This manual provides critical safety instructions on the proper setup, operation, maintenance, and service of this machine/tool. Save this document, refer to it often, and use it to instruct other operators.

Failure to read, understand and follow the instructions in this manual may result in fire or serious personal injury—including amputation, electrocution, or death.

The owner of this machine/tool is solely responsible for its safe use. This responsibility includes but is not limited to proper installation in a safe environment, personnel training and usage authorization, proper inspection and maintenance, manual availability and comprehension, application of safety devices, cutting/sanding/grinding tool integrity, and the usage of personal protective equipment.

The manufacturer will not be held liable for injury or property damage from negligence, improper training, machine modifications or misuse.

Some dust created by power sanding, sawing, grinding, drilling, and other construction activities contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm. Some examples of these chemicals are:

- Lead from lead-based paints.
- Crystalline silica from bricks, cement and other masonry products.
- Arsenic and chromium from chemically-treated lumber.

Your risk from these exposures varies, depending on how often you do this type of work. To reduce your exposure to these chemicals: Work in a well ventilated area, and work with approved safety equipment, such as those dust masks that are specially designed to filter out microscopic particles.
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INTRODUCTION

Manual Accuracy

We are proud to offer this manual with your new machine! We've made every effort to be exact with the instructions, specifications, drawings, and photographs of the machine we used when writing this manual. However, sometimes errors do happen and we apologize for them.

Also, owing to our policy of continuous improvement, your machine may not exactly match the manual. If you find this to be the case, and the difference between the manual and machine leaves you in doubt, immediately call our technical support for updates or clarification.

For your convenience, we always keep current Grizzly manuals and most updates available on our website at www.grizzly.com. Any updates to your machine will be reflected in these documents as soon as they are complete. Visit our site often to check for the latest updates!

Functional Overview

The vertical mill is used to remove material from metal workpieces to form shapes. Tooling is inserted into the spindle of the head, which can be positioned in nearly any configuration above the table and workpiece.

During most operations, the tooling rotates in the spindle above the workpiece while the operator moves the workpiece, which is clamped to the table, in any combination of three paths of table movement—longitudinal (X-axis), cross (Y-axis), and vertical (Z-axis). The range of vertical movement for the table is greater than that of the head and spindle. However some operations, such as drilling or tapping, are better accomplished with vertical spindle movement using the coarse or fine downfeed controls.

The operator selects available spindle speeds by configuring the two V-belts across the motor, idler, and spindle pulleys.

The Model G3103 has a longitudinal power feed for consistent powered table movement with adjustable limit stops for a preset range of motion.

Contact Info

We stand behind our machines. If you have any service questions, parts requests or general questions about the machine, please call or write us at the location listed below.

Grizzly Industrial, Inc.
1203 Lycoming Mall Circle
Muncy, PA  17756
Phone: (570) 546-9663
Fax: (800) 438-5901
E-Mail: techsupport@grizzly.com

If you have any comments regarding this manual, please write to us at the address below:

Grizzly Industrial, Inc.
/Technical Documentation Manager
P.O. Box 2069
Bellingham, WA  98227-2069
Email: manuals@grizzly.com
Identification

Figure 1. Model G3102/G3103 identification.

A. Fine Downfeed Handwheel
B. Coarse Downfeed Lever
C. V-Belt Cover
D. Longitudinal (X-Axis) Handwheel
E. Longitudinal Power Feed (Model G3103)
F. Knee
G. Cabinet Stand & Door
H. Power ON/OFF Switch & Spindle Direction Switch
I. Cross (Y-Axis) Handwheel
J. Vertical (Z-Axis) Crank
K. Cross Slide
L. Table
M. Spindle Motor
N. Turret
O. Downfeed Selection Knob
P. Halogen Work Light
Q. Longitudinal Handwheel
R. One-Shot Way Oiler
S. Floor Mounting Points
T. Power Connection & Cable
U. Electrical Panel Access Cover
V. Column
W. Power ON/OFF Switch
X. Spindle Direction Switch
MODEL G3102 VERTICAL MILL

Product Dimensions:

Weight............................................................. 800 lbs.
Width (side-to-side) x Depth (front-to-back) x Height........................................ 45-1/2 x 41 x 66-5/8 in.
Footprint (Length x Width)................................................................. 27-1/2 x 21 in.
Space Required for Full Range of Movement (Width x Depth).............................. 60 x 42 in.

Shipping Dimensions:

Type............................................................ Wood Crate
Content.......................................................... Machine
Weight.......................................................... 904 lbs.
Length x Width x Height............................................................. 37 x 41 x 76 in.
Must Ship Upright...................................................................................... Yes

Electrical:

Power Requirement............................................................. 110V or 220V, Single-Phase, 60 Hz
Prewired Voltage............................................................. 110V
Full-Load Current Rating......................................................... 16A at 110V, 8A at 220V
Minimum Circuit Size.......................................................... 20A at 110V, 15A at 220V
Connection Type............................................................. Cord & Plug
Power Cord Included............................................................. Yes
Power Cord Length............................................................. 6 ft.
Power Cord Gauge............................................................. 14 AWG
Plug Included................................................................. Yes
Included Plug Type............................................................. 5-15 for 110V
Recommended Plug Type..................................................... 6-15 for 220V
Switch Type............................................................. 220V ON/OFF Push Button Magnetic Switch

Motors:

Main

Type............................................................. TEFC Capacitor-Start Induction
Horsepower............................................................. 1.5 HP
Phase................................................................. Single-Phase
Amps................................................................. 16A/8A
Speed................................................................. 1720 RPM
Power Transfer............................................................. V-Belt Drive
Bearings............................................................. Shielded & Permanently Lubricated
Main Specifications:

Operation Info

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spindle Travel</td>
<td>3 in.</td>
</tr>
<tr>
<td>Max Distance Spindle to Column</td>
<td>5-1/2 in.</td>
</tr>
<tr>
<td>Max Distance Spindle to Table</td>
<td>12-1/2 in.</td>
</tr>
<tr>
<td>Longitudinal Table Travel (X-Axis)</td>
<td>15-5/8 in.</td>
</tr>
<tr>
<td>Cross Table Travel (Y-Axis)</td>
<td>6 in.</td>
</tr>
<tr>
<td>Vertical Table Travel (Z-Axis)</td>
<td>14 in.</td>
</tr>
<tr>
<td>Vertical Head Travel (Z-Axis)</td>
<td>2-1/2 in.</td>
</tr>
<tr>
<td>Turret or Column Swivel (Left /Right)</td>
<td>45 deg.</td>
</tr>
<tr>
<td>Head Tilt (Left/Right)</td>
<td>45 deg.</td>
</tr>
<tr>
<td>Drilling Capacity for Cast Iron</td>
<td>1 in.</td>
</tr>
<tr>
<td>Drilling Capacity for Steel</td>
<td>3/4 in.</td>
</tr>
<tr>
<td>End Milling Capacity</td>
<td>3/4 in.</td>
</tr>
<tr>
<td>Face Milling Capacity</td>
<td>3 in.</td>
</tr>
</tbody>
</table>

Table Info

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<tr>
<td>Table Width</td>
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<tr>
<td>Table Thickness</td>
<td>1-3/4 in.</td>
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<tr>
<td>Number of T-Slots</td>
<td>3</td>
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<tr>
<td>T-Slot Size</td>
<td>0.56 in.</td>
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<tr>
<td>T-Slots Centers</td>
<td>1-9/16 in.</td>
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<td>X/Y-Axis Travel per Handwheel Revolution</td>
<td>0.125 in.</td>
</tr>
<tr>
<td>Z-Axis Travel per Handwheel Revolution</td>
<td>0.062 in.</td>
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Spindle Info

<table>
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<td>Spindle Taper</td>
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<tr>
<td>Number of Vertical Spindle Speeds</td>
<td>9</td>
</tr>
<tr>
<td>Range of Vertical Spindle Speeds</td>
<td>240 – 2760 RPM</td>
</tr>
<tr>
<td>Quill Diameter</td>
<td>2.950 in.</td>
</tr>
<tr>
<td>Drawbar Thread Size</td>
<td>7/16-20</td>
</tr>
<tr>
<td>Drawbar Length</td>
<td>12-1/4 in.</td>
</tr>
<tr>
<td>Spindle Bearings</td>
<td>Tapered Roller Bearings</td>
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Construction

<table>
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<th>Feature</th>
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<td>Spindle Housing/Quill</td>
<td>Cast Iron</td>
</tr>
<tr>
<td>Table</td>
<td>Surface Ground Cast Iron</td>
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<tr>
<td>Head</td>
<td>Cast Iron</td>
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<tr>
<td>Column/Base</td>
<td>Cast Iron</td>
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<tr>
<td>Base</td>
<td>Cast Iron</td>
</tr>
<tr>
<td>Stand</td>
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<td>Paint Type/Finish</td>
<td>Enamel</td>
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Other

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<td>Recommended Mobile Base</td>
<td>D2058A</td>
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Other Specifications:

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<th>Feature</th>
<th>Specification</th>
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<tr>
<td>Country of Origin</td>
<td>China</td>
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<tr>
<td>Warranty</td>
<td>1 Year</td>
</tr>
<tr>
<td>Approximate Assembly &amp; Setup Time</td>
<td>1 Hour</td>
</tr>
<tr>
<td>ISO 9001 Factory</td>
<td>No</td>
</tr>
<tr>
<td>CSA, ETL, or UL Certified/Listed</td>
<td>No</td>
</tr>
</tbody>
</table>

Features:

- High Precision Ground Vertical and Cross Ways
- Milling Head Micro-Feed
- Lower Noise and Convenient Operation
- Built-In Work Light
Accessories Included:

Arbor
Drawbar
End Mill
Inner Hexagon Spanner
Oil Gun
Tool Box
Two Head Wrench
MODEL G3103 VERTICAL MILL W/ TABLE POWER FEED

Product Dimensions:

Weight.............................................................................................................................................................. 900 lbs.
Width (side-to-side) x Depth (front-to-back) x Height.......................................................................................... 45-1/2 x 41 x 66-5/8 in.
Footprint (Length x Width).................................................................................................................................. 27-1/2 x 21 in.
Space Required for Full Range of Movement (Width x Depth)......................................................................... 60 x 42 in.

