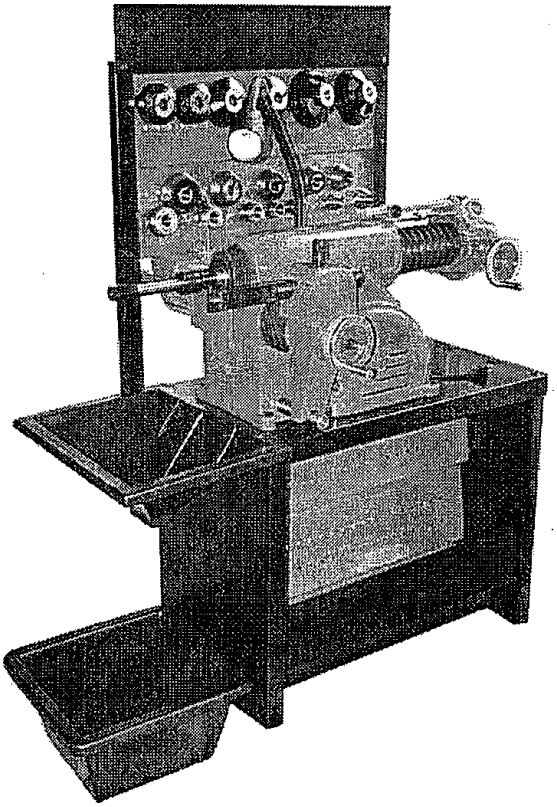
BL-1500 COMBINATION BRAKE LATHE

Designed for precision machining of Automobile & Light Truck Drums, Rotors and Flywheels



Operator's Manual and Parts Reference

Revised March 1, 2007 - DSC

SHIPPING DAMAGE CLAIMS

When this equipment is shipped, title passes to the purchaser upon receipt from the carrier. Consequently, claims for the material damaged in shipment must be made by the purchaser against the transportation company at the time shipment is received.

BE SAFE

Your new brake lathe was designed and built with safety in mind. However your overall safety can be increased by proper training and operator adherence to proper machining techniques. READ THIS MANUAL completely before attempting to operate your new lathe. Adhere to all safety instructions described within the manual

THIS SYMBOL POINTS OUT IMPORTANT SAFETY INSTRUCTIONS WHICH IF NOT FOLLOWED COULD ENDANGER THE PERSONAL SAFETY AND/OR PROPERTY OF YOURSELF AND OTHERS AND CAN CAUSE PERSONAL INJURY OR DEATH. READ AND FOLLOW ALL INSTRUCTIONS IN THIS MANUAL BEFORE ATTEMPTING TO OPERATE THIS MACHINE.

TABLE OF CONTENTS

DEFINITIONS OF HAZARD LEVELS

Identify the hazard levels used in this manual with the following definitions and signal words:

g DANGER

DANGER

Watch for this symbol: It Means: Immediate hazards which will result in severe personal injury or death.

A WARNING

WARNING

Watch for this symbol: It Means: Hazards or unsafe practices which could result in severe personal injury or death.

CAUTION

Watch for these symbols. They warn of Hazards or potential unsafe practices which may result in personal injury or product or property damage.

OWNER'S RESPONSIBILITY

To maintain machine and user safety, the responsibility of the owner is to read and follow these instructions:

- Follow all installation instructions.

- Make sure installation conforms to all applicable Local, State, and Federal Codes, Rules, and Regulations; such as State and Federal OSHA Regulations and Electrical Codes.

- Carefully check the unit for correct initial function.

- Read and follow the safety instructions. Keep them readily available for machine operators.

- Make certain all operators are properly trained, know how to safely and correctly operate the unit, and are properly supervised.

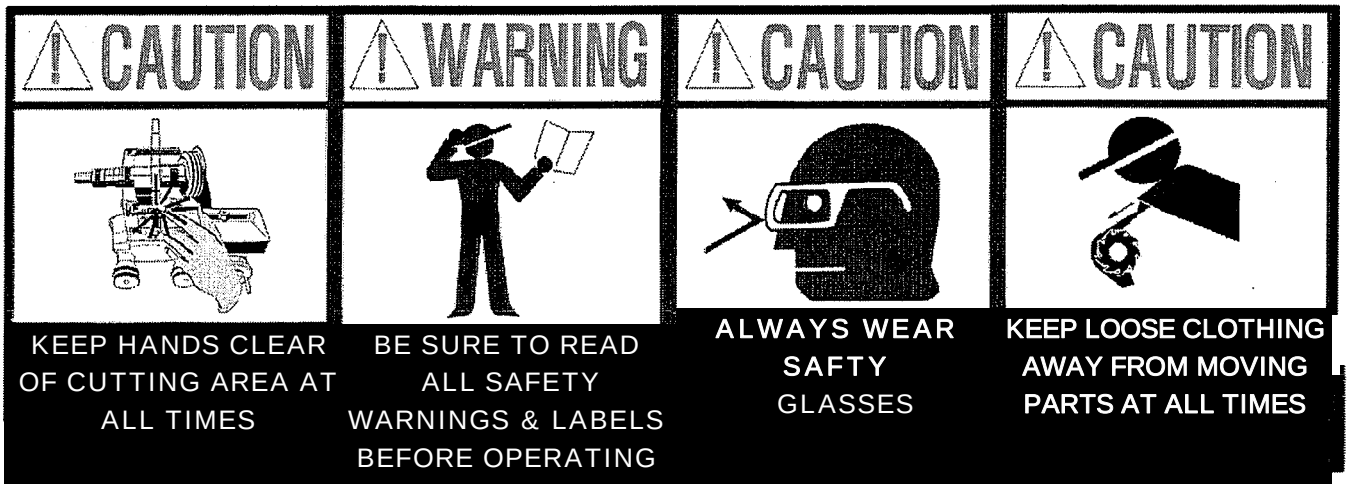
- Allow unit operation only with all parts in place and operating safely.

- Carefully inspect the unit on a regular basis and perform all maintenance as required.

- Service and maintain the unit only with authorized or approved replacement parts.

- Keep all instructions permanently with the unit and all decals on the unit clean and visible.

Watch for this symbol! It means BE ALERT! Your safety, or the safety of others, is involved!



WARNING INSTRUCTIONS

1. This equipment incorporates parts such as electrical switches which may produce sparks. When located in a service facility, the unit should be in a ventilated room or enclosure provided for the purpose, or should be at least 18 inches or more above floor to minimize the risk of igniting fuel vapors.

2. Eye and face protection is required and strongly recommended: "Protective eye and face equipment is required to be used where there is a reasonable probability of injury that can be prevented by use of such equipment." OSHA 1910.133 (a) Protective goggles, safety glasses, or a face shield must be provided by the purchaser/user and worn by the operator of the equipment. Make sure all eye and face safety precautions are followed by the operator(s). Keep bystanders out of the area.

3. Do not remove any safety equipment such as guards, control switches or shut-off devices.

4. Make sure rotors are properly mounted and true before starting the lathe. Check to make sure all parts are secure.

5. Make sure the rotors are clean and mounted properly before beginning any maching pass.

6. Do not overload the lathe. Read and understand the lathe capabilities prior to operation. Overloading the lathe can shorten the lifespan of the unit, and could cause a failure resulting in personal injury.

7. Check damaged parts carefully. Before further use of the lathe, a guard or other part that is damaged should be carefully checked. Immediately replace all damaged, missing, or non-functional parts. Check for alignment of moving parts, binding of moving parts, breakage of parts, mounting, and any other conditions that may affect operation. Guards and other parts that are damaged should be properly repaired or replaced before lathe is used again.

8. Always feed the cutter bar into the work **against** the direction of rotation. Cutters and tool bits are designed to begin the cut from near the center of the rotor to the outer edge. Never attempt to cut from the outside edge into the center.

9. Never leave the brake lathe running unattended. Turn the power off. Don't leave the brake lathe until the power switch is turned to the OFF position.

10. Never use compressed air to blow and clear chips. Chips and dust may be driven between machined parts and into bearings, causing undue wear. They may also become airborne and potentially cause personal injury.

BEFORE YOU BEGIN

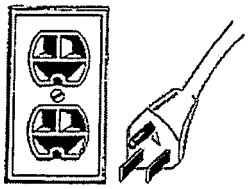
Receiving:
The shipment should be thoroughly inspected as soon as it is received. The signed bill of lading is an acknowledgement to the carrier of receipt in good condition of shipment covered by your invoice. If any of the goods called for on this bill of lading are missing or damaged, do not accept them until the carrier makes a notation on the freight bill of the shortage or damaged goods. Do this for your own protection.

NOTIFY THE CARRIER AT ONCE if any hidden loss or damage is discovered after receipt and request the carrier to make an inspection. If the carrier will not do so, prepare a signed statement to the effect that you have notified the carrier (on a specific date) and that the carrier has failed to comply with your request.

IT **IS DIFFICULT** TO **COLLECT FOR LOSS OR HIDDEN DAMAGE AFTER YOU HAVE GIVEN THE CARRIER A SIGNED RECEIPT.** File your claim with the carrier promptly. Support your claim with copies of the bill of lading, freight bill, invoice, and photographs, if available. Our willingness to assist in helping you process your claim does not make us responsible for collection of claims or replacement of lost or damaged materials.

ELECTRICAL REQUIREMENTS

This unit requires power from a 15 amp 110 volt electrical circuit. The lathe must be properly grounded to protect the operator from shock. The BL1500 is equipped with an approved power cord and 3-prong grounding-type plug. Should an extension cord be required, be sure to use a similar size power cord with 3-prong grounding plug and a 3-prong grounding receptacle properly rated to handle the electrical requirement of this unit. Do not modify a cord or plug to match a receptacle; have a qualified electrician install an appropriate outlet to match the lathe requirements. Repair or replace any worn or damaged power cords immediately.



IMPORTANT NOTE

For 220 volt operation it will be necessary to replace the 110 volt 3-prong plug with an appropriate 220 volt 3-prong plug with ground. After changing the plug, position the voltage selector switch at the rear of the unit to the 220 setting. Verify that the lathe plug and grounding-type receptacle match.

IMPORTANT SAFETY INSTRUCTIONS

Before operating the lathe, review the warning information on the lathe and the cautions, warnings and dangers in this manual. Also review the following general safety instructions.

When using your brake lathe basic safety precautions should always be followed, including the following:

♦ KEEP GUARDS IN PLACE and in working order.

♦ KEEP HANDS clear of moving parts at all times. Keep hair, loose clothing, neckties, shop rags, jewelry, fingers, and all parts of body away from moving parts.

♦ ALWAYS USE SAFETY GLASSES. Everyday eyeglasses only have impact resistant lenses, they are NOT safety glasses. Safety glasses, goggles, or a face shield will help protect the operator from injury. Use a face shield and dust mask during all operations.

♦ SECURE WORK properly for setup and tool bit positioning before attempting to make first cut. Do not attempt to touch rotors or drums with your hands with the lathe in operation.

♦ REMOVE ADJUSTING KEYS, WRENCHES and ALL LOOSE PARTS from the lathe before turning it on.

♦ MAINTAIN TOOLS WITH CARE. Keep tools sharp and clean for best and safest performance. Follow instructions for lubricating and changing accessories.

♦ USE FACTORY APPROVED TOOLS ONLY. Don't force a tool or an attachment to do a job for which it was not designed. The use of improper accessories may cause risk of injury to operator or bystanders. Use only as described in this manual. Use only manufacturer's recommended attachments.

• KEEP WORK AREA CLEAN and well lighted. Cluttered areas and benches invite accidents.

♦ LOCATE POWER CORD SAFELY. Do not let power cord come in contact with moving parts.

♦ PROVIDE ADEQUATE VENTILATION when working on operating internal combustion engines. Vehicle exhaust must be vented from work area.

♦ DRESS PROPERLY. Keep hair, loose clothing, neckties, shop rags, jewelry, fingers, and all parts of body away from moving parts. Non-slip footwear is recommended.

♦ ALWAYS UNPLUG EQUIPMENT from electrical outlet when not in use. Never use the cord to pull the plug from the outlet. Grasp plug firmly and pull to disconnect.

♦ DO NOT OPERATE EQUIPMENT with a damaged cord or if the equipment has been dropped or damaged-until it has been examined by a qualified serviceman.

♦ REDUCE RISK OF SHOCK. Do not use on wet surfaces or expose to rain.

♦ KEEP CHILDREN & UNAUTHORIZED PERSONS AWAY. All bystanders should be kept completely away from the work area.

• REMOVE POWER AND DISCONNECT TOOLS before servicing the unit and when changing accessories such as blades, bits, cutters, etc. Follow lock-out and tag-out procedures as required.

♦ AVOID UNINTENTIONAL STARTING. Make sure the switch is in the OFF position before plugging the machine in or performing any maintenance or service work.

♦ NEVER LEAN OR STAND ON THE LATHE. Serious injury could occur if the lathe is tipped over or if the cutting tool is unintentionally contacted.

