

POWERMATIC[®]

WMH TOOL GROUP

Operating Instructions and Parts Manual

Line Boring Machine

Model LBM21



WMH TOOL GROUP

2420 Vantage Drive
Elgin, Illinois 60123
Ph.: 800-274-6848
www.wmhtoolgroup.com

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Warranty and Service





WMH Tool Group, Inc., warrants every product it sells. If one of our tools needs service or repair, one of our Authorized Service Centers located throughout the United States can give you quick service. In most cases, any of these WMH Tool Group Authorized Service Centers can authorize warranty repair, assist you in obtaining parts, or perform routine maintenance and major repair on your POWERMATIC® tools. For the name of an Authorized Service Center in your area call 1-800-274-6848.

MORE INFORMATION

WMH Tool Group is consistently adding new products to the line. For complete, up-to-date product information, check with your local WMH Tool Group distributor, or visit powermatic.com.

WARRANTY

POWERMATIC products carry a limited warranty which varies in duration based upon the product.

<p>Industrial Products</p>  <p>One Year Standard, option available on select POWERMATIC machines</p>  <p> Bandsaws Dust Collectors Jointers Boring Machines Dovetail Machines Planers Sanders Shapers Rip Saws Cut-off Saws Tablesaws Scoring Saws Panel Saws Accessories & Abrasives </p> <p> Brush Sanders Dovetail Machines Drill Presses Drum Sanders Panel Saws Power Feeders Commercial use of Non-Industrial Products </p>	<p>Industrial Products</p>  <p>Two Year Option Available on select industrial machines with distributor installation. See your POWERMATIC Industrial Distributor for details.</p>	<p>Non-Industrial Products</p>  <p>Visit our distributors or our website for more information.</p> <p><i>Warranty reverts to 1 Year if above products are used for commercial, industrial or educational purposes</i></p>
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WHAT IS COVERED?

This warranty covers any defects in workmanship or materials subject to the exceptions stated below. Cutting tools, abrasives and other consumables are excluded from warranty coverage.

WHO IS COVERED?

This warranty covers only the initial purchaser of the product.

WHAT IS THE PERIOD OF COVERAGE?

The general POWERMATIC warranty lasts for the time period specified in the product literature of each product.

WHAT IS NOT COVERED?

The Five Year Warranty does not cover products used for commercial, industrial or educational purposes. Products with a Five Year Warranty that are used for commercial, industrial or education purposes revert to a One Year Warranty. This warranty does not cover defects due directly or indirectly to misuse, abuse, negligence or accidents, normal wear-and-tear, improper repair or alterations, or lack of maintenance.

HOW TO GET SERVICE

The product or part must be returned for examination, postage prepaid, to a location designated by us. For the name of the location nearest you, please call 1-800-274-6848.

You must provide proof of initial purchase date and an explanation of the complaint must accompany the merchandise. If our inspection discloses a defect, we will repair or replace the product, or refund the purchase price, at our option.

We will return the repaired product or replacement at our expense unless it is determined by us that there is no defect, or that the defect resulted from causes not within the scope of our warranty in which case we will, at your direction, dispose of or return the product. In the event you choose to have the product returned, you will be responsible for the handling and shipping costs of the return.

HOW STATE LAW APPLIES

This warranty gives you specific legal rights; you may also have other rights which vary from state to state.

LIMITATIONS ON THIS WARRANTY

WMH TOOL GROUP LIMITS ALL IMPLIED WARRANTIES TO THE PERIOD OF THE LIMITED WARRANTY FOR EACH PRODUCT. EXCEPT AS STATED HEREIN, ANY IMPLIED WARRANTIES OR MERCHANTABILITY AND FITNESS ARE EXCLUDED. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG THE IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

WMH TOOL GROUP 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. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

WMH Tool Group sells through distributors only. The specifications in WMH catalogs are given as general information and are not binding. Members of WMH Tool Group reserve the right to effect at any time, without prior notice, those alterations to parts, fittings, and accessory equipment which they may deem necessary for any reason whatsoever.

Table of Contents

Warranty and Service	2
Table of Contents	3
Warning.....	4
Introduction	6
Description	6
Specifications	6
Features of the LBM21	7
Unpacking	8
Contents of the Shipping Container	8
Assembly	9
Leveling the Machine	9
Crank Handle	10
Fence Extensions	10
Fence Stops.....	10
Air Supply	11
Installing/Replacing Boring Bits	11
Grounding Instructions	13
Extension Cords.....	13
Adjustments	13
Setting Boring Depth	13
Setting Boring Bit Feed Rate	14
Limit Switch Timing	14
Table Movement	15
Fence/Boring Head Parallelism	15
Oil Flow Rate	16
Operating Controls	16
Operation	17
Maintenance.....	18
Lubrication	18
Troubleshooting – Mechanical and Electrical Problems.....	19
Troubleshooting – Operational Problems	21
Boring Bit Purchase/Replacement	22
Replacement Parts	22
Frame Assembly	25
Parts List: Headstock Assembly	26
Headstock Assembly.....	27
Parts List: Boring Head Assembly	28
Boring Head Assembly.....	29
Parts List: Pneumatic Diagram	30
Pneumatic Diagram.....	31
Electrical Connections	32



Warnings

1. Read and understand the entire owners manual before attempting assembly or operation.
2. Read and understand the warnings posted on the machine and in this manual. Failure to comply with all of these warnings may cause serious injury.
3. Replace the warning labels if they become obscured or removed.
4. This line boring machine is designed and intended for use by properly trained and experienced personnel only. If you are not familiar with the proper and safe operation of a line boring machine, do not use until proper training and knowledge have been obtained.
5. Do not use this line boring machine for other than its intended use. If used for other purposes, WMH Tool Group disclaims any real or implied warranty and holds itself harmless from any injury that may result from that use.
6. Always wear approved safety glasses/face shields while using this line boring machine. Everyday eyeglasses only have impact resistant lenses; they are not safety glasses.
7. Before operating this line boring machine, remove tie, rings, watches and other jewelry, and roll sleeves up past the elbows. Remove all loose clothing and confine long hair. Non-slip footwear or anti-skid floor strips are recommended. Do **not** wear gloves.
8. Wear ear protectors (plugs or muffs) during extended periods of operation.
9. Some dust created by power sanding, sawing, grinding, drilling and other construction activities contain chemicals known to cause cancer, birth defects or other reproductive harm. Some examples of these chemicals are:
 - Lead from lead based paint.
 - Crystalline silica from bricks, cement and other masonry products.
 - Arsenic and chromium from chemically treated lumber.

Your risk of exposure 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 face or dust masks that are specifically designed to filter out microscopic particles.
10. Do not operate this machine while tired or under the influence of drugs, alcohol or any medication.
11. Make certain the switch is in the **OFF** position before connecting the machine to the power supply.
12. Make certain the machine is properly grounded.
13. Make all machine adjustments or maintenance with the machine unplugged from the power source.
14. Remove adjusting keys and wrenches. Form a habit of checking to see that keys and adjusting wrenches are removed from the machine before turning it on.
15. Keep safety guards in place at all times when the machine is in use. If removed for maintenance purposes, use extreme caution and replace the guards immediately.
16. Check damaged parts. Before further use of the machine, a guard or other part that is damaged should be carefully checked to determine that it will operate properly and perform its intended function. Check for alignment of moving parts, binding of moving parts, breakage of parts, mounting and any other conditions that may affect its operation. A guard or other part that is damaged should be properly repaired or replaced.
17. Provide for adequate space surrounding work area and non-glare, overhead lighting.
18. Keep the floor around the machine clean and free of scrap material, oil and grease.
19. Keep visitors a safe distance from the work area. **Keep children away.**



Warnings

20. Make your workshop child proof with padlocks, master switches or by removing starter keys.
21. Give your work undivided attention. Looking around, carrying on a conversation and “horse-play” are careless acts that can result in serious injury.
22. Maintain a balanced stance at all times so that you do not fall or lean against the drill bits or other moving parts. Do not overreach or use excessive force to perform any machine operation.
23. Use the right tool at the correct speed and feed rate. Do not force a tool or attachment to do a job for which it was not designed. The right tool will do the job better and safer.
24. Use recommended accessories; improper accessories may be hazardous.
25. Maintain tools with care. Keep bits sharp and clean for the best and safest performance. Follow instructions for lubricating and changing accessories.
26. Make sure the work piece is securely attached or clamped to the table. Never use your hand to hold the work piece.
27. Turn off the machine before cleaning. Use a brush or compressed air to remove chips or debris — do not use your hands.
28. Do not stand on the machine. Serious injury could occur if the machine tips over.
29. Never leave the machine running unattended. Turn the power off and do not leave the machine until it comes to a complete stop.
30. Remove loose items and unnecessary work pieces from the area before starting the machine.
31. Check your stock for loose knots, nails or other aspects that may create a safety hazard or affect the machine's performance.

Familiarize yourself with the following safety notices used in this manual:



This means that if precautions are not heeded, it may result in minor injury and/or possible machine damage.



This means that if precautions are not heeded, it may result in serious injury or possibly even death.

- - SAVE THESE INSTRUCTIONS - -

Introduction

This manual is provided by Powermatic covering the safe operation and maintenance procedures for a Model LBM21 Line Boring Machine. This manual contains instructions on installation, safety precautions, general operating procedures, maintenance instructions and parts breakdown. This machine has been designed and constructed to provide years of trouble free operation if used in accordance to instructions set forth in this manual. If there are any questions or comments, please contact either your local supplier or WMH Tool Group. WMH Tool Group can also be reached at our web site: www.wmhtoolgroup.com.

