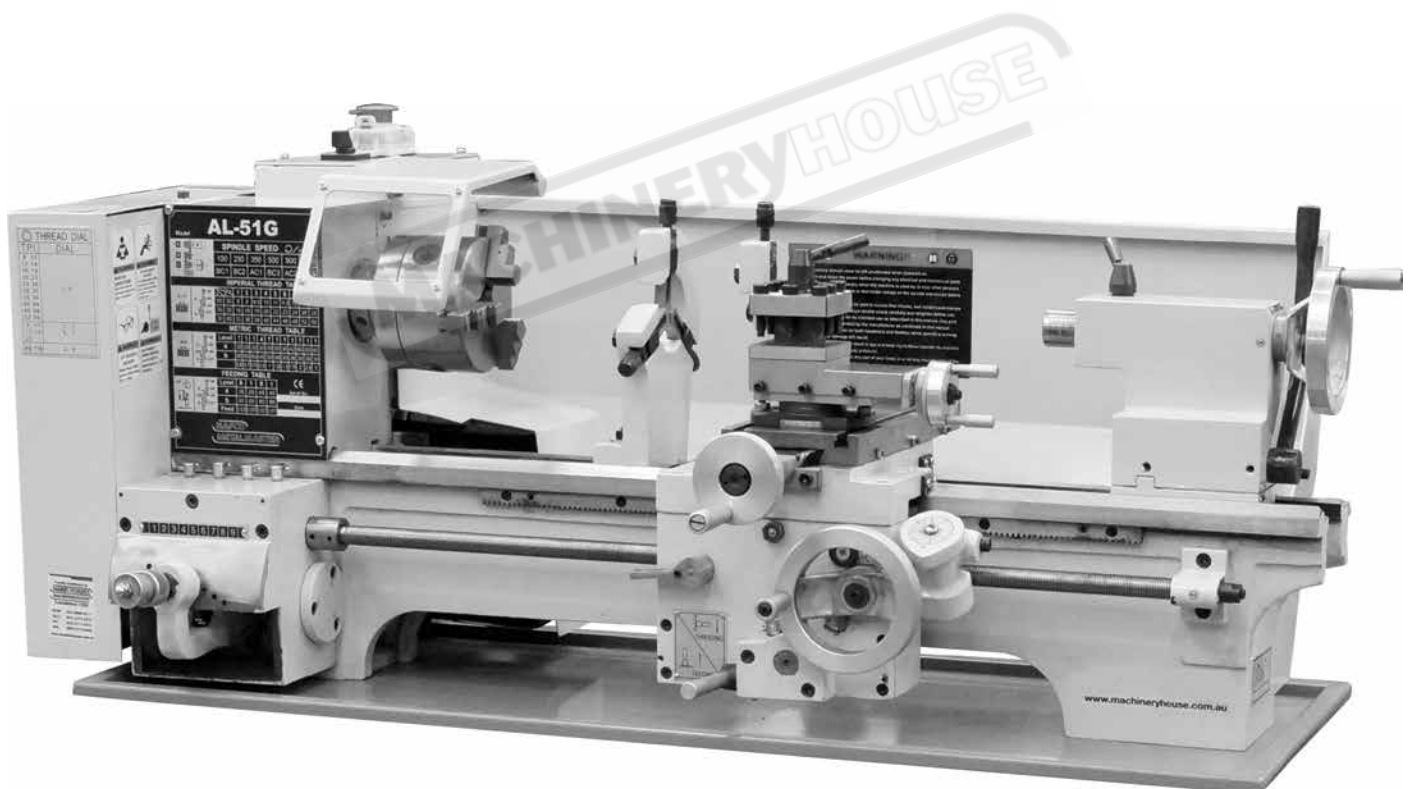


# INSTRUCTION MANUAL

## AL-51G Bench Lathe (240V) 230 x 500mm Turning Capacity



L160

***9"X19" (230mmX500mm)***

***9"X29" (230mmX750mm)***

# **METAL LATHE**

***INSTRUCTION MANUAL***

**MACHINERYHOUSE**

**2014-12-4**

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## ***SECTION 1 :SAFETY***

### **WARNION !**

**READ MANUAL BEFORE OPERATING MACHINE.FAILURE TO FOLLOW INSTRUCTIONS BELOW WILL RESULT IN PERSONAL INJURY.**

**DANGER !** Indicates an imminently hazardous situation which, if not avoided, WILL result in death or serious injury.

**WARNING !** Indicates a potentially hazardous situation which, if not avoided, COULD result in death or serious injury.

**CAUTION !** Indicates a potentially hazardous situation which, if not avoided, MAY result in minor or moderate injury.

**NOTICE !** This symbol is used to alert the user to useful information about proper operation of the equipment,and/or a situation that may cause damage to the machinery .

### **Standard Safety Instructions**

1. **Thoroughly read the owner's Manual before operating your machine.** Learn the applications, limitations and potential hazards of this machine. Keep the manual in a safe and convenient place for future reference.
2. **Keep work area clean and well lighted.** Clutter and inadequate lighting invite potential hazards.
3. **Ground all tools.** If a machine is equipped with a three-prong plug, it must be plugged into a three-hole grounded electrical receptacle or grounded extension cord. If using an adapter to aid in accommodating a two-hole receptacle, ground using a screw to a known ground.
4. **Wear eye protection at all times.** Use safety glasses with side shields or safety goggles that meet the appropriate standards of the **American National Standards Institute(ANSI)**.
5. **Avoid dangerous environments.** Do not operate this machine in wet or open flame environments. Airborne dust particles could cause an explosion and severe fire hazard.
6. **Ensure all guards are securely in place** and in working condition.
7. **Make sure switch is in the OFF position** before connecting power to machine.
8. **Keep work area clean**, free of clutter, **grease, etc.**
9. **Keep children and visitors away.** Visitors must be kept at a safe distance while operating unit.
10. **Childproof your workshop** with padlocks, master switches or by removing starter keys.
11. **Stop and disconnect the machine when cleaning, adjusting or servicing.**
12. **Do not force tool.** The machine will do a safer and better job at the rate for which it was designed.
13. **Use correct tool.** Do not force machine or attachment to do a job for which it was not designed.
14. **Wear proper apparel .**Do not wear loose clothing, neck ties, gloves, jewelry, and secure long hair away from moving parts.
15. **Remove chuck keys, rags, and tools.** Before turning the machine on, make it a habit to check that all chuck keys and wrenches have been removed.
16. **Avoid using an extension cord.** But if you must use one, examine the extension cord to

ensure it is in good condition. Immediately replace a damaged extension cord. Always use an extension cord that uses a ground pin and connected ground wire. Use an extension cord that meets the amp rating on the motor nameplate. If the motor is dual voltage, be sure to use the amp rating for the voltage you will be using. If you use an extension cord with an undersized gauge or one that is too long, excessive heat will be generated within the circuit, increasing the chance of a fire or damage to the circuit.

17. **Keep proper footing and balance at all times.**

18. **Do not leave machine unattended.** Wait until it comes to a complete stop before leaving the area.

19. **Perform machine maintenance and care.** Follow lubrication and accessory attachment instructions in the manual.

20. **If at any time you are experiencing** difficulties performing the intended operation, stop using the machine! Then contact our technical support or ask a qualified expert how the operation should be performed.

21. **Be aware that certain materials may cause an allergic reaction in people and animals,** especially when exposed to fine dust. Make sure you know what type of material dust you will be exposed to and the possibility of an allergic reaction.

22. **Habits-good and bad-are hard to break.** Develop good habits in your shop and safety will become second-nature to you .



## Additional Safety Instructions for Lathes

### WARNING !

**READ** and understand this entire Owner's Manual before using this machine. Serious personal injury may occur if safety and operational information is not understood and followed. **DO NOT** risk your safety by not reading!

### CAUTION !

USE this and other machinery with caution and respect. Always consider safety first, as it applies to your individual working conditions. No list of safety guidelines can be complete-every shop environment is different. Failure to follow guidelines could result in serious personal injury, damage to equipment or poor work results.

1. **AVOIDING INJURY:** Read and understand this manual before operating this lathe.
2. **AVOIDING LACERATIONS AND ENTANGLEMENT:** Do not clear chips by hand. Use a brush, and never clear chips while the lathe is turning.
3. **USING CORRECT TOOLING:** Always select the right cutter for the job, and make sure cutters are sharp. The right tool decreases strain on the lathe components and provides a better finish.
4. **ELIMINATING A PROJECTILE HAZARD:** Always remove chuck key. Never walk away from the lathe with the key in the chuck.
5. **SECURING A WORKPIECE:** Make sure workpiece is properly held in chuck before starting lathe. A workpiece thrown from the chuck will cause severe injury.
6. **CHUCK SAFETY:** Chucks are surprisingly heavy and awkward to hold, so protect your hands and the lathe ways. Always use a chuck cradle or piece of plywood over the lathe ways.
7. **WORKPIECE SUPPORT:** Support a long workpiece if it extends from the headstock so it will not wobble violently when the lathe is turned on. When machining, a workpiece that extends more than 2.5 times its diameter must be supported by a center or steady rest.
8. **AVOIDING STARTUP INJURIES:** Make sure workpiece, cutting tool, and tool post have adequate clearance before starting lathe. Check chuck clearance and saddle clearance before starting the lathe. Make sure spindle RPM is set correctly for part diameter before starting the lathe. Large parts can be ejected from the chuck if the chuck speed is set too high.
9. **ELIMINATING A PROJECTILE HAZARD:** Always use the appropriate feed and speed rates.
10. **AVOIDING ENTANGLEMENT INJURIES:** Never attempt to slow or stop the lathe chuck by hand, and tie back long hair, ponytails, loose clothing, and sleeves so they do not dangle.
11. **MAINTAINING A SAFE WORKPLACE:** Never leave lathe unattended while it is running.
12. **PREVENTING AN APPON-CHUCK CRASH:** Always release automatic feeds after completing a job.

## ***SECTION 2: CIRCUIT REQUIREMENTS***

### **Operation**

The machine is wired for 110 or 230 or 240 or 400 volt , single phase or three phase operation .A fuse or circuit breaker should be used when connecting this metal lathe to protect motor .

If you operate this on any circuit that is already close to its capacity, it might blow a fuse or trip a circuit breaker .However , if an unusual load does not exist and a power failure still occurs , contact a qualified electrician or our service department .

### **Extension Cords**

We do not recommend using an extension cord to operate your machine. However , when it is necessary to use an extension cord , use the following guidelines :

1. Use cord rated for standard service .
2. Never exceed a length of 15m (50 feet) .
3. Ensure cord has a ground wire and pin .
4. Do not use cords in need of repair .

### **Grounding**

In the event of an electrical short , grounding reduces the risk of electric shock by providing a path of least resistance to disperse electric current . This tool is equipped with a power cord having an equipment-grounding conductor . The outlet must be properly installed and grounded in accordance with all local codes and ordinances .

This machine must be grounded ! Verify that any existing electrical outlet and circuit you intend to plug into is actually grounded . If it is not , it will be necessary to run a separate copper ground wire , of the appropriate size , from the outlet to a known ground . Under no circumstances should you connect your machine to an ungrounded power source or electrocution or severe shock could occur .

## ***SECTION 3: INTRODUCTION***

### **Unpacking**

The machine is a heavy lathe . do not over-exert yourself or moving your machine –get assistance .In the event that your metal lathe must be moved up or down a flight of stairs , be sure that the stairs are capable of supporting the combined weight of people and the machine .Serious personal injury may occur .

### **Clean up**

The unpainted surfaces are coated with a waxy oil to protect them from corrosion during shipment. Remove this protective coating with a solvent cleaner or citrus-based degreaser. Avoid chlorine-based solvents as they may damage painted surfaces should they come in contact. Always follow the usage instructions on the product you choose for clean up.

### **CAUTION !**

Many of the solvents commonly used to clean machinery can be highly flammable, and toxic when inhaled or ingested. Always work in well-ventilated areas far from potential ignition sources when dealing with solvents. Use care when disposing of waste rags and towels to be sure they do not create fire or environmental hazards. Keep children and animals safely away when cleaning and assembling this machine.

### **WARNING !**

Do not use gasoline or other petroleum-based solvents to remove this protective coating. These products generally have low flash points which makes them extremely flammable. A risk of explosion and burning exists if these products are used. Serious personal injury may occur.

### **CAUTION !**

Make your shop “child safe”. Ensure that your workplace is inaccessible to youngsters by closing and locking all entrances when you are away. Never allow visitors in your shop when assembling, adjusting or operating equipment.

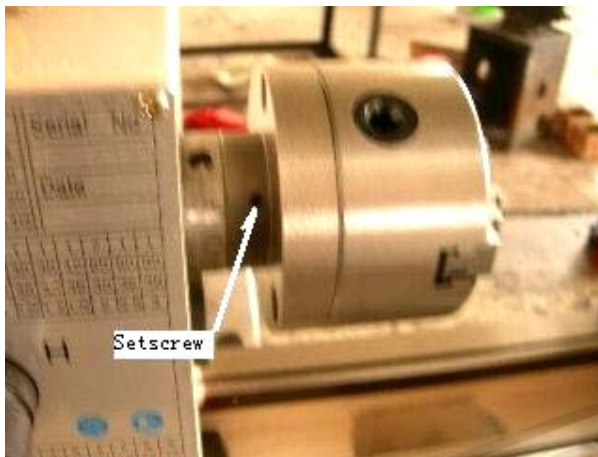


## SECTION 4: ASSEMBLY & SETUP

### Mounting

This lathe model should be securely Mounted to a stand or benchtop. DO NOT attempt to start this machine until you have completed all of the assembly and control familiarization steps .When performing the assembly steps, ensure that the switch is off and the power is disconnected.. Failure to comply with this could cause inadvertent starting of the machine which can result in serious operator injury .

### Chucks



**Figure 1** Typical chuck mounting .

The lathe comes equipped with a 100mm 3-jaw chuck (already installed), a 187mm 4-jaw chuck and a faceplate.

The 3-jaw chuck is a scroll-type chuck, meaning that all three jaws move in unison when adjustments are made .The 4-jaw chuck , on the other hand , features independent jaws . The 4-jaws chuck used for square or unevenly-shaped stock .

The 3 and 4-jaw chucks have a setscrew in the hub of the back plate . **Figure 1** . This setscrew prevents the chucks from unscr-ewing when rotating the lathe in the reverse direction . Prior to removing the chuck , loosen the setscrew in the hub of the back plate .

Use the chuck removal bars supplied to remove the 3 or 4-jaw chucks . **Figure 2** .

Use one bar to hold the spindle stationary , the other to unscrew the chuck . Turn the chuck counter-clockwise to remove .

To mount one of the standard chucks, line up the desired chuck (or face plate ) with the threaded spindle. Thread the chuck in place . Take care to ensure that the threads on both the headstock and the chuck are clean and free of obstructions before mounting .



**Figure 2** . Chuck removal bars in place

**WARNING !**

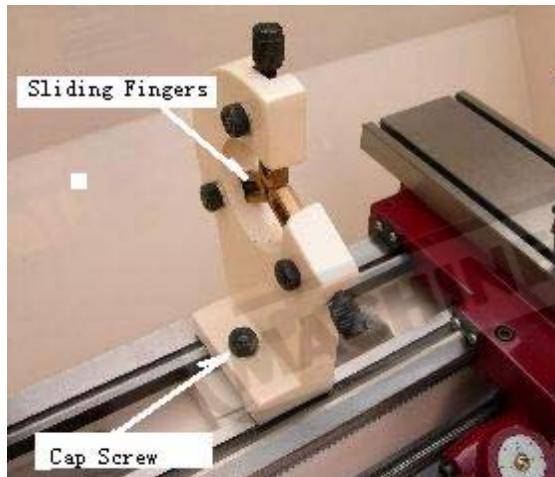
Never leave a chuck key or chuck removal bar in the chuck or spindle when they are not in use .If the machine accidentally started with these in place ,they can become projectiles and cause serious injury .

**Steady Rest**

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

To mount the steady rest:

1. Secure to bedway from below with the locking plate.
2. A single M8-1.25X55mm cap screw, along with a nut and washer, holds the steady rest in place see **Figure 3**.
3. The sliding fingers on the center steady rest should receive periodic lubrication while in use to prevent premature wear.



