Busy Bee Tools

MODEL BBMM45

HEAVY-DUTY BENCHTOP MILL/DRILL

OWNER'S MANUAL

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INTRODUCTION

We take great pride in introducing our model BBMM45 milling machine, which is a distinguished addition to the expanding Busy Bee Tools family of exceptional metalworking machinery. Adhering to the comprehensive guidelines outlined in this manual will ensure years of reliable and enjoyable performance in keeping with Busy Bee Tools' unwavering commitment to customer satisfaction.

We are delighted to provide you with this manual for the BBMM45. It has been meticulously crafted to assist you in the assembly process, ensure safety compliance, and cover essential operational procedures. Our goal is to deliver comprehensive documentation possible to facilitate your experience.

The specifications, drawings, and photographs featured in this manual accurately depict the BBMM45 as it was configured when this manual was produced. Nevertheless, adjustments and enhancements may be implemented at any time, with no obligation on Busy Bee Tools' part.

In keeping with Busy Bee Tools' continuous improvement policy and to enhance your convenience, we maintain an up-to-date repository of Busy Bee Tools manuals on our website at www.busybeetools.com. Any updates or modifications to your machine will be promptly reflected in these manuals. We encourage you to visit our website regularly to access the latest revisions to this manual and to stay informed about your equipment's optimal operation. Your satisfaction and safety are our top priorities, and we are committed to ensuring that your experience with the BBMM45 milling machine is exceptional.

Should you require additional assistance or have further questions, please do not hesitate to contact our dedicated Customer Service and Technical Support Department at:

Email us at: cs@busybeetools.com
Call us Toll Free: 1-800-461-2879.
Busy Bee Tools Head Office
130 Great Gulf Drive
Concord ON, L4K 5W1
Or at any of our branches across Canada.
For more information visit our website www.busybeetools.com

Our team of experts is here to provide the guidance and support you need and ensure the safe and efficient operation of your machine. We are committed to assisting you in any way we can. Your satisfaction and safety are our top priorities.

Machine Identification

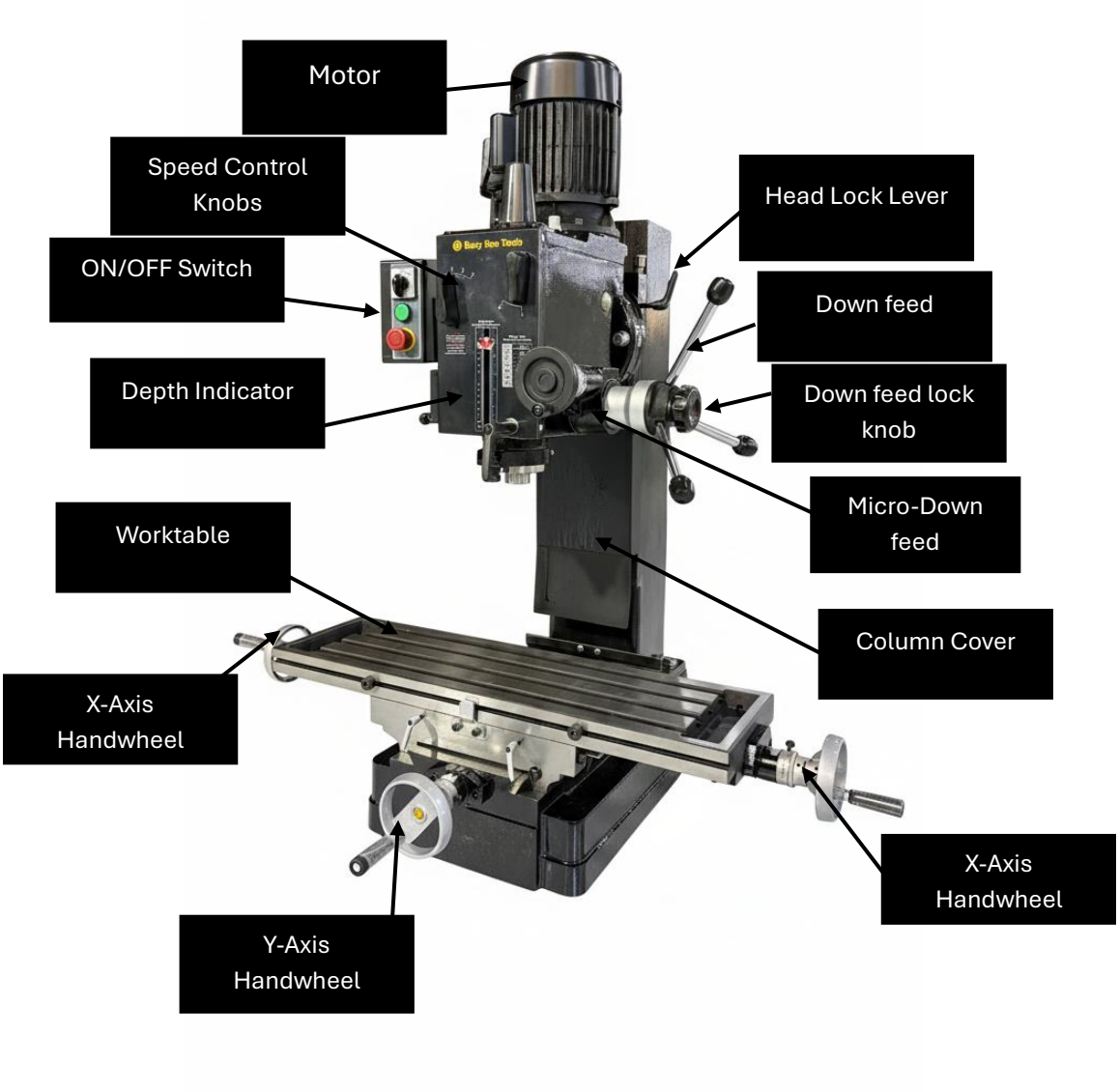


Figure 1: Machine Identification.

Controls

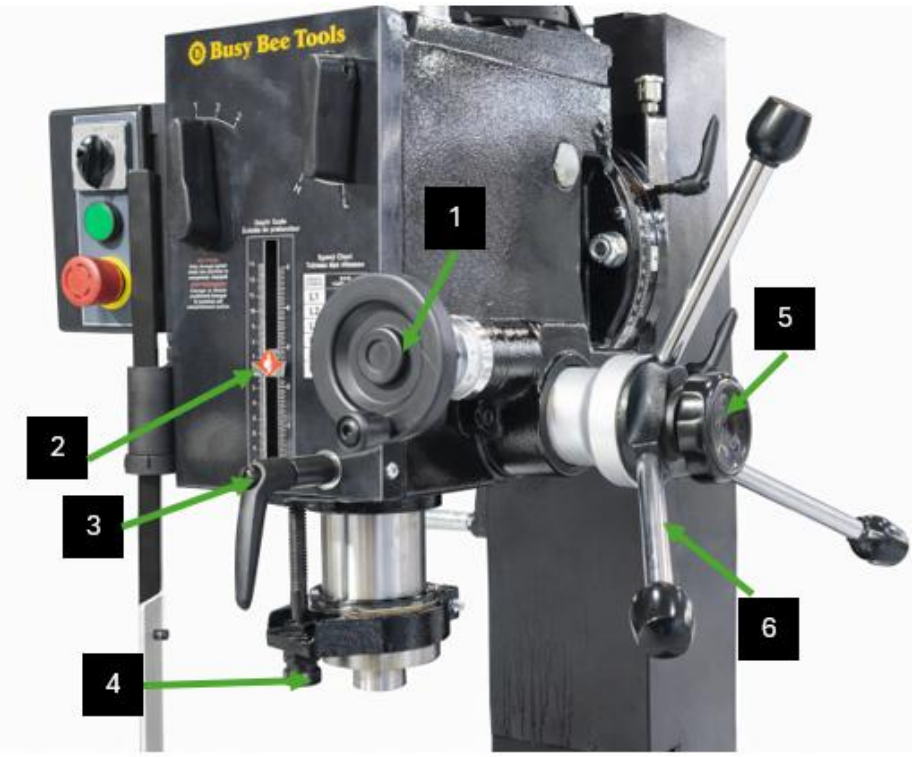


Figure 2: Machine Controls.

1- Micro down feed
2- Depth Indicator
3- Quill locking Handel
4- Depth stop lead screw
5- Down feed locking knob
6- Down feed lever

Machine Specifications

MODEL BBMM40HC HEAVY-DUTY BENCHTOP MILLING MACHINE

Product Dimensions:

Weight.	647 lbs.
Width (side-to-side) x Depth (front-to-back) x Height.	49-5/8 x 30-3/4 x 57 in.
Footprint (Length x Width).	21-5/8 x 17-3/4 in.

Shipping Dimensions:

Type.	Wood Crate
Content.	Machine
Weight.	714 lbs.
Length x Width x Height.	34 x 30 x 46 in.

Electrical:

Power Requirement.	220V, Single-Phase, 60Hz
Prewired Voltage.	V
Full-Load Current Rating.	8.6A
Minimum Circuit Size.	15A
Power Cord Included.	Yes
Power Cord Length.	5 ft.
Power Cord Gauge.	14 AWG
Plug Included.	No
Recommended Plug Type.	6-15
Switch Type.	Control Panel w/ Magnetic Switch Protection

Motors:

Main

Horsepower.	2 HP
Phase.	Single-Phase
Amps.	8.6A
Speed.	1720 RPM
Type.	TEFC Capacitor-Start Induction
Power Transfer	Gear Drive
Bearings.	Shielded & Permanently Lubricated
Centrifugal Switch/Contacts Type	Internal

Main Specifications:

Operation Info

Spindle Travel	4-3/4 in.
Max Distance Spindle to Column.	10-1/8 in.
Max Distance Spindle to Table.	18-1/8 in.
Longitudinal Table Travel (X-Axis).	22 in
Cross Table Travel (Y-Axis).	7-1/2 in.
Vertical Head Travel (Z-Axis).	13-3/4 in
Head Tilt (Left/Right).	Right 45, Left 45 deg.
Drilling Capacity for Cast Iron.	1-3/4 in.
Drilling Capacity for Steel.	1-1/4 in.
End Milling Capacity	1-1/4 in.
Face Milling Capacity.	3-1/8 in.

Table Info

Table Length	31-1/2 in.
Table Width	9-1/2 in.
Table Thickness	2-1/2 in.
Number of T-Slots	3
T-Slot Size	1/2 in.
T-Slots Centers	3-1/8 in.

Spindle Info

Spindle Taper	R-8
Number of Vertical Spindle Speeds	6
Range of Vertical Spindle Speeds	90–1970 RPM
Quill Diameter	3 in.
Drawbar Thread Size	7/16-20
Drawbar Length	17-3/4 in.
Spindle Bearings	High-Precision "P5" Tapered Roller Bearing

Construction

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

Other Specifications:

Country of Origin	China
Warranty	1 Year
Serial Number Location	Name Plate
Sound Rating	<80 dB
ISO 9001 Factory	Yes

Features:

High-precision P5 tapered roller spindle bearings
Coolant trough built into table
45° right/left head tilt

Accessories Included:

Drill chuck 1-13mm with B16 taper
Allen key set (3,4,5MM)
Milling Cutter
Plastic round knobs 3pcs.
R8 chuck arbor
Head height adjusting crank
Angle vise
Table handwheels 3 pcs.

Section 1: Safety Instructions

WARNING: FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN SERIOUS PERSONAL INJURY

General Shop Safety instructions

Your safety is of utmost importance. Prior to starting the assembly of this machine, it is imperative that you
thoroughly read the instruction manual. Safety symbols
and signal words have been incorporated into this manual to draw your attention to potentially hazardous conditions and to convey the significance of the safety messages.
It is essential to remember that these safety messages alone cannot eliminate danger and should not replace the implementation of proper accident prevention measures.

