

HAFCO METALMASTER



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Instruction Manual

CENTRE LATHE AL-1440V

Order Code: (L245VS)

MACHINE DETAILS

MACHINE.	CENTRE LATHE
MODEL NO.	AL-1440V
SERIAL NO.	
DATE OF MANF.	

Imported by

Australia



www.machineryhouse.com.au

New Zealand



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)

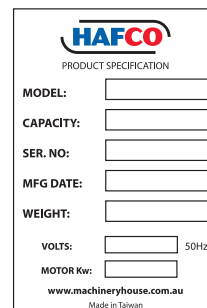


FIG. 1

CONTENTS:

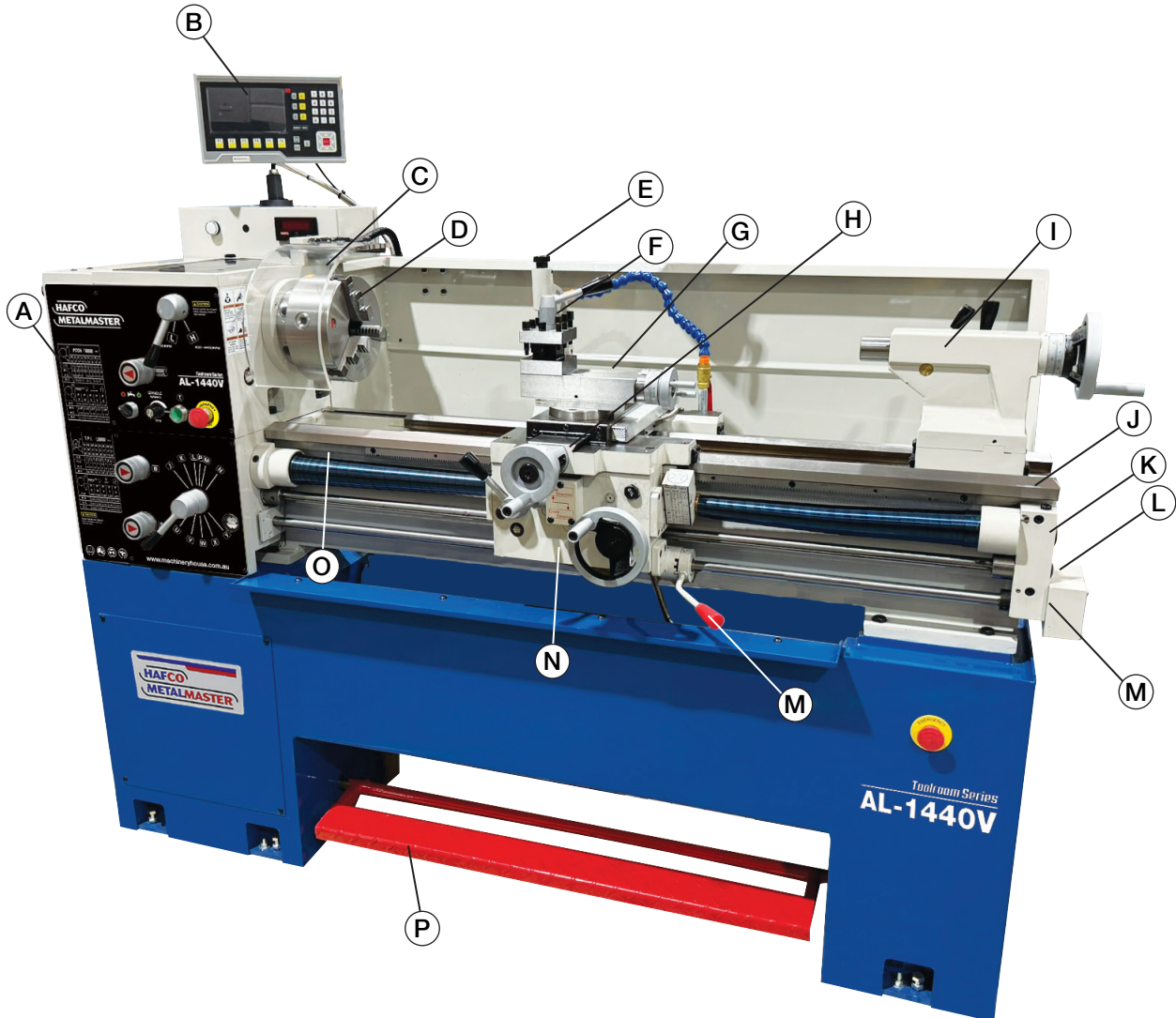
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1.1 SPECIFICATIONS

Order Code	L245VS
Model	AL-1440V
Swing Over Bed (mm)	356
Distance Between Centres (mm)	1000
Spindle Bore (mm)	51
Swing In Gap (mm)	516
Swing Over Cross-slide (mm)	225
Digital Readout System Fitted	Yes
Leadscrew	Metric
Leadscrew Covers Fitted	Yes
Taper Turning Attachment	Optional
Coolant System	Yes
Tool Height To Suit (mm)	16
Centre Height (mm)	178
Spindle Nose Size or Type	D1-5 Camlock
Bed Width (mm)	230
Headstock Spindle Taper (MT)	6
Tailstock Taper (MT)	3
Cross Slide Travel (mm)	175
Compound Slide Travel (mm)	100
Metric Cross Feed (X-Axis) (mm/rev)	0.033 - 0.467
Metric Longitudinal Feed (Z-Axis) (mm/rev)	0.066 - 0.935
Metric Thread Steps & Pitch (No./mm)	32 (0.4 - 7.0)
Imperial Thread Steps & TPI (No./TPI)	32 (4 - 56)
3 Jaw Chuck Diameter (mm)	200
4 Jaw Chuck Diameter (mm)	200
Spindle Steps / Speeds (No. / rpm)	Variable (30 - 2200)
Motor Power (kW / hp)	3.75 / 5
Voltage / Amperage (V / amp)	240 / 15
Nett Weight (kg)	840

1.3 IDENTIFICATION

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



A	Headstock	I	Tailstock
B	Digital Readout	J	Bed
C	Chuck Guard	K	Covered Leadscrew
D	3 Jaw Chuck	L	Feed Shaft
E	Travelling Steady	M	Motor Control Shaft
F	4 Way Toolpost	N	Saddle
G	Top Slide	O	Bed Gap
H	Cross Slide	P	Foot Brake

2. IMPORTANT INFORMATION

2.1 GENERAL METALWORKING MACHINE SAFETY

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



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 authorization 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 required.
- ✓ Gloves should never be worn while operating the machine, and only worn when handling the work piece.
- ✓ 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 SAFETY REQUIREMENTS 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.



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.



WARNING!

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

2.1 GENERAL SAFETY REQUIREMENTS 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!

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.



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.

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 jewelry 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.
- × Do not 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 REQUIREMENTS

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. To minimize the risk of electrocution, fire, or equipment damage, these machines should be hard wired with installation work and electrical wiring done by a qualified electrician.

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.....	12.5 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 can be found on the motor nameplate.

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 preventive 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.

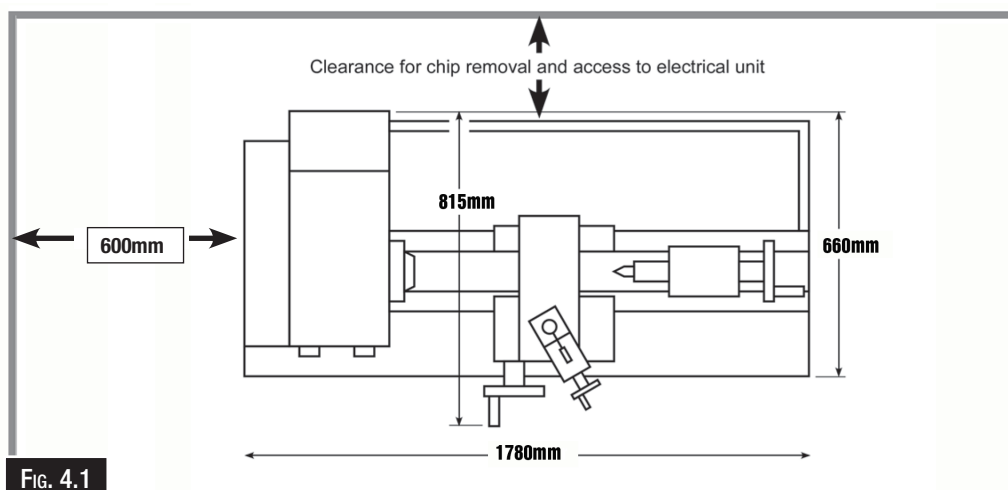
4.3 SITE PREPARATION

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.

SAFETY ZONE:

Make sure when placing the machine that enough room has been left to allow the operator to access the machine for maintenance and cleaning. (Fig. 4.1)



4.4 LIFTING INSTRUCTIONS

On the day that the machine arrives, make sure that a forklift or lifting device, 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.



WARNING

This machine is extremely heavy.

Serious personal injury may occur if safe moving methods are not followed. To be safe, you will need assistance and power equipment when moving the shipping crate and removing the machine from the crate.



LIFTING POINTS

When lifting the machine only certified lifting slings should be used. Ensure that when lifting, the machine does not tip over.

Check that the lifting slings do not interfere or damage any parts of the machine.

Hafco/Metalmaster recommend that lifting the machine be carried out by only persons with rigging training.

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. 4.2)

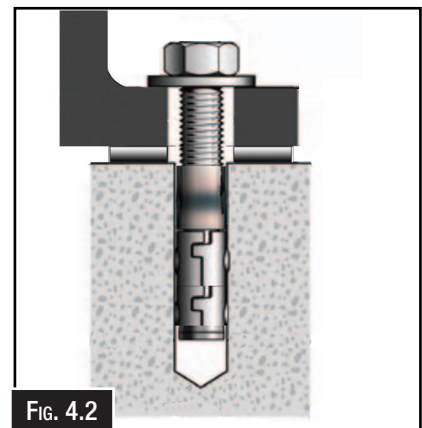


FIG. 4.2

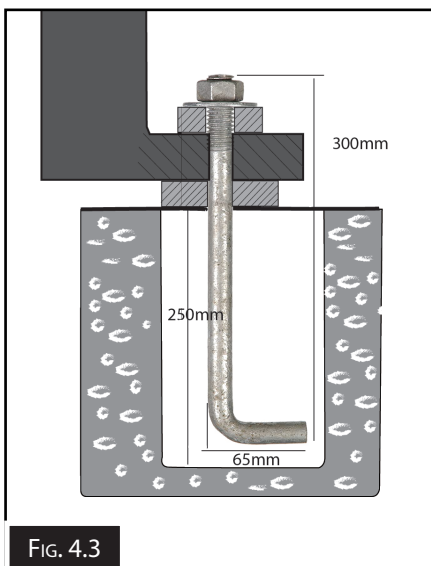


FIG. 4.3

In some cases a suitable foundation may not be available and a new one may need to be prepared.

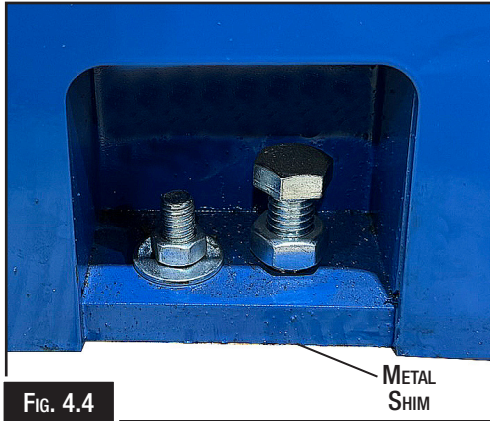
The foundation should be concrete approximately 250mm thick with pockets left clear for the hold down bolts. The hold down bolts can be "L" shape as per the example in Fig. 4.3

4.6 MACHINE LEVELLING

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 levelling is performed by loosening the hold down bolts, and then inserting metal shims under each jacking screw until the machine is level and does not rock. (Fig. 4.4). 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 and the lock nut on the jacking screw.



CAUTION!

The machine must not rest on supports other than those defined in Fig. 4.4

4.7 ASSEMBLY

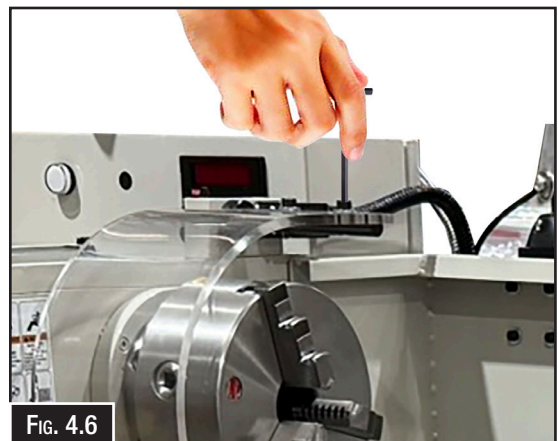
The machine must be fully assembled before it can be operated. First clean any parts that are coated in rust preventative to ensure the assembly process can proceed smoothly.

MOUNTING THE DIGITAL READOUT

The Digital Readout will need to be fitted by sliding the DRO over the mount. (Fig. 4.5)

CHUCK SAFETY GUARD

Assembly required will be the bolting on of the safety guard. (Fig. 4.6)



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 set up may result in malfunction or unexpected results that can lead to serious injury, death, or machine/property damage.

HEADSTOCK CONTROLS Fig.5.1

1. **High/Low Speed:** Changes the spindle speeds between the high and low range.
2. **Feed Direction:** Selects the direction of the feed shaft
3. **Coolant Switch:** Switches the coolant ON or OFF.
4. **Spindle Speed:** When turned increases or decreases the spindle speed.
5. **Joggle Button:** Allows for the spindle to be moved small amounts.
6. **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.

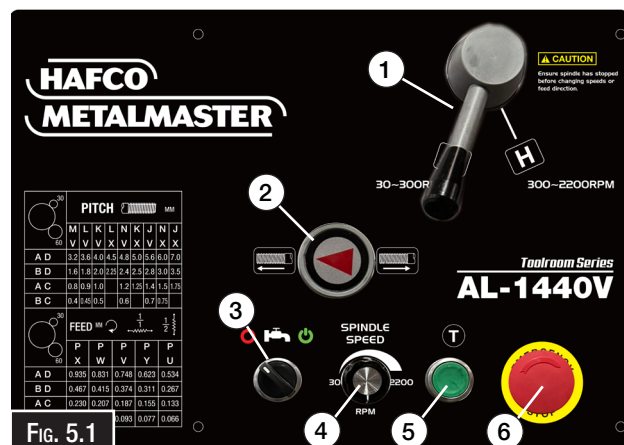


Fig. 5.1

GEARBOX CONTROLS Fig.5.2

- A. **Thread/Feed Selection:** Controls A and B positions on the feed chart.
- B. **Thread/Feed Selection:** Controls C and D positions on the feed chart.
- C. **Thread/Feed Selection:** Controls J to Y positions on the feed chart.