**Figure 3.** Steady rest in place.



**Figure 4.** Follow rest secured to saddle.

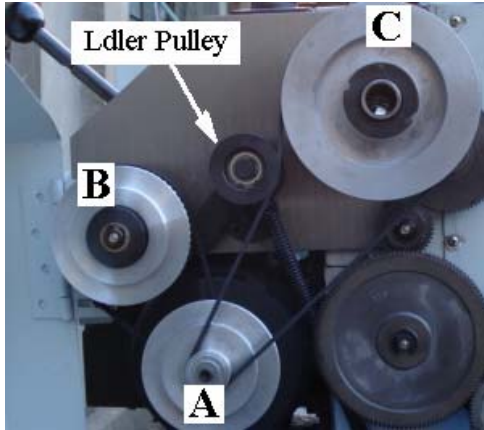
**Follow Rest**

The follow rest is normally used with small diameter stock to prevent the workpiece from “springing” under pressure from the turning tool. To install the follow rest:

1. The follow rest is secured to the saddle with two cap screws. See **Figure 4**.
2. The sliding fingers on the follow rest are similar to those on the steady rest, and should be lubricated to prevent premature wear.

## SECTION 5: CONTROLS

### Spindle Speeds



The rotating speed of the headstock is controlled by the positioning of the belts on the pulleys.

See **Figure 5**. These are accessed by removing the cover on the end of the headstock. Refer to the chart at the end of this manual or the plate on the headstock (**Figure 6 or Figure 7**) to determine which belt combinations produce what speeds. The speeds available on this machine are 130, 300, 400, 600, 1000, and 2000 RPM or 100, 250, 350, 500, 900, 1800 RPM.

**Figure 5** Pulley position in headstock

	/min					
	120	300	400	600	1000	2000
	BC1	BC2	AC1	BC3	AC2	AC3

**Figure 6**. Spindle speed portion of machine plate ( Motor hertz /60HZ)

	/min					
	100	250	350	500	900	1800
	BC1	BC2	AC1	BC3	AC2	AC3

**Figure 7**. Spindle speed portion of machine plate ( Motor hertz /50HZ)

This belt tensioning lever on the top of the headstock loosens the drive belt to enable the operator to change speeds. See **Figure 8**. The tension release lever can also be used as a clutch while the machine is in operation.



**WARNING!**

**NEVER** reach across a rotating chuck or plate, The use of the belt tension release lever as a clutch should be restricted to those times when starting a heavier part turning and then at very low speed.

**Figure 8** Belt tensioning lever

**Feed Rate and Thread cutting (1): For metric lead screw machine**



The lever at the bottom of the headstock changes the feed rate, or the number of threadsper-inch. , See **Figure 9**. The lever can be engaged in any of nine diffent positions . When used in conjunction with the interchangeable gears supplied it is possible to achieve a wide variety of feed or threading rates .

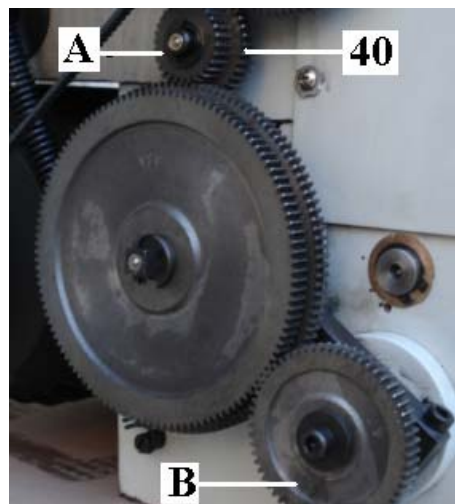
**Figure 9.** Feed rate selector lever.

The machine plate describes some of the more typical settings which might be used. **Figure 10and Figure 11** shows the feed rate portion of the machine plate. Looking at the first column, this means that a feed rate of 0.12 mm. can be achieved by putting the feed lever in postion 9 with a 28 tooth gear installed at A, and 60 tooth gear at B .

A metric 2mm pitch is the result of having a 60 tooth gear at A with a 30 tooth gear at B, and the lever in position 7.

An 8 thread per inch feed requires the lever to be in position 1 and use the same A and B gears installed above. However the gear between them changes from a 120 tooth to127 tooth .Also note that the alignment of gears A and B are offset so that A now engages the 120 tooth ger and B engages the 127 tooth gear. The shaftfor position B is provided with a spacer which can be installed behind the gear to change its position.

mm		lever	7	1	1	4	7	1	1	1	7	1	1	
		a	30	28	30	30	30	30	42	60	60	60	60	60
		b	60	60	60	45	30	36	30	36	30	36	30	36
		feed	0.5	0.7	0.75	0.8	1	1.25	1.5	1.75	2	2.5	3	
n/1"		lever	1	2	3	4	5	6	7	8	9			
		a	60	30	8	9	9.5	10	11	11.5	12	13	14	
		b	30	30	16	18	19	20	22	23	24	26	28	
		feed	30	60	32	36	38	40	44	46	48	52	56	
mm		lever	9	5	1	1	Serial No.							
		a	28	28	28	42	Date							
		b	60	60	60	60								
		feed	0.12	0.16	0.20	0.30								



**Figure 10** Feed and threading rates portion of machine plate

**Figure 11** Interchangeable gear positions





Several different threads can be cut using the proper combination of gears and settings . When **cutting metric threads**, the half nut and threading dial are used to thread in a conventional manner. **Figure 12.** The thread dial chart specifies at which point a thread can be entered using the threading dial.

**Figure 12**

**Inch Thread Cutting** – The only difference in metric thread cutting is, the half nut must remain engaged during the entire threading process. The thread dial cannot be utilized.

Set the machine up for the desired thread pitch . Start the machine and engage the half nut .When the tool reaches the workpiece ,it will cut the initial threading pass. When the tool reaches the end of the cut, stop the machine by turning the motor off and at the same time back the tool out off the workpiece so that it clears the thread. Do not disengage the half nut lever. Reverse the motor direction to allow the cutting tool to traverse back to the starting point. Repeat these steps until you have obtained results.

### **Feed Rate and Thread cutting (2) : For imperial lead screw machine**



The lever at the bottom of the headstock changes the feed rate, or the number of threadsper-inch. , See **Figure 13.**

The lever can be engaged in any of nine different positions . When used in conjunction with the interchangeable gears supplied it is possible to achieve a wide variety of feed or threading rates .

**Figure 13.** Feed rate selector lever.

The machine plate describes some of the more typical settings which might be used. **Figure 14and Figure 15** shows the feed rate portion of the machine plate. Looking at the first column, this means that a feed rate of  $0.0047''$  can be achieved by putting the feed lever in position 9 with a 28 tooth gear installed at A, and 60 tooth gear at B .

An 8 thread per inch feed is the result of having a 60 tooth gear at A with a 30 tooth gear at B, and the lever in position 1.

A metric 2 mm pitch requires the lever to be in position 7 and use the same A and B gears installed above. However the gear between them changes from a 120 tooth to 127 tooth .Also note that the alignment of gears A and B are offset so that A now engages the 127 tooth gear and B engages the

120 tooth gear. The shaft for position B is provided with a spacer which can be installed behind the gear to change its position.

n / 1"	a b	Level	1	2	3	4	5	6	7	8	9		
		a	60	30	8	9	9.5	10	11	11.5	12	13	14
mm	a b	Level	7	1	1	4	7	1	1	1	7	1	1
		a	30	28	30	30	30	30	30	42	60	60	60
"	a b	b	60	60	60	45	30	36	30	36	30	36	30
		Feed	0.005	0.007	0.007	0.007	0.8	1	1.25	1.5	1.75	2	2.5

Figure 14 Feed and threading rates portion

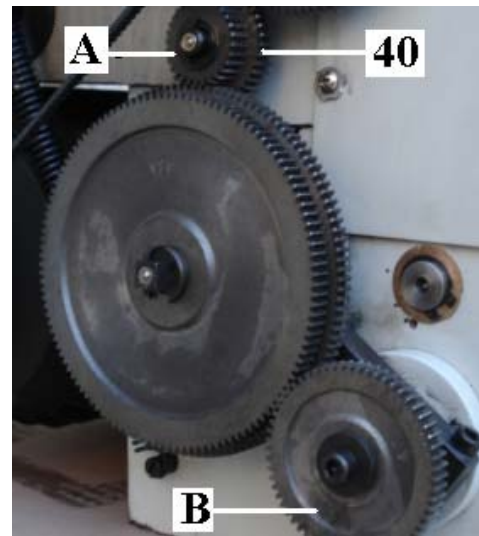


Figure 15 Interchangeable gear positions of machine plate



Several different threads can be cut using the proper combination of gears and settings . When **cutting Inch threads**, the half nut and threading dial are used to thread in a conventional manner. **Figure 16**. The thread dial chart specifies at which point a thread can be entered using the threading dial.

Figure 16

**Metric Thread Cutting** – The only difference in metric thread cutting is, the half nut must remain engaged during the entire threading process. The thread dial cannot be utilized.

Set the machine up for the desired thread pitch . Start the machine and engage the half nut .When the tool reaches the workpiece ,it will cut the initial threading pass. When the tool reaches the end of the cut, stop the machine by turning the motor off and at the same time back the tool out off the workpiece so that it clears the thread. Do not disengage the half nut lever. Reverse the motor direction to allow the cutting tool to traverse back to the starting point. Repeat these steps until you have obtained results.

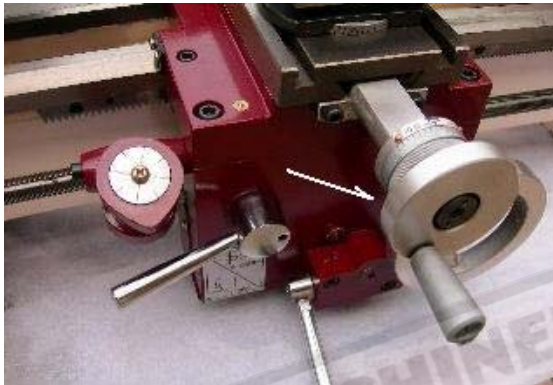
## Carriage Controls

The carriage allows the cutting tool to move along the length of the lathe bed. The cross slide allows the cutting tool to travel perpendicular to the bed. The carriage features a top slide which



allows linear movement of the cutting tool at any preset angle. This section will review the individual controls on the carriage and provide descriptions of their uses.

**Longitudinal Handwheel**-The longitudinal handwheel moves the carriage left or right along the bed. The control is helpful when manual movement is desired during turning operations. **Figure 17.**



**Cross Slide Handwheel** – The cross slide handwheel moves the top slide toward and away from the work. Turning the dial clockwise moves the slide toward the workpiece. The graduated scale can be adjusted using the same method as the longitudinal scale.

**Figure 18.**



**Top Slide Handwheel**- The top slide handwheel controls the position of the cutting adjustable for angle as well as longitudinal travel. It can be adjusted a full 360° , if needed. The graduated scale is adjustable using the same method as the other handwheels. angle adjustment is controlled by cap screws in the base of the top slide.

**Figure 19.**

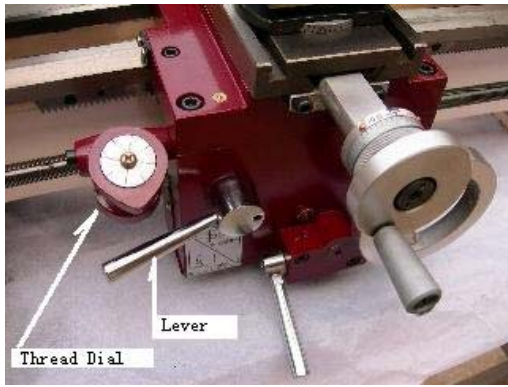


**Feed Selector** –Moving this lever upward engages the automatic longitudinal feed.

**Figure 20.**

**Figure 20** Longitudinal feed lever.





**Half Nut Lever** – This lever compresses and releases the half nut that engages the leadscrew. The lever is only engaged while turning threads in stock. A lockout device featured in the lever mechanism engages when the feed selector is used.

**Figure 21.**

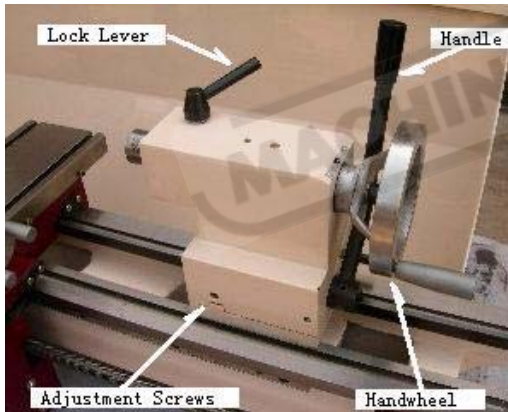
**Threading Dial Indicator** – The indicator tells you when to engage the half nut to begin the threading process. **Figure 21.**



**Tool post** – A four-way tool post is supplied with the lathe. Cutting tools can be attached and removed by tightening or loosening the clamping bolt. **Figure 22.**

**Figure 22.** Four-way tool post.

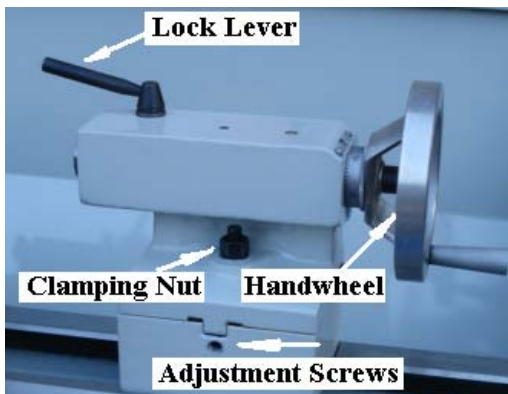
### Tailstock Controls (1)



**Tailstock Handwheel** – Turning the handwheel advances or retracts the barrel in the tailstock. The graduated scale on the handwheel is adjustable. **Figure 23.** **Lock Lever** – This lever locks the tailstock barrel in place. **Moving Handle** – The moving handle locks the tailstock in place on the lathe bed. **Adjustment Setscrews** – The setscrews are used for aligning the tailstock to the spindle. This is covered in the next section.

**Figure 23**

### Tailstock Controls (2)



**Tailstock Handwheel** – Turning the handwheel advances or retracts the barrel in the tailstock. The graduated scale on the handwheel is adjustable. **(Figure 24.)** **Lock lever** – This lever locks the tailstock barrel in place. **Clamping Nut** – The clamping nut locks the tailstock in place on the lathe bed. **Adjustment Setscrews** – These setscrews are used for aligning the tailstock to the spindle. This is covered in the next section.

**Figure 24**



## Test Run (1)

Now that the lathe is securely in place and you have read the safety guidelines , It is time to give the machine a test run .

Before starting the machine , mack sure the machine is properly grounded and the power and directional switch is in the “O” position . **Figure 25 .**

Inspect the machine to ensure that all hand tools are not of the way , guards are in place and nothing is impeding the movement of the chuck .



Green knob down and set the directional switch to position “R” . The chuck should be turning in a counterclockwise direction . If the direction is reversed , contact our service department for further instruction . If the lathe running correctly , take some time to become familiar with the various controls on the machine . The controls will be reviewed by location on the machine ,in Section 5

**Figure 25 . switch 1**

## Test Run (2)

Now that the lathe is securely in place and you have read the safety guidelines , It is time to give the machine a test run .

Before starting the machine , mack sure the machine is properly grounded and the power and directional switch is in the “STOP” position . **Figure 26.**

Inspect the machine to ensure that all hand tools are not of the way , guards are in place and



nothing is impeding the movement of the chuck .

Set the switch to position “FWD” . The chuck should be turning in a counterclockwise direction . If the direction is reversed , contact our service department for further instruction . If the lathe running correctly , take some time to become familiar with the various controls on the machine . The controls will be reviewed by location on the machine , in Section 5 .

**Figure 26. switch 2**

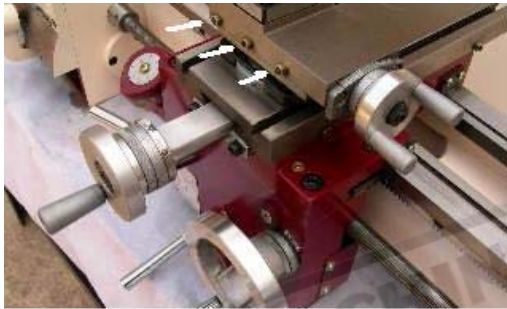
## SECTION 6: ADJUSTMENTS

### Gibs



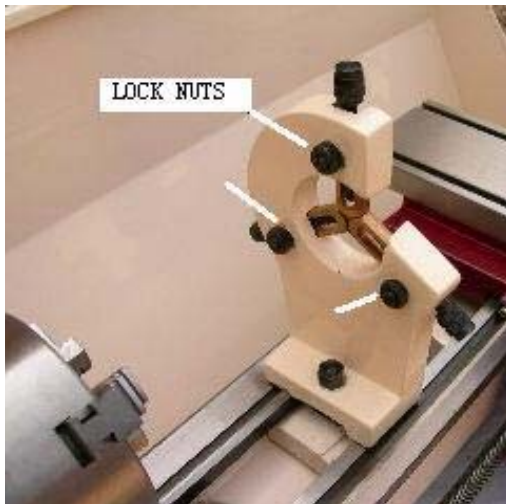
There are two main gib adjustments for the machine. They are: the cross-slide gib and the compound slide gib.