♦ REDUCE RISK OF FIRE. Do not operate equipment in near open containers of flammable liquids and their vapors.

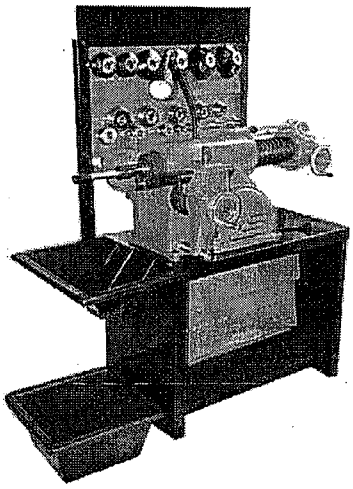
IMPORTANT NOTICE

Do not attempt to operate this equipment if you have never been trained on basic brake lathe operation procedures. Stay clear of moving parts that can cause injury. These instructions must be followed to insure proper installation and operation. Failure to comply with these instructions can result in serious bodily harm and void product warranty. Manufacturer will assume no liability for loss or damage of any kind, expressed or implied resulting from improper installation, operation or use of this product.

PLEASE READ ENTIRE MANUAL PRIOR TO INSTALLATION.

MODEL BL-I500
COMBINATION BRAKE LATHE

The BL 1500 Combination Brake Lathe i s intended to resurface disc brake rotors and drums on passenger cars & medium duty trucks only. Using this lathe for other purposes could result in personal injury and / or equipment damage.



FEATURES:
1 Produces an accurate machined surface that exceeds OEM specifications.

- Simultaneously machines both sides of the rotor parallel eliminating run-out problems. Rigid mounting micrometer type tool holders eliminate flexing for maximum accuracy

- Specially designed adapters assure that rotors are machined to exceed manufacturer's specifications.

♦ Features twin cuttertool head with micrometer dials and quick drum-to-rotor changeover. Adjustable spindle speeds allow for fast rough cut or slow finish cut settings. An infinitely adjustable spindle-feed gear box provides variable speed setting.

♦ Supports drums or rotors up to 100 lbs. using the standard one inch arbor.

♦ Allows you to work quickly and efficiently. Simple design and ergonomic controls are designed for minimal operator movement.

♦ A precision lathe that will cut rotors and drums to very precise tolerances. Durable construction and heavy design will provide superior accuracy year after year. Forged, hardened and ground components resist grooving and premature wear. Oversize tapered spindles offer superior weight support during rotation and a screw-feed oil delivery system supplies a constant flow of oil to the bearings.

STANDARD EQUIPMENT INCLUDES

- ♦ Combination Brake Lathe With Standard Bench
- ♦ Micrometer-Type Twin Tool Holder / Head
- ♦ Boring Bar
- ♦ Carbide Cutting Tools
- ♦ 6-Sided Carbide Cutting inserts
- ♦ 1" Arbor
- ♦ Spring
- ♦ Arbor Nut
- ♦ Spare Bulb For Lamp
- ♦ Inside Floating Adapters
- ♦ Self-Aligning Spacer
- ♦ Outside Floating Adapter
- ♦ Centering Cones
- ♦ Spacers
- ♦ Double Taper Adapters
- ♦ Hubless Adapters
- ♦ Anti-Vibration Bands
- ♦ Wrenches
- ♦ Spare Drive Belt
- ♦ High-impact storage case
- ♦ Illustrated Instruction Manual
- ♦ High-Impact Plastic Storage Box And Carrying Case

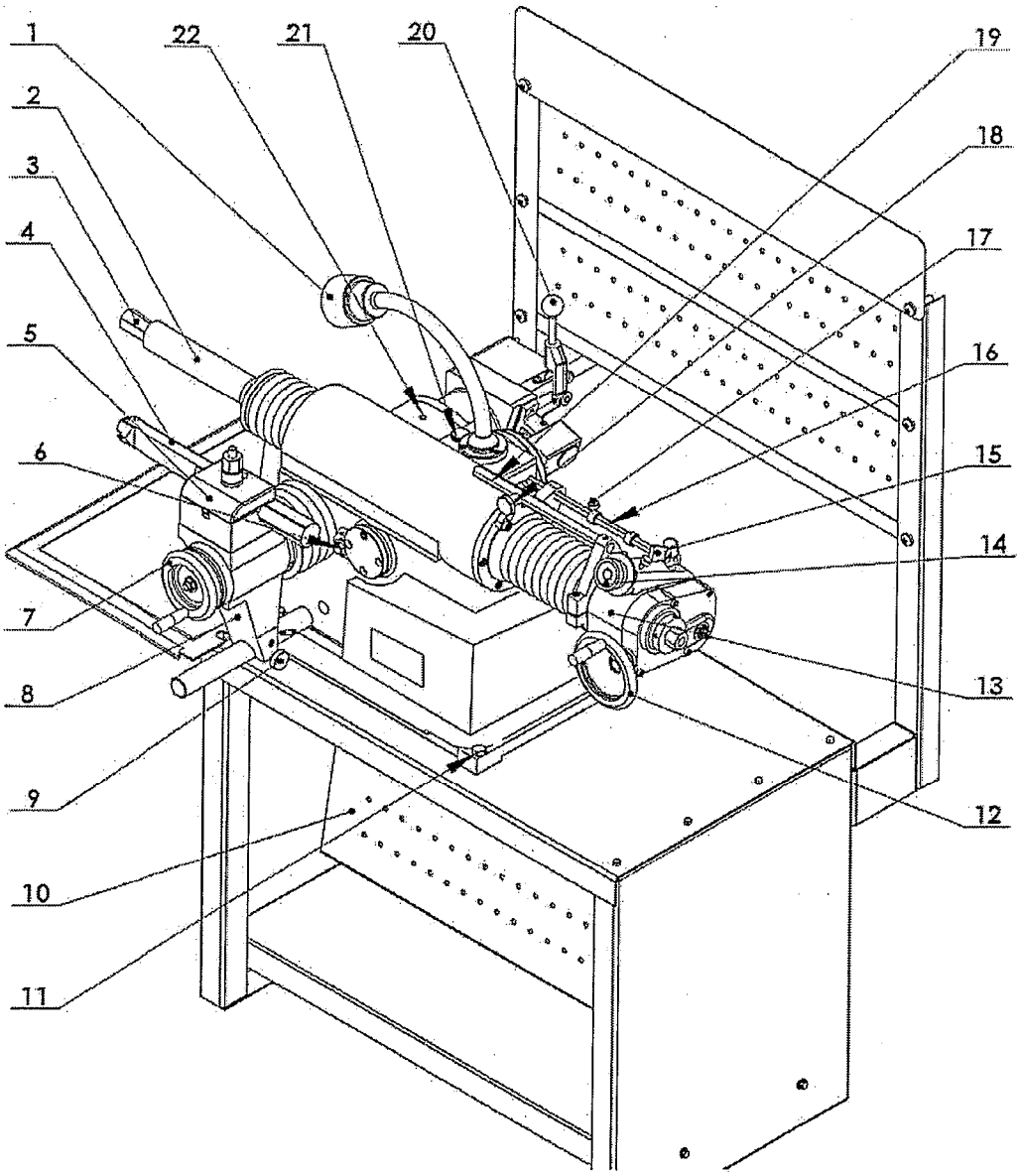
SPECIFICATIONS

Overall Height - Lathe only	17" 1 432 mm.
Overall Height – Lathe with Bench:	59'1 1499 mm.
Overall Width - Lathe only	45" / 1143 mm.
Overall Width - Lathe with Bench:	48" 1 1219 mm.
Overall Depth - Lathe only	35" 1 889 mm.
Overall Depth – Lathe with Bench	35" 1880 mm.
Spindle To Floor - On Bench:	38" I 886 mm.
Electrical:	115,230 VAC, 50/60Hz 1-Phase, 20 AMP
Spindle Travel:	6 7/8" – 175mm
Spindle Speed Min	100 rpm
Spindle Speed Max	200 rpm

Spindle Feed Variable: - Min: 0.002 Inch Per Rev./0.05 Mm/Rev. Spindle Feed Variable: - Max: 0.020 Inch per Rev. / 0.50 Ma-Rev. Cross Feed - Manual Fine: 0002 Inch per Rev. f 0.05 Mm/Rev. Cross Feed-Manual Course: 0.011nch per Rev /0.0250 Mm/Rev. Handwheel Tool Feed Graduations: 0.D32' 10.050 mm.

Maximum Rotor Diameter	14.5" / 386mm
Maximum Rotor Thickness	1/875" / 48mm
Minimum Drum Diameter	6" / 152 mm
Max Drum Diameter	28" / 711mm
Max Drum Depth	6.875" / 175mm
Maximum Arbor Load	100 lbs. /45.36Kg
Shipping Weight	590 lbs / 268 Kg.

BL-1500 ASSEMBLY VIEW



1 Work Lamp
2 Arbor
3 Arbor Nut
4 Boring Bar
5 Boring Bar Tool Holder
6 Oil Drain Plug
7 Cross Feed Hand Wheel
8 Tool Carrier Slide
9 Cross Feed Lock Knob
10 Lower Bench Panel
11 Lathe Mounting Bolt
12 Spindle Feed Hand Wheel
13 Spindle Feed Gearbox
14 Spindle Variable Speed Dial
15 Spindle Feed Clutch Handle
16 Travel Control Limit Rod
17 Travel Control Rod Lock Knob
18 Spindle Lock Knob
19 Lock Rod
20 Cross Feed Speed Setting Handle
21 Oil Fill Port f Dipstick
22 Cross Feed Screw Oiling Port

INSTALLATION

1. Assemble the bench and chip trays according to the diagram on page 7. Tighten all fasteners securely.

2. After assembly, the bench should be leveled. The bench may be bolted down with 3/8" concrete bolts or lag screws.

3. Unbolt the lathe from the shipping pallet and remove any packing materials and protective wrapping. Lift the lathe onto the bench.

⚠ WARNING

Always follow safe lifting practices when lifting heavy loads. Use a forklift or crane only. Do not attempt to lift lathe unit onto the bench without the use of material handling equipment with a lifting capacity 400 pounds or greater.

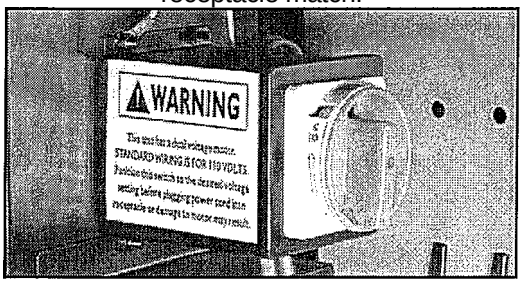
4. Bolt the lathe to the bench with the hardware provided. Tighten fasteners securely.

5. Remove any packing materials and protective wrapping from the lathe and components.

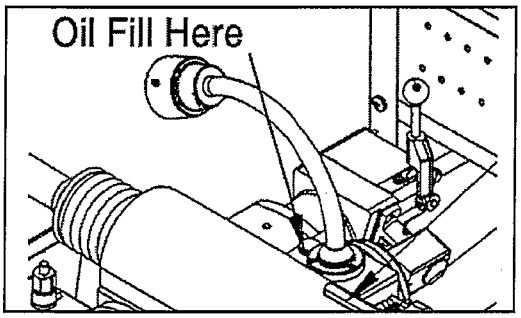
6. Make sure the lathe is turned off. Plug lathe into a properly installed and grounded outlet that matches the lathe plug.

IMPORTANT NOTE

Position the voltage selector switch at the rear of the unit to the appropriate voltage setting before plugging the lathe into outlet. Verify that the lathe plug and grounding-type receptacle match.

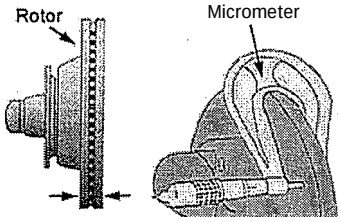


7. Remove the oil plug, insert the oil dipstick, and check oil level. The lathe is shipped with the correct amount and type of oil. Add oil as necessary to reach the correct mark on the dipstick. Use only EP-80-90 gear oil. Oil level should be checked often.



WARNING

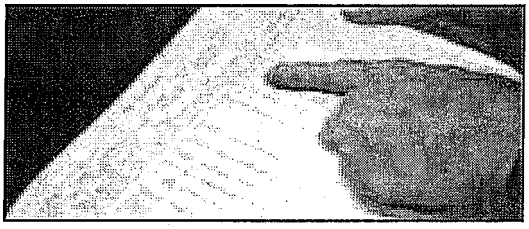
If any rotor is found to be below minimum specifications as called for by the vehicle manufacturer, replace as **required.** Never **attempt** to resurface a rotor beyond listed Specifications.