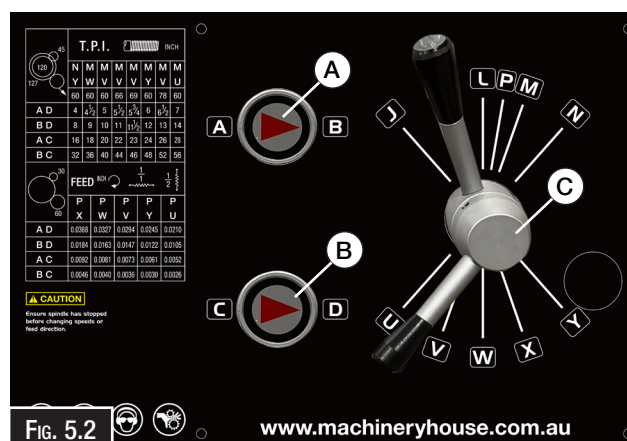
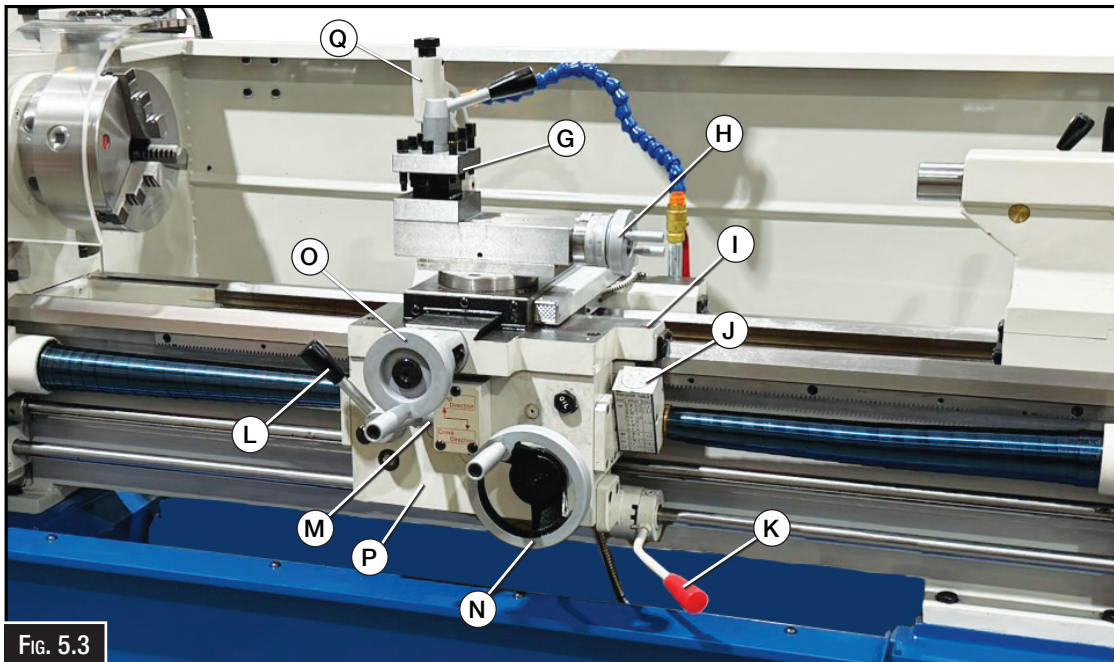


Fig. 5.2

SADDLE Fig.5.3



- G. Tool Post:** Allows the operator to load and unload tools.
- H. Compound Rest Hand wheel:** Moves the tool toward and away from the workpiece at the preset angle of the compound rest.
- I. Carriage Lock:** Secures the carriage in place for greater rigidity when it should not move.
- 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. Carriage Hand wheel:** Moves the carriage along the bed.
- O. Cross Slide Hand wheel:** Moves the cross slide toward and away from the workpiece.
- P. Apron:** Houses the carriage gearing.
- Q. Traveling Steady:** Travels with the saddle and is used to support thin materials and sits opposite the tool.



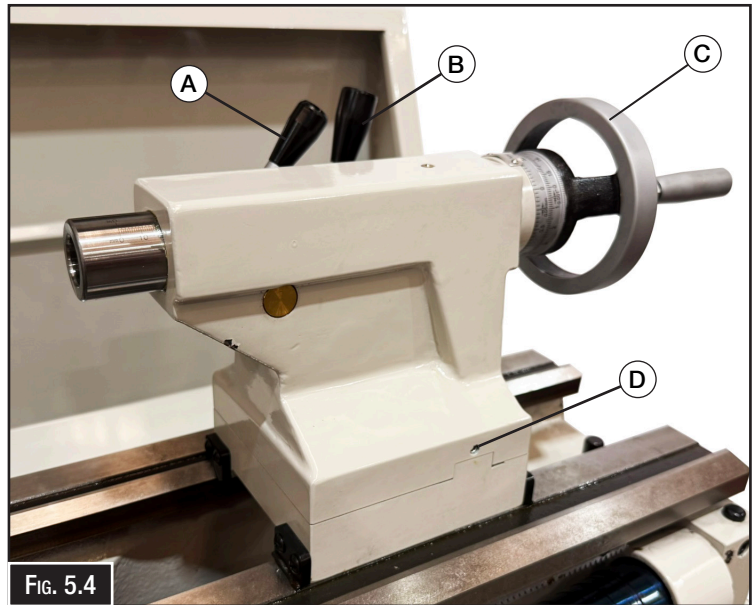
WARNING!

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.

TAILSTOCK Fig. 5.4

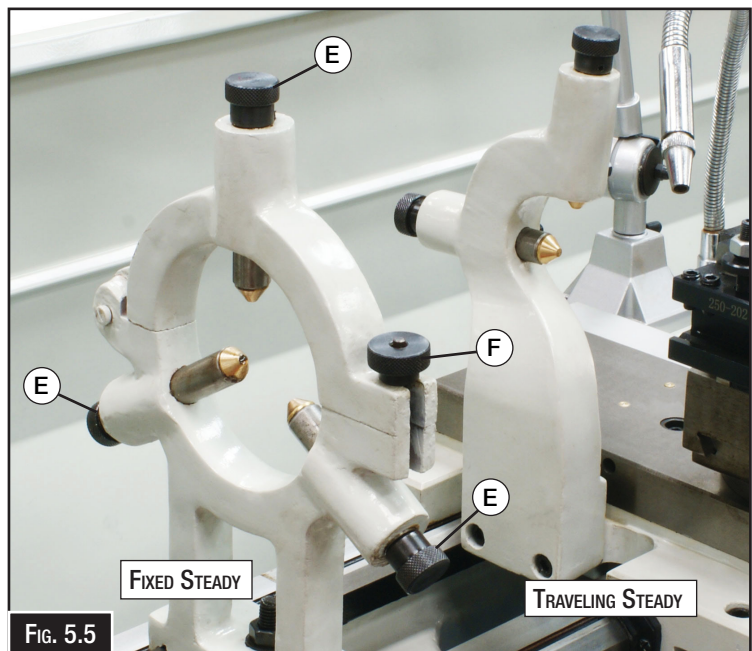
The tailstock has many functions. The main usage is for holding drill chucks and centers. The barrel has been etched with graduations in millimeters and inches and has a Morse taper #3 bore. The tailstock also can be offset to cut tapers.

- A. Top Lock Lever** - This lever locks the tailstock barrel in place.
- B. Side Lock Lever** - This lever locks the tailstock in place on the lathe bed.
- C. Tailstock Hand Wheel** - Turning the hand wheel advances or retracts the barrel in the tailstock. The graduated dial on the hand wheel is adjustable.
- D. Tailstock Adjustment** - Two grub screws, (one either side) control the adjustment of the tailstock when taper turning is required.



STEADIES Fig.5.5

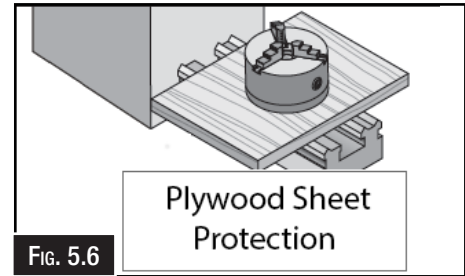
- E. Knurled Screws** - Moves the fingers in or out to allow for adjustment.
- F. Lock Nut** - When unlocked allows the fixed steady to be split to allow the steady to be placed around the work.



5.2 CHUCK & FACEPLATE MOUNTING

This lathe is equipped with a D1- 5 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. 5.6)



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.

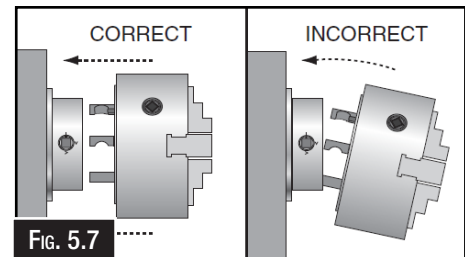
The chuck is properly installed when all camlocks are tight, the spindle and chuck tapers firmly lock together, and the back of the chuck is firmly seated against the face of the spindle all the way around without any gaps.

MOUNTING THE CHUCK

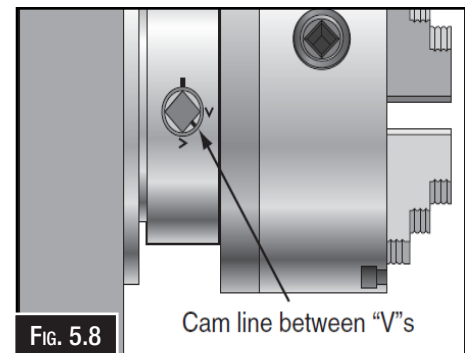
Clean and lightly oil the camlock studs, then thoroughly clean the mating surfaces of the spindle and chuck.

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. 5.7)



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. 5.8.



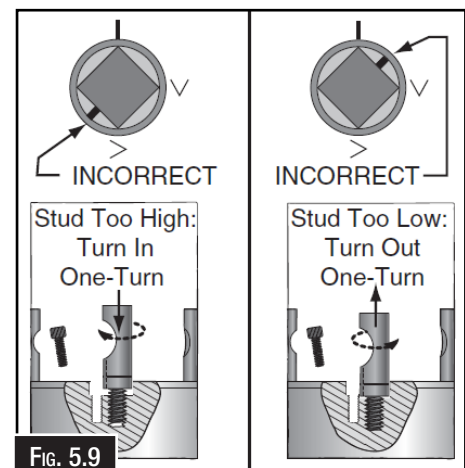
WARNING

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. 5.9). Make sure to re-install the stud cap screw afterwards.

If adjusting the stud height does not correct the problem, try swapping stud positions on the chuck.



5.3 SETTING CUTTING TOOL TO SPINDLE CENTERLINE

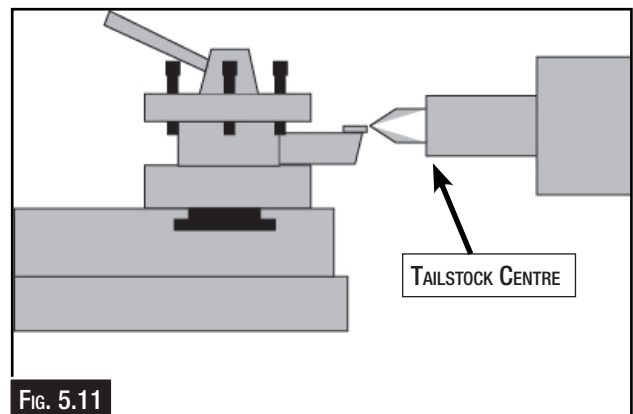
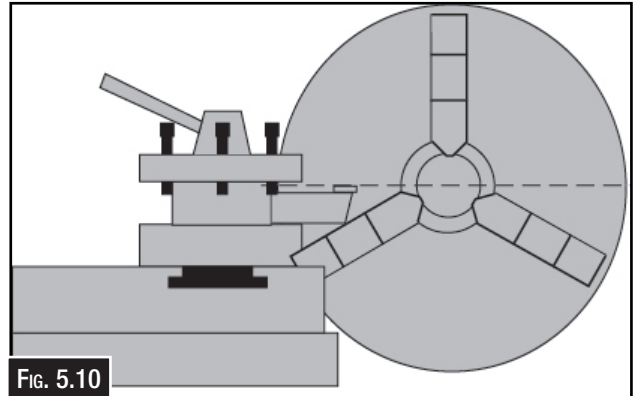
The tip of the cutting tool should be set up so that it is in line with the centerline of the spindle, as illustrated in Fig. 5.10.

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 properly support it.

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 tailstock 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. 5.11)



WARNING!

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

5.4 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.

To Set The Spindle Speed

1. The spindle must come to a complete stop.
2. Set the High/Low lever on the headstock to select the speed range required. (Fig. 5.12)
3. Turn the spindle speed knob slowly until the display reads the RPM required. (Fig. 5.13)

Note: If the High/Low spindle speed lever 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. Do not use the JOG function.



Fig. 5.12



Fig. 5.13



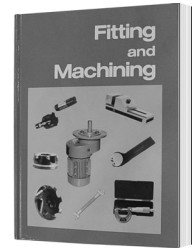
WARNING!

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

5.5 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.

ORDER CODE L341



THREAD CUTTING

The large gears in Figures 3-19 are transposing gears, 120T and 127T. They allow a standard-thread lead screw, in this case 4 mm, to cut metric threads. The transposing gears are keyed together.

CUTTING THREADS

To obtain the desired pitch a combination of a letters, with top dial “A”, “B”, or “C”, “D” on the lower dial and top and bottom levers.(Fig.5.15)

Example: To obtain 4mm pitch thread, the top dial on “A” and the bottom dial on “D” and the top lever is placed in the “K” slot and the bottom lever in the “V” position. (Fig.5.16)

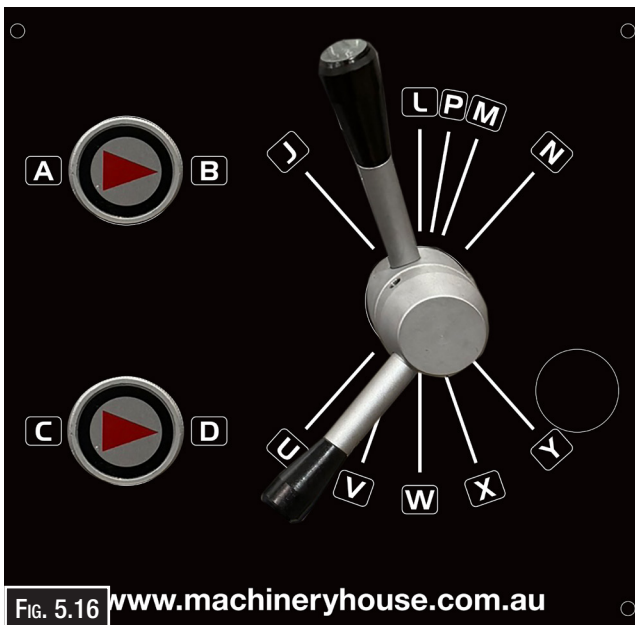




FIG. 5.16 www.machineryhouse.com.au

	PITCH  MM								
	M	L	K	L	N	K	J	N	J
	V	V	V	X	V	X	V	X	X
A D	3.2	3.6	4.0	4.5	4.8	5.0	5.6	6.0	7.0
B D	1.6	1.8	2.0	2.25	2.4	2.5	2.8	3.0	3.5
A C	0.8	0.9	1.0		1.2	1.25	1.4	1.5	1.75
B C	0.4	0.45	0.5		0.6		0.7	0.75	

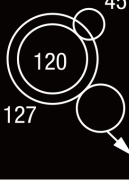

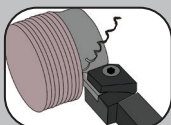
	T.P.I.  INCH							
	N	M	M	M	M	M	M	M
	Y	W	V	V	V	Y	V	U
	60	60	60	66	69	60	78	60
A D	4	4 1/2	5	5 1/2	5 3/4	6	6 1/2	7
B D	8	9	10	11	11 1/2	12	13	14
A C	16	18	20	22	23	24	26	28

FIG. 5.15



WARNING!

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

THREAD CUTTING DIAL

The thread cutting dial is mounted on the headstock. 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)

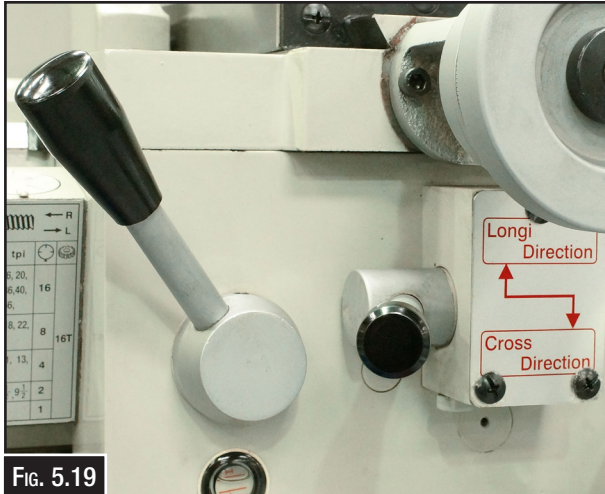


FIG. 5.19

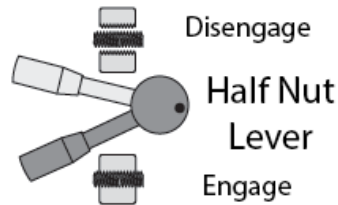


FIG. 5.19

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

5.6 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 may need to be reversed. Undo the 120T/127T gear hex nut (Fig. 5.21) and reverse the gears.

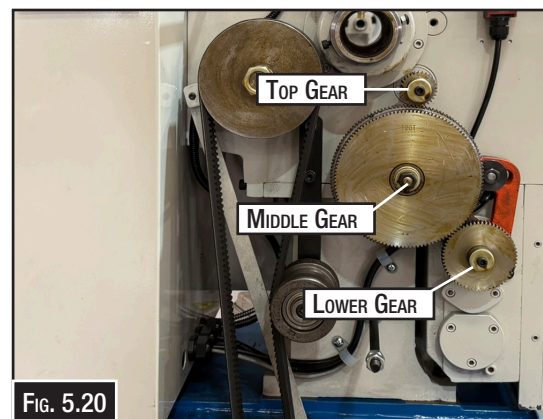


FIG. 5.20

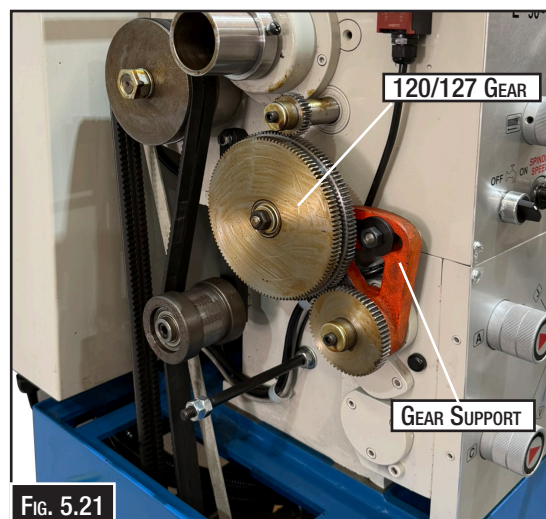


FIG. 5.21

END-GEAR CONFIGURATION Cont.

