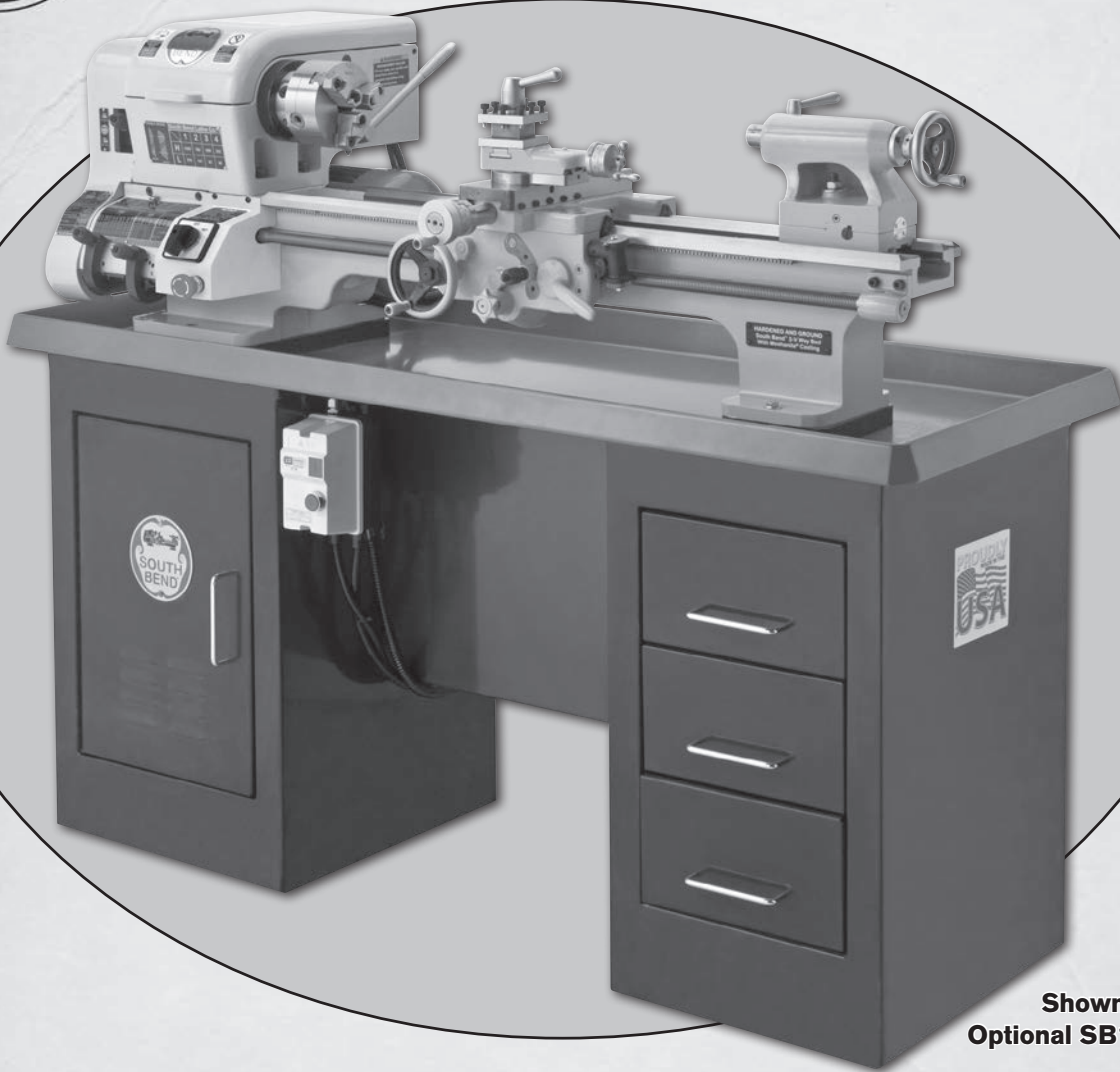




10K[®] 28" BENCH LATHE

MODEL SB1002

For Serial Numbers 1201 and Higher



Shown With
Optional SB1035 Stand

OWNER'S MANUAL

South Bend Lathe Co.[®]

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



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.southbendlathe.com

Customer Service

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

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About This Machine

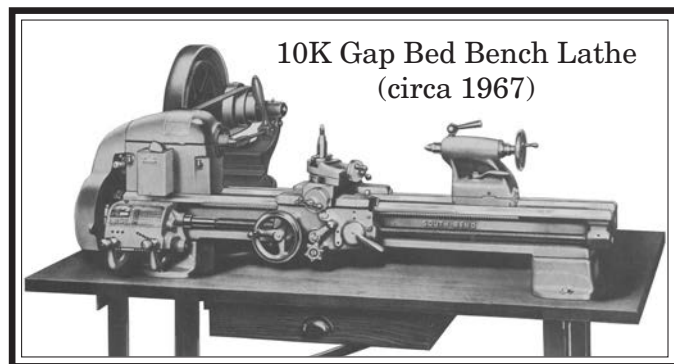
Foreword

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

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

Now, almost 300 years later, these modern 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)

10K® Lathe

Designed from the ground up as a modern version of the classic South Bend 10K lathe, this "new" model features many of the same traditional lines and styling of the vintage models, but with additional modern innovations.

The 10K is a very fine precision lathe for small work in the toolroom, manufacturing plant, maintenance department, or home machine shop. It is highly coveted as a small lathe because it offers features and precision usually found on larger, much more expensive lathes.

We have taken great care to ensure that many of the headstock, tailstock, and carriage controls look and function similar the classic 10K models.

The foundation of the lathe, the bed, is constructed with precision hardened and ground castings in the traditional three V-way prismatic design—long used on South Bend Lathes for accuracy, durability, and rigidity. Its length allows for 28" between centers.

The headstock features a D1-3 spindle and 8 spindle speeds that are controlled with a traditional pulley system. A convenient top cover provides access for the operator to quickly adjust the spindle speed within the available range of 60–1200 RPM.

Both the carriage and cross slide have power feeding capabilities, each with 16 different feed rates that are conveniently controlled by a quick-change gearbox.

For threading, the quick-change gearbox provides 40 different inch-thread settings from 8–224 TPI and 17 different metric thread pitches from 0.5–2.5mm.

This 10K also includes a classically-styled long-barrel tailstock, a 4-way toolpost, and 3-jaw scroll chuck.

Last but not least, thank you for being a part of the new South Bend Lathe Co. We appreciate your business and hope this new 10K lathe serves you well for a lifetime!

General Identification

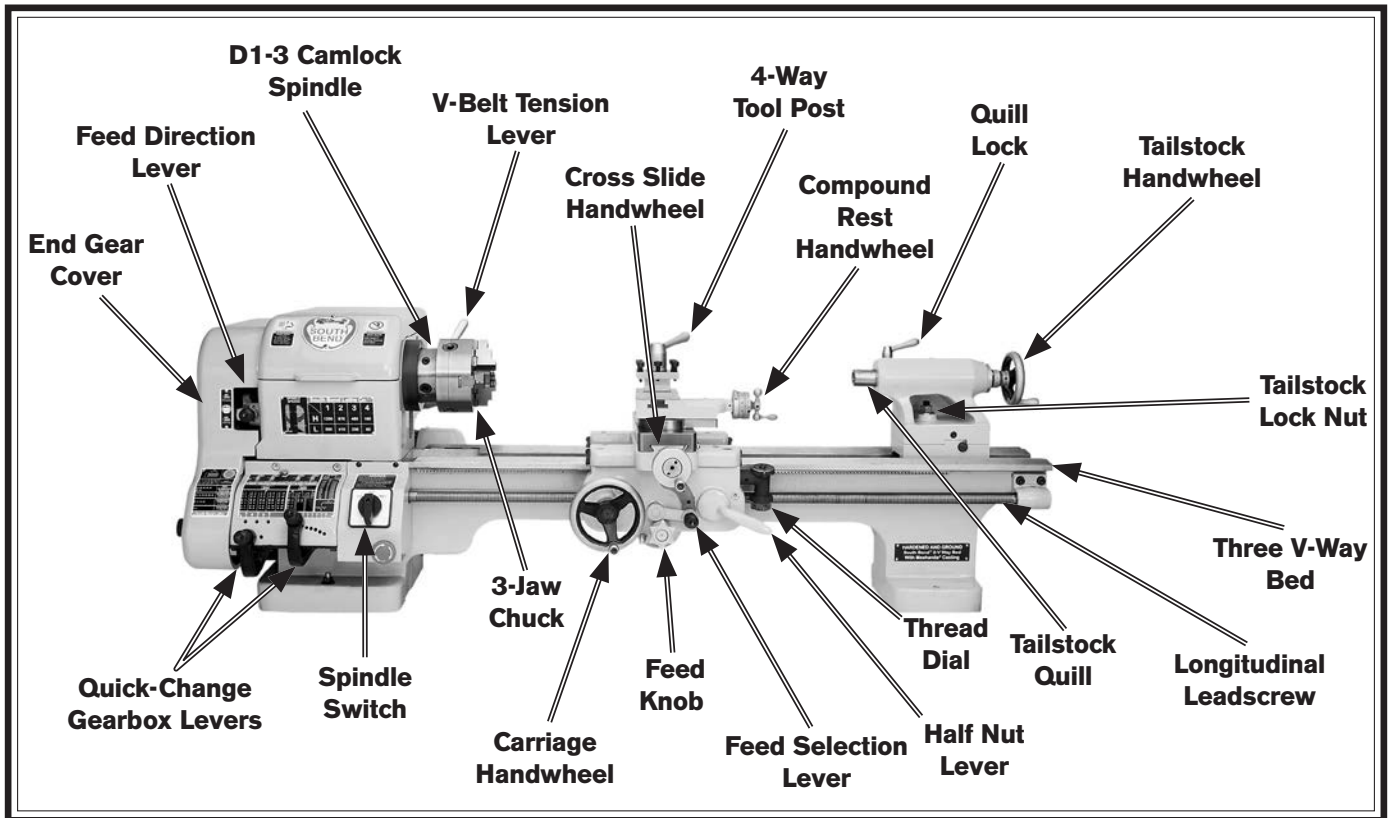


Figure 1. Model SB1002 10K 28" Bench Lathe.

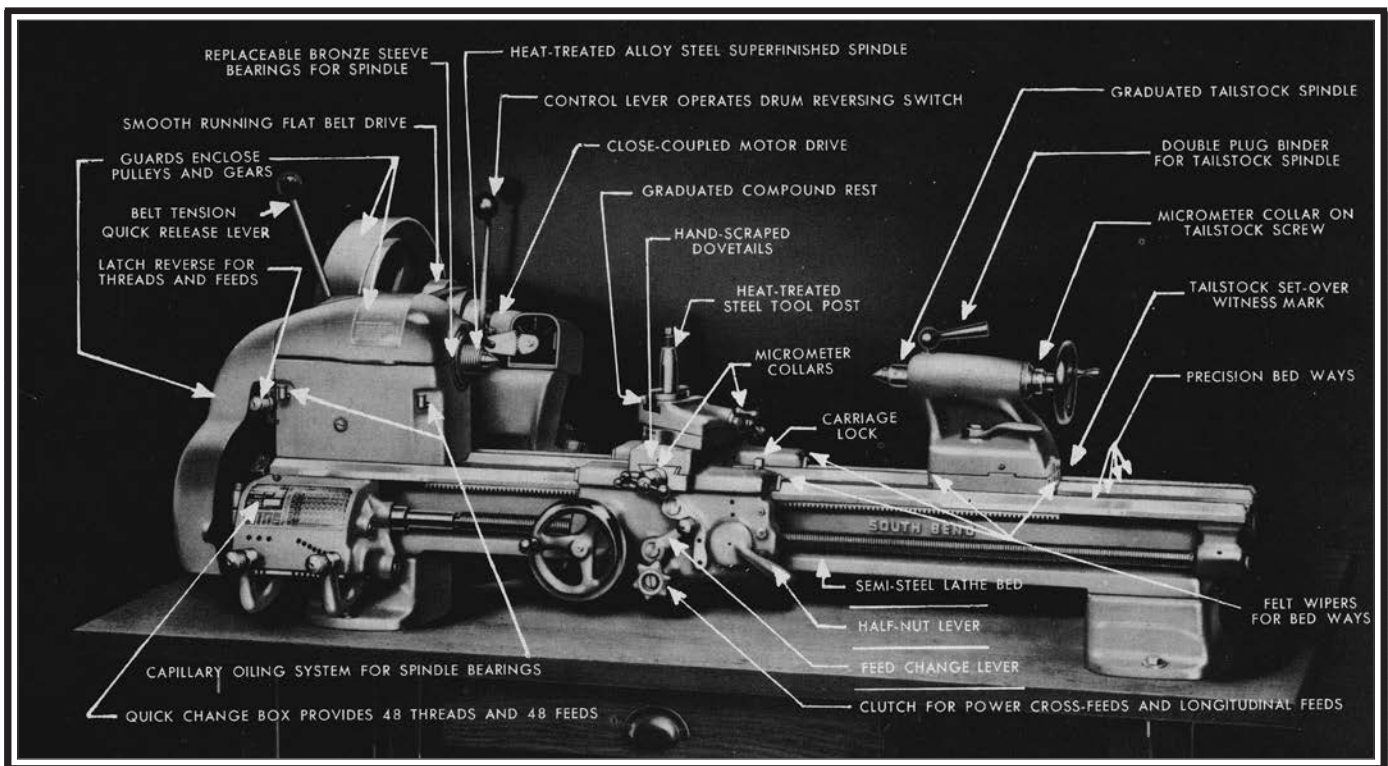


Figure 2. Model A South Bend 10-K Precision Bench Lathe (circa 1958).



Model SB1002 10K® - 28" Bench Lathe

Product Dimensions

Weight..... 506 lbs.
 Width (side-to-side) x Depth (front-to-back) x Height..... 55-1/8 x 21-3/4 x 18-3/8 in.
 Footprint (Length x Width)..... 47 x 12 in.

Shipping Dimensions

Type..... Wood Slat Crate
 Content..... Machine
 Weight..... 656 lbs.
 Length x Width x Height..... 62 x 30 x 29 in.
 Must Ship Upright..... N/A

Electrical

Power Requirement..... 110V or 220V, Single-Phase, 60 Hz
 Prewired Voltage..... 110V
 Full-Load Current Rating..... 12A at 110V, 6A at 220V
 Minimum Circuit Size..... 15A
 Switch..... Magnetic Switch w/Overload Protection
 Plug Included..... No
 Recommended Plug/Outlet Type..... 5-15 for 110V; 6-15 for 220V

Motors

Main

Type..... TEFC Capacitor-Start Induction
 Horsepower..... 1 HP
 Phase..... Single-Phase
 Amps..... 12A/6A
 Speed..... 1150 RPM
 Power Transfer Poly-V Belt Drive
 Bearings..... Shielded & Permanently Lubricated

Main Specifications

Operation Info

Swing Over Bed..... 9.84 in.
 Distance Between Centers..... 28 in.
 Swing Over Cross Slide..... 5-1/2 in.
 Swing Over Saddle..... 8.26 in.
 Maximum Tool Bit Size..... 1/2 in.
 Compound Travel..... 2 in.
 Carriage Travel..... 27 in.
 Cross Slide Travel..... 4-7/8 in.

Headstock Info

Spindle Bore.....	0.86 in.
Spindle Taper.....	MT#3
Number of Spindle Speeds.....	8
Spindle Speeds.....	60 – 1200 RPM
Spindle Type.....	D1-3 Camlock
Spindle Bearings.....	Tapered Roller

Tailstock Info

Tailstock Quill Travel.....	3.149 in.
Tailstock Taper.....	MT#2
Tailstock Barrel Diameter.....	1.1875 in.

Threading Info

Number of Longitudinal Feeds.....	16
Range of Longitudinal Feeds.....	0.0014 – 0.0394 in./rev.
Number of Cross Feeds.....	16
Range of Cross Feeds.....	0.0004 – 0.0131 in./rev
Number of Inch Threads.....	40
Range of Inch Threads.....	8 – 224 TPI
Number of Metric Threads.....	17
Range of Metric Threads.....	0.5 – 3.5 mm

Dimensions

Bed Width.....	5.9 in.
Leadscrew Diameter.....	3/4 in.
Leadscrew TPI.....	8 TPI
Leadscrew Length.....	44-1/4 in.

Construction

Base.....	Cast Iron
Headstock.....	Cast Iron
Headstock Gears.....	Flame Hardened Steel
Bed.....	Hardened and Precision-Ground Cast Iron
Body.....	Cast Iron
Paint.....	Epoxy

Fluid Capacities

Headstock Capacity.....	1 – 2 Pumps
Headstock Fluid Type.....	NLGI #2 Grease
Gearbox Capacity.....	1 – 2 Pumps
Gearbox Fluid Type.....	ISO 68 (SB1365, Grizzly T23962, Mobil Vactra 2)
Apron Capacity.....	1 – 2 Pumps
Apron Fluid Type.....	ISO 68 (SB1365, Grizzly T23962, Mobil Vactra 2)

Other

Optional Stand.....	SB1035
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Other

Country Of Origin	Taiwan
Warranty	1 Year
Serial Number Location	ID Label on Machine Left Side Cover
Approximate Assembly & Setup Time	1 Hour




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	<i>Death or catastrophic harm WILL occur.</i>	 CAUTION	<i>Moderate injury or fire MAY occur.</i>
 WARNING	<i>Death or catastrophic harm COULD occur.</i>	NOTICE	<i>Machine or property damage may occur.</i>

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 electrically 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

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

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

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

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

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

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

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

Stopping Spindle by Hand. Stopping the spindle by putting your hand on the workpiece or chuck creates an extreme risk of entanglement, impact, crushing, friction, or cutting hazards. Never attempt to slow or stop the lathe spindle with your hand. Allow the spindle to come to a stop on its own or use the brake.

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

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

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

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.

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

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

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

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

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

WARNING

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

WARNING

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

Preparation Overview

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

The typical preparation process is as follows:

1. Unpack the lathe and inventory the contents of the box/crate.
2. Clean the lathe and its components.
3. Identify an acceptable mounting location for the lathe and move it to that location.
4. Level the lathe and bolt it to the workbench or stand.
5. Assemble the loose components and make any necessary adjustments or inspections to ensure the lathe is ready for operation.
6. Properly lubricate the lathe.
7. Connect the lathe to the power source.
8. Test run the lathe to make sure it functions properly and is ready for operation.

Things You'll Need

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

For Lifting and Moving

- A forklift or other power lifting device rated for at least 750 lbs.
- Lifting straps rated for at least 750 lbs. each
- Two other persons for moving machine
- Precision level
- Workbench or stand (SB1035) that can adequately support the machine (review **Location** on **Page 17** for details)

For Power Connection

- A power source that meets the minimum circuit requirements for this machine (review **Power Supply Requirements** on **Page 12** for details)
- An electrician or qualified service personnel to ensure a safe and code-compliant connection to the power source

For Assembly

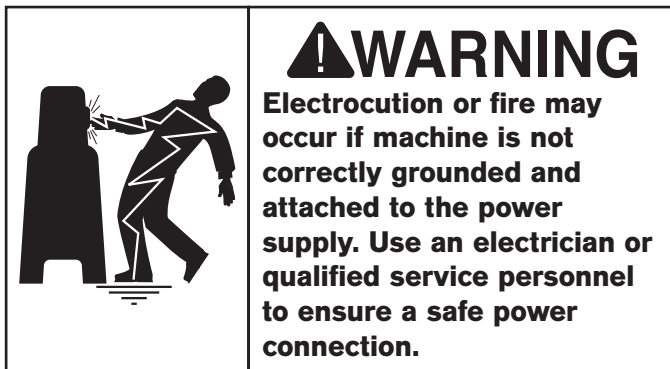
- Cotton rags
- Mineral spirits
- Quality metal protectant oil
- Safety glasses
- Hex Wrench 5mm
- Wrench 19mm
- Workbench/stand mounting hardware as needed

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.



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 110V 12 Amps
Full-Load Rating at 220V 6 Amps

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

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

Circuit Requirements for 110V

This machine is prewired to operate on a 110V power supply circuit that has a verified ground and meets the following requirements:

Nominal Voltage 110V/120V
Cycle 60 Hz
Phase 1-Phase
Circuit Rating 15 Amps
Receptacle NEMA 5-15

Circuit Requirements for 220V

This machine can be converted to operate on a 220V power supply (refer to **Voltage Conversion to 220V** on **Page 14** for detailed instructions). This power supply must have a verified ground and meet the following requirements:

Nominal Voltage 220V/230V
Cycle 60 Hz
Phase 1-Phase
Circuit Rating 15 Amps
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.)



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.

For 110V Operation: This machine is equipped with a power cord that has an equipment-grounding wire and a grounding plug (see **Figure 3**). 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.

⚠ 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.

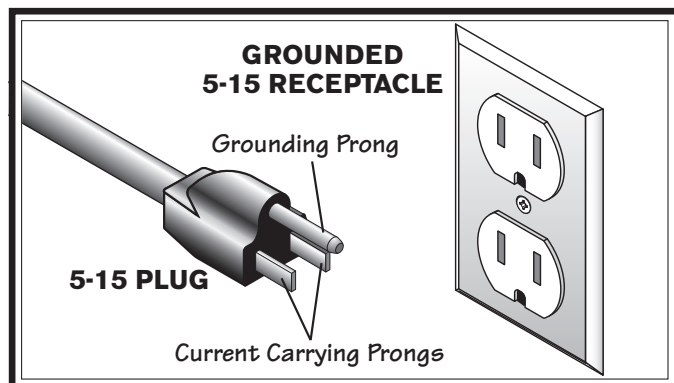
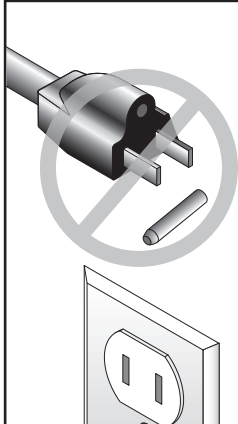


Figure 3. NEMA 5-15 plug and receptacle.



⚠ CAUTION

DO NOT modify the included plug or use an adapter if it will not fit your receptacle. Instead, have a qualified electrician install the proper receptacle on a power supply circuit that is grounded and meets the requirements for this machine.

For 220V Operation: The plug specified under **Circuit Requirements for 220V** on the previous page has a grounding prong that must be attached to the equipment-grounding wire on the included power cord. The plug must only be inserted into a matching receptacle (see **Figure 4**) that is properly installed and grounded in accordance with all local codes and ordinances.

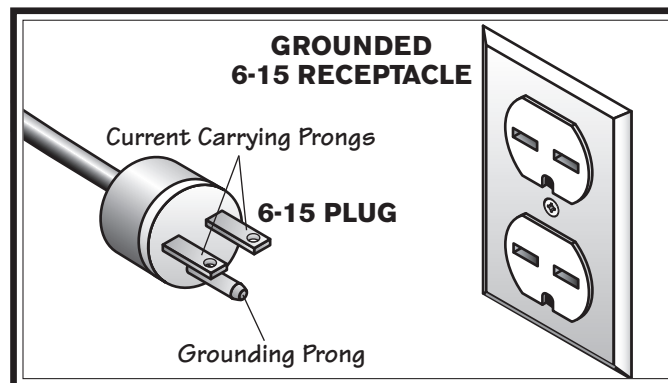


Figure 4. NEMA 6-15 plug and receptacle.

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.

Voltage Conversion to 220V

The voltage conversion **MUST** be performed by an electrician or qualified service personnel. Make sure the power source meets the **Circuit Requirements for 220V** on **Page 12**.

To perform the voltage conversion, a new plug must be installed, the magnetic switch assembly must be replaced, and the motor must be re-wired according to the provided **220V Wiring Diagram** on **Page 65**.

Note: If the diagram included inside the motor junction box cover conflicts with the one in the manual, the motor may have changed since the manual was printed. Use the diagram provided inside the motor junction box cover instead.

To obtain the replacement 220V magnetic switch assembly, contact your authorized South Bend dealer and order Part No. PSB10020326A.

To convert the machine to 220V:

1. DISCONNECT LATHE FROM POWER!
2. Remove the magnetic switch from its mounting.
3. Open the magnetic switch box and record the connection locations of the: **L1, L2, R1, S1, L31**, and both grounding wires (see **Figure 5**), then remove these wires from their connections.

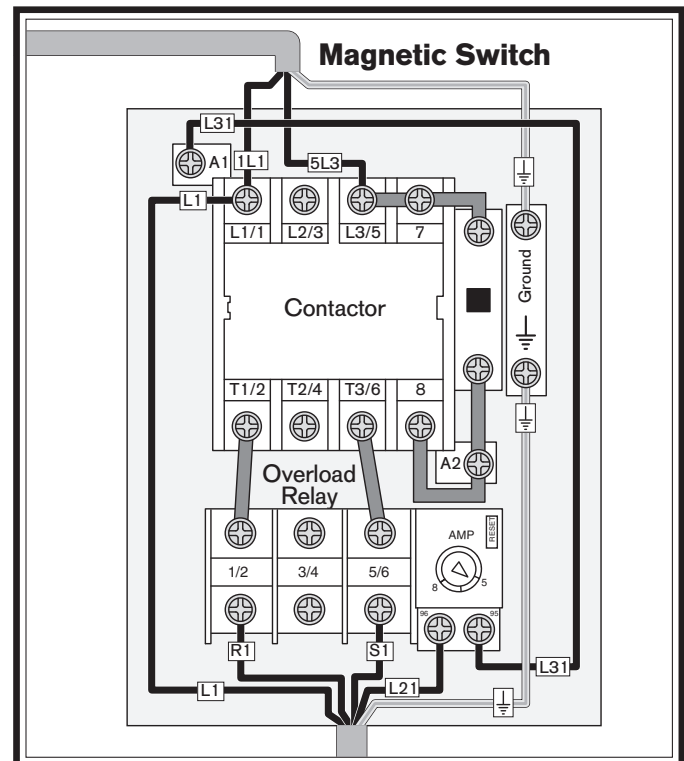


Figure 5. Magnetic switch contactor wire connections.

4. Loosen the strain reliefs, remove the cables from the magnetic switch box, then remove the strain reliefs.
5. Re-install the strain reliefs and cables on the 220V replacement magnetic switch box, connect the wires as recorded in **Step 3** (see **Figure 5**), then close the switch box and remount it.
6. Rewire the motor for 220V operation.
7. Attach the NEMA 6-15 plug to the power cord according to the plug manufacturer's instructions.

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

Shipping Inventory (Figure 6)	Qty
A. SB1002 Lathe Assembly (not shown)	1
B. 3-Jaw Chuck 5" (SB1352, Installed)	1
C. South Bend Closed-End Wrench 19mm.....	1
D. Hex Wrench 6mm	1
E. Cap Screws M6-1 x 10.....	2
F. Flat Washers 6mm.....	2
G. Carbide-Tipped Dead Center MT#3.....	1
H. Dead Center MT#2.....	1
I. End Gear 35-Tooth.....	1
J. End Gear 64-Tooth.....	1
L. Chuck Key (Attached to Tool Post)	1
K. V-Belt Tension Lever	1

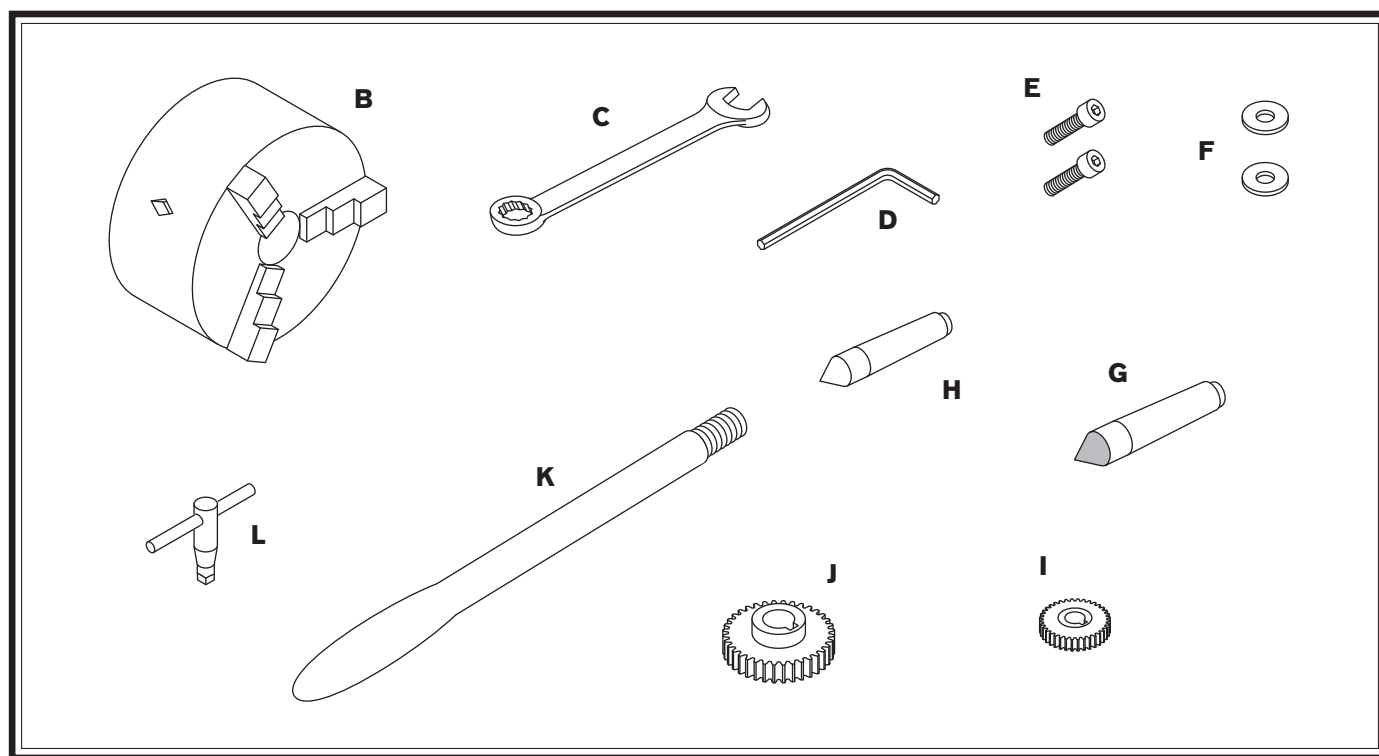


Figure 6. Shipping inventory.