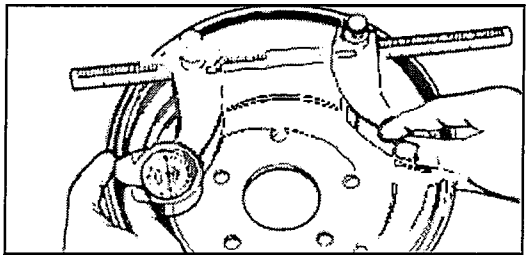


BRAKE ROTOR/DRUM INSPECTION

1. Before attempting any resurfacing, rotor and/or drum inspection is necessary. Determine the manufacturer's specifications from an approved specification guide.

2. Using a digital micrometer or other measuring tool, record the thickness of the rotor or drum. Observe any deep scores and gouges. This depth will also need to be recorded.





3. Determine if the total amount of material to be removed will meet the manufacturer's minimum specifications. If any rotor is found to be below minimum specifications as called for by the vehicle manufacturer, replace as required.

BASIC OPERATION

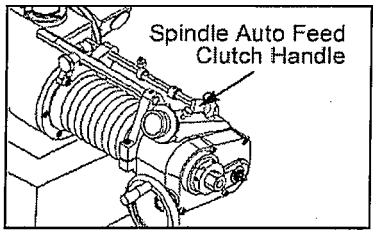
To help you understand drum and rotor turning, read the following that helps explain the features, operation and principles of drum and rotor resurfacing.

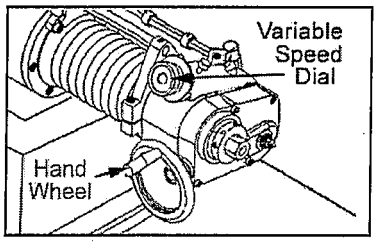
Horizontal Spindle / Arbor

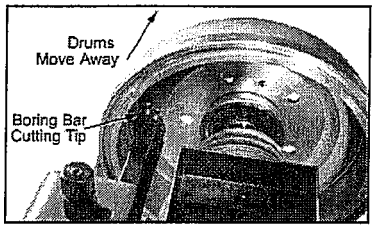
The spindle (horizontal main shaft) is motor driven and turns the arbor (main rod with threaded tip) which the brake drums or rotors are mounted on. When turning the drum or rotor via the arbor and holding a cutting tool against the braking surface, metal can be removed making the final result a smooth finish that meets original factory specifications. Smooth brake surfaces will extend the life of the brake pads and increase brake operation efficiency.

Horizontal Spindle f Arbor Feed

By engaging the spindle feed clutch handle, the spindle and arbor will move the mounted brake drum to the left. This feeds the drum braking surface across the cutting tool (boring bar) as the drum moves away. Spindle feed may also be done manually without engaging the spindle feed clutch handle by using the spindle feed hand wheel. Spindle feed rate refers to the distance the spindle is moved for each revolution. This speed is variable and can be adjusted using the spindle variable speed dial.





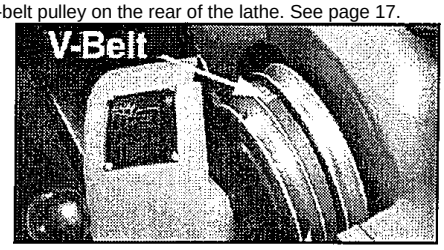


IMPORTANT NOTE

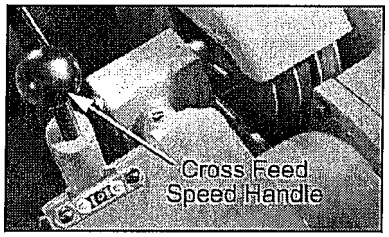
Spindle feed must be adjusted with the lathe running. Do not try to move any feed levers or dials without the drive motor running. Damage may occur to the **gears.**

Spindle Speed

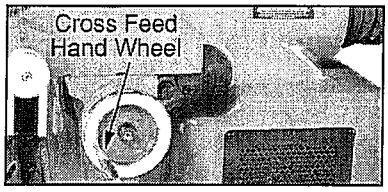
Spindle speed is adjustable by changing the position of the \/-belt pulley on the rear of the lathe. See page 17.

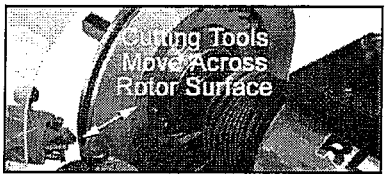


The cross feed (forward and aft) draws the tool bit (microdial twin cutters or boring bar) across the face of a brake rotor or flywheel when the cross feed speed setting handle is engaged.



The cross feed may also be operated manually without engaging the feed handle using the cross feed hand wheel.





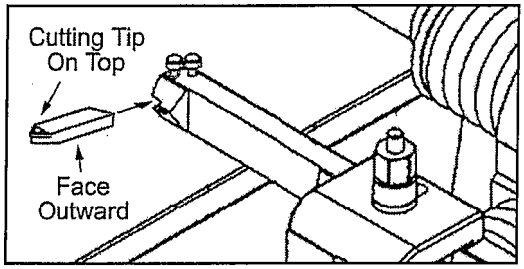
RECONDITIONING BRAKE DRUMS

1. After the following instructions are read and understood, obtain a scrap drum for practice. First determine if the drum will be within factory recommended limits after resurfacing is performed. The DISCARD diameter is often cast or stamped into brake drums, **not** the maximum machining diameter.

2. Inspect the brake drum. Do not attempt to machine a drum that is damaged, excessively worn or in poor condition.

3. Install the boring bar tool holder and boring bar as shown.

4. Be sure that a proper tool bit is secure in the boring bar and the cutting tip is not excessively worn. Sharp cutting tips must be used at all times. A dull cutter will affect the finish of both drums and rotors. If the cutting edge is damaged, replace it promptly. Be sure no metal chips are under tip when changing tips.

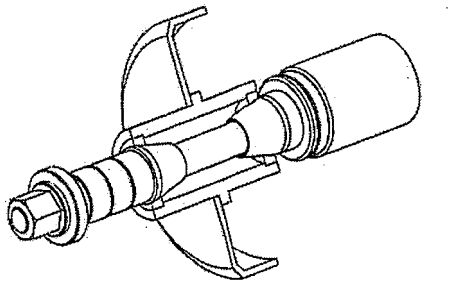


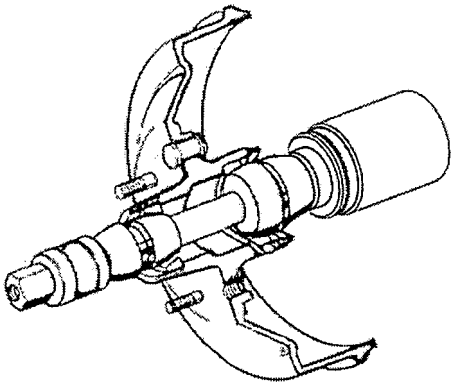
5. Mount the drum on the arbor using the proper adapters, cones, and spacers.

Mounting Hubbed Brake Drums

Tapered centering cones or double taper adapters fit in the bearing seats. Be sure to make contact as close as possible to the middle of the bearing race as possible. Various adapters and/or spacers may be used to fill out the shaft of the arbor.

Hubbed Brake Drums

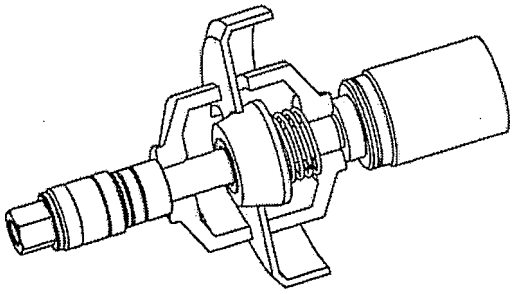




Mounting Hubless Brake Drums

Select the largest hubless adapter possible that will fit inside the drum against the flat lug hole surface. Be sure to straddle the bolt holes to avoid mounting against a burr, or remove the burrs with a grinding stone before mounting. Slip the hubless adapter onto the arbor followed by a spring, centering cone, the drum, and another similar size hubless adapter. The centering cone will fit into the center hole of the drum from the inside to center the drum on the arbor. Fill out the remaining shaft with various adapters and/or spacers as needed.

Hubless Brake Drums



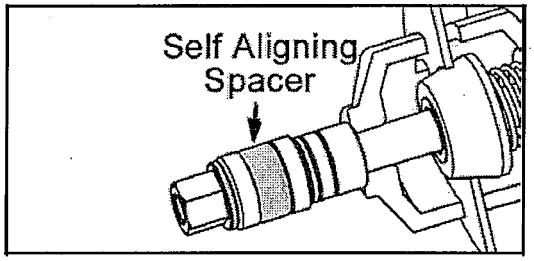
IMPORTANT NOTE

The arbor nut has **REVERSE THREADS.** Tighten by turning the arbor nut **COUNTER-CLOCKWISE.**

IMPORTANT NOTE

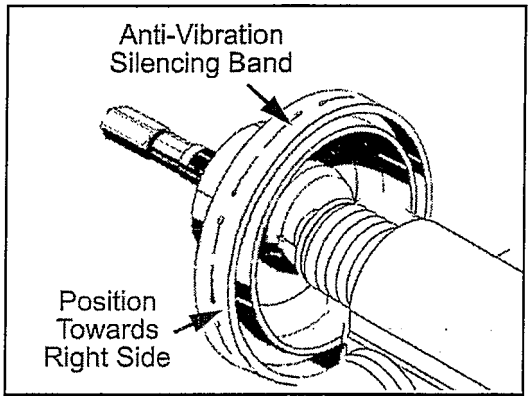
The self-aligning spacer should always be used next to the arbor nut when tightening. To avoid over tightening, wrench turn the arbor nut counterclockwise until the drum and adapters become fixed snug on the arbor and so that you are unable, to freely turn them. Then continue to advance the wrench 1/4 of a turn only. DO NOT over tighten the arbor nut. **Handle Adapters with Care**

The adapters, arbor, and spindle are made



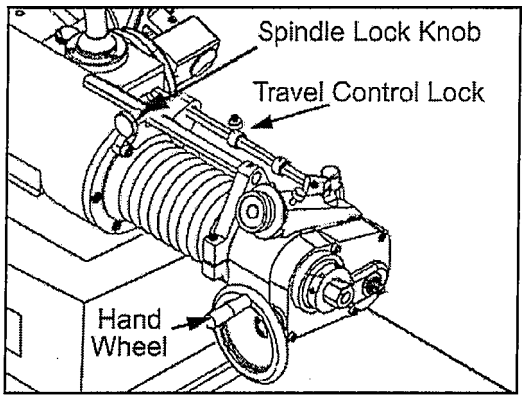
of top grade steel, hardened, and precision ground to close tolerances. Great care should be taken in their use, handling, and storage. The smallest nick or scratch can cause incorrect drum or rotor alignment resulting in inaccurate resurfacing.

6. Wrap a drum silencing band snugly around the drum. Be sure it is positioned towards the right-hand edge or nearest the open side of the drum. **IMPORTANT -** Failure to use a silencing band will cause premature wear of tool cutters and result in a poor finish cut.

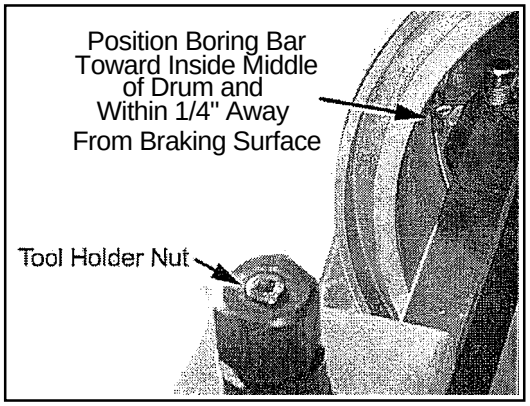


7. Using the cross feed hand wheel, move the cross feed to its innermost position by turning the hand wheel clockwise.

8. Using the spindle feed hand wheel, move the spindle to its innermost (right hand) position by turning the hand wheel clockwise and then back off by turning dial wheel five turns counterclockwise. NOTE: If the hand wheel does not turn freely, check to make sure the spindle lock and travel control lock knobs are loosened.



9. Next, position the boring bar by loosening the tool holder nut and sliding the boring bar towards the innermost side of the drum, within 1/4" away from the braking surface.



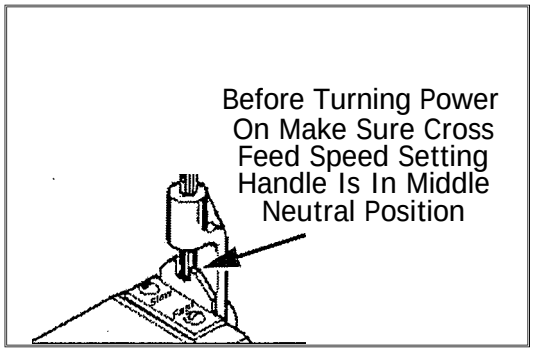
IMPORTANT NOTE

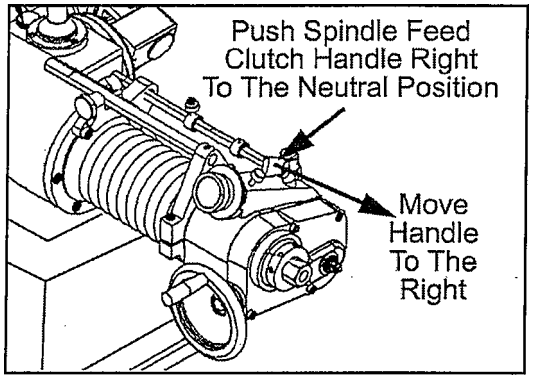
The boring bar position will have to be changed whenever a drum of different diameter is machined. The entire boring bar tool holder may be swiveled to achieve the best cutting position.

