CENTRAL MACHINERY®

9” X 20” GEARED HEAD, BELT DRIVEN, BENCH LATHE

Model 45861

SET UP AND OPERATING INSTRUCTIONS

Distributed exclusively by Harbor Freight Tools®.

3491 Mission Oaks Blvd., Camarillo, CA 93011

Visit our website at: http://www.harborfreight.com

Read this material before using this product. Failure to do so can result in serious injury. SAVE THIS MANUAL.

For technical questions or replacement parts, please call 1-800-444-3353.

CONTENTS

SAVE THIS MANUAL

Keep this manual for the safety warnings and precautions, assembly, operating, inspection, maintenance and cleaning procedures. Write the product's serial number in the back of the manual near the assembly diagram (or month and year of purchase if product has no number). Keep this manual and the receipt in a safe and dry place for future reference.

IMPORTANT SAFETY INFORMATION

In this manual, on the labeling, and all other information provided with this product:

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠DANGER **DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.**

⚠WARNING **WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.**

⚠CAUTION **CAUTION, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.**

NOTICE **NOTICE is used to address practices not related to personal injury.**

CAUTION **CAUTION, without the safety alert symbol, is used to address practices not related to personal injury.**

General Power Tool Safety Warnings

WARNING Read all safety warnings and instructions. *Failure to follow the warnings and instructions may result in electric shock, fire and/or serious injury.* **Save all warnings and instructions for future reference.** *The term "power tool" in the warnings refers to your mains-operated (corded) power tool.*

1. **Work area safety**
   a. **Keep work area clean and well lit.** *Cluttered or dark areas invite accidents.*
   b. **Do not operate power tools in explosive atmospheres, such as in the presence of flammable liquids, gases or dust.** *Power tools create sparks which may ignite the dust or fumes.*
   c. **Keep children and bystanders away while operating a power tool.** *Distractions can cause you to lose control.*
2. **Electrical safety**
   a. **Power tool plugs must match the outlet. Never modify the plug in any way. Do not use any adapter plugs with grounded power tools.**

Unmodified plugs and matching outlets will reduce risk of electric shock.

b. **Avoid body contact with grounded surfaces such as pipes, radiators, ranges and refrigerators.** *There is an increased risk of electric shock if your body is grounded.*

c. **Do not expose power tools to rain or wet conditions.** *Water entering a power tool will increase the risk of electric shock.*

d. **Do not abuse the cord. Never use the cord to unplug the power tool. Keep cord away from heat, oil, sharp edges or moving parts.** *Damaged or entangled cords increase the risk of electric shock.*

e. **If operating a power tool in a damp location is unavoidable, use a Ground Fault Circuit Interrupter (GFCI) protected supply.** *Use of a GFCI reduces the risk of electric shock.*

3. **Personal safety**

a. **Stay alert, watch what you are doing and use common sense when operating a power tool. Do not use a power tool while you are tired or under the influence of drugs, alcohol or medication.** *A moment of inattention while operating power tools may result in serious personal injury.*

b. **Use safety equipment. Always wear ANSI-approved eye protection.** *Safety equipment such as dust mask, full face shield, heavy-duty work gloves, non-skid safety shoes, hard hat, or hearing protection used for appropriate conditions will reduce personal injuries.*

c. **Remove any adjusting key or wrench before turning the power tool on.** *A wrench or a key left attached to a rotating part of the power tool may result in personal injury.*

d. **Do not overreach. Keep proper footing and balance at all times.** *This enables better control of the power tool in unexpected situations.*

e. **Dress properly. Do not wear loose clothing or jewelry. Keep your hair, clothing and gloves away from moving parts.** *Loose clothes, jewelry or long hair can be caught in moving parts.*

f. **If devices are provided for the connection of dust extraction and collection facilities, ensure these are connected and properly used.** *Use of these devices can reduce dust-related hazards.*

4. **Power tool use and care**

a. **Do not force the power tool. Use the correct power tool for your application.** *The correct power tool will do the job better and safer at the rate for which it was designed.*

b. **Do not use the power tool if the switch does not turn it on and off.** *Any power tool that cannot be controlled with the switch is dangerous and must be repaired.*

c. **Disconnect the plug from the power source before making any adjustments, changing accessories, or storing power tools.** *Such preventive safety measures reduce the risk of starting the power tool accidentally.*

d. **Store idle power tools out of the reach of children and do not allow persons unfamiliar with the power**

tool or these instructions to operate the power tool. *Power tools are dangerous in the hands of untrained users.*

e. **Maintain power tools. Check for misalignment or binding of moving parts, breakage of parts and any other condition that may affect the power tool's operation. If damaged, have the power tool repaired before use.** *Many accidents are caused by poorly maintained power tools.*

f. **Keep cutting tools sharp and clean.** *Properly maintained cutting tools with sharp cutting edges are less likely to bind and are easier to control.*

g. **Use the power tool, accessories and tool bits etc. in accordance with these instructions, taking into account the working conditions and the work to be performed.** *Use of the power tool for operations different from those intended could result in a hazardous situation.*

5. **Service**

a. **Have your power tool serviced by a qualified repair person using only identical replacement parts.** *This will ensure that the safety of the power tool is maintained.*

Lathe Safety Warnings

1. Maintain labels and nameplates on the tool. These carry important safety information. If unreadable or missing, contact Harbor Freight Tools for a replacement.

2. Do not run the Lathe without its covers and guards in place.

3. Use a brush or compressed air to remove metal shavings; never your hands. The metal shavings will be sharp.

4. The tool must always be tight within the tool post or chuck and adjusted to limit projection from the post. This will reduce the possibility of the tool breaking or bending.

5. Avoid unintentional starting. Prepare to begin work before turning on the tool.

6. Do not reach across the Lathe while it is running.

7. Industrial applications must follow OSHA guidelines.

8. Do not use the Lathe if it is off-balance, or the workpiece is not properly centered.

9. Only feed workpiece into a cutting tool against the direction of rotation.

10. Do not leave the tool unattended when it is plugged into an electrical outlet. Turn off the tool, and unplug it from its electrical outlet before leaving.

11. This product is not a toy. Keep it out of reach of children.

12. People with pacemakers should consult their physician(s) before use. Electromagnetic fields in close proximity to heart pacemaker could cause pacemaker interference or pacemaker failure. In addition, people with pacemakers should:
• Avoid operating alone.
• Do not use with power switch locked on.
• Properly maintain and inspect to

avoid electrical shock.
• Any power cord must be properly grounded. Ground Fault Circuit Interrupter (GFCI) should also be implemented – it prevents sustained electrical shock.

13. Some dust created by power sanding, sawing, grinding, drilling, and other construction activities, contains chemicals known [to the State of California] to cause cancer, birth defects or other reproductive harm. Some examples of these chemicals are:
• Lead from lead-based paints
• Crystalline silica from bricks and cement or other masonry products
• Arsenic and chromium from chemically treated lumber
Your risk from these exposures varies, depending on how often you do this type of work. To reduce your exposure to these chemicals: work in a well ventilated area, and work with approved safety equipment, such as those dust masks that are specially designed to filter out microscopic particles. (California Health & Safety Code § 25249.5, *et seq.*)

14. The warnings, precautions, and instructions discussed in this instruction manual cannot cover all possible conditions and situations that may occur. It must be understood by the operator that common sense and caution are factors which cannot be built into this product, but must be supplied by the operator.

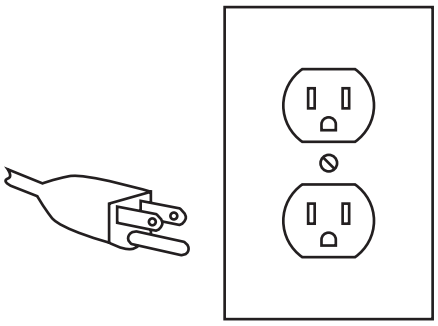
SAVE THESE INSTRUCTIONS.

GROUNDING

⚠WARNING TO PREVENT ELECTRIC SHOCK AND DEATH FROM INCORRECT GROUNDING WIRE CONNECTION:

Check with a qualified electrician if you are in doubt as to whether the outlet is properly grounded. Do not modify the power cord plug provided with the tool. Never remove the grounding prong from the plug. Do not use the tool if the power cord or plug is damaged. If damaged, have it repaired by a service facility before use. If the plug will not fit the outlet, have a proper outlet installed by a qualified electrician.

Grounded Tools: Tools with Three Prong Plugs



3-Prong Plug and Outlet

1. Tools marked with “Grounding Required” have a three wire cord and three prong grounding plug. The plug must be connected to a properly grounded outlet. If the tool should electrically malfunction or break down, grounding provides a low resistance path to carry electricity away from the user, reducing the risk

of electric shock. **(See 3-Prong Plug and Outlet.)**

2. The grounding prong in the plug is connected through the green wire inside the cord to the grounding system in the tool. The green wire in the cord must be the only wire connected to the tool's grounding system and must never be attached to an electrically "live" terminal. **(See 3-Prong Plug and Outlet.)**

3. The tool must be plugged into an appropriate outlet, properly installed and grounded in accordance with all codes and ordinances. The plug and outlet should look like those in the preceding illustration. **(See 3-Prong Plug and Outlet.)**

Extension Cords

1. ***Grounded*** tools require a three wire extension cord. ***Double Insulated*** tools can use either a two or three wire extension cord.

2. As the distance from the supply outlet increases, you must use a heavier gauge extension cord. Using extension cords with inadequately sized wire causes a serious drop in voltage, resulting in loss of power and possible tool damage.
(See Table A.) The smaller the gauge number of the wire, the greater the capacity of the cord. For example, a 14 gauge cord can carry a higher current than a 16 gauge cord. **(See Table A.)**

3. When using more than one extension cord to make up the total length, make sure each cord contains at least the minimum wire size required. **(See Table A.)**

4. If you are using one extension cord for more than one tool, add the nameplate amperes and use the sum to determine the required minimum cord size. **(See Table A.)**

5. If you are using an extension cord outdoors, make sure it is marked with the suffix "W-A" ("W" in Canada) to indicate it is acceptable for outdoor use.

6. Make sure the extension cord is properly wired and in good electrical condition. Always replace a damaged extension cord or have it repaired by a qualified electrician before using it.

7. Protect the extension cords from sharp objects, excessive heat, and damp or wet areas.

RECOMMENDED MINIMUM WIRE GAUGE FOR EXTENSION CORDS*
(120/240 VOLT)

NAMEPLATE AMPERES (at full load)	EXTENSION CORD LENGTH				
	25'	50'	75'	100'	150'
0 – 2.0	18	18	18	18	16
2.1 – 3.4	18	18	18	16	14
3.5 – 5.0	18	18	16	14	12
5.1 – 7.0	18	16	14	12	12
7.1 – 12.0	18	14	12	10	-
12.1 – 16.0	14	12	10	-	-
16.1 – 20.0	12	10	-	-	-

TABLE A

*** Based on limiting the line voltage drop to five volts at 150% of the rated amperes.**

Symbology

	Double Insulated
	Canadian Standards Association

Symbology

	Underwriters Laboratories, Inc.
V~	Volts Alternating Current
A	Amperes
n_0 xxxx/min.	No Load Revolutions per Minute (RPM)

SPECIFICATIONS

Electrical Requirements	120 V~ / 60 Hz
Lathe Type	Metal Cutting
Motor	3/4 HP
Motor Speed	1790 RPM
Spindle Speed	120, 320, 420, 620, 1130 & 2000
Spindle Taper	MT-3
Spindle Bore	3/4”
Chuck	3 Jaw
Chuck Capacity	4”
Tail Stock Quill Travel	1-3/4”
Tail Stock Quill Taper	MT-2
Tool Post Capacity	3/4”
Swing Over Bed	9”
Distance Between Centers	20”

UNPACKING

When unpacking, check to make sure that the item is intact and undamaged. If any parts are missing or broken, please call Harbor Freight Tools at the number shown on the cover of this manual as soon as possible.

Proper lubrication is essential. To be safe, and to become more familiar with the Lathe, disassemble the lathe entirely, then clean and lubricate each part with white lithium grease before first use.

List of contents

Description	Qty
9” X 20” Bench Lathe	1
4” 3-Jaw Chuck	1
Reverse Jaws For Chuck.	3
Chuck Wrench	1
Dead Center Mt#2	1
Dead Center Mt#3	1
Live Center	1
10-12 Open-End Wrench	1
14-17 Open-End Wrench	1
17-19 Open-End Wrench	1
Round Nut Wrench 45-52	1
Tool Post Wrench	1
Hex Wrenches - 3, 4, 5, 6mm	1 ea.
Drive Belts	2
Threading Gear Set 28,30, 36,42,45 & 80T	1
Oil Can	1
Splash Guard	1
Operators Manual	1

INSTRUCTIONS FOR PUTTING INTO USE

Read the ENTIRE IMPORTANT SAFETY INFORMATION section at the beginning of this manual including all text under subheadings therein before set up or use of this product.

⚠WARNING TO PREVENT SERIOUS INJURY FROM ACCIDENTAL OPERATION:
Turn the Power Switch of the tool to its “OFF” position and unplug the tool from its electrical outlet before assembling or making any adjustments to the tool.

Note: For additional information regarding the parts listed in the following pages, refer to the Assembly Diagram near the end of this manual.

Mounting

1. Unbolt and remove the Lathe from the crate.
2. The Lathe will need to be mounted to a surface capable of bearing the combined weight of the Lathe and intended workpieces. The surface must be able to withstand the vibra-

tion generated by the Lathe during operation. The cabinet recommended for use with this Lathe is SKU 46378; this product is available from Harbor Freight Tools.

3. Use a hoist or a forklift to lift the Lathe onto the cabinet or workbench.

4. Mount the Spacer Blocks. The Lathe must be completely level, left-to-right **and** front-to-back, or the Lathe will not mill properly and may become damaged.