Cleaning & Protecting

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

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

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

Before cleaning, gather the following:

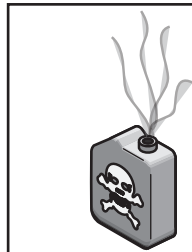
- Disposable rags
- Cleaner/degreaser (certain citrus-based degreasers work extremely well and they have non-toxic fumes)
- Safety glasses & disposable gloves

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



⚠ WARNING

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



⚠ CAUTION

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

NOTICE

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

Basic steps for removing rust preventative:

1. Put on safety glasses and disposable gloves.
2. Coat all surfaces that have rust preventative with a liberal amount of your cleaner or degreaser and let them soak for a few minutes.
3. Wipe off the surfaces. If your cleaner or degreaser is effective, the rust preventative will wipe off easily.

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

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

NOTICE

Open the headstock end gear cover, remove the end gears, use a stiff brush with mineral spirits to clean the rust preventative from the end gears and shafts—then lubricate them as instructed on Page 56. DO NOT get any cleaner, rust preventative, or lubrication on the ribbed V-belts, which could damage them or make them slip during operations. If the V-belts do become contaminated, replace them.

Location

Physical Environment

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

Electrical Installation

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

Lighting

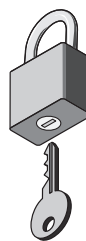
Lighting around the machine must be adequate enough that operations can be performed safely. Shadows, glare, or strobe effects that may distract or impede the operator must be eliminated.

Weight Load

Refer to the **Machine Specifications** for the weight of your machine. Make sure that the surface upon which the machine is placed will bear the weight of the machine, additional equipment that may be installed on the machine, and the heaviest workpiece that will be used. Additionally, consider the weight of the operator and any dynamic loading that may occur when operating the machine.

Space Allocation

Consider the largest size of workpiece that will be processed through this machine and provide enough space around the machine for adequate operator material handling or the installation of auxiliary equipment. With permanent installations, leave enough space around the machine to open or remove doors/covers as required by the maintenance and service described in this manual.



CAUTION

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

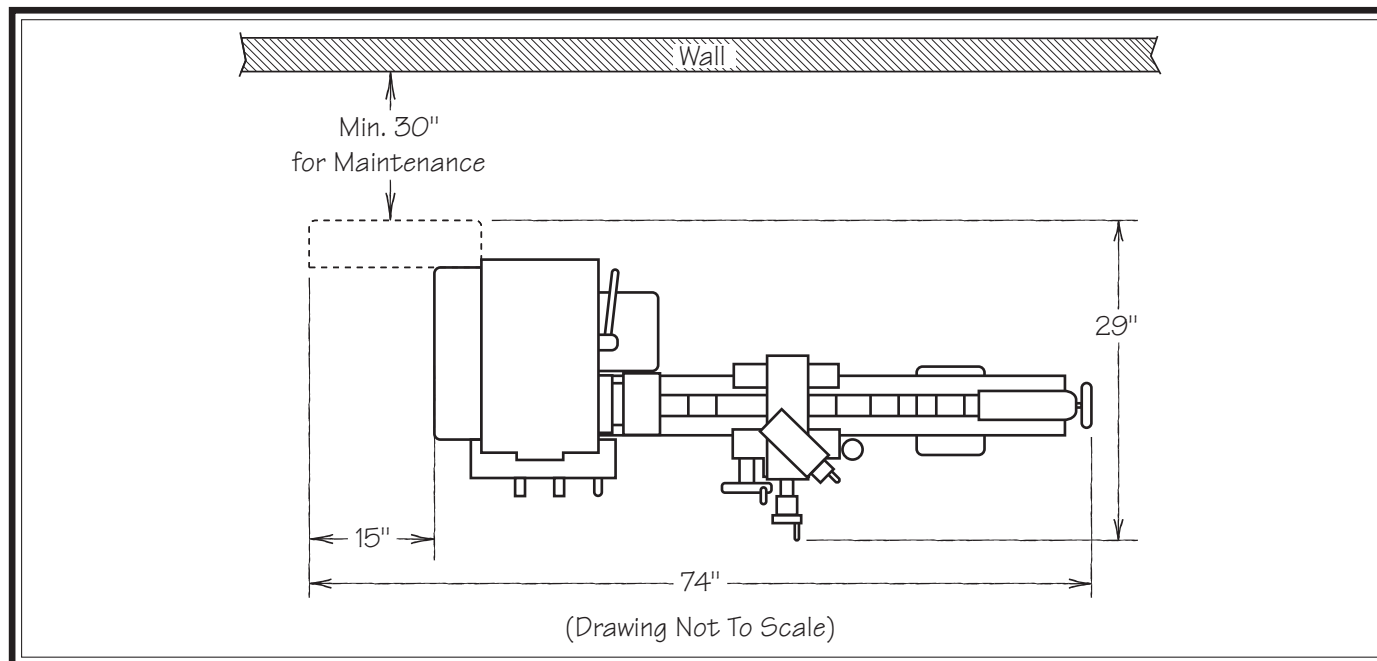
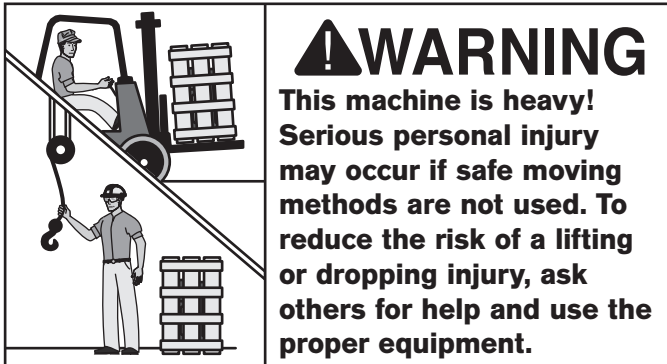


Figure 7. Space required for full range of movement.

Setup



Do not attempt to lift or move this lathe without using the proper equipment 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 during lifting. Refer to the **Things You'll Need** subsection on **Page 11** for details.

To lift and move the lathe:

1. Remove the shipping crate top and sides, remove the small components, then unbolt the lathe from the shipping pallet.
2. Loosen the tailstock lock nut (see **Figure 8**), move the tailstock to the end of the bedway, then re-tighten the lock nut to secure it in place. This will help balance the lifting load.

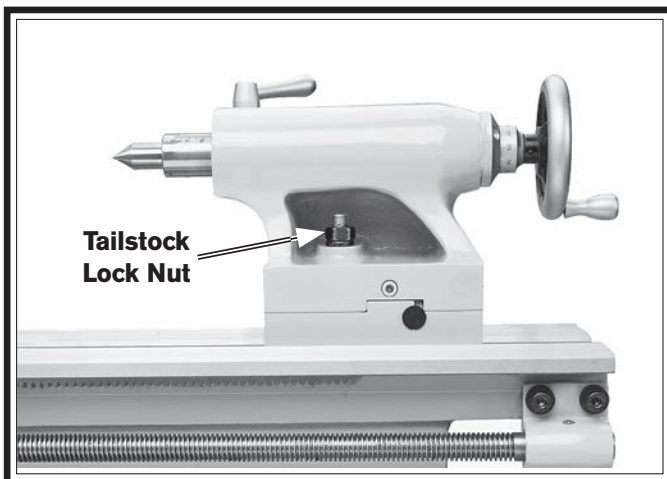


Figure 8. Tailstock lock nut.

3. To further balance the lifting load, move the carriage next to the tailstock, as follows:
 - a. Loosen the carriage lock (see **Figure 9**).

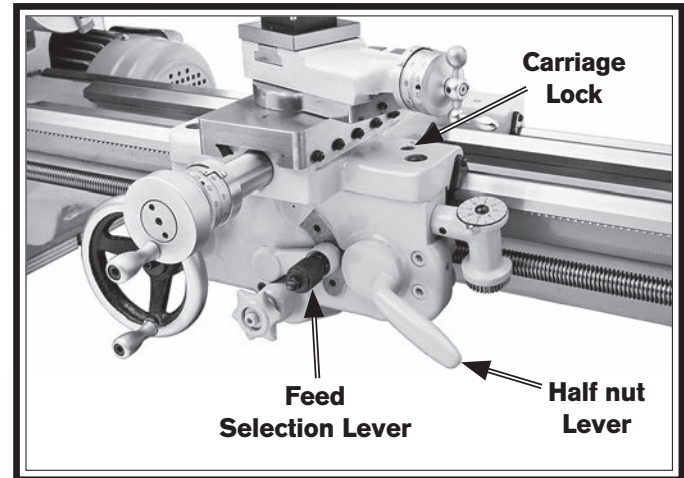


Figure 9. Carriage controls.

- b. Push the half nut lever down to disengage the carriage from the leadscrew.
 - c. Pull the handle of the feed selection lever out, then move the lever to the neutral (middle) position. This disengages the power feed mechanism from the leadscrew.
 - d. Use the handwheel to move the carriage next to the tailstock.
4. Wrap one lifting strap around the bed connector between the ways and next to the saddle (see **Figure 10**), then attach it the forklift.

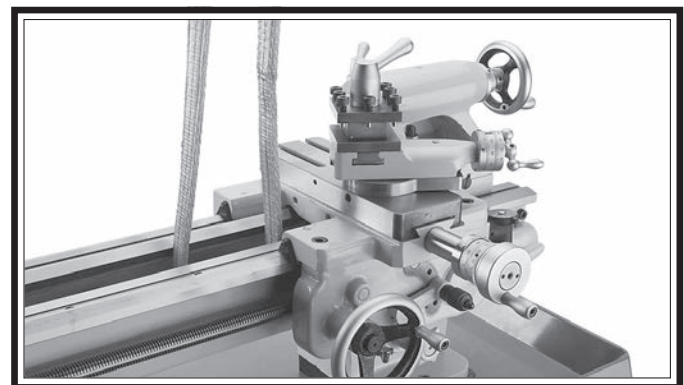


Figure 10. Tailstock, carriage, and one of the lifting straps in position for lifting the lathe.

5. Open the end gear cover and feed the lifting strap through the cavity of the headstock and behind the chuck, as shown in **Figure 11**, then attach it to the forklift.



Figure 11. Lifting strap properly positioned through the headstock.

Note: See **Figure 12** for an example photo of lifting the lathe with the straps positioned as instructed above.

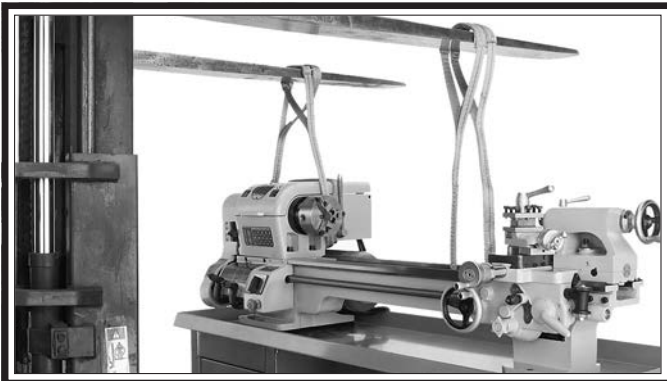


Figure 12. Example photo of lifting the lathe with the straps properly positioned.

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

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

7. Lift the lathe enough to clear the shipping pallet and any small floor obstacles, then move it to the prepared location and lower it in place.
8. Securely attach the magnetic switch in a convenient position near the lathe for quick use, but not close enough to interfere with operations (see the example photo in **Figure 13**).

Note: Secure the power cables so that there is not any strain on the wires inside and the cables are out of the way.



Figure 13. Example photo of the magnetic switch attached to the optional Model SB1035 stand.

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.

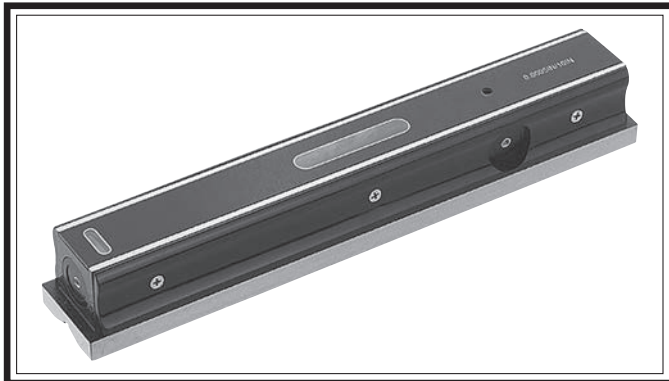


Figure 14. Example of a precision level.

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 15**) 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.

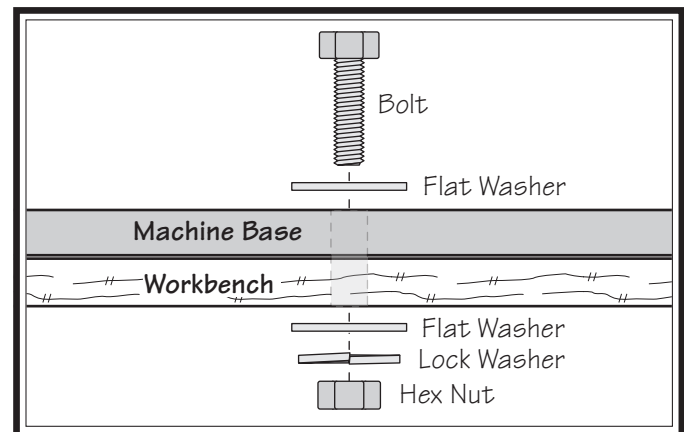


Figure 15. Example of a "Through Mount" setup.

Another option for mounting is a "Direct Mount" (see **Figure 16**) where the machine is simply secured to the workbench with a lag screw.

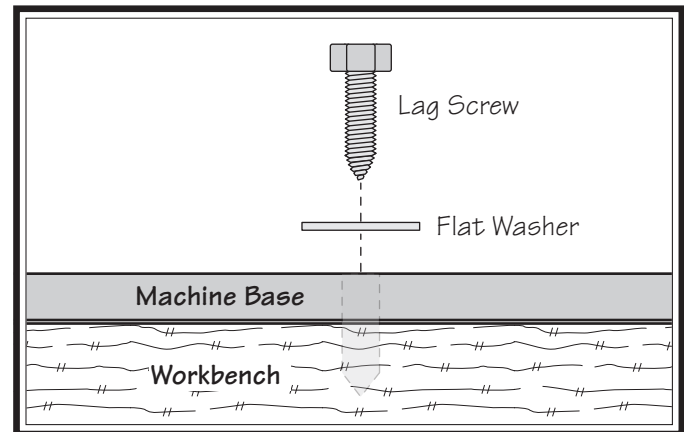


Figure 16. Example of a "Direct Mounting" setup.

Lubricating Lathe



The spindle bearings, quick-change gearbox, and carriage components must be properly lubricated before the lathe can be operated for the first time.

Running the lathe without proper lubrication may cause machine damage, which will not be covered under warranty. Refer to the **Lubrication** section, beginning on **Page 54**, for details on how to check and add lubrication.

Power Connection

Before the machine can be connected to the power source, an electrical circuit and connection device must be prepared per the **POWER SUPPLY REQUIREMENTS** section on **Page 12**, and all previous setup instructions in this manual must be complete to ensure that the machine has been assembled and installed properly.

Connecting Power

Always make sure the spindle switch on the front of the headstock is turned OFF (middle position) before connecting power.

Insert the power cord plug into a matching power supply receptacle. The machine is now connected to the power source.

Disconnecting Power

If you need to disconnect the machine from power for maintenance, service, or adjustments, pull the plug completely out of the receptacle.

Test Run

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

A **Troubleshooting** section is provided, starting on **Page 61**, to assist you with solutions if a problem occurs or if the lathe does not function as described in this section.

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

To test run your machine:

1. Read and follow the safety instructions at the beginning of the manual, take all required safety precautions, and make sure all previous preparation steps discussed in this manual have been followed and completed.
2. Clear away all tools and objects used during assembly, lubrication, and preparation.
3. To prevent unexpected movement when the lathe is turned **ON**, make sure the carriage components are disengaged from the longitudinal leadscrew by pressing down on the half nut lever and moving the feed selection lever to the neutral (middle) position (see **Figure 17**).

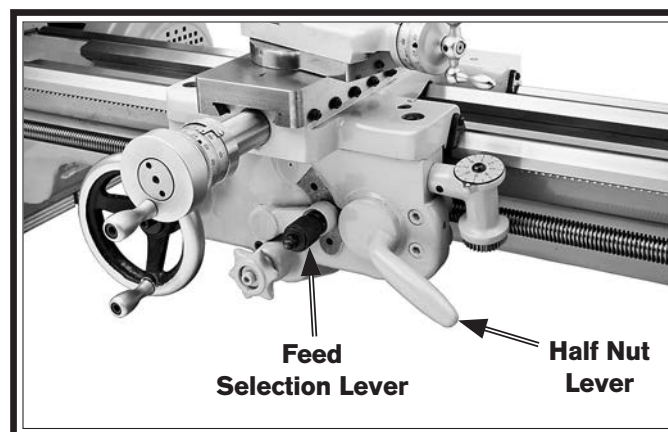


Figure 17. Carriage controls.

4. Configure the V-belts for a spindle speed of 216 RPM (see **Spindle Speed** on **Page 42** for detailed instructions).
5. Use the chuck key to make sure the chuck is firmly secured to the spindle, then remove the chuck key from the lathe (refer to **Chuck Installation** on **Page 28** for detailed instructions).
6. To verify that the lathe is operating properly, press the green button on the magnetic switch, then turn the lathe **ON** by rotating the spindle switch to the FWD (left) position.
 - When operating correctly, the machine runs smoothly with little or no vibration or rubbing noises.
 - Investigate and correct strange or unusual noises or vibrations before operating the machine further. Always disconnect the machine from power when investigating or correcting potential problems.
7. Turn the spindle switch to the OFF (middle) position, then wait until the spindle is completely stopped.
8. Verify the spindle operates in reverse by turning the spindle switch to the REV (right) position.
9. Move the spindle switch to the OFF (middle) position, wait until the spindle is completely stopped, then open the headstock top cover. This activates a limit switch that should prevent the lathe from starting while the cover is open.
10. Stay clear from the exposed V-belt and pulleys inside the headstock, then attempt to start the lathe—it should not start.
 - If the lathe *does not* start with the headstock cover open, the limit switch is operating correctly. Proceed to **Step 11**.
 - If the lathe *does* start with the headstock cover open, the limit switch is not operating correctly. This limit switch must operate properly before continuing operation. Rotate the spindle switch to the OFF position, disconnect the lathe from power, and call Tech Support for help.
11. Close the headstock cover, open the end gear cover on the left side of the headstock, stay clear from the exposed end gears, V-belt, and pulleys, then attempt to start the lathe.
 - If the lathe *does not* start with the end gear cover open, the limit switch is operating correctly. Close the end gear cover, then rotate the spindle switch to the OFF position.
 - If the lathe *does* start with the end gear cover open, this limit switch is not operating correctly. This safety feature must operate properly before continuing operation. Rotate the spindle switch to the OFF position, disconnect the lathe from power, and call Tech Support for help.

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

Spindle Break-In

Before subjecting the lathe to full loads, you must break it in so that bearings will fully seat, gear teeth will find their normal wear pattern, and lubricant will be worked into the required areas. Otherwise, the moving components of the lathe may suffer from excessive wear.

To perform the spindle break-in:

1. Successfully complete the **Test Run** procedure beginning on **Page 21**.
2. Set the spindle speed for 60 RPM (refer to **Spindle Speed** on **Page 42** for detailed instructions).
3. Take all safety precautions, then run the lathe for 10 minutes.

NOTICE

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

4. Turn the lathe **OFF** and wait until the spindle is completely stopped.
5. Repeat **Steps 3–4** for each of the remaining seven spindle speeds.
6. Set the spindle speed to 216 RPM and let the lathe run for a final 15 minutes to allow it to cool down, then turn the lathe **OFF**.
7. Check and, if necessary, re-tension the V-belts as instructed in the **Adjusting V-Belt Tension** subsection on **Page 60**.

The spindle break-in is complete. Continue with the following **Recommended Adjustments** subsection.

NOTICE

After the first 16 hours of use, the V-belts will stretch and seat into the pulley grooves. The V-belts must be properly re-tensioned after this period to avoid reducing their useful life. Refer to Adjusting V-Belt Tension on Page 60 for detailed instructions.

Recommended Adjustments

For your convenience, the adjustments listed below have been performed at the factory.

However, because of the many variables involved with shipping, we recommend that you at least verify the following adjustments to ensure the best possible results from your new machine.

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

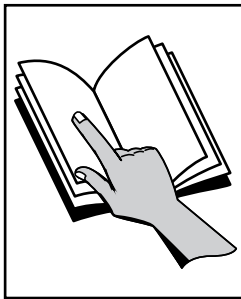
Factory adjustments that should be verified:

- Tailstock alignment (**Page 35**).
- Gib adjustments (**Page 57**).
- Cross slide backlash adjustment (**Page 59**).

Operation Overview

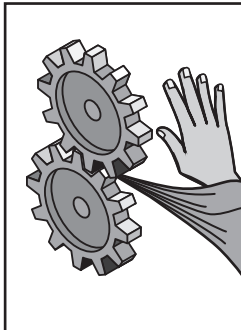
The purpose of this overview is to provide the novice machine operator with a basic understanding of how the machine is used during operation, so they can more easily understand the controls discussed later in this manual.

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



!WARNING

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



!WARNING

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



!WARNING

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

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

1. Puts on safety glasses, rolls up sleeves, removes jewelry, and secures any clothing, jewelry, or hair that could get entangled in moving parts.
2. Examines the workpiece to make sure it is suitable for turning, then mounts the workpiece in the chuck, and removes the chuck key from the machine.
3. Mounts the tooling, aligns it with the workpiece, then backs it away to establish a safe startup clearance.
4. Removes all setup tools from the lathe.
5. Checks for safe clearances by rotating the workpiece by hand at least one full revolution.
6. Moves slides to where they will be used during operation.
7. Sets the correct spindle speed for the operation.
8. If using power feed, selects the proper feed rate for the operation.
9. Presses the green button on the magnetic switch to enable power to the motor, then rotates the spindle switch to the FWD (left) position to start spindle rotation.
10. Uses the carriage handwheels or power feed options to move the tooling into the workpiece for operations.
11. When finished cutting, moves the spindle switch to the OFF position, waits until the spindle is completely stopped, then removes the workpiece.

Basic Controls & Components

Refer to **Figures 18–20** and the following descriptions to become familiar with the basic controls and components of this lathe.

Headstock

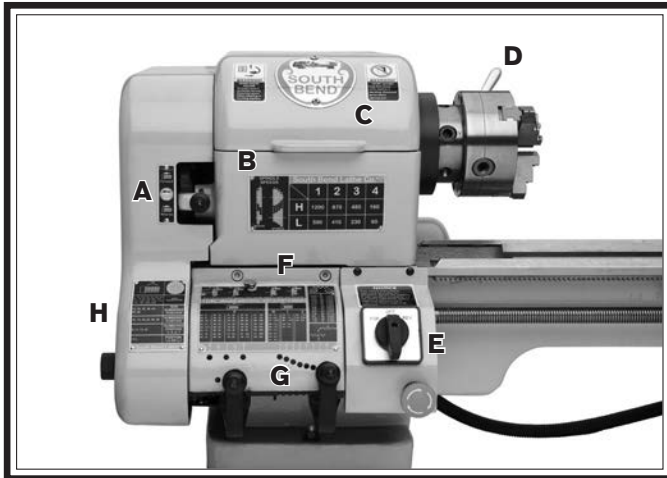


Figure 18. Headstock basic controls and components.

- A. Feed Direction Lever.** Controls the rotation direction of the longitudinal leadscrew, which controls the direction of travel for the carriage or cross slide when they are engaged with the leadscrew.
- B. Spindle Speed Chart.** Displays the V-belt configurations for the available spindle speeds.
- C. Headstock Cover.** Opens for access to the spindle V-belt when setting the spindle speed. When open, a limit switch is activated that cuts power to the motor.
- D. V-Belt Tension Lever.** When pulled forward, releases the tension on the V-belts so that they can be configured for the desired spindle speed. Push the lever backward to re-tension the V-belts before operation.
- E. Spindle Switch.** Starts, stops, and reverses spindle rotation.
- F. Power Feed & Thread Charts.** Display the configurations of the end gears and quick-change gearbox levers for available power feed rates or threading operations.
- G. Quick-Change Gearbox Levers.** Control the quick-change gears when selecting a power feed rate or threading option.
- H. End Gear Cover.** Allows access to the end gears and motor V-belt for configuration options. When opened, a limit switch is activated that cuts power to the motor.

Carriage

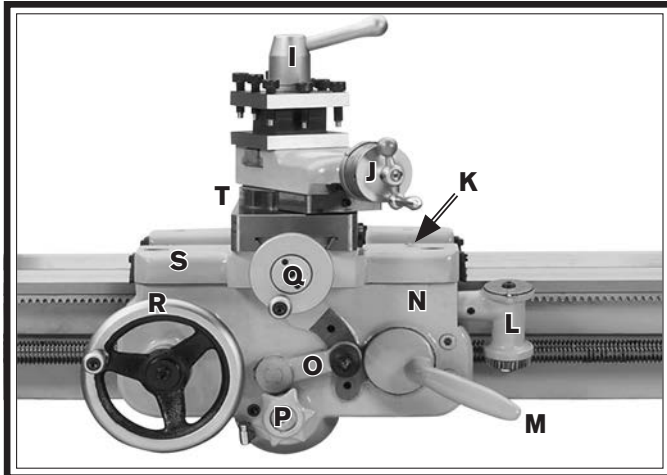


Figure 19. Carriage basic controls and components.

- I. **4-Way Tool Post.** Mounts up to four cutting tools at a time and rotates to index each of them to the workpiece as needed.
 - J. **Compound Rest Handwheel.** Moves the tool relative to the workpiece at the set angle. The attached indirect graduated dial has 0.001" (0.02mm) increments, with one full revolution equaling 0.100" (2.54mm) of travel.
 - K. **Carriage Lock.** Secures the carriage in place on the bedway for additional rigidity when the carriage should not move during the operation.
 - L. **Thread Dial Assembly.** Displays the correct position to engage the half nut when inch threading.
 - M. **Half Nut Lever.** Engages/disengages the half nut with the longitudinal leadscrew for threading operations.
 - N. **Apron.** Holds the controls and gears that control carriage and cross slide movement.
 - O. **Feed Selection Lever.** Selects either the carriage or cross slide for power feed operations. When in the neutral (middle) position, power feed is disabled. This lever works in conjunction with the feed knob.
 - P. **Feed Knob.** When tightened, engages either the carriage or cross slide for power feeding. Conversely, when loosened, disengages power feed. If the feed selection lever is in the neutral position or the half-nut is engaged, the feed knob has no effect.
 - Q. **Cross Slide Handwheel.** Moves the cross slide toward or away from the spindle centerline. The attached graduated dial has 0.001" (0.020mm) increments with one full revolution equaling 0.100" (2.54mm) of travel. This is an indirect dial, which means that the amount removed from the workpiece is twice the dial reading.
- Note:** There are two $\frac{5}{8}$ " T-slots on the top of the cross slide behind the compound rest for mounting additional accessories.
- R. **Carriage Handwheel.** Moves the carriage longitudinally along the bedway. The attached graduated dial has 0.020" increments with one full revolution equaling 0.100" of travel.
 - S. **Saddle.** Supports the cross slide, compound rest, and tool post over the bedway.
 - T. **Compound Rest Angle Scale.** Displays the angle of the compound rest left or right from the spindle centerline in increments of one degree.

