

HAFCO

METALMASTER



K8251



K8250

Edition : 2.0
Date: (06/25)

Instruction Manual

CENTRE LATHE

AL-1324

ORDER CODE: (K8250 & K8251)

MACHINE DETAILS

MACHINE

CENTRE LATHE

MODEL NO.

AL-1324

SERIAL NO.

DATE OF MANF.

IMPORTED BY

AUSTRALIA

HARE & FORBES
MACHINERYHOUSE

www.machineryhouse.com.au

NEW ZEALAND

MACHINERYHOUSE

www.machineryhouse.co.nz

NOTE:

This manual is only for your reference. At the time of the compiling of this manual every effort to be exact with the instructions, specifications, drawings, and photographs of the machine was taken. Owing to the continuous improvement of the HAFCO METALMASTER machine, changes may be made at any time without obligation or notice. Please ensure the local voltage is the same as listed on the specification plate before operating any electric machine.

SAFETY SYMBOLS:

The purpose of safety symbols is to attract your attention to possible hazardous conditions



WARNING Indicates a potentially hazardous situation causing injury or death



CAUTION Indicates an alert against unsafe practices.

Note: Used to alert the user to useful information



NOTE:

In order to see the type and model of the machine, please see the specification plate. Usually found on the back of the machine. See example (Fig.1)

Fig.1

HAFCO METALMASTER	
PRODUCT SPECIFICATIONS	
Model: AL-1324	Voltage: 240V, 50Hz
Capacity: 330 x 600	Motor: 1.5 KW
Nett Weight: 660 kg	FLC: 5.1 Amps
MFG Date:	
SERIAL NO:	
www.machineryhouse.com.au	www.machineryhouse.co.nz
Made in Taiwan	

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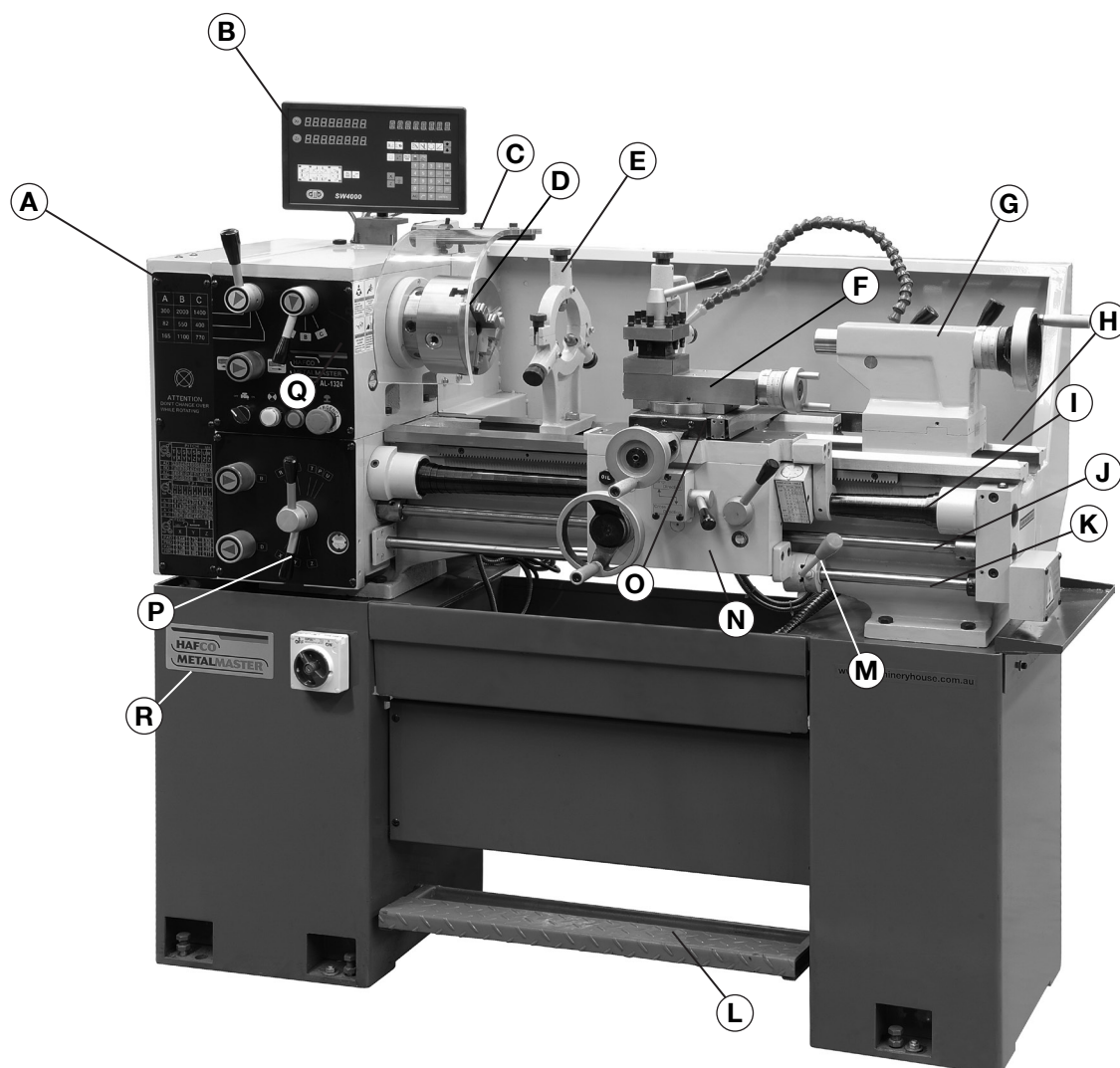
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1.1 SPECIFICATION

Order Code	K8250	K8251
MODEL	AL-1324	
Digital Readout	Optional	Yes
Tool To Suit (mm)	16	
Distance Between Centres (mm)	600	
Swing Over The Bed (mm)	330	
Swing Over Cross-slide (mm)	200	
Centre Height (mm)	165	
Spindle Bore (mm)	Ø40	
Cam lock Spindle Size	D1-4	
Bed Width (mm)	190	
Headstock Spindle Taper	5MT	
Tailstock Taper	3MT	
Cross Slide Travel (mm)	175	
Leadscrew Type	Metric	
Metric Cross Feed (X-Axis) (mm/rev)	0.034 - 0.468	
Metric Longitudinal Feed (Z-Axis) (mm/rev)	0.068 - 0.936	
Metric Thread Steps & Pitch (No. / mm)	30(0.4 - 7.0)	
Imperial Thread Steps & TPI (No. / TPI)	32(4 - 56)	
3 Jaw Chuck Diameter (mm)	160	
4 Jaw Chuck Diameter (mm)	200	
Spindle Steps / Speeds (No. / Rpm)	9 / 82-2000	
Motor Power (kW / hp)	1.5 / 2	
Voltage / Amperage (V / amp)	240 / 15	
Nett Weight (kg)	660	

1.2 IDENTIFICATION

Become familiar with the names and locations of the controls and features shown below to better understand the instructions in this manual.



A	Headstock	J	Feed Shaft
B	Digital Readout Display (K8251 Only)	K	Start and Stop Shaft
C	Chuck Safety Guard	L	Foot Brake
D	3 Jaw Chuck	M	Fwd/Rev Lever
E	Fixed Steady	N	Saddle
F	Top Slide	O	Cross Slide
G	Tailstock	P	Feed Gearbox
H	Bed	Q	Control Panel
I	Leadscrew Cover	R	Stand

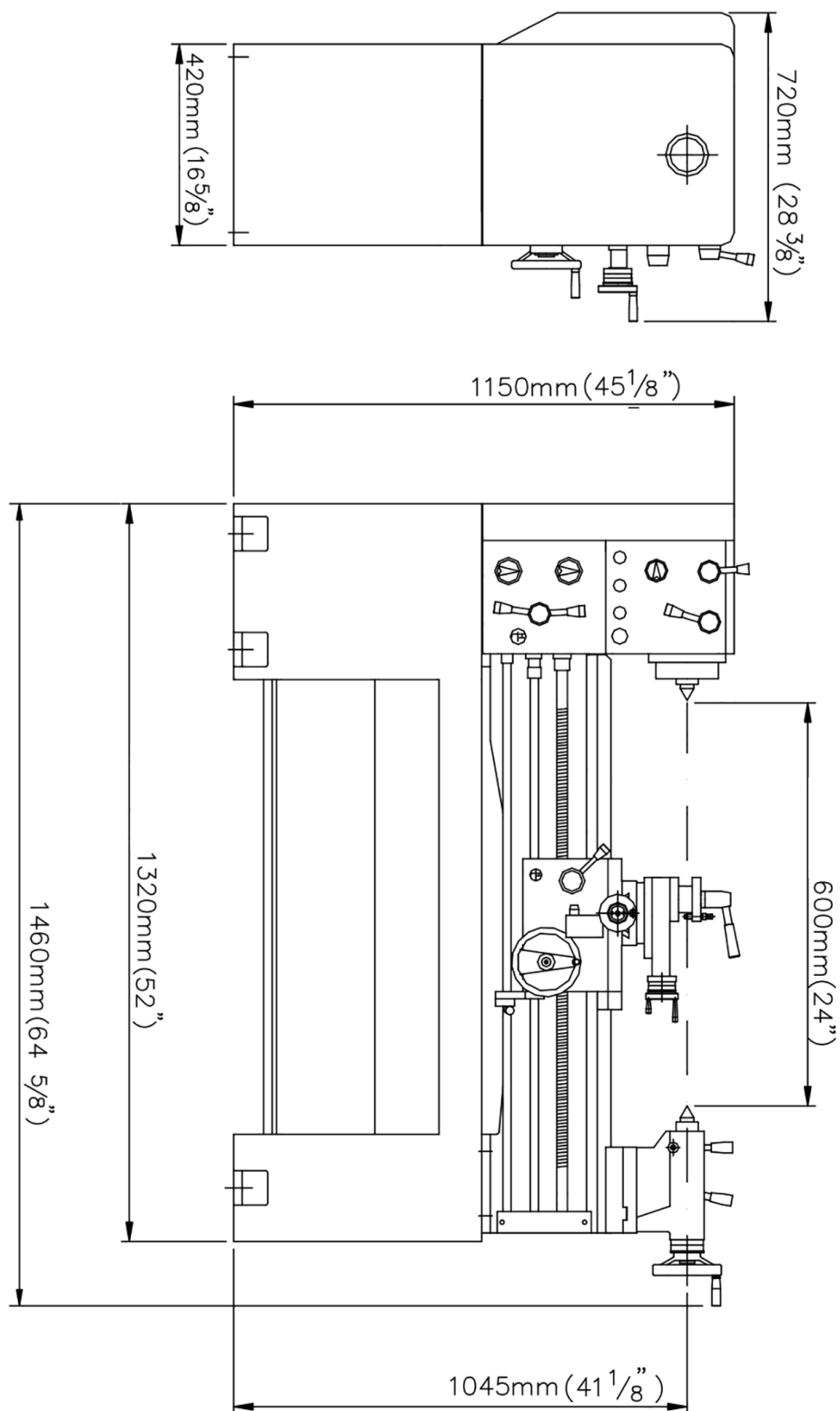
1.3 INCLUDED ACCESSORIES

The following is a list of the included accessories items shipped with the machine. Before beginning the setup, lay them out and check the quantities.

- | | |
|---------------------------------------|---|
| 1. Toolbox | 8. 3MT Live Centre (C052) |
| 2. Instruction booklet | 9. Knurling Tool Holder (Clamp Type) (L080) |
| 3. 16mm Turning Tool Kit (L451) | 10. 6 x 500kg capacity Machine Mounts (M002) |
| 4. Parting Tool Holder (L074) | 11. 1 x Lathe Carrier 38mm (Bent Tail) (L081) |
| 5. HSS Parting Blade (L0007) | 12. Drive Plate |
| 6. 13mm Keyless Drill Chuck (C292) | 13. 200mm 4 Jaw Chuck |
| 7. 3MT x JT6 Drill Chuck Arbor (D443) | 14. 160mm 3 Jaw Chuck (Fitted) |



1.4 MACHINE DIMENSIONS



2.1 GENERAL METALWORKING MACHINE SAFETY

DO NOT use this machine unless you have read this manual or have been instructed in the safe use and operation of this machine.



WARNING

This manual provides safety instructions on the proper setup, operation, maintenance, and service of this machine. Save this manual, refer to it often, and use it to instruct other operators. Failure to read, understand and follow the instructions in this manual may result in fire or serious personal injury—including amputation, electrocution, or death.

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

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



- ✓ Always wear safety glasses or goggles.
- ✓ Wear appropriate safety footwear.
- ✓ Wear respiratory protection where gasses and dust are present.
- ✓ Gloves should never be worn while operating the machine, and only worn when handling the workpiece.
- ✓ Wear hearing protection in areas > 85 dBA. If you have trouble hearing someone speak from one metre (three feet) away, the noise level from the machine may be hazardous.
- ✓ DISCONNECT THE MACHINE FROM POWER when making adjustments or servicing.
- ✓ Check and adjust all safety devices before each job.
- ✓ Ensure that guards are in position and in good working condition before operating.
- ✓ Ensure that all stationary equipment is anchored securely to the floor.
- ✓ Ensure all machines have a start/stop button within easy reach of the operator.
- ✓ Each machine should have only one operator at a time. However, everyone should know how to stop the machine in an emergency.

2.1 GENERAL METALWORKING MACHINE SAFETY Cont.

- ✓ Ensure that keys and adjusting wrenches have been removed from the machine before turning on the power. Appropriate storage for tooling should be provided.
- ✓ Ensure that all cutting tools and blades are clean and sharp. They should be able to cut freely without being forced.
- ✓ Stop the machine before measuring, cleaning or making any adjustments.
- ✓ Wait until the machine has stopped running to clear cuttings with a vacuum, brush or rake.
- ✓ Keep hands away from the cutting head and all moving parts.
- ✓ Avoid awkward operations and hand positions. A sudden slip could cause the hand to move into the cutting tool or blade.
- ✓ Return all portable tooling to their proper storage place after use.
- ✓ Clean all tools after use.
- ✓ Keep work area clean. Floors should be level and have a non-slip surface.
- ✓ Use good lighting so that the work piece, cutting blades, and machine controls can be seen clearly. Position any shade lighting sources so that they do not cause any glare or reflections.
- ✓ Ensure there is enough room around the machine to do the job safely.
- ✓ Obtain first aid immediately for all injuries.
- ✓ Understand that the health and fire hazards can vary from material to material. Make sure all appropriate precautions are taken.
- ✓ Clean machines and the surrounding area when the operation is finished.
- ✓ Use proper lock out procedures when servicing or cleaning the machines or power tools.

DO NOT

- ✗ Do not distract an operator. Horseplay can lead to injuries and should be strictly prohibited.
- ✗ Do not wear loose clothing, gloves, neckties, rings, bracelets or other jewellery that can become entangled in moving parts. Confine long hair.
- ✗ Do not handle cuttings by hand because they are very sharp. Do not free a stalled cutter without turning the power off first. Do not clean hands with cutting fluids.
- ✗ Do not use rags or wear gloves near moving parts of machines.
- ✗ Do not use compressed air to blow debris from machines or to clean dirt from clothes.
- ✗ Do not force the machine. It will do the job safer and better at the rate for which it was designed.



WARNING.

Before operating any machine, take time to read and understand all safety signs and symbols. If not understood seek explanation from your supervisor.



CAUTION!

It is impossible to cover all possible hazards. All workshop environments are different. These are designed as a guide to be used to compliment training and as a reminder to users prior to equipment use. Always consider safety first, as it applies to the individual working conditions.

2.1 GENERAL METALWORKING MACHINE SAFETY Cont.

HAZARDS ASSOCIATED WITH MACHINES include, but are not limited to:

- Being struck by ejected parts of the machinery.
- Being struck by material ejected from the machinery.
- Contact or entanglement with the machinery.
- Contact or entanglement with any material in motion.

Health Hazards (other than physical injury caused by moving parts)

- Chemicals hazards that can irritate, burn, or pass through the skin.
- Airborne items that can be inhaled, such as oil mist, metal fumes, solvents, and dust.
- Heat, noise, and vibration.
- Ionizing or non-ionizing radiation. (X-ray, lasers, etc.)
- Biological contamination and waste.
- Soft tissue injuries (for example, to the hands, arms, shoulders, back, or neck) resulting from repetitive motion, awkward posture, extended lifting, and pressure grip.

Other Hazards

- Slips and falls from and around machinery during maintenance.
- Unstable equipment that is not secured against falling over.
- Safe access to/from machines (access, egress).
- Fire or explosion.
- Pressure injection injuries from the release of fluids and gases under high pressure.
- Electrical Hazards, such as electrocution from faulty or ungrounded electrical components.
- Environment in which the machine is used (in a machine shop, or on a work site).



WARNING!

Machines are safeguarded to protect the operator from injury or death with the placement of guards. Machines must not be operated with the guards removed or damaged.



WARNING

The machine is the sole responsibility of the owner for its safe use. This responsibility includes but is not limited to proper installation in a safe environment, personnel training, proper inspection and maintenance, manual availability and comprehension. The manufacturer will not be held liable for injury or property damage from negligence, improper training, machine modifications or misuse.

2.2 SPECIFIC LATHE SAFETY

DO NOT use this machine unless you have been instructed in its safe use and operation and have read and understood this manual



Safety glasses must be worn at all times in work areas



Long and loose hair must be contained



Gloves must not be worn when using this machine



Sturdy footwear must be worn at all times in work areas



Close fitting/protective clothing must be worn



Rings and jewellery must not be worn.

PRE-OPERATIONAL SAFETY CHECKS

- ✓ Locate and ensure you are familiar with all machine operations and controls.
- ✓ Ensure all guards are fitted, secure and functional. Do not operate if guards are missing or faulty.
- ✓ Check workspaces and walkways to ensure no slip/trip hazards are present.
- ✓ Check the job is clamped tight in the chuck.
- ✓ Remove all tools from the bed and slides of the machine.
- ✓ Ensure the correct speed for machining process is selected.
- ✓ Remove the chuck key before starting the lathe.

OPERATIONAL SAFETY CHECKS

- ✓ Before making adjustments or measurements, switch off and bring the machine to a complete standstill.
- ✓ Always remove the chuck key from the chuck.

ENDING OPERATIONS AND CLEANING UP

- ✓ Switch off the machine when work completed.
- ✓ Reset all guards to a fully closed position.
- ✓ Avoid letting swarf build up on the tool or job. Stop the machine and remove it.
- ✓ Leave the machine in a safe, clean and tidy state.

DON'T

- ✗ Do not use faulty equipment. Immediately report suspect machinery.
- ✗ Do not try to lift chucks or face plates that are too heavy for you.
- ✗ Never leave the machine running unattended.
- ✗ Do not attempt to slow or stop the chuck or revolving work by hand.
- ✗ Do not leave equipment on top of the machine.

POTENTIAL HAZARDS AND INJURIES

- ☐ Flying objects such as the chuck key left in chuck.
- ☐ Cutting tool injury when cleaning, filing or polishing.
- ☐ Hair/clothing getting caught in moving machine parts.
- ☐ Metal splinters and swarf.
- ☐ Eye Injuries.

3. POWER SUPPLY

3.1 ELECTRICAL INSTALLATION

Place the machine near an existing power source. Make sure all power cords are protected from traffic, material handling, moisture, chemicals, or other hazards. Make sure there is access to a means of disconnecting the power source. The electrical circuit must meet the requirements for 240V.

NOTE : The use of an extension cord is not recommended as it may decrease the life of electrical components on your machine.

ELECTRICAL REQUIREMENTS

Nominal Voltage.....	240V
Cycle.....	50 Hz
Phase.....	Single Phase
Power Supply Circuit.....	15 Amps
Full Load Current.....	4.2 Amps

(Full load current rating is also on the specification plate on the motor.)

3.2 FULL-LOAD CURRENT RATING

The full-load current rating is the amperage a machine draws when running at 100% of the output power. Where machines have more than one motor, the full load current is the amperage drawn by the largest motor or a total of all the motors and electrical devices that might operate at one time during normal operations.

Full-Load Current Rating for these machine at 240V is 4.2 Amps

It should be noted that the full-load current is not the maximum amount of amps that the machine will draw. If the machine is overloaded, it will draw additional amps beyond the full-load rating and if the machine is overloaded for a long period of time, damage, overheating, or fire may be caused to the motor and circuitry.

This is especially true if connected to an undersized circuit or a long extension lead. To reduce the risk of these hazards, avoid overloading the machine during operation and make sure it is connected to a power supply circuit that meets the requirements.



4 SET-UP

4.1 UNPACKING

This machine was carefully packaged for safe transport. When unpacking, separate all enclosed items from packaging materials and inspect them for shipping damage. If items are damaged, please contact your distributor.

NOTE: Save all the packaging materials until you are completely satisfied with the machine and have resolved any issues with the distributor, or the shipping agent.

When unpacking, check the packing list to make sure that all parts shown are included. If any parts are missing or broken, please contact your distributor.

4.2 CLEAN - UP

The unpainted surfaces of the machine have been coated with a waxy oil to protect them from corrosion during shipment. Remove the protective coating with a solvent cleaner or a citrus based degreaser.

Optimum performance from your machine will be achieved when you clean all moving parts or sliding contact surfaces that are coated with rust prevented products.

It is advised to avoid chlorine based solvents, such as acetone or brake parts cleaner, as they will damage painted surfaces and strip metal should they come in contact. Always follow the manufacturer's instructions when using any type of cleaning product.

4.3 SITE PREPARATION

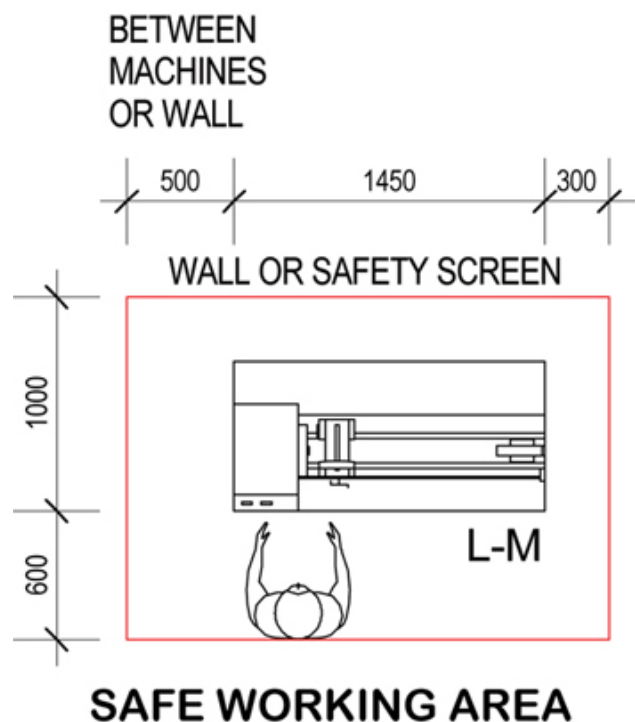
When selecting the site for the machine, consider the largest size of workpiece that will be processed through the machine and provide enough space around the machine for operating the machine safely. Consideration should be given to the installation of auxiliary equipment. Leave enough space around the machine to open or remove doors/covers as required for the maintenance and service as described in this manual.

