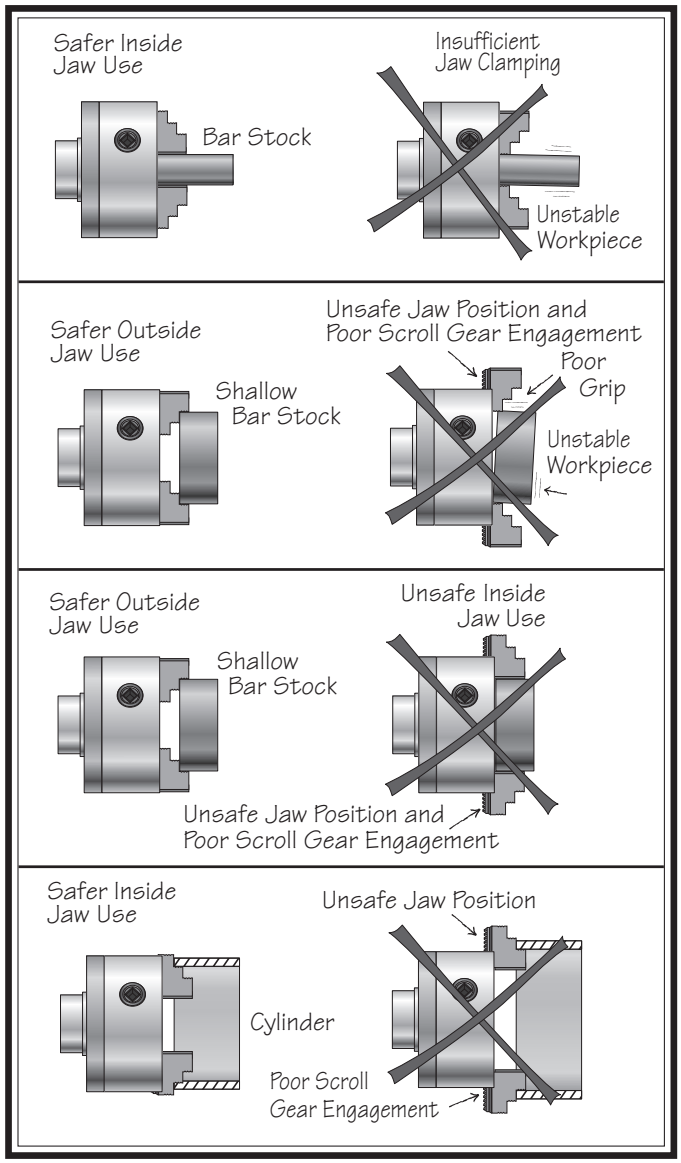


Figure 31. Jaw selection and workpiece holding.

Changing Jaw Set

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

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

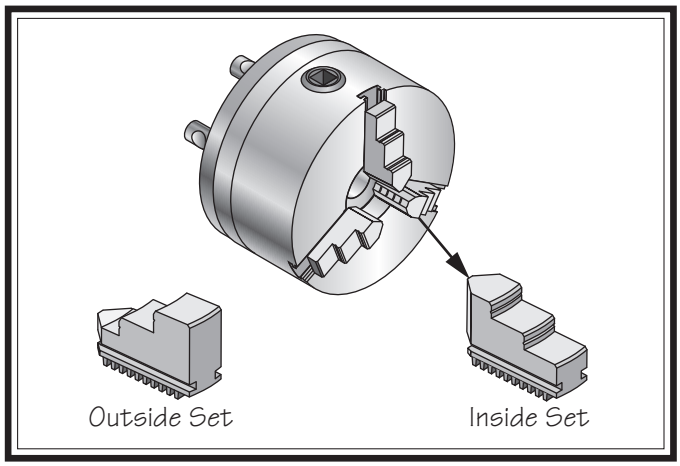


Figure 32. Chuck and jaw selection.

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

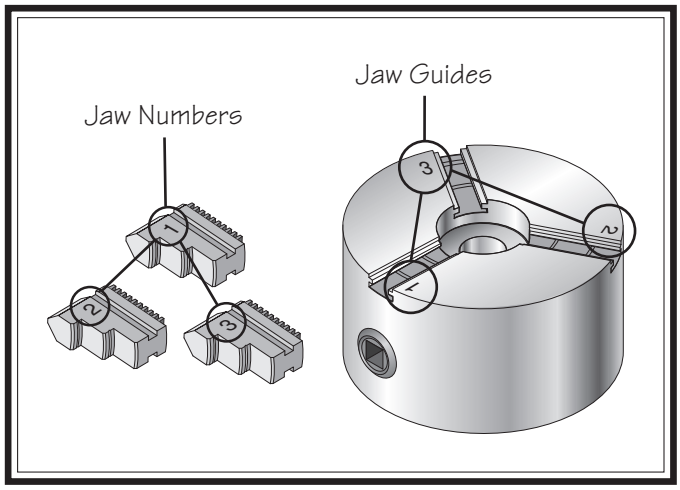


Figure 33. Jaw guide and jaw numbers.

To change jaw set:

1. DISCONNECT LATHE FROM POWER!

2. Use appropriate device to protect ways (refer to **Installation & Removal Devices** on **Page 29**).

3. Insert chuck key and turn it counterclockwise to back jaws out and remove them individually in descending order (i.e., 3, 2, 1).

4. Use mineral spirits to clean debris and grime from jaws and chuck jaw guides.

5. Apply thin coat of NLGI #2 grease to surfaces of removed jaw set. Store in safe place free from moisture and abrasives.

6. Rotate chuck key clockwise until you see tip of outer scroll-gear lead thread about to enter a jaw guide (see below).

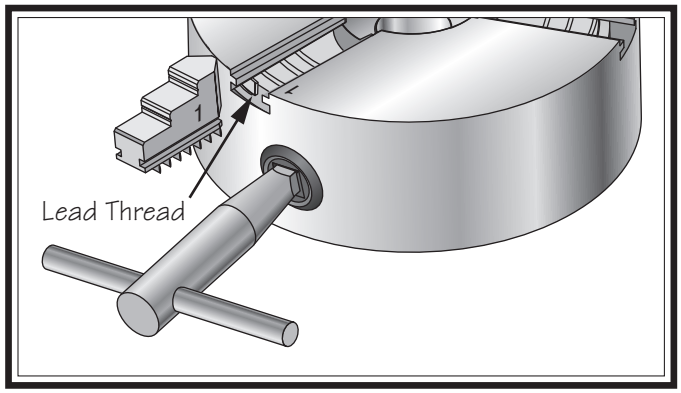


Figure 34. Lead thread on scroll gear.

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

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

9. Install remaining jaws in numerical order, in same manner. The jaws should converge evenly at center of chuck.

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

Tailstock

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

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

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

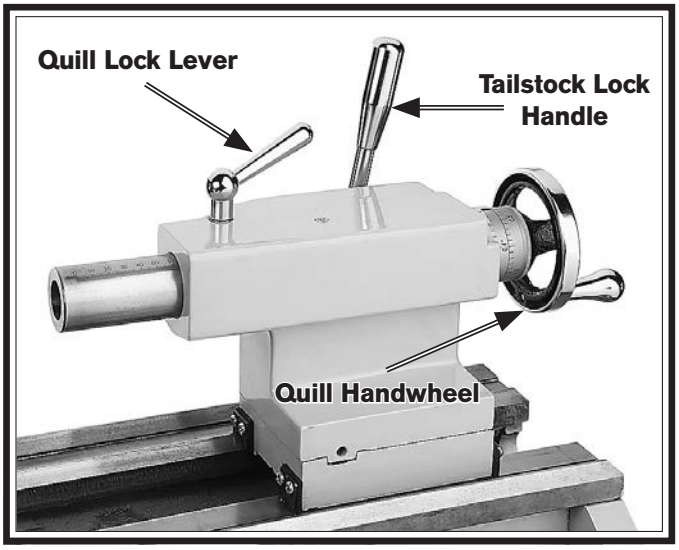


Figure 35. Arrangement of tailstock controls.

Graduated Dial on Handwheel

Increments.....0.002" (0.05mm)
One Full Revolution.....0.8" (2.0mm)

Increments on Quill Scale

Inch.....0–3⅛" in 1⁄16" Increments
Metric.....0–80mm in 1mm Increments

Positioning Tailstock

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

2. Slide tailstock to desired position.

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

Positioning Quill

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

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

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

Installing Tooling

This tailstock uses a quill with an MT#3 taper that accepts tapered arbors like those shown in **Figures 36–37**. Because the quill is flared at the back, it is capable of taking tools with or without tangs. Other tooling can be used if the potential load will not exceed the strength of the tapered fit. This includes smaller drill chucks, drill bits, and centers.

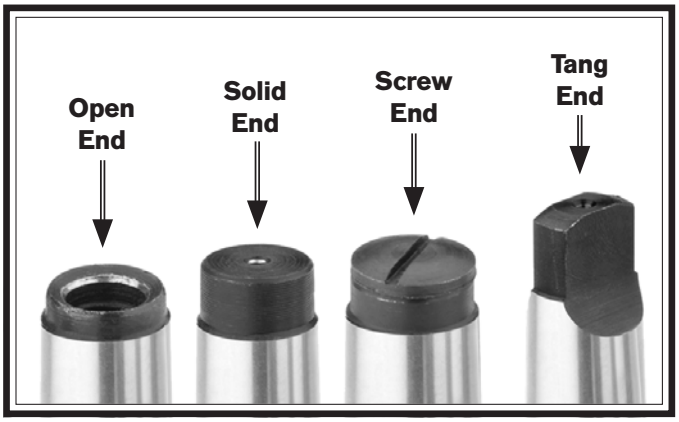


Figure 36. Types of tapered arbors and tooling.

If the arbor has an open hole in the end, 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.

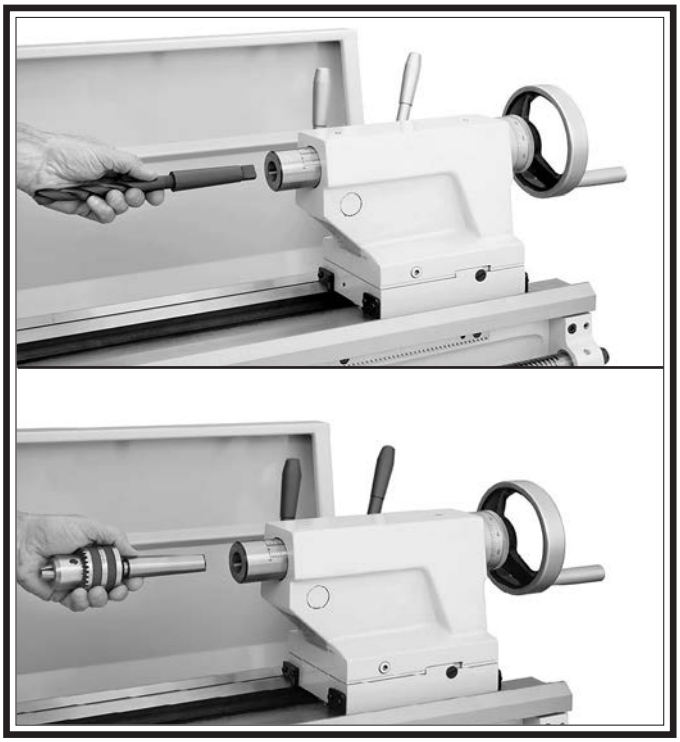


Figure 37. Example photos of MT#3 tools being inserted into tailstock.

To install tooling in tailstock:

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

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

   Note: This will ensure that tool will seat properly and reduce runout.

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

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

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

Removing Tooling

To remove tooling in tailstock:

1. Use a shop rag to hold tool.

2. Rotate tailstock handwheel counterclockwise until tool is forced out of 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 4mm	1

To offset tailstock:

1. Loosen tailstock lock handle to release clamping pressure between top and bottom castings (see **Figure 38**).

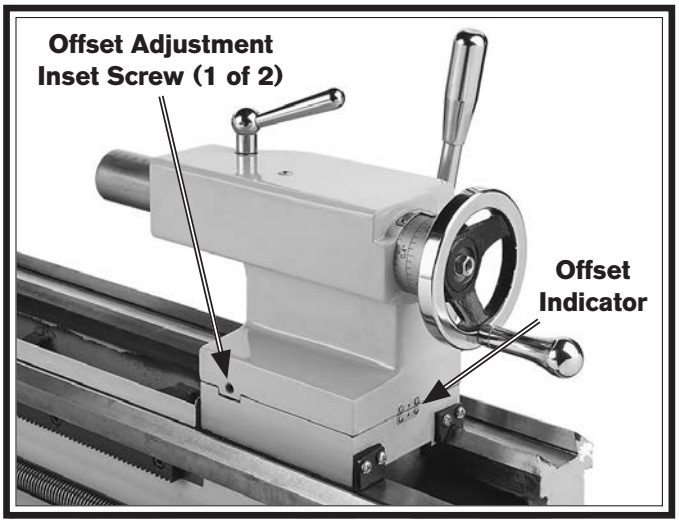


Figure 38. Tailstock offset controls.

2. Rotate offset adjustment inset screws the same amount in opposite directions for desired offset (see illustration in **Figure 39**).

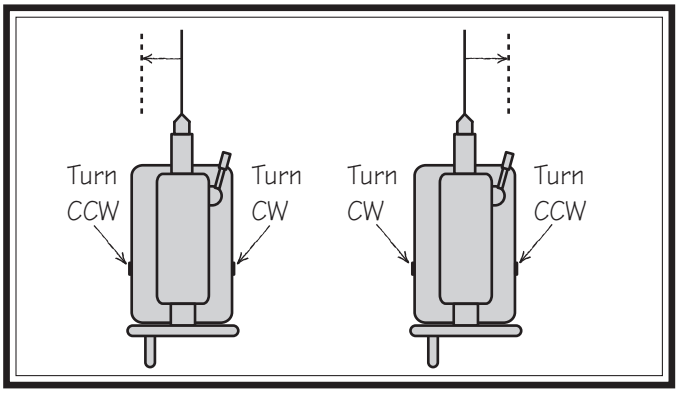


Figure 39. Set screw adjustment in relation to tailstock movement.

3. Retighten clamping cap screws underneath tailstock to secure offset.

Aligning Tailstock To Spindle Centerline

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

Items Needed	Qty
Hex Wrench 4mm	1
Precision Level	1
Round Stock 2" x 6"	2
Test or Dial Indicator w/Mount	1

To align tailstock offset to spindle centerline:

1. Use a precision level to ensure bedway is level from side to side and from front to back.

   — If bedway is not level, correct this condition before continuing with this procedure (refer to **Leveling & Mounting** on **Page 22**).

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

3. Use other piece of round stock to make a dead center, and turn it to a 60° point, as illustrated in **Figure 40**.

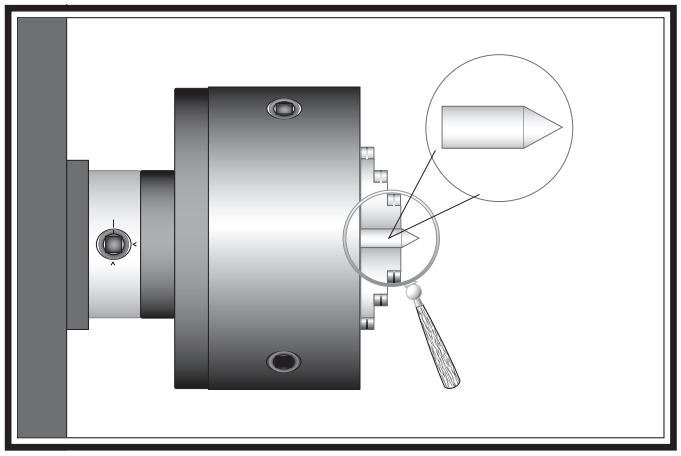


Figure 40. Turning a dead center.

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

4. Install a center in tailstock.

5. Attach a lathe dog to test stock from **Step 2**, then mount it between centers (see **Figure 41** for an example setup).

Figure 41. Example of stock mounted between centers.

6. Turn 0.010" off diameter along entire length of round stock.

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

8. Use calipers to measure both ends of workpiece and adjust tailstock offset as necessary (refer to **Offsetting Tailstock** on **Page 35** for detailed instructions).

— If test stock is *thicker* at tailstock end, move tailstock *toward* the *front* of lathe ½ distance of amount of taper (see **Figure 42**).

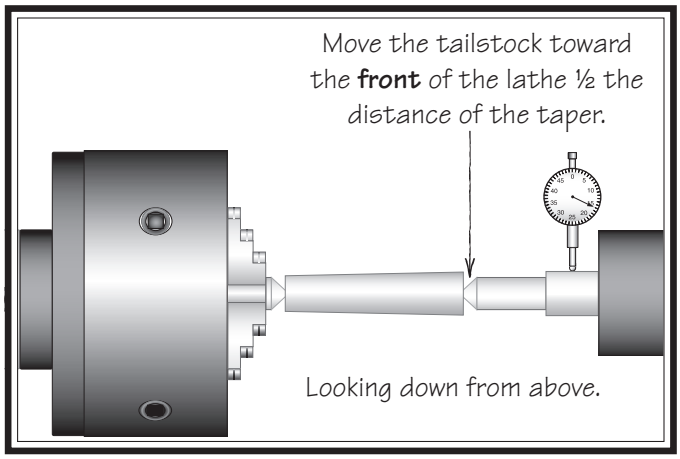


Figure 42. Adjust tailstock toward front of lathe.

— If test stock is *thinner* at tailstock end, move tailstock *toward* the *back* of lathe ½ distance of amount of taper (see **Figure 43**).

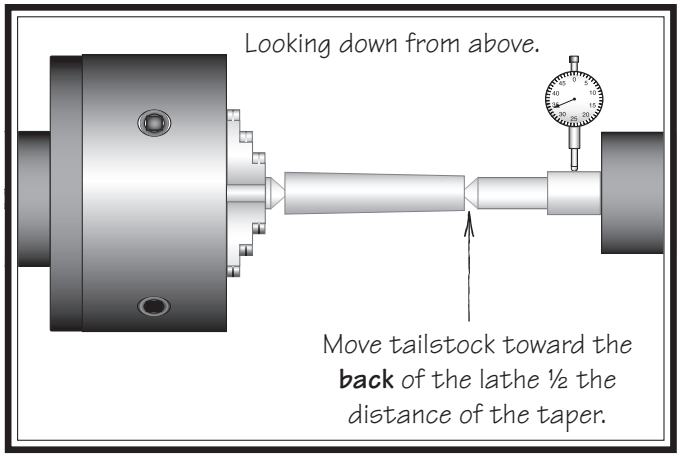


Figure 43. Adjust tailstock toward back of lathe.

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

Carriage & Slide Locks

The carriage and compound rest have locks (see **Figure 44)** that can be tightened to provide additional rigidity during operation, especially during heavy cuts or close tolerance work.

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

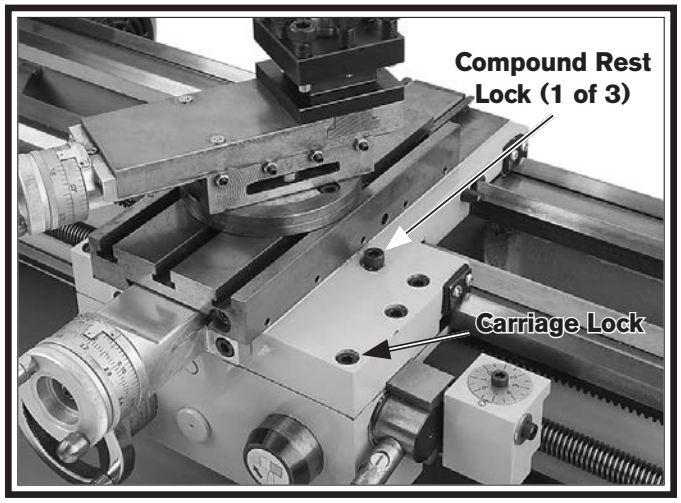


Figure 44. Location of carriage and compound rest hex nuts.

Compound Rest

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

Tools Needed	Qty
Open-End Wrench 12mm	1
Hex Wrench 6mm	1

Setting Angle

1. Loosen the two hex nuts at base of compound rest (1 of 2 shown in **Figure 45**).

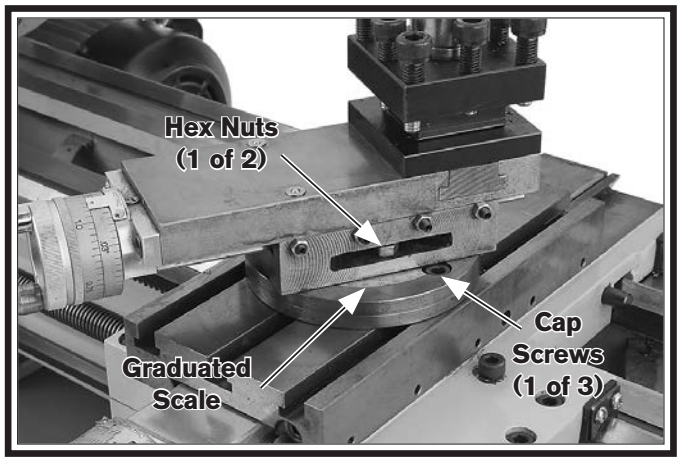


Figure 45. Location of compound rest locks.