Shipping Dimensions:

Type.......................................................................................................................................................... Wood Crate
Content........................................................................................................................................................... Machine
Weight.............................................................................................................................................................. 926 lbs.
Length x Width x Height.................................................................................................................................. 37 x 41 x 75 in.
Must Ship Upright................................................................................................................................................... Yes

Electrical:

Power Requirement........................................................................................................................................... 110V or 220V, Single-Phase, 60 Hz
Prewired Voltage............................................................................................................................................... 110V
Full-Load Current Rating.................................................................................................................................. 16A at 110V, 8A at 220V
Minimum Circuit Size........................................................................................................................................ 20A at 110V, 15A at 220V
Connection Type.............................................................................................................................................. Cord & Plug
Power Cord Included.......................................................................................................................................... Yes
Power Cord Length........................................................................................................................................... 6 ft.
Power Cord Gauge......................................................................................................................................... 14 AWG
Plug Included.................................................................................................................................................. Yes
Included Plug Type........................................................................................................................................ 5-15 for 110V
Recommended Plug Type.................................................................................................................................. 6-15 for 220V
Switch Type.................................................................................................................................................... ON/OFF Push Button Switch w/Safety Cover

Motors:

Main

Type.......................................................................................................................................................... TEFC Capacitor-Start Induction
Horsepower..................................................................................................................................................... 1.5 HP
Phase......................................................................................................................................................... Single-Phase
Amps.......................................................................................................................................................... 16A/8A
Speed.......................................................................................................................................................... 1720 RPM
Power Transfer........................................................................................................................................... V-Belt Drive
Bearings..................................................................................................................................................... Shielded & Permanently Lubricated
Main Specifications:

Operation Info

Spindle Travel..................................................................................................................................................... 3 in.
Max Distance Spindle to Column...................................................................................................................... 5-1/2 in.
Max Distance Spindle to Table......................................................................................................................... 12-1/2 in.
Longitudinal Table Travel (X-Axis)................................................................................................................... 15-5/8 in.
Cross Table Travel (Y-Axis)............................................................................................................................... 6 in.
Vertical Table Travel (Z-Axis)............................................................................................................................. 14 in.
Vertical Head Travel (Z-Axis)............................................................................................................................ 2-1/2 in.
Turret or Column Swivel (Left /Right)................................................................................................................. 45 deg.
Head Tilt (Left/Right)........................................................................................................................................... 45 deg.
Drilling Capacity for Cast Iron....................................................................................................................... 1 in.
Drilling Capacity for Steel................................................................................................................................. 3/4 in.
End Milling Capacity.......................................................................................................................................... 3/4 in.
Face Milling Capacity......................................................................................................................................... 3 in.

Table Info

Table Length........................................................................................................................................................ 26 in.
Table Width......................................................................................................................................................... 6-1/8 in.
Table Thickness............................................................................................................................................... 1-3/4 in.
Number of T-Slots............................................................................................................................................. 3
T-Slot Size.......................................................................................................................................................... 0.56 in.
T-Slots Centers.................................................................................................................................................. 1-9/16 in.
Number of Longitudinal Feeds......................................................................................................................... Variable
X-Axis Table Power Feed Rate............................................................................................................................ 0 – 11.67 FPM
XY-Y-Axis Travel per Handwheel Revolution............................................................................................... 0.125 in.
Z-Axis Travel per Handwheel Revolution........................................................................................................ 0.062 in.

Spindle Info

Spindle Taper..................................................................................................................................................... R-8
Number of Vertical Spindle Speeds................................................................................................................... 9
Range of Vertical Spindle Speeds..................................................................................................................... 240 - 2760 RPM
Quill Diameter................................................................................................................................................. 2.950 in.
Drawbar Thread Size....................................................................................................................................... 7/16-20
Drawbar Length.............................................................................................................................................. 12-1/4 in.
Spindle Bearings............................................................................................................................................. Tapered Roller Bearings

Construction

Spindle Housing/Quill...................................................................................................................................... Cast Iron
Table................................................................................................................................................................. Surface Ground Cast Iron
Head................................................................................................................................................................. Cast Iron
Column/Base.................................................................................................................................................. Cast Iron
Base................................................................................................................................................................. Cast Iron
Stand............................................................................................................................................................... Steel
Paint Type/Finish............................................................................................................................................ Enamel

Other

Recommended Mobile Base............................................................................................................................... D2058A

Other Specifications:

Country of Origin ............................................................................................................................................... China
Warranty ............................................................................................................................................................. 1 Year
Approximate Assembly & Setup Time .............................................................................................................. 1 Hour
ISO 9001 Factory............................................................................................................................................... No
CSA, ETL, or UL Certified/Listed ...................................................................................................................... No
Features:
- High Precision Ground Vertical and Cross Ways
- Milling Head Micro-Feed
- Lower Noise and Convenient Operation
- Built-In Work Light
- Servo-Type Variable Speed Power Feed Unit with Limit Switches
- Extended Lead Screw on the X-Axis

Accessories Included:
- Arbor
- Drawbar
- End Mill
- Inner Hexagon Spanner
- Oil Gun
- Tool Box
- Two Head Wrench
SECTION 1: SAFETY

For Your Own Safety, Read Instruction Manual Before Operating This Machine

Safety Instructions for Machinery

**WARNING**

OWNER’S MANUAL. Read and understand this owner’s manual BEFORE using machine.

TRAINED OPERATORS ONLY. Untrained operators have a higher risk of being hurt or killed. Only allow trained/supervised people to use this machine. When machine is not being used, disconnect power, remove switch keys, or lock-out machine to prevent unauthorized use—especially around children. Make workshop kid proof!

DANGEROUS ENVIRONMENTS. Do not use machinery in areas that are wet, cluttered, or have poor lighting. Operating machinery in these areas greatly increases the risk of accidents and injury.

MENTAL ALERTNESS REQUIRED. Full mental alertness is required for safe operation of machinery. Never operate under the influence of drugs or alcohol, when tired, or when distracted.

ELECTRICAL EQUIPMENT INJURY RISKS. You can be shocked, burned, or killed by touching live electrical components or improperly grounded machinery. To reduce this risk, only allow qualified service personnel to do electrical installation or repair work, and always disconnect power before accessing or exposing electrical equipment.

DISCONNECT POWER FIRST. Always disconnect machine from power supply BEFORE making adjustments, changing tooling, or servicing machine. This prevents an injury risk from unintended startup or contact with live electrical components.

EYE PROTECTION. Always wear ANSI-approved safety glasses or a face shield when operating or observing machinery to reduce the risk of eye injury or blindness from flying particles. Everyday eyeglasses are NOT approved safety glasses.
WARNING

WEARING PROPER APPAREL. Do not wear clothing, apparel or jewelry that can become entangled in moving parts. Always tie back or cover long hair. Wear non-slip footwear to avoid accidental slips, which could cause loss of workpiece control.

HAZARDOUS DUST. Dust created while using machinery may cause cancer, birth defects, or long-term respiratory damage. Be aware of dust hazards associated with each workpiece material, and always wear a NIOSH-approved respirator to reduce your risk.

HEARING PROTECTION. Always wear hearing protection when operating or observing loud machinery. Extended exposure to this noise without hearing protection can cause permanent hearing loss.

REMOVE ADJUSTING TOOLS. Tools left on machinery can become dangerous projectiles upon startup. Never leave chuck keys, wrenches, or any other tools on machine. Always verify removal before starting!

USE CORRECT TOOL FOR THE JOB. Only use this tool for its intended purpose—do not force it or an attachment to do a job for which it was not designed. Never make unapproved modifications—modifying tool or using it differently than intended may result in malfunction or mechanical failure that can lead to personal injury or death!

AWKWARD POSITIONS. Keep proper footing and balance at all times when operating machine. Do not overreach! Avoid awkward hand positions that make workpiece control difficult or increase the risk of accidental injury.

CHILDREN & BYSTANDERS. Keep children and bystanders at a safe distance from the work area. Stop using machine if they become a distraction.

GUARDS & COVERS. Guards and covers reduce accidental contact with moving parts or flying debris. Make sure they are properly installed, undamaged, and working correctly.

FORCING MACHINERY. Do not force machine. It will do the job safer and better at the rate for which it was designed.

NEVER STAND ON MACHINE. Serious injury may occur if machine is tipped or if the cutting tool is unintentionally contacted.

STABLE MACHINE. Unexpected movement during operation greatly increases risk of injury or loss of control. Before starting, verify machine is stable and mobile base (if used) is locked.

USE RECOMMENDED ACCESSORIES. Consult this owner’s manual or the manufacturer for recommended accessories. Using improper accessories will increase the risk of serious injury.

UNATTENDED OPERATION. To reduce the risk of accidental injury, turn machine OFF and ensure all moving parts completely stop before walking away. Never leave machine running while unattended.

MAINTAIN WITH CARE. Follow all maintenance instructions and lubrication schedules to keep machine in good working condition. A machine that is improperly maintained could malfunction, leading to serious personal injury or death.

