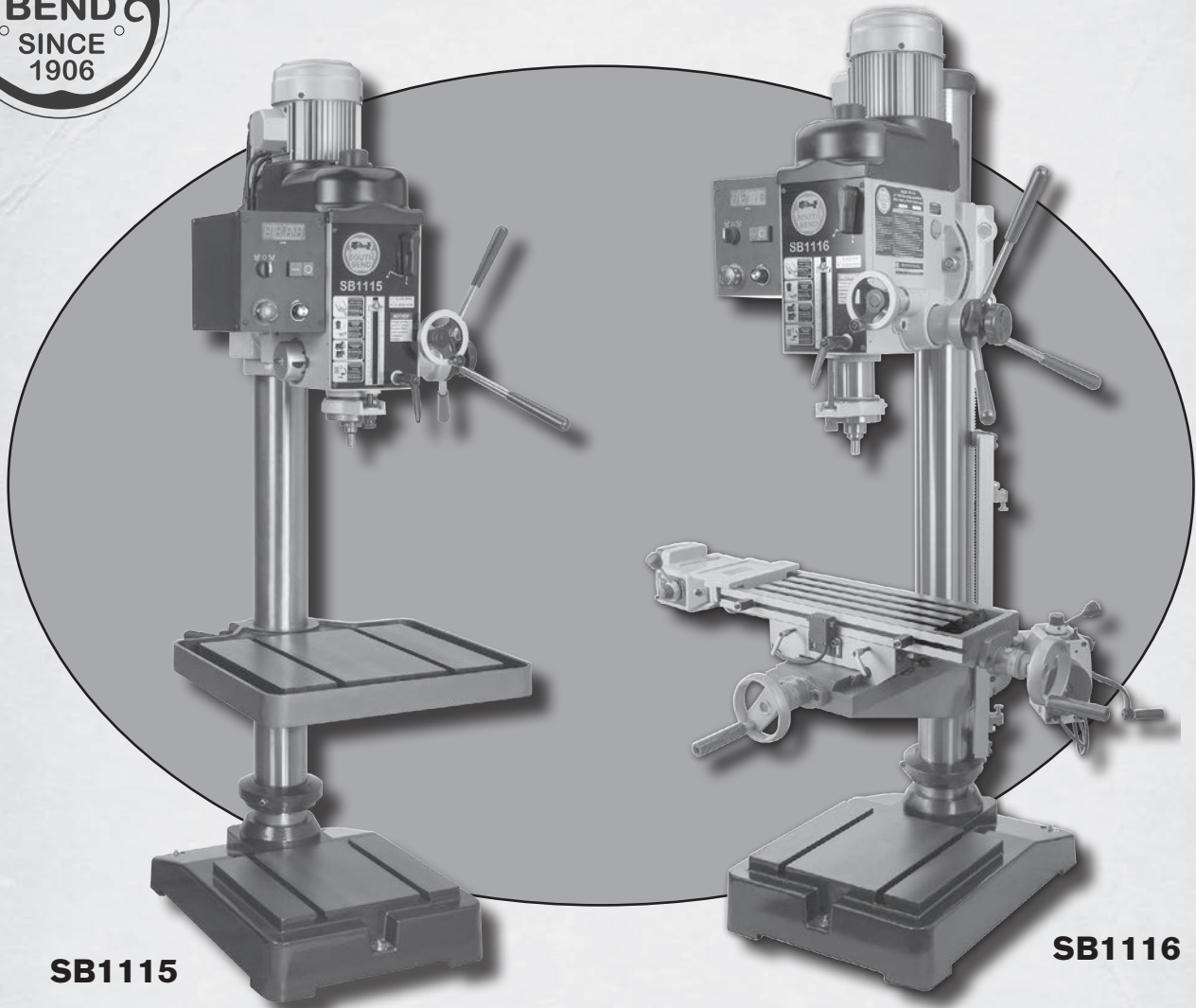


# 21" VARIABLE-SPEED GEARHEAD DRILL PRESS

MODEL SB1115/SB1116



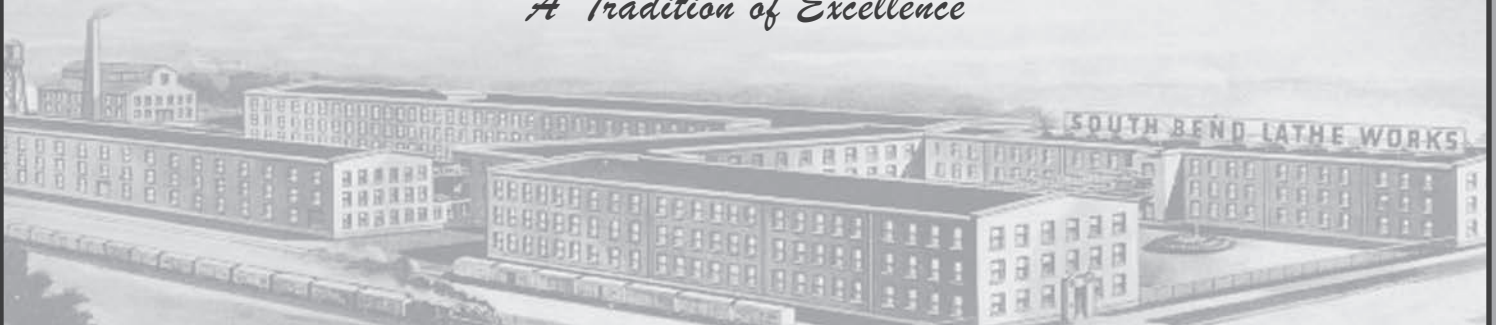
SB1115

SB1116

OWNER'S MANUAL

# South Bend Tools®

*A Tradition of Excellence*



# Scope of Manual

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

# Manual Feedback

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

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

**South Bend Tools**  
**c/o Technical Documentation Manager**  
**P.O. Box 2027**  
**Bellingham, WA 98227**  
**Email: [manuals@southbendtools.com](mailto:manuals@southbendtools.com)**

# Updates

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

**[www.southbendtools.com](http://www.southbendtools.com)**

# Customer Service

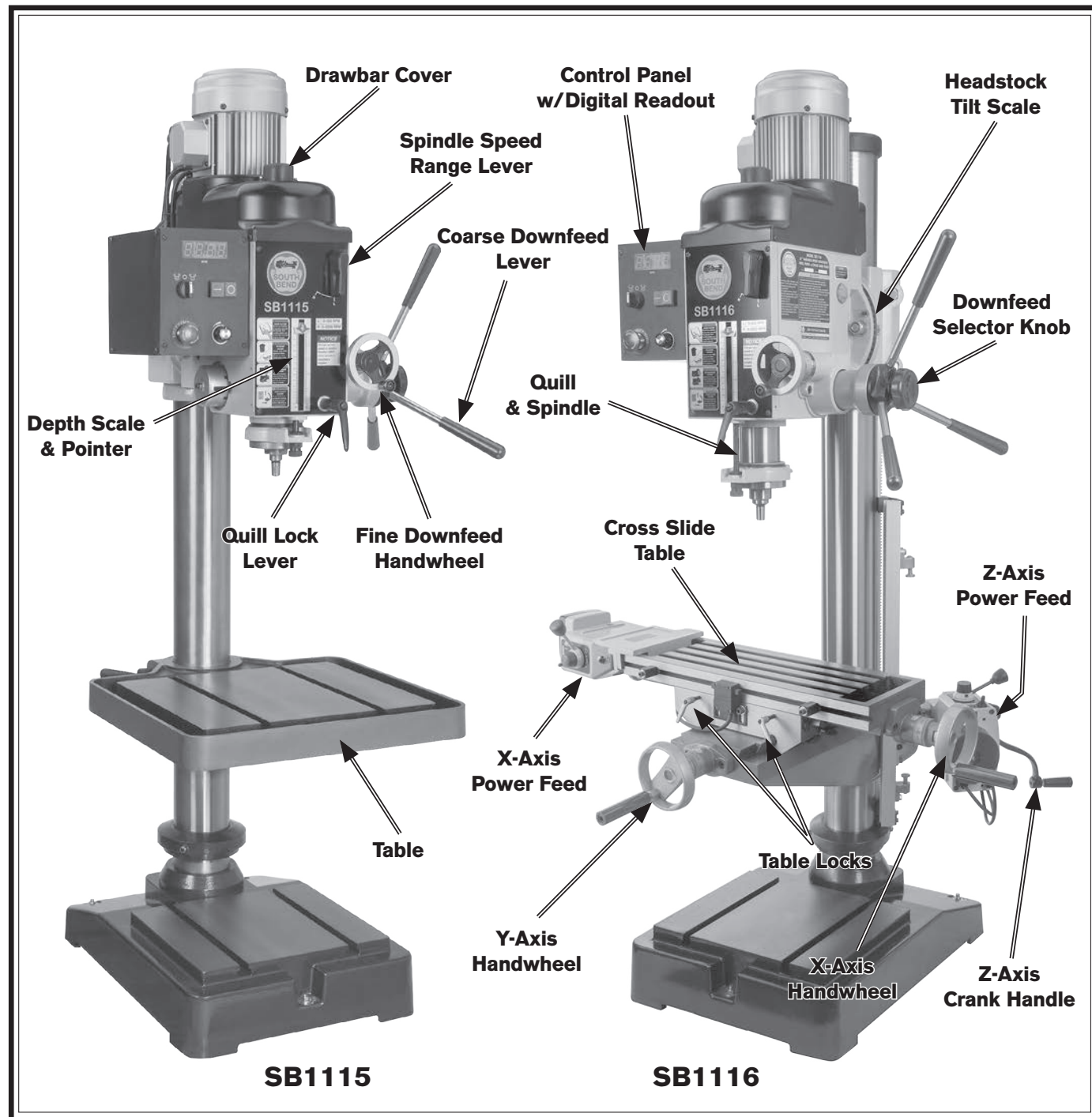
We stand behind our machines. If you have any service questions, parts requests or general questions about your purchase, feel free to contact us.

**South Bend Tools**  
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**Bellingham, WA 98227**  
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# Identification



## **⚠️ WARNING**

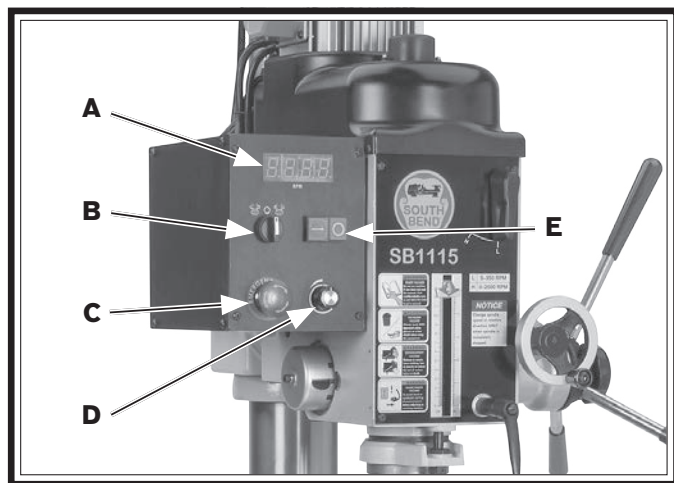
**For Your Own Safety Read Instruction Manual Before Operating Drill Press**

- a) Wear eye protection.
- b) Do not wear gloves, necktie, or loose clothing.
- c) Clamp workpiece or brace against column to prevent rotation.
- d) Use recommended speed for drill accessory and workpiece material.

# Description of Controls & Components

Refer to **Figures 1–7** and the following descriptions to become familiar with the basic controls and components used to operate this machine.

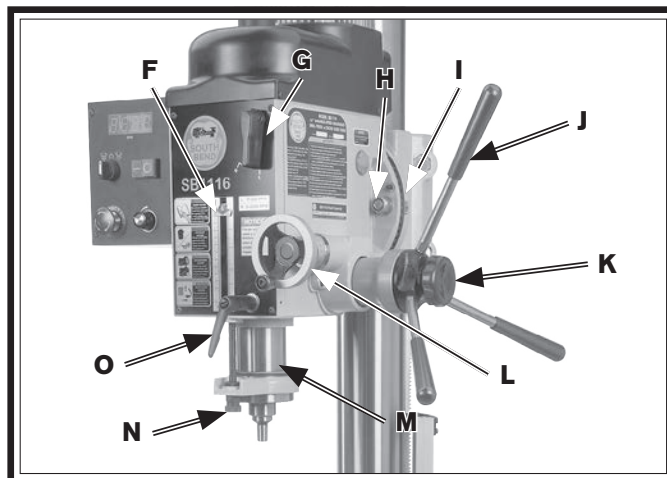
## Control Panel



**Figure 1. Control panel controls.**

- A. Digital Readout:** Displays spindle RPM.
- B. Spindle Direction Switch:** Selects direction of spindle rotation.
- C. EMERGENCY STOP Button:** Stops all machine functions. Twist clockwise to reset.
- D. Spindle Speed Dial:** Selects spindle speed from 0–2500 RPM.
- E. ON/OFF Buttons:** Starts and stops spindle rotation.

## Headstock



**Figure 2. Headstock controls.**

- F. Depth Stop Scale and Pointer:** Indicates depth of cut.
- G. Spindle Speed Range Lever:** Selects between low and high spindle speed ranges.
- H. Headstock Tilt Locking Nut (1 of 3):** Secures headstock tilt setting.
- I. Headstock Tilt Scale:** Indicates angle of headstock tilt from 90° left to 30° right.
- J. Coarse Downfeed Levers:** Provide coarse control over vertical spindle travel.
- K. Downfeed Selector Knob:** Engages/disengages fine downfeed handwheel.
- L. Fine Downfeed Handwheel:** Provides fine control over vertical spindle travel.
- M. Spindle and Quill:** Holds tooling for drilling operations.
- N. Depth Stop Adjustment Knob:** Determines depth of cut.
- O. Quill Lock:** Locks quill in position.

## Master Power Switch

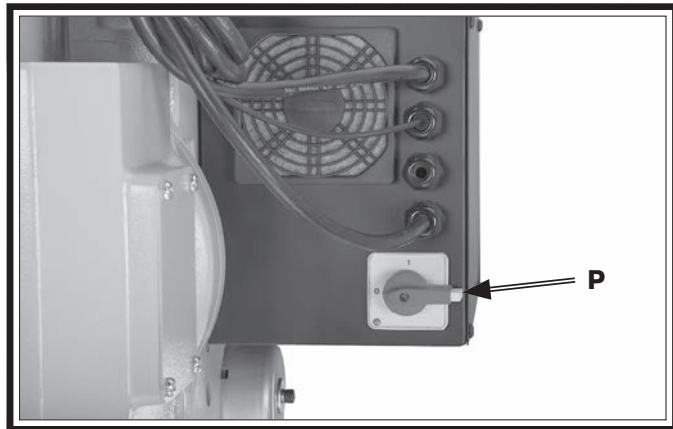


Figure 3. Master Power Switch.

- P. Master Power Switch:** Toggles incoming power *ON* or *OFF*. Vertical position toggles incoming power *ON*. Horizontal position, (see **Figure 3**) toggles incoming power *OFF*.

**Note:** Master power switch can be locked in *OFF* position with a padlock to prevent unauthorized usage.

## SB1115 Z-Axis Controls

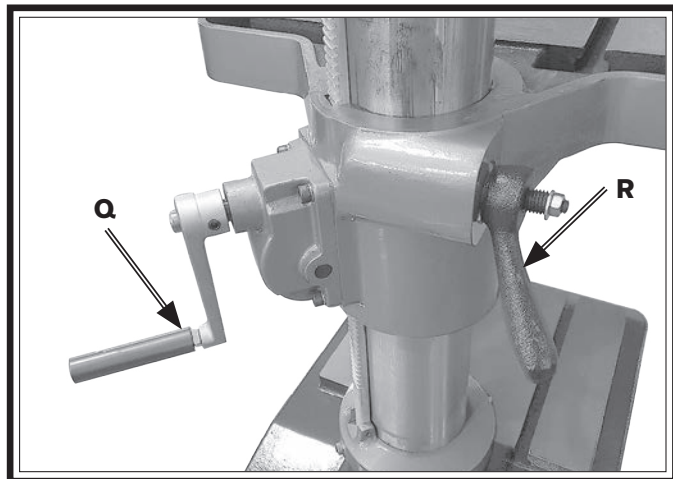


Figure 4. SB1115 Z-axis table controls.

- Q. Z-Axis Crank Handle:** Manually moves table along Z-axis (up and down).
- R. Z-Axis Table Lock:** Tightens to secure table height setting and ensure rigidity when milling.

## SB1116 X- and Z-Axis Cross-Table Controls

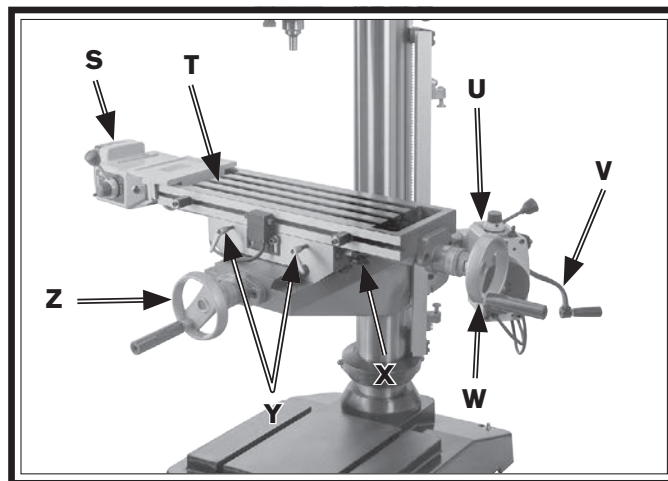
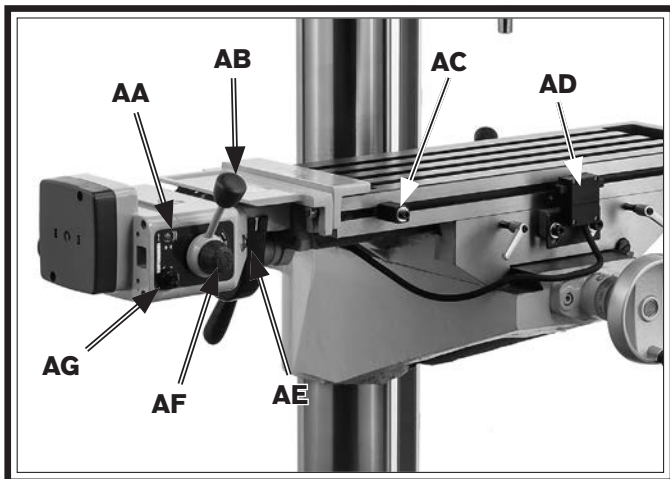


Figure 5. Table controls and components.

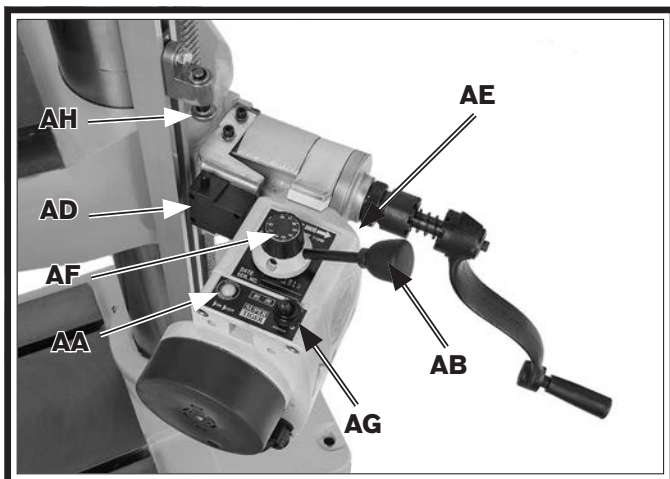
- S. X-Axis Power Feed:** Moves table along X-axis (left and right) when turned *ON* (see **Page 5** for more information).
- T. Table:** Equipped with four ½" T-slots for mounting workpiece. Adjusts in X-(left and right), Y-(front to back), and Z-(up and down) axes.
- U. Z-Axis Power Feed:** Moves table along Z-axis (up and down) when turned *ON* (see **Page 5** for more information).
- V. Z-Axis Crank:** Manually moves table along Z-axis (up and down); disengages for power feed use.
- W. X-Axis Handwheel:** Manually moves table along X-axis (left and right); handle folds for power feed use.
- X. Y-Axis Table Locks (1 of 2):** Tighten to prevent Y-axis table movement for increased rigidity during operations where the Y-axis should not move.
- Y. X-Axis Table Locks:** Tighten to prevent X-axis table movement for increased rigidity during operations where the X-axis should not move.
- Z. Y-Axis Handwheel:** Manually moves table along Y-axis (front and back).

## SB1116 X- and Z-Axis Power Feed Controls

Model SB1116 is equipped with power feed units for X- and Z-axis table movement. Refer to **Figures 6–7** and the following descriptions to understand the functions of the various components of the power feed system.



**Figure 6. X-axis power feed controls and limit stops.**



**Figure 7. Z-axis power feed controls.**

**AA. Reset Button:** Resets internal circuit breaker if unit is overloaded and shuts down.

**AB. Directional Lever:** Selects direction of table movement. Center position is neutral.

**AC. X-Axis Limit Stop (1 of 2 Shown):** Limits X-axis table travel.

**AD. Limit Switch:** Stops powered table movement when switch comes in contact with either limit stop.

**AE. Rapid Traverse Button:** When pressed, moves table at full speed when already in motion.

**AF. Speed Dial:** Controls speed of table movement. Turning dial clockwise causes table to move faster.

*Note: Feed rates for table travel are extremely difficult to precisely calculate. We recommend that you combine research and experimentation to find feed rates that best work for your operations.*

**AG. ON/OFF Switch:** Enables/disables power to unit.

**AH. Z-Axis Limit Stop (1 of 2 Shown):** Limits Z-axis table travel.



## Model SB1115 21" Variable-Speed Gearhead Drill Press

**Product Dimensions**

Weight..... 617 lbs.  
 Width (side-to-side) x Depth (front-to-back) x Height..... 42 x 35 x 69 in.  
 Footprint (Length x Width)..... 26 x 18-1/2 in.

**Shipping Dimensions**

Type..... Wood Crate  
 Content..... Machine  
 Weight..... 683 lbs.  
 Length x Width x Height..... 36 x 34 x 78 in.  
 Must Ship Upright..... Yes

**Electrical**

Power Requirement..... 220V, Single-Phase, 60 Hz  
 Full-Load Current Rating..... 5.5A  
 Minimum Circuit Size..... 15A  
 Connection Type..... Cord & Plug  
 Power Cord Included..... Yes  
 Power Cord Length..... 84 in.  
 Power Cord Gauge..... 14 AWG  
 Plug Included..... Yes  
 Included Plug Type..... 6-15  
 Switch Type..... Control Panel w/Magnetic Switch  
 Inverter (VFD) Type..... KB-26D

**Motors**

**Main**

Horsepower..... 1-1/2 HP  
 Phase..... 3-Phase  
 Amps..... 5.5A  
 Speed..... 1720 RPM  
 Type..... TEFC Induction  
 Power Transfer ..... Gear Drive  
 Bearings..... Shielded & Permanently Lubricated



**Main Specifications****Operation Information**

Type.....	Floor
Swing.....	20-3/4 in.
Spindle Taper.....	MT#3
Spindle Travel.....	5 in.
Max. Distance From Spindle to Column.....	10-7/16 in.
Max. Distance From Spindle to Table.....	17-3/8 in.
Range of Spindle Speeds.....	0 - 2500 RPM
Max. Head Tilt (Left/Right).....	90/30 deg.
Drilling Capacity (Mild Steel).....	1-9/16 in.
Drilling Capacity (Cast Iron).....	1-9/16 in.
End Milling Capacity.....	3/4 in.
Face Milling Capacity.....	3-15/16 in.
Drill Chuck Type.....	JT6 Key Chuck
Drill Chuck Size.....	1/64 - 5/8 in.

**Spindle Information**

Distance From Spindle to Base.....	35-3/4 in.
Quill Diameter.....	2.938 in.
Drawbar Thread Size.....	3/8"-16

**Table Information**

Table Swivel Around Column.....	360 deg.
Longitudinal Travel.....	14-1/2 in.
Cross Travel.....	7 in.
Table Length.....	19-1/2 in.
Table Width.....	21-3/4 in.
Table Thickness.....	2-1/4 in.
Vertical Table Travel.....	22-1/4 in.
Number of T-Slots.....	2
T-Slot Size.....	5/8 in.
T-Slot Centers.....	9 in.
Floor-To-Table Height.....	18-1/2 - 39-1/2 in.

**Construction**

Table.....	Cast Iron
Column.....	Cast Iron
Spindle Housing.....	Cast Iron
Head.....	Cast Iron
Base.....	Cast Iron
Paint Type/Finish.....	Enamel

**Other Related Information**

Base Length.....	26 in.
Base Width.....	18-1/2 in.
Column Diameter.....	4-1/2 in.
Quill Flange/Collar Diameter.....	3-3/4 in.

**Other**

Country of Origin .....	Taiwan
Warranty .....	2 Years
Approximate Assembly & Setup Time .....	1 Hour
Serial Number Location .....	ID Label
Sound Rating .....	82 - 84 dB
ISO 9001 Factory .....	Yes

**Features**

Variable Frequency Drive for 3-Phase Speed Control with Single-Phase Power  
Manual Table Elevation  
Coarse and Fine Downfeed Controls  
Cast-Iron Base with Two 1/2" T-Slots, 8-7/8" on Center  
360 Deg. Table Positioning Around Column  
360 Deg. Head Positioning Around Column  
Digital Speed Display  
Front-Mounted E-Stop Button  
Forward/Reverse Spindle Switch  
Headstock Features 2.6 Qt. Capacity

**Included Accessories**

Socket Wrench 13/23mm  
Hex Wrenches 3, 4, 5mm

	<h2 style="margin: 0;">Product Specifications</h2> <p style="margin: 0;">P.O. Box 2027, Bellingham, WA 98227 U.S.A.                  PHONE: (360) 734-1540 • © South Bend Tools                  www.southbendtools.com</p>	
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# Model SB1116

## 21" Variable-Speed Gearhead Drill Press With Cross-Slide Table

**Product Dimensions**

Weight..... 672 lbs.  
 Width (side-to-side) x Depth (front-to-back) x Height..... 42 x 35 x 69 in.  
 Footprint (Length x Width)..... 26 x 18-1/2 in.

**Shipping Dimensions**

Type..... Wood Crate  
 Content..... Machine  
 Weight..... 739 lbs.  
 Length x Width x Height..... 36 x 34 x 78 in.  
 Must Ship Upright..... Yes

**Electrical**

Power Requirement..... 220V, Single-Phase, 60 Hz  
 Full-Load Current Rating..... 5.5A  
 Minimum Circuit Size..... 15A  
 Connection Type..... Cord & Plug  
 Power Cord Included..... Yes  
 Power Cord Length..... 84 in.  
 Power Cord Gauge..... 14 AWG  
 Plug Included..... Yes  
 Included Plug Type..... 6-15  
 Switch Type..... Control Panel w/Magnetic Switch  
 Inverter (VFD) Type..... KB-26D

**Motors**

**Main**

Horsepower..... 1-1/2 HP  
 Phase..... 3-Phase  
 Amps..... 5.5A  
 Speed..... 1720A  
 Type..... TEFC Induction  
 Power Transfer ..... Gear Drive  
 Bearings..... Shielded & Permanently Lubricated

**Main Specifications****Operation Information**

Type.....	Floor
Swing.....	20-3/4 in.
Spindle Taper.....	R-8
Spindle Travel.....	5 in.
Max. Distance From Spindle to Column.....	10-7/16 in.
Max. Distance From Spindle to Table.....	17-3/8 in.
Number of Spindle Speeds.....	Variable
Range of Spindle Speeds.....	0 - 2500 RPM
Max. Head Tilt (Left/Right).....	90/30 deg.
Drilling Capacity (Mild Steel).....	1-9/16 in.
Drilling Capacity (Cast Iron).....	1-9/16 in.
End Milling Capacity.....	3/4 in.
Face Milling Capacity.....	3-15/16 in.
Drill Chuck Type.....	JT6 Key Chuck
Drill Chuck Size.....	1/64 - 5/8 in.

**Spindle Information**

Distance From Spindle to Base.....	35-3/4 in.
Quill Diameter.....	2.938 in.
Drawbar Thread Size.....	7/16" x 20

**Table Information**

Table Swivel Around Column.....	360 deg.
Longitudinal Travel.....	14-1/2 in.
Cross Travel.....	7-1/4 in.
Table Length.....	23 in.
Table Width.....	7-1/2 in.
Table Thickness.....	1-3/4 in.
Vertical Table Travel.....	17-3/16 in.
Number of T-Slots.....	4
T-Slot Size.....	1/2 in.
T-Slot Centers.....	1-1/2 in.
Floor-To-Table Height.....	18-1/2 - 39-1/2 in.

**Construction**

Table.....	Cast Iron
Column.....	Cast Iron
Spindle Housing.....	Cast Iron
Head.....	Cast Iron
Base.....	Cast Iron
Paint Type/Finish.....	Enamel

**Other Related Information**

Base Length.....	26 in.
Base Width.....	18-1/2 in.
Column Diameter.....	4-1/2 in.
Quill Flange/Collar Diameter.....	3-3/4 in.

**Other**

Country of Origin ..... Taiwan  
Warranty ..... 2 Years  
Approximate Assembly & Setup Time ..... 1 Hour  
Serial Number Location ..... ID Label  
Sound Rating ..... 83 - 85 dB  
ISO 9001 Factory ..... Yes

**Features**

Variable Frequency Drive for 3-Phase Speed Control with Single-Phase Power  
Longitudinal Power Feed on Precision-Ground Cast-Iron Table with Independent Power Supply  
Powered or Manual Table Elevation  
Coarse and Fine Downfeed Controls  
Cast-Iron Base with Two 1/2" T-Slots, 8-7/8" on Center  
360 Deg. Table Positioning Around Column  
360 Deg. Head Positioning Around Column  
Digital Speed Display  
Front-Mounted E-Stop Button  
Forward/Reverse Spindle Switch  
Headstock Features 2.6 Qt. Capacity

**Included Accessories**

Socket Wrench 13/23mm  
Hex Wrenches 3, 4, 5mm




# 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:

 <b>DANGER</b>	<i>Death or catastrophic harm WILL occur.</i>	 <b>CAUTION</b>	<i>Moderate injury or fire MAY occur.</i>
 <b>WARNING</b>	<i>Death or catastrophic harm COULD occur.</i>	<b>NOTICE</b>	<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 Drill Press Safety

## ⚠️ WARNING

**Serious injury or death can occur from getting clothing, jewelry, or long hair entangled in rotating spindle or bit/cutting tool. Contact with rotating bit/cutting tool can result in severe cuts or amputation of fingers. Flying metal chips can cause blindness or eye injuries. Broken bits/cutting tools, unsecured workpieces, chuck keys, or other adjustment tools thrown from rotating spindle can strike nearby operator or bystanders with deadly force. To reduce the risk of these hazards, operator and bystanders MUST completely heed hazards and warnings below.**

**Eye/Face/Hand Protection.** Flying chips created by drilling can cause eye injuries or blindness. Always wear a face shield in addition to safety glasses. Always keep hands and fingers away from drill bit/cutting tool. Avoid awkward hand positions, where a sudden slip could cause hand to move into bit/cutting tool.

