



Busy Bee Tools

BBMM40HC Gearhead Drill Press with Cross-Slide table

User's Manual



COPYRIGHT © 2026 BY BUSY BEE TOOLS LTD.

V1.0-2026

NO PORTION OF THIS MANUAL MAY BE
REPRODUCED WITHOUT THE WRITTEN CONSENT
OF BUSY BEE TOOLS LTD.



Table of Contents

| | |
|--|----|
| Introduction | 1 |
| Machine Identification | 2 |
| Machine Specification | 3 |
| Section 1: Safety | 4 |
| Section 2: Power and Electrical | 7 |
| Section 3: Assembly | 9 |
| Section 4: Operations | 13 |
| Section 5: Accessories | 19 |
| Section 6: Maintenance | 21 |
| Section 7: Service and Troubleshooting | 26 |
| Section 8: Electrical Diagrams | 28 |
| Section 9: Machine Diagrams and Parts List | 31 |
| Warranty | 40 |



This document specifies the mandatory safety requirements governing the installation, operation, maintenance, and servicing of this equipment. It shall be retained for reference and made readily accessible to all authorized personnel.

Failure to read, comprehend, and follow the instructions provided in this document may result in fire, serious bodily injury, amputation, electrical shock, or death.

The equipment owner bears full responsibility for ensuring safe operation. This responsibility includes, but is not limited to, proper installation in a compliant environment; verification of operator competency and training; implementation of routine inspection and maintenance programs; ensuring availability and understanding of this documentation; maintaining the correct selection and condition of cutting, sanding, or grinding accessories; confirming the functionality of all safety devices; and enforcing the use of appropriate personal protective equipment.

The manufacturer disclaims all responsibility for injury, loss, or damage arising from negligence, insufficient training, unauthorized modification, or improper use of the equipment.

Exposure to dust produced during power sanding, sawing, grinding, drilling, or similar construction activities may include substances recognized as carcinogenic or as causing reproductive harm. Notable examples of such hazardous materials include:

- Lead from lead-containing coatings and paints
- Crystalline silica from concrete, bricks, cement, and other masonry materials
- Arsenic and chromium from chemically treated lumber

The level of exposure risk is directly related to the frequency and duration of the activity. To reduce health hazards, perform tasks in a well-ventilated area and employ suitable respiratory protection specifically rated to filter fine particulate matter.

INTRODUCTION

We take great pride in introducing our model BBMM40HC 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 BBMM40HC. 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 BBMM40HC 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 BBMM40HC 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.



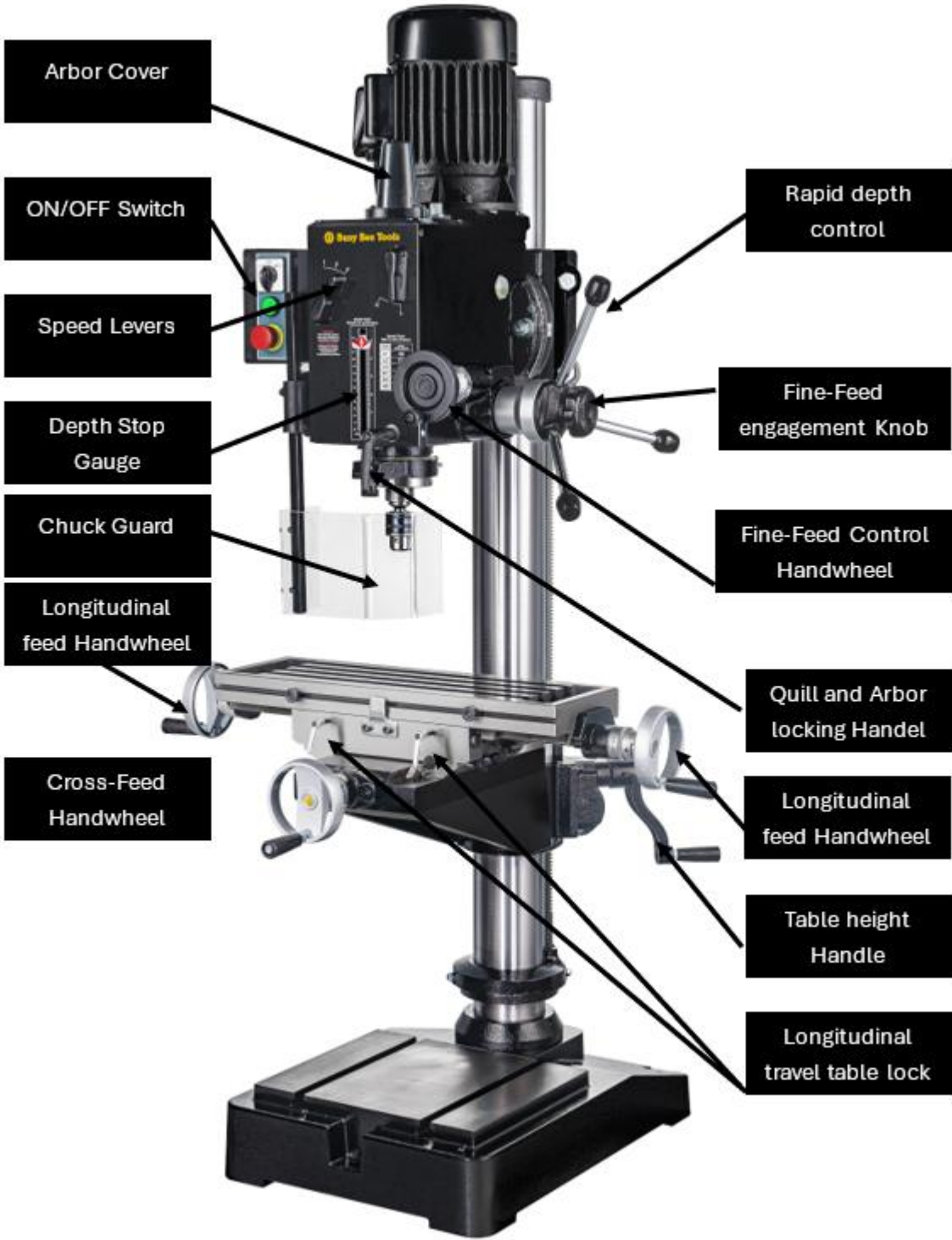
COPYRIGHT © 2026 BY BUSY BEE TOOLS LTD.

V1.0-2026

NO PORTION OF THIS MANUAL MAY BE
REPRODUCED WITHOUT THE WRITTEN CONSENT
OF BUSY BEE TOOLS LTD.



Machine Identification



Machine Specifications

Product Dimensions:

Weight.....274KG/ 605 lbs.
Width (side-to-side) x Depth (front-to-back) x Height.....35-7/16"X24-1/2"X69"
Footprint (Length x Width)..... 26"X 8-1/2"
Space Required for Full Range of Movement (Width x Depth)..... 56-1/2"X46-1/2"

Shipping Dimensions:

Type..... Wood Crate
Content..... Machine
Weight.....305KG/ 672 lbs.
Length x Width x Height..... 32-11/16"X29-1/8"X75-5/8"
Must Ship Upright..... Yes

Electrical:

Power Requirement..... 220V, Single-Phase, 60 Hz
Full-Load Current Rating..... 5.5A
Minimum Circuit Size..... 15A
Power Cord Included..... Yes
Power Cord Length..... 6'
Power Cord Gauge..... 14 AWG
Plug Included..... Yes
Included Plug Type..... 6-15
Switch Type..... Magnetic Switch
Inverter Type..... KB-26D

Main Motors:

Type..... TEFC Induction
Horsepower..... 1.5 HP
Phase..... 1-Phase
Amps..... 5.5A
Speed..... 1720 RPM
Power Transfer Gear Drive
Bearings..... Shielded & Permanently Lubricated

Main Specifications:

Operation Information

Swing..... 20-3/4"
Spindle Taper..... R-8
Spindle Travel..... 4-7/8"
Max. Distance From Spindle to Column..... 10-7/16"
Max. Distance From Spindle to Table..... 17-1/2"
Number of Spindle Speeds..... 6-Speed
Range of Spindle Speeds..... 60– 1500 RPM
Max. Head Tilt (Left/Right)..... 30/90 deg.
Drilling Capacity (Mild Steel)..... 1-9/16"
End Milling Capacity..... 3/4"
Face Milling Capacity..... 4"



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 hazards associated 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.

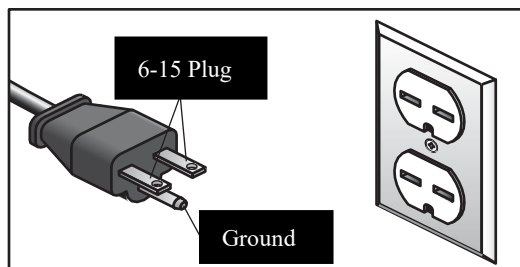
This machine is factory-configured for connection to a 220 V supply with verified grounding and shall be connected to a circuit meeting the following criteria:

- 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.