CHECK DAMAGED PARTS. Regularly inspect machine for any condition that may affect safe operation. Immediately repair or replace damaged or mis-adjusted parts before operating machine.

MAINTAIN POWER CORDS. When disconnecting cord-connected machines from power, grab and pull the plug—NOT the cord. Pulling the cord may damage the wires inside. Do not handle cord/plug with wet hands. Avoid cord damage by keeping it away from heated surfaces, high traffic areas, harsh chemicals, and wet/damp locations.

EXPERIENCING DIFFICULTIES. If at any time you experience difficulties performing the intended operation, stop using the machine! Contact our Technical Support at (570) 546-9663.
# WARNING

## Additional Safety Instructions for Mills

<table>
<thead>
<tr>
<th>No.</th>
<th>Instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>UNDERSTANDING CONTROLS. Make sure you understand the use and operation of all controls before starting the mill.</td>
</tr>
<tr>
<td>2.</td>
<td>SAFETY ACCESSORIES. Always keep the chip guard in place in addition to your safety glasses, or use a face shield when milling to reduce the risk of injury from flying chips.</td>
</tr>
<tr>
<td>3.</td>
<td>WORK HOLDING. A workpiece that moves unexpectedly during operation can result in personal injury and damage to tooling and the mill. Before starting the machine, be certain the workpiece has been properly clamped to the table. NEVER hold the workpiece by hand during operation.</td>
</tr>
<tr>
<td>4.</td>
<td>REMOVING TOOLS. Objects that are thrown by the spinning action of the mill can be deadly missiles. Always remove the chuck key, drawbar wrench, and any service tools immediately after use and before starting the mill.</td>
</tr>
<tr>
<td>5.</td>
<td>SPINDLE SPEEDS. For safe and good results, select the spindle speed that is appropriate for the type of work and material. Allow the mill to reach full speed before beginning a cut.</td>
</tr>
<tr>
<td>6.</td>
<td>STOPPING SPINDLE. Your hand was not designed to stop a rapidly spinning metal object. DO NOT stop the spindle using your hand. Allow the spindle to stop on its own.</td>
</tr>
<tr>
<td>7.</td>
<td>CLEAN-UP. Metal chips can cut your hands. DO NOT clear chips by hand or compressed air. Use a brush or vacuum, and never clear chips while the spindle is turning.</td>
</tr>
<tr>
<td>8.</td>
<td>MACHINE CARE AND MAINTENANCE. Never operate the mill with damaged or worn parts that can break apart and cause injury and property damage. Maintain your mill in proper working condition. Perform routine inspections and maintenance promptly. Put away adjustment tools after use.</td>
</tr>
<tr>
<td>9.</td>
<td>DISCONNECT POWER. To avoid possible electrocution, make sure the mill is turned OFF, disconnected from its power source and all moving parts have come to a complete stop before changing cutting tools, starting any inspection, adjustment, or maintenance procedure.</td>
</tr>
<tr>
<td>10.</td>
<td>AVOIDING ENTANGLEMENT HAZARDS. DO NOT wear loose clothing, gloves, or jewelry when operating mill. Tie back long hair and roll up sleeves.</td>
</tr>
<tr>
<td>11.</td>
<td>CUTTING TOOL INSPECTION. Inspect cutting tools for sharpness, chips, or cracks before each use. Replace dull, chipped, or cracked cutting tools immediately. Handle new cutting tools with care. Leading edges are very sharp and can cause lacerations.</td>
</tr>
<tr>
<td>12.</td>
<td>POWER DISRUPTION. In the event of a local power outage during operation, turn OFF all switches to avoid possible sudden start up once power is restored.</td>
</tr>
<tr>
<td>13.</td>
<td>BE ATTENTIVE. To avoid injury hazards to others, DO NOT leave the mill running unattended for any reason.</td>
</tr>
<tr>
<td>14.</td>
<td>EXPERIENCING DIFFICULTIES. If at any time you are experiencing difficulties performing the intended operation, stop using the machine! Contact our Technical Support at (570) 546-9663.</td>
</tr>
</tbody>
</table>
SECTION 2: CIRCUIT REQUIREMENTS

110/220V Operation

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

WARNING
Electrocution or fire could result if machine is not grounded and installed in compliance with electrical codes. Compliance MUST be verified by a qualified electrician!

Full Load Amperage Draw
Amp Draw at 110V (pre-wired) .......... 16 Amps
Amp Draw at 220V .......................... 8 Amps

Power Supply Circuit Requirements
You MUST connect your machine to a grounded circuit that is rated for the amperage given below. Never replace a circuit breaker on an existing circuit with one of higher amperage without consulting a qualified electrician to ensure compliance with wiring codes. If you are unsure about the wiring codes in your area or you plan to connect your machine to a shared circuit, consult a qualified electrician.

Minimum Circuit Size (110V) ................. 20 Amps
Minimum Circuit Size (220V) ................. 15 Amps

Power Connection Device
The Model G3102/G3103 comes pre-wired with a NEMA 5-15 plug for connection to power. If you rewire the motor to 220V, we recommend using the plug/receptacle shown in Figure 2 for 220V.

Extension Cords
Using extension cords may reduce the life of the motor. Instead, place the machine near a power source. If you must use an extension cord:

• For 110V, use at least a 12 gauge cord that does not exceed 50 feet in length.
• For 220V, use at least a 14 gauge cord that does not exceed 50 feet in length.
• The extension cord must have a ground wire and plug pin.

NOTICE
The Model G3102/G3103 is pre-wired for 110V operation. If you plan to operate your machine at 220V, follow the 220V Conversion procedure on the next page and refer to the wiring diagram on Page 44.
220V Conversion

To operate your mill with 220V power, you must: 1) replace the 110V power ON/OFF switch with the included 220V switch, 2) re-wire the motor, 3) re-wire the transformer, and 4) install a NEMA 6-15 plug and receptacle.

Refer to Page 44 for the full 220V Conversion Wiring Diagram.

WARNING
You MUST disconnect the mill from the power source before beginning any of the following 220V conversion procedures to avoid serious personal injury or death by electrocution.

Replacing the Power Switch
Record the wire connections on the 110V switch before you remove it, then replace it with the included 220V power switch and make the same wire connections.

Re-Wiring the Motor
1. Remove the cover of the motor wiring junction box.
2. Re-configure the two metal terminal jumpers so that terminals Z2 and U2 are connected and U2 and V1 are connected, as shown in Figure 3.
3. Remove the wire from the Z2 terminal and terminate it with a wire cap and electrical tape (see Figure 3), then re-install the wiring junction box cover.

Re-Wiring the Transformer
Remove the electrical panel access cover on the rear of the column, then move the wire from the 115V terminal on the transformer to the 230V terminal, as shown in Figure 4.

WARNING
Covers, guards, and safety devices on this machine are provided for your safety. Always keep them secured in place before connecting the machine to power to avoid serious personal injury.

Figure 3. Motor configured for 220V operation.

Figure 4. Electrical panel transformer configured for 220V operation.
SECTION 3: SETUP

Setup Safety

⚠️ WARNING
This machine presents serious injury hazards to untrained users. Read through this entire manual to become familiar with the controls and operations before starting the machine!

⚠️ WARNING
Wear safety glasses during the entire setup process!

⚠️ WARNING
The Model G3102/G3103 is a heavy machine. Serious personal injury may occur if safe moving methods are not used. To be safe, get assistance and use a fork lift rated for at least 1500 lbs. to move the shipping crate and remove the machine from the crate.

Items Needed for Setup

The following items are needed to complete the setup process, but are not included with your machine:

<table>
<thead>
<tr>
<th>Description</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assistant ...........................................</td>
<td>1</td>
</tr>
<tr>
<td>Safety Glasses ......................................</td>
<td>1</td>
</tr>
<tr>
<td>Solid Round High-Grade Steel Bar 5/8&quot;-3/4&quot;D x 3'L or longer</td>
<td>1</td>
</tr>
<tr>
<td>Fork Lift (rated for at least 1500 lbs) ..........</td>
<td>1</td>
</tr>
<tr>
<td>Precision Level .....................................</td>
<td>1</td>
</tr>
<tr>
<td>Metal Shims ..........................................</td>
<td>As Needed</td>
</tr>
<tr>
<td>Floor Mounting Hardware .............................</td>
<td>As Needed</td>
</tr>
<tr>
<td>Shop Rags &amp; Cleaning Solvent ........................</td>
<td>As Needed</td>
</tr>
<tr>
<td>Standard Screwdriver ................................</td>
<td>1</td>
</tr>
<tr>
<td>Hex Wrench 3mm .......................................</td>
<td>1</td>
</tr>
<tr>
<td>Wrench or Socket 16mm ................................</td>
<td>1</td>
</tr>
</tbody>
</table>

Unpacking

Your machine was carefully packaged for safe transportation. Remove the packaging materials from around your machine and inspect it. If you discover the machine is damaged, please immediately call Customer Service at (570) 546-9663 for advice.

Save the containers and all packing materials for possible inspection by the carrier or its agent. Otherwise, filing a freight claim can be difficult.

When you are completely satisfied with the condition of your shipment, inventory the contents.
Inventory

The following is a description of the main components shipped with your machine. Lay the components out to inventory them.

Note: If you can't find an item on this list, check the mounting location on the machine or examine the packaging materials carefully. Occasionally we pre-install certain components for shipping purposes.