**Avoiding Entanglement.** DO NOT wear loose clothing, gloves, or jewelry. Tie back long hair. Keep all guards in place and secure. Always allow spindle to stop on its own. DO NOT stop spindle using your hand or any other object.

**Removing Adjustment Tools.** Chuck key, wrenches, and other tools left on machine can become deadly projectiles when spindle is started. Remove all loose items or tools used on spindle immediately after use.

**Correct Spindle Speed.** Using wrong spindle speed can cause bits/cutting tools to break and strike operator or bystanders. Follow recommended speeds and feeds for each size/type of bit/cutting tool and workpiece material.

**Securing Bit/Cutting Tool.** Firmly secure bit/cutting tool in chuck so it cannot fly out of spindle during operation or startup.

**Drilling Preparation.** To avoid loss of drilling control or bit breakage, only drill into a flat surface that is approximately perpendicular to bit. Clear table of all objects before starting spindle. Never start spindle with bit pressed against workpiece.

**Securing Table and Headstock.** To avoid loss of control leading to accidental contact with tool/bit, tighten all table and headstock locks before operating drill press.

**Workpiece Control.** An unsecured workpiece may unexpectedly shift, spin out of control, or be thrown if bit/cutting tool “grabs” during operation. Clamp workpiece to table or in table-mounted vise, or brace against column to prevent rotation. NEVER hold workpiece by hand during operation. NEVER start machine with bit/cutting tool touching workpiece; allow spindle to gain full speed before drilling.

**Inspecting Bit/Cutting Tool.** Damaged bits/cutting tools may break apart during operation and hit operator or bystanders. Dull bits/cutting tools increase cutting resistance and are more likely to grab and spin/throw workpiece. Always inspect bits/cutting tools for sharpness, chips, or cracks before each use. Replace dull, chipped, or cracked bits/cutting tools immediately.

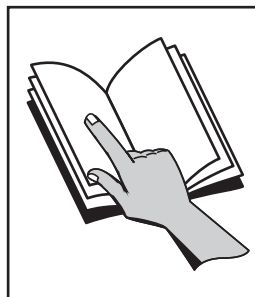


## Preparation Overview

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

### The typical preparation process is as follows:

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



### **!WARNING**

**Incorrect use of this machine can result in death or serious injury. For your own safety, read and understand this entire document before using.**

## Required for Setup

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

### For Lifting

- A forklift or other power lifting device rated for at least 1000 lbs.
- Lifting sling rated for at least 1000 lbs.

### For Power Connection

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

### For Assembly

- Additional Person
- Safety Glasses for Each Person
- Cleaner/Degreaser
- Disposable Gloves
- Disposable Shop Rags
- Precision Level
- Floor Mounting Hardware
- Open-End Wrench 22mm
- ISO 32 Equivalent Oil
- Dial Test Indicator & Holder
- Parallel Block (9" Long)

### For SB1116 Only:


- Hex Wrench 1/8"
- Hex Wrench 3/16"
- Hex Wrench 1/4"
- Open-End Wrench 9/16"
- Hex Wrench 6mm
- Flat Head Screwdriver 1/4"
- T-Handle Hex Wrench 5mm

# 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.

	<p><b>! WARNING</b>  <b>Electrocution or fire may occur if machine is not correctly grounded and attached to the power supply. Use a qualified electrician to ensure a safe power connection.</b></p>
--	---

## 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 220V ..... 5.5 Amps**

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

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

## **! WARNING**

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

## Circuit Requirements

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

**Nominal Voltage ..... 208V, 220V, 230V, 240V**  
**Cycle ..... 60 Hz**  
**Phase ..... Single-Phase**  
**Circuit Rating ..... 15 Amps**  
**Plug/Receptacle (included) ..... NEMA 6-15**

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

## **! CAUTION**

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

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

## Grounding Requirements

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

This machine is equipped with a power cord that has an equipment-grounding wire and a grounding plug (similar to the figure below). The plug must only be inserted into a matching receptacle (outlet) that is properly installed and grounded in accordance with all local codes and ordinances.

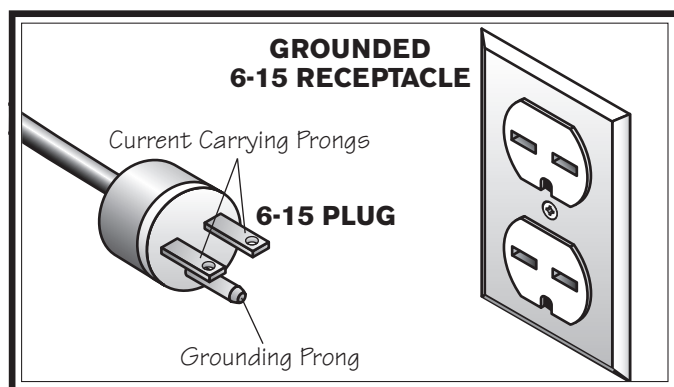
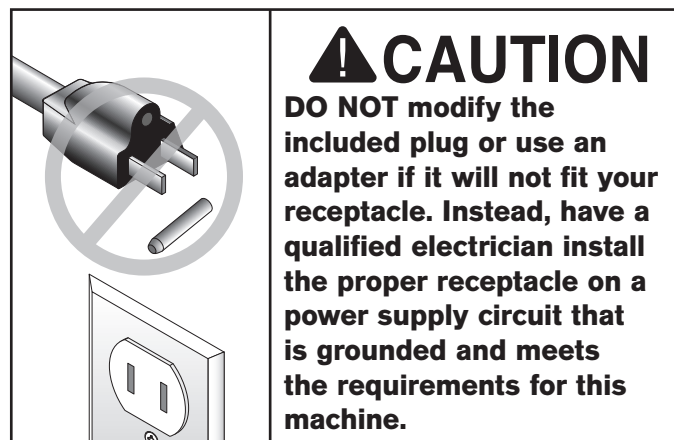


Figure 8. NEMA 5-15 plug and receptacle.



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.

# 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

## SB1115

Wood Crate (Figure 9)	Qty
A. SB1115 Drill Press (Not Shown).....	1
B. Coarse Downfeed Lever Shafts .....	3
C. Coarse Downfeed Lever Handles .....	3
D. Wrench 13mm/23mm.....	1
E. Z-Axis Crank Handle .....	1
F. Z-Axis Revolving Handle .....	1
G. Drift Key .....	1
H. Hex Wrenches 3, 4, 5mm .....	1 Ea.

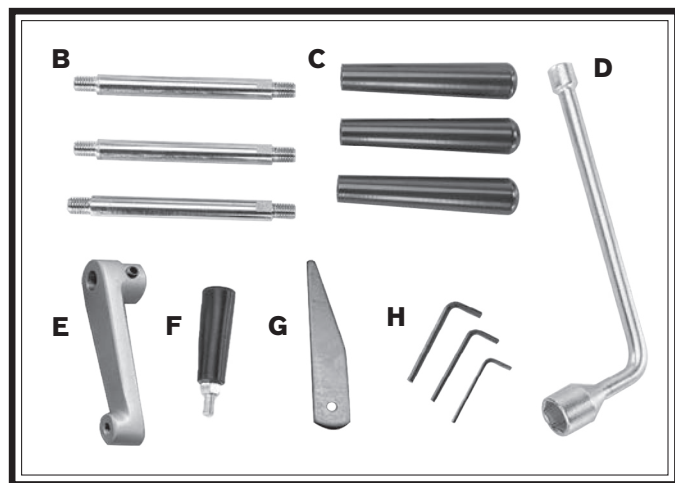


Figure 9. SB1115 Inventory.

## SB1116

Wood Crate (Figure 10)	Qty
I. SB1116 Drill Press (Not Shown).....	1
J. X-/Y- Axis Handwheels .....	3
K. Hex Wrenches 3, 4, 5mm .....	1 Ea.
L. Revolving Handles .....	3
M. X-Axis Folding Handle.....	1
N. Wrench 13mm/23mm.....	1
O. Coarse Downfeed Lever Shafts .....	3
P. Coarse Downfeed Lever Handles .....	3

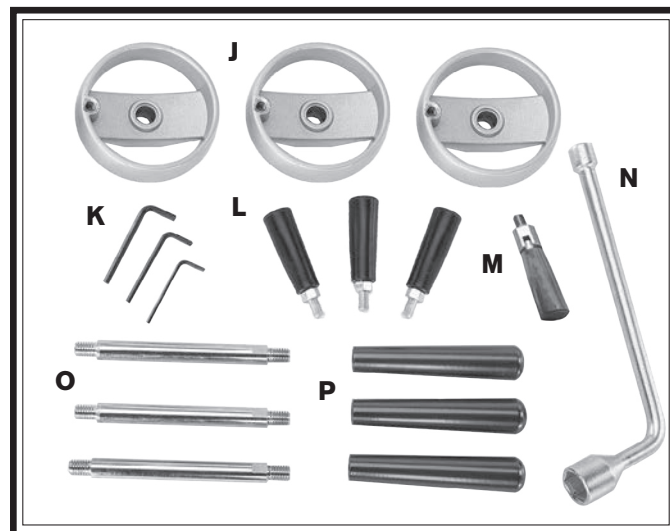


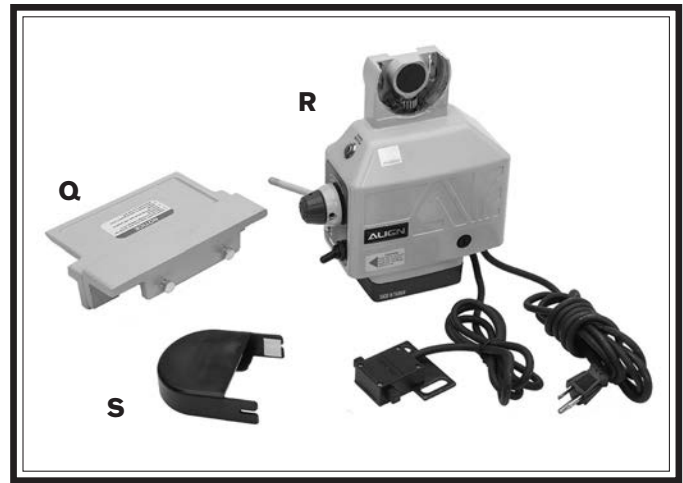
Figure 10. SB1116 Inventory.

# NOTICE

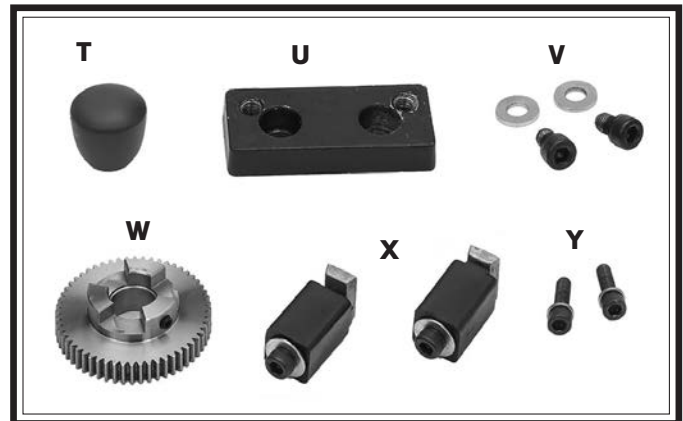
If you cannot find an item on this list, carefully check around/inside the machine and packaging materials. Often, these items get lost in packaging materials while unpacking or they are pre-installed at the factory.

**X-Axis Power Feed (Figures 11-12) Qty**

<b>Q.</b>	X-Axis Power Feed Bracket.....	1
<b>R.</b>	X-Axis Power Feed Unit .....	1
<b>S.</b>	X-Axis Power Feed Gear Guard .....	1
<b>T.</b>	Direction Lever Knob.....	1
<b>U.</b>	Limit Switch Mounting Block .....	1
<b>V.</b>	Limit Switch Mounting Hardware	
	Cap Screws M8-1.25 x 12.....	2
	Flat Washers 8mm.....	2
<b>W.</b>	X-Axis Leadscrew Gear 56T .....	1
<b>X.</b>	X-Axis Limit Stop Assemblies .....	2
	Cap Screws ¼"-20 x 1½" .....	2
	Flat Washers ¼" .....	2
	Slide Nuts ¼"-20 .....	2
<b>Y.</b>	X-Axis Power Feed Hardware	
	Cap Screws M6-1 x 25.....	2
	Flat Washers 6mm.....	2



**Figure 11. SB1116 X-axis power feed.**



**Figure 12. SB1116 X-axis power feed components.**

## 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:

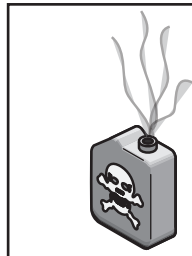
- Disposable rags
- Cleaner/degreaser (certain citrus-based degreasers work extremely well and they have non-toxic fumes)
- Safety glasses & disposable gloves

**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.

### T23692—Orange Power Degreaser

A great product for removing the waxy shipping grease from the *non-painted* parts of the machine during clean up.



Figure 13. T23692 Orange Power Degreaser.

## Location

### Physical Environment

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

### Electrical Installation

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

### Lighting

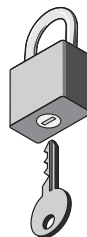
Lighting around the machine must be adequate enough to perform operations safely. Shadows, glare, or strobe effects that may distract or impede the operator must be eliminated.

### Weight Load

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

### Space Allocation

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



## CAUTION

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

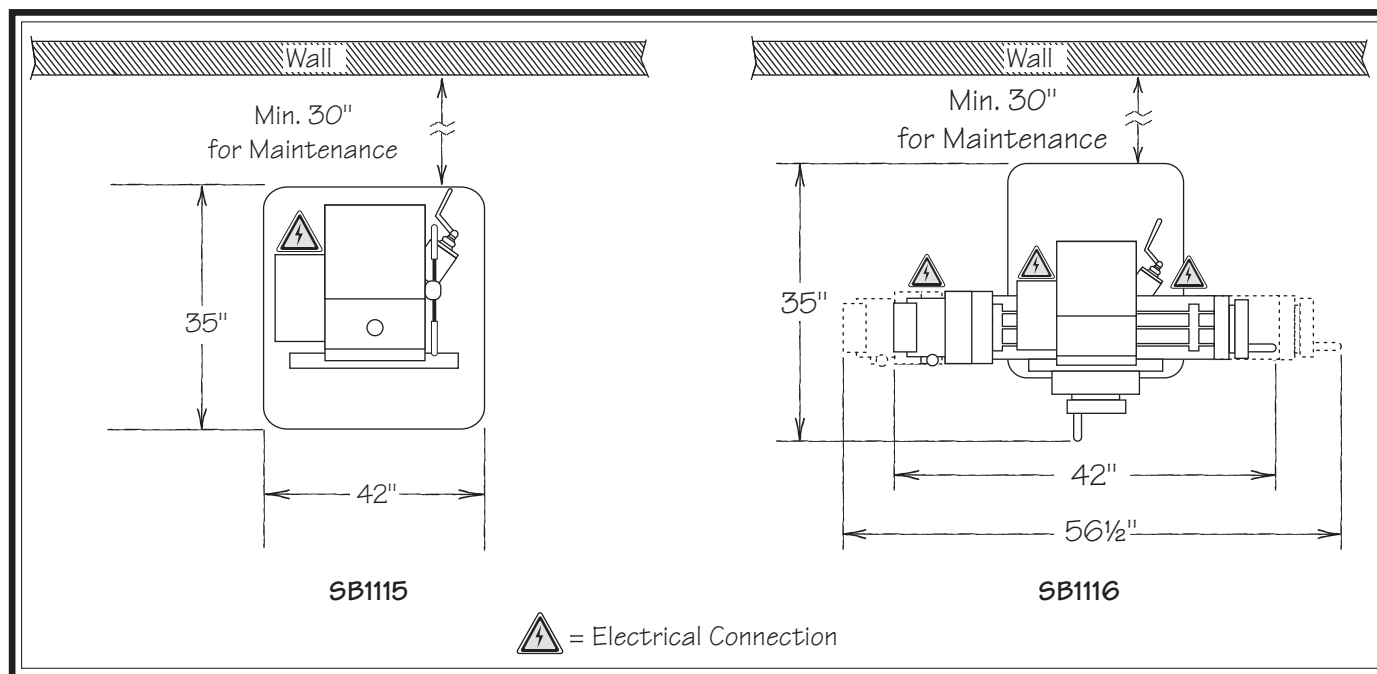
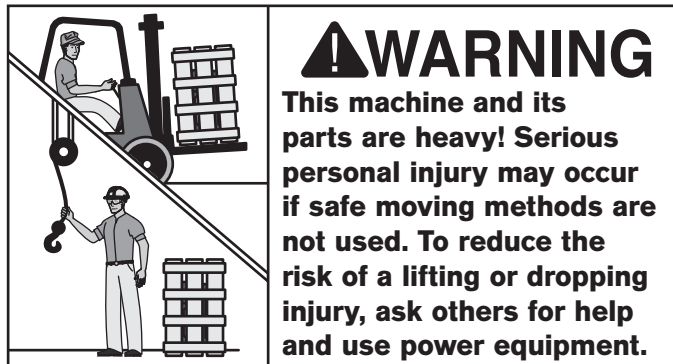


Figure 14. Minimum working clearances.

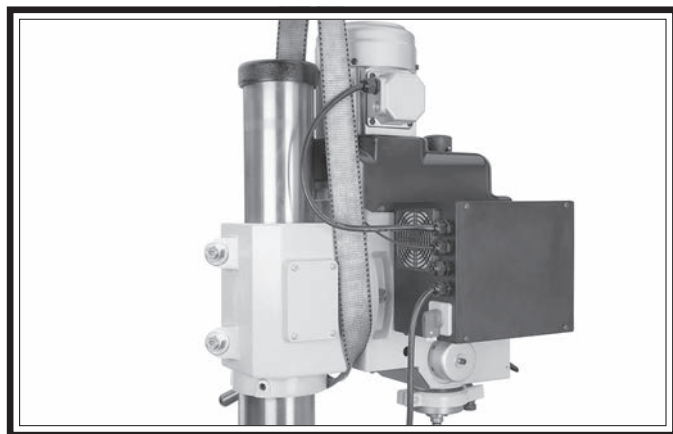
## Lifting & Moving



### To lift and place machine:

1. Move shipping crate next to intended location of drill press, then remove top portion of crate from shipping pallet.
2. To help balance machine when moving, move table as close to base as possible and center table in X-axis.
3. Place lifting sling around headstock as shown in **Figure 15**, and attach it securely to forklift (or other power lifting equipment).

**Note:** *To avoid sudden shifts that could unbalance machine, tighten all locks that restrict moving parts before lifting.*



**Figure 15.** Example of correct lifting sling position.

4. Unbolt machine from pallet.
5. With another person to help to steady machine, lift it just enough to clear pallet and any floor obstacles, then place it in its final position on shop floor.

## Leveling & Mounting

Generally, you can either bolt your machine to the floor or mount it on machine mounts. Although not required, we recommend that you secure the machine to the floor and level it while doing so. Because this is an optional step and floor materials may vary, hardware for securing the machine to the floor is not included.

### NOTICE

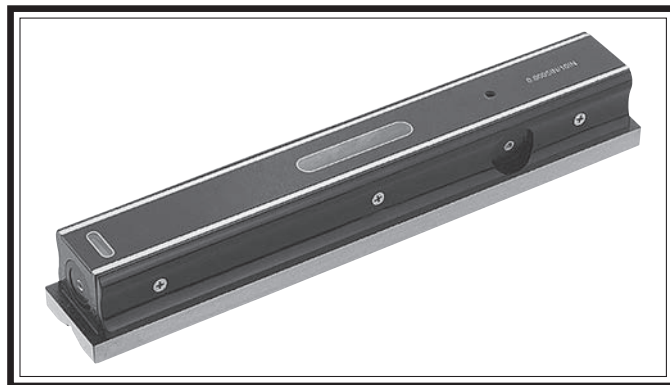
**We strongly recommend securing your machine to the floor if it is hardwired to the power source. Consult with your electrician to ensure compliance with local codes.**

### Leveling

Leveling machinery helps precision components, such as bed ways, remain straight and flat during the lifespan of the machine. Components on an unlevelled machine may slowly twist due to the dynamic loads placed on the machine during operation.

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

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



**Figure 16.** Example of a precision level.



## Anchoring to Concrete Floors

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

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

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

Number of Mounting Holes .....3  
Diameter of Mounting Hardware ..... $\frac{5}{8}$ "

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

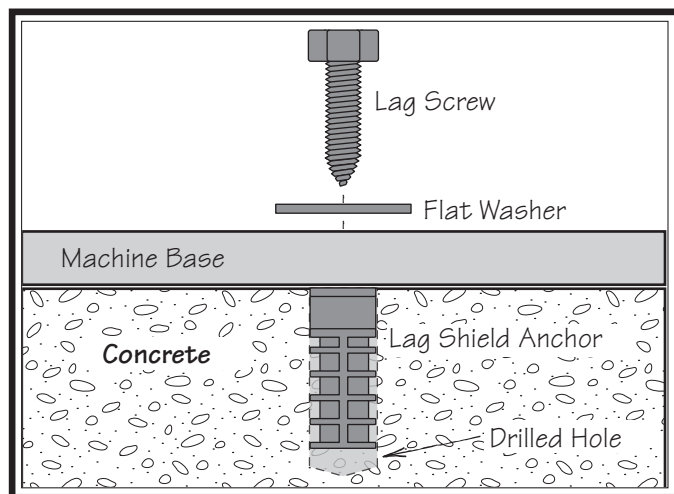


Figure 17. Popular method for anchoring machinery to a concrete floor.

## Assembly

This machine must be fully assembled before it can be operated. Before beginning the assembly process, refer to **Required for Setup** and gather all listed items. To ensure the assembly process goes smoothly, first clean any parts that are covered or coated in heavy-duty rust preventative (if applicable).

### Assembling SB1115

1. Install Z-axis crank handle and tighten set screw, then install revolving handle onto crank handle and tighten as shown in **Figure 18**.

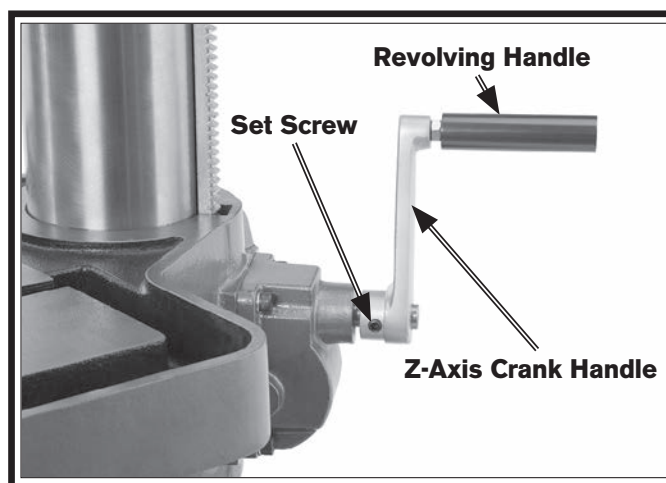


Figure 18. Z-axis crank handle installed.

2. Loosen Z-axis table lock (see **Figure 19**).

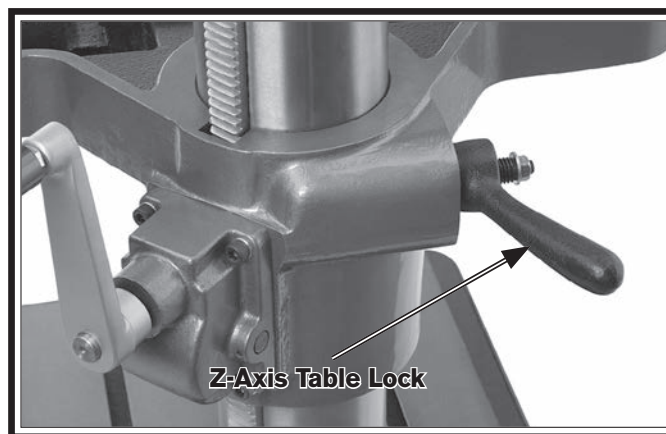
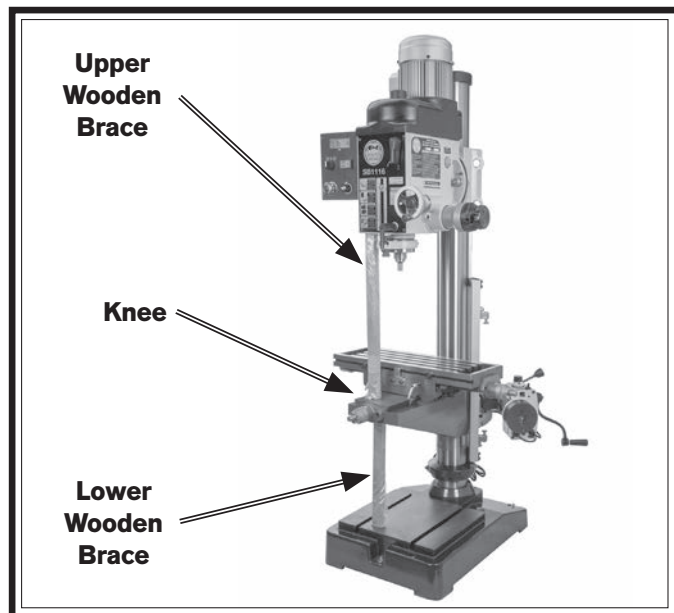


Figure 19. SB1115 Location of Z-axis table lock.

- Use Z-axis crank handle to slightly lower table.

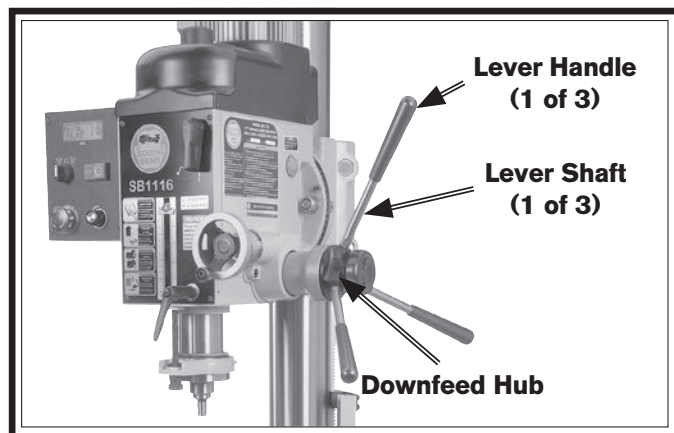
**Note:** Exert only mild pressure when lowering table during **Step 4**, otherwise you could damage knee by forcing it down against lower brace (see **Figure 20**).

- Remove upper wooden brace, raise table, then remove lower wooden brace (see **Figure 20**).



**Figure 20. Wooden shipping braces to be removed during assembly (SB1116 shown).**

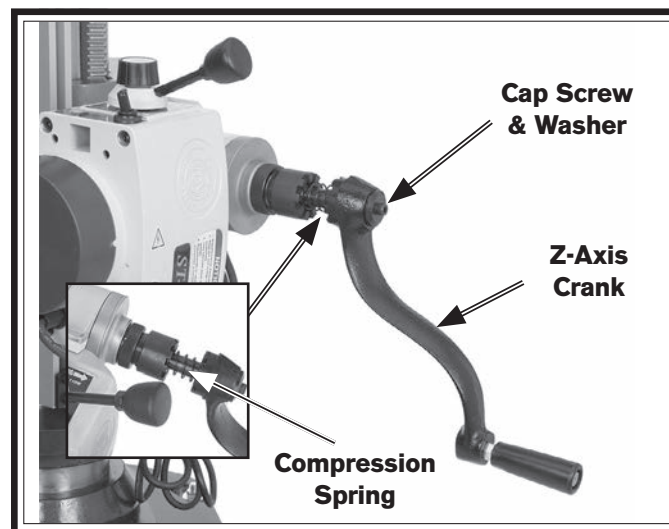
- Install coarse downfeed lever shafts and handles onto downfeed hub (see **Figure 21**).



**Figure 21. Coarse downfeed lever shafts and handles installed (SB1116 shown).**

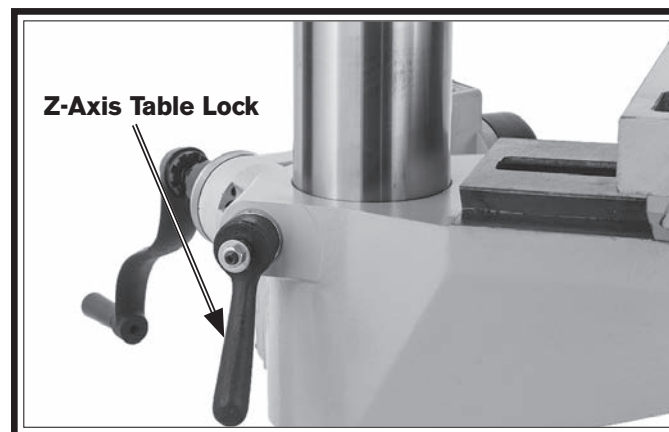
## Assembling SB1116

- Remove cap screw and washer that secure Z-axis crank, then remove crank, turn it around, and re-install it with compression spring, as shown in **Figure 22**.



**Figure 22. Z-axis crank handle installed correctly.**

- Loosen Z-axis table lock (see **Figure 23**).



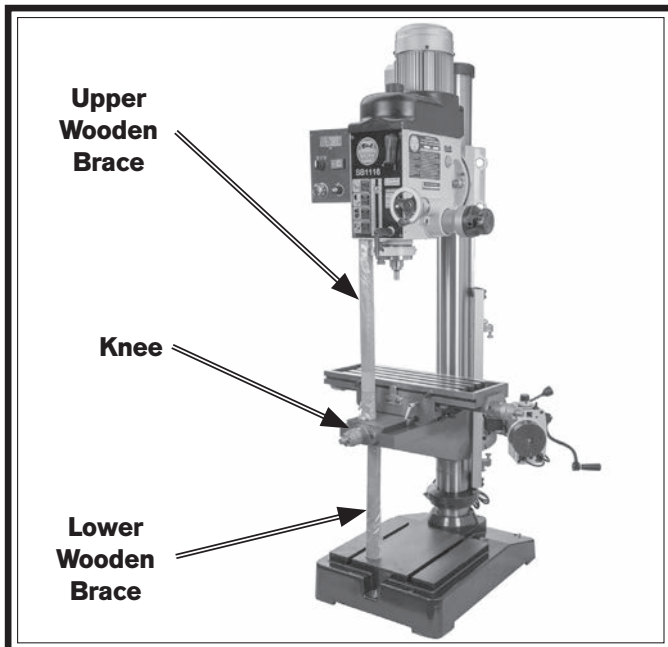
**Figure 23. SB1116 Location of Z-axis table lock.**

SB1115 Assembly is complete. Continue to **Checking Headstock Oil Level** on **Page 28**.