6. Remove the cap screw and flat washer from the top gear, then slide the gear off the shafts.
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.

5.7 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-1440 Metal Lathes 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)

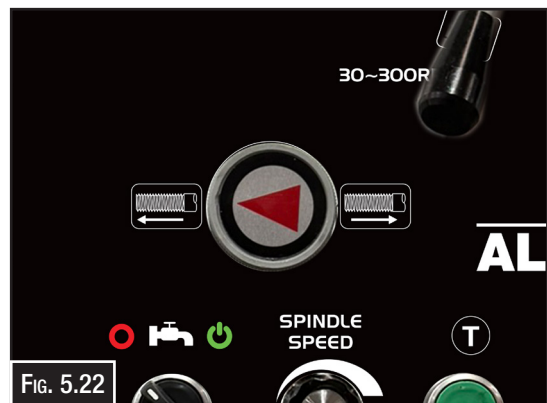


FIG. 5.22

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. (Fig. 5.23)

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.

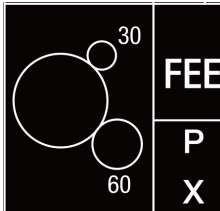
NOTE: When using this lever, you may need to slightly rotate the hand wheel of the component you are trying to engage, so that the apron gears can mesh.



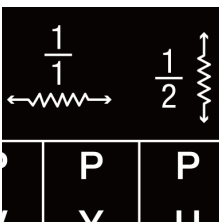
FIG. 5.23

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” or “Inch. Below is an explanation of some of the symbols.

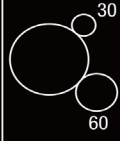



The symbol to the left, and found on the Threading and Feed charts, is the configuration of the end gears for the feed rates in the chart.



The symbols to the left, and 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.

	FEED INCH 				
	P X	P W	P V	P Y	P U
A D	0.0368	0.0327	0.0294	0.0245	0.0210
B D	0.0184	0.0163	0.0147	0.0122	0.0105
A C	0.0092	0.0081	0.0073	0.0061	0.0052
B C	0.0046	0.0040	0.0036	0.0030	0.0026

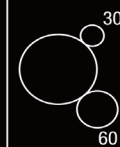
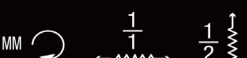
	FEED MM 				
	P X	P W	P V	P Y	P U
A D	0.935	0.831	0.748	0.623	0.534
B D	0.467	0.415	0.374	0.311	0.267
A C	0.230	0.207	0.187	0.155	0.133
B C	0.116	0.103	0.093	0.077	0.066

Fig. 5.24

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 0.103mm 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 is set on “W”. (Fig. 5.26)

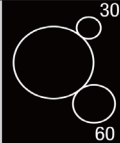
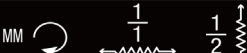
	FEED MM 				
	P X	P W	P V	P Y	P U
A D	0.935	0.831	0.748	0.623	0.534
B D	0.467	0.415	0.374	0.311	0.267
A C	0.230	0.207	0.187	0.155	0.133
B C	0.116	0.103	0.093	0.077	0.066

Fig. 5.25

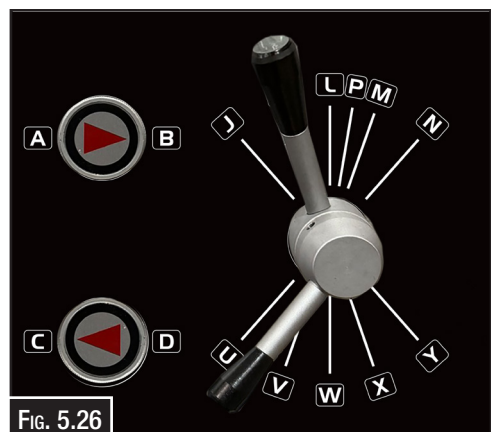


Fig. 5.26

5.8 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 later use in 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. 5.30.

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

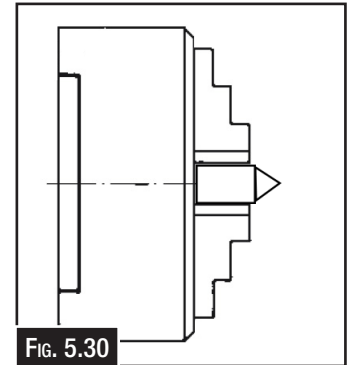


FIG. 5.30



FIG. 5.31

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. 5.31.
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. 5.32)
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 half the distance of the difference.
8. Repeat the steps until the round bar is turned parallel.

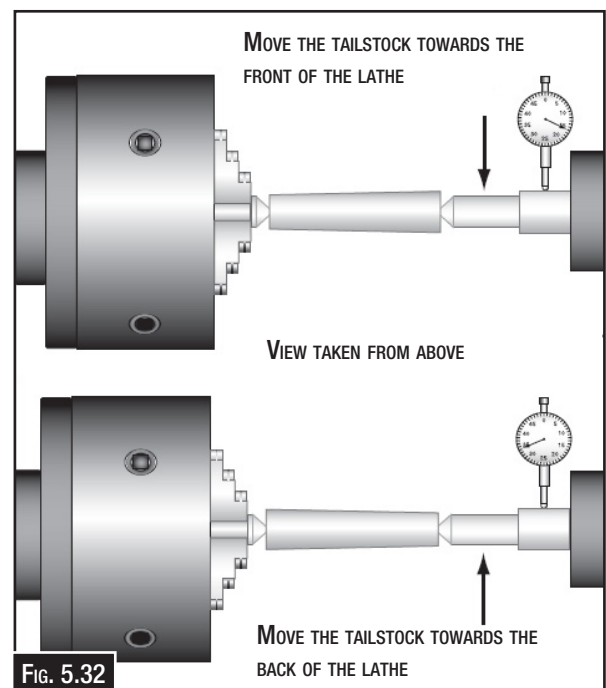


FIG. 5.32

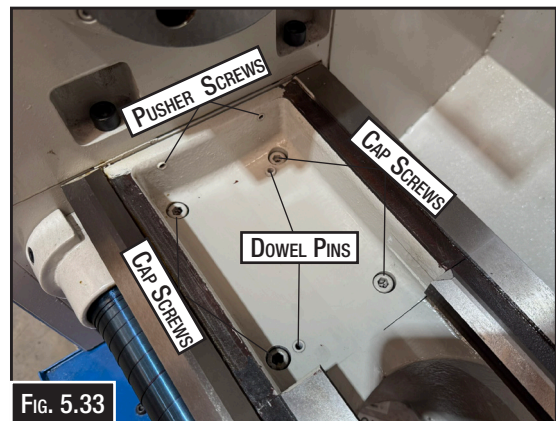
5.9 REMOVING AND REPLACING THE BED GAP

This AL-1440 Lathe bed is equipped with a removable gap that allows for the turning of large diameter workpieces. The gap was seated, pre-loaded, and then ground for precise mating and alignment at the factory.

Removing the gap can cause the lathe insert to slightly spring out of shape. When re-installed, there is no guarantee that original alignment and flush mating will be the same. For this reason, removing the gap is considered a permanent alteration to the lathe, even if it is later re-installed.

To Remove The Gap

1. DISCONNECT MACHINE FROM POWER!
2. Remove the four cap screws that secure gap to bed.
3. Tighten dowel-pin jack nuts (Fig. 5 .33) to remove the pins from gap.
4. Loosen the pusher set screws (Fig. 5.33) a few turns until they are no longer in contact with the headstock.
5. Tap the outside of the gap piece with a soft face hammer to loosen it and remove the gap piece.



To Re-install The Gap

1. Make sure all mating surfaces are clean.
2. Place the gap in position and tap in the dowel pins
3. Install the 4 hold down socket head cap screws snug but not tight.
4. Jack the insert to the right with the pusher screws to close the gap, if any, between the ground surfaces of the bed ways at the join.
5. Tighten the four hold down bolts.

 WARNING!	
SAFETY FIRST	<i>The safety instructions given in this manual cannot be complete. The environment in every shop is different. Always consider your safety first as it applies to your individual working conditions.</i>
	

5.10 OPTIONAL TAPER TURNING ATTACHMENT

This is a toolroom-quality fixture that can be retrofitted to the AL-1440 series lathes.

It is a self-contained, center-pivoted design that is attached by a single clamp at any point along the lathe bed. It handles tapers up to 300mm long, with half-angle from zero to +/- 10 degrees.

The Taper angle is precisely set by a micrometer-style screw adjustment.

Before installing the attachment, make certain that its two sliding components — Dovetail slide and Follower carriage — move freely without side play. Adjust the gibs and lubricate if necessary

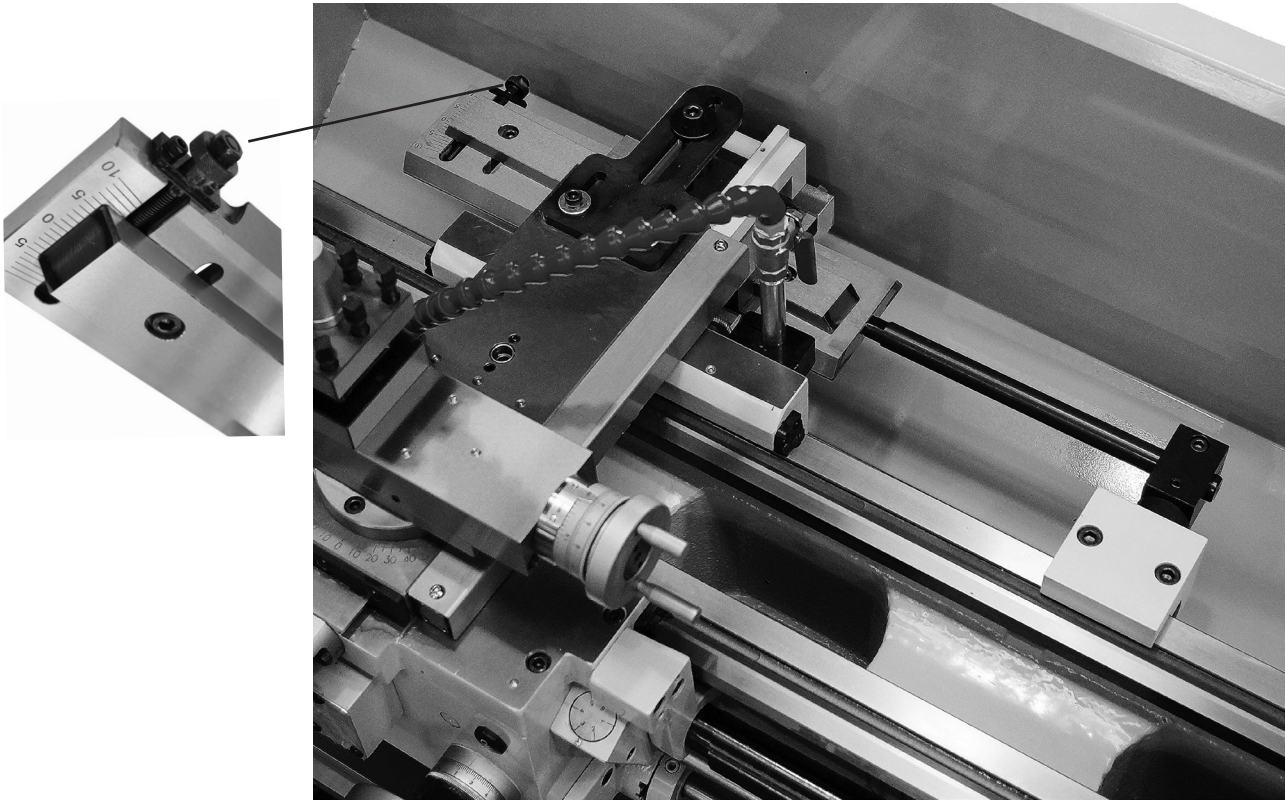
5.10 OPTIONAL TAPER TURNING ATTACHMENT Cont.

NOTE: *Setting up any taper attachment is an interactive, cut and try process.*

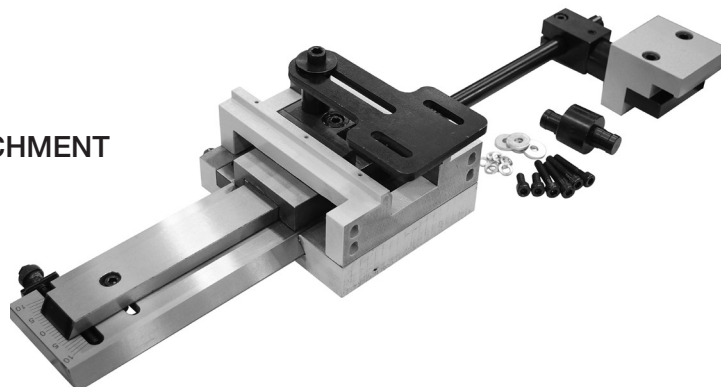
It consists of a bracket or frame which is attached to the rear of the lathe bed and supports a guide bar that pivots at the centre. The guide bar having graduations in degrees may be swiveled on either side of the zero graduation and is set at the desired angle to the lathe axis by a micrometer adjustment. When this taper attachment is used, the cross slide is de-linked from the saddle by removing the binder screw. The rear end of the cross slide is then attached to the guide block by means of a bolt. When the longitudinal feed is engaged, the tool mounted on the cross slide will follow the angular path, as the guide block slides on the guide bar that is set at an angle to the lathe axis.

The required depth of cut is given by the compound slide which is placed at right angles to the lathe axis. The guide bar must be set at half the taper angle.

The maximum angle through which the guide bar may be swiveled is ± 10 degrees on the lathe centre line.



TPA-1000
TAPER TURNING ATTACHMENT
300mm Travel
ORDER CODE L258



6. MAINTENANCE

6.1 LUBRICATION



WARNING

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 maintain. Follow the maintenance schedule listed in the following section and refer to any specific instructions given.

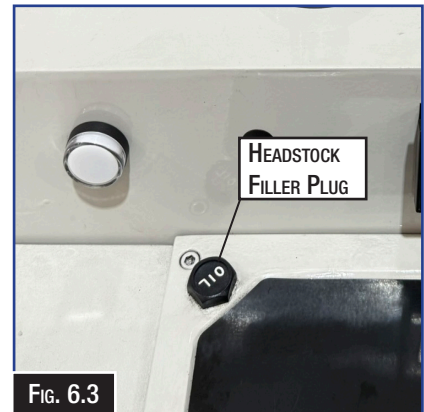
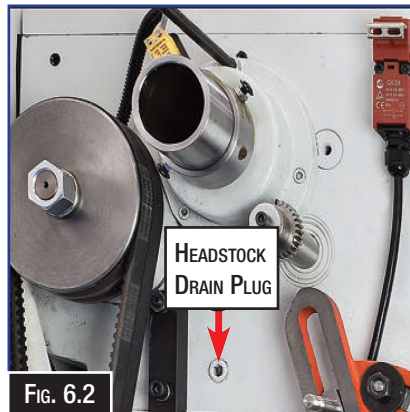
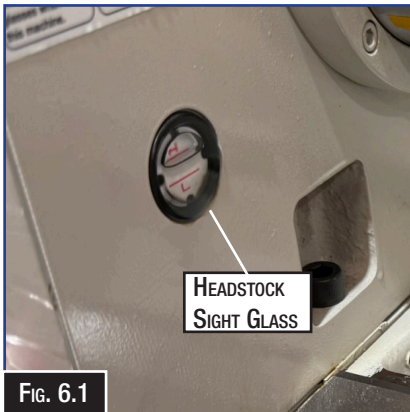
Use the information in the charts below as a daily guide for lubrication tasks.