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

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

Setting distance from workpiece

1. Loosen the three cap screws at base of compound rest (one of three shown in **Figure 45**).

2. Move rest desired distance from workpiece, then retighten cap screws.

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 retightening the handle to lock the tool into position.

Installing Tool

Tool Needed	Qty
Hex Wrench 8mm	1

To install tool in tool post:

1. Adjust tool post screws so cutting tool can fit underneath.

2. Firmly secure cutting tool with at least two tool post screws (see **Figure 46**).

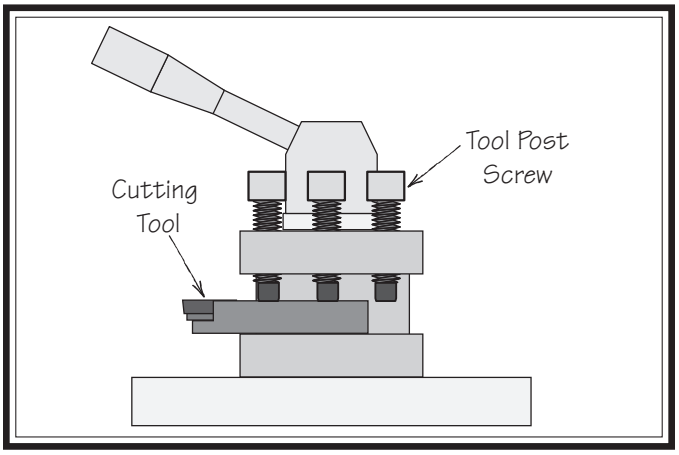


Figure 46. Example of tool mounted in tool post.

⚠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").

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

Aligning Cutting Tool with Spindle Centerline

For most operations, the cutting tool tip should be aligned vertically with the spindle centerline, as illustrated in **Figure 47**.

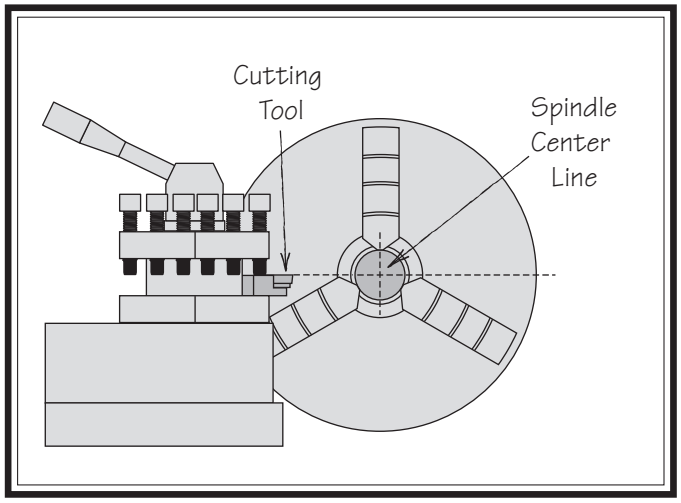


Figure 47. Tip of cutting tool aligned with spindle centerline (viewed from tailstock).

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

Below are two common methods:

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

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

Tools Needed	Qty
Hex Wrench 10mm	1
Steel Shims	As Needed
Cutting Tool	1
Fine Ruler	1
Tailstock Center	1

To align cutting tool with tailstock center:

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

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

3. Lock tailstock and quill in place.

4. Adjust height of cutting tool so that tool tip is aligned vertically and horizontally with center tip, as shown in **Figure 48**.

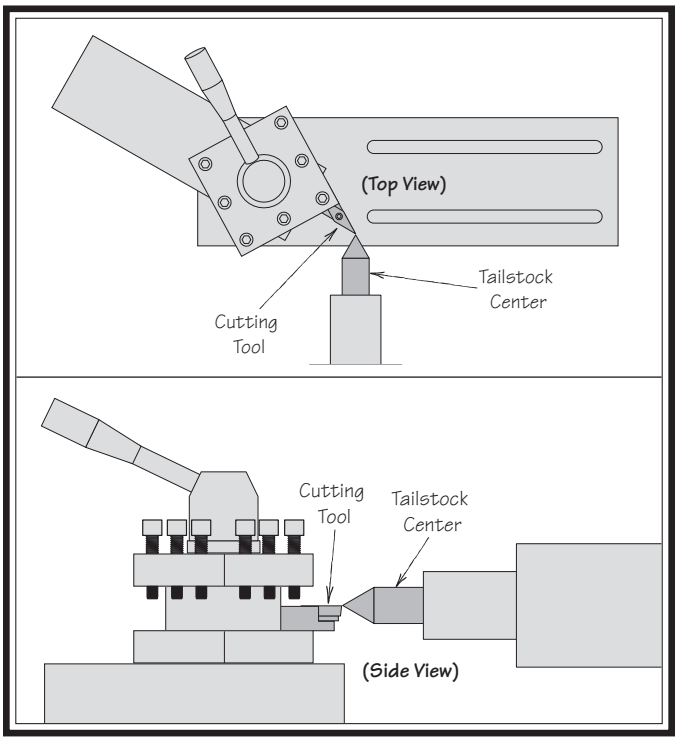


Figure 48. Cutting tool tip aligned with tailstock center.

Carriage Stop

The carriage stop allows you to manually stop the carriage at the same position for repeat cuts, such as when turning up to a shoulder. The carriage stop includes an adjustable set screw that allows you to precisely position the stop.

NOTICE

The carriage stop on this lathe is designed for manually stopping the carriage at the same position for repeat cuts. The carriage will NOT automatically stop by itself when it contacts the carriage stop.

Tools Needed	Qty
Hex Wrench 4mm	1
Hex Wrench 6mm	1
Open-End Wrench 12mm	1

To set carriage stop:

1. DISCONNECT LATHE FROM POWER!

2. Loosen the two cap screws shown in **Figure 49**, then use carriage handwheel to position carriage at desired stopping point.

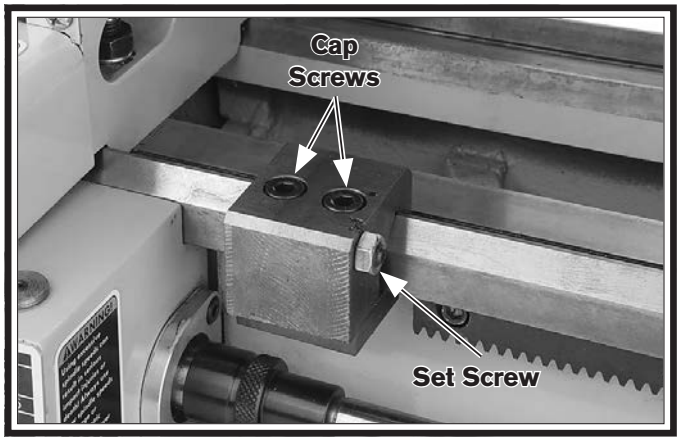


Figure 49. Location of carriage stop.

3. Move carriage stop up to carriage and use adjustable set screw to fine tune position.

4. Retighten cap screws.

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

Manual Feed

The handwheels shown in **Figure 50** allow the operator to manually move the cutting tool.

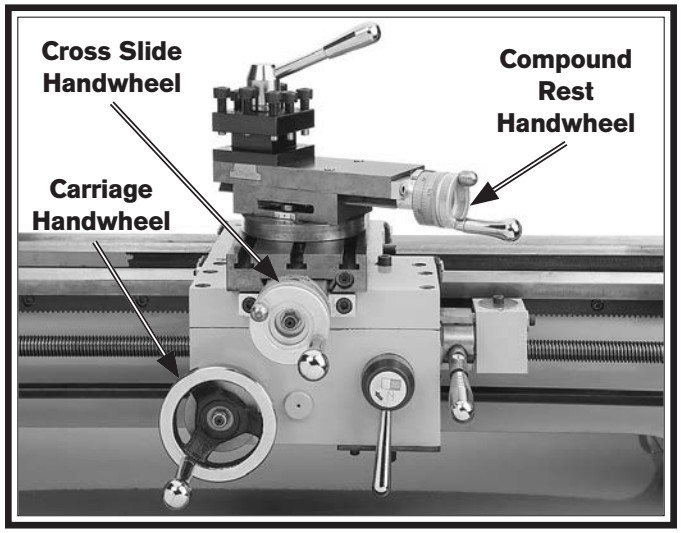


Figure 50. Carriage handwheel controls.

Carriage Handwheel

The carriage handwheel moves the carriage left or right along the bed. It has a graduated dial with 0.01" (0.2mm) increments, and one full revolution moves the carriage 0.75" (19mm).

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 dial displays the amount removed from the workpiece diameter (the slide only moves half the distance shown on the dial). The dial has 0.002" (0.04mm) increments, and one full revolution equals 0.16" (4.0mm).

Compound Rest Handwheel

The compound rest handwheel moves the cutting tool linearly along the set angle of the compound rest. The compound rest angle is set by hand-rotating it and securing it in place with two hex nuts. The compound rest has a direct-read graduated dial with 0.001" (0.025mm) increments. One full revolution of the handwheel moves the slide 0.50" (1.25mm).

Spider

This lathe is equipped with a set of outboard spindle supports otherwise known as a "spider" (see **Figure 51**).

Figure 51. Spider components.

⚠CAUTION

Remove spider screws when not in use. Always DISCONNECT LATHE FROM POWER when installing, removing, or adjusting spider screws. Accidental startup can lead to personal injury or machine damage.

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

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

Tools Needed

Hex Wrench 5mm 1
Hex Wrench 8mm 1

Spindle Speed

Using the correct spindle speed is important for safe and satisfactory results, as well as for 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 52**.

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

*Double if using carbide cutting tool

Figure 52. 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 workpiece surface.

A recommended cutting speed is the ideal speed for cutting a type of material in order to produce an optimum finish and maximize tool life. The table below provides cutting speeds for a variety of common metals, which can be used when calculating the formula provided in **Figure 52**.

CUTTING SPEEDS IN SURFACE FEET PER MINUTE

Kind of Metal	Roughing Cuts .010 in. to .020 in. Feed	Finishing Cuts .002 in. to .010 in. Feed	Cutting Screw Threads
Cast Iron	60 f. p. m.	80 f. p. m.	25 f. p. m.
Machine Steel	90 f. p. m.	100 f. p. m.	35 f. p. m.
Tool Steel, Annealed	50 f. p. m.	75 f. p. m.	20 f. p. m.
Brass	150 f. p. m.	200 f. p. m.	50 f. p. m.
Aluminum	200 f. p. m.	300 f. p. m.	50 f. p. m.
Bronze	90 f. p. m.	100 f. p. m.	25 f. p. m.

Figure 53. Cutting speed chart originally included in the South Bend classic "How to Run a Lathe."

For your convenience, the table below provides a set of pre-calculated spindle speeds for a variety of workpiece sizes of different metal types. To use this table, select the diameter that is closest to your workpiece size, look across the row to the number provided for your metal type, and then set your spindle RPM at or near that number.

SPINDLE SPEEDS IN R.P.M. FOR TURNING AND BORING
Calculated for Average Cuts with High Speed Steel Cutter Bits

Diameter in Inches	Alloy Steels 50 f. p. m.	Cast Iron 75 f. p. m.	Machine Steel 100 f. p. m.	Hard Brass 150 f. p. m.	Soft Brass 200 f. p. m.	Aluminum 300 f. p. m.
1	191	287	382	573	764	1146
2	95	143	191	287	382	573
3	64	95	127	191	254	381
4	48	72	95	143	190	285
5	38	57	76	115	152	228
6	32	48	64	95	128	192
7	27	41	55	82	110	165
8	24	36	48	72	96	144
9	21	32	42	64	84	126
10	19	29	38	57	76	114

Figure 54. Spindle speed chart for cutting common metals, taken from "How to Run a Lathe."

Additionally, 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 provide a wealth of additional information that will help you take into account all the applicable variables in order to determine the best spindle speed for the operation.

Setting Spindle Speed

The spindle speed levers (see **Figure 55**) are used in combination with the high/low range switch to select any one of eight spindle speeds.

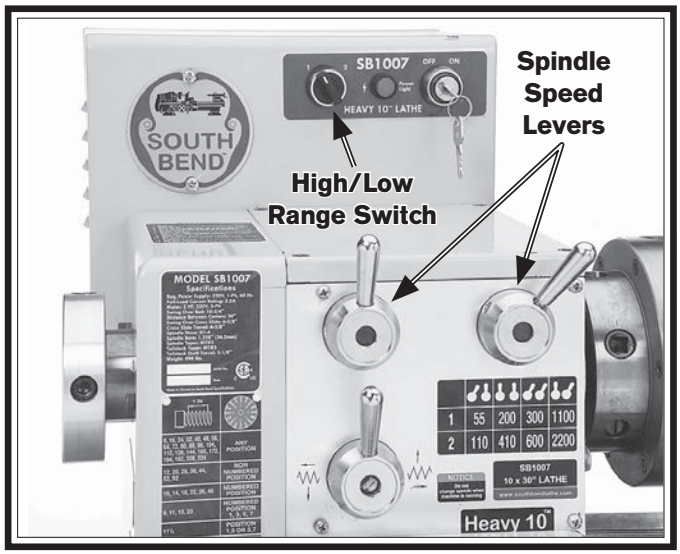


Figure 55. Spindle speed controls.

The spindle speed levers control the gear configuration in the headstock, while the high/low range switch determines high or low motor speed.

To set spindle speed RPM:

1. Press STOP button and make sure spindle has completely stopped.

NOTICE

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

2. Rotate high/low range switch to correct setting for speed indicated on gear chart (shown below): 1 (low) or 2 (high).

Spindle Speed RPM

1	55	200	300	1100
2	110	410	600	2200

Figure 56. Spindle speed gear chart.

3. Shift spindle speed levers to correct settings for spindle speed range (see **Figure 56**).

   Note: If spindle speed levers do not easily slide into position, rotate spindle by hand while applying pressure to lever. When gears align, lever will move easily into place. If you have trouble rotating spindle by hand, use spindle chuck key to get additional leverage. Just be sure to remove key when you are done.

4. Reset STOP button. Start spindle rotation using spindle direction switch.

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 levers, quick-change gearbox knobs, and end gear configuration.

Feed rate and spindle speed must be considered together. Keep in mind that the feed rate is expressed as the amount of tool travel per one 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, experienced machinists 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.

In the event that feed rates and/or spindle speeds should overload the system, the feed rod is equipped with a spring-loaded slip clutch that will cause feeding operations to stop in order to prevent a crash that could damage the gears or chuck.

For threading operations, the carriage can be driven by the leadscrew. 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 47**.

NOTICE

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

Power Feed Controls

Use **Figures 57–59** and the following descriptions to become familiar with the locations and functions of the power feed controls.

Before using power feed, you may have to re-configure the end gears, depending on the operation (refer to **End Gears** on **Page 45** for detailed instructions).

NOTICE

To avoid damaging lathe components, do not attempt to engage feed selection lever and half nut lever at the same time.

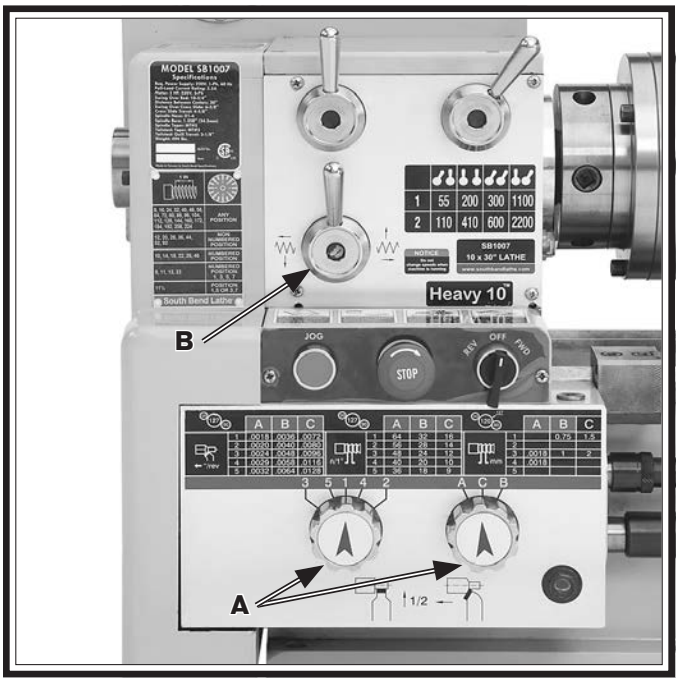


Figure 57. Quick-change gearbox and power feed controls.

A. Quick-Change Gearbox Knobs: Control feed rod speed for power feed operations.

B. Feed Direction Lever: Selects carriage or cross slide direction for power feed operations. This lever works in tandem with the apron feed selection lever and must be engaged for power feed to function.

C. Feed Selection Lever: Engages cross slide or carriage for power feed operations.

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

To position the lever (see **Figure 58**) for either cross slide or carriage feed, begin at the *middle* position, pull the lever straight out, and rotate it to the desired setting.

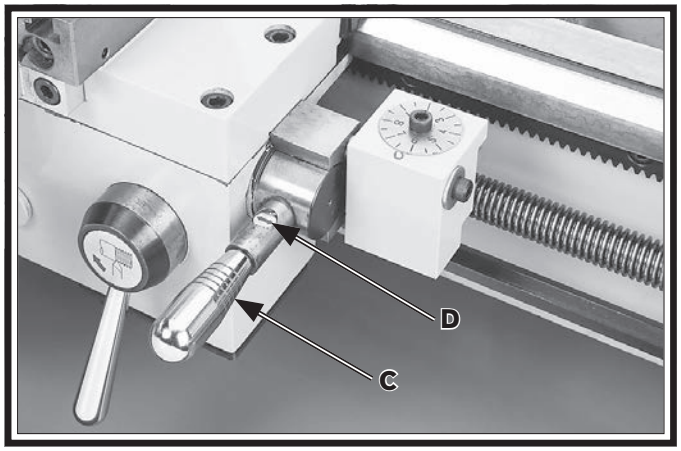


Figure 58. Location of the feed selection lever.

When the left/right arrows on the lever are visible, the lever can be shifted *up* to select the carriage (see **Figure 59**).

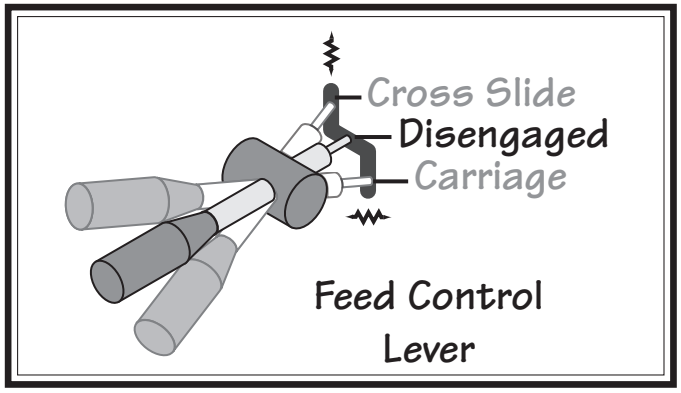


Figure 59. Feed selection lever positions.

Conversely, when the lever is rotated 180˚, and the up/down arrows are visible, the lever can be shifted *down* to select the cross slide.

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

D. Feed Selection Lever Indicator: Arrow symbols that visibly indicate carriage or cross feed selection.

Setting Power Feed Rate

The feed rate chart in **Figure 60** is also displayed on the quick change gearbox cover. It displays the end gear and quick-change gearbox knob settings for inch feed rates.

	A	B	C
1	.0018	.0036	.0072
2	.0020	.0040	.0080
3	.0024	.0048	.0096
4	.0029	.0058	.0116
5	.0032	.0064	.0128

Figure 60. Feed rate chart.

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 0.0018 in./rev.:

1. Make sure end gears are in configuration indicated on feed rate chart (refer to **End Gears** on this page for detailed instructions).

2. Locate box on feed rate chart that lists setting for 0.0018" of feed per revolution of spindle.

3. Rotate quick-change gearbox knobs to alpha-numeric settings indicated on feed rate chart (in this instance, 1A).

4. Use headstock feed direction lever to select direction of carriage travel.

   When lever is to the left, carriage will move toward the spindle. Conversely, when lever is to the right, the carriage will move away from the spindle.

5. Shift feed selection lever *up* to select carriage for power feed.

NOTICE

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

End Gears

The end gears on this lathe can be configured according to the operation to be performed: power feed and inch or metric threading. The operation you choose will determine which gear configuration you must use. This includes the number of gears—either three or four—and the tooth count of each gear. The SB1007 lathe arrives from the factory in the three-gear configuration.

The figure below shows the location of each component that must be considered when changing gears. The configuration of the gears is specified on the feed rate and threading charts.

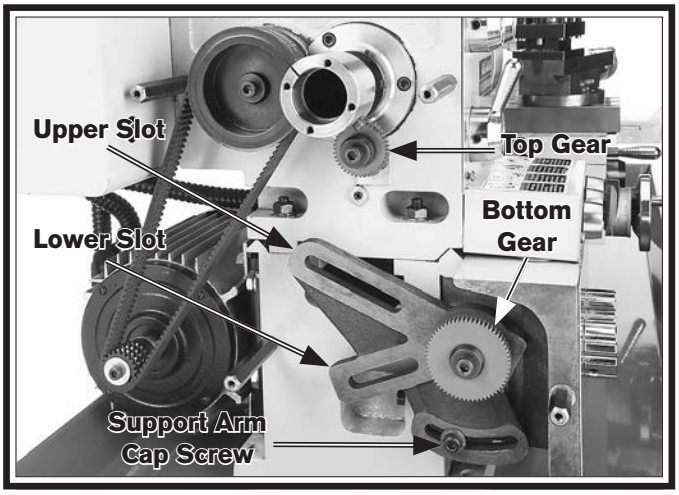


Figure 61. End gear support arm and components.