(Minor or Moderate Injury): This symbol indicates a potentially hazardous situation that, if not avoided, MAY
result in minor or moderate injury. It may also serve as a warning against unsafe practices.

(Death or Serious Injury): The warning
symbol signifies a potentially hazardous situation that, if not avoided, COULD result in death or serious injury.

(Imminent Death or Serious Injury): The danger symbol is used to indicate an imminently hazardous situation that, if not avoided, WILL result in death or serious injury.

General Machine Safety Instructions

1- Thoroughly review the entire manual before operating machinery: It is crucial to read and understand the complete manual before commencing any machinery operations. machinery can pose serious injury hazards to individuals who lack proper training and familiarity with its operation.
2- Always utilize CSA Approved Safety Glasses During machinery operation: For your safety, it is imperative to wear safety glasses that meet CSA standards when using machinery. Conventional eyeglasses are not equipped with impact resistant lenses and should not be considered a substitute for proper safety glasses.
3- Always Wear a CSA Approved Respirator When operating dust-producing machinery: When operating machinery that generates dust, it is essential to wear a respirator that has been approved by CSA Wood dust is classified as a carcinogen and can lead to cancer and severe respiratory illnesses. Your respiratory protection is paramount to your health and safety.
4- Utilize Hearing Protection When Operating Machinery: Always wear hearing protection when operating machinery. Prolonged exposure to

machinery noise can result in permanent hearing damage and protecting your hearing is vital for your long-term well-being.

5- Adhere to proper apparel guidelines: Avoid wearing loose clothing, gloves, neckties, rings, or jewelry that could potentially become entangled in moving parts of the machinery. Additionally, wear a protective hair covering to confine long hair and ensure you have non-slip footwear to prevent accidents.

6- Do Not operate machinery When Fatigued, or Under the Influence of Substances: Never operate machinery when you are tired, or if you are under the influence of drugs or alcohol. It is crucial to be always mentally alert when running machinery to maintain your safety and the safety of those around you.

7- Authorize trained and supervised personnel only: Permit only individuals who have received proper training and supervision to operate machinery. Ensure that operational instructions are not only safe but also clearly understood by those using the equipment.

8- Keep children and visitors at a safe distance: Maintain a safe distance between all children and visitors and the work area where machinery is in use.

9- Secure your workshop for child safety: Take measures to childproof your workshop, including the use of padlocks, master switches, and the removal of start switch keys to prevent unauthorized use by children.

10- Never leave machinery running unattended: It is essential never to leave machinery unattended while it is

11- still running. Turn off the power and allow all moving parts to come to a complete stop before leaving the machine unattended.

12- Avoid dangerous environments: Refrain from using machinery in locations that are damp, wet, or where flammable or noxious fumes may be present. Always ensure a safe operating environment.

13- Maintain a clean and well-Lit work area: Keep your work area clean and well-lit to prevent accidents. Clutter and dark shadows can pose significant safety risks.

14- Use properly rated extension cords: When necessary, use a grounded extension cord rated for the amperage of the machine. Undersized cords can overheat and lose power. Replace damaged extension cords promptly. Do not use extension cords with 220V machinery.

15- Disconnect from power source before servicing: Always disconnect the machinery from the power source before servicing it. Ensure the switch is in the OFF position before reconnecting.

16- Maintain machinery with care: To ensure the best and safest performance, maintain your machinery with care. Keep blades sharp and clean and follow the manufacturer’s instructions for lubrication and changing accessories.

17- Verify guards are in place and functional: Before using machinery, confirm that all safety guards are in place and functioning correctly.

Never operate machinery if guards are missing or not working as intended. Your safety relies on the proper functioning of these guards.

18- Remove adjusting keys and wrenches: Prior to turning on the machinery, it's essential to cultivate the habit of checking for adjusting keys and wrenches and ensuring they are removed. Leaving such tools in place can result in accidents.
19- Inspect for damaged parts before use: Before using the machinery, conduct a thorough inspection for damaged parts. Check for any issues such as binding or misalignment of parts, broken components, improperly mounted parts, loose bolts, or any other conditions that might impact the safe operation of the machine. Any damaged parts should be promptly repaired or replaced.
20- Utilize recommended accessories: Consult the instruction manual to identify the recommended accessories for your machinery. Using improper accessories can pose a risk of injury, so it's essential to adhere to the manufacturer's recommendations.
21- Avoid forcing machinery: Operate the machinery at the speed for which it was designed and avoid forcing it beyond its intended capabilities.
22- Secure the workpiece: Whenever possible, use clamps or a vise to secure the workpiece. A properly secured workpiece not only protects your hands but also allows you to use both hands to operate the machine safely.
23- Avoid overreaching: always maintain proper footing and balance. Overreaching can compromise your stability and pose a risk of accidents.
24- Beware of workpiece ejection: Be aware that certain machines may eject the workpiece toward the operator. Take precautions and avoid conditions that could lead to workpiece "kickback."
25- Lock mobile bases (If Used) Before Operation: If your machinery is equipped with mobile bases, ensure they are locked securely before operating the equipment. This prevents unintended movement during use.
26- Understand dust hazards: Recognize that some dust types can be hazardous to respiratory systems, both for people and animals, particularly fine dust particles. Familiarize yourself with the specific type of dust you will be exposed to and always wear a respirator approved for that specific type of dust to protect your respiratory health.

Milling Machine Safety Instructions

Entanglement with rotating cutters or the spindle can result in severe injury or fatality. Contact with rotating tools may cause deep lacerations or amputation, and ejected tooling, chips, or workpieces may cause eye or bodily injury. Strictly comply with the following requirements to minimize risk.

1- Understand all controls: Verify familiarity with the function, location, and operation of all machine controls before startup.

2- Confirm the ability to stop the machine immediately in an emergency.
3- Avoid entanglement hazards: Do not wear loose clothing, gloves, or jewelry; secure long hair.
4- Ensure all guards and protective covers are installed and secured.
5- Allow the spindle to coast to a complete stop; never attempt to stop rotation manually or with external objects.
6- Wear appropriate eye and face protection: Use approved safety glasses at all times. Wear a face shield in addition to safety glasses to provide full facial protection from chips and fragments.
7- Use correct spindle speeds and feeds: Apply manufacturer-recommended parameters for tool type, diameter, and material. Improper settings increase likelihood of tool breakage and ejection.
8- Inspect cutting tools prior to use: Check for wear, cracks, or chipping before installation. Replace defective tools immediately; do not attempt reuse.
9- Secure tooling properly: Install and tighten cutters or drill bits according to specification. Verify retention before spindle engagement.
10- Prepare for power disruptions: In the event of power loss, switch controls
11- to the OFF position. This prevents unintended startup when power is restored.
12- Clean the machine safely: Chips and swarf may be sharp; never remove by hand or with compressed air.
13- Use a brush or vacuum system only after spindle motion has ceased.
14- Secure the workpiece: Clamp to the table or hold in a machine vise to prevent shifting or rotation.
15- Never hold material by hand during machining operations.
16- Maintain machine condition: Conduct routine inspections and maintenance to ensure mechanical integrity and proper guard function.
17- Do not operate equipment with worn, damaged, or missing components.
18- Disconnect power before servicing: Turn the machine OFF, isolate from electrical supply, and confirm complete stoppage before adjustments, tool changes, or maintenance.
19- Remove spindle keys and setup tools: Remove chuck keys, drawbar wrenches, and similar tools immediately after use. Failure to do so may result in tool projection upon startup.

These instructions shall be retained with the machine documentation and communicated to all authorized operators prior to use.

Section 2: Power Supply and Electrical Safety

Electrical Supply and Circuit Requirements

Prior to machine installation, evaluate the accessibility and capacity of the intended electrical supply circuit. Confirm that the existing circuit meets the machine's specified voltage and current demands. If the available circuit is inadequate, a compliant circuit must be installed. To reduce the risk of electrical shock, fire, or equipment damage, all electrical installation and wiring activities shall be performed by a licensed electrician or qualified service personnel in accordance with applicable local codes and recognized standards. Improper grounding or connection to the supply network may result in electrocution, fire, or damage to the machine.

The full-load current rating represents the current drawn when the machine operates at its rated output capacity. For equipment incorporating multiple motors, this value reflects the demand of the largest motor or the combined load of components expected to operate simultaneously under normal conditions. For this machine, the full-load current at 220 V is 8.6 Amp. This value does not represent the maximum possible current draw; overload conditions may increase amperage beyond the rated level. Sustained overloading—particularly when connected to an undersized circuit—may cause overheating, component failure, or fire. To mitigate these risks, avoid operating beyond rated capacity and ensure the power circuit complies with the requirements specified below.

This machine is factory-configured for connection to a 220 V supply with verified grounding and shall be connected to a circuit meeting the following criteria:

- Nominal Voltage: 220 / 230 V
- Frequency: 60 Hz
- Phase: Single-phase
- Minimum Circuit : 15 Amp
- Plug/Receptacle Type: NEMA 6-15
- Full Load Current @ 220V 8.6Amp

If uncertainty exists regarding electrical practices or regulatory requirements applicable to the installation location, consultation with a qualified electrician is required for personnel and property protection. These circuit specifications apply to a dedicated branch circuit intended to supply a single machine. Where connection to a shared circuit is anticipated, a qualified electrician must confirm that circuit capacity is sufficient to support concurrent loads while maintaining safe operation.

Grounding Instructions

This machine should be connected to an effective protective ground. Proper grounding provides a low-resistance path for fault current and reduces the likelihood of electric shock in the event of malfunction or electrical failure.

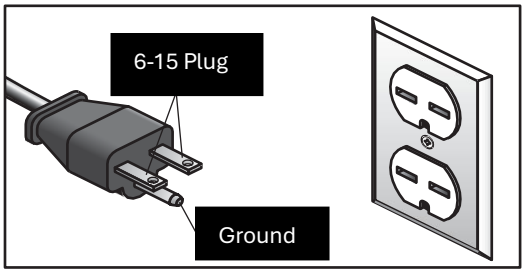


Figure 3: NEMA-6-15 Plug and Receptacle.

Incorrect termination of the equipment grounding conductor may create a shock

hazard. The conductor identified by green insulation, with or without yellow striping, is designated for grounding purposes only. If service or replacement of the supply cord or plug is required, this conductor shall not be connected to any energized terminal. Where grounding requirements are not fully understood, or verification of proper grounding is uncertain, consult a qualified electrician or authorized service personnel. Any damaged or deteriorated cord or plug shall be disconnected from the power source immediately and replaced before further use.

Connection of the machine to electrical power prior to completion of installation and setup procedures may result in serious injury. Electrical connection shall only be performed when specifically instructed within the installation sequence.

The power cord and plug specified in the circuit requirements incorporate an equipment grounding conductor and grounding prong. The plug shall be inserted only into a compatible receptacle that is correctly installed and grounded in accordance with applicable electrical codes and regulations. Use of adapters or modification of the plug is prohibited. If the supplied plug is incompatible with the available receptacle, or if reconnection to an alternative circuit configuration is required, all modifications shall be carried out by a qualified electrician in compliance with applicable codes and standards.

Extension Cord Guidelines: Use of an extension cord with this machine is not recommended. Extension cords should only be employed when absolutely necessary and for temporary use.

Extended cords may cause a voltage drop, which can lead to premature wear of electrical components and reduce motor lifespan. Voltage drop increases with longer cord lengths and smaller conductor sizes (higher AWG numbers correspond to smaller wire diameters).

If an extension cord must be used, it shall:

- Include a grounding conductor.
- Be compatible with the machine's plug and receptacle.
- Meet the following specifications:

Minimum Wire Gauge: 14 AWG

Maximum Length: 50 ft (shorter is recommended to minimize voltage drop)

Permanent or long-term operation with an extension cord is not permitted; a properly rated dedicated circuit should be installed for safe operation.

Section 3: Assembly and Setup

Unpacking and Inspection Instructions

This machine has been carefully packaged to ensure safe transport. Upon receipt, remove all components from the packaging and inspect each item for shipping damage. If any damage is detected, contact Busy Bee Tools immediately.