Description

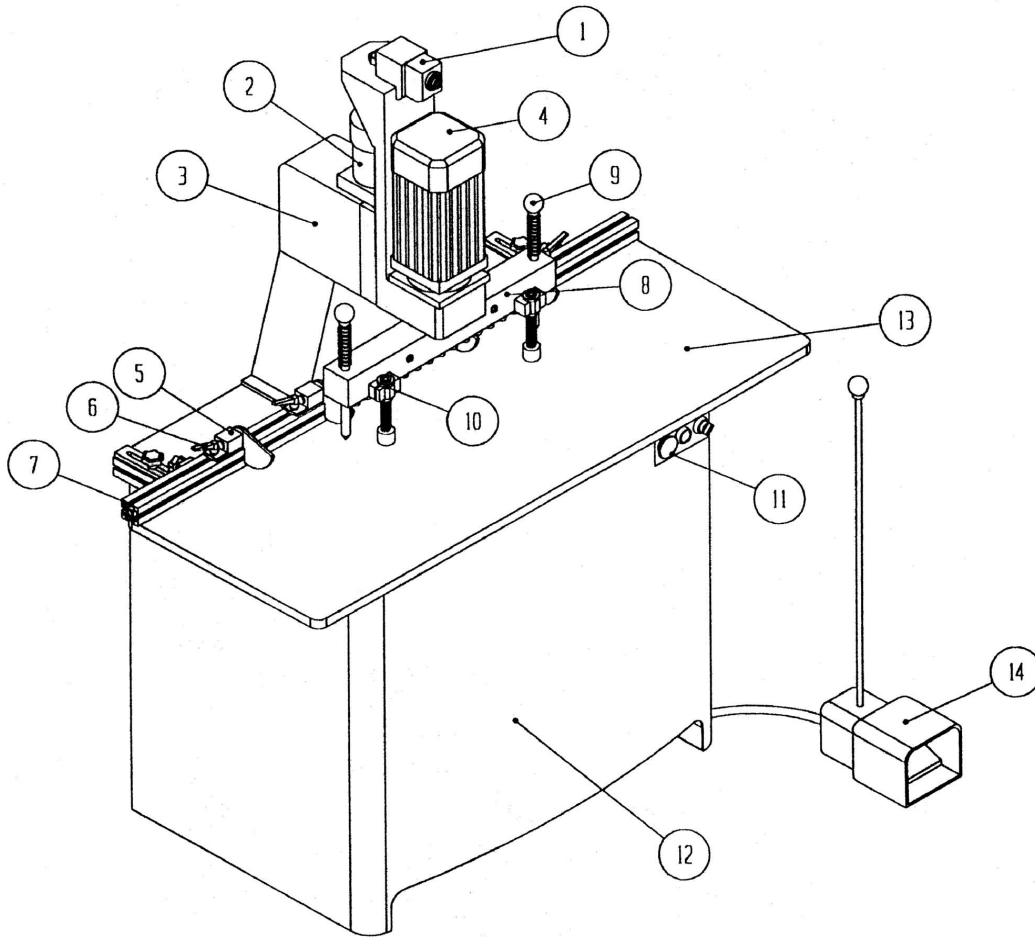
The Model LBM21 is an automatic 21-spindle single row line drill. It is designed for fast, safe and reliable 32mm (1-1/4") line boring, ideal for drilling shelf supports and hinges. The machine has a 60" capacity fence with four stops; and a foot pedal controller will quickly and conveniently accomplish the entire boring cycle. The motor starts only when the pneumatic feed cycle is activated by the foot pedal; this extends service life and saves electrical power.

Specifications

Model Number.....	LBM21
Stock Number.....	1791301
Distance between centers (mm).....	32
Spindle speed (RPM).....	3450
Number of spindles.....	21 (11 right, 10 left)
Depth of stroke (in).....	2
Table surface (L x W) (in)	47-1/4 x 19
Throat Depth (in)	6
Quick Chuck internal diameter (mm).....	10
Table height from floor (in).....	33
Length of fence (in).....	60, right and left
Fence stops.....	4
Approximate air pressure required (psi)	90
Motor.....	TEFC, 2.5HP, 1Ph, 230V
Overall dimensions (L x W x H) (in).....	49 x 24 x 63
Shipping weight (lbs)	526
Net weight (lbs)	340

The above specifications were current at the time this manual was published, but because of our policy of continuous improvement, WMH Tool Group reserves the right to change specifications at any time and without prior notice, without incurring obligations.

Features of the LBM21



1. Mechanical Digital Readout (Height Adjustment)
2. Air Cylinder
3. Motor Seat
4. 2.5HP Motor
5. Fence Stop
6. Fence Stop Locking Handle
7. Fence
8. Boring Head
9. Indexing Pin
10. Clamp
11. Control Panel
12. Machine Frame
13. Work Table
14. Foot Pedal

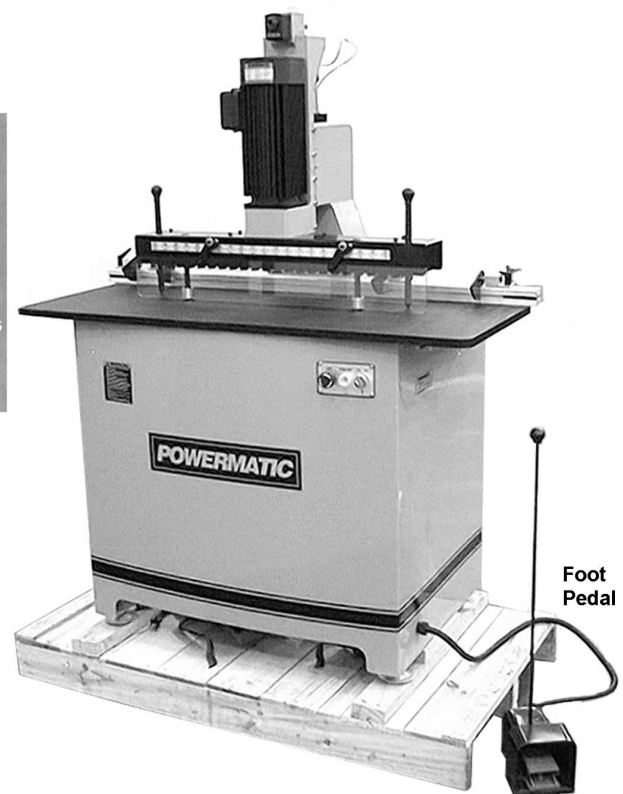
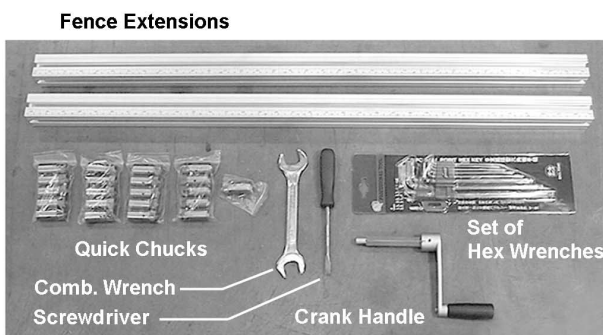
Unpacking

Open shipping container and check for shipping damage. Report any damage immediately to your distributor and shipping agent.

Compare the contents of your container with the following parts list to make sure all parts are intact. Missing parts, if any, should be reported to your distributor. Read the instruction manual thoroughly for assembly, maintenance and safety instructions.

Contents of the Shipping Container

- 1 Line boring machine
- 1 Foot pedal
- 2 Fence Extensions (L and R)
- 1 Toolbox containing:
 - 21 Quick Chucks
 - 1 Crank Handle
 - 1 Set Hex Wrenches (1.5 through 10mm)
 - 1 Combination Wrench (22-24mm)
 - 1 Flathead Screwdriver
- 1 Owner's Manual
- 1 Warranty Card



⚠ WARNING

Read and understand the entire contents of this manual before attempting set-up or operation! Failure to comply may cause serious injury.

Assembly

Tools required for assembly

24mm wrench (provided)
2.5mm hex wrench (provided)
bubble level
forklift (or hoist with straps)
straight edge

Remove all shipping container pieces from around the machine, and remove protective plastic. Remove the toolbox and other accessory items from below the machine.

Remove the four hex nuts and flat washers that are holding the machine to the pallet (Figure 1). Use a forklift to lift the machine off the screws and the pallet. Do NOT fork under the table surface – place forks under the bottom of the machine.

The Line Boring Machine should be placed on a sturdy, level floor with good ventilation and sufficient lighting. Leave enough space around the machine for mounting the fence extensions, loading and off-loading stock and general maintenance work. After setting the machine into place, leave the forks under it for the leveling process, described below.

Exposed metal surfaces have been given a protective coating at the factory. This should be removed with a soft cloth moistened with kerosene or mineral spirits. Do not use acetone, gasoline, or lacquer thinner for this purpose. Do not use solvents on plastic parts, and do not use an abrasive pad because it may scratch the surfaces.

Leveling the Machine

With the machine resting on the floor, place a level on the table. If the machine is not level, raise the machine off the floor slightly with the forklift. On the side of the machine that needs adjusting, loosen the top hex nut (A, Figure 2) and rotate the lower hex nut (B, Figure 2) to raise or lower the foot pad. When satisfied, re-tighten the top hex nut (A, Figure 2). Lower the machine to the floor and re-test it with the level.

Do this to any of the four feet as necessary until the table surface is level. When finished, make sure all top hex nuts (A, Figure 2) are tight, and lower the machine to the floor.

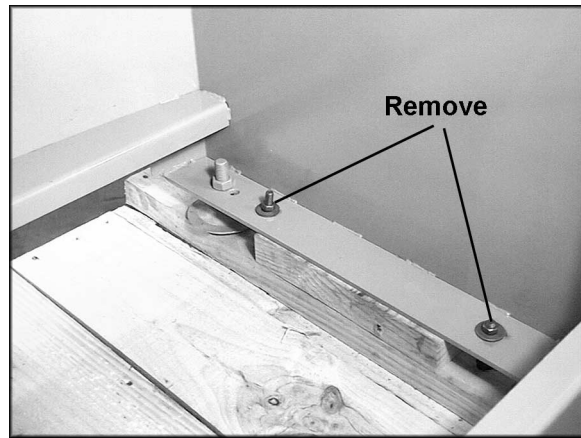


Figure 1

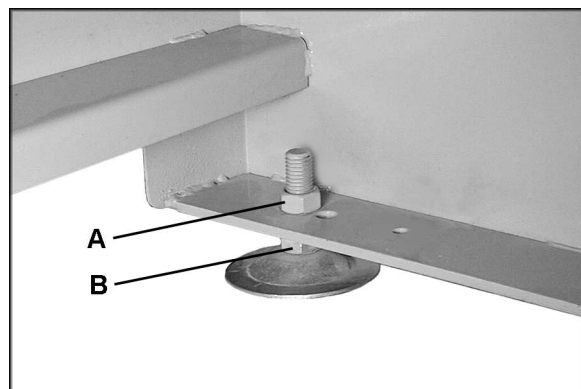


Figure 2

Crank Handle

Mount the crank handle by pushing it into the square hole above the digital readout (Figure 3).

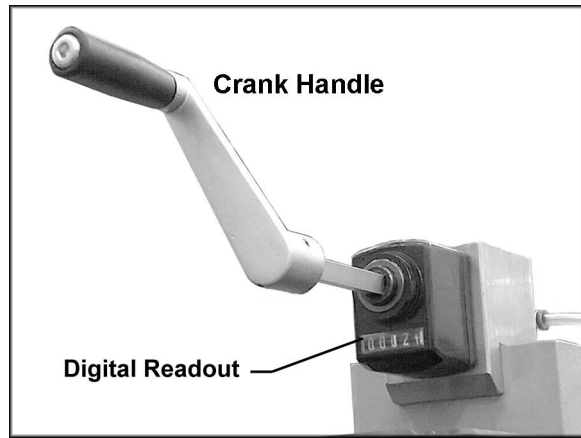


Figure 3

Fence Extensions

Left and Right Fence Extensions are provided to support long workpieces. Check the sequence on the measuring scales to distinguish right and left hand pieces.