Tools Needed	Qty
Hex Wrench 5mm	1
Hex Wrench 6mm	1
Open-End Wrench 13mm	1

To install three-gear configuration:

1. DISCONNECT LATHE FROM POWER!

2. Remove headstock end gear cover.

3. Loosen support arm cap screw (see **Figure 61**) and allow assembly to pivot down.

4. Install top and bottom gears indicated by feed rate or threading charts. Make sure keys stay inserted in shafts when removing these gears.

Note: When installing new gears, do not overtighten cap screws. They simply hold gears in place. Overtightening could hinder gear rotation.

5. Install middle gear on upper slot (see **Figure 62**). The gear bolts directly onto support arm. Be careful not to lose washer or square nut that locate gear on arm.

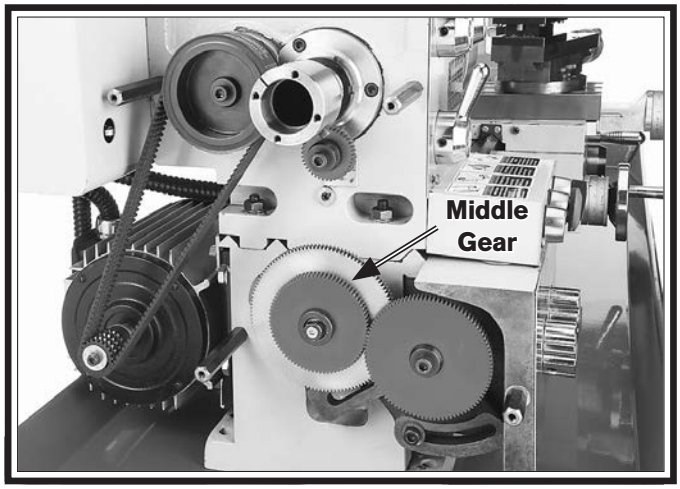


Figure 62. Middle gear installed in three-gear configuration.

6. Slide middle gear against bottom gear until they mesh, and allow for backlash of 0.002"-0.004". Tighten bolt that holds gear in place.

7. Rotate support arm upward until middle gear meshes with top gear, and allow for backlash of 0.002"-0.004". Then tighten support arm cap screw.

8. Re-install end gear cover.

To install four-gear configuration:

1. DISCONNECT LATHE FROM POWER!

2. Follow **Steps 2–4** of preceding **Three-Gear Configuration** section.

3. Install middle gear in lower slot (see **Figure 63**), then mesh with bottom gear. Allow for backlash of 0.002"-0.004", then tighten bolt.

4. Install middle gear in upper slot (see **Figure 63**), then mesh with gear in lower slot, allowing for same backlash. Then tighten bolt.

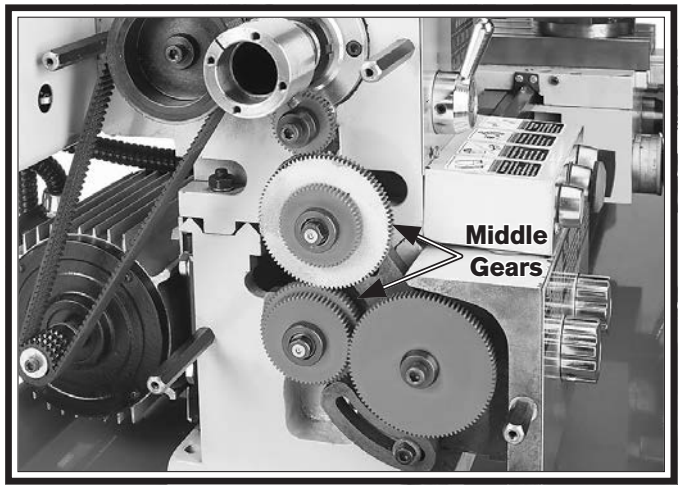


Figure 63. Middle gears installed in four-gear configuration.

5. Rotate support arm upward until gear in upper slot meshes with top gear, and allow for same backlash. Then tighten support arm cap screw.

6. Re-install end gear cover.

Threading

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

Headstock Threading Controls

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

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

To set up a thread pitch of 13 TPI:

1. DISCONNECT LATHE FROM POWER!

2. Locate 13 TPI on additional inch thread chart (see **Figure 64**) on end gear cover.

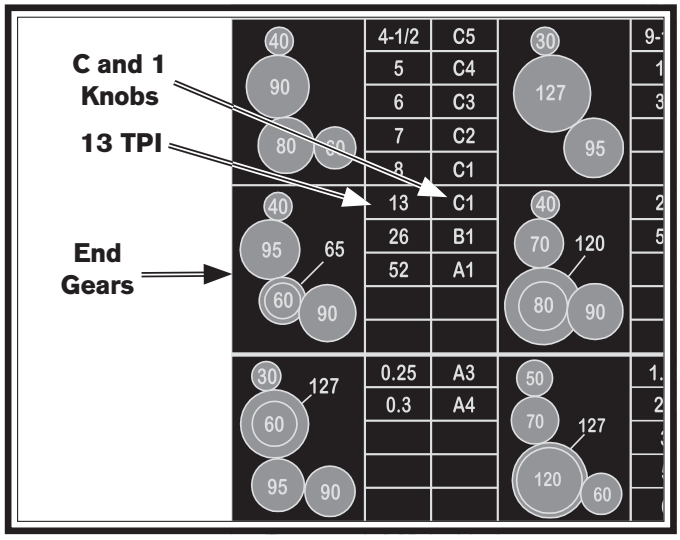


Figure 64. Headstock inch thread chart showing additional end gear and gearbox knob configurations.

3. Install 40T, 60T, 90T, and 95T gears as instructed in **End Gears** on **Page 45**.

   Note: The 65T gear called out in the above diagram functions as a spacer installed behind the 60T gear to position it correctly on the gear shaft.

4. Locate C1 to the right of 13 TPS.

5. Position gearbox knobs, as shown in **Figure 65**.

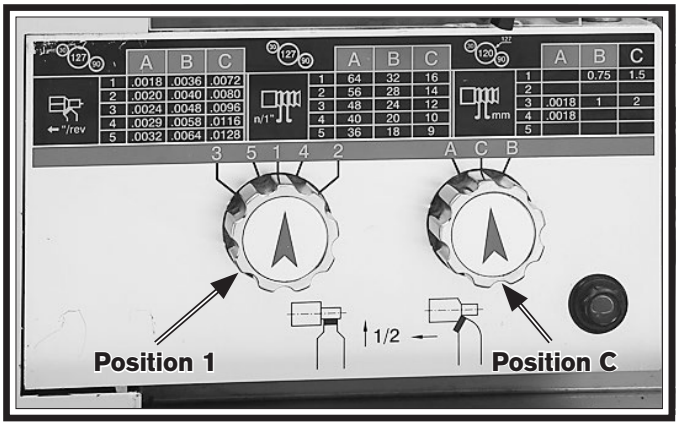


Figure 65. Gearbox settings for 13 TPI.

   The lathe is now set up to cut 13 TPI threads.

6. Shift headstock feed direction lever left to engage leadscrew rotation. This will move carriage toward spindle.

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 66**).

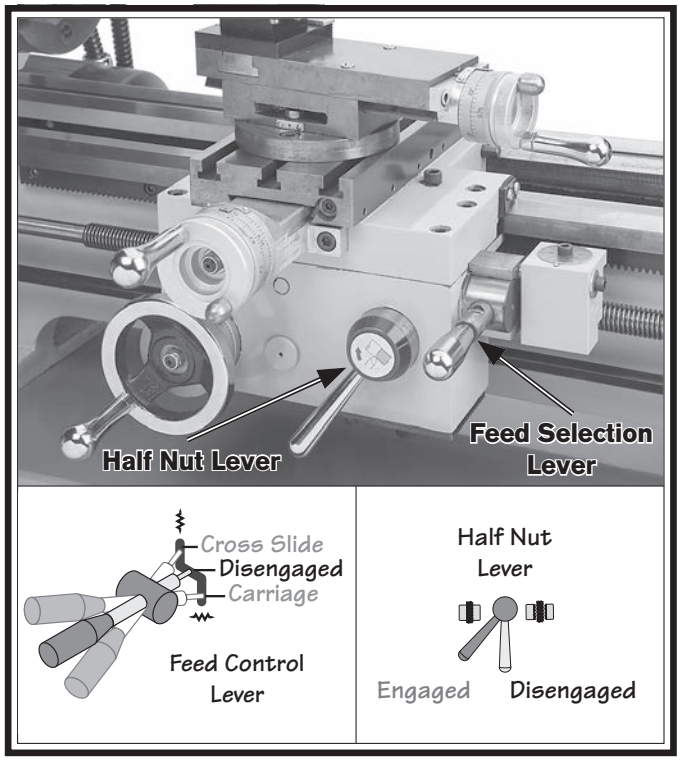


Figure 66. Location of feed control and half nut lever.

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

Thread Dial

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

The numbers on the thread dial are used with the thread dial chart to show when to engage the half nut during inch threading. The thread dial gear must be engaged with the leadscrew for this to work.

To use the thread dial, loosen the cap screw on the side of the housing (see **Figure 67**), pivot the dial gear toward the leadscrew so that it properly meshes with the leadscrew threads, then tighten the cap screw to secure it in place.

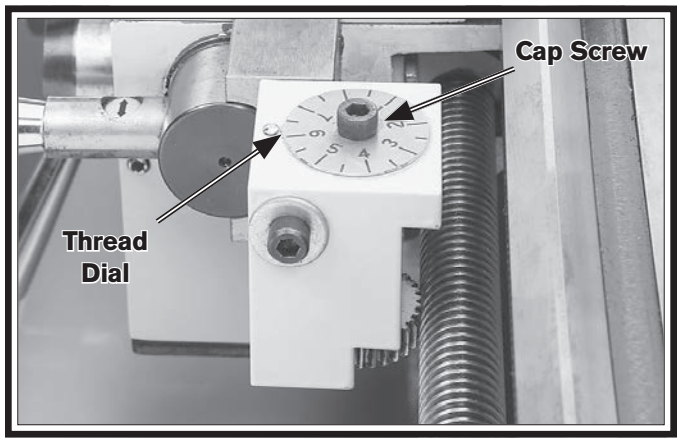


Figure 67. Thread dial engaged with leadscrew.

Note: The thread dial is not used for metric threading. For that type of operation, you must leave the half nut engaged until the turning is complete.

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

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

The thread dial chart (see **Figure 68**) is located on the front of the headstock. Find the TPI (threads per inch) that you want to cut in the left column, 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.

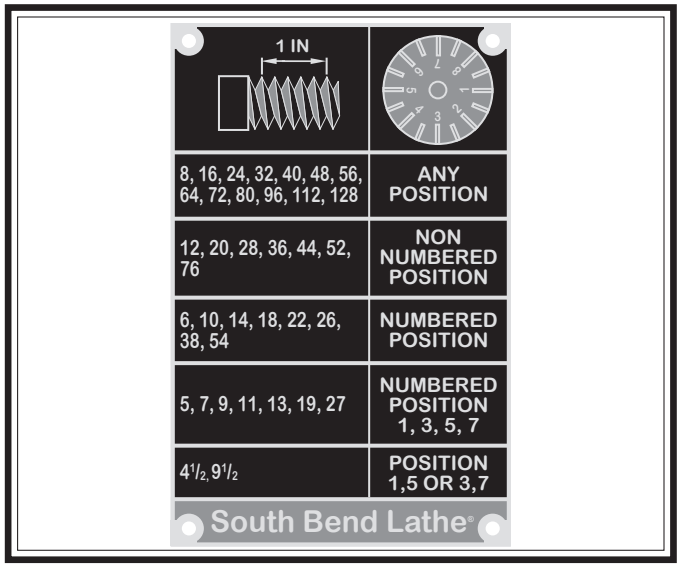


Figure 68. Thread dial chart on headstock.

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 69**).

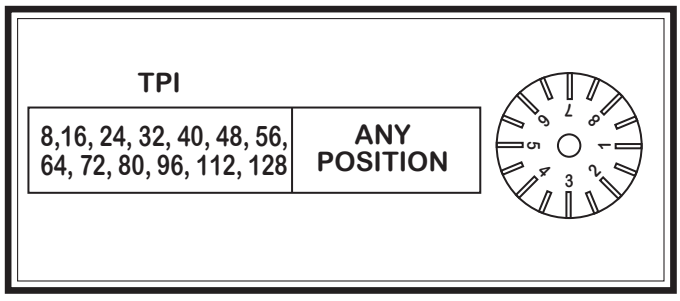


Figure 69. Use any position on dial for threading TPI divisible by four.

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 70**).

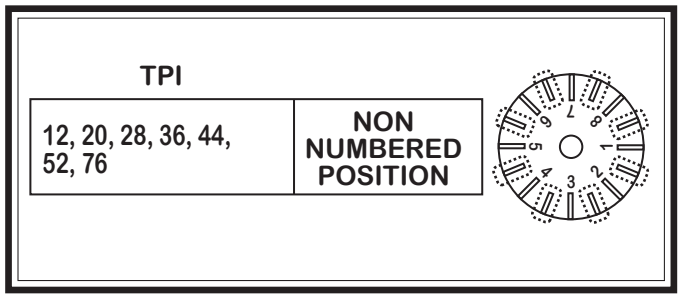


Figure 70. Non-numbered marks on dial used for threading TPI not divisible by four.

Odd Numbered TPI

For odd numbered TPI, use any of the numbered lines on the thread dial (see **Figure 71**).

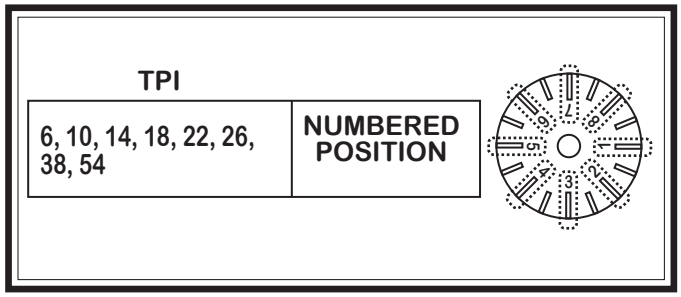


Figure 71. Numbers used for threading odd numbered TPI.

½ Fractional TPI

Use any opposing number pairs—2/4 or 1/3 on the thread dial for ½ fractional TPI (see **Figure 72**). For example, to cut a 4½ thread, select 1 or 3 on the dial.

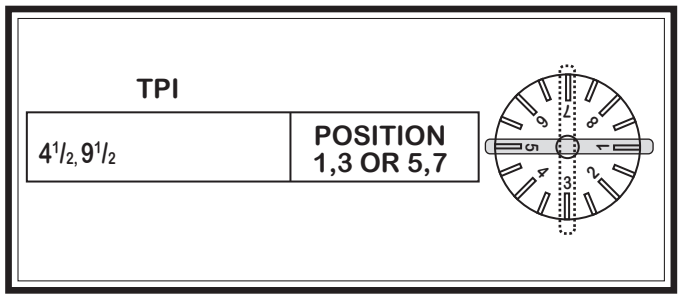


Figure 72. Numbers used for threading fractional TPI.

Accessories

This section includes the most common accessories available for your machine, which are available through our exclusive dealer, **Grizzly Industrial, Inc.**, at **grizzly.com**.

SBCE3450–How to Run a Lathe

First printed in 1907, this 56th edition is an exact reprint from 1966. Well illustrated with vintage photos and drawings, this 128-page book is written specifically about the care and operation of a metal lathe.

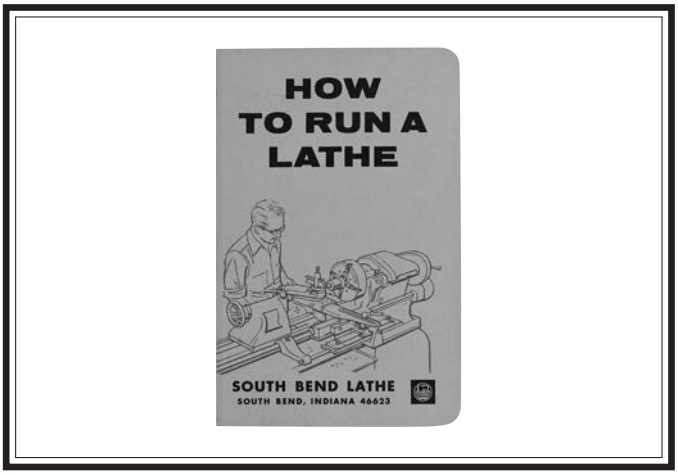


Figure 73. SBCE3450 How to Run a Lathe.

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 lathe. Won't gum up! 12 oz. AMGA#2 (ISO 68 equivalent).

Figure 74. SB1365 Way Oil.

SB1035–Lathe Stand for SB1007

This USA-made lathe stand for the Model SB1007 lathe is constructed with heavy-gauge welded steel. Three full-extension ball-bearing drawers support 250 lbs. each. Includes eight adjustable leveling glides—each tested to support 2500 lbs! The storage cabinet has one shelf and a magnetic door latch. The one-piece catch pan is made of heavy-gauge steel.

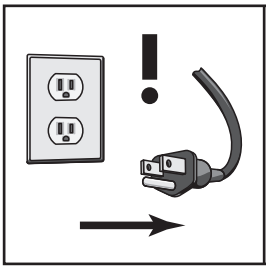
Figure 75. SB1035 Stand for SB1007 Lathe.

SB1354–Pair of Cast Iron Table Legs

Designed with smooth flowing lines reminiscent of the early 1900's, these heavy cast-iron legs provide plenty of support and stability for shop-made workbenches or machine stands. The overall size is 22½"W x 36½"H x 1½" T, the distance from floor to top support is 36½", and the distance from floor to shelf support tab is 7½".

Figure 76. SB1354 Cast Iron Legs.

Maintenance Schedule



⚠WARNING

Always disconnect lathe from power before performing maintenance or serious personal injury may result.

For optimum performance from your lathe, follow this maintenance schedule and refer to any specific instructions given in this section. For your convenience, an easy-to-use maintenance chart has been included on the following page.

Ongoing

The condition of lathe 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.
- STOP button not working correctly or not requiring you to reset it before starting the lathe again.
- Oil level not visible in the sight glasses.
- Components damaged or malfunctioning.

Daily, Before Operations

- Check/add headstock oil (**Page 52**).
- Check/add gearbox oil (**Page 53)**.
- Lubricate the bedways (**Page 54**).
- Clean/lubricate leadscrew (**Page 54**).
- Add oil to ball oilers (**Page 54**).
- Disengage feed selection lever on apron (to prevent crashes upon startup).
- Ensure carriage lock screw is loose.

Daily, After Operations

- Press STOP button and turn master power switch to OFF.
- Vacuum/clean all chips and swarf from bed and ways.
- Wipe down all unpainted or machined surfaces with an oiled rag.

Monthly

- Check timing belt for tension or wear.

Annually

- Change headstock oil (**Page 52**).
- Change gearbox oil (**Page 53**).
- Lubricate end gears (**Page 55**).
- Check/level bedway (**Page 22**).

Cleaning & Protecting

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

Typically, the easiest way to clean swarf from the bed ways is to use a wet/dry shop vacuum. Small chips left over after vacuuming can be wiped up with a lightly oiled rag. Avoid using compressed air to blow off chips, as it may drive them more deeply into moving surfaces and could cause sharp chips to fly into your face or hands.

All unpainted and machined surfaces should be wiped down daily to keep them rust free and in top condition. This includes any surface that is vulnerable to rust if left unprotected. Typically, a thin film of quality way oil is all that is necessary for protection.

Lubrication

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, which will not be covered under warranty.

Headstock

Oil Type .. Mobil DTE Light or ISO 32 Equivalent
Oil Amount ..... 25 Ounces
Check/Add Frequency ..... Daily
Change Frequency ..... Annually

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

Checking Oil Level

The sight glass on the side of the headstock oil tank (see **Figure 77**) shows the oil level. The reservoir has the proper amount of oil when the oil level sits approximately halfway in the sight glass.

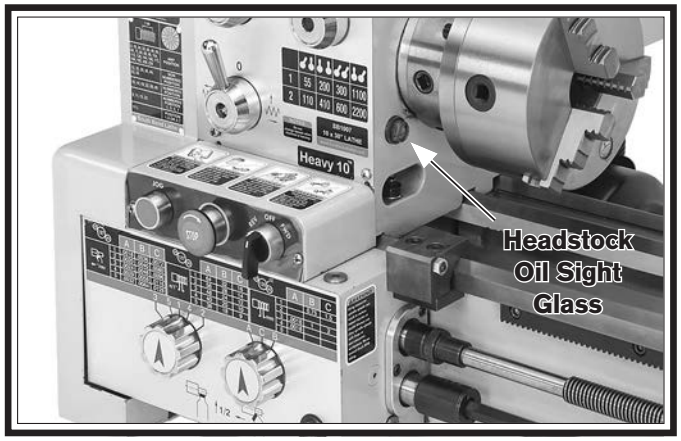


Figure 77. Location of headstock oil sight glass.