Inventory: (Figure 5)   Qty
A. V-Belts A-32 & A-37 .......................... 1 Each
B. Handwheels ........................................... 2
C. Toolbox .................................................. 1
D. Power ON/OFF Switch 220V ................. 1
E. Hex Wrenches 3, 4, 5, 6mm ................. 1 Each
F. Handles ...................................................... 4
G. Wrenches 10/12mm & 16/18mm .... 1 Each
H. Face Mill 3" ............................................. 1
I. Screwdrivers Standard & Phillips .... 1 Each
J. Drawbar 7⁄16"-14 x 10 1⁄2" ...................... 1
K. Table T-Bolts ........................................... 2

Figure 5. Model G3102/G3103 inventory.
Clean Up

The unpainted surfaces are coated with a waxy oil to prevent corrosion during shipment. Remove this protective coating with a solvent cleaner or degreaser, such as shown in Figure 6. For thorough cleaning, some parts must be removed. For optimum performance, clean all moving parts or sliding contact surfaces. Avoid chlorine-based solvents, such as acetone or brake parts cleaner that may damage painted surfaces. Always follow the manufacturer’s instructions when using any type of cleaning product.

![Warning]

**WARNING**
Gasoline and petroleum products have low flash points and can explode or cause fire if used to clean machinery. DO NOT use these products to clean the machinery.

![Caution]

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

G2544—Solvent Cleaner & Degreaser
H9692—Orange Power Degreaser
Great products for removing shipping grease.

![Figure 6]

**Figure 6.** Cleaner/dgreasers available from Grizzly.

Site Considerations

Floor Load
Refer to the Machine Data Sheet beginning on Page 4 for the weight and footprint specifications of your machine. Some residential floors may require additional reinforcement to support both the machine and operator.

Placement Location
Consider existing and anticipated needs, size of material to be processed through each machine, and space for auxiliary stands, work tables or other machinery when establishing a location for your new machine. See Figure 7 for the minimum working clearances.

![Figure 7]

**Figure 7.** Minimum working clearances.

![Caution]

**CAUTION**
Children and visitors may be seriously injured if unsupervised around this machine. Lock entrances to the shop or disable start switch or power connection to prevent unsupervised use.

G2544—Solvent Cleaner & Degreaser
H9692—Orange Power Degreaser
Great products for removing shipping grease.

![Figure 6]

**Figure 6.** Cleaner/dgreasers available from Grizzly.
To move and place your mill:

1. After removing the crate from the shipping pallet, insert a \( \frac{5}{8} - \frac{3}{4} ” D \times 3’ L \) solid round steel bar through the hoisting holes on both sides of the column.

   **Note:** Make sure the round bar is high grade steel capable of holding the load without bending.

2. Place the forklift forks under the bar and close to the column on both sides, as shown in Figure 8.

3. Unbolt the mill from the shipping pallet.

4. With assistance to steady the machine, lift it just enough to clear the shipping pallet and floor obstacles, then move it to the prepared location.

5. When mounting the machine, use shims and a precision level to make sure the table is level from side-to-side and front-to-back.

   **Note:** You can either place the shims between the steel cabinet stand and the floor, or between the cast iron base and the cabinet stand.

---

**WARNING**

The Model G3102/G3103 is a heavy machine. Serious personal injury may occur if safe moving methods are not used. To be safe, get assistance and use a fork lift rated for at least 1500 lbs. to move the shipping crate and remove the machine from the crate.

---

**NOTICE**

We strongly recommend bolting your machine to the floor if it is hardwired to the power source. Consult with your electrician to ensure compliance with local codes.
Mounting to Shop Floor

Although not required, we recommend that you mount your new machine to the floor. Because this is an optional step and floor materials may vary, floor mounting hardware is not included. Generally, you can either bolt your machine to the floor or mount it on machine mounts. Both options are described below. Whichever option you choose, it is necessary to level your machine with a precision level.

Bolting to Concrete Floors

Anchor studs and lag shield anchors with lag bolts are two popular methods for anchoring an object to a concrete floor (see Figure 9. We suggest you research the many options and methods for mounting your machine and choose the best that fits your specific application.

Using Machine Mounts

Using machine mounts, shown in Figure 10, gives the advantage of fast leveling and vibration reduction. The large size of the foot pads distributes the weight of the machine to reduce strain on the floor.

Figure 10. Machine mount example.

Figure 9. Typical fasteners for mounting to concrete floors.
Assembly

To assemble your mill:

1. Install the four handles into the table handwheels and the elevation crank (see Figure 11).

2. Remove the tape that secures the keys to the left longitudinal and cross leadscrews, slide the handwheels onto the shaft, then tighten the set screws in the handwheel hub to secure them.

3. Loosen the three turret rotation lock nuts (see Figure 12), manually center the head over table, then re-tighten the lock nuts.

![Figure 11. Handle and handwheel installed.](image)

![Figure 12. Turret rotation lock nut.](image)

⚠️ WARNING
Before starting the mill, make sure you have performed the preceding assembly instructions, and you have read through the rest of the manual and are familiar with the various functions and safety features on this machine. Failure to follow this warning could result in serious personal injury or even death!
Test Run

Once the assembly is complete, test run your machine to make sure it runs properly and is ready for regular operation. The test run consists of verifying the following: 1) The motor powers up and runs correctly, 2) the spindle direction switch operates correctly, and 3) the V-belt cover safety switch works properly.

If, during the test run, you cannot easily locate the source of an unusual noise or vibration, stop using the machine immediately, then review Troubleshooting on Page 37.

If you cannot find a remedy, contact our Tech Support at (570) 546-9663 for assistance.

To test run the machine:

1. Make sure you understand the safety instructions at the beginning of the manual and that the machine is set up properly.

2. Make sure all tools and objects used during setup are cleared away from the machine.

3. Connect the machine to the power source.

4. Verify that the machine is operating correctly by lifting the power ON/OFF switch cap and pushing the ON button.

   —When operating correctly, the machine runs smoothly with little or no vibration or rubbing noises.

   —Investigate and correct strange or unusual noises or vibrations before operating the machine further. Always turn the machine OFF and disconnect it from power before investigating or correcting potential problems.

5. Turn the machine OFF and wait for the spindle to come to a complete stop.

6. Use the spindle direction switch to change the direction of spindle rotation.

7. Turn the mill ON and verify that the spindle is rotating in the opposite direction.

8. Turn the machine OFF and wait for the spindle to stop.

9. Lift the V-belt cover so that it stays up on its own.

10. Keeping your hands away from the V-belts and pulleys, verify the V-belt cover safety switch is operating correctly by attempting to turn the machine ON.

   —If the machine DOES NOT start, the V-belt cover safety switch is working correctly. The Test Run procedure is complete.

   —If the machine DOES start with the V-belt cover lifted, immediately turn the machine OFF and disconnect it from power. The V-belt cover safety switch is not working correctly. This safety feature must work properly before proceeding with regular operations. Call Tech Support for help.

After all of the Test Run procedures are successfully completed, proceed to Spindle Break-in on the next page.
Spindle Break-In

**NOTICE**

Successfully complete the spindle break-in procedure to avoid rapid wear of the spindle components when placed into operation.

To perform the spindle break-in procedure:

1. DISCONNECT MACHINE FROM POWER!

2. Configure the V-belts for a spindle speed of 360 RPM (refer to Setting Spindle Speed on Page 27).

3. Connect the machine to power, then turn it ON and let it run for 20 minutes.

4. Turn the machine OFF and wait for the spindle to stop.

5. Use the spindle direction switch to reverse the spindle rotation, then turn the mill ON and let it run for another 20 minutes.

6. Turn the machine OFF, disconnect it from power, then configure the V-belts for a spindle speed of 2220 RPM.

7. Repeat Steps 3–5 for this speed.

8. Turn the mill OFF. The spindle break-in procedure is now complete and the machine is ready for operation.

---

**Recommended Adjustments**

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

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

Step-by-step instructions for these adjustments can be found in the SERVICE section starting on Page 37.

Factory adjustments that should be verified:


2. Leadscrew backlash adjustment (Page 40).
SECTION 4: OPERATIONS

Operation Safety

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

⚠️ WARNING
Damage to your eyes and face could result from using this machine without proper protective gear. Always wear safety glasses and face shield when operating this machine.

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

⚠️ WARNING
Like all machinery there is potential danger when operating this machine. Accidents are frequently caused by lack of familiarity or failure to pay attention. Use this machine with respect and caution to decrease the risk of operator injury. If normal safety precautions are overlooked or ignored, serious personal injury may occur.

Table Movement

Your mill table has three paths of movement controlled by the handwheels or crank (see Figure 13): 1) Longitudinal (X-axis), 2) cross (Y-axis), and 3) vertical (Z-axis).

The graduated dials on the handwheels and crank are marked in increments of 0.001", with one full revolution moving the table 0.125".

The Model G3103 also has a longitudinal power feed unit (refer to Power Feed on Page 25 for detailed instructions).

⚠️ NOTICE
If you have never used this type of machine or equipment before, WE STRONGLY RECOMMEND that you read books, trade magazines, or get formal training before beginning any projects. Regardless of the content in this section, Grizzly Industrial will not be held liable for accidents caused by lack of training.
Locks
Use the table, cross slide, and knee locks shown in Figures 14–15 to secure the table in position when controlled movement of the workpiece and table are not needed during operation.

Limit Stops
Position the limit stops along the limit stop tracks to confine the distance the table or cross slide can travel (see Figures 16–18).

CAUTION
Always keep the table locked in place unless controlled movement is required for your operation. Unexpected table movement during operations could cause the cutter to bind with the workpiece resulting in damage to the cutter and workpiece, and possible personal injury.
The Model G3103 is equipped with a power feed system for controlled X-axis table movement. Refer to Figure 19 and the following descriptions to understand the functions of these devices.