It is recommended that the machine is anchored to the floor to prevent tipping or shifting. It also reduces vibration that may occur during operation.

Safe Working Area

To protect the operator and nearby workers a safe working area must be established.

(See diagram)



4.4 LIFTING INSTRUCTIONS

On the day that the machine arrives, make sure that a crane or forklift with sufficient capacity is available to unload the machine from the vehicle. Ensure access to the chosen site is clear and that doors and ceilings are sufficiently high and wide enough to receive the machine.

To handle the machine, the slings should be positioned so the machine is level when lifted.

When using slings please take note of the sling angle and the loads that apply

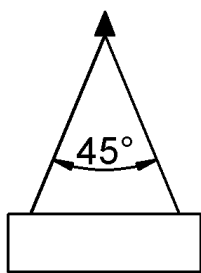


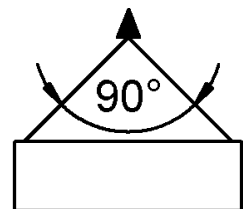
FIG 4.1.

When the slings are at a 45° angle then each sling is carrying the equivalent of 50% of load weight. (Fig.4.1).

When the slings are at a 90° angle then each sling will have a weight equal to 75% of the load on each sling. (Fig 4.2)

NOTE: The manufacturer recommends not to exceed 90° angle

FIG 4.2



Lifting Point

When lifting the machine only certified web lifting slings must be used.

Move the tailstock and the carriage to the end of the lathe.

Make sure that the load is balanced and the slings are secure and will not slip before lifting.

Ensure that when lifting, the machine does not tip over.

Check that the lifting slings do not interfere with the feed shafts, or electrical conduits.

Failure to follow these instructions could cause damage to the machine.

NOTE! Use blocks of wood to protect the feed shaft and lead screw.

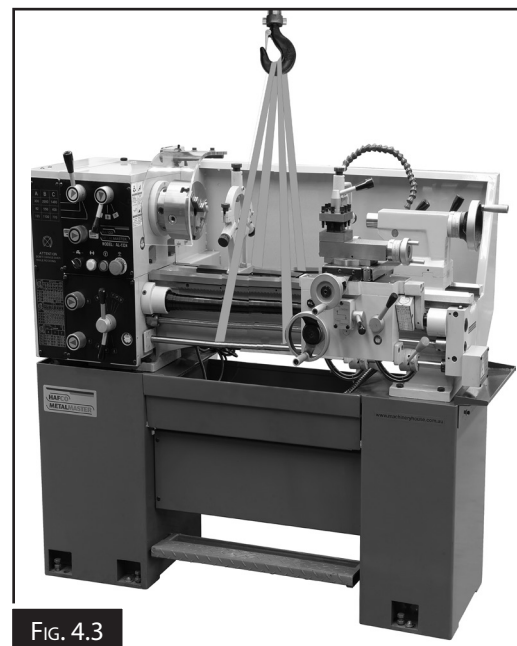


FIG. 4.3

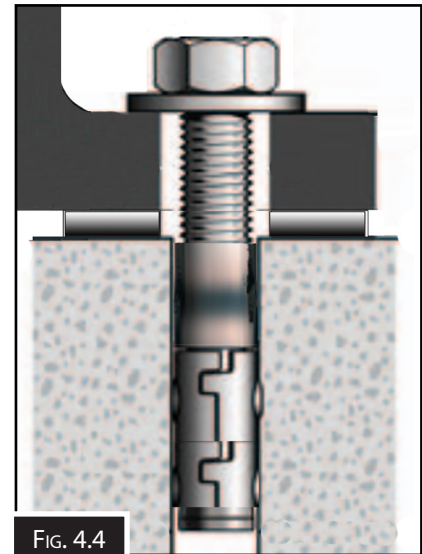
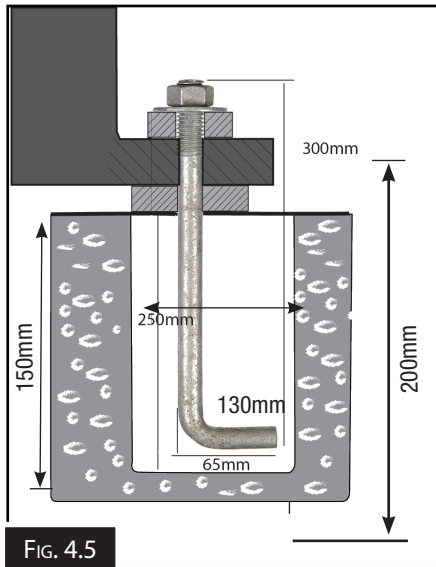


WARNING!

Make sure everyone is away from the load before hoisting. The load must be under control when lowering loads or when the load is suspended. Rigging and crane operation must be carried out by persons with approved qualifications.

4.5 ANCHORING TO THE FLOOR

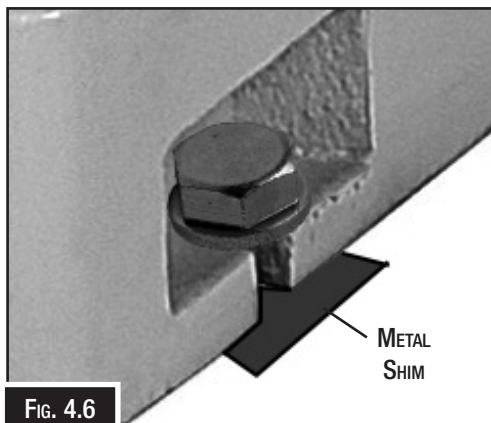
The machine is best mounted on a concrete slab. Masonry anchors with bolts are the best way to anchor machinery, because the anchors sit flush with the floor surface, making it easy to unbolt and move the machine later, if needed. (Fig. 4.4)



In some case a suitable foundation may not be available and a new one may need to be prepared. The foundation should be concrete approximately 250mm thick with pockets left clear for the hold down bolts. The hold down bolts can be “L” shape as per the example in Fig. 4.5

4.6 MACHINE LEVELING

To set your machine up so that it operates to optimum performance, the machine should be level. To level the machine follow the procedure below. After your machine has been anchored to a concrete slab floor, then the leveling is performed by loosening the hold down bolts, and then inserting metal shims under each hold down bolt until the machine is level and does not rock.(Fig. 4.6). Place a level on the surface of the working table to check if level. The tolerance should be 1000:0.30mm, for both longitudinal and transverse. Once the machine is level, then tighten the hold down bolts.



CAUTION!

The machine must not rest on supports other than those defined in Fig. 4.6

4.7 ASSEMBLY

The machine must be fully assembled before it can be operated. First clean any parts that are coated in rust preventative to ensure the assembly process can proceed smoothly.

MOUNTING THE DIGITAL READOUT (K8251)

The Digital Readout will need to be fitted using the aluminium angle bracket. (Fig. 4.7)



FIG. 4.7

CHUCK SAFETY GUARD. (FIG.4.8)

Assembly required will be the bolting on of the safety guard.

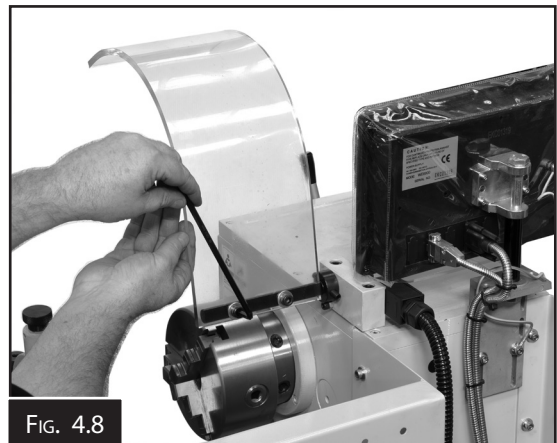


FIG. 4.8

LUBRICATION

Before proceeding with the test run It is critical that there is oil in the headstock, quick change gearbox, and the apron gearbox. Check the oil sight glass levels to ensure there is enough oil in these reservoirs. The machine bed ways and lubricating points should also be lubricated as per the instructions. Refer to the Lubrication instructions on Page 29 for more details on which type and how much oil to use in each gearbox.

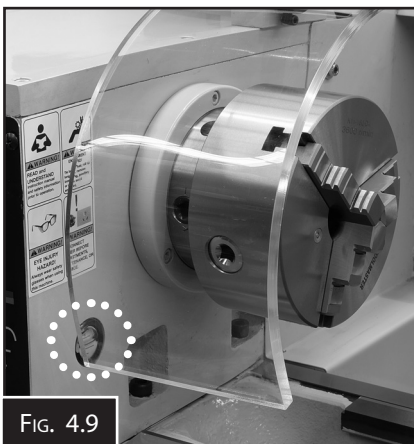


FIG. 4.9



CAUTION!

Check the oil levels and lubrication points before running the machine for the first time. Lack of lubrication can cause damage to the machine and may void the warranty.

4.8 TEST RUN

Test run the machine to ensure it is properly connected to power and safety components are functioning correctly. If you find an unusual problem during the test run, immediately stop the machine, disconnect it from power, and fix the problem BEFORE operating the machine again.

Consult The Troubleshooting table in the maintenance section of this manual for possible solution.

The Test Run consists of verifying the following:

- 1) The motor powers up and runs correctly, and
- 2) the safety disabling mechanism on the emergency stop button and the chuck guard are working correctly.

To test run the machine:

1. Clear all setup tools away from machine.
2. Connect machine to power supply. Power lamp (B in Fig. 4.10) should light.
3. Press EMERGENCY STOP button (C in Fig. 4.10) This will help prevent unexpected startup when machine is connected to power.
4. Twist EMERGENCY STOP button (C in Fig. 4.10) clockwise until it pops out - this resets the button and enables the power to control panel and motor.
5. Set the spindle speed to 82 rpm.

Note: You may need to rotate spindle back and forth by hand while putting pressure on the shift lever to allow gears to mesh.

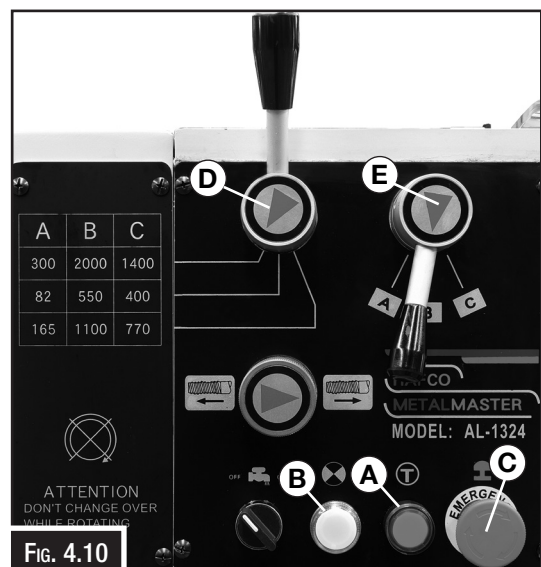


Fig. 4.10

6. Move the Spindle Start lever up (F in Fig 4.11). Spindle should rotate clockwise (as viewed from top) and machine should run smoothly with little to no vibration or rubbing noises.
7. Move the Spindle Start lever down to the middle position (F in Fig. 4.11) and wait for the spindle to come to a complete stop.
8. Move the Spindle Start lever down (G in Fig. 4.11) Spindle should rotate counterclockwise (as viewed from top).
9. Press EMERGENCY STOP button (C in Fig.4.10) and wait for spindle to come to a complete stop.
10. Without resetting EMERGENCY STOP button, Move the Spindle Start lever up to start the spindle (F in Fig. 4.11) Machine should not start.
11. Reset the Emergency Stop Button and try again. The machine should start

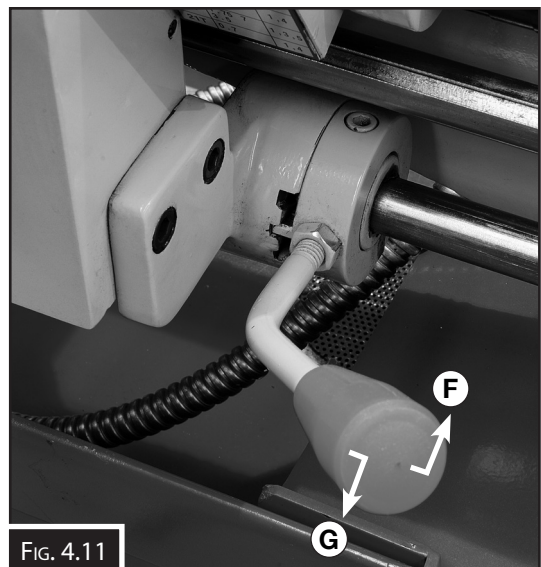


FIG. 4.11

NOTE: If the machine DOES start (with EMERGENCY STOP button pushed in), immediately disconnect the power to machine as EMERGENCY STOP safety feature is not working correctly. This safety feature must work properly before proceeding with regular operations. Refer to Troubleshooting on Page 33 for possible solution.

5. OPERATION

This machine may perform many types of operations that are beyond the scope of this manual. Many of these operations may be dangerous or deadly if performed incorrectly.

The instructions in this section are written with the understanding that the operator has the necessary knowledge and skills to operate this machine. If at any time you are experiencing difficulties performing any operation, stop using the machine!

If you are an inexperienced operator, we strongly recommend that you read books, trade articles, or seek training from an experienced operator before performing any unfamiliar operations.

Above all, your safety should come first!

5.1 CONTROLS

The purpose of this control overview is to provide the novice machine operator with a basic understanding of how the machine is used during operation and the machine controls and what they do. It also helps the operator to understand if they are discussed later in this manual.

NOTE: DO NOT start the machine until all of the setup instructions have been performed. Operating a machine that is not setup may result in malfunction or unexpected results that can lead to serious injury, death, or machine/property damage.

HEADSTOCK ELECTRICAL CONTROLS FIG.5.1

1. **Coolant Switch:** Switches the coolant On or OFF
2. **Pilot Lamp:** Illuminates when power is connected to the control panel.
3. **Joggle Button:** Allows for the spindle to be moved small amounts during setup.
4. **Emergency Stop Button:** When pressed disconnects power to the control panel and stops the machine. To reset the stop button the top of the stop button must be twisted to allow the button to pop up.



FIG. 5.1

STEADIES FIG.5.5

- E. **Knurled Screws** - Moves the fingers in or out to allow for adjustment.
- F. **Lock Nut** - When unlocked allows the fixed steady to be split to allow the steady to be placed around the work.

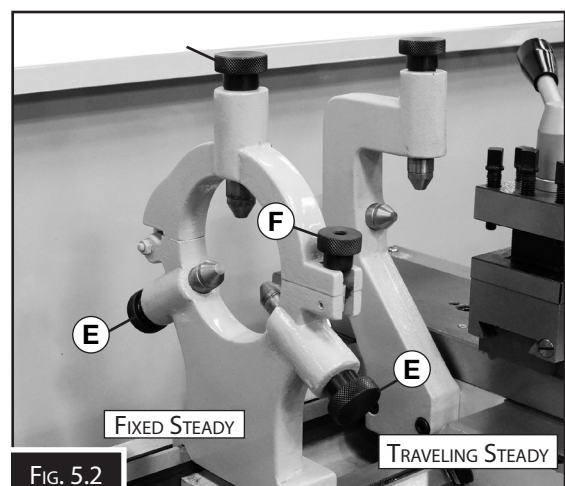


FIG. 5.2

APRON (FIG. 5.3)

- I. Compound Slide Handwheel:** Moves the tool toward and away from the workpiece at the preset angle of the compound slide.
- J. Thread Dial:** Indicates when to engage the half nut during threading operations.
- K. Spindle Lever:** Starts, stops and reverses direction of spindle rotation.
- L. Half Nut Lever:** Engages/disengages the half nut for threading operations.
- M. Feed Selection Lever:** Selects the carriage or cross slide for power feed.
- N. Cross Slide Handwheel:** Moves the cross slide toward and away from the workpiece.
- O. Carriage Handwheel:** Moves the carriage along the bed.

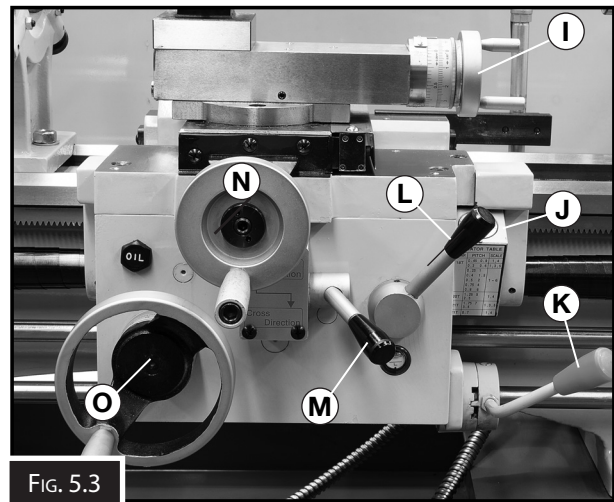


FIG. 5.3

TAILSTOCK (FIG. 5.4)

- P. Quill Handwheel:** Moves the quill toward or away from the spindle.
- Q. Graduated Scale:** Indicates quill movement in increments of 0.02mm or 0.001" graduations.
- R. Tailstock Lock Lever:** Secures the tailstock in position along the bedway.
- S. Quill Lock Lever:** Secures the quill in position.
- T. Quill:** Moves toward and away from the spindle and holds centers and tooling.
- U. Tailstock Offset Screws:** Adjusts the tailstock offset left or right from the spindle centerline (1 of 2).
- V. Offset Scale:** Indicates the relative distance of tailstock offset from the spindle centerline.

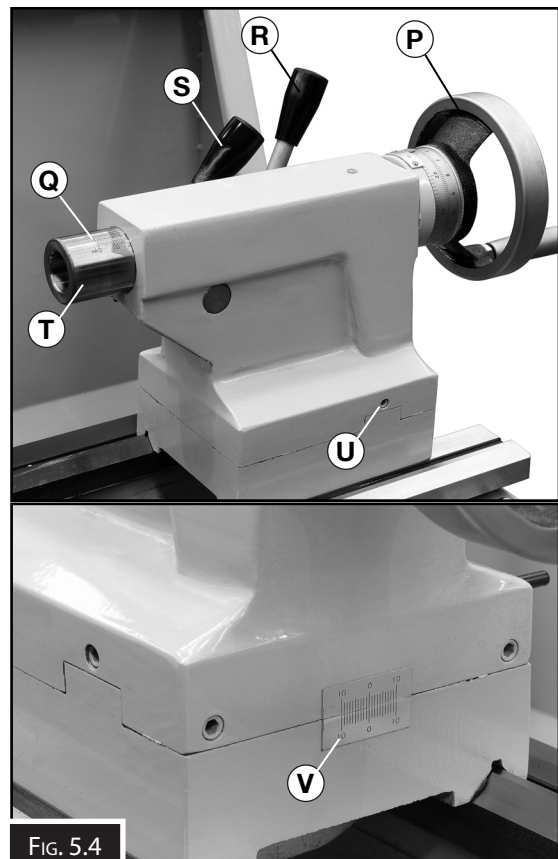


FIG. 5.4

5.2 CHUCK & FACEPLATE MOUNTING

This lathe is equipped with a D1- 4 Camlock spindle nose. This type of spindle uses cams that are adjusted with a chuck key to securely mount a chuck or faceplate with repeatable precision and ease.

Because chucks are heavy and often awkward to hold, some kind of lifting, support, or protective device should be used during installation or removal. (Fig. 5.5)

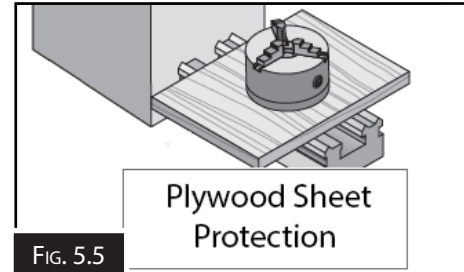


FIG. 5.5

To ensure that the work is accurate, it is extremely important to make sure the spindle nose and chuck mating surfaces and tapers are clean. Even a small amount of lint or dirt can affect the accuracy.

The chuck is properly installed when all camlocks are tight, the spindle and chuck tapers firmly lock together, and the back of the chuck is firmly seated against the face of the spindle all the way around without any gaps.

MOUNTING THE CHUCK

Clean and lightly oil the camlock studs, then thoroughly clean the mating surfaces of the spindle and chuck.

Install the chuck by inserting the camlock studs straight into the spindle cam holes.

NOTE: Avoid inserting the studs in from an angle or rotating the spindle. This can damage the studs or the cam holes. (Fig. 5.6)

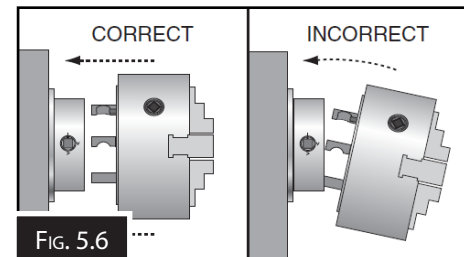


FIG. 5.6

When the chuck is fully seated and all the camlocks are tight, check that the cam line is between the two “V” marks on the spindle nose, as shown in Fig. 5.7.

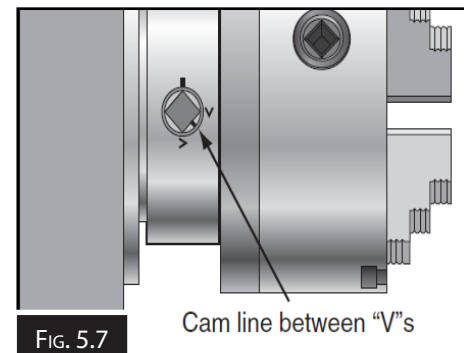


FIG. 5.7



WARNING!

Chucks can be heavy and difficult to hold. During installation and removal, protect your hands and precision bed ways by using a chuck cradle or piece of plywood over the bed ways. Use lifting equipment, as necessary, for large chucks.

If the cam line is not between the “V” marks when the camlock is tight, the stud may be installed at the incorrect height.

First check that the line on the cam is flush with the surface of the chuck. If it is not then adjust the stud height as shown (Fig. 5.8). Make sure to re-install the stud cap screw afterward. If adjusting the stud height does not correct the problem, try swapping stud positions on the chuck.

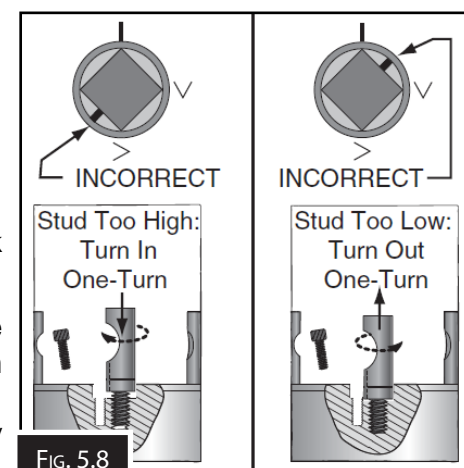


FIG. 5.8

5.3 OFFSETTING THE TAILSTOCK

The tailstock is typically used to support long workpieces by means of a live or dead center. It can also be used to hold a drill or chuck to drill holes in the center of the end of a part.