5. Mount the dip tray.

6. Thread on the belt tensioner lever.

7. The unpainted surfaces are coated with a waxy oil to protect them from corrosion during shipment. Remove the coating with a solvent cleaner or citrus-based degreaser. Avoid chlorine-based solvents since they will damage the paint.

CAUTION **When connecting or removing the chuck, take care to protect the ways by placing a piece of wood, or other guard, over them. Damaging the ways may permanently disable the lathe.**

Functions

1. The Lathe can be used to shape metal, make screws, and bore screw threads.

OPERATING INSTRUCTIONS

Read the ENTIRE IMPORTANT SAFETY INFORMATION section at the beginning of this manual including all text under subheadings therein before set up or use of this product.

Tool Set Up

⚠WARNING **TO PREVENT SERIOUS INJURY FROM ACCIDENTAL OPERATION:**
Turn the Power Switch of the tool to its "OFF" position and unplug the tool from its electrical outlet before performing any inspection, maintenance, or cleaning procedures.

1. Settings for the spindle, chuck, gibs, ways, and ends, will be determined by the length of the stock and the intended operation.

2. The Lathe speed must be set to "0" before restarting.

Workpiece and Work Area Set Up

1. Designate a work area that is clean and well-lit. The work area must not allow access by children or pets to prevent injury and distraction.

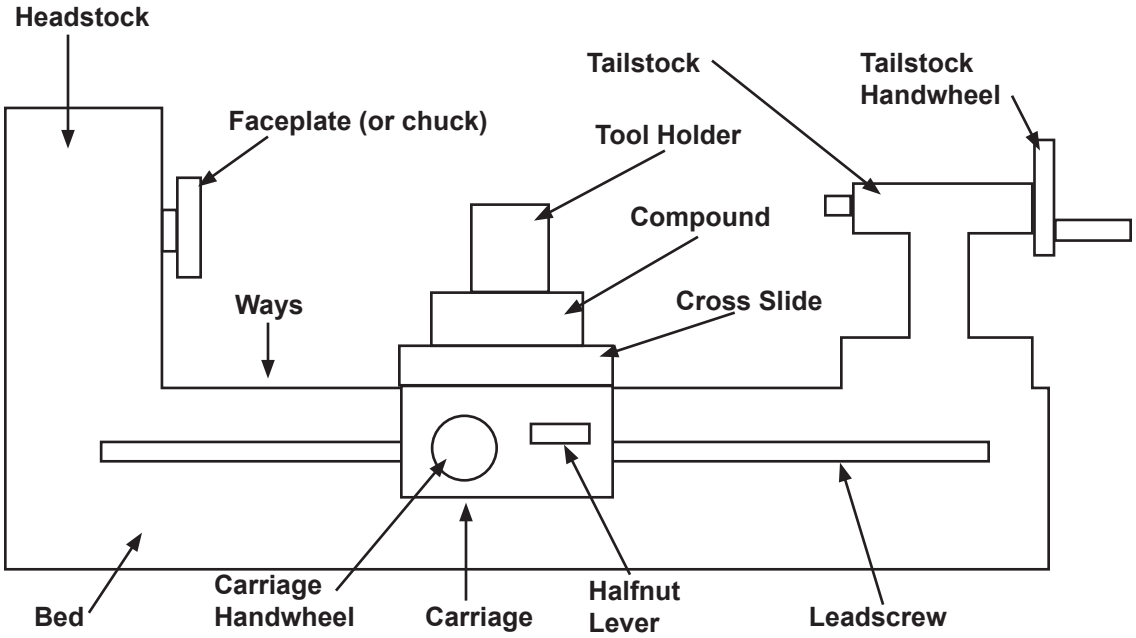
2. Route the power cord along a safe route to reach the work area without creating a tripping hazard or exposing the power cord to possible damage.

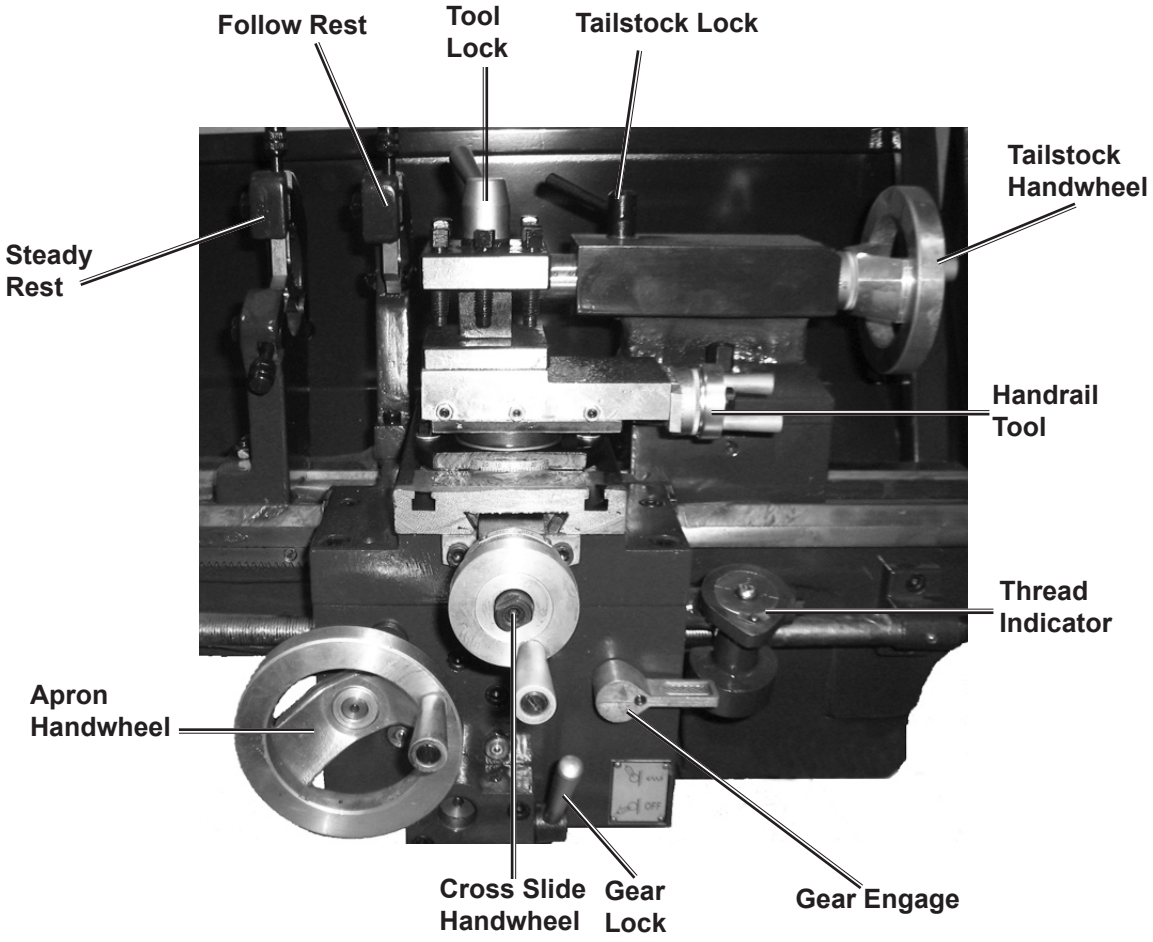
3. Secure loose workpieces to prevent movement while working.

Definition of Terms

Apron: The front part of the carriage assembly where the carriage handwheel is mounted.

Lathe


Headstock
Faceplate (or chuck)
Tailstock
Tailstock Handwheel
Tool Holder
Compound
Ways
Cross Slide
Bed
Carriage Handwheel
Carriage
Halfnut Lever
Leadscrew


Follow Rest
Tool Lock
Tailstock Lock
Tailstock Handwheel
Steady Rest
Handrail Tool
Thread Indicator
Apron Handwheel
Cross Slide Handwheel
Gear Lock
Gear Engage

Bed: Main supporting casting running the length of the lathe

Between Centers: A dimension representing the maximum length of a workpiece that can be turned between centers. Also a method of holding a workpiece by mounting it between the centers of the headstock and the tailstock spindles.

Carriage: The assembly that moves the tool post and cutting tool along the ways.

Carriage Handwheel: A wheel with a handle used to move the carriage by hand.

Center: A precision ground tapered cylinder with a 60º pointed tip and a Morse Taper shaft. Used in the tailstock to support the end of long workpieces. May also be used in the headstock spindle to support work between centers at both ends.

Center Drill: A short drill used to form pilot holes and countersunk holes.

Centerline: An imaginary line extending from the center of the spindle through the center of the tailstock ram, representing the central axis of the lathe around which the work rotates.

Chuck: A clamping device for holding work in the lathe or for holding drills in the tailstock.

Compound: Movable platform where the tool post is mounted; it can be set at an angle to the workpiece (also known as compound slide and compound rest).

Compound Handwheel: The wheel used to move the compound slide in and out.

Cross Slide: Platform that moves along the lathe axis under control of the cross-slide handwheel.

Cross Slide Handwheel: The wheel used to move the cross slide in and out (also called cross feed).

Faceplate: A metal plate with a flat face-mounted spindle to hold irregularly shaped work.

Facing: A lathe operation in which metal is removed from the end of a workpiece to create a smooth surface.

Gib: An adjustable length of steel or brass with a diamond shaped cross-section that engages one side of the dovetail slide. Used to adjust the dovetail for optimum tightness and to compensate for wear.

Halfnut: A nut formed from two halves which clamp around the leadscrew to move the carriage.

Halfnut Lever: This Lever engages the carriage with the leadscrew.

Headstock: The main casting mounted on the left end of the bed where the spindle is mounted. Houses the spindle gears.

Leadscrew: Screw used to drive the carriage under power for turning and thread cutting operations. Smaller leadscrews are used within the cross-slide and compound to move those parts by precise amounts.

Morse Taper (MT): A taper of specific dimensions used to mate match-

ing male and female parts together tightly. The spindle has a #3 Morse Taper (MT-3) and the tailstock has a #2 Morse Taper (MT-2).

Saddle: An “H” shaped casting that rides along the ways. A main components of the carriage.

Spindle: Main rotating shaft on which the chuck is mounted. It passes through the headstock.

Spindle Through-hole: A dimension indicating the minimum diameter of the hole that passes through the spindle. A workpiece with a diameter smaller than this can pass through the spindle to work on longer pieces.

Swing: A dimension representing the largest diameter workpiece that a lathe can rotate. The 9x20 lathe has a 9” swing, meaning that the maximum size workpiece that can rotate without hitting the bed is 9” in diameter.

Tailstock: Assembly that slides along the ways and can be locked in place. Used to hold long workpieces in place or to mount a drill chuck.

Tailstock Handwheel: Moves the tailstock in and out. Has a tapered internal bore to accept a #2 Morse Taper shank.

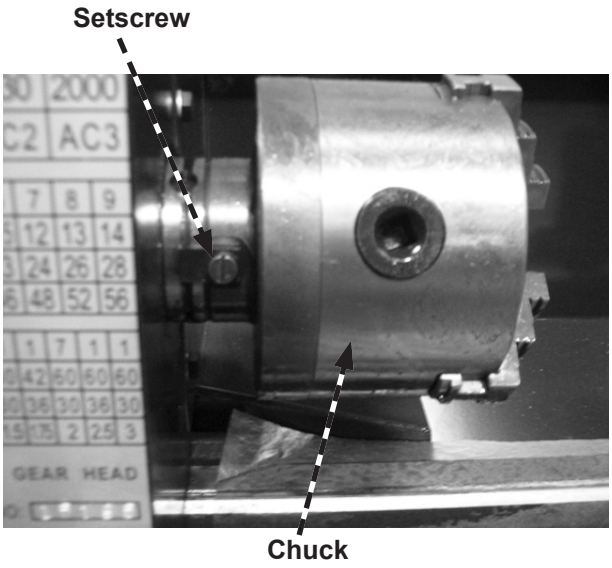
Tool Post: A device mounted on the compound that holds the cutting tool.

Turning: A lathe operation that removes metal from the outside diameter of the workpiece.

Ways: Surface along the top of the bed on which the saddle rides. The ways are aligned with the centerline of the lathe.

Installing a Chuck

1. Place a piece of wood on the bed of the Lathe to prevent possible damage to the Ways.
2. The 3-jaw chuck is a scroll-type chuck, meaning that all three jaws move in unison when adjustments are made.
3. The setscrew at the back of the Chuck prevents it from unscrewing when rotating the lathe in the reverse direction.



4. Loosen the setscrew, and use the provided Chuck removal wrenches to remove the Chuck. Use one tool to hold the spindle in place and the other to rotate the Chuck counter-clockwise.

The Live Center

1. The Live Center supports stock that is too long to be supported by the chuck alone. Stock protruding more than three times its diameter should also be supported by the live center. When using a Live Center, the tail-

stock barrel should protrude about 1/2'' and not more than 3''.

2. To remove the Live Center, back the tailstock barrel all the way into the casting. The Live Center will pop out; catch it when it comes out to avoid damaging it.

Steady Rest

1. The steady rest supports long, small diameter stock that otherwise could not be turned. The steady rest can also replace the tailstock to allow for cutting tool access at the outboard end of the workpiece.

2. To mount the Steady Rest, secure the bedway from below with the locking plate, and use setscrews to secure it in place.