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 preferable to minimize voltage drop)

Section 3: Assembly and Setup

This milling machine come mostly pre-assembled with the exception of all the handwheels, handles and knobs.

For assembly please follow the steps below.

Unpacking and Crate Inventory

The machine comes a wooden crate please refer to the specifications section for measurements and weight.

Uncrate the machine carefully making sure there's no damage to it due to shipping.

If the Contact Busy Bee Tools customer service department immediately should you discover any damages.

Drill Chuck and Key

Hex. Wrench Set (3mm, 4mm, 5mm)

Milling Cutter

Plastic Round Knob * 3 pcs

R8 Chuck Arbor

L-shaped Wrench

Head Height-adjusting Crank

Clamp Handle Assembly * 4 pcs

M6601S Table Handle Wheel * 3 pcs

M6241A 3 " Angle Vise

SM61122B Two-Slot Spindle Wrench

M6139 Handle Rod * 3pcs



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

Confirm all items are accounted for before proceeding with assembly to ensure proper installation and operation. Machine Cleanup Instructions

The unpainted surfaces of this machine are coated with a heavy-duty rust preventative to protect against corrosion during shipping and storage. While highly effective, this coating requires careful cleaning before use. Thorough cleaning at this stage ensures proper maintenance and prolongs the life of all unpainted components.

Precautions:

- Always follow the manufacturer's instructions for any cleaning products used.
- Work in a well-ventilated area to minimize exposure to fumes.
- Wear safety glasses and disposable gloves during the cleaning process.

Required Materials:

- Disposable rags
- Cleaner/degreaser (e.g., WD-40)
- Safety glasses and disposable gloves
- Plastic paint scraper (optional)


Cleaning Procedure:

- 1- Put on safety glasses and gloves.
- 2- Apply a liberal amount of cleaner/degreaser to the rust preventative and allow it to soak for 5–10 minutes.
- 3- Wipe the surfaces with a rag. If necessary, use a plastic paint scraper to remove thicker deposits before finishing with the rag.
- 4- Repeat the soaking and wiping process until all unpainted surfaces are clean.
- 5- After cleaning, apply a quality metal protectant to all unpainted surfaces to prevent future rust and corrosion.

Careful attention to this process ensures optimal protection and long-term durability of the machine's unpainted metal components.

 **WARNING** **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.

 **WARNING** **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 Consideration

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.**

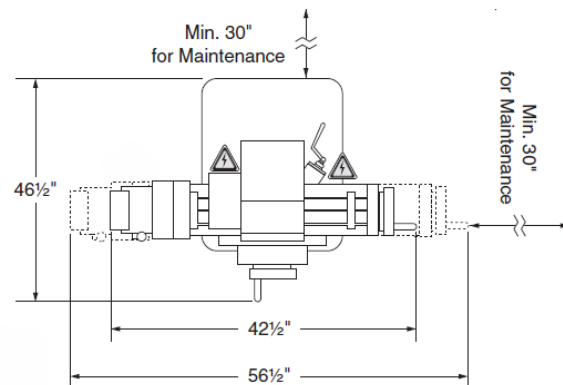
Operating Environment and Electrical Requirements

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.





WARNING

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.

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.

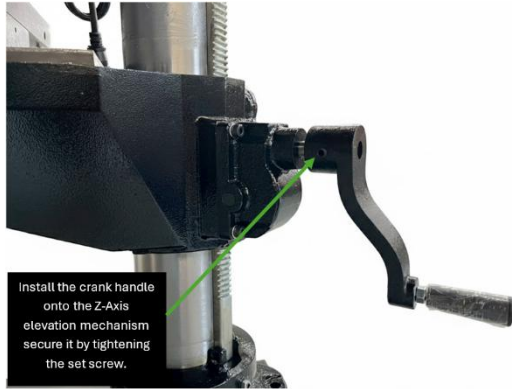
Assembly Instructions

After uncrating the machine you'll find two upper and lower braces you can remove these braces to begin the assembly. To remove the braces follow the instructions below.

Z-Axis Crank Handle Installation and Shipping Brace Removal

Z-Axis Crank Handle Installation





1. Remove the **cap screw and washer** securing the Z-axis crank handle.
2. Remove the crank handle and reverse its orientation.
3. Reinstall the crank handle with the **compression spring** in place, as shown in Figure.
4. Secure the assembly using the cap screw and washer.

2. Using the Z-axis crank handle, slightly lower the table.

Note: Apply only slight downward pressure. Excessive force may damage the knee by forcing it against the lower brace.

3. Remove the **upper wooden brace**.
4. Raise the table slightly, then remove the **lower wooden brace**.

Installing the Handwheels



Install all three handwheels two for X-Axis and one for the Y-Axis secure them with the set screw.



Removal of Shipping Braces

1. Loosen the **Z-axis table lock**



Section 4: Operations

Test Run

Test Run Procedure

After assembly is complete, perform a test run to verify proper electrical connection and correct operation of all safety devices.

WARNING:

Serious injury or death may result from operating this machine without fully understanding its controls and safety features. Do not operate, or allow others to operate, the machine until all instructions have been reviewed and understood.

If any abnormal condition occurs during the test run, immediately stop the machine, disconnect it from power, and correct the issue before resuming operation. Refer to the **Troubleshooting** table in the *Service* section of this manual as required.

Test Run Steps:

1. Remove all setup tools and loose items from the machine.
2. Rotate the **Master Power Switch** to the ON (“1”) position.
3. Press the **Emergency Stop/Reset** button.
4. Move the **Spindle Direction Switch** to the neutral (center) position.

5. Rotate the **Spindle Speed Dial** to “0”.
6. Set the **Spindle Speed Range Lever** to “L” (low range).
7. Connect the machine to power by inserting the power cord into a properly rated receptacle. The digital display and ON/OFF buttons should illuminate.
8. Reset the Emergency Stop button by twisting it clockwise until it releases and springs outward.
9. Press the **green ON button** to start the machine.
10. Move the spindle direction switch to the right (forward), then slowly increase the speed to “1” using the spindle speed dial.
 - Verify the motor starts smoothly and operates without abnormal noise or vibration.
11. Press the **Emergency Stop** button to stop the machine.
12. Without resetting the Emergency Stop button, attempt to start the machine by pressing the ON button.

Safety Verification

- If the machine **does not start**, the Emergency Stop safety circuit is functioning correctly. The test run is complete.



- If the machine **does start**, immediately turn it OFF and disconnect power. The Emergency Stop safety function is defective and must be repaired or replaced before further operation.

Spindle Break-In Procedure

NOTICE: Completion of this procedure is required to maintain warranty coverage. Failure to perform the spindle break-in may result in premature bearing wear once the spindle is placed under load.

The break-in process distributes lubrication throughout the spindle bearings, reducing the risk of early failure caused by dry spots or settled grease. This procedure must be performed:

- Before placing the spindle under load for the first time on a new machine.
- If the machine has been idle for more than **six (6) months**.

Always begin at the lowest speed to minimize potential wear while lubrication is being distributed.

Break-In Procedure

1. Set the **spindle speed range lever** to **Low** and rotate the **spindle speed dial** to “0”.
2. Slowly increase the spindle speed dial to “1”.

- Run the spindle for **10 minutes**, then turn the machine OFF.
3. Reverse the spindle rotation direction.
 - Run at the same speed for an additional **10 minutes**, then turn the machine OFF.
4. Repeat Steps 2–3 with the spindle speed dial set to “4” and then “8”, running for **5 minutes in each direction** at each setting.
5. Set the spindle speed range lever to **High**, then repeat Steps 2–4, operating for **5 minutes in each direction** at each speed setting.

The spindle break-in procedure is now complete. The machine may be placed into normal service.

Inspections & Adjustments

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

- **Gib Adjustments**
- **Leadscrew Backlash Adjustments**
- **Spindle Tramming**

Machine components may shift during transportation. Inspect these adjustments carefully during initial setup and early operation.

Spindle Tramming Requirement



The drill head may have moved during shipping. The spindle must be properly trammed to the table to ensure a precise **90° alignment**.

Refer to the **Tramming Spindle** in the service section for detailed procedures.

If any adjustments are found to be outside the specifications provided in this manual, or do not meet operational requirements, re-adjust them accordingly before placing the machine into service.

Operation

Overview

This overview provides a fundamental understanding of machine operation for novice operators. It is intended to introduce basic operational concepts and familiarize the user with machine controls and components referenced later in this manual.

This section is general in nature and does not replace formal instruction.

Operators should:

- Read this manual in its entirety before operating the machine.
- Obtain hands-on training from experienced personnel.
- Supplement their knowledge with industry publications, technical references, and formal instruction where necessary.



CAUTION Failure to obtain proper training may result in serious injury. The manufacturer assumes no liability for accidents resulting from inadequate training or improper use.