- Use Z-axis crank handle to slightly lower table.

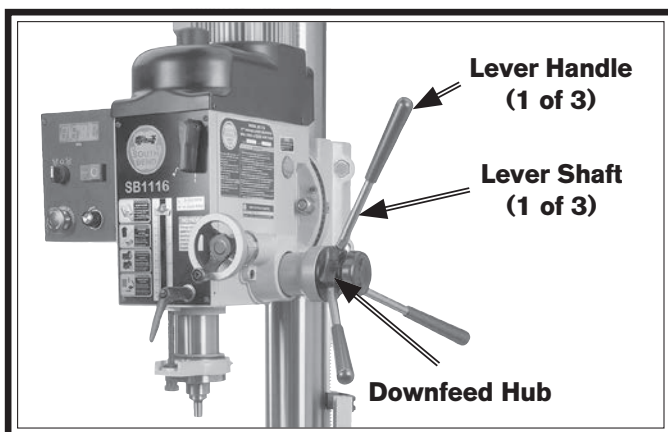
**Note:** Exert only mild pressure when lowering table during **Step 4**, otherwise you could damage knee by forcing it down against lower brace (see **Figure 24**).

- Remove upper wooden brace, raise table, then remove lower wooden brace (see **Figure 24**).



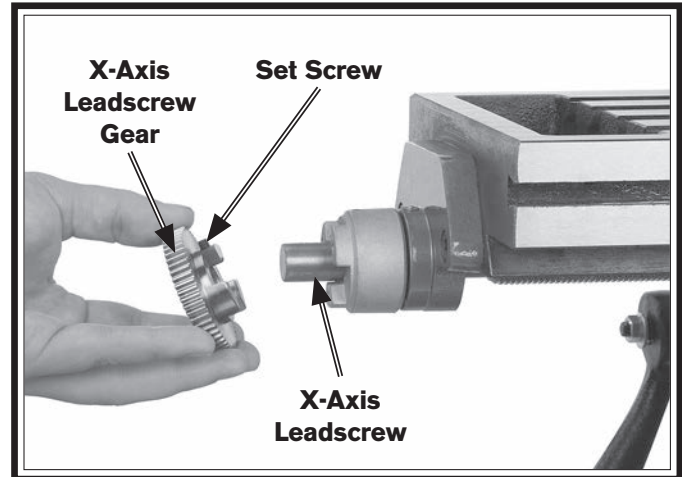
**Figure 24.** Wooden shipping braces to be removed during assembly.

- Install coarse downfeed lever shafts and handles onto downfeed hub (see **Figure 25**).



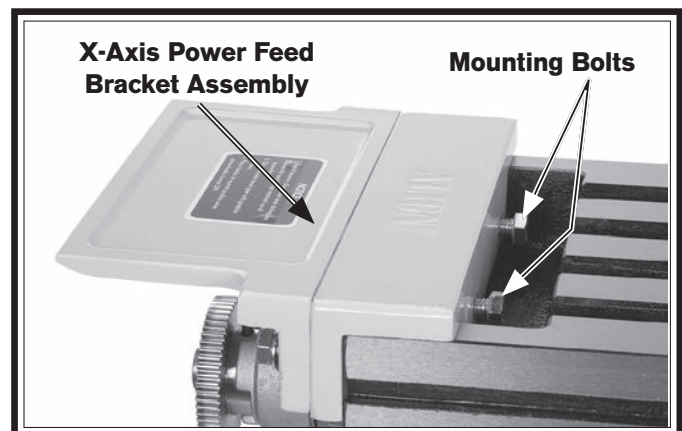
**Figure 25.** Coarse downfeed lever shafts and handles installed.

- Slide X-axis leadscrew gear onto X-axis leadscrew and tighten set screw (see **Figure 26**).



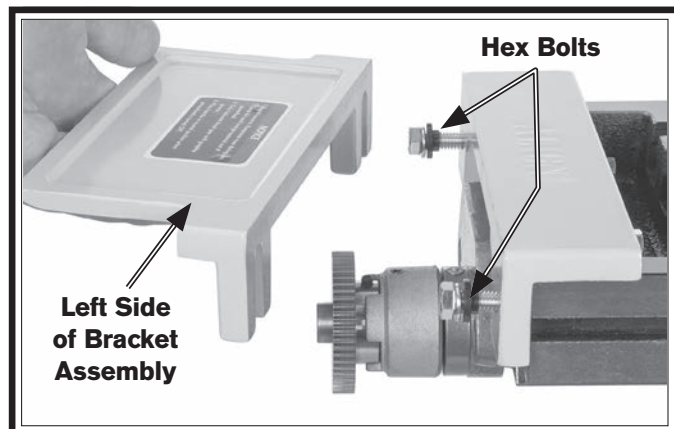
**Figure 26.** Installing X-axis leadscrew gear.

- Install X-axis power feed bracket assembly onto left end of table, then tighten pre-installed mounting bolts (see **Figure 27**).



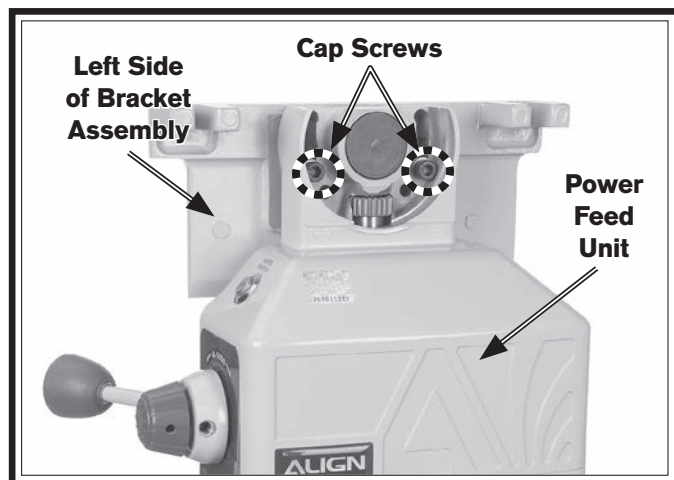
**Figure 27.** X-axis power feed bracket assembly mounted to table.

8. Loosen hex bolts shown in **Figure 28**, then remove left side of X-axis power feed bracket assembly.



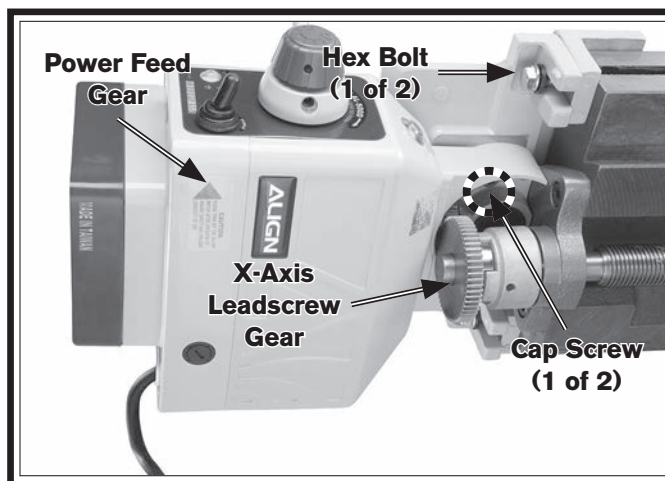
**Figure 28.** Left side of X-axis power feed bracket assembly removed.

9. Install left side of bracket assembly onto X-axis power feed unit with (2) M6-1 x 25 cap screws and (2) 6mm flat washers (see **Figure 29**). Do not fully tighten cap screws.



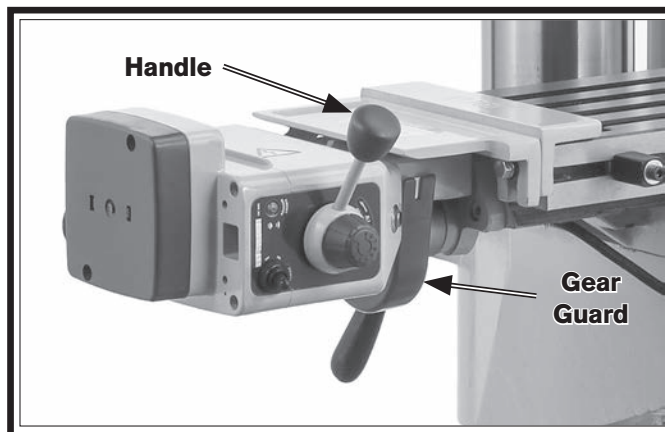
**Figure 29.** Left side of bracket assembly mounted to power feed unit.

10. Install power feed unit onto right side of bracket assembly and temporarily tighten hex bolts (see **Figure 30**).
11. Move power feed unit until power feed gear teeth align with X-axis leadscrew gear teeth, then tighten hex bolts from **Step 8** (see **Figure 30**).
12. Loosen hex bolts from **Step 10**, adjust power feed unit until power feed gear meshes with X-axis leadscrew gear, then fully tighten hex bolts (see **Figure 30**).



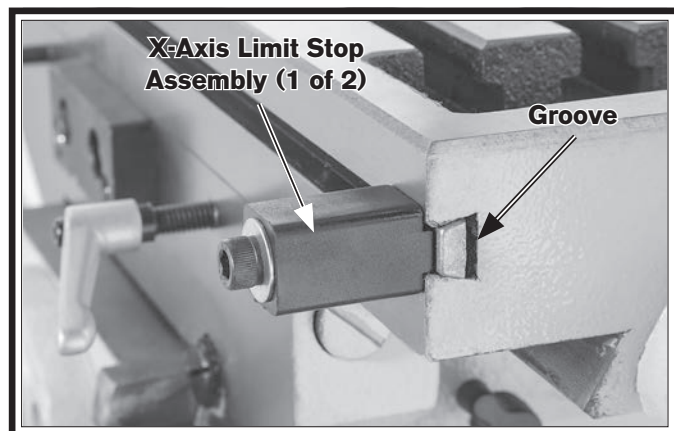
**Figure 30.** Left side of power feed bracket with attached power feed unit mounted to right side of bracket.

13. Install direction lever knob, as shown in **Figure 31**.
14. Remove adhesive backing from gear guard and install over X-axis table gear, as shown in **Figure 31**.



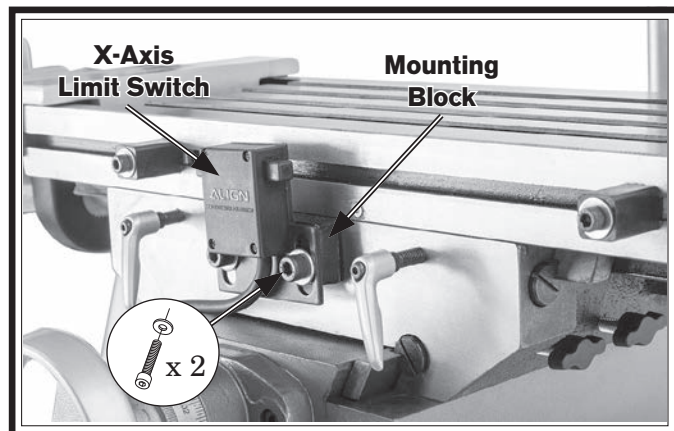
**Figure 31.** Gear cover and direction lever installed.

15. Loosen and remove factory-installed limit stops, then insert both accessory limit stop assemblies into groove in table, as shown in **Figure 32**.



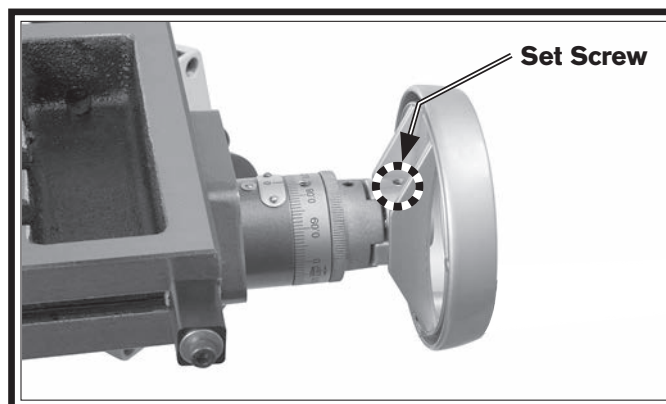
**Figure 32. Accessory limit stop assembly mounted in table groove (1 of 2 shown).**

16. Slide one limit stop all the way to left end of table, and slide the other stop all the way to right end.
17. Remove factory-installed stop plate, then use its mounting screws to install limit switch mounting block in its place (see **Figure 33**).
18. Install X-axis limit switch to mounting block using (2) M8-1.25 x 12 cap screws and 8mm flat washers (see **Figure 33**).



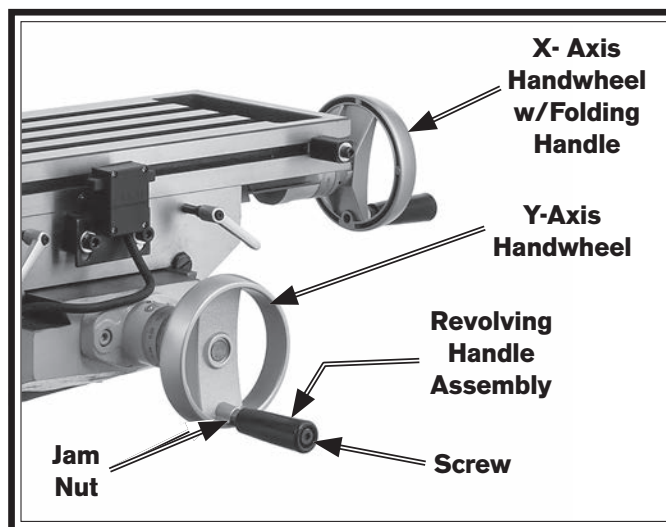
**Figure 33. X-axis limit switch installed.**

19. Mount handwheel to right end of X-axis leadscrew and tighten set screw on base of handwheel to secure it (see **Figure 34**).



**Figure 34. Set screw on base of handwheel (X-axis shown).**

20. Thread folding handle assembly into X-Axis handwheel, then tighten jam nut against handwheel to secure handle (see **Figure 35**).



**Figure 35. Table handwheels installed.**

21. Mount one of the remaining handwheels to Y-axis leadscrew (see **Figure 35**), and tighten set screw on base of handwheel (see **Figure 34**).
22. Follow **Step 20** to install one of the revolving handles onto Y-axis handwheel.

**Note:** One extra handwheel and revolving handle is provided in case the X-axis power feed is not installed.

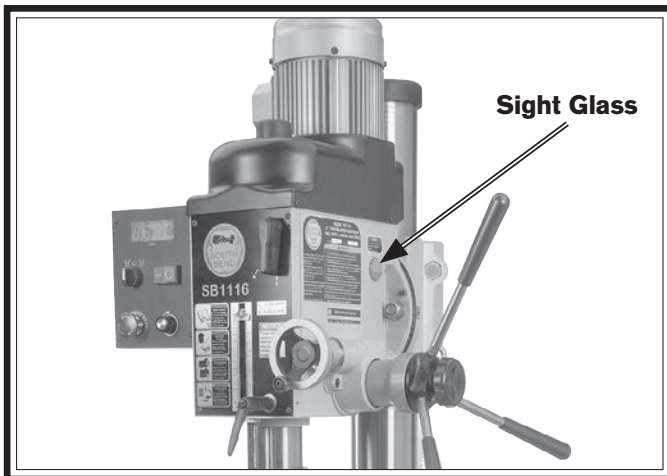
# Checking Headstock Oil Level



This machine was shipped from the factory with oil in it, but the headstock oil reservoir level must be verified before the machine can be operated for the first time.

The headstock has the proper amount of oil when the sight glass is halfway full (see **Figure 36**).

**Note:** *If oil level is not sufficient, see **Page 50** for instructions to fill headstock oil.*



**Figure 36.** Oil level sight glass.

## **NOTICE**

**Damage caused by running drill press without oil will not be covered by warranty.**

# 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, do not operate it further until you have resolved the problem.

**Note:** *Refer to **Troubleshooting** on **Page 59** for solutions to common problems that occur with all metal lathes. If you need additional help, contact our Tech Support at (360) 734-1540.*

The test run consists of verifying the following:

- Motors power up and run correctly.
- EMERGENCY STOP button works correctly.

## **!WARNING**

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

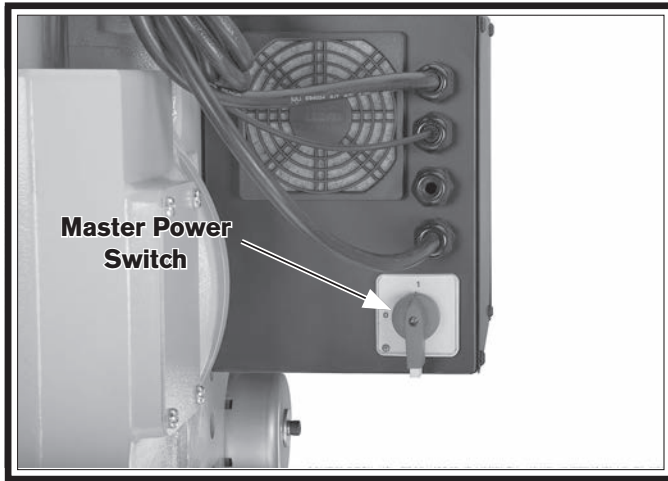
## **!WARNING**

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

**To test run machine:**

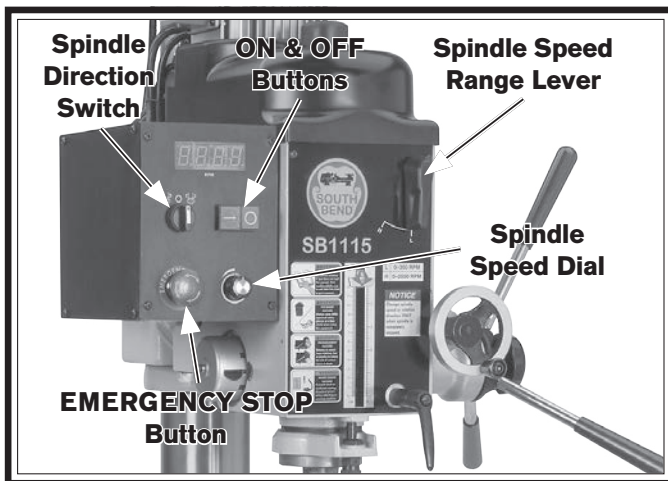
1. Clear away all tools and objects used during assembly and preparation.

2. Press EMERGENCY STOP button in and turn master power switch to ON position as shown in **Figure 37**.



**Figure 37. Master Power Switch in ON ("1") position.**

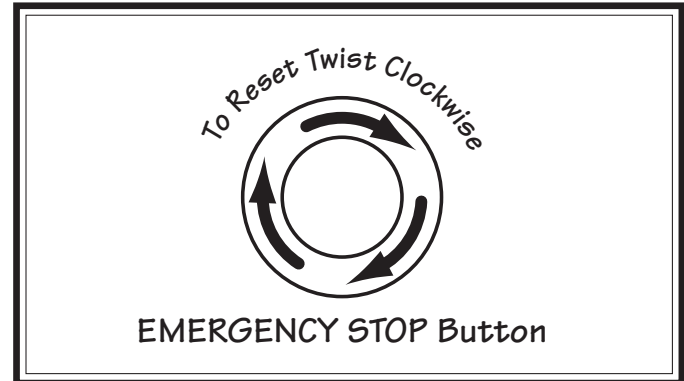
3. Move spindle direction switch to neutral (middle) position (see **Figure 38**).
4. Rotate spindle speed dial counterclockwise to "0" (see **Figure 38**).
5. Move spindle speed range lever to "L" (see **Figure 38**).



**Figure 38. Location of controls necessary for test run.**

6. Plug machine into power source. Digital readout and ON/OFF buttons will illuminate.

7. Twist EMERGENCY STOP button clockwise until it pops out (see **Figure 39**). This resets switch and machine can now start.



**Figure 39. Resetting EMERGENCY STOP button.**

8. Press green ON button to turn machine **ON** (see **Figure 38**).
9. Move spindle direction switch to the right (see **Figure 38**); slowly rotate spindle speed dial clockwise to full speed, then rotate counterclockwise back to "1". Verify motor starts up and runs smoothly without any unusual vibrations or noises.
  - When operating correctly, machine runs smoothly with little or no vibration or rubbing noises.
  - Investigate and correct any unusual noises or vibrations before operating any further. **ALWAYS** disconnect machine from power when investigating or correcting potential problems.
10. Press EMERGENCY STOP button to turn machine **OFF**.

11. WITHOUT resetting Emergency Stop button, try to start machine by pressing the ON button. The machine should not start.

- If the machine *does not* start, the safety feature of the Emergency Stop button is working correctly.
- If the machine *does* start, immediately turn it **OFF** and disconnect power. The safety feature of the EMERGENCY STOP button is NOT working properly and must be replaced before further using the machine. Call Tech Support for help.

Congratulations! The SB1115 Test Run is complete. Proceed to **Page 32** to perform the **Spindle Break-In and Inspections & Adjustments** procedures.

For Model SB1116, proceed to **Power Feed Test Run**.

## Power Feed Test Run

Model SB1116 comes with power feed units for X- and Z-axis table travel. Proper operation of the limit switches (attached to the front middle of the table and at the base of the Z-axis power feed unit) is important to the operation of the power feed units. Refer to **SB1116 X- and Z-Axis Power Feed Controls** on **Page 5** to understand the names and locations of components referenced in this section.

Both X- and Z-axis power feed units operate in a similar way. Therefore, use the following instructions to test run both units. If either power feed does not operate as expected during the following steps, disconnect it from power and contact our Tech Support at (360) 734-1540 for assistance.

## ⚠ CAUTION

**During power feed operation, handwheels/ cranks will spin rapidly if engaged. To reduce risk of entanglement or impact injury, always fold in the X-axis handwheel handle and disengage the Z-axis elevation crank when using power feed. Failure to do so could lead to entanglement or impact injuries.**

### To test run power feed units:

1. Make sure all tools, cables, and other items are well clear of table movement and potential direction of travel.
2. Refer to **Operating Power Feed** section, beginning on **Page 35**, to understand how power feeds, table locks, and limit switches function.
3. Adjust X-axis limit stops and loosen X-axis table locks to allow for maximum table movement in following steps, shown in **Figure 40**.

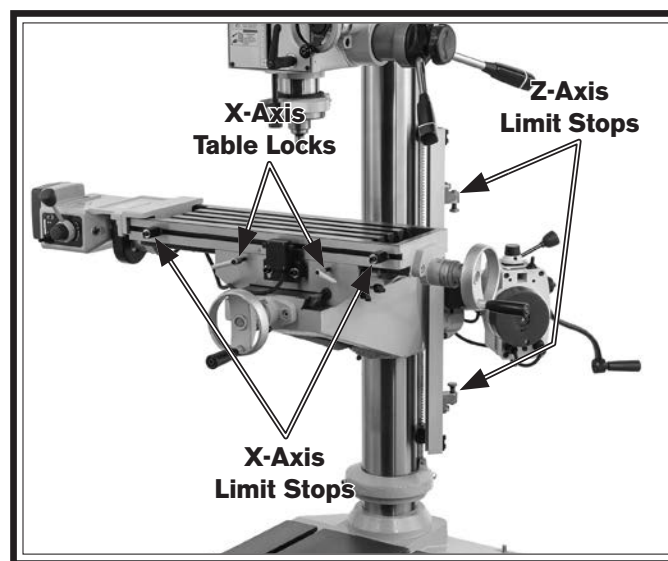
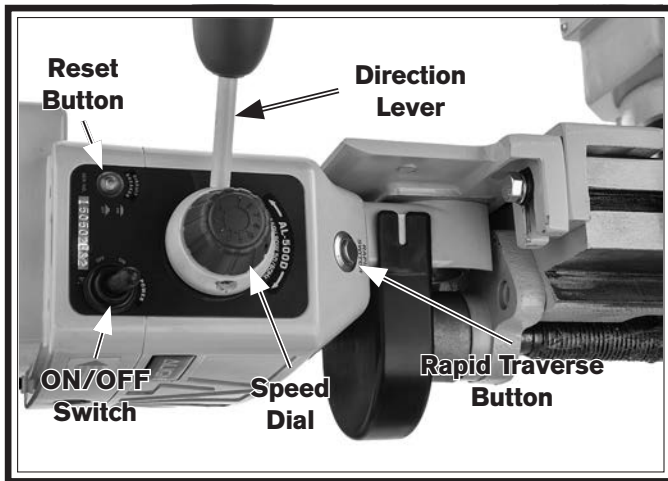


Figure 40. Locations of limit stops and table locks.

4. Plug X-axis power feed power cord into a matching power supply receptacle.



5. Make sure power feed direction lever is in neutral (middle) position, turn speed dial counterclockwise to lowest setting, then move ON/OFF switch to **ON** position (see Figure 41).



**Figure 41. Power feed controls (X-axis shown).**

6. Move direction lever to left, slowly turn speed dial clockwise to increase speed, then confirm that table is moving to the left.
7. Press and hold Rapid Traverse button for a few moments to confirm rapid traverse is operating correctly. Table should move rapidly to the left.
8. Release Rapid Traverse button. Table should resume normal speed.
9. Allow table limit stop to hit limit switch. Table movement should stop.
  - If table movement does not stop, Turn **OFF** power feed and DISCONNECT POWER IMMEDIATELY. Contact Tech Support.
10. Move direction lever through neutral (middle) position and all the way to the right. Table should begin moving in opposite direction.
11. Allow table limit stop to hit limit switch. Table movement should stop.
  - If table movement does not stop, Turn **OFF** power feed and DISCONNECT POWER IMMEDIATELY. Contact Tech Support.
12. Move direction knob to neutral (middle) position, turn speed dial to lowest setting, and press OFF button.
13. Retighten table locks.
14. Loosen Z-axis table lock, then repeat this same Test Run process with Z-axis power feed unit.

Congratulations! The SB1116 Test Run is complete. Continue to the next page to perform the **Spindle Break-In and Inspections & Adjustments** procedures.

## Spindle Break-In

### **NOTICE**

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

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

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

#### **To perform spindle break-in procedure:**

1. Set spindle speed range lever to low and rotate spindle speed dial to "0" (see **Page 3**).
2. Slowly rotate spindle speed dial to "1" and run spindle for 10 minutes, then turn machine **OFF**.
3. Reverse spindle rotation direction, then run spindle at same speed for another 10 minutes, then turn machine **OFF**.
4. Repeat **Steps 2–3** with spindle speed dial set to "4" and "8" for 5 minutes in each direction.
5. Set spindle speed range lever to high, then repeat **Steps 2–4** at 5 minutes each.

Congratulations, the **Spindle Break-In** is now complete!

## Inspections & Adjustments

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

- **Gib Adjustment** .....Page 54
- **Leadscrew Backlash Adjustment**...Page 55
- **Tramming Spindle Adjustment**....Page 56

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

Your machine was lubricated at the factory, but we strongly recommend that you inspect all lubrication points yourself and provide additional lubrication if necessary. Refer to **Lubrication** on **Page 43** for specific details.

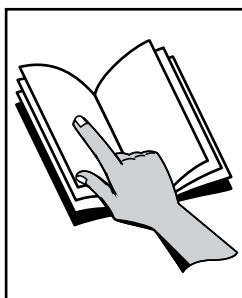
### **NOTICE**

**Since the drill head may have moved during shipping, you will need to tram the spindle with the table to ensure 90° alignment. Refer to the *Tramming Spindle* section on *Page 56* for detailed instructions.**

## Operation Overview

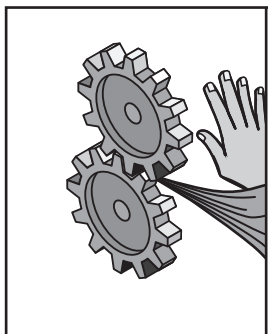
The purpose of this overview is to provide the novice machine operator with a basic understanding of how the machine is used during operation, so they can more easily understand the controls discussed later in this manual.

**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.



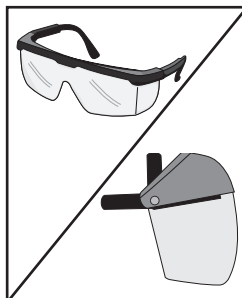
### **!WARNING**

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 personal injury. Keep these items away from moving parts at all times to reduce this risk.



### **!WARNING**

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

## NOTICE

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

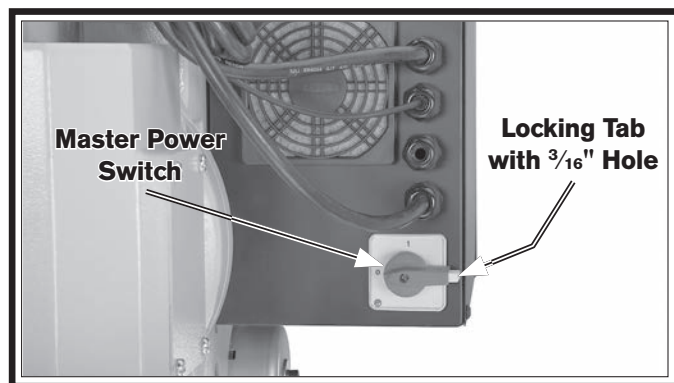
To complete typical operation, operator does following:

1. Examines workpiece to make sure it is suitable for drilling.
2. Installs correct tooling for operation.
3. Firmly secures workpiece to table using a vise or T-slot clamps.
4. Adjusts table height, then locks it in place.
5. Puts on required safety glasses and face shield.
6. Connects machine to power.
7. Turns Master Power Switch to ON ("1") position, then selects spindle direction, range, and speed, then turns machine **ON**.
8. Begins drilling operations.
9. When finished, turns machine **OFF**, turns Master Power Switch to OFF ("0") position, and disconnects machine from power.

## Master Power Switch

The Master Power Switch (see **Figure 42**) toggles the incoming power ON and OFF. It can be locked in the OFF ("0") position to prevent unauthorized use.

To lock the switch in the OFF position, rotate the switch to the OFF position, press the locking tab in, then insert a padlock with a maximum shank diameter of 3/16" through the hole in the tab and switch body (see **Figure 42**).

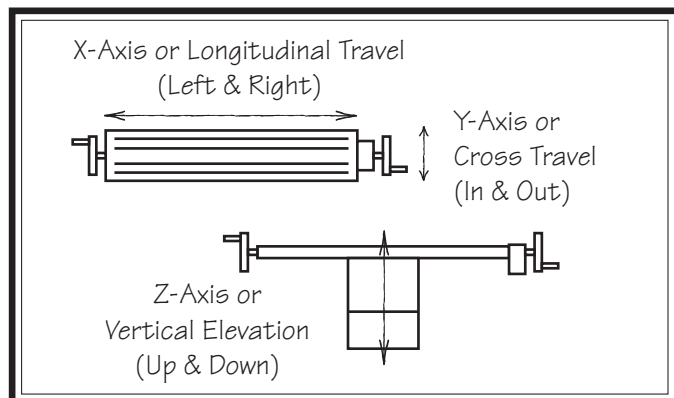


**Figure 42. Master power switch.**

## Table Movement

The Model SB1115 Z-axis is controlled by the Z-axis crank handle. The table can also be moved 360° around the column.