Important: Retain all original packaging until you are fully satisfied with the machine and any issues with the manufacturer or shipping carrier have been resolved. Original packaging is required to file a freight claim, and it is also necessary if the machine must be returned in the future.

Additional Items Required for Setup (Not Included):

Description	Qty.
Additional personnel	1
Safety glasses	1 per person
Cleaner/Degreaser	As needed
Disposable shop rags	As needed
Forklift	1
Lifting strap (rated 1000 lb.)	1
Mounting hardware	As needed
Flat-head screwdriver #2	1
Brass hammer	1
Mineral spirits	As needed

Follow these instructions carefully to ensure safe handling and preparation for machine setup.

Inventory

Before beginning machine setup, remove all shipped items from the packaging and verify that all components are present. Lay out the items and perform a complete inventory.

If any non-proprietary parts (e.g., nuts, washers) are missing, replacements can be obtained from a local hardware store or requested from Busy Bee Tools for immediate replacement.

Accessories Inventory:

1- Handwheel Handles with Screws 2
2- Oil Bottle 1
3- Handles for down feed 3
4- Hex Wrenches (3, 4, 5 mm) 1 each
5- Drift Key 1
6- Drill Chuck with Chuck Key (B16, 1 13 mm capacity) 1
7- Spindle Sleeve (R-8 × MT#3) 1
8- Drill Chuck Arbor (R-8 × B16) 1
9- Spindle Sleeve (MT#3 × MT#2) 1
10- Fly Cutter 1

Figure 4: Accessories.

Cleanup

Removal of Rust Preventative Coating all unpainted surfaces of this machine are protected with a heavy-duty rust preventative to prevent corrosion during shipping and storage. This coating must be completely removed before the machine is placed into service.
Proper removal is essential to ensure smooth operation and to protect precision-machined surfaces. Take the time to clean the machine thoroughly before operation.

Safety and Preparation

- Work in a well-ventilated area.
- Follow all manufacturer instructions for cleaning products used.
- Wear:
    - Safety glasses
    - Disposable gloves

Required Materials

- Disposable rags
- Cleaner/degreaser (e.g., WD-40 or equivalent)
- Plastic paint scraper (optional)

Removal Procedure

1. Put on appropriate personal protective equipment.
2. Apply a liberal amount of cleaner/degreaser to the rust preventative coating.
3. Allow the solution to soak for 5–10 minutes to soften the coating.
4. Remove the softened coating:
    - Use a plastic scraper (if available) to lift heavier deposits.
    - Wipe remaining residue with clean rags.
5. Repeat the application and wiping process as necessary until all residue is removed.
6. After cleaning, immediately apply a quality non-staining metal protectant or light machine oil to all unpainted surfaces to prevent oxidation.

Important Notes

- Do not use metal scrapers or abrasive tools that may damage precision surfaces.
- Ensure all ways, leadscrews, and sliding surfaces are fully cleaned and lightly lubricated before machine operation.
- Careful attention to this process ensures optimal protection and long-term durability of the machine's unpainted metal components.

- **Flammable Liquids**
- **DO NOT** use gasoline, kerosene, or other petroleum-based products to clean this machine. These substances have low flash points and present a serious risk of fire or explosion. Use only approved cleaning agents and degreasers in a well-ventilated area.

- **Solvent Safety**
- Many cleaning solvents can be toxic if inhaled. Always perform cleaning and degreasing operations in a well-ventilated area to minimize exposure to fumes. Use appropriate personal protective equipment, such as gloves and safety glasses.
- **Notice: Solvent Compatibility**
- Do not use chlorine-based solvents, including acetone or brake parts cleaner, on the machine. These chemicals can damage painted surfaces. Use only approved cleaning agents that are safe for both painted and unpainted components.

Site Considerations

Weight and Space Requirements

Weight Load:

Refer to the Machine Data Sheet for the exact weight of your machine. Ensure that the installation surface can safely support the combined weight of the machine, any additional equipment, and the heaviest anticipated workpiece. Account for the operator's weight and any dynamic forces generated during machine operation.

Space Allocation:

Provide sufficient clearance around the machine to accommodate the largest workpiece and allow safe operator movement and material handling. For permanent installations, ensure adequate space to fully open or remove doors and covers as required for maintenance and service procedures outlined in this manual. Follow the recommended space allocation guidelines to maintain safe and efficient operation.

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

Operating Environment and Electrical Requirements

Physical Environment:
For safe operation and long-term reliability, operate the machine in a clean, dry environment free from excessive moisture, corrosive chemicals, airborne particulates, or other hazardous conditions. Avoid locations with extreme ambient temperatures (outside 41°–104°F), relative humidity above 95% or below 20% (non-condensing), or areas subject to vibration, shock, or mechanical impact.

Electrical Installation:
Install the machine near a suitable power source. Protect all power cords from foot traffic, material handling equipment, moisture, chemicals, and other potential hazards. Ensure unobstructed access to a disconnect device or provision for lockout/tagout procedures where required.

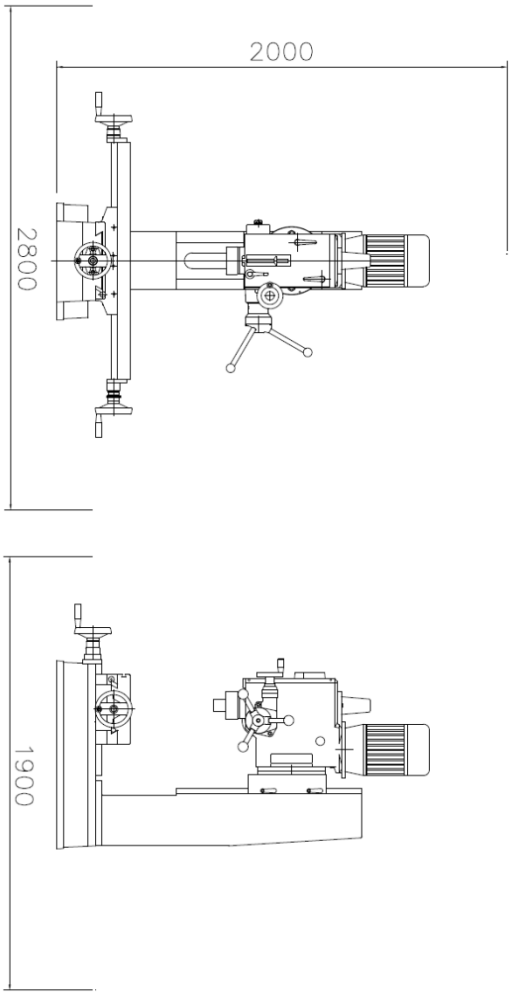


Figure 5: Space requirements.

Lighting:
Provide sufficient lighting around the machine to allow safe operation. Eliminate shadows, glare, or stroboscopic effects that

could distract the operator or interfere with visibility during machining tasks.

Heavy Lifting

Improper lifting of the machine or its components can result in serious strain or crushing injuries. Always use multiple personnel and/or mechanical lifting equipment, such as a forklift or hoist, rated for the full weight of the machine. Follow proper lifting techniques and secure the load before moving.

Figure 6: How to lift the machine.

Machine Positioning Instructions

To safely move the machine into its installation location:

1. Position the shipping crate adjacent to the workbench or stand, then unbolt the machine from its pallet.
2. Move the table as close to the column as possible and raise the headstock to its maximum height. This improves balance during lifting.
3. Engage the Z-axis locks to prevent unexpected movement while lifting.
4. Place a lifting strap under the headstock (refer to Figure 6) and attach the strap ends securely to a forklift or appropriate lifting device. Lift and carefully position the machine in its final location.

Always ensure the lifting equipment is rated for the machine's weight and that the load is stable before moving.

Machine Mounting Instructions

After confirming that all inventory items are present, secure the machine to a workbench using the mounting holes in the base. For Mill/Drill models, it is recommended to cut an access hole in the bench top to reach the underside of the base, which is required for adjusting the Y-axis leadscrew.

Mounting Options:

- **Through Mount (Recommended):**
  - Drill holes completely through the workbench.
  - Secure the machine using hex bolts, washers, and hex nuts.
  - Provides the strongest and most stable attachment, minimizing vibration and movement during operation.
- **Direct Mount:**
  - Fasten the machine directly to the workbench with lag screws.
  - Suitable for general use but offers less rigidity than the through mount.

Ensure all fasteners are properly tightened and the machine is stable before beginning operation.

Assembly

Handwheel Handle Installation

The mill/drill is fully assembled at the factory, with the exception of the handwheel handles.

Installation Procedure

1. Position each handwheel handle onto its respective handwheel.
2. Secure the handle using the supplied screw.
3. Tighten using a flat-head screwdriver until firmly seated.

Ensure all handles are securely fastened before operating the machine.

Joining the Drill Chuck and Arbor

Drill Chuck Arbor Installation

An arbor is provided for use with the included drill chuck. Once the arbor and drill chuck are assembled, they form a permanent fit and are difficult to separate. For future use of a different chuck, a new arbor should be obtained.

Important: DO NOT install the arbor and drill chuck assembly into the spindle until after the machine has successfully completed the test run.

Installation Procedure

1. Clean the mating surfaces of the drill chuck and arbor using **mineral spirits**, paying particular attention to the bore of the chuck.
2. Fully **retract the chuck jaws** into the drill chuck.
3. Insert the **small end of the arbor** into the drill chuck bore.
4. Hold the arbor firmly and **tap the chuck onto a block of wood** with medium force to seat the arbor, ensuring a secure fit (see Figure 10).
5. Verifying Drill Chuck and Arbor Fit
6. After tapping the drill chuck onto the arbor:
7. **Attempt to separate** the drill chuck and arbor by hand.
8. If the chuck can be pulled off the arbor, **repeat the installation procedure** to ensure a secure fit.
9. The assembly should remain firmly joined before installation in the spindle.

Ensure the assembly is secure before attempting installation in the spindle.

⚠WARNING

Headstock Oil Reservoir

Before the initial operation of the mill/drill, ensure the **headstock oil reservoir** is filled to the proper level.

Important: Operating the machine without sufficient oil in the headstock reservoir can cause serious damage and is **not covered under warranty**.

For detailed instructions on checking and adding oil, refer to the **Lubrication** subsection.

Test Run

After completing assembly and setup, perform a test run to verify that the machine operates correctly and safely before placing it into service.

If unusual noise, vibration, or irregular operation is observed during the test run and the source cannot be identified:

- Stop the machine immediately and disconnect it from the power supply.
- Refer to the troubleshooting section of this manual to diagnose the issue.
- If the condition cannot be resolved, contact **Busy Bee Tools Customer Service or Technical Support** before operating the machine further.

Do not resume operation until the cause has been identified and corrected.

Test Run Procedure:

1. Ensure all fasteners, guards, and covers are properly installed and secured.
2. Confirm that all tooling and loose objects have been removed from the spindle and table.
3. Verify that all controls are in their neutral or OFF positions.
4. Connect the machine to the power supply and stand clear of moving components.
5. Start the machine and allow it to run at low speed, observing for abnormal vibration, noise, or irregular movement.
6. Try the forward/Reverse switch.
7. Stop the machine and confirm that all controls respond properly and the spindle comes to a complete stop.

Upon successful completion of the test run and verification that the machine is functioning correctly, the machine is ready for operation.

Spindle Break-In Procedure

Before applying operational loads to the spindle bearings, perform the following break-in procedure to evenly distribute internal lubrication and prevent premature bearing wear.

NOTICE: Completion of this procedure is **required to maintain the machine warranty**. **Failure to perform the break-in may result in rapid spindle bearing wear.**

Procedure

1. Set the spindle speed to **90 RPM**.
2. Run the spindle for **at least 5 minutes** in each direction.
3. Stop the spindle, select the **next highest speed**, and repeat Step 2.
4. Continue sequentially through all available spindle speeds, from **lowest to highest**.
5. After completing the break-in at all speeds, **change the headstock oil** (refer to the

Lubrication section on Page 31 for instructions).