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)



GEARBOX

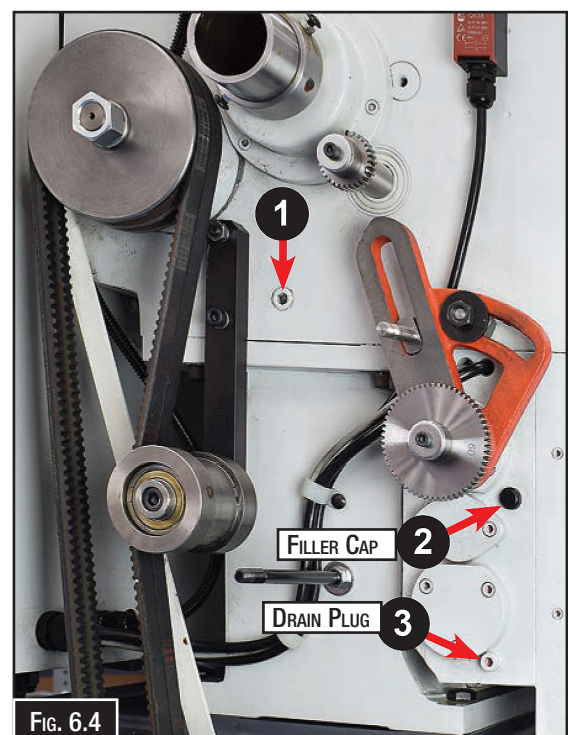
The gearbox oil sight glass is on the front of the gearbox, as shown in Fig. 6.4. Maintain the oil volume so that the level is approximately halfway in the sight glass.

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 gearbox 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.



APRON

The apron oil sight glass is on the front of the apron, as shown in Fig. 6.5. 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. 6.5), remove the fill plug, then use a 6mm 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.

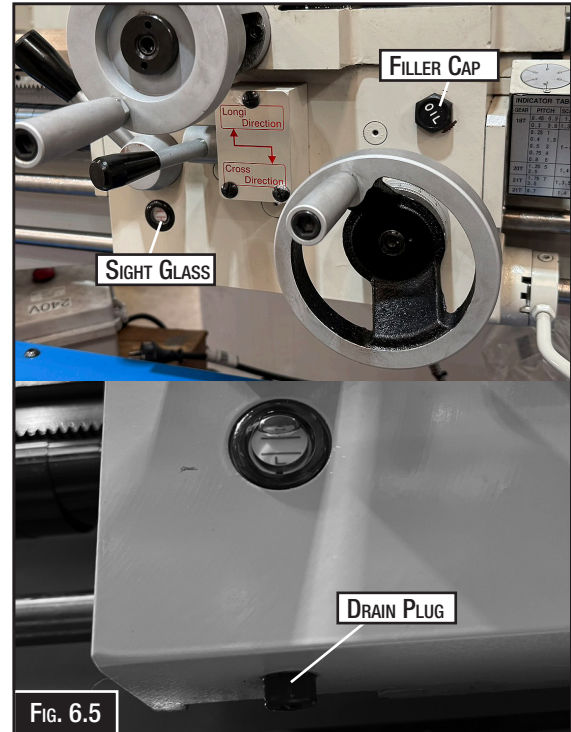


FIG. 6.5

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. 6.6) 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.

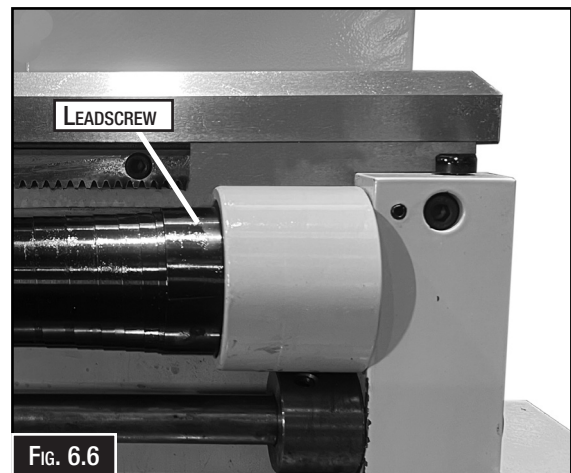


FIG. 6.6

LEAD SCREW & FEED SHAFT BEARINGS (Fig.6.7)

The feed and leads screw bearings are lubricated through an oil reservoir at the end of the bed.

Fill with machine oil and check each shift.

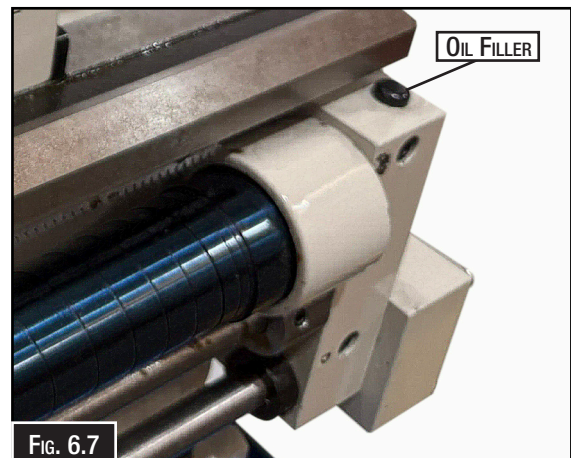


FIG. 6.7

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 lead screw & slides
- Compound-rest lead screw & slides
- Saddle slides
- Carriage hand wheel
- Feed selection lever gearing
- Tailstock ball oilers (Fig. 6.8)
- Lead screw end bearing
- Feed rod end bearing

6.3 ADJUSTMENTS

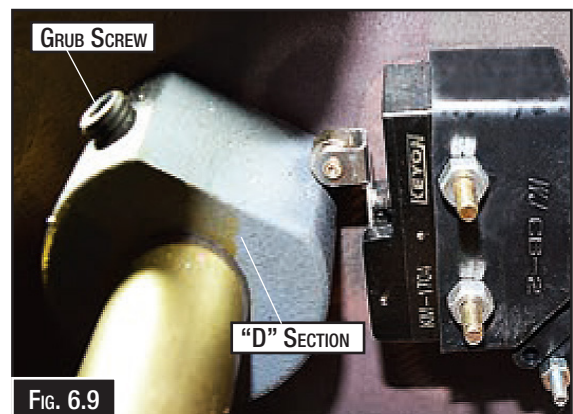
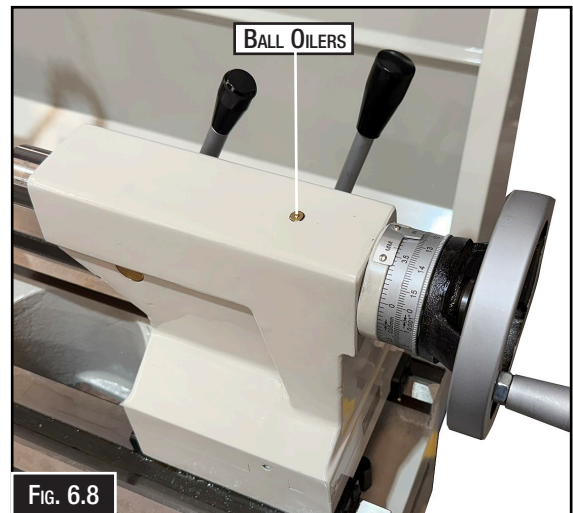
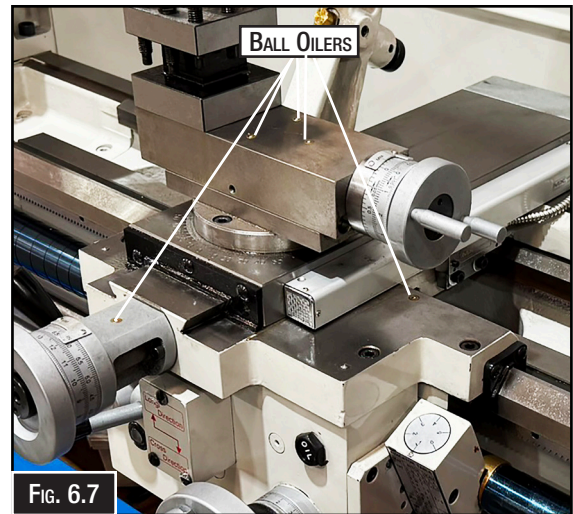
ADJUSTING FOOT BRAKE INTERLOCK

The AL-1440 is fitted with a foot brake that will brake the machine if pressed and disconnects the power to the motor. The lathe will not run if the foot brake switch fails to close when the foot treadle is released (brake OFF). This switch is located inside the LH stand cabinet. Check that the D-shape cam operates the switch when the treadle is pressed, (Fig. 6.9)

To Adjust The Micro Switch

1. DISCONNECT THE MACHINE FROM POWER.
2. Loosen the Grub screw on the "D" section.
3. Press the foot pedal and rotate the "D" section until the micro switch clicks.
4. Tighten the grub screw.
5. Test the foot brake.

NOTE: When testing the foot brake, the motor must switch OFF before the brake is applied.



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 throughout the full slide travel. (Fig. 6.10)

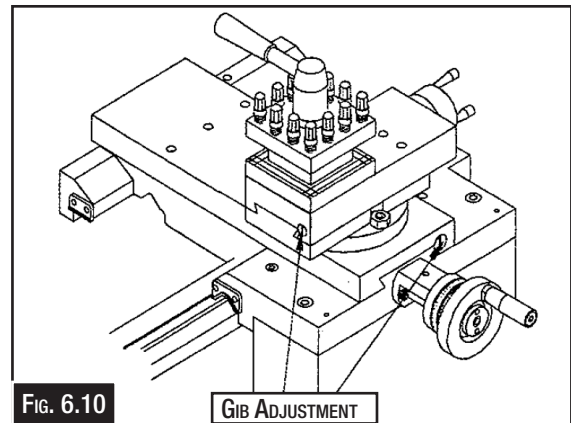


FIG. 6.10

GIB ADJUSTMENT

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. 6.11)
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. 6.11

BUTTON SCREWS

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. (Fig. 6.12)

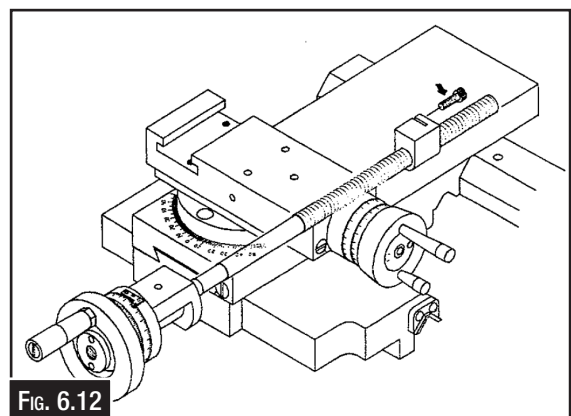


FIG. 6.12

To adjust the backlash:

1. DISCONNECT THE MACHINE FROM THE POWER SUPPLY.
2. Remove the backlash 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. 6.13)

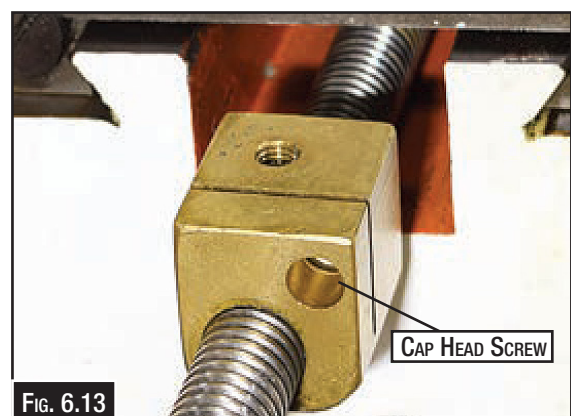


FIG. 6.13

CAP HEAD SCREW

6.4 FEED CLUTCH ADJUSTMENT

The AL-1440 is equipped with a feed rod clutch, that connects the feed drive with the feed rod through a set of spring loaded ball bearings. This clutch helps protect the apron feed system from overload. The feed rod clutch comes set from the factory, and unless there is a problem, it needs no adjustment.

The clutch may slip if the path for the carriage or the cross feed is obstructed during turning or facing operations.

1. DISCONNECT MACHINE FROM POWER!
2. Position the top left hand dial pointer between "A" and "B" , then position bottom left hand gearbox dial pointer between "C" and "D" (Fig. 6.14). This allows feed rod to move freely so adjustments can be made to the clutch.
3. If the clutch slips during normal work loads, increase the clutch spring pressure by tightening each of the four clutch drive set screws on the face of the clutch hub (Fig. 6.15) one full turn, then recheck for slippage. If the clutch does not slip when it should, reduce the clutch spring pressure by loosening each of the four clutch set screws one full turn, then recheck for slippage.

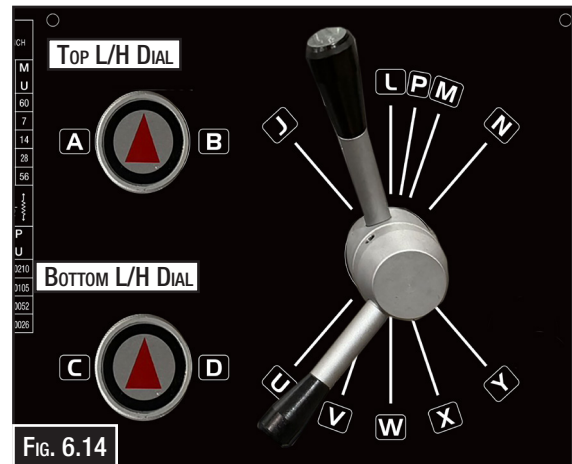


Fig. 6.14

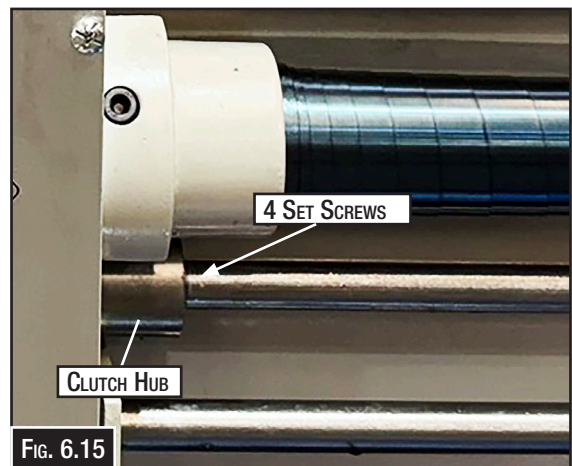


Fig. 6.15

6.5 V-BELT ADJUSTMENT

A toothed belt connects the motor to the headstock gearbox,

The motor is mounted on a pivoted platform that is positioned vertically by a threaded stud attached to the front of the left-hand cabinet, (Fig. 6.16). If it is necessary to remove the belt, lower its tension by raising the motor mount 12mm or so, then roll the belt off the upper (driven) pulley.



Fig. 6.16

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



WARNING!

Disconnect all power from the machine before servicing. There may be multiple power sources present. Remove the plug from the power point or remove the fuse if hardwired. Failure to do may cause death or injury.

6.6 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 hand wheel 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. Hand wheel is loose. Mechanism worn or needs adjustment.	Tighten gib screw(s). Tighten hand wheel 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 resharpen 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.



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.

CENTRE LATHE

MODEL AL-1440V

Order Code: (L245VS)

Edition : 1.0
Date: (01/26)

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!