A. Limit Switch: Stops powered table movement when either limit stop presses a plunger on the switch.

B. Limit Stop: Activates the limit switch. Secure these devices along the limit slot to confine table movement.

C. Rapid Movement Button: When pressed, moves the table at the maximum speed in the direction selected.

D. Direction Lever: Starts, reverses, and stops longitudinal table movement.

E. Speed Dial: Controls the speed that the table moves—turn the dial clockwise to increase the speed.

F. ON/OFF Switch: The master power switch for the power feed.

G. Power Lamp: Lights when the power feed is turned ON.

H. Ball Handle: Manually positions the table.

I. Graduated Dial: Marked in 0.001" increments, each complete revolution is equal to 0.125" of longitudinal table travel.

CAUTION
Stay away from the spinning longitudinal handwheels when using the power feed to avoid entanglement and personal injury.

Tools Needed

<table>
<thead>
<tr>
<th>Qty</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hex Wrench 5mm</td>
</tr>
</tbody>
</table>

To operate the longitudinal power feed:

1. Loosen the table locks.

2. Position the longitudinal limit stops (see Figure 20) along the table to confine the longitudinal distance you want the table to travel, then tighten the cap screws to secure them in place.

3. Rotate the speed dial all the way to the left, then use the direction lever to select the direction of table travel.

4. Flip the ON/OFF switch up to turn the power feed ON.

CAUTION
Be sure there is enough running clearance between the table, spindle, vise/clamps, or jigs before turning the power feed ON. Be aware that all of these objects represent potential pinch points.
5. Adjust the speed dial to move the table at the correct speed for your operation.

   **Note:** Power feed rates are difficult to precisely adjust. We recommend that you experiment with different dial settings to find the feed rate that best works for your operation.

6. When you are through using the power feed, move the direction lever to the center neutral position, then flip the ON/OFF switch down to turn the power feed **OFF**.

---

**Head Tilt**

The head tilts 90° from left to right (see Figure 21).

![Figure 21. Head tilted 45° to the left.](image)

**Tools Needed**

<table>
<thead>
<tr>
<th>Wrench 19mm</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

To tilt the head:

1. DISCONNECT THE MILL FROM POWER!

2. Loosen the four locking hex nuts on either side of the turret (see **Figure 22**).

   ![Locking Hex Nuts (2 of 4)](image)

3. Manually tilt the head to the left or right and use the head tilting scale to determine the angle.

4. Re-tighten the four locking hex nuts to secure the head.

---

**Turret Rotation**

The turret rotates 360° around the column (see **Figure 23**).

![Figure 23. Head and turret rotated 45° to the left.](image)
Always lock the head firmly in place after adjusting its position. Unexpected movement of the head during operations could cause the cutter to bind with the workpiece causing damage to the cutter and workpiece, and possible personal injury.

CAUTION

Tools Needed
Wrench 19mm ................................................... 1

To rotate the turret:

1. DISCONNECT THE MILL FROM POWER!

2. Loosen the three locking hex nuts on the turret (see Figure 24).

3. Manually rotate the head and turret around the column to the left or right and use the turret rotation scale to determine the amount of rotation.

4. Re-tighten the three turret locking hex nuts to secure the head and turret in place before beginning operations.

To select the correct spindle speed (RPM) for your milling operation, you will need to: 1) Determine the spindle speed needed for your workpiece, and 2) configure the V-belts for the selected spindle speed.

Calculating Spindle Speed

1. Use the table in Figure 25 to determine the cutting speed or surface feet per minute (SFM) required for your workpiece material.

<table>
<thead>
<tr>
<th>Workpiece Material</th>
<th>Cutting Speed (SFM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum &amp; alloys</td>
<td>300</td>
</tr>
<tr>
<td>Brass &amp; Bronze</td>
<td>150</td>
</tr>
<tr>
<td>Copper</td>
<td>100</td>
</tr>
<tr>
<td>Cast Iron, soft</td>
<td>80</td>
</tr>
<tr>
<td>Cast Iron, hard</td>
<td>50</td>
</tr>
<tr>
<td>Mild Steel</td>
<td>90</td>
</tr>
<tr>
<td>Cast Steel</td>
<td>80</td>
</tr>
<tr>
<td>Alloy Steel, hard</td>
<td>40</td>
</tr>
<tr>
<td>Tool Steel</td>
<td>50</td>
</tr>
<tr>
<td>Stainless Steel</td>
<td>60</td>
</tr>
<tr>
<td>Titanium</td>
<td>50</td>
</tr>
<tr>
<td>Plastics</td>
<td>300-800</td>
</tr>
<tr>
<td>Wood</td>
<td>300-500</td>
</tr>
</tbody>
</table>

Note: For carbide cutting tools, double the cutting speed. These values are a guideline only. Refer to the MACHINERY’S HANDBOOK for more detailed information.

Figure 25. Cutting speed table for HSS cutting tools.

2. Measure the diameter of your cutting tool in inches.

3. Use the following formula to calculate the required spindle speed (RPM) for your operation:

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

\[
= \frac{\text{Recommended Tool Dia. (in inches) \times 3.14 \times \text{Cutting Speed (FPM)}}}{12}
\]
**Configuring V-Belts**

1. **DISCONNECT MACHINE FROM POWER!**

2. Open the V-belt cover.

3. Support the motor with one hand and loosen the motor lock shown in Figure 26.

   **Note:** The motor lock secures the position of the tension pin. This pin has an internal spring that keeps it in contact with the head casting when you loosen the lock and re-position the motor.

4. Press the motor toward the front to release the tension on the V-belts, then use the motor lock to secure it in position.

5. Refer to the V-belt configuration chart in Figure 27 (also found on the inside of the V-belt cover) to configure the V-belts on the pulleys for the selected spindle speed.

   **Figure 27.** V-belt configuration chart.

6. When the V-belts are properly positioned on the pulleys, loosen the motor lock, pull the motor away from the machine with moderate force to tension the V-belts, then lock the tension pin in place by re-tightening the motor.

   **Note:** The pivot arm of the idler pulley will equally distribute the tension between the two V-belts.

7. Check the V-belt tension by applying moderate pressure on the V-belt with your finger between two pulleys. The proper amount of deflection of the V-belt for this machine is approximately \( \frac{1}{2} \)" (see Figure 28).

   **Figure 28.** The correct amount of V-belt deflection when properly tensioned.

8. Close the V-belt cover before beginning operations.

**Example of Setting Spindle Speed with HSS Cutting Tool**

If you want make a surface cut on a hard cast iron workpiece using a \( \frac{5}{8} \)" (0.625") HSS cutter, do the following:

**Step 1:** Examine the mill cutting speed table in Figure 25 to find the recommended cutting speed to be 50 SFM, then use the formula on Page 27 to find the correct spindle speed (RPM).

**Step 2:** 50 SFM (from the chart) \( \times 4 = 200 \).

**Step 3:** \( \frac{200}{0.625} \) (diameter of cutter) = 320.
Step 4: Find the nearest spindle speed in the V-belt configuration chart in Figure 27, which is 360 RPM.

Step 5: Note the V-belt configuration in the chart above and to the left of the speed of 360 RPM, which is CI.

Step 6: Position the motor V-belt on the third pulley from the bottom of the idler and motor pulleys, as shown in Figure 29, then position the spindle V-belt on the second pulley from the bottom of the spindle and idler pulley.

Figure 29. V-belts configured for a spindle speed of 360 RPM.

NOTICE

When using a carbide cutting tool, double the cutting speed found in the cutting speed table in Figure 25 on Page 27.

Downfeed Controls

Refer to the following descriptions and Figures 30–31 to understand the functions of the downfeed controls for the quill/spindle.

A. Quill Dog: Moves with the quill. Use the pointer on the side with the downfeed scale to determine the depth of downfeed travel.

B. Downfeed Scale: Displays in inches the amount of quill travel.

C. Coarse Downfeed Lever: When this lever is enabled with the downfeed selector, it raises/lowers the quill quickly.

D. Quill Lock: Locks the quill in place but does not affect spindle rotation.

E. Downfeed Stop & Lock Wheels: Stops the downfeed travel when the quill dog reaches this point. Set the stop wheel along the downfeed scale for the desired depth of cut, then secure it in place by tightening the lock wheel up to it.

F. Graduated Scale: Displays quill travel in 0.001" increments when the fine downfeed handwheel is used, with one full revolution represents 0.100" of quill travel.

G. Fine Downfeed Handwheel: When enabled, it raises/lowers the quill in small increments.

H. Downfeed Selector: Enables either the coarse or fine downfeed control. Tighten the selector to enable the fine downfeed handwheel, and loosen it to enable the coarse downfeed lever.
Loading/Unloading Tooling

Your mill is equipped with a 7/16"-20 x 10 1/2" drawbar (see Figure 32).

Tools Needed

<table>
<thead>
<tr>
<th>Item</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wrench 19mm</td>
<td>1</td>
</tr>
</tbody>
</table>

Loading Tooling

1. DISCONNECT MACHINE FROM POWER!

2. Clean any debris or oily substances from the mating surfaces of the spindle and tool tapers.

3. Open the V-belt cover, rotate the adjustment hex nut to the top of the drawbar, then place the drawbar through the top of the spindle (see Figure 33).

4. Slowly rotate the tool as you insert it into the spindle until you feel the spindle key slip into the tool keyway (see Figure 34).

5. Thread the drawbar into the tool by hand until it is snug.

6. Fully seat the tool into the spindle by tightening the drawbar adjustment hex nut down to draw the tool up only until it is snug.

   Note: Over-tightening the drawbar could make removing the tool difficult.