The Model SB1116 table travels in three directions (see **Figure 43**). This travel is controlled by table handwheels and the Z-axis crank handle or Z-axis power feed. Additionally, the table can be moved along the X-axis with the power feed and manually rotated 360° around the column.

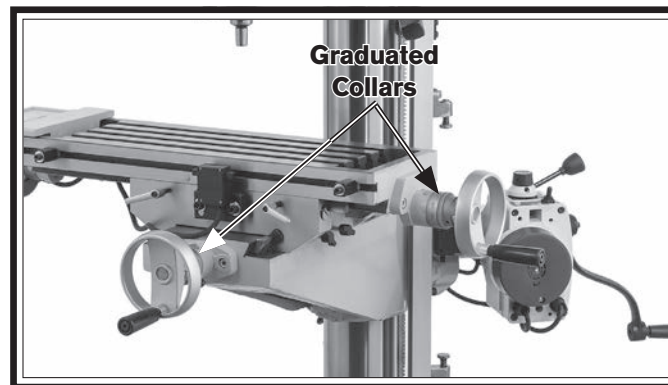


**Figure 43. The directions of SB1116 table movement.**

## Graduated Collars (SB1116)

The table handwheels have graduated collars (see **Figure 44**) that are used to determine table movement in 0.001" increments with one full revolution equaling 0.100" of travel.

Additionally, each collar has a thumb screw that is used to adjust the dial to "0".

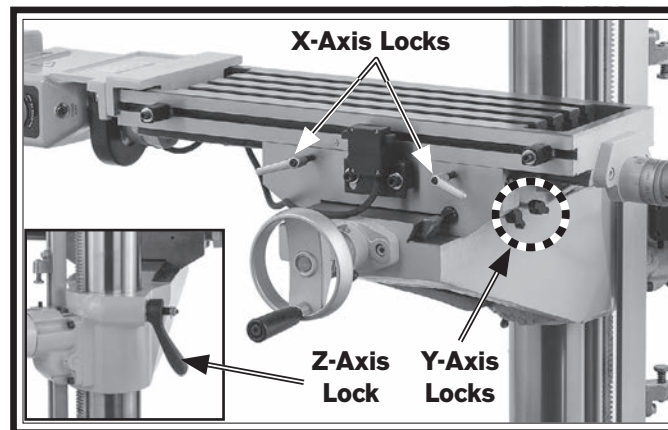


**Figure 44. Locations of graduated collars.**

## Table Locks (SB1116)

Use table locks to increase the rigidity of the table when movement in that axis is not required for the operation.

Refer to **Figure 45** to identify the locks for each table axis.



**Figure 45. Location of SB1116 table locks.**

## **NOTICE**

**Always keep table locked in place unless table movement is required. Unexpected table and workpiece movement could cause tooling to bind with workpiece, which may damage tooling or workpiece.**

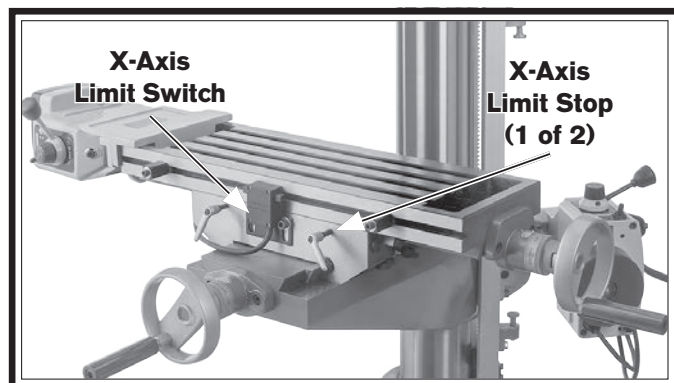
## Limit Stops (SB1116)

Use X- and Z-axis limit stops, as shown in **Figures 46–47**, in conjunction with each power feed to set the total amount of travel. The limit stops come into contact with the limit switch and stop power feed motion.

When not in use, position stops as far away from limit switches as possible, so as not to interfere with table movement.

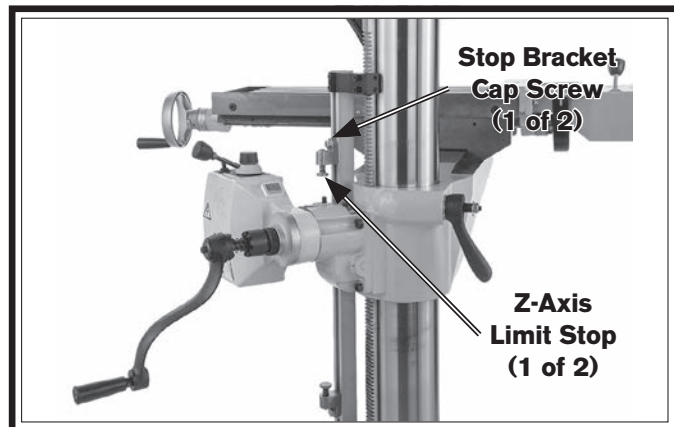
Tools Needed	Qty
Hex Wrench 5mm .....	1
Hex Wrench 12mm .....	1

To adjust the position of the X-axis limit stops (see **Figure 46**), loosen cap screws that secure stops, move stops to desired positions, then tighten securely.



**Figure 46. X-axis limit switch and stops.**

To adjust the position of the Z-axis limit stops, loosen the stop bracket cap screws, raise or lower the stops to the desired positions, then retighten the cap screws (see **Figure 47**).



**Figure 47. Location of Z-axis limit switch and upper stop with stop bracket cap screw.**

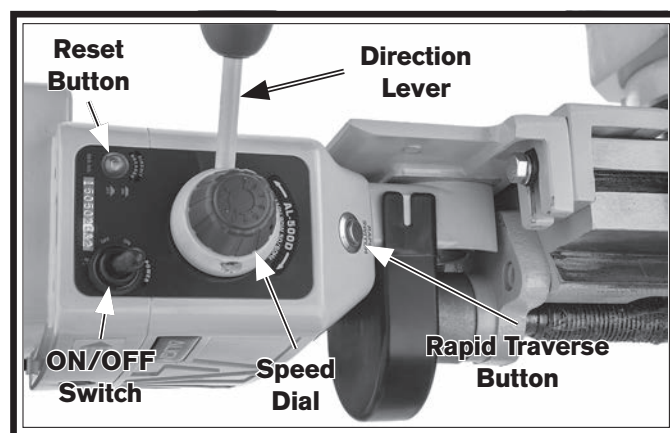
## Operating Power Feed (SB1116)

The X- and Z-axis power feed units operate in a similar way. Use the following instructions to operate both units. For additional component details, refer to **Power Feed Identification** on **Page 5**.

### To operate X-axis power feed:

1. Loosen table lock(s).
2. Turn speed dial (see **Figure 48**) all the way counterclockwise to slowest setting.
3. Move direction lever to neutral (middle) position, then move ON/OFF switch (see **Figure 48**) to ON position.
4. With your hand poised over ON/OFF switch in case you need to suddenly turn unit **OFF**, move direction lever (see **Figure 48**) to select desired direction of table travel.
5. Use speed dial (see **Figure 48**) to slowly bring speed of movement up to desired rate.

To cause table to instantly move at full speed when already in motion, press and hold rapid traverse button (see **Figure 48**). The table will resume previous speed when button is released.

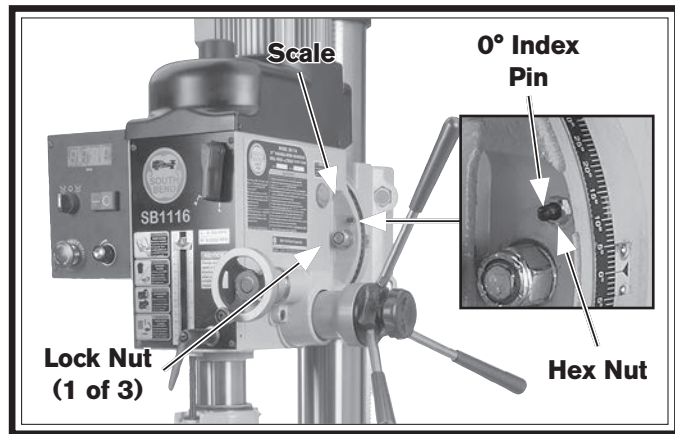


**Figure 48. Power feed controls (X-axis shown).**

6. When you are finished using power feed, turn unit **OFF**, rotate speed dial all the way counterclockwise, and move direction lever to neutral (middle) position to avoid unexpected table movement later.

# Head Tilt

The head tilts from 90° left to 30° right. The 0° index pin locks the head perpendicular to the table and must be removed before tilting the head. A scale on the side of the head indicates the angle of tilt (see **Figure 49**).



**Figure 49. Head tilting controls.**

**NOTICE**

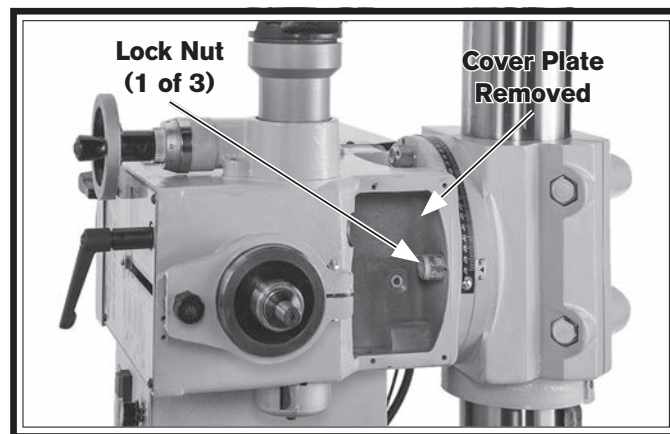
**When positioning head back to 0° after tilting, you will need to tram it to ensure spindle is precisely perpendicular to table for proper drilling accuracy. Refer to *Tramming Spindle* on *Page 56* section for instructions.**

Tools Needed	Qty
Screwdriver Phillips #2 .....	1
Open-End Wrench 10mm .....	1
Open-End Wrench or Socket 24mm .....	1
Small Hammer/Mallet .....	1

**To tilt head:**

1. DISCONNECT MACHINE FROM POWER!
2. Tighten hex nut on 0° index pin (see **Figure 49**) against headstock, which will force pin out. Pull pin out of hole to allow head to tilt in following steps.

3. Remove cover plate from bottom of headstock (see **Figure 50**).

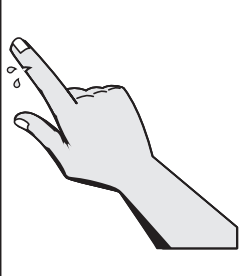


**Figure 50. Cover plate removed from bottom of headstock (headstock tilted 90° for clarity).**

4. Loosen three lock nuts (one on each side of head and one inside head) that secure head tilt setting (see **Figures 49–50**).
5. With assistance from another person to support head, tilt head to desired position.
  - If tilting head to an angle other than 0° (perpendicular to table), use scale (see **Figure 49**) as a guide for setting tilt angle.
  - If returning head to 0° (perpendicular to table), use scale as a guide. When head is at 0°, re-insert index pin with hex nut, and gently tap it with a small hammer or mallet to seat it.
6. Retighten lock nuts from **Step 4**.

# Installing/Removing Tooling (SB1115)

Model SB1115 features an MT#3 spindle taper and a 3/8"-16 drawbar. Make sure the speed range lever is set to "L" to prevent spindle rotation when installing/removing tooling.



**⚠ CAUTION**  
**Cutting tools are sharp and can easily cause laceration injuries. Always protect your hands with leather gloves or shop rags when handling cutting tools.**

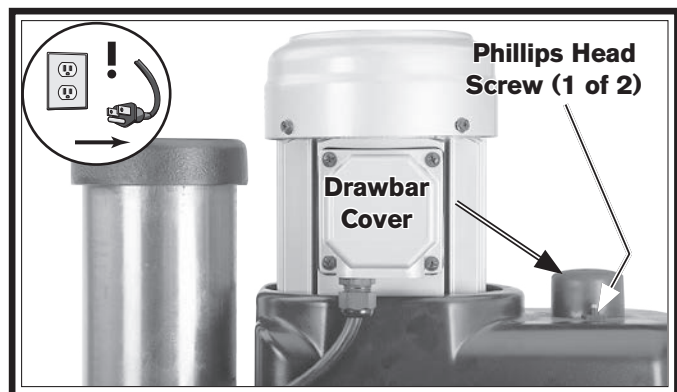
## Installing/Removing Threaded Tooling

Threaded tooling is held in the spindle by the combination of a drawbar and a press fit or "friction fit" when the tooling taper matches the spindle taper.

Tools Needed:	Qty
Phillips Screwdriver #2 .....	1
Wrench or Socket 17mm .....	1
Deadblow Hammer .....	1

### To install threaded tooling:

1. DISCONNECT MACHINE FROM POWER!
2. Set spindle speed range lever to "L".
3. Remove (2) M4-.7 x 10 Phillips head screws, then remove drawbar cover (see **Figure 51**).

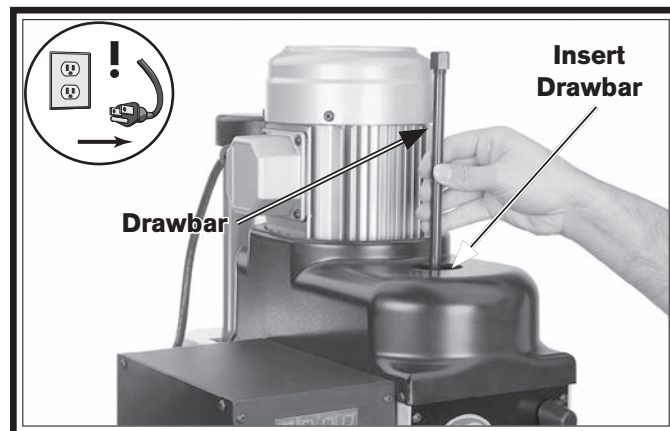


**Figure 51. Location of drawbar cover.**

4. Clean any debris or oily substances from mating surfaces of tooling.

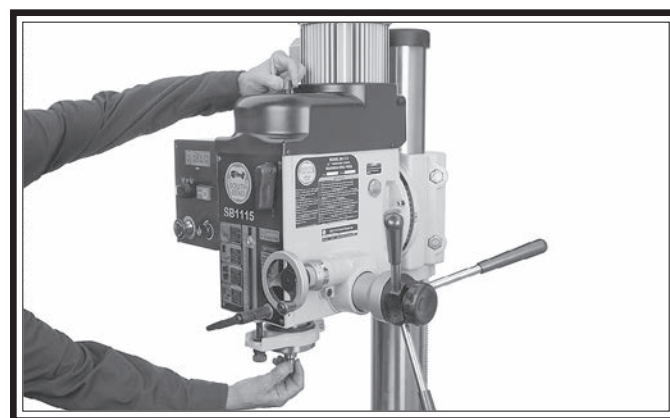
**Note:** *Debris or oily substances can prevent tooling and spindle from properly mating. This condition can cause excessive vibration, poor cutting results, or tool/workpiece damage.*

5. Insert drawbar through top of spindle, as shown in **Figure 52**.



**Figure 52. Inserting drawbar.**

6. Insert MT#3 tooling into spindle while maneuvering until it engages with slot in end of spindle, then thread drawbar into tool by hand until it is snug (see **Figure 53**).



**Figure 53. Threading drawbar into tooling.**

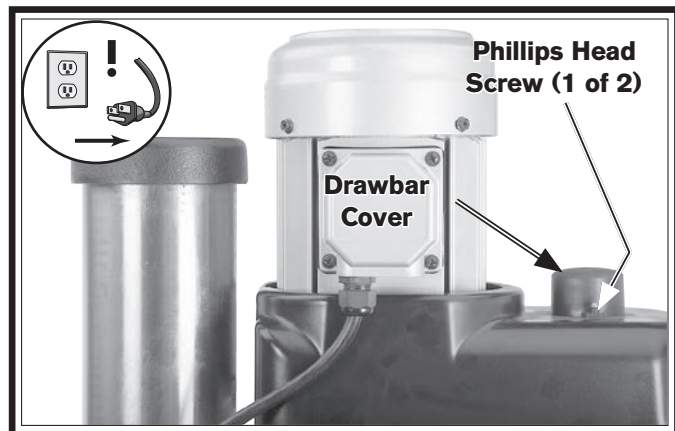
7. Use wrench to tighten drawbar additional 1/4 turn.

**Note:** *Do not overtighten drawbar. Overtightening makes tool removal difficult and may damage arbor and threads.*

8. Reinstall drawbar cover.

**To remove threaded tooling:**

1. DISCONNECT MACHINE FROM POWER!
2. Set spindle speed range lever to "L".
3. Remove (2) M4-.7 x 10 Phillips head screws, then remove drawbar cover (see **Figure 54**).

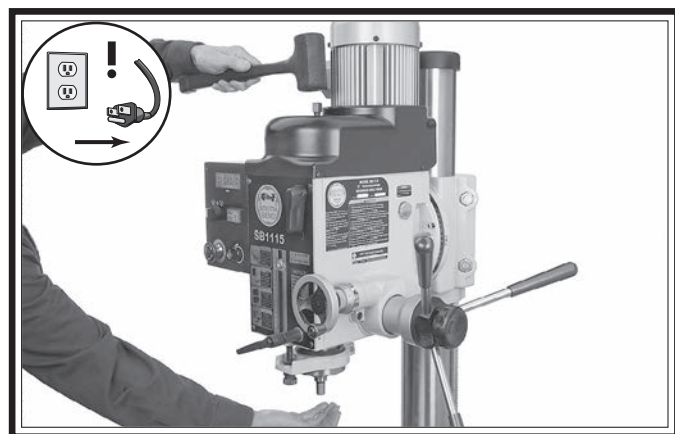


**Figure 54.** Location of drawbar cover.

4. Loosen drawbar 1–2 full rotations.

**Note:** Make sure drawbar has at least three threads engaged with tooling, or drawbar and tool threads could be damaged in next step.

5. Tap top of drawbar with deadblow hammer to unseat taper (see **Figure 55**).



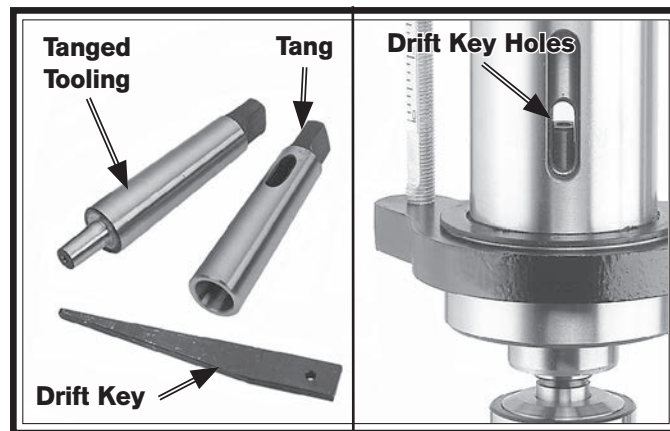
**Figure 55.** Tapping drawbar to unseat taper.

5. Support tool with one hand and fully unthread drawbar from tool.

**Installing/Removing Tanged Tooling**

Tanged tooling (see **Figure 56**) is held in the spindle by a press fit or "friction fit" when the tooling taper meets the spindle taper. The tang engages with a slot in the spindle to prevent the tool from spinning freely.

The Model SB1115 is equipped with a drift key and drift holes in the spindle and quill to assist in the removal of tanged tooling (see **Figure 56**).



**Figure 56.** Example of tanged MT#3 tooling, drift key, and drift key holes in quill/spindle.

Tools Needed	Qty
Deadblow Hammer .....	1
Hex Wrench 3mm .....	1
Drift Key .....	1

**To install tanged tooling:**

1. DISCONNECT MACHINE FROM POWER!
2. Remove drawbar cover, then remove drawbar.
3. Clean any debris or oily substances from mating surfaces of spindle taper and tooling.

**Note:** Debris or oily substances can prevent tooling and spindle from properly mating. This condition can cause excessive vibration, poor cutting results, or tool/workpiece damage.

4. Insert MT#3 tooling into spindle, and engage tang (see **Figure 56**) with slot inside spindle.



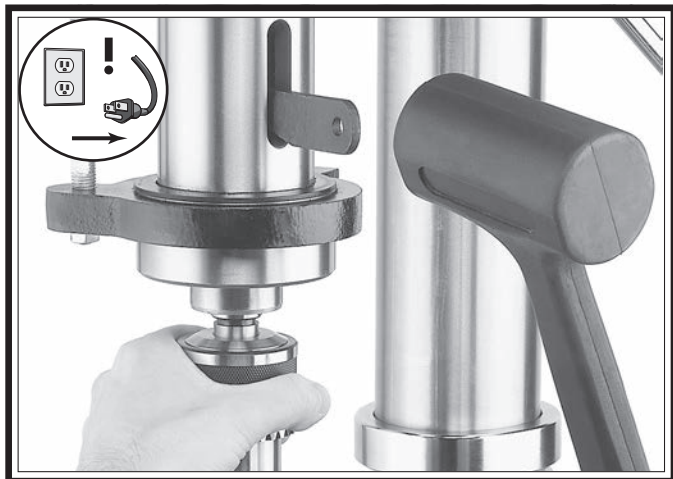
- Use deadblow hammer to seat tooling into spindle by firmly tapping from bottom.

**Note:** *If installing a drill chuck, retract jaws to prevent damage to chuck when tapping with hammer.*

- Re-install drawbar cover.

#### To remove tangted tooling:

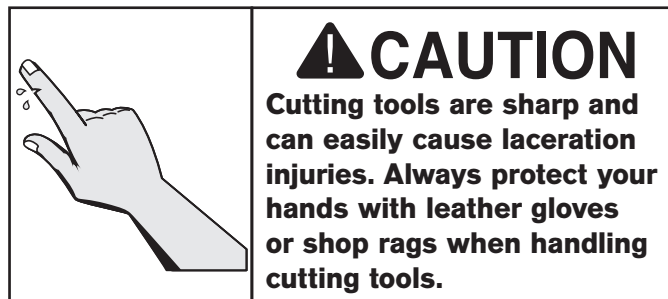
- DISCONNECT MACHINE FROM POWER!
- Lower quill and rotate spindle by hand until drift key holes in spindle and quill are aligned (see **Figure 56**).
- Insert drift key into aligned holes (see **Figure 57**) and allow quill to rise, trapping drift key.
- Use deadblow hammer (see **Figure 57**) to softly tap end of key while holding arbor/chuck assembly until it separates from spindle.



**Figure 57.** Example of using drift key and deadblow to remove tangted tooling.

## Installing/Removing Tooling (SB1116)

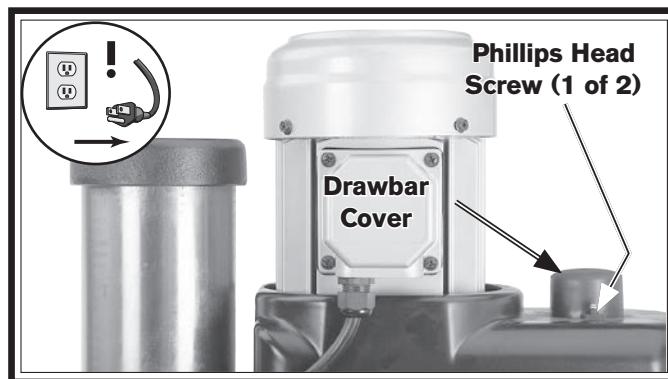
Model SB1116 features a spindle and a  $\frac{7}{16}$ "-20 drawbar that accepts R-8 tooling. Make sure speed range lever is set to "L" to prevent spindle rotation when installing/removing tooling.



Tools Needed:	Qty
Phillips Screwdriver #2 .....	1
Wrench or Socket 17mm.....	1
Deadblow Hammer .....	1

### Installing Tooling

- DISCONNECT MACHINE FROM POWER!
- Set spindle speed range lever to "L".
- Remove (2) M4-.7 x 10 Phillips head screws, then remove drawbar cover (see **Figure 58**).



**Figure 58.** Location of drawbar cover.

- Clean any debris or oily substances from mating surfaces of tooling.

**Note:** *Debris or oily substances can prevent tooling and spindle from properly mating. This condition can cause excessive vibration, poor cutting results, or tool/workpiece damage.*

5. Insert tool into spindle and rotate to align tool slot (see **Figure 59**) with pin inside spindle, then insert tooling all the way into spindle.



Figure 59. Example of R-8 tooling with alignment slot.

6. With one hand holding tool in place, insert drawbar into spindle from top of headstock, then thread it into tool by hand until snug, as shown in **Figure 60**.

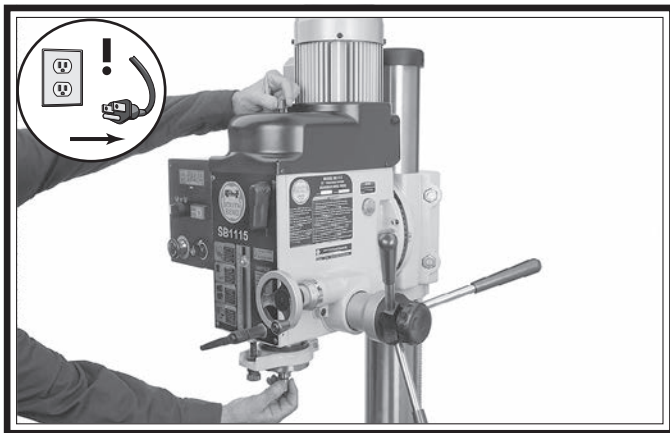


Figure 60. Threading drawbar into tooling.

7. Use wrench to tighten drawbar an additional  $\frac{1}{4}$  turn.

**Note:** Do not overtighten drawbar. Overtightening makes tool removal difficult and may damage arbor and threads.

8. Re-install drawbar cover.

## Removing Tooling

1. DISCONNECT MACHINE FROM POWER!
2. Set spindle speed range lever to "L".
3. Remove (2) M4-.7 x 10 Phillips head screws, then remove drawbar cover (see **Figure 54**).

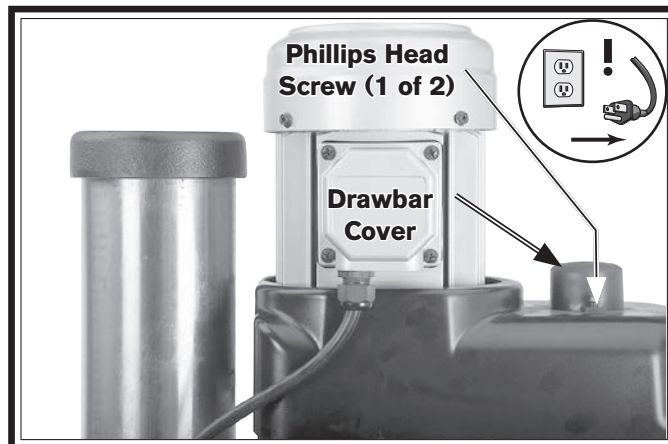


Figure 61. Location of drawbar Cover.

4. Loosen drawbar 1–2 full rotations.

**Note:** Make sure drawbar has at least three threads engaged with tooling or drawbar and tool threads could be damaged in next step.

5. Tap top of drawbar with deadblow hammer to unseat taper (see **Figure 55**).

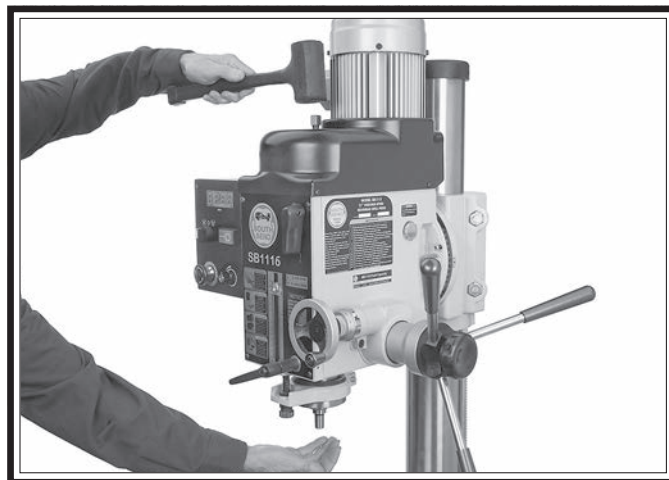


Figure 62. Tapping drawbar to unseat tool taper.

6. Support tool with one hand and fully unthread drawbar from tool.

## Spindle Downfeed

Spindle downfeed movement on the drill press is controlled by two mechanisms: 1) The coarse downfeed lever, and 2) the fine downfeed handwheel (see **Figure 63**). Refer to **Controls & Components** on **Page 3** for detailed descriptions of all downfeed controls and components.

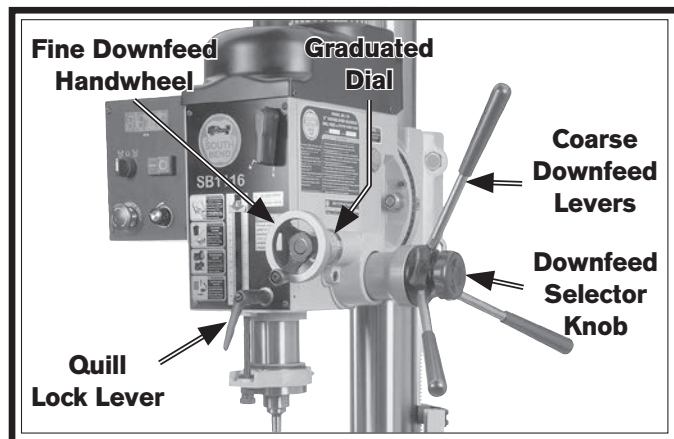


Figure 63. Downfeed control locations.

### Using Coarse Downfeed

Coarse downfeed is typically used for drilling, because it allows you to quickly lower the spindle with varying speed/pressure, and it automatically retracts the spindle back to the top position when released.

To engage coarse downfeed, make sure the spindle is completely stopped, and loosen the downfeed selector knob shown in **Figure 63**.

**Note:** To maintain control of the upward spindle travel, always continue holding the coarse downfeed levers until the spindle returns to the top position. Letting go of the levers too soon will cause the spindle to retract too quickly and slam up into the headstock.

### Using Fine Downfeed

Fine downfeed is typically used for precise, non-retractable Z-axis positioning of a cutter or end-mill when milling a flat surface across the face of a workpiece. The fine downfeed handwheel is equipped with a graduated collar (see **Figure 63**) with 0.001" increments. Each complete revolution of the handwheel equals 0.100".

In order to ensure the milled surface remains flat, the quill lock lever should be tightened after each adjustment to ensure the spindle height cannot move until the entire milling operation is complete.

To engage fine downfeed, make sure the spindle is completely stopped, and tighten the downfeed selector knob. Rotate the fine downfeed handwheel to raise or lower the spindle (see **Figure 63**).

## Setting Depth Stop

The depth stop limits the drilling depth or downward movement of the cutting tool. The maximum depth is 5". This is useful when performing the same operation multiple times.