The spindle break-in is now complete, and the machine is ready for normal operation.

Factory Adjustments

The following adjustments were completed at the factory prior to shipment:

- **Gib Adjustments**
- **Leadscrew Backlash**

Important: Shipping may affect these settings. Inspect these adjustments during initial operation and re-adjust as needed to suit your preferences or to ensure proper machine function.

Section 4: Operations

Operation Overview

This section provides a general introduction to the basic operation of the machine. Its purpose is to familiarize novice operators with key components and controls, making subsequent sections of this manual easier to understand.

Important Notes:

- This overview is **not** a step-by-step instructional guide.
- For detailed operation instructions, read the entire manual carefully.
- Seek additional training from experienced operators.
- Supplement your knowledge with external resources, such as instructional books, industry trade magazines, and reputable online sources.

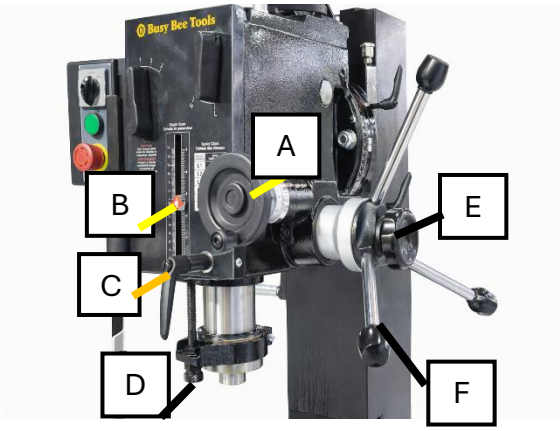
WARNING **Safety and Training Notice**

- **Read the Manual:** Review this entire manual thoroughly **before operating the machine** to minimize the risk of serious injury.
- **Eye and Face Protection:** Always wear **approved safety glasses and a face shield** to protect against flying chips or debris.
- **Training Requirement:** If you are inexperienced with this type of machine, it is **strongly recommended** to seek additional instruction. Options include:
  - Industry-specific books or trade magazines
  - Formal hands-on training from qualified personnel
- **Liability Disclaimer:** Busy Bee Tools is **not responsible for accidents or injuries** resulting from insufficient training or improper use.

Figure 7: Down Feed Controls.

Down feed Controls Identification

- **A.** Fine Down feed Handwheel
- **B.** Depth Stop and Scale
- **C.** Quill Lock Lever
- **D.** Depth Stop Adjustment Knob
- **E.** Down feed Selector Knob
- **F.** Coarse Down feed Handle



Depth Stop

- Limits the downward travel of the cutting tool.
- Adjustable using the **Depth Stop Adjustment Knob (D)** from **0" to 5"**.
- Useful for repetitive operations or tapping tasks.

Coarse Down feed Operation

1. Loosen the **Quill Lock Lever (C)**.
2. Loosen the **Down feed Selector Knob (E)** to engage the coarse down feed handles.
3. Adjust the depth stop using the **Adjustment Knob (D)**.
4. Operate the **Coarse Down feed Handles (F)** to raise or lower the spindle.

Fine Down feed Operation

1. Loosen the **Quill Lock Lever (C)**.
2. Tighten the **Down feed Selector Knob (E)** to engage the fine down feed handwheel.
3. Adjust the depth stop using the **Adjustment Knob (D)**.
4. Rotate the **Fine Down feed Handwheel (A)** to raise or lower the spindle.

Headstock Movement Capabilities

- Vertical travel along the column (**Z-axis**)
- Tilting up to **90° left or right** relative to the table

Raising/Lowering Headstock

1. **Disconnect machine from power.**
2. Loosen both **Z-axis lock levers** (Figure 14).
3. Rotate the **Z-axis crank** (Figure 15) to adjust headstock height.
4. Retighten the **Z-axis lock levers** to secure the headstock.

Tilting Headstock

1. **Disconnect machine from power.**

2. Loosen the **two locking hex nuts and locking handle.**
3. Swivel the headstock to the desired angle using the **scale** as a guide.
4. Retighten the two **hex nuts** and locking handle to secure the headstock.

Section 5: Accessories

Here are some selected accessories from Busy Bee Tools wide range of available accessories for milling machines.

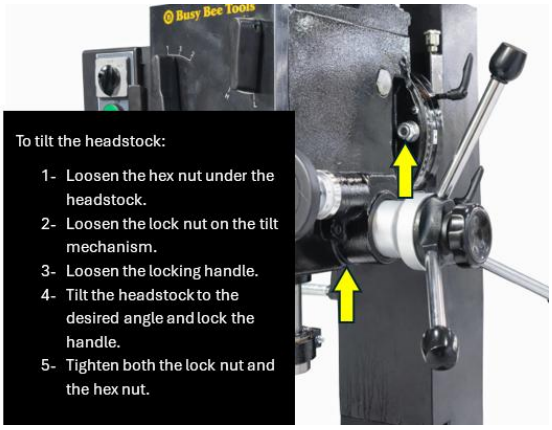
B2485 6" Rotary Table with Tailstock

Precision Rotary Work holding

- **Application:** Provides indexed work positioning in **horizontal and vertical orientations** for milling operations.
- **Construction:** Fine-grade cast iron with precision-ground surfaces and hardened worm gear.
- **Gear Ratio & Indexing:** 90 : 1 worm gear ratio with **360° graduations** for precise rotation.
- **Included Components: Tailstock and indexing plates** included to support longer workpieces and repeatable index drilling or machining cycles.
- Suitable for machining operations requiring accurate angular positioning and support for workpiece ends.

Busy Bee Tools B2724 Rotary Table 4" Horizontal/Vertical Compact Rotary Table

- **Table Diameter:** 4” rotary table ideal for smaller milling tasks.
- **Features:**
  - Whole-degree graduated dial with **0–360°** scale and 10-minute divisions.
  - **Ball bearing support** and worm gear drive for smooth



rotation.
  - **Lash adjustment screw** and reference lines for precision setup.
- **Construction:** Machined steel with black oxide finish.
- Used extensively for indexed machining, bolt pattern cutting, and precision rotational work on smaller parts.

Accusize Collet Chuck & Set B4031 18-PC ER32 Set Collet System for Tool Holding

- **Description:** Accusize branded **ER32 collet set** including a collet chuck compatible with milling operations.
- **Contents & Size:**
  - Example set includes **18 ER32 collets** covering a wide range of shank sizes (e.g., 1/8 in up to larger diameters) and chuck.
  - Collet chuck accepts standard cutting tools or drills and provides accurate radial clamping.
- **Use Case:** Enhances tooling flexibility by enabling precise clamping for end mills, drills, reamers, and other cutters in milling or drilling operations.

Busy Bee Tools BB111 Deluxe 52pc Clamping Kit T-Slot Clamping Set

- **Purpose:** Provides a comprehensive set of clamps and hardware for securing workpieces or accessories to the machine table.
- **Application:** Ideal for milling, drilling, or clamping fixtures on T-slot worktables; expands work holding versatility.

Precision Boring Bar Set 12 pc (3/4″)

- **Description:** Precision boring bar set with **3/4″ shank** and carbide-tipped cutting ends designed for flat-bottom boring and fine internal machining.
- **Construction:** High-quality alloy steel bars with precision-ground shanks and square carbide tips for accurate, clean bored surfaces.
- **Contents:** 12 precision boring bars in multiple lengths to accommodate different bore requirements.
- **Application:** Used in milling machines, lathes, and boring operations where rigid cutting and precise internal finishes are required.

Boring Bar Set 3/8″

- **Description:** Precision ground shank boring bars with **carbide tips** for reliable boring and minor internal machining tasks.
- **Material:** High-quality alloy steel with carbide cutting tips for durability and performance.
- **Features:** Offset taper design for rigidity, multiple bar lengths for versatility.
- **Use:** Suitable for smaller bore operations on milling machines where precision and stability are needed.

Boring Bar Set 1/2″

- **Description:** 9-piece precision boring bar set with **1/2″ shank** for internal machining and boring tasks requiring rigidity and accuracy.
- **Construction:** Alloy steel bodies with carbide tips and an offset taper for stable cutting performance.
- **Application:** Ideal for machining internal features on workpieces where controlled, flat-bottom holes are required.

2″ End Mill with Carbide Inserts, MT3

- **Description:** End mill with **replaceable carbide inserts** designed for MT3 spindle tooling applications.
- **Features:** Multiple carbide cutting edges enhance tool life and performance; suitable for roughing and finishing cuts where insert-style end mills are appropriate.
- **Shank/Attachment:** MT3 compatible for direct mounting using collet or arbor systems.

Parallel Bars Accusize

- **Accusize 1/8″ Parallel Bar Set 5″**
  - Precision parallel bar set with 10 pairs of bars sized **1/8″ thick and 5″ long** for milling machine table work holding.
  - Used to support and elevate workpieces within machine vises to ensure consistent setup height and clearances.

1-2-3 Blocks — Busy Bee Tools

- Busy Bee does not explicitly list a catalogue page for 1-2-3 blocks under the SKU B4463, but these precision machinist blocks are standard hardened steel blocks used for setup, fixturing, and squaring of workpieces. They are typically manufactured to **1.000″, 2.000″, and 3.000″ dimensions with ground surfaces** for accurate referencing in milling and inspection tasks.

For full specifications, detailed sizing, and pricing, visit Busy Bee Tools online or visit one of our branches across Canada. **www.busybeetools.com**.

Section 6: Maintenance

Scheduling

To maintain your mill's operation at its peak performance the following maintenance schedule must be followed.

Daily Cleaning & Lubrication Procedure

Objective: Prevent corrosion, residue build-up, and mechanical wear to ensure consistent, safe machine operation.

Procedure:

1. Power Off and Lockout
    - Ensure the machine is turned OFF and disconnected from the power supply.
    - Engage lockout/tagout if required.
2. Chip & Debris Removal
    - Use a brush and shop vacuum to remove all metal chips, dust, and debris from the table, spindle, leadscrews, and other exposed surfaces.
    - Do not use compressed air; this may drive debris into bearings or other moving parts and create hazards.
3. Coolant Residue Management
    - Inspect surfaces exposed to water-soluble coolant. Wipe or clean to remove gummy residues that can interfere with smooth operation.
4. Lubrication of Daily Points
    - Apply a light, non-staining machine oil to the following:
        - Lead screws (X, Y, Z axes)
        - Spindle quill and arbor interfaces
        - Table ways and sliding surfaces
    - Ensure oil is evenly applied and wipe off any excess.
5. Inspection
    - Check cutting tools for damage or wear.
    - Inspect power cords, wiring, and plug connections.
    - Verify mounting bolts and guards are secure.
6. Surface Protection
    - Wipe any exposed unpainted metal surfaces with a light protective lubricant to prevent rust formation.

Weekly Cleaning & Lubrication Procedure

Objective: Maintain machine precision and prevent premature wear of critical components.

1. Complete Surface Cleaning
    - Repeat daily chip removal procedure.

    - Clean the machine base, column, and motor housing.
    - Remove any accumulated rust or corrosion from unpainted surfaces using fine steel wool or non-abrasive pads; apply non-staining protective oil.
2. V-Belt & Pulley Check
    - Inspect V-belts for tension, wear, or cracks. Adjust or replace if necessary.
    - Clean pulleys to remove any dust, oil, or debris.
3. Lubrication of Weekly Points
    - Grease or oil bearings, spindle supports, and power feed gears according to manufacturer's recommendations.
    - Check gear mesh on power feed and lubricate if dry.
4. Coolant System Maintenance (if applicable)
    - Drain and clean trays or sumps to remove metallic residue or sediment.
    - Refill with fresh coolant if needed.
5. Safety and Function Check
    - Verify all guards and shields are correctly positioned and functional.
    - Check limit switches, depth stops, and handwheel dials for smooth movement and accuracy.