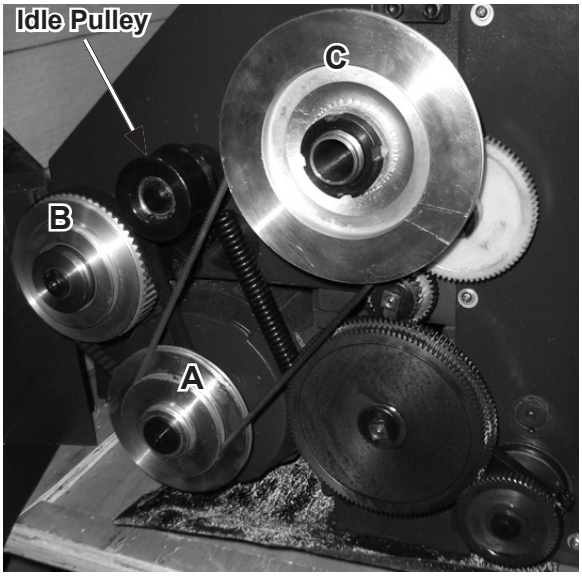
Follow Rest

1. The follow rest is used with small diameter stock to prevent the work-piece from ''springing'' under pres-sure from the turning tool.

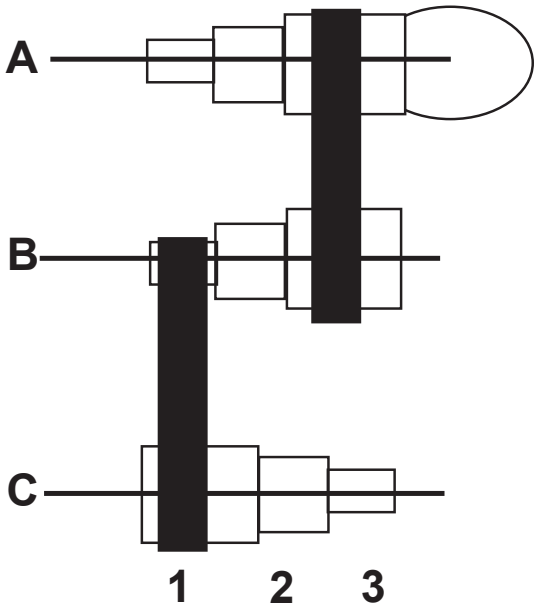
2. The follow rest is secured to the saddle with two cap screws.

Spindle Speeds

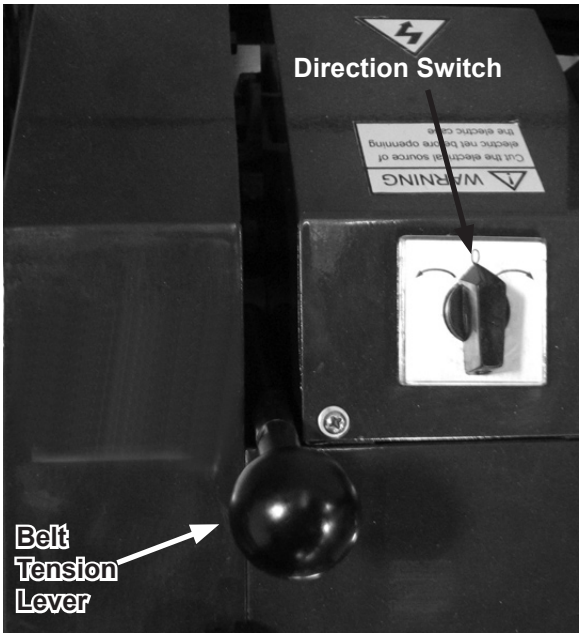
1. The rotation speed of the headstock is controlled by the position of the belts on the pulleys. The cover on the end of the headstock must be removed to access them. Refer to the following chart (or the plate on the headstock) to determine which belt combinations produce what speeds. The speed settings on this machine are 120, 320, 420, 620, 1130 and 2200 RPM. See photograph, chart and diagram below.



Speed	120	320	420	620	1130	2200
Settings	BC1	BC2	AC1	BC3	AC2	AC3

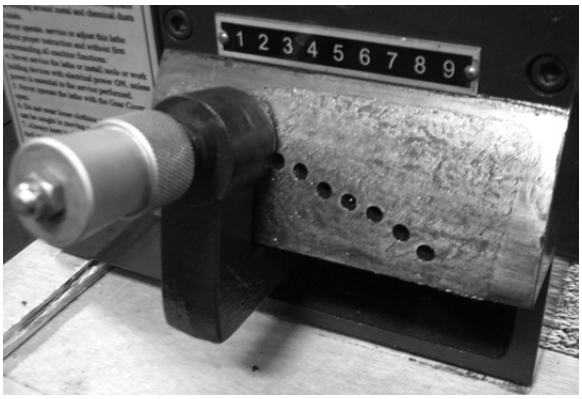


2. The Belt Tension Lever on the top of the headstock, loosens the drive belt to allow the operator to change speeds and can be used like a clutch during operation. See photograph below.



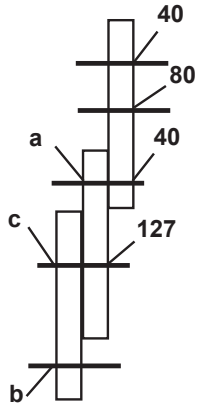
⚠CAUTION **Do not change the Direction Switch rotation while running Lathe.**

Feed Rate



1. The Feed Rate Lever (above) changes the number of threads-per-inch (TPI) that can be cut. The plate on the machine and the following charts list typical settings.

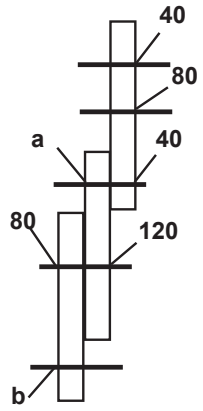
Feed rate portion of machine plate



Lever	9	1	9	1	1
a	28	28	28	28	45
b	80	80	60	60	60
c	80	80	120	120	120
Feed	0.0023	0.004	0.005	0.008	0.013

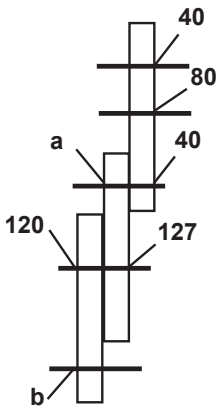
2. During metric thread cutting the half nut must remain engaged through entire threading process. The thread dial cannot be utilized.

Threading rate portion of machine plate for Inches



Lever a	Lever b	1	2	3	4	5	6	7	8	9
60	30	8	9	9.5	10	11	11.5	12	13	14
30	30	16	18	19	20	22	23	24	26	28
30	60	32	36	38	40	44	46	48	52	56

Threading rate portion of machine plate for Millimeters



Lever	7	1	1	4	7	1	1	1	7	1	1
a	30	28	30	30	30	30	30	42	60	60	60
b	60	60	60	45	30	36	30	36	30	36	30
	0.5	0.7	0.75	0.8	1	1.25	1.5	1.75	2	2.5	3

General Operating Instructions

Every ten hours of operation, lubricate the lathe's gears and ways with white lithium grease, as directed in the Maintenance Section of this manual.

1. The Lathe can perform a wide variety of operations; the purchase of reference materials, such as books about machining or engineering tables, is highly recommended.
2. If Lathe use requires a higher degree of accuracy than supplied by the standard set-up, have the Lathe serviced by a qualified machinist.
3. Settings for the spindle, chuck, gibs, ways, and ends, will be determined by the length of the stock and the intended operation.
4. Turn the chuck by hand to make sure it rotates smoothly.
5. Plug the Lathe into a standard, grounded 120V electrical outlet.

General Milling Guidelines

1. When performing any operation with the Lathe it is best to proceed slowly and make several passes.
2. A 1000th of an inch of movement yields a 2000th inch cut.
3. Use of a high-quality cutting fluid (not included) will greatly aid in most milling processes.

Facing Operations

Facing is the process of removing metal from the end of a workpiece to produce a flat surface.

1. To safely perform a facing operation the jaws of the chuck must be as close as possible to the end of the workpiece. The workpiece should not extend more than 2 or 3 times its diameter from the chuck jaws unless the steady rest is used to support the end of the workpiece.

2. Softer metals require higher cutting speeds. Consult a machining manual to determine the rotation speed that must be set to cut the metal.

3. The tumbler gear lever must be in the neutral position so that the leadscrew does not rotate.

4. Clamp the half nut on the leadscrew to keep the saddle from being forced back from the workpiece during cutting.

5. To center the workpiece; close the chuck until the jaws touch its surface, twist the workpiece to seat it; then tighten the jaws. Tighten the jaws from all three chuck key positions to ensure even gripping by the jaws.

6. Clamp the cutting tool in the tool post and turn the toolpost so that the tip of the cutting tool will meet the end of the workpiece at a slight angle. The tip of the cutting tool must be at the centerline of the lathe, or the work will be marred.

7. Clamp the toolpost in place and advance the carriage until the tool is even with, but not touching the end of the workpiece.

8. Set the lathe to its lowest speed and turn it on. Make sure the leadscrew is not turning.

9. Turn the lathe off and press the Halfnut lever down to engage it with the leadscrew. Locking the half-nut to the leadscrew will prevent the carriage from moving back away from the workpiece during the facing operation.

10. Use the compound crank to advance the tool until it touches the end of the workpiece. Use the cross feed crank to back off the tool until it is beyond the diameter of the workpiece.

11. Turn the lathe on and adjust the speed to low RPM.

12. Use the cross feed crank to slowly move the tool towards the workpiece.

13. When the tool touches the workpiece it should start to remove metal from the end. Continue advancing the tool until it reaches the center of the workpiece, then crank the tool back until it is past the end of the workpiece.

14. Continue slowly moving the tool closer to the workpiece until the desired facing is achieved.

15. After the facing operation is completed the sides of the workpiece should be filed to eliminate the sharp edge.

Drilling

1. Face the workpiece as described above to ensure a clean surface for drilling.

Note: Drill chucks, center drills and drills are not included with this Lathe.

2. Attach a drill chuck and secure a center drill into it.

3. Use the center drill that is about the same size as the hole you intend to drill to bore a starter hole. Drilling a starter hole will prevent the drill from wandering off-center.

4. Allow the center drill to cool before removing it from the drill chuck and inserting the drill.

5. Use the drill to bore a hole two full diameters of the drill at a time. After

advancing the drill twice its diameter, back the drill out and clean off shavings before continuing.

6. Continue until the desired depth is drilled.

Turning

Turning is the removal of metal from the outer diameter of a cylindrical workpiece to reduce the diameter and to produce a smooth finish on the metal. Longer workpieces may need to use a dead or live center in the tailstock to support the workpiece.

1. Attach tool to the chuck.
2. Adjust the angle of the tool holder so the tool is perpendicular to the side of the workpiece. The left side of the tip of the tool should engage the work, but not the entire front edge.
3. Make sure the half nut and feed levers are disengaged.
4. Turn the motor on. The leadscrew should now be rotating counterclockwise.
5. Position the tool beyond the end of the workpiece and engage the half-nut lever. The carriage should move slowly to the left under power from the leadscrew. When the tool gets to within about 1/4” of the chuck, disengage the half-nut to stop the carriage motion.
6. Repeat until the desired diameter is reached.

Note: When cutting under power be careful to not run the tool into the chuck.

Thread Cutting

1. Set the machine up for the desired thread pitch.
2. Insert the appropriate tool into the chuck and secure.
3. Start the machine and engage the half nut.
4. When the tool reaches the workpiece, it will cut the initial threading pass.
5. When the tool reaches the end of the cut, stop the machine by turning the motor off.
6. Back the tool out of the workpiece so that it clears the thread. Do not disengage the half nut lever.
7. Reverse the motor direction to allow the cutting tool to traverse back to the starting point.
8. Repeat until you have obtained the desired results.

MAINTENANCE AND SERVICING

Procedures not specifically explained in this manual must be performed only by a qualified technician.

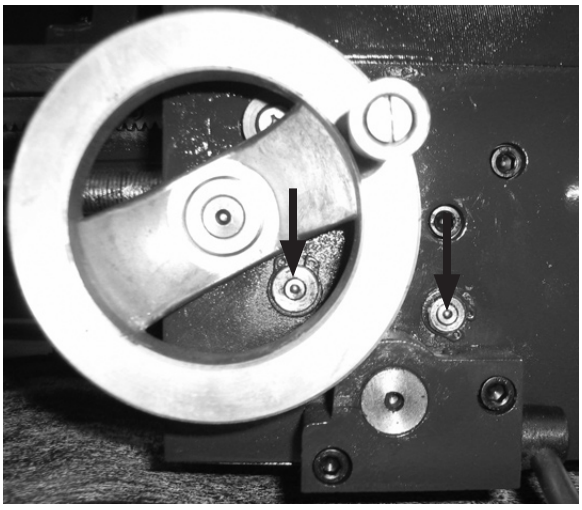
⚠WARNING TO PREVENT SERIOUS INJURY FROM ACCIDENTAL OPERATION:
Turn the Power Switch of the tool to its "OFF" position and unplug the tool from its electrical outlet before performing any inspection, maintenance, or cleaning procedures.

TO PREVENT SERIOUS INJURY FROM TOOL FAILURE:
Do not use damaged equipment. If abnormal noise or vibration occurs, have the problem corrected before further use.