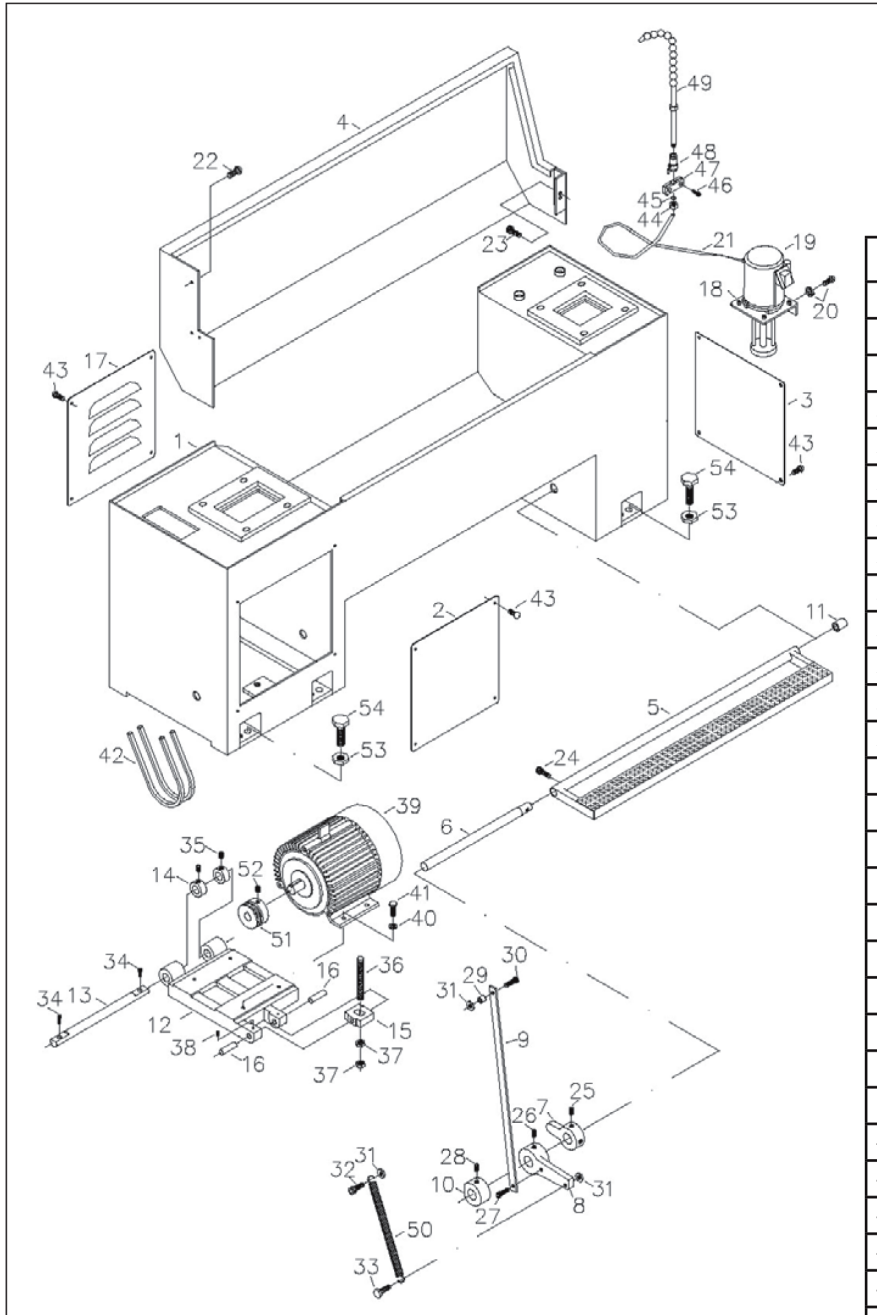
Electricity is dangerous and could cause death
All electrical work must be carried out by a qualified electrician.



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.

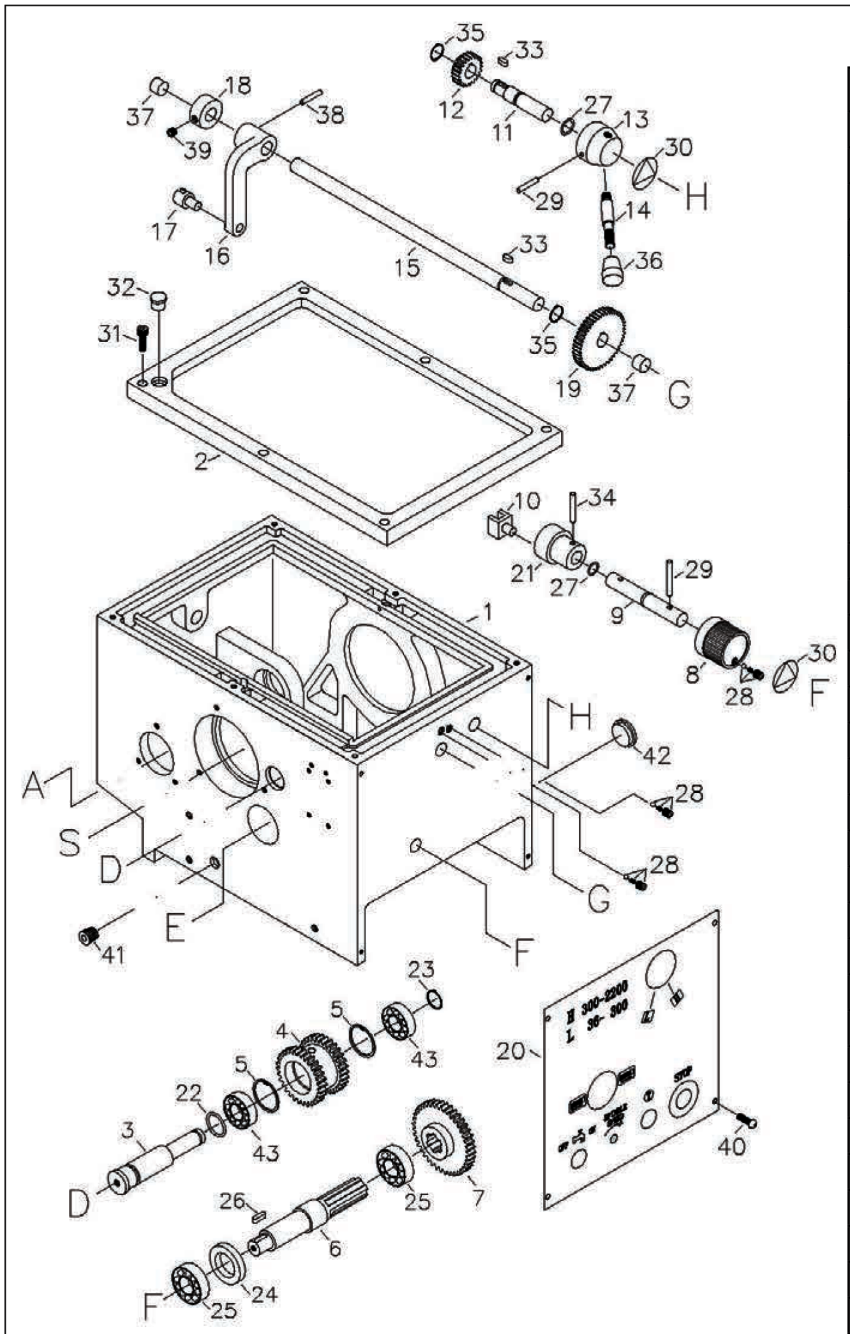
CABINETS, PANELS & COOLANT SYSTEM Fig 2



Ref	Description	Part
17	COVER	Z11779
18	PLATE	Z11780
19	MOTOR PULLEY (1/8 HP)	Z11781
20	SCREW AND WASHER	Z11782
21	PIPE	Z11783
22	CAP SCREW M6x12	Z11784
23	CAP SCREW M8x20	Z11785
24	CAP SCREW M8x20	Z11786
25	SET SCREW M10x20	Z11787
26	SET SCREW M10x40	Z11788
27	CAP SCREW	Z11789
28	SET SCREW M10x20	Z11790
29	WASHER	Z11791
30	SCREW	Z11792
31	NUT	Z11793
32	SCREW	Z11794
33	SCREW	Z11795
34	SCREW M10x40	Z11796
35	SET SCREW M12x12	Z11797
36	SCREW	Z11798
37	NUT M16	Z11799
38	SET SCREW M8x10	Z11800
39	MOTOR	Z11801
40	WASHER	Z11802
41	SCREW	Z11803
42	V-BELT	Z11804
43	SCREW	Z11805
44	NUT	Z11806
45	RING	Z11807
46	CAP SCREW M6x30	Z11808
47	BRACKET	Z11809
48	KNOB	Z11810
49	HOSE	Z11811
50	SPRING	Z11812
51	V-BELT PULLEY	Z11813
52	SET SCREW M10x20	Z11814
53	NUT	Z11815
54	SCREW 1/2"x1-1/2"	Z11816

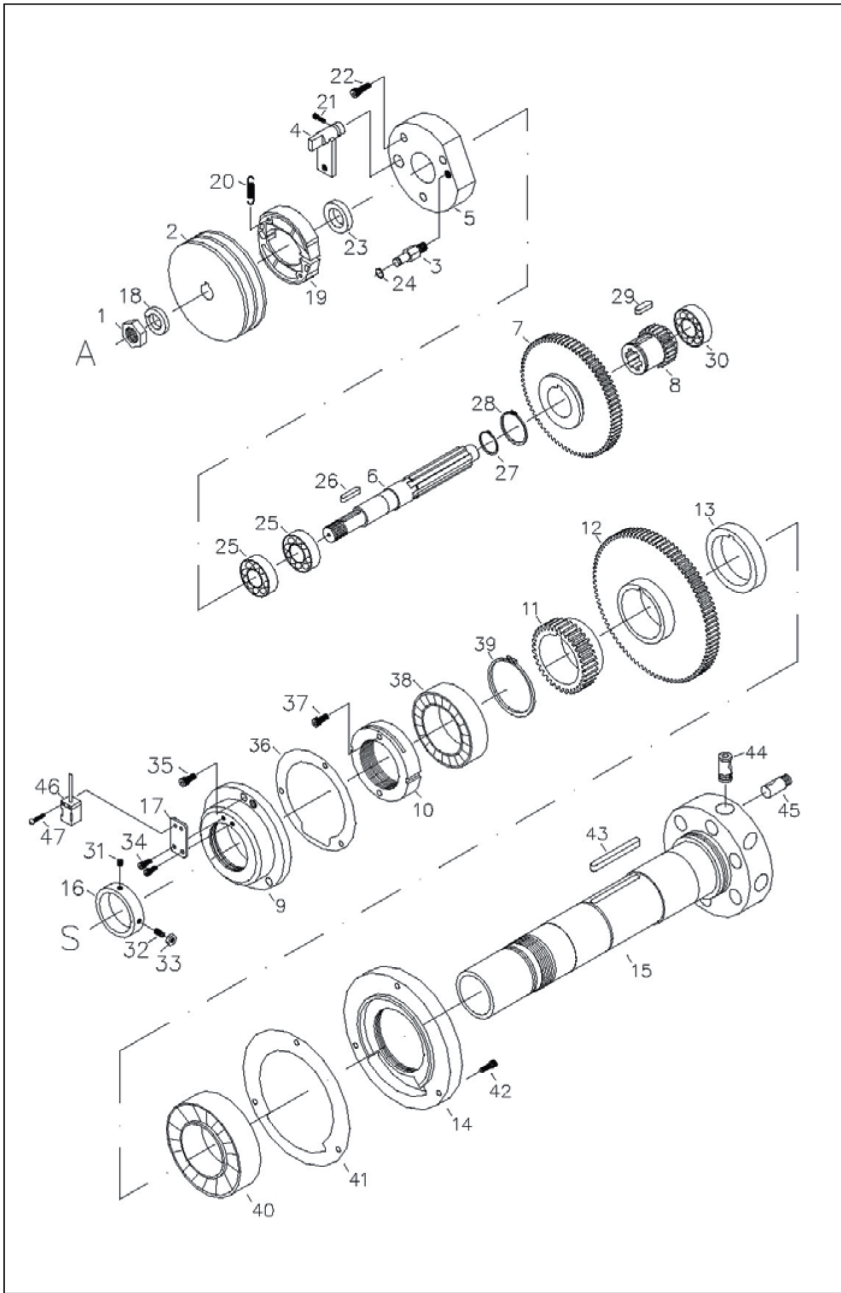
Ref	Description	Part	Ref	Description	Part
1	PEDESTAL	Z11763	9	BAR	Z11771
2	COVER	Z11764	10	COLLAR	Z11772
3	COVER	Z11765	11	COLLAR	Z11773
4	SPLASH GUARD	Z11766	12	MOTOR PLATE	Z11774
5	FOOT BRAKE PEDAL	Z11767	13	SHAFT	Z11775
6	CONNECTOR SHAFT	Z11768	14	COLLAR	Z11776
7	LEVER	Z11769	15	CLAMP	Z11777
8	LEVER	Z11770	16	SHAFT	Z11778

HEADSTOCK BODY & CONTROLS Fig 4



Ref	Description	Part
1	HEADSTOCK CASTING	Z11867
2	HEADSTOCK COVER	Z11868
3	SHAFT	Z11869
4	GEAR M2x32T	Z11870
5	SNAP RING (R40)	Z11871
6	SHAFT	Z11872
7	GEAR M2x40T	Z11873
8	HANDLE	Z11874
9	SHAFT	Z11875
10	GEAR SHIFT FORK	Z11876
11	SHAFT	Z11877
12	GEAR M1.5x23T	Z11878
13	HANDLE	Z11879
14	CONTROL LEVER	Z11880
15	SHAFT	Z11881
16	FORK ARMS	Z11882
17	GEAR SHIFT FORK	Z11883
18	COLLAR	Z11884
19	GEAR M1.5x46T	Z11885
20	DATA PLATE	Z11886
21	FORK ARMS	Z11887
22	OIL RING (P20)	Z11888
23	SNAP RING (S17)	Z11889
24	COLLAR OIL SEAL (20x42x8)	Z11890
25	BEARING (#6005)	Z11891
26	KEY 5x18	Z11892
27	OIL RING (P12)	Z11893
28	BALL/SCREW/SPRING	Z11894
29	SPRING PIN (5x45)	Z11895
30	INDICATOR PLATE	Z11896
31	CAP SCREW M6x25	Z11897
32	PLUG (5/8")	Z11898
33	KEY 5x12	Z11899
34	SPRING PIN (5x40)	Z11900
35	SNAP RING (S15)	Z11901
36	PVC KNOB	Z11902
37	OIL RING	Z11903
38	SPRING PIN (5x30)	Z11904
39	SET SCREW M8x10	Z11905
40	SCREW	Z11906
41	PLUG (3/8 G. P.)	Z11907
42	OIL SIGHT (29mm)	Z11908

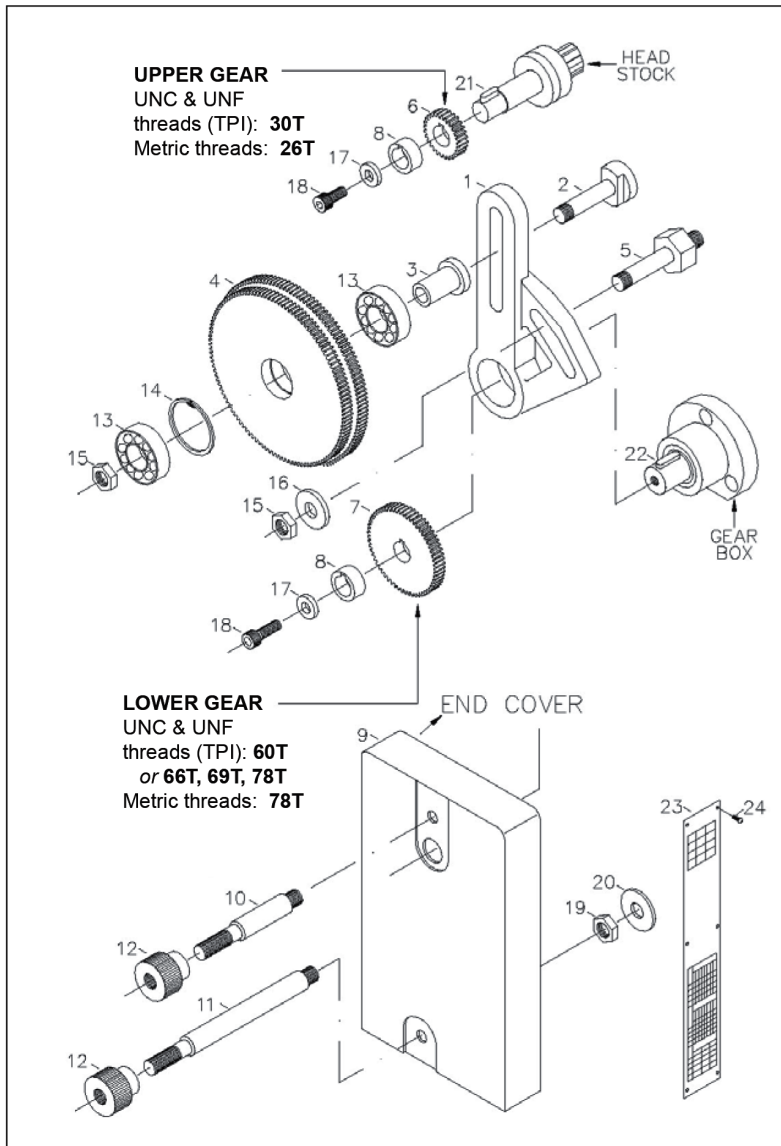
HEADSTOCK COMPONENTS Fig 5



Ref	Description	Part
17	FIXED PLATE	Z11925
18	WASHER	Z11926
19	BRAKE SHOES ASSY	Z11927
20	SPRING	Z11928
21	CAP SCREW M6x10	Z11929
22	CAP SCREW M6x25	Z11930
23	COLLAR OIL SEAL (25x40x8)	Z11931
24	SNAP RING	Z11932
25	BEARING (#6205)	Z11933
26	KEY 6x30	Z11934
27	SNAP RING (S28)	Z11935
28	SNAP RING (S40)	Z11936
29	KEY 8x25	Z11937
30	BEARING (#6204)	Z11938
31	SET SCREW M6x12	Z11939
32	SET SCREW M6x20	Z11940
33	NUT M6	Z11941
34	CAP SCREW	Z11942
35	CAP SCREW M6x25	Z11943
36	GASKET	Z11944
37	CAP SCREW M6x15	Z11945
38	BEARING (#30211)	Z11946
39	SNAP RING (S56)	Z11947
40	BEARING (#30212)	Z11948
41	GASKET	Z11949
42	CAP SCREW M6x25	Z11950
43	KEY 8x66	Z11951
44	CAM	Z11952
45	PLUNGER/SPRING/SCREW	Z11953
46	SENSOR	Z11954
47	SCREW	Z11955