### To set depth stop:

1. DISCONNECT MACHINE FROM POWER!
2. Install tooling (refer to **Page 37** for SB1115 or **Page 39** for SB1116), then make sure spindle is drawn all the way up into headstock.
3. Loosen Z-axis table lock, and raise table until it is approximately 1/8" below tooling.
4. Rotate depth stop adjustment knob until top of depth stop pointer is level with desired depth as listed on scale (see **Figure 64**).

**Note:** The depth stop scale functions as a general guide only. It is not intended for tight-tolerance, precision results. To calibrate the depth stop see **Calibrating Depth Stop** on **Page 58**.

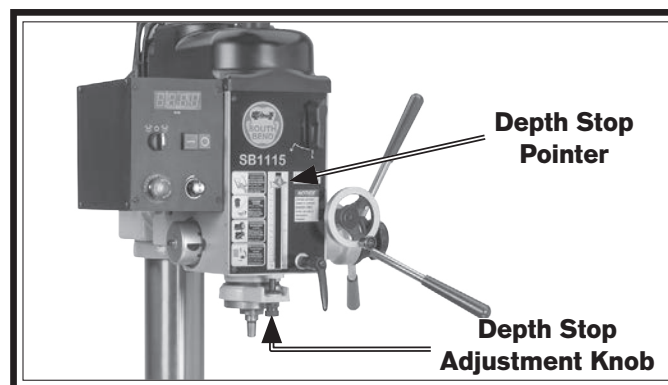


Figure 64. Location of depth stop controls.

## 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 spindle speed range lever and spindle speed dial 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 cutting tool, as noted in the formula shown in **Figure 65**.

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

\*Double if using carbide cutting tool

**Figure 65. Spindle speed formula for milling.**

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

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

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

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

## Setting Spindle Speed

Use the chart below or the one on the headstock when setting the spindle speed.

Spindle Speed Range	Range Lever
0–350 RPM	L
0–2500 RPM	H

## NOTICE

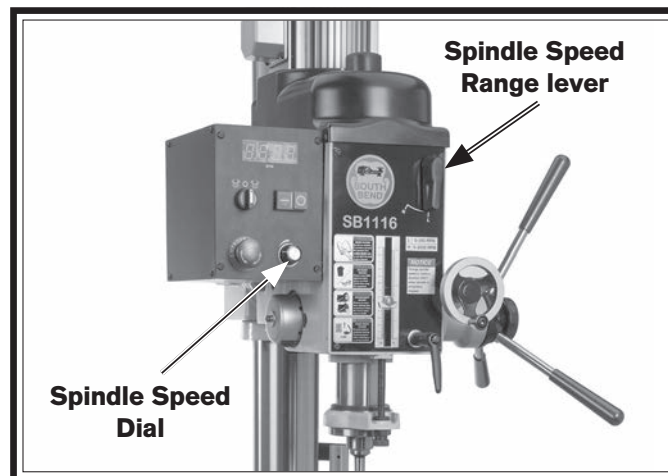
**Change spindle speed range ONLY when the spindle is completely stopped. Otherwise, machine damage could occur.**

### To set spindle speed:

1. With spindle completely stopped, position spindle speed range lever (see **Figure 66**) to high or low ("H" or "L") range.

**Note:** *If necessary, rotate the spindle by hand to mesh the gears when changing speed range.*

2. Rotate spindle speed dial (see **Figure 66**) to approximate desired spindle speed, then turn machine **ON**. If necessary, adjust spindle speed dial with machine running to fine-tune spindle speed.



**Figure 66. Spindle speed controls.**

# Calculating Spindle Speed for Drilling

The chart shown in **Figure 67** is intended as a guide only. Always follow the manufacturer's speed recommendations if provided with your drill bits, cutters, or hole saws. Exceeding the recommended speeds may be dangerous to the operator or cause damage to the tooling.

The speeds shown here are intended to get you started. The optimum speed will always depend on various factors, including tool diameter, drilling pressure, material hardness, material quality, and desired finish.

Often, when drilling materials other than wood, some type of lubrication is necessary.

## Lubrication Suggestions

Wood ..... None  
 Plastics.....Soapy Water  
 Brass ..... Water-Based Lubricant  
 Aluminum..... Paraffin-Based Lubricant  
 Mild Steel ..... Oil-Based Lubricant

** CAUTION**

**Larger bits turning at slower speeds tend to grab the workpiece aggressively. This can result in the operator's hand being pulled into the bit or the workpiece being thrown with great force. Always clamp the workpiece to the table to prevent injuries.**

Twist/Brad Point Drill Bits	Soft Wood	Hard Wood	Plastic	Brass	Aluminum	Mild Steel
1/16" – 3/16"	3000	2500	2500	2500	3000	2500
13/64" – 3/8"	2000	1500	2000	1250	2500	1250
25/64" – 5/8"	1500	750	1500	750	1500	600
1 1/16" – 1"	750	500	1000	400	1000	350
Spade/Forstner Bits	Soft Wood	Hard Wood	Plastic	Brass	Aluminum	Mild Steel
1/4" – 1/2"	2000	1500				
9/16" – 1"	1500	1250				
1 1/8" – 1 7/8"	1000	750				
2" – 3"	500	350				
Hole Saws	Soft Wood	Hard Wood	Plastic	Brass	Aluminum	Mild Steel
1/2" – 7/8"	500	500	600	600	600	500
1" – 1 7/8"	400	400	500	500	500	400
2" – 2 7/8"	300	300	400	400	400	300
3" – 3 7/8"	200	200	300	300	300	200
4" – 5"	100	100	200	200	200	100
Rosette Cutters	Soft Wood	Hard Wood	Plastic	Brass	Aluminum	Mild Steel
Carbide Insert Type	350	250				
One-Piece Type	1800	500				
Tenon/Plug Cutters	Soft Wood	Hard Wood	Plastic	Brass	Aluminum	Mild Steel
3/8" – 1/2"	1200	1000				
5/8" – 1"	800	600				

Figure 67. Drilling speed chart.

# Accessories

This section includes the most common accessories available for your machine through our exclusive dealer, Grizzly Industrial, Inc., at [grizzly.com](http://grizzly.com).

**⚠ WARNING**

Installing unapproved accessories may cause machine to malfunction, resulting in serious personal injury or machine damage. To reduce this risk, only install accessories recommended by South Bend or Grizzly.

**NOTICE**

Refer to Grizzly's website or latest catalog for additional recommended accessories.

- G5562—SLIPIT® 1 Qt. Gel
- G5563—SLIPIT® 12 oz Spray
- G2871—Boeshield® T-9 12 oz Spray
- G2870—Boeshield® T-9 4 oz Spray
- H3788—G96® Gun Treatment 12 oz Spray
- H3789—G96® Gun Treatment 4.5 oz Spray



Figure 68. Recommended products for protecting unpainted cast iron/steel part on machinery.

- SB1365—South Bend Way Oil-ISO 68
- T26419—Syn-O-Gen Synthetic Grease
- T26685 Moly-D Machine Oil-ISO 32



Figure 69. Recommended products for machine lubrication.

## Basic Eye Protection

- T20501—Face Shield Crown Protector 4"
- T20502—Face Shield Crown Protector 7"
- T20503—Face Shield Window
- T20451—"Kirova" Clear Safety Glasses
- T20452—"Kirova" Anti-Reflective S. Glasses
- T20456—DAKURA Safety Glasses, Black/Clear



Figure 70. Assortment of basic eye protection.

**order online at [www.grizzly.com](http://www.grizzly.com) or call 1-800-523-4777**

## South Bend Keyless Integral Chucks

For SB1115

**SB1379-MT#3** 1/32"-1/2"

**SB1380-MT#3** 1/32"-5/8"

For SB1116

**SB1382-R-8** 1/32"-1/2"

**SB1383-R-8** 1/32"-5/8"

These keyless chucks are produced with an integral shank to maximize concentricity between the body, shank and jaws. They start as a one-piece high alloy body which is turned, then finish ground throughout, making them as close to zero TIR (Total Indicated Runout) as can be. A spanner is provided to ease jaw opening.



Figure 71. South Bend Keyless Integral Drill Chucks.

### D2140-Cobalt Alloy Drill Bits 1/16"-1/2", 29-Pc.

These cobalt alloy bits are resistant to heat and stress, allowing them to turn faster without overheating. The 135° split point enables the drill to use less thrust and eliminates the tendency of the drill point to walk, which makes these great for use in portable drills or drill presses. Cobalt Alloy bits retain their edge sharpness longer than normal HSS bits, resulting in a significant saving of time and money in the workshop.



Figure 72. D2140 29-Pc. Cobalt Alloy Drill Bits.

## 8 Piece Quick Change Collet Set

For SB1115

**SB1350-South Bend 8-Pc. MT#3 Collet Set**

**SB1351-South Bend 16-Pc. MT#3 Collet Set**

For SB1116

**SB1348-South Bend 8-Pc. R-8 Collet Set**

**SB1349-South Bend 16-Pc. R-8 Collet Set**

Get true South Bend quality and precision with one of these quick-change collet sets. Each set includes hardened and precision-ground spring collets for maximum holding power, collet chuck, spanner wrench, and protective moulded case.



Figure 73. SB1349 South Bend 16-Pc. R-8 Collet Set.

### G3658-Tin-Coated 115-Pc. Drill Bit Set

Titanium nitride-coated bits last up to six times as long as uncoated bits. This 115-pc. set features 29 fractional bits, from 1/16"-1/2" in increments of 1/64", letter bits from A-Z, and 60 number bits. Housed in a rugged steel case.

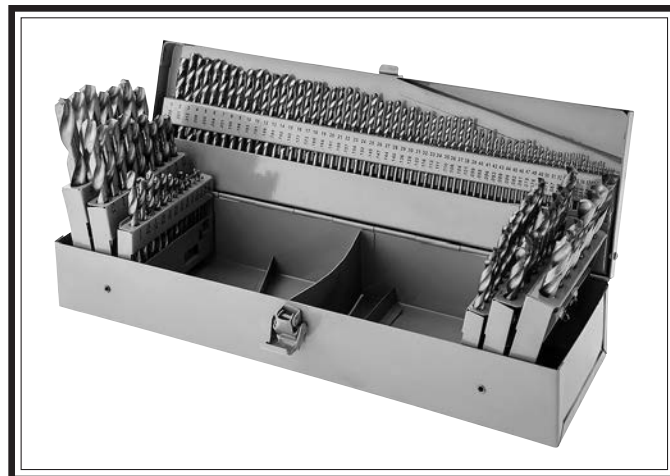
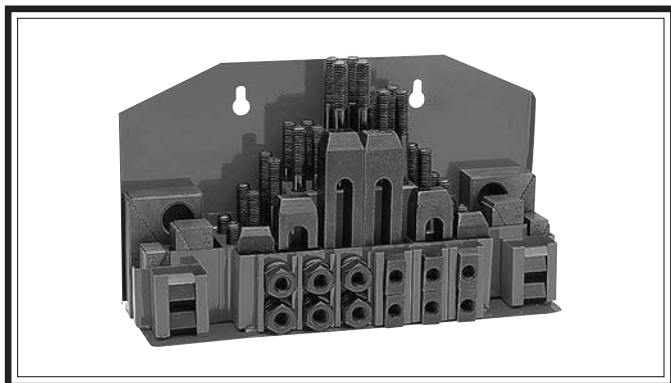


Figure 74. Model G3658 115-Pc. Drill Bit Set.

**order online at [www.grizzly.com](http://www.grizzly.com) or call 1-800-523-4777**

**G1075—58-Pc. Clamping Kit  
(For SB1116 Only)**

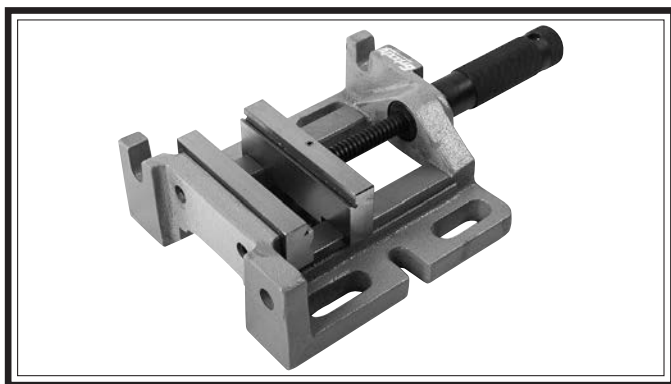
This kit includes 24 studs, 6 step block pairs, 6 T-nuts, 6 flange nuts, 4 coupling nuts, and 6 end hold-downs. The rack is slotted so it can be mounted close to the machine for easy access. Made for ½" T-slots.



**Figure 75. G1075 58-Pc. Clamping Kit.**

**T10440—Precision 3-Way Drill Press Vise**

This Precision 3-Way Drill Press Vise is made from graded cast-iron and features a prismatic fixed jaw for holding round material, stepped jaws for holding thin material, and precision-ground right angle faces for horizontal and vertical positioning. Includes a sturdy lip along both sides of the base, allowing vise to be mounted to nearly any machine table, using common T-slot clamps.



**Figure 76. T10440 Precision 3-Way Drill Press Vise.**

**G9761—2 Flute 10-Pc. TiN End Mill Set  
G9762—4 Flute 10-Pc. TiN End Mill Set**

Coated in extra-durable titanium nitride, this 10-piece assortment of high-speed steel end mills features the following sizes: ⅜", ¼", ⅝", ⅜", ⅞", ½", ⅜", ⅝", ⅞", 1 ⅛" and ¾". Finely-crafted mills are single-ended cutters. Includes molded plastic case.



**Figure 77. G9762 10-Pc. TiN End Mill Set.**

**H5608—V-Block Pair w/Clamps 1 ⅝"****H5609—V-Block Pair w/Clamps 1 ¾"****H5610—V-Block Pair w/Clamps 2"****H5611—V-Block Pair w/Clamps 2 ¾"**

Each V-Block pair is precision-ground and numbered to match for accuracy.



**Figure 78. H5611 V-Block Pair w/Clamps.**

**order online at [www.grizzly.com](http://www.grizzly.com) or call 1-800-523-4777**



### T27480—Dial Indicator 3-Axis 7" Universal Clamp + 0.03/0.0005" Test Indicator Set

The perfect tool for trammung mill spindles, this indicator set features a satin chrome finished dial indicator with a measuring range of 0-0.03" in 0.0005" graduations and includes and universal clamp.



Figure 79. T27480 Dial Indicator and Mounting Clamp.

### H7527— 6" Rotary Table w/ Div. Plates

Use this 6" rotary table in either the horizontal or vertical position for a variety of milling applications and with the set of dividing plates and adjustable tailstock, your milling applications are nearly unlimited. With 4 degree table movement per handle rotation and 20 second vernier scale, control is very accurate and precise. Also includes a 3/8" clamping set for the 4-slot table. Everything you need in one great set!



Figure 80. H7527 6" Rotary Table w/Div. Plates.

### T24799—1-2-3 Precision Parallel Blocks T24800—2-4-6 Precision Parallel Blocks

These blocks are extremely handy for layout and set up work. Matched blocks are hardened and precision ground so all six sides are square to within 0.0003".

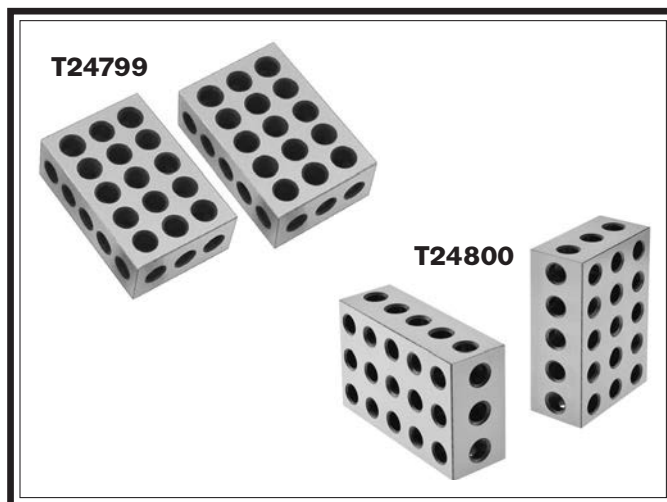


Figure 81. T24799 and T24800 Precision Parallel Blocks.

### H6572—Grease-Resistant Mat 3' x 3' x 3/4"

These Black Grease Resistant Mats are engineered for proper back and leg support. The non-slip surface features a modular interlock design, which enables the user to create a custom floor. Mats measure 36" x 36" x 3/4".

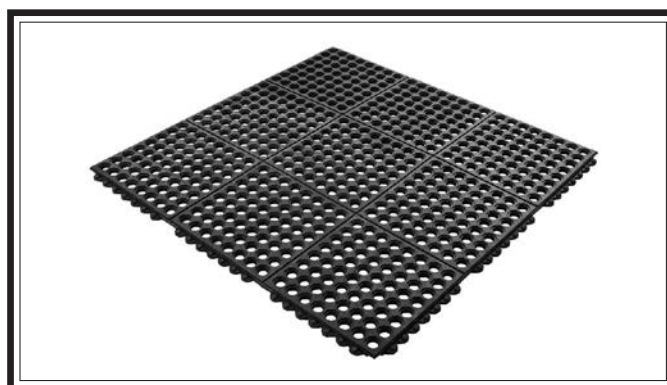
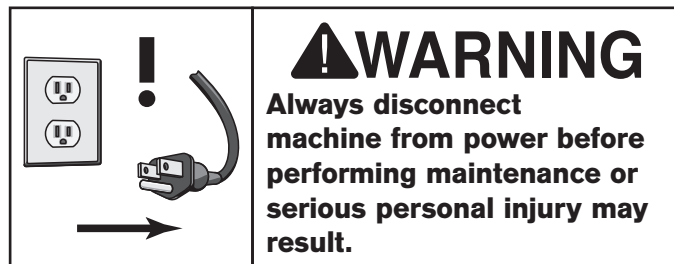


Figure 82. H6572 Grease-Resistant Mat.

**order online at [www.grizzly.com](http://www.grizzly.com) or call 1-800-523-4777**

## Maintenance Schedule



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

### Ongoing

To help minimize your risk of injury and maintain proper machine operation, if you ever observe any of the items below shut the machine down immediately, disconnect it from power, and fix the problem before continuing operations.

- Loose mounting bolts or fasteners.
- Worn, frayed, cracked, or damaged wires.
- Any other unsafe condition.

### Before Beginning Operations

- Turn the spindle direction switch to the OFF (middle) position to prevent spindle startup when connected to power (see **Page 3**).
- (SB1116) Make sure the X- and Z-axis power feed units are turned **OFF** to prevent unintentional table movement when connected to power (see **Page 35**).
- Perform lubrication tasks as directed in the **Lubrication** section, beginning on **Page 49**.
- Check table movement in all three axis directions for loose/tight gibs. Adjust the gibs if necessary (see **Page 54**).

### Daily, After Operations

- Disconnect the machine from power.
- Vacuum/clean all debris from table, slides, and base.
- Wipe down all unpainted or machined surfaces with a good quality rust preventative.

## Cleaning & Protecting

Regular cleaning is one of the most important steps in taking good care of this machine. Each operator is responsible for cleaning the machine immediately after using it or at the end of the day. 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 debris from the ways and table is to use a wet/dry shop vacuum that is dedicated for this purpose only. Small metal chips leftover after vacuuming can be wiped up with a slightly oiled rag. Avoid using compressed air to blow off metal chips, as this may drive them deeper into moving surfaces and could cause sharp chips to fly into your face or hands.

Besides the ways and elevation leadscrew, 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 could be vulnerable to rust if left unprotected (this especially includes any parts that may be exposed to water soluble cutting fluids). Typically with these parts, a thin film of oil is all that is necessary for protection.

Keep tables rust-free with ISO 68 way oil (see **Page 44**).

# Lubrication

This machine has numerous moving metal-to-metal contacts that require regular and proper lubrication to ensure efficient and long-lasting operation, and to protect your investment.

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 MACHINE FROM POWER!**

**IMPORTANT:** *Before adding lubricant, clean any debris and grime from the fill hole / grease fitting and the immediate area to prevent contamination of the new lubricant.*

Use the schedule and information shown in **Figure 83** as a guide for lubrication tasks. Follow the referenced sections on the following pages for detailed instructions.

**NOTICE**

The following recommended lubrication schedule is based on light to medium usage. You may need to lubricate some of these items more frequently depending on individual usage.

Lubrication Task	Frequency (Hours of Operation)	Page Ref.
Quill, Column, and Column Rack	8 Hrs.	<b>This Page</b>
Headstock Reservoir	8 Hrs.	<b>50</b>
X- and Y-Axis Leadscrews (SB1116)	40 Hrs.	<b>52</b>
Quill Rack and Pinion	90 Hrs.	<b>52</b>
Power Feed Gears (SB1116)	160 Hrs.	<b>53</b>

**Figure 83. Recommended lubrication tasks, schedules, and instruction page references.**

**NOTICE**

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

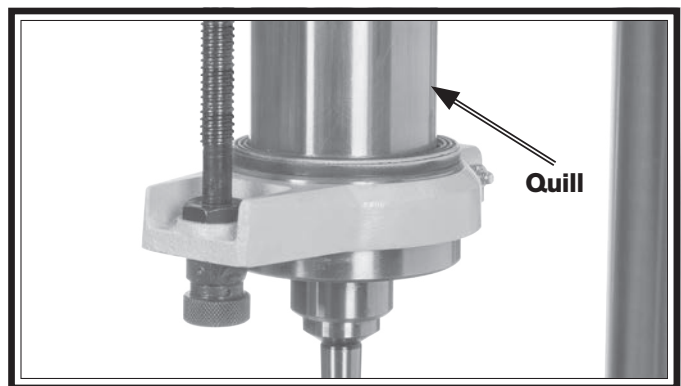
## Quill, Column, & Column Rack

Oil Type ..... Model T23962 or ISO 68 Equivalent  
 Oil Amount ..... Thin Coat  
 Lubrication Frequency..... 8 Hrs. of Operation

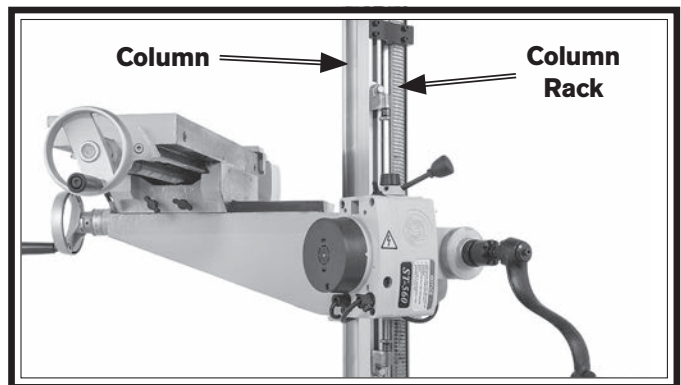
Use the controls to access all surfaces (see **Figures 84–85**), then clean them with mineral spirits, shop rags, and, where appropriate, brushes.

When dry, apply a thin coat of oil to the surfaces. Use clean brushes to apply oil to the grooves of the column rack. Move each component through the entire path of travel several times to distribute the lubricant.

**Note:** *Take care not to remove the quill rack grease without re-applying it.*



**Figure 84. Outside surface of quill.**



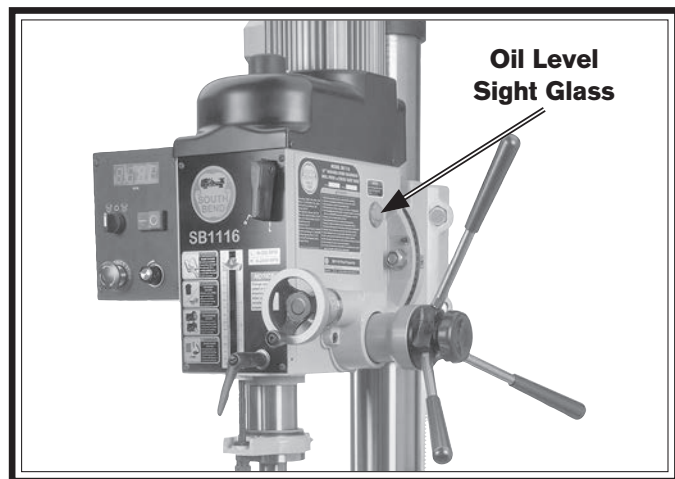
**Figure 85. Column and rack.**

## Headstock Reservoir

Oil Type ..... Model T26685 or ISO 32 Equivalent  
 Oil Amount ..... 2½ Qt.  
 Check/Add Frequency ..... 8 Hrs. of Operation  
 Change Frequency ..... Every 180 Days

Items Needed	Qty
Screwdriver Phillips #2 .....	1
Open-End Wrench 22mm .....	1
Hex Wrench 3mm .....	1
Drain Pan (1-Gallon or Larger).....	1

The headstock has the proper amount of oil when the sight glass is halfway full (see **Figure 86**). If oil level is not visible in sight glass, follow **Steps 2-5** to access oil fill plug and top off with fresh ISO 32 equivalent oil until oil sight glass is halfway full.

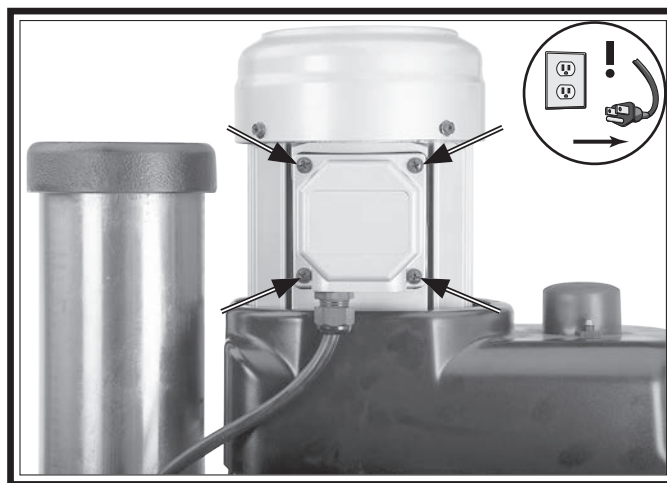


**Figure 86.** Location of headstock oil sight glass and fill plug.

### To change headstock oil:

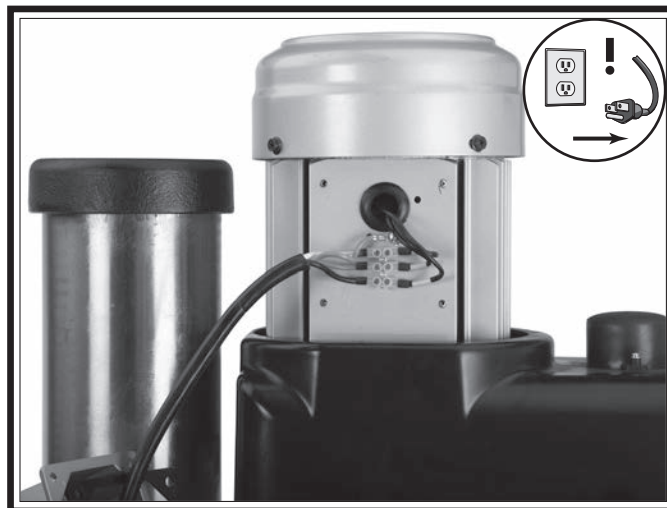
1. Run spindle at approximately 500 RPM for approximately 10 minutes to warm headstock oil.
2. **DISCONNECT MACHINE FROM POWER!**

3. Remove (4) hex head screws, then remove motor junction box cover (see **Figure 87**).



**Figure 87.** Motor junction box cover.

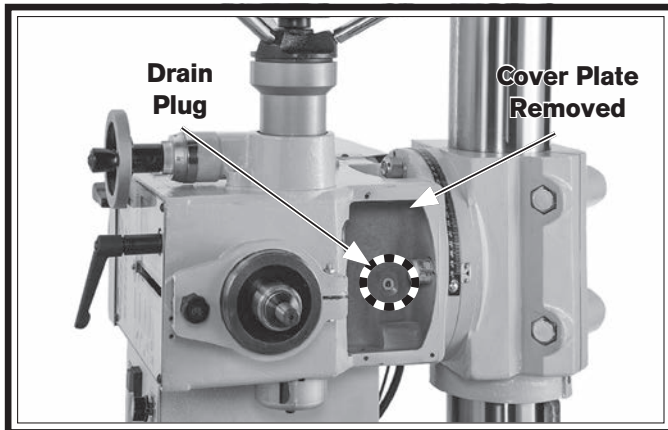
4. Remove Phillips head screw to disconnect ground wire and unplug (3) wires from left side of terminal, as shown in **Figure 88**.



**Figure 88.** Motor junction box cover removed.

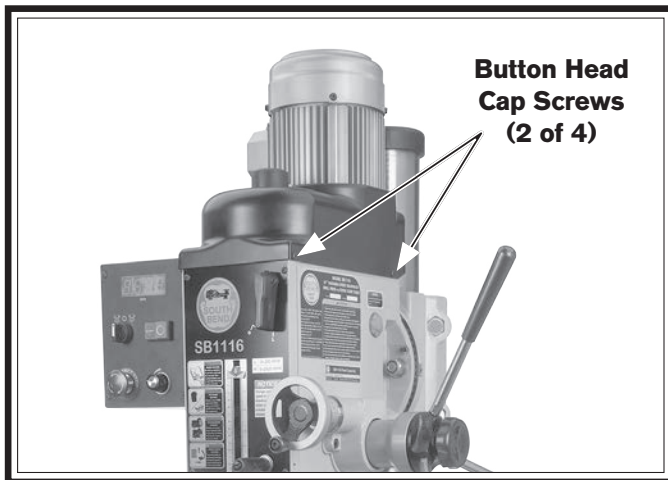
**Note:** Make a note of wire locations so that they are plugged back into the proper locations.

5. Remove cover plate from bottom of headstock (see **Figure 89**).



**Figure 89.** Headstock drain plug (headstock tilted 90° for clarity).

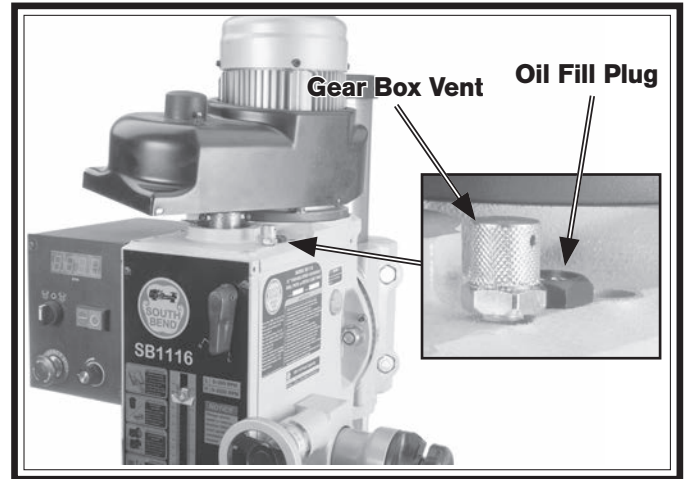
6. Remove (4) button head cap screws securing headstock cover, then carefully lift and rotate headstock cover to expose oil fill plug (see **Figure 90**).