Custom arbors and tapers can also be cut on your lathe by using the offset tailstock adjustment screws (W in Fig. 5.9)

The tailstock can be offset from the spindle centerline for turning tapers. Move the tailstock top casting toward the front of the lathe to machine a taper at the tailstock end. Conversely, move the tailstock top casting toward the back of the lathe to machine a taper at the spindle end.

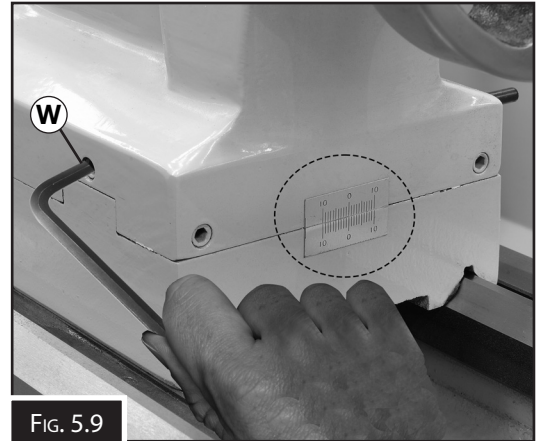


FIG. 5.9

Note: The marks on the indicator on the end of the tailstock (Fig. 5.4) are only a guide. For a precise offset, use a dial indicator to check while adjusting the screws that are located on both sides of the tailstock. (W in Fig. 5.9)

5.4 ALIGNING TAILSTOCK TO SPINDLE CENTERLINE

This is an essential adjustment that should be checked or performed each time the tailstock is used to turn concentric workpieces between centers or immediately after offsetting the tailstock when turning a taper. If the tailstock is not aligned with the spindle centerline when it is supposed to be, turning results will not be parallel along the length of the workpiece.

STEPS TO ALIGN THE TAILSTOCK TO THE SPINDLE CENTERLINE:

1. Center drill both ends of one piece of round bar, then set it aside for use in a later step 4.
2. Use the other piece of round stock to make a dead center, and turn it to a 60° point, as illustrated in the Fig. 5.10.

NOTE : Do not remove machined centre from the chuck. The point of the center will remain true to the spindle centerline.

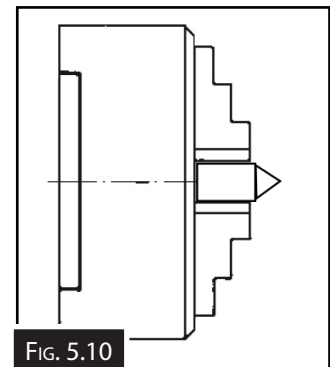


FIG. 5.10



WARNING!

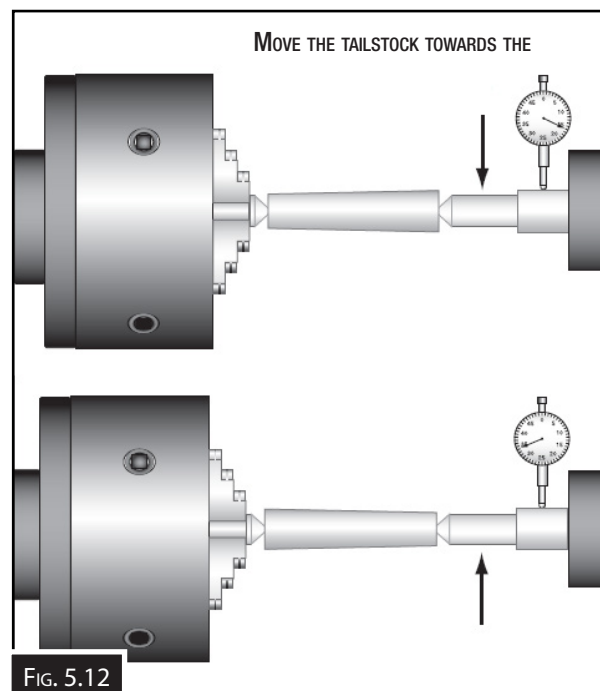
Serious injury or death can result from using this machine BEFORE understanding its controls and related safety information. DO NOT operate, or allow others to operate, the machine until the information is understood.

5.4 ALIGNING TAILSTOCK TO SPINDLE CENTERLINE Cont.



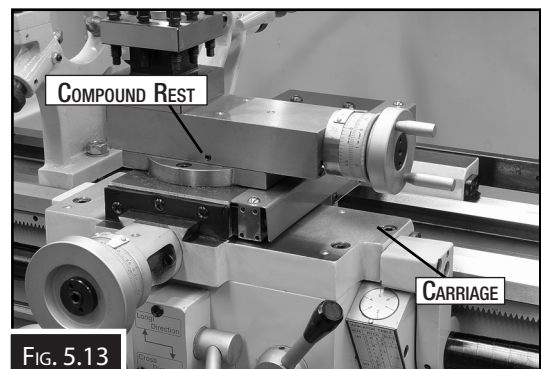
3. Install a center in the tailstock.
4. Attach a lathe dog to the test piece of round stock from Step 1, then mount it between the centers as shown in Fig. 5.11.
5. Turn 1mm off the stock diameter.

6. Mount a test or dial indicator so that the plunger is on the tailstock quill and set the dial to "0". (Fig. 5.12)
7. Use a micrometer to measure both ends of the workpiece.
If the test stock is larger at the tailstock end, then adjust the tailstock toward the front of the lathe 1/2 of the difference.
(See "U" in Fig. 5.4 for adjustment screws)
8. Repeat the steps until the round bar is turned parallel.



5.5 CARRIAGE & SLIDE LOCKS

The compound rest, and carriage are fitted with locks that can be tightened to increase rigidity when taking heavy turning cuts. See Fig. 5.13 for the locations of the locks for each slide.



WARNING!

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

5.6 SETTING CUTTING TOOL TO SPINDLE CENTERLINE

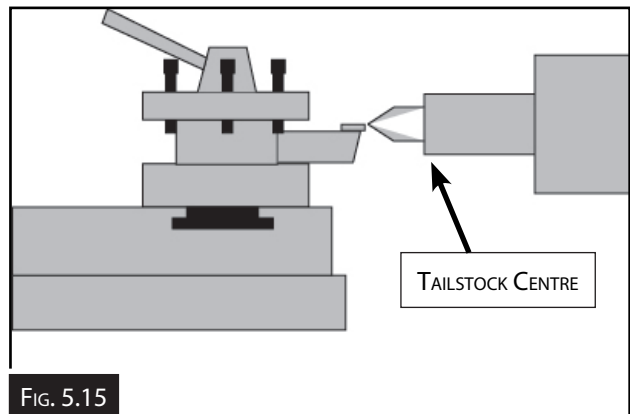
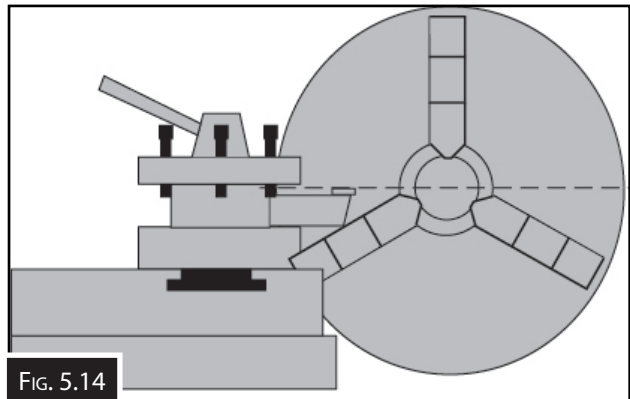
The tip of the cutting tool should be set up so that it is in line with the centerline of the spindle, as illustrated in Fig. 5.14.

The cutting tool can be raised by placing steel shims underneath it. The shims should be as long and as wide as the cutting tool to ensure correct support.

There are a number of ways to check that the cutting tool is on the centre line of the spindle.

Below are two common methods:

1. Move the tailstock center over the cross slide and use a fine ruler to measure the distance from the surface of the cross slide to the tip of the center. Adjust the cutting tool height so it is the same distance above the cross slide as the tailstock center.
2. Align the tip of the cutting tool with a tail stock center, as described in the following procedure.
 - a. Mount the cutting tool and secure the post so the tool faces the tailstock.
 - b. Install a center in the tailstock, and position the tip near the cutting tool.
 - c. Lock the tailstock and quill in place.
 - d. Adjust the height of the cutting tool tip to meet the center tip, as shown. (Fig. 5.15)



WARNING!

Cutting tools are sharp. Take care when handling them. Failure could cause deep cut injury

5.7 SPINDLE SPEEDS

Using the correct spindle speed is important for getting safe and satisfactory results, as well as maximizing tool life. To set the spindle speed for your operation, you will need to:

1. Determine the best spindle speed for the cutting task, and
2. Configure the lathe controls to produce the required spindle speed.

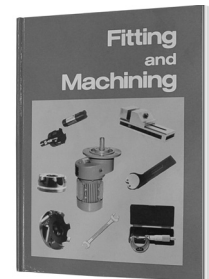
DETERMINING SPINDLE SPEED

Many variables affect the optimum spindle speed to use for any given operation, but the two most important are the recommended cutting speed for the workpiece material and the diameter of the workpiece, as noted in the formula shown below.

$$\frac{\text{Recommended Cutting Speed (Mtrs/Min)} \times 1000}{\text{Diameter in Millimeters} \times 3.14} = \text{RPM}$$

The Fitting & Machining handbook (L341) and some internet sites, provide excellent recommendations for which cutting speeds to use when calculating the spindle speed.

These sources also provide a wealth of additional information about the variables that affect cutting speed and they are a good educational resource.



ORDER CODE
L341

Figure 5.16 shows the levers positioned for a spindle speed of 1400 RPM.

Note: If the spindle speed levers do not easily adjust into position, rotate the spindle by hand while you apply pressure to the lever. When the gears align, the lever will easily move into place. If you have trouble rotating the spindle by hand, you can use the spindle key or a chuck key to get additional leverage, just be sure to remove the key when you are done.



FIG. 5.16



WARNING.

To avoid damaging gears, ALWAYS make sure the spindle is completely stopped BEFORE moving the spindle speed levers.

5.8 THREADING

The machine is designed to cut most metric and inch threads. The following sections will describe how to use the threading controls to set up the lathe for a threading operation. If you are unfamiliar with the process of cutting threads on a lathe, it is strongly recommend that you read a trade manual such as Hafco L341, or seek formal training before attempting any threading projects. Consult the thread charts for the correct lever settings.

CUTTING THREADS

To obtain the desired pitch a combination of letters, with top dial "A", "B", or "C", "D" on the lower dial and top and bottom levers.(Fig.5.17)

Example: To obtain 0.4mm Pitch, the top dial on "B" and the bottom dial on "C" and the top lever is placed in the "T" slot and the bottom lever in the "Y" position. (Fig.5.18)

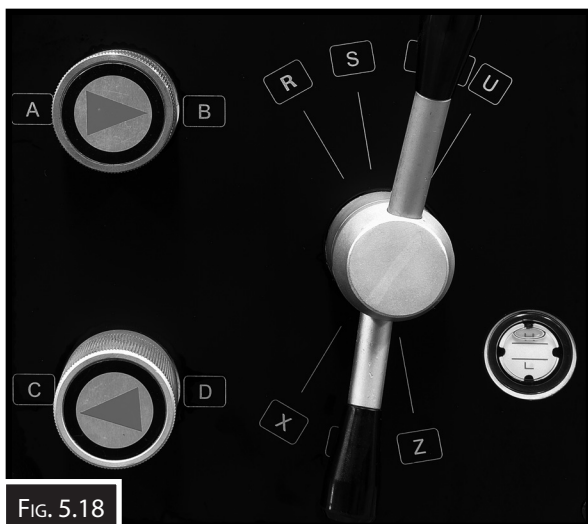


FIG. 5.18

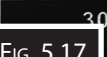
		PITCH								MM
		T	U	S	U	S	R	U	R	
		Y	X	Y	Y	Z	Y	Z	Z	
AD		3.2	3.6	4.0	4.8	5.0	5.6	6.0	7.0	
BD		1.6	1.8	2.0	2.4	2.5	2.8	3.0	3.5	
AC		0.8	0.9	1.0	1.2	1.25	1.4	1.5	1.75	
BC		0.4	0.45	0.5	0.6		0.7	0.75		
		T.P.I								INCH
		U	S	T	U	T	T	T	T	
		X	Y	X	X	X	X	X	X	
48		60	38	60	44	48	52	56		
A D		4	4½	4¾	5	5½	6	6½	7	
B D		8	9	9½	10	11	12	13	14	
A C		16	18	19	20	22	24	26	28	
B C		32	36	38	40	44	48	52	56	
		FEED								1 — 1
MM										1 — 2

FIG. 5.17

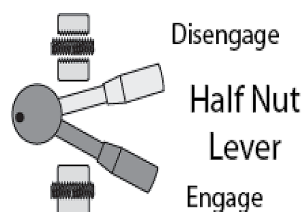
FIG. 5.17

THREAD CUTTING DIAL

The thread cutting dial is mounted The numbers on the thread dial are used with the thread dial chart to show when to engage the half nut during threading. (Fig. 5.19)



FIG. 5.19



INDICATOR TABLE			
GEAR	PITCH	SCALE	
18T	0.45	0.9	1, 4
	0.3	0.6	1, 3, 5
	0.25	1	
	0.4	1.5	
	0.5	2	1 - 6
	0.75	4	
20T	0.8	6	
	1.25	5	1, 4
21T	2.5		
	1.75	7	1, 3, 5
21T	3.5		
21T	0.7		1, 4

5.9 END GEARS

The end gears are used to setup for power feed, inch, or metric threading operations. See Fig. 5.20 to identify the upper gear, middle 120T/127T change gears, and the lower gear. Details on which gear to use are found on the headstock feed and threading charts.

END-GEAR CONFIGURATION

To configure the end gears, first

1. Locate the chart on the headstock that has the thread or feed option that is required.
2. DISCONNECT THE MACHINE FROM THE POWER!
3. Remove the headstock end gear cover.
4. While holding the 120T/127T gears, loosen the arm by undoing the gear support hex nut and slowly let the gears pivot down and away from the upper top gear, as illustrated (Fig. 5.21)
5. Loosen the 120T/127T gear hex nut and slide the middle gear away from the bottom gear. The 120T/127T gears many need to be reversed. Undo the 120T/127T gear hex nut (Fig. 5.21) and reverse the gears.
6. Remove the cap screw and flat washer from the top gear, then slide the gear off the shaft.
7. Slide the desired gear onto the top gear shaft and desired gear onto the bottom gear shaft making sure to align the keys and keyways. Position the flat, non-stepped face of the gears away from the headstock so they will mesh with either the 120T or 127T gear depending on which one is required.
8. Secure the top and bottom gears with the flat washers and cap screws that were removed earlier.
9. Raise the gear support arm and mesh the top gear 120T/127T then tighten the gear support hex nut and replace the end gear cover.

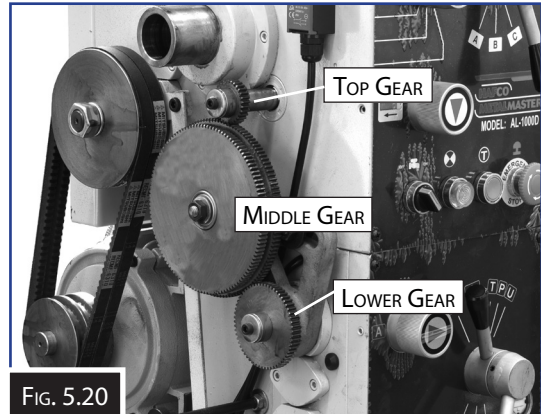


FIG. 5.20

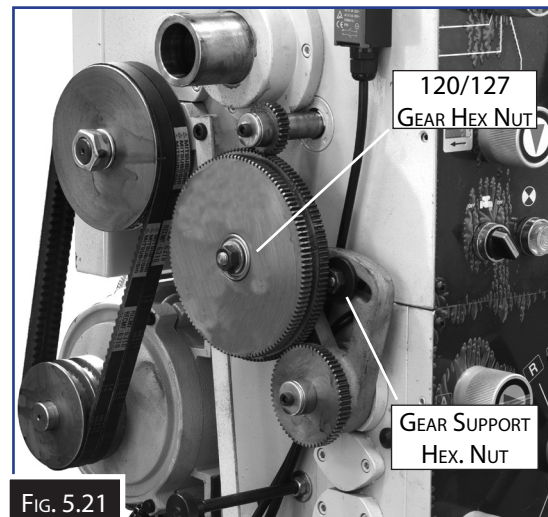


FIG. 5.21



WARNING!

***Keep hands and fingers away from moving gears at all times.
Machines should never be operated with out safety guards in place.
Failure to do so may cause amputation or serious injury.***

5.10 SELECTING THE FEEDS

The carriage and cross slide both have power feed capability when the carriage is engaged with the feed rod. The rate that these components move per revolution of the feed rod is controlled by the quick-change gearbox lever positions and the end gear configuration. The AL-1324 can cut left or right while feeding or threading and both ways for facing operations. This feed direction is controlled by the selection knob on the headstock (Fig.5.22)

NOTE: The feed direction knob should not be changed while the spindle is rotating.

Feed Selection Lever: Changes the power feed to either the cross slide or the carriage.

When the lever is down and the indent pin is pointing up, the cross slide is selected. Conversely, when the lever is up and the pin is pointing down, the carriage is selected.

In the middle position, the apron gears are disengaged from the feed rod and neither component will move.

NOTE: When using this lever, you may need to slightly rotate the handwheel of the component you are trying to engage, so that the apron gears can mesh.



FIG. 5.22

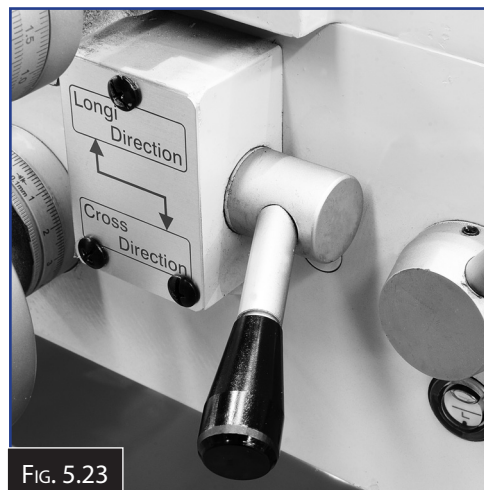


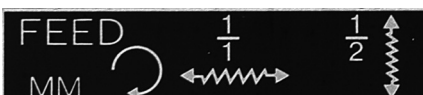
FIG. 5.23

SETTING THE FEED RATE

The feed rate chart (Fig. 5.24) displays the settings for the headstock feed controls for feed rates. Feed settings are displayed in "Metric". Below is an explanation of some of the symbols.



The symbol to the left, and found on the Threading and Feed charts, is the configuration of the end gears for the feed rates in the chart



	FEED		
	X	Y	Z
PAD	0.544	0.752	0.936
PBD	0.272	0.376	0.468
PAC	0.136	0.188	0.234
PBC	0.068	0.094	0.117

FIG. 5.24

The symbols above are found on the Threading and Feed charts, explain the ratio of the feed shaft to movement of the slides. For the long travel, one rotation of the shaft means the saddle travels the distance selected on the chart.

For the cross slide one revolution of the feed shaft moves the cross slide half the distance selected on the chart.

SETTING THE FEED CONTROLS

When you examine the chart, you will see a series of boxes. The number in the box is the saddle feed rate.

Example: To select 0.094mm feed,

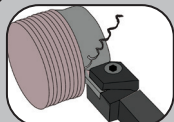
1. First make sure the end gears are set correctly as displayed in Fig. 5.25.
2. The top dial needs to be set on "B" and the bottom dial set on "C". (Fig. 5.26)
3. The top handle needs to be set on "P" and the bottom handle set on "Y". (Fig. 5.26)

	FEED		
	MM	$\frac{1}{1}$	$\frac{1}{2}$
	X	Y	Z
PAD	0.544	0.752	0.936
PBD	0.272	0.376	0.468
PAC	0.136	0.188	0.234
PBC	0.068	0.094	0.117

FIG. 5.25



FIG. 5.26



WARNING!

STOP the machine before attempting to remove the swarf. Use leather gloves when handling swarf. Cuttings are sharp and can cause injury.



WARNING!

Always check the capacity of the machine. Exceeding the capacity of the machine may result in sudden breakage that ejects dangerous metal debris at the operator or bystanders.

6. MAINTENANCE

6.1 LUBRICATION



Before maintaining or cleaning the machine, turn off the circuit breaker, or disconnect the machine from the power supply.

Post a sign to inform other workers that the machine is under maintenance.

For optimum performance from the machine, it is important that the machine is well lubricated and maintained. Follow the maintenance schedule listed in the following section and refer to any specific instructions given.