**Cross-slide Gib-** The gib on the cross slide is adjusted by the setscrews at the side of the cross slide. To adjust, loosen the check nuts holding the setscrews in place, tighten the setscrews until excess movement is eliminated and tighten the check nuts. **Figure 27.**



**Compound Gib –** The gib on the top slide is adjusted by the setscrews at the side of the slide. As you did with the cross slide, loosen the check nuts holding the setscrews in place, tighten the setscrews until excess movement is eliminated and retighten the check nuts. **Figure 28.**

### Steady/Follow Rest



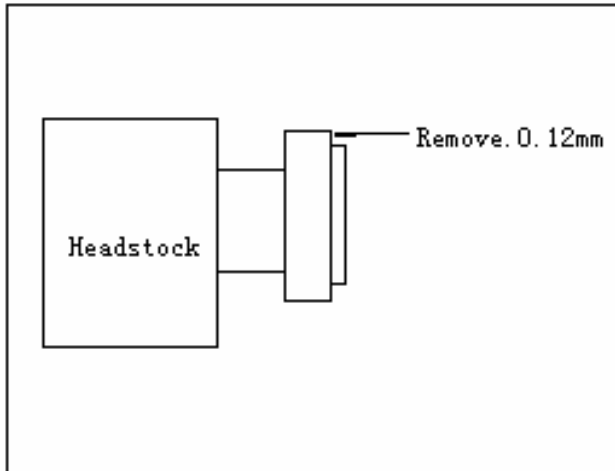
**Figure 29**

#### To adjust the steady rest:

1. Loosen the lock nuts. **Figure 29.**
2. Open the sliding fingers by loosening the knurled screws far enough to fit around the work piece. Secure the steady rest in position.
3. Tighten the knurled screws so that the fingers are snug but not tight against the work piece. Tighten the lock nuts.
4. Lubricate the sliding points with machine oil.

The Follow Rest is setup in the same manner except that the place of the third finger is taken up by the tool bit. The follow rest prevents long, small diameter pieces from flexing under the cutting pressure from the tool bit..

## Chuck Runout



**Figure 30.**

If your lathe use requires a higher level of accuracy, you may find it necessary to true-up the chuck to ensure minimal runout .To check and correct runout:

1. Mount a piece of bar stock in the chuck. The stock should protrude approximately 50mm (2" ) .
2. Using dial indicator, measure the run-out at the end of the bar. Inmost

cases, the amount of runout will not exceed 0.12mm over 50mm which should be accurate enough for most applications. If the runout on the chuck is excessive (e.g., greater than 0.15mm /0.006" ), the excess runout should be eliminated.

3. Start by removing the chuck.

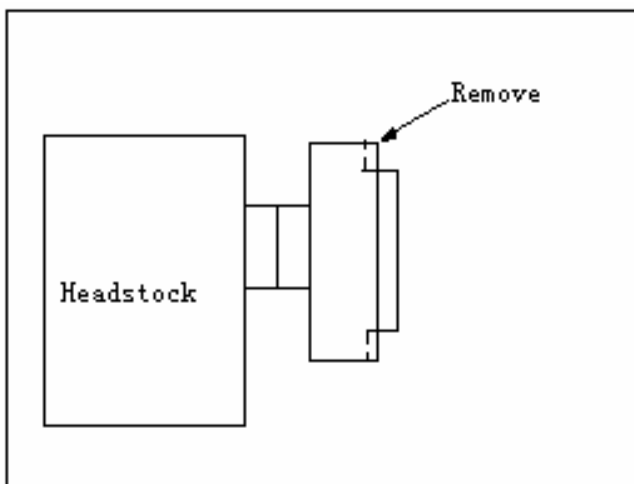
4. Remove the mounting bolts that hold the back-plate to the chuck. Tap along the edge of the mounting shoulder until the chuck and back plate are free of each other.

5. Tread back plate onto the spindle.

6.Remove about 0.12mm (0.005" ) of material from the surface that the chuck mounts to. Be careful not to remove any material from the diameter of the shoulder. **Figure 30.**

7. Install the chuck onto the back plate and check the run-out. If the run out is not within an acceptable ranger, it may be necessary to turn a new should on the back plate.

8.Before turning a new shoulder, accurately measure the diameter of the recess in the back of the chuck.



9.Remove approximately one half of the thickness of the shoulder (approximately 1.5mm).Remove the same thickness off the face of the mounting surface. Figure 31.

10.The finished diameter of the shoulder should be 0.025mm (0.001" ) larger than the diameter of the recess in the chuck. This is a critical step in minimizing chuck run-out.

11. Install the chuck and check for runout .

**Figure 31**

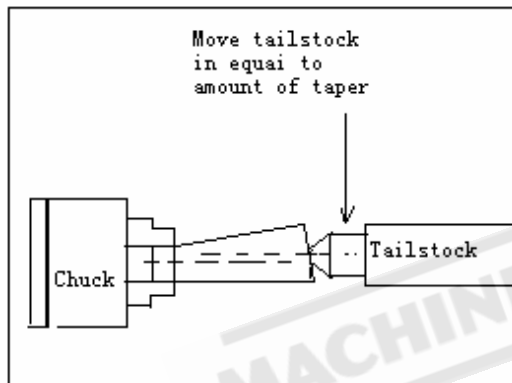
## Tailstock



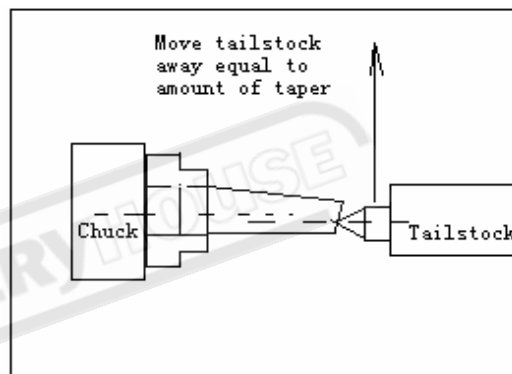
**Figure 32**

The tailstock on the machine is aligned at the factory with the headstock. You may want to take the time to ensure that the tailstock is aligned to your own desired tolerances. To align the tailstock:

- 1.Center drill a 150mm (6" ) piece of bar stock on one ends.
2. Place the center in your tailstock. See **Figure 32.**
- 3.Turn approximately 0.025mm (0.01" ) off the diameter.

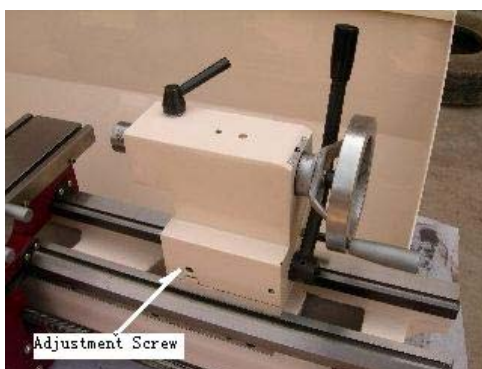


**Figure 33**



**Figure 34**

4. Measure the stock with a micrometer. If the stock is fat at the tailstock end, the tailstock needs to be moved toward you the amount of the taper. **Figure 33.** If the stock is thinner at the tailstock end ,the tailstock needs to be moved away from you the amount of the tape . **Figure 34.**



**Figure 35.**

- 5.Loosen the tailstock mounting boit. Adjust the tailstock offset by the amount of the taper by turning the adjustment setscrews. **Figure 35.** Turn another 0.5mm (0.02" ) off the stock and check for taper. Repeat as necessary until the desired amount of accuracy is achieved.



## SECTION 7: MAINTENANCE

### WARNING !

ALWAYS disconnect the electric power to the machine before servicing .NEVER lubricate your lathe while it is running

### Lubrication

Your lathe will function best when it is clean and well lubricated. Take the time to wipe down and oil the machine after use. We recommend using ISO 68 or SAE 20W non-detergent oil unless otherwise specified.

**Apron-**Apply lubrication to the apron through the ball fitting on the front face of the apron.**Figure 36 and Figure 37**

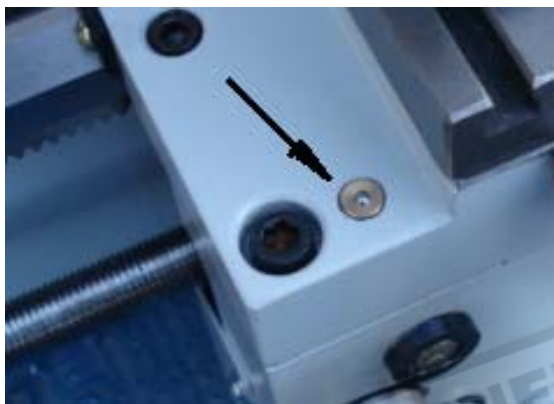


Figure 37

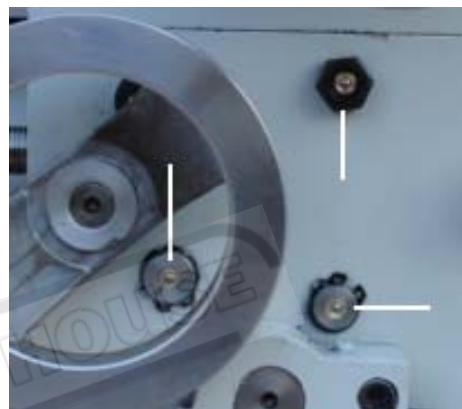


Figure 36 .Apron lubrication point

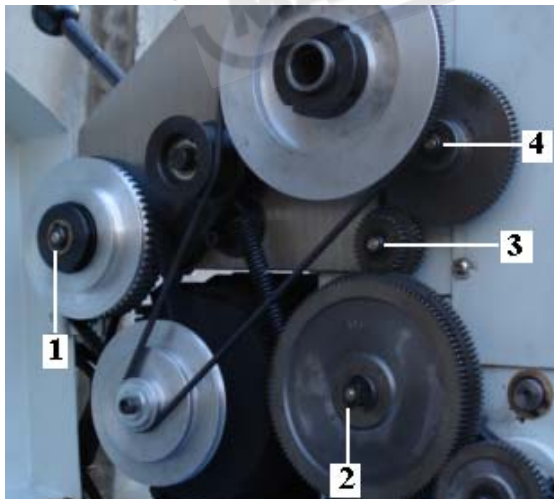


Figure 38. Oil ball on gear hubs



Figure 39. Gearbox lubrication caps and oil balls

**External Gearing-**One-to-two squirts of oil into the oil ball on the gear hubs.**Figure 38.**

Apply only a minimal amount of oil to the teeth of the end gears. Avoid getting oil on the belt or pulleys when lubricating.

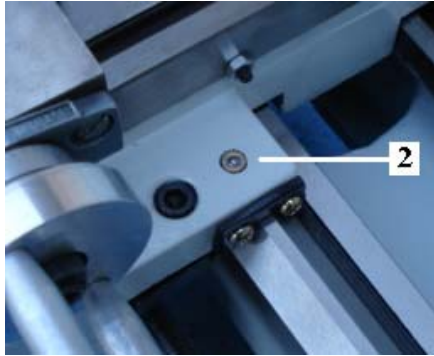
Please note that the large toothed pulley that is to the left of the gears shown in **Figure 38** has an oil ball on the end of the shaft it is mounted to. Make sure to apply one-to-two squirts into the oil ball.

**Gearbox**-Lubrication for the Gearbox is provided through 4 oil caps and two oil balls. Add a squirt or two of oil after every three-to-four hours of use. **Figure 39.**

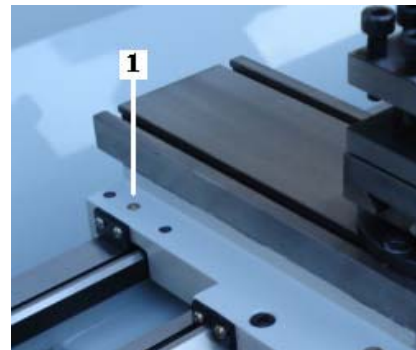
**Motor**-The bearings. used in the motor are shielded and lubricated for life.

**Slides**-Apply oil to the slides after each use. Wipe the ways with a clean rag prior to lubrication to ensure that no grime is carried along with your lubricant into friction-sensitive areas. Applying oil to the bedways and other bare metal parts also protect the lathe from rust and pitting.

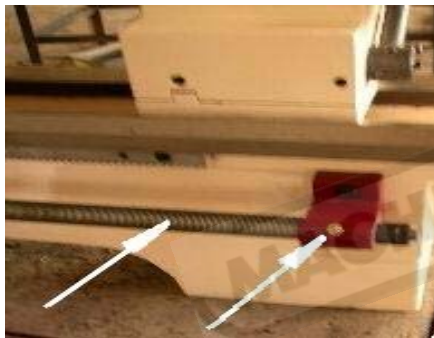
**Way**-Apply lubrication to the way through two oil balls fitting on the carriage .See **Figure 40** and **Figure 41** .



**Figure 40** Way lubrication point



**Figure 41** Way lubrication point



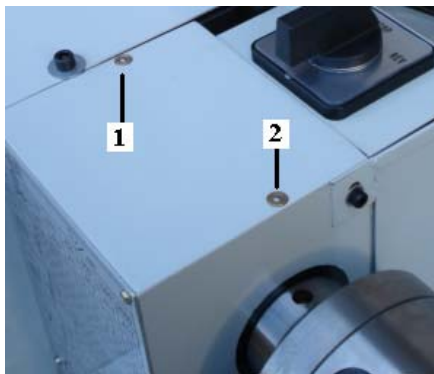
**Figure 42.** leadscrew bearing lubrication point



**Figure 43.** tailstock oiling point

**Lead Screw**-Be sure to lubricate the leadscrew and the leadscrew bearing at the tailstock end of the lathe. **Figure 42.**

**Tailstock**-The tailstock is fitted with one oiling point. Apply oil each week, or after every five uses (depending on the frequency of operation). **Figure 43.**



**Headstock**-Lubrication for the headstock is provided through two points. Add a squirt or two of oil after every-three to four hours of use. See **Figure 44.**

**Figure 44.** Headstock oiling point

## Bearing preload

This lathe is shipped from the factory with the bearing preload already set, If the preload requires resetting for whatever reason, please contact our service department for further instruction.