Unloading Tooling

1. DISCONNECT MACHINE FROM POWER!

2. Keep one hand on the tool, loosen the adjustment hex nut, then completely unthread the drawbar.

   —If the tool does not release from the spindle when the drawbar is unthreaded, turn the drawbar back into the tool two full turns, then tap the top of the drawbar with a dead-blow hammer or rubber mallet until the tool releases.

CAUTION

Cutting tools are sharp and can quickly cut your hands. Always protect your hands when handling cutting tools.
SECTION 5: ACCESSORIES

H6087—2 Axis Digital Readout (8" x 20")
H7848—3 Axis Digital Readout (8" x 20" x 16¾")
You will be amazed the list of features for these DROs that include: selectable resolution down to 5µm, absolute/incremental coordinate display, arc function, line of holes function, angled cuts function, 199 user defined datum points, centering/cutter offset, double sealed scales, inches/millimeters, calculator with trig functions, and linear error compensation.

Figure 35. 3 Axis Digital Read Out.

H8257—Primrose Armor Plate with Moly-D Machine and Way Oil 1 Quart
This superior machine and way lubricant prevents stick slip and chatter due to anti-friction capabilities resulting in greater precision machining capabilities. Provides the thinnest oil film possible while effectively providing needed lubrication and rust/corrosion protection. Adhesive/cohesive components are added for vertical surfaces. Resists squeeze out, running, dripping and non-gumming.

“This is good stuff! I use it on my lathes at home.”
S. Balolia – President

Figure 37. Primrose Armor Plate Lubricant.

G1075—52-PC. Clamping Kit
This clamping kit includes 24 studs, 6 step block pairs, 6 T-nuts, 6 flange nuts, 4 coupling nuts, and 6 end hold-downs. The rack is slotted so it can be mounted close to the machine for easy access. Made for ½" T-slots.

Figure 36. G1075 52-PC. Clamping Kit.

T10063—Milling Vise 12½" x 6½"
T10064—Milling Vise 17½" x 8¼"
• Ultra precise in flatness, parallelism and verticality.
• Anti-lift mechanism ensures the workpiece does not lift when jaws are tightened.
• Ductile iron body.
• Flame hardened vise bed and jaws.
• Sealed bearing system.
• 8200 lbs. of clamping pressure.

Figure 38. T10064 Milling vise (handle included, but not shown.)
**G9299—10” Yuasa-Type Rotary Table**
This high precision rotary table features extra deep coolant channels, dual positive action locks, very low profiles, 10 second vernier scales, gear drives with oil immersion and satin chrome dials. See the current Grizzly catalog for full specifications. Features: 4.330” overall height (horizontal), 6.750” height to center hole (vertical), #3 Morse Taper, 0.465” T-slot width, and 117 lb approximate shipping weight.

*Figure 39. G9299 10” Yuasa-Type Rotary Table.*

**T20501—Face Shield Crown Protector 4”**
**T20502—Face Shield Crown Protector 7”**
**T20503—Face Shield Window**
**T20451—“Kirova” Clear Safety Glasses**
**T20452—“Kirova” Anti-Reflective S. Glasses**
**H7194—Bifocal Safety Glasses 1.5**
**H7195—Bifocal Safety Glasses 2.0**
**H7196—Bifocal Safety Glasses 2.5**

*Figure 40. Our most popular eye protection.*

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

*Figure 41. Recommended products for protecting unpainted cast iron/steel part on machinery.*

**H8370—Power Feed for Mills**
If you want to get the most out of your mill, you really need a power feed. This power feed comes with everything required to start milling with exact control. Comes supplied with a mounting bracket, gear, auto-stop limit switch with moveable stop pins, gear guard, and motor. Specs: 0–140 RPM, 200 RPM rapid switch, 440 in/lb. maximum torque, 110V 60Hz motor, 4:1 bevel drive gear.

*Figure 42. H8370 power feed.*

**Call 1-800-523-4777 To Order**
SECTION 6: MAINTENANCE

WARNING
Always disconnect power to the machine before performing maintenance. Failure to do this may result in serious personal injury.

Schedule

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

Before Daily Operation:
- Check/tighten loose mounting bolts.
- Check/sharpen/replace worn or damaged tooling.
- Check/repair/replace worn or damaged wires.
- Check for any other unsafe condition.
- Use the one-shot way oiler (Page 34).

Every 8 Hours of Operation:
- Use the one-shot way oiler (Page 34).
- Clean the mill.

Every 40 Hours of Operation:
- Lubricate the longitudinal, cross, and vertical leadscrews (Page 34).

Every 120 Hours of Operation:
- Lubricate quill downfeed gears (Page 35).

Note: This maintenance schedule is based on average usage. Adjust the maintenance schedule to match your actual usage to keep your mill running smoothly and to protect your investment.

Cleaning & Protecting

Use a brush and shop vacuum to remove chips and debris from the mill. Never blow off the mill with compressed air, as this will force metal chips deep into the mechanisms and may injure yourself or bystanders.

Wipe built-up grime from the mill with a rag and a mild solvent. Remove any rust from the unpainted cast iron surfaces of your mill, then treat them with regular applications of products such as Primrose Armor Plate Way Oil, G96® Gun Treatment, SLIPIT®, or Boeshield® T-9 (see Section 5: Accessories on Page 31 for more details).
Lubrication

Your mill has numerous metal sliding surfaces that require proper lubrication to help ensure smooth and long-lasting mill operation.

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

**NOTICE**

Follow the lubrication practices outlined in this manual. Failure to do so could lead to premature failure of your mill and will void the warranty.

One-Shot Way Oiler

<table>
<thead>
<tr>
<th>Lubricant</th>
<th>Frequency</th>
<th>Qty</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO 68 Lubricant or Equivalent</td>
<td>Every 8 Hours of Operation</td>
<td>1</td>
<td>Pump</td>
</tr>
</tbody>
</table>

The oil lines running from the one-shot oiler feed lubrication to the ways of the table, cross slide, and knee (column).

Make sure the oil reservoir is full, then pull the handle (see Figure 43) and release it to send the lubricant through the lines.

Figure 43. One-shot way oiler.

Leadscrews

<table>
<thead>
<tr>
<th>Lubricant</th>
<th>Frequency</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>NLGI #2 Grease or Equivalent</td>
<td>Every 40 Hours of Operation</td>
<td>Thin Coat</td>
</tr>
</tbody>
</table>

Use solvent to clean the debris and grime from the leadscrews shown in Figures 44–46, then wipe them dry. Brush a thin coat of lubricant on the threads of the leadscrews, then rotate the leadscrew through its full path to distribute the grease.

Figure 44. Longitudinal lead screw as viewed from the underneath right side of the table.

Figure 45. Cross lead screw viewed from underneath the knee.
Quill Downfeed Gears

<table>
<thead>
<tr>
<th>Lubricant</th>
<th>Frequency</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>NLGI #2 Grease or Equivalent</td>
<td>Every 120 Hours of Operation</td>
<td>Thin Coat</td>
</tr>
</tbody>
</table>

Tools Needed

<table>
<thead>
<tr>
<th>Qty</th>
</tr>
</thead>
<tbody>
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</tr>
</tbody>
</table>

Hex Wrench 4mm
Hex Wrench 6mm
External Retaining Ring Pliers

To lubricate the quill downfeed gears:

1. DISCONNECT MACHINE FROM POWER!
2. Use the quill lock to keep the quill from moving during the following steps.
3. Loosen the set screw securing the coarse downfeed lever assembly to the quill gear shaft, then remove the assembly from the shaft (see Figure 47).
4. Remove the external retaining ring in front of the end cap from the quill gear shaft, then remove the end cap.
   
   **Note:** *As the end cap becomes loose, it will spin slightly as the spring inside the cavity unwinds—this is normal.*
5. Clean away any grime from inside the cavity and the gear shaft, then use the nozzle of a grease gun to apply a small amount of lubricant to the teeth of the gear shaft and the quill pinion (see Figure 48).

---

Figure 46. Vertical leadscrew viewed from underneath the knee.

Figure 47. Coarse downfeed lever assembly and end cap.

Figure 48. Right side of quill gear shaft exposed.
6. Remove the end cap from the left side of the quill gear shaft that surrounds the downfeed selector (see Figure 49).

![Figure 49. Left side of quill gear shaft exposed.](image)

7. Clean away any grime from inside the cavity and the gear shaft, then use the nozzle of a grease gun to apply a small amount of lubricant to the teeth of the gear shaft and the fine downfeed worm gear.

8. Re-install the parts in the reverse order they were removed.

**Note:** When re-installing the end cap on the right side of the quill gear shaft, insert the prong on the spring into the inside hole of the end cap shown in Figure 50, then rotate the end cap approximately 1/3 turn clockwise to tension the spring before securing it to the head.

![Figure 50. End cap from the right side of the quill gear shaft.](image)
SECTION 7: SERVICE

Review the troubleshooting and procedures in this section to fix or adjust your machine if a problem develops. If you need replacement parts or you are unsure of your repair skills, then feel free to call our Technical Support at (570) 546-9663.