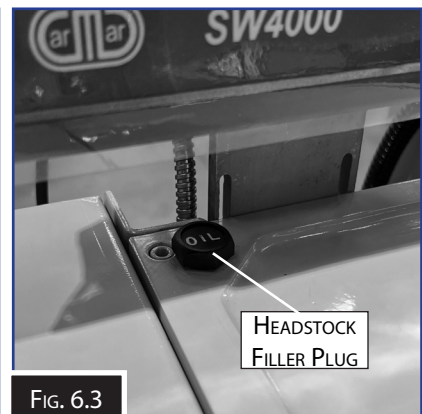
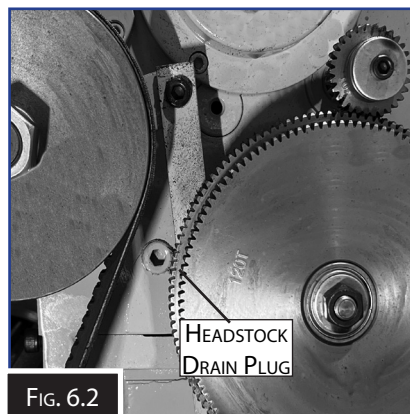
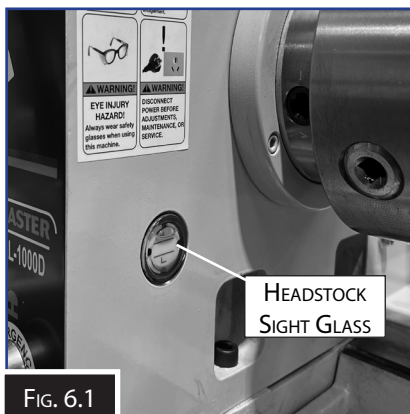
Use the information in the charts below as a daily guide for lubrication tasks

Assembly	Part	Method	Lubricant	Interval
Headstock	Spindle Gears and Bearings	Oil Bath	Machine Oil	6 Months
Feed Box	Gears and Bearings	Oil Bath	Machine Oil	Check site glass daily and fill as required
Carriage	Gears and Bearings	Oil Bath	Machine Oil	Check site glass daily and fill as required
End Gears	Change gears and quadrant	Oil Can	Machine Oil and Grease	Once per shift
Carriage Slide	Bedway slides	Oil Can	Machine Oil	Once per shift
Cross Slide	Slides and Screws	Oil Can	Machine Oil	Once per shift
Tailstock	Quill and Screw	Oil Can	Machine Oil	Once per shift
Feed Screw	Screws and Bearings	Oil Can	Machine Oil	Once per shift
Lead Screw	Screw	Oil Can	Machine Oil	Annually

6.2 LUBRICATION POINTS

HEADSTOCK

The headstock reservoir has the proper amount of oil when the oil level in the sight glass is approximately halfway. (Fig. 6.1) The oil sight glass is located below the chuck. The oil should be changed every six months by firstly draining the oil by removing the drain plug (Fig. 6.2) then filling by the oil filler plug. (Fig. 6.3)



APRON

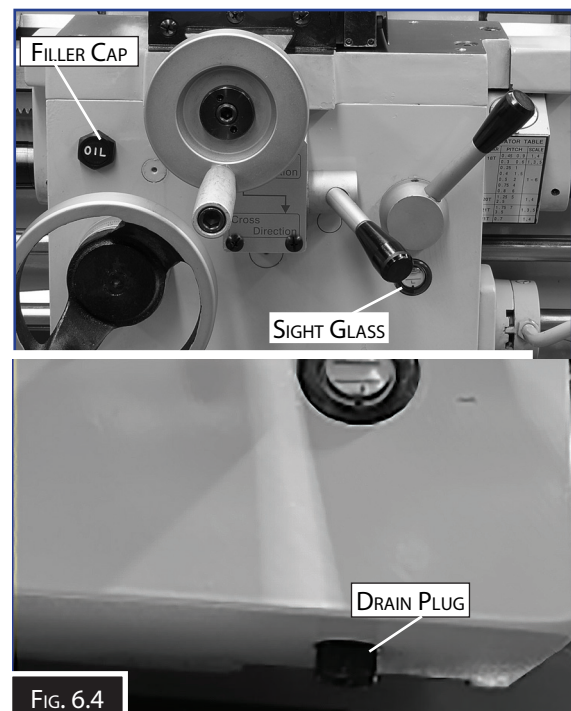
The apron oil sight glass is on the front of the apron, as shown in Fig. 6.4. Maintain the oil volume so that the level is approximately halfway in the sight glass.

CHANGING OIL & FLUSHING RESERVOIR

Small metal particles may accumulate at the bottom of the reservoir with normal use. Therefore, to keep the reservoir clean, drain and flush it at least once a year. Place a catch pan under the apron drain plug (Fig. 6.4), remove the fill plug, then use a hex wrench to remove the drain plug and empty the reservoir.

Flush the reservoir by pouring a small amount of clean oil into the fill hole and allowing it to drain out the bottom.

Replace the drain plug, add oil as required, then re-install the fill plug.



LONGITUDINAL LEADSCREW

Undo the end of the lead screw cover and slide it to the end of the shaft. Before lubricating the lead screw (Fig. 6.5) it should be cleaned with mineral spirits. The use of a stiff brush will help clean out the threads. Move the carriage out of the way, so you can clean the entire length of the lead screw. Apply a thin coat of oil along the length of the lead screw. Use a stiff brush to make sure the oil is applied evenly and down into the threads. Replace the lead screw cover.

Lead Screw & Feed Shaft Bearings (Fig. 6.6)
The feed and lead screw bearings are lubricated through an oil reservoir at the end of the bed. Fill with machine oil and check each shift.

BALL OILERS (FIG. 6.7)

Proper lubrication of ball oilers is done with a pump-type oil can that has a plastic or rubberized cone tip, usually supplied with the accessories. Lubricate the ball oilers before and after machine use, and more frequently under heavy use. When lubricating ball oilers, first clean the outside surface to remove any dust or grime. Push the tip of the oil can nozzle against the ball oiler to create a hydraulic seal, then pump the oil can once or twice. It is important not to press the ball oiler too hard with nozzle of the oil can as it may cause the ball to jam in the open position, allowing dirt to enter. If you see sludge and dirt coming out of the lubrication area, keep pumping the oil can until the oil runs clear. When finished, wipe away any excess oil.

Oilers can be found below

- ☐ Cross-slide leadscrew & slides
- ☐ Compound-rest leadscrew & slides
- ☐ Saddle slides
- ☐ Carriage handwheel
- ☐ Feed selection lever gearing
- ☐ Tailstock ball oilers
- ☐ Leadscrew end bearing
- ☐ Feed rod end bearing

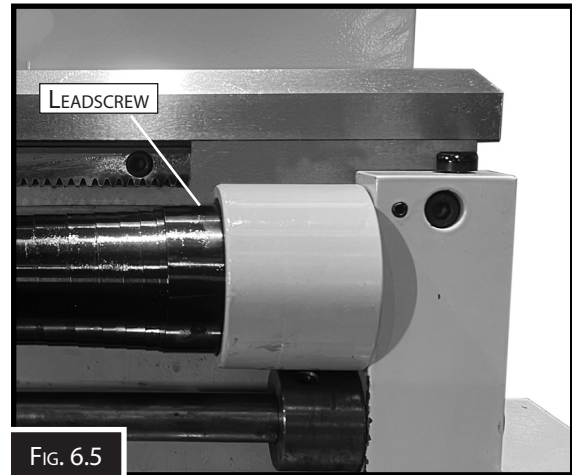


FIG. 6.5



FIG. 6.6

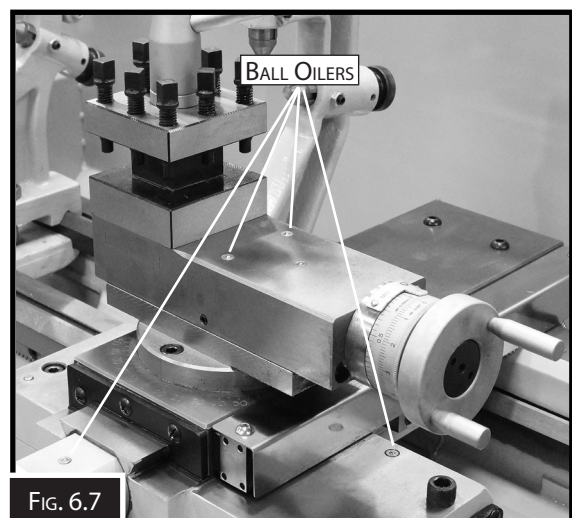


FIG. 6.7

6.3 ADJUSTMENTS

SLIDE WAY GIBS

Tapered gibs are fitted to the slide ways of the saddle, cross-slide and top (compound) slides so that if any slackness, that may develop can be reduced. Make sure that slide ways are thoroughly cleaned and lubricated before attempting adjustment.

To Adjust The Top Slide Gib:

1. DISCONNECT THE MACHINE FROM THE POWER SUPPLY
2. Release the rear gib screw and tightening the front screw a little at a time. Check constantly for a smooth action through out the full slide travel. (Fig. 6.8)

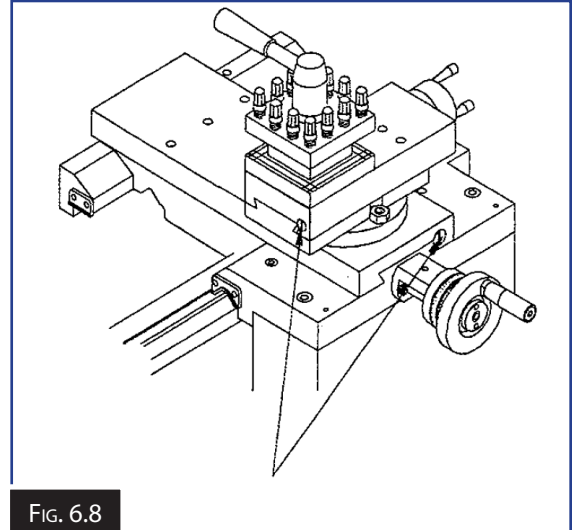


FIG. 6.8

To adjust the cross slide gib:

1. DISCONNECT THE MACHINE FROM THE POWER SUPPLY.
2. Undo the three button head screws that hold the slide wiper and remove the rubber wiper. (Fig. 6.9)
3. Release the rear gib screw and tightening the front screw a little at a time. Check constantly for a smooth action throughout the full slide travel.

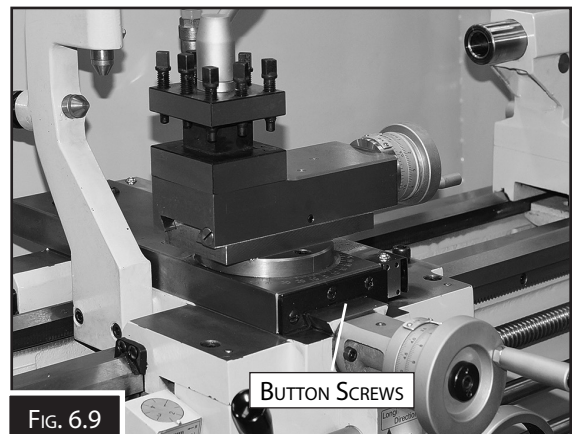


FIG. 6.9

CROSS SLIDE NUT ADJUSTMENT.

This is an adjustment that can be made to eliminate excessive backlash, which may develop over time. Backlash is reduced through the cap head screw located at the rear of the nut.

To adjust the backlash:

1. DISCONNECT THE MACHINE FROM THE POWER SUPPLY
2. Remove the back splash guard.
3. With a long hex key in the cap head screw, make only small adjustment. Operating the cross slide several times by hand to be sure of smooth operation throughout the travel. (Fig. 6.10)

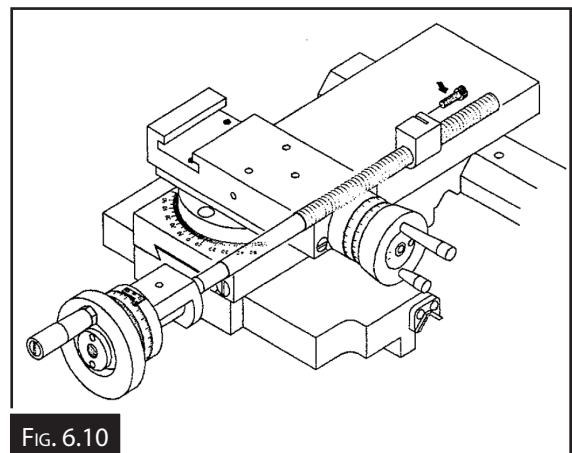


FIG. 6.10

6.4 TROUBLE SHOOTING

If the machine develops a problem, review the trouble shooting section below to find a fix for the problem. If the problem cannot be solved then contact your dealer for help or to book a service engineer.

Symptoms	Possible Cause	Possible Solution
Machine does not start or circuit breaker trips.	Emergency button needs to be reset.	Rotate the emergency stop button until it pops out and resets.
	Chuck guard open.	Close chuck guard.
	Fuse has blown in the machines electrical box.	Replace fuse. Determine if overload is due to heavy operation; ensure power source has high enough voltage.
	Power supply has switched OFF.	Ensure power supply is ON and the voltage is correct.
	Thermal overload relay has tripped.	The wiring connection is correct .
	Wall fuse or circuit breaker is blown/ tripped; caused by a short in electrical system;	Verify circuit is rated for machine amp load; troubleshoot and repair cause of overload; Have a qualified electrician replace weak breaker; find/repair electrical short.
	Start capacitor at fault.	Test/replace if faulty.
	Contactor not getting energised. Has burnt contacts.	Test for power supply to contactors and that contactor operation is correct. Replace unit if faulty.
Motor stalls or is under powered.	Motor is at fault.	Test/replace if faulty.
	Belts slipping.	Check the tension of the belts and replace if worn.
	Faulty run capacitor.	Test and replace if faulty.
Loud noises coming from near the motor.	Motor faulty.	Test and replace if faulty.
	Pulley keys worn or are missing or set screws loose.	Inspect keys and set screws. Replace or tighten as required.
Motor is noisy when the machine is cutting.	Motor fan is loose.	Tighten the fan and reset the fan cover.
	Depth of cut is too deep.	Reduce the depth of cut or feed rate.
	Speed or feed rate is wrong.	Consult the speed and feed charts in the machinery handbook.
Machined surface finish is rough.	Cutting tool is dull.	Replace or sharpen the cutting tool.
	Incorrect spindle speed or feed rate.	Adjust for appropriate spindle speed and feed rate.
	Blunt tool or poor tool selection.	Sharpen tooling or select a better tool for the intended operation.
	Tapered gibs not correctly adjusted.	Tighten gibs.

6.3 TROUBLE SHOOTING CONT.

Symptoms	Possible Cause	Possible Solution
Entire machine Vibrates excessively upon startup and while running	Workpiece is unbalanced. Loose or damaged belt(s). V-belt pulleys not properly aligned. Worn or broken gear present. Chuck or faceplate has become unbalanced. Spindle bearings badly worn.	Reinstall workpiece so it is as centered with the spindle bore as possible. Tighten/replace the belt as necessary. Align the V-belt pulleys. Inspect gears and replace if necessary. Re-balance chuck or faceplate; contact a local machine shop for help. Replace spindle bearings.
Bad surface finish.	Wrong RPM or feed rate. Dull tooling or poor tool selection. Too much play in gibs. Tool too high.	Adjust for appropriate RPM and feed rate. Sharpen tooling or select a better tool for the intended operation. Tighten gibs. Lower the tool position.
Can't remove tapered tool from tailstock quill.	Quill had not retracted all the way back into the tailstock. Debris on the taper before inserting	Turn the quill handwheel until it forces taper out of quill. Always make sure that taper surfaces are clean.
Cross slide, compound slide, or carriage feed has sloppy operation	Gibs are out of adjustment. Handwheel is loose. Mechanism worn or needs adjustment.	Tighten gib screw(s). Tighten handwheel fasteners. Tighten any loose fasteners on lead screw mechanism.
Cutting tool or machine components vibrate excessively during cutting	Tool holder not tight enough. Cutting tool sticks too far out of tool holder; lack of support. Gibs are out of adjustment. Dull cutting tool. Incorrect spindle speed or feed rate.	Check for debris, clean, and re-tighten. Reinstall cutting tool so no more than 1/3 of the total length is sticking out of tool holder. Tighten gib screws at affected component. Replace or sharpen cutting tool. Use the recommended spindle speed.
Inaccurate turning results from one end of the workpiece to the other.	Headstock and tailstock are not properly aligned with each other.	Realign the tailstock to the headstock spindle bore centre line.
Chuck jaws won't move or don't move easily.	Chips lodged in the jaws.	Remove jaws, clean and lubricate chuck threads, and replace jaws.

CENTRE LATHE

AL-1324

ORDER CODE: (K8250 & K8251)

EDITION : 2.0
DATE: (06/25)

The following section covers the spare parts diagrams and lists that were current at the time this manual was originally printed. Due to continuous improvements of the machine, changes may be made at anytime without notification.

HOW TO ORDER SPARE PARTS

1. Have your machines model number, serial number & date of manufacture on hand, these can be found on the specification plate mounted on the machine.
2. A scanned copy of your parts list/diagram with required spare part/s identified.

NOTE: SOME PARTS MAY ONLY BE AVAILABLE AS AN ASSEMBLY

3. Go to www.machineryhouse.com.au/contactus and fill out the inquiry form attaching a copy of scanned parts list.



WARNING!

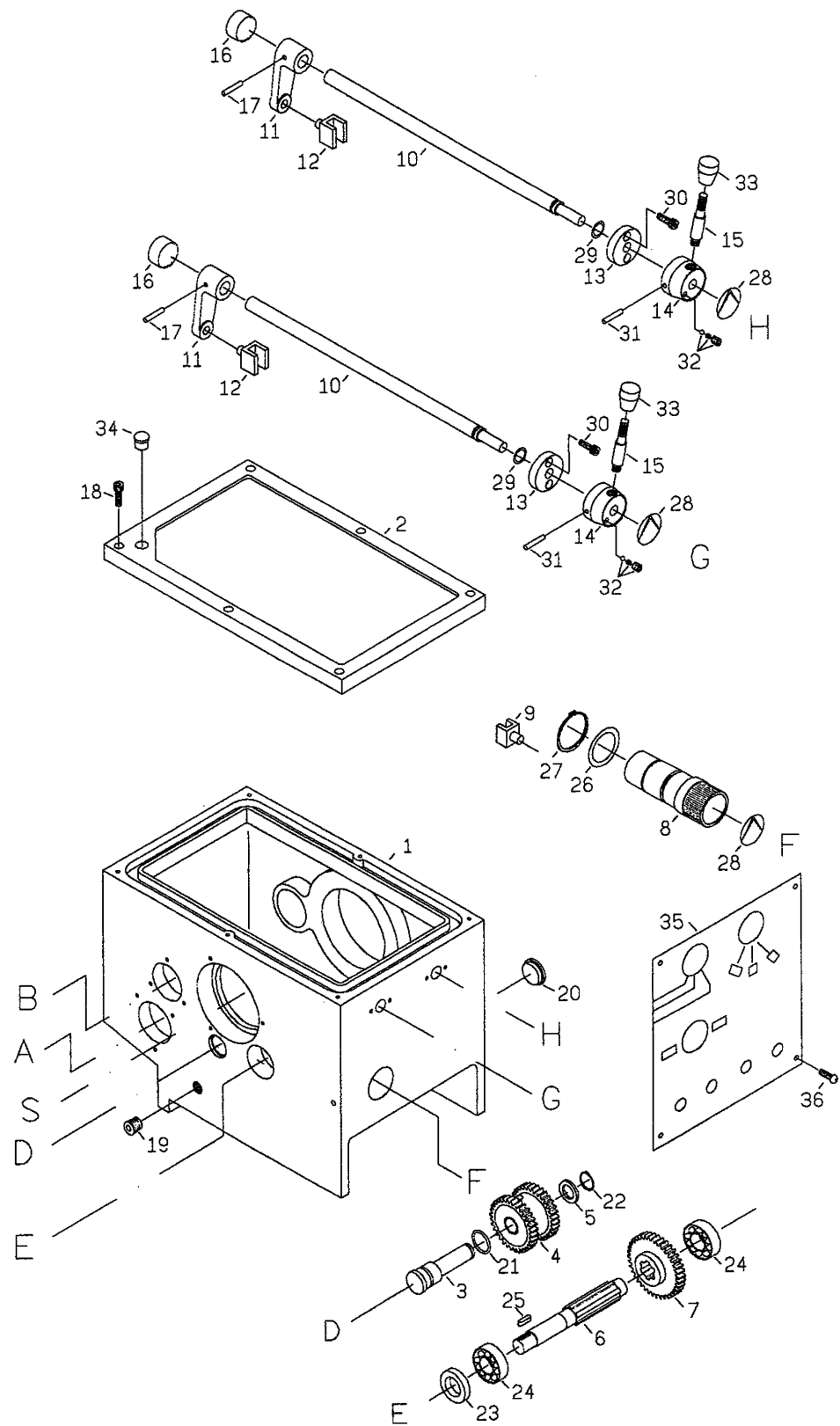
*Electricity is dangerous and could cause death.
All electrical work must be carried out by a qualified electrician.*



CAUTION!

It is impossible to cover all possible hazards Every workshop environment is different. These are designed as a guide to be used to compliment training and as a reminder to users prior to equipment use. Always consider safety first, as it applies to the individual working conditions.

AL-1324 HEADSTOCK PARTS DIAGRAM

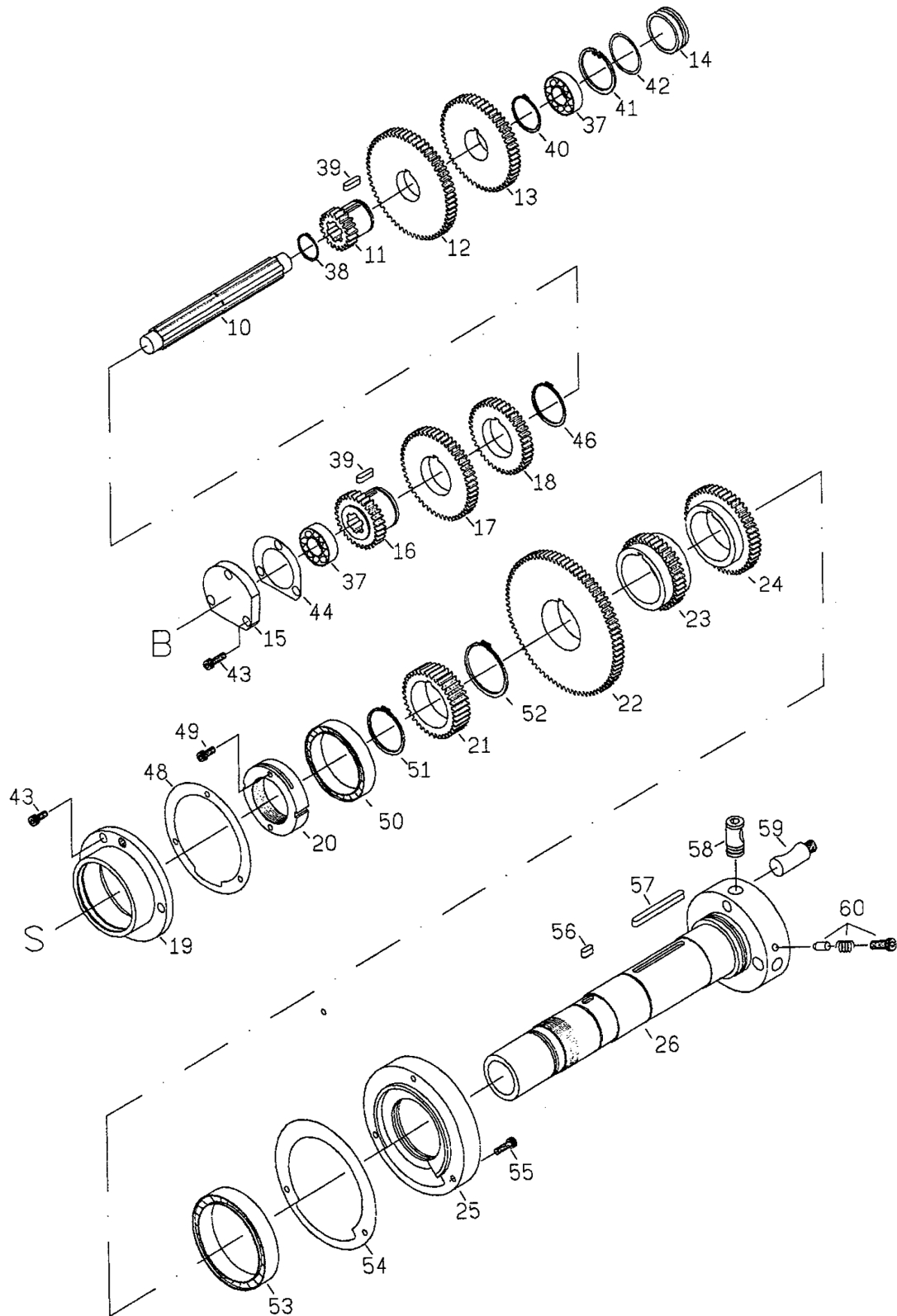


AL-1324 HEADSTOCK PARTS LIST

No.	FACTORY CODE	DESCRIPTION	Qty.
1	2101	HEADSTOCK CASTING	1
2	2143	HEADSTOCK COVER	1
3	2121	SHAFT	1
4	2122	GEAR (M2X32T)	1
5	2123	WASHER	1
6	2124	SHAFT	1
7	2125	GEAR (M2X38T)	1
8	2126	HANDLE	1
9	2127	GEAR SHIFT FORK	1
10	2136	SHAFT	2
11	2137	FORK' ARMS	2
12	2138	GEAR SHIFT FORK	2
13	2139	COLLAR	2
14	2141	HANDLE	2
15	2142	CONTROL LEVER	2
16	2194	OIL RING	2
17	2193	PIN (5mmx32mm)	2
18	2184	CAP SCREW (6mmx25mm)	6
19	2195	PLUG (3/8 G.P.)	1
20	2144	OIL SIGHT(29mm)	1
21	2181	OIL RING(P20)	1
22	2148	SNAP RING (S18)	1
23	2178	WASHER	1
24	2180	BEARING (6004)	2
25	2145	KEY(5mmx 18mm)	1
26	2146	OIL RING (P12)	1
27	2188	SNAP RING (S40)	1
28	2185	INDICATOR PLATE	3
29	2191	OIL RING (P12)	2
30	2189	CAP SCREW (6mmx16mm)	4
31	2192	SPRING PIN (5mmx40mm)	2
32	2186	STEEL BALL SPRING & SET SCREW	2
33	2190	PVC KNOB	2
34	2183	PLUG (5/8")	1
35	2196	DATA PLATE	1
36	2197	SCREW (3/ 16"x3/8")	4