**SECTION 8-1: TECHNICAL PARAMETER**

9" x19" (230mmx500mm) METAL LATHE

**Overall Dimensions:**

Overall Length-----36½" (927mm)  
 Overall Width-----22" (560mm)  
 Height-----15" (381mm)  
 Bed Width-----4½" (114mm)  
 Spindle Bore-----¾" (20mm)  
 Spindle Taper-----# 3 Morse Taper  
 Tailstock Taper-----# 2 Morse Taper  
 Weight(Net)-----250 lbs(113kg)  
 Weight(Shipping)-----300 lbs(136kg)  
 Crats Size-----LxWxH=41" x22" x19" (1041mmx560mmx482mm)

**Capacity**

Swing Over Bed-----9" (230mm)  
 Swing Over Saddle-----5" (127mm)  
 Carriage Travel-----16" (400mm)  
 Max Tool Size-----¾" x ¾" (11mmx11mm)  
 Distance Between Centers-----19" (480mm)  
 Spindle Thread-----39mmx4mm  
 Compound Travel-----1⅞" (48mm)  
 Cross Slide Travel-----4¼" (108mm)  
 Tailstock Barrel Travel-----1⅞" (40mm)  
 Spindle Speeds-----110~2000RPM (100-1800RPM)  
 Feed Rate Range-----0.0047" -0.012" (0.12mm-0.3mm)  
 Thread Range Lnch-----27 @8 TPI-56TPI  
 Thread Range Metric-----11@ .5-3.0mm

**Motor**

Horsepower-----¾HP/550w

**Standard Accessories:**

-----4" (100mm) - 3-Jaw Chuck w/Two Sets of Jaws  
 -----7¼" (187mm) - 4—Jaw Chuck w/Reversible Jaws  
 -----7.5" (190mm) Face Plate  
 -----4-Way Tool Post  
 -----Follow Rest/Steady Rest  
 -----# 2 Morse Taper Dead Center  
 -----# 3 Morse Taper Dead Center  
 -----Tool Box & Tool Kit

## **SECTION 8-2: TECHNICAL PARAMETER**

9" x29" (230mmx750mm) METAL LATHE

### **Overall Dimensions:**

Overall Length-----	41 " (1177mm)
Overall Width-----	22 " (560mm)
Height-----	15 " (381mm)
Bed Width-----	4½ " (114mm)
Spindle Bore-----	¾ " (20mm)
Spindle Taper-----	# 3 Morse Taper
Tailstock Taper-----	# 2 Morse Taper
Weight(Net)-----	290 lbs(133kg)
Weight(Shipping)-----	350 lbs(160kg)
Crats Size-----	LxWxH=46" x22" x19" (1291mmx560mmx482mm)

### **Capacity**

Swing Over Bed-----	9 " (230mm)
Swing Over Saddle-----	5 " (127mm)
Carriage Travel-----	21 " (650mm)
Max Tool Size-----	¾ " x ¾ " (11mmx11mm)
Distance Between Centers-----	19 " (480mm)
Spindle Thread-----	39mmx4mm
Compound Travel-----	1⅞ " (48mm)
Cross Slide Travel-----	4¼ " (108mm)
Tailstock Barrel Travel-----	1⅞ " (40mm)
Spindle Speeds-----	110~2000RPM (100-1800RPM)
Feed Rate Range-----	0.0047 " -0.012 " (0.12mm-0.3mm)
Thread Range Lnch-----	27 @8 TPI-56TPI
Thread Range Metric-----	11@ .5-3.0mm

### **Motor**

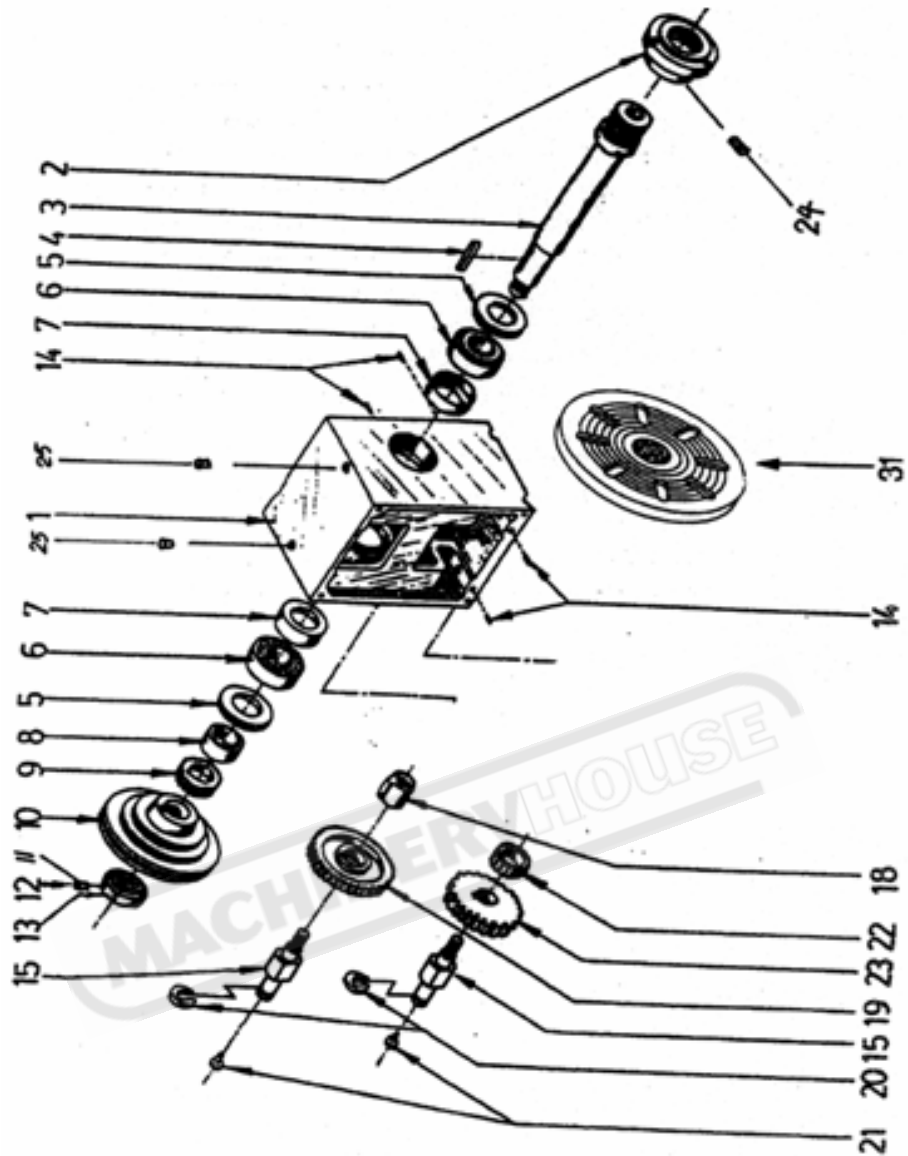
Horsepower-----	¾HP/550w
-----------------	----------

### **Standard Accessories:**

-----	4 " (100mm) - 3-Jaw Chuck w/Two Sets of Jaws
-----	7¼ " (187mm) - 4—Jaw Chuck w/Reversible Jaws
-----	7.5" (190mm) Face Plate
-----	4-Way Tool Post
-----	Follow Rest/Steady Rest
-----	# 2 Morse Taper Dead Center
-----	# 3 Morse Taper Dead Center
-----	Tool Box & Tool Kit

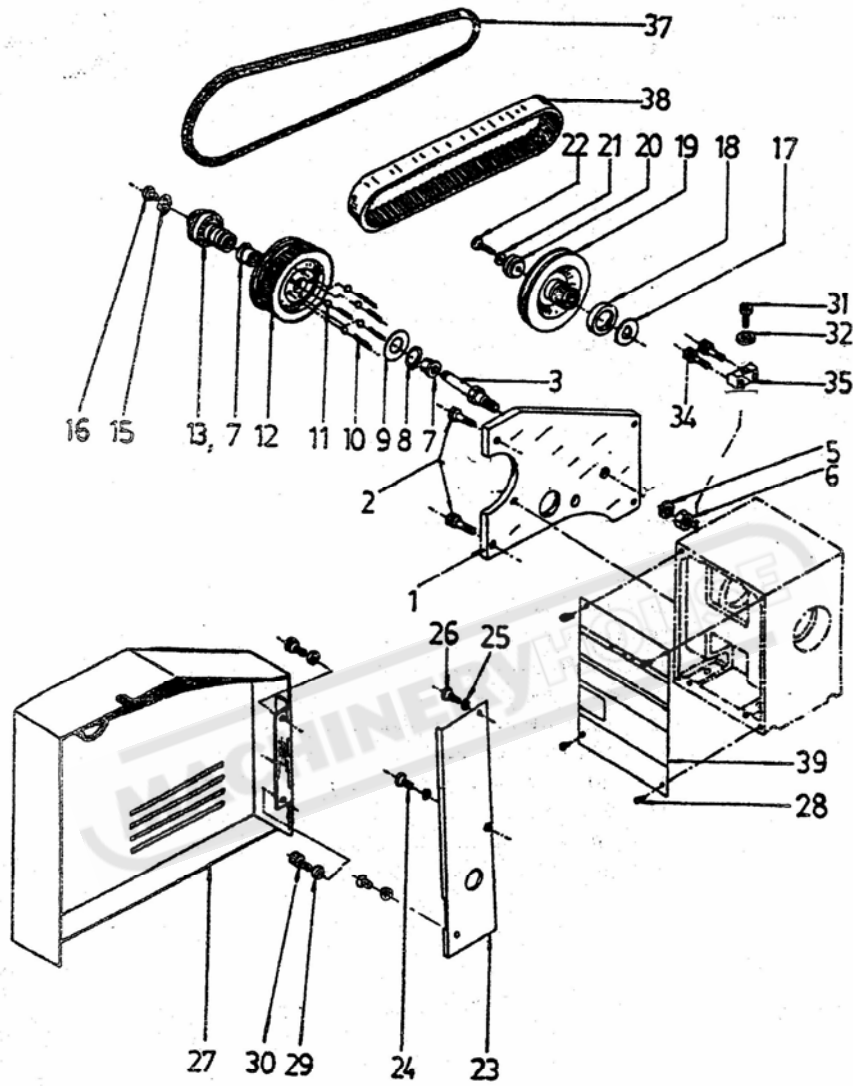


### Headstock Assembly



1-----1002-----Headstock Casting	13-----1012-----Nut M28
2-----1006-----Flange Joint	14-----TS-152104-----Set Screw m5x6
3-----1004-----Spindle	15-----1017-----Shaft
4-----BD920N-H04-----KEY	18-----1016-----Bushing
5-----1005-----Gasket	19-----1014-----Gear 80T
6-----BD920N-H06-----Ball Bearing	20-----1013-----Washer
7-----1003-----Cover	21-----BD920N-H21-----Oil Port 6
8-----1007-----Spacing Ring	22-----1018-----Gear 40T
9-----1011-----Gear 40T	23-----1019-----Gear 28T
10-----1008-----Pulley	24-----1080-----Set Screw M6X8
11-----1010-----Bushing	25-----1081-----Oil Port 8
12-----TS-152102-----Set Screw M8X8	

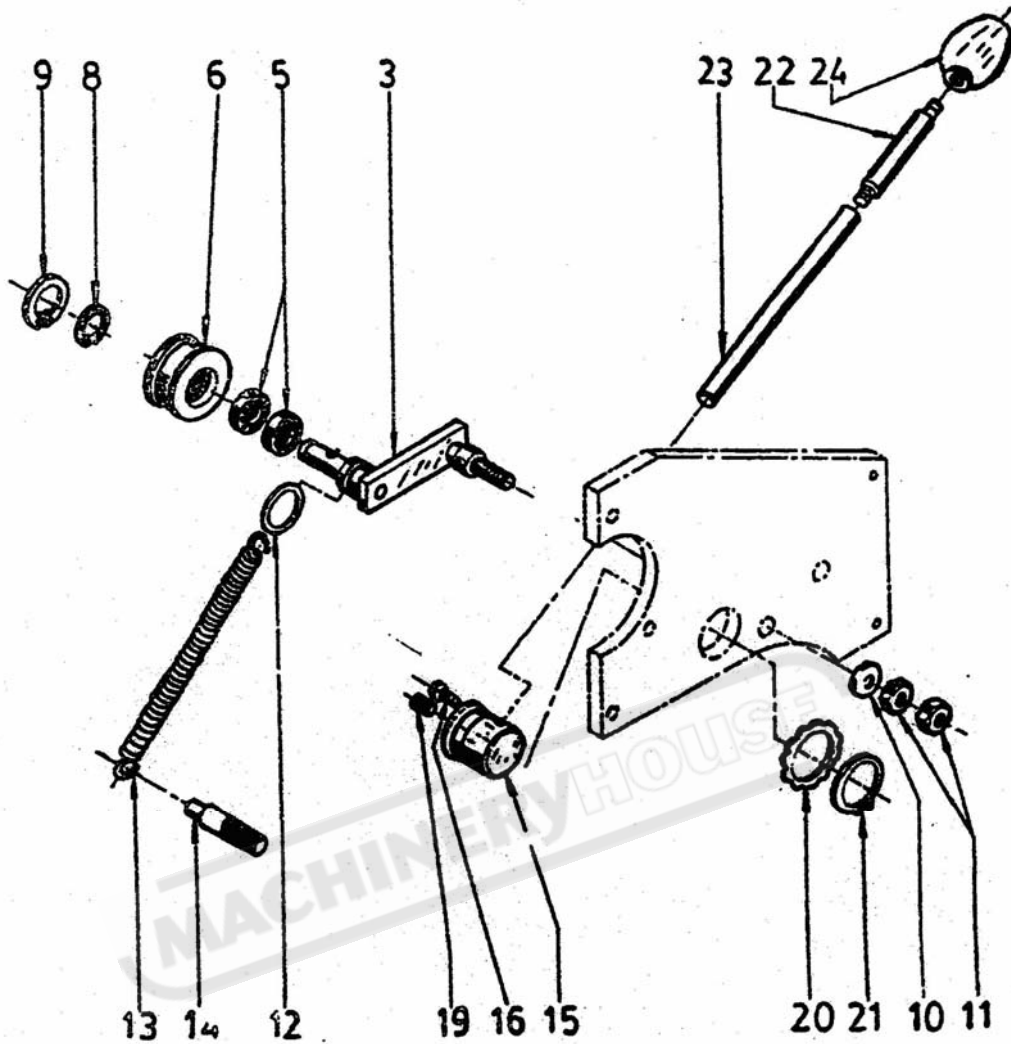
### Drive Assembly



**Driver Assembly**

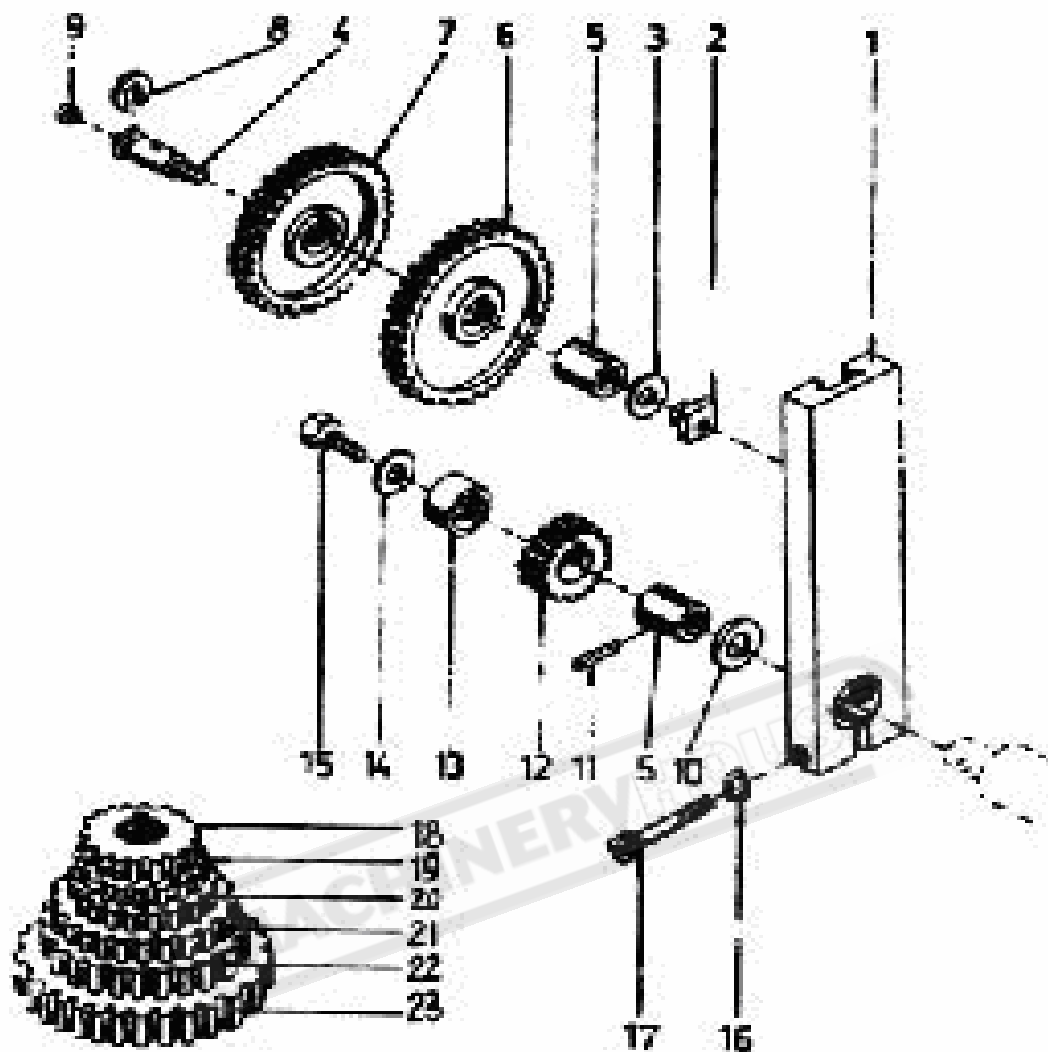
- 1----1044-----Bracket Platw
- 2----TS-150404-----Hex Socket Cap Screw M8X20
- 3----1026-----Belt Pulley Shaft
- 5----TS-1551071-----Hex Nut M10
- 6----TS-1540071-----Hex Nut M10
- 7----1031-----Bushing
- 8----BD920N-D08-----Snap Ring 25
- 9----1027-----Washer
- 10----1025-----Spring
- 11----BD920N-D11-----Ball
- 12----1024-----Pulley
- 13----1029-----Pulley
- 15----BD920N-D15-----Snap Ring 12
- 16----BD920N-D16-----Oil Port
- 17----1021-----Spacer
- 18----1023-----Collar
- 19----1020-----Mort Pulley
- 20----1022-----Washer
- 21----TS-155104-----Washer 6
- 22----TS-150306-----Cap Screw M6X8
- 23----1049-----Cover Plate
- 24----TS-150203-----Cap Screw M5X8
- 25----TS-1550031-----Washeer 5
- 26----TS-150201-----Cap Screw M5X8
- 27----1045-----Cover w/Hinge
- 28----TS-150403-----Cap Screw M4X6
- 29----TS1500041-----Washer 6
- 30----TS150302-----Cap Screw M5X10
- 31----TS-150306-----Cap Screw M6X12
- 32----TS1550041-----Washer 6
- 34----TS-150305-----Cap Screw M6X20
- 35----1047-----Clamp Block
- 37----VB-5M710-----V-Belt
- 38----VB-170XL050-----Cog Belt
- 39----1001-----Plate