Typical Operating Sequence

A standard drilling operation generally includes the following steps:

1. Inspect the workpiece to confirm it is suitable for drilling.
2. Install the appropriate tooling for the intended operation.
3. Secure the workpiece firmly to the table using a vise or T-slot clamping system.
4. Adjust the table height as required and lock it securely in position.
5. Wear approved safety glasses and a face shield.
6. Connect the machine to a properly rated power source.
7. Select the appropriate spindle direction, speed range, and spindle speed.
8. Turn the machine ON and begin the drilling operation.
9. Upon completion:
 - Turn the machine OFF.
 - Rotate the Master Power Switch to the OFF ("0") position.
 - Disconnect the machine from power.

The spindle must come to a complete stop before adjusting, changing tooling, or removing the workpiece.

Table Movement and Locking

Table Travel

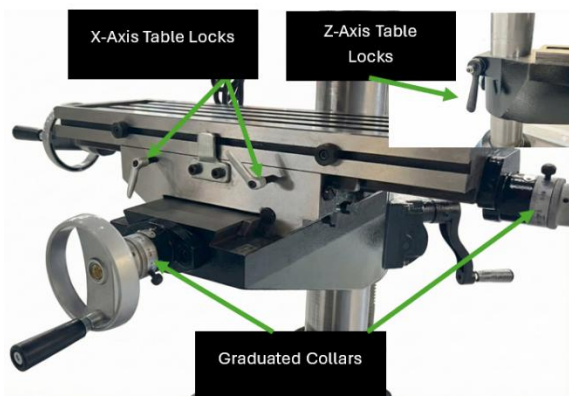


- The table moves along three axes: **X-axis (longitudinal), Y-axis (cross), and Z-axis (vertical)**.
- Movement is controlled manually using the **table handwheels** and the **Z-axis crank handle**.
- Optional **power feed** allows automated movement along the X- and Z-axes.
- The table can also be **rotated 360° around the column** for angled operations.

Table Locks

- Each axis is equipped with a **lock** to secure the table in position.
- **Always engage table locks** when movement along an axis is not required to increase rigidity.
- Failure to lock the table may result in:
 - Tool binding
 - Workpiece shifting
 - Damage to tooling or the workpiece

Refer to Figure for the location and identification of each axis lock.



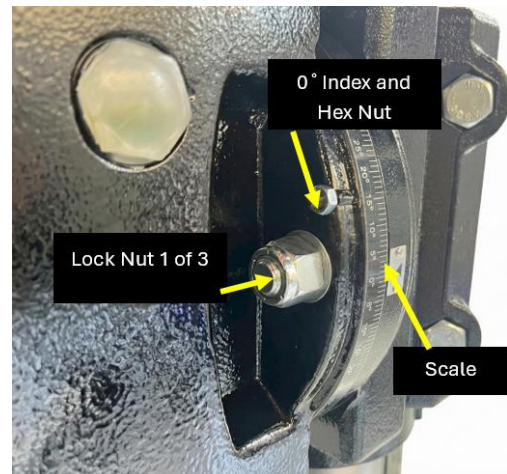
Head Tilt Operation

Overview

- The head tilts from **30° left to 90° right**.
- A **0° index pin** locks the head perpendicular to the table. Remove this pin before tilting.
- Use the **scale on the side of the head** to guide the tilt angle.
- When returning the head to 0°, **tram the spindle** to ensure it is perpendicular to the table (refer to Trimming Spindle, Page 48).

Tools Required

- Phillips #2 screwdriver – 1
- 10 mm open-end wrench – 1
- 24 mm open-end wrench or socket – 1
- Small hammer or mallet – 1



Procedure

1. **Disconnect power** from the machine.

2. Tighten the hex nut on the **0° index pin** to push the pin out of its hole. Remove the pin to allow tilting.
3. Remove the **cover plate** from the bottom of the headstock if necessary.
4. Loosen the **three lock nuts** securing the head tilt (one on each side and one inside the head under the cover plate).
5. With assistance to support the head, **tilt to the desired angle.**
 - Use the **scale** to set the desired tilt accurately.
6. If returning to 0°:
 - Use the scale to guide positioning.
 - Reinsert the **index pin** and gently tap it with a hammer or mallet to seat it.
7. **Retighten all lock nuts** to secure the head in position.

Safety Notes:

- Always have assistance when tilting the head to avoid injury.
- Verify the spindle is perpendicular after returning to 0° for accurate drilling.

Installing and Removing Tooling

Overview

- This machine features an **R-8 spindle.**
- Set **speed range lever to "L"** before installing or removing tooling to prevent spindle rotation.

- **Cutting tools are sharp;** always protect hands with **leather gloves or shop rags.**

Tools Required

- Hex wrench 3 mm – 1
- Wrench or socket 17 mm – 1
- Brass-head or mallet – 1

Installing Tooling

1. **Disconnect machine from power.**
2. **Clean spindle taper** and mating surface of tooling. Debris or oil can cause vibration, poor cutting, or tool/workpiece damage.
3. Remove motor cover.
4. Align **tool slot** with spindle pin and fully insert tooling.
5. Insert drawbar from the top of the head and **thread into tool by hand** until snug.
6. Tighten drawbar **1/4 turn** with wrench.
 - **Do not overtighten;** this can make removal difficult and damage threads/arbor.
7. Reinstall motor cover.



Removing Tooling

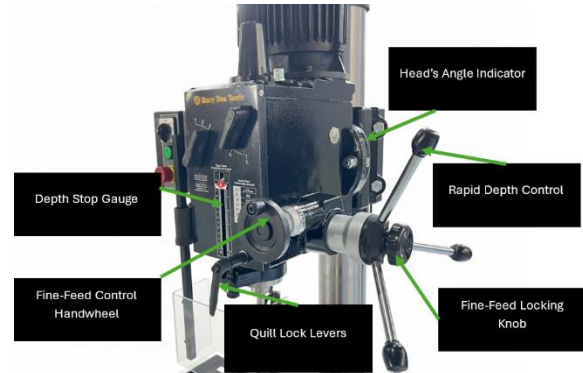
1. **Disconnect machine from power.**
2. Set spindle speed range lever to "L" to prevent spindle rotation.
3. Remove motor cover.
4. **Unthread drawbar** from tool at least one full rotation.
 - Ensure **at least three threads remain engaged** to prevent damage.
5. **Tap top of drawbar** with brass-head or dead-blow hammer to unseat taper.
6. Support tool with one hand and **fully unthread drawbar** from tool.

Down feed Controls

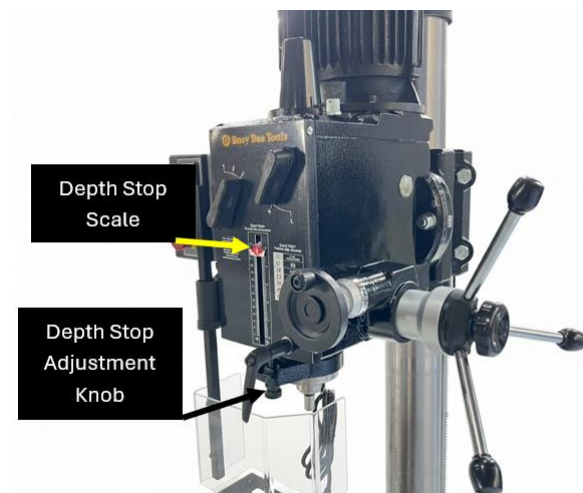
- **Coarse Down feed** – Used for drilling; quickly lowers spindle with variable speed/pressure and automatically retracts when released.
 - **Engage:** Loosen down feed selector knob while spindle is stopped.
 - **Caution:** Hold levers until spindle fully returns to avoid sudden upward motion.
- **Fine Down feed** – Provides precise spindle movement via handwheel.
- See **Figure** for all down feed control components (coarse levers, fine handwheel, quill lock lever, graduated dial, down feed selector knob).

Depth Stop

The depth stop controls the **maximum downward travel of the cutting tool**, limiting drilling depth to a **maximum of 5"**.



This feature is particularly useful for **repeated operations** where consistent depth is required.



Setting the Depth Stop

1. **Disconnect machine from power.**
2. **Install tooling** (refer to Installing Tooling, Page 30) and ensure spindle is fully raised into the headstock.
3. **Loosen Z-axis table lock** and raise the table until it is approximately **1/8" below the cutting tool**.

4. **Rotate depth stop adjustment knob** until the **top of the depth stop pointer** aligns with the desired depth on the scale see Figure .

Note: The depth stop scale serves as a **general guide only** and is **not intended for precision, tight-tolerance drilling**. For precise settings, refer to **Calibrating Depth Stop** on Page .

Spindle Speed Selection

Correct spindle speed is critical for **safe operation, optimal cutting performance, and maximum tool life**.

Understanding Spindle Speed

- **Cutting Speed (FPM):** The speed at which the cutting edge moves across the workpiece surface.
- **Recommended Cutting Speed:** Ideal speed for a given material to achieve **desired surface finish** and **tool longevity**.
- References such as **Machinery’s Handbook, Machine Shop Practice**, and online resources provide recommended cutting speeds for various materials and tooling.
- Online **spindle speed calculators** can help determine the correct spindle speed while accounting for variables such as tool diameter and material type.

| Gear Lever 1 | G L 2 | Speed |
|--------------|---------|--------------|
| Low Gear L | 1, 2, 3 | 60,130,230 |
| High Gear H | 1, 2, 3 | 450,800,1500 |

Setting Spindle Speed

Important: Always change spindle speed range **only when the spindle is completely stopped** to prevent damage.