Adding Oil

To add oil, remove the headstock top plate shown in **Figure 78**.

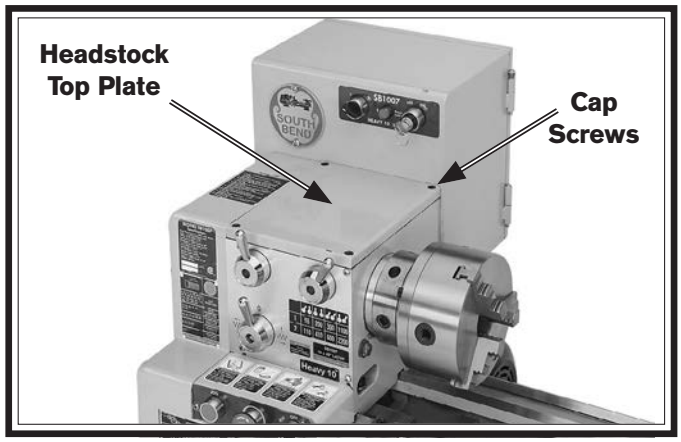


Figure 78. Location of headstock top plate.

Tools Needed	Qty
Hex Wrench 6mm	1

To add oil to headstock:

1. DISCONNECT LATHE FROM POWER!
2. Loosen four cap screws shown in **Figure 78**, then remove top plate from headstock.

   Note: Be careful not to displace or damage paper gasket that seals top plate and headstock.
3. Pour oil directly into headstock reservoir until oil level is visible at halfway point in sight glass (see **Figure 77**).
4. Replace top plate and secure with four cap screws.

Changing Oil

To ensure proper lubrication of headstock gears and spindle bearings, the headstock oil must be changed after the **Spindle Break-In** (see **Page 27**) and annually thereafter.

Tools Needed	Qty
Oil Catch Pan (2-Gallon)	1
Flexible Oil Funnel w/Hose	1
Hex Wrench 6mm	1
Hex Wrench 5mm	1
Hex Wrench 3mm	1
Shop Rags	As Needed

To change headstock oil:

1. Run lathe at a medium speed for at least 10 minutes to warm headstock oil.
2. DISCONNECT LATHE FROM POWER!
3. Remove top plate from headstock. This will allow oil to flow freely from headstock in next steps.
4. Remove end gear cover.
5. Cover timing belt to keep it clean.
6. Loosen cap screw that secures end gear support arm and allow arm to pivot left, revealing drain plug (see **Figure 79**).

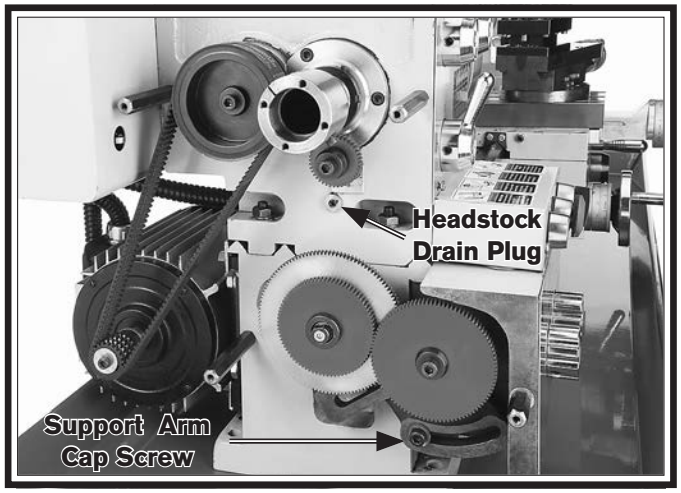


Figure 79. Headstock drain plug location.

7. Hold funnel and catch pan under drain plug and use 3mm hex wrench to remove drain plug. Allow oil to drain completely.
8. When headstock is empty, replace drain plug and clean up any spilled oil.
9. Fill headstock reservoir until oil level is visible at halfway point in sight glass, then replace headstock top plate.
10. Pivot end gear support arm upward until gears mesh (refer to **End Gears** on **Page 45**), then retighten support arm cap screw.
11. Replace end gear cover.

Quick-Change Gearbox

Oil Type .....SB1365 Oil or ISO 68 Equivalent
Oil Amount .....12 Ounces
Check/Add Frequency .....Daily
Change Frequency .....Annually

Checking Oil Level

The gearbox reservoir has the proper amount of oil when the oil level is visible at the halfway point in the sight glass (see **Figure 80**).

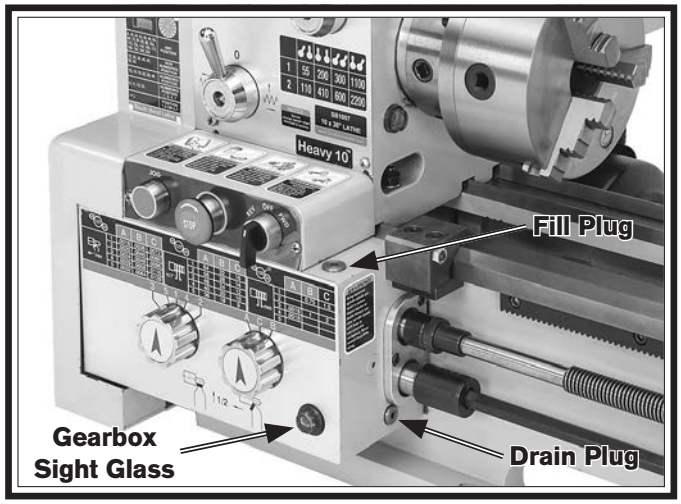


Figure 80. Quick-change gearbox sight glass and reservoir plugs.

Changing Oil

Place a funnel and catch pan under the quick change gearbox drain plug (see **Figure 80**). Use a 3mm wrench to remove the fill plug and then the drain plug. Allow the gearbox reservoir to empty. Re-install the drain plug and add oil until the oil in the sight glass reads approximately half full. Then re-install the fill plug.

Bedways

Oil Type .....SB1365 Oil or ISO 68 Equivalent
Oil Amount ..... As Needed
Lubrication Frequency..... Daily

Before lubricating the bedways (see **Figure 81**), clean them with mineral spirits. Apply a thin coat of oil along the length of the bedway. Move the carriage and tailstock to access the entire length of the bedways. If the lathe is in a moist or dirty environment, the bedways should be lubricated more often.

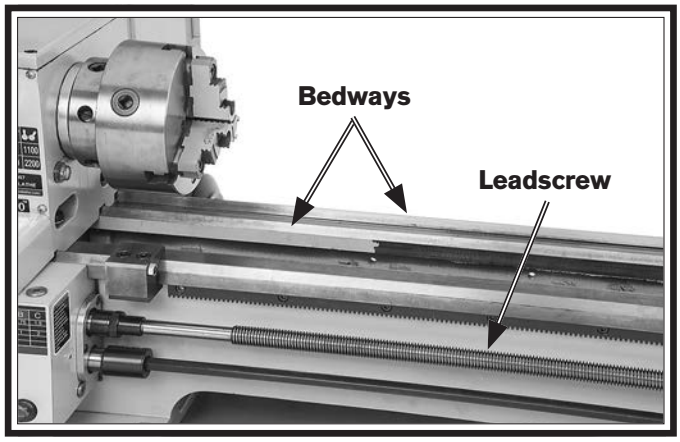


Figure 81. Bedways and leadscrew.

Leadscrew

Oil Type .....SB1365 Oil or ISO 68 Equivalent
Oil Amount ..... As Needed
Lubrication Frequency..... Daily

Before lubricating the leadscrew (see **Figure 81**), clean it first with mineral spirits. A stiff brush works well to help clean out the threads. Be sure to move the carriage out of the way, so you can clean the entire length of the leadscrew.

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

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

Ball Oilers

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

This lathe has 10 ball oilers that should be oiled on a daily basis before beginning operation.

Proper lubrication of ball oilers is done with a pump-type oil can. We do not recommend using an oil can that has metal needle- or lance-type 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 lathe use, and more frequently under heavy use. When lubricating ball oilers, first clean the outside surface to remove any dust or grime. Push the tip of the oil can nozzle against the ball oiler, 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.

Refer to **Figures 82–86** and the following descriptions to identify the locations of each ball oiler.

A. Saddle slides.
B. Compound rest slides.
C. Compound rest leadscrew.
D. Cross slide leadscrew and slides.
E Tailstock leadscrew.
F. Leadscrew end bearing.
G. Feed rod end bearing.
H. Change gear bearings.

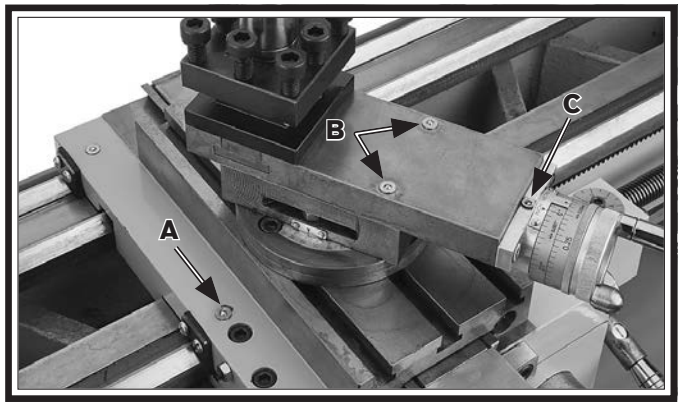


Figure 82. Carriage ball oilers.

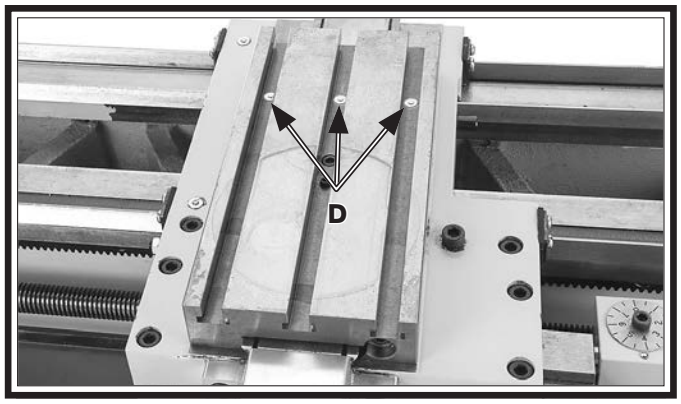


Figure 83. Cross slide ball oilers.

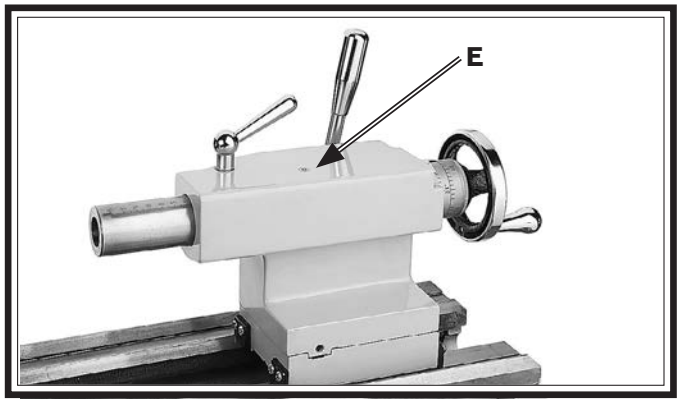


Figure 84. Tailstock ball oiler.

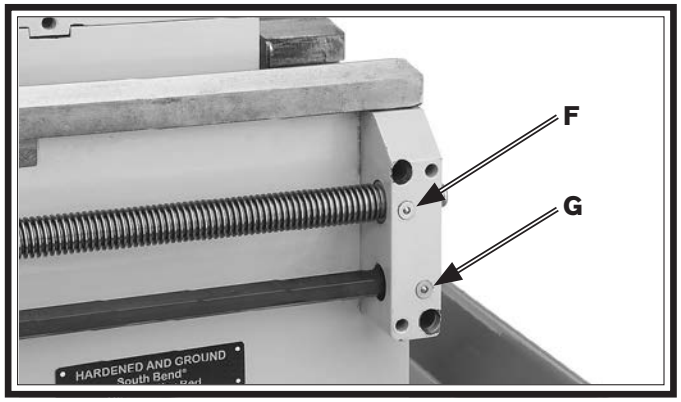


Figure 85. Leadscrew and feed rod bearing ball oilers.

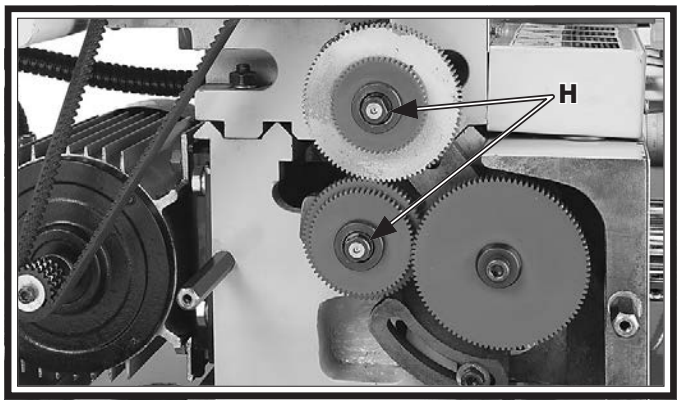


Figure 86. Change gear ball oilers.

End Gears

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

The end gears, shown in **Figure 87**, should always have a thin coat of heavy grease to minimize corrosion, noise, and wear. However, always be sure to wipe away excess grease that could be thrown onto the belt and reduce optimal power transmission from the motor.

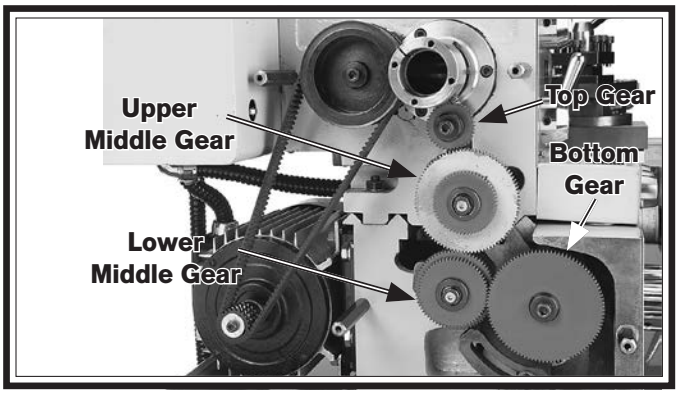


Figure 87. End gear positions.

Handling & Care

Clean and lubricate any gears you install or change. Be careful during handling and storage—the grease on the gears will easily pick up dirt or debris, which can then spread to the other gears and increase the rate of wear. Make sure the end gear cover remains installed to keep the gears free of debris.

Cleaning & Lubricating End Gears

1. DISCONNECT LATHE FROM POWER!
2. Remove end gear cover and all end gears.
3. Clean shafts and end gears thoroughly with mineral spirits to remove old grease. Use a small brush to clean between teeth.
4. Use a clean brush to apply a thin layer of grease on gears. Get grease between the gear teeth, but do not fill teeth valleys.
5. Re-install end gears and mesh together, allowing for backlash of 0.002"-0.004". Apply grease between gears where they meet. Grease will be distributed as gears rotate.
6. Re-install end gear cover.

Machine Storage

All machinery will suffer serious rust problems and corrosion damage if not properly prepared for storage. Bare metal surfaces can quickly develop surface rust if not coated. And machinery stored near windows in direct sunlight or where paints, thinners, or certain gasses are open to the air can experience bleaching, discoloring of paint, or yellowing of clear plastic guards.

If decommissioning this lathe, use the steps in this section to ensure that it remains in good condition.

To prepare lathe for storage or decommission it from service:

1. DISCONNECT LATHE FROM POWER!

2. Thoroughly clean all unpainted, bare metal surfaces, then coat with a lightweight grease or rust preventative. Take care that surfaces are completely covered but that grease or rust preventative is kept off of painted surfaces.

   Note: If lathe will be out of service for only a short period of time, use way oil or a good grade of medium-weight machine oil (not auto engine oil) in place of grease or rust preventative.

3. Loosen or remove timing belt so it does not become stretched while lathe is not in use.

4. Fill headstock and gearbox with recommended gear oil so components above normal oil level do not develop rust. (Be sure to put a tag on controls as a reminder to adjust gear oil level before starting lathe during recommissioning.)

   Note: If lathe will be out of service for only a short period of time, start lathe once a week and run all gear-driven components for a few minutes. This will put a fresh coat of oil on all gearing.

5. Completely cover lathe with a tarp or plastic sheet that will keep out dust and resist liquid or moisture. If lathe will be stored in/near direct sunlight, use a cover that will block sun's rays.

To bring lathe out of storage:

1. Remove grease or rust preventative (see **Page 18**).

2. If you removed timing belt, re-install and re-tension belt (see **Page 60**).

3. Check oil level in headstock and quick change gear box. If reservoirs were over-filled for storage, drain until oil level sight glass reads approximately half full.

4. Repeat **Test Run** and **Spindle Break-In** procedures, beginning on **Page 247**.

Backlash Adjustment

Backlash is the amount of free play felt in the handwheel when changing direction of rotation. This can be adjusted on the compound rest and cross slide leadscrews, and the amount of backlash can be observed on the handwheel graduated dial. 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
Hex Wrench 6mm	1

The compound rest backlash is adjusted by tightening the set screw shown in **Figure 88**. When this screw is tightened against the leadscrew nut, it offsets part of the nut to remove play between the nut and leadscrew.

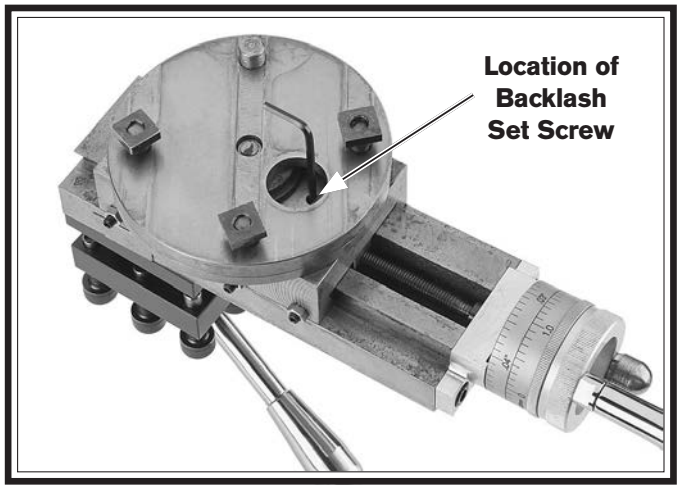


Figure 88. Compound rest backlash components (viewed from underneath).

To adjust compound rest backlash:

1. DISCONNECT LATHE FROM POWER!

2. Loosen the three cap screws at base of compound rest and slide complete assembly off cross slide table.

3. With base of compound rest facing upward (see **Figure 88**), rotate cut-out hole until it aligns with leadscrew and locate set screw.

4. To adjust backlash, rock handwheel back and forth while slowly loosening or tightening set screw with 3mm wrench. Backlash should be approximately 0.002"–0.003", as indicated on the graduated dial.

   Note: If you end up adjusting the nut too tightly, loosen the set screw, 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 the cap screw shown in **Figure 89**, and then tightening the accompanying set screw. This will push down on a wedge and force the leadscrew nut apart, taking up lash between the nut and leadscrew.

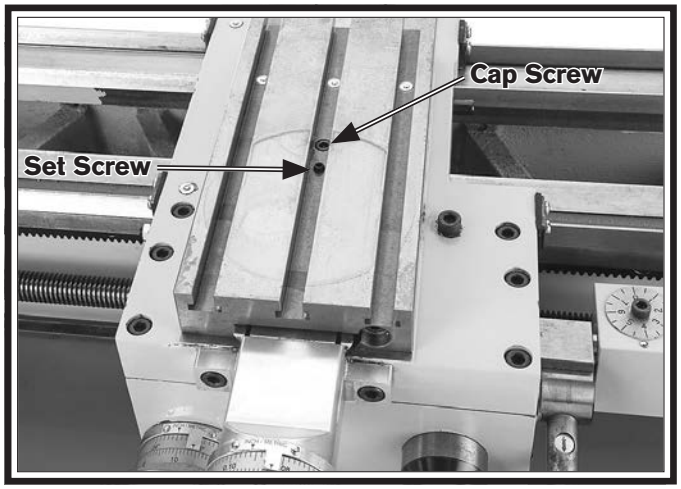


Figure 89. Cross slide backlash components.

To adjust cross slide backlash:

1. DISCONNECT LATHE FROM POWER!

2. Remove compound rest. Loosen cap screw (see **Figure 89**) located in middle T-slot of cross slide.

3. Rock cross slide handwheel back and forth, and tighten set screw slowly until backlash is approximately 0.002"–0.003", as indicated on graduated dial.

   Note: If you end up adjusting the nut too tightly, loosen the set screw, 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.

4. Retighten cap screw when finished, then re-install compound rest.

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.

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

The cross slide gib on this lathe is tapered and held in position by a screw at each end of the table. 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.