Tailstock

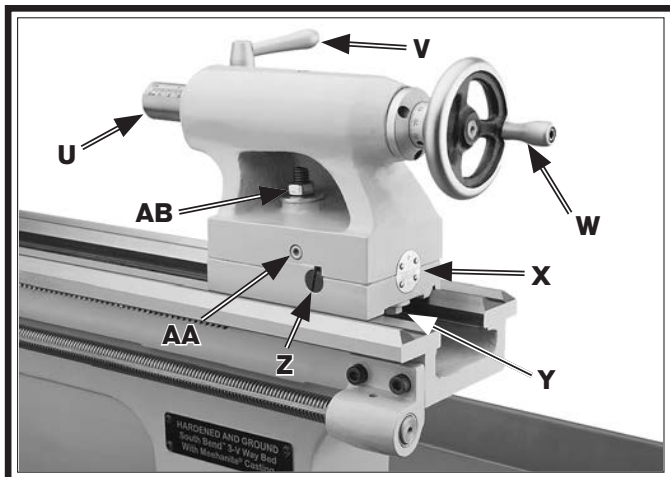


Figure 20. Tailstock basic controls and components.

- U. Quill.** Holds an MT#2 cutting tool, chuck, or center. The outside of the quill is marked in inches and latheimeters.
- V. Quill Lock Lever.** When tightened, locks the quill in place for increased rigidity.
- W. Tailstock Handwheel.** Moves the quill toward or away from the spindle. The attached graduated dial has 0.010" increments with one full revolution equaling 0.100" of travel.
- X. Offset Scale.** Displays the relative amount the tailstock is offset from the spindle centerline. For accurate offset measurements, use a dial indicator.
- Y. Clamping Cap Screw.** One of two cap screws that clamp the top and bottom tailstock castings together after adjusting the offset.
- Z. Gib Adjustment Screw.** One of two screws that adjust the tailstock gib.
- AA. Tailstock Adjustment Screw.** One of two screws that adjust the offset of the tailstock top casting from the spindle centerline.
- AB. Tailstock Lock Nut.** When tightened, secures the tailstock in place along the bedway.

Chuck & Faceplate Mounting

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

!WARNING

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

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

The 3-jaw chuck has a D1-3 camlock mount, and the chuck key is used to turn the locking cams to secure the chuck to the spindle.

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

If neither chuck cannot hold your workpiece, a faceplate has slots for T-bolts that hold standard or custom clamping hardware. With the correct clamping hardware, a faceplate offers a wide range of uses, including machining non-concentric workpieces, straight turning between centers, off-center turning, and boring.

See **Accessories** on **Page 51** for available 4-jaw chuck and faceplate options from South Bend.

Installation & Removal Chuck Installation Devices

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

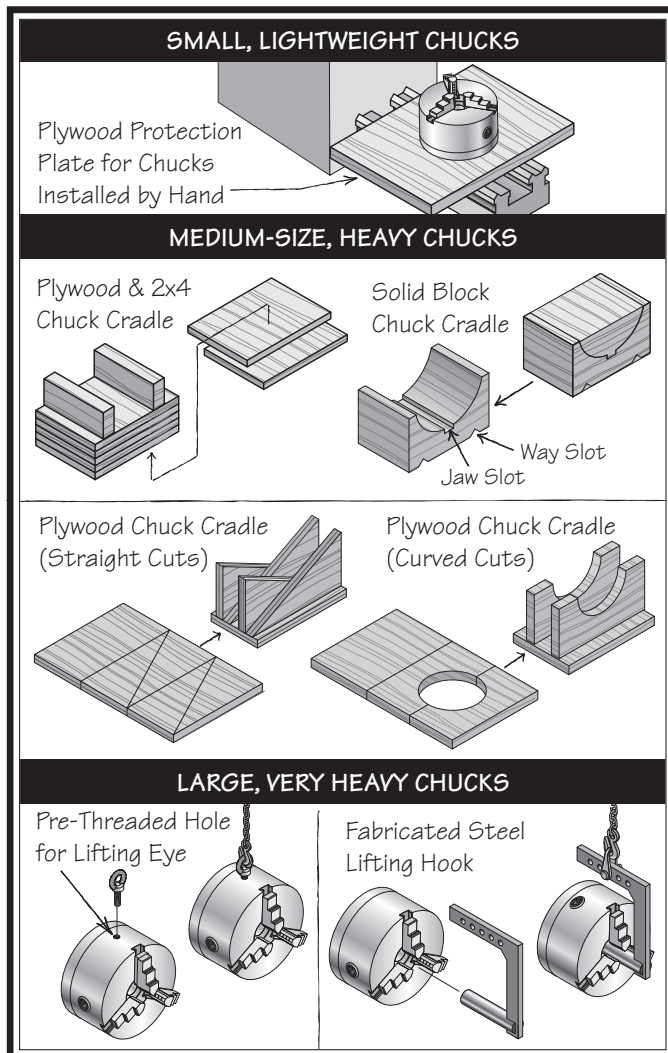


Figure 21. Examples of common devices used during chuck installation and removal.

Chuck Installation

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

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

To install the chuck:

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

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

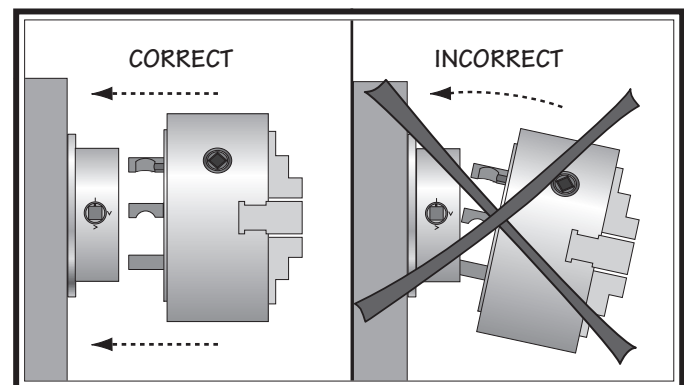


Figure 22. Inserting camlock studs into spindle cam holes.

5. Incrementally tighten the camlocks in a criss-cross or star pattern to ensure that the chuck seats evenly against the spindle.
6. When the chuck is fully seated and all the camlocks are tight, verify that the cam line is between the two "V" marks on the spindle nose, as shown in the following figure.

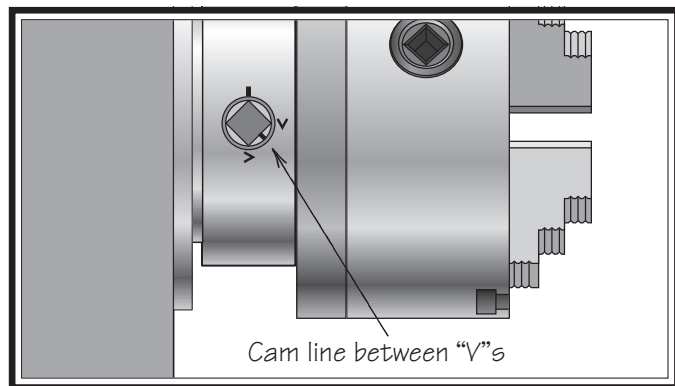


Figure 23. Cam line positioned between the "V" marks after the camlocks are fully tightened.

- If the cam line is NOT between the "V" marks when the camlock is tight, the stud may be installed at the incorrect height. To fix this, adjust the stud height as shown in the following figure. Make sure to re-install the stud cap screw afterward.
- If adjusting the stud height does not correct the problem, try swapping stud positions on the chuck.

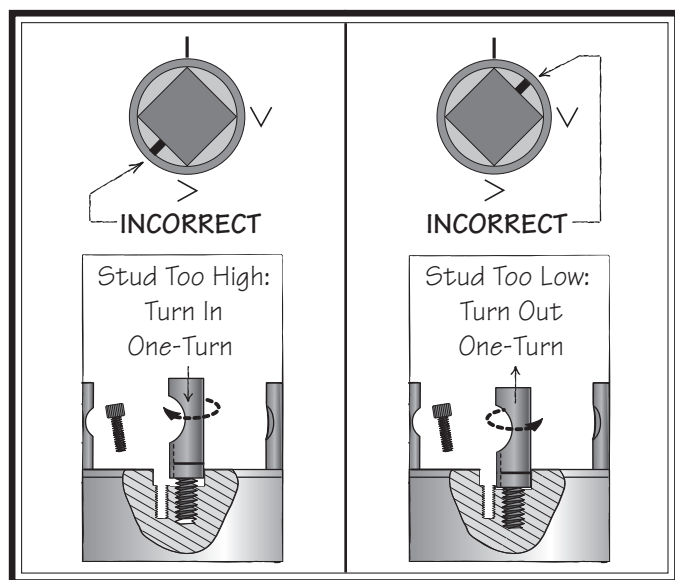


Figure 24. Correcting an improperly installed stud.

7. Verify that the chuck fits the spindle properly by checking for any gaps between the mating surfaces.
 - If there are no gaps, proceed to **Step 8**.
 - If there is a gap, remove the chuck, re-clean the mating surfaces carefully, and re-install. If the problem persists, contact our Tech Support.
8. Verify that the chuck/spindle tapers are seated firmly together by removing the chuck, per the **Chuck Removal** instructions, and pay close attention to how easily the tapers release.
 - If it was necessary to bump the chuck or use a mallet to release the tapers, then they are seating together properly.
 - If the tapers released easily with little intervention, they are not seated together firmly as required. Remove the chuck, re-clean the mating surfaces carefully, and re-install. If the problem persists, contact our Tech Support.

Registration Marks

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

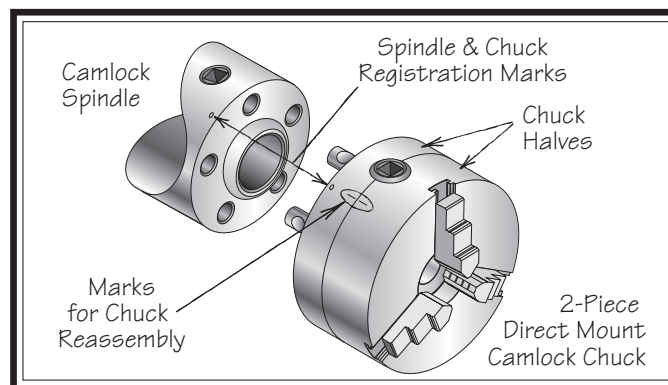


Figure 25. Registration mark locations.

Chuck Removal

To remove the chuck:

1. DISCONNECT LATHE FROM POWER!
2. Use an appropriate support or protective device to protect the ways and support the chuck (refer to **Installation & Removal Devices** on Page 28).
3. Loosen the camlocks by turning the key counterclockwise until each of the cam lines are aligned with its corresponding spindle mark (see **Figure 26**).

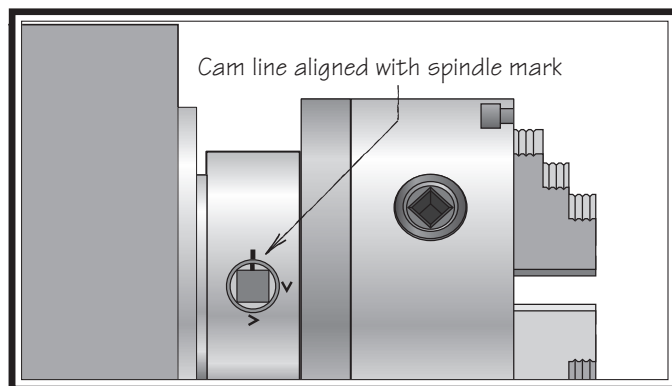


Figure 26. Camlock is fully loosened when the cam line is aligned with the spindle mark.

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

4. Using a dead blow hammer or other soft mallet, lightly tap around the outer circumference of the chuck body to loosen it from the spindle.
5. Remove the chuck from the spindle, using a light rocking motion to carefully slide the studs out of the cam holes.
 - If the chuck does not immediately come off, rotate it approximately 60° and tap it again. Make sure all the marks on the cams and spindle are in proper alignment for removal.

Scroll Chuck Clamping

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

Never mix jaw types or positions to accommodate an odd-shaped workpiece.

The chuck will spin out of balance and may throw the workpiece! Instead, use an independent jaw chuck or a faceplate.

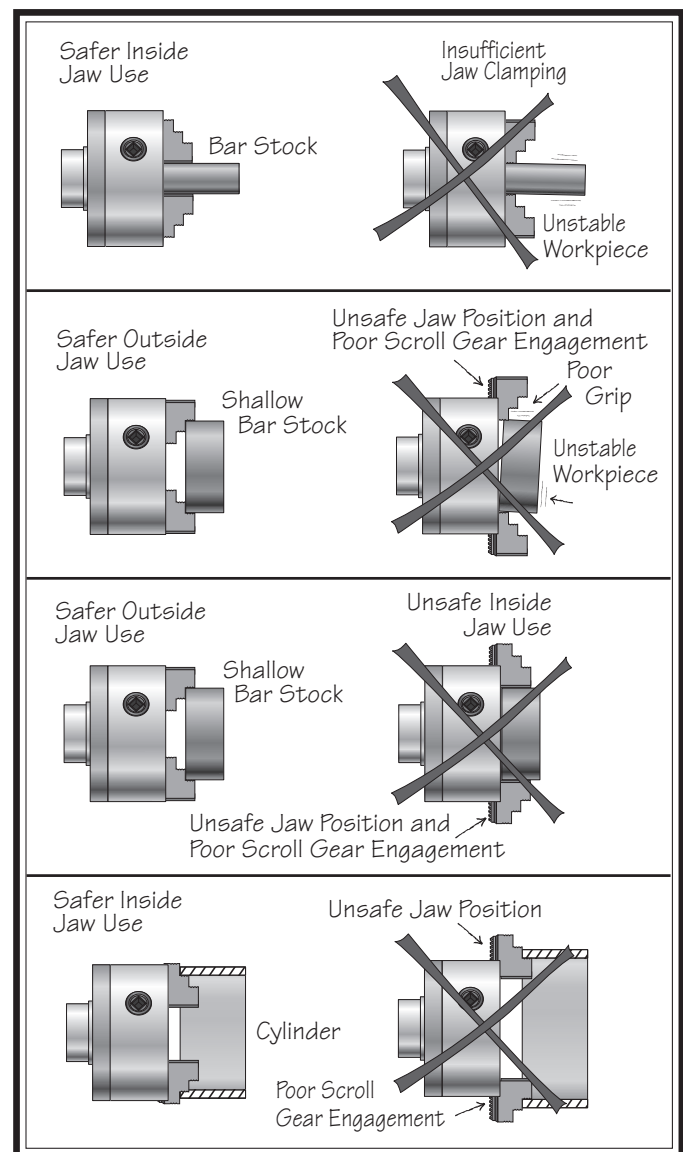


Figure 27. Jaw selection and workpiece holding.

4-Jaw Chuck

Refer to the **Chuck Installation** (see **Page 28**) and **Chuck Removal** (see **Page 30**) instructions to install or remove a 4-jaw chuck.

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

⚠ WARNING

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

Mounting Workpiece

1. DISCONNECT LATHE FROM POWER!
2. Use an appropriate support, or protective device to protect the ways and support the chuck (refer to **Installation & Removal Devices** on **Page 28**).
3. Use the chuck key to open each jaw so the workpiece will lay flat against the chuck face, jaw steps, or into the spindle opening.
4. With help from another person or a holding device, position the workpiece so it is centered in the chuck.

5. Tighten each jaw in small increments. After you have adjusted the first jaw, continue tightening the remaining jaws in an opposing sequence, as shown by the sequential order in **Figure 28**.

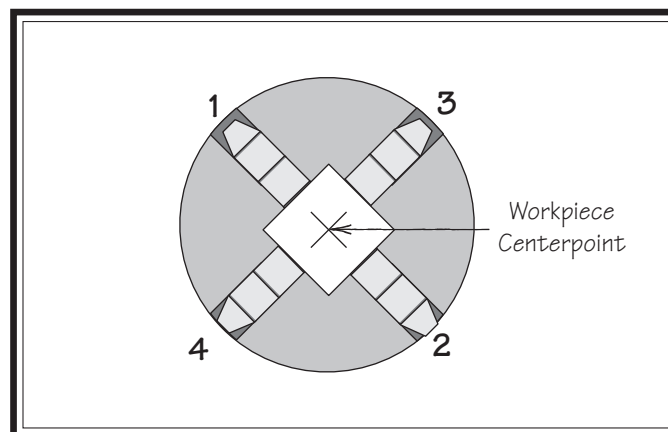


Figure 28. 4-jaw tightening sequence.

6. After the workpiece is held in place by the jaws, use a dial indicator to make sure the workpiece is centered in the chuck.
 - If the workpiece is not correctly centered, make fine adjustments by slightly loosening one jaw and tightening the opposing jaw until the workpiece is correctly positioned (see **Figure 29** for an example).



Figure 29. Example photo of non-cylindrical workpiece correctly mounted on the 4-jaw chuck.

Faceplate

Refer to the **Chuck Installation (Page 28)** and **Chuck Removal (Page 30)** instructions to install or remove the faceplate.

The optional Model SB1452 cast-iron faceplate can be used for a wide range of operations, including machining non-concentric workpieces, straight turning between centers, off-center turning, and boring.

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

⚠ WARNING

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

⚠ WARNING

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

To mount a non-concentric workpiece to the faceplate:

1. DISCONNECT LATHE FROM POWER!
2. Use an appropriate support, or protective device to protect the ways and support the chuck (refer to **Installation & Removal Devices on Page 28**).
3. With help from another person or a holding device to support the workpiece, position it onto the faceplate and clamp it in place with a minimum of three independent clamping devices (see **Figure 30** for an example).

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

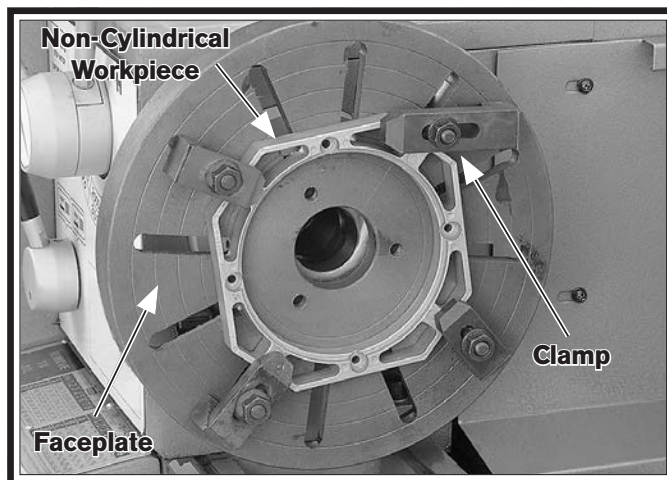


Figure 30. Example photo of workpiece clamped in a faceplate.

Tailstock

The tailstock (see **Figure 31**) can be used to support workpieces with the use of centers. It can also be used to drill or bore holes, or cut shallow tapers by using the offset adjustment.

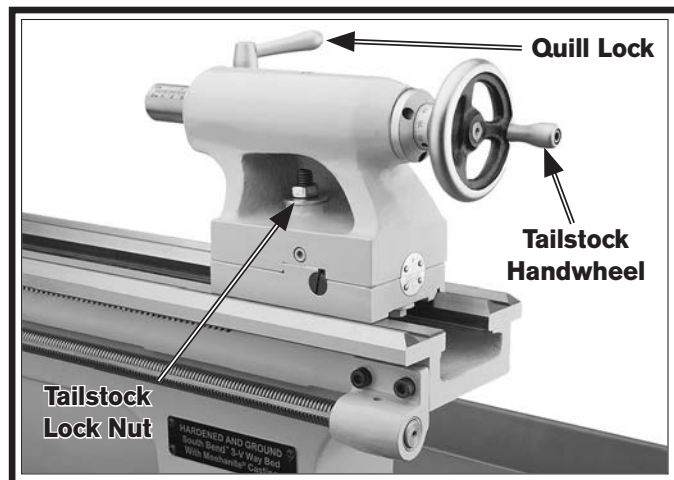


Figure 31. Tailstock controls.

Positioning Tailstock

1. Use a 19mm wrench to loosen the tailstock lock nut.
2. Slide the tailstock to the desired position.
3. Re-tighten the lock nut to secure the tailstock in position.

Using Quill

1. Rotate the quill lock counterclockwise to allow for quill adjustment.
2. Turn the tailstock handwheel clockwise to move the quill toward the spindle or counterclockwise to move the quill away from the spindle.
3. Re-tighten the quill lock to secure the quill in place.

Installing Tooling

This tailstock quill accepts tooling arbors and drill bits with an MT#2 taper (see **Figures 32** for examples).

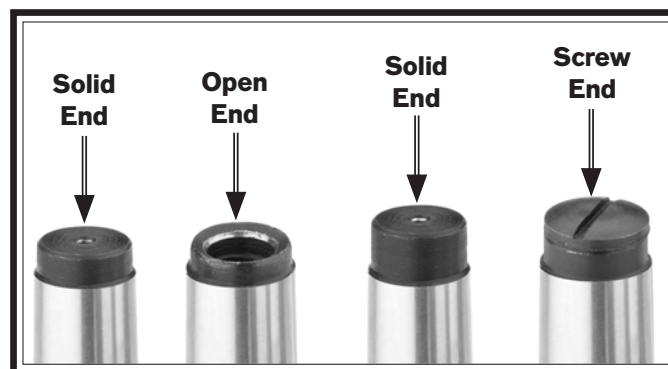


Figure 32. Types of tapered arbors and tooling.

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.

To install tooling in the tailstock:

1. With the tailstock locked in place, unlock the quill, then use the handwheel to extend it approximately 1".
2. Thoroughly clean and dry the tapered mating surfaces of the quill and the center, making sure that no lint or oil remains on the tapers.
3. With a firm and quick motion, insert the tool into the quill. Check to see if it is firmly seated by attempting to twist it—a firmly seated tool will not twist.
4. Unlock the tailstock and move it until the tip of the tool is close to, but not touching, the workpiece, then re-lock the tailstock.

Note: The tool may seat further as it contacts the workpiece.

Removing Tooling

1. Use a shop rag to hold the tool.
2. Rotate the tailstock handwheel counterclockwise until the tool is forced out of the quill.

Offsetting Tailstock

The tailstock can be offset from the spindle centerline for turning tapers. Move the tailstock top casting toward the front of the lathe to machine a taper at the tailstock end. Conversely, position the tailstock top casting toward the back of the lathe to machine a taper at the spindle end (see the illustration in **Figure 34**).

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 5mm	1
Hex Wrench 6mm	1

To offset the tailstock:

1. Loosen the clamping cap screws underneath both ends of the tailstock to release the clamping pressure between the top and bottom castings (see **Figure 33**).

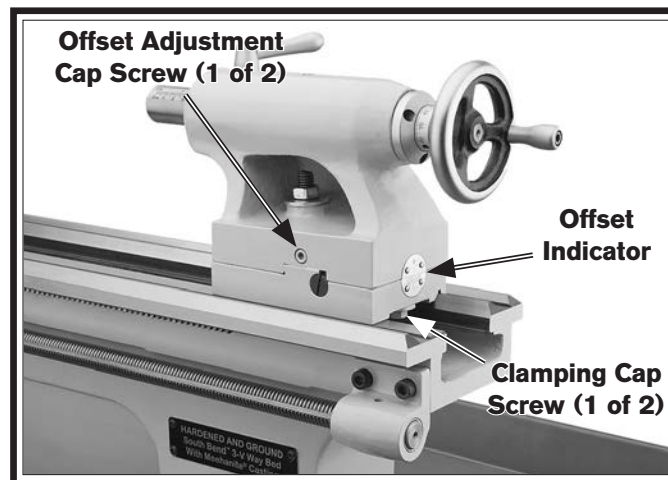


Figure 33. Tailstock offset controls.

2. Rotate the offset adjustment cap screws in opposite directions for the desired offset (see the illustration in **Figure 34**).

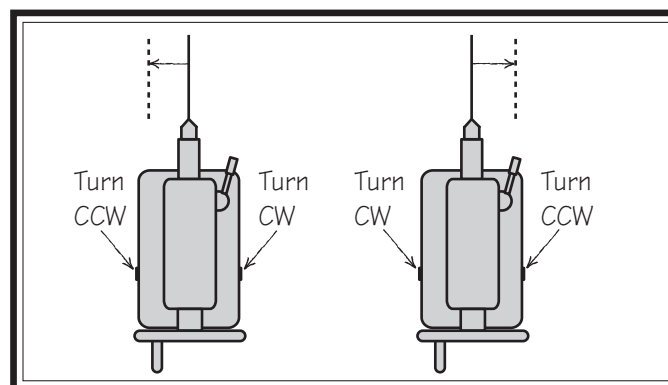


Figure 34. Set screw adjustment in relation to tailstock movement.

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

Aligning Tailstock To Spindle Centerline

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

Items Needed	Qty
Hex Wrench 5mm	1
Hex Wrench 6mm	1
Precision Level	1
Round Stock 2" x 6"	2
Test or Dial Indicator w/Mount.....	1

To align the tailstock offset to the spindle centerline:

1. Use the precision level to make sure the bedway is level from side to side and from front to back.
 - If the bedway is not level, correct this condition before continuing with this procedure (refer to **Leveling on Page 20**).
2. Center drill both ends of one piece of round stock, then set it aside for use in **Step 5**.
3. Use the other piece of round stock to make a dead center, and turn it to a 60° point, as illustrated in **Figure 35**.

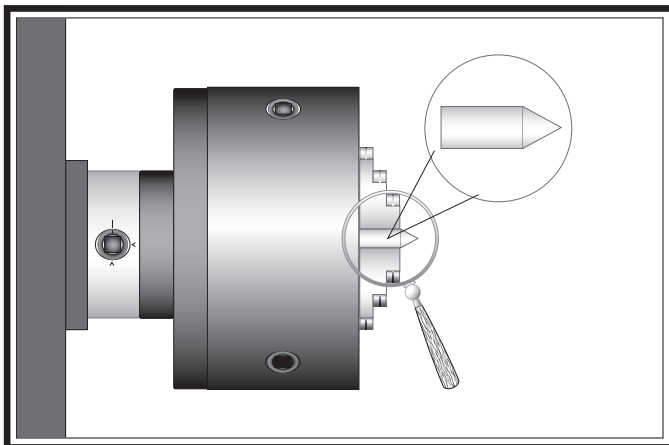


Figure 35. Turning a dead center.

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

4. Install a center in the tailstock.
5. Attach a lathe dog to the test stock from **Step 2**, then mount it between the centers (see **Figure 36** for an example setup).



Figure 36. Example photo of stock mounted between the centers.

6. Turn 0.010" off the diameter along the entire length of the stock.
7. Mount a test or dial indicator so that the plunger is on the tailstock quill.

Note: If necessary in the following step, refer to **Offsetting Tailstock** on **Page 34** for detailed instructions.

8. Use calipers to measure both ends of the workpiece and adjust the tailstock offset as necessary (refer to **Offsetting Tailstock** on **Page 34** for detailed instructions).

— If the test stock is *thicker* at the tailstock end, move the tailstock *toward* the *front* of the lathe $\frac{1}{2}$ the distance of the amount of taper (see **Figure 37**).

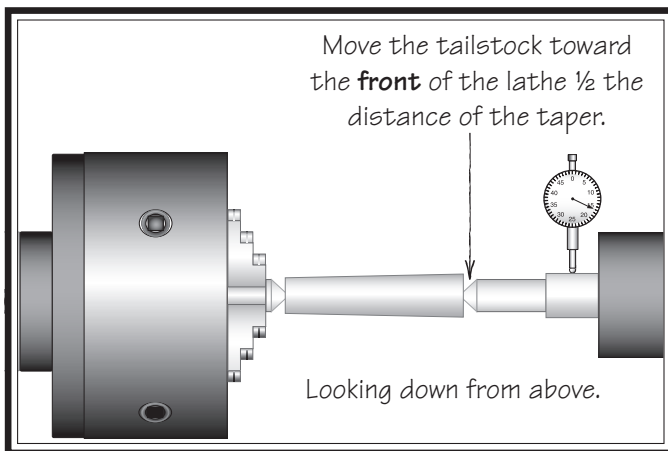


Figure 37. Adjust tailstock toward the front of the lathe.

— If the test stock is *thinner* at the tailstock end, move the tailstock *toward* the *back* of the lathe $\frac{1}{2}$ the distance of the amount of taper (see **Figure 38**).