10. Check all clearances closely to make sure that nothing will "crash" when the power is turned on and the drum starts rotating. NOTE: It may help to turn the arbor nut counter-clockwise and manually turn the drum by hand to pre-check all clearances.

A CAUTION

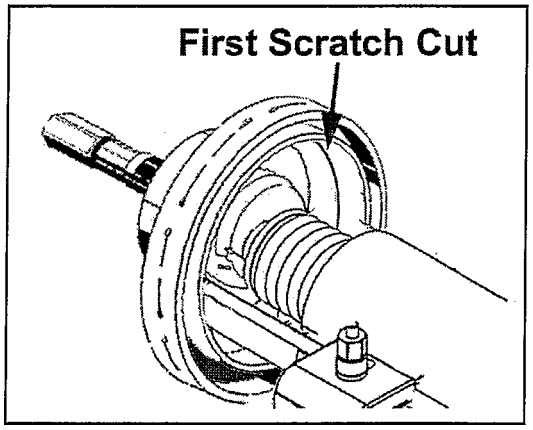
Before turning the power on, make sure the cross feed speed setting handle and the spindle feed clutch handle are in their neutral positions.





11. Turn the power on.

12. Turn the cross feed hand wheel counterclockwise and bring the boring bar cutting tip into the braking surface until it just barely contacts the drum surface and makes a slight scratch cut.



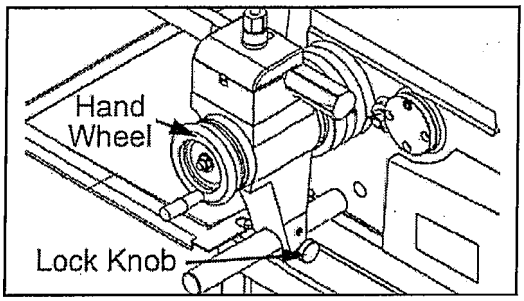
AWARNING

KEEP HANDS clear of moving parts at all times. Keep hair, loose clothing, neckties, shop rags, jewelry, fingers, and all parts of body away from moving parts.

CAUTION J

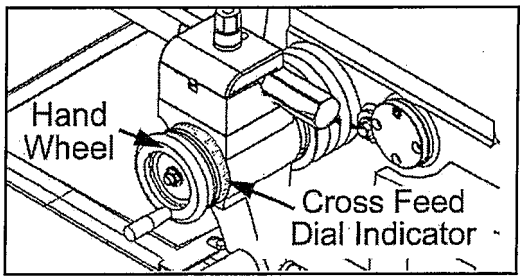
Always wear safety glasses or a face shield. Cutting an exposed surface such as a brake drum or rotor will produce flying chips and debris.

IMPORTANT NOTE
If the hand wheel does not turn freely, check to make sure the cross feed lock knob is loosened.



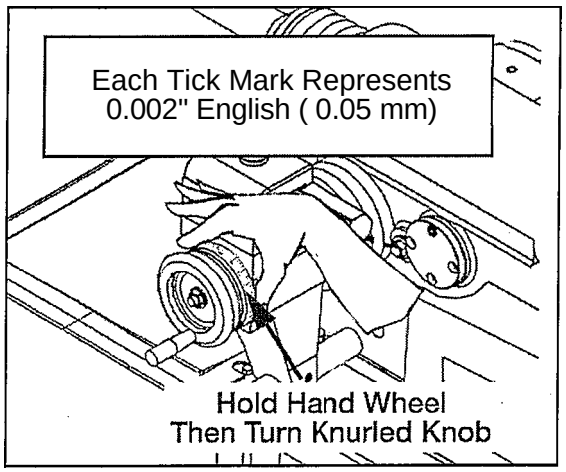
13. Examine the scratch cut making sure it is uniform around the entire circumference of the drum. If the scratch cut appears to be deeper on one side of the drum and not a uniform depth, then turn the power off, remove the drum from the arbor, check the mounting adapters and arbor for nicks, burrs, or chips, then remount the drum, and repeat steps 4 - 13 until a uniform scratch cut is achieved.

14. Holding the cross feed hand wheel firmly in position with your left hand, carefully rotate the cross feed dial indicator (the outer, knurled knob) with your right hand until ZERO is positioned at top dead center and lined up with the tick mark. This will give you an initial zero-set starting point.



15. Turn the spindle feed hand wheel clockwise until the boring bar reaches the innermost part of the drum. Be careful not to crash the boring bar and cutting tip on the inside wall of the drum or damage to tooling may result.

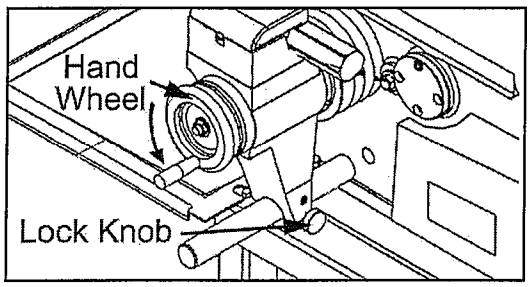
16. There are 100 graduations on the dial indicator. Each tick mark represents 0.002" (0.05 mm metric).



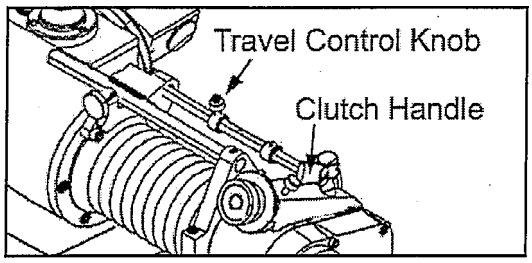
GUIDELINES TO DETERMINE THE DEPTH-OF-CUT

• Rough cuts should be no deeper than 0.020".
• Finish cuts should be no shallower than 0.004" deep.

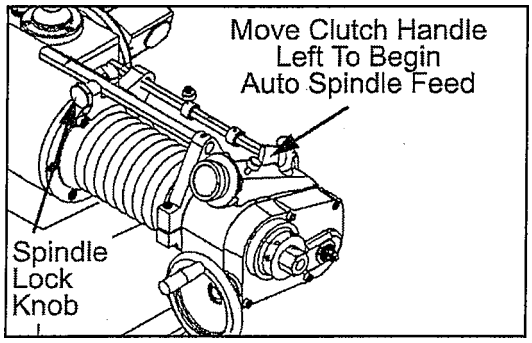
17. With the lathe running, turn the cross feed hand wheel dial counterclockwise to the depth desired and then lock the cross feed by tightening the lock knob.



18. Set the automatic feed shut-off by sliding the travel control lock knob on the limit rod to a point that approximately equals the 'depth of the drum and tighten the knob in place. The limit rod will then automatically disengage the clutch handle and stop the spindle feed when it reaches this point.



19. Double check to make sure the spindle lock knob is loosened then engage the spindle feed clutch handle (move to the left) to begin auto-feed drum resurfacing. To make sure the clutch gear is fully engaged, hold the clutch handle to the left until the spindle feed hand wheel starts turning.



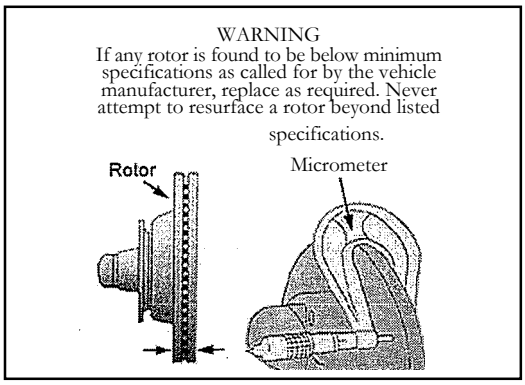
By engaging the spindle feed clutch handle, the spindle and arbor will move the mounted brake drum to the left. The spindle feed rate can be adjusted by using the spindle variable speed dial. Adjust the feed rate depending on the surface finish you desire. Fast for rough cuts and slower for finish cuts. **REMEMBER!** Spindle feed must be adjusted with the lathe running only. Do not try to adjust speed dial without the drive motor running or gear damage will occur.

20. After the first cut is made, repeat steps 14 - 19 until a smooth finish cut is made.

RECONDITIONING BRAKE ROTORS

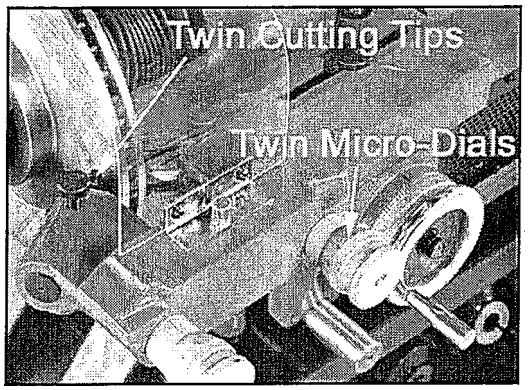
After the following instructions are read and understood, obtain a scrap rotor for practice. Inspect all rotors carefully for excessive scoring, rust ridges (at the inner and outer circumference of the rotor), and blemished hard spots. Any excessive wear or deformity should be noted. If the rotor is not within acceptable limits, the rotor should be replaced.

Always use a micrometer to check the thickness of the rotor. If the rotor thickness is less than the minimum established by the manufacturer, or if it will be less after reconditioning, the rotor should be replaced.



Twin Cutters

A micro-dial twin cutter tool assembly is used to recondition both surfaces of a brake rotor at the same time. The twin cutter replaces the boring bar on top of the cross feed after removing the boring bar and tool holder boring bar brackets.



Practice setting the micro-dial cutters for machining rotors. Learn all the functions thoroughly to insure proper operation. Most rotors will have the minimum thickness values cast into the outer surface.

The proper procedure for determining whether to resurface rotors or discard them is as follows:

A. Using a micrometer or some other micrometer suitable for measuring the thickness of the rotor to be machined, check the rotor thickness at four points (90 degrees apart) about 1" from the outer diameter.

B. If the thickness at any of the four points is less than the minimum established by car manufacturers as shown on the rotor or in a current brake specifications book, replace the rotor.

C. The rotor may be resurfaced if scored or it has a small amount of runout, provided it is within the minimum thickness requirement.

D. After the rotor is machined, measure the thickness again, and, if it is not within the allowable minimum limits, discard it. NOTE: This check requires a measurement in only one spot if both braking surfaces cleaned up 100%, because the turning operation assures almost absolute parallelism.

Preparing For Twin Cutters

1. Remove the boring bar and tool holder brackets.

2. Using the spindle feed hand wheel, move the spindle to its innermost (right hand) position by turning the hand wheel clockwise and then back off by turning dial wheel three turns counterclockwise. On some deeper rotors it may be necessary to move the spindle farther left. For best results, always position the spindle as far to the right as the job will allow. NOTE: If the hand wheel does not turn freely, check to make sure the spindle lock and travel control lock knobs are loosened.

3. Turn the cross feed hand wheel counterclockwise and move the cross feed assembly away from the arbor. This will make room for the twin cutters after the rotor is installed. If the hand wheel does not turn freely, check to make sure the cross feed lock knob is loosened.

IMPORTANT NOTE

If the cross feed assembly moves too far outward the feed screw may exit the feed screw nut and cause the cross feed assembly to become disengaged from the hand wheel. If this happens, simply push firmly forward on the **RIGHT SIDE** of the cross feed assembly while at the same time turning the cross feed hand wheel clockwise until the feed screw engages the feed screw nut and the cross feed assembly begins to move.

Mounting Brake Rotors

4. Clean excess grease from bearing races of rotor. Inspect bearing races for damage and replace if necessary.

5. With the power turned off, mount the rotor on the arbor using the proper adapters, cones, and spacers.

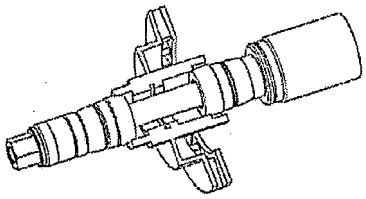
Hubbed Brake Rotors

Tapered centering cones or double taper adapters fit in the bearing seats. Be sure to make contact near the middle of the bearing race whenever possible rather than near an edge. Various adapters and/or spacers may be used to fill out the shaft of the arbor.