NOTE: SOME INDIVIDUAL PARTS MAY ONLY BE AVAILABLE AS AN ASSEMBLY

AL-1324 HEADSTOCK GEARS PARTS DIAGRAM

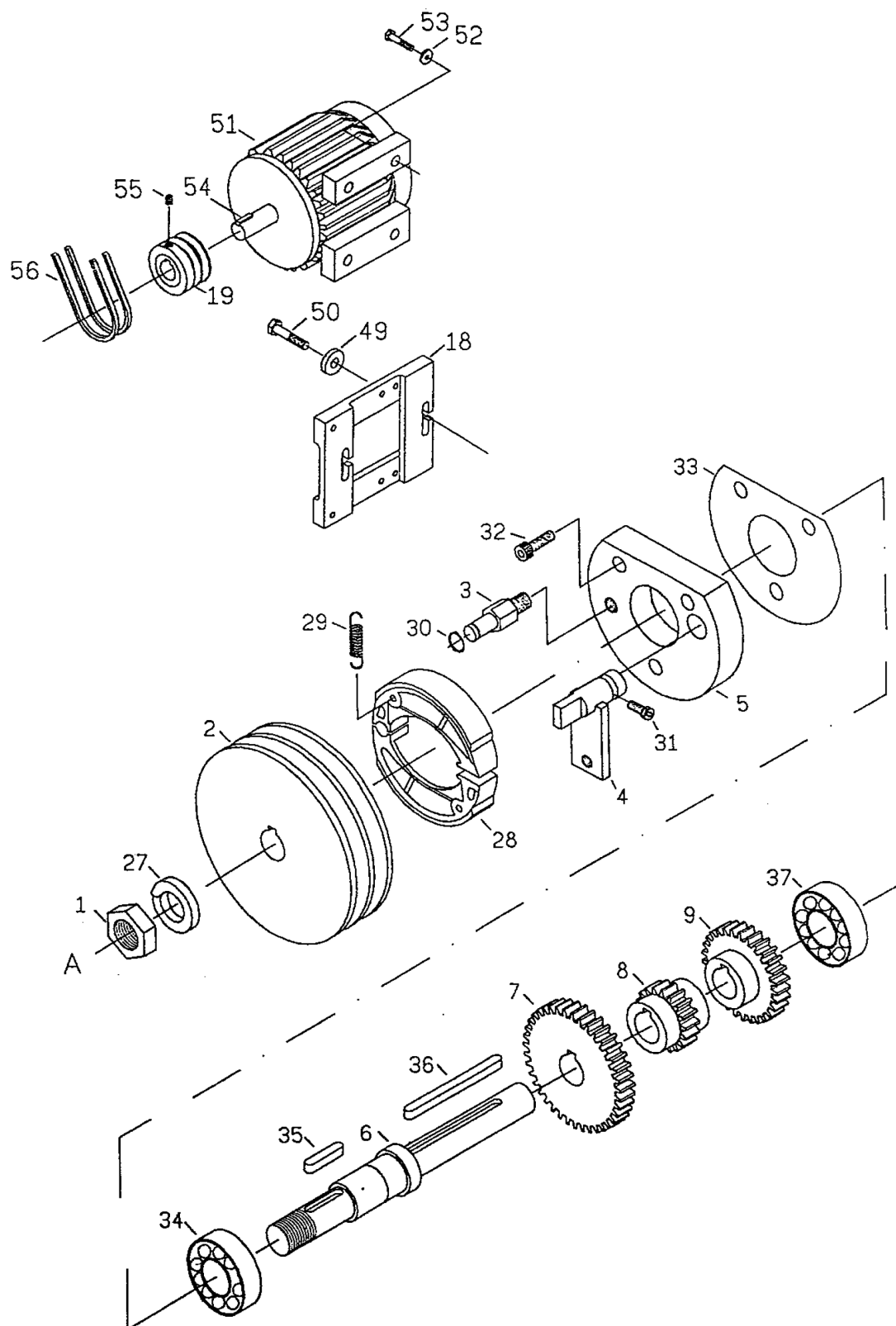


AL-1324 HEADSTOCK GEARS PARTS LIST

No	FACTORY CODE	DESCRIPTION	Qty.
10	2112	SHAFT	1
11	2116	GEAR (M2x 19T)	1
12	2117	GEAR (M2x60T)	1
13	2118	GEAR (M2x52T)	1
14	2119	BORE PLUG	1
15	2120	COVER	1
16	2113	GEAR (M2x30T)	1
17	2114	GEAR (M2x50T)	1
18	2115	GEAR (M2x40T)	1
19	2135	COVER (BACK)	1
20	2134	LOCK NUT	1
21	2133	GEAR (M2x38T)	1
22	2132	GEAR (M2x80T)	1
23	2131	GEAR (M2x39T)	1
24	2130	GEAR (M2x48T)	1
25	2128	COVER (FRONT)	1
26	2129	MAIN SPINDLE	1
38	2162	SNAP RING (S25)	1
39	2163	KEY (6mmx22mm)	2
37	2158	BEARING (#6204)	2
40	2164	SNAP RING (S35)	1
41	2165	SNAP RING (R47)	1
42	2166	OIL RING (P39.4)	1
43	2159	SCREW (CAP 6mmx16mm)	6
44	2180	GASKET	1
46	2161	SNAP RING (S45)	1
48	2167	GASKET	1
49	2147	SCREW (CAP 6mmx25mm)	2
50	2168	BEARING (#30211)	1
51	2169	SNAP RING (S55)	1
52	2170	SNAP RING (S58)	1
53	2171	BEARING (#30212)	1
54	2172	GASKET	1
55	2173	SCREW (CAP 6mmx25mm)	3
56	2174	KEY (6mmx 15mm)	1
57	2175	KEY (7mmx75mm)	1
58	2176	CAM DI-4	3
59	2182	STUD	3
60	2177	DETENT PLUNGER.SPRING AND SCREW	3

NOTE: SOME INDIVIDUAL PARTS MAY ONLY BE AVAILABLE AS AN ASSEMBLY

AL-1324 MOTOR & BRAKE PARTS DIAGRAM

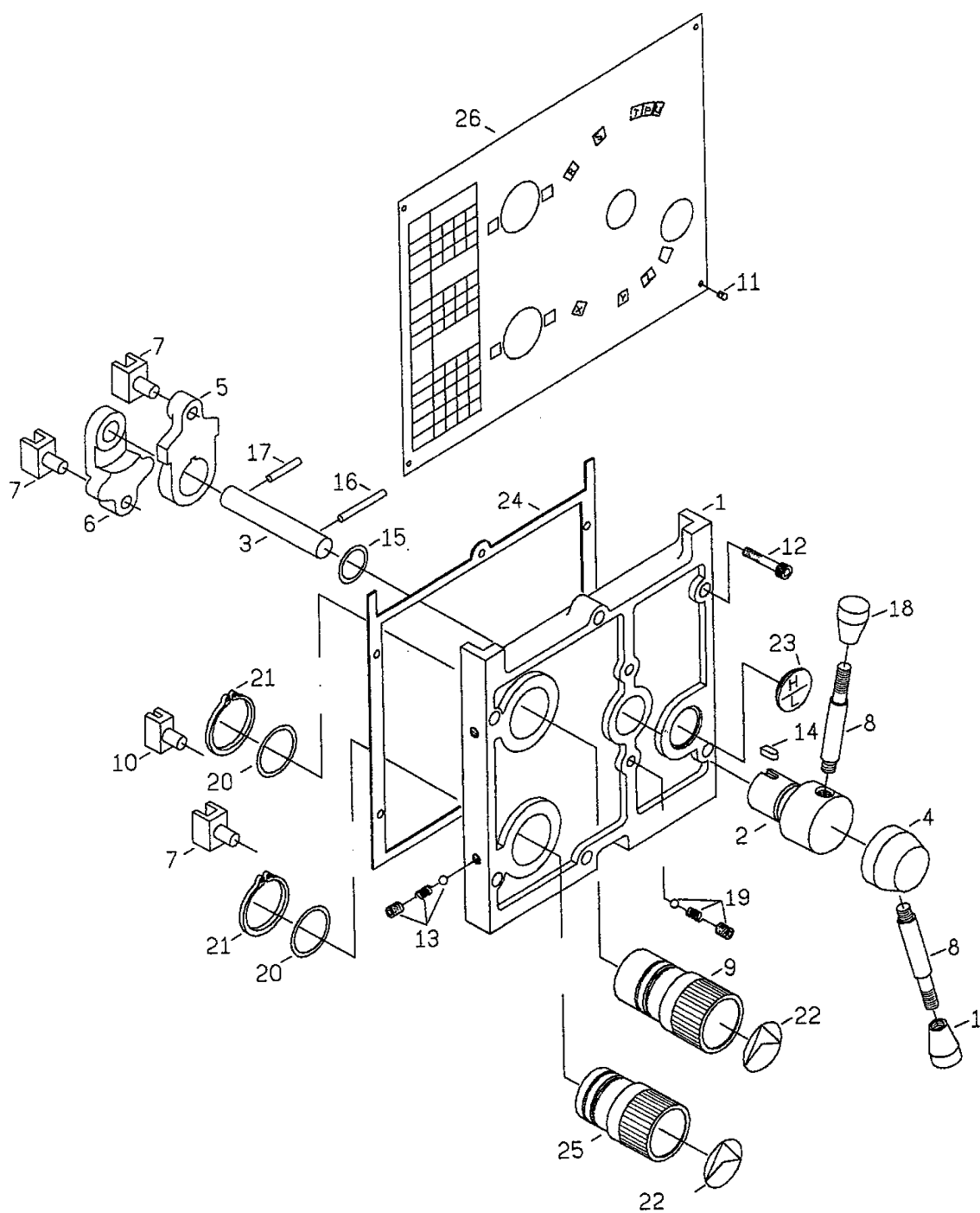


AL-1324 MOTOR & BRAKE PARTS LIST

No	FACTORY CODE	DESCRIPTION	Qty.
1	2111	NUT (M2xPl.5mm)	1
2	2110	V-BELT PULLY	1
3	2107	STUD	1
4	2108	SHAFT LEVER	1
5	2106	COVER	1
6	2102	SHAFT	1
7	2103	GEAR (M2x39T)	1
8	2104	GEAR (M2x18T)	1
9	2105	GEAR (M2x29T)	1
18	2618	MOTOR PLATE	1
19	2653	MOTOR PULLEY	1
27	2149	WASHER	1
28	2109	BRAKE SHOES ASSY	1
29	2140	SPRING	2
30	2151	SNAP RING	1
31	2153	CAP SCREW	1
32	2152	SCREW (CAP 6mmx25mm)	3
33	2179	GASKET	1
34	2155	BEARING (#6205)	1
35	2156	KEY (6mmx30mm)	1
36	2157	KEY (6mmx80mm)	1
37	2158	BEARING (#6204)	1
49	2619	WASHER	2
50	2631	SCREW (CAP 10mmx35mm)	2
51	2652	MAIN MOTOR	1
52	2656	WASHER	4
53	2657	SCREW (CAP 8mmx30mmj)	4
54	2659	KEY (8mmx45mm)	1
55	2655	SCREW (SET 10mmx20mm)	1
56	2654	V-BELT	2

NOTE: SOME INDIVIDUAL PARTS MAY ONLY BE AVAILABLE AS AN ASSEMBLY

AL-1324 GEARBOX CASTING PARTS DIAGRAM

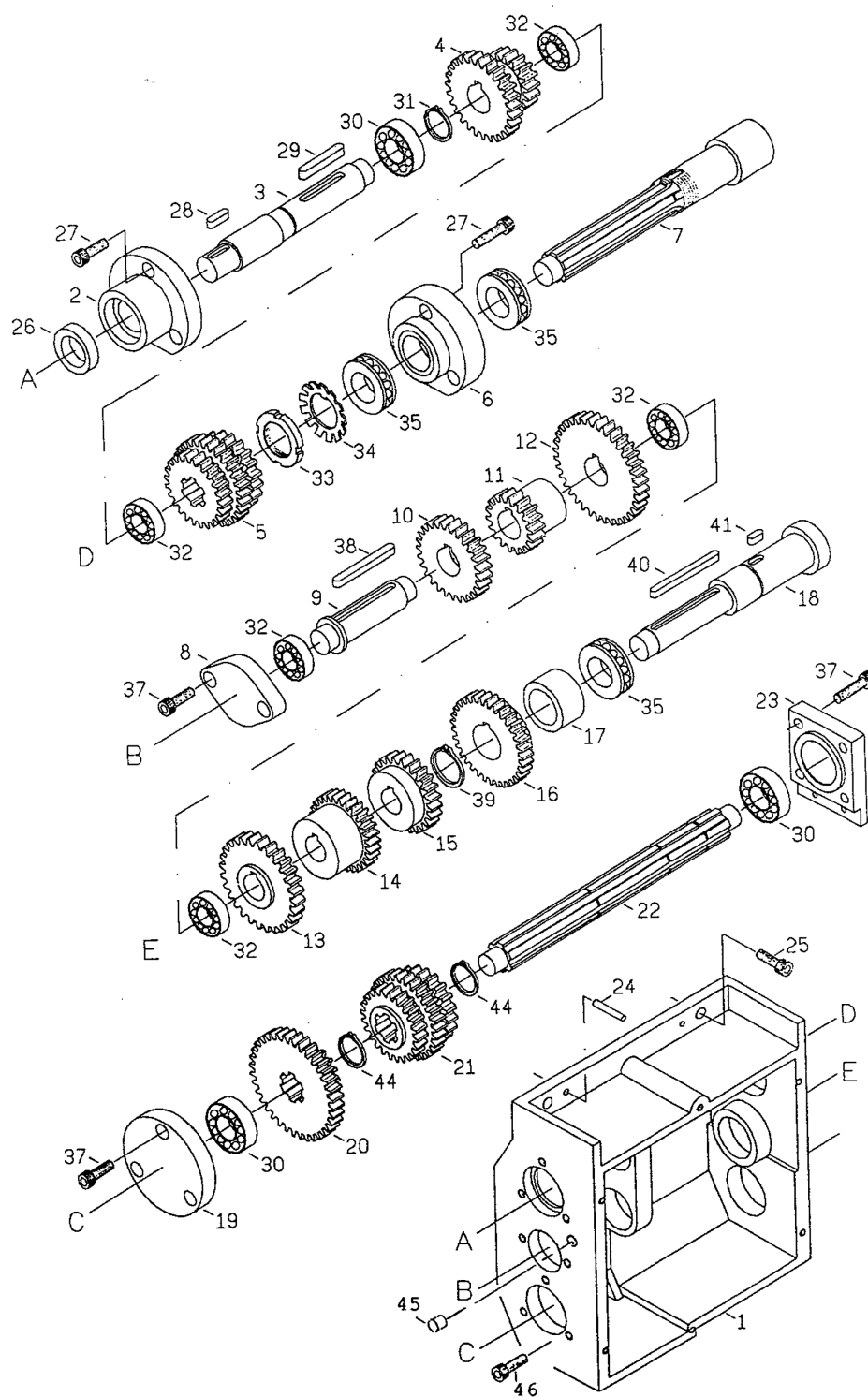


AL-1324 GEARBOX CASTING PARTS LIST

No	FACTORY CODE	DESCRIPTION	Qty.
1	2224	COVER	1
2	2225	HANDLE	1
3	2226	SHAFT	1
4	2227	HANDLE	1
5	2228	SHIFT LEVER	1
6	2229	SHIFT LEVER	1
7	2230	SHIFT FORK	3
8	2231	LEVER	2
9	2233	HANDLE	1
10	2234	SHIFT FORK	1
11	2241	SCREW (3/16x3/8 IN)	6
12	2248	SCREW (CAP 6mmx30mm)	6
13	2247	SET SCREW SPRING AND STEEL BALL	2
14	2251	KEY (5mmx10mm)	1
15	2244	OIL RING (P24)	1
16	2243	SPRING PIN (5mmx40mm)	1
17	2242	SPRING PIN (5mmx30mm)	1
18	2250	PVC KNOB	2
19	2253	SET SCREW SPRING AND STEEL BALL	2
20	2246	OIL RING (P34)	2
21	2245	SNAP RING (S40)	2
22	2249	INDEXING PLATE	2
23	2252	OIL SIGHT (29mm)	1
24	2254	GASKET	1
25	2232	HANDLE	1
26	2240	DATA PLATE	1

NOTE: SOME INDIVIDUAL PARTS MAY ONLY BE AVAILABLE AS AN ASSEMBLY

AL-1324 IMPERIAL GEARBOX DIAGRAM

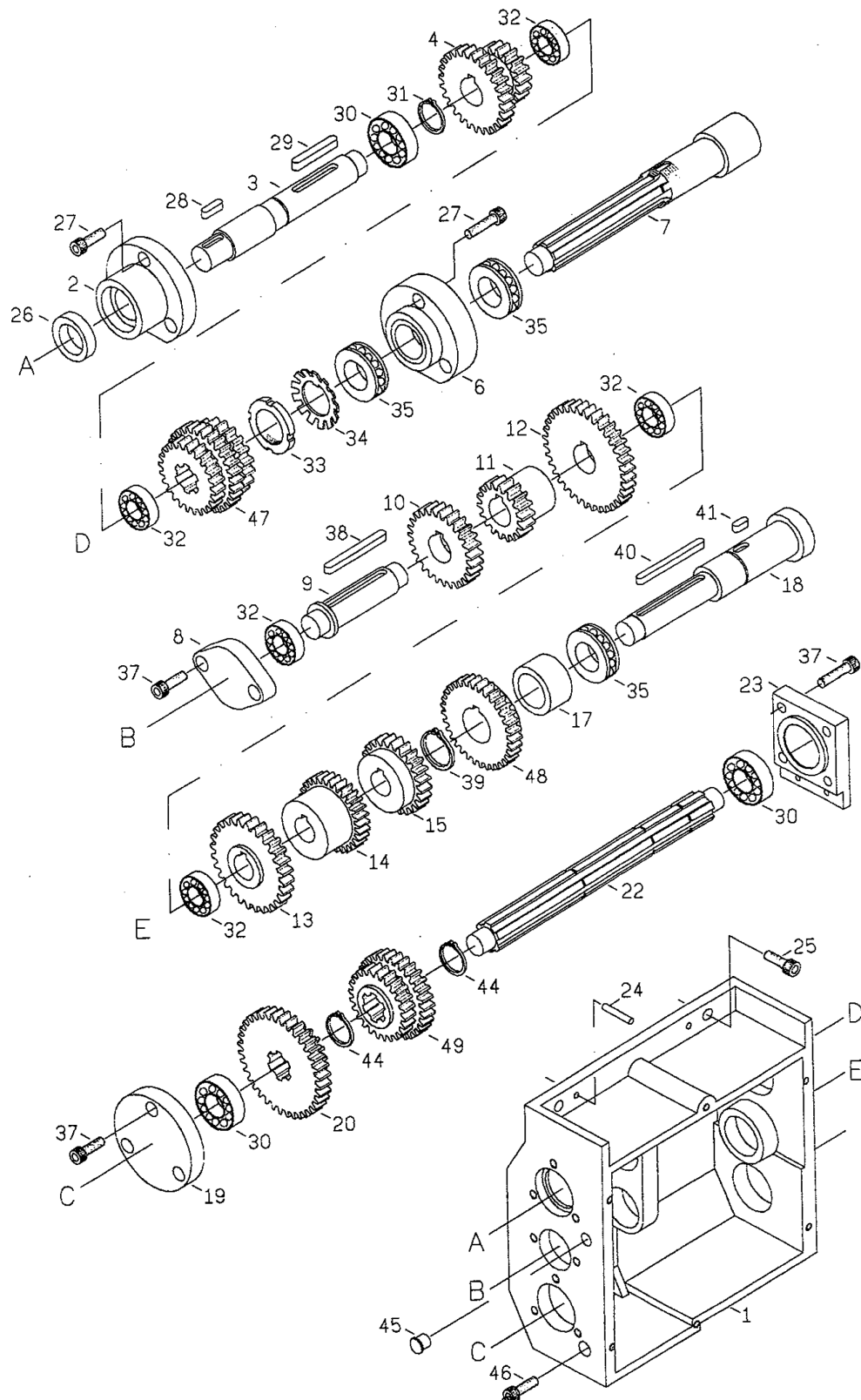


AL-1324 IMPERIAL GEARBOX LIST

No	FACTORY CODE	DESCRIPTION	Qty.
1	2201	GEAR BOX CASTING	1
2	2204	COVER	1
3	2202	SHAFT	1
4	2203	GEAR (M2x27TX18T)	1
5	2236	GEAR (14Px27Tx30T)(M2.25x21T)	1
6	2205	COVER	1
7	2206	SHAFT	1
8	2218	COVER	1
9	2208	SHAFT	1
10	2209	GEAR (M2x27T)	1
11	2210	GEAR (M2x18T)	1
12	2211	GEAR (M2x36T)	1
13	2217	GEAR (M2.25x28T)	1
14	2216	GEAR (14Px30T)	1
15	2215	GEAR (14Px24T)	1
16	2237	GEAR (14Px33T)	1
17	2212	SPACER	1
18	2213	SHAFT	1
19	2222	COVER	1
20	2220	GEAR (M2x36Tx18T)	1
21	2235	GEAR (14Px24Tx30T)(M2.25x20T)	1
22	2219	SHAFT	1
23	2223	COVER	1
24	2272	PIN (5mmx28mm)	2
25	2273	CAP SCREW (8mmx30mm)	3
26	2256	OIL SEAL (22x35x7)	1
27	2255	CAP SCREW (6mmx20mm)	6
28	2267	KEY (5mmx18mm)	1
29	2258	KEY (6mmx40mm)	1
30	2259	BEARING (6004)	3
31	2260	SNAP RING (S20)	1
32	2261	BEARING (6003)	5
33	2262	NUT	1
34	2269	WASHER	1
35	2263	THRUST (51105)	3
37	2275	CAP SCREW (6mmx20mm)	9
38	2268	KEY (6mmx55mm)	1
39	2266	SNAP RING (S25)	1
40	2264	KEY (5mmx60mm)	1
41	2265	KEY (5mmx12mm)	1
44	2274	SNAP RING (S22)	2
45	2276	OILER (5/16 IN)	1
46	2277	SCREW (CAP 8mmx10mm)	1