Notes:

- Maintain a log sheet for daily and weekly maintenance.
- Immediately report or repair any damage, wear, or unsafe conditions.

Monthly Maintenance Checks

- Inspect **the gearbox** for damage, signs of wear, and oil level; adjust or repair as needed.

Cleaning and Protecting the Machine

- **Chip Removal:** Metal chips that have been exposed to water-soluble coolant can promote oxidation and leave gummy residues on moving parts. Remove all chips and debris from the machine using a **brush and shop vacuum**.
- **Avoid Compressed Air: Do not use compressed air** to blow off chips, as this can drive particles deep into the machine's mechanisms and create a safety hazard.
- **Rust Prevention:** Inspect all **unpainted surfaces** for rust.

Remove any corrosion using appropriate methods, then apply a **non-staining protective lubricant** to prevent future oxidation.

- **Surface Maintenance:** Ensure that all cleaned surfaces are free of coolant, oil, or debris before applying lubricant to maintain smooth operation of all moving components.

Gib Adjustment

- **Factory Setting:** The gibs are pre-set at the factory and **typically require no adjustment** until the machine has experienced extended use.
- **Initial Movement:** If table movement feels stiff initially:
    1. Ensure **all rust preventative** has been thoroughly removed from the ways.
    2. Apply a **light machine oil** to the ways.
    3. Move the table back and forth several times to work the lubrication in and loosen the movement.
- **Adjusting Gibs:**

    - **Front Screw:** Controls **cross-feed movement** (front-to-back).
    - **Right-Side Screw:** Controls **longitudinal movement** (left-to-right).
    - Adjust each screw by turning the **large-slotted screw heads** until there is a **slight, uniform drag** on the handwheels.
- **Loosening:** If movement becomes excessively stiff during use, the screws can be **loosened slightly** to restore smooth operation.
- **Safety Note:** Always adjust slowly and check movement frequently to avoid over-tightening, which can cause premature wear of the ways or handwheel mechanisms.

Periodic Lubrication Points

- **Main Column**
    - Apply a light film of **SAE 30 oil** as needed.

    - Ensures smooth vertical movement and prevents rust/corrosion.
- **Quill**
    - Coat with a thin layer of **SAE 30 oil** as needed.
    - Maintains smooth spindle movement.
- **Quill Return Spring**
    - Oil **annually** using **SAE 30**.
    - Apply with a brush or a squirt-can, this'll preserve elasticity and prevent corrosion.

To tighten the quill return spring, loosen the cap screw slightly at the center of the spring cover (do not remove the cap screw), then rotate the cover to the left to tighten the recoil.

- **Quill Pinion**
    - Lubricate **every 90 days** with **non-hardening grease**.
    - Ensures smooth gear engagement and reduces wear.
- **Table Leadscrews**
    - Lubricate **weekly** with several drops of **SAE 30 oil** along the threads.
    - Keeps table movement smooth and accurate.
- **Table Leadscrew Bearings**
    - Lubricate **daily**.
    - Bearings are located at the **ends of the table** and just in front of the **Y-axis hand crank**.
    - Use the oil port with a ball; depress the ball with the oil can tip while applying a small amount of **SAE 30 oil**.
- **Table and Apron Slides**
    - Lubricate **daily**.
    - Clean chips and debris from slides before applying oil.
    - Table slide: use the **oil port with ball** on the operator's side.
    - Apron slide: oil directly after cleaning.

Notes:

- Always remove chips, debris, and coolant residues before lubrication.
- Avoid over-lubrication to prevent dust and chip buildup.
- Maintain a **lubrication log** to track daily, weekly, and annual maintenance.

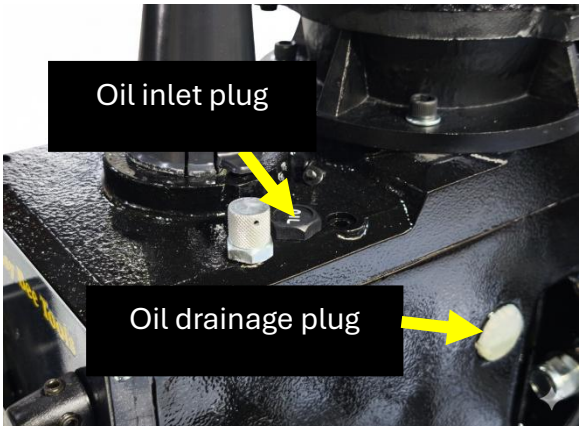
Gearbox Maintenance

- Regularly, check the oil level in the gearbox.
- Watch for oil quality regularly; if the oil is dark, smells burnt or milky it is a sign to replace it immediately.
- Oil replacement intervals depends on the frequency of use of the machine; if the machine is

used few hours a week once a year change is sufficient .

- If the machine is frequently used 4 to 5 hours a day every 6 months oil change is the recommended. However, if the machine is used every day for 8 hours a day every 3 months it is the best practice.
- The ideal oil to lubricate the gearbox is hydraulic oil **AW32** or **AW46**.

See figure for inlet and drainage oil plugs.



- **Notes**
  - Regular inspection helps maintain the gearbox functioning optimally.
  - Keep the machine well oiled, greased, and debris free.

Quill Adjustments

The internal quill pin is a setscrew and has been pre-adjusted at the factory. It should not need adjustment under normal circumstances.
The slotted setscrew on the left side of the head is used for limiting the amount of rotational play in the quill body.

Loosening the check-nut and tightening the setscrew will work to eliminate this play in the quill. If you are worried that you might have excessive quill play, spindle looseness or if an accident has occurred that requires re-adjusting this setscrew,
contact Technical Support for advice.

Quill Return Spring Safety and Adjustment

- **Safety Precautions:**
  - The **spring tail** on the perimeter of the spring housing may be sharp.
  - Always wear **leather gloves** or use a **heavy shop towel** to cover the spring tail when loading or unloading spring tension.
  - Failure to take precautions may result in **serious personal injury**.

Lubricating the Z-Axis:

Use the oiling cups located at the top of the headstock (at the left and the right), add oil to these cups regularly to keep the operation of raising and lowering the headstock smooth.

Section 7: Service and Troubleshooting

Motor and Electrical

Symptom	Possible cause	Solution
Machine does not start or a breaker trips.	1. Plug/receptacle is at fault or wired incorrectly. 2. Motor connection wired incorrectly. 3. Wall fuse/circuit breaker is blown/tripped. 4. Overload relay has tripped. 5. Power supply switched *OFF* or is at fault. 6. Wiring is open/has high resistance. 7. Main power switch is at fault. 8. Motor is at fault.	1. Test for good contacts; correct the wiring. 2. Correct motor wiring connections. 3. Ensure circuit size is suitable for this machine; replace weak breaker. 4. Reset overload relay. 5. Ensure power supply is switch on; ensure power supply has the correct voltage. 6. Check for broken wires or disconnected/ corroded connections, and repair/replace as necessary. 7. Replace faulty ON/OFF switch. 8. Test/repair/replace.
Machine stalls or is underpowered.	1. Feed rate/cutting speed too fast for task. 2. Workpiece alignment is poor. 3. Wrong workpiece material. 4. Motor connection is wired incorrectly. 5. Gears are slipping not engaged. 6. Plug/receptacle is at fault. 7. Motor bearings are at fault. 8. Machine is undersized for the task. 9. Motor has overheated. 10. Contactor not getting energized or has poor contacts. 11. Spindle rotation s	1. Decrease feed rate/cutting speed. 2. Eliminate workpiece binding; use jig or clamps and position table properly for workpiece alignment control. 3. Use metal with correct properties for your type of machining. 4. Correct motor wiring connections. 5. Ensure the gears are engaged. 6. Test for good contacts; correct the wiring. 7. Test by rotating shaft; rotational grinding/loose shaft requires bearing replacement. 8. Use smaller sharp cutters/drill bits; reduce the feed rate; reduce the spindle RPM; use cutting fluid if possible. 9. Clean off motor, let cool, and reduce workload.

		10. Test for power on all legs and contactor operation. Replace if faulty. 11. Test/repair/replace switch. 12. Test/repair/replace motor.
Machine has vibration or noisy operation.	1. Motor or component is loose. 2. the gears in the gearbox may be damaged. worn or loose. 3. Motor mount loose/broken. 4. Machine is incorrectly mounted or sits unevenly. 5. Workpiece is loose. 6. Motor fan is rubbing on fan cover. 7. Cutter is at fault. 8. Bit is chattering. 9. Motor bearings are at fault.	1. Inspect/replace stripped or damaged bolts/ nuts and re-tighten with thread locking fluid. 2. Replace/replace damaged gears. 3. Tighten/replace. 4. Tighten/replace anchor studs in floor; relocate/ shim machine. 5. Use the correct holding fixture and re-clamp workpiece. 6. Replace dented fan cover; replace loose/ damaged fan. 7. Replace out-of-round cutter; replace/resharpen cutter; use appropriate feed rate and cutting RPM. 8. Replace/sharpen bit; index bit to workpiece; use appropriate feed rate and cutting RPM. 9. Test by rotating shaft; rotational grinding/loose shaft requires bearing replacement.

Operations and Work Results

Symptom	Possible cause	Solution
Tool slips in collet.	1. Collet is not fully drawn up into spindle taper. 2. Wrong size collet. 3. Debris in collet or in spindle taper. 4. Taking too big of a cut.	1. Snug up draw bar. 2. Measure tool shank diameter and match with appropriate diameter collet. 3. Remove all oil and debris from collet and spindle taper. 4. Lessen depth of cut and allow chips to clear.
Breaking tools or cutters.	1. RPM and or feed rate is too fast.	1. Set correct RPM and feed rates.

	2. Cutting tool getting too hot. 3. Taking too big of a cut.	2. Use coolant fluid or oil for appropriate application. 3. Lessen depth of cut and allow chips to clear.
Machine is loud when cutting. Overheats or bogs down in the cut.	1. Excessive depth of cut. 2. Dull cutting tools.	1. Decrease depth of cut. 2. Use sharp cutting tools.
Workpiece vibrates or chatters during operation.	1. Table locks not tight. 2. Quill lock not tight. 3. Workpiece not securely clamped to table or into mill vice. 4. RPM and feed rate too high.	1. Tighten down table locks. 2. Tighten quill lock. 3. Check that clamping is tight and sufficient for the job. Make sure mill vice is tight to the table. 4. Use appropriate RPM and feed for the job.
Table is hard to move.	1. Table locks are tightened down. 2. Chips have loaded up on ways. 3. Ways are dry and in need of lubrication. 4. Limit stops are interfering. 5. Gibs are too tight.	1. Make sure table locks are fully released. 2. Frequently clean away chips that load up during milling operations. 3. Lubricate ways and handles. 4. Check to make sure that all limit stops are floating and not hitting the limit switch. 5. Adjust gibs.
Bad surface finish.	1. Wrong RPM or feed rate. 2. Dull cutting tool or poor cutting tool selection. 3. Wrong rotation of cutting tool. 4. Workpiece not securely clamped.	1. Adjust for appropriate RPM and feed rate. 2. Sharpen cutting tool or select a better cutting tool for the intended operation. 3. Check for proper cutting rotation for cutting tool. 4. Secure properly.