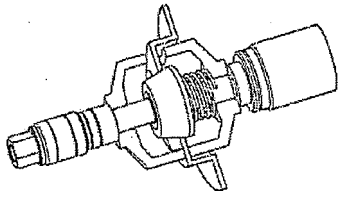
Hubless Brake Rotors

Select a hubless adapter *which* will *fit inside the drum* against the flat surface. Be sure to remove any burrs with sandpaper or wire brush. Slip the hubless adapter onto the arbor followed by a spring, centering cone, the drum, and another hubless adapter. Fill out the remaining shaft with various adapters and/or spacers as needed.

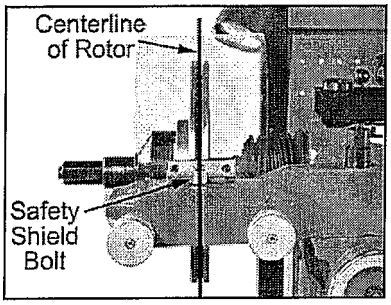
Hubbed Rotors



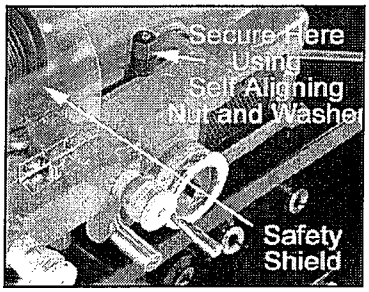
Hubless Rotors



6. With the power turned off, mount the micro-dial twin cutter assembly on the tool holder stud bolt extending the bolt through the cast slot. The slot of the twin cutter should be approximately parallel to the lathe spindle and the center of the twin cutters lined up with the centerline of the rotor NOTE: It helps to use the safety shield mounting bolt as a guide to line up twin cutters with the centerline of rotor.



7. Secure the twin cutter to the tool holder with the self aligning nut and washer assembly. Tighten the nut firmly.



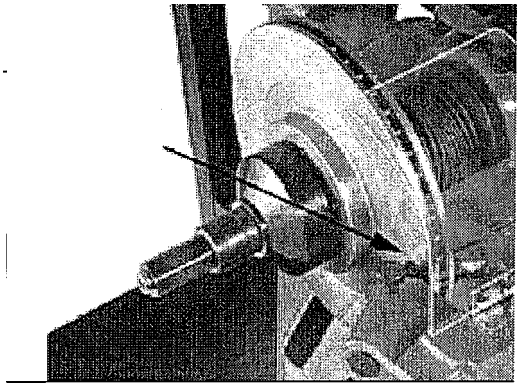
S. Install the safety shield if it was removed for storage then review the cautions and dangers section and the general safety information at the beginning of this manual. The safety shield is easily screwed onto the twin cutter in the threaded mounting hole provided.

IMPORTANT NOTE:
Do not over tighten arbor nut when mounting rotors on the spindle. The pressure of one hand on the wrench is sufficient to tighten. If centering cones, adapters and spacers are not clean and free of nicks and burrs or foreign matter when the arbor is tightened, it could introduce spindle moot or "wobble".

9. With the power turned off, install a silencer band that is appropriate for the rotor being machined, Stretch the band around the rotor and hook the metal loop over a lead weight. Aadjust both micrometer toot-feed knobs on the tool holders making sure the cutting bits are opened wider than the width of the rotor.

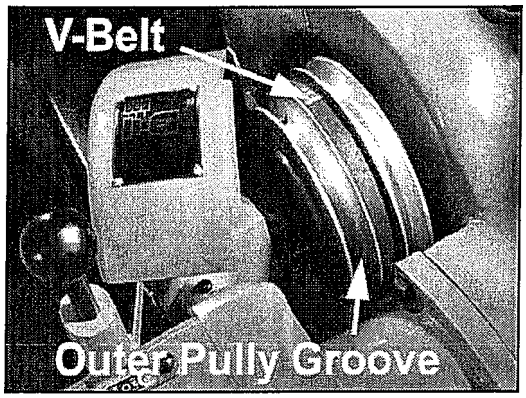
11_Turn the cross feed hand wheel clockwise and manually feed the cutting tools inward stopping near the center of the rotor. Remember, the hand wheel will not turn manually unless the cross feed lock knob is loosened.

Move cutters to center of rotor

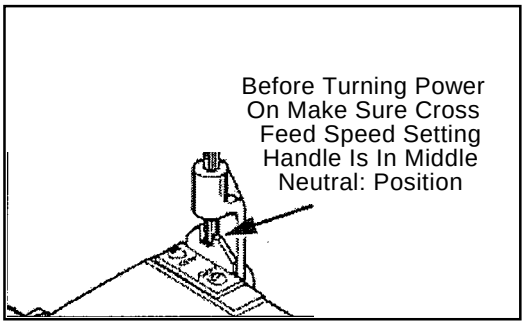


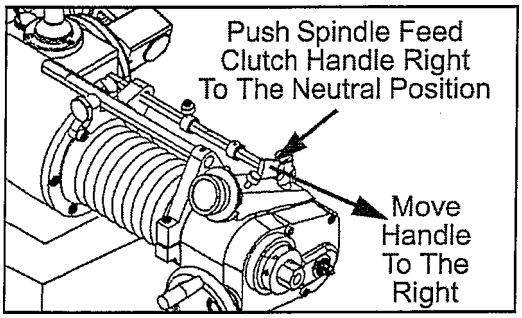
12. Check all clearances closely to make sure that nothing will "crash" when the power is turned on and the rotor starts rotating. NOTE: It may help to loosen the arbor nut slightly and manually turn the rotor by hand to check all clearances.

13. Adjust the drive belt to match the rotor size. The speed of the spindle is adjustable by changing the position of the V-belt pulley at the rear of the lathe. See page 17 for adjustment procedure. Use the outer pulley groove (FASTEST SPINDLE SPEED) for passenger car and most light duty truck rotors. Choose one of the inner pulley grooves (SLOWER SPINDLE SPEEDS) when machining medium duty and larger truck rotors and some solid rotors.



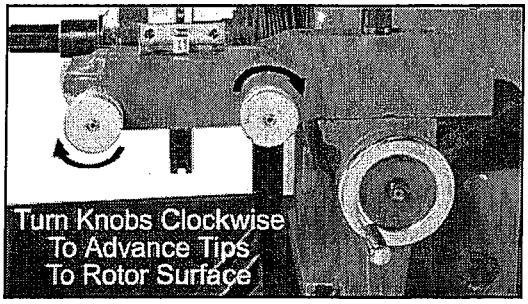
13. Before turning the power on, make sure both speed setting handles are in their neutral positions.

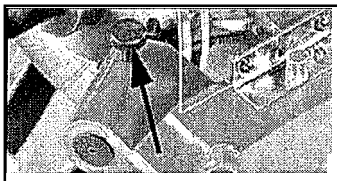




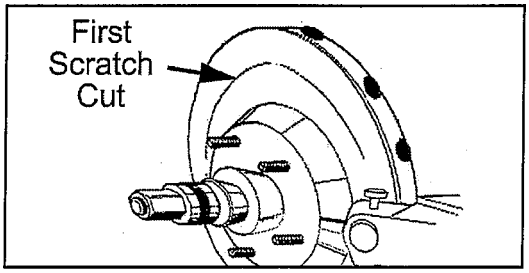
14. Turn the lathe ON.

15. Turn each tool bit control (the outer knurled knobs) clockwise until the tool bits just barely contact the rotor surfaces and make a slight scratch cut. NOTE: The dial locks for the micro-dials must be loosened before adjustments are made. After required adjustments are made, re-tighten dial locks to hold cutting tips secure.





Dial Locks Must Be Loosened BeforeTurning Dials. Re-Tighten After Adjustments Are Made.



A. WARNING

KEEP HANDS clear of moving parts at all times. Keep hair, loose clothing, neckties, shop rags, jewelry, fingers, and all parts of body away from moving parts.

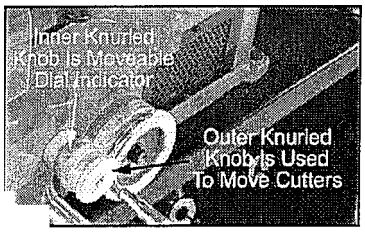
A CAUTION

Always wear safety glasses or a face shield. Cutting an exposed surface such as a brake drum or rotor will produce flying chips and debris.

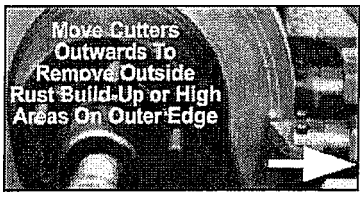
16. Examine the scratch cut making sure it is uniform around the entire circumference of the rotor. If the scratch cut appears to be deeper on one side of the rotor and not a uniform depth, then turn the power off, remove the rotor from the arbor, check the mounting adapters and arbor for nicks, burrs, or chips, remount the rotor, and repeat the process.

17. Check to make sure the **spindle lock knob** and **micro-dial lock knobs** are tightened before continuing.

18. Hold the outer knurled knobs firmly with your left hand, and then carefully rotate the inner knurled dial indicator knobs clockwise with your right hand until ZERO is positioned at top dead center and lined up with the tick mark. This will give you an initial zero-set starting point.



'19. Manually turn the cross feed hand wheel counterclockwise and move the cutting toots outward toward the edge of the rotor to remove any rust build-up or high areas on the outer edge.



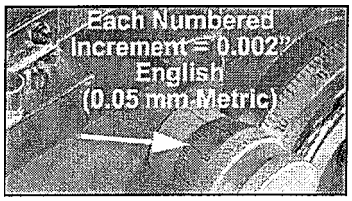
20. After cleaning up the outer edge of the rotor manually feed the cutting tools inward towards the center of the rotor to a point slightly beyond the contact surface of the brake pads being careful not to run the carbide inserts into the hub portion of the rotor.

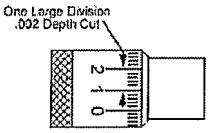
21. Turn both tool bit controls (OUTER KNURLED KNOBS) to the desired depth-of cut then lock them in position by tightening the dial lock knobs.

USE THESE GENERAL GUIDELINES
TO DETERMINE THE DEPTH-OF-CUT

Either rough or finish cuts may be taken to resurface a rotor. Generally, finish cuts should be 0.004' (0.10 mm) to 0.006" (0.15 mm) per side. Very shallow cuts of less than 0.004' (10 mm) per side tend to reduce tool bit life because the heat generated during reconditioning isn't transferred to the rotor efficiently. Rough cuts may be taken from 0.006" to 0.010" per side.

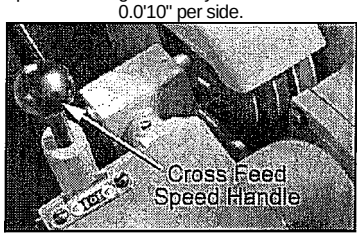
IMPORTANT NOTE
Hold OUTER knobs with one hand and turn CLOCK-WISE to move cutting tips inward towards rotor. There are 10 large graduations on each dial indicator. Each mark represents 0.002' English (0.05 mm metric).





22. Engage the automatic cross feed to begin the cut by moving the lever to the desired speed. The cross feed will stop automatically when the cutting tools have moved all the way across the face of the rotor.

IMPORTANT NOTE
For roughing cuts, move the cross feed lever to the FAST position. Rough cuts may be taken from 0.006' to 0.0'10" per side.



23. Manually feed the cutting tools inward towards the center of the rotor to a point slightly beyond the contact surface of the brake pads being careful not to run the carbide inserts into the hub portion of the rotor.

24. Turn the end knob of each tool bar micro-dial individually to set each tool bit to the desired depth-of cut. Remove only enough material to clean up each side.

25. Engage the automatic cross feed to begin another cut.

2G. When the tool bits have cleared the rotor, disengage the cross feed and turn the lathe OFF.

27. Inspect the brake surfaces. if part of the surface was not cut, leave the tool bars locked in position, turn the lathe ON, slowly turn the cross feed handwheel clockwise until the outer tool reaches the groove at the rotor hub, and repeat steps 20 -23.

2E. Repeat steps until a smooth finish cut are made.

RECONDITIONING FLYWHEELS

Mounting Flywheels

1. Clean the machined surfaces, so they are free of rust, dirt and burrs.

2. Mount the flywheel in the same manner as a hubless rotor or drum, with the side to be machined facing the lathe.

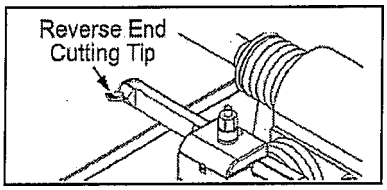
IMPORTANT NOTE

Dowel pins or studs must be removed before machining can be performed. Use silencers when possible. Magnet packs or bars may be used as silencers.

Machining Flywheels

5. Install the boring bar tool holder and boring bar.

6. Loosen the two square head set screws on the boring bar holder and replace the tool bits with the reverse end tool cutter.



7. The left hand edge of the tool bit insert should be as close to 90 degree to the surface to be machined as possible. Adjust (swivel) the boring bar to obtain the most optimum angle for cutting.