Troubleshooting

Motor & Electrical

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Possible Cause</th>
<th>Possible Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machine does not start or a breaker trips.</td>
<td>1. ON/OFF button is at fault. 2. Plug/receptacle is at fault or wired incorrectly. 3. Power supply is switched OFF or is at fault. 4. Motor connection wired incorrectly. 5. Motor windings or motor is at fault.</td>
<td>1. Replace faulty ON/OFF button. 2. Test for good contacts; correct the wiring. 3. Ensure hot lines have correct voltage on all legs and main power supply is switched ON. 4. Correct motor wiring connections (Page 42). 5. Replace motor.</td>
</tr>
<tr>
<td>Machine stalls or is overloaded.</td>
<td>1. Machine is undersized for the task. 2. Workpiece alignment is poor. 3. Dull or incorrect cutting tool. 4. Motor connection is wired incorrectly. 5. Plug/receptacle is at fault. 6. V-belts loose or worn. 7. Pulley/sprocket slipping on shaft. 8. Motor bearings are at fault. 9. Motor has overheated. 10. Motor is at fault.</td>
<td>1. Use smaller sharp tooling; reduce the feed rate; reduce the spindle RPM; use coolant. 2. Eliminate workpiece binding; use vise or clamps as required for workpiece alignment control. 3. Use sharp and correct cutting tool for the operation. 4. Correct motor wiring connections (Page 42). 5. Test for good contacts; correct the wiring. 6. Properly tension V-belts (Page 28). 7. Replace loose pulley/shaft. 8. Test by rotating shaft; rotational grinding/loose shaft requires bearing replacement. 9. Clean off motor, let cool, and reduce workload. 10. Test and repair or replace.</td>
</tr>
<tr>
<td>Machine has vibration or noisy operation.</td>
<td>1. Tool holder or cutter is at fault. 2. Workpiece alignment is poor. 3. Motor or component is loose. 4. Pulley is loose. 5. Machine is incorrectly mounted or sits unevenly. 6. Motor fan is rubbing on fan cover. 7. Motor bearings are at fault.</td>
<td>1. Replace out-of-round tool holder; replace/resharpen cutter; use appropriate feed rate and cutting RPM. 2. Eliminate workpiece binding; use vise or clamps as required for workpiece alignment control. 3. Inspect/replace stripped or damaged bolts/nuts, and re-tighten with thread locking fluid. 4. Realign/replace shaft, pulley, setscrew, and key as required. 5. Tighten/replace mounting bolts in floor; relocate/shim machine. 6. Replace dented fan cover or fan. 7. Test by rotating shaft; rotational grinding/loose shaft requires bearing replacement.</td>
</tr>
</tbody>
</table>
### Operation

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Possible Cause</th>
<th>Possible Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tool slips in collet.</td>
<td>1. Collet is not fully drawn into spindle taper.</td>
<td>1. Snug up drawbar.</td>
</tr>
<tr>
<td></td>
<td>2. Wrong size collet.</td>
<td>2. Use correct collet for shank diameter.</td>
</tr>
<tr>
<td></td>
<td>3. Debris on collet or spindle mating surface.</td>
<td>3. Remove oil and debris from collet and spindle mating surfaces, then re-install.</td>
</tr>
<tr>
<td></td>
<td>4. Excessive depth of cut.</td>
<td>4. Decrease depth of cut and allow chips to clear.</td>
</tr>
<tr>
<td>Breaking tooling.</td>
<td>1. Spindle speed/feed rate too fast.</td>
<td>1. Use correct spindle RPM and feed rate (<a href="#">Page 27</a>).</td>
</tr>
<tr>
<td></td>
<td>2. Tooling getting too hot.</td>
<td>2. Use coolant; reduce spindle RPM/feed rate.</td>
</tr>
<tr>
<td></td>
<td>3. Excessive depth of cut.</td>
<td>3. Decrease depth of cut and allow chips to clear.</td>
</tr>
<tr>
<td>Machine is loud when cutting; overheats or</td>
<td>1. Excessive depth of cut.</td>
<td>1. Decrease depth of cut and allow chips to clear.</td>
</tr>
<tr>
<td>bogs down in the cut.</td>
<td>2. Dull tooling.</td>
<td>2. Use sharp tooling.</td>
</tr>
<tr>
<td></td>
<td>3. Feed rate too fast.</td>
<td>3. Decrease feed rate.</td>
</tr>
<tr>
<td>Workpiece vibrates or chatters during</td>
<td>1. Locks not tight.</td>
<td>1. Tighten all locks on mill that are not associated with movement for the</td>
</tr>
<tr>
<td>operation.</td>
<td>2. Workpiece not securely clamped to table or mill vise.</td>
<td>operation.</td>
</tr>
<tr>
<td></td>
<td>3. Tooling not secure or is damaged.</td>
<td>2. Check that clamping is tight and sufficient for the operation; make sure mill</td>
</tr>
<tr>
<td></td>
<td>4. Spindle speed/feed rate too fast.</td>
<td>vise is tight to table.</td>
</tr>
<tr>
<td></td>
<td>5. Gibs are too loose.</td>
<td>3. Secure tooling; replace if damaged.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Use correct spindle RPM and feed rate (<a href="#">Page 27</a>).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Adjust gibs properly (<a href="#">Page 39</a>).</td>
</tr>
<tr>
<td>Table hard to move.</td>
<td>1. Locks are tightened down.</td>
<td>1. Fully loosen locks needed for movement.</td>
</tr>
<tr>
<td></td>
<td>2. Chips have loaded up on the ways.</td>
<td>2. Frequently clean away chips that load up during operations.</td>
</tr>
<tr>
<td></td>
<td>3. Ways are dry and in need of lubrication.</td>
<td>3. Use one-shot way oiler to lubricate ways (<a href="#">Page 34</a>).</td>
</tr>
<tr>
<td></td>
<td>4. Gibs are too tight.</td>
<td>4. Adjust gibs properly (<a href="#">Page 39</a>).</td>
</tr>
<tr>
<td>Bad surface finish.</td>
<td>1. Wrong spindle speed/feed rate.</td>
<td>1. Use correct spindle RPM and feed rate (<a href="#">Page 27</a>).</td>
</tr>
<tr>
<td></td>
<td>2. Dull/damaged tooling; wrong tooling for operation.</td>
<td>2. Sharpen/replace tooling; use correct tooling for operation.</td>
</tr>
<tr>
<td></td>
<td>3. Wrong spindle rotation for tooling.</td>
<td>3. Check for proper spindle rotation for tooling.</td>
</tr>
<tr>
<td></td>
<td>4. Workpiece not securely clamped to table or mill vise.</td>
<td>4. Check that clamping is tight and sufficient for the operation; make sure mill</td>
</tr>
<tr>
<td></td>
<td>5. Gibs are too loose.</td>
<td>vise is tight to table.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Adjust gibs properly (<a href="#">Page 39</a>).</td>
</tr>
</tbody>
</table>
Adjusting Gibs

Gibs control the accuracy of the table movements along the ways. Tight gibs make the movements more accurate, but harder to move. Loose gibs make the movements sloppy, but easier to move. The goal of gib adjustment is to remove unnecessary sloppiness without causing the ways to bind.

**NOTICE**

Excessively loose gibs may cause poor workpiece finishes, and may cause undue wear of sliding surfaces and ways. Over-tightening the gibs may cause premature wear of these sliding devices.

Each sliding surface for the table, cross slide, and knee has a tapered gib that is sandwiched between the stationary and moving surfaces. The cross slide and knee have a gib on both sides. There are two adjustment screws, one on each end of each gib, that move the tapered gib back and forth increasing or decreasing friction of the sliding surfaces.

**To adjust the gibs:**

1. **DISCONNECT THE MILL FROM POWER!**
   
   *Note: Minor parts will need to be removed to access some of the gib adjustment screws.*

2. Loosen one adjustment screw and tighten the other the same amount to move the gib until you feel a slight drag in that path of movement.

   *Note: Refer to Figures 51–53 for the locations of the table, cross slide, and knee gib adjustment screws.*
**Adjusting Backlash**

Leadscrew backlash is the amount of play in a lead screw. It is felt when turning a handwheel in one direction, then turning it in the other direction. The distance that the handwheel moves without moving the leadscrew or attached components is the backlash.

When turning the handwheel in only one direction, the backlash is taken up with the initial turn of the handwheel and will not reoccur until the handwheel is rotated in the opposite direction.

When adjusting backlash, tighten the components enough to remove backlash, but not so much that the components bind the leadscrew, making it hard to turn. Overtightening will cause excessive wear to the leadscrew and nut. Generally, 0.005”–0.010” of backlash is acceptable.

The backlash of the longitudinal and cross leadscrew can be adjusted by changing the gap in the leadscrew nuts (see Figures 54–55).

Use a 5mm hex wrench to tighten or loosen the cap screws on the leadscrew nuts shown in Figures 54–55, then test the amount of backlash by slowly rocking the handwheels back-and-forth.
SECTION 8: ELECTRICAL

These pages are current at the time of printing. However, in the spirit of improvement, we may make changes to the electrical systems of future machines. Study this diagram carefully. If you notice differences between your machine and these wiring diagrams, call Technical Support at (570) 546-9663 for assistance.

⚠️ WARNING

Electrical Safety Instructions

1. **SHOCK HAZARD.** Disconnect the power from the machine before servicing electrical components. Touching electrified parts will result in personal injury including but not limited to severe burns, electrocution, or death.

2. **CIRCUIT REQUIREMENTS.** You MUST follow the CIRCUIT REQUIREMENTS section on Page 13. If you are unsure about the wiring codes in your area or you plan to connect your machine to a shared circuit, consult a qualified electrician.

3. **GROUNDED CIRCUIT.** Electrocution or fire could result if the machine is not grounded and installed in compliance with electrical codes. Compliance MUST be verified by a qualified electrician.

4. **MOTOR WIRING.** The motor wiring shown in these diagrams are current at the time of printing, but it may not match your machine. Always use the wiring diagram inside the motor junction box.

5. **CONVERTING TO 220V OPERATION.** The Model G3102/G3103 is pre-wired for 110V operation. If you plan to operate your machine at 220V, you must do the following: 1) install the 220V power switch (included), 2) rewire the motor, 3) rewire the transformer on the control panel, and 4) change the power plug and receptacle to NEMA 6-15 type. Refer to Pages 14 & 44 for instructions and wiring diagrams.