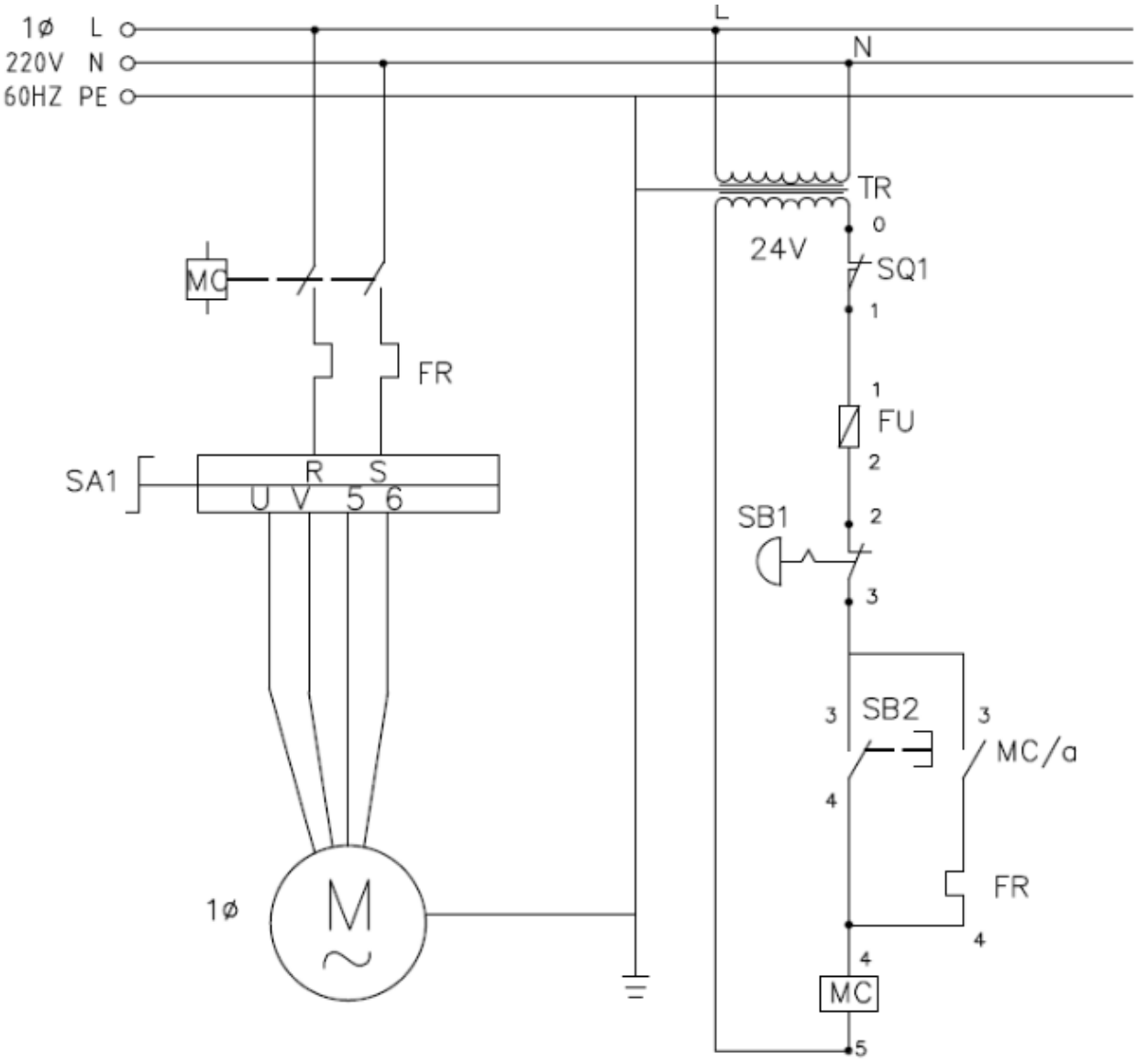
Section 8: Electrical Wiring Diagram

Notes on Electrical System Updates

The information contained in this section reflects the electrical system configuration at the time this manual was produced. In the interest of continuous product improvement, future machines may feature modifications to the electrical components or layout. Before performing any work or reference, verify the **manufacture date of your machine** against the date indicated in this manual. Carefully review this section to ensure that the procedures, diagrams, and specifications correspond accurately to your specific unit.

Wiring Safety – Quick Reference

- **Shock Hazard:**
  - Disconnect power before servicing or inspecting.
  - Use insulated tools and PPE.
- **No Modifications:**
  - Do not alter wiring or replace components with non-approved parts.
- **Wire Connections:**
  - Ensure connections are tight, clean, and match the wiring diagram.
- **Circuit Requirements:**
  - Connect only to a dedicated circuit matching voltage, phase, and amperage specifications.
- **Wire & Component Damage:**
  - Inspect for cracks, wear, or overheating; replace damaged parts immediately.
- **Motor Wiring:**
  - Confirm proper voltage/phase and secure connections. Protect from moisture and vibration.
- **Capacitor Safety:**
  - Discharge capacitors before touching. Avoid bare-hand contact with terminals.
- **If Difficulties Occur:**
  - Stop operation, disconnect power, and contact qualified service personnel.
- **General Practices:**
  - Keep wiring organized, secured, and away from moving parts, heat, and sharp edges.
  - Follow local electrical codes and maintain regularly for safe operation.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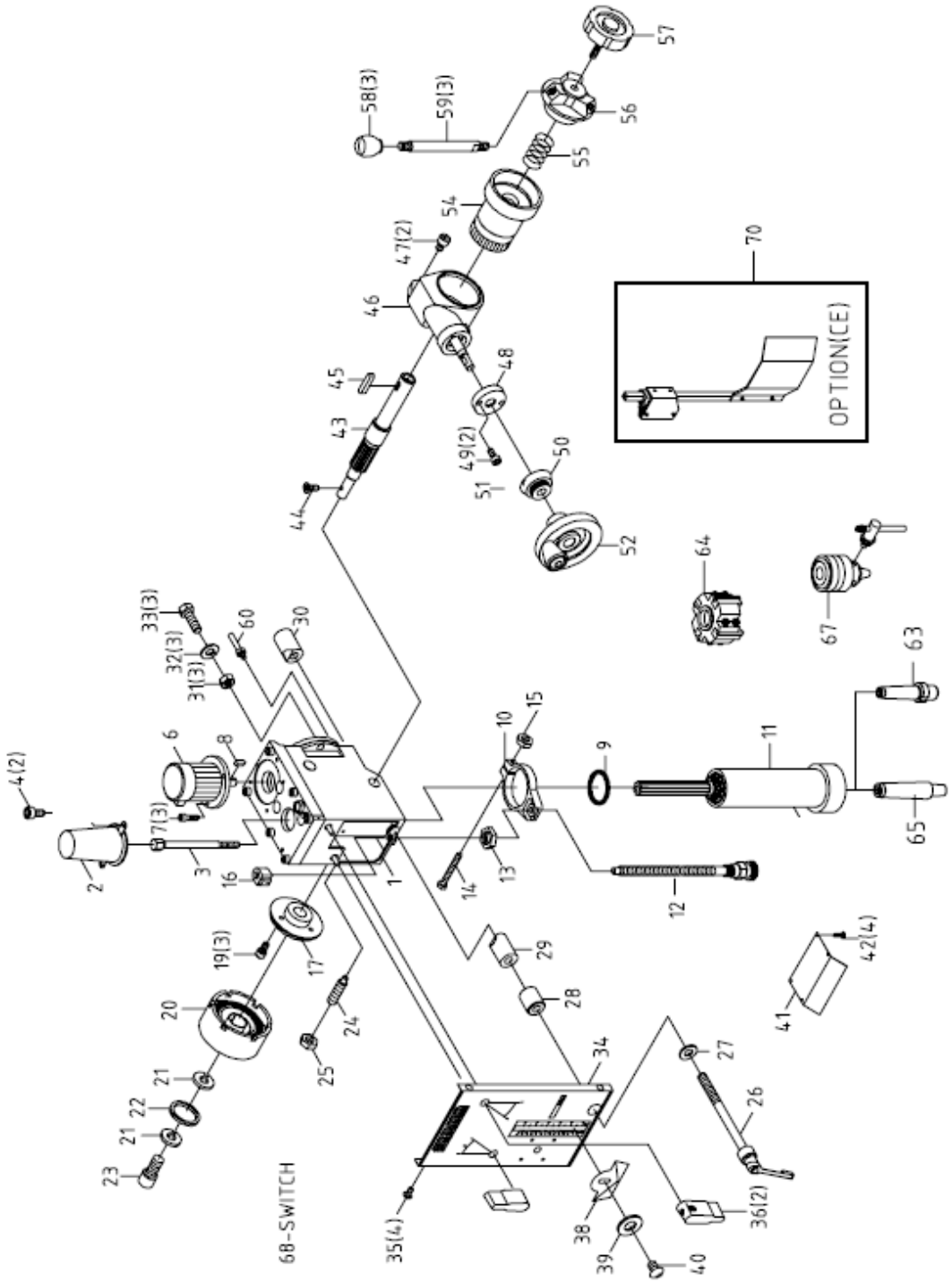
Section 9: Machine Diagram and Parts List