### Tension Roller Assembly



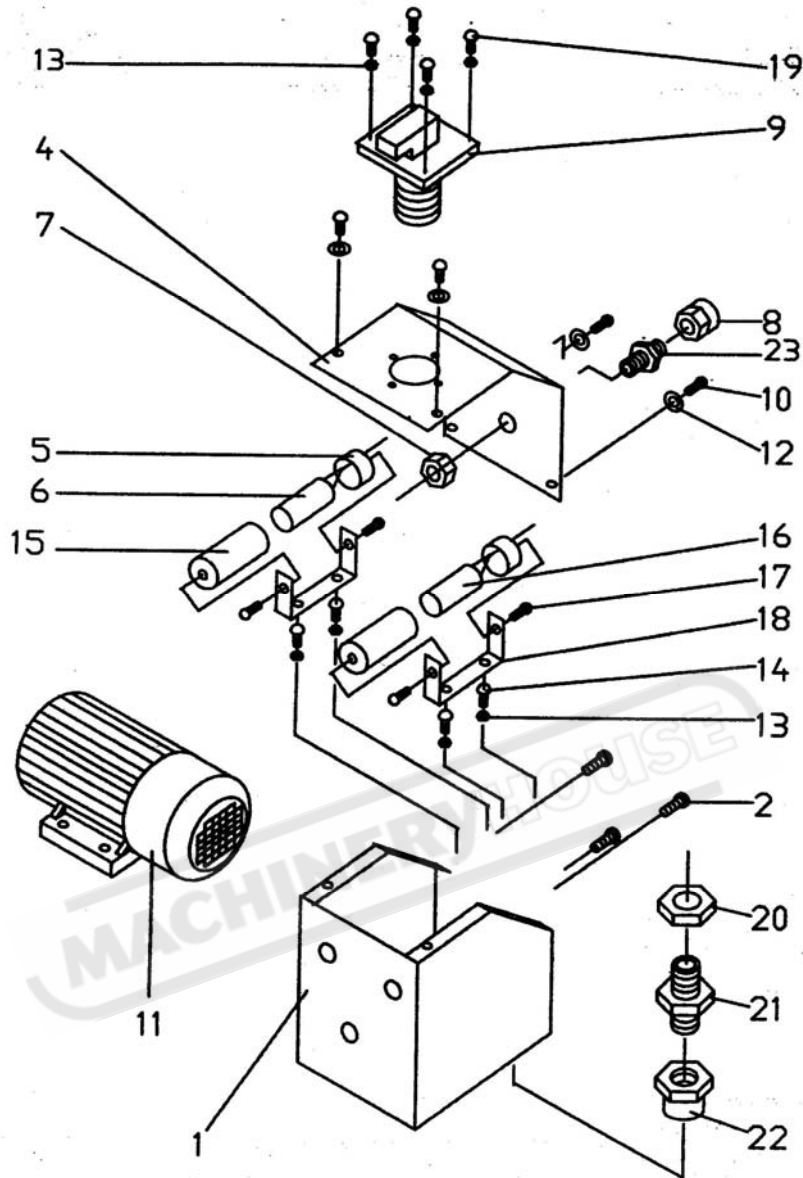
3-----1035-----Shaft	14----1050-----Stud Bolt
5-----BD920N-TR05-----Ball Bearing	15----1032-----Toggle
6-----1039-----Roller	16----1051-----Cap Screw M6X12
8-----BD920N-TR08-----Snap Ring 12	19----TS-152403-----Set Screw M8X8
9-----BD920N-TR09-----Snap Ring 28	20----1034-----Wave Washer
10----TS1550071-----Washer	21----BD920N-TR21-----Snap Ring 34
11----TS1540071-----Nut M10	22----1042-----Lever
12----1036-----Washer	23----1043-----Lever
13----1037-----Spring	24----1044A-----Knob

### Quadrant Assembly



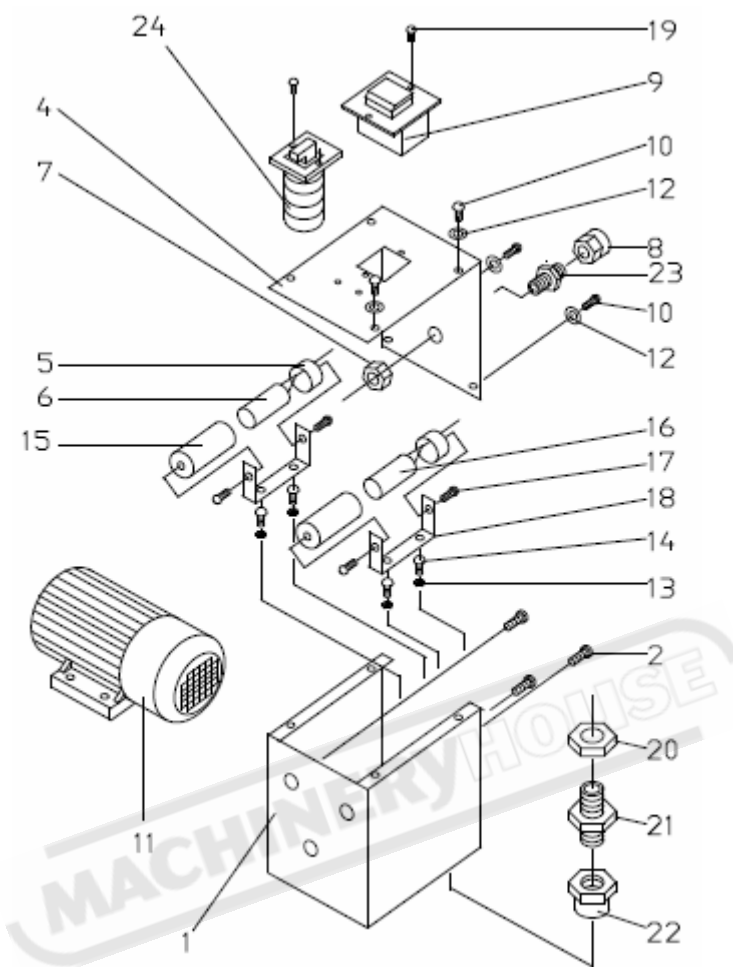
1-----2003-----	Bracket	13-----2008-----	Spacing Ring
2-----2004-----	T-Nut	14-----TS-1550041-----	Washer
3-----TS-1550041-----	Washer	15-----TS-150302-----	Cap Screw M6X8
4-----2005-----	Shaft	16-----TS-155104-----	Lock Washer 6
5-----2009-----	Bushing	17-----TS-150308-----	Cap Screw M6X35
6-----2001-----	Gear 127T	18-----2010-----	Gear 28T
7-----2002-----	Gear 120T	19-----2011-----	Gear 36T
8-----2006-----	Washer	20-----2012-----	Gear 42T
9-----BD920N-Q09-----	Oil Port 6	21-----2013-----	Gear 45T
10-----TS-1550071-----	Washer	22-----2014-----	Gear 60T
11-----BD920N-Q11-----	Pin 4x12	23-----2015-----	Gear 80T
12-----2007-----	Gear 30T		

### Electrical-1 Assembly



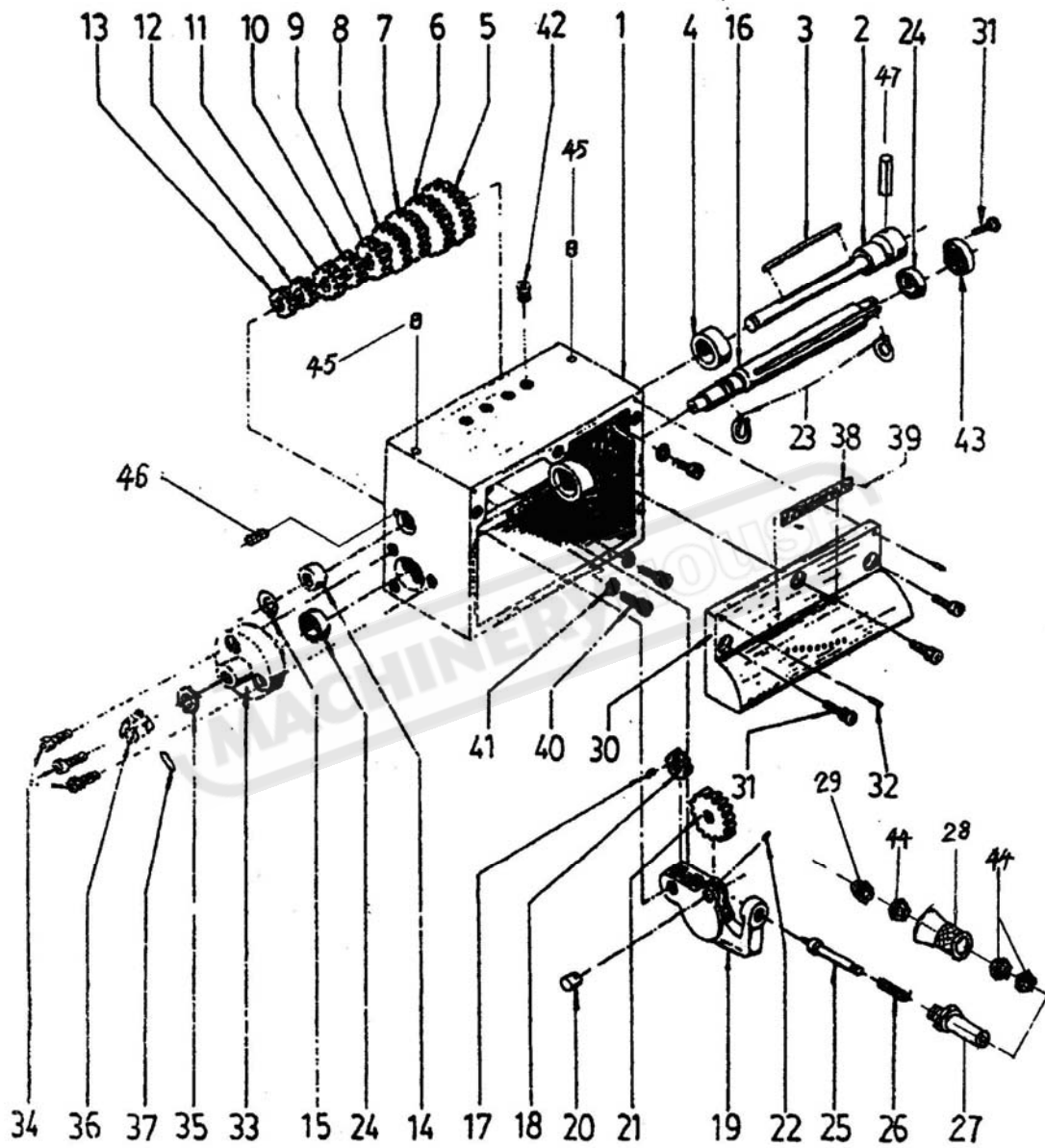
1-----10002-----Housing	13----TS-1540031-----Nut M4
2-----BD920N-E02-----Cap Screw M5X10	14----TS-150202-----Cap Screw M4X8
4-----10001-----Cover	15----10003-----Cover
5-----BD920N-E05-----Cover	16----10004-----Small Condenser
6-----BD920N-E06-----Big Condenser	17----10005-----Cap Screw M4X6
7-----BD920N-E07-----Nut M16X1.5	18----10006-----Clip
8-----BD920N-E08-----Nut M16X1.5	19----10007-----Cap Screw M4X16
9-----BD920N-E09-----Switch	20----10008-----Nut M24X1.5
10----BD920N-E10-----Cap Screw M5X8	21----10009-----Screw
11----BD920N-E11-----Motor	22----10010-----Nut M24X1.5
12----TS-155103-----Washer 5	23----10011-----Screw

### Electrical-2 Assembly



1-----10002-----Housing	13-----TS-1540031-----Nut M4
2-----BD920N-E02-----Cap Screw M5X10	14-----TS-150202-----Cap Screw M4X8
4-----10001-----Cover	15-----10003-----Cover
5-----BD920N-E05-----Cover	16-----10004-----Small Condenser
6-----BD920N-E06-----Big Condenser	17-----10005-----Cap Screw M4X6
7-----BD920N-E07-----Nut M16X1.5	18-----10006-----Clip
8-----BD920N-E08-----Nut M16X1.5	19-----10007-----Cap Screw M4X16
9-----BD920N-E09-----Switch KJD17B	20-----10008-----Nut M24X1.5
10-----BD920N-E10-----Cap Screw M5X8	21-----10009-----Screw
11-----BD920N-E11-----Motor	22-----10010-----Nut M24X1.5
12-----TS-155103-----Washer 5	23-----10011-----Screw
	24-----BD920N-E091-----Switch ZH-A