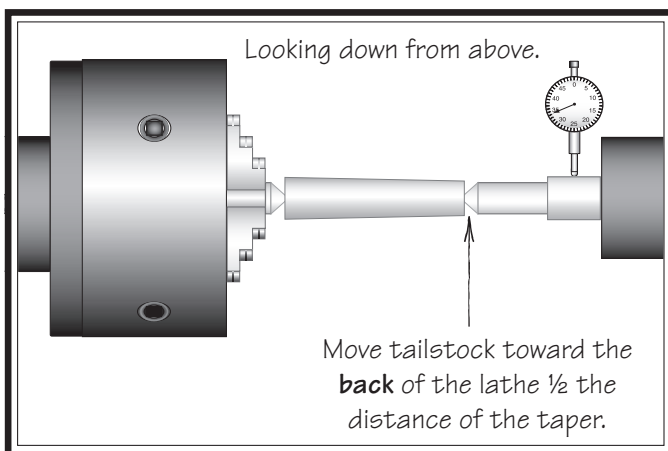


Figure 38. Adjust tailstock toward the back of the lathe.

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

Centers

Figure 39 shows the MT#2 and carbide-tipped MT#3 dead centers included with the lathe.



Figure 39. Dead centers.

Dead Centers

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

The carbide-tipped dead center can better withstand the effects of friction. The tip of the center must be generously lubricated with an lubricant to avoid premature wear and maximize smooth operation. Using low spindle speeds will also reduce the heat and wear from friction.

Live Centers

Although the dead center achieves a more accurate finished product, it requires low spindle speeds to avoid excessive heat from friction that could damage the center or workpiece. A live center has bearings that allow the center tip to rotate with the workpiece, and is installed in the tailstock quill for higher speeds, but with a slight bit of accuracy loss.

Mounting Dead Center in Spindle

1. DISCONNECT LATHE FROM POWER!
 2. Thoroughly clean and dry the tapered mating surfaces of the spindle bore and the MT#3 center, making sure that no lint or oil remains on the tapers.
- Note:** This will ensure that the center seats properly and reduce runout.
3. Mount a chuck or faceplate onto the spindle, whichever is correct for your operation.
 4. Insert the center into the spindle bore through the chuck or faceplate.

Figure 40 shows an example of the dead center installed in the spindle, using a lathe dog and faceplate for turning between centers.

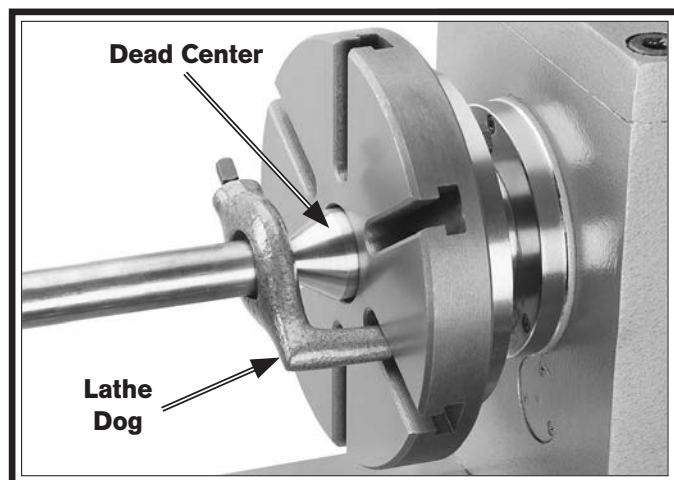


Figure 40. Example photo of using a dead center with a faceplate and lathe dog.

Removing Center from Spindle

To remove the center from the spindle, insert a piece of round bar stock or similar tool through the outboard end (on the left side of the headstock), then tap the center loose.

Hold onto the center with a gloved hand or shop rag as you tap it loose to avoid dropping it and damaging the tip of the center or the bedways.

Mounting Center in Tailstock

Use the MT#2 dead center in the tailstock.

Figure 41 shows an example photo of a dead center mounted in a tailstock.

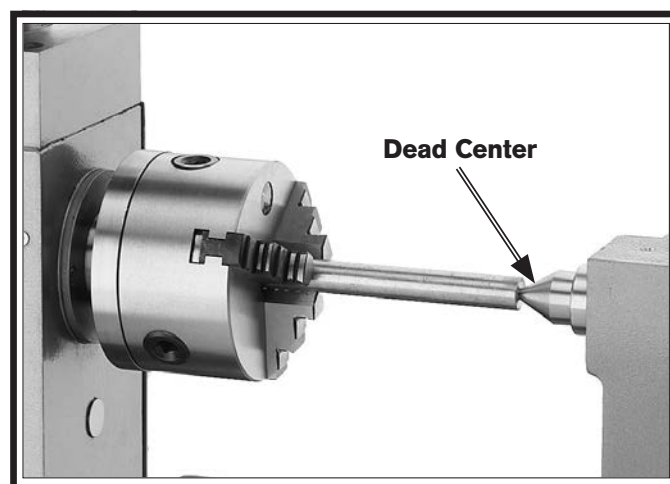


Figure 41. Example photo of using a carbide-tipped dead center installed in the tailstock.

NOTICE

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

To mount a center in the tailstock:

1. DISCONNECT LATHE FROM POWER!
2. Thoroughly clean and dry the tapered mating surfaces of the tailstock quill bore and the MT#2 center, making sure that no lint or oil remains on the tapers.
3. Use the tailstock handwheel to feed the quill out from the casting approximately 1".

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

4. Insert the center into the tailstock quill with a quick and firm motion.

Removing Center from Tailstock

1. Use a shop rag to hold the center.
2. Rotate the tailstock handwheel counterclockwise until the center is forced out of the quill.

Mounting Workpiece Between Centers

1. DISCONNECT LATHE FROM POWER!
2. Drill center holes in both ends of the workpiece.
3. Install the MT#3 dead center in the spindle with a lathe dog and chuck or faceplate, then install the MT#2 dead center in the tailstock.
4. Generously lubricate the workpiece center holes, then mount the workpiece on the centers and hold it in place with light pressure from the tailstock center.
5. Seat the center firmly into the quill by rotating the tailstock handwheel clockwise to apply pressure against the workpiece (see the example photo in **Figure 42**).

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



Figure 42. Example photo of a workpiece mounted between the centers.

Carriage & Slide Locks Compound Rest

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

To lock the carriage, use a 5mm hex wrench to tighten the carriage lock cap screw shown in **Figure 43**.

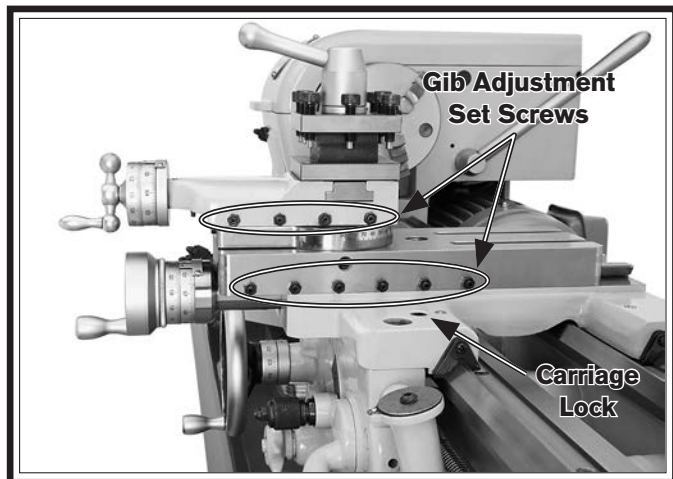


Figure 43. Locations of carriage lock and cross slide/compound rest gib adjustment screws.

To lock the cross slide or compound rest, use an 8mm wrench and 2.5mm hex wrench to fully tighten the two end gib adjustment set screws on both sides.

Note: When it is no longer necessary to lock these components, make sure to loosen/re-adjust the lock fasteners to allow the components to freely move.

The base of the compound rest has an angle scale used for setting the tool to a specific angle to the spindle centerline.

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

To set the compound rest at a certain angle:

1. Loosen the two set screws in the side of the cross slide (1 of 2 shown in **Figure 44**).

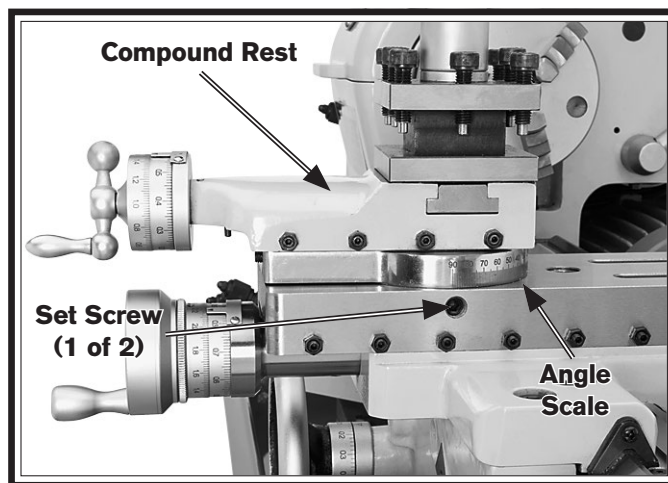


Figure 44. Compound rest locking set screws.

2. Rotate the rest to the desired angle, as indicated by the scale at the base, then re-tighten the two set screws.

Tip: If setting up to cut external right-hand inch or metric threads, or internal left-hand threads for the first time, set the compound rest so its travel is perfectly parallel with the cross slide. Using a protractor, rotate the compound 29.5° counterclockwise and mark the new location on the cross slide. This mark will be the quick reference point for setting the offset angle. To mark for internal right-hand threads or external left-hand threads, repeat this process, but rotate the rest 29.5° clockwise and mark the cross slide accordingly.

Four-Way Tool Post

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

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

Installing Tool

Tool Needed

Hex Wrench 5mm 1

Qty

To load the tool post:

1. Adjust the tool post bolts so that the cutting tool can fit underneath them (see **Figure 45**).

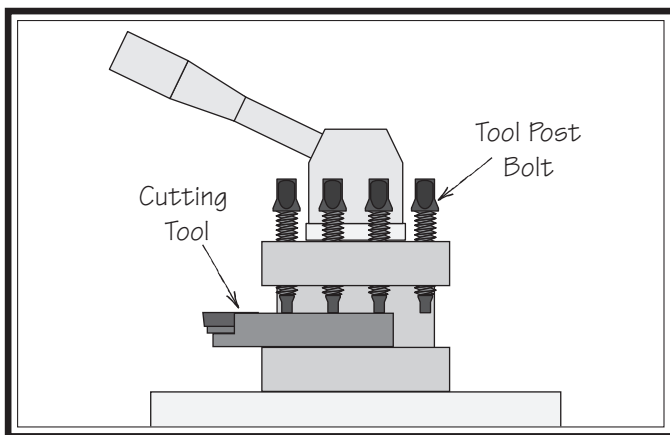


Figure 45. Example of tool mounted in tool post.

⚠ WARNING

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

2. Firmly secure the cutting tool with a minimum of two tool post cap screws.
3. Check and adjust the cutting tool to the spindle centerline, as instructed in the next subsection.

Aligning Cutting Tool with Spindle Centerline

For most operations, the cutting tool tip should be aligned with the spindle centerline, as illustrated in **Figure 46**.

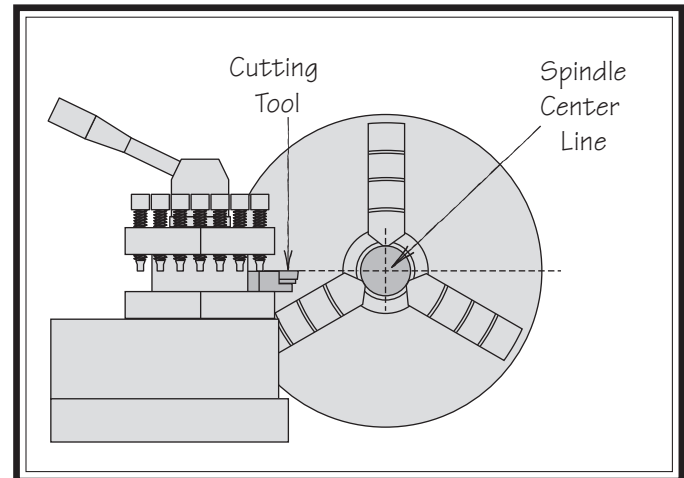


Figure 46. Cutting tool aligned with spindle centerline (viewed from tailstock).

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

Below are two common methods:

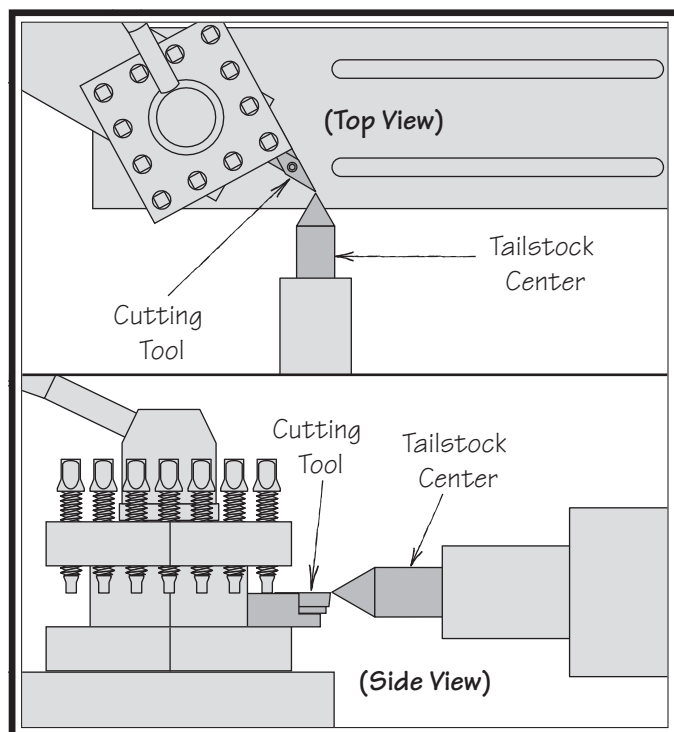
- Align the tip of the cutting tool with a center installed in the tailstock, as instructed on the next page. For this to work, the tailstock must be aligned to the spindle centerline (refer to **Aligning Tailstock To Spindle Centerline** on **Page 35** for detailed instructions).
- Make a facing cut on a piece of round bar stock. If the tool is above or below the spindle centerline, a nub will be left in the center of the workpiece. Adjust the height of the tool, then repeat the facing cut to check the adjustment. Repeat as necessary until the center of the workpiece face is smooth.

Tools Needed

	Qty
Hex Wrench 5mm	1
Steel Shims.....	As Needed
Cutting Tool.....	1
Fine Ruler.....	1
Tailstock Center.....	1

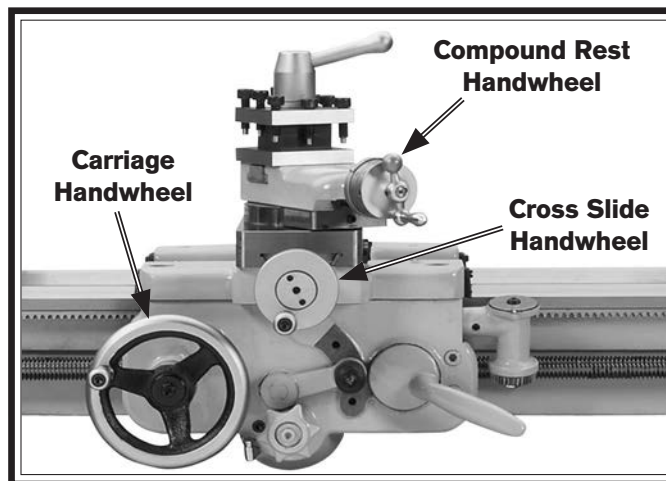
To align the cutting tool with the tailstock center:

1. Mount the cutting tool in the tool post, then secure the post so the tool faces the tailstock.
2. Install a center in the tailstock, and position the center tip near the cutting tool tip.
3. Lock the tailstock and quill in place.
4. Adjust the height of the cutting tool so that the tool tip is aligned vertically and horizontally with the center tip, as shown in **Figure 1**.

**Figure 1. Cutting tool tip aligned with tailstock center.**

Manual Feed

The handwheels shown in **Figure 47** allow the operator to manually move the cutting tool.

**Figure 47. Manual feed controls.**

Carriage Handwheel

The carriage handwheel moves the carriage left or right along the bed. It has a graduated dial with 0.020" increments, and one full revolution moves the carriage 1".

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. This slide has an indirect dial, which means the workpiece amount removed is twice the amount read on the dial. The dial has 0.001" (0.02mm) increments, and one full revolution moves the slide 0.100" (2.54mm).

Compound Rest Handwheel

The compound rest handwheel moves the cutting tool linearly along the set angle of the rest. The compound rest angle is set by hand-rotating it and securing it in place with the two set screws in both sides of the slide. The dial has 0.001" (0.02mm) increments, and one full revolution moves the slide 0.100" (2.54mm).

Spindle Speed

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

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

Determining Spindle Speed

Many variables affect the optimum spindle speed to use for any given operation, but the two most important are the recommended cutting speed for the workpiece material and the diameter of the workpiece, as noted in the formula shown in **Figure 48**.

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

*Double if using carbide cutting tool

Figure 48. Spindle speed formula for lathes.

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

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

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

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

Setting Spindle Speed

Setting spindle speed requires positioning the motor and spindle V-belts on the correct pulleys for the desired speed (see **Figure 49**).

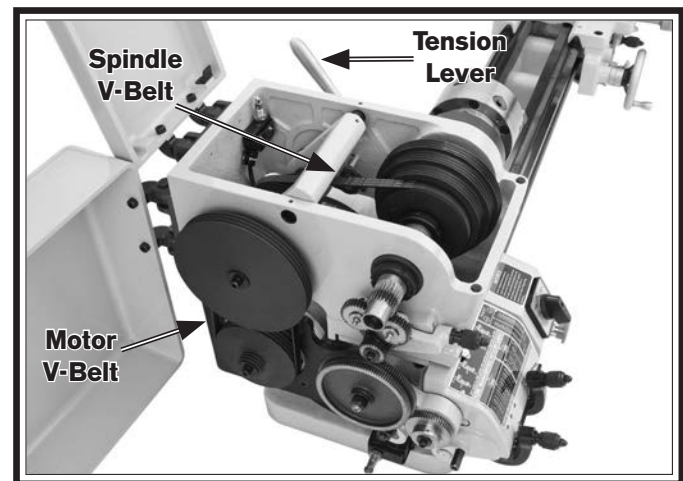


Figure 49. Spindle speed configuration controls.

The spindle speed configuration chart in **Figure 50**, displays the motor and spindle V-belt pulley positions for the available spindle speeds.

SPINDLE SPEEDS		South Bend Lathe Co.®			
		1	2	3	4
H	1200	782	509	332	
L	216	141	92	60	

Figure 50. Spindle speed configuration chart.

To set the spindle speed:

1. DISCONNECT LATHE FROM POWER!
2. Pull the V-belt tension lever all the way forward, then open the headstock and end gear covers.
3. Roll the V-belts onto the correct pulleys for the spindle speed selected, then push the tension lever all the way back.
4. Close and secure the headstock and end gear covers before connecting the lathe to power.

Power Feed

On this lathe, both the carriage and cross slide have power feed capability when the carriage is engaged with the longitudinal leadscrew. The rate that these components move (feed rate) is controlled by the end gear arrangement and the configuration of the gearbox levers.

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

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

Note: 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 the spindle is completely stopped **BEFORE** using the gearbox levers to make changes. If the spindle is rotating when you change the power feed rate with the quick-change gearbox levers, the gears could become damaged!

Power Feed Chart

Refer to the feed rate configuration chart in **Figure 51** to identify the correct quick-change gearbox lever arrangement for the desired power feed.

Note: For non-threading power feed operations, the end gears must be in the "F" configuration. Refer to **End Gears** on **Page 46** for detailed instructions in arranging the end gears.

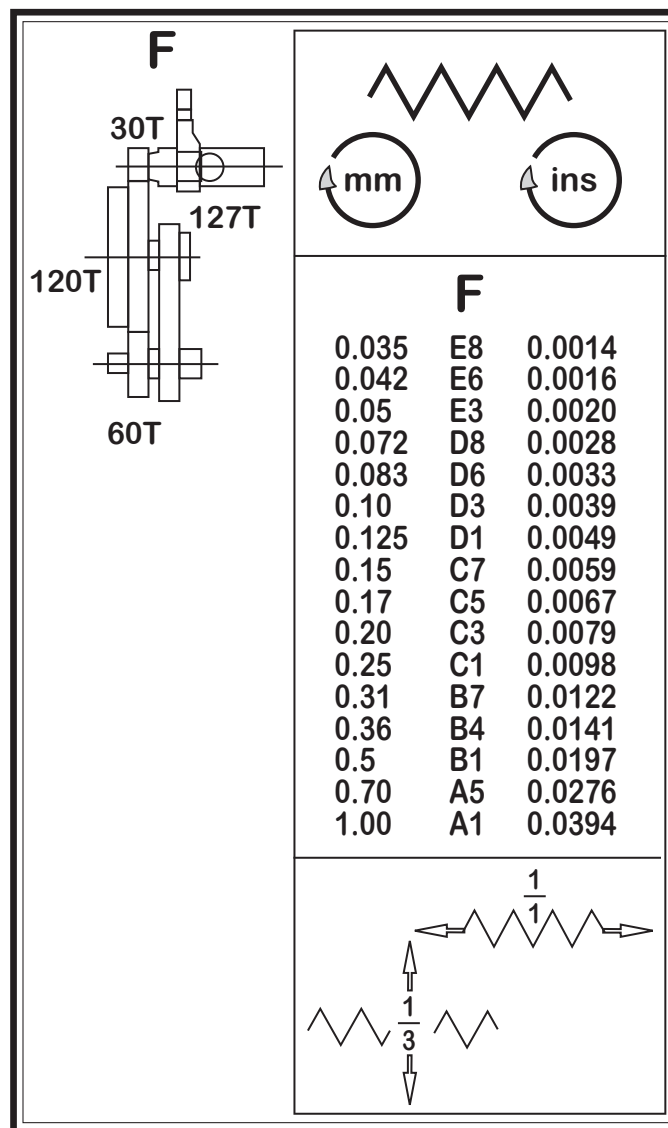


Figure 51. Feed rate configuration chart.

Setting Power Feed Rate

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

Note: The feed rate when the cross slide is selected for power feed is $\frac{1}{3}$ the rate stated in the feed rate chart.

Setting Power Feed Rate of 0.17mm/rev

1. DISCONNECT LATHE FROM POWER!
2. Make sure the end gears are in the **F** configuration, which is applicable for all feed operations (refer to **End Gears** on **Page 46** for detailed instructions).
3. Pull the locking pin out on the feed direction lever, align it with the hole for the desired feed direction per the label to the left, then release the pin so that it is fully seated into the hole (see **Figure 52**).

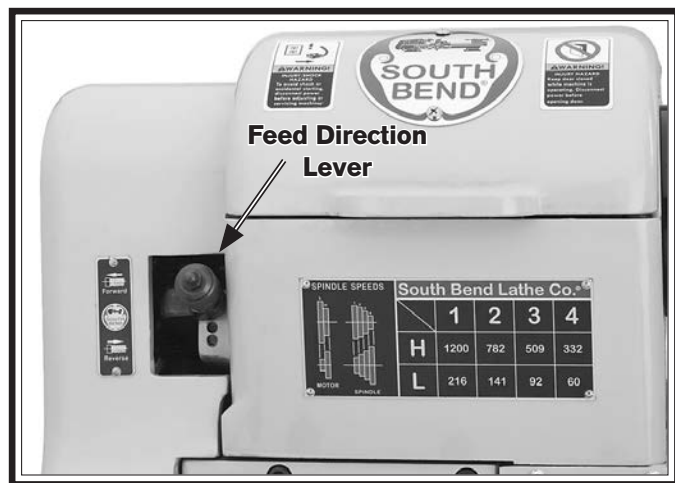


Figure 52. Location of the feed direction lever.

NOTICE

Keep in mind that if spindle rotation is reversed, the power feed direction will also reverse. Always be aware of the actual direction of power feed during operation before engaging it.

4. Locate the line in the feed rate chart that lists the setting for 0.17mm of feed per revolution of the spindle, as illustrated in **Figure 53**.

Note: Metric feed rates are listed on the left of the chart and inch feed rates on the right.

F		
0.035	E8	0.0014v
0.042	E6	0.0016
0.05	E3	0.0020
0.072	D8	0.0028
0.083	D6	0.0033
0.10	D3	0.0039
0.125	D1	0.0049
0.15	C7	0.0059
0.17	C5	0.0067
0.20	C3	0.0079
0.25	C1	0.0098

0.17mm/rev.
Feed Rate

Figure 53. Feed rate of 0.17mm/rev. highlighted on the feed rate chart.

NOTICE

To prevent damage to the lathe, **DO NOT** use spindle speeds higher than 320 RPM when the left gearbox lever pin is in the A, B, or C holes.

5. Setup the quick-change levers per the letter/number combination to the right of 0.17 in the chart—**C5**, as follows:

- a. Pull the locking pin out on the left gearbox lever, align it under the **C** printed on the label above it, then move it up and release the pin into the hole (see **Figure 54**).

Note: You may need to rock the spindle back and forth by hand to help mesh the gears.

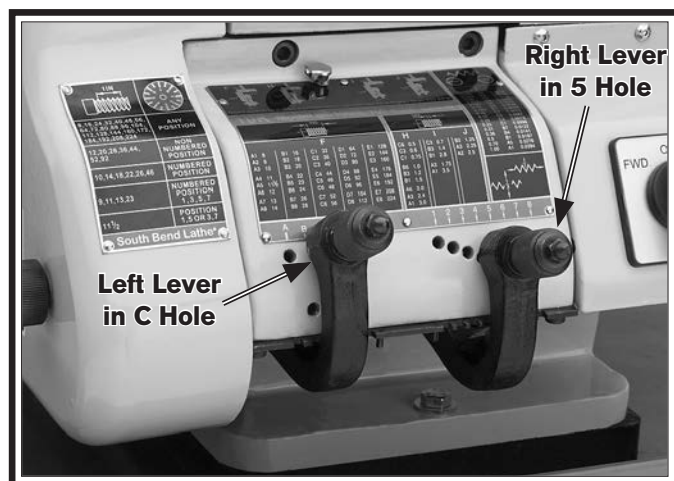


Figure 54. Quick-change gearbox levers configured for 0.17mm/rev. feed rate.

- b. Use the same method stated above to insert the locking pin of the right gearbox lever in the hole below the **5** on the label.
6. Push down on the half nut lever to make sure the half nut is disengaged from the leadscrew.
7. Seat the locking pin of the feed selection lever on the apron in the upper hole to select carriage power feed or in the lower hole for cross slide power feed (see **Figure 55**).

NOTICE

To prevent damage to the feed gear or leadscrew when the spindle is rotating, **ALWAYS** disengage the feed knob before moving the feed selection lever.

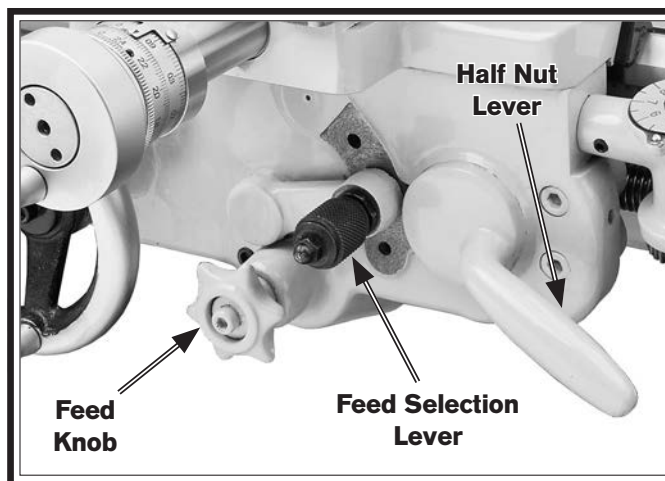


Figure 55. Apron power feed controls.

8. Fully rotate the feed knob clockwise to engage the feed gear with the leadscrew.

The lathe is now set up for a power feed rate of 0.17mm/rev.

Feed Knob

The feed knob shown in **Figure 55** is used to engage and disengage the feed gear inside the apron with the leadscrew.

Use the feed selection lever to select either cross slide or carriage feed, then fully tighten the feed knob to engage power feed.

When you are finished with the power feed operation, move the feed selection lever to the neutral (middle) position and fully loosen the feed knob to disengage power feed.

End Gears

The end gears on the left side of the headstock are used when setting up the lathe for power feed or threading operations (see the illustrations in **Figure 56**).