8. Proceed with steps 15-28 (cutting rotors) shown on pages 15-16.

⚠ CAUTION

When machining cup-type flywheels you must stay with the lathe, because you must stop the unit and reposition the tool bar for the outside tip surface. You must also remove the same amount from the outside mounting surface as was removed from the lower surface: failure to do this may cause incorrect clutch operation.

ADJUSTING SPINDLE SPEED

The 6L1500 brake lathe has three spindle speed pulley settings in addition to an infinitely variable spindle feed dial to accommodate a wide range of machining tasks. It is important to remember that the desired surface finish depends on the correct relationship of the spindle speed with the cross feed speed. As a general rule, slower spindle speeds require slower cross feed speeds. Also deeper cuts normally dictate that a slower cross feed rate andlor spindle speed may be necessary.

Multi-Speed Settings

The BL1500 brake lathe has three different pulley selections.

(1) The small outside pulley at the motor in conjunction with the large pulley at the gear box drives the spindle at 70 -98 RPM's. This speed is recommended for large diameter drums, rotors, and most flywheels; the cross feed rate should be set at a slow setting.

(2) The middle pulleys rotate the spindle at 88 -123 RPM'S and are normally used to machine intermediate size rotors and drums that have a diameter larger than that used on most passenger cars. At this spindle RPM, cross feed can be set at a slow and fast feed rate.

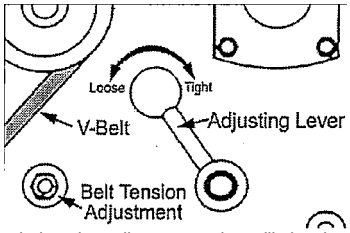
(3) The large pulley at the motor and the small pulley at the gear box allow the spindle to rotate at 118 - 165 RPM's. This spindle speed should be satisfactory for most passenger car drums and rotors. The cross feed speed may be set at a variety of rates from slow to fast to produce the desired finish.

Spindle **Speed** Adjustment

This V-belt adjustment must be made with the lathe off.

'l. Release the belt tension by moving the V-belt adjusting lever to the right (clockwise).

2. Open the rear pulley cover to access the v-belt pulleys.



3. Move the belt to the pulley groove that will give the correct spindle speed for the cut to be taken.

4. Reapply tension to the V-belt by moving the adjusting lever back to the operating position.

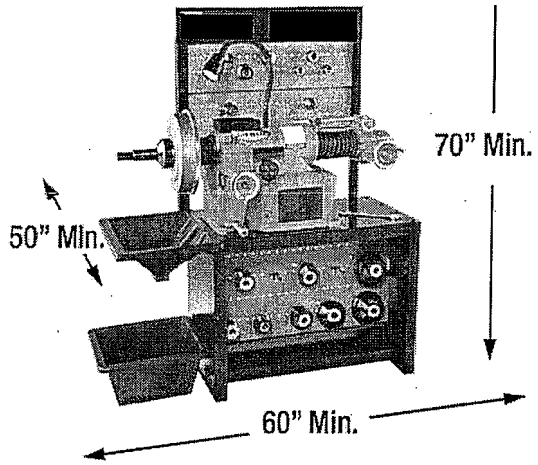
INSTALLATION INSTRUCTIONS

A CAUTION

Proper unit installation is necessary for safe use and efficient operation. Proper installation also helps protect the unit from **damage** and **makes** service easier. Always keep this manual nearby.

Location

Select a location that will provide the operator with enough space to use the equipment in a safe manner. The area selected should be well lit, easy to clean and should be away from oil, grease, etc. Avoid areas where bystanders and customers may be present.



Electrical Source

This unit requires power from a 15 amp electrical circuit. Refer to the serial tag of the machine for specific electrical requirements. Have a licensed electrical technician perform any necessary changes to the power source before plugging in the unit. The electrical source must have a solid connection between ground and building ground.

MAINTENANCE INSTRUCTIONS

Read and follow all the maintenance instructions provided in this manual to keep the lathe in good operating condition. Regular inspections and proper maintenance are essential to preventing accidents and injuries. These instructions will help you service the unit. Instructions are for a person with some mechanical ability and training. No attempt has been made to describe all basic steps like how to loosen or tighten fasteners. Basic procedures such as cycling systems and checking operation of the equipment are not fully described since they are described in this manual. Do not attempt to perform work beyond your ability or at which you have no experience. If you need assistance, call an authorized service center or contact the factory.

II:WARNING

4 Before making any inspection, adjustment, or repair, disconnect the power source and block out all moving parts to prevent injury.

♦ Keep the machine and the immediate work area clean. Do not use compressed air to remove dirt and debris from the lathe. Chips and dust may be driven between machined parts and into bearings causing undue wear and foreign material may be propelled into the air and into operator or bystander causing personal injury.

♦ Wear protective clothing and use eye protection when making any adjustments or repairs to the machine.

PREVENTIVE MAINTENANCE

♦ Check for worn, damaged or missing parts including grips and protective covers. Replace them before allowing the unit to be used.

♦ Make sure all fasteners are securely tightened and all guards and covers are in place.

♦ Replace any damaged or missing safety decals. They are available from the factory.

♦ On a daily basis, inspect the unit and check to be certain that all systems are operating normally. Follow detailed inspection and testing procedures for various components at regular intervals.

GENERAL LUBRICATION

♦ Oil the ways of the head assembly and thread screw periodically with light oil. Note: Cross feed should be in full inward position during lubrication.

♦ Oil the threaded rods periodically with light oil. Spray the drum lead screw with silicone lubricant.

♦ Lightly oil the dovetails with motor oil.

CLEANING

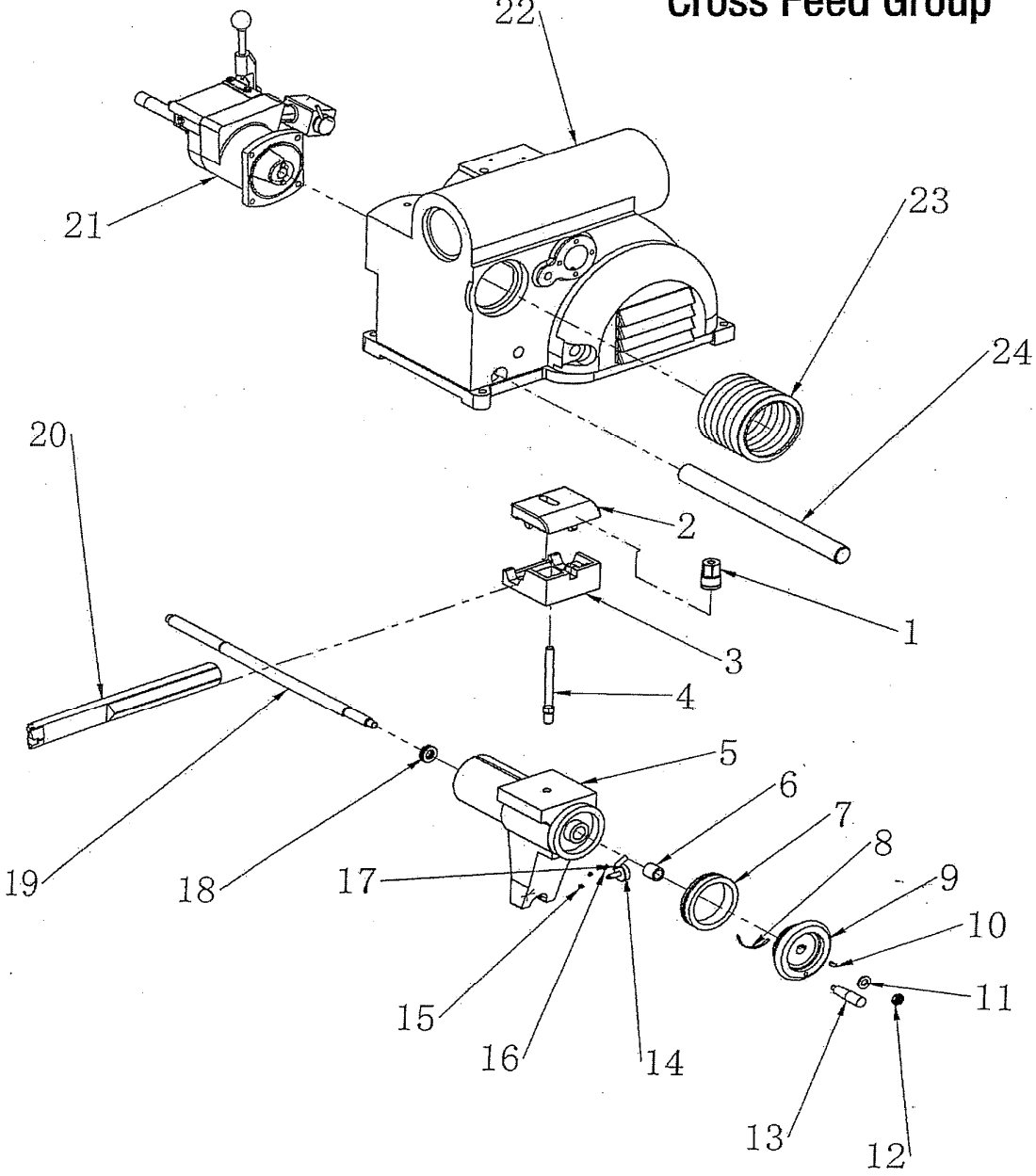
♦ Keep the lathe as clean as possible for trouble free operation as well as safety and longer lathe life. Use a brush to sweep metal chips and dust off the lathe.

♦ After use, always wipe clean.

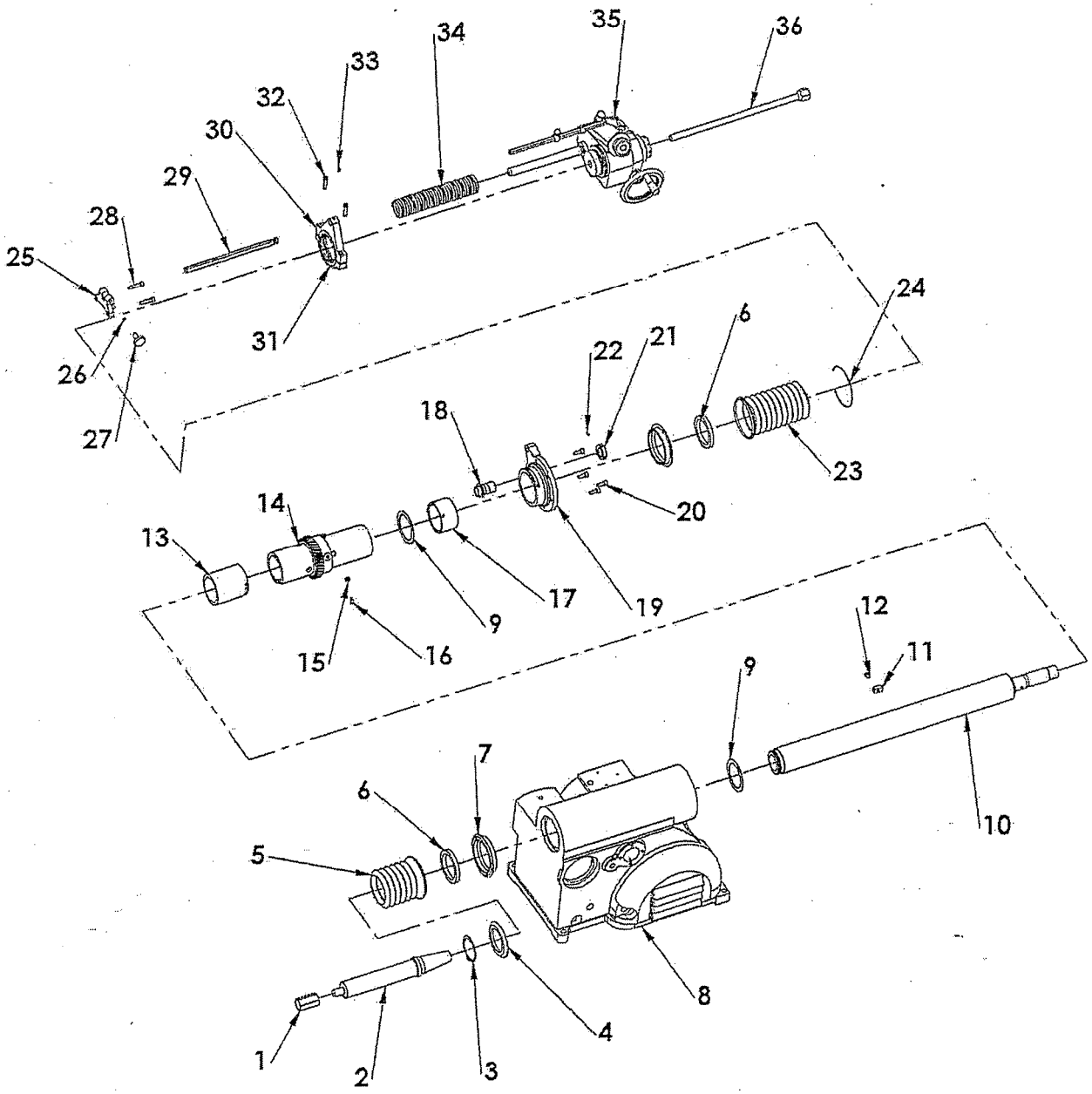
♦ Clean all exposed metal parts with a brush and apply a light coating of motor oil with. Note: DO NOT apply oil to the tool slide clamping surface or the round tool holders on the twin cutter.