NOTE: SOME INDIVIDUAL PARTS MAY ONLY BE AVAILABLE AS AN ASSEMBLY

AL-1324 METRIC GEARBOX DIAGRAM

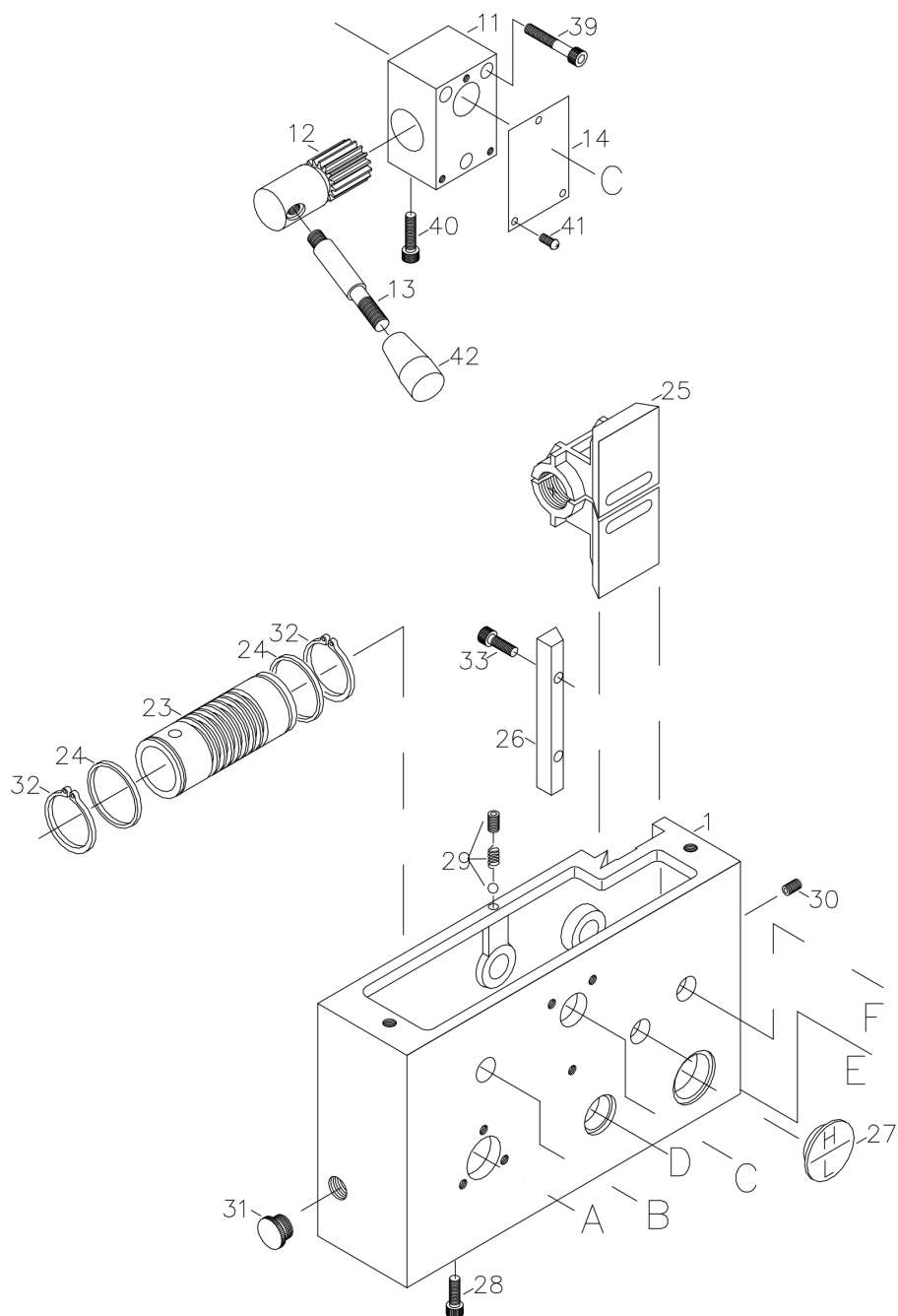


AL-1324 METRIC GEARBOX LIST

No	FACTORY CODE	DESCRIPTION	Qty.
1	2201	GEAR BOX CASTING	1
2	2204	COVER	1
3	2202	SHAFT	1
4	2203	GEAR (M2x27TX18T)	1
47	2207	GEAR (M2.25x20T)(14Px30T)(M2x25T)	1
6	2205	COVER	1
7	2206	SHAFT	1
8	2218	COVER	1
9	2208	SHAFT	1
10	2209	GEAR (M2x27T)	1
11	2210	GEAR (M2x18T)	1
12	2211	GEAR (M2x36T)	1
13	2217	GEAR (M2.25x28T)	1
14	2216	GEAR (14Px30T)	1
15	2215	GEAR (14Px24T)	1
48	2214	GEAR (M2x30T)	1
17	2212	SPACER	1
18	2213	SHAFT	1
19	2222	COVER	1
20	2220	GEAR (M2x36Tx18T)	1
49	2221	GEAR (M2.25x21T)(14Px30T)	1
22	2219	SHAFT	1
23	2223	COVER	1
24	2272	PIN (5mmx28mm)	2
25	2273	CAP SCREW (8mmx30mm)	3
26	2256	OIL SEAL (22x35x7)	1
27	2255	CAP SCREW (6mmx20mm)	6
28	2267	KEY (5mmx18mm)	1
29	2258	KEY (6mmx40mm)	1
30	2259	BEARING (6004)	3
31	2260	SNAP RING (S20)	1
32	2261	BEARING (6003)	5
33	2262	NUT	1
34	2269	WASHER	1
35	2263	THRUST (51105)	3
37	2275	CAP SCREW (6mmx20mm)	9
38	2268	KEY (6mmx55mm)	1
39	2266	SNAP RING (S25)	1
40	2264	KEY (5mmx60mm)	1
41	2265	KEY (5mmx12mm)	1
44	2274	SNAP RING (S22)	2
45	2276	OILER (5/16 IN)	1
46	2277	SCREW (CAP 8mmx10mm)	1

NOTE: SOME INDIVIDUAL PARTS MAY ONLY BE AVAILABLE AS AN ASSEMBLY

AL-1324 APRON CASTING DIAGRAM

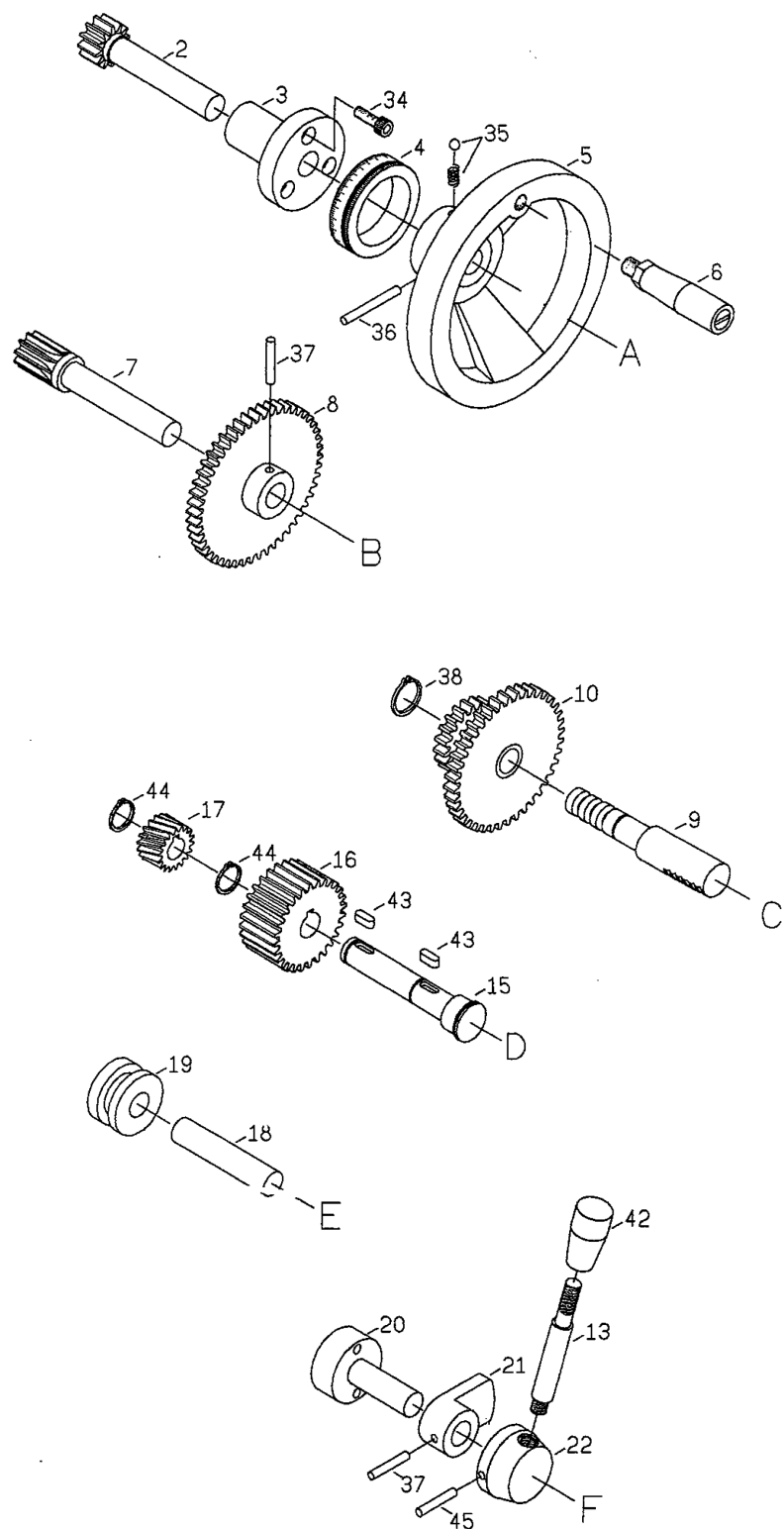


AL-1324 APRON CASTING LIST

No.	FACTORY CODE	DESCRIPTION	Qty.
10	2301	APRON CASTING	1
11	2316	BRACKET	1
12	2317	GEAR SHAFT (M1.5x16T)	1
13	2318	LEVER	2
14	2362	INDEXING PLATE	1
23	2309	WORM	1
24	2310	COLLAR	2
25	2325	HALF NUT CLUTCH	1
26	2326	GIB	1
27	2358	OIL SIGHT (29mm)	1
28	2357	CAP SCREW (8mmx 10mm)	1
29	2355	STEEL BALL SET SCREW AND SPRING	1
30	2354	SET SCREW (6mmx10mm)	3
31	2356	PLUG (5/8 IN)	1
32	2352	SNAP RING (S 30)	2
33	2353	CAP SCREW (6mmx20mm)	2
39	2363	CAP SCREW (6mmx40mm)	4
40	2360	CAP SCREW (8mmx25mm)	1
41	2361	SCREW (3/16x3/8 IN)	3
42	2359	PVC KNOB	2

NOTE: SOME INDIVIDUAL PARTS MAY ONLY BE AVAILABLE AS AN ASSEMBLY

AL-1324 APRON GEAR AND SHAFT DIAGRAM



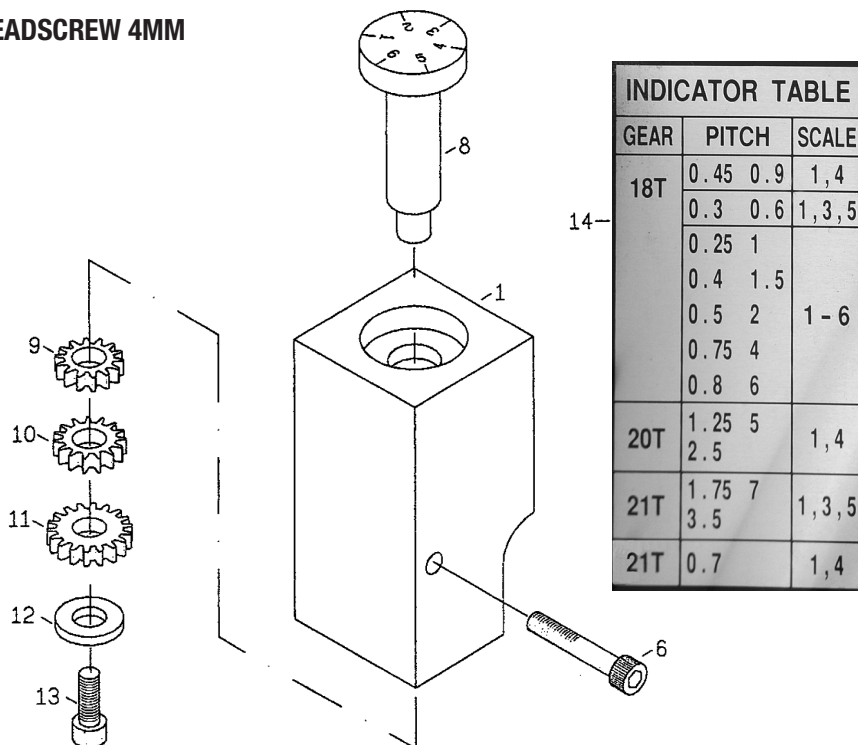
AL-1324 APRON GEAR AND SHAFT LIST

No	FACTORY CODE	DESCRIPTION	Qty.
2	2302	GEAR SHAFT(M2x12T)	1
3	2303	KEEPPASSY	1
4	2304	INDEX RING	1
5	2305	HANDWHEEL	1
6	2306	HANDLE	1
7	2307	GEAR SHAFT (M1.5x13T)	1
8	2308	GEAR (M2x50T)	1
9	2314	SHAFT	1
10	2315	GEAR(M2x22T)(M2x44T)	1
15	2311	SHAFT	1
16	2312	GEAR(M2x22T)	1
17	2313	GEAR(M1.5x 18T)	1
18	2319	SHAFT	1
19	2320	COLLAR	1
20	2321	SHAFT	1
21	2322	LEVER	1
22	2323	HANDLE	1
34	2340	CAP SCREW(6mmx16mm)	3
35	2341	STEEL BALL AND SPRING	1
36	2342	PIN (5mmx50mm)	1
37	2343	PIN (5mmx30mm)	2
38	2344	CIRCLIP (E12)	1
43	2348	KEY (5mmx14mm)	2
44	2346	SNAP RING (S14)	2
45	2351	PIN (5mmx40mm)	1

NOTE: SOME INDIVIDUAL PARTS MAY ONLY BE AVAILABLE AS AN ASSEMBLY

AL-1324 THREADING INDICATOR DIAGRAMS

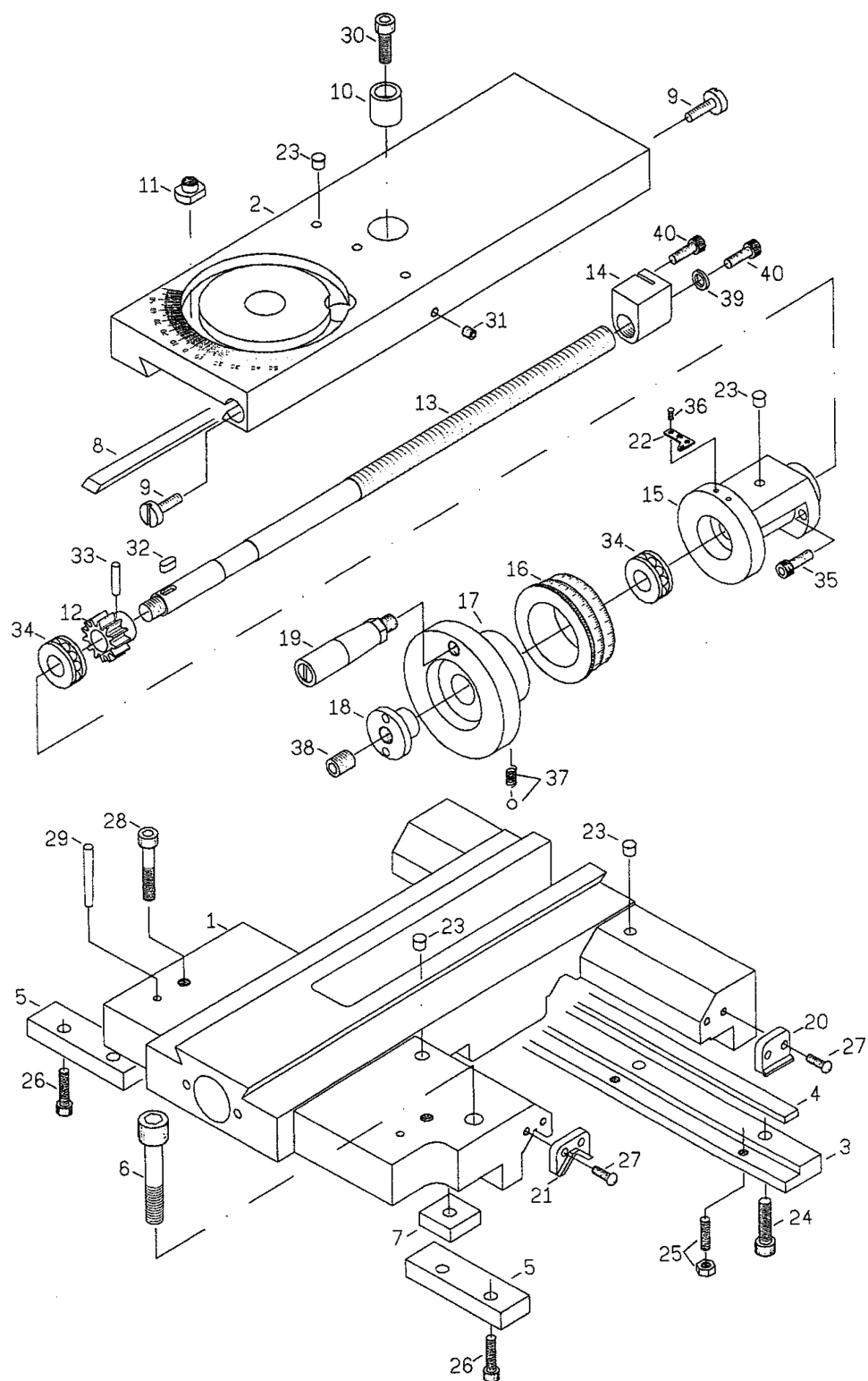
METRIC TYPE LEADSCREW 4MM



AL-1324 THREADING INDICATOR LIST

No	FACTORY CODE	DESCRIPTION	Qty.
1	2327	THREAD BODY INDICATOR	1
2	2328	THREAD DIAL BODY (INCH TYPE)	1
3	2329	GEAR (M2x16T)	1
4	2366	FLAT WASHER	1
5	2365	CAP SCREW (6mmx12mm)	1
6	2364	CAP SCREW (6mmx45mm)	1
7	2336	THREAD CHART PLATE (IN TYPE)	1
8	2328-1	THREAD DIAL BODY (METRIC TYPE)	1
9	2330	GEAR (MI.25x18T)	1
10	2331	GEAR (MI.25x20T)	1
11	2332	GEAR (MI.25x21T)	1
12	2366	FLAT WASHER	1
13	2365	CAP SCREW (6mmx12mm)	1
14	2337	THREAD CHART PLATE (METRIC TYPE)	1