1. On the main Fence, loosen the four set screws in the front connecting block (Figure 4) and the rear connecting block (not shown) with a 2.5 mm hex wrench.
2. The connecting blocks should be located in the side channels of the main Fence. If they are not, slide them out and re-insert them into the side channels, as they are shown in Figure 4.
3. Slide the fence extension onto both connecting blocks, and flush against the main fence, as shown in Figure 4.
4. Tighten all four set screws in each connecting block.
5. Repeat for the other extension.

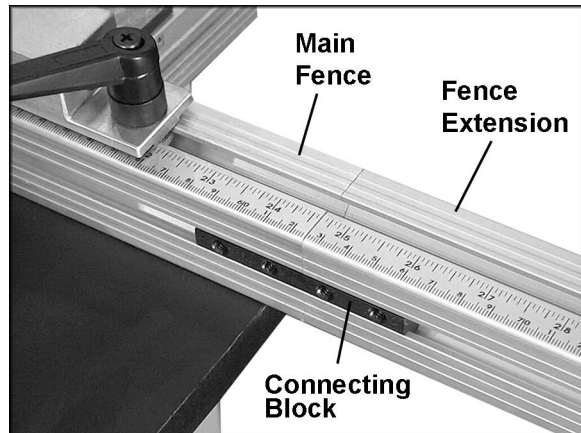


Figure 4

Fence Stops

Mount a fence stop from the end of the fence by sliding the bolt head at the bottom of the fence stop into the top channel of the Fence, as shown in Figure 5.

The fence stop can be moved to any point along the fence, and secured by tightening the locking handle. When not in use, the stop plate can be flipped upward and out of the way.

NOTE: All locking handles, such as that shown in Figure 5, can be pivoted out of the way. Simply pull up on the handle, rotate it to a more convenient position, then release it making sure it seats itself on the screw.

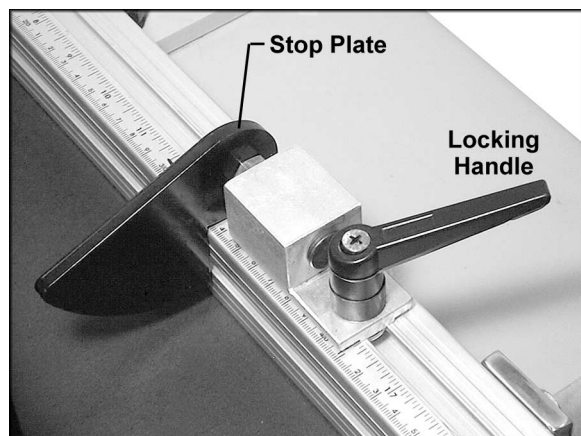


Figure 5

Air Supply

Connect your air hose to the nozzle on the machine's F.R.L. unit, as shown in Figure 6. Make sure your hose fitting is pushed completely onto the nozzle. Turn on the air.

CAUTION Stay clear of the boring head. The boring head is shipped in the lowered position, but will rise slightly when the air is turned on.

Check the reading on the pressure gauge; it should read approximately 90 psi (or 6.3 kg/cm²).

If the air pressure is incorrect, adjust it with the regulator knob (Figure 7) as follows:

1. Pull up on the air pressure regulator knob, then rotate it clockwise to increase the air pressure; or counterclockwise to decrease the air pressure. Make this adjustment in small increments and allow the pressure gauge time to react.
2. When satisfied, push the regulator knob back down.

(For further adjustments of the air system, see under "Adjustments".)

CAUTION Do not operate this machine until the pressure gauge shows the correct pressure of approximately 90 psi (6.3 kg/cm²). Other pressure settings can cause potential damage to the machine.

NOTE: A wood support block has been placed beneath the boring head for shipping purposes. This should be removed.

Installing/Replacing Boring Bits

Boring bits (not included) are to be installed in the chucks, which are in turn mounted to the spindles of the machine. The chucks accept boring bits with 10mm diameter shanks. These boring bits will have a screw inside the shank (see Figure 11). This style of boring bit is available from the dealers listed on page 22. It can also be found at many woodworking supply stores.

This machine requires a total of 21 boring bits, which are standard color coded. There should be 11 right-hand bits (black in color) and 10 left-hand bits (orange in color). Note that a bit of 77mm in length will reach the table of the line boring machine, while shorter bits will not.

Always wipe clean the shank of the boring bit before inserting into the chuck.

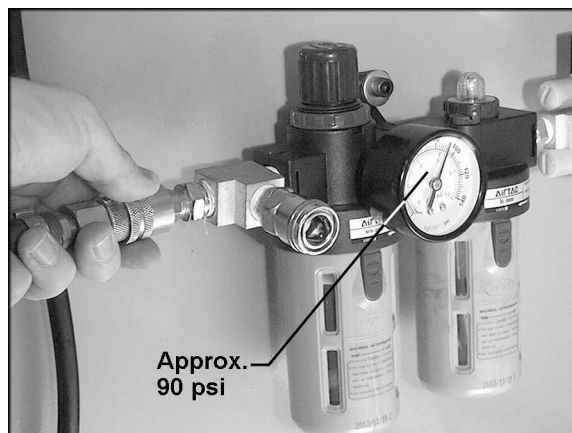


Figure 6

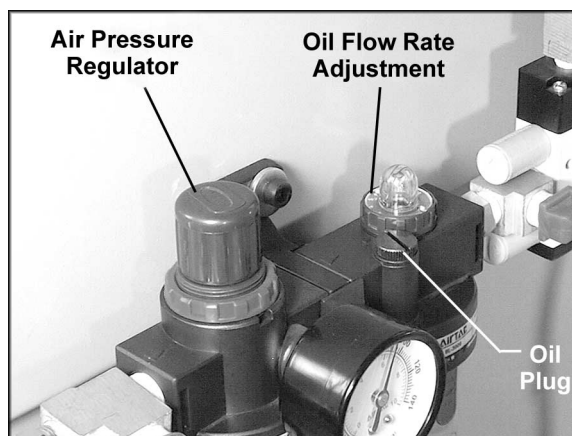


Figure 7

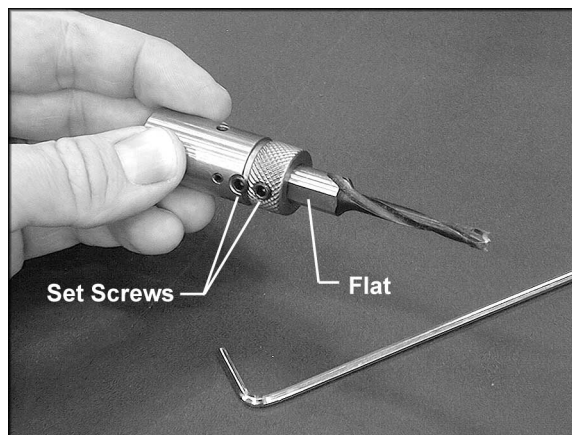


Figure 8

CAUTION Use care when installing or removing sharp boring bits.

To install boring bits:

1. Make sure the two set screws on the chuck (Figure 8) are backed out far enough for the bit to be inserted. Push the shank of the boring bit into the knurled end of the chuck. Make sure the flat of the boring bit shank is toward the set screws, as shown in Figure 8.
2. Tighten both set screws on the chuck with a 2.5 mm hex wrench, shown in Figure 8.
3. Pull down on the protective plastic caps that cover the spindles, and remove them. NOTE: Retain plastic caps for future use.
4. Make sure the right-hand and left-hand boring bits with their chucks are placed on the correct spindles. A label is affixed to the boring head just above the spindles, to show the rotation of the spindles as well as the color coding for the proper boring bit.
5. Push the chuck all the way up onto the spindle. Rotate the chuck right and left while pushing it, to make sure it properly engages the spindle, and is fully seated, as shown in Figure 9. (The roll pin inside the chuck should slide up into the notch at the bottom of the spindle.)
6. Repeat for other spindles as needed.
7. After all boring bits are installed, check to make sure they are aligned, that is, that they all protrude an equal distance from the chuck. (This assumes, of course, that all boring bits are of equal length.) This can be done with a straight edge contacting the tips of the boring bits, as shown in Figure 10. You may need to remove the index pins for this.
8. If a boring bit needs to be aligned, remove the chuck by carefully pulling down on the chuck while twisting it slightly. Then loosen the two set screws on the chuck and remove the bit from the chuck.
9. Use a flat head screwdriver to turn the screw at the end of the bit shank (Figure 11) in or out until the bit will protrude the correct distance from the chuck.
10. Re-insert the bit into the chuck and tighten the two set screws.
11. Confirm the accuracy of the adjustment with your straight edge.

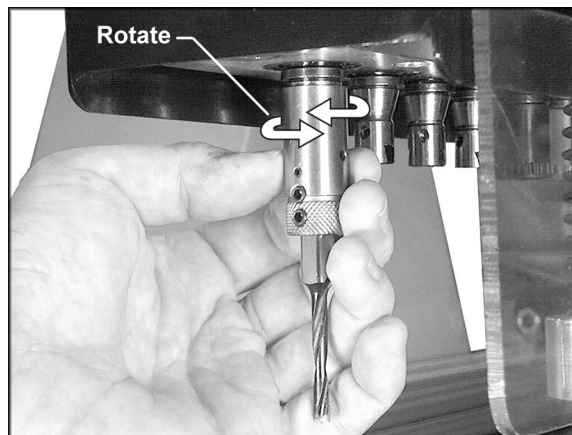


Figure 9
(chuck is shown fully seated on spindle)

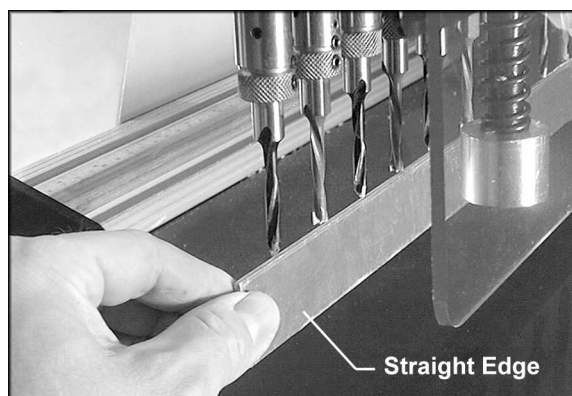


Figure 10

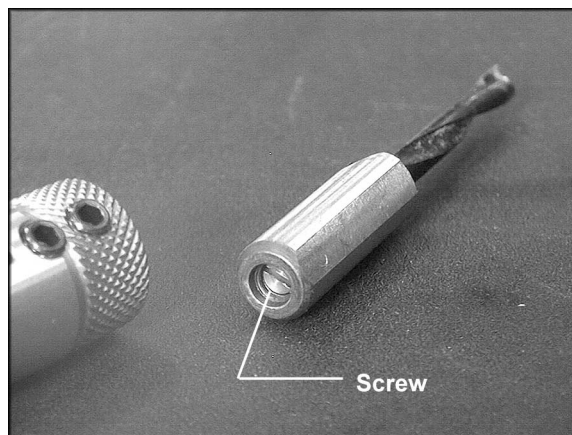


Figure 11

Grounding Instructions

⚠WARNING Electrical connections must be made by a qualified electrician in compliance with all relevant codes. This machine must be properly grounded to help prevent electrical shock and possible fatal injury.