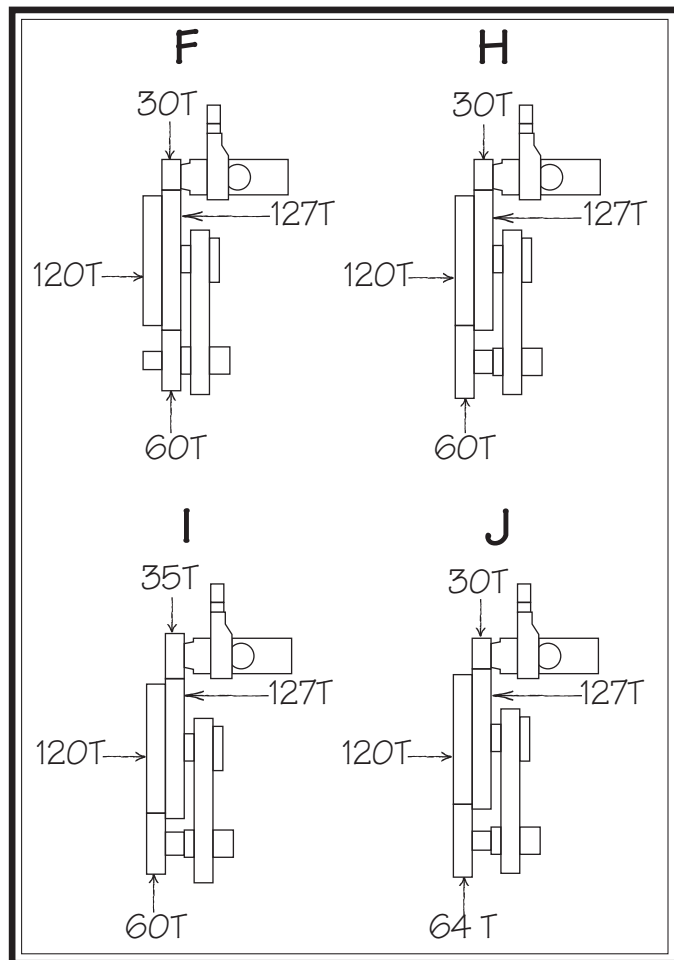


Figure 56. End gear configurations.

The **F** end gear configuration is used for power feed and inch threading operations, and configurations **H**, **I**, and **J** are used for making metric threads.

Configuring End Gears

Tools Needed

	Qty
Hex Wrench 5mm	1
Wrench 19mm	1

To configure the end gears:

1. DISCONNECT LATHE FROM POWER!
2. Open the end gear cover.

3. Loosen the pivot arm hex nut, then fully lower the 120T/127T combination gear away from the top gear (see **Figure 57**).

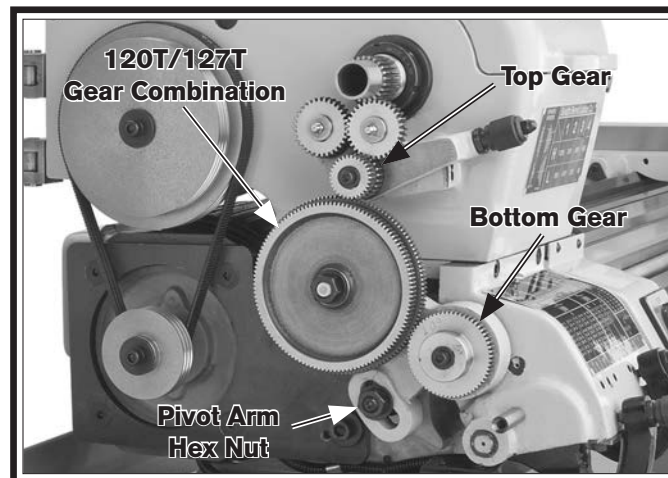


Figure 57. End gears.

4. Loosen the hex nut that secures the 120T/127T combination gear, then move it away from the bottom gear.

Important: Before installing or storing an end gear, clean it with mineral spirits and a stiff brush. When the gear is dry, apply a thin coat of NLGI#2 grease to it. This will prevent corrosion and keep the gears running smoothly (see the **End Gear** subsection of **Lubrication** on **Page 56** for additional information).

5. Change the top gear as follows:
 - a. Remove the cap screw and flat washer from the top gear, then slide the gear off the shaft.

Note: Take care to keep the shaft key in place.

- b. Align the keyway of the replacement gear with the shaft key, slide the gear onto the shaft, then secure it in place with the cap screw and flat washer.

Note: The cap screw merely keeps the gear on the shaft. Do not over-tighten it—this could cause excessive wear to the shaft or gear.

6. Change the bottom gear as follows:
 - a. Remove the cap screw and flat washer from the bottom gear, then slide the gear off the shaft.

Important: The bottom end gears have a hub that is used to align the gear teeth with either the 120T large gear or the 127T gear (see **Figure 58**).

Install the bottom gear with the hub on the outside to align the gear with the inner 127T gear. Conversely, position the hub on the inside to align the bottom gear with the outer 120T gear.

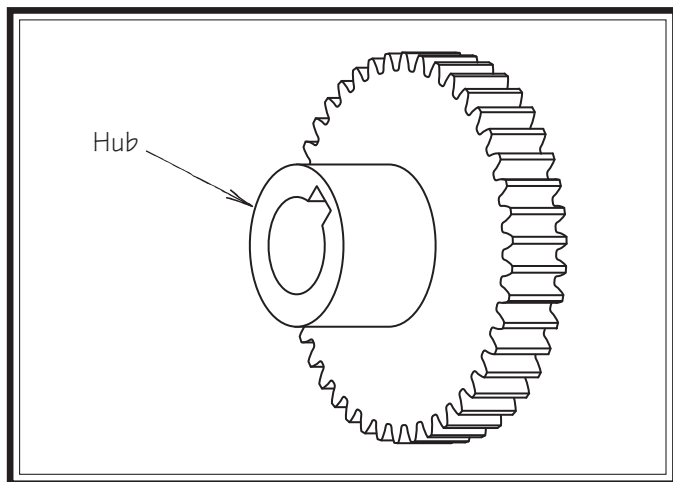


Figure 58. Bottom gear flange.

- b. Align the keyway of the replacement gear with the shaft key, slide the gear onto the shaft, then secure it in place with the cap screw and flat washer.
7. Mesh the 120T/127T combination gear with the bottom gear, then re-tighten the hex nut to secure the combination gear on the pivot arm.

Note: To prevent excessive wear or damage to the gear teeth, maintain approximately 0.003"-0.005" of play between the gears.

8. Move the 120T/127T combination gear up and mesh it with the top gear, then re-tighten the pivot arm hex nut to secure it in place.
9. Rotate the gears by hand to make sure they properly mesh with one another with the correct amount of play. If necessary, repeat **Steps 7-8** until the gears properly mesh with one another.

Threading

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

Setting Threading Controls

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

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

Setting Inch Thread Pitch of 18 TPI

1. DISCONNECT LATHE FROM POWER!
2. Make sure the end gears are in the **F** configuration, which is applicable for all feed operations (refer to **End Gears on Page 46** for detailed instructions).

3. Pull the locking pin out on the feed direction lever, align it with the hole for the desired feed direction per the label to the left, then release the pin so that it is fully seated into the hole (see **Figure 59**).

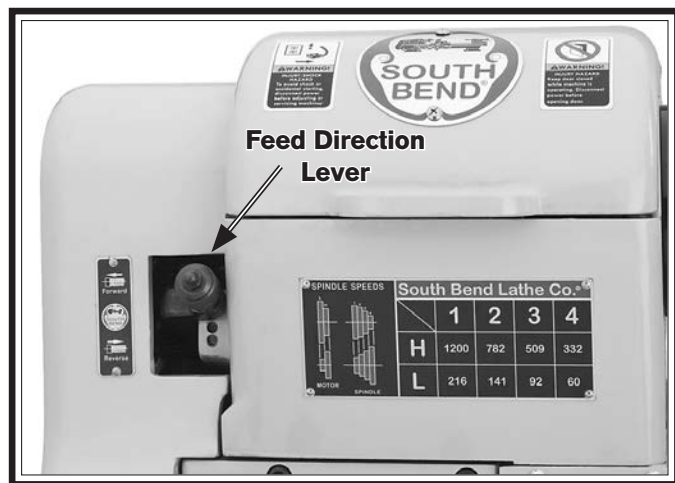


Figure 59. Location of the feed direction lever.

NOTICE

Keep in mind that if spindle rotation is reversed, the power feed direction will also reverse. Always be aware of the actual direction of power feed during operation before engaging it.

4. Find the listing for an inch thread pitch of 18 TPI in the threading chart display below, which is a replica of the label on the front of the headstock.

F				
A1 8	B1 16	C1 32	D1 64	E1 1
A2 9	B2 18	C2 36	D2 72	E2 1
A3 10	B3 20	C3 40	D3 80	E3 1
A4 11	B4 22	C4 44	D4 88	E4 1
A5 11½	B5 23	C5 46	D5 92	E5 1
A6 12	B6 24	C6 48	D6 96	E6 1
A7 13	B7 26	C7 52	D7 104	E7 2
A8 14	B8 28	C8 56	D8 112	E8 2

Figure 60. Listing for 18 TPI threading setup.

5. Setup the quick-change levers per the letter/number combination to the left of 18 in the chart—**B2**, as follows:

- a. Pull out the locking pin on the left gearbox lever as you align it under the **B** printed on the label above it, then move it up and align it with the hole as you release the pin so that it is fully seated (see **Figure 61**).

Note: You may need to rock the spindle back and forth by hand to help mesh the gears.

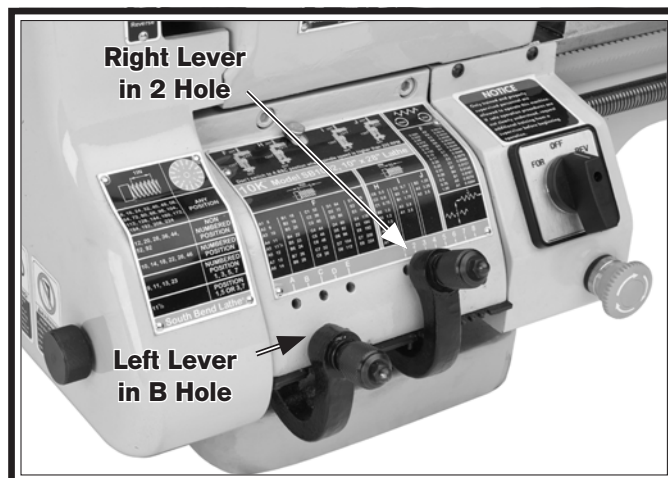


Figure 61. Quick-change gearbox levers set up for 18 TPI inch threading.

- b. Use the same method as stated above to insert the locking pin on the right gearbox lever in the hole below the **2** on the label.

Apron Controls

The half nut lever engages the carriage with the leadscrew to move the cutting tool along the length of the workpiece for threading operations (see **Figure 62**).

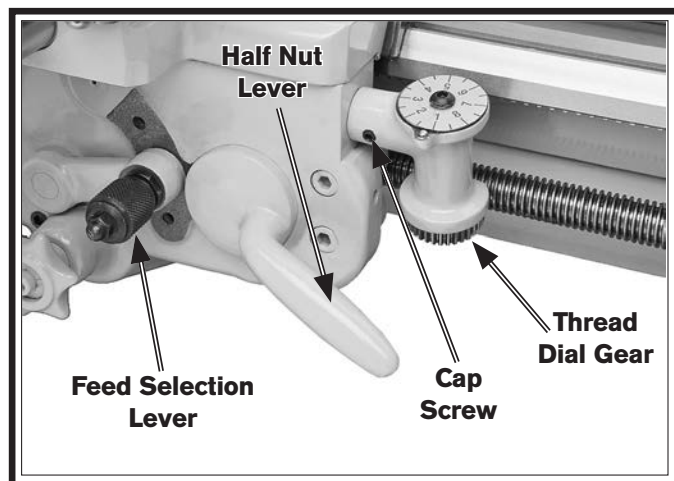


Figure 62. Apron controls set for threading operation.

To setup the apron controls for threading:

1. Make sure the feed selection lever is in the neutral (middle) position.
2. Pull the half nut lever up to engage the carriage with the leadscrew.

Note: You may need to rock the carriage with the handwheel to help the half nut mesh with the leadscrew.

Thread Dial

The numbers on the thread dial are used with the thread dial chart to show when to engage the half nut during inch threading. The thread dial gear must be engaged with the leadscrew for this to work. To use the thread dial, pivot the dial gear toward the leadscrew so that it properly meshes with the leadscrew threads (see **Figure 62**), then tighten the cap screw to secure it in place.

NOTICE

When threading, we recommend you use the slowest spindle speed possible and make multiple light cuts. This will give you better control of when to engage/disengage the half nut and prevent damaging your workpiece or the lathe.

Thread Dial Chart

Find the TPI (threads per inch) that you want to cut in the left column of the thread dial chart contained in the label on the end gear cover, 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.

Note: The thread dial is not used for metric threads—you must leave the half nut engaged from the beginning of the cut until the threads are complete for metric threading.

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

Any TPI Divisible By 4

For threading TPI divisible by four, use any line on the thread dial (see **Figure 63**).

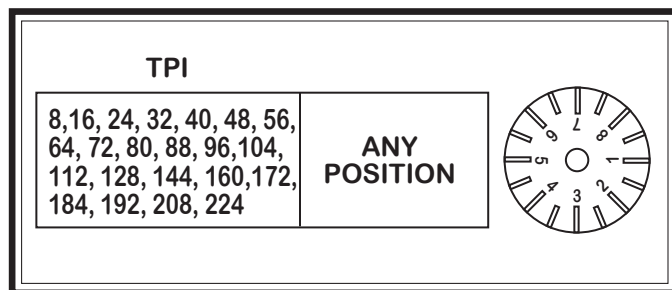


Figure 63. Use any number or mark for TPI's divisible by 4.

12, 20, 28, 36, 44, 52, 92 TPI's

For these threading TPI's, use any of the non-numbered lines on the thread dial (see **Figure 64**).

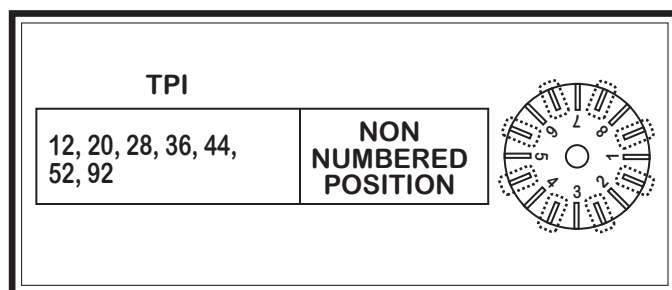


Figure 64. Use any non-numbered mark for these TPI's.

10, 14, 18, 22, 26, 46 TPI's

For these threading TPI's, use any of the numbered lines on the thread dial (see **Figure 65**).

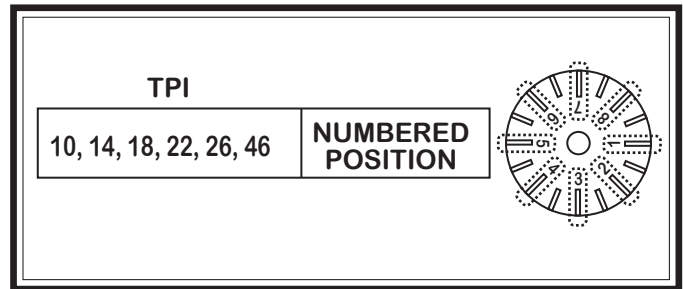


Figure 65. Use any numbered mark for these TPI's.

9, 11, 13, 23 TPI's

For these threading TPI's, use the number lines 1, 3, 5, or 7 on the thread dial (see **Figure 66**).

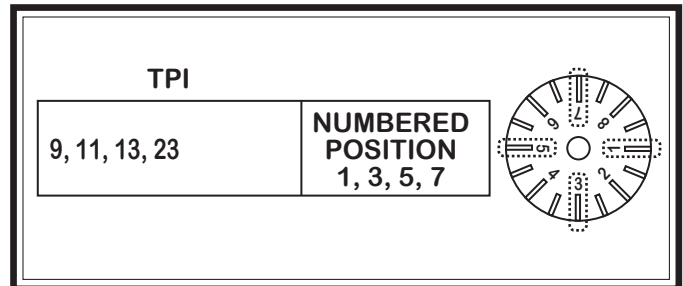


Figure 66. Use the numbered marks 1, 3, 5, or 7 for these TPI's.

11½ TPI

For the threading TPI of 11½, use the number lines 1 and 5, or 3 and 7 on the thread dial (see **Figure 67**).

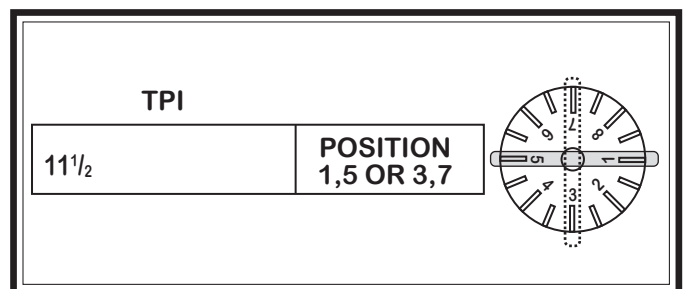


Figure 67. Use the numbered marks 1 and 5, or 3 and 7 for a TPI of 11½.

Accessories

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

SB1035—Lathe Stand for SB1002

This USA-made lathe stand for the Model SB1002 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 68. SB1035 Stand for SB1002 Lathe.

SB1365—Way Oil for Lathes

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



- SB1450—Steady Rest for SB1002
- SB1451—Follow Rest for SB1002
- SB1452—Face Plate for SB1002
- SB1391—6" D1-3 Back Plate for SB1002
- SB1211—6" 4-Jaw Ind. Chuck, Plain Back



Figure 69. SB1002 lathe accessories.

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. Each leg weighs in at 107 pounds and provides plenty of mass to dampen machine operations or provide an extremely stable work surface. 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 70. SB1354 Cast Iron Legs.

SB1237—MT#2 High-Performance Live Center

The shafts of this live center is made of alloy steel and vacuum heat-treated to HRC 60 ± 1 for high rigidity and durability. This water-proof live center uses a combination of roller bearings, thrust bearings, and ball bearings.



Figure 71. SB1237 MT#2 Live Center.

SB1245—MT#2 Bull Nose Center

- Cr-Mo steel; hardened to HRC60 ± 1
- Taper roller & ball bearing construction
- Great for turning pipes

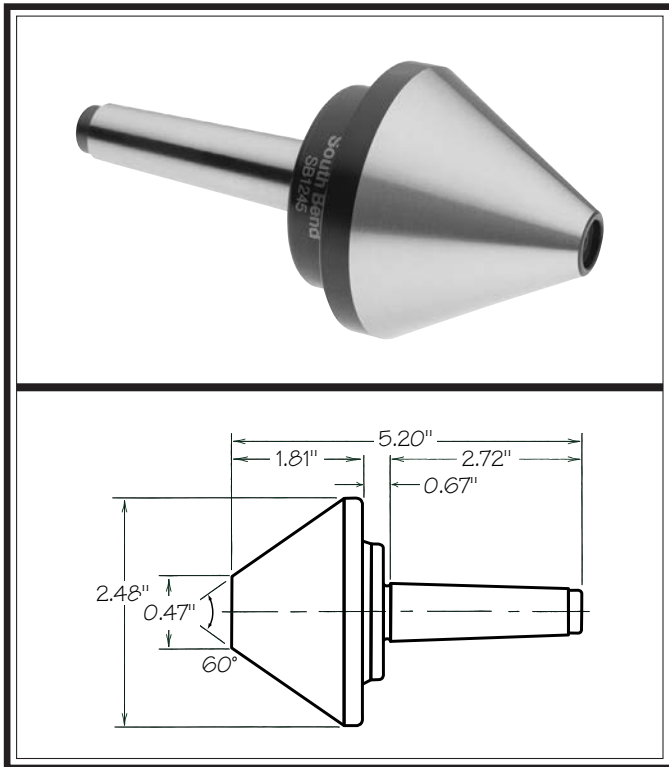


Figure 72. SB1245 MT#2 Bull Nose Center.

SB1378—MT#2 ½" Keyless Integral Chuck

This keyless chuck is produced with an integral shank to maximize concentricity between the body, shank, and jaws. It started as a one-piece high-alloy body which is turned, then finish-ground throughout, making it as close to zero TIR (Total Indicated Runout) as can be. A spanner wrench is included to ease jaw opening.



Figure 73. SB1378 MT#2 ½" Keyless Integral Chuck.

SB1298—10K Bench Lathe Shop Clock**SB1299—SBL Toolroom Lathe Shop Clock****SB1300—10K Bench Lathe with Man**

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

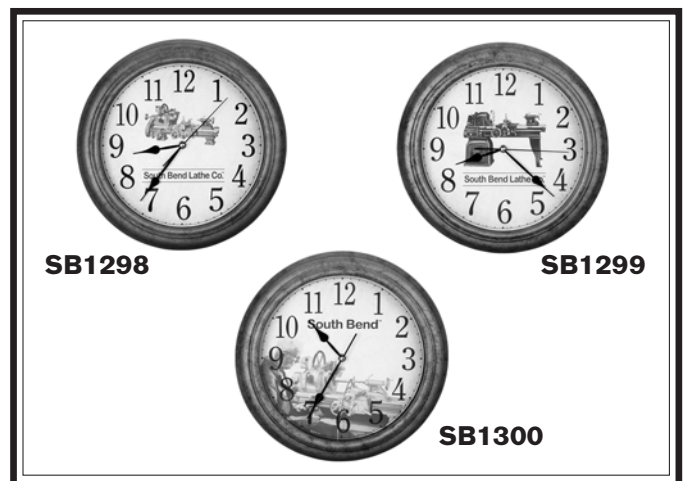
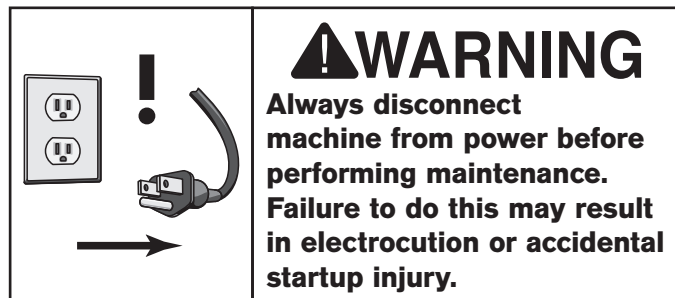


Figure 74. Antique-finished South Bend shop clocks.

Maintenance Schedule Cleaning & Protecting



Ongoing

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

- Loose mounting bolts or fasteners.
- Worn, frayed, cracked, or damaged wires.
- Cover limit switches not working correctly.
- Spindle switch not operating properly.
- Any other unsafe condition.

Daily, Before Operations

- Perform all daily lubrication tasks (**Page 54**).
- Move the power feed selection lever on the apron to disengage (to prevent crashes upon startup).
- Ensure carriage lock is loose.

Daily, After Operations

- Turn the spindle switch to the OFF position and disconnect the lathe from power (to prevent accidental startup).
- Vacuum/clean all chips and swarf from bed, slides, and chip drawer.
- Wipe down all unpainted or machined surfaces with an oiled rag.

Monthly

- Clean and lubricate spindle direction gears and end gears (**Page 56**).

Annually

- Inspect/level bedway (**Page 20**).

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

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

In addition to the ways, all other unpainted and machined surfaces should be wiped down daily to keep them rust-free and in top condition. This includes any surface that is vulnerable to rust (especially any parts exposed to water soluble cutting fluid). Typically, a thin film of good quality way oil is all that is necessary for protection (see **Page 51** for an option from South Bend).

Lubrication

The lathe has numerous metal-to-metal sliding surfaces that require regular lubrication to maintain smooth movement and ensure long-lasting operation.

Other than the lubrication points covered in this section, all other bearings are internally lubricated and sealed at the factory. Simply leave them alone unless they need to be replaced.

Before performing any lubrication task, **DISCONNECT LATHE FROM POWER!**

Important: Before adding lubricant to ball oilers, grease fittings, or oil cups, clean off entry points to prevent contamination of lubricant.

Use the schedule and information in **Figure 75** as a daily guide for lubrication tasks.

NOTICE

The following schedule is based on light-to-medium usage. Some components may need to be lubricated more frequently depending on usage.

Lubrication Task	Frequency	Page Ref.
Gearbox & Feed Knob Oil Cups	Daily	This Page
Ball Oilers	Daily	55
Longitudinal Leadscrew	Daily	55
Spindle Bearings	Daily	56
Spindle Direction Gears	Monthly	56
End Gears	Monthly	56

Figure 75. Recommended lubrication tasks, schedules, and instruction page references.

Gearbox & Feed Knob Oil Cups

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

There is one oil cup that lubricates the quick-change gearbox gears (see **Figure 76**) and one that lubricates the power feed gear in the apron (see **Figure 77**).

Raise the lids of the oil cups, then use an oil gun fill them with oil.

The oil will slowly seep onto the gears. If the oil cups become empty during operation, refill them.

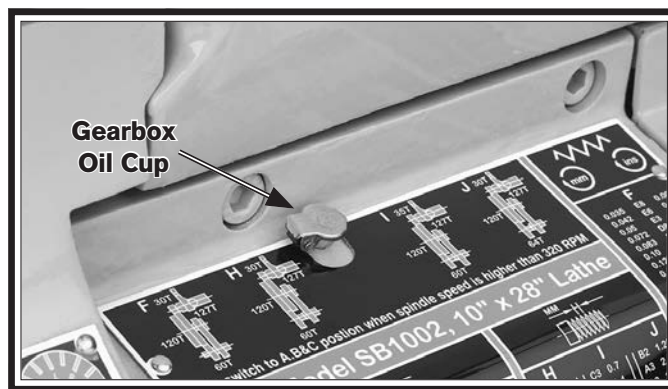


Figure 76. Gearbox oil cup.



Figure 77. Feed knob oil cup on the apron.

Ball Oilers

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

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

Push the rubber or plastic tip of the oil can nozzle against the ball oiler to create a hydraulic seal, then pump the oil can once or twice. If you see sludge and contaminants coming out of the lubrication area, keep pumping the oil gun until clean oil runs out. When finished, wipe away any excess oil.

Refer to **Figures 78–80** for the locations of the saddle, tailstock, and leadscrew ball oilers.

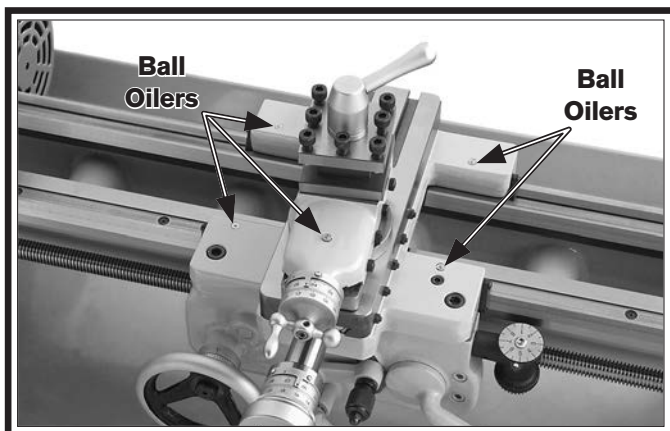


Figure 78. Saddle ball oilers.

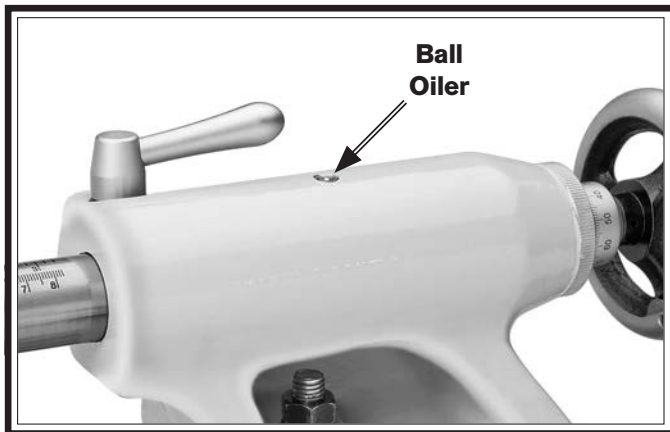


Figure 79. Tailstock ball oiler.

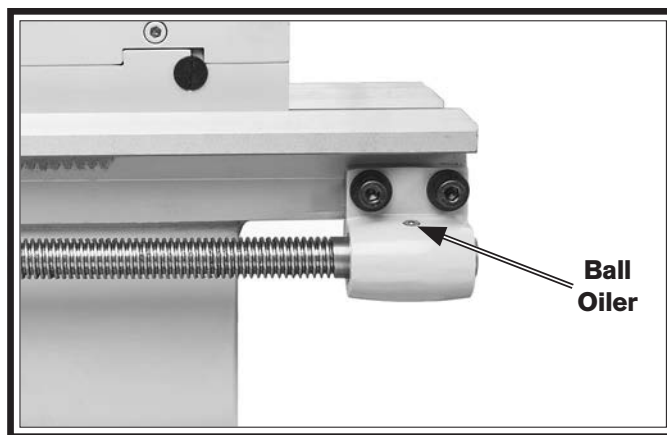


Figure 80. Leadscrew ball oiler.

Longitudinal Leadscrew

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

Before lubricating the leadscrew (see **Figure 81**), clean it first with mineral spirits and a stiff brush. Make sure to move the carriage out of the way, so you can clean the entire length of the leadscrew.

Apply a thin coat of oil along the length of the leadscrew. Use a clean, stiff brush to apply the oil evenly and down into the threads.