1. **Determine the required spindle speed** based on material and tooling.
2. **Stop the spindle completely.**
3. **Set the spindle speed range lever** (see Figure 49) to high or low (“H” or “L”).
 - If necessary, **rotate the spindle by hand** to mesh the gears when changing range.
4. **Select the specific speed** using the gear lever (1, 2, 3) or the headstock chart.
5. Verify that the spindle speed dial corresponds to the desired speed before starting the machine.

Tip: Always confirm the spindle speed before cutting to **avoid tool damage or poor surface finish**.

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.

(Specific B2136MT3 listing not found on site; the above end mill closely matches typical Busy Bee tooling found online.)

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)
 - 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. Gearbox
 - Inspect for wear and oil level.
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.
 - The elevation mechanism of the table.
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 oil level**, signs of **wear**, or **damage**; adjust or replace as needed.

This format clearly separates daily versus monthly checks and emphasizes safety and preventive maintenance.

If you want, I can expand this into a **full preventive maintenance schedule** for the entire milling machine, including lubrication points and periodic inspections.

Here's a clear, technical rewrite of your cleaning and protection instructions:

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.
- **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.

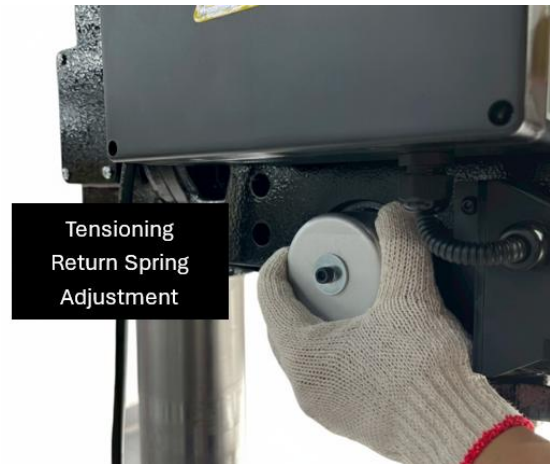
Belt and Pulley Maintenance

- **Inspect Belts Regularly**
 - Check for tension, wear, cracks, or fraying.
 - Replace immediately if any damage is found.



- **Replacement Belts**
 - Spindle to idler pulley: Use B-42 belt.
 - Idler pulley to motor pulley: Use B-34 belt.
- **Pulley Alignment**
 - Ensure all pulleys are properly aligned to prevent premature belt wear or slippage.
- **Notes**
 - Regular inspection helps maintain accurate spindle speeds and prevents mechanical damage.
 - Keep belts free of oil, grease, and debris.

- Failure to take precautions may result in **serious personal injury**.



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.

- **Factory Setting:**

- The **automatic quill return spring** is pre-set at the factory.
- **No adjustment is normally required** under standard operating conditions.

- **Adjustment Procedure (if needed):**

1. Locate the **spring housing** on the left side of the head.
2. Loosen the **black thumb knob two to three turns**.
3. Adjust the spring tension as required (follow full adjustment steps in the manual).
4. Retighten the thumb knob to secure the adjustment.

- **Caution:**

- Only perform spring adjustment if excessive or insufficient quill return is observed.
- Improper adjustment may affect **spindle operation** or cause injury.

Leadscrew Adjustment X and Y Axes

- **Purpose:**
 - Reduce **excessive play** in handwheels when moving the table.
 - Play exceeding **0.010"** (measured at the dial base) indicates adjustment is needed.
- **General Notes:**
 - Adjust in **small increments**.
 - Over-tightening can cause **excessive wear** on leadscrews and bearings.
 - Some adjustments may require **hex wrench extensions**.

X-Plane Leadscrew Adjustment

1. Locate the **X-plane leadscrew adjuster** under the middle of the table.
 - Adjustment screw head faces to the **right** Figure
2. Turn the **adjustment screw** carefully to reduce play.
3. Tighten the screw once the play is minimized.
4. Test by turning one of the sides handwheels.
 - Play should be **less than 0.010"**.

Y-Plane Leadscrew Adjustment

1. Access the **underside of the base** through the bench hole.
 2. Locate the **Y-plane leadscrew adjuster** midway along the leadscrew inside the base.
 3. Tighten the **set screw** on the adjuster.
 4. Test by turning the **front handwheel**.
 - Play should be **less than 0.010"**.
- **Caution:**
 - Make only **incremental adjustments**.
 - Verify movement and play after each adjustment before fully tightening.



Section 7: Service and Troubleshooting

Motor and Electrical

| Symptom | Possible cause | Solution |
|--|--|--|
| Machine does not start or a breaker trips. | <ol style="list-style-type: none"> 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 <i>OFF</i> or is at fault. 6. Wiring is open/has high resistance. 7. Main power switch is at fault. 8. Motor is at fault. | <ol style="list-style-type: none"> 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. | <ol style="list-style-type: none"> 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. V-belt(s) slipping. 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 | <ol style="list-style-type: none"> 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. Replace bad V-belt(s). 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. |



| | | |
|---|--|--|
| | | <ul style="list-style-type: none"> 11. Test/repair/replace switch. 12. Test/repair/replace motor. |
| Machine has vibration or noisy operation. | <ul style="list-style-type: none"> 1. Motor or component is loose. 2. V-belts are slapping belt cover; are worn or loose. 3. Belt pulley is loose. 4. Motor mount loose/broken. 5. Machine is incorrectly mounted or sits unevenly. 6. Workpiece is loose. 7. Motor fan is rubbing on fan cover. 8. Cutter is at fault. 9. Bit is chattering. 10. Motor bearings are at fault. | <ul style="list-style-type: none"> 1. Inspect/replace stripped or damaged bolts/nuts and re-tighten with thread locking fluid. 2. Replace/re-tension V-belts. 3. Replace shaft, pulley, setscrew, and key as required. 4. Tighten/replace. 5. Tighten/replace anchor studs in floor; relocate/shim machine. 6. Use the correct holding fixture and re-clamp workpiece. 7. Replace dented fan cover; replace loose/damaged fan. 8. Replace out-of-round cutter; replace/resharpen cutter; use appropriate feed rate and cutting RPM. 9. Replace/sharpen bit; index bit to workpiece; use appropriate feed rate and cutting RPM. 10. Test by rotating shaft; rotational grinding/loose shaft requires bearing replacement. |

Operation and Work Results

| Symptom | Possible cause | Solution |
|----------------------------|---|---|
| Tool slips in collet. | <ul style="list-style-type: none"> 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. | <ul style="list-style-type: none"> 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. | <ul style="list-style-type: none"> 1. RPM and or feed rate is too fast. 2. Cutting tool getting too hot. 3. Taking too big of a cut. | <ul style="list-style-type: none"> 1. Set correct RPM and feed rates. 2. Use coolant fluid or oil for appropriate application. 3. Lessen depth of cut and allow chips to clear. |
| Machine is loud | <ul style="list-style-type: none"> 1. Excessive depth of cut. | <ul style="list-style-type: none"> 1. Decrease depth of cut. |



| | | |
|---|--|---|
| when cutting. Overheats or bogs down in the cut. | 2. Dull cutting tools. | 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 (see Page). |
| 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

Note on Electrical System Updates

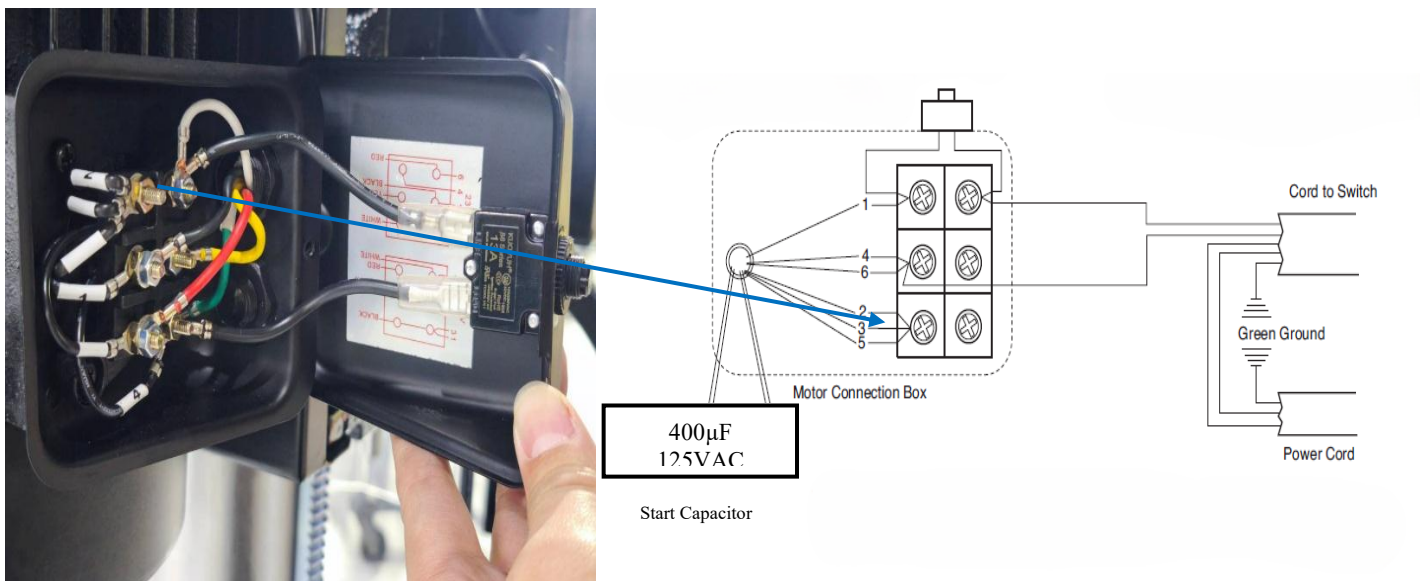
The information contained in this section reflects the electrical system configuration at the time this manual was produced. In the interest of continuous product improvement, future machines may feature modifications to the electrical components or layout. Before performing any work or reference, verify 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