A power plug is not provided with the Model LBM21. You may either connect a 230 volt plug or “hardwire” the machine directly to your electrical panel provided there is a disconnect near the machine. Consult the electrical drawing on page 32 for further clarification of wiring setup.

This machine must be grounded. Grounding provides a path of least resistance to help divert current away from the operator in case of electrical malfunction.

Make sure the voltage of your power supply matches the specifications on the motor plate of the machine.

Extension Cords

If an extension cord is necessary make sure the cord rating is suitable for the amperage listed on the machine's motor plate. An undersize cord will cause a drop in line voltage resulting in loss of power and overheating.

The chart in Figure 12 shows the correct size cord to use based on cord length and motor plate amp rating. If in doubt, use the next heavier gauge. The smaller the gauge number the heavier the cord.

Adjustments

Setting Boring Depth

The depth of the holes (up to 2”) is controlled by the crank handle, shown in Figure 13. A mechanical digital readout displays the depth measurement in inches. To set the boring depth:

1. Rotate the crank handle until the digital display reads all zeros, as shown in Figure 13.

NOTE: Zero represents the table surface. When you rotate the handle counter-clockwise from zero, the boring depth will decrease, but the numbers on the readout will increase. To find the proper setting of the digital display, find the thickness of your workpiece and subtract the desired depth of hole. The result should be what the digital display reads.

Recommended Gauges (AWG) of Extension Cords

Amps	Extension Cord Length *					
	25 feet	50 feet	75 feet	100 feet	150 feet	200 feet
< 5	16	16	16	14	12	12
5 to 8	16	16	14	12	10	NR
8 to 12	14	14	12	10	NR	NR
12 to 15	12	12	10	10	NR	NR
15 to 20	10	10	10	NR	NR	NR
21 to 30	10	NR	NR	NR	NR	NR

*based on limiting the line voltage drop to 5V at 150% of the rated amperes.

NR: Not Recommended.

Figure 12

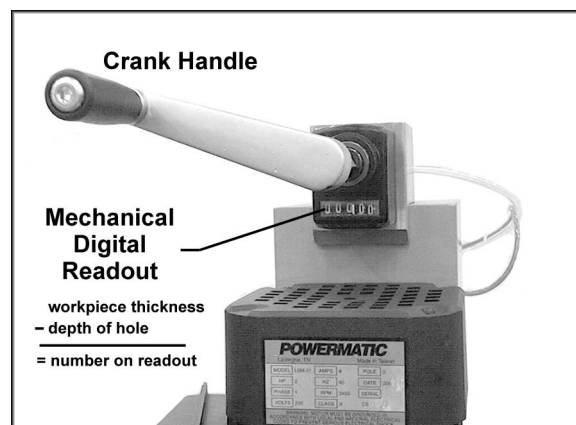


Figure 13

2. Rotate the crank handle clockwise to increase the boring depth; counterclockwise to decrease the boring depth.

IMPORTANT: Depending on the length of the boring bits and the setting of the boring depth, it is possible to bore into the work table. While this won't affect performance of the machine, to prevent this from happening you should use care and take your time when calculating the boring depth. Make test cuts on scrap material if necessary.

The mechanical digital display can be recalibrated if necessary:

1. Rotate the crank handle until the mechanical digital display reads zero.
2. Loosen the set screw (Figure 14) with a 2.5mm hex wrench. Rotate the crank handle to move the boring head to desired height. The display will remain at zero while the head travels, as long as the set screw is loose.
3. Re-tighten the set screw to establish the zero point.

Setting Boring Bit Feed Rate

The rate at which the boring head lowers and the boring bits feed into the workpiece is controlled by the valve (Figure 15) located at the rear of the cabinet above the top lip. Turn the knob counterclockwise to increase feed rate of the boring bits, or clockwise to decrease.

The feed rate will be determined by the type of wood being used, but a general rule of thumb is that hard woods require slower feed rates, while soft woods require faster feed rates.

Limit Switch Timing

The boring depth limit switch, shown in Figure 16, has a "timer" adjustment knob for delaying the retraction of the boring head; that is, how long the bits remain engaged in the workpiece before the boring head rises.

This setting has been established at the factory, and should not need adjusting for normal operations. In the future, however, should this setting require attention, proceed as follows:

1. Loosen the knurled nut on the timer adjustment knob (Figure 16).
2. Rotate the knob clockwise to increase the time delay, counterclockwise to decrease it.
3. When finished, re-tighten the knurled nut.

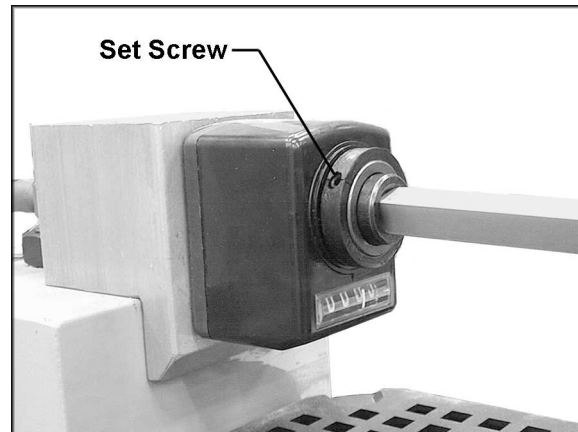


Figure 14

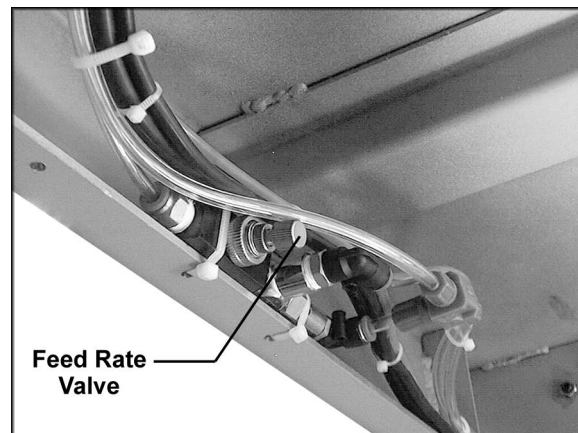


Figure 15

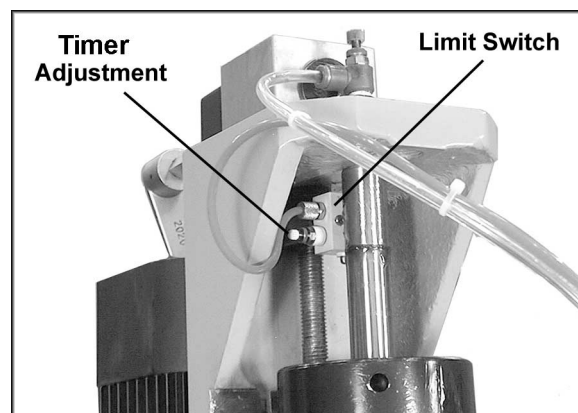


Figure 16

Table Movement

The table can be moved forward or backward to adjust the centerline of the holes in your workpiece. The scale (Figure 17) shows the measurement from fence to centerline of the holes. When the table is all the way to the back, the hole centerline will be 6 inches from the rear edge of your workpiece.

1. Loosen the two locking handles on both sides of the machine, behind the table. See Figure 17.
2. Slide the table forward or backward until the indicator line matches the required dimension on the scale (Figure 17).
3. Firmly tighten both table locking handles.

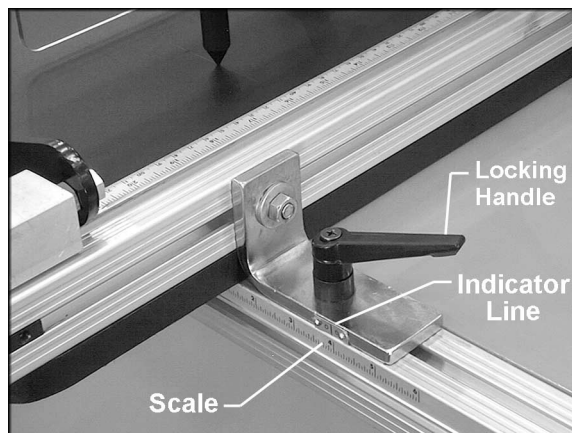


Figure 17

Fence/Boring Head Parallelism

For accurate centerlines, the boring head must be parallel to the fence. Both fence and boring head have been aligned at the factory. As the machine receives extended use, this setting may need to be checked. The boring head has a fine adjustment to make it parallel to the fence.

If the boring head is out of parallel with the fence, proceed as follows:

1. Slightly loosen the four socket head screws under the boring head (Figure 18) with a 5mm hex wrench.
2. At the back of the boring head, loosen the hex nut (A, Figure 19) on either of the screws, depending upon which side of the boring head needs adjusting. Use a 10mm wrench.
3. Rotate the screw (Figure 19) in or out as needed.
4. Re-tighten the hex nut (A, Figure 19).
5. Firmly re-tighten the four socket head screws (Figure 18)
6. The best way to confirm the adjustment is to draw an accurate centerline across the length of a scrap board, then bore holes and confirm that all boring bits hit the center line.

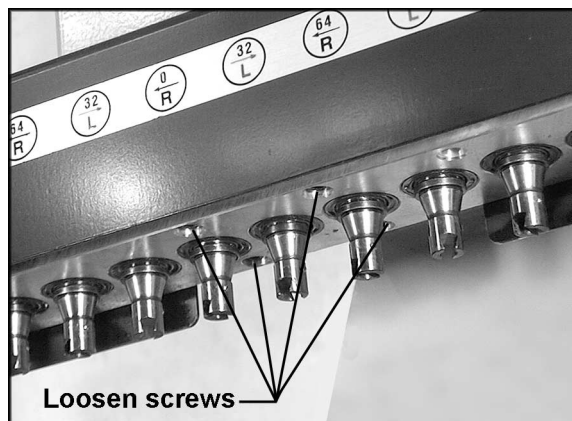


Figure 18

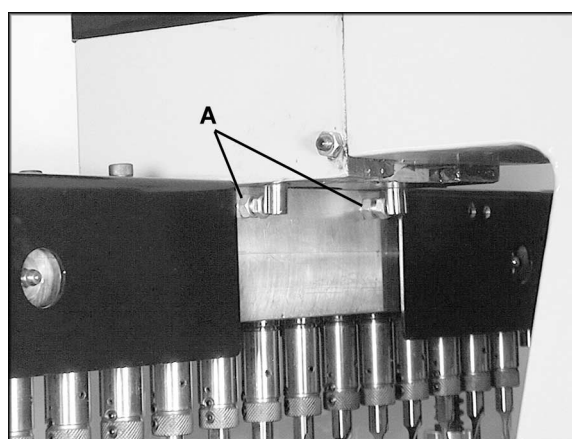


Figure 19

Oil Flow Rate

To adjust the rate of the oil flow, rotate the oil flow adjustment collar (Figure 20) until the desired number on the collar lines up with the small triangular indicator on the housing adjacent to the collar.