AL-1324 SADDLE AND CROSS SLIDE DIAGRAM

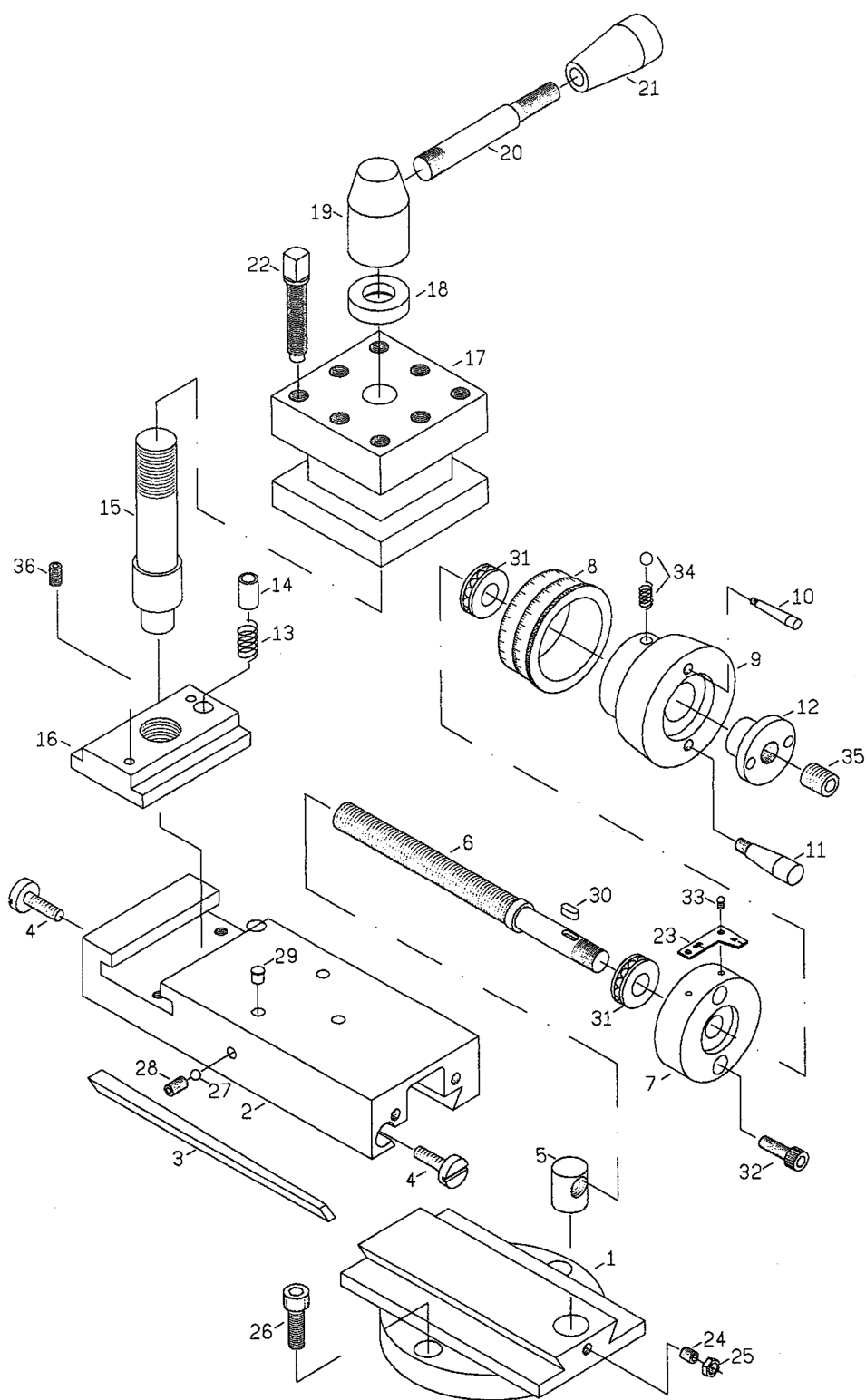


AL-1324 SADDLE AND CROSS SLIDE LIST

No	FACTORY CODE	DESCRIPTION	Qty.
1	2401	SADDLE CASTING	1
2	2402	CROSS-SLIDE	1
3	2403	CLAMP REAR	1
4	2404	GIB	1
5	2405	CLAMP FRONT	2
6	2406	CAP SCREW (7/16x2-1/2 IN)	1
7	2407	WASHER	1
8	2408	GIB	1
9	2409	GIB SCREW	2
10	2410	COLLAR	1
11	2419	NUT	2
12	2411	GEAR (M2x13T)	1
13	2412	SCREW	1
14	2413	NUT	1
15	2414	KEEP ASSY	1
16	2415	INDEX RING	1
17	2417	HANDWHEEL	1
18	2416	PLUG	1
19	2418	HANDLE	1
20	2439	WIPER	2
21	2440	WIPER	2
22	2465	DIAL	1
23	2450	OILER (1/4 IN)	5
24	2454	CAP SCREW (8mmx20mm)	3
25	2453	SCREW AND NUT	1
26	2451	CAP SCREW (8mmx16mm)	2
27	2452	SCREW (3/16x1/2 IN)	8
28	2466	CAP SCREW	2
29	2467	PIN	2
30	2462	CAP SCREW (8mmx20mm)	1
31	2461	CAP SCREW (8mmx20mm)	1
32	2460	KEY (5mmx12mm)	1
33	2459	PIN (5mmx22mm)	1
34	2457	THRUST (2902)	2
35	2458	CAP SCREW (6mmx25mm)	2
36	2468	NAIL (2mm)	2
37	2456	STEEL BALL AND SPRING	1
38	2455	SCREW (12mmx12mm)	1
39	2464	WASHER	1
40	2463	CAP SCREW (6mmx12mm)	2

NOTE: SOME INDIVIDUAL PARTS MAY ONLY BE AVAILABLE AS AN ASSEMBLY

AL-1324 TOP SLIDE DIAGRAM

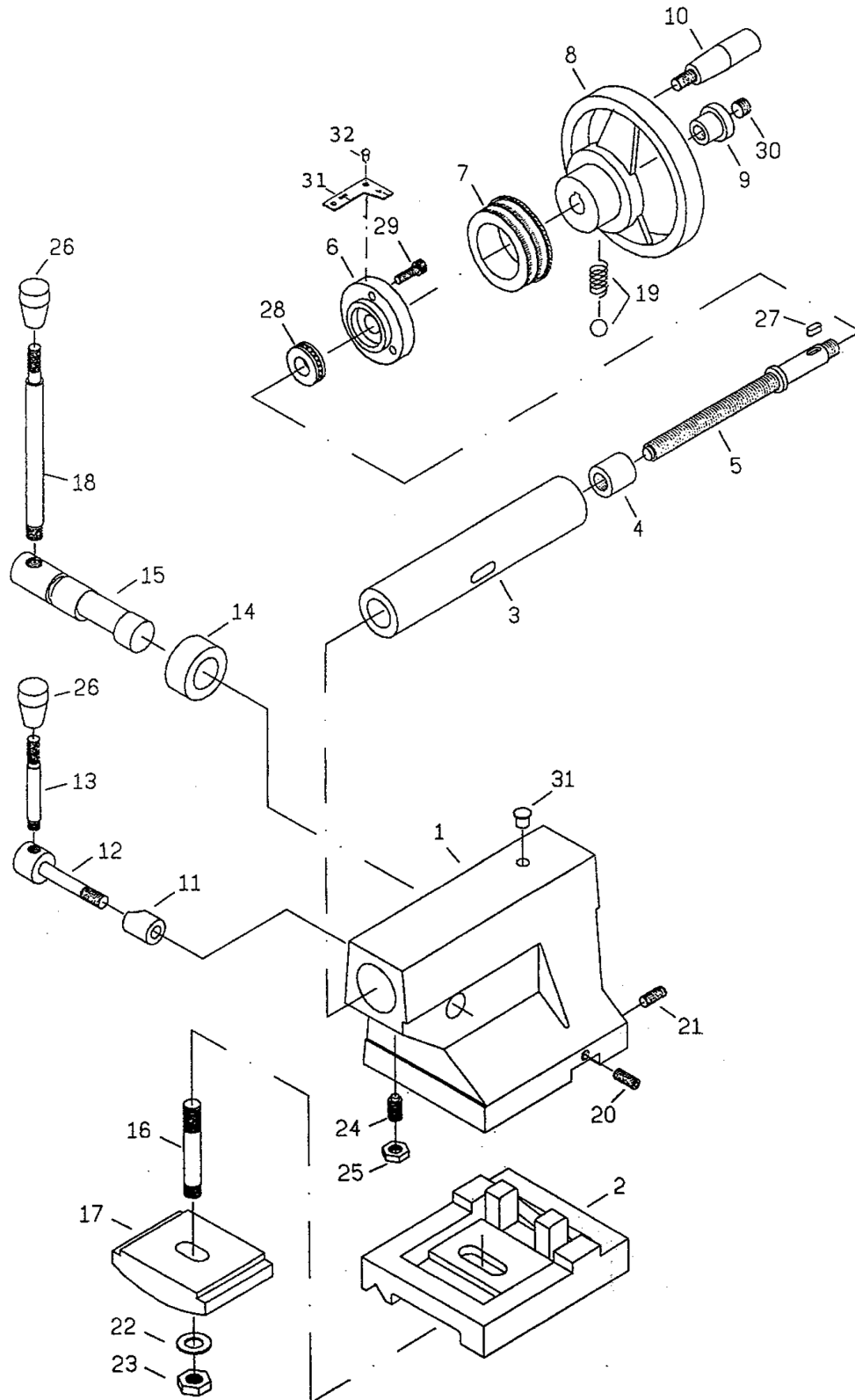


AL-1324 TOP SLIDE LIST

No	FACTORY CODE	DESCRIPTION	Qty.
1	2420	SWIVEL SLIDE	1
2	2421	TOP-SLIDE (T-SLOT)	1
3	2422	GIB	1
4	2423	SCREW	2
5	2424	NUT	1
6	2425	LEAD SCREW	1
7	2426	BRACKET	1
8	2427	INDEXING RING	1
9	2428	HANDWHEEL	1
10	2429	GRIP (LONG)	1
11	2430	GRIP (SHORT)	1
12	2416	NUT	1
13	2442	SPRING	1
14	2431	PIN	1
15	2432	BOLT	1
16	2441	T-SLOT NUT	1
17	2433	4-WAY TOOL POST	1
18	2434	WASHER	1
19	2435	HUB	1
20	2436	LEVER	1
21	2437	PVC KNOB	1
22	2438	SCREW (3/8 IN)	8
23	2443	DIAL	1
24	2463	SET SCREW (6mmx12mm)	1
25	2444	NUT	1
26	2462	CAP SCREW (8mmx16mm)	2
27	2445	STEEL BALL	1
28	2469	SCREW	1
29	2450	OIL CAP (1/4 IN)	3
30	2464	KEY (4mmx10mm)	1
31	2465	THRUST BEARING (51101)	2
32	2466	CAP SCREW (6mmx25mm)	2
33	2446	NAIL (2mm)	2
34	2467	STEEL BALL & SPRING	1
35	2455	SCREW (12mmx12mm)	1
36	2468	SET SCREW	2

NOTE: SOME INDIVIDUAL PARTS MAY ONLY BE AVAILABLE AS AN ASSEMBLY

AL-1324 TAILSTOCK PARTS DIAGRAM

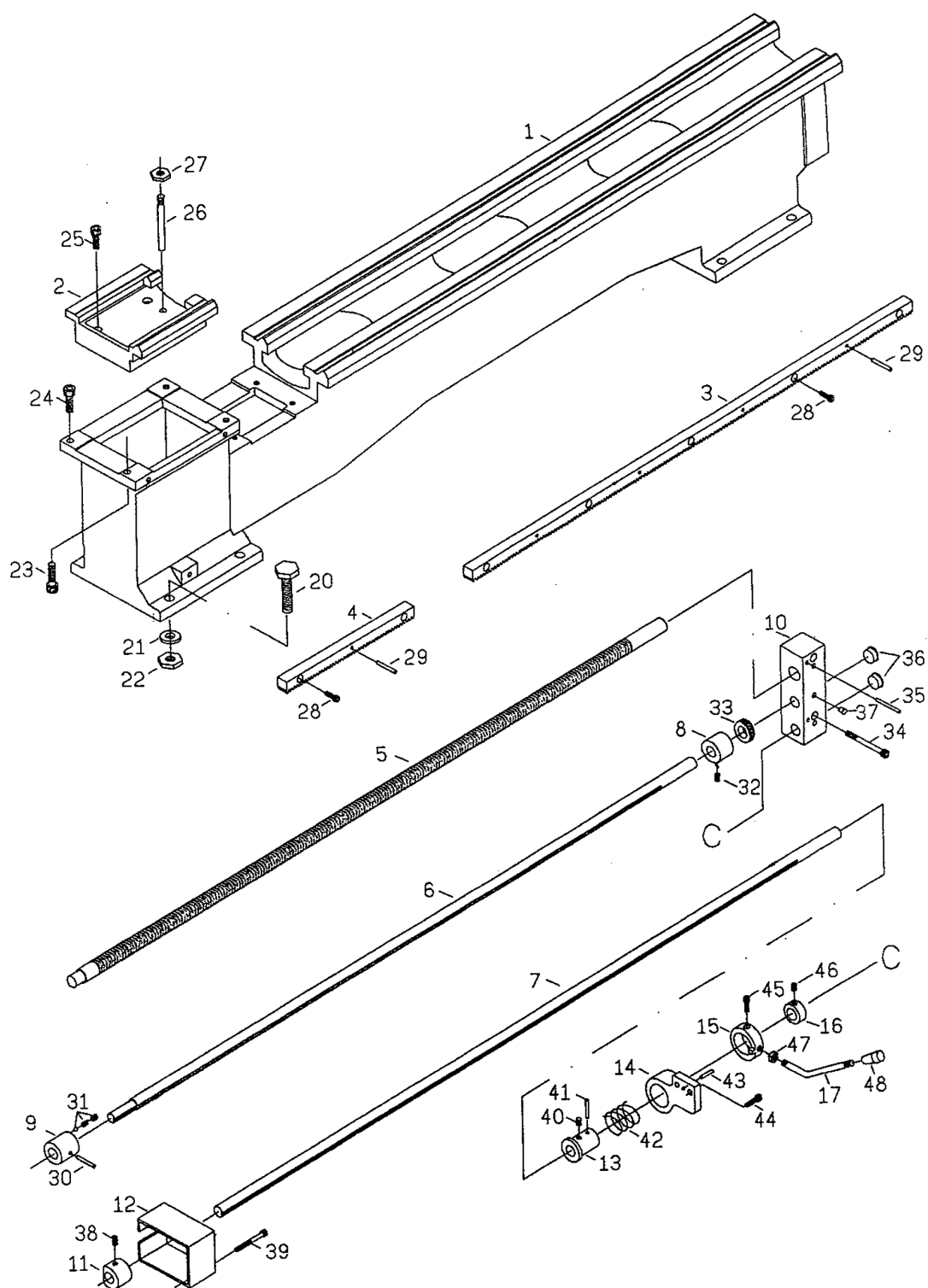


AL-1324 TAILSTOCK PARTS LIST

No	FACTORY CODE	DESCRIPTION	Qty.
1	2501	TAILSTOCK CASTING	1
2	2502	TAILSTOCK BASE	1
3	2503	TAILSTOCK BARREL	1
4	2504	NUT	1
5	2505	FEED SCREW	1
6	2506	BRACKET	1
7	2507	DIAL	1
8	2508	HANDWHEEL	1
9	2509	NUT	1
10	2510	HANDLE	1
11	2511	NUT	1
12	2512	SHAFT	1
13	2513	LEVER	1
14	2514	COLLAR	1
15	2515	CAM SHAFT	1
16	2516	CLAMP STUD	1
17	2517	CLAMP	1
18	2518	CLAMP HANDLE LEVER	1
19	2519	STEEL BALL & SPRING	1
20	2520	SET SCREW (8mmx30mm)	2
21	2521	SET SCREW (8mmx30mm)	2
22	2522	WASHER	1
23	2523	NUT	1
24	2524	CAP SCREW (8mmx20mm)	1
25	2525	NUT	1
26	2526	PVC KNOB	2
27	2528	KEY (5mmx 12mm)	1
28	2529	THRUST BEARING(2902)	1
29	2530	CAP SCREW (6mmx20mm)	3
30	2531	SCREW (12mmx 12mm)	1
31	2527	DIAL	1
32	2532	SCREW(3/ 16"x3/8")	2
33	2533	OIL CAP(1/4")	1

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AL-1324 BED PARTS DIAGRAM

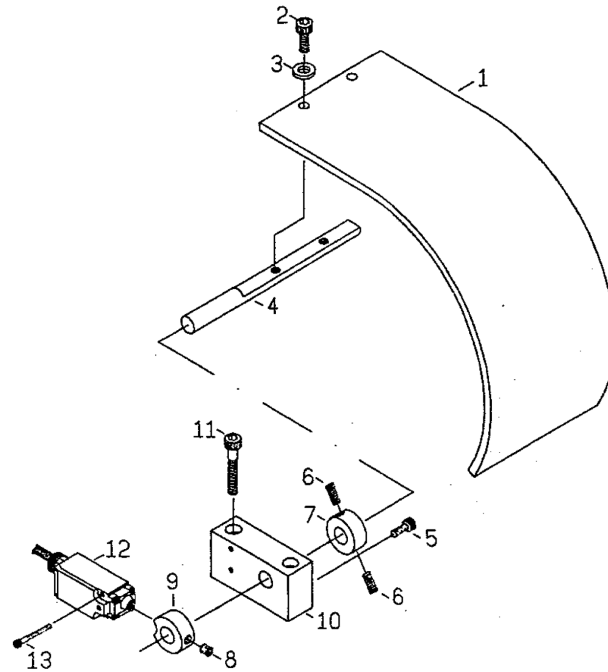


AL-1324 BED PARTS LIST

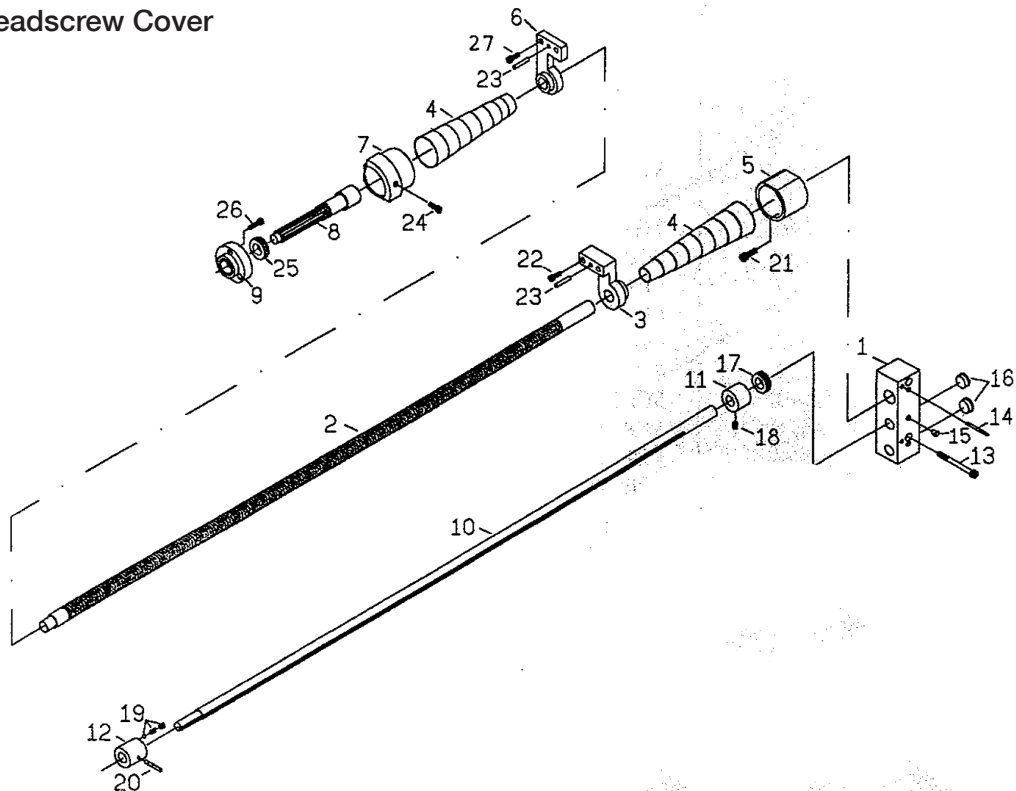
No	FACTORY CODE	DESCRIPTION	Qty.
1	2601	BED	1
2	2602	GAP	1
3	2603	RACK	1
4	2604	RACK	1
5	2605	LEAD SCREW (4 T.P.I.)(4 MM)	1
6	2606	SHAFT	1
7	2607	FOR/REV CONTROL.THIRD-ROD SHAFT	1
8	2609	COLLAR	1
9	2608	COLLAR	1
10	2617	END BRACKET	1
11	2611	BUSH	1
12	2610	BOX	1
13	2612	BUSHING	1
14	2613	BRACKET	1
15	2614	BUSH	1
16	2615	BUSH	1
17	2616	LEVER	1
18	2630	PVC KNOB	1
20	2634	SCREW (CAP 1/2"x2")	6
21	2621	WASHER	6
22	2622	NUT	6
23	2623	SCREW (CAP 10mmx40mm)	2
24	2624	SCREW (CAP 10mmx35mm)	2
25	2632	SCREW (CAP 10mmx35mm)	4
26	2633	SCREW TAPER PIN	2
27	2627	NUT	2
28	2636	SCREW (CAP 6mmx20mm)	6
29	2635	PIN (5mmx28mm)	4
30	2637	SCREW (SET 8mmx 12mm)	1
31	2638	STEEL BALL AND SPRING	2
32	2639	SCREW (SET 8mmx10mm)	1
33	2640	THRUST (#51104)	1
34	2651	SCREW (8mmx60mm)	2
35	2650	PIN (5mmx50mm)	2
36	2658	PLUG	2
37	2649	OIL CUP (1/4")	3
38	2642	SCREW (SET 8mmx10mm)	1
39	2641	SCREW (CAP 6mmx16mm)	2
40	2628	SCREW (SET 6mmx16mm)	1
41	2629	PIN (5mmx28mm)	1
42	2643	SPRING	1
43	2646	PIN (5mmx28mm)	1
44	2644	SCREW (CAP 6mmx20mm)	2
45	2645	SCREW (CAP 6mmx10mm)	1
46	2648	SCREW (SET 8mmx8mm)	1
47	2647	NUT	1

AL-1324 CHUCK GUARD & COVER DIAGRAM

Chuck Guard



Leadscrew Cover

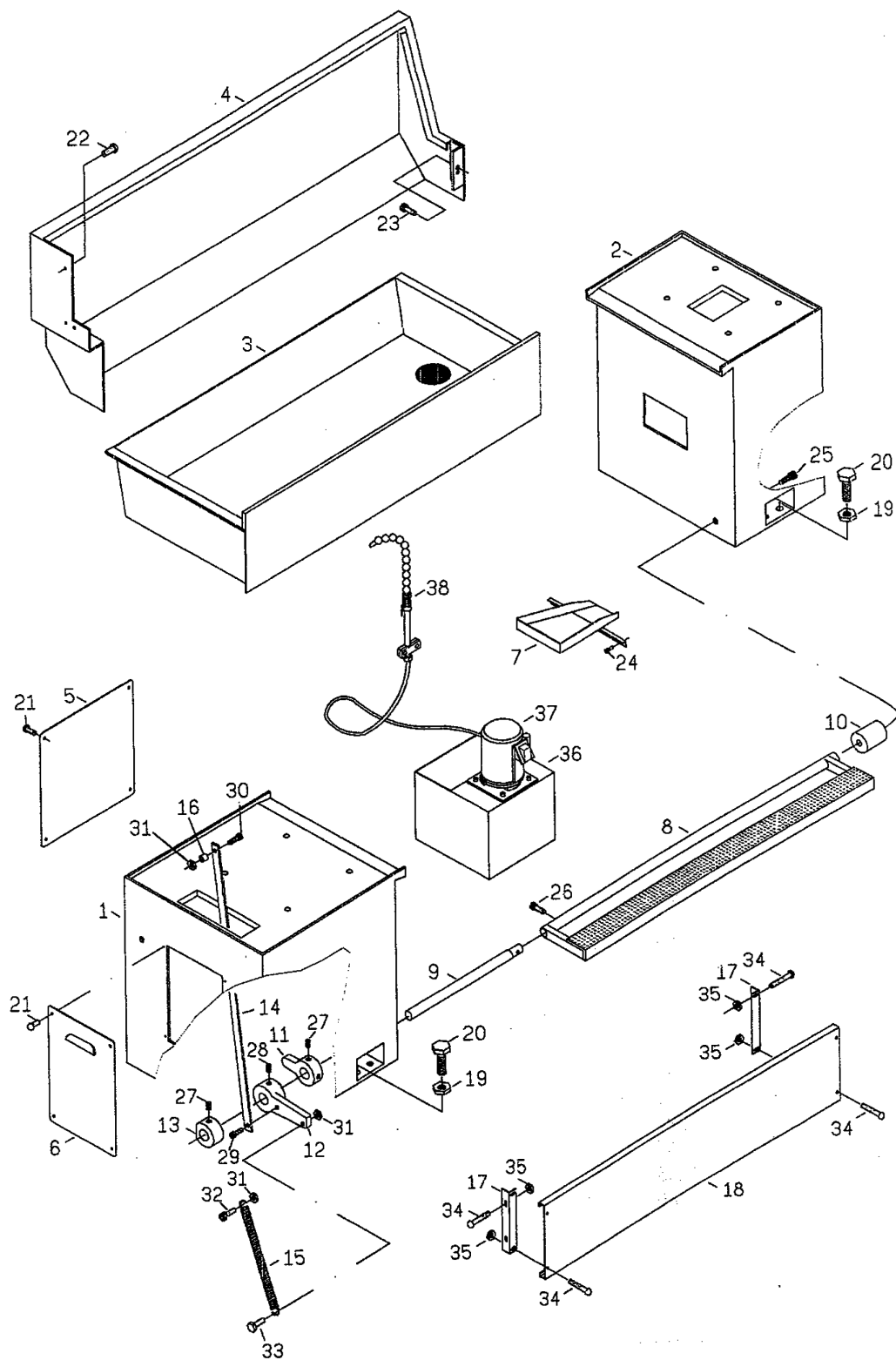


AL-1324 CHUCK GUARD & COVER LIST

No	FACTORY CODE	DESCRIPTION	Qty.
		CHUCK GUARD	
1	2901	COVER	1
2	2912	CAP SCREW (8mmx20mm)	2
3	2913	WASHER	2
4	2914	ROD	1
5	2911	SCREW (CAP 6mmx16mm)	1
6	2906	SCREW (SET 8mmx20mm)	2
7	2907	COLLAR	1
8	2908	SCREW (SET 8mmx10mm)	1
9	2909	COLLAR	1
10	2910	FRAME	1
11	2903	SCREW (CAP 8mmx55mm)	2
12	2902	SWITCH AND COVER	1
13	2904	SCREW (CAP 4mmx30mm)	2
		LEADSCREW COVER	
1	2617	END BRACKET	1
2	2605	LEAD SCREW	1
3	2625	ARM	1
4	2668	PROTECTION HOOD	2
5	2626	BUSH	1
6	2620	ARM	1
7	2618	COVER	1
8	2206	SHAFT	1
9	2205	COVER	1
10	2606	SHAFT	1
11	2609	COLLAR	1
12	2608	COLLAR	1
13	2651	SCREW (CAP 8mmx60mm)	2
14	2650	PIN (5mmx50mm)	2
15	2649	OIL CUP (1/4")	3
16	2658	PLUG	2
17	2667	THRUST (51104)	1
18	2666	SCREW (SET 8mmx10mm)	1
19	2665	STEEL BALL SPRING & SCREW	2
20	2664	SCREW (SET 8mmx12mm)	1
21	2661	SCREW (CAP 6mmx20mm)	2
22	2663	SCREW (CAP 8mmx50mm)	2
23	2653	PIN (5mmx50mm)	2
24	2662	SCREW (CAP 8mmx16mm)	1
25	2263	THRUST (51105)	1
26	2255	SCREW (CAP 6mmx20mm)	3
27	2660	SCREW (CAP 8mmx30mm)	2