Note: In some environments, abrasive material will stick to the leadscrew lubricant and be drawn into the half nut. In this case, lubricate the leadscrew with a quality dry lubricant instead.

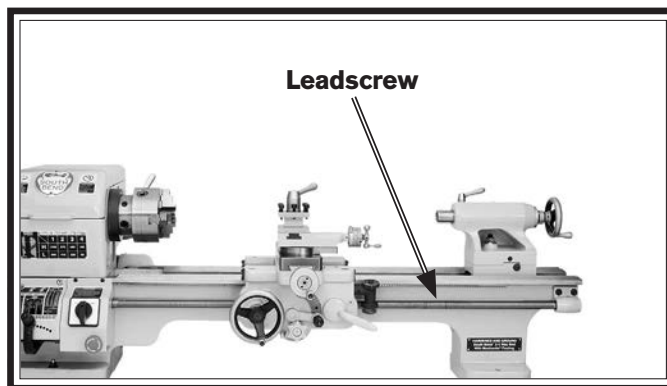


Figure 81. Longitudinal leadscrew.

Spindle Bearings

Grease Type..... NLGI#2
 Amount 1–2 Pumps from a Grease Gun
 Frequency Daily

There are two grease fittings for lubricating the spindle bearings (see **Figure 82**).

Use a grease gun to add 1–2 pumps of grease to each fitting and wipe away any excess grease so it does not attract chips or debris.

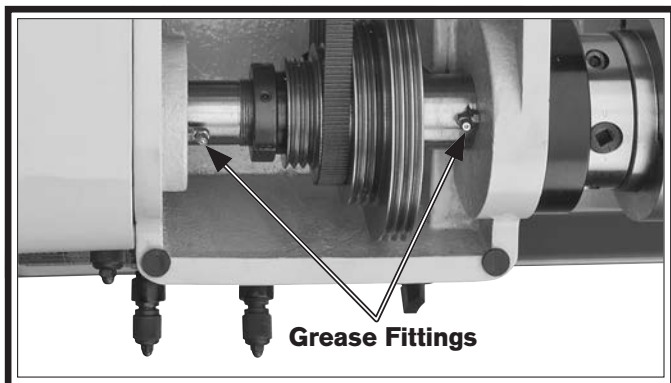


Figure 82. Spindle bearing grease fittings.

Spindle Direction Gears

Grease Type..... NLGI#2
 Amount 1 Pump from a Grease Gun
 Frequency Monthly

Each spindle direction gears has a grease fitting that sends grease through the shaft to the gear bushing (see **Figure 83**).

Use a grease gun to add 1 pump of grease to each fitting and wipe away any excess grease so it does not attract chips or debris.



Figure 83. Spindle direction gear grease fittings.

End Gears

Grease Type..... NLGI#2
 Amount As Needed
 Frequency Monthly or When Changing

The end gears, shown in **Figure 84**, should always have a thin coat of grease to minimize corrosion, noise, and wear. Avoid using excess grease to prevent it from being flung onto the V-belts and causing them to slip.

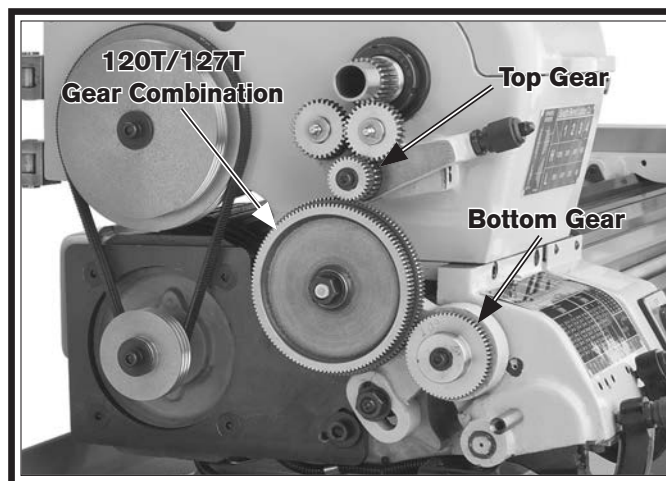


Figure 84. End gears.

To lubricate the end gears:

1. DISCONNECT LATHE FROM POWER!
2. Open the end gear cover and remove the end gears (see **End Gears** on **Page 46** for detailed instructions).
3. Use mineral spirits, a brush, and rags to clean the gears and shafts.
4. When dry, apply a thin layer of grease on the gears and shafts. Make sure to get grease between the teeth, but do not fill the teeth valleys.
5. Re-install the gears, then apply a small dab of grease between them where they mesh together—this grease will be distributed when the gears rotate and re-coat any areas scraped off during installation.
6. Close and secure the end gear cover before re-connecting the lathe to power.

Machine Storage

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

To prepare the lathe for storage:

1. DISCONNECT LATHE FROM POWER!
2. Thoroughly clean all surfaces, then apply a heavy coat of way oil to unpainted and bare metal surfaces.
3. Lubricate the machine as outlined in **Lubrication**, beginning on **Page 54**, then move/rotate the components through the full range of motion several times to distribute the lubricant.
4. Cover the lathe and place it in a dry area that is out of direct sunlight and away from hazardous fumes, paint, solvents, or gas that could damage the surfaces of the lathe.
5. Once or twice a month, move the carriage, tailstock, and other components mounted on the bedway down the bed to make sure that rust is not beginning to occur. If it is, remove it and re-apply a heavy coat of way oil.
6. Every few months, repeat **Step 3**.

Gib Adjustment

The goal of adjusting the gibs is to remove sloppiness in the sliding surfaces without over-adjusting them to the point where movement becomes stiff and difficult.

In general, loose gibs cause poor finishes and tool chatter. However, over-tightened gibs cause premature wear on the sliding surfaces, leadscrew and nut, and make it difficult to move the handwheels.

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

Cross Slide & Compound Rest

Tools Needed	Qty
Wrench or Socket 8mm.....	1
Hex Wrench 2.5mm	1

To adjust the cross slide or compound rest gib:

1. Loosen the hex nuts on the set screws shown in **Figure 85**.

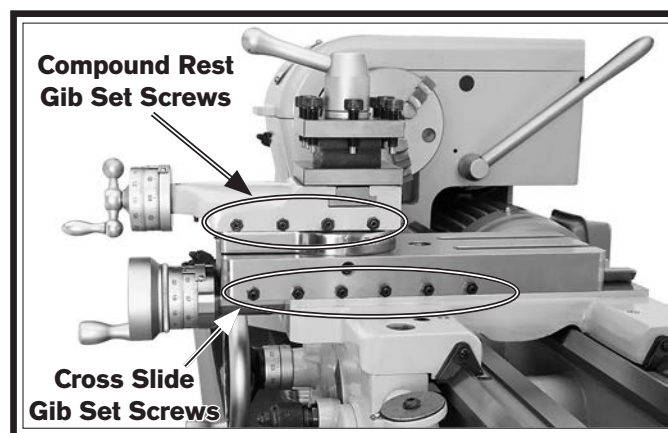


Figure 85. Cross slide and compound rest gib screws.

2. Loosen each set screw in equal amounts and move the appropriate handwheel back and forth so that the gib becomes loose.
 3. Tighten each set screw in equal amounts until you feel a small amount of resistance.
 4. Move the handwheel back and forth to test the setting.
 - If the slide movement is too loose, tighten each set screw a $\frac{1}{4}$ turn, then repeat this step.
 - If the slide movement is too tight, loosen each set screw a $\frac{1}{4}$ turn, then repeat this step.
- Note:** Make sure to adjust all the set screws the same. This will ensure even wear of the gib and sliding surfaces.
5. Hold the set screws in position with the hex wrench, and tighten the hex nuts against the slide to secure the screw positions.

Saddle

Tools Needed

	Qty
Wrench 10mm	1
Hex Wrench 3mm	1

The five set screws that secure the saddle gib are located under the rear of the saddle, as shown in **Figure 86**.

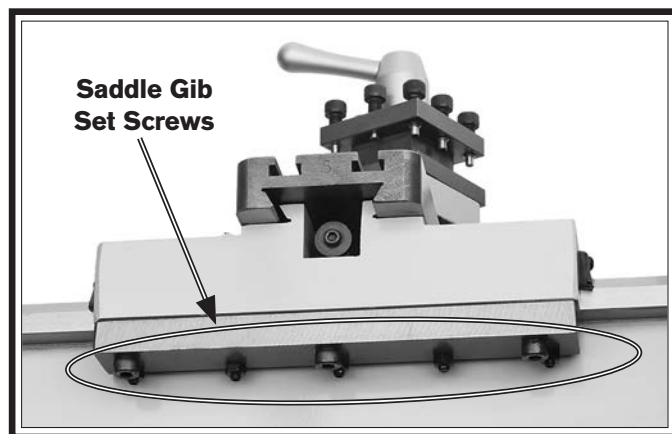


Figure 86. Saddle gib set screws (viewed from underneath the rear of the saddle).

To adjust the saddle gib:

1. Loosen the hex nuts on each of the set screws.
2. Loosen each set screw in equal amounts and move the carriage handwheel back and forth so that the gib becomes loose.
3. Tighten the set screws until you feel a small amount of resistance.
4. Move the carriage handwheel back and forth to test the setting.
 - If the carriage movement is too loose, tighten each set screw a $\frac{1}{4}$ turn, then repeat this step.
 - If the carriage movement is too tight, loosen each set screw a $\frac{1}{4}$ turn, then repeat this step.

Note: Make all the set screws the same. This will ensure even wear of the gib and sliding surfaces.

5. Hold the set screws in position with the hex wrench, and tighten the hex nuts against the slide to secure the screw positions.

Tailstock

The tailstock gib screws control how the top casting slides against the bottom casting when changing the tailstock offset.

Tools Needed

	Qty
Hex Wrench 6mm	1
Standard Screwdriver #2.....	1

To adjust the tailstock gib:

1. Loosen the clamping cap screws on both ends of the tailstock so that the top casting can move independently from the bottom casting (see **Figure 87**).

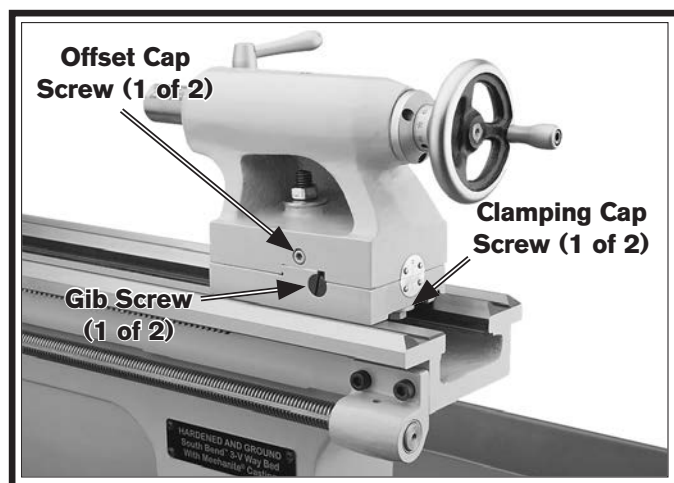


Figure 87. Tailstock gib controls.

2. Adjust the gib by turning one gib screw $\frac{1}{4}$ turn clockwise and the other screw $\frac{1}{4}$ turn counterclockwise (see the illustration in **Figure 34** on **Page 34**).
3. Test the movement of the top casting by turning one offset cap screw clockwise and the other counterclockwise.
4. When you are satisfied with the movement, re-tighten the clamping cap screws to prevent the top casting from moving from the bottom casting.

Note: Because the tailstock offset has changed during this procedure, we recommend that you perform the **Aligning Tailstock to Spindle Centerline** procedure on **Page 35** before resuming cutting operations.

Cross Slide Backlash Adjustment

Backlash is the amount of free play felt while switching rotation directions with the handwheel. This can be adjusted on the cross slide leadscrew.

Before beginning any adjustments, make sure the cross slide is not locked with the gib set screws.

NOTICE

Reducing backlash to less than 0.002" is impractical and can lead to accelerated wear of the leadscrew and nut. Avoid the temptation to overtighten the backlash cap screw.

Tool Needed:

	Qty
Hex Wrench 5mm	1

To adjust the cross slide backlash, rock the cross slide handwheel back and forth and tighten the cap screw shown in **Figure 88** until the backlash is approximately 0.002"–0.005", as indicated on the graduated dial.

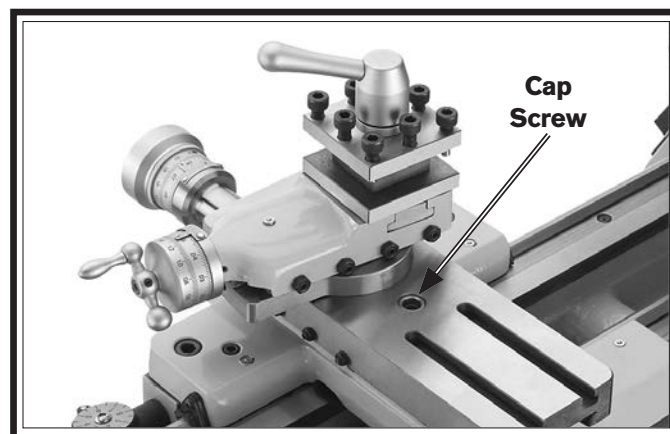


Figure 88. Cross slide backlash adjustment cap screw.

If you end up adjusting the cap screw too tight, loosen it, then tap the cross slide a few times with a rubber or wooden mallet to make it free. Turn the handwheel slowly back and forth until it turns freely, then try again.

Adjusting V-Belt Tension

V-belts stretch and wear with use, so check the tension on a monthly basis to ensure optimal power transmission.

V-belt tension is controlled by the position of the eccentric cam on the inboard end of the idler pulley shaft (see **Figure 89**).

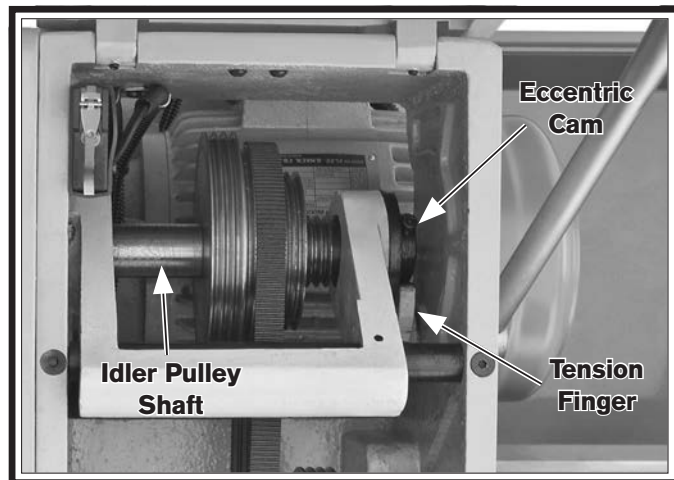


Figure 89. V-belt tension eccentric cam.

When the V-belt tension lever is pushed backward, the tension finger pushes against the eccentric cam and forces the idler pulley shaft backward, which applies full tension to the V-belts.

The V-belts are properly tensioned when they deflect approximately $\frac{1}{4}$ " when you push on them midway between the pulleys with moderate pressure (see **Figure 90**).

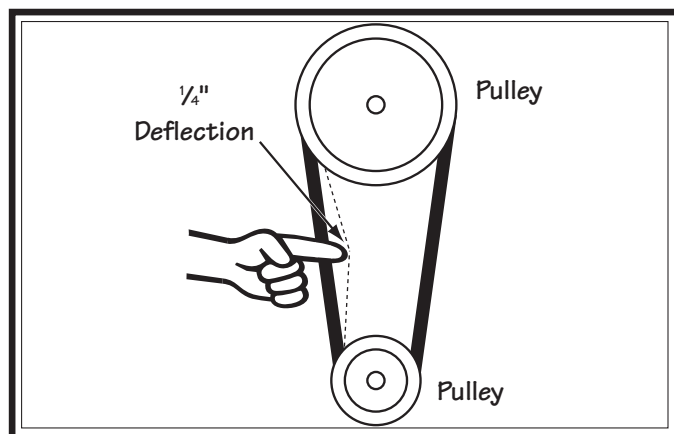


Figure 90. Testing V-belt tension.

Tool Needed: Qty
Hex Wrench 4mm 1

To adjust V-belt tension:

1. DISCONNECT LATHE FROM POWER!
2. Pull the V-belt tension lever forward to release tension, then open the headstock top cover.
3. Loosen the cap screw on the eccentric cam shown in **Figure 89**.
4. Rotate the cam backward to reduce tension, or rotate it forward to increase tension.
5. Re-tighten the cam cap screw, push the tension lever backward to apply full tension, then test V-belt deflection.
6. If necessary, repeat **Steps 3–5** until you are satisfied with the V-belt tension, then fully tighten the cam cap screw.

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 circuit breaker trips.	<ol style="list-style-type: none"> 1. One or more limit switches are engaged. 2. Power supply is switched OFF at master power switch or breaker. 3. Wall fuse/circuit breaker is blown/tripped; short in electrical system; start-up load too high for circuit. 4. Motor connection wired incorrectly. 5. Wiring is open/has high resistance. 6. Spindle switch is at fault. 7. Motor is at fault. 	<ol style="list-style-type: none"> 1. Verify end gear cover and headstock top cover limit switches are not engaged. 2. Make sure circuit breaker is turned ON. 3. Verify circuit is rated for machine amp load; troubleshoot and repair cause of overload; replace weak breaker; find/repair electrical short. 4. Correct motor wiring connections (see Pages 64–65). 5. Check for broken wires or disconnected/corroded connections, and repair/replace as necessary. 6. Replace switch. 7. Test/repair/replace.
Loud, repetitious noise coming from lathe at or near the motor.	<ol style="list-style-type: none"> 1. Pulley set screws or keys are missing or loose. 2. Motor fan is hitting the cover. 	<ol style="list-style-type: none"> 1. Inspect keys and set screws. Replace or tighten if necessary. 2. Adjust fan cover; replace fan and cover if damaged.
Motor overheats.	<ol style="list-style-type: none"> 1. Motor overloaded. 	<ol style="list-style-type: none"> 1. Reduce load on motor.
Motor is loud when cutting, or bogs down under load.	<ol style="list-style-type: none"> 1. Excessive depth of cut or feed rate. 2. Spindle speed or feed rate wrong for cutting operation. 3. Cutting tool is dull or incorrect for operation. 	<ol style="list-style-type: none"> 1. Decrease depth of cut or feed rate. 2. Refer to the feeds and speeds charts in Machinery's Handbook or a speeds and feeds calculator on the internet. 3. Sharpen or replace the cutting tool; use correct tool for operation.
Entire machine vibrates upon startup and while running.	<ol style="list-style-type: none"> 1. Workpiece is unbalanced. 2. Loose or damaged V-belt(s). 3. V-belt pulleys are not properly aligned. 4. Worn or broken gear present. 5. Chuck or faceplate is unbalanced. 6. Workpiece is hitting stationary object. 7. Spindle bearings at fault. 	<ol style="list-style-type: none"> 1. Center workpiece with spindle bore as much as possible. 2. Re-tension (see Page 60) or replace the V-belt(s). 3. Align the V-belt pulleys. 4. Replace with new gears. 5. Re-balance chuck or faceplate; contact a local machine shop for help. 6. Stop lathe immediately and correct interference problem. 7. Replace worn spindle bearings.
Bad surface finish.	<ol style="list-style-type: none"> 1. Wrong spindle speed or feed rate. 2. Cutting tool is dull or incorrect for operation. 3. Tool height incorrect. 4. Too much play in gibs. 	<ol style="list-style-type: none"> 1. Adjust for appropriate spindle speed and feed rate. 2. Sharpen or replace the cutting tool; use correct tool for operation. 3. Adjust tool height to centerline (see Page 40). 4. Tighten gibs (see Page 57).

Symptom	Possible Cause	Possible Solution
Tapered tool difficult to remove from tailstock quill.	<ol style="list-style-type: none"> 1. Quill is not retracted all the way back into the tailstock. 2. Contaminants not removed from taper before inserting into quill. 	<ol style="list-style-type: none"> 1. Turn the tailstock handwheel until it forces the tapered tool out of quill. 2. Clean the taper and bore and re-install tapered tool.
Cross slide, compound, or carriage feed has sloppy operation.	<ol style="list-style-type: none"> 1. Gibs are out of adjustment. 2. Handwheel is loose or backlash is excessive. 	<ol style="list-style-type: none"> 1. Adjust gibs (see Page 57). 2. Tighten handwheel fasteners, adjust handwheel backlash to a minimum (see Page 59).
Cross slide or compound rest handwheel is hard to move.	<ol style="list-style-type: none"> 1. Dovetail slides loaded with swarf, dust, or grime. 2. Gib screws are too tight. 3. Cross slide backlash setting too tight. 4. Bedways are dry. 	<ol style="list-style-type: none"> 1. Remove gibs, clean ways/dovetails, lubricate, and re-adjust gibs. 2. Loosen gib screw(s), and lubricate bedways (see Page 57). 3. Loosen backlash setting (see Page 59). 4. Lubricate bedways.
Carriage will not feed or is hard to move.	<ol style="list-style-type: none"> 1. Carriage lock is tight. 2. Chips have loaded up on bedways. 3. Bedways are dry and in need of lubrication. 4. Gibs are too tight. 5. Gears broken. 	<ol style="list-style-type: none"> 1. Check to make sure the carriage lock is loose. 2. Frequently clean away chips that load up during turning operations. 3. Lubricate bedways and handles. 4. Loosen gib screw(s) slightly (see Page 57). 5. Replace gears.
Cutting tool or machine components vibrate excessively during cutting.	<ol style="list-style-type: none"> 1. Tool holder not tight enough. 2. Cutting tool sticks too far out of tool holder; lack of support. 3. Gibs are out of adjustment. 4. Dull cutting tool. 5. Incorrect spindle speed or feed rate. 	<ol style="list-style-type: none"> 1. Check for debris, clean, and retighten. 2. Re-install cutting tool so no more than 2½ times its cross section or less is sticking out of tool holder. 3. Adjust gib screws at affected component (see Page 57). 4. Replace or resharpen cutting tool. 5. Use the recommended spindle speed.
Workpiece is tapered.	<ol style="list-style-type: none"> 1. Headstock and tailstock are not properly aligned with each other. 	<ol style="list-style-type: none"> 1. Realign the tailstock to the headstock spindle bore centerline (see Page 35).
Chuck jaws will not move or do not move easily.	<ol style="list-style-type: none"> 1. Chuck needs lubrication. 2. Chips lodged in the jaws or scroll plate. 	<ol style="list-style-type: none"> 1. Remove jaws, then clean and lubricate all surfaces. 2. Remove jaws, clean and lubricate scroll plate, then replace jaws.
Gearbox change levers will not shift into position.	<ol style="list-style-type: none"> 1. Gears not aligned inside headstock. 	<ol style="list-style-type: none"> 1. Rotate spindle by hand with light pressure on the lever until gear falls into place.

Electrical Safety Instructions

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

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

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

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

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

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

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

Wire/Component Damage: Damaged wires or components increase the risk of serious personal injury, fire, or machine damage. If you notice that any wires or components are damaged while performing a wiring task, replace those wires or components before completing the task.

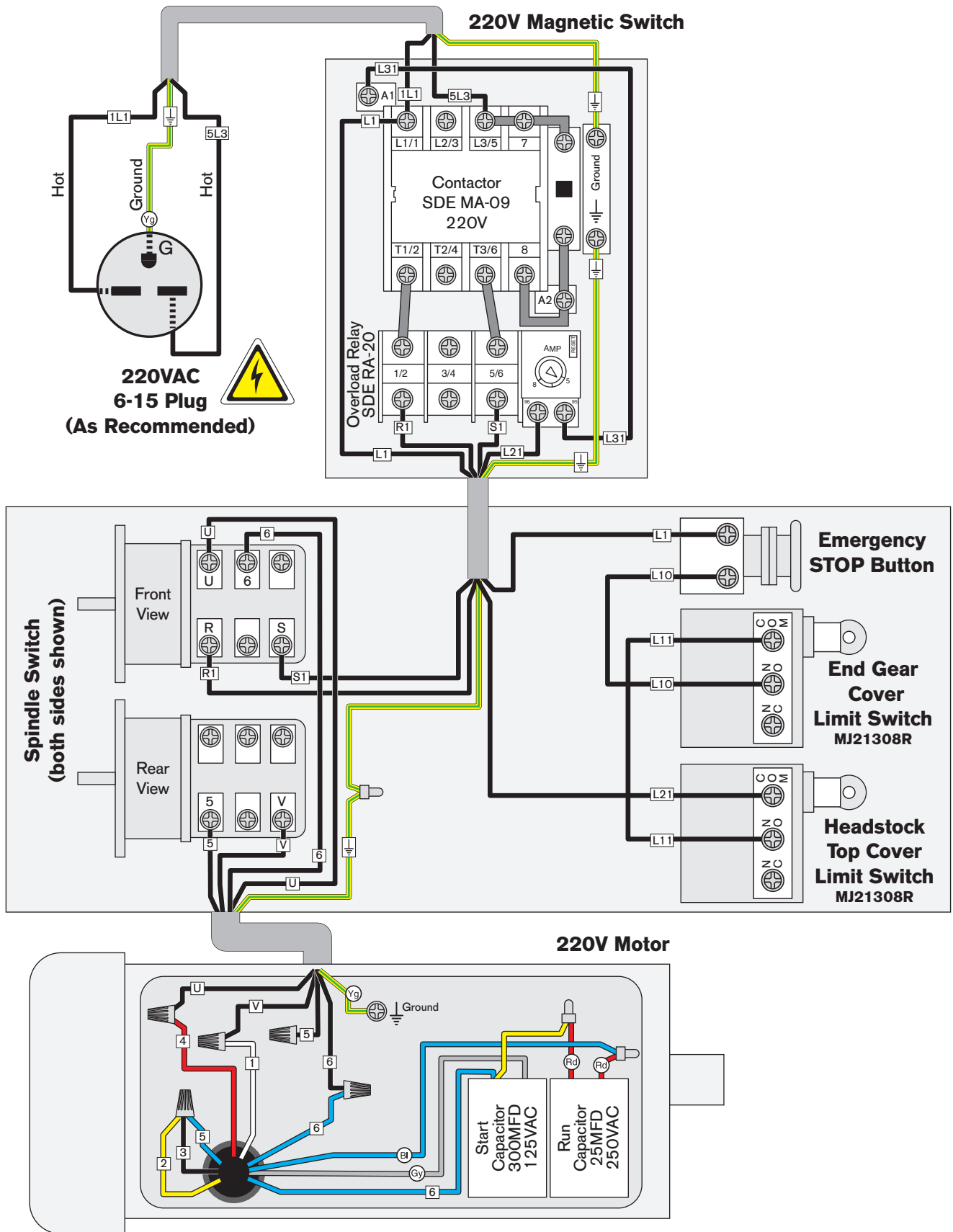
Experiencing Difficulties: If you are experiencing difficulties understanding the information included in this section, contact our Technical Support at (360) 734-1540.

WIRING DIAGRAM COLOR KEY

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

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

220V Wiring Diagram



Electrical Component Reference

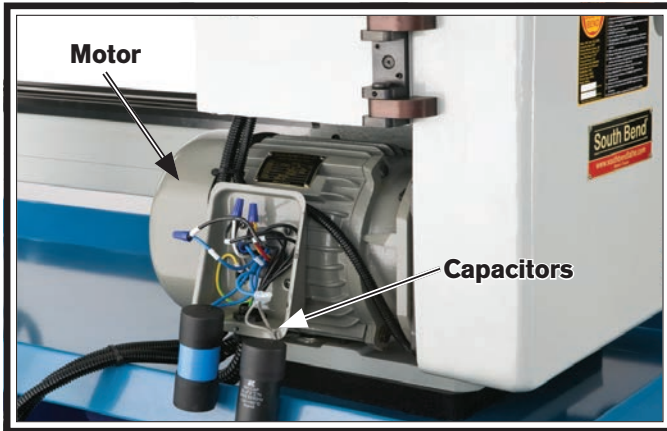


Figure 91. Motor location and wiring.

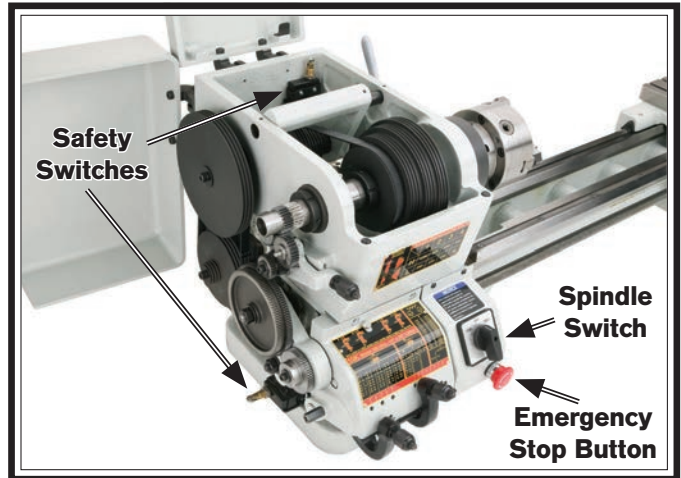


Figure 93. Switch locations.