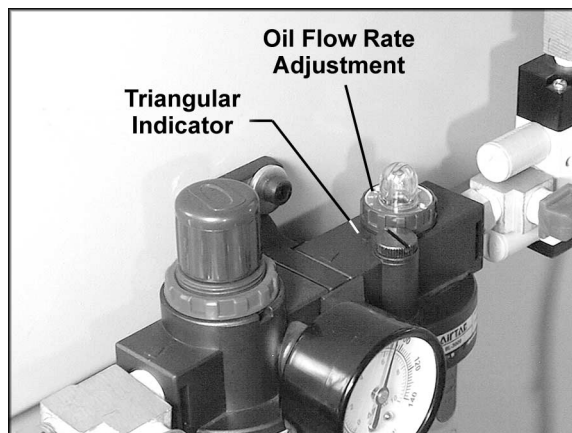


Figure 20

Operating Controls

The controls at the front of the machine are shown in Figure 21, and are described from left to right.

OFF – This red mushroom-shaped button is used for instant shut-down of the machine. In order to restart the machine, rotate the knurled ring on the stop button clockwise and allow it to pop back out.

POWER – Lights up to indicate machine is receiving power.

ON – Turn clockwise to start power to the machine.

A foot pedal is provided with this machine. Pressing the foot pedal lowers the boring head thus bringing the boring bits down into the workpiece. Releasing the foot pedal retracts the boring bits from the workpiece after the boring cycle is complete.

A limit switch is mounted to the left side of the frame (Figure 22). As the boring head rises after a boring operation, the bracket on the boring head will contact the limit switch, which will shut off the machine, in preparation for the next cycle.



Figure 21

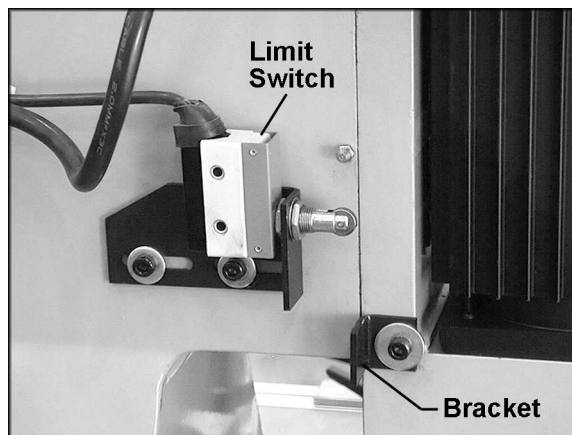


Figure 22

Operation

⚠WARNING This line boring machine is for use with wood or plastic products only – Do NOT use it for boring in metal.

The boring bits rotate in opposite directions to prevent excessive torque against the workpiece. The rotation of the boring bits should match the arrow indicators on the label affixed to the guard (Figure 23).

The two indexing pins (one is shown in Figure 23) are set at the same centerline as the spindles. They are useful for positioning your workpiece. For example, use them to find centerline so you'll know how far to adjust the table. They can also be used to locate and center a pre-drilled hole, or to make a dimple in the workpiece for further alignment purposes.

The following is the basic procedure for operating the LBM21 Line Boring Machine.

1. Make sure all boring bits and chucks are secured on the spindles, and that boring bits are aligned properly.
2. Turn on the power and the air supply.
3. Rotate the crank handle until the desired boring depth is achieved, as indicated by the adjacent digital display in inches.
4. Move the table forward or backward to establish the centerline of your holes. This is best accomplished by scribing a mark on the workpiece where centerline is to be located; then placing the workpiece against the fence and adjusting the table until the indexing pin touches your mark. See Figure 24.
5. Set fence stops as necessary.
6. Place the workpiece in position against the fence and stops. Press the foot pedal to begin the boring cycle. NOTE: The bits will remain rotating in the workpiece as long as the foot pedal is held down.
7. Release the foot pedal, and the machine will finish the complete boring cycle. After the boring head retracts from the workpiece, the machine will shut off automatically.
8. Remove workpiece from the table.

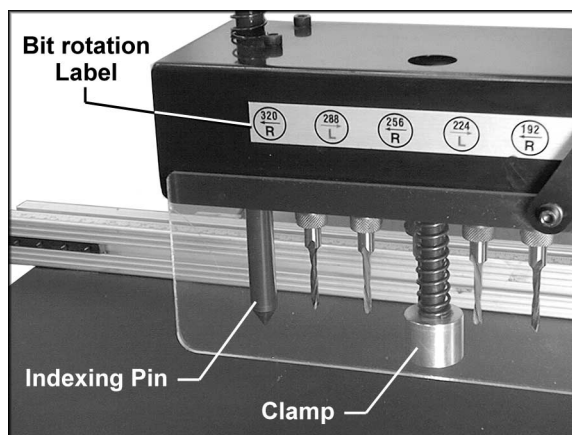


Figure 23

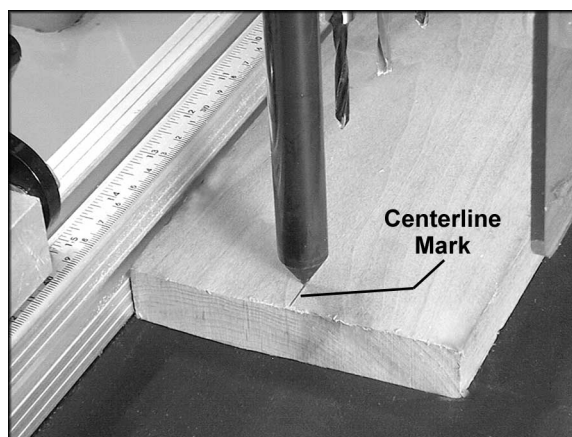


Figure 24

Maintenance

⚠WARNING Before performing any maintenance on this machine, disconnect it from the electrical supply by pulling out the plug or switching off the breaker. Failure to comply may cause serious injury.

Always keep oil in the lubricator cup (Figure 25) to at least 80 percent of full cup capacity. Unscrew and remove the oil plug (Figure 26) with a flat head screwdriver, and add oil through the inlet port. Use standard air tool oil. This is available from your local distributor or can be found in most hardware and tool stores. Always re-install the oil plug after adding oil.

The water filter cup (Figure 25) collects moisture from the air line. Periodically remove any water that collects in the water filter cup by pushing up the release valve at the bottom of the cup.

If the power cord is worn, cut, or damaged in any way, have it replaced immediately.

Lubrication

Occasionally wipe clean the guide rod on the cylinder (A, Figure 27) and the elevating screw (B, Figure 27). If there is an appreciable build-up of dust, dirt or wood shavings, use an oil cloth, but never pour oil directly on these areas. Over-oiling defeats the purpose of lubrication as it hastens the collection of dust, shavings, etc.

Grease the ways upon which the head slides, through the two grease fittings at opposite sides of the head (Figure 28). Use a good quality general-purpose grease.

Grease the gears within the boring head, using the two grease fittings at the back of the boring head. (Figure 29).



Figure 29

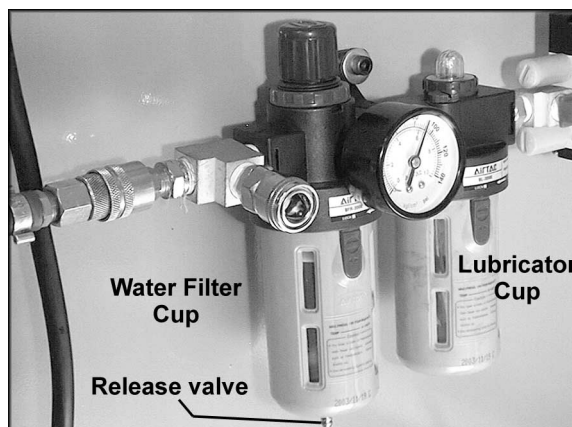


Figure 25

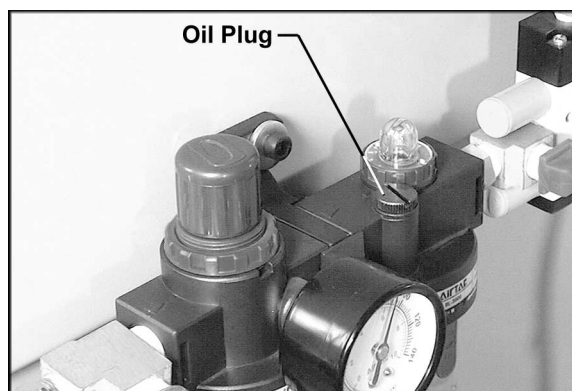


Figure 26

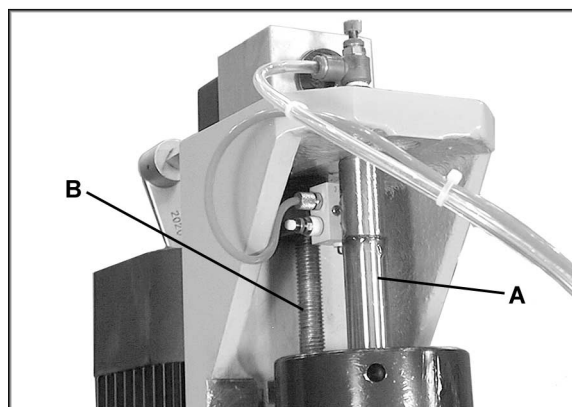


Figure 27

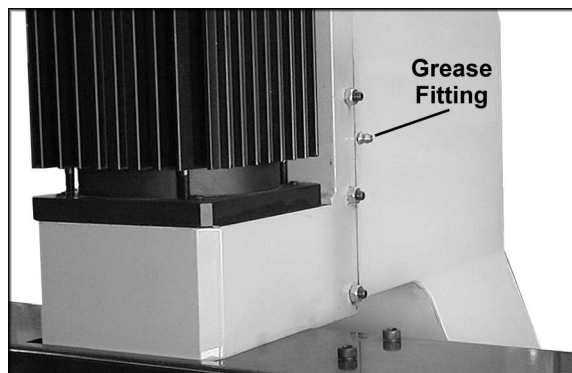


Figure 28

Troubleshooting – Mechanical and Electrical Problems

Trouble	Probable Cause	Remedy
Machine will not start/restart or repeatedly trips circuit breaker or blows fuses.	No incoming power.	Verify unit is connected to power, and the switch is on.
	Cord damaged.	Replace cord.
	Overload automatic reset has not reset.	When the Line Boring Machine overloads on the circuit breaker built into the motor starter, it takes time for the machine to cool down before restart. Allow unit to adequately cool before attempting restart. If problem persists, check amp setting on the motor starter inside the electrical enclosure.
	Machine frequently trips.	One cause of overloading trips which is not electrical in nature is too fast a cut. The solution is to slow the speed at which the bits enter the workpiece. If too fast a cut is not the problem, then check the amp setting on the overload relay. Match the full load amps on the motor as noted on the motor plate. If amp setting is correct then there is probably a loose electrical lead. Check amp setting on motor starter.
	Building circuit breaker trips or fuse blows.	Verify that machine is on a circuit of correct size. If circuit size is correct, there is probably a loose electrical lead. Check amp setting on motor starter.
	Motor starter failure.	If you have access to a voltmeter, you can separate a starter failure from a motor failure by first, verifying incoming voltage at 220+/-20 and second, checking the voltage between starter and motor at 220+/-20. If incoming voltage is incorrect, you have a power supply problem. If voltage between starter and motor is incorrect, you have a starter problem. If voltage between starter and motor is correct, you have a motor problem.
	Motor overheated.	Clean motor vents of dust and debris to allow proper air circulation. Allow motor to cool down before restarting.