Cleaning and Maintenance

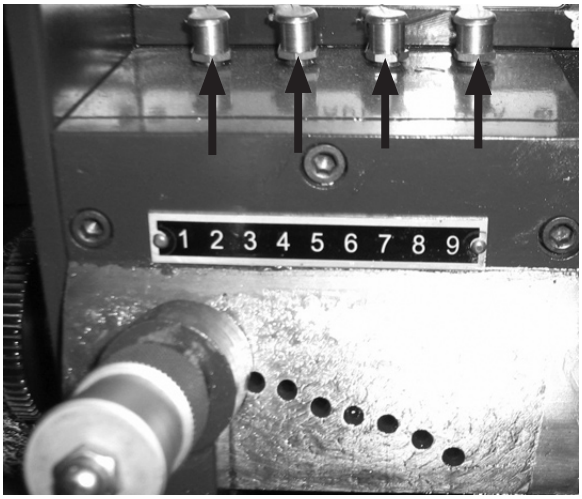
1. **BEFORE EACH USE,** inspect the general condition of the tool. Check for loose screws, misalignment or binding of moving parts, cracked or broken parts, damaged electrical wiring, and any other condition that may affect its safe operation.
2. **AFTER USE,** clean external surfaces of the tool with clean cloth.
3. **⚠WARNING! If the supply cord of this power tool is damaged, it must be replaced only by a qualified service technician.**

Lubrication

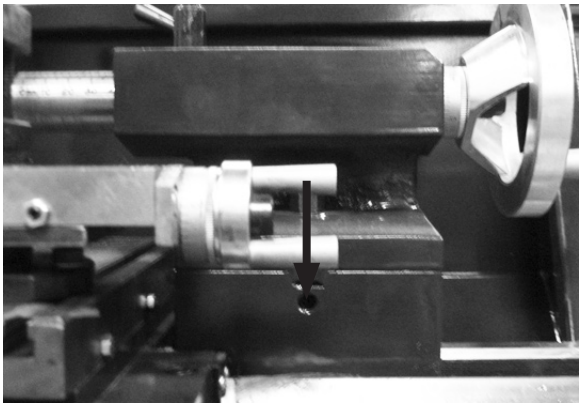


1. Lubricate the Apron through the fittings on the front face with ISO 68 or SAE 20W oil.

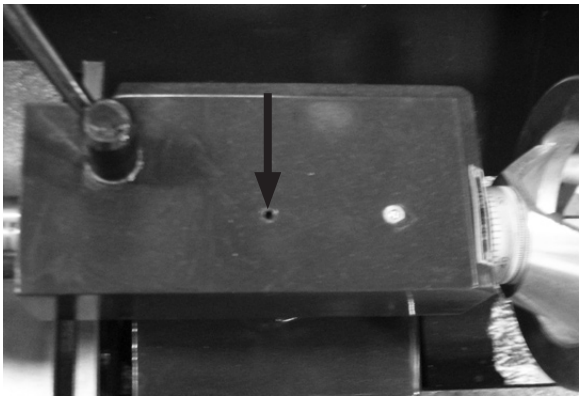
2. Lightly oil the hubs and gear teeth in the gear area. Avoid getting oil on the belt or pulleys.



3. Lubricate the Gearbox through the four oil caps. Add a few squirts of oil every three hours of use.



4. Lubricate the leadscrew and lead-screw bearing frequently.



5. Lubricate the tailstock oiling point every five uses, or once per week if used frequently.

6. Wipe down the ways and slides after each use and lubricate with white lithium grease.

7. Applying oil to the bedways and other metal parts will protect the Lathe from rusting and pitting.

PLEASE READ THE FOLLOWING CAREFULLY

THE MANUFACTURER AND/OR DISTRIBUTOR HAS PROVIDED THE PARTS LIST AND ASSEMBLY DIAGRAM IN THIS MANUAL AS A REFERENCE TOOL ONLY. NEITHER THE MANUFACTURER OR DISTRIBUTOR MAKES ANY REPRESENTATION OR WARRANTY OF ANY KIND TO THE BUYER THAT HE OR SHE IS QUALIFIED TO MAKE ANY REPAIRS TO THE PRODUCT, OR THAT HE OR SHE IS QUALIFIED TO REPLACE ANY PARTS OF THE PRODUCT. IN FACT, THE MANUFACTURER AND/OR DISTRIBUTOR EXPRESSLY STATES THAT ALL REPAIRS AND PARTS REPLACEMENTS SHOULD BE UNDERTAKEN BY CERTIFIED AND LICENSED TECHNICIANS, AND NOT BY THE BUYER. THE BUYER ASSUMES ALL RISK AND LIABILITY ARISING OUT OF HIS OR HER REPAIRS TO THE ORIGINAL PRODUCT OR REPLACEMENT PARTS THERETO, OR ARISING OUT OF HIS OR HER INSTALLATION OF REPLACEMENT PARTS THERETO.

HEADSTOCK PARTS LIST

Part	Description	Qty.
1	Headstock	1
2	Flange Joint	1
3	Spindle	1
4	Key	1
5	Gasket	2
6	Bearing	2
7	Cover	2
8	Spacing Ring	1
9	Gear	1
10	Pulley	1
11	Bushing	1
12	Set Screw M4x6	4
13	Nut M28	1
14	Set Screw M4x10	4
15	Shaft	2
16	Spacing Ring	2
17	Set Screw M4x6	2
18	Bushing	2
19	Gear	1
20	Washer	2
21	Oil Feeder	2
22	Gear	1
23	Gear	1

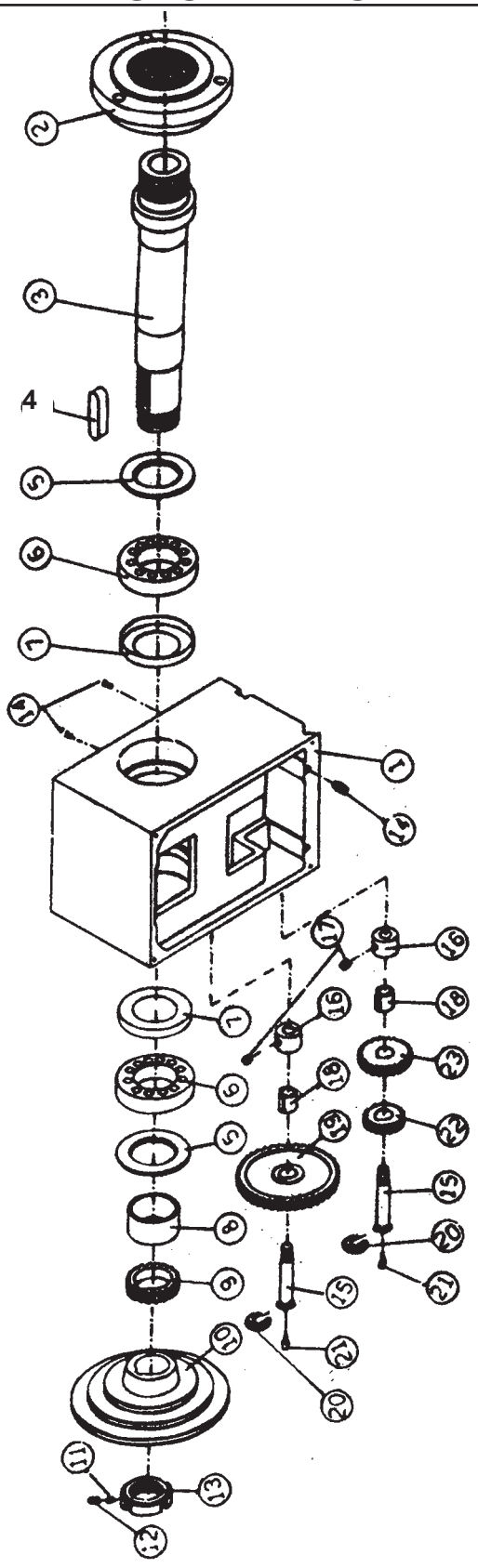
Record Product's Serial Number Here:

_____

Note: If product has no serial number, record month and year of purchase instead.

Note: Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts.

HEADSTOCK DIAGRAM



DRIVE PARTS LIST

Part	Description	Qty.
1A	Bracket Plate	1
2A	Screw M8x20	3
3A	Belt Pulley Shaft	1
4A	Washer	1
5A	Spring Washer	1
6A	Nut M10	1
7A	Bushing	2
8A	Snap Ring	1
9A	Washer	5
10A	Spring	5
11A	Ball	5
12A	Pulley	1
13A	Pulley	1
14A	Washer	1
15A	Snap Ring	1
16A	Oil Feeder	1
17A	Spacer	1
18A	Collar	1
19A	Motor Pulley	1
20A	Washer	1

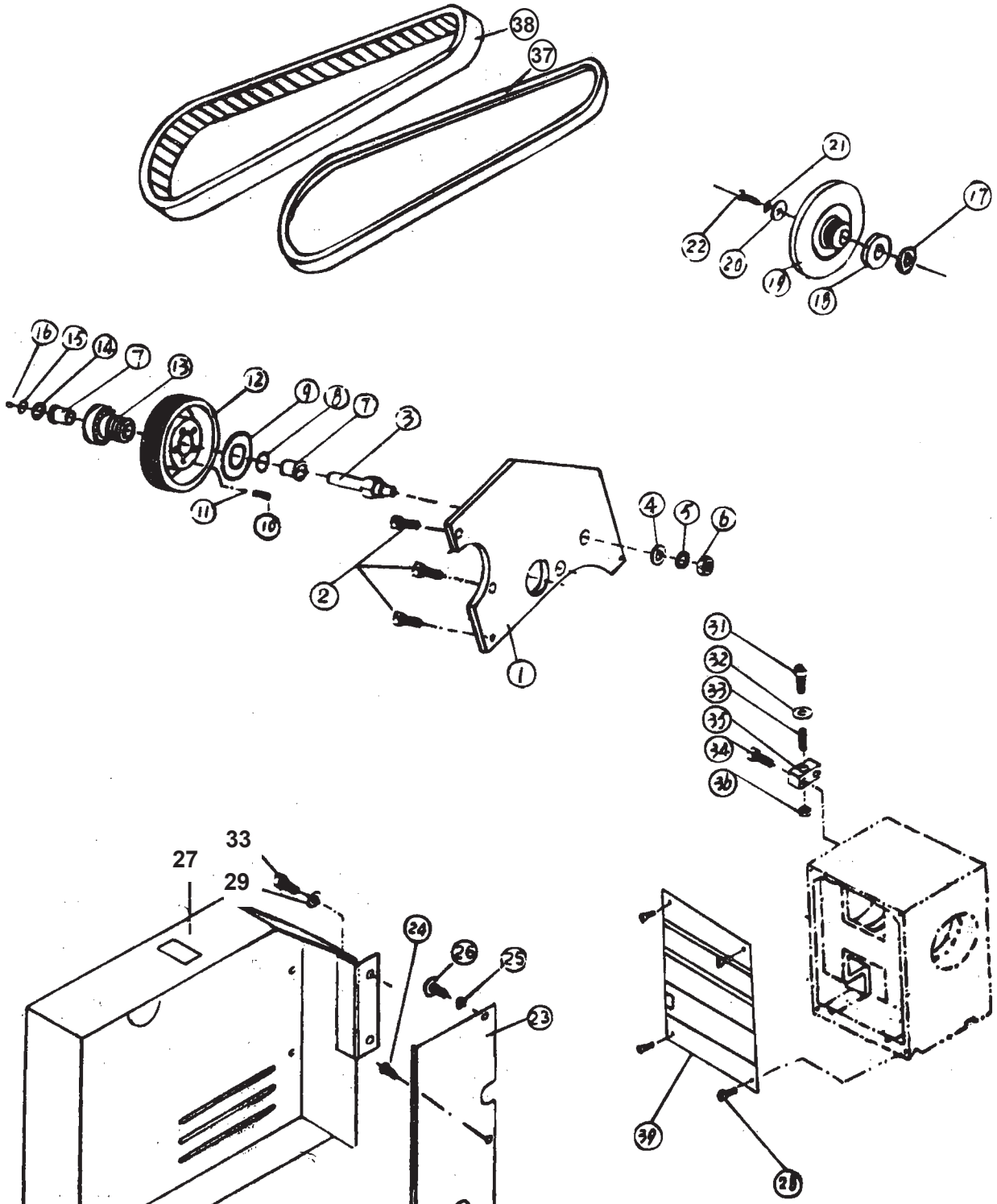
DRIVE PARTS LIST

Part	Description	Qty.
21A	Spring Washer	1
22A	Cap Screw	1
23A	Cover Mount	1
24A	Screw M6x12	1
25A	Washer	1
26A	Screw M5x8	1
27A	Cover	1
28A	Screw M4x10	4
29A	Washer	2
30A	Screw M6x10	2
31A	Screw M6x25	1
32A	Washer	1
33A	Spring	1
34A	Screw M6x20	2
35A	Clamp Piece	1
36A	Nut M6	1
37A	V-Belt	1
38A	Tooth Belt	1
39A	Plate	1

Note: When ordering parts from this list be sure to include the correct suffix.

Note: Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts.