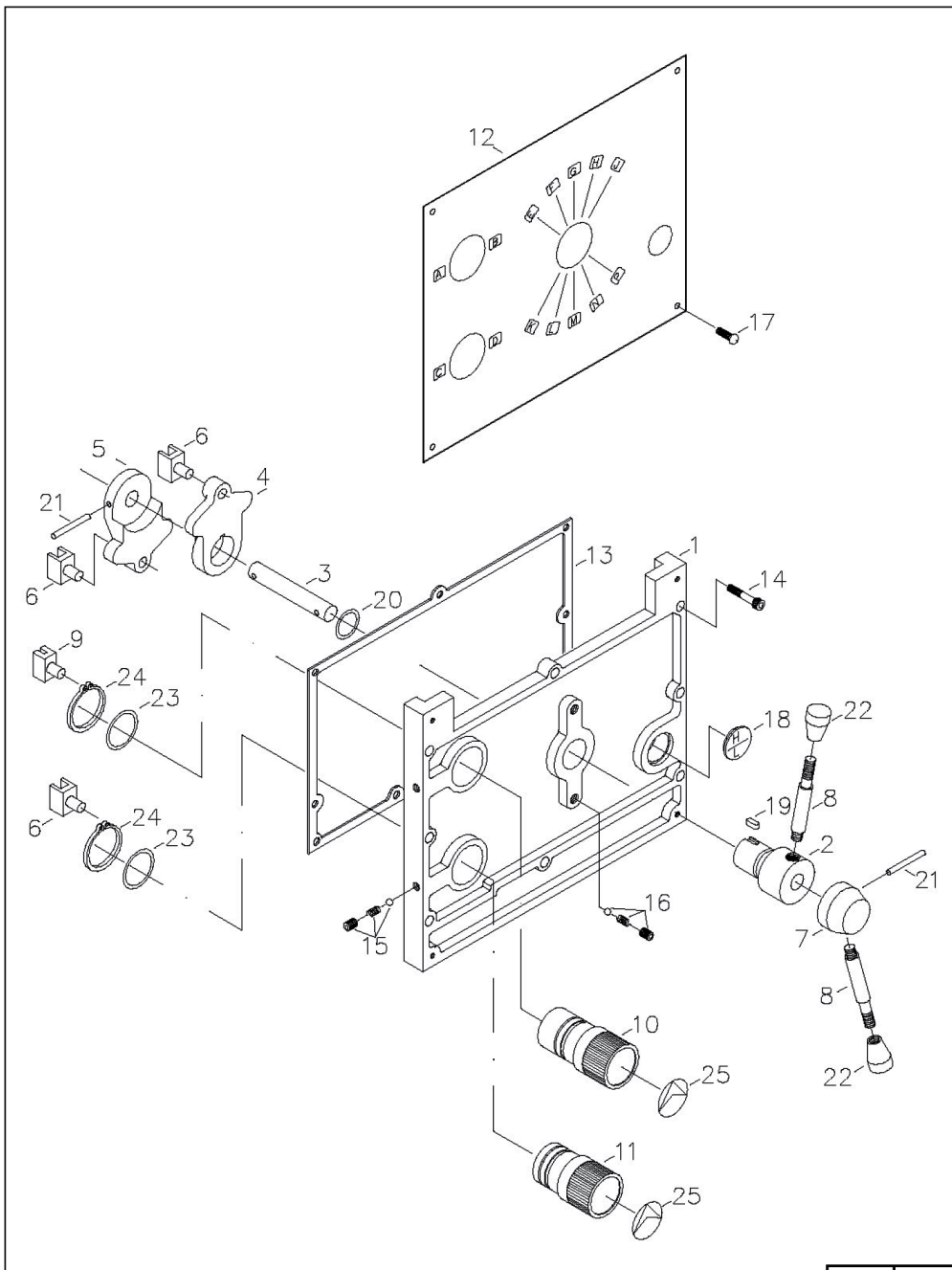
Ref	Description	Part	Ref	Description	Part
1	NUT	Z11909	9	BEARING CAP	Z11917
2	V-BELT PULLEY	Z11910	10	LOCK NUT	Z11918
3	SHAFT	Z11911	11	GEAR M2x42T	Z11919
4	SHAFT AND LEVER	Z11912	12	GEAR M2x96T	Z11920
5	BEARING CAP	Z11913	13	COLLAR	Z11921
6	SHAFT	Z11914	14	BEARING CAP	Z11922
7	GEAR M2x76T	Z11915	15	MAIN SPINDLE	Z11923
8	GEAR M2x23T	Z11916	16	INDEXING CAP	Z11924

EXTERNAL CHANGE GEARS Fig 6



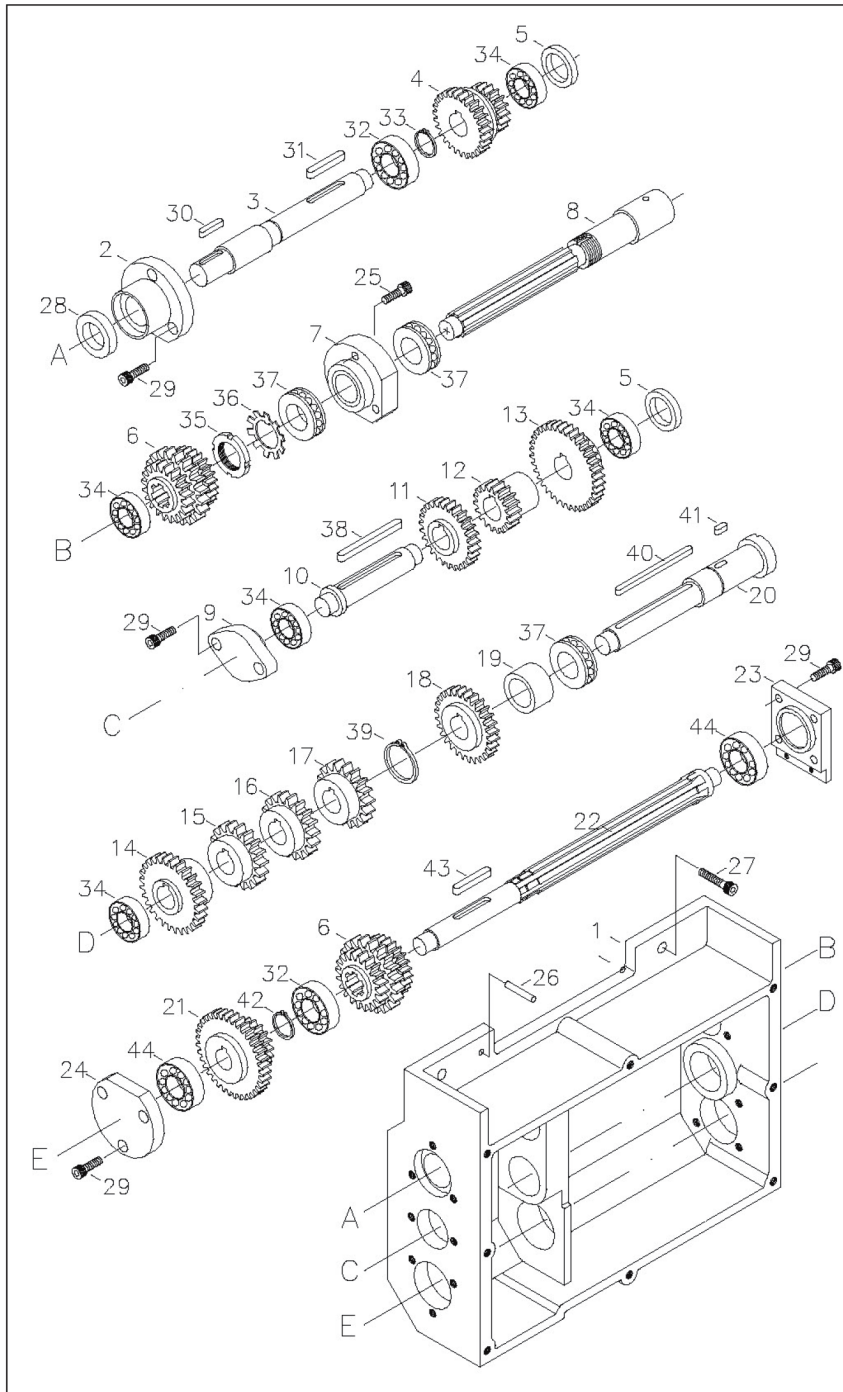
Ref	Description	Part
1	SWING FRAM	Z11956
2	BOLT	Z11957
3	COLLAR	Z11958
4	GEAR M1.25x120Tx127T	Z11959
5	SCREW	Z11960
6	GEAR M1.25x30T	Z11961
7	GEAR M1.25x60T	Z11962
8	COLLAR	Z11963
9	END COVER	Z11964
10	STUD	Z11965
11	STUD	Z11966
12	NUT	Z11967
13	BEARING (#620ZZ)	Z11968
14	CIRCLIP (R35)	Z11969
15	NUT	Z11970
16	WASHER	Z11971
17	WASHER	Z11972
18	CAP SCREW M6x16	Z11973
19	NUT	Z11974
20	WASHER	Z11975
21	KEY 5x18	Z11976
22	KEY 5x18	Z11977
23	DATA PLATE	Z11978
24	CAP SCREW (3/16"x3/8")	Z11979
25	CHANGE GEAR (M1.25 x 26T)	Z11980
26	CHANGE GEAR (M1.25 x 45T)	Z11981
27	CHANGE GEAR (M1.25 x 66T)	Z11982
28	CHANGE GEAR (M1.25 x 69T)	Z11983
29	CHANGE GEAR (M1.25 x 78T)	Z11984

SADDLE FEED GEARBOX CONTROLS Fig 7



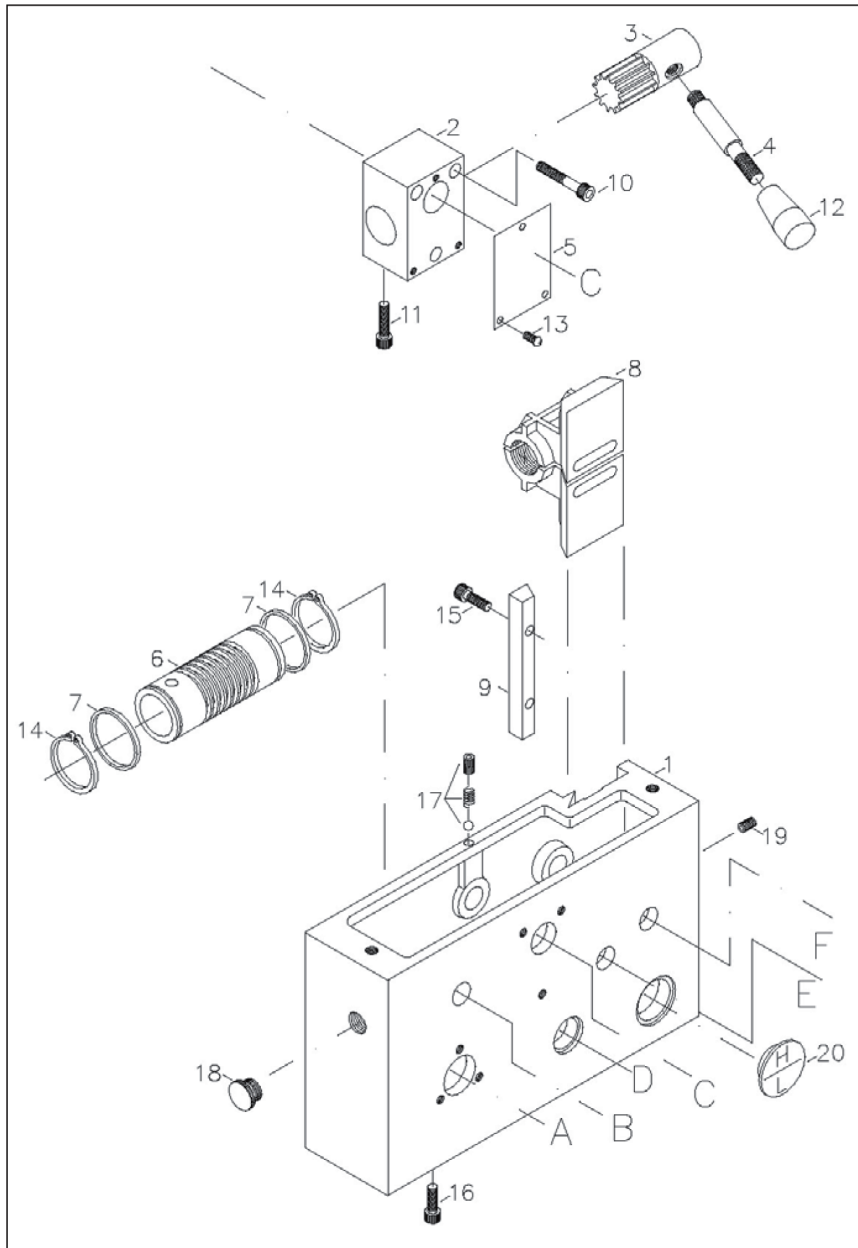
Ref	Description	Part	Ref	Description	Part	Ref	Description	Part
						17	SCREW 3/16"x3/8"	Z12001
1	COVER	Z11985	9	SHIFT FORK	Z11993	18	OIL SIGHT (29mm)	Z12002
2	HANDLE	Z11986	10	HANDLE	Z11994	19	KEY 5x13	Z12003
3	SHAFT	Z11987	11	HANDLE	Z11995	20	OIL RING (P24)	Z12004
4	HANDLE	Z11988	12	DATA PLATE	Z11996	21	KEY 5x40	Z12005
5	SHIFT LEVER	Z11989	13	GASKET	Z11997	22	PVC KNOB	Z12006
6	SHIFT FORK	Z11990	14	CAP SCREW M6x30	Z11998	23	OIL RING (P34)	Z12007
7	HANDLE	Z11991	15	BALL/SCREW/SPRING	Z11999	24	SNAP RING (S40)	Z12008
8	LEVER	Z11992	16	BALL/SCREW/SPRING	Z12000	25	INDEXING PLATE	Z12009