The compound rest and saddle gibs are flat bars that exert pressure on the ways through four set screws, which are secured in place by four jam nuts. Test the feel of each slide by turning the handwheel, and adjust the gib screws as necessary to make the movement 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.

Compound Rest Gib

Tools Needed:	Qty
Hex Wrench 2.5mm	1
Open-End Wrench 8mm	1

To adjust compound rest gib:

1. DISCONNECT LATHE FROM POWER!

2. Loosen jam nuts on four set screws shown in **Figure 90**.

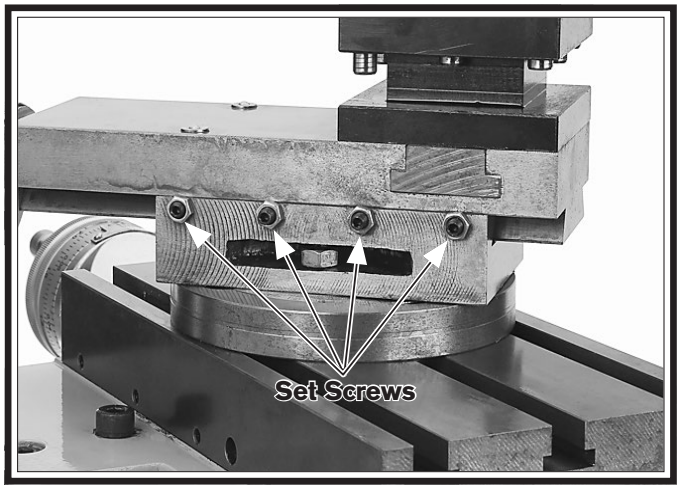


Figure 90. Compound rest gib components.

3. To tighten compound rest gib, tighten set screws. To loosen gib, loosen set screws.

   Note: Be sure to adjust all set screws the same. This will ensure even wear of gib and sliding surfaces.

4. Using handwheel, move table back and forth, repeating adjustments as necessary, until compound rest movement is acceptable.

5. Hold set screws in place and retighten jam nuts.

Cross Slide Gib

Tools Needed:	Qty
Flat Head Screwdriver #2	1

To adjust cross slide gib:

1. DISCONNECT LATHE FROM POWER!

2. To increase slide tension, loosen rear gib screw ⅛ turn, and tighten front gib screw ⅛ turn (see **Figure 91**).

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

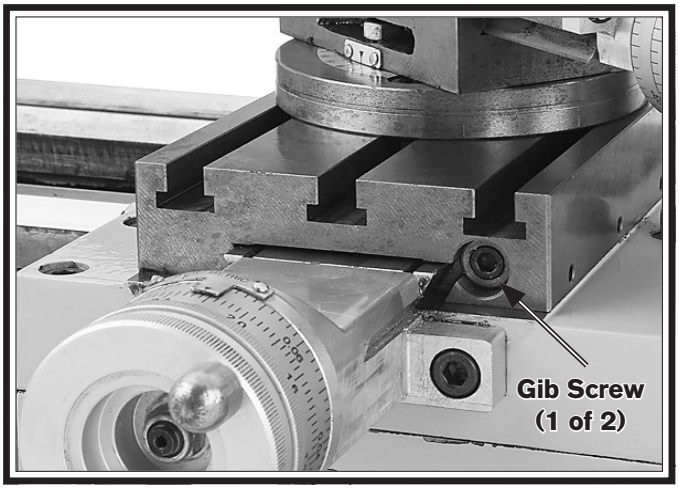


Figure 91. Cross slide gib components.

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

4. Repeat process until cross slide movement is acceptable.

Saddle Gib

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

Before making adjustments to the saddle gib, make sure the carriage lock (see **Figure 44** on **Page 37**) is loose by turning it counterclockwise one full turn.

To adjust saddle gib:

1. DISCONNECT LATHE FROM POWER!

2. To tighten saddle gib, tighten set screws (see **Figure 92**). To loosen gib, loosen set screws.

   Note: Be sure to adjust all set screws the same amount. This will ensure even wear of gib and sliding surfaces.

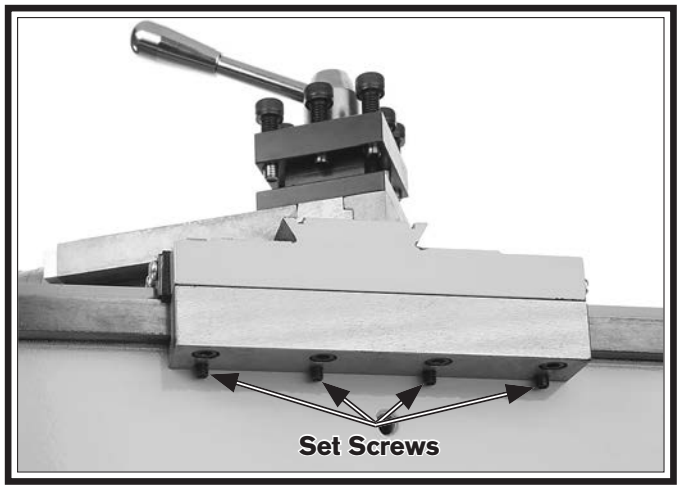


Figure 92. Saddle gib components.

3. Move carriage back and forth, repeating adjustments as necessary, until saddle movement is acceptable.

Belt Tension & Replacement

The timing belt transfers power from the motor to the drive pulley.

Because the molded teeth in the belt fit together with matching teeth in the pulley, the timing belt will not slip unless the belt teeth become overly worn or belt tension is overly loose.

An improperly tensioned timing belt will slip, which quickly causes it to become damaged and unsuitable for further use. Therefore, it is essential to maintain belt tension properly to prevent slippage.

Once a timing belt begins to slip, it must be replaced in order to regain proper power transmission.

Tools Needed: **Qty**
Open-End Wrench 17mm 1
Hex Wrench 5mm 1
Hex Wrench 6mm 1

Tensioning Timing Belt:

1. DISCONNECT LATHE FROM POWER!

2. Remove end gear cover.

3. Loosen four motor mount hex bolts (see **Figure 93**).

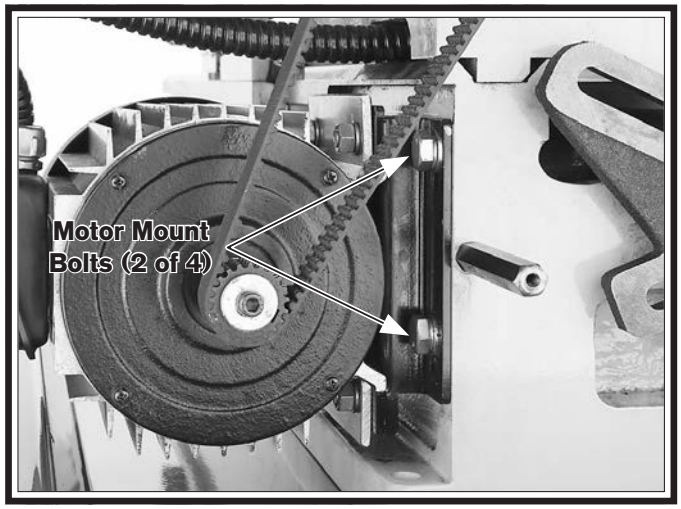


Figure 93. Motor mount bolts.

4. Ensure belt teeth are properly engaged in pulley notches, push down on motor with light/moderate pressure, and tighten motor mount hex bolts.

The timing belt is correctly tensioned when there is approximately ⅛" deflection when it is pushed with moderate pressure, as shown in **Figure 94.**

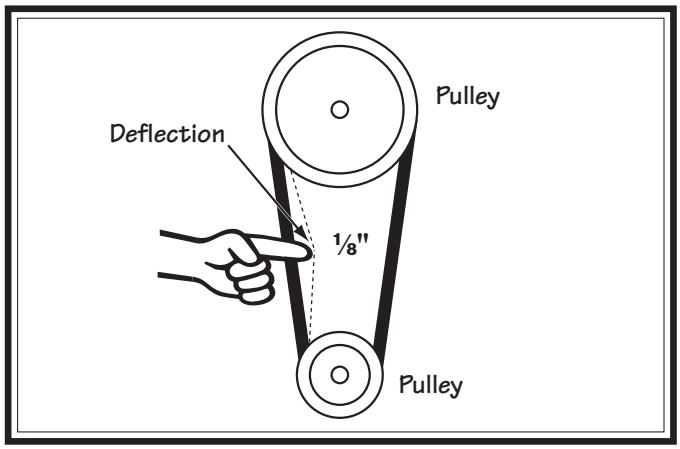


Figure 94. Correct belt deflection.

5. When deflection is correct, retighten motor mount hex bolts.

6. Re-install end gear cover.

Replacing Belt:

1. DISCONNECT LATHE FROM POWER!

2. Remove end gear cover.

3. Loosen four motor mount hex bolts (see **Figure 93** on previous page), slide motor up, and remove belt.

Note: Loose pulleys impact transmission of power from motor. If pulleys are loose, retighten them now.

4. Slide off old timing belt and install new one, making sure that belt teeth are seated together with pulley teeth.

5. Tension belt (see **Figure 95**), then retighten motor mount bolts.

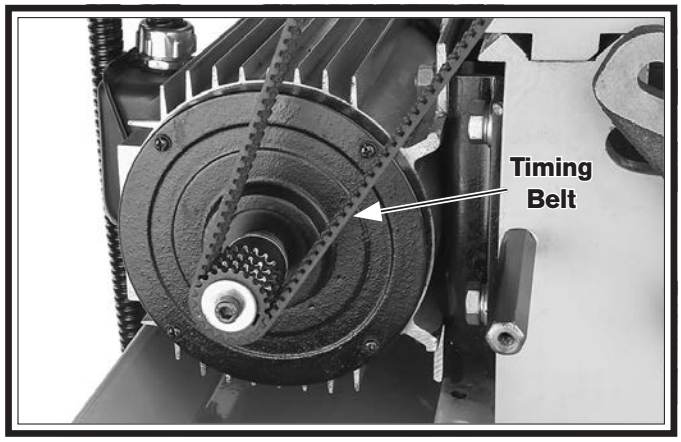


Figure 95. Timing belt properly seated with pulley.

6. Re-install end gear cover.

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 breaker trips.	**1.** Master power switch turned off or at fault.	**1.** Turn master power switch on. Replace.
	2. Emergency stop button depressed/ at fault.	**2.** Rotate button head to reset; replace.
	3. Incorrect power supply voltage or circuit size.	**3.** Ensure correct power supply voltage and circuit size.
	4. Power supply circuit breaker tripped or fuse blown.	**4.** Ensure circuit is sized correctly and free of shorts.
	5. End gear cover open/safety switch at fault.	**5.** Close end gear cover/replace switch.
	6. Motor wires connected incorrectly.	**6.** Correct motor wiring connections.
	7. Wiring open/has high resistance.	**7.** Check/fix broken, disconnected, or corroded wires.
	8. Inverter/control box at fault.	**8.** Inspect inverter/control box; replace.
	9. Motor at fault.	**9.** Test/repair/replace.
	10. Spindle rotation switch at fault.	**10.** Test/repair/replace.
Machine stalls or is underpowered.	**1.** Machine undersized for task.	**1.** Use sharp bits/chisels at correct angle; reduce feed rate/depth of cut; use coolant if possible.
	2. Feed rate/cutting speed too fast.	**2.** Decrease feed rate/cutting speed.
	3. Wrong workpiece material.	**3.** Use correct type/size of metal.
	4. Timing belt slipping.	**4.** Tension/replace belt; ensure pulleys are aligned.
	5. Motor wired incorrectly.	**5.** Wire motor correctly.
	6. Gearbox at fault.	**6.** Select appropriate gear ratio; replace broken or slipping gears.
	7. Motor overheated.	**7.** Clean motor, let cool, and reduce workload.
	8. Pulley/sprocket slipping on shaft.	**8.** Replace loose pulley/shaft.
	9. Contactor not energized/has poor contacts.	**9.** Test all legs for power/replace.
	10. Motor capacitors or centrifugal switch at fault.	**10.** Test/repair/replace.
	11. Motor bearings at fault.	**11.** Test by rotating shaft; rotational grinding/loose shaft requires bearing replacement.
	12. Motor burnt or has internal direct short.	**12.** Replace motor.

Symptom	Possible Cause	Possible Solution
Machine has vibration or noisy operation.	**1.** Workpiece or chuck at fault.	**1.** Center workpiece in chuck or faceplate; replace defective chuck.
	2. Chuck or cutter at fault.	**2.** Replace unbalanced chuck; replace/sharpen cutter; use correct feed rate.
	3. Machine incorrectly mounted on stand.	**3.** Adjust feet, shim, or tighten mounting hardware.
	4. Bit chattering.	**4.** Replace/sharpen bit; index bit to workpiece; use correct feed rate and cutting RPM; retract tool holder and position workpiece closer.
	5. Pulley loose or mis-aligned.	**5.** Re-align/replace pulley and firmly secure in place.
	6. Timing belt worn or loose.	**6.** Inspect/replace with new belt.
	7. Motor fan rubbing on fan cover.	**7.** Fix/replace fan cover; replace loose/damaged fan.
	8. Motor mount loose or broken.	**8.** Tighten/replace.
	9. Motor bearings at fault.	**9.** Test by rotating shaft; rotational grinding/loose shaft requires bearing replacement.
	10. Motor or component loose.	**10.** Inspect/replace damaged bolts/nuts, and retighten with thread-locking fluid.
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 intended operation.
	3. Tool height not at centerline.	**3.** Adjust tool height to centerline (see **Page 39**).
	4. Too much play in gibs.	**4.** Tighten gibs (see **Page 58**).
Tapered tool difficult to remove from tailstock quill.	**1.** Quill is not retracted all the way back into tailstock.	**1.** Turn quill handwheel until it forces tapered tool out of quill.
	2. Contaminants not removed from taper before inserting into quill.	**2.** Clean 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 58**).
	2. Handwheel is loose or has excessive backlash.	**2.** Tighten handwheel fasteners; adjust handwheel backlash to a minimum (see **Page 57**).
Cross slide, compound, or carriage feed handwheel is hard to move.	**1.** Ways loaded with chips, dust, or grime.	**1.** Clean ways and lubricate.
	2. Gib screws are too tight.	**2.** Loosen gib screw(s) slightly, and lubricate bedways (see **Page 58**).
	3. Backlash setting too tight (cross slide, compound rest only).	**3.** Slightly loosen backlash setting (see **Page 57**).
	4. Bedways are dry.	**4.** Lubricate bedways and handles.
Cutting tool or lathe 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 extends from tool holder.
	3. Cutting tool dull.	**3.** Replace or resharpen cutting tool.
	4. Incorrect spindle speed or feed rate.	**4.** Use recommended spindle speed.
	5. Gibs are out of adjustment.	**5.** Adjust gib screws at affected component (see **Page 58**).

Workpiece is tapered.	**1.** Headstock and tailstock are not properly aligned with each other.	**1.** Re-align tailstock to headstock spindle bore centerline (see **Page 36**).
Chuck jaws will not move or do not move easily.	**1.** Chips lodged in 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 or interfering with movement. **4.** Chips have loaded up on bedways. **5.** Bedways are dry and in need of lubrication. **6.** Carriage stop is interfering. **7.** Gibs are too tight.	**1.** Adjust gear levers. **2.** Tighten screw. **3.** Check to make sure carriage lock bolt is fully released. **4.** Frequently clean away chips that load up during turning operations. **5.** Lubricate bedways and handles. **6.** Check carriage stop position and adjust as necessary (see **Page 40**). **7.** Loosen gib screw(s) slightly (see **Page 58**).
Gear change levers will not shift into position.	**1.** Gears not aligned inside headstock.	**1.** Rotate spindle by hand with light pressure on lever until gear falls into place.
Chuck jaws will not move or do not move easily.	**1.** Chips lodged in jaws or scroll plate inside chuck body.	**1.** Remove jaws, clean and lubricate scroll plate, then replace jaws.

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 lathes. Study this section carefully. If you see differences between your lathe 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 lathe.

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.

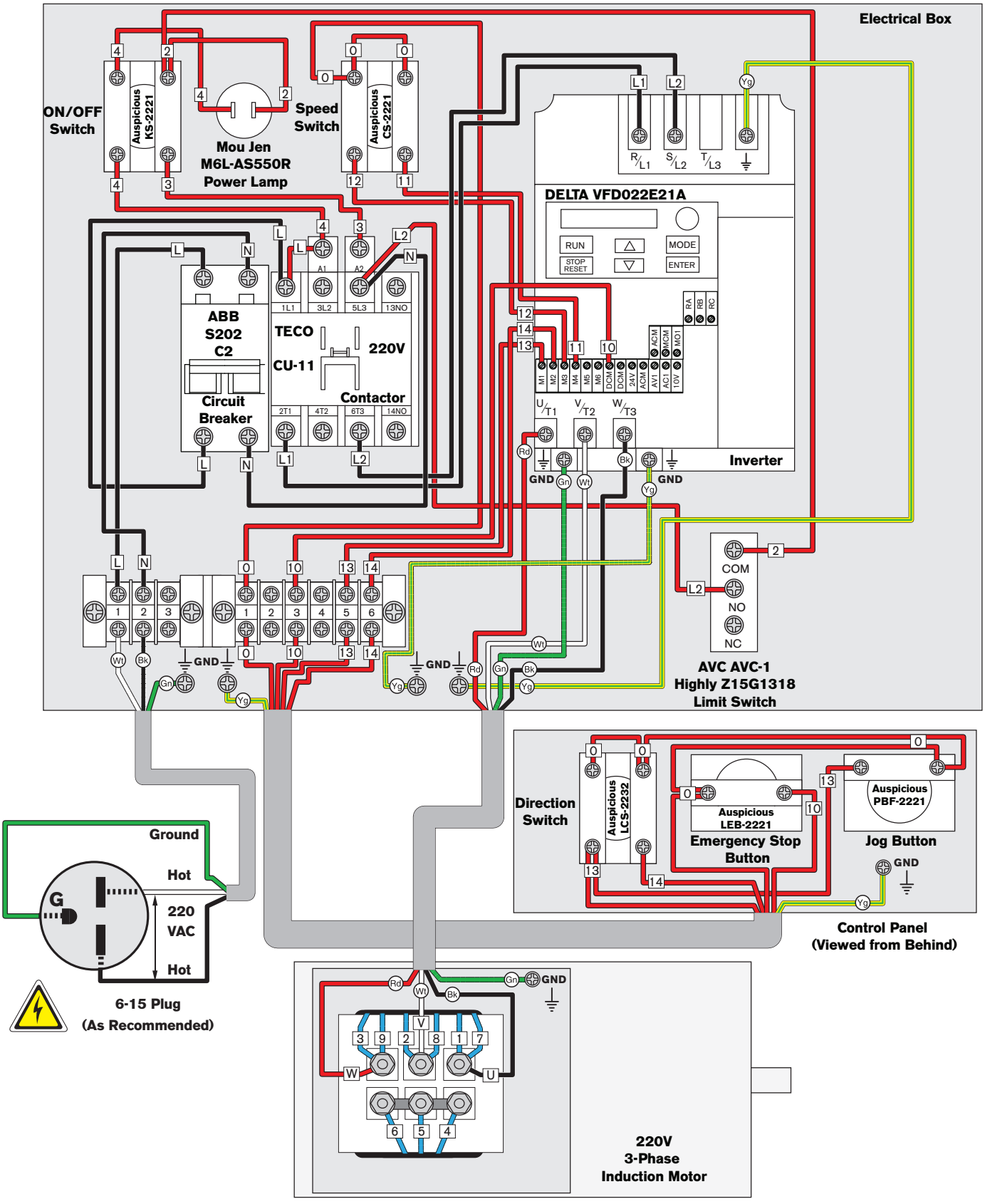
Experiencing Difficulties: If you are experiencing difficulties understanding the information included in this section, contact our Technical Support at (360) 734-1540.