DRIVE DIAGRAM



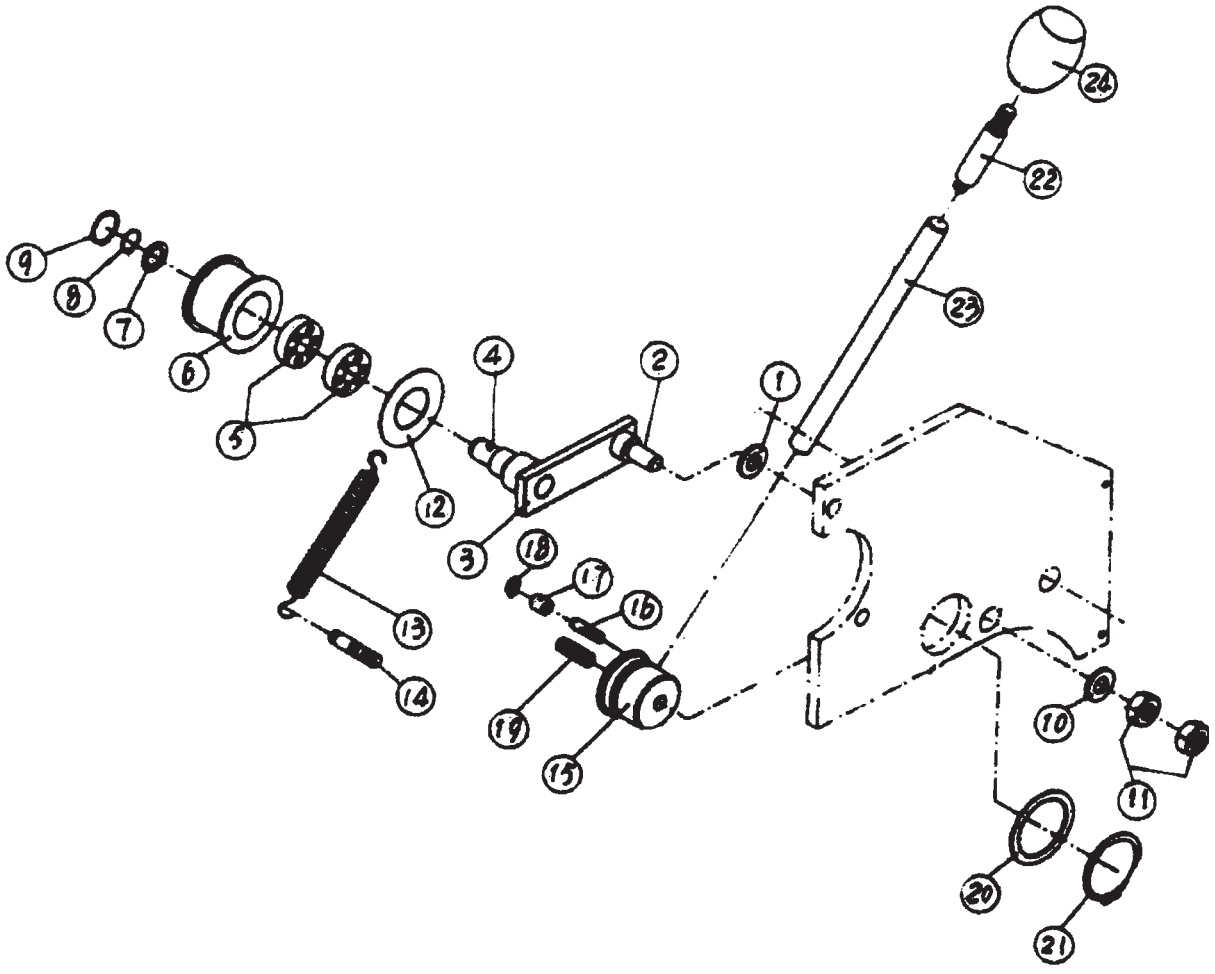
Note: When ordering parts from this diagram be sure to include the correct "A" suffix.

TENSIONING ROLLER PARTS LIST

Part	Description	Qty.
1B	Washer	1
2B	Bolt	1
3B	Lever Bracket	1
4B	Lever	1
5B	Bearing	1
6B	Roller	1
7B	Washer	1
8B	Snap Ring	1
9B	Snap Ring	1
10B	Washer	1
11B	Nut M10	2
12B	Washer	1

TENSIONING ROLLER PARTS LIST

Part	Description	Qty.
13B	Spring	1
14B	Bolt	1
15B	Toggle	1
16B	Bolt	1
17B	Sleeve	1
18B	Snap Ring	1
19B	Set Screw M8x12	1
20B	Wave Washer	1
21B	Snap Ring	1
22B	Lever	1
23B	Lever	1
24B	Knob	1



Note: When ordering parts from this list be sure to include the correct suffix.

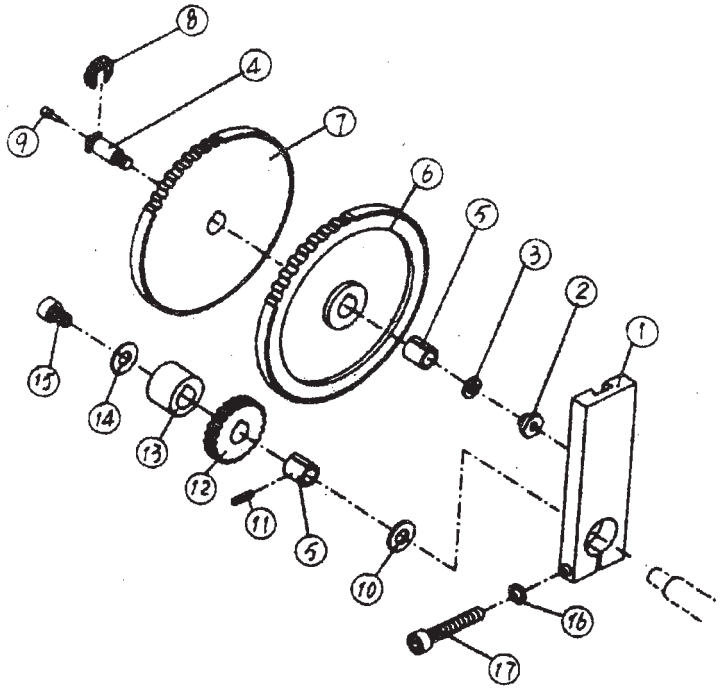
Note: Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts.

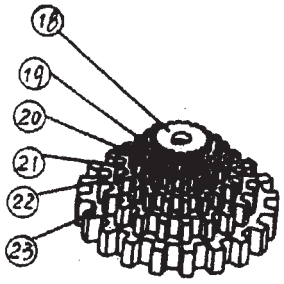
QUADRANT PARTS LIST

Part	Description	Qty.
1C	Bracket	1
2C	T-nut	1
3C	Washer	1
4C	Shaft	1
5C	Bushing	2
6C	Gear	1
7C	Gear	1
8C	Washer	1
9C	Oil Feeder	1
10C	Washer	1
11C	Pin	1
12C	Gear	2

QUADRANT PARTS LIST

Part	Description	Qty.
13C	Spacer	1
14C	Washer	1
15C	Screw M6x10	1
16C	Spring Washer	1
17C	Screw M6x35	1
18C	Gear 28T	1
19C	Gear 36T	1
20C	Gear 42T	1
21C	Gear 45T	1
22C	Gear 60T	1
23C	Gear 80T	1





Note: When ordering parts from this list be sure to include the correct suffix.

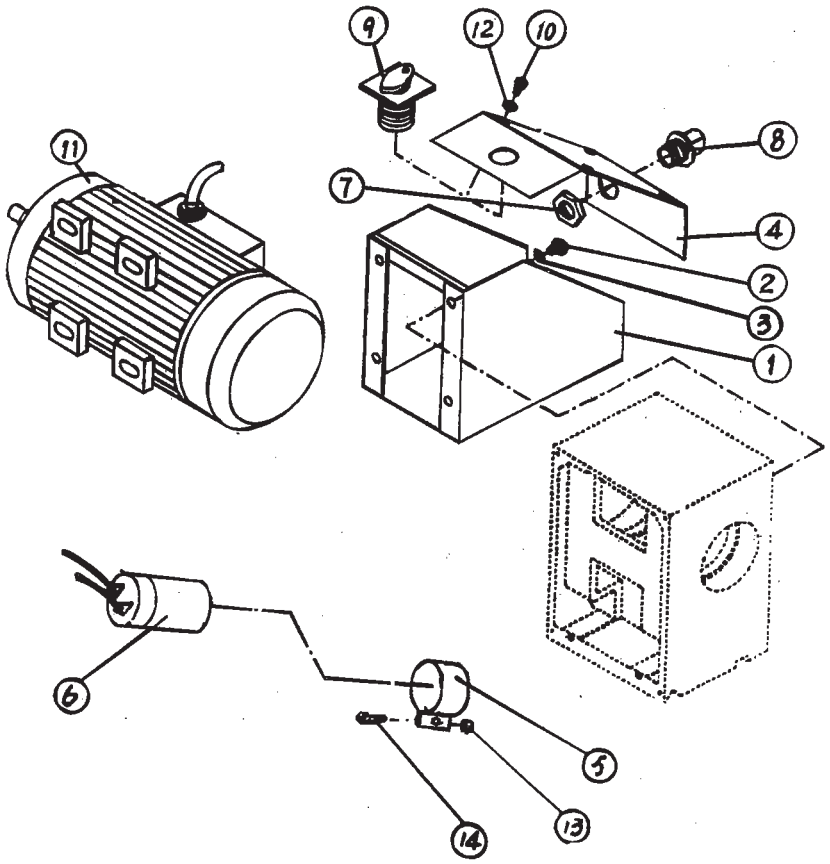
Note: Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts.

MOTOR HOUSING PARTS LIST

Part	Description	Qty.
1D	E-housing	1
2D	Screw	4
3D	Lock Washer	4
4D	Cover	1
5D	Clip	1
6D	Condenser	1
7D	Lock Nut	1

MOTOR HOUSING PARTS LIST

Part	Description	Qty.
8D	Screw Coupling	1
9D	Switch	1
10D	Hex Screw	4
11D	Motor	1
12D	Lock Washer	4
13D	Nut	1
14D	Screw M5x10	1



Note: When ordering parts from this list be sure to include the correct suffix.

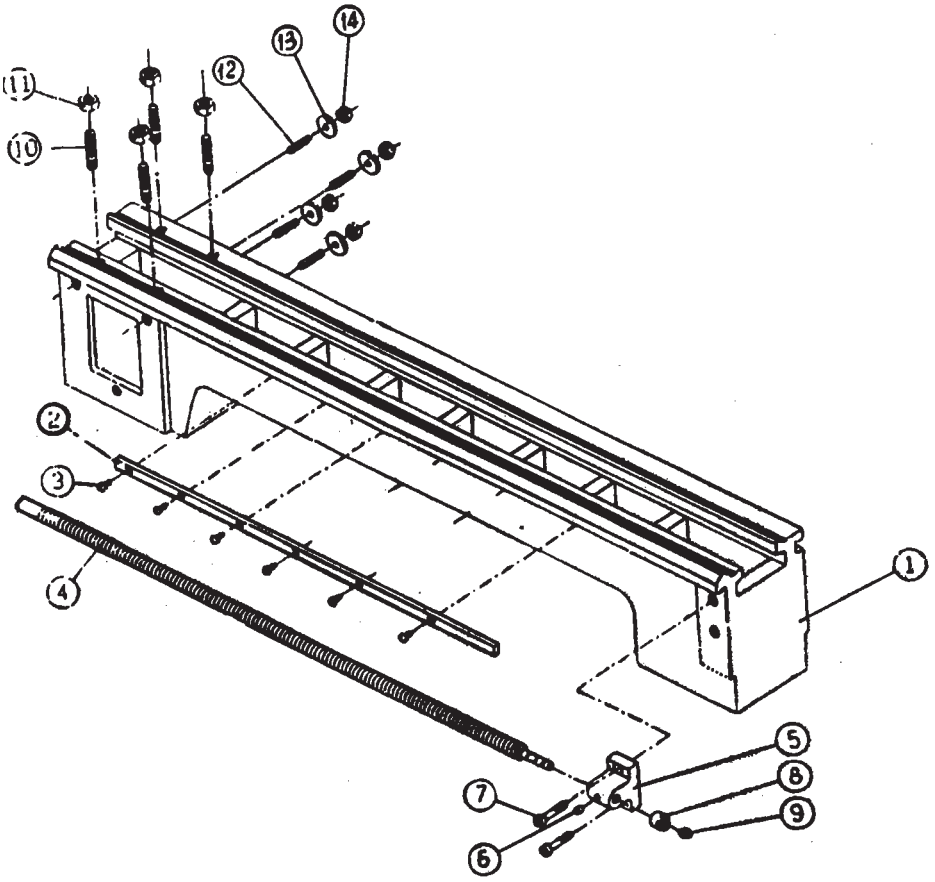
Note: Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts.

BED PARTS LIST

Part	Description	Qty.
1E	Bed	1
2E	Rack	1
3E	Screw M4x8	6
4E	Head Screw	1
5E	Bracket	1
6E	Oil Feeder	1
7E	Screw M6x20	2

BED PARTS LIST

Part	Description	Qty.
8E	Nut	1
9E	Set Screw M8x6	1
10E	Stud M8x28	4
11E	Nut M8	4
12E	Set Screw M6x25	4
13E	Spring Washer	1
14E	Nut M6	4



Note: When ordering parts from this list be sure to include the correct suffix.

Note: Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts.