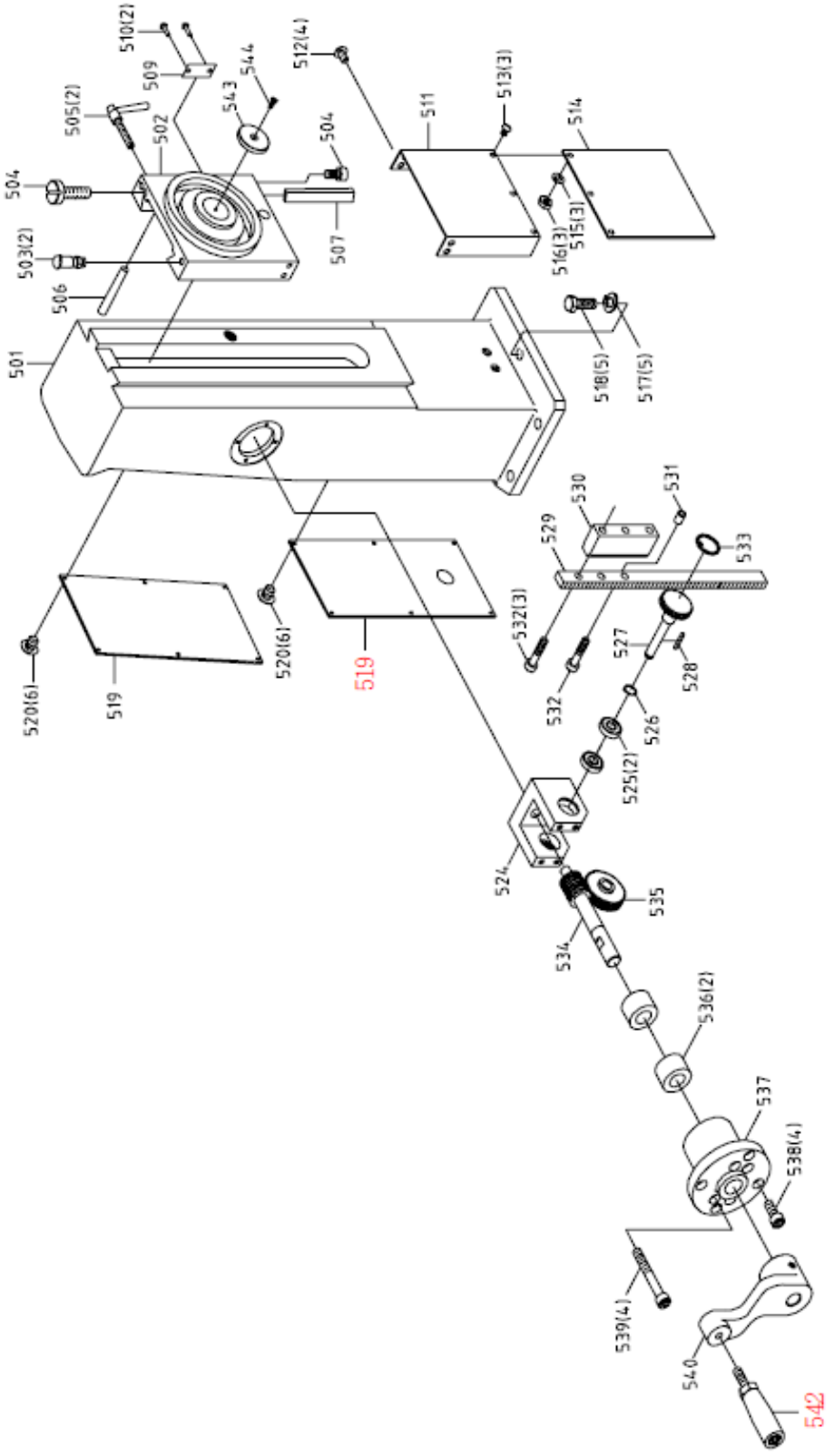


Headstock Parts list

NO	PART NO	DESCRIPTION	QTY
1	BBMM45001	Headstock Casting	1
2	BBMM45002	Spindle Cap	1
3	BBMM45003	Chuck Arbor Bolt R8 W7/16"-20	1
4	BBMM45004	Cross Round Head Screw M4-0.70X10MM	2
6	BBMM45MOT	Motor 1.5HP/220V/60Hz/1PH	1
6-1	BBMM45MOT-1	Motor Capacitor 400MFD/125VAC NOT SHOWN	1
6-2	BBMM45MOT-2	Motor Fan Cover MM4016 NOT SHOWN	1
6-3	BBMM45MOT-3	Motor Overload 13AMP	1
6-4	BBMM45MOT-4	Motor Fan NOT SHOWN	1
7	BBMM45007	Hex. Socket Head Screw 3/8"-16X1"	3
8	BBMM45008	Key 6 X 6 X 30MM	1
9	BBMM45009	Quill Seal (Rubber)	1
10	BBMM45010	Depth Rod Mount	1
11S	BBMM45011	Pinion Assembly R8	1
11-1	BBMM45011-1	Spanner Nut M30-1.5 NOT SHOWN	1
11-3	BBMM45011-3	Tapered Roller Bearing E30206J NOT SHOWN	1
11-4	BBMM45011-4	Quill NOT SHOWN	1
11-5	BBMM45011-5	Tapered Roller Bearing 30207J NOT SHOWN	1
11-6	BBMM45011-6	Spindle R8 2-SLOT NOT SHOWN	1
11-7	BBMM45011-7	Bearing Cap R8 NOT SHWON	1
12	BBMM45012	Quill Depth Leadscrew	1
13	BBMM45013	Quill Depth Support Nut M16-1.5 5/8"-18	1
14	BBMM45014	Hex. Head Screw 1/4"-18X2"	1
15	BBMM45015	Hex. Nut 1/4"-18	1
16	BBMM45016	Position Set Bracket	1
17	BBMM45017	Spring Base Set	1
19	BBMM45019	Cross Round Head Screw 3/16"-18X3/4"	3
20	BBMM45020	Return Spring Cover	1
21	BBMM45021	Lock Washer 1/4"X1"	2
22	BBMM45022	Fender Washer 1/4	1
23	BBMM45023	Cap Screw 1/4-20 X 5/8"	1
24	BBMM45024	Alignment Pin 3/8"-16 X 38	1
25	BBMM45025	Hex Nut 3/8"-16	1
26	BBMM45026	Adjustable Handle 9"L, 1/2-13 X 2-3/4	1
27	BBMM45027	Washer 1/2"X7/8"X2t	1
28	BBMM45028	Fixed Tight Collar Ø31.5X36L	1
29	BBMM45029	Fixed Tight Collar Ø31.5X48L	1
30	BBMM45030	Fixed Tight Collar Ø31.5X51L (1/2"-12)	1
31	BBMM45031	Nut 5/8"-11	3

NO	PART NO	DESCRIPTION	QTY
32	BBMM45032	Dock Washer 5/8 X 1-9/16 X 1/8	3
33	BBMM45033	Hex Bolt 5/8-11 X 5-1/2	3
34	BBMM45034	Headstock Faceplate (BUSY BEE)	1
35	BBMM45035	Cross Round Head Screw 3/16"-24X3/8"	4
36	BBMM45036	Speed Lever Set	2
38	BBMM45038	Depth Indicator	1
39	BBMM45039	Flat Washer 1/8"	1
40	BBMM45040	Cross Round Head Screw 3/16"-24X3/8"	1
41	BBMM45041	Dust Plate	1
42	BBMM45042	Cross Round Head Screw 3/16"-24X1/2"	4
43	BBMM45043	Pinion Shaft	1
44	BBMM45044	Flat Hd Scr 3/16"-24 X 1/2"	1
45	BBMM45045	Key 7X7X20MM	1
46	BBMM45046	Bearing Cover Set	1
46-1	BBMM45046-1	Bearing Cover NOT SHOWN	1
46-2	BBMM45046-2	Worm Shaft NOT SHOWN	1
46-3	BBMM45046-3	Ball Bearing 6202ZZ NOT SHOWN	2
46-4	BBMM45046-4	C-Retainer Ring C15 NOT SHOWN	1
46-5	BBMM45046-5	Washer Ø 34XØ27.5X30L	1
47	BBMM45047	Hex. Socket Head Screw 5/16"-18X3/4"	2
48	BBMM45048	Worm Shaft End Bracket	1
49	BBMM45049	Phlp Hd Screw 3/15"-24 X 3/4"	2
50	BBMM45050	Micro Adjusting Indicator Set	1
52	BBMM45052	Handwheel Assembly	1
54	BBMM45054	Worm Gear	1
55	BBMM45055	Compression Spring 2.4 X 17.5 X 25MM	1
56	BBMM45056	Coarse Down feed Lever Hub	1
57	BBMM45057	Knob Bolt 3/8-16 X 1-5/8 - 6 Lobe PLASTIC	1
58	BBMM45058	Plastic Handle Ball W1/2"-12	3
59	BBMM45059	Handle Rod	3
60	BBMM45060	Head Adapter	1
63	BBMM45063	Cutter Arbor R8 W7/16"-20 (25.4MM)	1
64	BBMM45064	Milling Cutter 25.4MM	1
65	BBMM45065	Milling Cutter Arbor 88 W7/16"-20 (JT6)	1
67	BBMM45067	Drill Chuck With Key 1/2"-JT6 (Ø 42)	1
68S	BBMM45068	Electric Box Assembly NOT SHOWN	1
68-1	BBMM45068-1	Electric Box BLACK NOT SHOWN	1
68-2	BBMM45068-2	Emergency Stop HY-57B	1
68-3	BBMM45068-3	F/R Switch 48X48MM NOT SHOWN	1
68-4	BBMM45068-4	Green ON Button NPB22-F10G NOT SHOWN	1

NO	PART NO	DESCRIPTION	QTY
68-5	BBMM45068-5	Motor Cord CSA 14AWGX4C NOT SHOWN	1
68-6	BBMM45068-6	Power Cord With 220v Plug CSA AWG13X3C	1
70	BBMM45070	CE Chuck Guard Assembly	1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Column Parts List

NO	PART NO	DESCRIPTION	QTY
501	BBMM45501	Vertical Square Column	1
502	BBMM45502	Headstock Swivel Base	1
503	BBMM45503	Oil CUP PT1/8"	2
504	BBMM45504	Adjustable Screw	2
505	BBMM45505	Grip	2
506	BBMM45506	Miter Pin M6X50MM (1:48)	1
507	BBMM45507	Gib Strip Bolt	1
509	BBMM45509	Index Label	1
510	BBMM45510	Rivet Ø2X5MM	2
511	BBMM45511	Antidust Plate	1
512	BBMM45512	Cross Round Head Screw M5-0.80X10MM	4
513	BBMM45513	Cross Round Head Screw M4-0.70X8MM	3
514	BBMM45514	Antidust Plate	1
515	BBMM45515	Washer M5	3
515	BBMM45515-1	Press Board	1
516	BBMM45516	Hex. Nut 5/8"-18	3
517	BBMM45517	Spring Washer 5/8"	5
518	BBMM45518	Hex. Head Screw 5/8"-18X2-1/2"	5
519	BBMM45519	Steel Plate	2
520	BBMM45520	Cross Round Head Screw M5-0.80X10MM	12
524	BBMM45524	Bracket	1
525	BBMM45525	Bearing 6003ZZ	2
526	BBMM45526	C-Retainer Ring S17	1
527	BBMM45527	Gear Shaft	1
528	BBMM45528	Key 5X5X28MM	1
529	BBMM45529	Rack	1
530	BBMM45530	Pad	1
531	BBMM45531	Bushing	1
532	BBMM45532	Hex. Socket Head Screw M12-1.75X85MM	4
533	BBMM45533	C-Retainer Ring R35	1
534	BBMM45534	Worm Shaft	1
535	BBMM45535	Worm Gear	1
536	BBMM45536	Oil Bearing	2
537	BBMM45537	Support Flange	1
538	BBMM45538	Hex. Socket Head Screw M8-1.25X25MM	4
539	BBMM45539	Hex. Socket Head Screw M8-1.25X60MM	4
540	BBMM45540	Head Handle Set	1
542	BBMM45541	Clamp Handle	1
543	BBMM45543	Slide Base Flange	1
NO	PART NO	DESCRIPTION	QTY