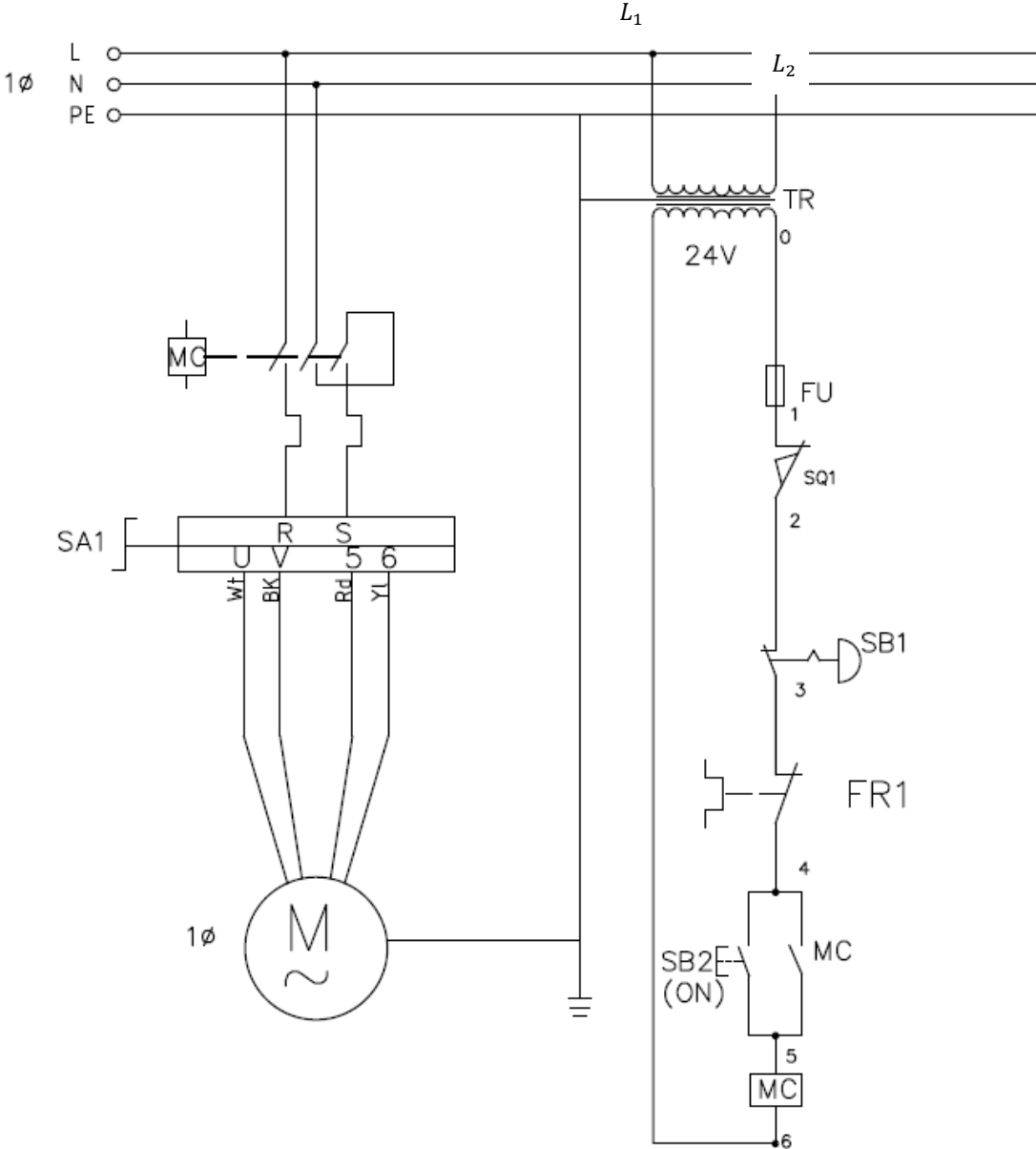


- **Shock Hazard:**
 - Disconnect power before servicing or inspecting.
 - Use insulated tools and PPE.
- **No Modifications:**
 - Do not alter wiring or replace components with non-approved parts.
- **Wire Connections:**
 - Ensure connections are tight, clean, and match the wiring diagram.
- **Circuit 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.