SADDLE FEED GEARBOX COMPONENTS Fig 8



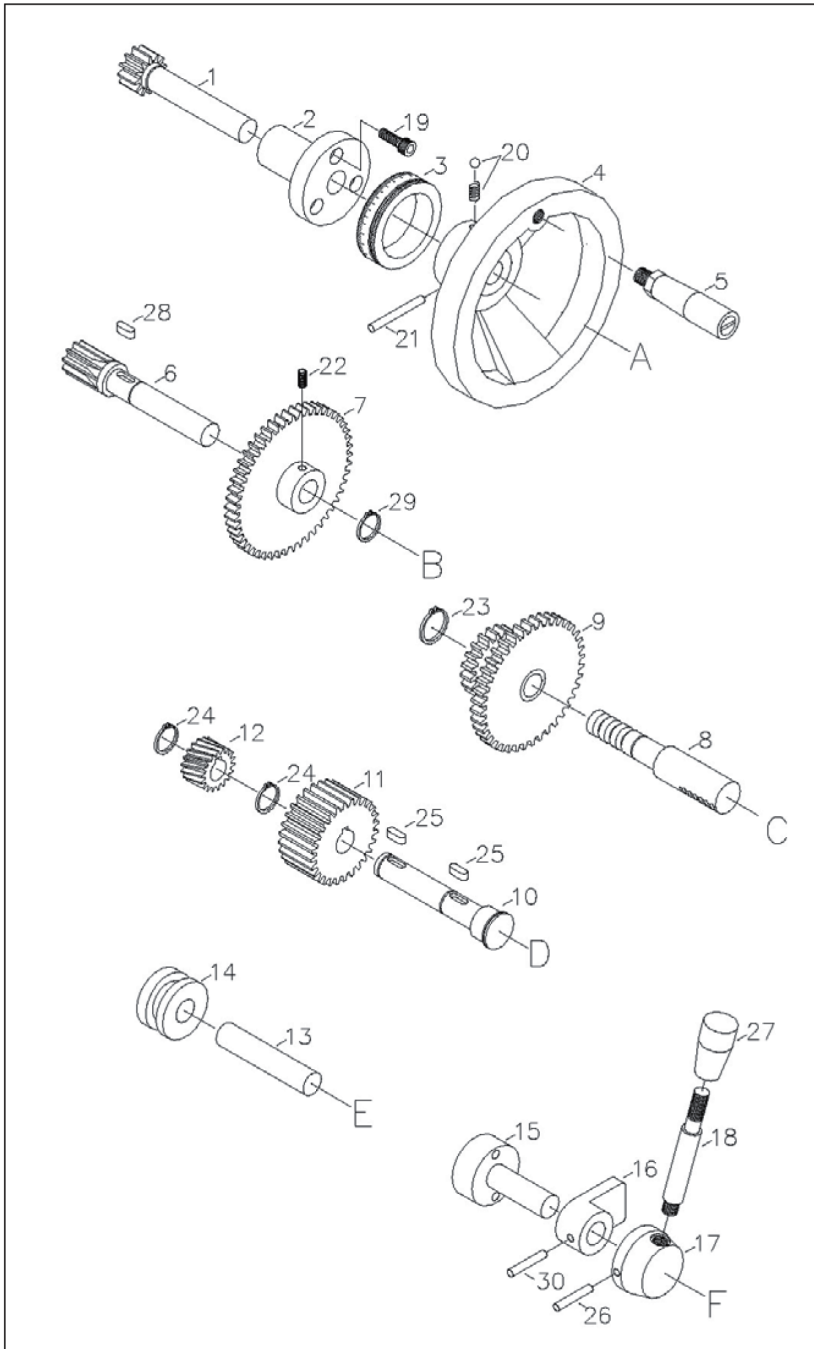
Ref	Description	Part
1	GEAR BOX CASTING	Z12010
2	COVER	Z12011
3	SHAFT	Z12012
4	GEAR M2x27Tx18T	Z12013
5	SPACER	Z12014
6	GEAR	Z12015
7	COVER	Z12016
8	SHAFT	Z12017
9	COVER	Z12018
10	SHAFT	Z12019
11	GEAR M2x27T	Z12020
12	GEAR M2x18T	Z12021
13	GEAR M2x36T	Z12022
14	GEAR M2.25x28T	Z12023
15	GEAR M2.75x20T	Z12024
16	GEAR M2.75x18T	Z12025
17	GEAR M2.75x16T	Z12026
18	GEAR M2x30T	Z12027
19	SPACER	Z12028
20	SHAFT	Z12029
21	GEAR M2x36T to M2x18T	Z12030
22	SHAFT	Z12031
23	COVER	Z12032
24	COVER	Z12033
25	CAP SCREW M6x25	Z12034
26	PIN 5x28	Z12035
27	CAP SCREW M8x30	Z12036
28	OIL SEAL (24x35x8)	Z12037
29	CAP SCREW M6x20	Z12038
30	KEY 5x18	Z12039
31	KEY 6x40	Z12040
32	BEARING (#6004)	Z12041
33	SNAP RING (S20)	Z12042
34	BEARING (#6003)	Z12043
35	NUT M25	Z12044
36	WASHER (M25)	Z12045
37	THRUST BEARING (#51105)	Z12046
38	KEY 6x65	Z12047
39	SNAP RING (S25)	Z12048
40	KEY 5x85	Z12049
41	KEY 5x12	Z12050
42	SNAP RING (S20)	Z12051
43	KEY 6x40	Z12052
44	BEARING (#6302)	Z12053

APRON (I) Fig 9



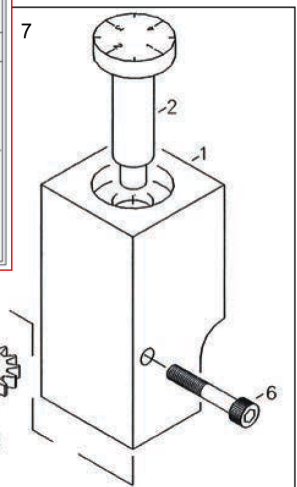
Ref	Description	Part
1	APRON CASTING	Z12054
2	BRACKET	Z12055
3	GEAR SHAFT M1.5x16T	Z12056
4	LEVER	Z12057
5	INDEXING PLATE	Z12058
6	WORM	Z12059
7	COLLAR	Z12060
8	HALF NUT CLUTCH	Z12061
9	GIB	Z12062
10	CAP SCREW M6x40	Z12063
11	CAP SCREW M8x25	Z12064
12	PVC KNOB	Z12065
13	SCREW 3/16"x3/8"	Z12066
14	SNAP RING (S30)	Z12067
15	CAP SCREW M6x20	Z12068
16	CAP SCREW M8x10	Z12069
17	BALL/SCREW/SPRING	Z12070
18	PLUG (5/8")	Z12071
19	SET SCREW M6x10	Z12072
20	OIL SIGHT (29mm)	Z12073

APRON (II) Fig 10



Ref	Description	Part
1	GEAR SHAFT (M2x12T)	Z12074
2	KEEP ASSY	Z12075
3	INDEX RING	Z12076
4	HANDWHEEL	Z12077
5	HANDLE	Z12078
6	GEAR SHAFT M1.5x13T	Z12079
7	GEAR M2x50T	Z12080
8	SHAFT	Z12081
9	GEAR M2x22T to M2x44T	Z12082
10	SHAFT	Z12083
11	GEAR M2x22T	Z12084
12	GEAR M1.5x18T	Z12085
13	SHAFT	Z12086
14	COLLAR	Z12087
15	SHAFT	Z12088
16	LEVER	Z12089
17	HANDLE	Z12090
18	LEVER	Z12091
19	CAP SCREW M6x16	Z12092
20	BALL/SCREW/SPRING	Z12093
21	PIN 5x50	Z12094
22	SCREW	Z12095
23	CIRCLIP (E12)	Z12096
24	CIRCLIP (E12)	Z12097
25	KEY 5x14	Z12098
26	PIN 5x40	Z12099
27	PVC KNOB	Z12100
28	KEY 5x18	Z12101
29	SNAP RING (S16)	Z12102
30	PIN 5x30	Z12103

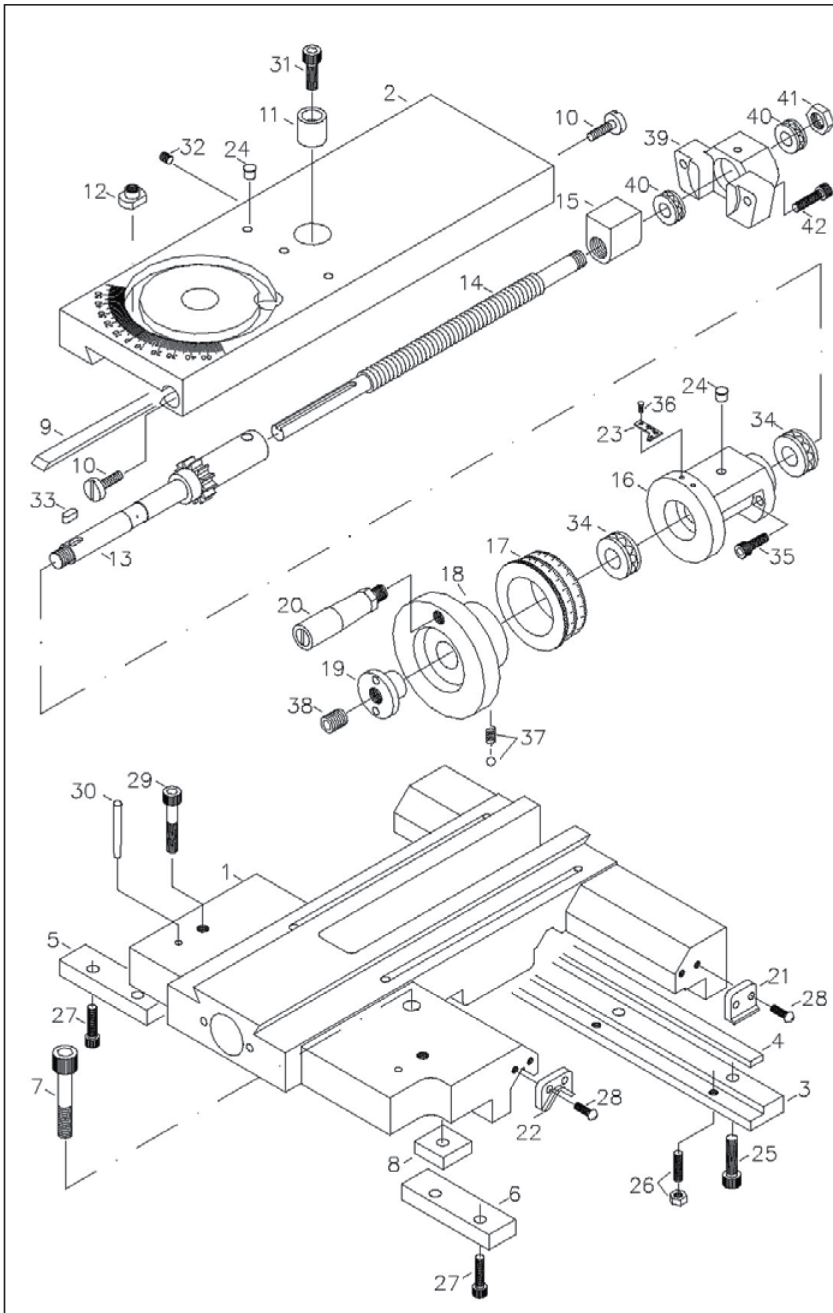
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6, 10, 14, 18, 22, 26, 38,		8 16T
5, 7, 9, 11, 13, 19,		4
1 1/2, 5 1/2, 6 1/2, 9 1/2,		2
4 3/8		1



Ref	Description	Part
1	THREAD BODY INDICATOR	Z12227
2	THREAD DIAL BODY	Z12228
3	GEAR M2x16T	Z12229
4	FLAT WASHER	Z12230
5	CAP SCREW M6x12	Z12231
6	CAP SCREW M6x45	Z12232
7	THREAD CHART PLATE	Z12233

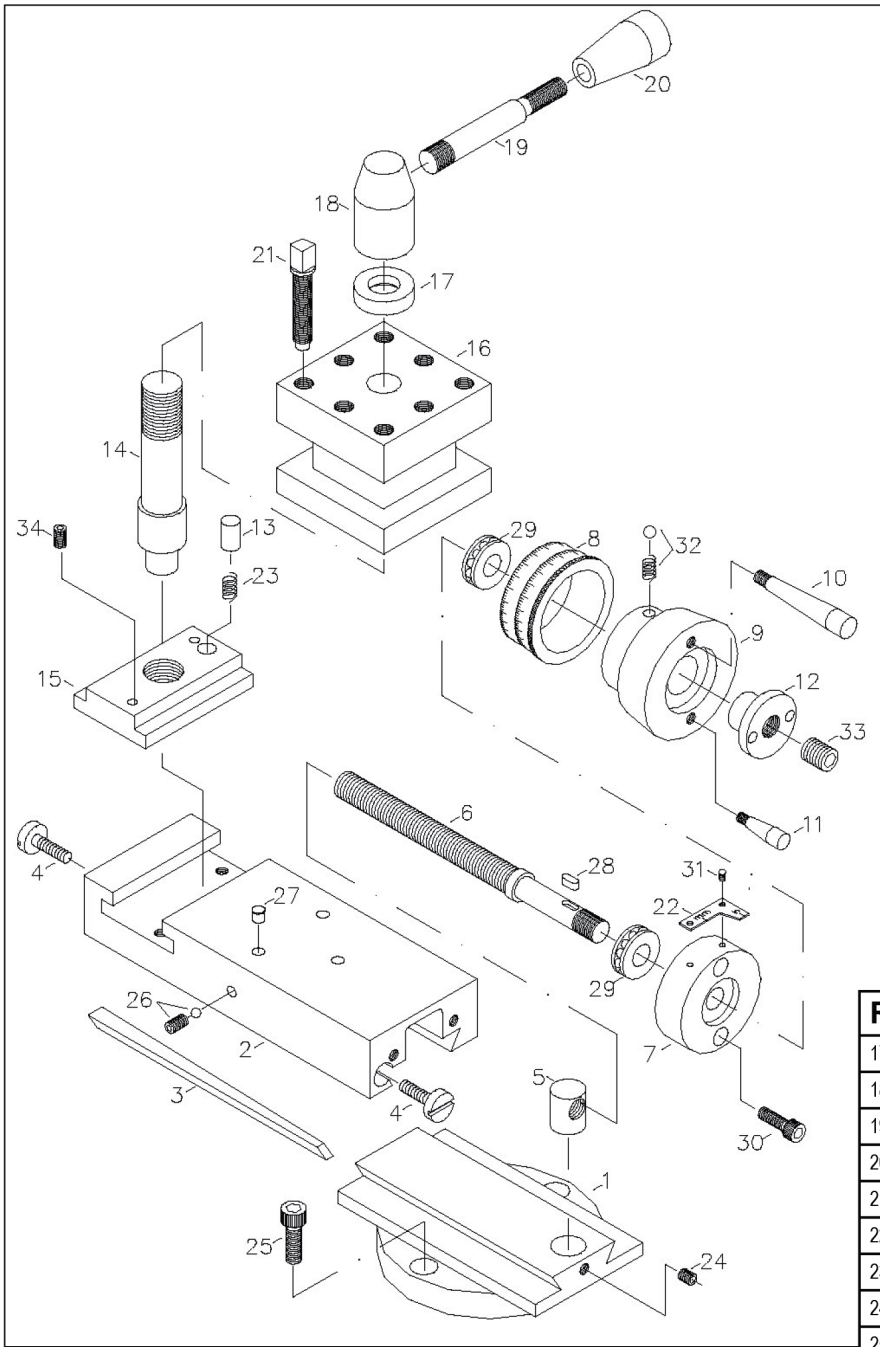
THREADING DAIL Fig 15

SADDLE & CROSS-SLIDE Fig 11



Ref	Description	Part
1	SADDLE CASTING	Z12104
2	CROSS-SLIDE	Z12105
3	CLAMP REAR	Z12106
4	GIB	Z12107
5	LEFT CLAMP FRONT	Z12108
6	RIGHT CLAMP FRONT	Z12109
7	CAP SCREW (7/16x2-1/2")	Z12110
8	WASHER	Z12111
9	GIB	Z12112
10	GIB SCREW	Z12113
11	COLLAR	Z12114
12	NUT	Z12115
13	GEAR M2x14T	Z12116
14	SCREW	Z12117
15	NUT	Z12118
16	KEEP ASSY	Z12119
17	INDEX RING	Z12120
18	HANDWHEEL	Z12121
19	PLUG	Z12122
20	HANDLE	Z12123
21	WIPER	Z12124
22	WIPER	Z12125
23	DIAL	Z12126
24	OILER (1/4")	Z12127
25	CAP SCREW M8x20	Z12128
26	SCREW AND NUT	Z12129
27	CAP SCREW M8x16	Z12130
28	SCREW 3/16"x1/2"	Z12131
29	CAP SCREW	Z12132
30	PIN	Z12133
31	CAP SCREW M8x20	Z12134
32	SCREW M8x16	Z12135
33	KEY 5x12	Z12136
34	THRUST BEARING (#2902)	Z12137
35	CAP SCREW M6x25	Z12138
36	NAIL (2mm)	Z12139
37	BALL/SCREW/SPRING	Z12140
38	SCREW M12x12	Z12141
39	KEEP ASSY	Z12142
40	THRUST BEARING (#51101)	Z12143
41	NUT M12	Z12144