Use only original or authorized service parts
to insure safety and performance.

Cross Feed Group



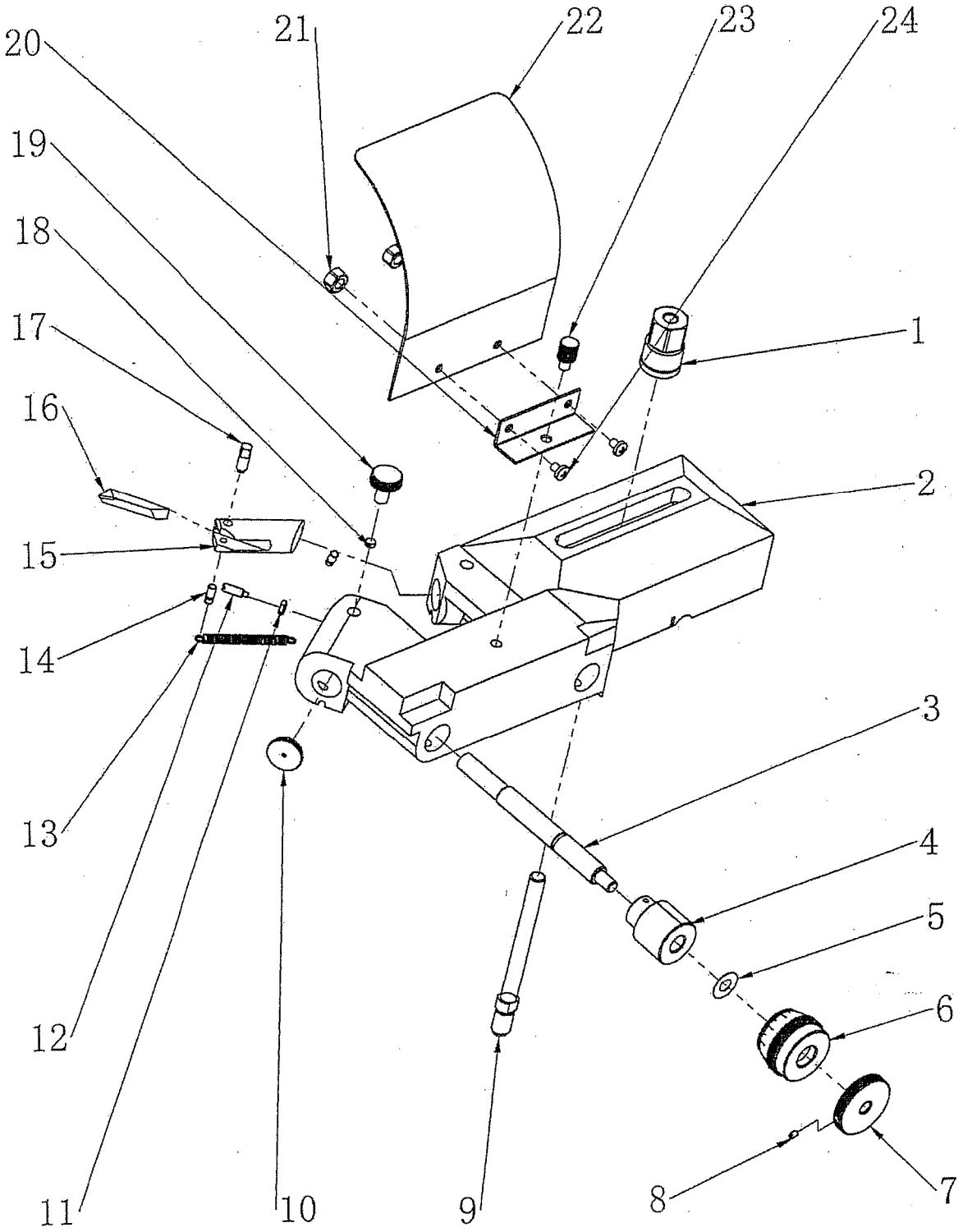
Spindle Group Assembly



SPINDLE GROUP ASSEMBLY - PARTS CHART

No.	Qty.	Part No.	Description
1	1	C4-0-48A	Mandrel nut
2	1	C4-00-43	Mandrel
3	1	GB 894 - 65 x 2.5	Retaining ring
4	1	C4-0-1	Retaining ring
5	1	C4-0-57 short	Shield
6	2	Sealing ring	Sealing ring GB9877.3-88
7	2	C4-0-2	Sealing ring
8	1	C4-00-04	Main machine seat
9	2	C4-0-7	Trimming washer
10	1	C4-0-12	Spindle
11	1	C4-0-23	Guide key
12	1	Screw GB 70 - M06X12	
13	1	C4-0-3	Front brass bushing of spindle
14	1	C4-0-5-0	Rotating sleeve
15	1	GB41-M08	
16	1	Screw GB 75 - M8 x 16	
17	1	C4-0-9	Back brass bushing of spindle
18	1	C4-0-51	Screw nut
19	1	C4-0-8	Back cover of spindle
20	4	Screw GB 70 - M08X20	
21	1	C4-0-52	Tension nut
22	1	Screw(flat head) GB 73 - M4x10	
23	1	C4-0-57	Shield
24	1	C4-0-15	Elastic ring
25	1	C4-0-22	Retainer
26	1	C4-9-16	Copper plug
27	1	C4-0-10	Locknut
28	2	Screw GB 70 - M08X35	
29	1	C4-0-13	Lock bar of spindle
30	1	C4-0-14	Upper retainer
31	1	C4-0-16	Lower retainer
32	2	Screw GB 70 - M06X35	
33	1	Screw GB 79 - M8 x 10	
34	1	C4-8-0	Shield and reed
35	1	C4-10000	Feeding mechanism
36	1		Tie bar and nut assembly

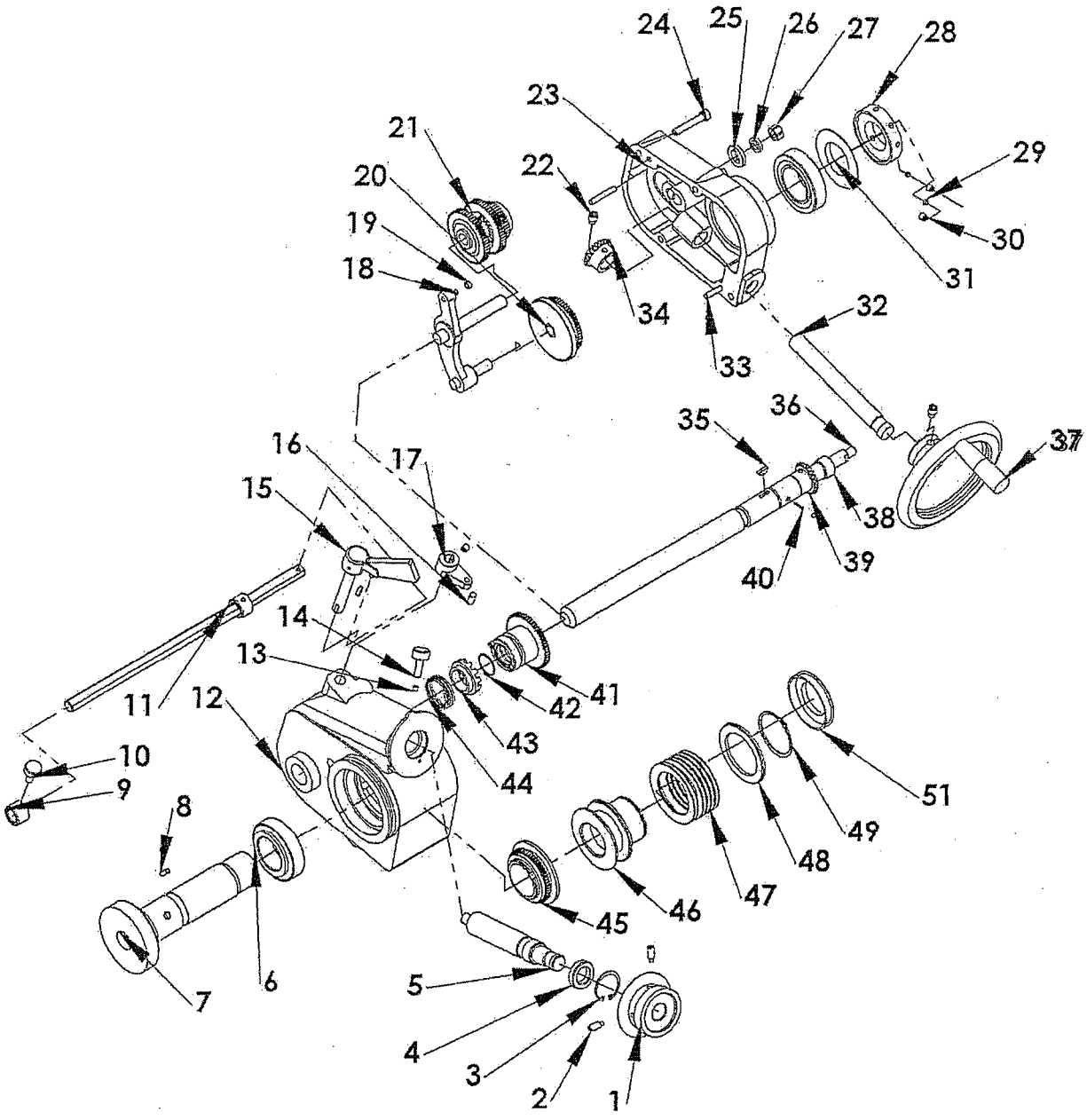
Micro-Dial Group



MICRO DIAL GROUP - PARTS CHART

NO.	Part No.	Description	Qty.
1	C4-4-0	Nut and washer assembly	1
2	c4-9-7	Double cutters box	1
3	C4-9-5	Dial assembly	2
4	C4-9-4	Liner	2
5	C4-9-2	Spring washer	2
6	C4-9-3	Indicator dial	2
7	C4-9-1	Handle of dial bar	2
8	GB 71-M4x8	screw	2
9	C4-0-26	Bolt side Bolt	1
10	C4-9-6	Multipoint plug	1
11	ISO 4035 - M6 - N	Hexagon Thin Nut	2
12	C4-9-15	Positioning screw	2
13	C4-9-13	Spring	2
14	C4-9-12	Slot pin	4
15	C4-9-11	Right cutter holder assembly	1
16	C4-9-10-0	Right cutter assembly	1
17	DIN 479 - M8 x 16-N	Positioning screw	2
18	C4-9-16	Brass Plug	2
19	C4-9-14	Positioning screw	2
20	C4-11-2	Bracket	1
21	GB41-M06	Nut	2
22	C4-11-1	Baffle	1
23	C4-11-3	screw	1
24	GB 67 M6 x 08	screw	2
25	C4-9-8	Left cutter holder assembly	1
26	C4-9-9-0	Left cutter assembly	1
27	DIN 914 - M8 x 12-N	screw	2