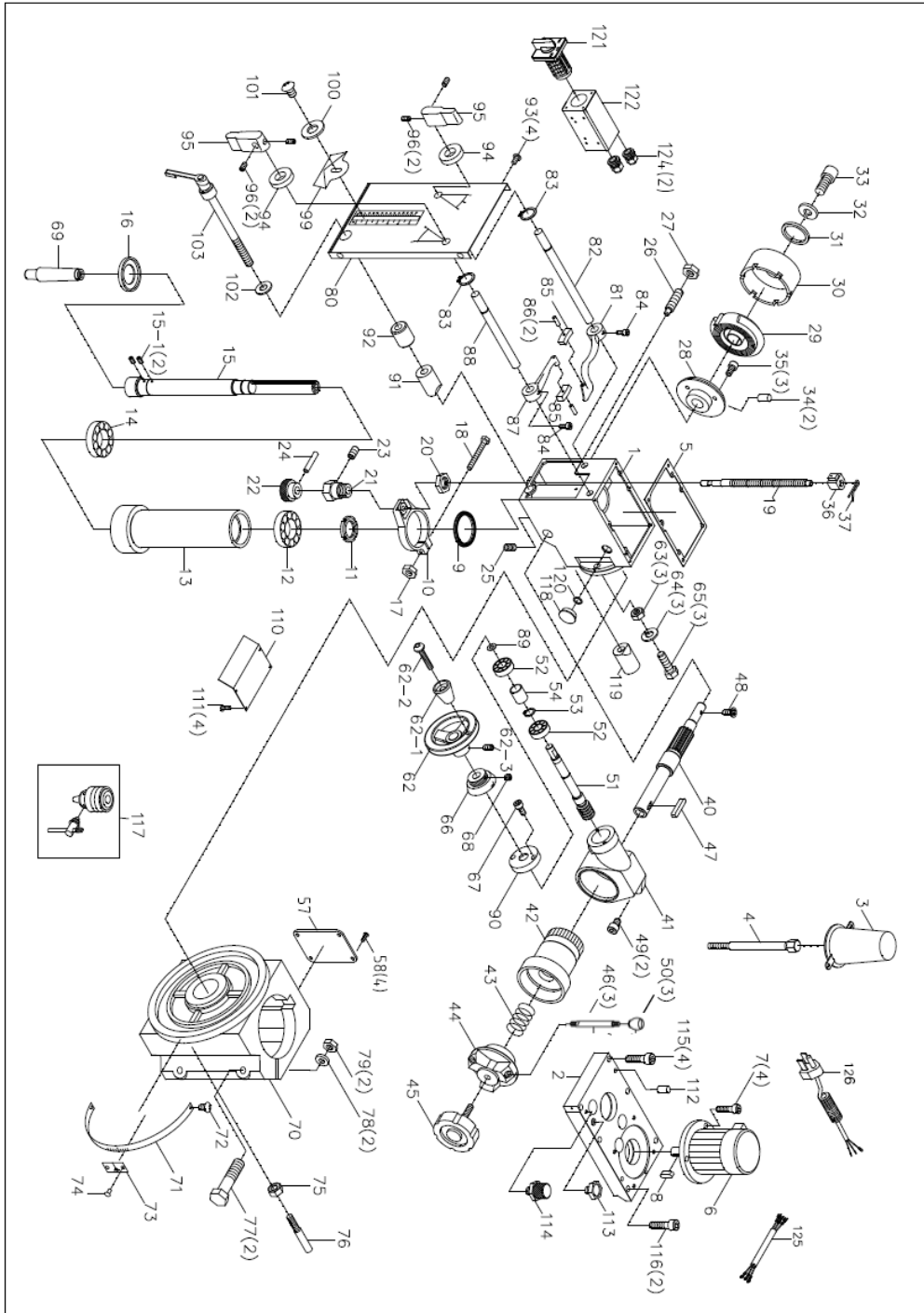
Motor Wiring Diagram

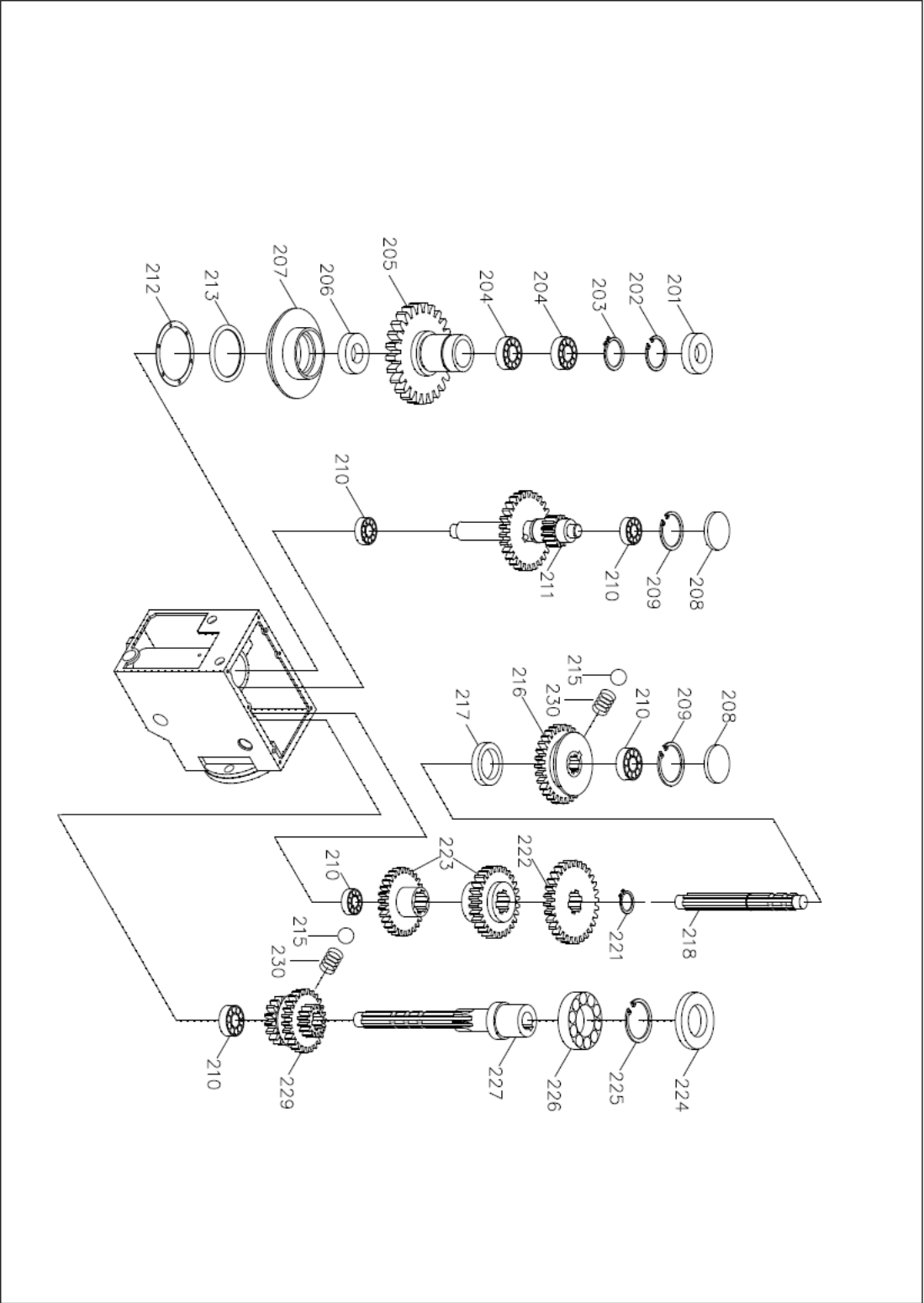


Electric Diagram



Section 9: Machine Diagrams and Parts List





| NO | PART NO | DESCRIPTION | QTY |
|------|--------------|---|-----|
| 1 | PBBMM40001 | Headstock Casting | 1 |
| 2 | PBBMM40002 | Headstock Cover | 1 |
| 3 | PBBMM40003 | Spindle Cap | 1 |
| 4 | PBBMM40004 | Drawbar R8 W7/16"-20 | 1 |
| 5 | PBBMM40005 | Leak Proof Gasket R8 W7/16"-20 | 1 |
| 6 | PBBMM40MOT | Motor 1.5HP/220V/60HZ/1PH | 1 |
| 6-1 | PBBMM40006-1 | Motor Capacitor 400MFD/125VAC | 1 |
| 6-2 | PBBMM40006-2 | Motor Fan Cover MM4016-2 | 1 |
| 6-3 | PBBMM40006-3 | Motor Overload 13A | 1 |
| 6-4 | PBBMM40006-4 | Motor Fan | 1 |
| 7 | PBBMM40007 | Cap Screw 3/8-16 X 1 3/8"-16x1"L | 4 |
| 8 | PBBMM40008 | Key 6 X 6 X 30MM | 1 |
| 9 | PBBMM40009 | Quill Seal (Rubber) $\phi 92 \times \phi 75 (T=6\text{mm})$ | 1 |
| 10 | PBBMM40010 | Depth Rod Mount | 1 |
| 11 | PBBMM40011 | Spanner Nut M30-1.5 | 1 |
| 12 | PBBMM40012 | Tapered Roller Bearing E30206j D=62,d=30,T=17.25mm | 1 |
| 13 | PBBMM40013 | Quill | 1 |
| 14 | PBBMM40014 | Tapered Roller Bearing 30207j D=72,d=35,T=18.25mm | 1 |
| 15 | PBBMM40015 | Spindle R8 | 1 |
| 15-1 | PBBMM40015-1 | Set Screw 8-32 X 1/4 | 2 |
| 16 | PBBMM40016 | Spindle End Cap MT3\MT4\R8 | 1 |
| 17 | PBBMM40017 | Hex Nut 1/4-20 | 1 |
| 18 | PBBMM40018 | Hex Bolt 1/4-20 X 2 | 1 |
| 19 | PBBMM40019 | Quill Depth Leadscrew | 1 |
| 20 | PBBMM40020 | Quill Depth Support Nut M16-1.5 | 1 |
| 21 | PBBMM40021 | Support Bracket | 1 |
| 22 | PBBMM40022 | Handle | 1 |
| 23 | PBBMM40023 | Set Screw M4x8l | 1 |
| 24 | PBBMM40024 | Pin $\phi 4 \times 20\text{L}$ | 1 |
| 25 | PBBMM40025 | Oil Drain Plug 1/4 Npt | 1 |
| 26 | PBBMM40026 | Alignment Pin 3/8-16 X 38 | 1 |
| 27 | PBBMM40027 | Hex Nut 3/8-16 | 1 |
| 28 | PBBMM40028 | Spring Base | 1 |
| 29 | PBBMM40029 | Flat Coiled Spring | 1 |
| 30 | PBBMM40030 | Return Spring Cover | 1 |
| 31 | PBBMM40031 | Fender Washer 1/4 | 1 |
| 32 | PBBMM40032 | Lock Washer 1/4"-20 | 2 |
| 33 | PBBMM40033 | Cap Screw 1/4-20 X 5/8 | 1 |
| 34 | PBBMM40034 | Dowel Pin 3 X 12 | 2 |
| 35 | PBBMM40035 | Phlp Hd Scr 10-24 X 3/4 | 3 |