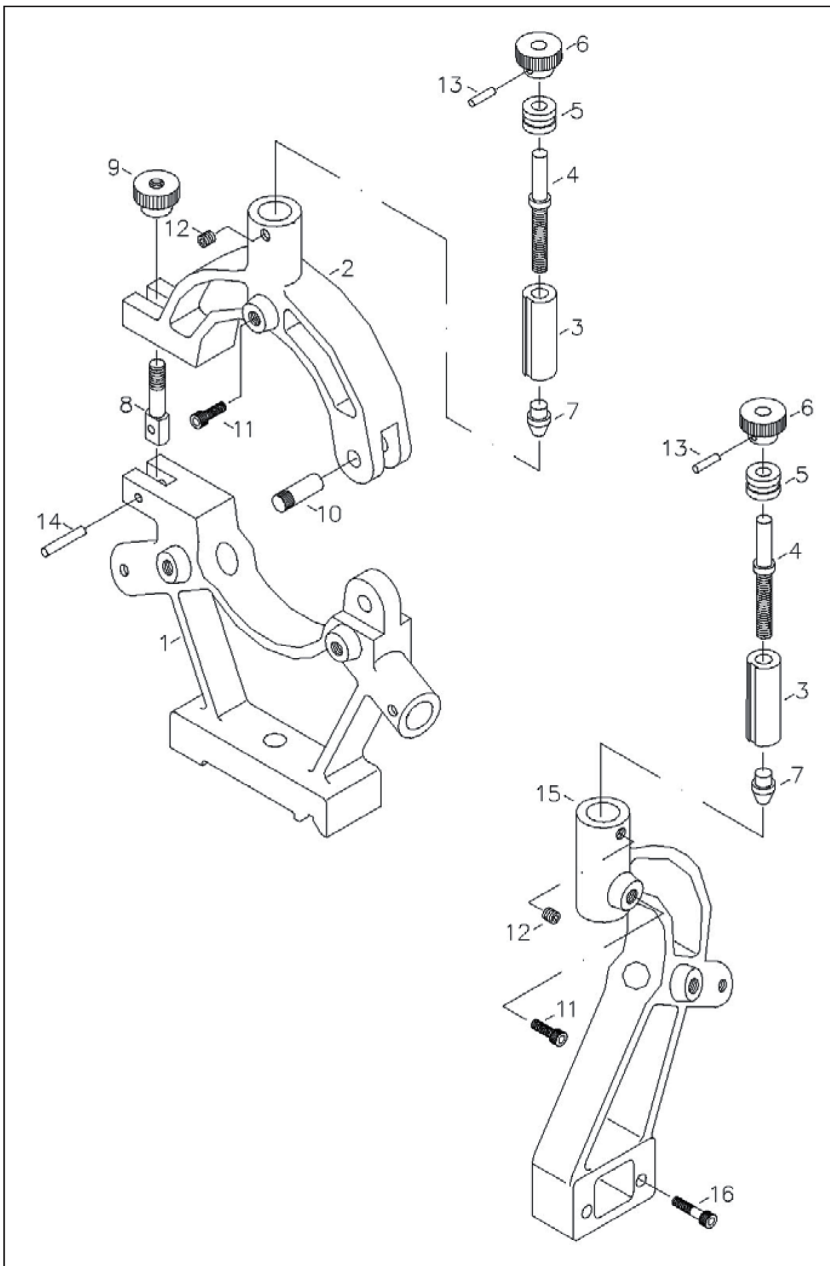
COMPOUND Fig 12



Ref	Description	Part
17	WASHER	Z12161
18	HUB	Z12162
19	LEVER	Z12163
20	PVC KNOB	Z12164
21	SCREW 3/8"	Z12165
22	DIAL	Z12166
23	SPRING	Z12167
24	SET SCREW M6x12	Z12168
25	CAP SCREW M8x16	Z12169
26	STEEL BALL AND SCREW	Z12170
27	OIL CAP (1/4")	Z12171
28	KEY 4x10	Z12172
29	THRUST BEARING (#51101)	Z12173
30	CAP SCREW M6x25	Z12174
31	NAIL (2mm)	Z12175
32	STEEL BALL AND SPRING	Z12176
33	SCREW M6x16	Z12177
34	SET SCREW M6x16	Z12178

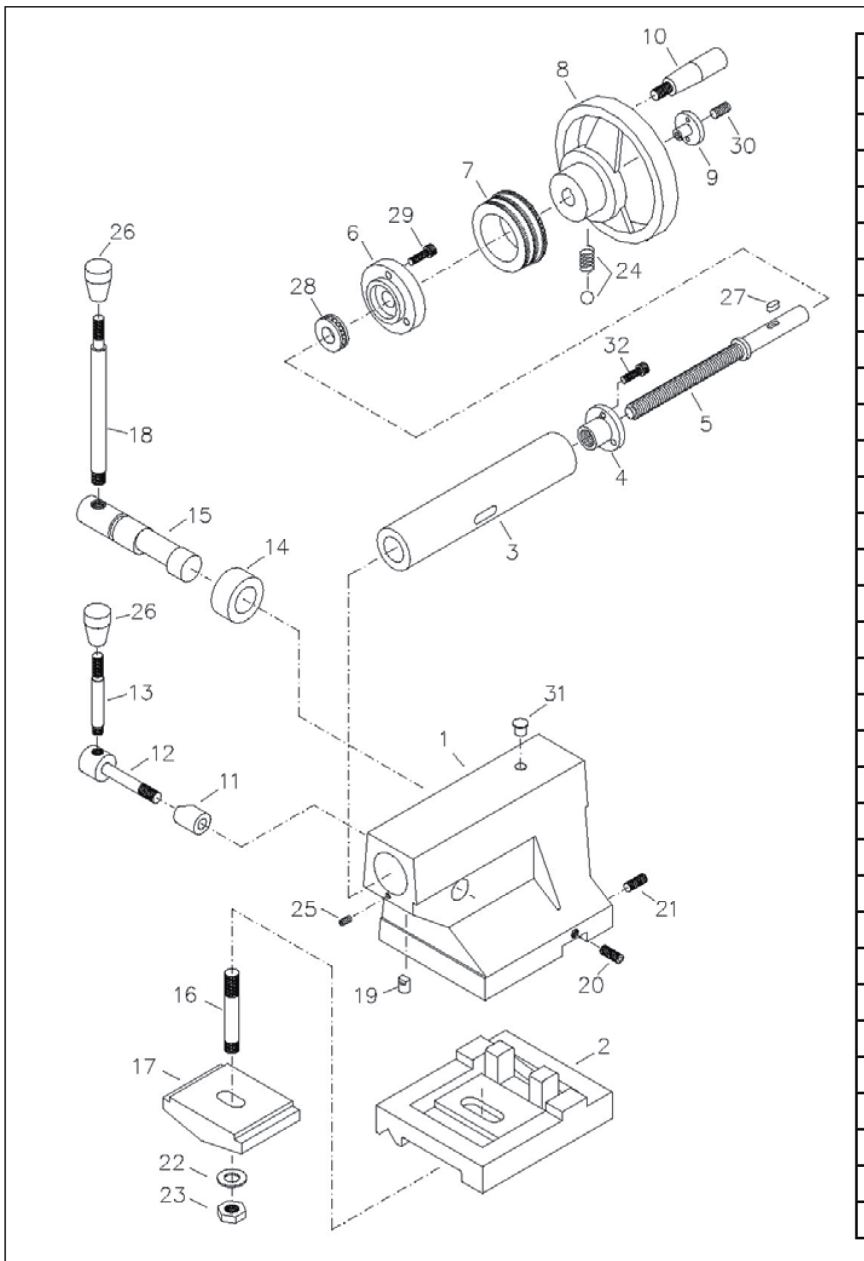
Ref	Description	Part	Ref	Description	Part
1	SWIVEL SLIDE	Z12145	9	HANDWHEEL	Z12153
2	TOP-SLIDE (T-SLOT)	Z12146	10	GRIP (LONG)	Z12154
3	GIB	Z12147	11	GRIP (SHORT)	Z12155
4	SCREW	Z12148	12	NUT	Z12156
5	NUT	Z12149	13	PIN	Z12157
6	LEAD SCREW	Z12150	14	BOLT	Z12158
7	BRACKET	Z12151	15	T-SLOT NUT	Z12159
8	INDEXING RING	Z12152	16	4 - WAY TOOL POST	Z12160

RESTS Fig 13



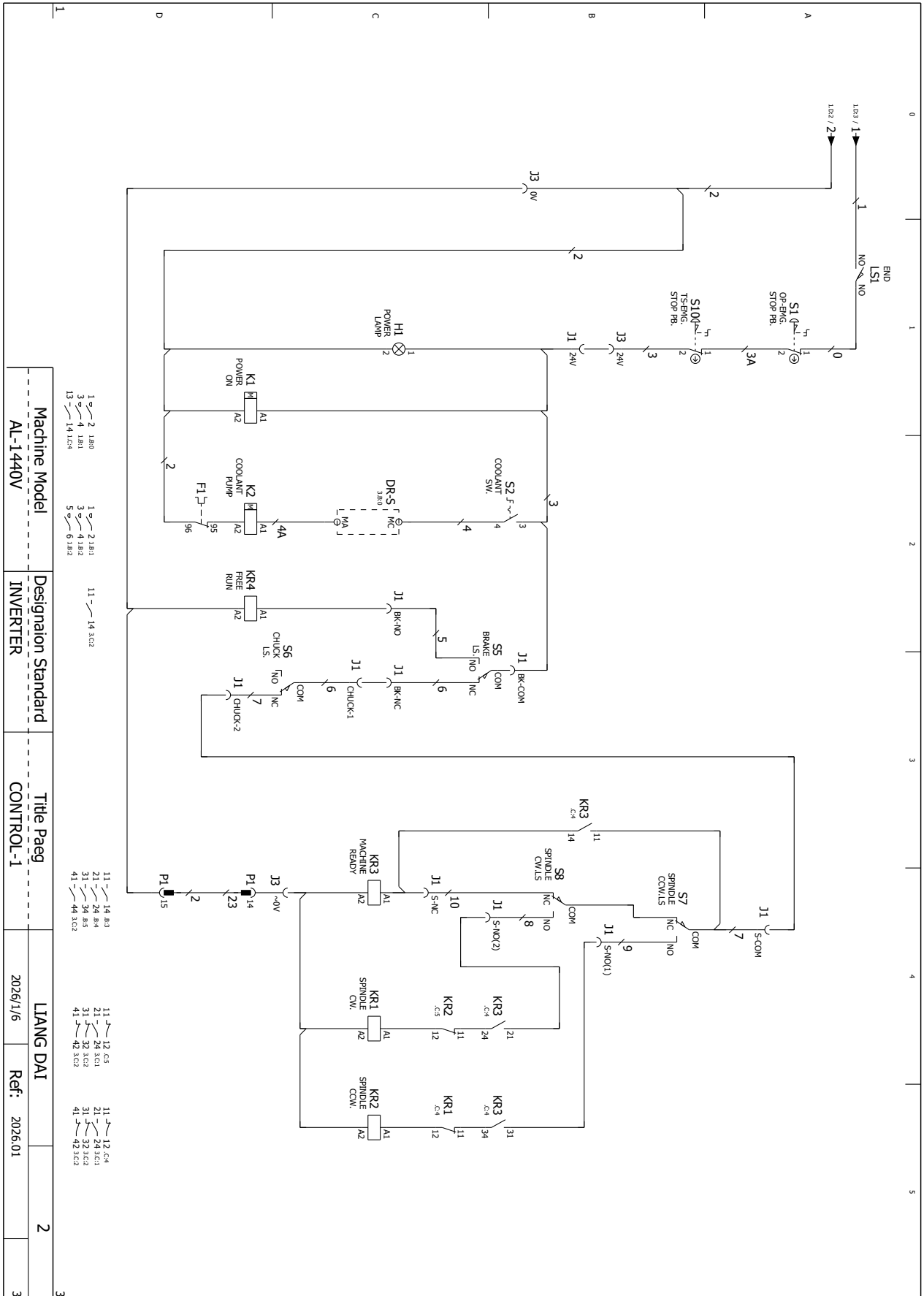
Ref	Description	Part
1	CASTING	Z12179
2	CASTING	Z12180
3	SHAFT	Z12181
4	SCREW	Z12182
5	COLLAR	Z12183
6	HANDLE	Z12184
7	SHAFT	Z12185
8	SCREW	Z12186
9	HANDLE	Z12187
10	SHAFT	Z12188
11	SCREW	Z12189
12	SCREW	Z12190
13	SPRING PIN	Z12191
14	SPRING PIN	Z12192
15	CASTING	Z12193
16	SCREW	Z12194

TAILSTOCK Fig 14

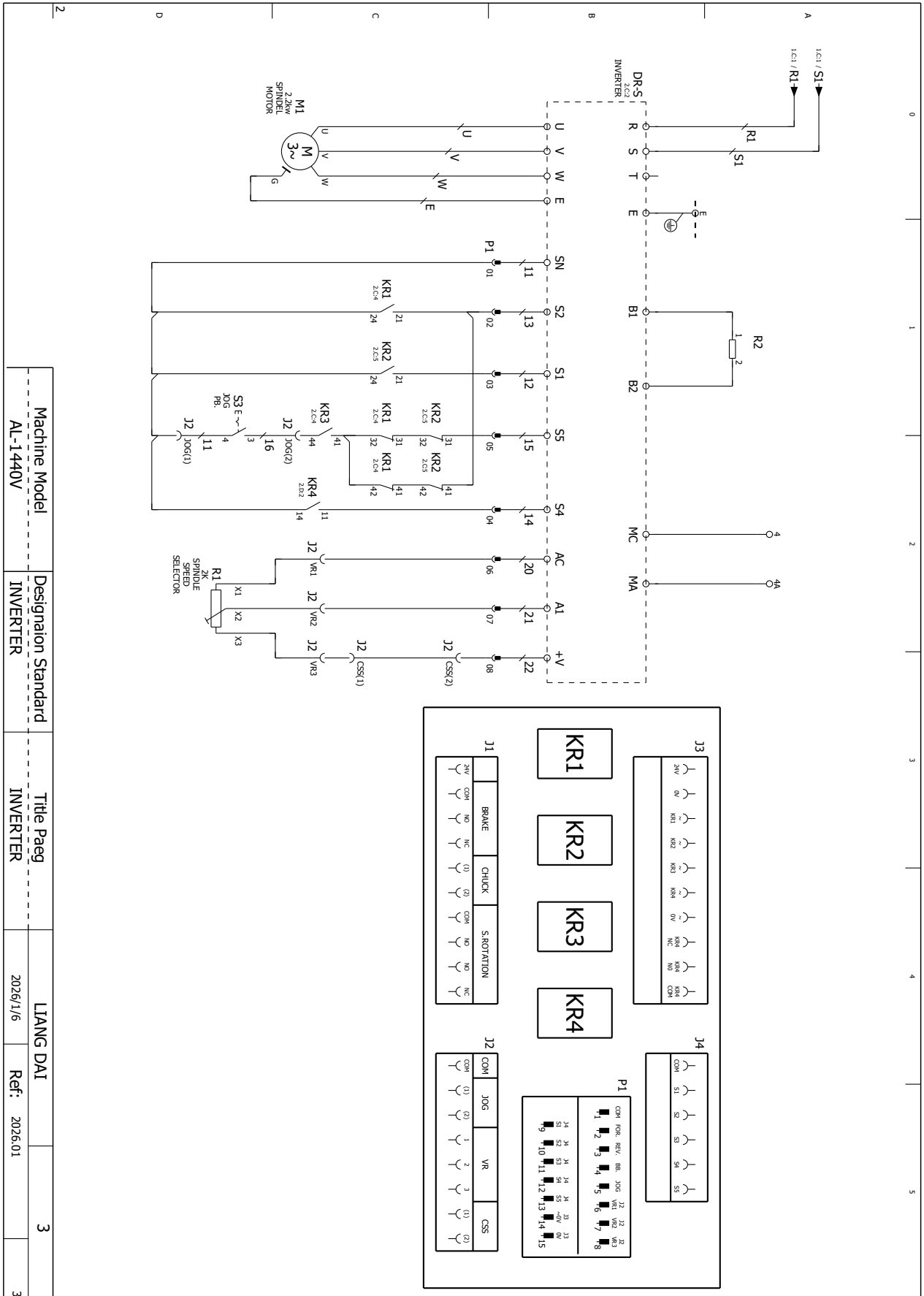


Ref	Description	Part
1	TAILSTOCK CASTING	Z12195
2	TAILSTOCK BASE	Z12196
3	TAILSTOCK BARREL	Z12197
4	NUT	Z12198
5	FEED SCREW	Z12199
6	BRACKET	Z12200
7	DIAL	Z12201
8	HANDWHEEL	Z12202
9	NUT	Z12203
10	HANDLE	Z12204
11	NUT	Z12205
12	SHAFT	Z12206
13	LEVER	Z12207
14	COLLAR	Z12208
15	CAM SHAFT	Z12209
16	CLAMP STUD	Z12210
17	CLAMP	Z12211
18	CLAMP HANDLE LEVER	Z12212
19	KEY	Z12213
20	SET SCREW M8x30	Z12214
21	SET SCREW M8x30	Z12215
22	WASHER (M12)	Z12216
23	NUT M12	Z12217
24	STEEL BALL AND SPRING	Z12218
25	SET SCREW M5x10	Z12219
26	PVC KNOB	Z12220
27	KEY 5x12	Z12221
28	THRUST BEARING (#2902)	Z12222
29	CAP SCREW M6x20	Z12223
30	SCREW M6x16	Z12224
31	OILER (1/4")	Z12225
32	CAP SCREW M5x16	Z12226

WIRING DIAGRAM - 2



WIRING DIAGRAM - 3





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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