Troubleshooting – Mechanical and Electrical Problems

Trouble	Probable Cause	Remedy
Machine will not start/restart or repeatedly trips circuit breaker or blows fuses.	Motor failure.	If electric motor is suspect, you have two options: Have a qualified electrician test the motor for function or remove the motor and take it to a qualified electric motor repair shop and have it tested.
	Miswiring of the unit.	Double check to confirm all electrical connections are correct and properly tight. The electrical connections other than the motor are pre-assembled and tested at the factory. Therefore, the motor connections should be double checked as the highest probability for error. If problems persist, double check the factory wiring.
	On/off switch failure.	If the on/off switch is suspect, you have two options: Have a qualified electrician test the switch for function, or purchase a new on/off switch and establish if that was the problem on changeout.

Troubleshooting – Operational Problems

Trouble	Probable Cause	Remedy
Boring speed is not sufficient; machine has low power.	Feed rate not adjusted properly.	Adjust feed rate knob. [page 14]
	Extension cord too light or too long.	Replace with adequate size and length cord. [page 13]
	Low current.	Contact a qualified electrician.
After operation, boring head will not retract.	Timer damaged.	Replace timer.
Boring head will not lower.	Air hose is cracked/broken.	Replace air hose.
	Feed rate regulator valve too tight.	Loosen feed rate valve. [page 14]
	Air leaking from air cylinder.	Repair or replace cylinder.
	Foot switch not operating.	Replace foot switch.
	Boring bits are dull.	Sharpen or replace boring bits.
	Air pressure insufficient.	Set air pressure to approximately 90 psi (or 6.3 kg/cm ²). [page 11]
Hole centerline is not accurate.	Boring head is not parallel with main fence.	Adjust boring head to be parallel with fence. [pg. 15]
Smoke occurs while the holes are being bored.	Boring bits are dull.	Sharpen or replace boring bits.
	Air pressure incorrect.	Set air pressure to approximately 90 psi (or 6.3 kg/cm ²). [page 11]

Boring Bit Purchase/Replacement

These companies supply the Right-Hand and Left-Hand boring bits required for this machine:

Amana Toolsphone: 1-800-445-0077

CMTphone: 1-888-CMT-BITS

Replacement Parts

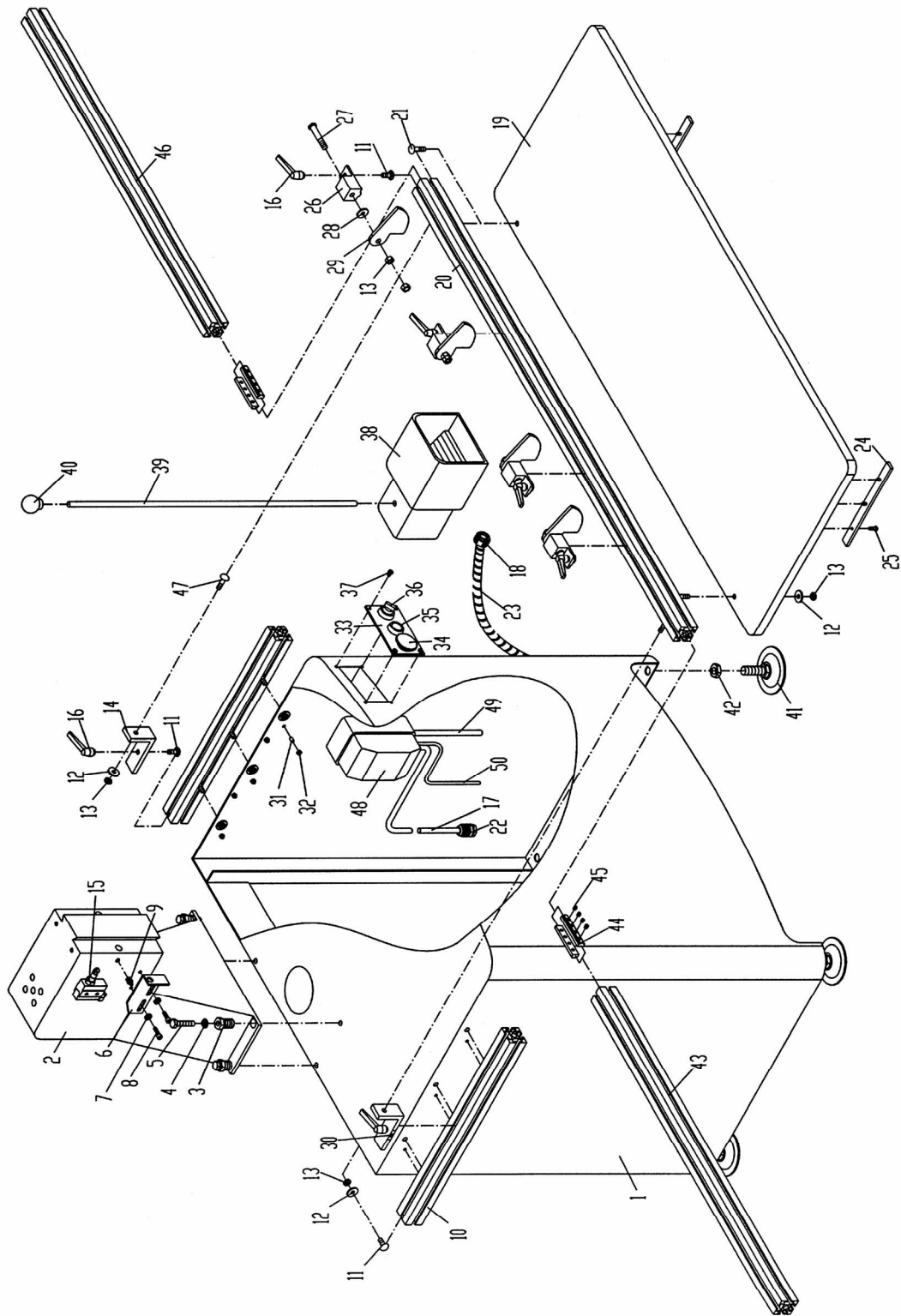
Replacement parts are listed on the following pages. To order parts or reach our service department, call 1-800-274-6848 between 7:00 a.m. and 6:00 p.m. (CST), Monday through Friday. Having the Model Number and Serial Number of your machine available when you call will allow us to serve you quickly and accurately.

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Parts List: Frame Assembly

Index No.	Part No.	Description	Size	Qty
1	LBM21-101	Machine Frame		1
2	LBM21-102	Head Frame		1
3	LBM21-103	Adjustable Bushing		4
4	TS-2361101	Lock Washer	M10	4
5	CBM21-406	Hex Cap Screw (Full Thread)	M10 x 45	4
6	LBM21-106	Bracket		1
7	TS-0680021	Flat Washer	1/4"	2
8	TS-1503041	Socket Head Cap Screw	M6 x 16	2
9	LBM21-109	Grease Fitting		2
10	LBM21-110	Fence Mount Rail		2
11	LBM21-111	Carriage Bolt	M8 x 20	12
12	TS-0680031	Flat Washer	5/16"	10
13	TS-1540061	Hex Nut	M8	18
14	LBM21-114	Dovetailed Slide		2
15	CBM21-431	Limit Switch		1
16	LBM21-116	Locking Handle	M8	6
17	LBM21-117	Motor Cord (switch to motor)		1
18	CBM21-149	Strain Relief		2
19	LBM21-119	Working Table		1
20	LBM21-120	Fence		1
21	LBM21-121	Carriage Bolt	M8 x 30	2
22	CBM21-156	Strain Relief		1
23	CBM21-148	Protective Hose		1
24	LBM21-124	Linear Guide Rail		2
25	LBM21-125	Tap Screw	M4 x 20	6
26	LBM21-126	Stop Block Body		4
27	LBM21-127	Special Bolt		4
28	TS-0680041	Flat Washer	3/8"	4
29	LBM21-129	Stop Plate		4
30	LBM21-130	Scale		1
31	TS-1523031	Socket Set Screw	M6 x 10	10
32	TS-1540041	Hex Nut	M6	10
33	LBM21-133	Panel		1
34	LBM21-134	Emergency Stop Button		1
35	LBM21-135	Power Indicator		1
36	LBM21-136	Start Switch		1
37	TS-1533032	Machine Screw	M5 x 10	4
38	CBM21-136	Foot Switch Box		1
39	CBM21-137	Rod		1
40	CBM21-138	Knob		1
41	LBM21-141	Foot Pad		4
42	TS-0561071	Hex Nut	5/8"-11UNC	4
43	LBM21-143	Extended Fence, Left		1
44	LBM21-144	Connecting Block		4
45	TS-2276081	Socket Set Screw	M6 x 8	16
46	LBM21-146	Extended Fence, Right		1
47	LBM21-147	Carriage Bolt	M8 x 25	2
48	CBM21-152	Magnetic Switch		1
49	LBM21-149	Power Cord		1
50	LBM21-150	Limit Switch Cord (switch to limit switch)		1
51	3312341	Powermatic Label (not shown)		1
52	COS18-242	Warning Label (not shown)		1