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)	TURQUOISE (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.southbendtools.com.**

Wiring Diagram



Electrical Component Pictures

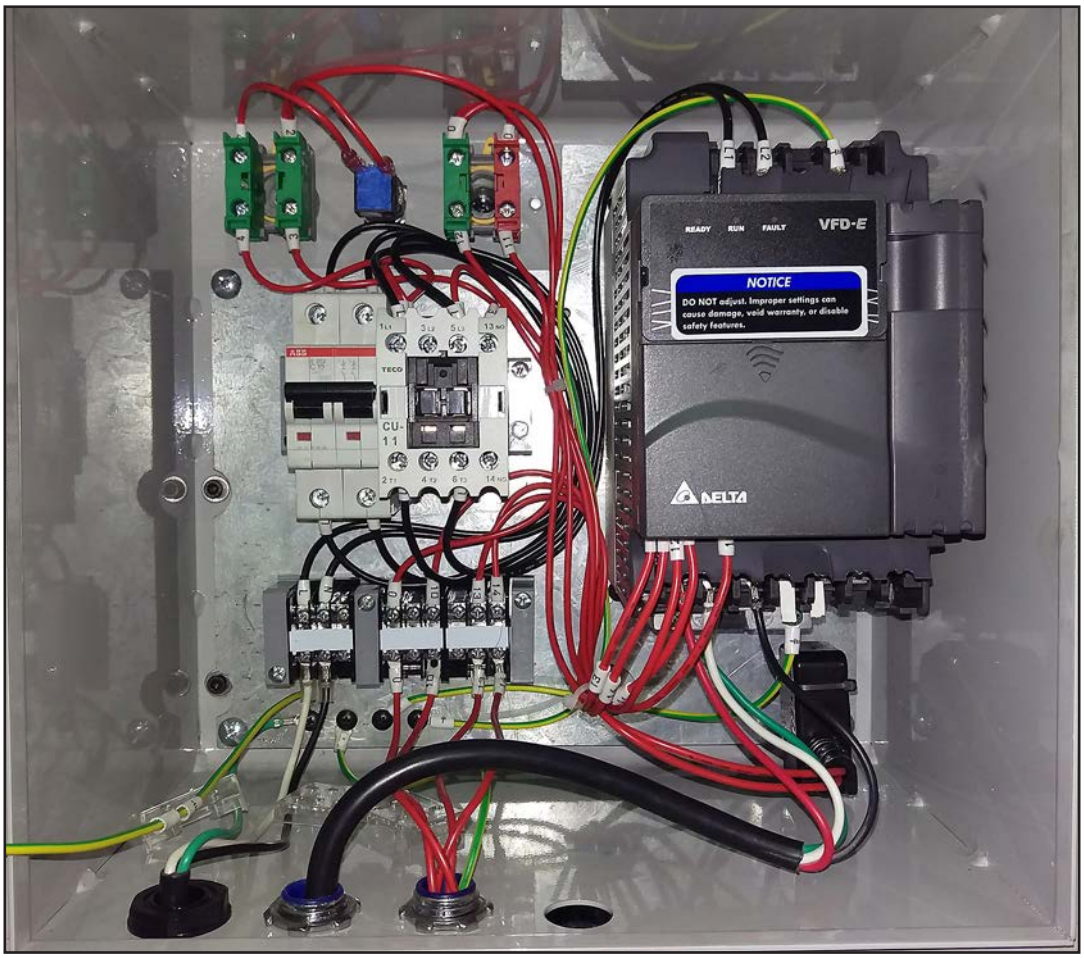


Figure 96. Electrical box.

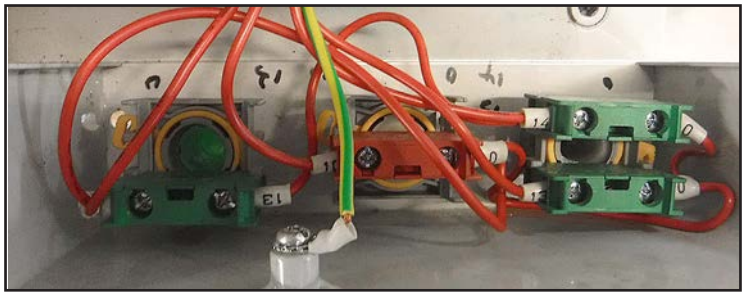


Figure 97. Control panel.

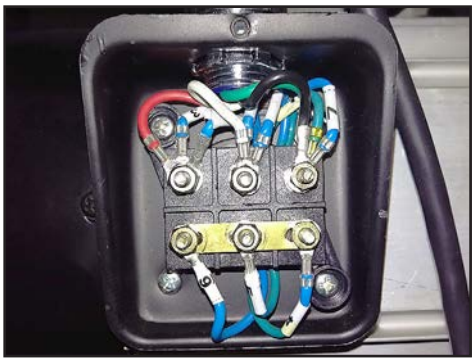
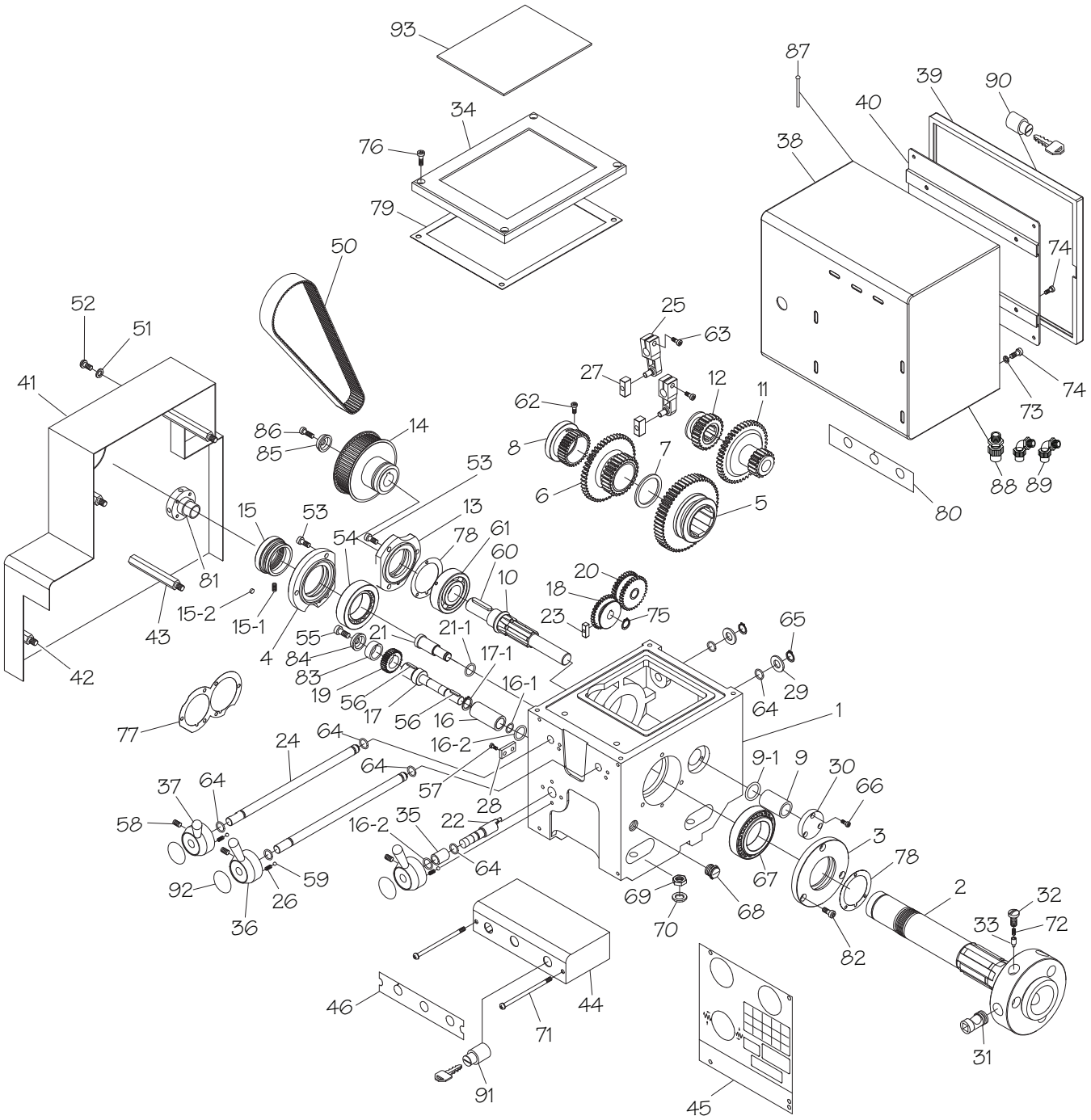


Figure 98. Motor junction box.

Headstock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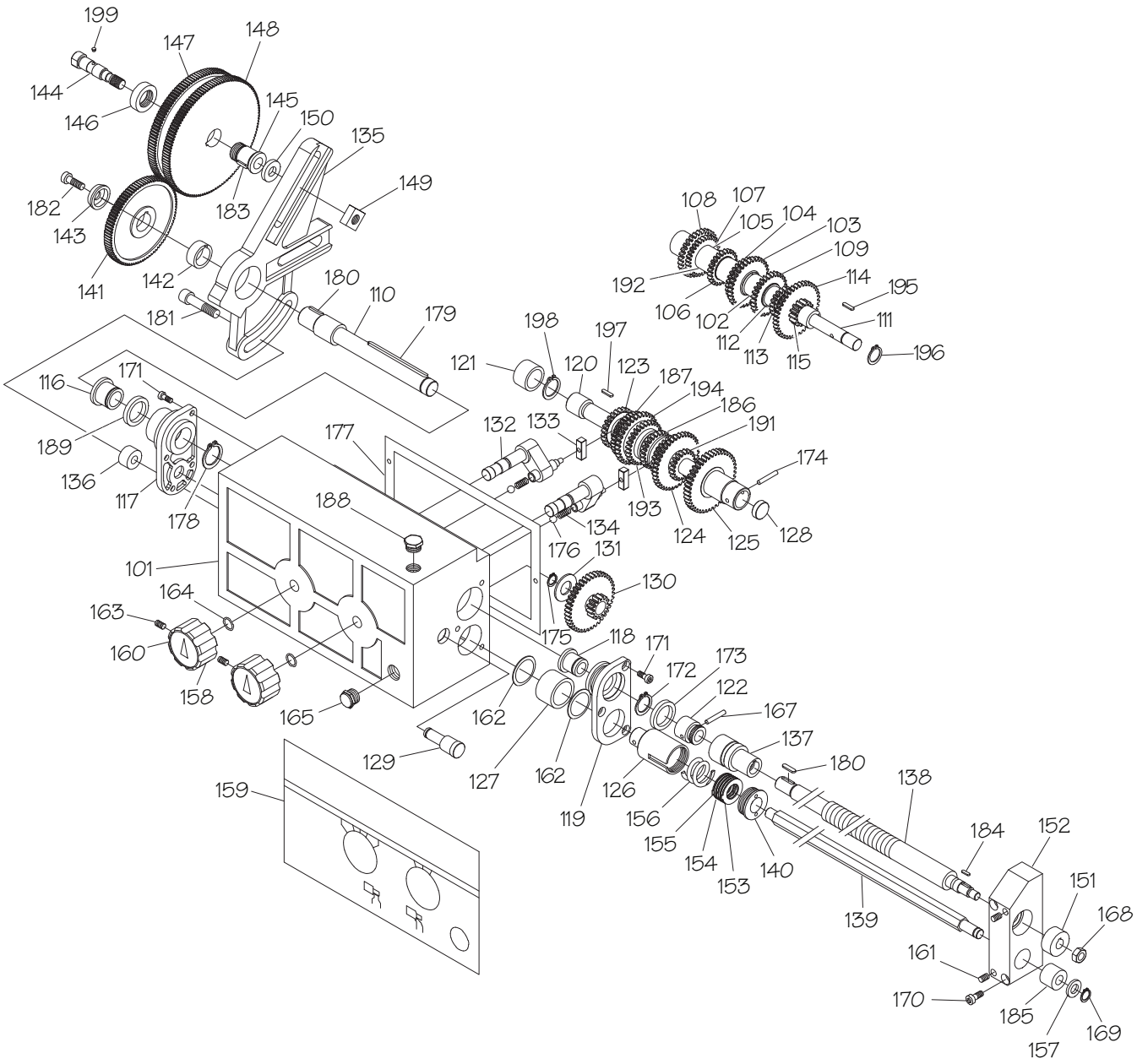
Headstock Parts List

REF	PART #	DESCRIPTION
1	PSB1007001	HEADSTOCK CASTING
2	PSB1007002	SPINDLE D1-4
3	PSB1007003	SPINDLE BEARING COVER (INBOARD)
4	PSB1007004	SPINDLE BEARING COVER (OUTBOARD)
5	PSB1007005	SLIDING GEAR 55T
6	PSB1007006	COMBO GEAR 49T/27T
7	PSB1007007	SPACER
8	PSB1007008	GEAR 32T
9	PSB1007009	BUSHING
9-1	PSB1007009-1	O-RING 17.8 X 2.4 P18
10	PSB1007010	DRIVE SHAFT
11	PSB1007011	COMBO GEAR 45T/17T
12	PSB1007012	GEAR 23T
13	PSB1007013	BEARING COVER
14	PSB1007014	DRIVE PULLEY
15	PSB1007015	PRELOAD NUT
15-1	PSB1007015-1	SET SCREW M5-.8 X 6
15-2	PSB1007015-2	PLATE 4 X 4 X 2
16	PSB1007016	BUSHING
16-1	PSB1007016-1	OIL SEAL TC12 X 18 X 5
16-2	PSB1007016-2	O-RING 15.8 X 2.4 P16
17	PSB1007017	SHAFT
17-1	PSB1007017-1	EXT RETAINING RING 12MM
18	PSB1007018	GEAR 32T
19	PSB1007019	GEAR 30T
20	PSB1007020	COMBO GEAR 32T/32T
21	PSB1007021	LOCK SHAFT
21-1	PSB1007021-1	O-RING 15.8 X 2.4 P16
22	PSB1007022	FEED DIRECTION SHAFT
23	PSB1007023	SHIFT BLOCK
24	PSB1007024	SHAFT
25	PSB1007025	SHIFT FORK
26	PSB1007026	COMPRESSION SPRING
27	PSB1007027	SLIDE BLOCK
28	PSB1007028	PLATE
29	PSB1007029	O-RING COVER
30	PSB1007030	SHAFT END COVER
31	PSB1007031	CAMLOCK
32	PSB1007032	LOCK SCREW M8-1.25 X 18
33	PSB1007033	LOCK PIN
34	PSB1007034	HEADSTOCK TOP COVER
35	PSB1007035	BUSHING
36	PSB1007036	HANDLE HUB
37	PSB1007037	HANDLE M8-1.25
38	PSB1007038	ELECTRICAL CABINET
39	PSB1007039	ELECTRICAL CABINET DOOR W/LATCH
40	PSB1007040	ELECTRICAL CABINET MOUNTING PLATE
41	PSB1007041	END COVER
42	PSB1007042	END COVER THREADED SHAFT (SHORT)
43	PSB1007043	END COVER THREADED SHAFT (LONG)
44	PSB1007044	CONTROL PANEL BOX
45	PSB1007045	HEADSTOCK FRONT PANEL
46	PSB1007046	CONTROL PANEL PLATE (LOWER)
50	PSB1007050	TIMING BELT GATES HTD 710-5M-25
51	PSB1007051	FLAT WASHER 6MM
52	PSB1007052	CAP SCREW M6-1 X 12
53	PSB1007053	CAP SCREW M6-1 X 16
54	PSB1007054	TAPERED ROLLER BEARING 32008 FAG
55	PSB1007055	CAP SCREW M8-1.25 X 20
56	PSB1007056	KEY 4 X 4 X 16
57	PSB1007057	CAP SCREW M5-.8 X 12
58	PSB1007058	SET SCREW M8-1.25 X 15
59	PSB1007059	STEEL BALL 6MM
60	PSB1007060	KEY 6 X 6 X 30
61	PSB1007061	BALL BEARING 6305Z FAG
62	PSB1007062	CAP SCREW M4-.7 X 16
63	PSB1007063	CAP SCREW M6-1 X 12
64	PSB1007064	O-RING 8.8 X 1.9 P9
65	PSB1007065	EXT RETAINING RING 10MM
66	PSB1007066	CAP SCREW M4-.7 X 12
67	PSB1007067	TAPERED ROLLER BEARING 32009 FAG
68	PSB1007068	OIL SIGHT GLASS 3/8" NPT
69	PSB1007069	HEX NUT M10-1.5
70	PSB1007070	LOCK WASHER 10MM
71	PSB1007071	FLANGE SCREW M5-.8 X 95
72	PSB1007072	COMPRESSION SPRING
73	PSB1007073	FLAT WASHER 5MM
74	PSB1007074	CAP SCREW M5-.8 X 12
75	PSB1007075	EXT RETAINING RING 12MM
76	PSB1007076	CAP SCREW M6-1 X 16
77	PSB1007077	OUTBOARD HEADSTOCK OIL GASKET
78	PSB1007078	INBOARD HEADSTOCK OIL GASKET
79	PSB1007079	HEADSTOCK TOP COVER GASKET
80	PSB1007080	CONTROL PANEL PLATE (UPPER)
81	PSB1007081	PRELOAD NUT RETAINER RING
82	PSB1007082	CAP SCREW M6-1 X 18
83	PSB1007083	BUSHING
84	PSB1007084	SHAFT END CAP
85	PSB1007085	DRIVE SHAFT END CAP
86	PSB1007086	CAP SCREW M8-1.25 X 20
87	PSB1007087	ELECTRICAL CABINET HINGE PIN 5.5 X 62MM
88	PSB1007088	STRAIN RELIEF 1/2" NPT ST METAL
89	PSB1007089	STRAIN RELIEF 1/2" NPT 90D METAL
90	PSB1007090	ELECTRICAL BOX LOCK WITH KEYS (2-PC)
91	PSB1007091	CONTROL BOX LOCK WITH KEYS (2-PC)
92	PSB1007092	HANDLE HUB COVER LABEL 30MM, BLACK
93	PSB1007093	RUBBER PAD

Gearbox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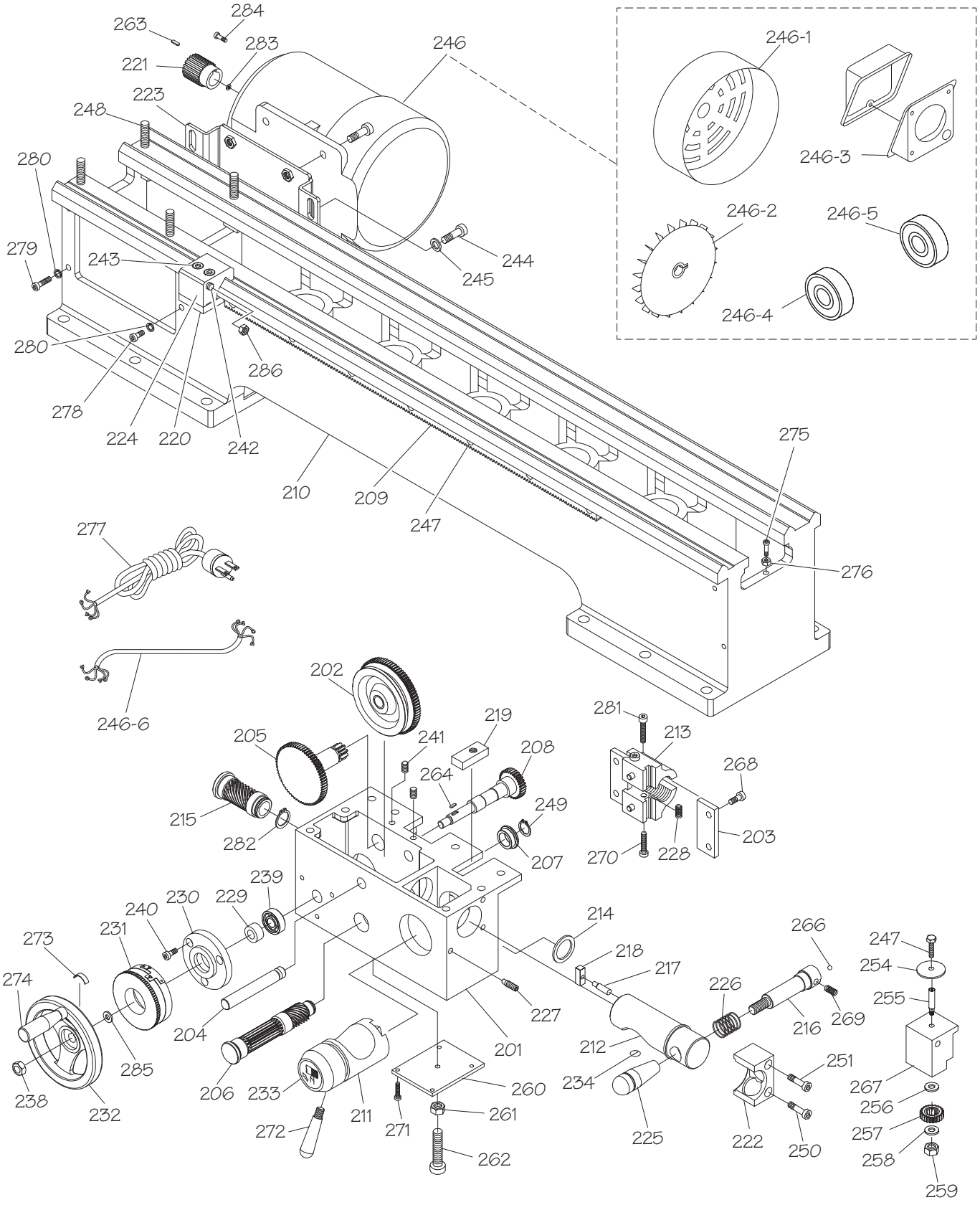
Gearbox Parts List