6. **EXPERIENCING DIFFICULTIES.** If at any time you are experiencing difficulties understanding the information included in this section, contact our Technical Support at (570) 546-9663.

---

**NOTICE**

The photos and diagrams included in this section are best viewed in color. You can view these pages in color at www.grizzly.com.
110V Electrical Wiring Diagram

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

24V Halogen Work Light

V-Belt Cover Safety Switch

Electrical Panel

Transformer

Motor 110V

110V Power ON/OFF Switch

Spindle Direction Switch

Power Wiring Junction Box

NEMA 5-15 PLUG As Recommended

-42- READ ELECTRICAL SAFETY ON PAGE 41!

G3102/G3103 Vertical Mill
Electrical Wiring Photos

Figure 56. Electrical panel wiring.

Figure 57. Power wiring junction box.

Figure 58. V-belt cover safety switch wiring.

Figure 59. 110V motor wiring.

Figure 60. Power ON/OFF and spindle direction switches.

READ ELECTRICAL SAFETY ON PAGE 41!
220V Wiring Diagram

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

24V Halogen Work Light

220V Power ON/OFF Switch

Spindle Direction Switch

Motor 220V

Transformer

People DZ47-63 220V Circuit Breaker
People DZ47LE-32 220V Circuit Breaker

Capacitor 150M 250V
Capacitor 20M 450V

Electrical Panel

NEMA 6-15 PLUG
As Recommended

220V Power Wiring

V-Belt Cover Safety Switch

Power Wiring Junction Box

220V Halogen Work Light

220V Wiring Diagram

-44- READ ELECTRICAL SAFETY ON PAGE 41! G3102/G3103 Vertical Mill
## Head Parts List

<table>
<thead>
<tr>
<th>REF</th>
<th>PART #</th>
<th>DESCRIPTION</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>P3102001</td>
<td>HEAD CASTING</td>
</tr>
<tr>
<td>1-1</td>
<td>P3102001-1</td>
<td>HEAD ROTATION SCALE</td>
</tr>
<tr>
<td>2</td>
<td>P3102002</td>
<td>BELT HOUSING COVER</td>
</tr>
<tr>
<td>2-1</td>
<td>P3102002-1</td>
<td>BELT HOUSING BASE</td>
</tr>
<tr>
<td>3</td>
<td>P3102003</td>
<td>SPINDLE</td>
</tr>
<tr>
<td>3-1</td>
<td>P3102003-1</td>
<td>PLASTIC QUILL GUARD</td>
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<td>4</td>
<td>P3102004</td>
<td>BALL BEARING 6009ZZ</td>
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<tr>
<td>5</td>
<td>P3102005</td>
<td>SPANNER WASHER 30MM</td>
</tr>
<tr>
<td>6</td>
<td>P3102006</td>
<td>SPINDLE</td>
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<tr>
<td>7</td>
<td>P3102007</td>
<td>SPINDLE END CAP</td>
</tr>
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<td>P3102008</td>
<td>SPANNER NUT M30-1.5</td>
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<td>9</td>
<td>P3102009</td>
<td>SPINDLE SLEEVE</td>
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<td>P3102009-1</td>
<td>KEY 5 X 5 X 20</td>
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<td>SPANNER NUT M45-1.5</td>
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<td>P3102011</td>
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<td>QUIL PINION SHAFT</td>
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<td>P3102013</td>
<td>CAP SCREW M5-.8 X 10</td>
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<td>CLUTCH ADJUSTING NUT M18-1.5 X 35</td>
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<td>P3102027</td>
<td>HANDWHEEL</td>
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<td>HANDLE</td>
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<td>P3102029</td>
<td>QUIL LOCKING BLOCK</td>
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<td>QUIL LOCKING BOLT M10-1.25 X 101</td>
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<td>DOWNFEED SCREW M12-1.25 X 184</td>
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<td>DOWNFEED STOP WHEEL M12-1.25</td>
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<td>DOWNFEED LOCK WHEEL M12-1.25</td>
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<td>QUIL DOG</td>
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<td>HEX BOLT M8-1.25 X 20</td>
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<td>FLAT WASHER 8MM</td>
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<td>P3102037</td>
<td>DRAWBAR</td>
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<td>RIVET C5 X 15</td>
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<td>PHLP HD SCR M5-.8 X 10</td>
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<td>COVER SUPPORTING ARM</td>
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<td>BALL BEARING 6206ZZ</td>
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Electrical & Accessories Breakdown

**Electrical Panel**

- Transformer
- Circuit Breaker 1-Pole 220V
- Circuit Breaker 2-Pole 220V
- V-Belt Safety Switch
- Terminal Block 15-Pole
- Screwdriver Phillips #2
- Screwdriver Flat #2
- Face Mill 3"

**REF PART # DESCRIPTION**

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**V-Belt Cover Safety Switch**

- Circuit Breaker 220V 1-Pole

**220V Magnetic Switch**

- Transformer
- Circuit Breaker 220V 2-Pole

**REF PART # DESCRIPTION**

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Safety labels warn about machine hazards and ways to prevent injury. The owner of this machine MUST maintain the original location and readability of the labels on the machine. If any label is removed or becomes unreadable, REPLACE that label before using the machine again. Contact Grizzly at (800) 523-4777 or www.grizzly.com to order new labels.
WARRANTY CARD

Name _____________________________________________________________________________

Street _____________________________________________________________________________

City _______________________ State _________________________ Zip _____________________

Phone # ____________________ Email _________________________________________________

Model # ____________________ Order # _______________________ Serial # __________________

The following information is given on a voluntary basis. It will be used for marketing purposes to help us develop better products and services. Of course, all information is strictly confidential.

1. How did you learn about us?
   _____ Advertisement  _____ Friend  _____ Catalog
   _____ Card Deck  _____ Website  _____ Other: __________________________

2. Which of the following magazines do you subscribe to?
   _____ Cabinetmaker & FDM  _____ Popular Science  _____ Wooden Boat
   _____ Family Handyman  _____ Popular Woodworking  _____ Woodshop News
   _____ Hand Loader  _____ Precision Shooter  _____ Woodsmith
   _____ Handy  _____ Projects in Metal  _____ Woodwork
   _____ Home Shop Machinist  _____ RC Modeler  _____ Woodworker West
   _____ Journal of Light Cont.  _____ Rifle  _____ Woodworker’s Journal
   _____ Live Steam  _____ Shop Notes  _____ Other: __________________________
   _____ Model Airplane News  _____ Shotgun News
   _____ Old House Journal  _____ Today’s Homeowner
   _____ Popular Mechanics  _____ Wood
   _____ Popular Science
   _____ Precision Shooter
   _____ Projects in Metal
   _____ RC Modeler
   _____ Rifle
   _____ Shop Notes
   _____ Shotgun News
   _____ Today’s Homeowner
   _____ Wood

3. What is your annual household income?
   _____ $20,000-$29,000  _____ $30,000-$39,000  _____ $40,000-$49,000
   _____ $50,000-$59,000  _____ $60,000-$69,000  _____ $70,000+

4. What is your age group?
   _____ 20-29  _____ 30-39  _____ 40-49
   _____ 50-59  _____ 60-69  _____ 70+

5. How long have you been a woodworker/metalworker?
   _____ 0-2 Years  _____ 2-8 Years  _____ 8-20 Years  _____ 20+ Years

6. How many of your machines or tools are Grizzly?
   _____ 0-2  _____ 3-5  _____ 6-9  _____ 10+

7. Do you think your machine represents a good value?  _____ Yes  _____ No

8. Would you recommend Grizzly Industrial to a friend?  _____ Yes  _____ No

9. Would you allow us to use your name as a reference for Grizzly customers in your area?  
   Note: We never use names more than 3 times.  _____ Yes  _____ No

10. Comments: _____________________________________________________________________
    ______________________________________________________________________________
    ______________________________________________________________________________
    ______________________________________________________________________________
Send a Grizzly Catalog to a friend:

Name__________________________
Street__________________________
City________________ State____ Zip_____

TAPE ALONG EDGES--PLEASE DO NOT STAPLE
Grizzly Industrial, Inc. warrants every product it sells for a period of 1 year to the original purchaser from the date of purchase. This warranty does not apply to defects due directly or indirectly to misuse, abuse, negligence, accidents, repairs or alterations or lack of maintenance. This is Grizzly’s sole written warranty and any and all warranties that may be implied by law, including any merchantability or fitness, for any particular purpose, are hereby limited to the duration of this written warranty. We do not warrant or represent that the merchandise complies with the provisions of any law or acts unless the manufacturer so warrants. In no event shall Grizzly’s liability under this warranty exceed the purchase price paid for the product and any legal actions brought against Grizzly shall be tried in the State of Washington, County of Whatcom.

We shall in no event be liable for death, injuries to persons or property or for incidental, contingent, special, or consequential damages arising from the use of our products.

To take advantage of this warranty, contact us by mail or phone and give us all the details. We will then issue you a “Return Number,” which must be clearly posted on the outside as well as the inside of the carton. We will not accept any item back without this number. Proof of purchase must accompany the merchandise.

The manufacturers reserve the right to change specifications at any time because they constantly strive to achieve better quality equipment. We make every effort to ensure that our products meet high quality and durability standards and we hope you never need to use this warranty.

Please feel free to write or call us if you have any questions about the machine or the manual.

Thank you again for your business and continued support. We hope to serve you again soon.
Visit Our Website Today For Current Specials!

ORDER
24 HOURS A DAY!
1-800-523-4777