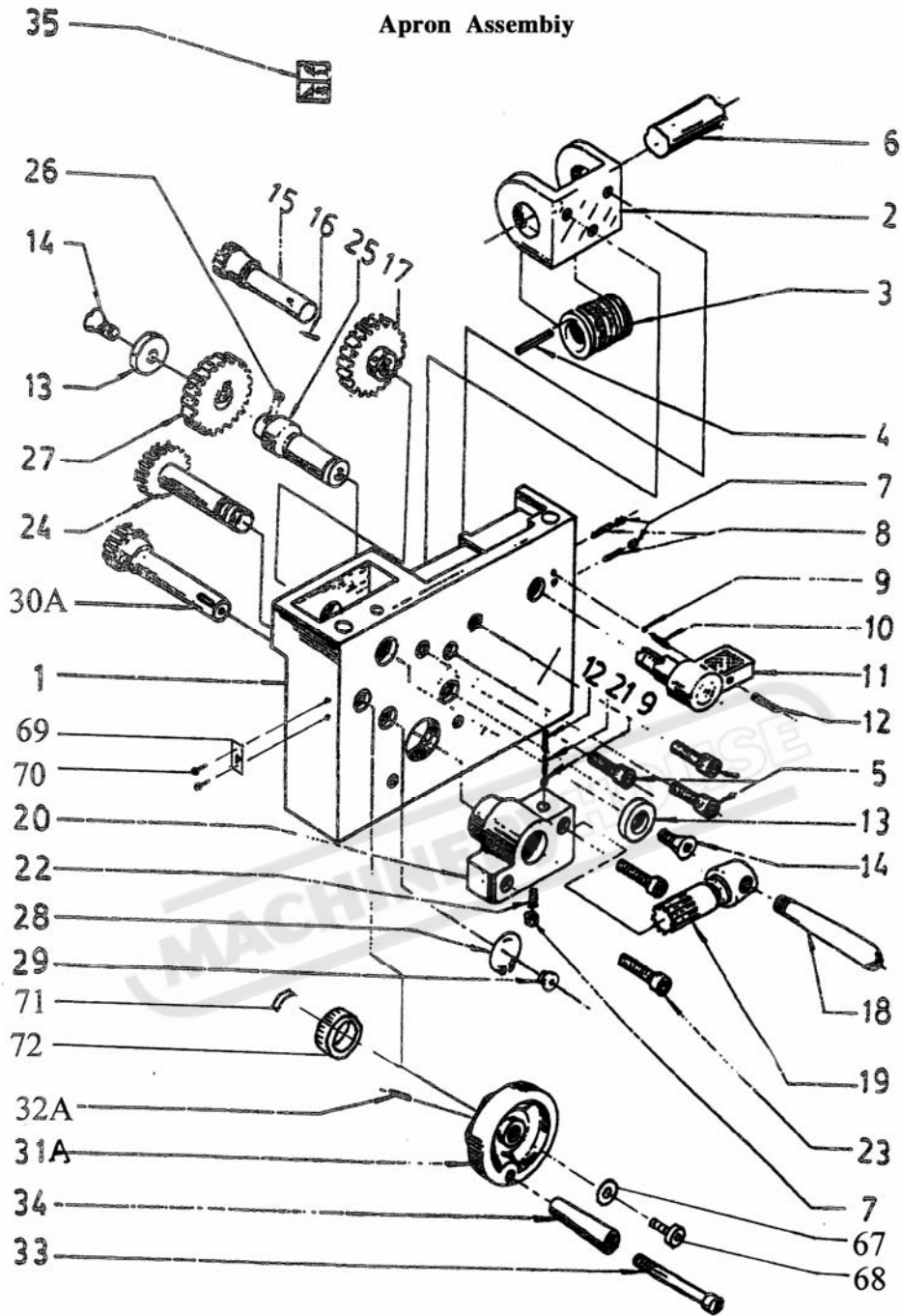
### Gear Box Assembly





### Gear Box Assembly

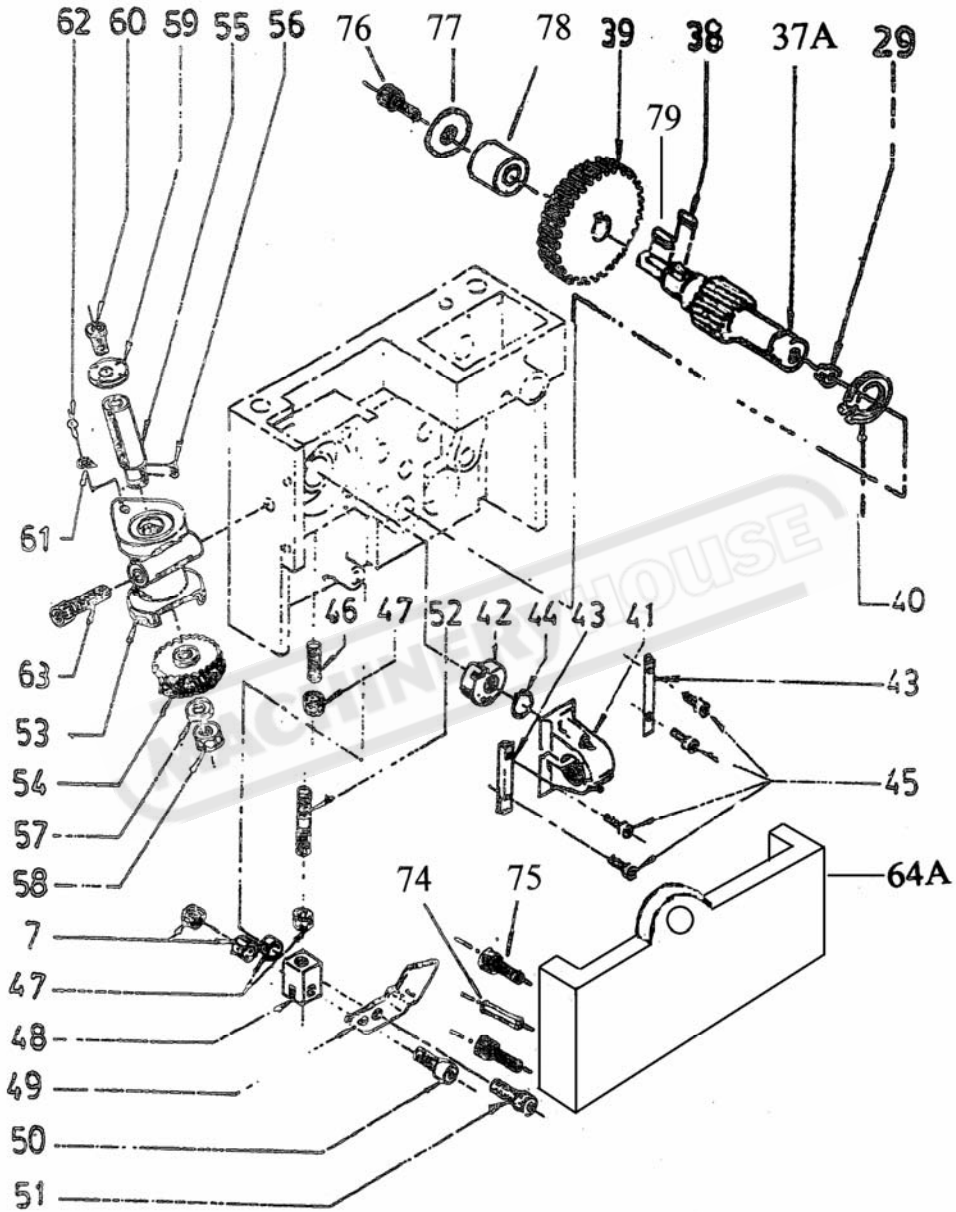
1----	3001-----	Gear Box Cassting
2----	3009-----	Shaft
3----	BD920N-GB03-----	Key
4----	3019-----	Bushing
5----	3018-----	Gear 28T
6----	3017-----	Gear 26T
7----	3016-----	Gear 24T
8----	3015-----	Gear 23T
9----	3014-----	Gear 22T
10---	3013-----	Gear 20T
11---	3012-----	Gear 19T
12---	3011-----	Gear 18T
13---	3010-----	Gear 16T
14---	3025-----	Bushing
15---	BD920N-GB15-----	Snap Ring 16
16---	3020-----	Shaft
17---	BD920N-GB17-----	Key
18---	3021-----	Gear 16T
19---	3002-----	Shift Arm
20---	3007-----	Shaft
21---	3023-----	Gear 36T
22---	TS-152203-----	Set Screw M5X6
23---	BD920N-GB23-----	Snap Ring
24---	BD920N-GB24-----	Ball Bearing
25---	3004-----	Plunger
26---	3005-----	Spring
27---	3003-----	Bushing
28---	3006-----	Handle
29---	BD920N-GB29-----	Cap Nut M6
30---	3008-----	Front Cover
31---	TS-150304-----	Cap Screw M6X12
32---	BD920N-GB32-----	Pin 3x16
33---	3022-----	Bracket
34---	TS-150302-----	Cap Screw M6X12
35---	TS-1550071-----	Washer
36---	2009-----	Bushing
37---	BD920N-GB37-----	Pin 4x12
38---	3026-----	Plate
39---	BD920N-GB38-----	Rivet
40---	TS-150404-----	Cap Screw M8X20
41---	TS-155108-----	Lock Washer 8
42---	BD920N-GB42-----	Oil Cup M6X1
43---	3027-----	Bearing Cap
44---	3028-----	Hex Nut M6
45---	3029-----	Oil Port 6
46---	3030-----	Set Screw M4X6
47---	3031-----	Lock Pin 4X12



### Apron Assembly

1	4006	Apron Casting
2	4034	Bracket
3	4033	Worm
4	BD920N-A04	Key
5	TS-150306	Hex Socket Cap Screw M6X25
6	7003	Feed Screw
7	TS-1540021	Nut M4
8	TS-152105	Set Screw M4X12
9	BD920N-A09	Steel Ball
10	4021	Spring
11	4022	Handle
12	TS-152301	Set Screw M6X6
13	4005	Washer
14	BD920N-A14	Flat Head Screw M6X8
15	4008	Gear 12T
16	BD920N-A16	Spring Pin 4X30
17	4007	Gear 43T
18	4015	Handle
19	4014	Gear 13T
20	4013	Bracket
21	4025	Spring
22	TS-152104	Set Screw M4X10
23	TS-150307	Hex Socket Cap Screw M6X30
24	4011	Gear 36T
25	4009	Shaft
26	BD920N-A26	Key 4x5
27	4010	Gear 41T
28	BD920N-A28	Ring 14
29	BD920N-A29	Oil Port 6
30	4004	Gear 17T
31	4003	Hand Wheel
32	BD920N-A32	Spring Pin 4x25
33	4002	Screw
34	4001	Handle
35	4018	Label
67	4067	Washer
68	4068	Cap Screw
69	4069	Plate
70	4070	Rivet 2x5mm
71	4071	Spring

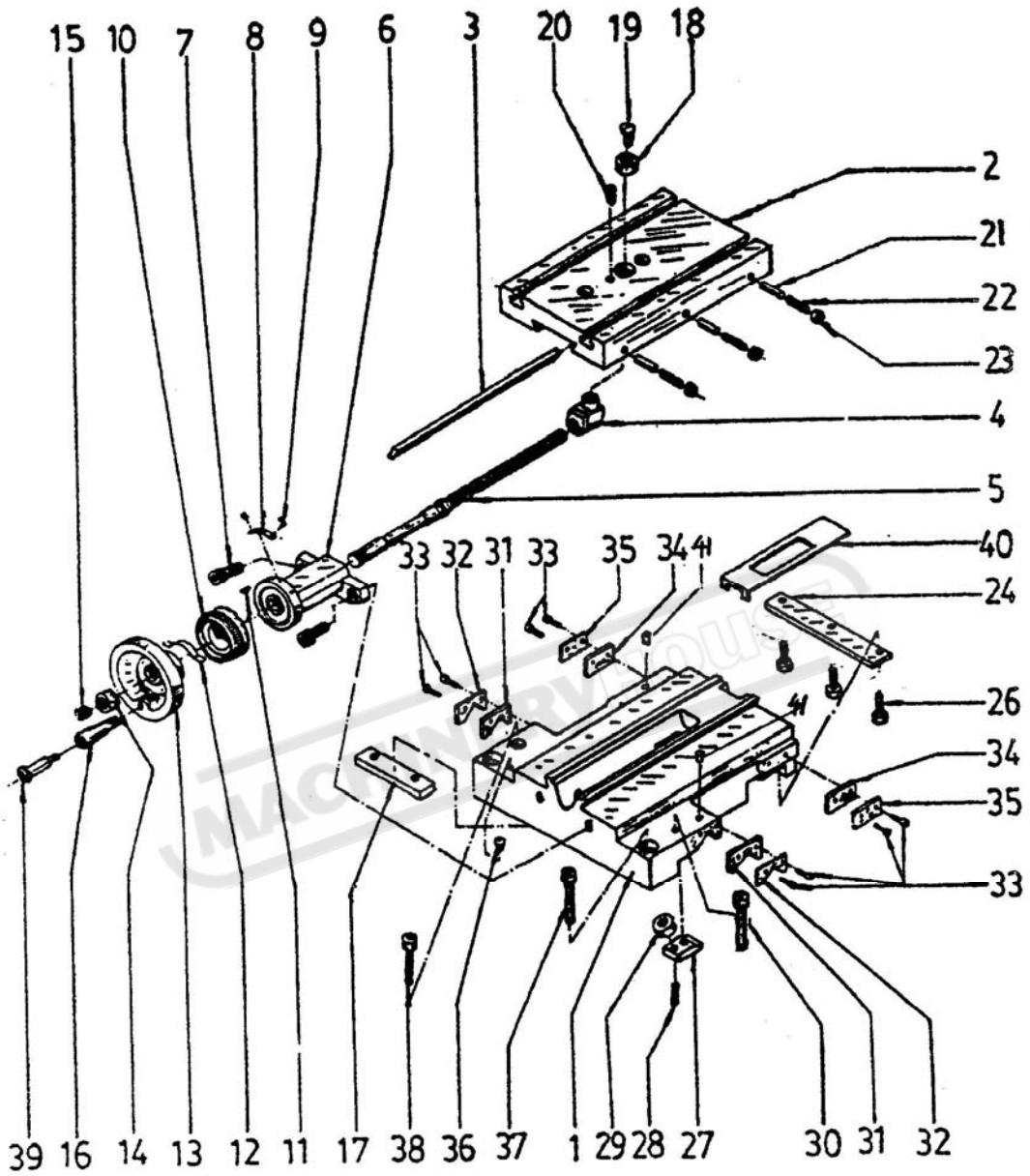
Apron Assembly (cont' d)



**Apron Assembly (con'd)**

37A	4016A	-----	Gear	18T
38	BD920N-A38	-----	Key	4x11
39	4012	-----	Worm Gear	42T
40	BD920N-A40	-----	Ring	12
41	4017	-----	Half Nut	
42	4019	-----	Locking Cam	
43	4020	-----	Guide	
44	BD920N-A44	-----	Ring	8
45	TS-150105	-----	Hex Socket Cap Screw	M4x16
46	BD920N-A46	-----	Set Screw	M5X25
47	TS-1540031	-----	Hex Nut	M5
48	4030	-----	Control Block	
49	4032	-----	Joint Plate	
50	TS-150106	-----	Hex Socket Cap Screw	M4x20
51	TS-150204	-----	Cap Screw	
52	4031	-----	Screw	
53	4036	-----	Thread Dial Body	
54	4029	-----	Worm Gear	64T
55	4028	-----	Shaft	
56	BD920N-A56	-----	Key	3x10
57	TS155006	-----	Lock Washer	8
58	TS154006	-----	Hex Nut	M8
59	4027	-----	Dial	
60	BD920N-A60	-----	Screw	M6X6
61	4024	-----	Pointer	
62	BD920N-A62	-----	Rivet	2x4
63	TS-150313	-----	Hex Socket Cap Screw	
64A	4023A	-----	Apron Cover	
74	4074	-----	Pin	3x6
75	4075	-----	Cap Screw	M5x12
76	4076	-----	Cap Screw	M5x10
77	4077	-----	Flat Washer	5
78	4078	-----	Bushing	
79	4079	-----	Key	3x8

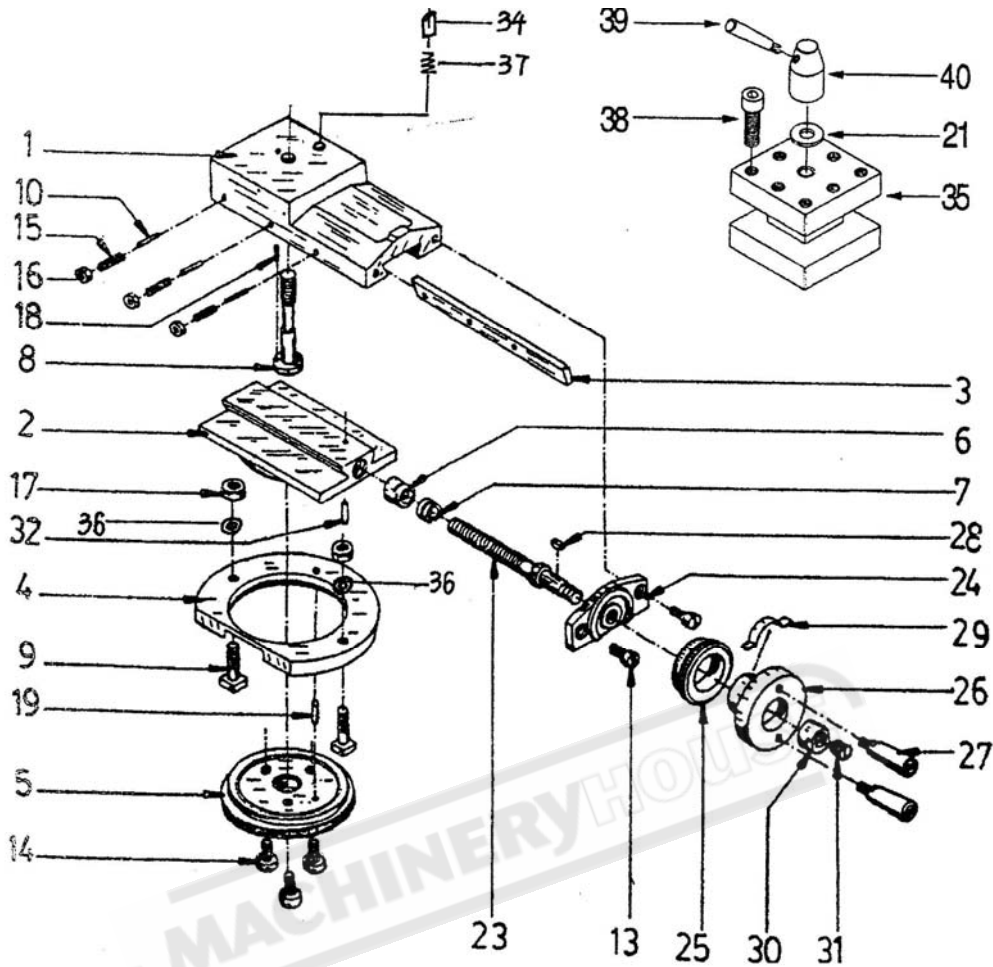
### Saddle and Cross Slide Assembly



### Saddle And Cross Slide Assembly

1	5005	Saddle
2	5006	Cross Slide
3	5002	Gib
4	5036	Nut
5	5018	Lead Screw
6	5019	Bracket
7	TS-150304	Hex Socket Cap Screw M5X16
8	5026	Plate
9	BD902N-CS09	Rivet 2x5
10	5020	Graduated Ring
11	BD920N-CS11	Key
12	5023	Spring
13	5021	Handle Wheel
14	5022	Hex Nut
15	BD920N-CS15	Set Screw M8X6
16	5025	Handle
17	5003	Slide Block
18	5037	Bushing
19	TS-1534041	Flat Head Screw M6X10
20	TS-1521031	Set Screw M4X8
21	5001	Pin
22	TS-152105	Set Screw M4X10
23	TS-154002	Nut M4
24	5016	Slide Block
26	TS-150304	Hex Socket Cap Screw M6X16
27	5017	Clip
28	TS-152306	Set Screw M6X20
29	TS-1540041	Nut M6
30	TS-150306	Hex Socket Cap Screw M6X25
31	5042	Way Cover
32	5041	Cover Mount
33	TS-1532012	Pan Head Screw M4X8
34	5040	Way Cover
35	5039	Cover Mount
36	BD920N-CS36	Oil Port 8
37	TS-150406	Hex Socket Cap Screw M8X30
38	TS-150306	Hex Socket Cap Screw M6X30
39	5024	Handle Screw
40	5038	Cover Mount
41	5044	Oil Port 6