| NO | PART NO | DESCRIPTION | QTY |
|------|--------------|---|-----|
| 36 | PBBMM40036 | Quill Depth Stop Block | 1 |
| 37 | PBBMM40037 | Hairpin Cotter | 1 |
| 40 | PBBMM40040 | Pinion Shaft | 1 |
| 41 | PBBMM40041 | Worm Shaft Housing | 1 |
| 42 | PBBMM40042 | Worm Gear | 1 |
| 43 | PBBMM40043 | Compression Spring 2.4 X 17.5 X 25 | 1 |
| 44 | PBBMM40044 | Coarse Down feed Lever Hub | 1 |
| 45 | PBBMM40045 | Knob Bolt 3/8-16 X 1-5/8, 6 Lobe PLASTIC | 1 |
| 46 | PBBMM40046 | Handle Rod | 3 |
| 47 | PBBMM40047 | Key 7x7x20L | 1 |
| 48 | PBBMM40048 | Flat Hd Scr 10-24 X 1/2 | 1 |
| 49 | PBBMM40049 | Cap Screw 5/16-18 X 3/4 | 2 |
| 50 | PBBMM40050 | Plastic Handle Ball W1/2"-12UNC | 3 |
| 51 | PBBMM40051 | Worm Shaft | 1 |
| 52 | PBBMM40052 | Ball Bearing 6202ZZ | 2 |
| 53 | PBBMM40053 | Ext Retaining Ring S15 | 1 |
| 54 | PBBMM40054 | Bearing Spacer $\phi 34 \times \phi 27$. | 1 |
| 57 | PBBMM40057 | Headstock Adapter Cover Plate | 1 |
| 58 | PBBMM40058 | Phlp Hd Screw 1/4"-20x3/8"L | 4 |
| 62S | PBBMM40062S | Handwheel 100mm | 1 |
| 62-1 | PBBMM40062-1 | Knob 5/16, 1 X 1 | 1 |
| 62-2 | PBBMM40062-2 | Shoulder Screw 5/16-18 X 1/4, 3/8 X 1 | 1 |
| 62-3 | PBBMM40062-3 | Set Screw 5/16-18 X 5/16 | 1 |
| 63 | PBBMM40063 | Lock Nut 5/8-11 | 3 |
| 64 | PBBMM40064 | Dock Washer 5/8 X 1-9/16 X 1/8 | 3 |
| 65 | PBBMM40065 | Hex Bolt 5/8-11 X 5-1/2 | 3 |
| 66 | PBBMM40066 | Fine Down feed Graduated Dial Inch (0~0.09) | 1 |
| 67 | PBBMM40067 | Phlp Hd Scr 10-24 X 1/2 | 2 |
| 68 | PBBMM40068 | Set Screw 1/4-20 X 5/16 | 1 |
| 69 | PBBMM40069 | Milling Cutter Arbor | 1 |
| 70 | PBBMM40070 | Head Adapter | 1 |
| 71 | PBBMM40071 | Head Tilt Scale | 1 |
| 72 | PBBMM40072 | Phlp Hd Scr 10-24 X 3/8 | 2 |
| 73 | PBBMM40073 | Tilt Scale Indicator | 1 |
| 74 | PBBMM40074 | Rivet 2 X 4mm | 2 |
| 75 | PBBMM40075 | Hex Nut M6-1 | 1 |
| 76 | PBBMM40076 | Index Pin M6-1 X 18, 6.5 X 34 | 1 |
| 77 | PBBMM40077 | Hex Bolt 5/8-11 X 5-1/2 | 2 |
| 78 | PBBMM40078 | Dock Washer 5/8 X 1-9/16 X 1/8 | 2 |
| 79 | PBBMM40079 | Hex Nut 5/8"-11 | 2 |

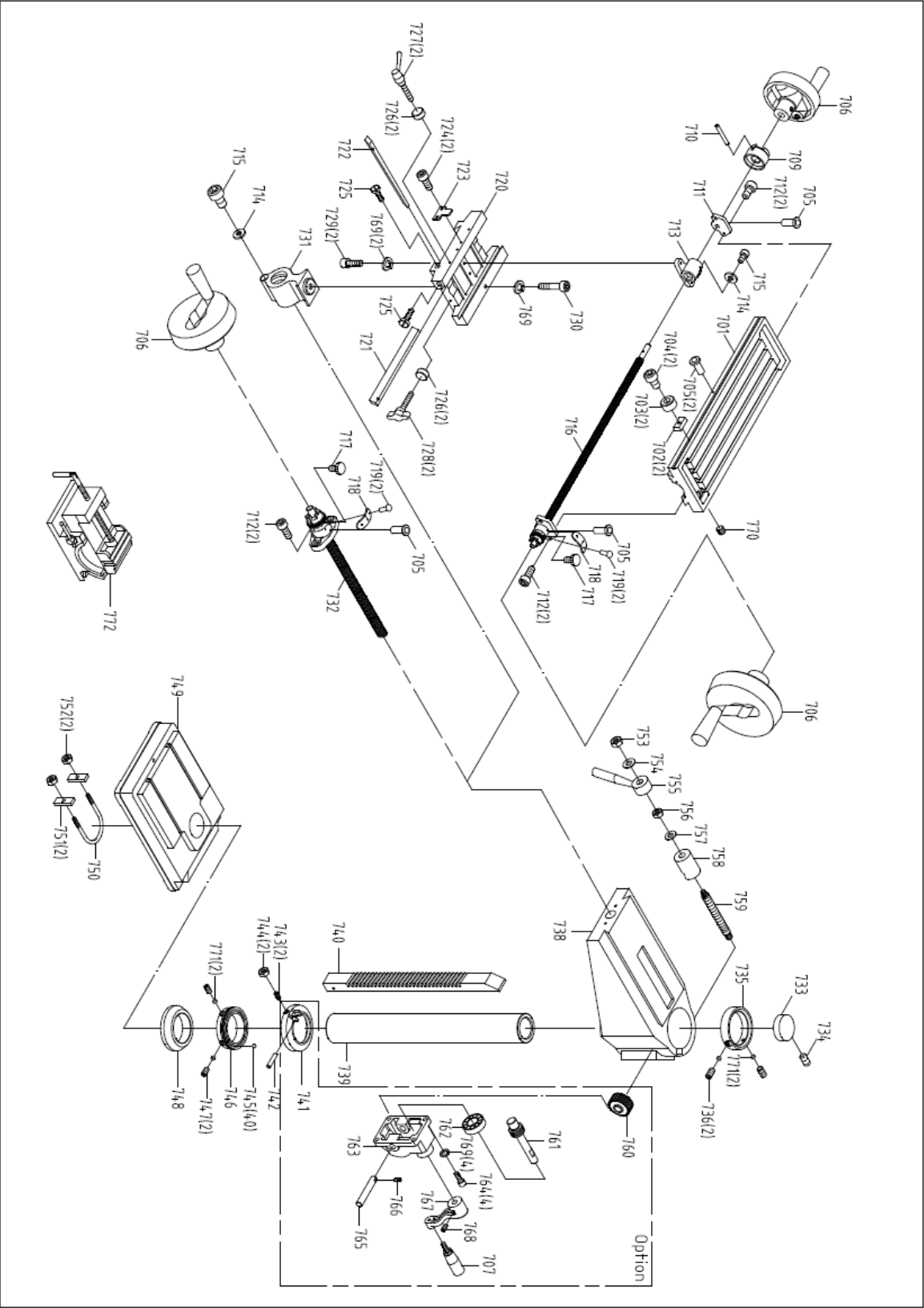


| NO | PART NO | DESCRIPTION | QTY |
|-----|------------|--|-----|
| 80 | PBBMM40080 | Headstock Faceplate BUSY BEE ONLY | 1 |
| 81 | PBBMM40081 | Speed Range Shift Lever (Left) | 1 |
| 82 | PBBMM40082 | Speed Range Shift Shaft (Left) | 1 |
| 83 | PBBMM40083 | Ext Retaining Ring S12 | 2 |
| 84 | PBBMM40084 | Cap Screw 1/4-20 X 1/2 | 2 |
| 85 | PBBMM40085 | Speed Range Shift Fork | 2 |
| 86 | PBBMM40086 | Dowel Pin 4 X 16 | 2 |
| 87 | PBBMM40087 | Speed Range Shift Lever (Right) | 1 |
| 88 | PBBMM40088 | Speed Range Shift Shaft (Right) | 1 |
| 89 | PBBMM40089 | Washer D30*d15*T2 | 1 |
| 90 | PBBMM40090 | Worm Shaft End Bracket | 1 |
| 91 | PBBMM40091 | Outside Lock Plunger ϕ 31.5x48L | 1 |
| 92 | PBBMM40092 | Lock Plunger Sleeve ϕ 31.5x36L | 1 |
| 93 | PBBMM40093 | Phlp Hd Scr 10-24 X 3/8 | 4 |
| 94 | PBBMM40094 | Oil Seal ϕ 12x ϕ 22x7 | 2 |
| 95 | PBBMM40095 | Speed Range Lever | 2 |
| 96 | PBBMM40096 | Set Screw 5/16-18 X 5/16 | 4 |
| 99 | PBBMM40099 | Depth Indicator | 1 |
| 100 | PBBMM40100 | Flat Washer 1/8"x6xt1 | 1 |
| 101 | PBBMM40101 | Phlp Hd Screw M3X8L | 1 |
| 102 | PBBMM40102 | Flat Washer 1/2"x25xt2mm | 1 |
| 103 | PBBMM40103 | Adjustable Handle 9"L, 1/2-13 X 2-3/4 | 1 |
| 110 | PBBMM40110 | Dust Shield | 1 |
| 111 | PBBMM40111 | Phlp Hd Scr 10-24 X 3/8 | 4 |
| 112 | PBBMM40112 | Taper Pin 10.3 X 30 | 1 |
| 113 | PBBMM40113 | Oil Fill Plug 3/8" Npt | 1 |
| 114 | PBBMM40114 | Vent Plug 1/8" Npt | 1 |
| 115 | PBBMM40115 | Cap Screw 5/16-18 X 1-1/4 | 4 |
| 116 | PBBMM40116 | Cap Screw 5/16-18 X 2 | 2 |
| 117 | PBBMM40117 | Drill Chuck With Key | 1 |
| 118 | PBBMM40118 | Oil Sight Glass 30mm | 1 |
| 119 | PBBMM40119 | Inside Lock Plunger | 1 |
| 120 | PBBMM40120 | O-Ring 28 X 2.6 | 1 |
| 121 | PBBMM40121 | Electric Box | 1 |
| 122 | PBBMM40122 | Emergency Stop | 1 |
| 123 | PBBMM40123 | F/R Switch | 1 |
| 124 | PBBMM40124 | Green Button | 1 |
| 125 | PBBMM40125 | Motor Cord CSA 14AWG*4C | 1 |
| 126 | PBBMM40126 | Power Cord With 220v Plug CSA AWG14x3C (220V PLUG) | 1 |
| 201 | PBBMM40201 | Oil Seal 40 X 68 X 8MM | 1 |