**Figure 90.** Location of headcover button head cap screws.

7. Remove oil fill plug (see **Figure 91**).

**Note:** Do not remove gearbox vent.



**Figure 91.** Oil fill plug exposed.

8. Place drain pan on table under headstock.
9. Remove drain plug (see **Figure 89**) from underneath headstock and allow oil to drain into pan.

## NOTICE

Follow federal, and state, and local requirements for proper disposal of used oil.

10. Replace drain plug.
11. Add oil at fill plug hole until sight glass is halfway full, then re-install fill plug and cover plate.
12. Re-install headstock cover.
13. Re-connect motor wires, then re-install motor junction box cover.

**Note:** Refer to **Pages 63–64** for correct wiring configuration.

14. Clean up any spilled oil to prevent slipping hazards.

### Quill Rack & Pinion

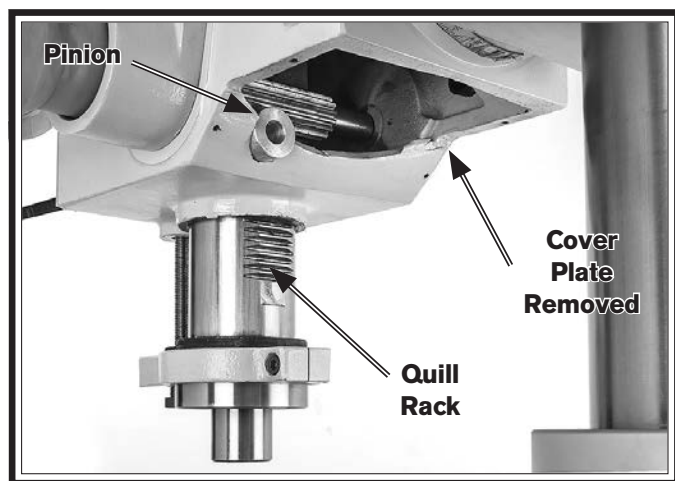
Oil Type .....NLGI#2 Grease or Equivalent  
 Oil Amount ..... Thin Coat  
 Lubrication Frequency..... 90 Hrs. of Operation

**Items Needed**

**Qty**

Double-Sided Adhesive Tape ..... As Needed  
 Mineral Spirits and Shop Rags ..... As Needed  
 Wire Brush ..... 1

Remove cover plate from bottom of headstock, then move the quill up and down to gain full access to the quill rack and pinion (see **Figure 92**). Clean the teeth with mineral spirits, shop rags, and a brush.



**Figure 92. Quill rack and pinion.**

When dry, use a brush to apply a thin coat of grease to the teeth, then raise/lower the quill several times to distribute the grease. Re-install cover plate when finished.

**Note:** *Re-apply oil to the quill smooth outside surface that was removed during the cleaning process.*

### SB1116 X-Axis & Y-Axis

#### Leadscrews

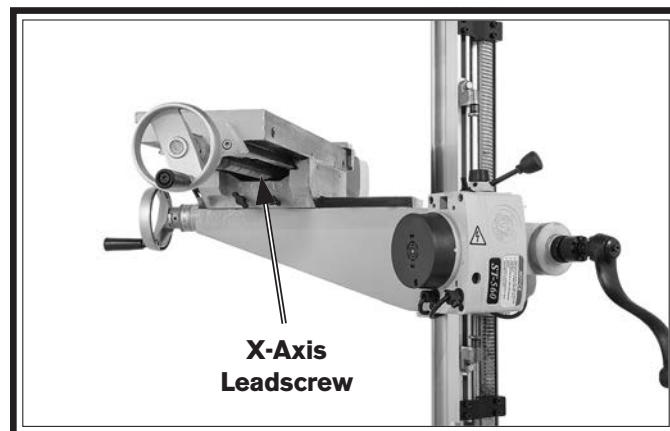
Grease Type.....NLGI #2 or Equivalent  
 Grease Amount ..... Thin Coat  
 Check/Add Frequency ..... 40 Hrs. of Operation

**Items Needed**

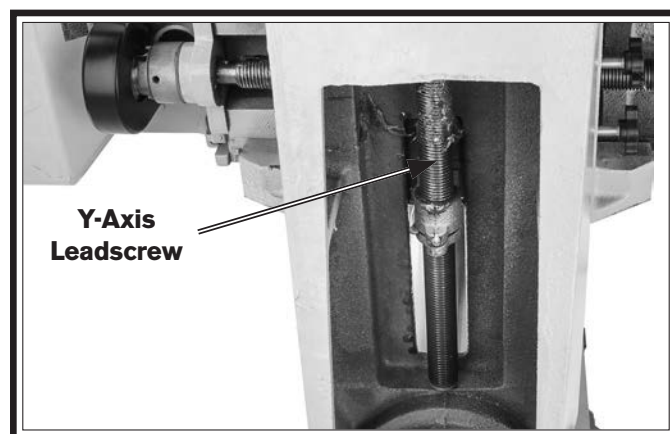
**Qty**

Double-Sided Adhesive Tape ..... As Needed  
 Mineral Spirits and Shop Rags ..... As Needed  
 Wire Brush ..... 1

Use mineral spirits to clean any debris and built-up grime from the leadscrews shown in **Figures 93–94**, then wipe them dry. Brush a thin coat of lubricant on the threads of the leadscrews, then rotate each leadscrew through its full path to distribute the grease.



**Figure 93. X-axis leadscrew as viewed from underneath right side of table.**



**Figure 94. Y-axis leadscrew as viewed from underneath knee.**

### SB1116 Power Feed Gears

Grease Type.....NLGI #2 or Equivalent  
 Grease Amount .....Two Pumps of Grease Gun  
 Check/Add Frequency ..... 160 Hrs. of Operation

**Items Needed**

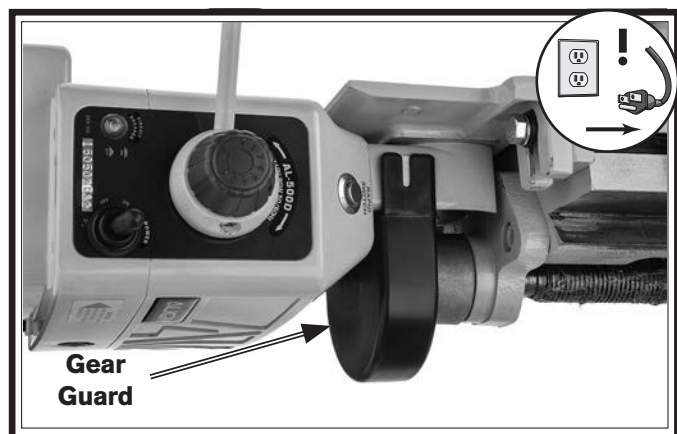
	<b>Qty</b>
Double-Sided Adhesive Tape.....	As Needed
Mineral Spirits and Shop Rags .....	As Needed
Wire Brush .....	1

To lubricate the Z-axis power feed gears, always make sure column rack has adequate lubrication (see **Page 49**), which will disburse throughout the Z-axis power feed gears.

To lubricate the X-axis power feed gears, follow the instructions below.

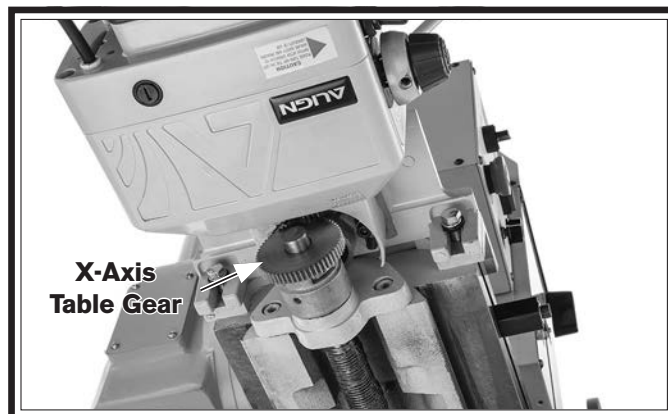
**To lubricate X-axis power feed gears:**

1. DISCONNECT MACHINE FROM POWER!
2. Remove gear guard (see **Figure 95**).



**Figure 95. Location of gear guard.**

3. Brush a light coat of grease on teeth of power feed gear and X-axis table gear (see **Figure 96**).



**Figure 96. Lubrication points for X-axis power feed gears.**

4. Use rubbing alcohol or other appropriate solvent/cleaner to thoroughly clean grease/residue from mating surfaces of gear guard, then re-install guard using double-sided adhesive tape.

## Adjusting Gibs (SB1116)

Gibs are tapered lengths of metal that are sandwiched between two moving surfaces. Gibs control the gap between these surfaces and how they slide past one another. Correctly adjusting the gibs is critical to producing good milling results.

Tight gibs make table movement more accurate but stiff. Loose gibs make moving the table sloppy but easier to do. The goal of gib adjustment is to remove unnecessary sloppiness without causing the ways to bind.

Gibs are adjusted with gib screws (see **Figures 97–98**) that move the tapered gib back-and-forth to increase or decrease the friction pressure between the sliding surfaces. The process of properly adjusting the gibs requires trial-and-error and patience.

Refer to the figures on this page to identify the locations of the gibs, and one of the two adjustment screws for each.

**Note:** *It will be necessary to remove small parts, such as way wipers and covers, to access the gib adjustment screws.*

Tool Needed	Qty
Flat Head Screwdriver #2.....	1

### To adjust each gib:

1. DISCONNECT MACHINE FROM POWER!
2. Loosen locks for component you are adjusting.
3. Loosen one gib adjustment screw, then tighten the other the same amount to move the gib.
4. Use handwheel/crank (if applicable) to move component until you feel a slight drag in the path of movement. Repeat **Steps 3–4** as necessary.



Figure 97. X-axis gib adjustment screw (1 of 2).



Figure 98. Y-axis gib adjustment screw (1 of 2).



# Adjusting Leadscrew Backlash (SB1116)

Leadscrew backlash is the amount of motion or "play" in leadscrew rotation before the attached device begins to move. Leadscrews will always have a certain amount of backlash that will increase with normal wear.

Generally, 0.005"–0.010" leadscrew backlash is acceptable to ensure smooth movement and reduce the risk of premature thread wear. However, if you find it necessary to adjust leadscrew backlash, perform the procedures listed below.

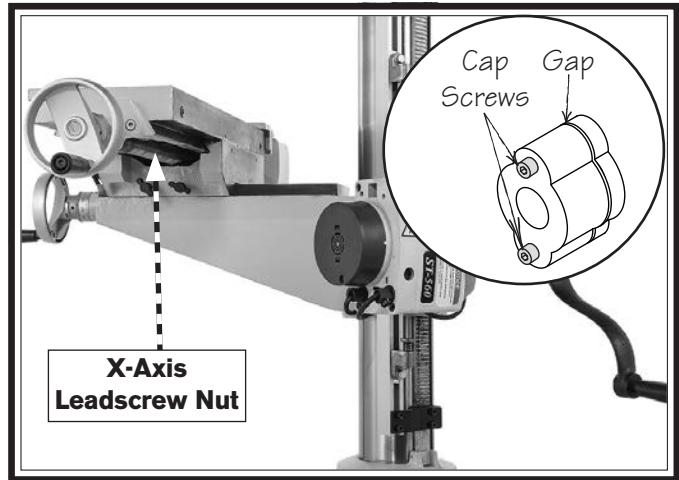
**Tool Needed**

T-Handle Hex Wrench 5mm..... 1

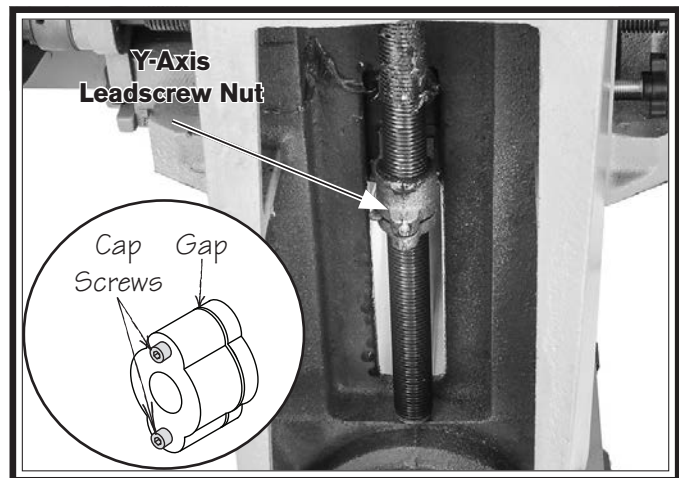
**Qty**

**To adjust leadscrew backlash:**

Tighten or loosen the cap screws on the leadscrew nuts shown in **Figures 99–100**, then test the amount of backlash by slowly rocking the handwheels back-and-forth. Repeat if necessary.



**Figure 99. X-axis leadscrew nut located under right side of table.**

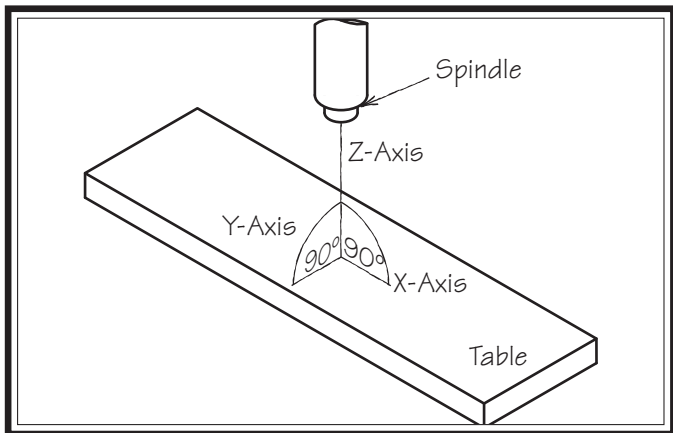


**Figure 100. Y-axis leadscrew nut located inside knee.**

# Tramming Spindle

After positioning the head at an angle and when your operation requires that the spindle axis be precisely perpendicular to the table, you must tram or align the spindle with the table to ensure the spindle is exactly 90° to the table.

This procedure involves mounting a dial test indicator to the quill or spindle, rotating it around the table, and adjusting the spindle axis (Z-axis) 90° to the table X- and Y-axis, as illustrated in **Figure 101** below.



**Figure 101. Spindle Z-axis perpendicular to the table X- and Y-axis.**

We encourage you to research the many variations of spindle tramming to find the one that works best for you. If you do not already have a preference for performing this operation, use the following widely-used procedure for accurately tramming the spindle to the table.

Keep in mind that all workpiece top surfaces are not exactly parallel with the table top. You may choose to tram the spindle to the top surface of the workpiece after it is mounted rather than tramming the spindle to the table.

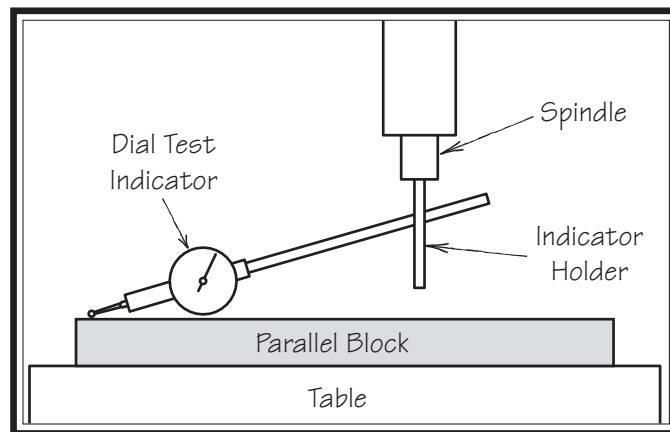
**Tools Needed**

	<b>Qty</b>
Dial Test Indicator (with at least 0.0005" resolution) .....	1
Indicator Holder (mounted on the quill/spindle) .....	1
Precision Parallel Block (at least 9" in length) .....	1

**Note:** A precision-ground plate can be substituted for the parallel blocks. Keep in mind that the farther the indicator point can be placed from the spindle axis, the more accurate the alignment measurements will be.

**To tram spindle to table:**

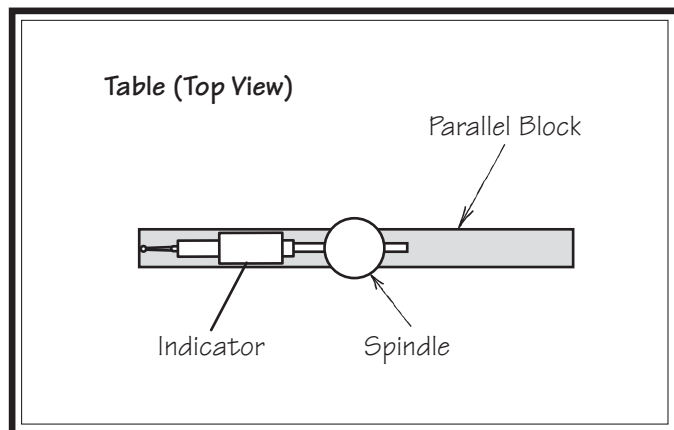
- 1. DISCONNECT MACHINE FROM POWER!**
- 2.** Prepare machine for tramming by performing following tasks:
  - Verify the table is clean by running your hand over the top of it. If necessary, stone the table to remove all nicks and burrs, then clean off all debris.
  - Position the table for the operation you intend to perform after tramming—preferably centered with the saddle.
  - Tighten any table, knee, quill, or ram locks that should be tight during the intended operation.
- 3.** Place parallel block underneath spindle.
- 4.** Install indicator holder in spindle or on quill, then mount indicator so that point is as parallel to block as possible as illustrated in **Figure 102**.



**Figure 102. Dial test indicator mounted.**

5. To measure spindle alignment along X-axis, place parallel block directly under spindle and indicator across length of table, as illustrated in figure below.

**Note:** If you must re-position the quill or the knee to accommodate the above step, then review the tasks in **Step 2** to make sure the machine is properly prepared for tramping.



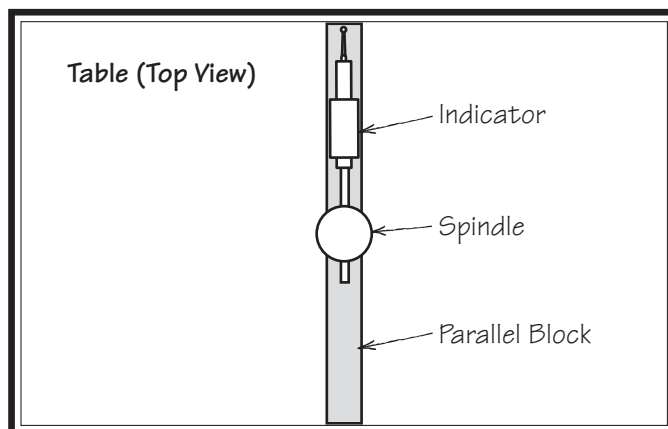
**Figure 103. Parallel block and indicator positioned for the X-axis measurement (top view).**

**Note:** Your general goal in the next steps should be to get the difference of the indicator readings between the ends of the parallel bar down to 0.0005". However, the acceptable variance will depend on the requirements for your operation.

6. Rotate spindle by hand so that indicator point rests on one end of parallel block, then zero the dial.
7. Rotate spindle so that indicator point rests in same manner on other end of block, then read dial.
- If the indicator dial still reads zero or is within the acceptable variance, continue on with **Step 8**.
  - If the indicator dial has moved from zero beyond the acceptable variance, you will need to compensate for that amount by rotating the head left or right. Repeat **Steps 6–7** until you are satisfied with the spindle axis alignment along the table X-axis.

**Note:** Keep one of the rotation lock bolts just snug so the head does not move loosely while you adjust it. Remember to tighten all the rotation lock bolts after adjusting the head.

8. Place parallel block directly under spindle and across width of table, as illustrated in figure below.



**Figure 104. Parallel block and indicator positioned for the Y-axis measurement (top view).**

9. Rotate spindle so indicator point rests on parallel bar, as illustrated in figure above, then zero the dial.

10. Rotate spindle so that indicator point rests on other end of bar in same manner, then read dial.

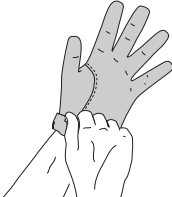

— If the indicator dial still reads zero or is within the acceptable variance, the spindle is precisely perpendicular to the table in both the X- and Y-axis, and the tramping procedure is complete.

— If the indicator dial has moved from zero beyond the acceptable variance, you will need to compensate for that amount by tilting the head forward or backward. Repeat **Steps 9–10** until you are satisfied with the spindle axis alignment along the table Y-axis.

**Note:** Keep one of the tilt lock bolts just snug so the head does not move loosely while you adjust it. Remember to tighten all the tilt lock bolts after adjusting the head.

# Tensioning Return Spring

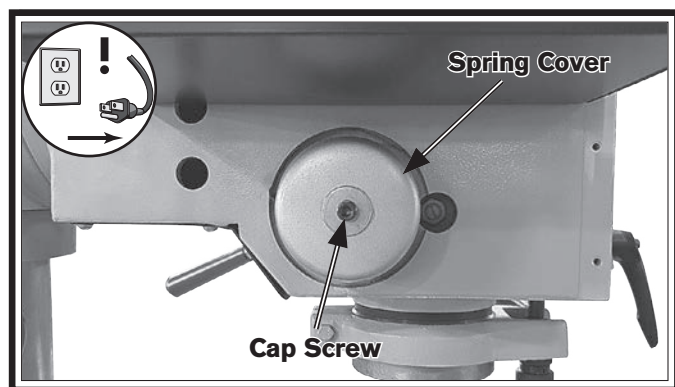
The spring tension for automatic quill recoil has been pre-set at the factory. It should not need adjustment under most normal circumstances. If it does need adjustment, the spring housing is located on the left side of the headstock.

	<p><b>⚠ WARNING</b> If the return spring should come loose from the spring cap and rapidly unwind, laceration or impact injuries could occur. Always wear heavy leather gloves and safety glasses when adjusting the return spring tension.</p>
	

<b>Tool Needed</b>	<b>Qty</b>
Hex Wrench 5mm .....	1

**To tension return spring:**

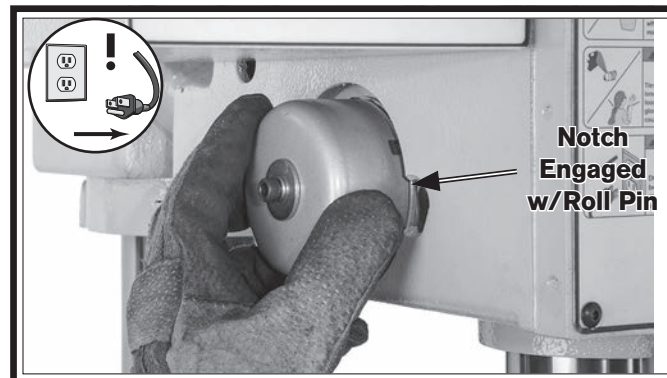
1. DISCONNECT MACHINE FROM POWER!
2. PUT ON SAFETY GLASSES!
3. Loosen cap screw shown in **Figure 105** 2–3 turns (DO NOT completely remove it).



**Figure 105. Spring tension components.**

4. Wearing heavy leather gloves, pull spring cover out enough so notches just clear roll pin (see **Figure 106**). HOLD SPRING COVER TIGHTLY during this step, or force of spring will cause cover to spin out of your hands.

5. Rotate cover counterclockwise to increase tension, then push cover back in to engage roll pin with one of the notches, as shown in **Figure 106**, then retighten cap screw.



**Figure 106. Example of adjusting spring tension.**

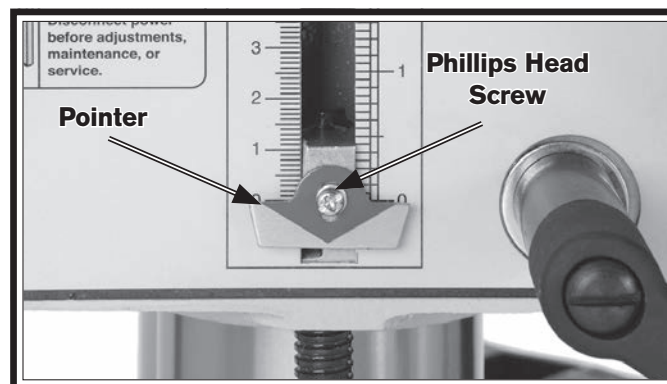
# Calibrating Depth Stop

The depth stop can be calibrated to improve accuracy. Make sure the spindle is retracted all the way into the quill, then follow the steps below.

<b>Tool Needed</b>	<b>Qty</b>
Screwdriver Phillips #2 .....	1

**To calibrate depth stop:**

1. Lower depth stop (see **Figure 107**) until pointer reaches bottom of its travel.
2. Loosen Phillips head screw shown in **Figure 107**, and position pointer so its upper edge aligns with zero, then re-tighten screw.



**Figure 107. Depth stop calibrated.**

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 power supply breaker immediately trips after startup.	<ol style="list-style-type: none"> <li>1. Master power switch in OFF position.</li> <li>2. Emergency Stop button depressed/ at fault.</li> <li>3. Blown machine fuse.</li> <li>4. Incorrect power supply voltage or circuit size.</li> <li>5. Power supply circuit breaker tripped or fuse blown.</li> <li>6. Motor wires connected incorrectly.</li> <li>7. Wiring broken, disconnected, or corroded.</li> <li>8. ON/OFF switch at fault.</li> <li>9. Circuit board at fault.</li> <li>10. Spindle rotation switch at fault.</li> <li>11. Potentiometer at fault.</li> <li>12. Inverter/control box at fault.</li> <li>13. Motor or motor bearings at fault.</li> </ol>	<ol style="list-style-type: none"> <li>1. Turn master power switch to ON position (<b>Page 4</b>).</li> <li>2. Rotate button head to reset; replace if at fault.</li> <li>3. Replace fuse/ensure no shorts.</li> <li>4. Ensure correct power supply voltage and circuit size (<b>Page 16</b>).</li> <li>5. Ensure circuit is free of shorts. Reset circuit breaker or replace fuse.</li> <li>6. Correct motor wiring connections (<b>Page 62</b>).</li> <li>7. Fix broken, disconnected, or corroded wires.</li> <li>8. Replace switch.</li> <li>9. Replace circuit board.</li> <li>10. Test/replace switch.</li> <li>11. Test/replace potentiometer.</li> <li>12. Inspect inverter/controller box; replace if at fault.</li> <li>13. Replace motor.</li> </ol>
Machine stalls or is underpowered.	<ol style="list-style-type: none"> <li>1. Workpiece material unsuitable for machine.</li> <li>2. Gearbox at fault.</li> <li>3. Motor wired incorrectly.</li> <li>4. Machine undersized for task.</li> <li>5. Motor overheated.</li> <li>6. Extension cord too long.</li> <li>7. Spindle rotation switch at fault.</li> <li>8. Potentiometer at fault.</li> <li>9. Inverter/control box at fault.</li> <li>10. Motor or motor bearings at fault.</li> </ol>	<ol style="list-style-type: none"> <li>1. Use proper material type for machine.</li> <li>2. Select appropriate speed range; replace broken or slipping gears.</li> <li>3. Wire motor correctly (<b>Page 62</b>).</li> <li>4. Use correct cutter/bit; reduce feed rate; reduce spindle speed; use cutting fluid if possible.</li> <li>5. Clean motor, let cool, and reduce workload.</li> <li>6. Move machine closer to power supply; use shorter extension cord.</li> <li>7. Test/replace switch.</li> <li>8. Test/replace potentiometer.</li> <li>9. Inspect inverter/control box; replace if at fault.</li> <li>10. Replace motor.</li> </ol>

Symptom	Possible Cause	Possible Solution
Machine has vibration or noisy operation.	<ol style="list-style-type: none"> <li>1. Motor or component loose.</li> <li>2. Spindle loose, improperly installed, or damaged.</li> <li>3. Workpiece loose.</li> <li>4. Motor fan rubbing on fan cover.</li> <li>5. Spindle bearings at fault.</li> <li>6. Chuck or cutter at fault.</li> <li>7. Gearbox at fault.</li> <li>8. Machine incorrectly mounted to floor.</li> <li>9. Motor bearings at fault.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace damaged or missing bolts/nuts; retighten if loose.</li> <li>2. Remove and inspect spindle; clean and reinstall (<b>Page 37</b>).</li> <li>3. Use the correct holding fixture/reclamp workpiece.</li> <li>4. Fix/replace fan cover; replace loose/damaged fan.</li> <li>5. Test by rotating spindle; rotational grinding/loose shaft requires bearing replacement.</li> <li>6. Replace unbalanced chuck; replace/resharpen cutter; use correct feed rate.</li> <li>7. Rebuild gearbox; replace bad gears/bearings.</li> <li>8. Tighten mounting bolts; relocate/shim machine.</li> <li>9. Replace motor.</li> </ol>
Tool falls out or loose in spindle.	<ol style="list-style-type: none"> <li>1. Tool is not fully drawn up into spindle taper.</li> <li>2. Debris on tool or in spindle taper.</li> <li>3. Excessive feed pressure.</li> </ol>	<ol style="list-style-type: none"> <li>1. Tighten drawbar (<b>Page 37</b>).</li> <li>2. Clean tool and spindle taper, then re-install.</li> <li>3. Decrease feed pressure and allow chips to clear.</li> </ol>
Breaking tools or cutters.	<ol style="list-style-type: none"> <li>1. Spindle speed/feed rate is too fast.</li> <li>2. Excessive feed pressure.</li> <li>3. Improper cutting technique or type of cut for tool/machine.</li> <li>4. Cutting tool is too small.</li> <li>5. Cutting tool getting too hot.</li> <li>6. Spindle extended too far down at beginning of operation.</li> </ol>	<ol style="list-style-type: none"> <li>1. Reduce spindle speed (<b>Page 42</b>); reduce feed rate.</li> <li>2. Decrease feed pressure and allow chips to clear.</li> <li>3. Use right technique, tool or machine for job.</li> <li>4. Use larger cutting tool and slower feed rate.</li> <li>5. Use coolant or oil for appropriate application/reduce cutting speed.</li> <li>6. Fully retract spindle (this increases rigidity), and raise table (<b>Pages 34 &amp; 41</b>).</li> </ol>
Workpiece or tool vibrates or chatters during operation.	<ol style="list-style-type: none"> <li>1. Table locks not tight.</li> <li>2. Workpiece not secure.</li> <li>3. Spindle speed/feed rate is too fast.</li> <li>4. Spindle extended too far down at beginning of operation.</li> <li>5. Quill lock lever not tight.</li> <li>6. Gibs too loose in table (SB1116).</li> </ol>	<ol style="list-style-type: none"> <li>1. Tighten table locks (<b>Page 34</b>).</li> <li>2. Properly clamp workpiece on table or in vise.</li> <li>3. Reduce spindle speed (<b>Page 42</b>); reduce feed rate.</li> <li>4. Fully retract spindle (this increases rigidity), and raise table (<b>Pages 34 &amp; 41</b>).</li> <li>5. Tighten quill lock lever (<b>Page 41</b>).</li> <li>6. Tighten gibs (<b>Page 54</b>).</li> </ol>
Table is hard to move.	<ol style="list-style-type: none"> <li>1. Table locked.</li> <li>2. Chips loaded up on ways.</li> <li>3. Ways dry and need lubrication.</li> <li>4. Table limit stops interfering.</li> <li>5. Gibs too tight (SB1116).</li> </ol>	<ol style="list-style-type: none"> <li>1. Disengage table locks (<b>Page 34</b>).</li> <li>2. Frequently clean away chips that load up during operations.</li> <li>3. Lubricate ways.</li> <li>4. Adjust table limit stops out of the way (<b>Page 35</b>).</li> <li>5. Adjust gibs (<b>Page 54</b>).</li> </ol>