544	BBMM45544	Hex. Socket Flat Head Screw	1

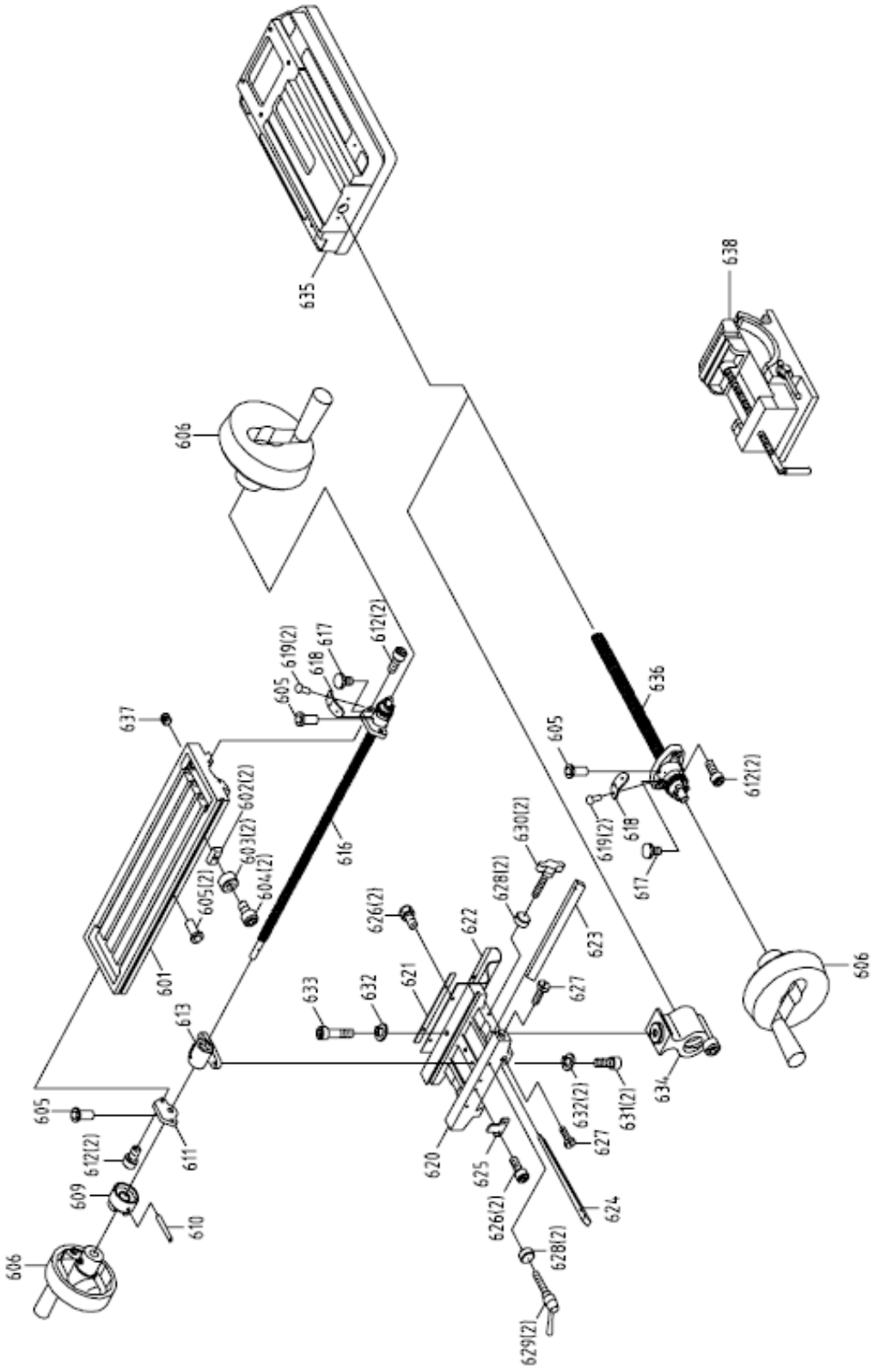
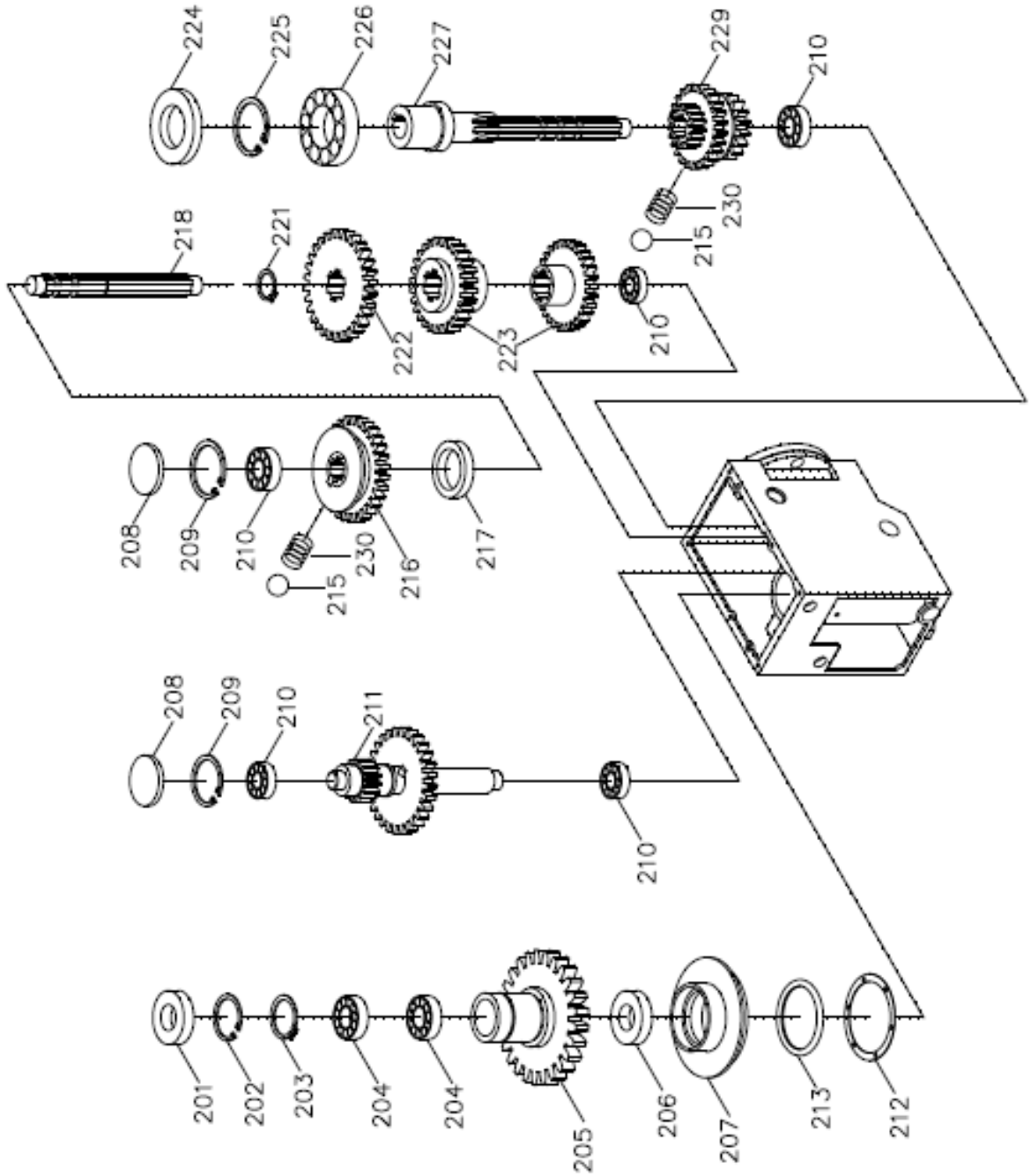


Table and Base Parts List

NO	PART NO	DESCRIPTION	QTY
601	BBMM45601	Table 820X240MM	1
602	BBMM45602	Fixed Block	2
603	BBMM45603	Movable Fixed Ring	2
604	BBMM45604	Hex. Socket Head Screw 1/4"-18X1/2"	2
605	BBMM45605	Oil Ball 1/4"	5
606	BBMM45606	Table Handle Wheel ALUMINIUM	3
609	BBMM45609	Table Clutch Ø17	1
610	BBMM45610	Pin Ø5X38MM	1
611	BBMM45611	Left Flange Ø17	1
612	BBMM45612	Hex. Socket Head Screw 5/16"-18X1"	6
613	BBMM45613	Table Nut Set 31/31L INCH	1
616	BBMM45616	Table Screw Assembly 31L	1
617	BBMM45617	Link Screw	2
618	BBMM45618	Depth Indicator	2
619	BBMM45619	Rivet Ø2	4
620	BBMM45620	Center Base 30L	1
621	BBMM45621	Antidust Plate	1
622	BBMM45622	Antidust Plate	1
623	BBMM45623	Gib Strip 30L	1
624	BBMM45624	Gib Strip	1
625	BBMM45625	Movable Fixed Block	1
626	BBMM45626	Hex. Socket Head Screw 5/16"-18X1/2"	4
627	BBMM45627	Gib Strip Bolt	2
628	BBMM45628	Bushing	4
628	BBMM45628-1	Grip 5/16"-18X36L	2
629	BBMM45629	Grip	2
630	BBMM45630	Thumb Screw	2
631	BBMM45631	Hex. Socket Head Screw 6/16-18X1"	2
632	BBMM45632	Spring Washer 5/16"	3
633	BBMM45633	Hex. Socket Head Screw 5/16"-18X2-1/2"	1
634	BBMM45634	Acme Nut Assembly INCH	1
635	BBMM45635	Machine Base	1
636	BBMM45636	Acme Screw Assembly INCH	1
637	BBMM45637	Hex. Socket Headless Screw PT1/4"	1
638	BBMM45638	Vise	1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Gearbox Parts List

NO	PART NO	DESCRIPTION	QTY
201	BBMM45201	Oil Seal 40 X 68 X 8MM	1
202	BBMM45202	Int Retaining Ring R68	1
203	BBMM45203	Ext Retaining Ring 40mm S40	1
204	BBMM45204	Ball Bearing 6008ZZ	2
205	BBMM45205	Gear 53t	1
206	BBMM45206	Oil Seal 35 X 45 X 8 MM	1
207	BBMM45207	Oil Seal Ring 40/40N2F	1
208	BBMM45208	Bearing Cover 35mm 35X8t MM	2
209	BBMM45209	Int Retaining Ring 35MM	2
210	BBMM45210	Ball Bearing 6202ZZ	5
211	BBMM45211-1	Gear Shaft Assembly 15t/41t	1
	BBMM45211-2	Gear Shaft 15t	1
	BBMM45211-3	Key 6 X 6 X 10MM	1
	BBMM45211-4	Gear 41t	1
	BBMM45211-5	Ext Retaining Ring 22mm S22	1
212	BBMM45212	Leak Proof Gasket 40	1
213	BBMM45213	O-Ring OD75.6XID69.4XW3.1MM (G70)	1
215	BBMM45215	Steel Ball Ø5/16"	2
A	BBMM45GBA	Gear Box Set ASSY INCLUDING 216-218-222-223 (6 PCS.)	1
216	BBMM45216-1	Combo Gear 16t/42t	1
	BBMM45216-2	Combo Gear 16t	1
217	BBMM45217	Bushing	1
218	BBMM45218	Gear Shaft	1
221	BBMM45221	Ext Retaining Ring 20mm S20	1
222	BBMM45222	Combo Gear 44t	1
223	BBMM45223	Combo Gear 28t	1
	BBMM45223-1	Combo Gear 35t	1
224	BBMM45224	Oil Seal Ø35 X Ø62 X 8MM	1
225	BBMM45225	Int Retaining Ring 62mm R62	1
226	BBMM45226	Ball Bearing 6007ZZ	1
B	BBMM45GSA	Gear Shaft Assembly B INCLUDES 227- 229 (4 PCS.)	1
227	BBMM45227	Gear Shaft Ø19	1
229	BBMM45229-1	Combo Gear 15t	1
	BBMM45229-2	Combo Gear 31t	1
	BBMM45229-3	Combo Gear 23t	1
230	BBMM45230	Compression Spring 0.8 X 7.1 X 15MM	2

Busy Bee Tools

BUSY BEE TOOLS 2 YEARS LIMITED WARRANTY

Busy Bee Tools warrants every product to be free from defects in materials and agrees to correct such defects where applicable. This warranty covers ***two years*** for parts and 90 days for labor (unless specified otherwise), to the original purchaser from the date of purchase but does not apply to malfunctions arising directly or indirectly from misuse, abuse, improper installation or assembly, negligence, accidents, repairs or alterations or lack of maintenance.

Proof of purchase is necessary.

All warranty claims are subject to inspection of such products or part thereof and Busy Bee Tools reserves the right to inspect any returned item before a refund or replacement may be issued.

This warranty shall not apply to consumable products such as blades, bits, belts, cutters, chisels, punches etc.

Busy Bee Tools shall in no event be liable for injuries, accidental or otherwise, death to persons or damage to property or for incidental contingent, special or consequential damages arising from the use of our products.

IF THE MACHINE IS ALTERED IN ANY WAY, THE WARRANTY SHALL BE NULL AND VOID.

WARRANTY, RETURNS, REPAIRS AND REPLACEMENTS

To return, repair, or replace a Busy Bee Tools product, you must visit the appropriate Busy Bee Tools showroom or call 1-800-461-BUSY.

For replacement parts directly from Busy Bee Tools, for this machine, please call 1-800-461-BUSY (2879), and have your model number and part number & payment option ready.

- All returned merchandise will be subject to a minimum charge of 15% for re-stocking and handling with the following qualifications.
- Returns must be pre-authorized by us in writing.
- We do not accept collect shipments.
- Items returned for warranty purposes must be insured and shipped pre-paid to the nearest warehouse
- Returns must be accompanied by a copy of your original invoice as proof of purchase. Returns must be in an un-used condition and shipped in their original packaging a letter explaining your reason for the return. Incurred shipping and handling charges are not refundable.
- Busy Bee will repair or replace the item at our discretion and subject to our inspection.
- Repaired or replaced items will be returned to you pre-paid by our choice of carriers.
- Busy Bee reserves the right to refuse reimbursement or repairs or replacement if a third party without our prior authorization has carried out repairs to the item.
- Repairs made by Busy Bee Tools are warranted for 30 days on parts and labor.
- Any unforeseen repair charges will be reported to you for acceptance prior to making the repairs.
- The Busy Bee Parts & Service Departments are fully equipped to do repairs on all products purchased from us except for some products that require the return to their authorized repair depots. A Busy Bee representative will provide you with the necessary information to have this done.
- For faster service it is advisable to contact the nearest Busy Bee location for parts availability prior to bringing your product in for repair.