| NO | PART NO | DESCRIPTION | QTY |
|-----|-------------|--|-----|
| 202 | PBBMM40202 | Int Retaining Ring R68 | 1 |
| 203 | PBBMM40203 | Ext Retaining Ring S40 | 1 |
| 204 | PBBMM40204 | Ball Bearing 6008ZZ | 2 |
| 205 | PBBMM40205 | Gear 53t | 1 |
| 206 | PBBMM40206 | Oil Seal 35 X 45 X 8MM | 1 |
| 207 | PBBMM40207 | Oil Seal Ring | 1 |
| 208 | PBBMM40208 | Bearing Cover 35mm | 2 |
| 209 | PBBMM40209 | Int Retaining Ring R35 | 2 |
| 210 | PBBMM40210 | Ball Bearing 6202ZZ | 5 |
| 211 | PBBMM400211 | Gear Shaft Assembly 15t/41t | 1 |
| | | Gear Shaft 15t | 1 |
| | | Key 6 X 6 X 10MM | 1 |
| | | Gear 41t | 1 |
| | | Ext Retaining Ring 22mm | 1 |
| 212 | PBBMM40212 | Leak Proof Gasket | 1 |
| 213 | PBBMM40213 | O-Ring OD75.6 X ID69.4 X W3.1 (G70) | 1 |
| 215 | PBBMM40215 | Steel Ball 5/16 | 2 |
| A | PBBMM40GBA | Gear Box Set A INCLUDING 216/218/222/223 (6 PCS) | 1 |
| 216 | PBBMM40216 | Combo Gear 16t/42t | 1 |
| | | Combo Gear 16t | 1 |
| 217 | PBBMM40217 | Bushing | 1 |
| 218 | PBBMM40218 | Gear Shaft | 1 |
| 221 | PBBMM40221 | Ext Retaining Ring 20MM | 1 |
| 222 | PBBMM40222 | Combo Gear 44t | 1 |
| 223 | PBBMM40223 | Combo Gear 28t | 1 |
| | | Combo Gear 35t | 1 |
| 224 | PBBMM40224 | Oil Seal 35 X 62 X 8 | 1 |
| 225 | PBBMM40225 | Int Retaining Ring 62mm | 1 |
| 226 | PBBMM40226 | Ball Bearing 6007zz | 1 |
| B | PBBMM40GBB | Gear Shaft Assembly B | 1 |
| 227 | PBBMM40227 | Gear Shaft | 1 |
| 229 | PBBMM40229 | Combo Gear 15t | 1 |
| | | Combo Gear 31t | 1 |
| | | Combo Gear 23t | 1 |
| 230 | PBBMM40230 | Compression Spring 0.8 X 7.1 X 15 | 2 |





| NO | PART NO | DESCRIPTION | QTY |
|-----|------------|---|-----|
| 701 | PBBMM40701 | Table | 1 |
| 702 | PBBMM40702 | Fixed Block | 2 |
| 703 | PBBMM40703 | Movable Fixed Ring | 2 |
| 704 | PBBMM40704 | Hex. Socket Head Screw 1/4"X1/2" | 2 |
| 705 | PBBMM40705 | Oil Ball 1/4" | 5 |
| 706 | PBBMM40706 | Table Handle Wheel | 3 |
| 707 | PBBMM40707 | Clamp Handle | 1 |
| 709 | PBBMM40709 | Table Clutch ϕ 17 | 1 |
| 710 | PBBMM40710 | Pin ϕ 5x38L | 1 |
| 711 | PBBMM40711 | Left Flange ϕ 17 | 1 |
| 712 | PBBMM40712 | Hex. Socket Head Screw 5/16"x1"L | 6 |
| 713 | PBBMM40713 | Table Nut TM23.7-10 Inch | 1 |
| 714 | PBBMM40714 | Hex. Socket Head Screw M5x16L | 2 |
| 716 | PBBMM40716 | Table Screw Set | 1 |
| 717 | PBBMM40717 | Link Screw | 2 |
| 718 | PBBMM40718 | Limit Plate | 2 |
| 719 | PBBMM40719 | Rivet ϕ 2 | 4 |
| 720 | PBBMM40720 | Center Base | 1 |
| 721 | PBBMM40721 | Gib Strip | 1 |
| 722 | PBBMM40722 | Gib Strip | 1 |
| 723 | PBBMM40723 | Movable Fixed Block | 1 |
| 724 | PBBMM40724 | Hex. Socket Head Screw 5/16"x1/2"L | 2 |
| 725 | PBBMM40725 | Gib Strip Bolt | 2 |
| 726 | PBBMM40726 | Bushing | 4 |
| 727 | PBBMM40727 | Grip 5/16"-18UNC-36L | 2 |
| 728 | PBBMM40728 | T Screw | 2 |
| 729 | PBBMM40729 | Hex. Socket Head Screw 5/16"x1"L | 2 |
| 730 | PBBMM40730 | Hex. Socket Head Screw 5/16"x2-1/4"L | 1 |
| 731 | PBBMM40731 | Acme Nut TM23.7-10 Inch | 1 |
| 732 | PBBMM40732 | Table Base Screw | 1 |
| 733 | PBBMM40733 | Column Head | 1 |
| 734 | PBBMM40734 | Hex. Socker Headless Screw 5/16"x5/16"L | 1 |
| 735 | PBBMM40735 | Collar | 1 |
| 736 | PBBMM40736 | Hex. Socker Headless Screw 1/2"x5/8"L | 2 |
| 738 | PBBMM40738 | Swivel Base | 1 |
| 739 | PBBMM40739 | Column | 1 |
| 740 | PBBMM40740 | Rack | 1 |
| 741 | PBBMM40741 | Bearing Cover | 1 |
| 742 | PBBMM40742 | Pin ϕ 5x38L | 1 |
| 743 | PBBMM40743 | Fixed Screw | 2 |



| NO | PART NO | DESCRIPTION | QTY |
|-----|------------|---------------------------------------|-----|
| 744 | PBBMM40744 | Hex. Nut 5/16" | 2 |
| 745 | PBBMM40745 | Steel Ball ϕ 10 | 40 |
| 746 | PBBMM40746 | Bearing Cover (Lower) | 1 |
| 747 | PBBMM40747 | Hex. Socker Headless Screw 1/2"x5/8"L | 2 |
| 748 | PBBMM40748 | Bushing Bracket | 1 |
| 749 | PBBMM40749 | Machine Base | 1 |
| 750 | PBBMM40750 | "U" Bolt | 1 |
| 751 | PBBMM40751 | Fixed Block | 2 |
| 752 | PBBMM40752 | Hex. Nut 1/2" | 2 |
| 753 | PBBMM40753 | Hex. Nut 3/8" | 1 |
| 754 | PBBMM40754 | Washer 3/8" | 1 |
| 755 | PBBMM40755 | Plum Handle | 1 |
| 756 | PBBMM40756 | Hex. Nut 5/8" | 1 |
| 757 | PBBMM40757 | Washer 5/8" | 1 |
| 758 | PBBMM40758 | Lock Block | 1 |
| 759 | PBBMM40759 | Lock Bolt | 1 |
| 760 | PBBMM40760 | Worm Gear | 1 |
| 761 | PBBMM40761 | Worm Shaft | 1 |
| 762 | PBBMM40762 | Bearing | 1 |
| 763 | PBBMM40763 | Head Raise Bracket | 1 |
| 764 | PBBMM40764 | Hex. Socket Head Screw 5/16"x1"L | 4 |
| 765 | PBBMM40765 | Worm Shaft | 1 |
| 766 | PBBMM40766 | Hex. Socker Headless Screw 1/4"x3/8"L | 1 |
| 767 | PBBMM40767 | Head Handle | 1 |
| 768 | PBBMM40768 | Hex. Socker Headless Screw 3/8"x1/2"L | 1 |
| 769 | PBBMM40769 | Spring Washer 5/16" | 7 |
| 770 | PBBMM40770 | Hex. Socket Headless Screw PT1/4" | 2 |
| 771 | PBBMM40771 | Brass Bush | 4 |
| 772 | PBBMM40772 | Vise | 1 |





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.