REF	PART #	DESCRIPTION
101	PSB1007101	GEARBOX CASTING
102	PSB1007102	BUSHING
103	PSB1007103	GEAR 32T
104	PSB1007104	GEAR 29T
105	PSB1007105	BUSHING
106	PSB1007106	GEAR 24T
107	PSB1007107	GEAR 30T
108	PSB1007108	GEAR 80T
109	PSB1007109	GEAR 29T
110	PSB1007110	END GEAR BRACKET SHAFT
111	PSB1007111	SHAFT
112	PSB1007112	BUSHING
113	PSB1007113	GEAR 19T
114	PSB1007114	GEAR 38T
115	PSB1007115	GEAR 14T
116	PSB1007116	BUSHING
117	PSB1007117	SHAFT END COVER (OUTBOARD)
118	PSB1007118	FLANGED BUSHING
119	PSB1007119	SHAFT END COVER (INBOARD)
120	PSB1007120	SHAFT
121	PSB1007121	SPACER
122	PSB1007122	COLLAR
123	PSB1007123	GEAR 35T/25T/32T/29T/24T
124	PSB1007124	GEAR 38T/29T/19T
125	PSB1007125	GEAR 42T
126	PSB1007126	CLUTCH HOUSING
127	PSB1007127	BUSHING
128	PSB1007128	SHAFT END CAP
129	PSB1007129	SHAFT
130	PSB1007130	COMBO GEAR 40T/13T
131	PSB1007131	SPACER
132	PSB1007132	ROCKER ARM
133	PSB1007133	SHIFT BLOCK
134	PSB1007134	COMPRESSION SPRING
135	PSB1007135	END GEAR BRACKET
136	PSB1007136	SPACER
137	PSB1007137	LEADSCREW COUPLER
138	PSB1007138	LONGITUDINAL LEADSCREW
139	PSB1007139	FEED ROD
140	PSB1007140	CLUTCH COLLAR
141	PSB1007141	GEAR 90T
142	PSB1007142	BUSHING
143	PSB1007143	SHAFT END CAP
144	PSB1007144	THREADED SHAFT
145	PSB1007145	THREADED BUSHING
146	PSB1007146	THREADED COLLAR
147	PSB1007147	GEAR 120T
148	PSB1007148	GEAR 127T
149	PSB1007149	SQUARE NUT M10-1.5

REF	PART #	DESCRIPTION
150	PSB1007150	THRUST WASHER
151	PSB1007151	BUSHING
152	PSB1007152	SHAFT END BRACKET
153	PSB1007153	SPACER
154	PSB1007154	CLUTCH PLATE
155	PSB1007155	CARRIER PLATE
156	PSB1007156	COMPRESSION SPRING
157	PSB1007157	SPACER
158	PSB1007158	SHIFT KNOB
159	PSB1007159	GEARBOX FRONT PANEL
160	PSB1007160	KNOB INDICATOR PLATE
161	PSB1007161	SET SCREW M6-1 X 20
162	PSB1007162	OIL SEAL 24 X 32 X 4
163	PSB1007163	SET SCREW M8-1.25 X 16
164	PSB1007164	O-RING 8.8 X 1.9 P9
165	PSB1007165	OIL SIGHT GLASS 3/8" NPT
167	PSB1007167	ROLL PIN 4 X 24
168	PSB1007168	LOCK NUT M8-1.25
169	PSB1007169	EXT RETAINING RING 10MM
170	PSB1007170	CAP SCREW M6-1 X 35
171	PSB1007171	CAP SCREW M5-.8 X 10
172	PSB1007172	EXT RETAINING RING 18MM
173	PSB1007173	OIL SEAL 30 X 22 X 4
174	PSB1007174	ROLL PIN 4 X 25
175	PSB1007175	EXT RETAINING RING 10MM
176	PSB1007176	STEEL BALL 6MM
177	PSB1007177	GEARBOX GASKET
178	PSB1007178	EXT RETAINING RING 22MM
179	PSB1007179	KEY 5 X 5 X 80
180	PSB1007180	KEY 4 X 4 X 14
181	PSB1007181	CAP SCREW M8-1.25 X 35
182	PSB1007182	CAP SCREW M8-1.25 X 20
183	PSB1007183	KEY 4 X 4 X 14
184	PSB1007184	KEY 3 X 3 X 8
185	PSB1007185	BUSHING
186	PSB1007186	TOOTHED GEAR COUPLER
187	PSB1007187	TOOTHED GEAR COUPLER
188	PSB1007188	OIL FILL PLUG M14-1.5 X 20
189	PSB1007189	OIL SEAL 30 X 22 X 4
191	PSB1007191	TOOTHED GEAR COUPLER
192	PSB1007192	SPACER
193	PSB1007193	TOOTHED GEAR COUPLER
194	PSB1007194	GEAR 14T
195	PSB1007195	KEY 4 X 4 X 50
196	PSB1007196	EXT RETAINING RING 12MM
197	PSB1007197	KEY 5 X 5 X 20
198	PSB1007198	EXT RETAINING RING 16MM
199	PSB1007199	GREASE FITTING 5/16"

Bed, Motor & Apron

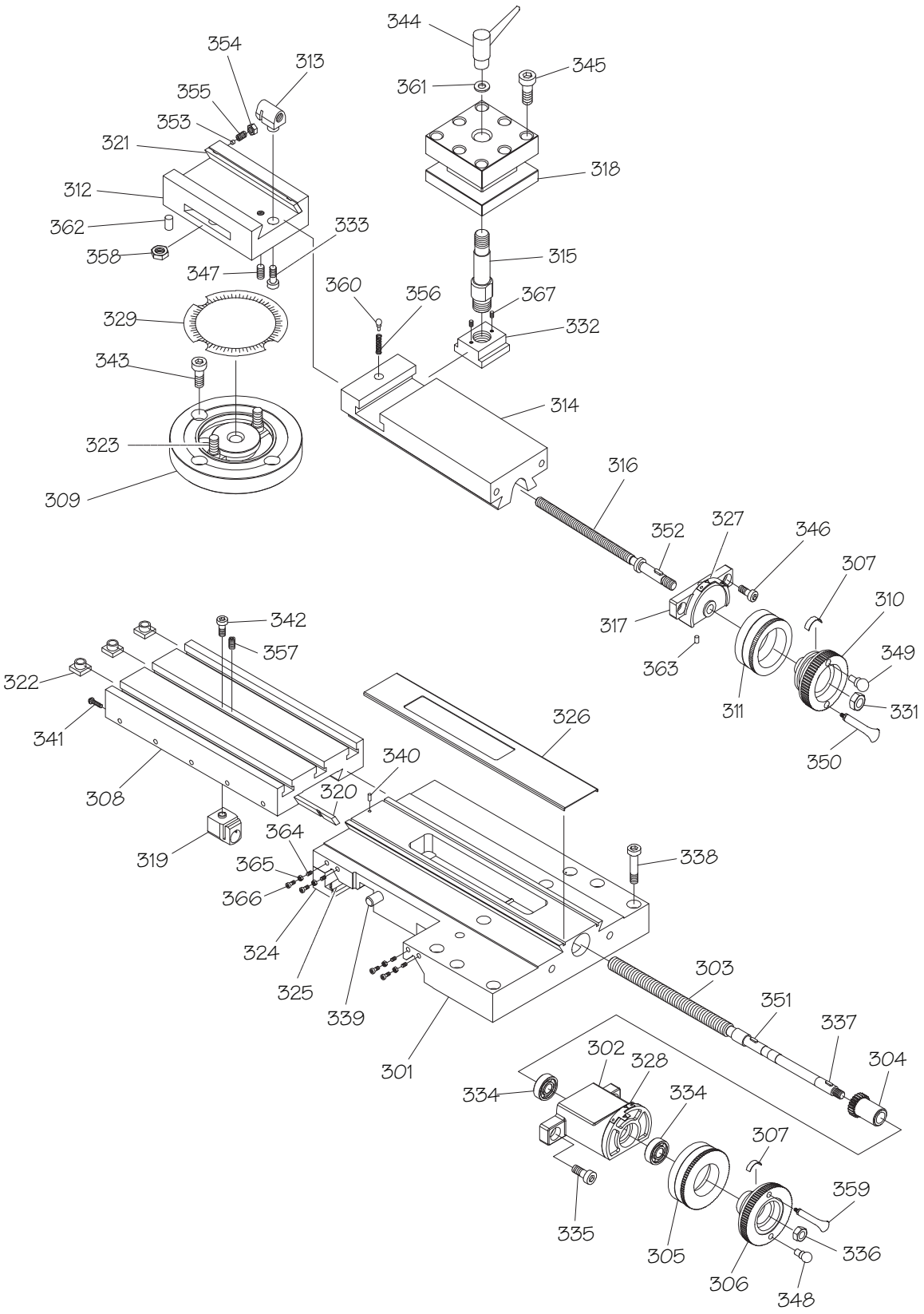


Bed, Motor & Apron Parts List

REF	PART #	DESCRIPTION
201	PSB1007201	APRON CASTING
202	PSB1007202	GEAR 81T/22T
203	PSB1007203	HALF NUT MOUNT
204	PSB1007204	SHAFT
205	PSB1007205	WORM GEAR
206	PSB1007206	WORM SHAFT
207	PSB1007207	FLANGED BUSHING
208	PSB1007208	CARRIAGE PINION 30T
209	PSB1007209	RACK
210	PSB1007210	BED
211	PSB1007211	HALF NUT PIVOT HUB
212	PSB1007212	FEED SELECTION PIVOT SHAFT
213	PSB1007213	HALF NUT 2-PC SET
214	PSB1007214	SPACER
215	PSB1007215	WORM SHAFT
216	PSB1007216	FEED SELECTION SHAFT
217	PSB1007217	PIVOT PIN
218	PSB1007218	SHIFT BLOCK
219	PSB1007219	STOP PLATE
220	PSB1007220	CLAMP PLATE
221	PSB1007221	MOTOR PULLEY
222	PSB1007222	PIVOT SHAFT BRACKET
223	PSB1007223	MOTOR MOUNT
224	PSB1007224	MICROMETER CARRIAGE STOP
225	PSB1007225	FEED SELECTION HANDLE M10-1.5 X 30
226	PSB1007226	COMPRESSION SPRING
227	PSB1007227	SET SCREW M6-1 X 35 DOG-PT
228	PSB1007228	COMPRESSION SPRING
229	PSB1007229	SPACER
230	PSB1007230	CARRIAGE HANDWHEEL BRACKET
231	PSB1007231	CARRIAGE GRADUATED DIAL
232	PSB1007232	CARRIAGE HANDWHEEL
233	PSB1007233	HALF NUT INDICATOR PLATE
234	PSB1007234	FEED SELECTION INDICATOR PLATE
238	PSB1007238	LOCK NUT M8-1.25
239	PSB1007239	BALL BEARING 6000ZZ
240	PSB1007240	CAP SCREW M5-.8 X 10
241	PSB1007241	SET SCREW M6-1 X 12
242	PSB1007242	SET SCREW M8-1.25 X 50
243	PSB1007243	CAP SCREW M8-1.25 X 40
244	PSB1007244	HEX BOLT M10-1.5 X 20
245	PSB1007245	FLAT WASHER 10MM
246	PSB1007246	MOTOR 2HP 220V 3-PH

REF	PART #	DESCRIPTION
246-1	PSB1007246-1	MOTOR FAN COVER
246-2	PSB1007246-2	MOTOR FAN
246-3	PSB1007246-3	MOTOR JUNCTION BOX
246-4	PSB1007246-4	BALL BEARING 6204-2RS (FRONT)
246-5	PSB1007246-5	BALL BEARING 6204-2RS (REAR)
246-6	PSB1007246-6	MOTOR CORD 16G 4W 20"
247	PSB1007247	CAP SCREW M6-1 X 12
248	PSB1007248	STUD-FT M10-1.5 X 65
249	PSB1007249	EXT RETAINING RING 15MM
250	PSB1007250	CAP SCREW M6-1 X 55
251	PSB1007251	CAP SCREW M6-1 X 35
254	PSB1007254	THREAD DIAL
255	PSB1007255	THREAD DIAL SHAFT
256	PSB1007256	FLAT WASHER 8MM
257	PSB1007257	GEAR 32T
258	PSB1007258	FLAT WASHER 8MM
259	PSB1007259	HEX NUT M8-1.25
260	PSB1007260	CLAMP PLATE
261	PSB1007261	HEX NUT M10-1.5
262	PSB1007262	CAP SCREW M10-1.5 X 50
263	PSB1007263	KEY 6 X 6 X 40
264	PSB1007264	KEY 3 X 3 X 8
266	PSB1007266	STEEL BALL 6MM
267	PSB1007267	THREAD DIAL BODY
268	PSB1007268	CAP SCREW M6-1 X 16
269	PSB1007269	COMPRESSION SPRING
270	PSB1007270	CAP SCREW M6-1 X 40
271	PSB1007271	CAP SCREW M5-.8 X 12
272	PSB1007272	HALF NUT HANDLE M8-1.25 X 8
273	PSB1007273	HANDWHEEL CURVED PLATE SPRING
274	PSB1007274	CARRIAGE HW HANDLE M8-1.25 X 10
275	PSB1007275	CAP SCREW M8-1.25 X 35
276	PSB1007276	HEX NUT M8-1.25
277	PSB1007277	POWER CORD 16G 3W 72" 6-15P
278	PSB1007278	CAP SCREW M8-1.25 X 35
279	PSB1007279	CAP SCREW M8-1.25 X 45
280	PSB1007280	LOCK WASHER 8MM
281	PSB1007281	CAP SCREW M6-1 X 45
282	PSB1007282	EXT RETAINING RING 22MM
283	PSB1007283	DOCK WASHER 6 X 28 X 3MM
284	PSB1007284	CAP SCREW M6-1 X 15
285	PSB1007285	FENDER WASHER 10MM
286	PSB1007286	HEX NUT M8-1.25

Slides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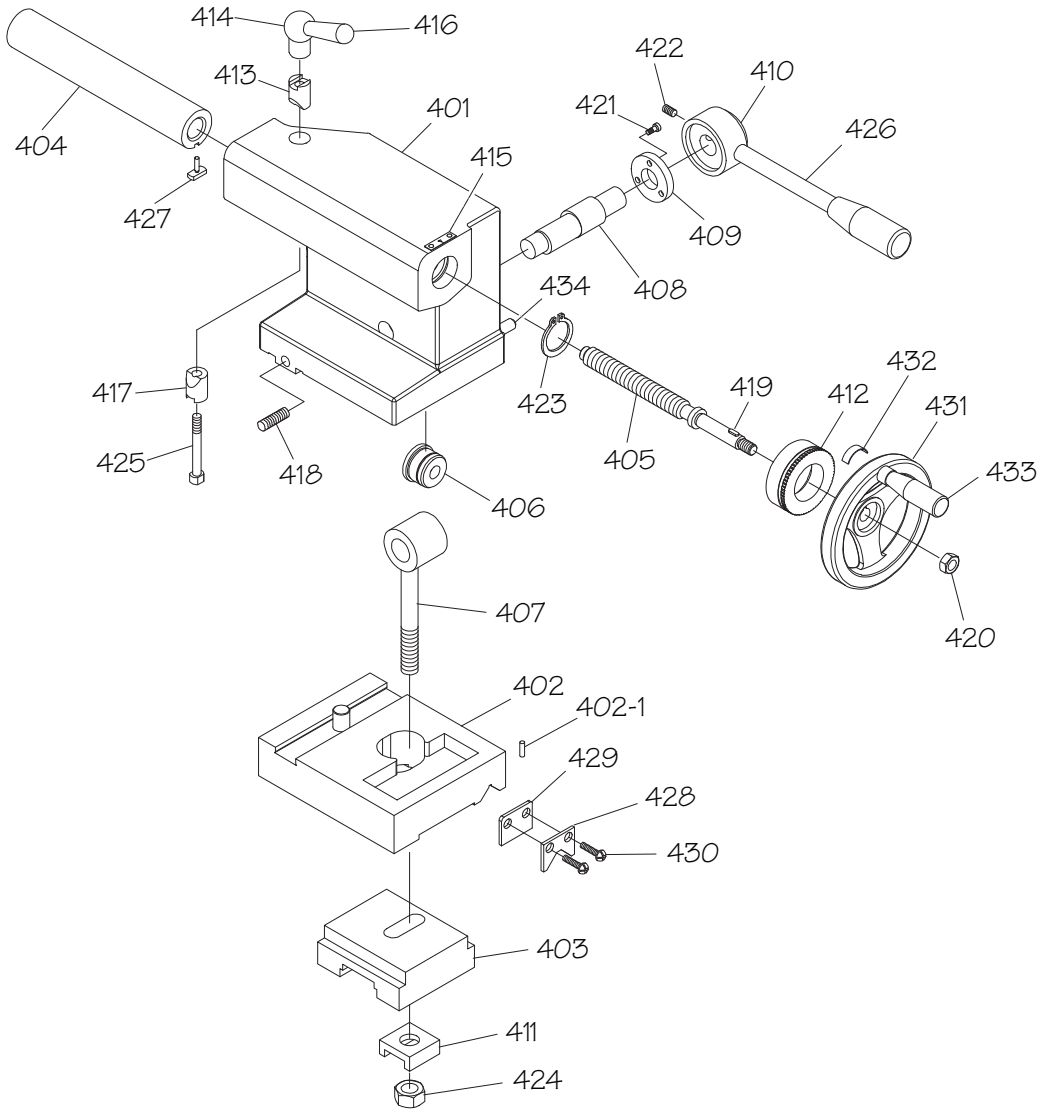
Slides Parts List

REF	PART #	DESCRIPTION
301	PSB1007301	SADDLE
302	PSB1007302	CROSS HANDWHEEL BRACKET
303	PSB1007303	CROSS LEADSCREW
304	PSB1007304	GEAR 22T
305	PSB1007305	CROSS SLIDE GRADUATED DIAL
306	PSB1007306	CROSS SLIDE HANDWHEEL
307	PSB1007307	HANDWHEEL CURVED PLATE SPRING
308	PSB1007308	CROSS SLIDE
309	PSB1007309	COMPOUND SLIDE SWIVEL BASE
310	PSB1007310	COMPOUND SLIDE HANDWHEEL
311	PSB1007311	COMPOUND SLIDE GRADUATED DIAL
312	PSB1007312	COMPOUND SLIDE DOVETAIL BASE
313	PSB1007313	COMPOUND SLIDE LEADSCREW NUT
314	PSB1007314	COMPOUND REST
315	PSB1007315	TOOL POST SHAFT
316	PSB1007316	COMPOUND SLIDE LEADSCREW
317	PSB1007317	COMPOUND SLIDE HANDWHEEL BRACKET
318	PSB1007318	TOOL POST BODY
319	PSB1007319	CROSS SLIDE LEADSCREW NUT
320	PSB1007320	CROSS SLIDE GIB
321	PSB1007321	COMPOUND REST GIB
322	PSB1007322	T-NUT 5/8" M8-1.25
323	PSB1007323	CAP SCREW M8-1.25 X 12
324	PSB1007324	SADDLE WAY CLAMP
325	PSB1007325	SADDLE GIB
326	PSB1007326	SADDLE WAY COVER
327	PSB1007327	COMPOUND SLIDE INDICATOR PLATE
328	PSB1007328	CROSS SLIDE INDICATOR PLATE
329	PSB1007329	COMPOUND SLIDE ANGLE SCALE
331	PSB1007331	LOCK NUT M8-1.25
332	PSB1007332	TOOL POST CLAMP PLATE
333	PSB1007333	CAP SCREW M6-1 X 12
334	PSB1007334	BALL BEARING 6000ZZ

REF	PART #	DESCRIPTION
335	PSB1007335	CAP SCREW M8-1.25 X 16
336	PSB1007336	LOCK NUT M8-1.25
337	PSB1007337	KEY 3 X 3 X 6
338	PSB1007338	CAP SCREW M8-1.25 X 35
339	PSB1007339	STOP ROD
340	PSB1007340	ROLL PIN 3 X 6
341	PSB1007341	PHLP HD SCR M6-1 X 12
342	PSB1007342	CAP SCREW M6-1 X 12
343	PSB1007343	CAP SCREW M8-1.25 X 15
344	PSB1007344	TOOL POST LOCK HANDLE 1/2"-13 CHROME
345	PSB1007345	CAP SCREW M10-1.5 X 30
346	PSB1007346	CAP SCREW M6-1 X 12
347	PSB1007347	SET SCREW M6-1 X 12
348	PSB1007348	CROSS SLIDE HW KNOB M8-1.25 X 10
349	PSB1007349	COMPOUND SLIDE HW KNOB M6-1
350	PSB1007350	COMPOUND SLIDE HW HANDLE M6-1 X 10
351	PSB1007351	KEY 3 X 3 X 8
352	PSB1007352	KEY 3 X 3 X 6
353	PSB1007353	PLUNGER
354	PSB1007354	HEX NUT M5-.8
355	PSB1007355	SET SCREW M5-.8 X 18
356	PSB1007356	COMPRESSION SPRING
357	PSB1007357	SET SCREW M6-1 X 12
358	PSB1007358	HEX NUT M8-1.25
359	PSB1007359	CROSS SLIDE HW HANDLE M8-1.25 X 10
360	PSB1007360	PLUNGER
361	PSB1007361	FLAT WASHER 10MM
362	PSB1007362	LOCK PIN 11 X 26MM
363	PSB1007363	BALL OILER 1/4"
364	PSB1007364	SET SCREW M5-.8 X 12
365	PSB1007365	HEX NUT M5-.8
366	PSB1007366	CAP SCREW M6-1 X 12
367	PSB1007367	SET SCREW M6-1 X 12