Variable Speed Gearbox Assembly

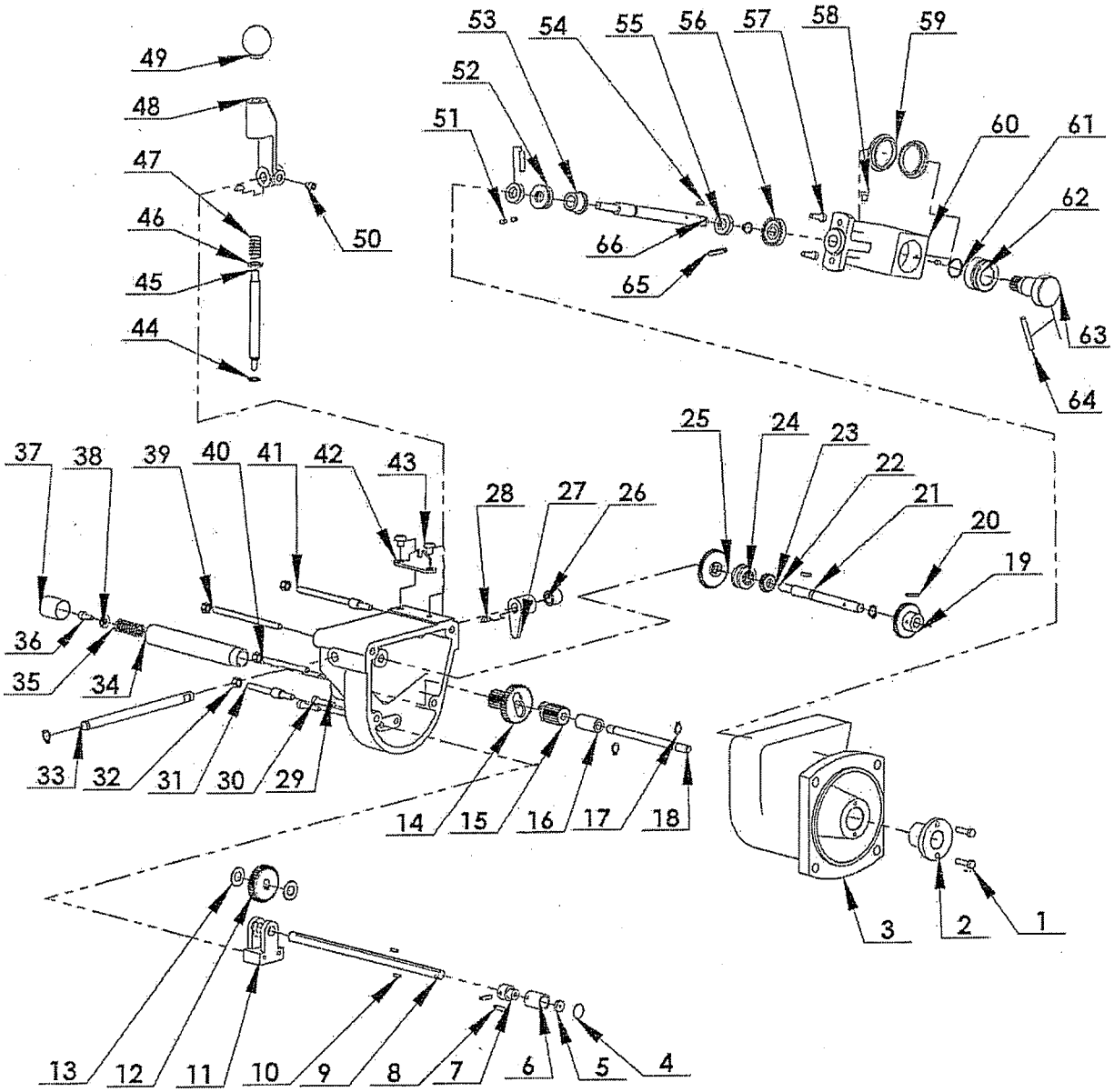


VARIABLE SPEED GEAR BOX ASSEMBLY PARTS CHART

Chart #	Part No.	Description	Qty.
1	C4-1-24	Speed changing hand wheel	1
2	GB 75 - M6 x 16	Screw	2
3	GB 893 - 28 x 1.2	Retaining ring (for hole)	1
4	C4-1-26	Shaft washer	1
5	C4-1-28	Feed setting screw	1
6	SKF - 32007 X - 20,SI,NC,20		2
7	C4-0-12	Spindle	1
8	Pin GB 119 - A04 m6 x 14		1
9	C4-0-11	Shaft liner	1
10	C4-0-20	Milled screw	1
11	C4-0-21-0	Limited rod	1
12	c4-1-15	Longitudinal gear-box	1
13	C4-00-68	Copper column	1
14	C4-1-27	Milled screw	1
15	C4-10300	Handle assembly	1
16	Pin GB 119 - D 06 u8 x 12		1
17	C4-1-31	Poking fork	1
18	C4-10200	Control bar assembly	1
19	C4-1-19	Rolling sleeve	1
20	C4-1-9-0	Friction disk assembly	1
21	C4-10100	Planet gear assembly	1
22	GB 79 - M8 x 12	Screw	2
23	c4-1-14	Longitudinal gear-box cover	1
24	GB 70 - M06X35	Screw	1
25	C4-1-39	Washer	1
26	GB93 - 10	Washer	1
27	GB41-M08		1
28	C4-1-8	Locknut	1
29	C4-1-42	Copper column	2
30	GB 77 - M06 x 06	Screw(flat head)	3
31	C4-1-41	Sphere washer	1
32	C4-1-43	Shaft	1
33	Pin GB 119 - A05 m6 x 30		2
34	C4-1-40	Bevel gear 2	1
35	GB 1099 – 3x5x13	Key (semi-circle)	2
36	C4-1-38	Longitudinal screw	1

37	C4-10400A	Hand wheel assembly	1
38	C4-1-37	Shaft liner	1
39	C4-1-36	Bevel gear 1	1
40	C4-1-35	Spring	1
41	C4-1-32	Jaw gear	1
42	Retaining ring GB 895.2 - 22		1
43	C4-1-34	Jaw	1
44	C4-1-33	Spring	1
45	C4-1-1	Friction disk gear	1
46	C4-1-2	Sliding friction disk	1
47	C4-1-3	Disc spring	10
48	C4-1-4	Washer	1
49	GB 894 - 45 x 1.5	Retaining ring for shaft	1
50	Pin(elastic) GB 879	Elastic pin	1
51	C4-1-6	Spring load seat	1
52	Steel ball GB 308 - 4		1
53	C4-1-47	Washer	1
54	Screw GB 70 - M06x20		3
55	C4-1-45	Washer	1
56	C4-1-48		1
57	C4-1-21a	Setting washer	1

Cross Feed Group Assembly

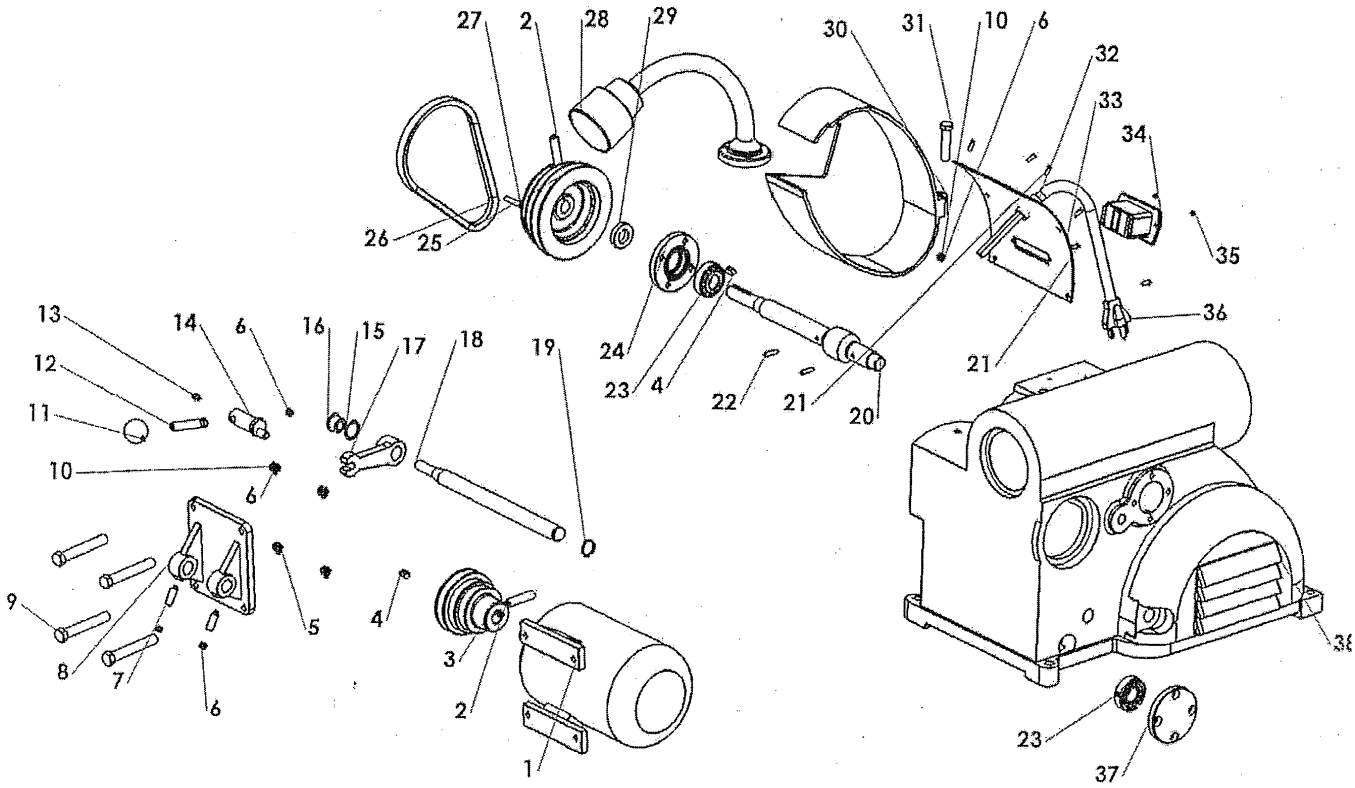


CROSS FEED GROUP ASSEMBLY – PARTS CHART

No.	Qty.	Part No.	Description
1	2	Bolt GB 5781 - M05 x 20	Hex head bolt
2	1	C4-6-5	Screw nut
3	1	C4-6-6	Gear-box
4	1	C4-6-29	Wire retaining ring for hole (snap ring)
5	1	C4-6-8	Spacing ring
6	1	C4-6-7	Coupler
7	1	C4-6-9	Universal coupler
8	2	Pin GB 879 - 4x16	Elastic pin (cylindrical pin)
9	1	C4-6-17	Driving bar
10	2	Pin GB 119 - C03 h11 x 08	Positioning pin
11	1	C4-6-23	Bracket
12	1	C4-6-24	Driving gear
13	2	C4-6-25	Thrust washer
14	1	C4-6-16	Gear-box
15	1	C4-6-22	Gear-box
16	1	C4-6-27	Bush
17	2	GB 894 - 08 x 1	Elastic retaining ring for shaft
18	1	C4-6-26	Shaft
19	1	C4-6-11	Bevel gear
20	1	Pin GB 119 - A03 m6 x 18	Cylindrical pin
21	1	Retaining ring GB 895.1 - 10	Snap ring
22	1	C4-6-10	Clutch shaft
23	1	C4-6-12	Precise feed gear
24	1	C4-6-13	Clutch shaft
25	1	C4-6-14	Rough feed gear
26	1	C4-6-30	Bush
27	1	C4-6-28	Poking fork
28	3	GB 1099 – 3x6.5x16	Semi-circle key
29	1	C4-6-15	Gear-box cover
30	2	Screw GB 70 - M05X25	Socket head cap screw
31	1	C4-6-38	Stud
32	4	GB41-M06	Hex nut
33	1	C4-6-31	Moving shaft
34	1	C4-6-18	Pipe
35	1	C4-6-19	Spring

36	1	Screw GB 70 - M05X12	Socket head cap screw
37	1	C4-6-21	Pipe cover
38	1	C4-6-20	Washer
39	1	C4-6-33	Stud
40	1	C4-6-1	Stud
41	1	C4-6-2	Stud
42	1	C4-6-3	Speed changing limit plate
43	2	Screw GB 67 M6 x 08	Slotted pan head screw
44	4	GB 894 - 10 x 1	Elastic retaining ring for shaft (snap ring)
45	1	C4-6-36	Moving handle support bar
46	1	C4-6-32	Washer
47	1	C4-6-34	Spring
48	1	C4-6-35	Moving handle
49	1	C4-6-37	Handle ball
50	1	Screw GB 79 - M8 x 10	Stop screw
51	3	Screw GB 71-M4x8	Slotted taper head lock screw
52	1	Bearing GBT 301 - 51101	Bearing
53	1	C4-7-7	Small copper bush
54	1	Key GB 1096 - A3X8	Key
55	2	C4-7-8	Retaining ring
56	1	C4-7-4	Face gear
57	2	Screw GB 70 - M05X16	Socket head cap screw
58	1	Screw GB 65 - M5X06	Slotted cylindrical head screw
59	2	C4-7-3	Cover
60	1	c4-07-06	Driving box
61	1	GB 894 - 20 x 1	Elastic retaining ring for shaft(snap ring)
62	1	C4-7-1	Copper bush
63	1	C4-7-2	Gear shaft
64	1	Pin GB 119 - D 05 u8 x 40	Cylindrical pin
65	2	Pin GB 879 - 5x22	Elastic pin
66	1	C4-7-5	Worm

Motor I Drive Assembly Group



BL1500 COMBINATION BRAKE LATHE

RECORD HERE THE FOLLOWING INFORMATION
WHICH IS LOCATED ON THE SERIAL NUMBER DATA PLATE

Serial No._____

Model No. _____

Manufacturing Date_____

PURCHASE RECORD

Purchased Through (Distributor)

Distributor Address _____

Distributor Phone _____

BL-1500 BRAKE LATHE STANDARD FACTORY WARRANTY

Manufacturer warrants each new BL-1500 Brake Lathe to be free from defects in Material and Workmanship for a period of twelve (12) months from the date of purchase to the original equipment owner under normal use and service