GEAR BOX PARTS LIST

Part	Description	Qty.
1G	Gear Box	1
2G	Shaft	1
3G	Key	1
4G	Bushing	1
5G	Gear 28T	1
6G	Gear 26T	1
7G	Gear 24T	1
8G	Gear 23T	1
9G	Gear 22T	1
10G	Gear 20T	1
11G	Gear 19T	1
12G	Gear 18T	1
13G	Gear 16T	1
14G	Bushing	1
15G	Snap Ring	1
16G	Shaft	1
17G	Key	1
18G	Gear 16T	1
19G	Arm	1
20G	Shaft	1
21G	Gear 36T	1
22G	Set Screw M5x10	1

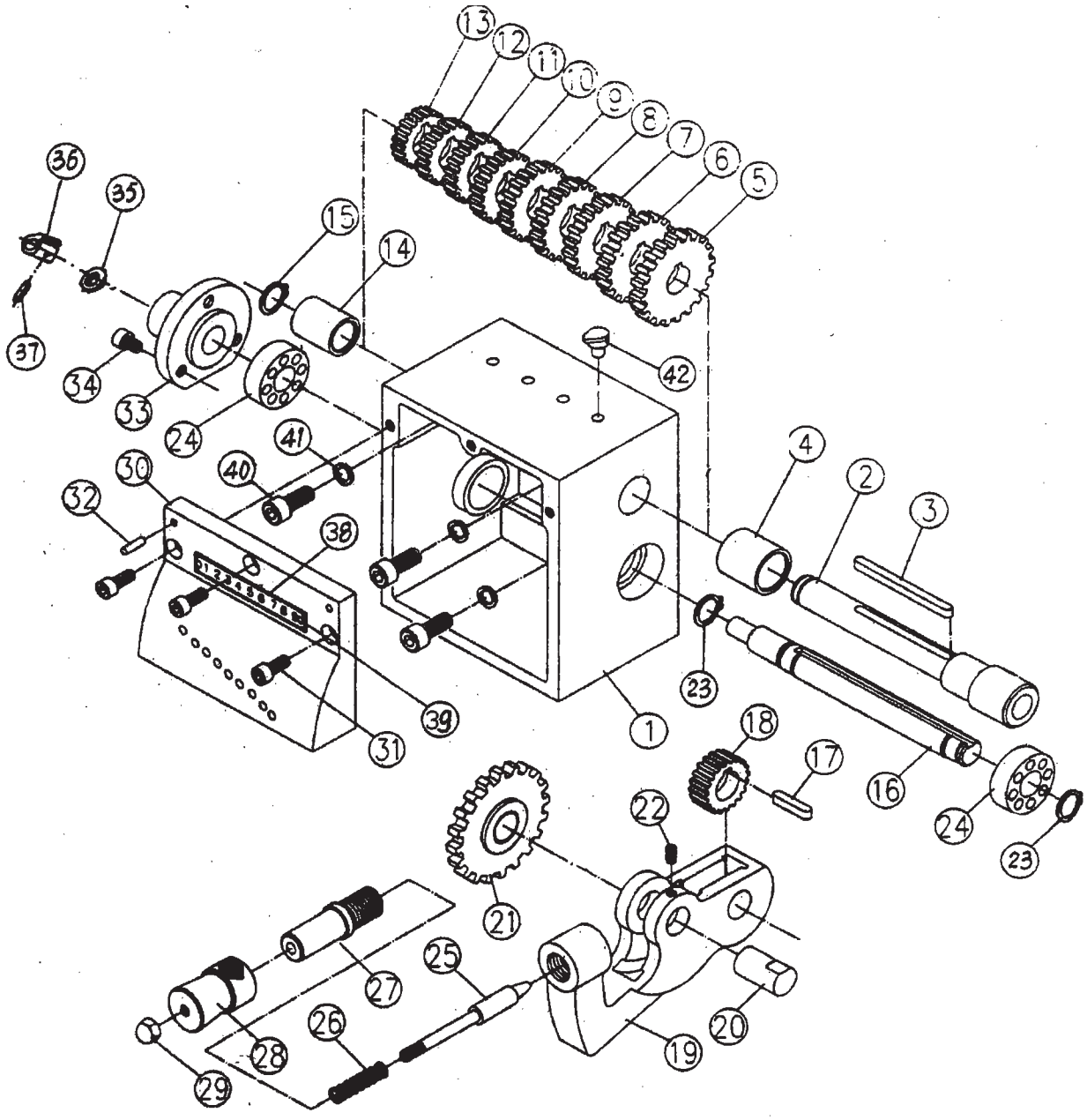
GEAR BOX PARTS LIST

Part	Description	Qty.
23G	Snap Ring	2
24G	Bearing	2
25G	Plunger	1
26G	Spring	1
27G	Bushing	1
28G	Handle	1
29G	Cap Nut M10	1
30G	Front Cover	1
31G	Cap Screw M6x15	3
32G	Pin 6x22	2
33G	Bracket	1
34G	Cap Screw M6x10	3
35G	Washer	1
36G	Bushing	1
37G	Pin 4x14	1
38G	Plate	1
39G	Rivet 2x5	2
40G	Cap Screw M8x20	3
41G	Spring Washer	3
42G	Oil Cap	4
43G		

Note: When ordering parts from this list be sure to include the correct suffix.

Note: Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts.

GEAR BOX DIAGRAM



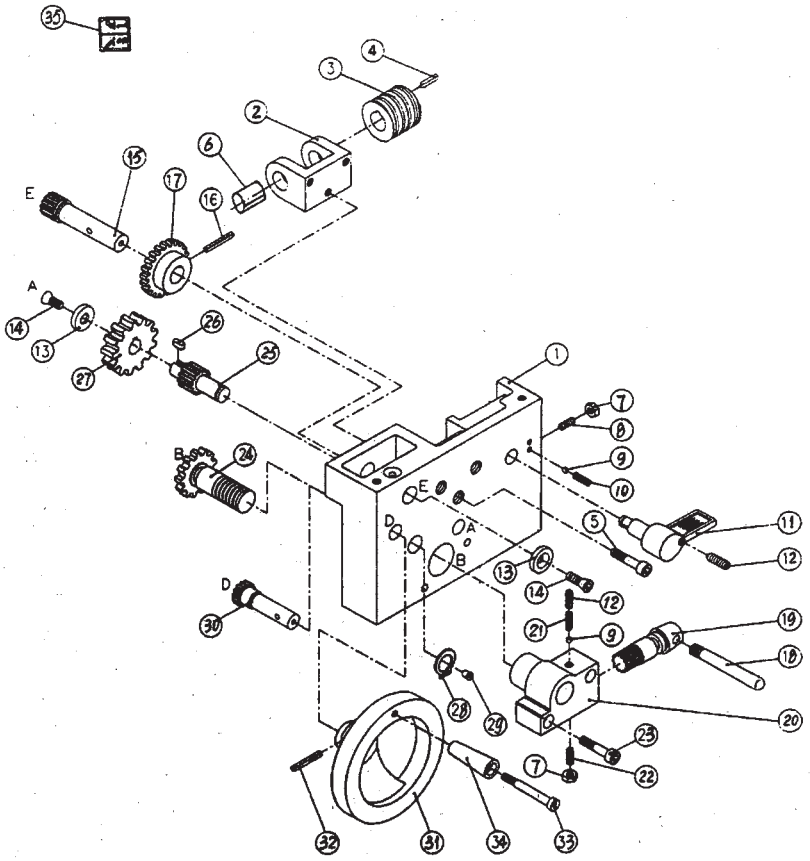
Note: When ordering parts from this diagram be sure to include the correct "G" suffix.

APRON PARTS LIST

Part	Description	Qty.
1H	Apron Cover	1
2H	Bracket	1
3H	Worm	1
4H	Key 3x25	1
5H	Cap Screw M6x25	3
6H	Feed Screw	1
7H	Nut M4	5
8H	Set Screw M4x12	2
9H	Ball	2
10H	Spring	1
11H	Handle	1
12H	Set Screw M6x6	2
13H	Washer	3
14H	Screw M6x8	3
15H	Gear 12T	1
16H	Spring Pin 4x30	1
17H	Gear 43T	1
18H	Handle	1

APRON PARTS LIST

Part	Description	Qty.
19H	Gear 13T	1
20H	Bracket	1
21H	Spring	1
22H	Set Screw M4x10	1
23H	Cap Screw M6x30	2
24H	Gear 36T	1
25H	Gear 18T	1
26H	Key 4x5	1
27H	Worm Gear	1
28H	Ring	1
29H	Oil Feeder	2
30H	Gear 17T	1
31H	Hand Wheel	1
32H	Spring Pin 4x25	1
33H	Screw	1
34H	Handle	1
35H	Plate	1



Note: When ordering parts from this list be sure to include the correct suffix.

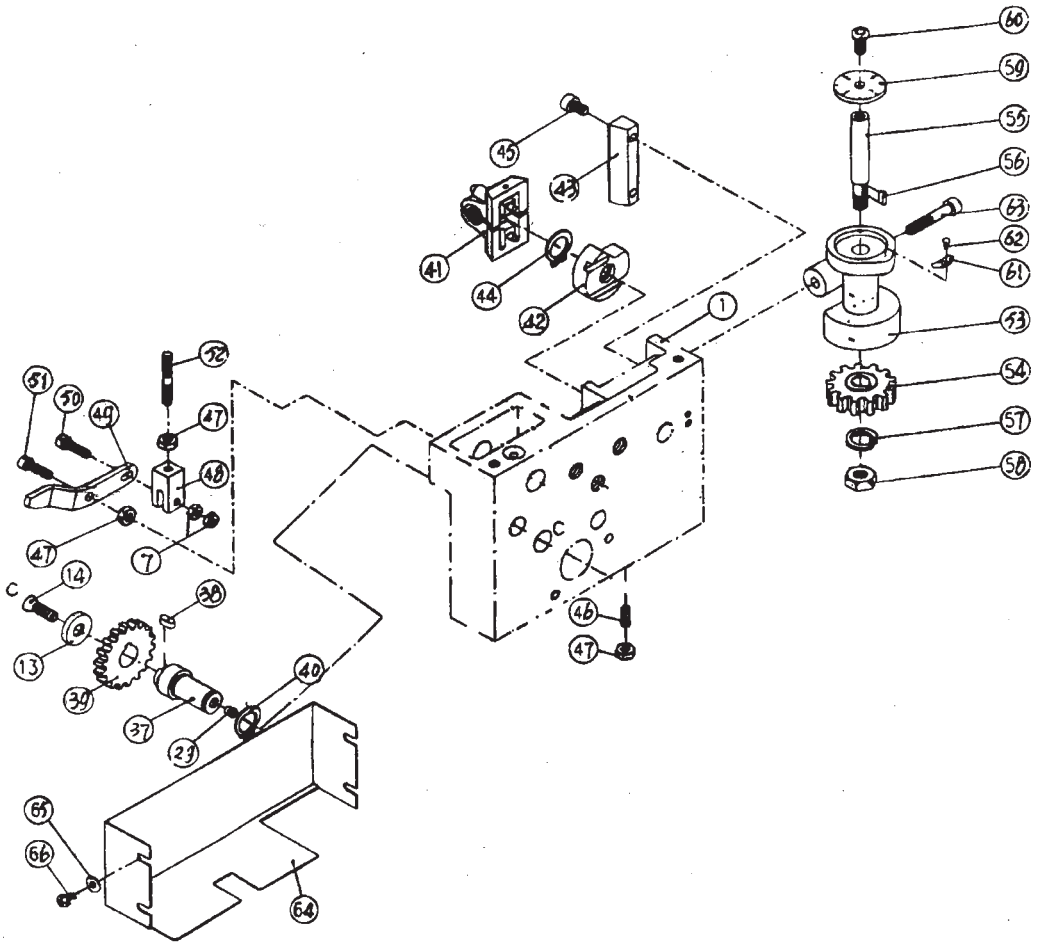
Note: Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts.

APRON PARTS LIST CONTINUED

Part	Description	Qty.
37H	Shaft	1
38H	Key 4x11	3
39H	Gear 41T	1
40H	Ring	1
41H	Half Nut	1
42H	Locking Cam	1
43H	Guide	2
44H	Ring	1
45H	Cap Screw M4x16	5
46H	Set Screw M5x25	5
47H	Nut M5	5
48H	Control Plate	1
49H	Joint Plate	1
50H	Cap Screw M4x20	1
51H	Cap Screw M5x16	1

APRON PARTS LIST CONTINUED

Part	Description	Qty.
52H	Screw	1
53H	Thread Dial Body	1
54H	Worm Gear 64T	1
55H	Shaft	1
56H	Key 3x10	1
57H	Spring Washer	1
58H	Nut M8	1
59H	Dial	1
60H	Screw M6x8	1
61H	Pointer	1
62H	Rivet 2x5	1
63H	Screw M6x60	1
64H	Apron Cover	4
65H	Washer	2
66H	Screw M4x8	2



Note: When ordering parts from this list be sure to include the correct suffix.

Note: Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts.

SADDLE AND CROSS SLIDE PARTS LIST

Part	Description	Qty.
1J	Saddle	1
2J	Cross Slide	1
3J	Gib	1
4J	Nut	1
5J	Lead Screw	1
6J	Bracket	1
7J	Screw M6x15	2
8J	Plate	1
9J	Rivet 2x5	2
10J	Graduated Ring	1
11J	Key 3x13	1
12J	Spring	1
13J	Hand Wheel	1
14J	Nut	1
15J	Set Screw M8x6	1
16J	Handle	1
17J	Slide Guide	1
18J	Bushing	1
19J	Screw M6x12	1
20J	Screw M4x8	1