Figure 92. Motor 110V wiring.

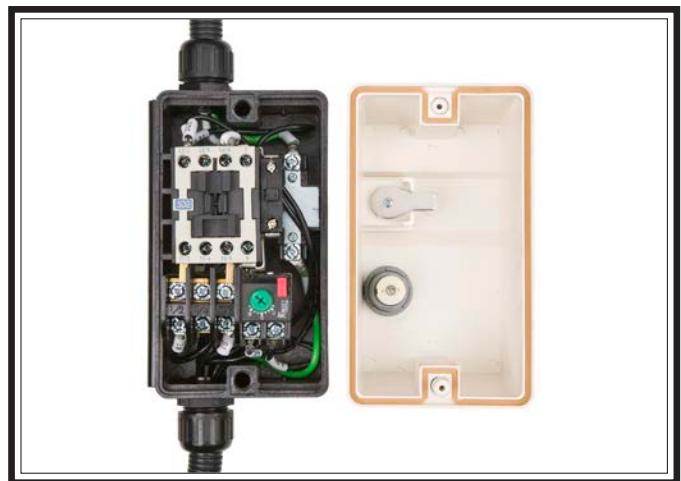
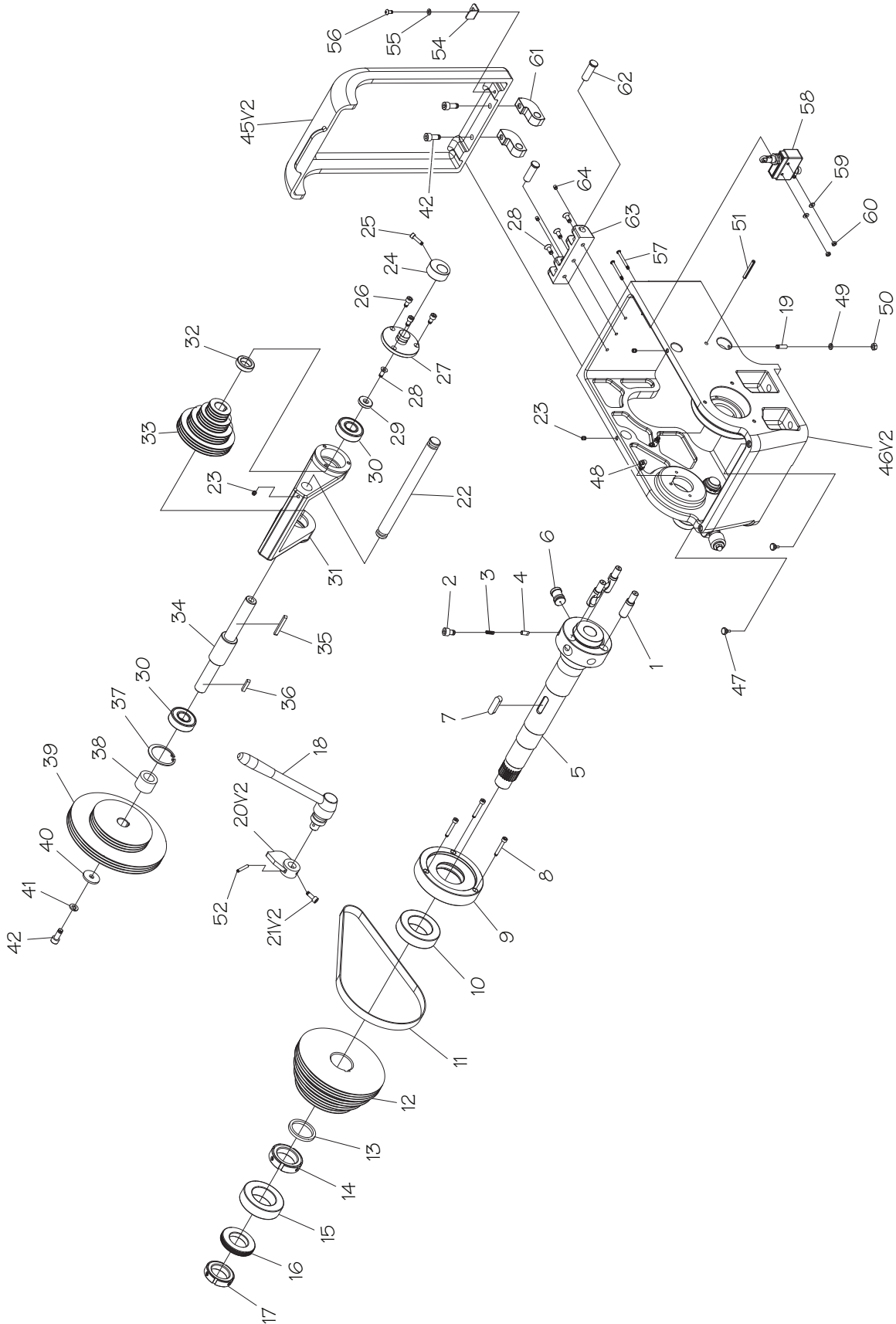


Figure 94. Magnetic switch wiring.

Headstock

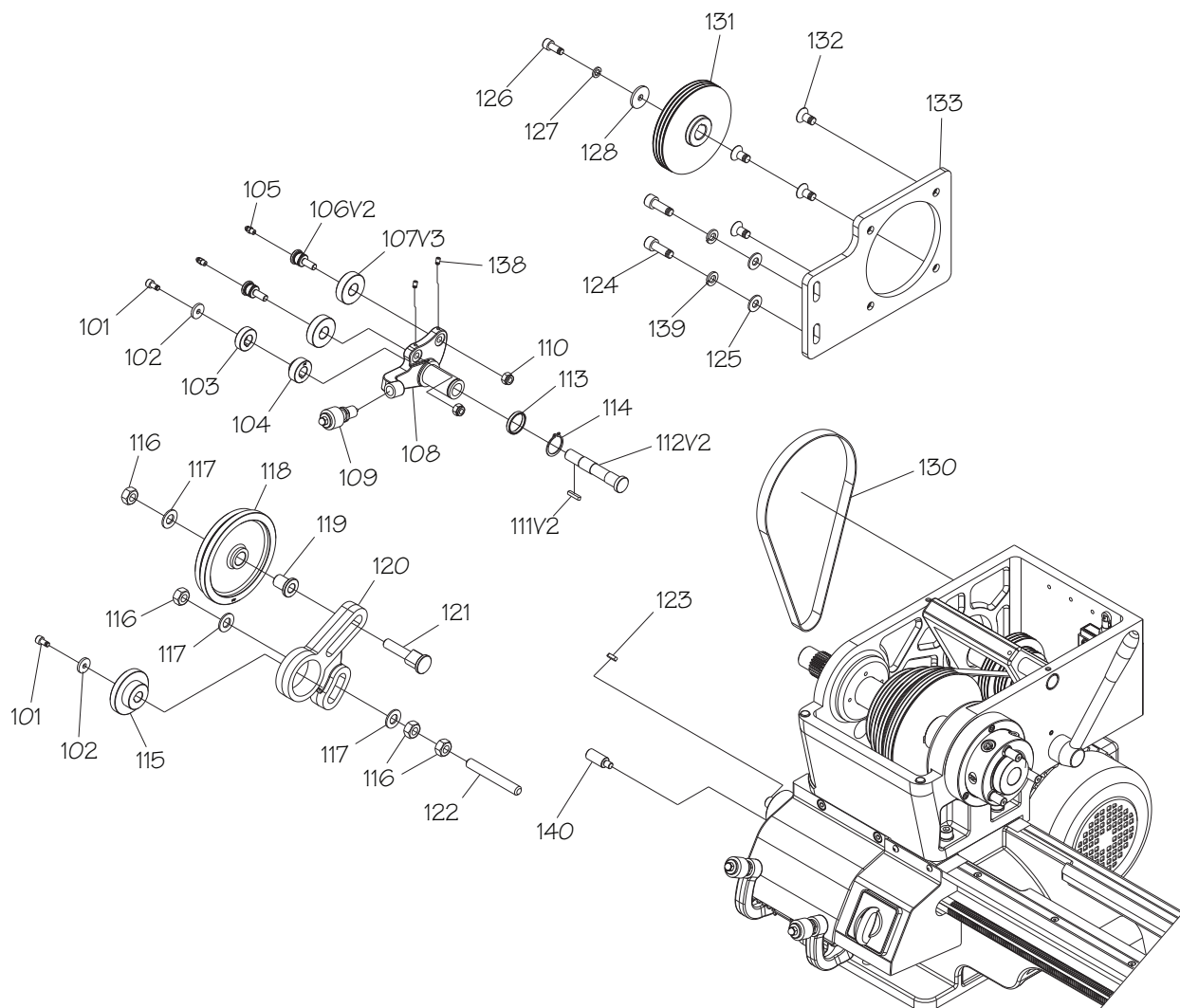


Headstock Parts List

REF	PART #	DESCRIPTION
1	P5B10020001	CAMLOCK SHAFT
2	PCAP199M	CAP SCREW M8-1.25 X 8
3	P5B10020003	COMPRESSION SPRING
4	P5B10020004	PLUNGER
5	P5B10020005	SPINDLE D1-3 MT#3
6	P5B10020006	CAMLOCK
7	P5B10020007	KEY 10 X 8 X 38
8	PCAP79M	CAP SCREW M5-.8 X 35
9	P5B10020009	FRONT SPINDLE BEARING COVER
10	P5B10020010	TAPERED BEARING E32009J
11	P5B10020011	RIBBED V-BELT 5M5-730A
12	P5B10020012	SPINDLE PULLEY
13	P5B10020013	SPACER
14	P5B10020014	SPANNER NUT M40-1.5
15	P5B10020015	TAPERED BEARING E32007J
16	P5B10020016	THRUST WASHER
17	P5B10020017	SPANNER NUT M35-1.5
18	P5B10020018	BELT TENSION LEVER
19	P5S25M	SET SCREW M6-1 X 20
20V2	P5B10020020V2	CAM PLATE V2.06.12
21V2	PCAP01M	CAP SCREW M6-1 X 16
22	P5B10020022	PIVOT SHAFT
23	P5S02M	SET SCREW M6-1 X 6
24	P5B10020024	CAM
25	P5S01M	SET SCREW M6-1 X 20
26	PCAP26M	CAP SCREW M6-1 X 12
27	P5B10020027	BEARING END COVER
28	PFH73M	FLAT HD CAP SCR M6-1 X 16
29	P5B10020029	BEARING FLAT WASHER 6MM
30	P6204-2NSE	BALL BEARING 6204-2NSE
31	P5B10020031	TENSION PIVOT BRACKET

REF	PART #	DESCRIPTION
32	P5B10020032	SPACER
33	P5B10020033	INTERNAL IDLER PULLEY
34	P5B10020034	PULLEY SHAFT
35	PK33M	KEY 5 X 5 X 45
36	PK23M	KEY 5 X 5 X 25
37	PR25M	INT RETAINING RING 47MM
38	P5B10020038	BUSHING
39	P5B10020039	EXTERNAL IDLER PULLEY
40	P5B10020040	PULLEY FLAT WASHER 8MM
41	PLW04M	LOCK WASHER 8MM
42	PCAP14M	CAP SCREW M8-1.25 X 20
45V2	P5B10020045V2	HEADSTOCK TOP COVER V2.06.12
46V2	P5B10020046V2	HEADSTOCK CASTING V2.06.12
47	P5B10020047	RUBBER PAD
48	P5B10020048	GREASE FITTING M6-1 90 DEG
49	PLW03M	LOCK WASHER 6MM
50	PNO1M	HEX NUT M6-1
51	PRP28M	ROLL PIN 5 X 40
52	PRP73M	ROLL PIN 4 X 30
54	P5B10020054	LIMIT SWITCH BRACKET
55	PW02M	FLAT WASHER 5MM
56	P509M	PHLP HD SCR M5-.8 X 10
57	P565M	PHLP HD SCR M4-.7 X 40
58	P5B10020058	LIMIT SWITCH MJ2-1308R
59	PW05M	FLAT WASHER 4MM
60	PNO4M	HEX NUT M4-.7
61	P5B10020061	COVER HINGE ARM
62	P5B10020062	HINGE PIN
63	P5B10020063	HINGE BRACKET
64	P5S26M	SET SCREW M5-.8 X 6

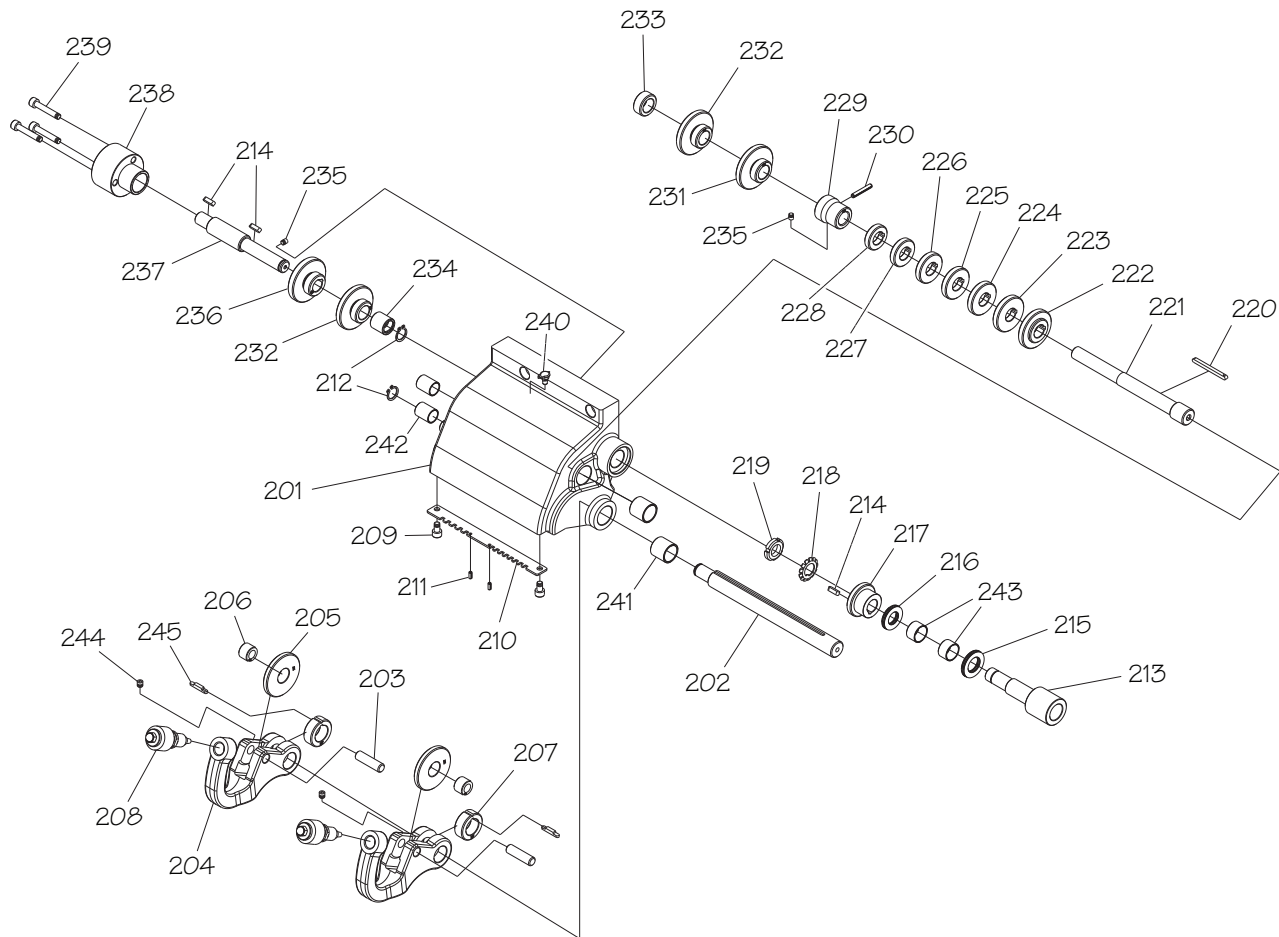
End Gears



REF	PART #	DESCRIPTION
101	PCAP26M	CAP SCREW M6-1 X 12
102	PSB10020102	GEAR FLAT WASHER 6MM
103	PSB10020103	GEAR 30T
104	PSB10020104	GEAR 24T
105	PSB10020105	GREASE FITTING M6-1 STRAIGHT
106V2	PSB10020106V2	GEAR SHAFT, NO CHANNEL V2.06.12
107V3	PSB10020107V3	GEAR 32T W/SLEEVE BEARING V3.06.12
108	PSB10020108	PIVOT BRACKET W/SLEEVE BEARING
109	PSB10020109	PIVOT LEVER
110	PLNO4M	LOCK NUT M8-1.25
111V2	PK48M	KEY 4 X 4 X 20
112V2	PSB10020112V2	PIVOT BRACKET SHAFT V2.06.12
113	PSB10020113	SPACER
114	PR17M	EXT RETAINING RING 26MM
115	PSB10020115	GEAR 60T
116	PNO9M	HEX NUT M12-1.75
117	PWO6M	FLAT WASHER 12MM
118	PSB10020118	GEAR 120T/127T W/SLEEVE BEARING

REF	PART #	DESCRIPTION
119	PSB10020119	SHAFT BUSHING
120	PSB10020120	PIVOT FRAME
121	PSB10020121	PIVOT SHAFT
122	PSB10020122	STUD-FT M12-1.75 X 90
123	PK47M	KEY 4 X 4 X 15
124	PCAP72M	CAP SCREW M10-1.5 X 30
125	PWO4M	FLAT WASHER 10MM
126	PCAP14M	CAP SCREW M8-1.25 X 20
127	PLWO4M	LOCK WASHER 8MM
128	PWO1M	FLAT WASHER 8MM
130	PSB10020011	RIBBED V-BELT 5M5-730A
131	PSB10020131	MOTOR PULLEY
132	PFH82M	FLAT HD CAP SCR M5-.8 X 30
133	PSB10020133	MOTOR MOUNT PLATE
138	PS531M	SET SCREW M5-.8 X 8
139	PLWO6M	LOCK WASHER 10MM
140	PSB10020140	EXTENSION PIN

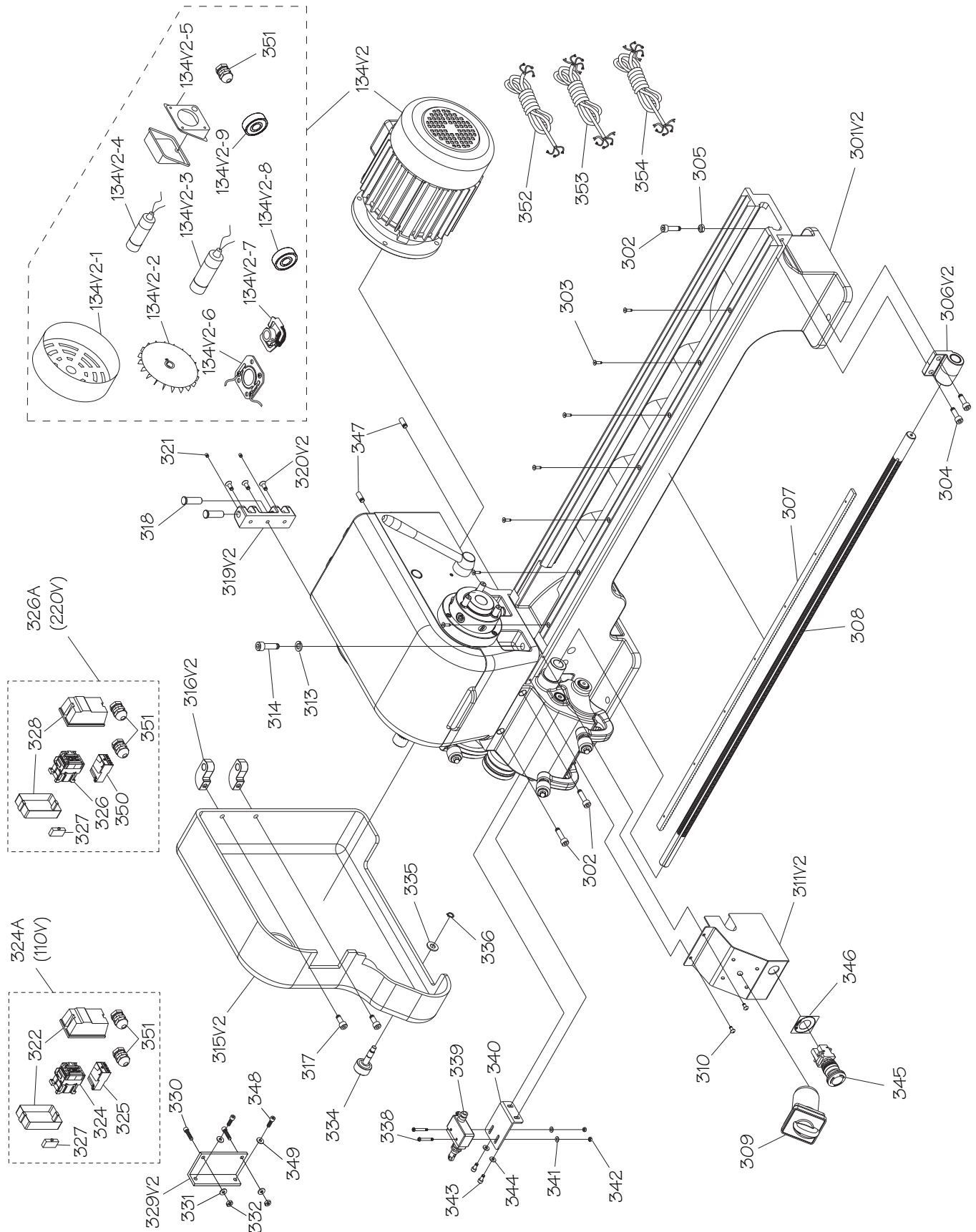
Gearbox



REF	PART #	DESCRIPTION
201	PSB10020201	GEARBOX COVER
202	PSB10020202	SHIFTER PIVOT SHAFT
203	PSB10020203	DOWEL PIN
204	PSB10020204	SHIFTER PIVOT BRACKET
205	PSB10020205	GEAR 32T
206	PSB10020206	NEEDLE BEARING TA1012
207	PSB10020207	GEAR 20T
208	PSB10020208	SHIFTER PIN HANDLE
209	PS68M	PHLP HD SCR M6-1 X 10
210	PSB10020210	SHIFTER PIN GUIDE
211	PSB10020211	DOWEL PIN 3 X 8
212	PRO2M	EXT RETAINING RING 14MM
213	PSB10020213	LEADSCREW CONNECTOR
214	PK47M	KEY 4 X 4 X 15
215	PSB10020215	THRUST BEARING 1831A2
216	PSB10020216	THRUST BEARING 1528A2
217	PSB10020217	GEAR 24T
218	PSB10020218	SPANNER LOCK WASHER
219	PSB10020219	SPANNER NUT M15-1
220	PK133M	KEY 4 X 4 X 50
221	PSB10020221	GEAR SHAFT
222	PSB10020222	GEAR 28T
223	PSB10020223	GEAR 26T

REF	PART #	DESCRIPTION
224	PSB10020224	GEAR 24T
225	PSB10020225	GEAR 23T
226	PSB10020226	GEAR 22T
227	PSB10020227	GEAR 20T
228	PSB10020228	GEAR 18T
229	PSB10020229	GEAR 16T
230	PRP108M	ROLL PIN 4 X 28
231	PSB10020231	COMBO GEAR 32T/16T W/SLEEVE BEARING
232	PSB10020232	COMBO GEAR 32T/16T W/SLEEVE BEARING
233	PSB10020233	GEAR 16T W/SLEEVE BEARING
234	PSB10020234	SPACER
235	PS626M	SET SCREW M5-.8 X 6
236	PSB10020236	COMBO GEAR 32T/16T
237	PSB10020237	GEAR SHAFT
238	PSB10020238	HUB W/SLEEVE BEARING
239	PCAP48M	CAP SCREW M6-1 X 35
240	PSB10020240	OIL CUP 5MM STRAIGHT
241	PSB10020241	SLEEVE BEARING MB1920DU W/PTFE
242	PSB10020242	SLEEVE BEARING MB1420DU W/PTFE
243	PSB10020243	SLEEVE BEARING MB1812DU W/PTFE
244	PS602M	SET SCREW M6-1 X 6
245	PSB10020245	GEAR KEY

Bed & Motor

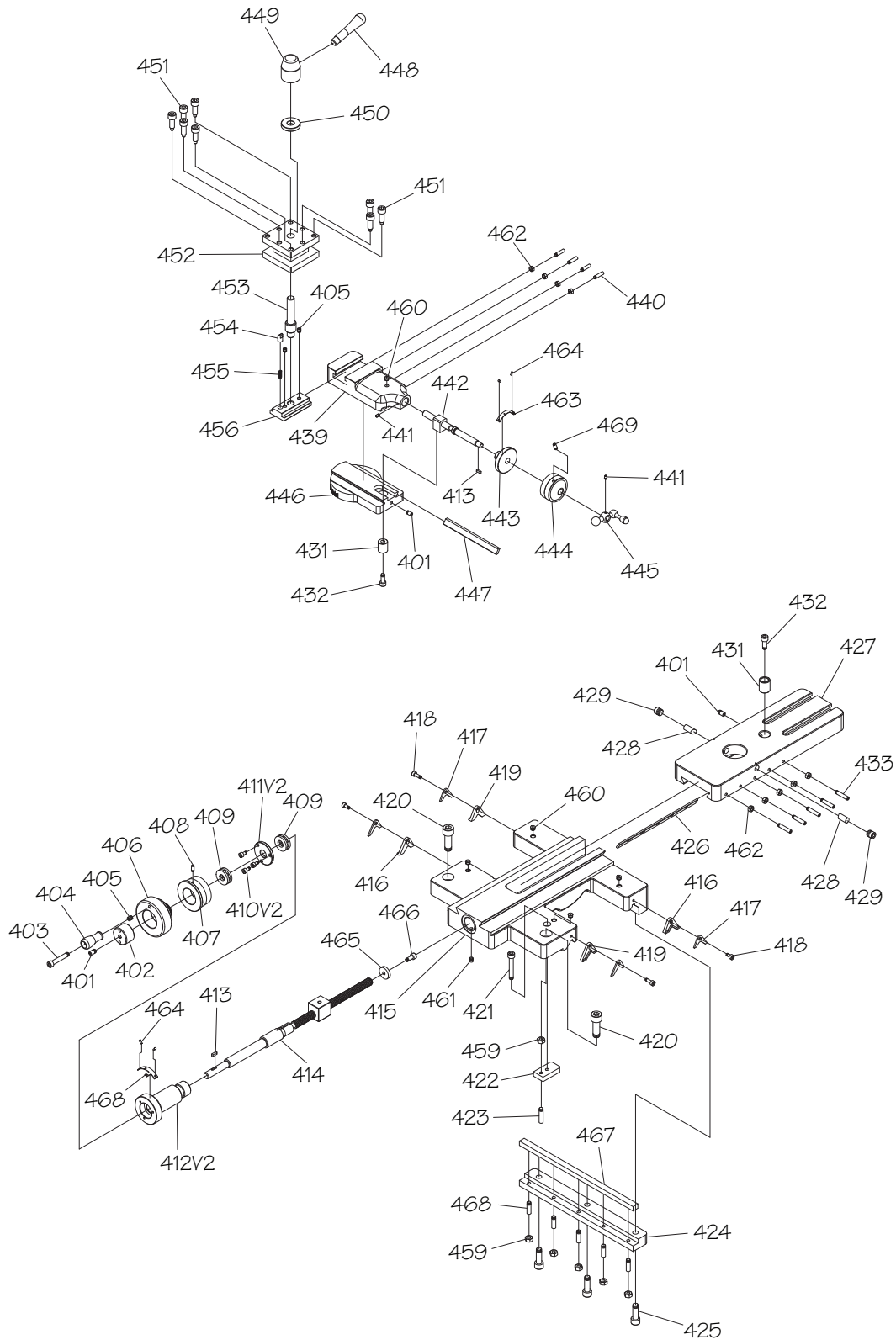


Bed & Motor Parts List

REF	PART #	DESCRIPTION
134V2	PSB10020134V2	MOTOR 1HP 110/220V 1-PH V2.06.12
134V2-1	PSB10020134V2-1	MOTOR FAN COVER
134V2-2	PSB10020134V2-2	MOTOR FAN
134V2-3	PSB10020134V2-3	S CAPACITOR 300M 125V 1-3/4 X 4
134V2-4	PSB10020134V2-4	R CAPACITOR 25M 250V 1-3/8 X 2-3/8
134V2-5	PSB10020134V2-5	MOTOR JUNCTION BOX
134V2-6	PSB10020134V2-6	CONTACT PLATE 16MM
134V2-7	PSB10020134V2-7	CENTRIFUGAL SWITCH 16MM-1175
134V2-8	P6205ZZ	BALL BEARING 6205ZZ
134V2-9	P6203ZZ	BALL BEARING 6203ZZ
301V2	PSB10020301V2	BED V2.06.12
302	PCAP13M	CAP SCREW M8-1.25 X 30
303	PFH46M	FLAT HD SCR M4-.7 X 16
304	PCAP31M	CAP SCREW M8-1.25 X 25
305	PNO3M	HEX NUT M8-1.25
306V2	PSB10020306V2	LS BRACKET W/SLEEVE BEARING V2.06.12
307	PSB10020307	RACK
308	PSB10020308	LONGITUDINAL LEADSCREW 8TPI
309	PSB10020309	SPINDLE SWITCH KEDU 3-CH-HZ
310	PSO9M	PHLP HD SCR M5-.8 X 10
311V2	PSB10020311V2	SWITCH COVER V2.06.12
313	PLW06M	LOCK WASHER 10MM
314	PCAP84M	CAP SCREW M10-1.5 X 35
315V2	PSB10020315V2	END GEAR COVER V2.06.12
316V2	PSB10020316V2	HINGE BLOCK V2.06.12
317	PCAP02M	CAP SCREW M6-1 X 20
318	PSB10020318	HINGE PIN
319V2	PSB10020319V2	CAST IRON HINGE BRACKET V2.06.12
320V2	PFH74M	FLAT HD CAP SCR M5-.8 X 16
321	PS526M	SET SCREW M5-.8 X 6
322	PSB10020322	MAGNETIC SWITCH BOX 110V