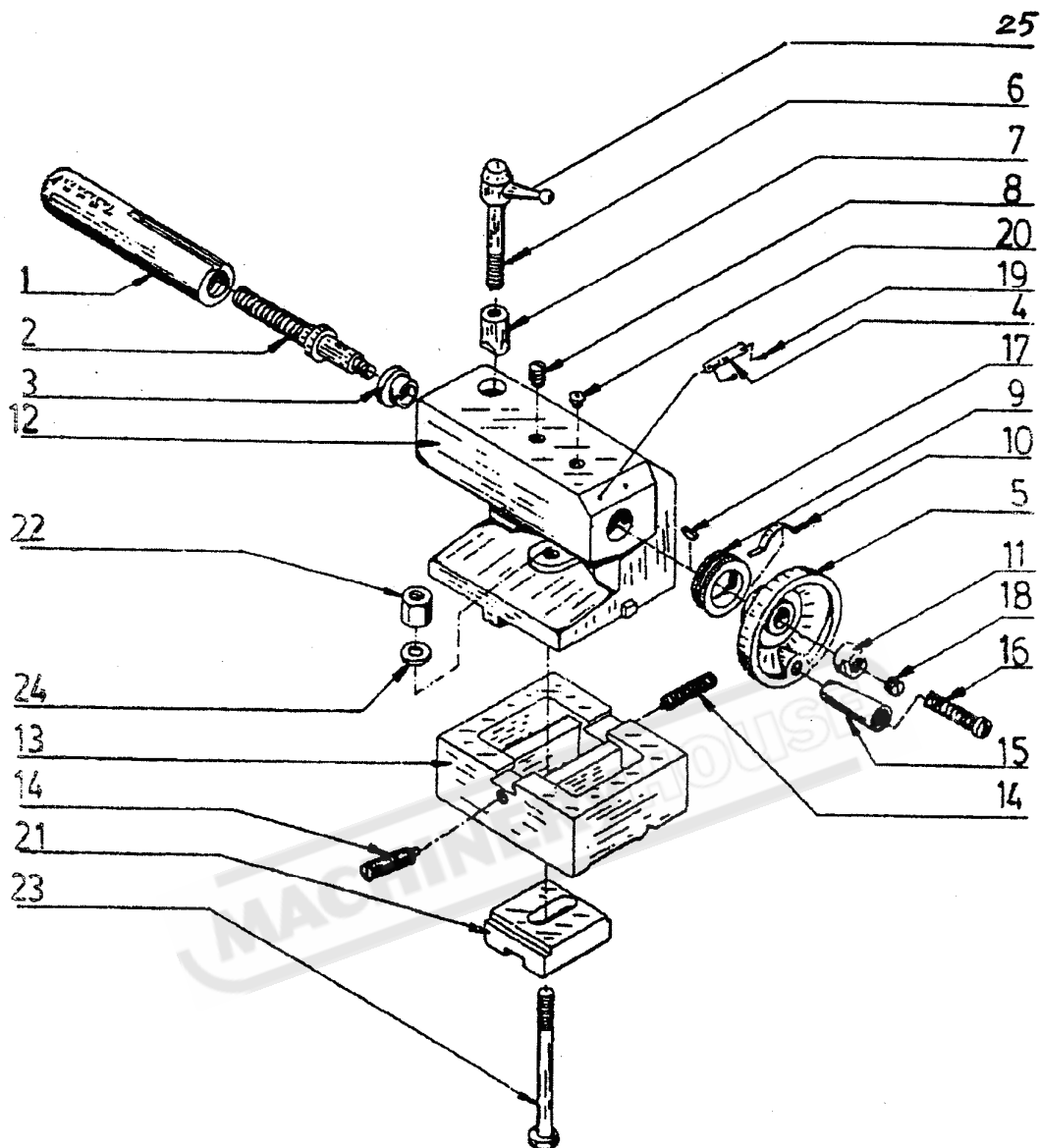
### Top Slide Assembly



1-----5011-----Longitudinal Slide	23----5012-----Lead Screw
2-----5010-----Swivel Base	24----5043-----Lead Screw Mount
3-----5028-----Gib	25----5004-----Micrometer Collar
4-----5008-----Clamping Ring	26----5031-----Handwheel
5-----5009-----Micrometer Pan	27----5015-----Handle
6-----5013-----Lead Screw Nut	28----BD920N-TS28-----Key 3x13
7-----5014-----Adjusting Screw	29----5023-----Feed Spring
8-----5033-----Screw	30----5022-----Nut
9-----5007-----T-Screw	31----BD920N-TS31-----Set Screw M8X6
10----5027-----Pin	32----BD920N-TS32-----Lock Pin 3x12
13----TS-150202----- Cap Screw M5X10	34----5035-----Pin
14----BD920N-TS14----- Screw M6X12	35----5045-----Tool Rest
15----TS-152104-----Set Screw M4X10	36----5046-----Washer 6
16----TS-1550021-----Nut M4	37----5047-----Spring
17----TS-1550041-----Nut M6	38----5048-----Cap Screw M8X30
18----BD920N-TS18-----Lock Pin 3x8	39----5049-----Lock Handle
19----BD920N-TS19-----Lock Pin 3x14	40----5050-----Lock Nut

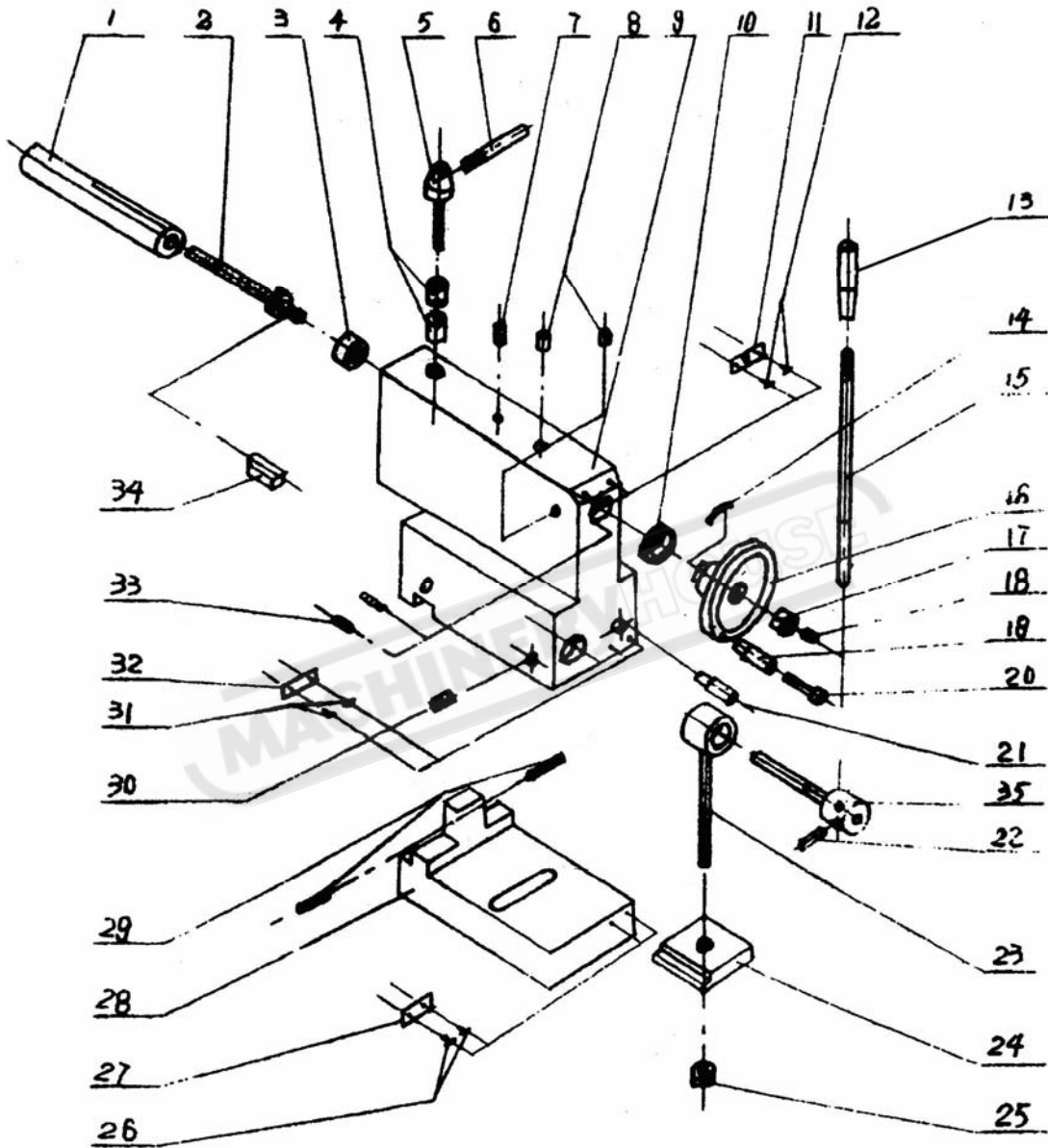


### Tailstock-1 Assembly



1-----8009-----Tailstock Ram	14----TS-152406-----Set Screw M8X25
2-----8010-----Lead Screw	15----4001-----Handle
3-----8011-----Bushing	16----4002-----Screw
4-----8012-----Off Set Indicator Plat	17----BD920N-T17-----Key 3X13
5-----8013-----Hand Wheel	18----TS-152401-----Set Screw M8X8
6-----8008-----Screw	19----BD920N-T19-----Rivet 2x4
7-----8001-----Clamp	20----BD920N-T20-----Oil Port 6
8-----BD920N-T08-----Set Screw M5X8	21----8015-----Clamping Plate
9-----8016-----Micrometer Collar	22----8006-----Nut M8
10----5023-----Feed Spring	23----8007-----Screw
11----8014-----Nut	24----TS-1550061-----Washer 8
12----8005-----Tailstock Body	25----8017-----Lever
13----8002-----Tailstock Base	

### Tailstock-2 Assembly

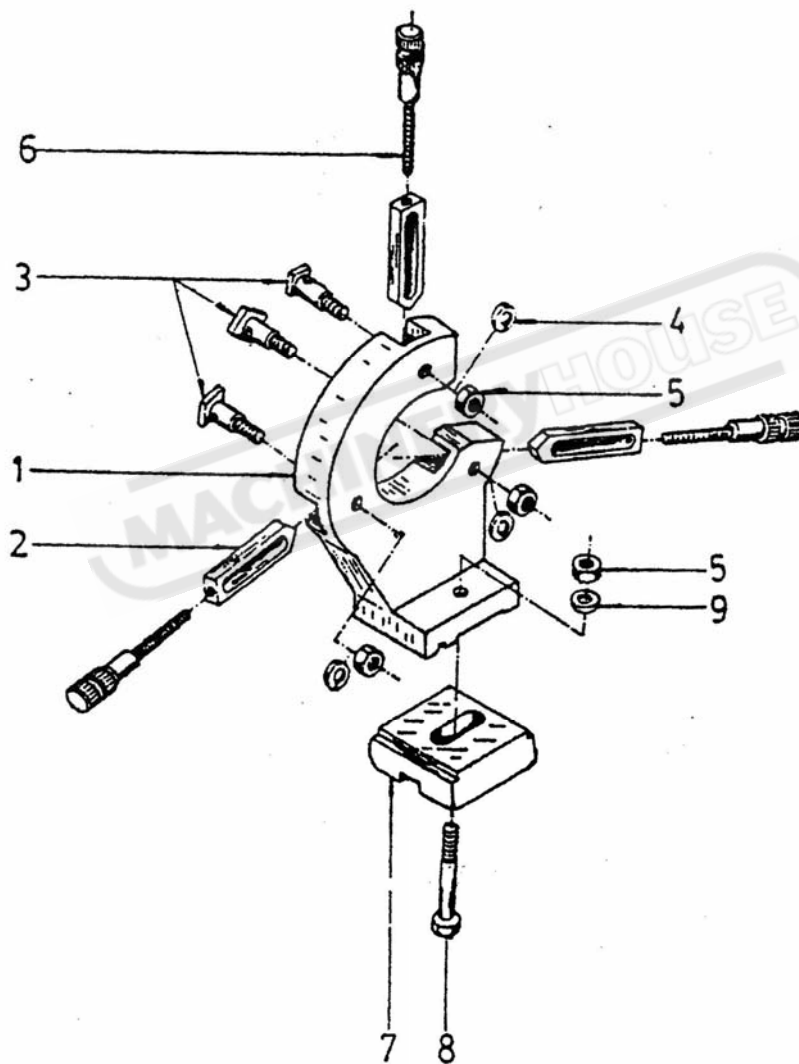


### Tailstock-2 Assembly

1	P091001	Tailstock Ram
2	P091002	Lead Screw
3	P091003	Bushing
4	P091004	Clamp
5	P091005	Screw
6	P091006	Lever
7	GB1001	Set Screw
8	GB1002	Oil Ball 6
9	P091007	Tailstock Body
10	P091008	Graduated Dial
11	P091009	Plate
12	GB1003	Rivet 2x4
13	P091010	Handle
14	P101011	Spring
15	P091012	Lever
16	P091013	Hand Wheel
17	P091014	Nut
18	GB1004	Set Screw M8X8
19	P091015	Handle
20	P091016	Handls Screw
21	P091017	Pin
22	GB1005	Pin 2x4
23	P091018	Screw
24	P091019	Clamping Plate
25	GB1006	Hex Nut M8
26	GB1007	Rivet 2x4
27	P091020	Plate
28	P091021	Tailstock Base
29	GB1008	Set Screw M8X25
30	GB1009	Set Screw M6X25
31	GB1010	Rivet 2x4
32	P091022	Plate
33	GB1011	Set Screw M5X6
34	GB1012	Key c4x10
35	P091023	Shaft