Symptom	Possible Cause	Possible Solution
Bad surface finish.	<ol style="list-style-type: none"> <li>1. Spindle speed/feed rate too fast.</li> <li>2. Dull or incorrect cutting tool/bit.</li> <li>3. Wrong rotation direction of cutting tool.</li> <li>4. Workpiece not secure.</li> <li>5. Spindle extended too far down at beginning of operation.</li> </ol>	<ol style="list-style-type: none"> <li>1. Reduce spindle speed (<b>Page 42</b>); reduce feed rate.</li> <li>2. Sharpen cutting tool or select one that better suits the operation.</li> <li>3. Reverse cutting tool rotation.</li> <li>4. Properly clamp workpiece on table or in vise.</li> <li>5. Fully retract spindle (this increases rigidity), and raise table (<b>Pages 34 &amp; 41</b>).</li> </ol>
Cutting/drilling results not square.	<ol style="list-style-type: none"> <li>1. Table and spindle not at 90° to each other.</li> <li>2. Table travel is inconsistent.</li> </ol>	<ol style="list-style-type: none"> <li>1. Tram spindle (<b>Page 56</b>).</li> <li>2. Adjust gibs (SB1116) (<b>Page 54</b>).</li> </ol>
Spindle overheats.	<ol style="list-style-type: none"> <li>1. Machine operated at high speeds for extended period.</li> </ol>	<ol style="list-style-type: none"> <li>1. Allow machine to cool; avoid operating at high speeds for extended amount of time.</li> </ol>
Lack of power at spindle.	<ol style="list-style-type: none"> <li>1. Wrong voltage.</li> </ol>	<ol style="list-style-type: none"> <li>1. Ensure correct voltage (<b>Page 16</b>).</li> </ol>
Spindle does not fully retract.	<ol style="list-style-type: none"> <li>1. Poorly adjusted return spring.</li> <li>2. Debris on spindle/quill rack.</li> <li>3. Worn return spring.</li> </ol>	<ol style="list-style-type: none"> <li>1. Increase return spring tension (<b>Page 58</b>).</li> <li>2. Clean spindle/quill rack.</li> <li>3. Replace return spring.</li> </ol>
Drill bit/cutter drifts	<ol style="list-style-type: none"> <li>1. Dull/incorrectly sharpened drill bit.</li> <li>2. Tool/bit/chuck incorrectly installed.</li> <li>3. Bit being ran in wrong direction.</li> </ol>	<ol style="list-style-type: none"> <li>1. Correctly sharpen drill bit.</li> <li>2. Correctly re-install tool/bit/chuck.</li> <li>3. Reverse direction of spindle.</li> </ol>
Drill bit/cutter stuck in workpiece.	<ol style="list-style-type: none"> <li>1. Workpiece squeezing drill bit, or feed rate too fast.</li> <li>2. Spindle speed/feed rate too slow.</li> </ol>	<ol style="list-style-type: none"> <li>1. Properly clamp workpiece on table or in vise; decrease feed rate.</li> <li>2. Increase spindle speed; increase feed rate.</li> </ol>
Workpiece thrown from table.	<ol style="list-style-type: none"> <li>1. Workpiece not secure; tool/bit too large for feed speed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Properly clamp workpiece on table or in vise.</li> </ol>
Excessive runout or wobbling in chuck/drill bit.	<ol style="list-style-type: none"> <li>1. Debris between chuck-to-spindle mating surface.</li> <li>2. Tool/bit bent.</li> <li>3. Tool/bit installed incorrectly.</li> <li>4. Spindle bearings worn.</li> </ol>	<ol style="list-style-type: none"> <li>1. Remove chuck, clean, deburr tapered chuck and spindle mating surfaces, reassemble.</li> <li>2. Replace with straight tool/bit.</li> <li>3. Correctly re-install tool/bit/chuck.</li> <li>4. Replace spindle bearings.</li> </ol>
Backside of workpiece splinters.	<ol style="list-style-type: none"> <li>1. Scrap board not installed between table and workpiece.</li> </ol>	<ol style="list-style-type: none"> <li>1. Install scrap board between table and workpiece.</li> </ol>

## Power Feed

Power feed does not move table or is slipping.	<ol style="list-style-type: none"> <li>1. Table locked.</li> <li>2. Direction lever not engaged.</li> <li>3. Gears not meshing or teeth missing.</li> <li>4. Motor shaft and gear shaft not engaged.</li> </ol>	<ol style="list-style-type: none"> <li>1. Disengage table locks (<b>Page 34</b>).</li> <li>2. Select speed, engage direction lever (<b>Page 35</b>).</li> <li>3. Check gears and adjust/replace.</li> <li>4. Replace clutch.</li> </ol>
Operates at high speed only or is inconsistent.	<ol style="list-style-type: none"> <li>1. Rapid traverse button at fault.</li> <li>2. Wiring harness unplugged from circuit board.</li> </ol>	<ol style="list-style-type: none"> <li>1. Inspect/replace rapid traverse button.</li> <li>2. Reconnect wiring harness.</li> </ol>

# 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.southbendtools.com](http://www.southbendtools.com).

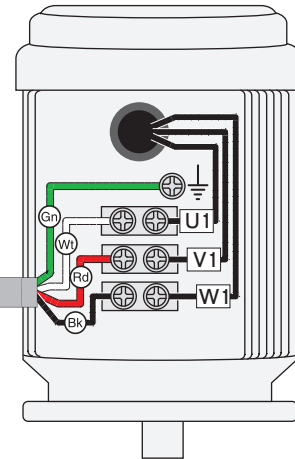


# Wiring Diagram

**⚠ WARNING!**

**SHOCK HAZARD!**  
Disconnect power before working on wiring.

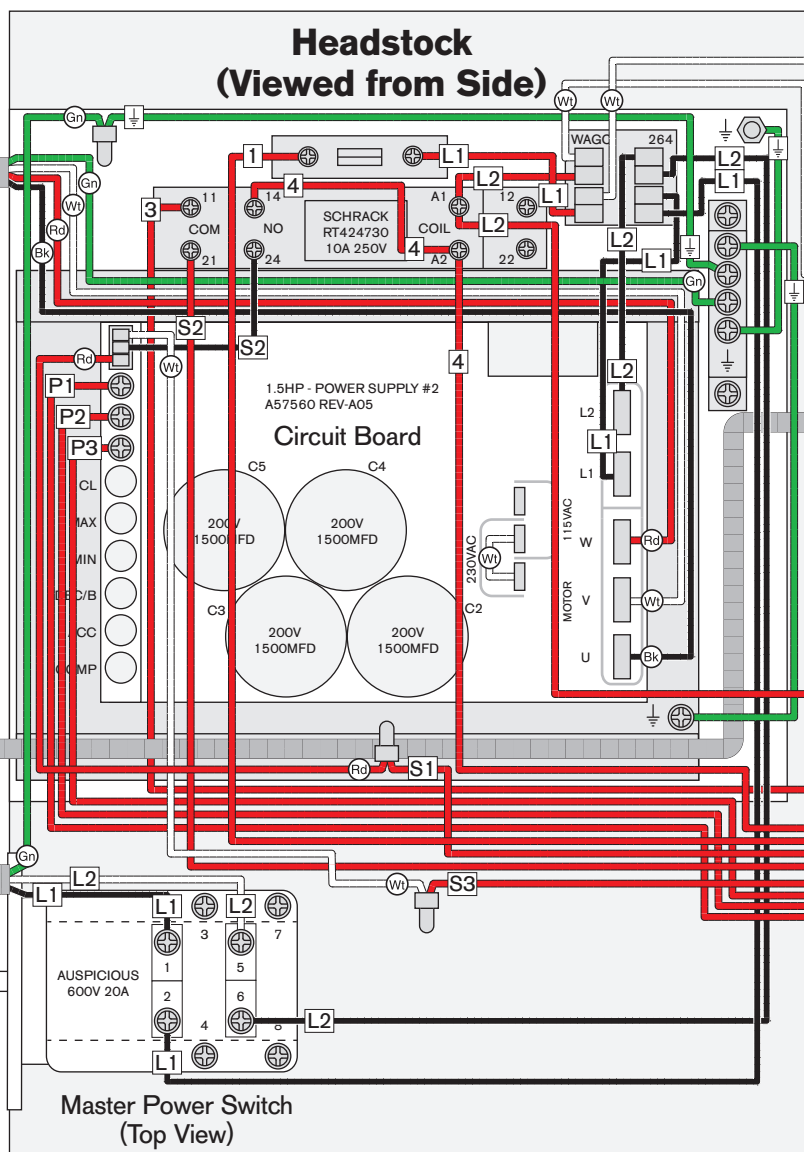
## 220V 3-Ph Motor



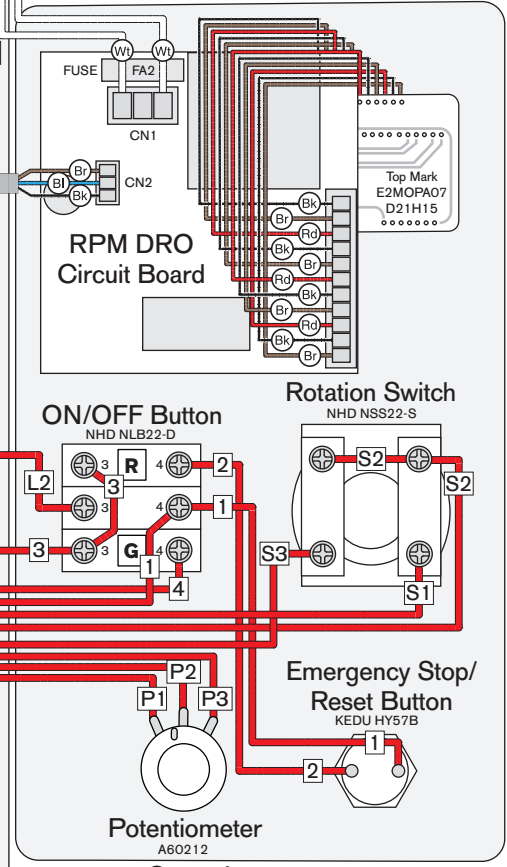
## DRO Sensor

DRH  
DA-1805NO-3M  
10-30VDC

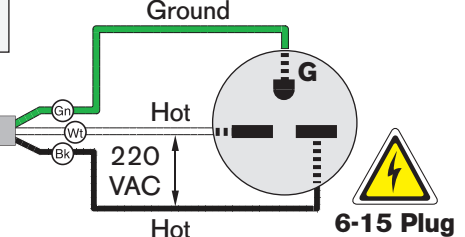
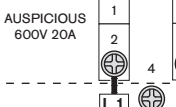
## Headstock (Viewed from Side)



## Back of Control Panel



## Master Power Switch (Top View)



# Electrical Component Pictures

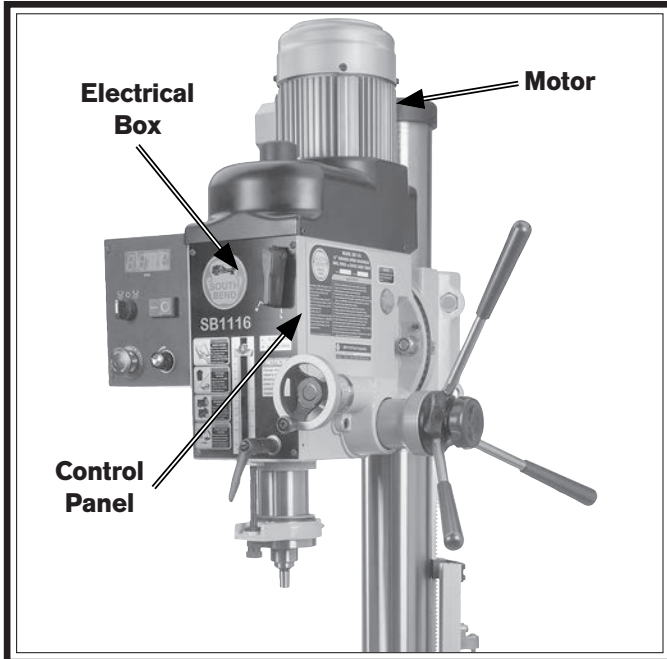


Figure 108. Electrical component wiring overview.

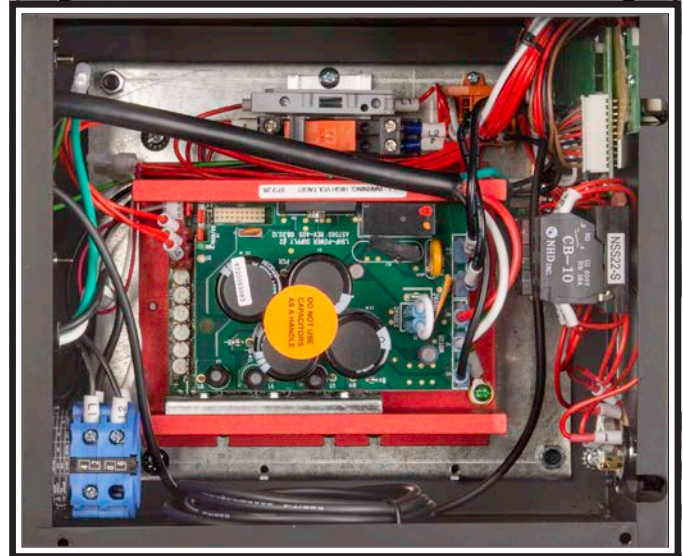


Figure 110. Electrical box wiring.

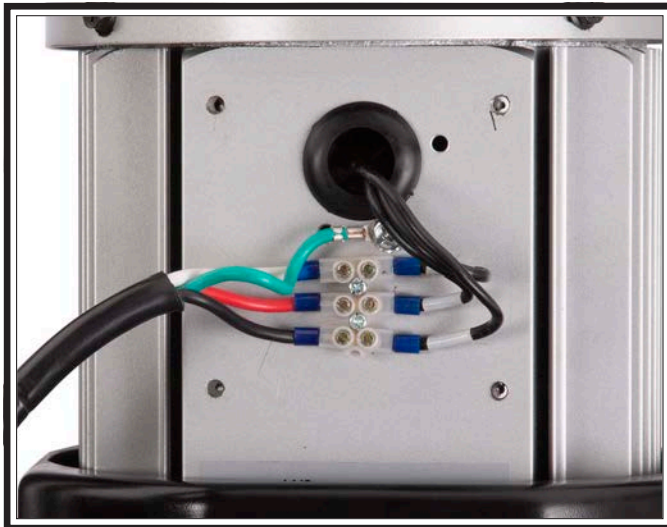


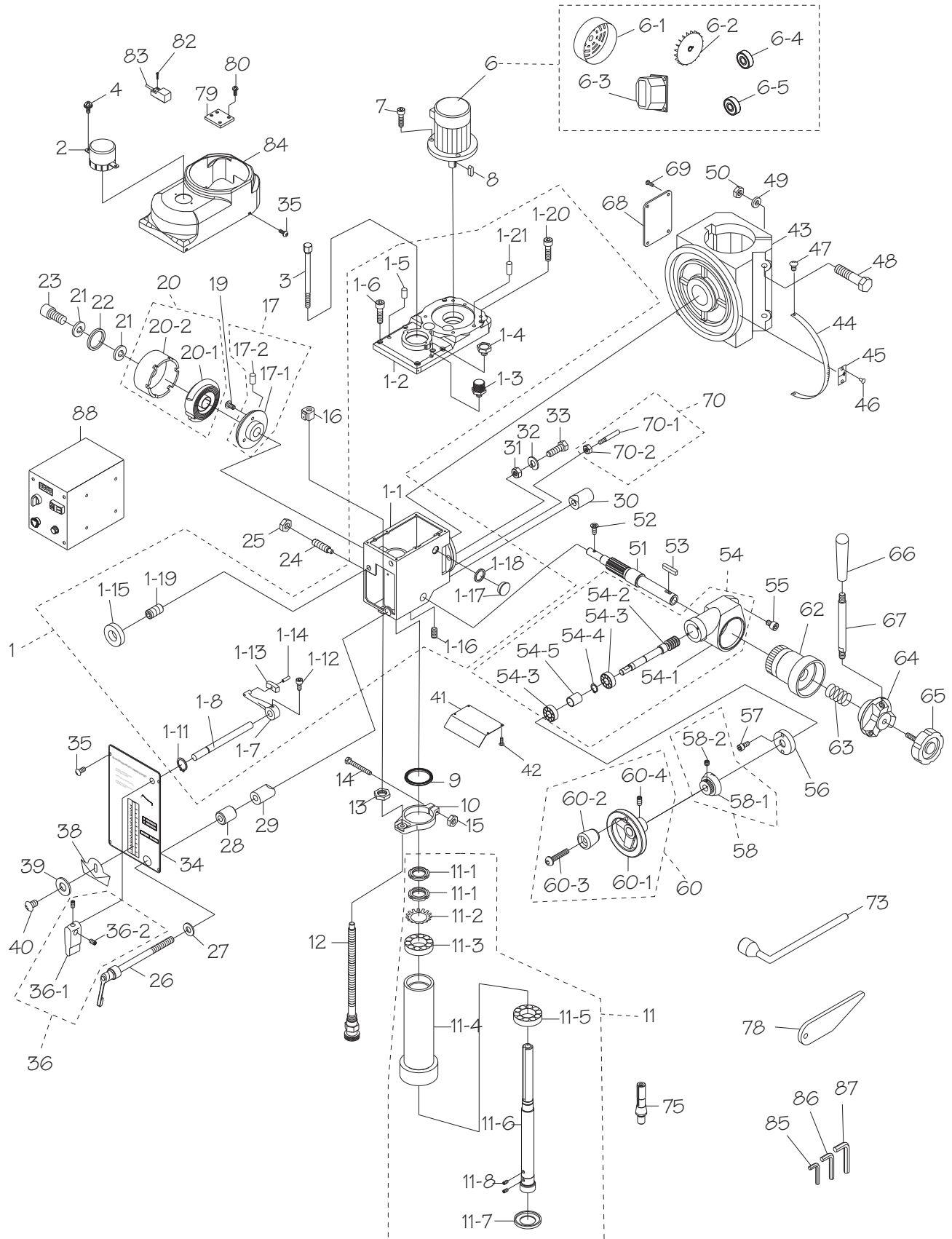
Figure 109. Motor wiring.



Figure 111. Control panel wiring.



# Headstock



# Headstock Parts List

REF	PART #	DESCRIPTION
1	PSB1115001	HEADSTOCK ASSEMBLY
1-1	PSB1115001-1	HEADSTOCK CASTING
1-2	PSB1115001-2	HEADSTOCK COVER
1-3	PSB1115001-3	VENT PLUG 1/8" NPT
1-4	PSB1115001-4	OIL FILL PLUG 3/8" NPT
1-5	PSB1115001-5	TAPER PIN 10.3 X 30
1-6	PSB1115001-6	CAP SCREW 5/16-18 X 1-1/4
1-7	PSB1115001-7	SPEED RANGE SHIFT LEVER
1-8	PSB1115001-8	SPEED RANGE SHIFT SHAFT
1-11	PSB1115001-11	EXT RETAINING RING 12MM
1-12	PSB1115001-12	CAP SCREW 1/4-20 X 1/2
1-13	PSB1115001-13	SPEED RANGE SHIFT FORK
1-14	PSB1115001-14	DOWEL PIN 4 X 16
1-15	PSB1115001-15	OIL SEAL 12 X 22 X 7
1-16	PSB1115001-16	OIL DRAIN PLUG 1/4" NPT
1-17	PSB1115001-17	OIL SIGHT GLASS 30MM
1-18	PSB1115001-18	O-RING 28 X 2.6
1-19	PSB1115001-19	OIL SEAL COVER 12MM
1-20	PSB1115001-20	CAP SCREW 5/16-18 X 2
1-21	PSB1115001-21	TAPER PIN 10.3 X 50
2	PSB1115002	SPINDLE COVER
3	PSB1115003	DRAWBAR MT#3 3/8-16 (SB1115)
3	PSB1116003	DRAWBAR R8 7/16-20 X 16-5/16 (SB1116)
4	PSB1115004	PHLP HD SCR M4-.7X10
6	PSB1115006	MOTOR 1HP 220V/440V 3-PH
6-1	PSB1115006-1	MOTOR FAN COVER
6-2	PSB1115006-2	MOTOR FAN
6-3	PSB1115006-10	MOTOR JUNCTION BOX
6-4	PSB1115006-3	BALL BEARING 6203ZZ (REAR)
6-5	PSB1115006-4	BALL BEARING 6204ZZ (FRONT)
7	PSB1115007	CAP SCREW 3/8-16 X 1
8	PSB1115008	KEY 6 X 6 X 30 RE
9	PSB1115009	QUILL SEAL (RUBBER)
10	PSB1115010	DEPTH ROD MOUNT
11	PSB1115011	PINION ASSEMBLY MT#3 (SB1115)
11	PSB1116011	PINION ASSEMBLY R8 (SB1116)
11-1	PSB1115011-1	SPANNER NUT M30-1.5
11-2	PSB1115011-2	EXT TOOTH WASHER 30MM
11-3	PSB1115011-3	TAPERED ROLLER BEARING E30206J
11-4	PSB1115011-4	QUILL MT#3 (SB1115)
11-4	PSB1116011-4	QUILL R8 (SB1116)
11-5	PSB1115011-5	TAPERED ROLLER BEARING 30207J
11-6	PSB1115011-6	SPINDLE MT#3 (SB1115)
11-6	PSB1116011-6	SPINDLE R8 (SB1116)
11-7	PSB1115011-7	SPINDLE END CAP
11-8	PSB1115011-8	SET SCREW 8-32 X 1/4
12	PSB1115012	QUILL DEPTH LEADSCREW ASSY 1/2-10 X 8.5
13	PSB1115013	QUILL DEPTH SUPPORT NUT 1/2-10
14	PSB1115014	HEX BOLT 1/4-20 X 2
15	PSB1115015	HEX NUT 1/4-20

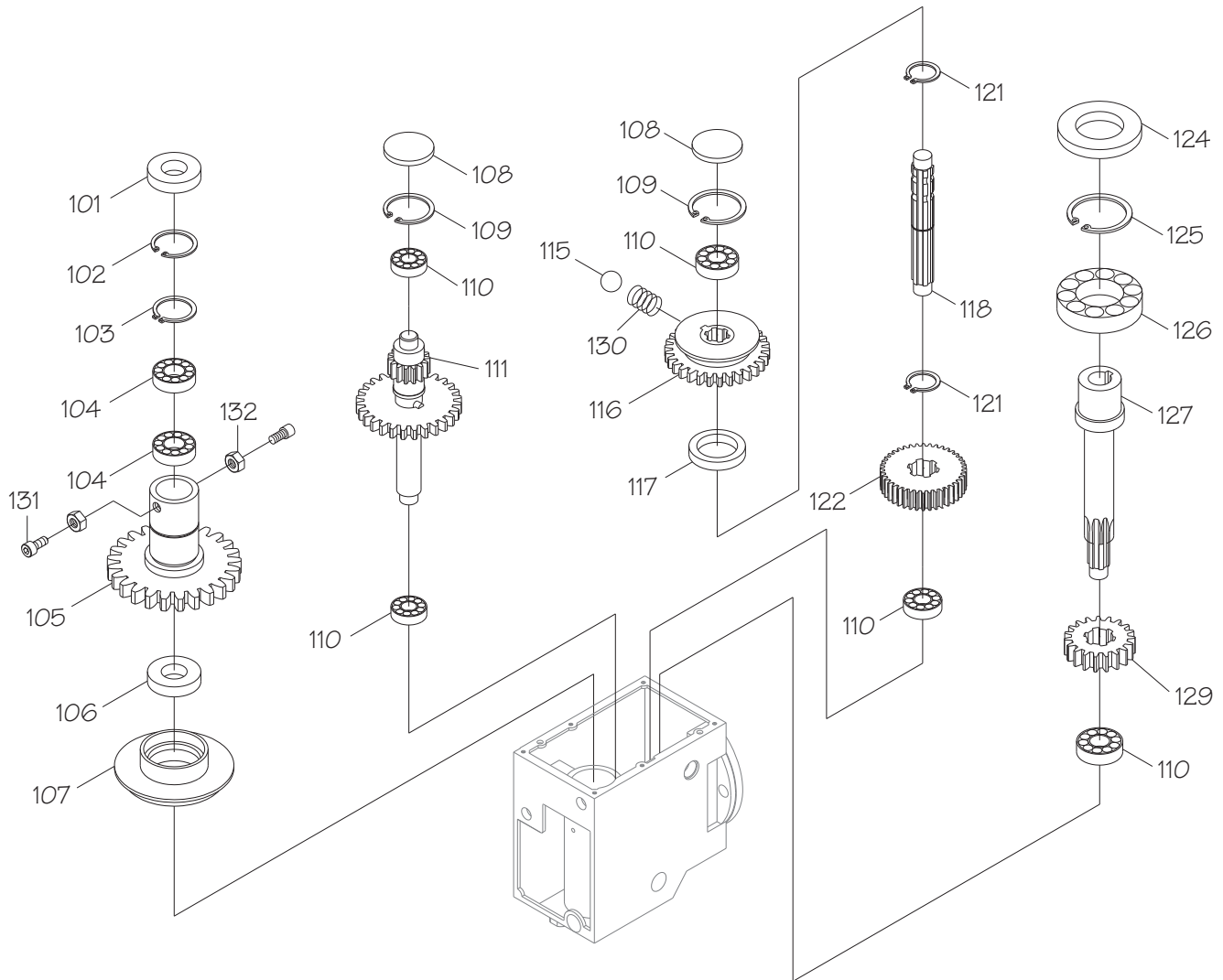
REF	PART #	DESCRIPTION
16	PSB1115016	QUILL DEPTH STOP BLOCK
17	PSB1115017	SPRING BASE ASSEMBLY
17-1	PSB1115017-1	SPRING BASE
17-2	PSB1115017-2	DOWEL PIN 3 X 12
19	PSB1115019	PHLP HD SCR 10-24 X 3/4
20	PSB1115020	RETURN SPRING ASSEMBLY
20-1	PSB1115020-1	FLAT COILED SPRING
20-2	PSB1115020-2	RETURN SPRING COVER
21	PSB1115021	LOCK WASHER 1/4
22	PSB1115022	FENDER WASHER 1/4
23	PSB1115023	CAP SCREW 1/4-20 X 5/8
24	PSB1115024	ALIGNMENT PIN 3/8-16 X 3/8
25	PSB1115025	HEX NUT 3/8-16
26	PSB1115026	ADJUSTABLE HANDLE 9"L, 1/2-13 X 2-3/4
27	PSB1115027	FLAT WASHER 1/2
28	PSB1115028	LOCK PLUNGER SLEEVE
29	PSB1115029	OUTSIDE LOCK PLUNGER
30	PSB1115030	INSIDE LOCK PLUNGER
31	PSB1115031	LOCK NUT 5/8-11
32	PSB1115032	DOCK WASHER 5/8 X 1-9/16 X 1/8
33	PSB1115033	HEX BOLT 5/8-11 X 5-1/2
34	PSB1115034	HEADSTOCK FACEPLATE
35	PSB1115035	BUTTON HD CAP SCR 10-24 X 3/8
36	PSB1115036	SPEED RANGE LEVER ASSEMBLY
36-1	PSB1115036-1	SPEED RANGE LEVER
36-2	PSB1115036-2	SET SCREW M5-.8 X 16 CONE-PT
38	PSB1115038	DEPTH INDICATOR
39	PSB1115039	FLAT WASHER 1/8
40	PSB1115040	PHLP HD SCR 1/8 X 1/4
41	PSB1115041	DUST SHIELD
42	PSB1115042	PHLP HD SCR 10-24 X 3/8
43	PSB1115043	HEAD ADAPTER
44	PSB1115044	HEAD TILT SCALE
45	PSB1115045	TILT SCALE INDICATOR
46	PSB1115046	RIVET 2 X 4MM, STEEL
47	PSB1115047	PHLP HD SCR 10-24 X 3/8
48	PSB1115048	HEX BOLT 5/8-11 X 5-1/2
49	PSB1115049	DOCK WASHER 5/8 X 1-9/16 X 1/8
50	PSB1115050	HEX NUT 5/8-11
51	PSB1115051	PINION SHAFT
52	PSB1115052	FLAT HD SCR 10-24 X 1/2
53	PSB1115053	KEY 7X7X20 RE
54	PSB1115054	WORM SHAFT ASSEMBLY
54-1	PSB1115054-1	WORM SHAFT HOUSING
54-2	PSB1115054-2	WORM SHAFT
54-3	PSB1115054-3	BALL BEARING 6202ZZ
54-4	PSB1115054-4	EXT RETAINING RING 15MM
54-5	PSB1115054-5	BEARING SPACER 34 X 27.5 X 30
55	PSB1115055	CAP SCREW 5/16-18 X 3/4
56	PSB1115056	WORM SHAFT END COVER

# Headstock Parts List (Continued)

REF	PART #	DESCRIPTION
57	PSB1115057	CAP SCREW 10-24 X 1/2
58	PSB1115058	FINE DOWNFEED DIAL ASSEMBLY
58-1	PSB1115058-1	FINE DOWNFEED GRADUATED DIAL
58-2	PSB1115058-2	SET SCREW 1/4-20 X 5/16
60	PSB1115060	FINE DOWNFEED HANDWHEEL ASSEMBLY
60-1	PSB1115060-1	HANDWHEEL TYPE-24 4D X 1/2B X 5-16-18
60-2	PSB1115060-2	HOLLOW HANDLE 5/16, 1 X 1 ALUMINUM
60-3	PSB1115060-3	SHOULDER SCREW 5/16-18 X 1/4, 3/8 X 1
60-4	PSB1115060-4	SET SCREW 5/16-18 X 5/16
62	PSB1115062	WORM GEAR
63	PSB1115063	COMPRESSION SPRING 2.4 X 17.5 X 25
64	PSB1115064	COARSE DOWNFEED LEVER HUB
65	PSB1115065	KNOB BOLT 3/8-16 X 1 5/8, 6-LOBE
66	PSB1115066	FIXED HANDLE 1/2-13, 1-1/4 X 4-3/8
67	PSB1115067	SHAFT 1/2-13 X 3/4, 6-3/4L
68	PSB1115068	HEADSTOCK ADAPTER COVER PLATE
69	PSB1115069	PHLP HD SCR 1/4-20 X 3/8