REF	PART #	DESCRIPTION
324A	PSB10020324A	MAGNETIC SWITCH ASSY MP-09 110V
324	PSB10020324	CONTACTOR SDE MA-15 110V
325	PSB10020325	OL RELAY SDE RA-20 12-18A
326A	PSB10020326A	MAGNETIC SWITCH ASSY MP-09 220V
326	PSB10020326	CONTACTOR SDE MA-09 220V
327	PSB10020327	CONTACTOR START SWITCH
328	PSB10020328	MAGNETIC SWITCH BOX 220V
329V2	PSB10020329V2	MAG SWITCH BRACKET V2.06.12
330	PCAP15M	CAP SCREW M5-.8 X 20
331	PW02M	FLAT WASHER 5MM
332	PNO6M	HEX NUT M5-.8
334	PSB10020334	END COVER KNOB BOLT M10-1.5
335	PW04M	FLAT WASHER 10MM
336	PRO1M	EXT RETAINING RING 10MM
338	PS51M	PHLP HD SCR M4-.7 X 30
339	PSB10020058	END COVER LIMIT SWITCH MJ2-1308R
340	PSB10020340	LIMIT SWITCH BRACKET
341	PW05M	FLAT WASHER 4MM
342	PNO4M	HEX NUT M4-.7
343	PCAP33M	CAP SCREW M5-.8 X 12
344	PW02M	FLAT WASHER 5MM
345	PSB10020345	E-STOP BUTTON AUSPICIOUS ES16G
346	PSB10020346	STOP BUTTON LABEL
347	PS509M	SET SCREW M8-1.25 X 20
348	PCAP04M	CAP SCREW M6-1 X 10
349	PW03M	FLAT WASHER 6MM
350	PSB10020350	OL RELAY SDE RA-20 5-8A
351	PSB10020351	STRAIN RELIEF 3/8" STRAIGHT LT
352	PSB10020352	POWER CORD 12AWG 3W 60"
353	PSB10020353	MOTOR CORD 12AWG 5W 36"
354	PSB10020354	CONTROL PANEL CORD 12AWG 5W 75"

Saddle & Slides

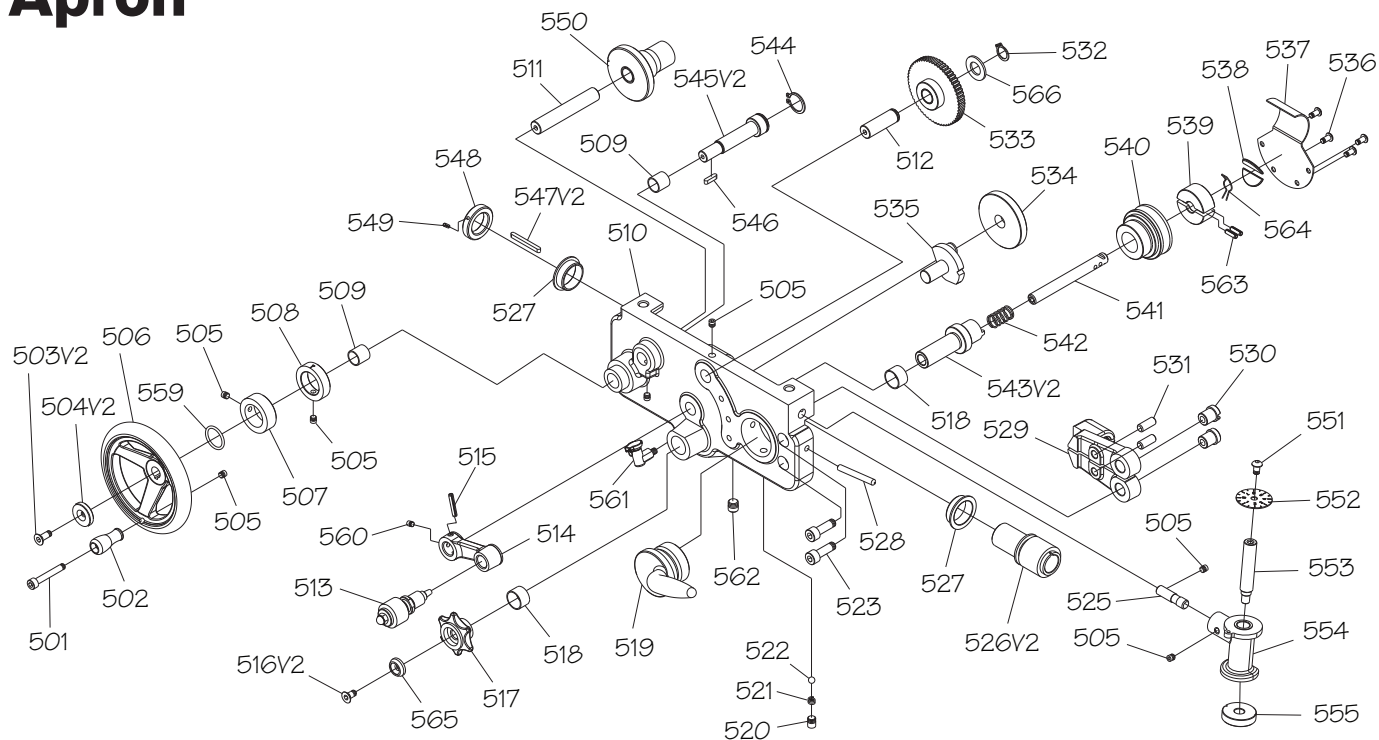


Saddle & Slides Parts List

REF	PART #	DESCRIPTION
401	PSS01M	SET SCREW M6-1 X 10
402	PSB10020402	HANDWHEEL HUB
403	PCAP48M	CAP SCREW M6-1 X 35
404	PSB10020404	HANDWHEEL HANDLE
405	PSS02M	SET SCREW M6-1 X 6
406	PSB10020406	CROSS HANDWHEEL
407	PSB10020407	CROSS HANDWHEEL GRADUATED DIAL
408	PSS23M	SET SCREW M4-.7 X 10
409	P51100	THRUST BEARING 51100
410V2	PCAP23M	CAP SCREW M4-.7 X 12
411V2	PSB10020411V2	BEARING CAP V2.06.12
412V2	PSB10020412V2	HUB W/SLEEVE BEARING V2.06.12
413	PK39M	KEY 3 X 3 X 10
414	PSB10020414	CROSS LEADSCREW 12 TPI W/NUT
415	PSB10020415	SADDLE
416	PSB10020416	FRONT V-WAY WIPER
417	PSB10020417	V-WAY WIPER PLATE
418	PCAP23M	CAP SCREW M4-.7 X 12
419	PSB10020419	REAR V-WAY WIPER
420	PCAP72M	CAP SCREW M10-1.5 X 30
421	PCAP29M	CAP SCREW M6-1 X 40
422	PSB10020422	CARRIAGE LOCK PLATE
423	PSS12M	SET SCREW M6-1 X 25
424	PSB10020424	REAR CLAMP BAR
425	PCAP31M	CAP SCREW M8-1.25 X 25
426	PSB10020426	CROSS SLIDE GIB
427	PSB10020427	CROSS SLIDE
428	PSB10020428	LOCK PIN
429	PSS30M	SET SCREW M10-1.5 X 10
431	PSB10020431	LOCKING SLEEVE
432	PCAP01M	CAP SCREW M6-1 X 16

REF	PART #	DESCRIPTION
433	PSS24M	SET SCREW M5-.8 X 25
439	PSB10020439	COMPOUND REST
440	PSS57M	SET SCREW M5-.8 X 20
441	PSS79M	SET SCREW M4-.7 X 6
442	PSB10020442	COMPOUND REST LEADSCREW W/NUT
443	PSB10020443	COMPOUND REST HANDWHEEL HUB
444	PSB10020444	COMPOUND REST GRADUATED DIAL
445	PSB10020445	COMPOUND REST BALL HANDLE
446	PSB10020446	COMPOUND REST SWIVEL BASE
447	PSB10020447	COMPOUND REST GIB
448	PSB10020448	TOOL POST LEVER
449	PSB10020449	TOOL POST NUT
450	PSB10020450	TOOL POST FLAT WASHER
451	PSB10020451	TOOL POST HOLD-DOWN CAP SCREW
452	PSB10020452	TOOL POST TURRET BODY
453	PSB10020453	TOOL POST SHAFT
454	PSB10020454	DETENT PIN
455	PSB10020455	COMPRESSION SPRING
456	PSB10020456	TOOL POST BASE
459	PNO1M	HEX NUT M6-1
460	PLUBE001	TAP-IN BALL OILER 1/4
461	PSS26M	SET SCREW M5-.8 X 6
462	PNO6M	HEX NUT M5-.8
463	PSB10020463	INDICATOR PLATE
464	PRIV001M	STEEL FLUTED RIVET 2 X 5MM
465	PWO2M	FLAT WASHER 5MM
466	PCAP33M	CAP SCREW M5-.8 X 12
467	PSB10020467	SADDLE GIB
468	PSS25M	SET SCREW M6-1 X 20
469	PSS53M	SET SCREW M5-.8 X 12

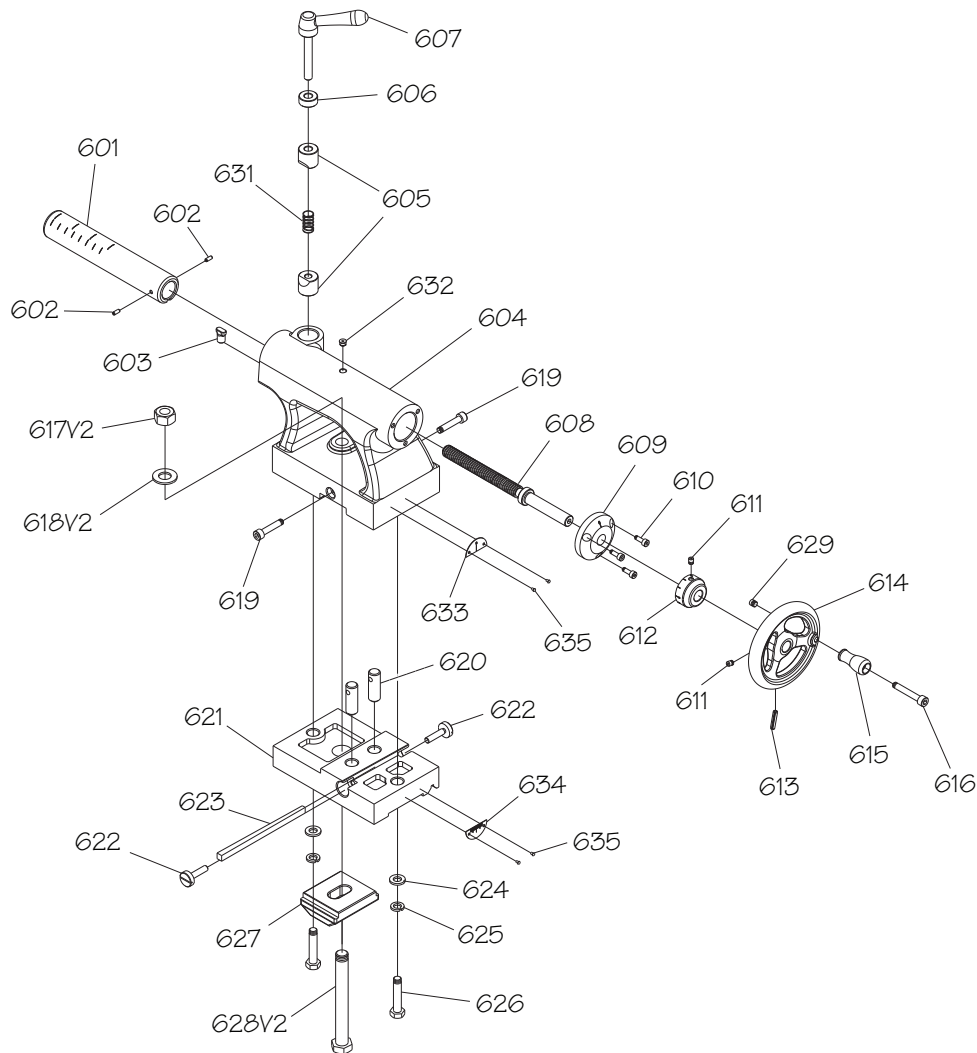
Apron



REF	PART #	DESCRIPTION
501	PCAP29M	CAP SCREW M6-1 X 40
502	PSB10020502	CARRIAGE HANDWHEEL HANDLE
503V2	PFH73M	FLAT HD CAP SCR M6-1 X 16
504V2	PSB10020504V2	HANDWHEEL FLAT WASHER 6MM
505	PSS02M	SET SCREW M6-1 X 6
506	PSB10020506	CARRIAGE HANDWHEEL
507	PSB10020507	CARRIAGE GRADUATED DIAL
508	PSB10020508	DIAL COLLAR
509	PSB10020509	SLEEVE BEARING MB1415DU W/PTFE
510	PSB10020510	APRON CASTING
511	PSB10020511	GEAR SHAFT
512	PSB10020512	GEAR SHAFT
513	PSB10020513	FEED SELECTION PIN HANDLE
514	PSB10020514	FEED SELECTION PIVOT ARM
515	PRP04M	ROLL PIN 4 X 24
516V2	PSB10020516V2	FLAT HD SCR M6-1 X 12 LH V2.10.11
517	PSB10020517	FEED CLUTCH KNOB
518	PSB10020518	SLEEVE BEARING MB1812DU W/PTFE
519	PSB10020519	HALF NUT LEVER
520	PSS16M	SET SCREW M8-1.25 X 10
521	PSB10020521	COMPRESSION SPRING
522	PSTB001	STEEL BALL 1/4
523	PCAP31M	CAP SCREW M8-1.25 X 25
525	PSB10020525	THREAD DIAL PIVOT ROD
526V2	PSB10020526V2	WORM GEAR V2.06.12
527	PSB10020527	SLEEVE BEARING MB2510-36FDU
528	PSB10020528	SHAFT
529	PSB10020529	HALF NUT 2-PC
530	PSB10020530	HALF NUT PIVOT BUSHING
531	PSB10020531	HALF NUT PIN 8 X 22MM
532	PRO2M	EXT RETAINING RING 14MM

REF	PART #	DESCRIPTION
533	PSB10020533	COMBO GEAR 22T/57T W/SLEEVE BEARING
534	PSB10020534	GEAR 45T W/SLEEVE BEARING
535	PSB10020535	GEAR CAM BRACKET
536	PS09M	PHLP HD SCR M5-.8 X 10
537	PSB10020537	CLUTCH EXPANDER COVER
538	PSB10020538	CLUTCH EXPANDER 2-PC
539	PSB10020539	EXPANDER RING 2-PC
540	PSB10020540	CLUTCH BEVEL GEAR
541	PSB10020541	CLUTCH EXPANDER SHAFT
542	PSB10020542	COMPRESSION SPRING
543V2	PSB10020543V2	CLUTCH GEAR SHAFT V2.06.12
544	PRO9M	EXT RETAINING RING 20MM
545V2	PSB10020545V2	CARRIAGE HANDWHEEL GEAR SHAFT V2.06.12
546	PK37M	KEY 4 X 4 X 16
547V2	PK68M	KEY 4 X 4 X 40
548	PSB10020548	LOCK COLLAR
549	PRP15M	ROLL PIN 3 X 8
550	PSB10020550	GEAR 17T/44T W/SLEEVE BEARING
551	PS68M	PHLP HD SCR M6-1 X 10
552	PSB10020552	THREAD DIAL PLATE
553	PSB10020553	THREAD DIAL SHAFT
554	PSB10020554	THREAD DIAL BODY
555	PSB10020555	GEAR 32T
559	PORP021	O-RING 20.8 X 2.4 P21
560	PSS26M	SET SCREW M5-.8 X 6
561	PSB10020561	OIL CUP 6MM 90 DEG
562	PSS30M	SET SCREW M10-1.5 X 10
563	PRP19M	ROLL PIN 4 X 14
564	PSB10020564	SPRING CLIP
565	PSB10020565	KNOB RETAINER
566	PW10M	FLAT WASHER 14MM

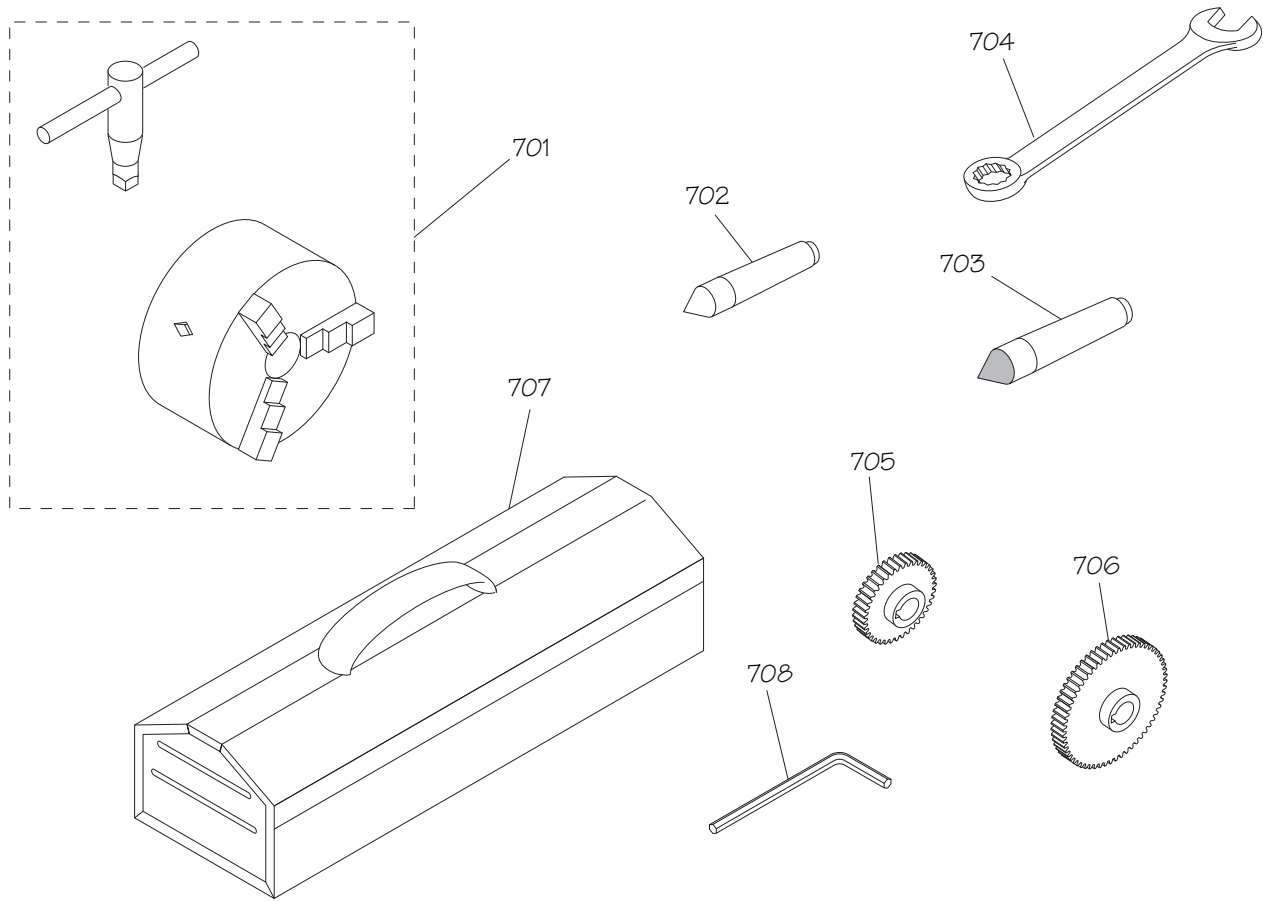
Tailstock



REF	PART #	DESCRIPTION
601	PSB10020601	QUILL
602	PRP15M	ROLL PIN 3 X 8
603	PSB10020603	QUILL GUIDE KEY
604	PSB10020604	TAILSTOCK TOP CASTING
605	PSB10020605	QUILL LOCK PLUNGER 2-PC
606	PSB10020606	QUILL LOCK FLAT WASHER 8MM
607	PSB10020607	QUILL LOCK LEVER
608	PSB10020608	TAILSTOCK LEADSCREW
609	PSB10020609	HANDWHEEL HUB
610	PCAP23M	CAP SCREW M4-.7 X 12
611	PSS26M	SET SCREW M5-.8 X 6
612	PSB10020612	GRADUATED DIAL
613	PRP39M	ROLL PIN 4 X 20
614	PSB10020614	QUILL HANDWHEEL
615	PSB10020615	QUILL HANDWHEEL HANDLE
616	PCAP29M	CAP SCREW M6-1 X 40
617V2	PN13	HEX NUT 1/2-13

REF	PART #	DESCRIPTION
618V2	PW01	FLAT WASHER 1/2
619	PCAP07M	CAP SCREW M6-1 X 30
620	PSB10020620	OFFSET ALIGNMENT PIN
621	PSB10020621	TAILSTOCK BOTTOM CASTING
622	PSB10020622	GIB SCREW
623	PSB10020623	TAILSTOCK GIB
624	PW01M	FLAT WASHER 8MM
625	PLW04M	LOCK WASHER 8MM
626	PB15M	HEX BOLT M8-1.25 X 40
627	PSB10020627	CLAMP PLATE
628V2	PB79	HEX BOLT 1/2-13 X 4-1/2
629	PSS02M	SET SCREW M6-1 X 6
631	PSB10020631	COMPRESSION SPRING
632	PLUBE001	TAP-IN BALL OILER 1/4
633	PSB10020633	UPPER OFFSET INDICATOR
634	PSB10020634	LOWER OFFSET INDICATOR
635	PRIV001M	STEEL FLUTED RIVET 2 X 5MM

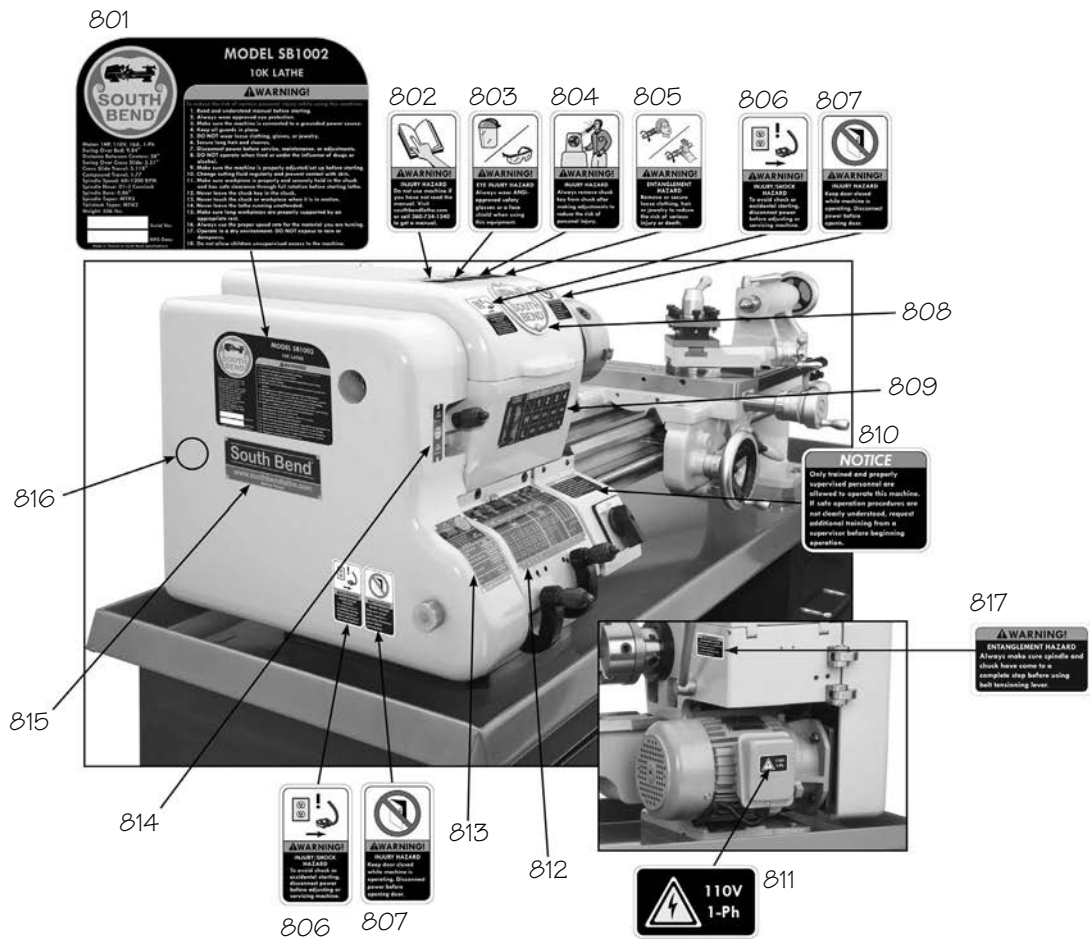
Accessories



REF	PART #	DESCRIPTION
701	PSB10020701	3-JAW CHUCK 5" W/CHUCK KEY
702	PSB10020702	DEAD CENTER MT#2
703	PSB10020703	DEAD CENTER MT#3 CARBIDE-TIP
704	PSB10020704	SB WRENCH 19MM COMBO

REF	PART #	DESCRIPTION
705	PSB10020705	END GEAR 35T
706	PSB10020706	END GEAR 64T
707	PSB10020707	TOOL BOX
708	PAW06M	HEX WRENCH 6MM

Labels



REF	PART #	DESCRIPTION
801	PSB10020801	MACHINE ID LABEL
802	PSBLABEL01VL	READ MANUAL LABEL
803	PSBLABEL03VL	EYE INJURY HAZARD LABEL
804	PSB10020804	CHUCK KEY HAZARD LABEL
805	PSBLABEL08VL	ENTANGLEMENT HAZARD LABEL
806	PSBLABEL02VL	SHOCK INJURY HAZARD LABEL
807	PSBLABEL13VL	KEEP DOOR CLOSED LABEL
808	SB1319	SOUTH BEND ROUND NAMEPLATE
809	PSB10020809	SPINDLE SPEED CHART

REF	PART #	DESCRIPTION
810	PSB10020810	TRAINED PERSONNEL NOTICE LABEL
811	PSB10020811	110V 1PH LABEL
812	PSB10020812	FEED/THREAD CHARTS LABEL
813	PSB10020813	THREAD DIAL LABEL
814	PSB10020814	SPINDLE DIRECTION LABEL
815	PSB10020815	SOUTH BEND RECTANGULAR LOGO
816	PSBPAIN01	SB GRAY TOUCH-UP PAINT
817	PSB10020817	BELT TENSION WARNING LABEL

Warranty

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

We do not warrant or represent that this machine complies with the provisions of any law, act, code, regulation, or standard of any domestic or foreign government, industry, or authority. In no event shall South Bend's liability under this warranty exceed the original purchase price paid for this machine. Any legal actions brought against South Bend Lathe Company shall be tried in the State of Washington, County of Whatcom.

This is the sole written warranty for this machine. Any and all warranties that may be implied by law, including any merchantability or fitness, for any purpose, are hereby limited to the duration of this warranty. To take advantage of this warranty, contact us by mail or phone to give us the details of the problem you are having.

Thank you for your business and continued support.



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