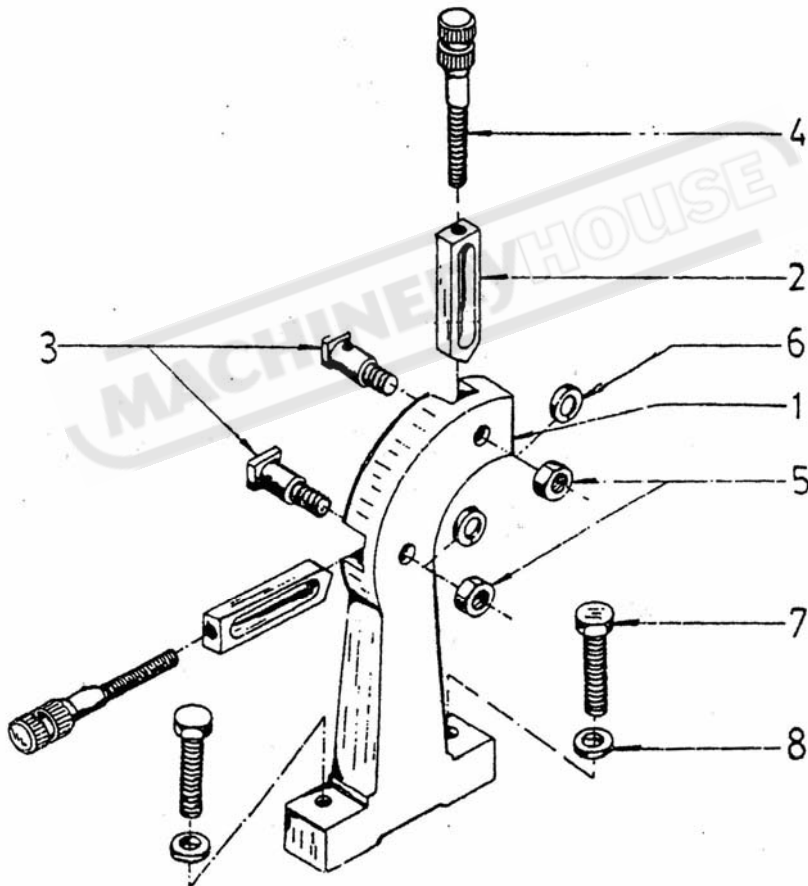
### Center Rest Assembly (optional accessories)

- 1-----F1001-----Rest Casting
- 2-----F1002-----Jaw
- 3-----F1003-----Screw
- 4-----TS-155108-----Washer 8
- 5-----TS-1540061-----Nut M8
- 6-----F1004-----Adjusting Screw
- 7-----F1005-----Clamping Plate
- 8-----TS-1490111-----Cap Bolt M8X60
- 9-----TS-1550061-----Washer 8

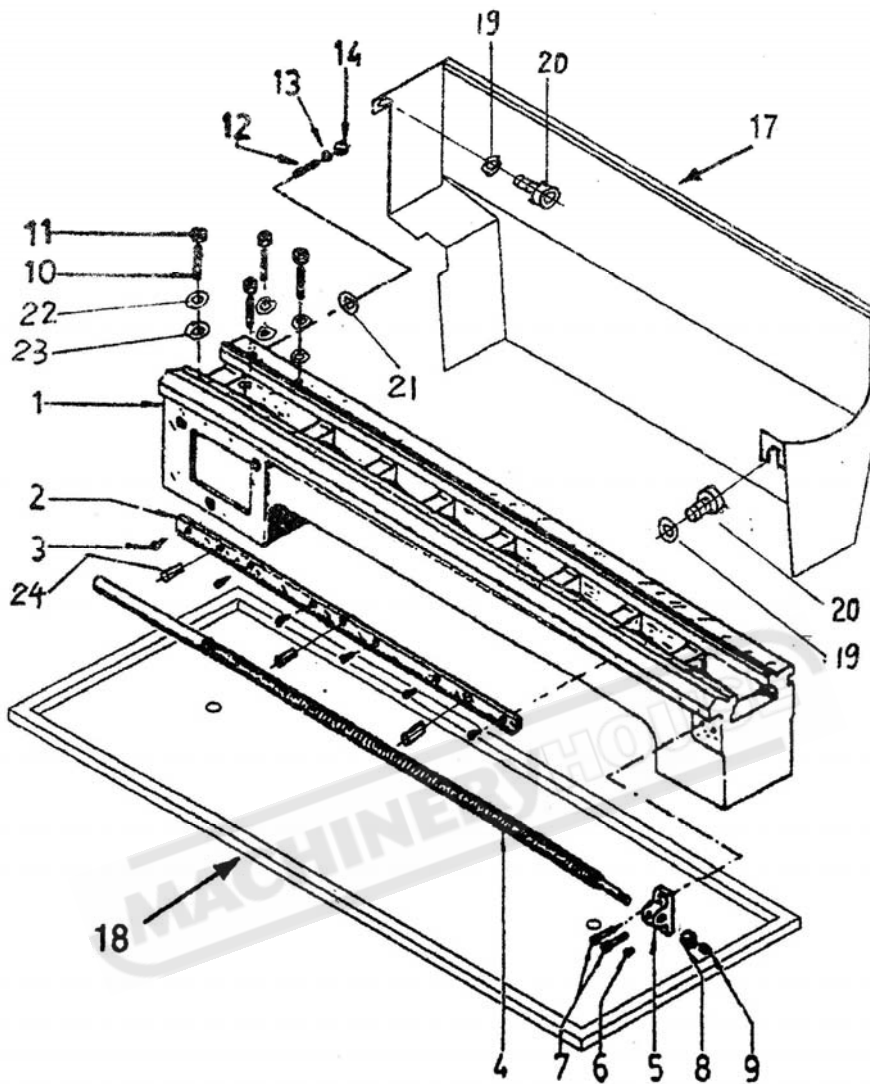


### Travel Rest Assembly (optional accessories)

- 1-----F2001-----Rest Casting  
 2-----F2002-----Jaw  
 3-----F2003-----Screw  
 4-----F2004-----Adjusting Screw  
 5-----TS-1540061-----Hex Nut M8  
 6-----TS-1551081-----Washer 8  
 7-----TS-150307-----Hex Socket Cap Screw M6X30  
 8-----TS-1550041-----Washer 6

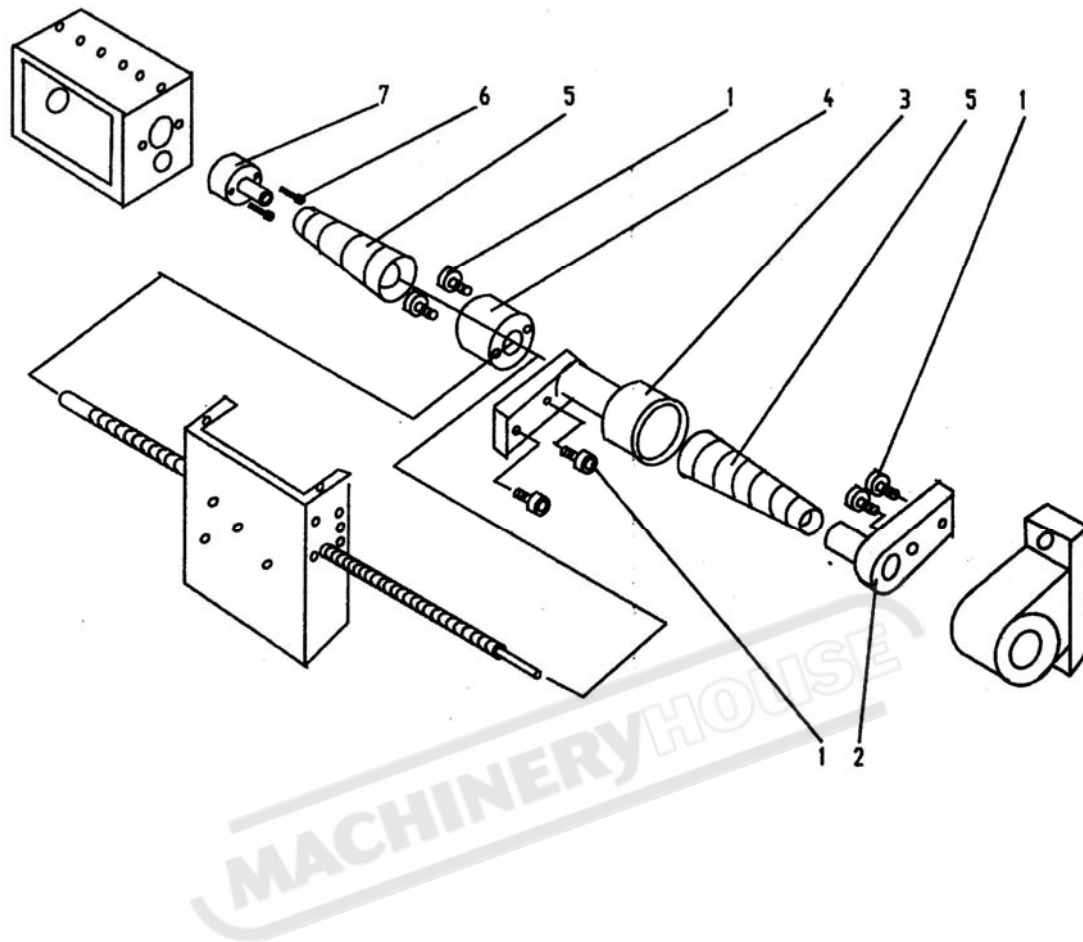


### Lathe Bed Assembly



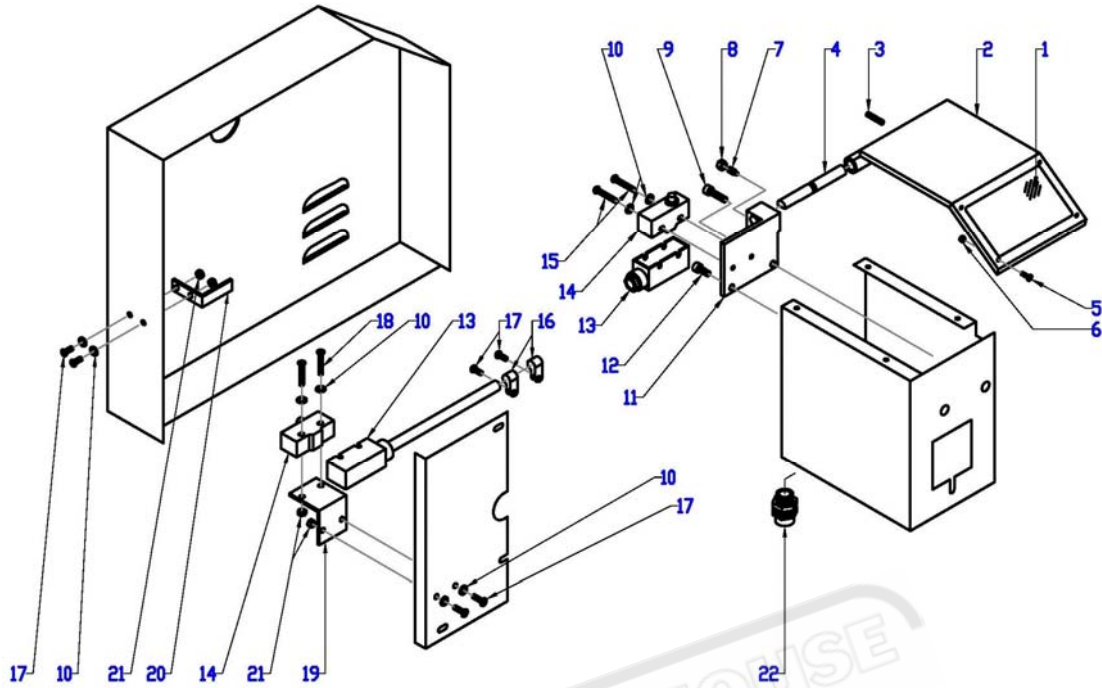
1-----7001-----Bed	13----TS-1551041-----Lock Washer	6
2-----7002-----Rack	14----TS-1540041-----Hex Nut	M6
3-----TS-150102-----Cap Screw	17----7006-----Chip Shield	
4-----7003-----Leadscrew	18----7007-----Chip Pan	
5-----7004-----Bracket	19----7008-----Washer	5
6-----BD920N-B06-----Oil Port	20----7009-----Cap Screw	M5X10
7-----TS-1503051-----Cap Screw	21----7010-----Big Washer	6
8-----7006-----Nut	22----7011-----Lock Washer	8
9-----BD920N-B09-----Set Screw	23----7012-----Washer	8
10----7005-----Stud	24----7013-----Lock Pin	4x16
11----TS-1540061-----Hex Nut		M8
12----TS-1523071-----Set Screw		M6X35

### Feed Screw Assembly (optional accessories)



- 1----GB301-----Cap Screw M4X10
- 2----P09301-----Bracket
- 3----P09302-----Bracket
- 4----P09303-----Bracket
- 5----P09304-----Screw Cover
- 6----GB302-----Cap Screw M4X35
- 7----P09305-----Bracket

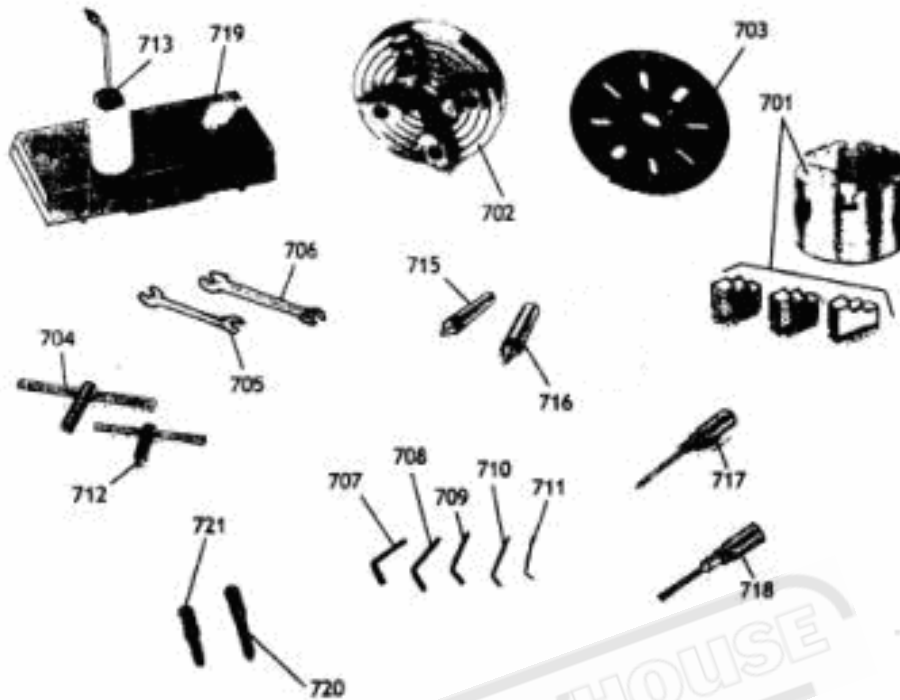
### Chuck Cover Assembly (optional accessories)



- 1-----16001A-----Protecting glass
- 2-----16002A-----Iron cover
- 3-----GB16001A-----Pin 4X16
- 4-----160003A-----Shaft
- 5-----GB16002A-----Cap Screw M4X8
- 6-----GB16003A-----Hex Nut M4
- 7-----GB16004A-----Set Screw M5X10
- 8-----GB16005A-----Hex Nut M5
- 9-----GB16006A-----Cap Screw M5X12
- 10----GB16007A-----Washer 4
- 11----16003A-----Bracket
- 12----GB16008A-----Cap Screw M5X10
- 13----GB16009A-----Swich Cover
- 14----GB16010A-----Swich LXW5-11D1
- 15----GB16011A-----Cap Screw M4X25
- 16----GB16012-----Clamp
- 17----GB16013A-----Cap Screw M4X8
- 18----GB16014A-----Cap Screw M4X30
- 19----16004A-----Bracket
- 20----16005A-----Bracket
- 21----GB16015A-----Hex Nut M4
- 22----GB16016A-----Strain Relief PG9



## Accessories



701	-----	100mm(4" )	Three-Jaw Chuck
702	--	187mm (7" )	Four-Jaw Chuck ( <b>optional accessories</b> )
703	-----	190mm (7.5" )	Face Plate ( <b>optional accessories</b> )
704	-----		Four-Jaw Chuck Key ( <b>optional accessories</b> )
705	-----		Combination Wrench 8/10mm
706	-----		Combination Wrench 12/14mm
707	-----		Hex Wrench 6mm
708	-----		Hex Wrench 5mm
709	-----		Hex Wrench 4mm
710	-----		Hex Wrench 3mm
711	-----		Hex Wrench 2mm
712	-----		Three-Jaw Chuck Key
713	-----		Oil Bottle
715	-----		Dead Center MT#2
716	-----		Dead Center MT#3
717	-----		Phillips Screwdriver
718	-----		Standard Screwdriver
719	-----		Tool Box
720	-----		Spindle Lever
721	-----		Chuck Lever