NOTE: SOME INDIVIDUAL PARTS MAY ONLY BE AVAILABLE AS AN ASSEMBLY

AL-1324 PUMP AND CABINET DIAGRAM

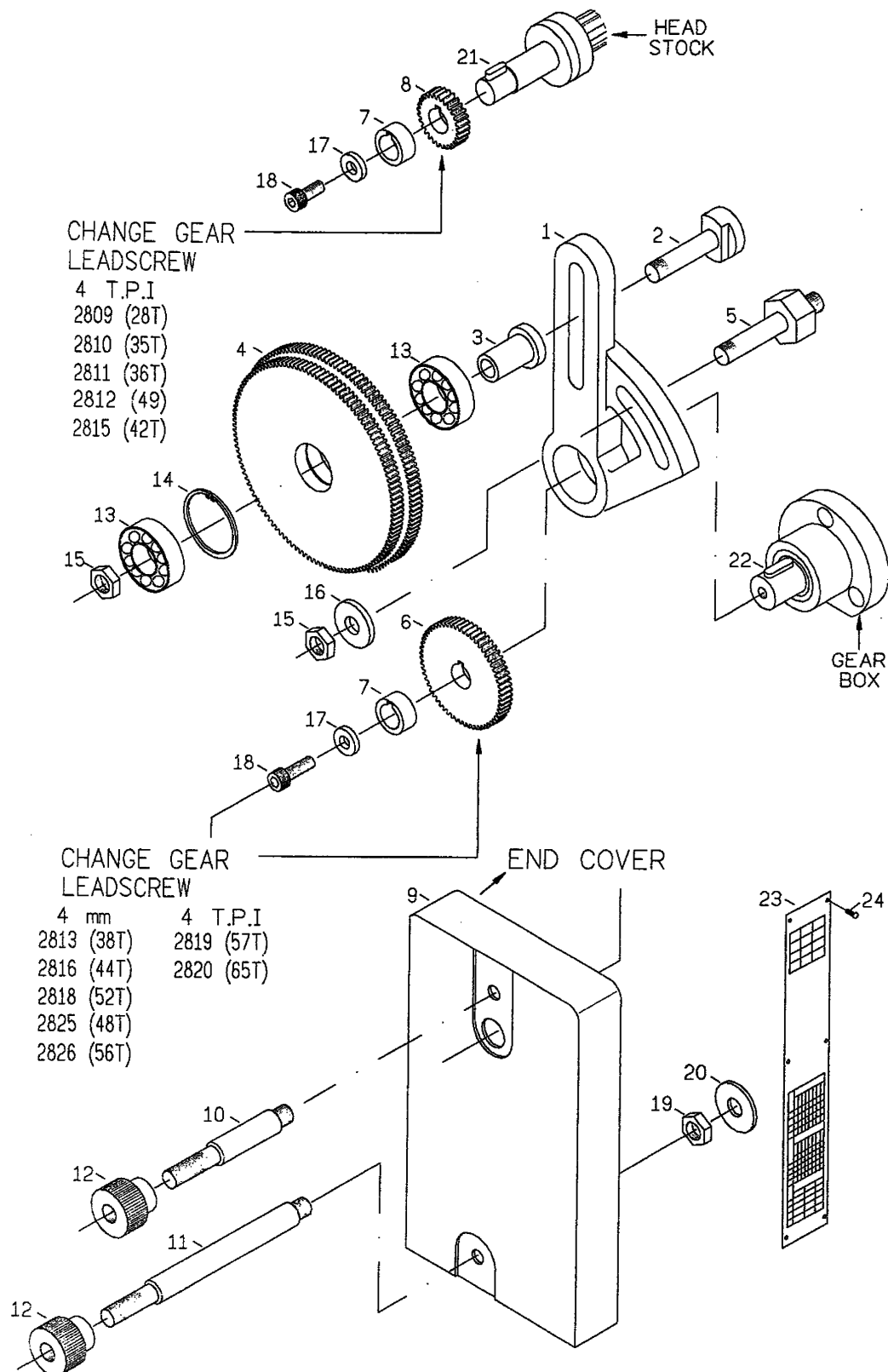


AL-1324 PUMP AND CABINET LIST

No	FACTORY CODE	DESCRIPTION	Qty.
1	2701	LEFT PEDESTAL HEAD-END	1
2	2702	RIGHT PEDESTAL TAIL-END	1
3	2704	CHIP PAN	1
4	2705	SPLASH GUARD	1
5	2709	COVER	1
6	2708	COVER	1
7	2707	CHUTE	1
8	2703	FOOT BRAKE PEDAL	1
9	2715	CONNECTOR SHAFT	1
10	2716	COLLAR	1
11	2714	LEVER	1
12	2713	LEVER	1
13	2712	COLLAR	1
14	2711	BAR	1
15	2745	SPRING	1
16	2730	WASHER	1
17	2719	BAR	2
18	2718	CONNECT PLATE	1
19	2710	NUT	2
20	2732	SCREW (1/2"x2")	4
21	2741	SCREW (6mmx12mm)	8
22	2737	SCREW (CAP 6mmx12mm)	3
23	2736	SCREW (CAP 8mmx20mm)	1
24	2735	SCREW (CAP 6mmx16mm)	2
25	2734	SCREW (CAP 8mmx20mm)	1
26	2733	SCREW (CAP 8mmx20mm)	2
27	2742	SCREW (SET 10mmx20mm)	2
28	2743	SCREW (SET 10mmx40mm)	2
29	2731	SCREW (CAP 8mmx10mm)	1
30	2740	SCREW (8mmx10mm)	1
31	2746	NUT	3
32	2738	SCREW (CAP 8mmx25mm)	1
33	2739	SCREW (8mmx30mm)	1
34	2747	SCREW (6mmx16mm)	8
35	2748	NUT	8
36	2706	TANK	1
37	2717	PUMP (1/8 HP)	1
38	2720	HOSE	1

NOTE: SOME INDIVIDUAL PARTS MAY ONLY BE AVAILABLE AS AN ASSEMBLY

AL-1324 END GEARS AND COVER DIAGRAM

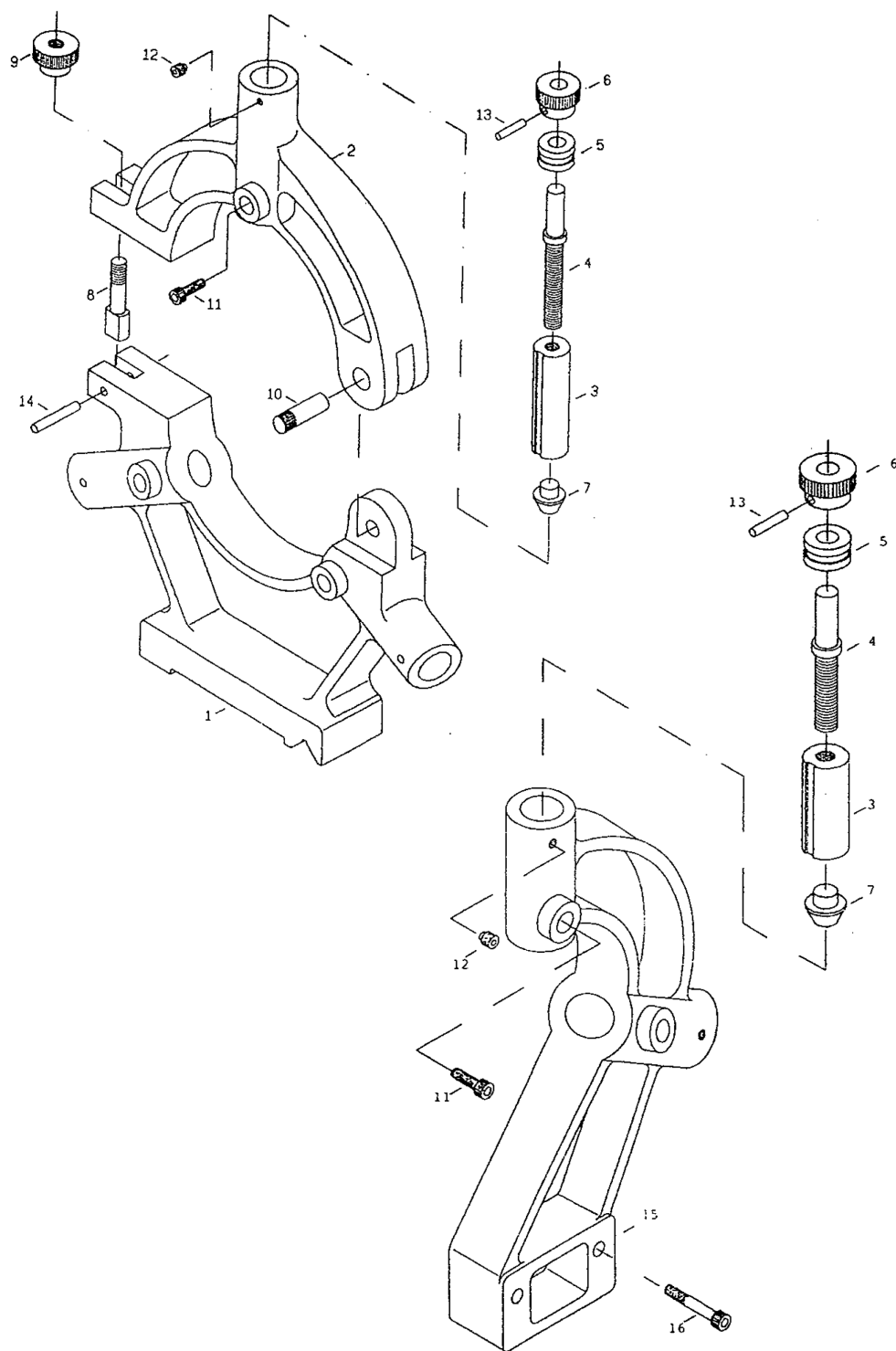


AL-1324 END GEARS AND COVER LIST

No	FACTORY CODE	DESCRIPTION	Qty.
1	2801	SWING FRAME	1
2	2802	BOLT	1
3	2803	COLLAR	1
4	2804	GEAR(M 1.25x 120T,127T)	1
5	2805	SCREW	1
6	2808	GEAR(1.25x60T)	1
7	2806	COLLAR	1
8	2807	GEAR(1.25x30T)	1
9	2821	END COVER	1
10	2822	STUD	1
11	2824	STUD	1
12	2823	NUT	2
13	2833	BEARING(6202Z)	2
14	2836	CIRCLIP(R 35)	1
15	2835	NUT	2
16	2837	WASHER	1
17	2839	WASHER	2
18	2840	SCREW(CAP 6mmx16mm)	2
19	2838	NUT	1
20	2831	WASHER	1
21	2830	KEY (5mrnx 18mm)	1
22	2841	KEY (5rnrnx 18mm)	1
23	2827	DATA PLATE	1
24	2817	SCREW (3/16"x3/8")	6
25	2809	CHANGE GEAR (MI.25x28T)	1
26	2810	CHANGE GEAR (MI.25x35T)	1
27	2811	CHANGE GEAR (MI.25x36T)	1
28	2812	CHANGE GEAR (MI.25x49T)	1
29	2815	CHANGE GEAR (MI.25x42T)	1
30	2813	CHANGE GEAR (MI.25x38T)	1
31	2816	CHANGE GEAR (MI.25x44T)	1
32	2818	CHANGE GEAR (M 1.25x52T)	1
33	2825	CHANGE GEAR (MI.25x48T)	1
34	2826	CHANGE GEAR (MI.25x56TJ)	1
35	2819	CHANGE GEAR (MI.25x57T)	1
36	2820	CHANGE GEAR (MI.25x65T)	1
37	2814	CHANGE GEAR (MI.25x40T)	1

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AL-1324 FIXED & TRAVELLING STEADIES DIAGRAM

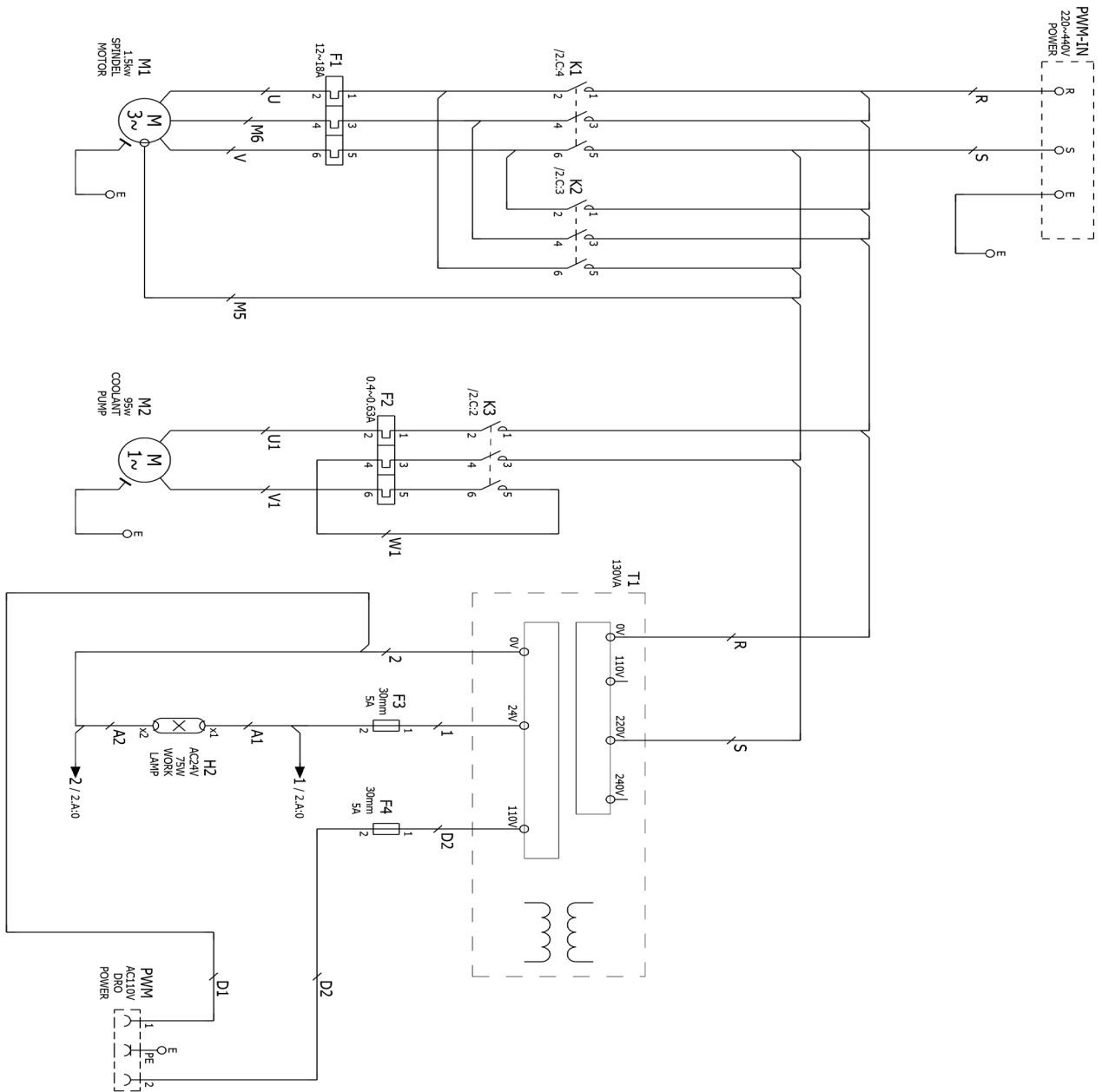


AL-1324 FIXED & TRAVELLING STEADIES LIST

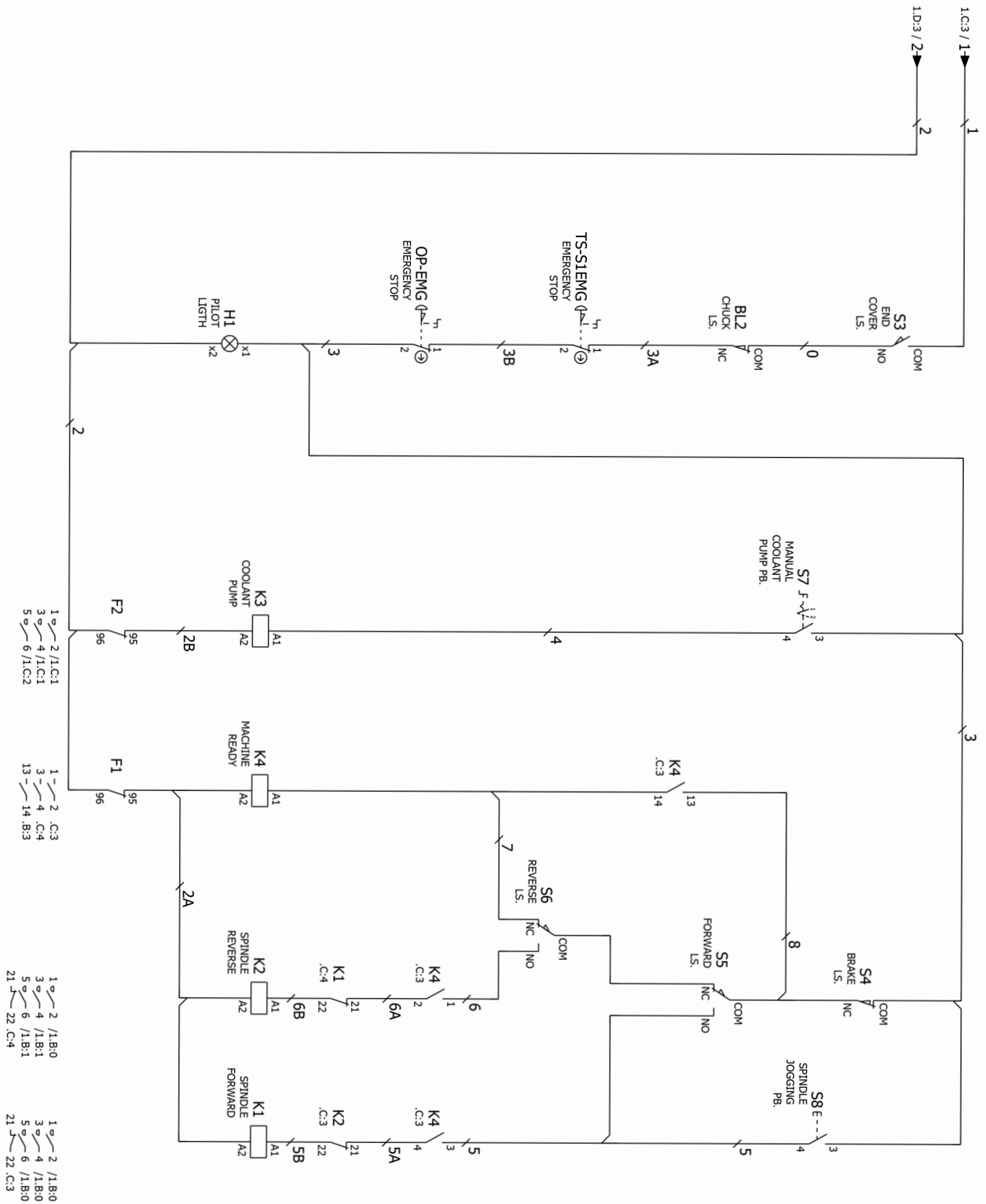
No	FACTORY CODE	DESCRIPTION	Qty.
1	2917	CASTING	1
2	2918	CASTING	1
3	2919	SHAFT	5
4	2920	SCREW	5
5	2905	COLLAR	5
6	2921	HANDLE	5
7	2922	SHAFT	5
8	2923	SCREW	1
9	2924	HANDLE	1
10	2925	SHAFT	1
11	2926	SCREW	5
12	2927	SCREW	5
13	2928	SPRING PIN	5
14	2929	SPRING PIN	1
15	2915	CASTING	1
16	2916	SCREW	2

NOTE: SOME INDIVIDUAL PARTS MAY ONLY BE AVAILABLE AS AN ASSEMBLY

AL-1324 WIRING DIAGRAM -1



AL-1324 WIRING DIAGRAM -2





ENVIRONMENT PROTECTION

Recycle unwanted materials instead of disposing of them as waste. All tools, accessories and packaging should be sorted, taken to a recycling centre and disposed of in a manner which is compatible with the environment. When the product becomes completely unserviceable and requires disposal, drain any fluids (if applicable) into approved containers and dispose of the product and fluids according to local regulations.

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