REF	PART #	DESCRIPTION
70	PSB1115070	INDEX PIN ASSEMBLY
70-1	PSB1115070-1	INDEX PIN M6-1 X 18, 6.5 X 34
70-2	PSB1115070-2	HEX NUT 6-1
73	PSB1115073	L-WRENCH 13MM X 23MM
75	PSB1115075	CHUCK ARBOR MT#3 X JT6 (SB1115)
75	PSB1116075	CHUCK ARBOR R8 X JT6 (SB1116)
78	PSB1115078	DRIFT KEY (SB1115)
79	PSB1115079	RPM SENSOR BRACKET
80	PSB1115080	PHLP HD SCR M3-.5 X 5
82	PSB1115082	PHLP HD SCR M3-.5 X 20
83	PSB1115083	RPM SENSOR DRH DA-1805NO-13 10-30VDC
84	PSB1115084	HEADSTOCK COVER
85	PSB1115085	HEX WRENCH 3MM
86	PSB1115086	HEX WRENCH 4MM
87	PSB1115087	HEX WRENCH 5MM
88	PSB1115088	CONTROL PANEL BOX

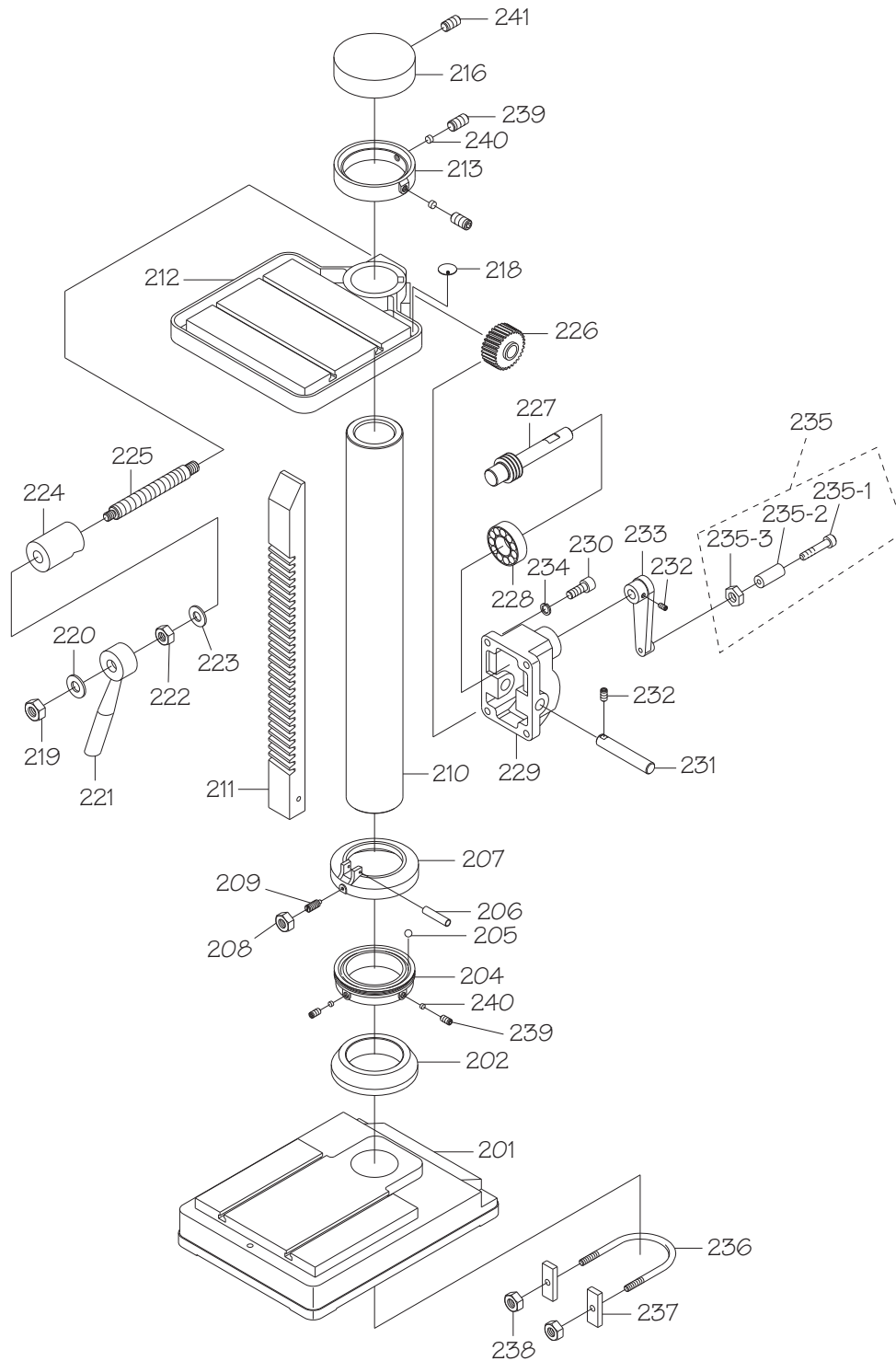
# Gearbox



REF	PART #	DESCRIPTION
101	PSB1115101	OIL SEAL 40 X 68 X 8
102	PSB1115102	INT RETAINING RING 68MM
103	PSB1115103	EXT RETAINING RING 40MM
104	PSB1115104	BALL BEARING 6008ZZ
105	PSB1115105	GEAR 53T
106	PSB1115106	OIL SEAL 35 X 45 X 8
107	PSB1115107	OIL SEAL RING
108	PSB1115108	BEARING COVER 35MM
109	PSB1115109	INT RETAINING RING 35MM
110	PSB1115110	BALL BEARING 6202ZZ
111	PSB1115111	GEAR SHAFT ASSEMBLY 15T/41T
115	PSB1115115	STEEL BALL 5/16
116	PSB1115116	COMBO GEAR 16T/42T

REF	PART #	DESCRIPTION
117	PSB1115117	BUSHING
118	PSB1115118	GEAR SHAFT
121	PSB1115121	EXT RETAINING RING 20MM
122	PSB1115122	GEAR 31T
124	PSB1115124	OIL SEAL 35 X 62 X 8
125	PSB1115125	INT RETAINING RING 62MM
126	PSB1115126	BALL BEARING 6007ZZ
127	PSB1115127	GEAR SHAFT
129	PSB1115129	GEAR 28T
130	PSB1115130	COMPRESSION SPRING 0.8 X 7 X 15
131	PSB1115131	CAP SCREW M6-1 X 8
132	PSB1115132	HEX NUT M6-1

# SB1115 Column & Table





# SB1115 Column & Table Parts List

REF	PART #	DESCRIPTION
201	PSB1115201	BASE
202	PSB1115202	COLUMN COLLAR (LOWER)
204	PSB1115204	RACK RING BASE
205	PSB1115205	STEEL BALL 10MM
206	PSB1115206	ROLL PIN 5 X 3/8
207	PSB1115207	RACK RING
208	PSB1115208	HEX NUT 5/16-18
209	PSB1115209	SET SCREW 5/16-18 X 13/16 DOG-PT
210	PSB1115210	COLUMN
211	PSB1115211	RACK
212	PSB1115212	TABLE
213	PSB1115213	COLUMN COLLAR (UPPER)
216	PSB1115216	COLUMN CAP
218	PSB1115218	SCREEN
219	PSB1115219	HEX NUT 3/8-16
220	PSB1115220	FLAT WASHER 3/8
221	PSB1115221	Z-AXIS LOCK HANDLE 16D X 45L
222	PSB1115222	HEX NUT 5/8-11
223	PSB1115223	FLAT WASHER 5/8
224	PSB1115224	LOCK PLUNGER Z-AXIS

REF	PART #	DESCRIPTION
225	PSB1115225	Z-AXIS LOCK SHAFT 1/2-13 X 5/8, 4-3/8L
226	PSB1115226	WORM GEAR 33T
227	PSB1115227	WORM SHAFT
228	PSB1115228	THRUST BEARING 51103
229	PSB1115229	Z-AXIS CRANK BRACKET
230	PSB1115230	CAP SCREW 5/16-18 X 1
231	PSB1115231	SHAFT
232	PSB1115232	SET SCREW 1/4 X 3/8
233	PSB1115233	Z-AXIS CRANK
234	PSB1115234	LOCK WASHER 5/16
235	PSB1115235	Z-AXIS CRANK HANDLE
235-1	PSB1115235-1	CAP SCREW 3/8-16 X 3-1/2
235-2	PSB1115235-2	HOLLOW HANDLE 3/8, 1D X 2-3/4L (ALUMINUM)
235-3	PSB1115235-3	HEX NUT 3/8-16
236	PSB1115236	U-BOLT 1/2-13
237	PSB1115237	U-BOLT RETAINING BLOCK
238	PSB1115238	HEX NUT 1/2-13
239	PSB1115239	SET SCREW 1/2-13 X 5/8
240	PSB1115240	BUSHING (BRASS)
241	PSB1115241	SET SCREW 5/16-18 X 5/16

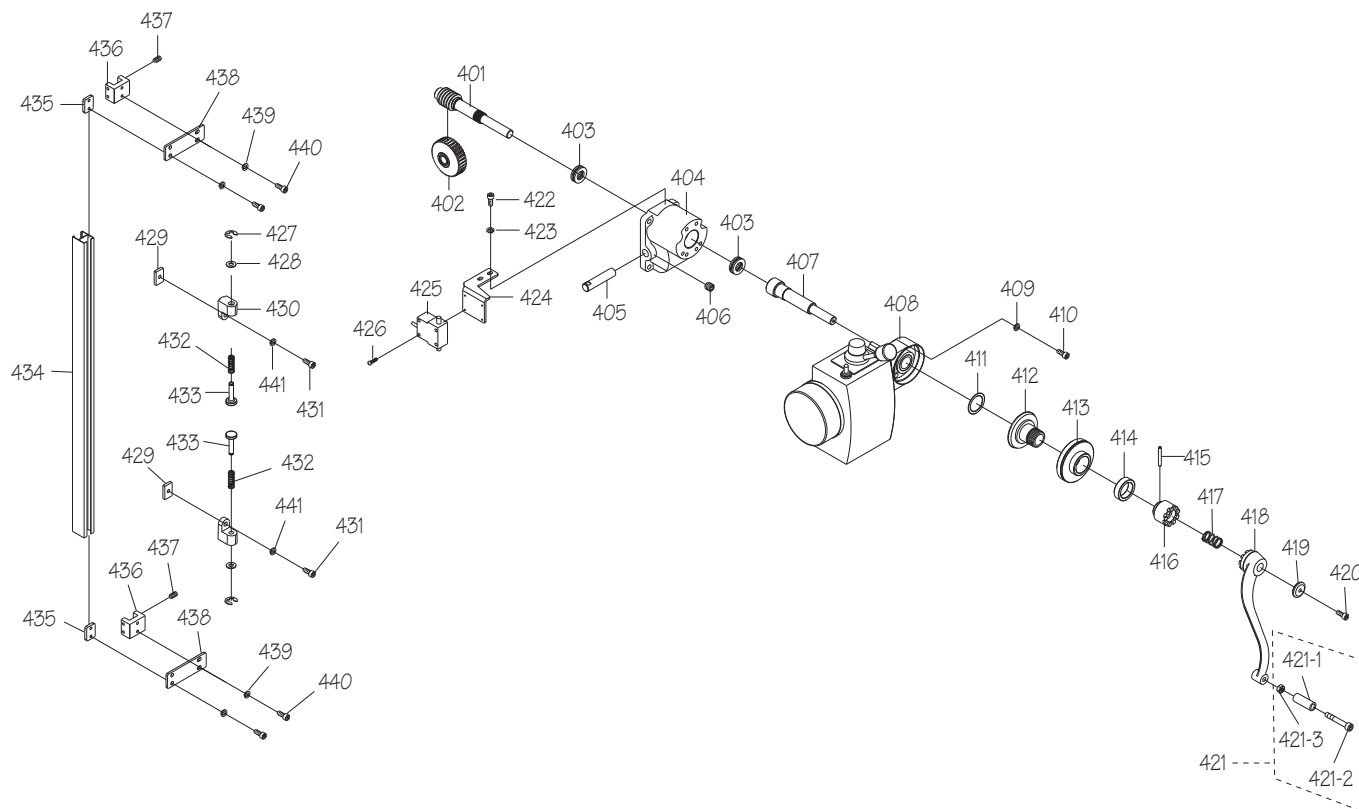


# SB1116 Column & Table Parts List

REF	PART #	DESCRIPTION
301	PSB1116301	TABLE
302	PSB1116302	SLIDE NUT 1/4-20
303	PSB1116303	LIMIT STOP
304	PSB1116304	CAP SCREW 1/4-20 X 1/2
305	PSB1116305	BALL OILER 1/4 PRESS-IN
306	PSB1116306	Y-AXIS HANDWHEEL ASSEMBLY
306-1	PSB1116306-1	HANDWHEEL TYPE-22 120D X 17B-S X 3/8-16
306-2	PSB1116306-2	SET SCREW M6-1 X 8
306-3	PSB1116306-3	HEX NUT 3/8-16
306-4	PSB1116306-4	HOLLOW HANDLE 3/8, 1DX 2-3/4L ALUMINUM
306-5	PSB1116306-5	CAP SCREW 3/8-16 X 3-1/2
307	PSB1116307	X-AXIS HANDWHEEL ASSEMBLY
307-1	PSB1116307-1	HANDWHEEL TYPE-22 120D X 17B-S X M10-1.5
307-2	PSB1116307-2	SET SCREW 1/4-20 x 3/8
307-3	PSB1116307-3	FOLDING HANDLE M10-1.5 X 12, 23 X 90
309	PSB1116309	X-AXIS LEADSCREW CLUTCH (LEFT)
310	PSB1116310	ROLL PIN 5 X 38
311	PSB1116311	X-AXIS LEADSCREW BRACKET (LEFT)
312	PSB1116312	CAP SCREW 5/16-18 X 1
313	PSB1116313	X-AXIS LEADSCREW NUT 23-1/2 X 10
314	PSB1116314	CAP SCREW M5-.8 X 16
316	PSB1116316	X-AXIS LEADSCREW ASSEMBLY
316-1	PSB1116316-1	X-AXIS LEADSCREW 23-1/2 X 10
316-2	PSB1116316-2	THRUST BEARING 51103
316-3	PSB1116316-3	X-AXIS LEADSCREW BRACKET (RIGHT)
316-4	PSB1116316-4	GRADUATED COLLAR (INCH)
316-5	PSB1116316-5	X-AXIS LEADSCREW CLUTCH (RIGHT)
316-6	PSB1116316-6	ROLL PIN 5 X 38
317	PSB1116317	KNURLED THUMB SCREW 1/4-20 X 1/2, 1/2D
318	PSB1116318	DIAL INDICATOR
319	PSB1116319	RIVET 2 X 4MM, STEEL
320	PSB1116320	TABLE BASE
321	PSB1116321	GIB (X-AXIS)
322	PSB1116322	GIB (Y-AXIS)
323	PSB1116323	LIMIT STOP BRACKET
324	PSB1116324	CAP SCREW 5/16-18 X 1/2
325	PSB1116325	GIB BOLT 5/16-18 X 1
326	PSB1116326	BUSHING
327	PSB1116327	ADJUSTABLE HANDLE 2L, 5/16-18 X 1-3/8
328	PSB1116328	T-KNOB 5/16-18 X 1-5/8
329	PSB1116329	CAP SCREW 5/16-18 X 1

REF	PART #	DESCRIPTION
330	PSB1116330	CAP SCREW 5/16-18 X 2-1/4
331	PSB1116331	Y-AXIS LEADSCREW NUT 23-1/2 X 10
332	PSB1116332	Y-AXIS LEADSCREW ASSEMBLY
332-1	PSB1116332-1	Y-AXIS LEADSCREW 23-1/2 X 10
332-2	PSB1116332-2	THRUST BEARING 51103
332-3	PSB1116332-3	Y-AXIS LEADSCREW BRACKET
332-4	PSB1116332-4	GRADUATED COLLAR (INCH)
332-5	PSB1116332-5	Y-AXIS LEADSCREW CLUTCH
332-6	PSB1116332-6	ROLL PIN 5 X 38
333	PSB1116333	COLUMN CAP
334	PSB1116334	SET SCREW 5/16-18 X 5/16
335	PSB1116335	COLUMN COLLAR (UPPER)
336	PSB1116336	SET SCREW 1/2-13 X 5/8
338	PSB1116338	KNEE
339	PSB1116339	COLUMN
340	PSB1116340	RACK
341	PSB1116341	RACK RING
342	PSB1116342	ROLL PIN 5 X 38
343	PSB1116343	SET SCREW 5/16-18 X 13/16 DOG-PT
344	PSB1116344	HEX NUT 5/16-18
345	PSB1116345	STEEL BALL 10MM
346	PSB1116346	RACK RING BASE
347	PSB1116347	SET SCREW 1/2-13 X 5/8
348	PSB1116348	COLUMN COLLAR (LOWER)
349	PSB1116349	BASE
350	PSB1116350	U-BOLT 1/2-13
351	PSB1116351	U-BOLT RETAINING BLOCK
352	PSB1116352	HEX NUT 1/2-13
353	PSB1116353	HEX NUT 3/8-16
354	PSB1116354	FLAT WASHER 3/8
355	PSB1116355	Z-AXIS LOCK HANDLE 16DX 45L
356	PSB1116356	HEX NUT 5/8-11
357	PSB1116357	FLAT WASHER 5/8
358	PSB1116358	LOCK PLUNGER (Z-AXIS)
359	PSB1116359	Z-AXIS LOCK SHAFT 1/2-13 X 5/8, 4-3/8L
369	PSB1116369	LOCK WASHER 5/16
370	PSB1116370	DRAIN PLUG 1/4 NPT
371	PSB1116371	BUSHING (BRASS)
372	PSB1116372	POWER FEED UNIT ALIGN AL-500D
373	PSB1116373	LIMIT SWITCH ALIGN DC2
374	PSB1116374	X-AXIS LEADSCREW GEAR 56T

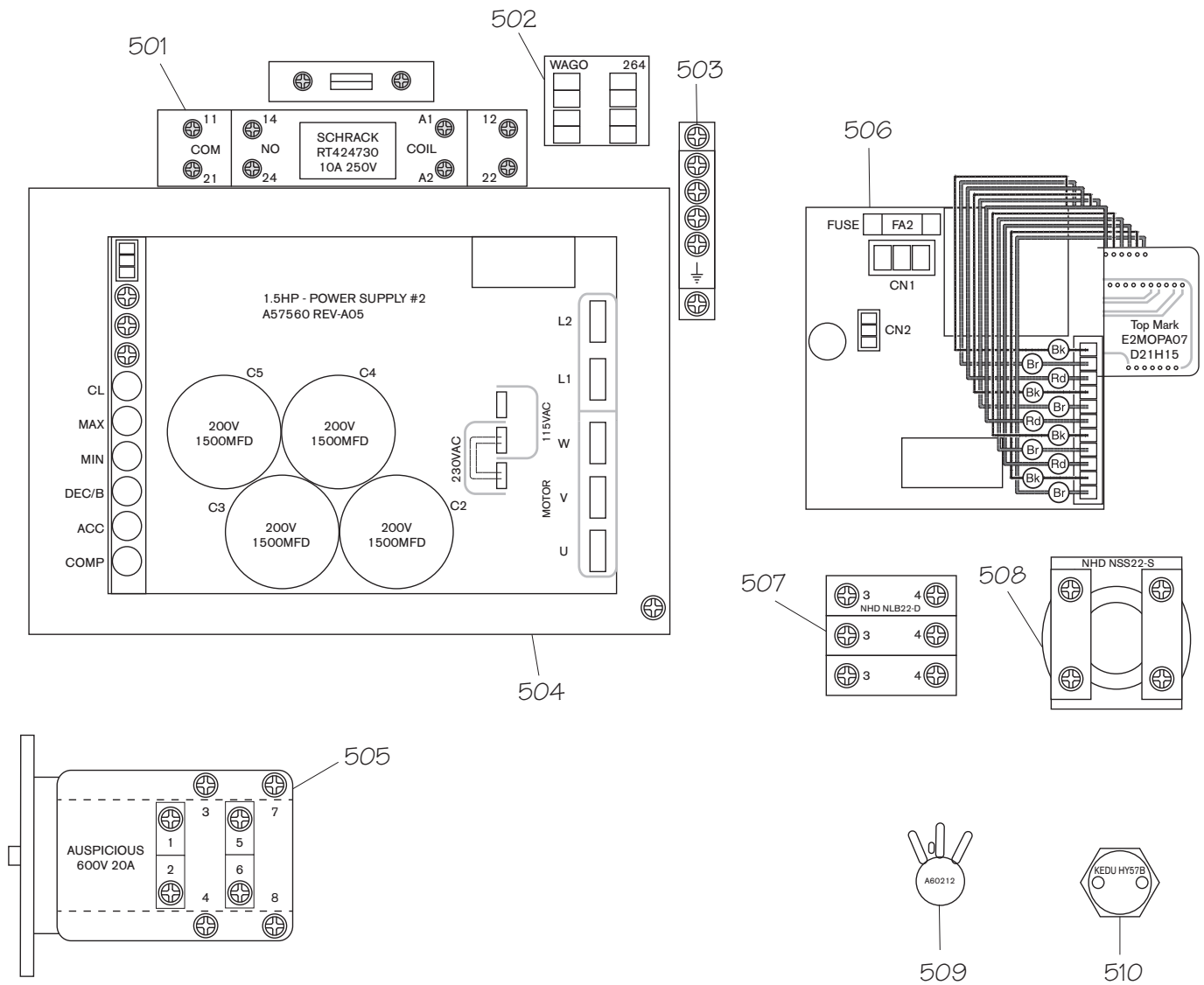
# SB1116 Z-Axis Power Feed



REF	PART #	DESCRIPTION
401	PSB1116401	WORM SHAFT
402	PSB1116402	WORM GEAR 33T
403	PSB1116403	THRUST BEARING 51104
404	PSB1116404	Z-AXIS CRANK BRACKET
405	PSB1116405	SHAFT
406	PSB1116406	SET SCREW M6-1 X 10
407	PSB1116407	Z-AXIS POWER FEED SHAFT
408	PSB1116408	Z-AXIS POWER FEED ASSY ALIGN AL-500D
409	PSB1116409	LOCK WASHER 8MM
410	PSB1116410	CAP SCREW M8-1.25 X 35
411	PSB1116411	SPACER
412	PSB1116412	BEVEL GEAR
413	PSB1116413	BEVEL GEAR COVER
414	PSB1116414	KNURLED COLLAR
415	PSB1116415	ROLL PIN 5 X 30
416	PSB1116416	DETENT COLLAR
417	PSB1116417	COMPRESSION SPRING 1.5 X 10 X 37
418	PSB1116418	Z-AXIS CRANK
419	PSB1116419	BEVELED WASHER 6 X 30 X 5
420	PSB1116420	CAP SCREW M6-1 X 20
421	PSB1116421	Z-AXIS CRANK HANDLE ASSEMBLY
421-1	PSB1116421-1	HOLLOW HANDLE 3/8, 1DX 2-3/4L (ALUMINUM)

REF	PART #	DESCRIPTION
421-2	PSB1116421-2	CAP SCREW 3/8-16 X 3-1/2
421-3	PSB1116421-3	HEX NUT 3/8-16
422	PSB1116422	CAP SCREW M6-1 X 15
423	PSB1116423	LOCK WASHER 6MM
424	PSB1116424	Z-AXIS LIMIT SWITCH BRACKET
425	PSB1116425	LIMIT SWITCH TIGER HIGHLY VS10NO21C
426	PSB1116426	PHLP HD SCR M3-.5 X 20
427	PSB1116427	E-CLIP 6MM
428	PSB1116428	FLAT WASHER 8MM
429	PSB1116429	LIMIT STOP CLAMP PLATE
430	PSB1116430	Z-AXIS LIMIT STOP BLOCK
431	PSB1116431	CAP SCREW M8-1.25 X 15
432	PSB1116432	COMPRESSION SPRING 1 X 11 X 34
433	PSB1116433	LIMIT STOP PLUNGER
434	PSB1116434	GUIDE SHAFT
435	PSB1116435	LIMIT STOP ASSEMBLY CLAMP PLATE
436	PSB1116436	LIMIT STOP ASSEMBLY MOUNT BLOCK
437	PSB1116437	SET SCREW M6-1 X 10
438	PSB1116438	LIMIT STOP ASSEMBLY MOUNT BRACKET
439	PSB1116439	CAP SCREW M6-1 X 15
440	PSB1116440	LOCK WASHER 6MM
441	PSB1116441	LOCK WASHER 8MM

# Electrical Components



REF	PART #	DESCRIPTION
501	PSB1115501	RELAY RT424730 10A 250V
502	PSB1115502	WIRE JUNCTION TERMINAL
503	PSB1115503	GROUND TERMINAL 4P
504	PSB1115504	CIRCUIT BOARD REV-A05 A57560
505	PSB1115505	ROTARY SWITCH A USP AC-21A 600V 20A

REF	PART #	DESCRIPTION
506	PSB1115506	DRO TOP MARK E2M0PA07 D21H15
507	PSB1115507	ON/OFF SWITCH NHD CB-10 22MM
508	PSB1115508	ROTARY SWITCH NHD CB-10 22MM
509	PSB1115509	POTENTIOMETER A60212 0249
510	PSB1115510	E-STOP KEDU HY57B 18A 125V/12A 250V

# Machine Labels

**SOUTH BEND SINCE 1906**

**SB1115**

**L 0-350 RPM**  
**H 0-2500 RPM**

**NOTICE**  
Change spindle speed or rotation direction ONLY when spindle is completely stopped.

**WARNING!**  
INJURY HAZARD  
Do not use machine if you have not read the manual. Visit southbendtools.com or call 360-734-1540 to get a manual.

**WARNING!**  
EYE INJURY HAZARD  
Always wear ANSI-approved safety glasses or a face shield when using this equipment.

**WARNING!**  
ENTANGLEMENT HAZARD  
Remove or secure loose clothing, hair or jewelry to reduce the risk of serious injury or death.

**WARNING!**  
INJURY SHOCK HAZARD  
To avoid shock or electrical injury, disconnect power before adjusting or servicing machine.

13  
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CM IN

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602  
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604  
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**NOTICE**  
Do not fill gearbox beyond center of all eight pins below.

**MODEL SB1116 21" VARIABLE-SPEED GEARHEAD DRILL PRESS w/CROSS SLIDE TABLE**

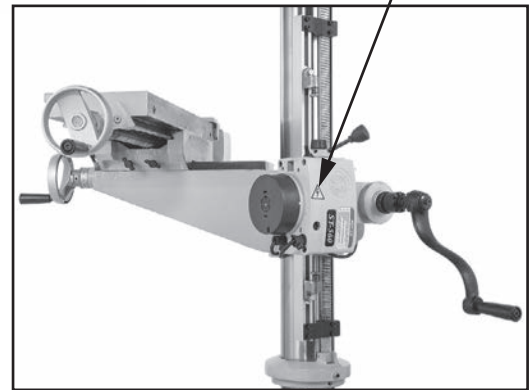
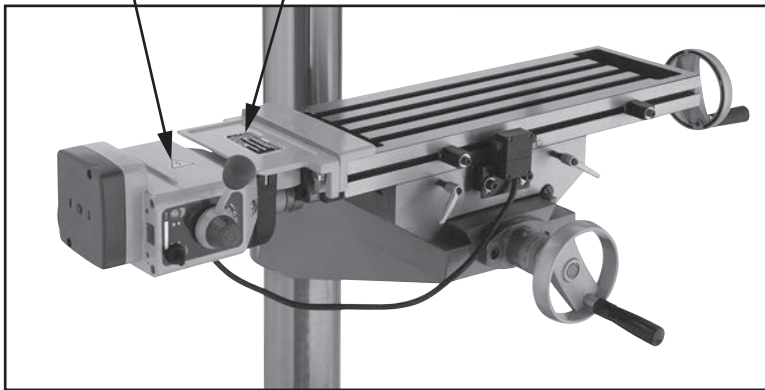
**WARNING!**  
To reduce the risk of serious injury when using this machine:  
1. Read and understand owner's manual before operating.  
2. Always wear approved safety glasses and a face shield.  
3. Only plug power cord into a grounded outlet.  
4. Disconnect power before setting up, servicing, or changing bits.  
5. Avoid entanglement with spindle—tie back long hair, roll up long sleeves, and DO NOT wear loose clothing, gloves, or jewelry.  
6. Properly set up machine before starting.  
7. Keep all guards and covers in place during operation.  
8. Clamp workpiece to table to prevent unexpected rotation.  
9. Avoid positioning hands where they could slip into rotating bits.  
10. Always remove chuck keys and other tools before starting.  
11. Never attempt to slow or stop spindle with hands or tools.  
12. Use correct speeds for drill bits and workpiece material.  
13. Do not operate when tired or under influence of drugs or alcohol.  
14. Do not expose to rain or use in wet locations.  
15. Prevent unauthorized use by children or untrained users; restrict access or disable machine when unattended.

**SB1116 Fluid Capacity**

Component	Capacity	Type
Gearhead	2.6 Qt.	Gravity 126685 or ISO 32 Equivalent

**STOP**  
CHECK OIL LEVEL BEFORE USING!  
REFER TO OWNER'S MANUAL FOR OIL TYPE AND AMOUNT.

**NOTICE**  
607 SB1116 Only  
1. Rapid traverse. Keep area clear during use.  
2. Keep dirt and foreign material out of powerfeed.  
3. Only lubricate bevel gear with graphite grease.  
4. Place handle in neutral position when powerfeed is turned OFF.



REF	PART #	DESCRIPTION
601	PSB1115601	FACEPLATE/WARNING COMBO LABEL (SB1115)
601	PSB1116601	FACEPLATE/WARNING COMBO LABEL (SB1116)
602	PSB1115602	ELECTRICITY LABEL
603	PSB1115603	GEARBOX FILL NOTICE
604	PSB1115604	MACHINE ID LABEL (SB1115)
604	PSB1116604	MACHINE ID LABEL (SB1116)
605	PSB1115605	FLUID CAPACITY LABEL

REF	PART #	DESCRIPTION
606	PSB1115606	STOP CHECK OIL TAG
607	PSB1116607	RAPID TRAVERSE NOTICE
608	PSB1115608	TOUCH-UP PAINT, BLACK
609	PSB1115609	TOUCH-UP PAINT, GREY
610	PSB1115610	TOUCH-UP PAINT, LIGHT BLUE
611	PSB1115611	TOUCHUP PAINT, DARK BLUE

# Warranty

This quality product is warranted by South Bend Tools to the original buyer for **2 years** from the date of purchase. This warranty does not apply to consumable parts, or defects due to any kind of misuse, abuse, negligence, accidents, repairs, alterations or lack of maintenance. We do not reimburse for third party repairs. In no event shall we be liable for death, injuries to persons or property, or for incidental, contingent, special or consequential damages arising from the use of our products.

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

This is the sole written warranty for this machine. Any and all warranties that may be implied by law, including any merchantability or fitness, for any purpose, are hereby limited to the duration of this warranty.

Thank you for your business and continued support.

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





[southbendtools.com](http://southbendtools.com)