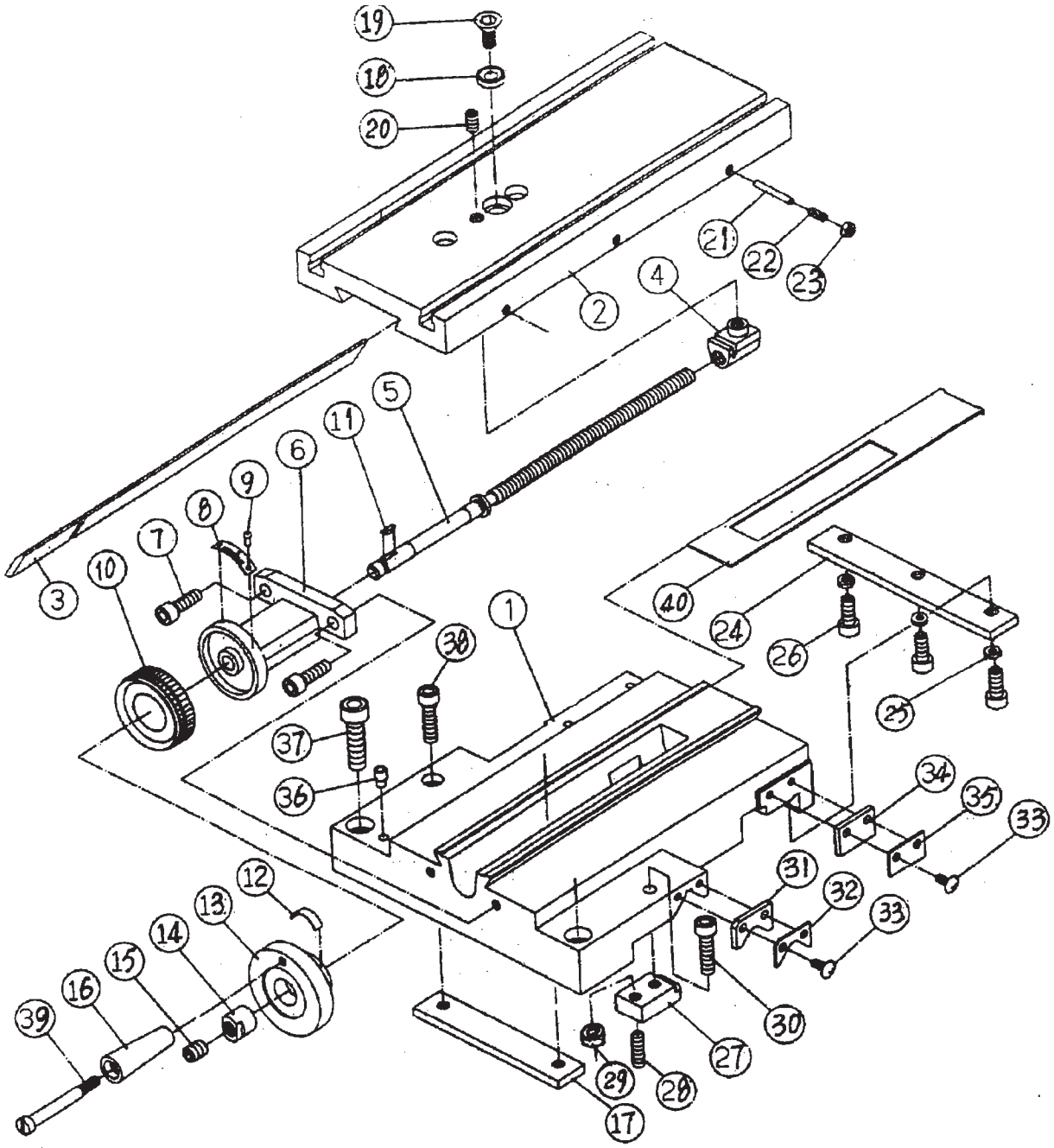
SADDLE AND CROSS SLIDE PARTS LIST

Part	Description	Qty.
21J	Pin	3
22J	Set Screw M4x12	3
23J	Nut M4	3
24J	Slide Guide	1
25J	Washer	3
26J	Cap Screw M6x15	3
27J	Mount	1
28J	Set Screw M6x20	1
29J	Nut M6	1
30J	Cap Screw M6x25	1
31J	Way Cover	2
32J	Cover Mount	2
33J	Screw M4x6	8
34J	Way Cover	2
35J	Cover Mount	2
36J	Oil Feeder	1
37J	Cap Screw M8x30	2
38J	Cap Screw M6x25	2
39J	Screw	1
40J	Cover Mount	1

Note: When ordering parts from this list be sure to include the correct suffix.

Note: Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts.

SADDLE AND CROSS SLIDE DIAGRAM



Note: When ordering parts from this diagram be sure to include the correct "J" suffix.

TOOL POST PARTS LIST

Part	Description	Qty.
1K	Longitudinal Slide	1
2K	Swivel Base	1
3K	Gib	1
4K	Clamping Ring	1
5K	Micrometer Pan	1
6K	Lead Screw Nut	1
7K	Adjusting Screw	1
8K	Screw	1
9K	T-cap Screw	2
10K	Pin	3
13K	Screw M5x10	2
14K	Screw M6x12	3
15K	Set Screw M4x10	3
16K	Nut M4	3
17K	Nut M6	2
18K	Lock Pin 3x8	1

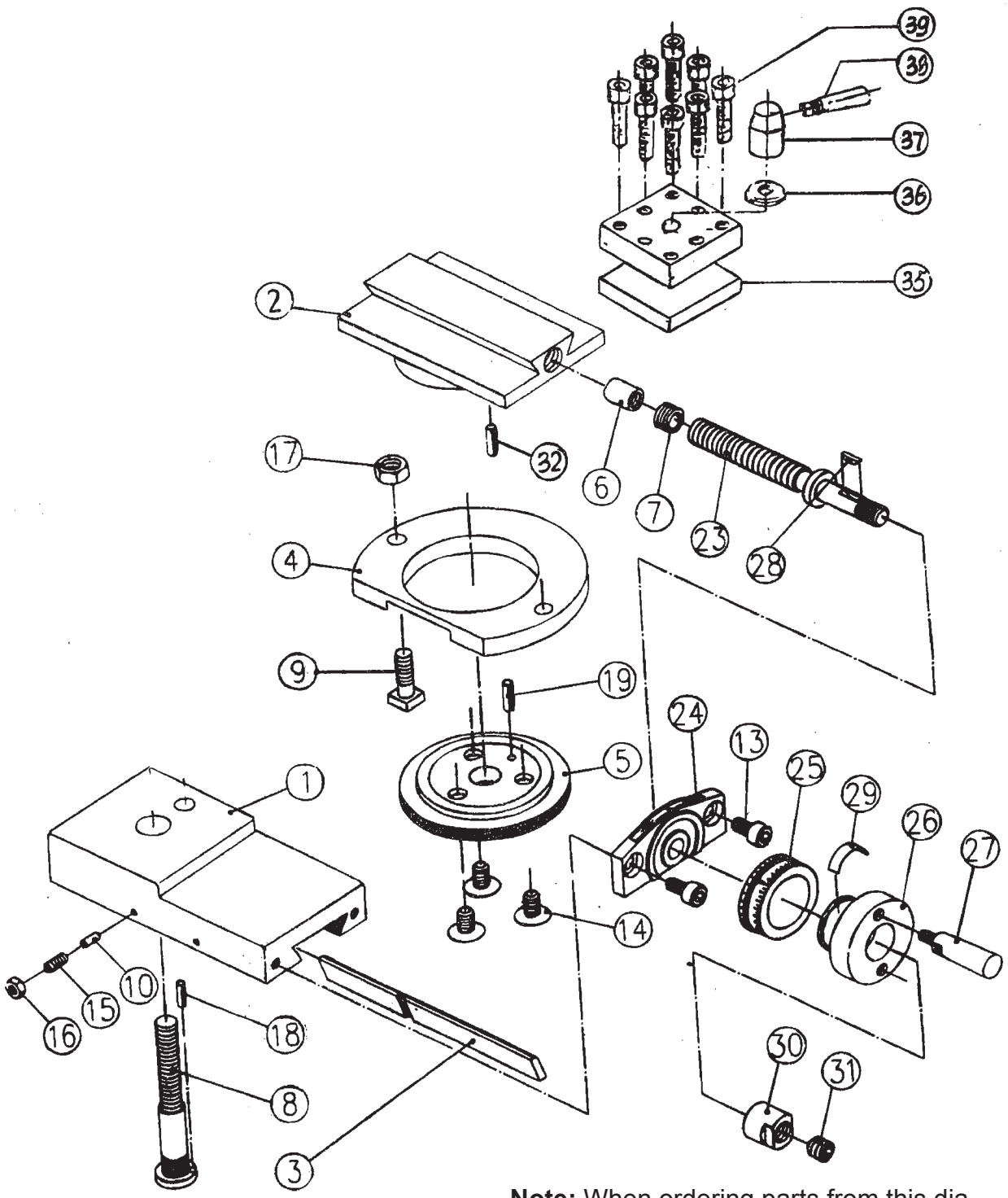
TOOL POST PARTS LIST

Part	Description	Qty.
19K	Lock Pin 3x14	1
23K	Lead Screw	1
24K	Lead Screw Mount	1
25K	Micrometer Collar	1
26K	Handwheel	1
27K	Handle	2
28K	Key 3x13	1
29K	Feed Spring	1
30K	Nut	1
31K	Set Screw M8x6	1
32K	Lock Pin 3x12	1
35K	Tool Post	1
36K	S-Washer	1
37K	Hand Nut	1
38K	Handle	1
39K	S-screw M8x30	8

Note: When ordering parts from this list be sure to include the correct suffix.

Note: Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts.

TOOL POST DIAGRAM



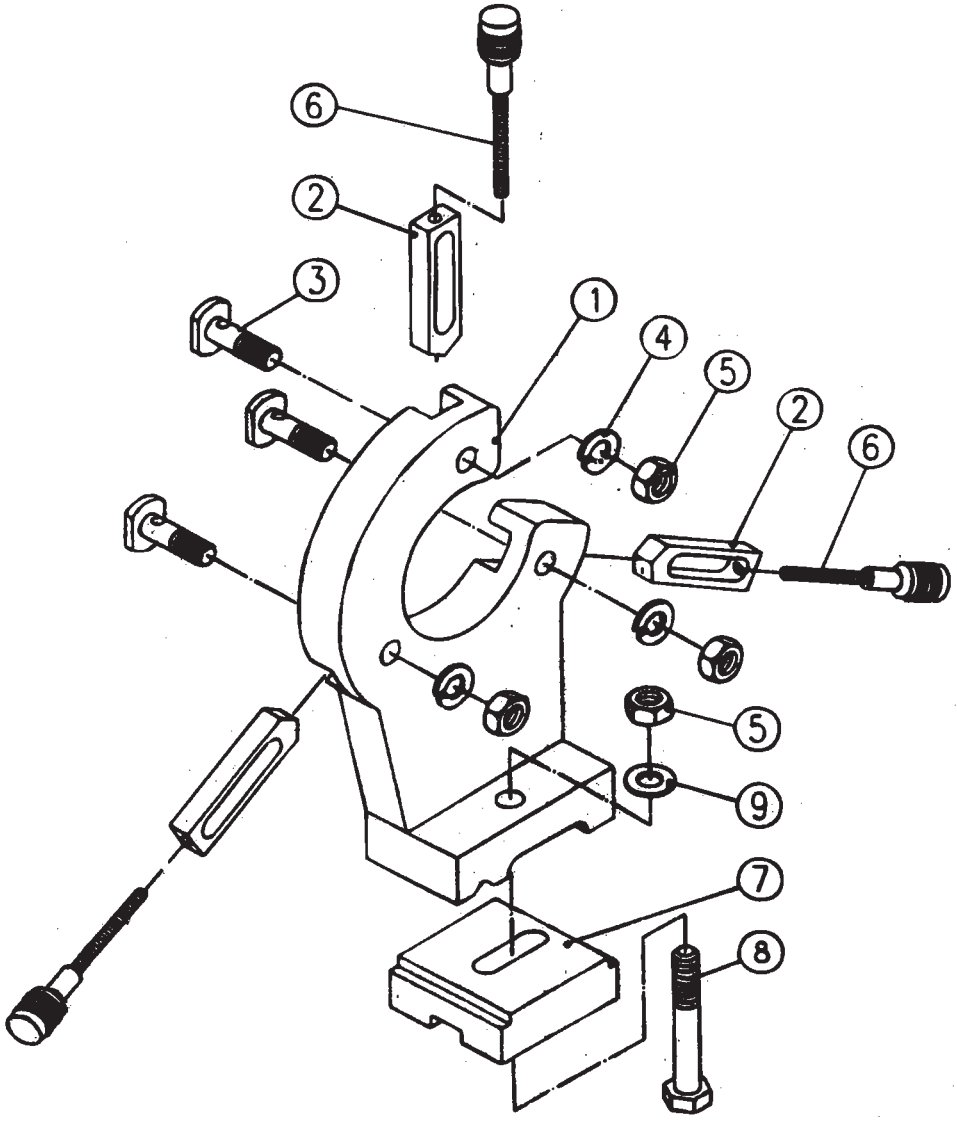
Note: When ordering parts from this diagram be sure to include the correct "K" suffix.

TRAVELLING REST PARTS LIST

Part	Description	Qty.
1M	Rest	1
2M	Jaw	2
3M	Screw	2
4M	Spring Washer	2
5M	Nut M8	2

TRAVELLING REST PARTS LIST

Part	Description	Qty.
6M	Adjustment Screw	2
7M	Clamping Plate	2
8M	Hex Screw M8x60	2
9M	Washer	1



Note: When ordering parts from this list be sure to include the correct suffix.

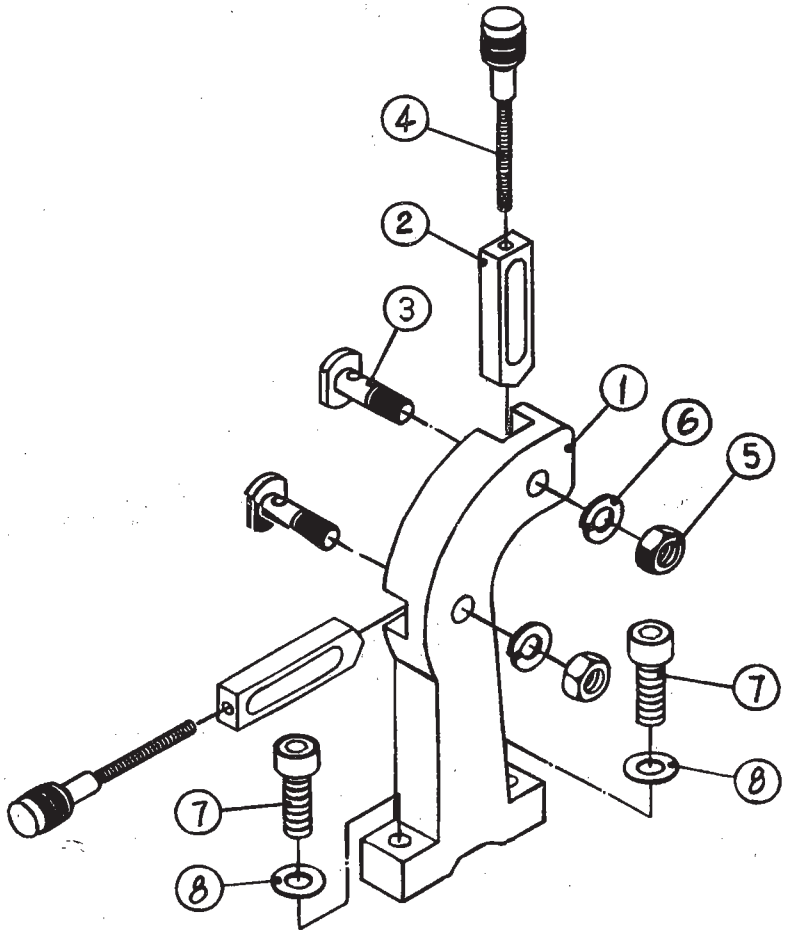
Note: Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts.