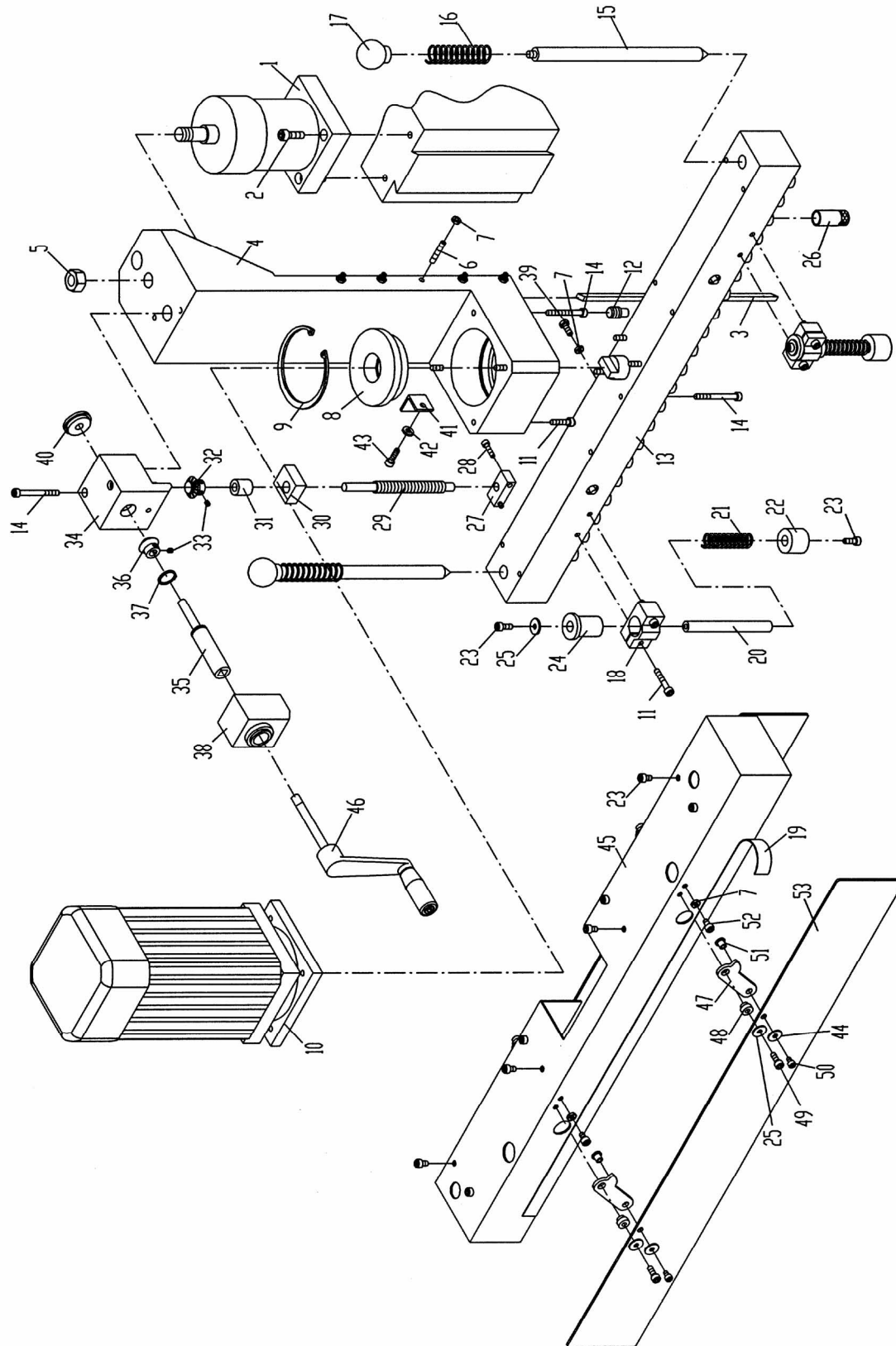
Frame Assembly



Parts List: Headstock Assembly

Index No.	Part No.	Description	Size	Qty
1	LBM21-201	Cylinder		1
2	TS-1504051	Socket Head Cap Screw	M8 x 25	2
3	LBM21-203	Gib		1
4	LBM21-204	Motor Holder		1
5	LBM21-205	Special Hex Nut		1
6	LBM21-206	Socket Set Screw	M6 x 35	5
7	TS-1540041	Hex Nut	M6	11
8	LBM21-208	Collar		1
9	LBM21-209	C Ring	R95	1
10	LBM21-210	Motor, TEFC	2.5HP, 1Ph, 230V	1
	LBM21-210MFC	Motor Fan Cover		1
11	TS-1503081	Socket Head Cap Screw	M6 x 35	7
12	LBM21-212	Special Screw Rod		2
13	LBM21-213	Boring Head		1
14	TS-1503131	Socket Head Cap Screw	M6 x 60	7
15	LBM21-215	Index Pin Rod		2
16	LBM21-216	Spring		2
17	LBM21-217	Index Pin Knob		2
18	LBM21-218	Hold Down Base		2
19	LBM21-219	Label, Bit Rotation		2
20	LBM21-220	Hold Down Rod		2
21	LBM21-221	Spring		2
22	LBM21-222	Block		2
23	TS-1503031	Socket Head Cap Screw	M6 x 12	12
24	LBM21-224	Bushing		2
25	TS-0680021	Flat Washer	1/4"	6
26	CBM21-543	Quick Chuck		21
27	LBM21-227	Switch Base		1
28	TS-2284202	Phillips Pan Head Machine Screw	M4 x 20	2
29	LBM21-229	Elevating Screw		1
30	LBM21-230	Block		1
31	LBM21-231	Collar		1
32	LBM21-232	Bevel Gear		1
33	TS-1522011	Socket Set Screw	M5 x 6	4
34	LBM21-234	Gear Box		1
35	LBM21-235	Shaft		1
36	LBM21-236	Bevel Gear		1
37	LBM21-237	C Ring	S20	1
38	LBM21-238	Readout		1
39	TS-1482031	Hex Cap Screw	M6 x 16	2
40	LBM21-240	Plug		1
41	LBM21-241	Bracket		1
42	TS-0680031	Flat Washer	5/16"	1
43	TS-1503041	Socket Head Cap Screw	M6 x 16	1
44	TS-0680021	Flat Washer	1/4"	2
45	LBM21-245	Safety Guard		1
46	LBM21-246	Crank Handle		1
47	LBM21-247	Arm		2
48	LBM21-248	Collar		2
49	TS-1503041	Socket Head Cap Screw	M6 x 16	2
50	TS-1502021	Socket Head Cap Screw	M5 x 10	2
51	LBM21-251	Spacer		2
52	TS-1503021	Socket Head Cap Screw	M6 x 10	2
53	LBM21-253	PC Cover		1
54	LBM21-WLH	Warning Label, Keep Hands Out (not shown)		2

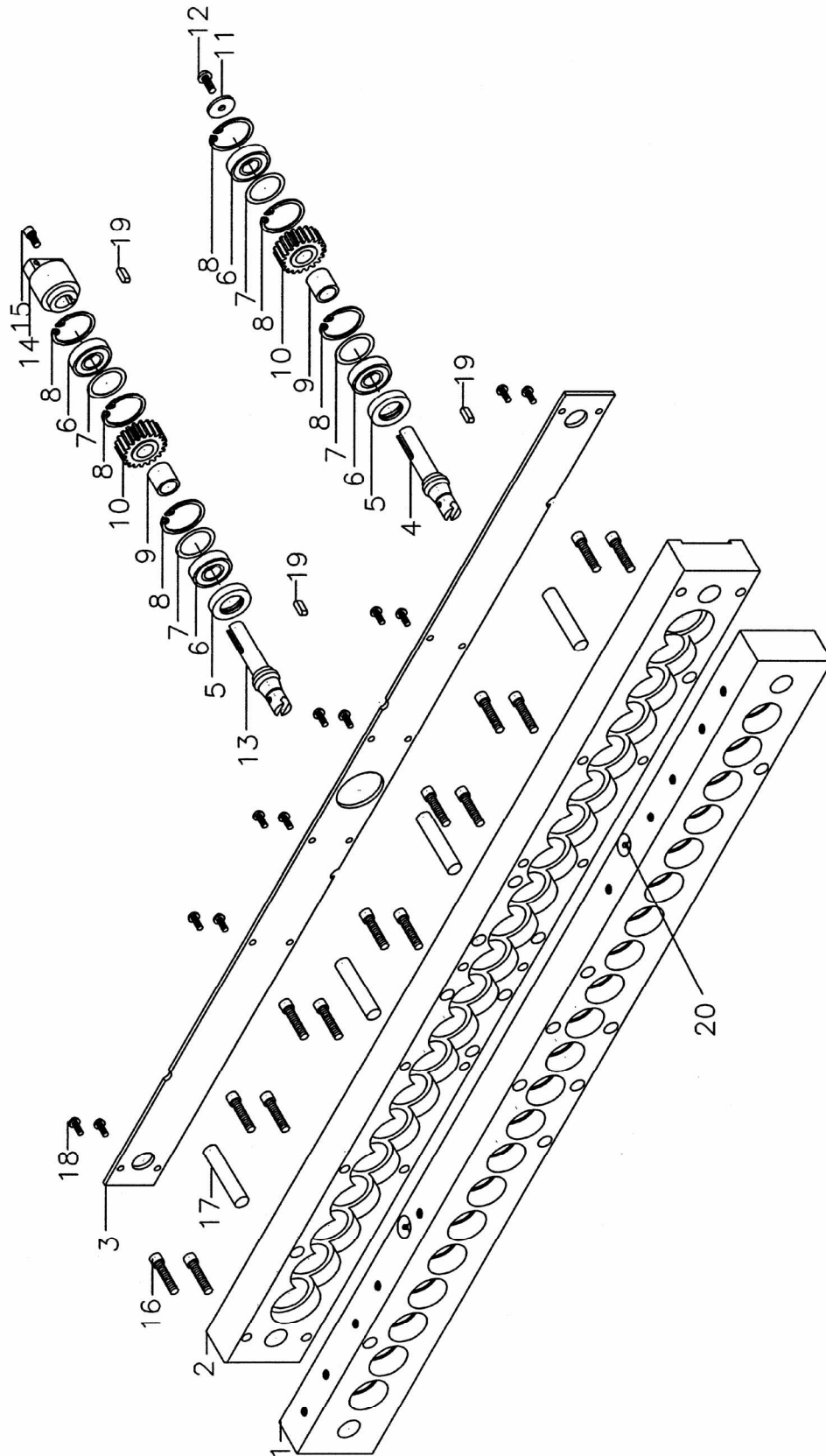
Headstock Assembly



Parts List: Boring Head Assembly

Index No.	Part No.	Description	Size	Qty
1	LBM21-301	Bottom Gear Box		1
2	LBM21-302	Top Gear Box		1
3	LBM21-303	Gear Box Cover		1
4	CBM21-204	Spindle		20
5	CBM21-205	Oil Seal		21
6	BB-6001ZZ	Ball Bearing	6001ZZ	42
7	CBM21-207	Special Caulking Ring		42
8	CBM21-208	C Ring	R28	63
9	CBM21-209	Bushing		21
10	CBM21-210	Gear		21
11	CBM21-211	Special Caulking Ring		20
12	TS-1513021	Socket Head Flat Screw	M5 X 12	20
13	LBM21-313	Main Spindle		1
14	LBM21-314	Transmission Shaft		1
15	TS-1502041	Socket Head Cap Screw	M5 X 16	1
16	TS-1503071	Socket Head Cap Screw	M6 X 30	14
17	CBM21-217	Pin	Ø10 X 50	4
18	TS-1512021	Socket Head Flat Screw	M4 X 12	12
19	CBM21-219	Key	4 X 12	22
20	CBM21-222	Grease Fitting	1/16	2