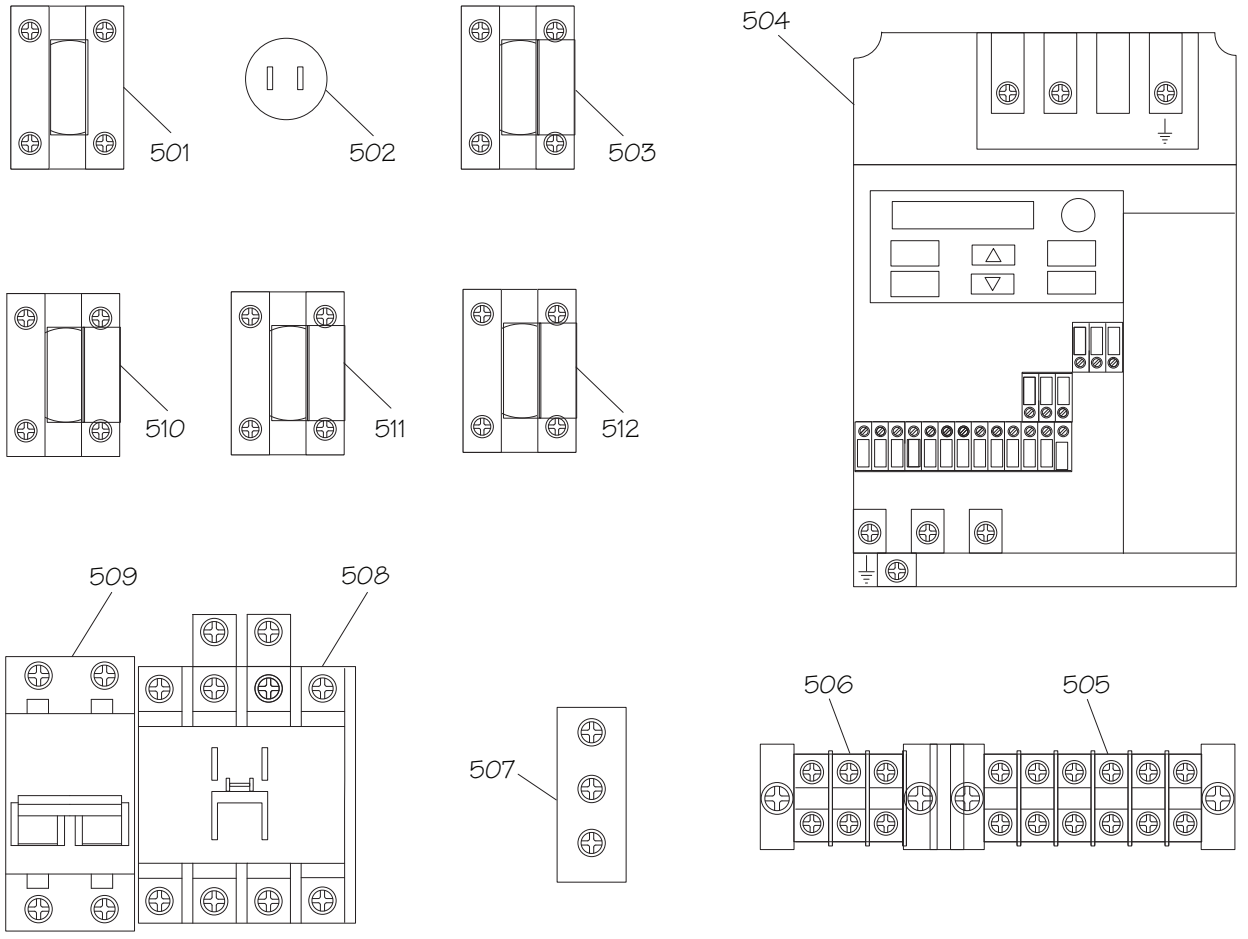
Tailstock



REF	PART #	DESCRIPTION
401	PSB1007401	TAILSTOCK CASTING
402	PSB1007402	TAILSTOCK BASE
402-1	PSB1007402-1	DOWEL PIN 12 X 25
403	PSB1007403	TAILSTOCK CLAMP PLATE
404	PSB1007404	QUILL
405	PSB1007405	QUILL LEADSCREW
406	PSB1007406	QUILL LEADSCREW NUT
407	PSB1007407	CLAMP BOLT M12-1.75 X 35
408	PSB1007408	ECCENTRIC SHAFT
409	PSB1007409	TAILSTOCK LOCK HUB BRACKET
410	PSB1007410	TAILSTOCK LOCK HUB
411	PSB1007411	CLAMP PLATE WEDGE
412	PSB1007412	QUILL GRADUATED DIAL
413	PSB1007413	LOCK PLUNGER (UPPER)
414	PSB1007414	QUILL LOCK HUB
415	PSB1007415	INDICATOR PLATE
416	PSB1007416	QUILL LOCK HANDLE M8-1.25 X 8
417	PSB1007417	LOCK PLUNGER (LOWER)

REF	PART #	DESCRIPTION
418	PSB1007418	SET SCREW M8-1.25 X 50
419	PSB1007419	KEY 3 X 3 X 6
420	PSB1007420	LOCK NUT M8-1.25
421	PSB1007421	CAP SCREW M4-.7 X 12
422	PSB1007422	SET SCREW M8-1.25 X 16
423	PSB1007423	EXT RETAINING RING 25MM
424	PSB1007424	LOCK NUT M12-1.75
425	PSB1007425	QUILL LOCK BOLT M6-1 X 70
426	PSB1007426	TAILSTOCK LOCK HANDLE M10-1.5 X 12
427	PSB1007427	QUILL ALIGNMENT KEY
428	PSB1007428	WAY WIPER PLATE
429	PSB1007429	WAY WIPER
430	PSB1007430	PHLP HD SCR M5-.8 X 12
431	PSB1007431	QUILL HANDWHEEL
432	PSB1007432	HANDWHEEL CURVED PLATE SPRING
433	PSB1007433	QUILL HANDWHEEL HANDLE M8-1.25 X 10
434	PSB1007434	STOP PIN 8 X 65

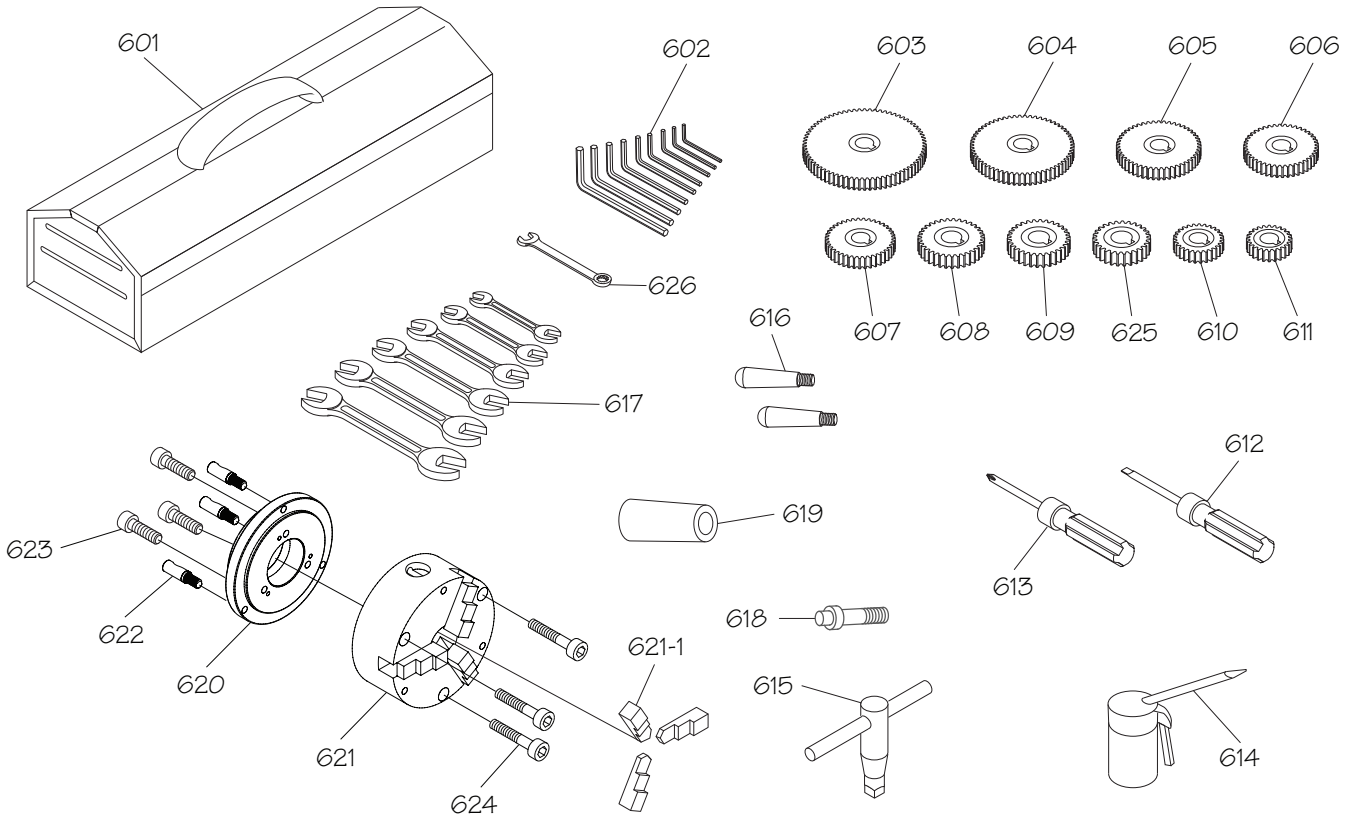
Electrical Box



REF	PART #	DESCRIPTION
501	PSB1007501	ON/OFF SWITCH AUSP KS-2221 22MM
502	PSB1007502	POWER LAMP MOU JEN M6L-AS550R 22MM
503	PSB1007503	SPEED SWITCH AUSP CS-2221 22MM
504	PSB1007504	INVERTER DELTA VFD0222E21A
505	PSB1007505	TERMINAL BAR 6P
506	PSB1007506	TERMINAL BAR 3P

REF	PART #	DESCRIPTION
507	PSB1007507	LIMIT SWITCH AVC AVC-1 HIGHLY Z15G1318
508	PSB1007508	CONTACTOR TECO CU-11 220V
509	PSB1007509	CIRCUIT BREAKER ABB S202-C2
510	PSB1007510	DIRECTION SWITCH AUSPICIOUS LCS-2232 22MM
511	PSB1007511	E-STOP BUTTON AUSPICIOUS LEB-2221 22MM
512	PSB1007512	JOG BUTTON AUSPICIOUS PBF-2221 22MM GRN

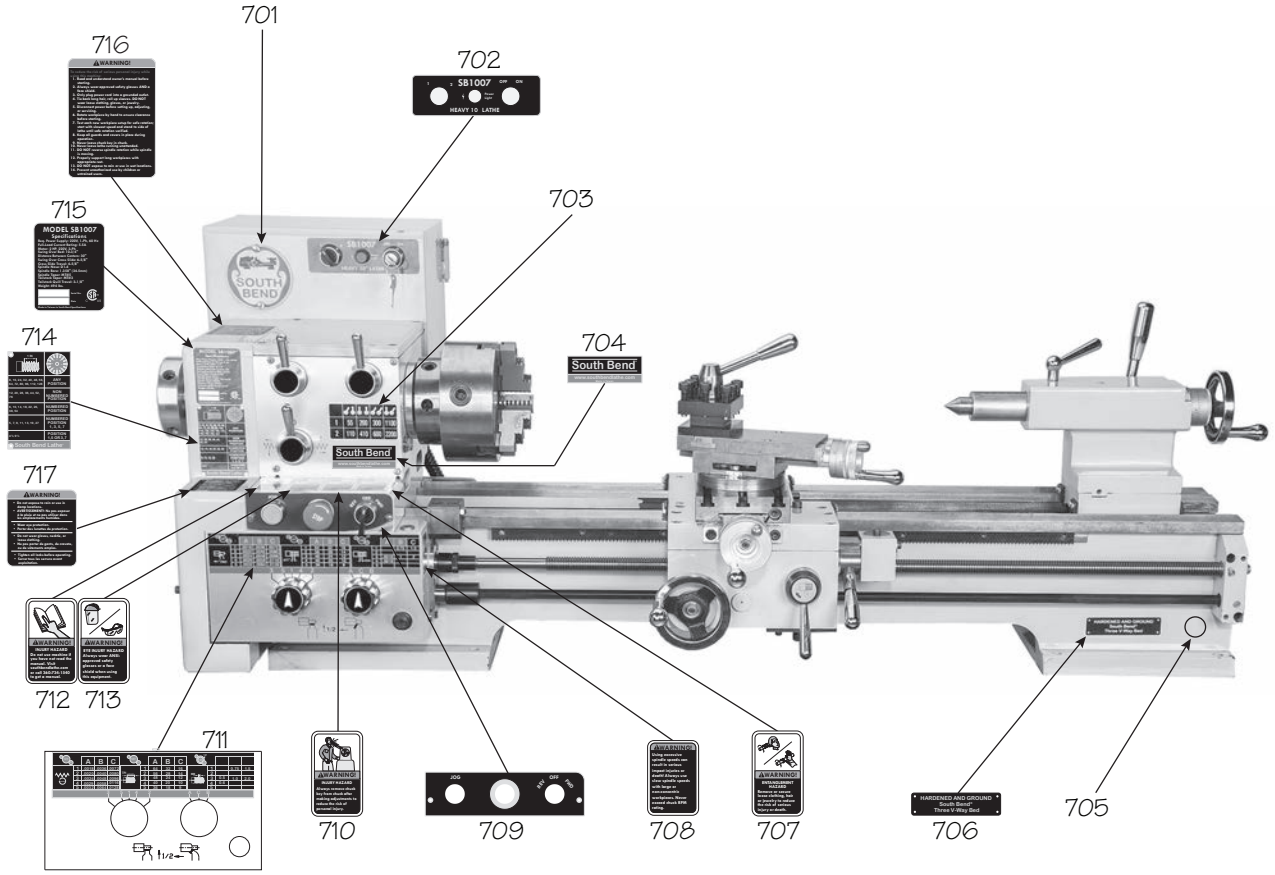
Accessories



REF	PART #	DESCRIPTION
601	PSB1007601	TOOLBOX
602	PSB1007602	HEX WRENCH SET 9-PC.
603	PSB1007603	CHANGE GEAR 95T
604	PSB1007604	CHANGE GEAR 80T
605	PSB1007605	CHANGE GEAR 70T
606	PSB1007606	CHANGE GEAR 65T
607	PSB1007607	CHANGE GEAR 60T
608	PSB1007608	CHANGE GEAR 55T
609	PSB1007609	CHANGE GEAR 50T
610	PSB1007610	CHANGE GEAR 40T
611	PSB1007611	CHANGE GEAR 35T
612	PSB1007612	SCREWDRIVER FLAT #2
613	PSB1007613	SCREWDRIVER PHILLIPS #2
614	PSB1007614	OIL CAN

REF	PART #	DESCRIPTION
615	PSB1007615	LATHE CHUCK KEY
616	PSB1007616	HANDWHEEL HANDLE
617	PSB1007617	OPEN-END WRENCH SET 6-PC.
618	PSB1007618	GEAR DRIVE SHAFT
619	PSB1007619	TAPERED SPINDLE SLEEVE MT#5–MT#3
620	PSB1007620	BACK PLATE
621	PSB1007621	3-JAW CHUCK
621-1	PSB1007621-1	OUTSIDE JAW SET 3-PC.
622	PSB1007622	CAMLOCK STUD D1-4
623	PSB1007623	CAP SCREW M10-1.5 X 70
624	PSB1007624	CAP SCREW 1/4-20 X 3/4
625	PSB1007625	CHANGE GEAR 45T
626	PSB1007626	OPEN-END WRENCH 13MM

Machine Labels – Front



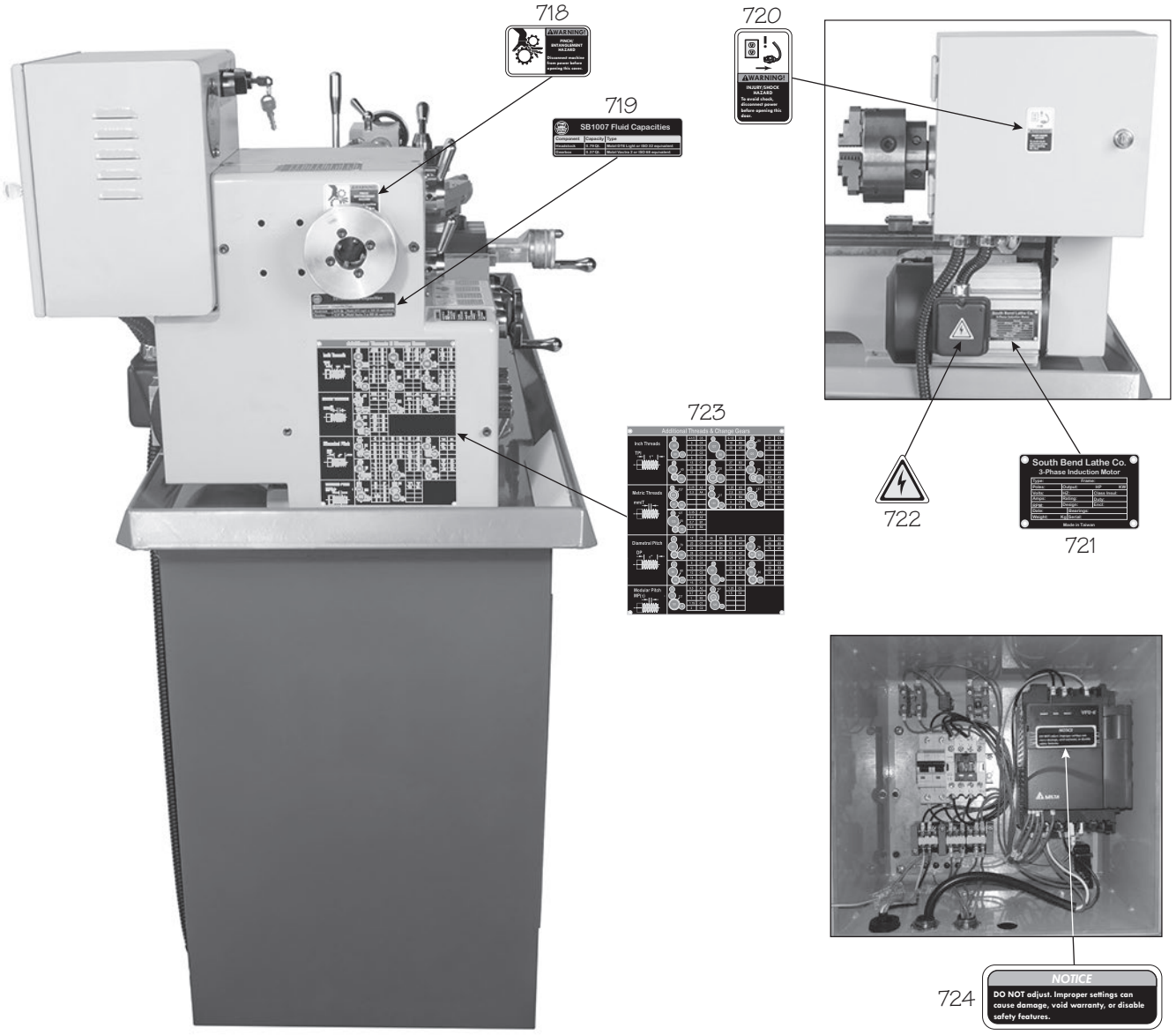
REF	PART #	DESCRIPTION
701	PSB1007701	SOUTH BEND ROUND NAMEPLATE
702	PSB1007702	MASTER POWER LABEL
703	PSB1007703	SPINDLE SPEED CHART
704	PSB1007704	SOUTH BEND RECTANGULAR LOGO
705	PSB1007705	SOUTH BEND GREY TOUCH-UP PAINT
706	PSB1007706	V-WAY DESCRIPTION LABEL
707	PSB1007707	ENTANGLEMENT HAZARD LABEL
708	PSB1007708	SPINDLE SPEED WARNING LABEL
709	PSB1007709	CONTROL PANEL LABEL

REF	PART #	DESCRIPTION
710	PSB1007710	CHUCK KEY WARNING LABEL
711	PSB1007711	FEED RATE LABEL
712	PSB1007712	READ MANUAL LABEL
713	PSB1007713	EYE INJURY HAZARD LABEL
714	PSB1007714	THREAD DIAL LABEL
715	PSB1007715	MACHINE ID LABEL
716	PSB1007716	WARNING LABEL
717	PSB1007717	WARNING LABEL FRENCH

⚠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 Tools at (360) 734-1540 or www.southbendtools.com to order new labels.

Machine Labels – Rear & Side



REF	PART #	DESCRIPTION
718	PSB1007718	PINCHING HAZARD LABEL
719	PSB1007719	FLUID CAPACITIES LABEL
720	PSB1007720	SHOCK INJURY HAZARD LABEL
721	PSB1007721	MOTOR ID LABEL

REF	PART #	DESCRIPTION
722	PSB1007722	ELECTRICITY LABEL
723	PSB1007723	THREAD CHART LABEL
724	PSB1007724	NOTICE LABEL

⚠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 Tools at (360) 734-1540 or www.southbendtools.com to order new labels.

Warranty

This quality product is warranted by South Bend Tools to the original buyer for **2 years** 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 Tools 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.

Thank you for your business and continued support.

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

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