STEADY REST PARTS LIST

Part	Description	Qty.
1P	Rest	1
2P	Jaw	2
3P	Screw	2
4P	Adjustment Screw	2

STEADY REST PARTS LIST

Part	Description	Qty.
5P	Nut M8	2
6P	Spring Washer	2
7P	Cap Screw M8x30	2
8P	Washer	2



Note: When ordering parts from this list be sure to include the correct suffix.

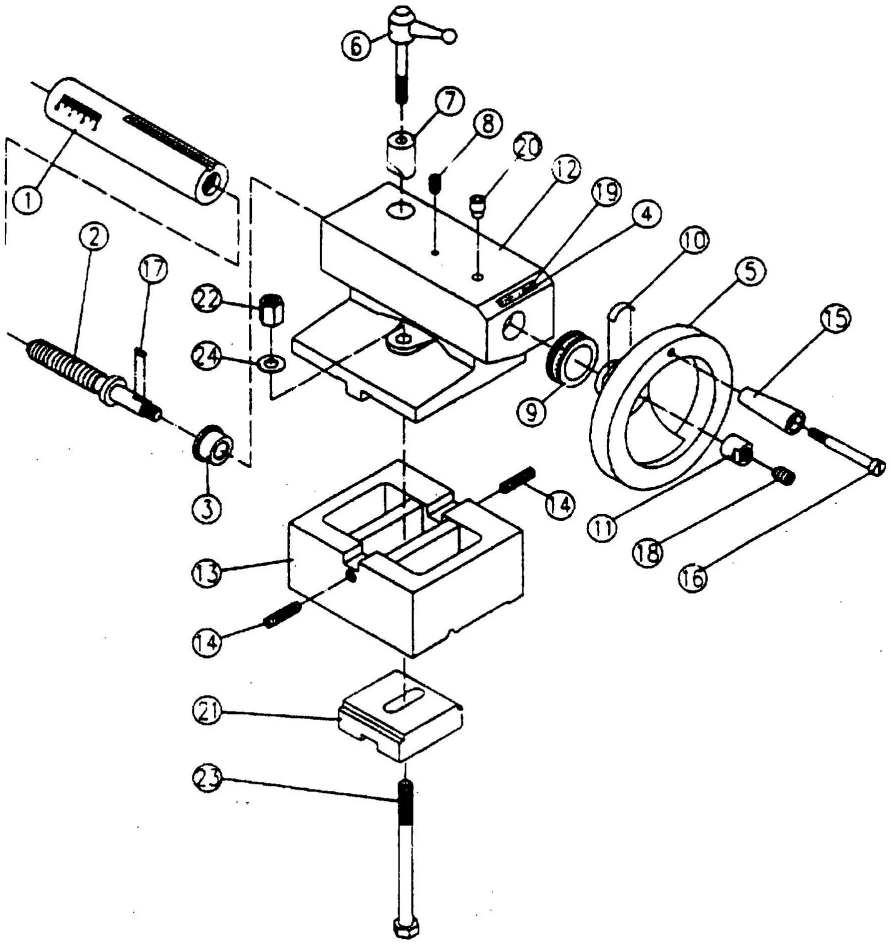
Note: Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts.

TAIL STOCK PARTS LIST

Part	Description	Qty.
1Q	Tailstock Ram	1
2Q	Lead Screw	1
3Q	Bushing	1
4Q	Plate	1
5Q	Handwheel	1
6Q	Lever	1
7Q	Clamp	1
8Q	Guide Pin	1
9Q	Micrometer Collar	1
10Q	Feed Spring	1
11Q	Nut	2
12Q	Tailstock	1

TAIL STOCK PARTS LIST

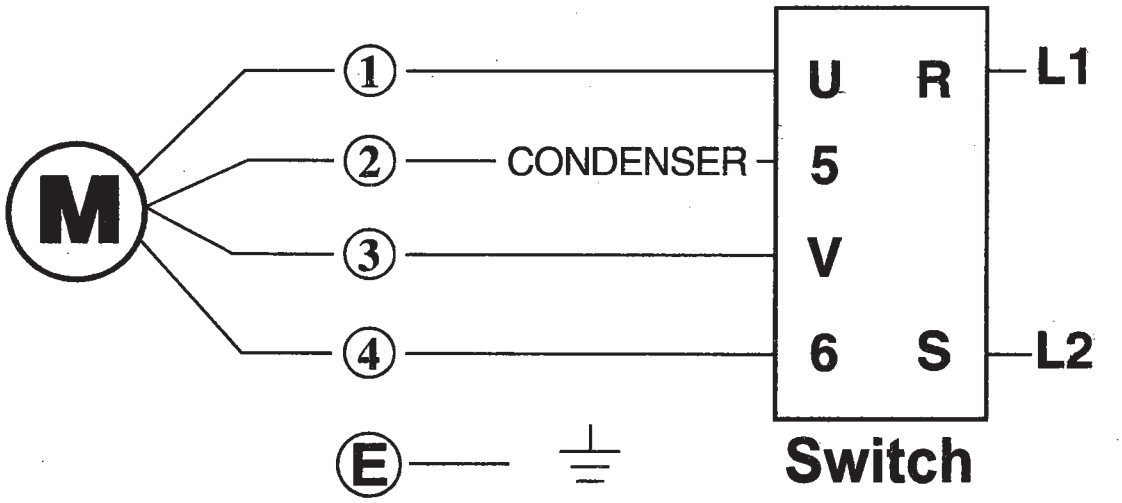
Part	Description	Qty.
13Q	Tailstock Base	1
14Q	Set Screw	2
15Q	Handle	1
16Q	Screw	1
17Q	Key	1
18Q	Set Screw	1
19Q	Rivet	2
20Q	Oil Feeder	1
21Q	Clamping Plate	2
22Q	Nut	1
23Q	Screw	1
24Q	Washer	1



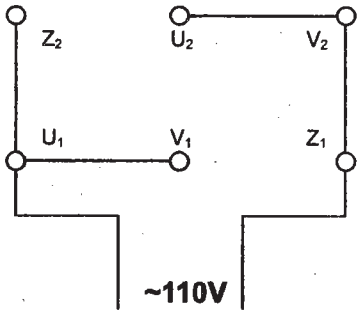
Note: When ordering parts from this list be sure to include the correct suffix.

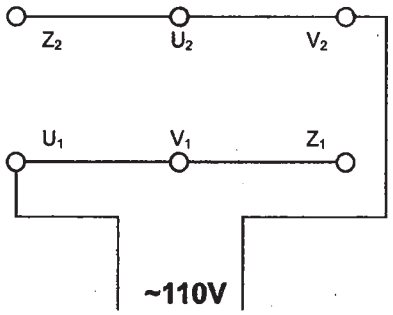
Note: Some parts are listed and shown for illustration purposes only, and are not available individually as replacement parts.

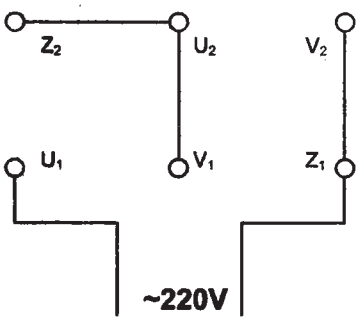
WIRING DIAGRAM

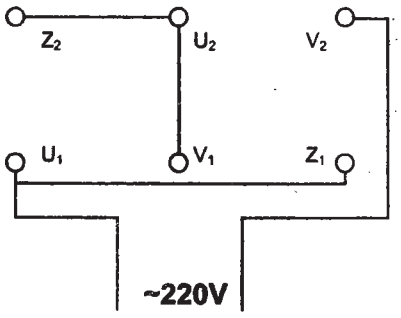


The Motor 110/220V Transferring Connection Diagram









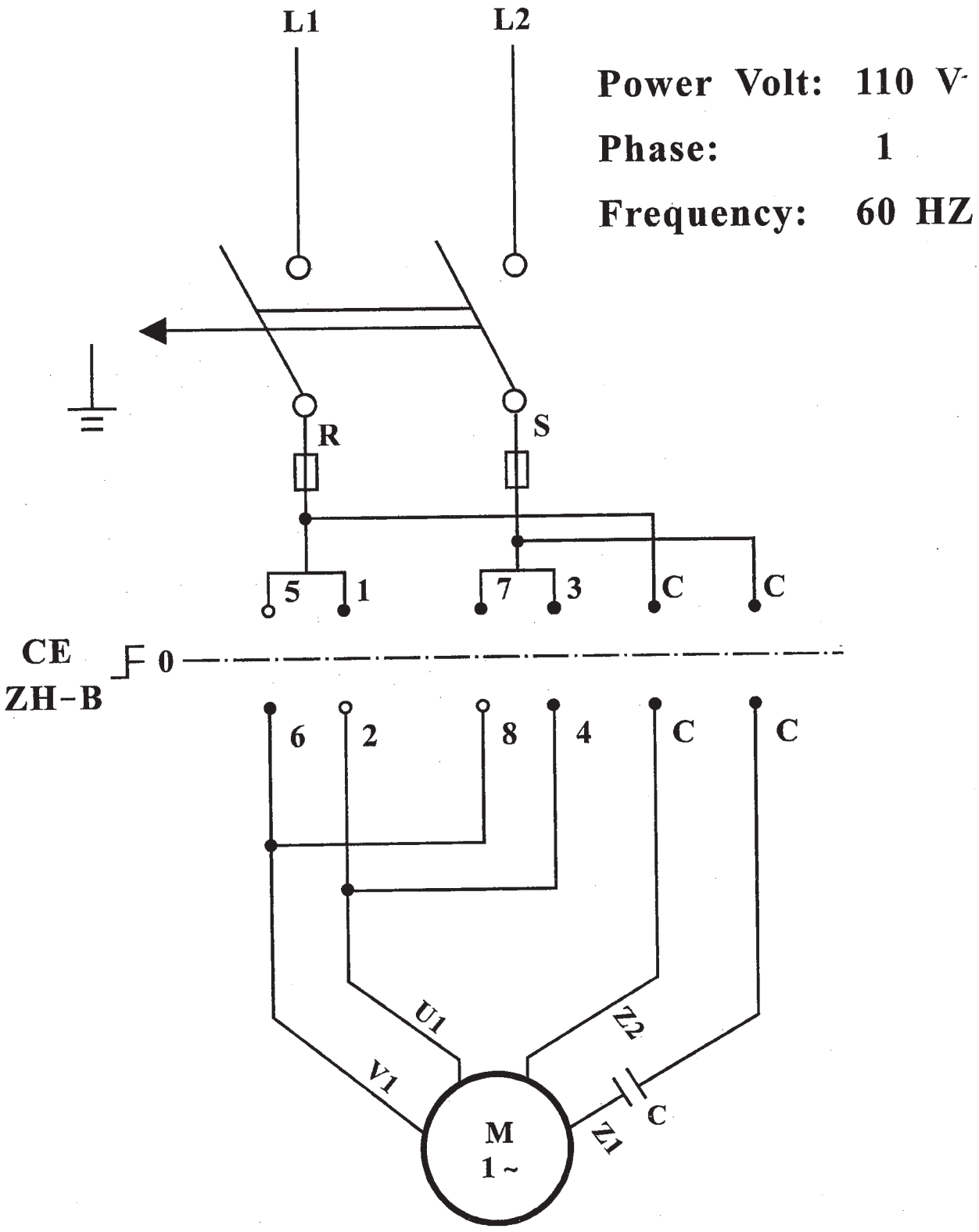
ForWard run

Reverse run

Caution:When 110v transfer to 220v, only

3 Wires Were Connected, Z_1, U_1, V_2

WIRING DIAGRAM



LIMITED 1 YEAR / 90 DAY WARRANTY

Harbor Freight Tools Co. makes every effort to assure that its products meet high quality and durability standards, and warrants to the original purchaser that for a period of one year from date of purchase that the tank is free of defects in materials and workmanship (90 days if used by a professional contractor or if used as rental equipment). Harbor Freight Tools also warrants to the original purchaser, for a period of ninety days from date of purchase, that all other parts and components of the product are free from defects in materials and workmanship. This warranty does not apply to damage due directly or indirectly to misuse, abuse, negligence or accidents, repairs or alterations outside our facilities, normal wear and tear, or to lack of maintenance. We shall in no event be liable for death, injuries to persons or property, or for incidental, contingent, special or consequential damages arising from the use of our product. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation of exclusion may not apply to you. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.

To take advantage of this warranty, the product or part must be returned to us with transportation charges prepaid. Proof of purchase date and an explanation of the complaint must accompany the merchandise. If our inspection verifies the defect, we will either repair or replace the product at our election or we may elect to refund the purchase price if we cannot readily and quickly provide you with a replacement. We will return repaired products at our expense, but if we determine there is no defect, or that the defect resulted from causes not within the scope of our warranty, then you must bear the cost of returning the product.

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

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