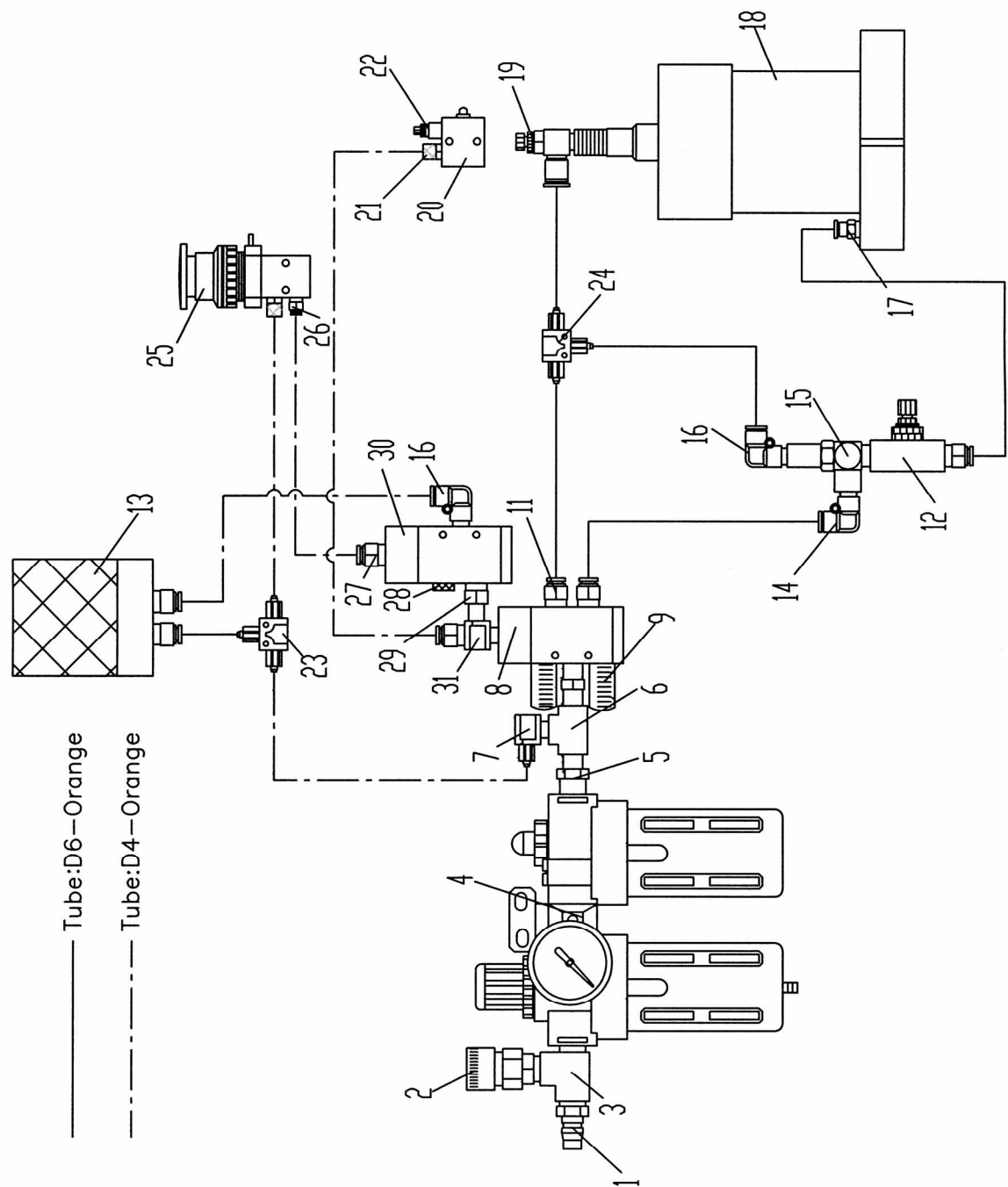
Boring Head Assembly



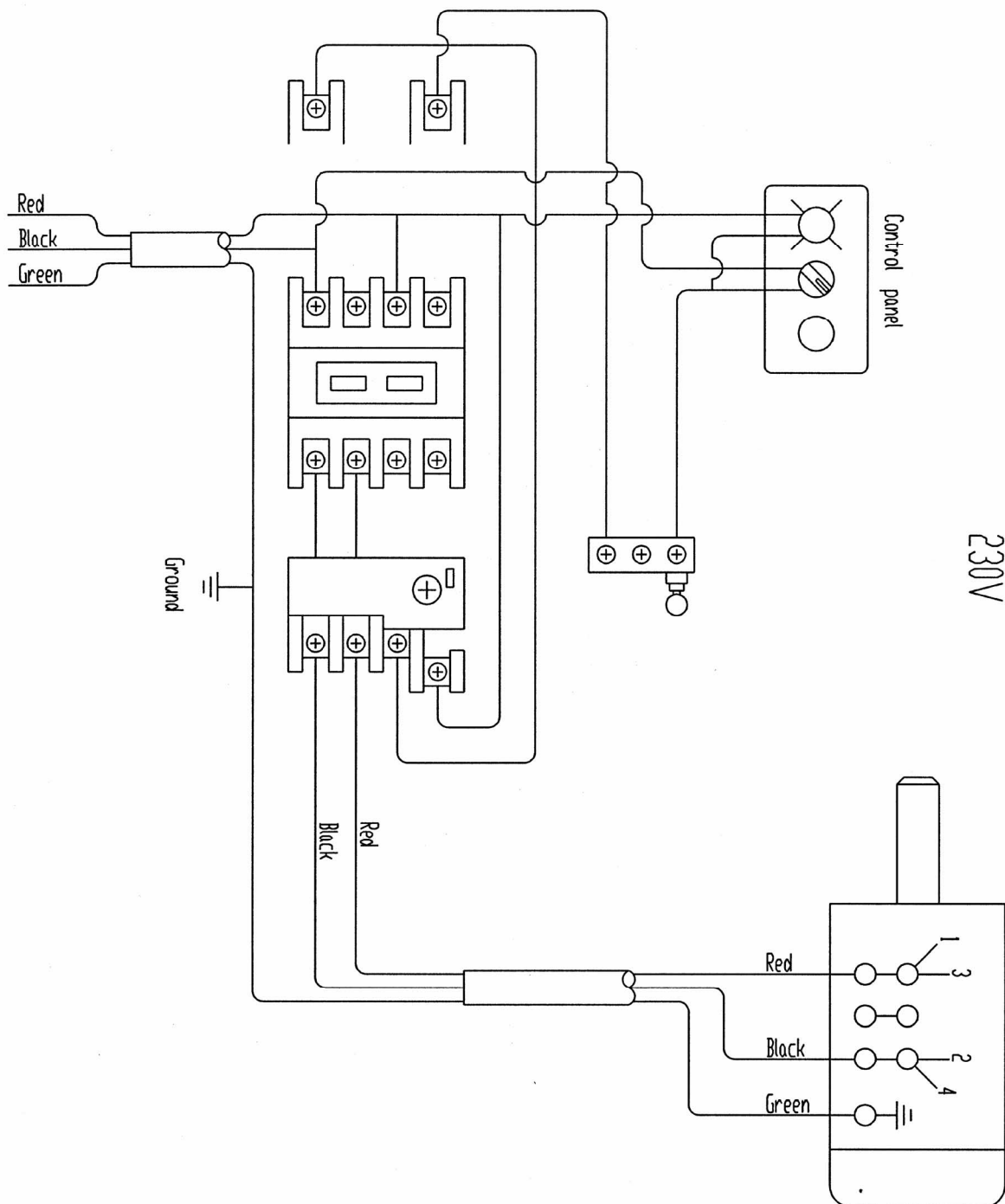
Parts List: Pneumatic Diagram

Index No.	Part No.	Description	Size	Qty
1	CBM21-601	Quick Fitting		1
2	CBM21-603	Quick Fitting		1
3	CBM21-602	Connection Block		1
4	CBM21-604	F.R.L. Unit		1
5	CBM21-605	Jointer	3/8" x 1/4"	1
6	CBM21-612	Connection Block	1/4"	1
7	CBM21-606	Tube Fitting (L type)	1/4 x Ø4	1
8	CBM21-609	Connector		1
9	CBM21-610	Silencer	1/8"	2
10	CBM21-611	Tube Fitting (L type)	1/8" x Ø4	1
11	CBM21-613	Quick Tube Fitting (I type)	1/4" x Ø6	3
12	LBM21-412	Air Regulator	1/4"	1
13	CBM21-617	Pedal Switch		1
14	CBM21-628	Quick Tube Fitting (L type)	1/4" x Ø6	1
15	LBM21-415	Valve	1/4"	1
16	LBM21-416	Quick Tube Fitting (L type)	Ø5 x Ø6	1
17	LBM21-417	Copper Tube Fitting (I type)	1/8" x Ø6	1
18	LBM21-201	Cylinder		
19	LBM21-419	Air Regulator With Quick Tube Fitting	1/8" x Ø6	1
20	CBM21-623	Limit Switch		1
21	CBM21-618	Golden Tube Fitting (I type)	Ø5 x Ø4	2
22	CBM21-625	Air Regulator	Ø5	1
23	CBM21-622	Tube Fitting (T type)	Ø4 x Ø4 x Ø4	1
24	LBM21-424	Tube Fitting (T type)	Ø6 x Ø6 x Ø6	1
25	LBM21-134	Emergency Stop Button	Ø5	
26	CBM21-632	Quick Tube Fitting (I type)	Ø5 x Ø4	1
27	CBM21-635	Quick Tube Fitting (I type)	1/8" x Ø4	4
28	CBM21-634	Special Screw	1/8"	1
29	LBM21-429	Jointer	1/8" x 1/8"	1
30	CBM21-636	Connector	1/8"	1
31	LBM21-431	Connection Block	1/8"	1

Pneumatic Diagram



Electrical Connections



POWERMATIC®

WMH Tool Group
2420 Vantage Drive
Elgin, Illinois 60123
Phone: 800-274-6848
www.wmhtoolgroup.com