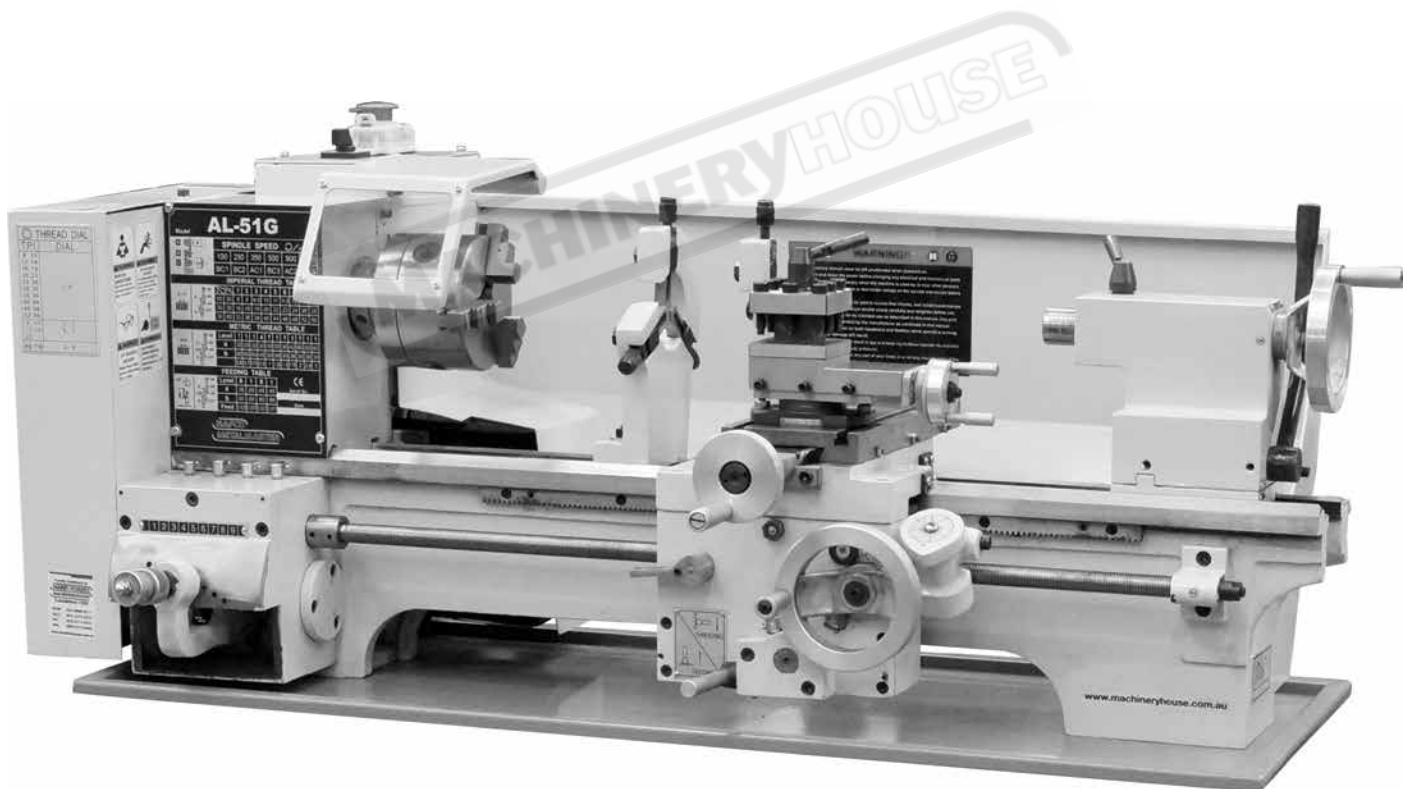


INSTRUCTION MANUAL

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



L160

9"X19" (230mmX500mm)

9"X29" (230mmX750mm)

METAL LATHE

INSTRUCTION MANUAL



2014-12-4

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SECTION 1 :SAFETY

WARNION !

READ MANUAL BEFORE OPERATING MACHINE.FAULTURE 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. **ULIMINATING 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 , it an unusual load does not exist and a power failure still occurs , contact aqualified 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 15mm (50 feet) .
- 3.Ensure cord has a ground wire and pin .
- 4.Do not use cords in need 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 instailed and grounded in accordance with all local codes and ordinances .

This machine must be grounded ! Verify that any exsiting electrical outlet and circuit you intend to plug into is actually grounded .If 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 connectt 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 unscrewing 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 singleM8-1.25X55mm 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.

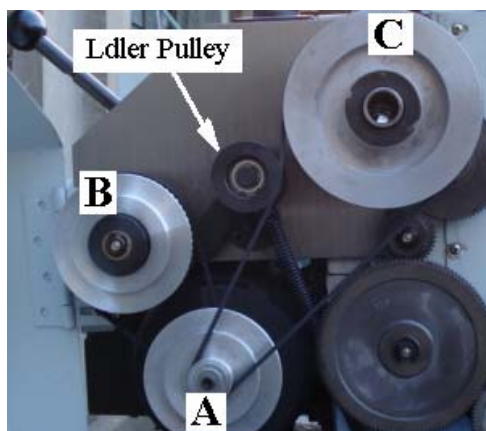
Follow Rest

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

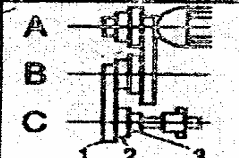
	 /min					
	120	300	400	600	1000	2000
A	BC1	BC2	AC1	BC3	AC2	AC3

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

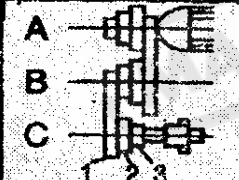
	 /min					
	100	250	350	500	900	1800
A	BC1	BC2	AC1	BC3	AC2	AC3

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 threads per inch. , See **Figure 9**.

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 9. Feed rate selector lever.

The machine plate describes some of the more typical settings which might be used. **Figure 10** and **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 position 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 to 127 tooth .Also note that the alignment of gears A and B are offset so that A now engages the 120 tooth gear and B engages the 127 tooth gear. The shaft for position B is provided with a spacer which can be installed behind the gear to change its position.

mm	40	80	120	127	lever	7	1	1	4	7	1	1	1	7	1	1
a	30	28	30	30	30	30	30	42	60	60	60	60	60	60	60	60
b	60	60	60	45	30	36	30	36	30	36	30	36	30	36	30	30
feed	0.5	0.7	0.75	0.8	1	1.25	1.5	1.75	2	2.5	3					

n/1"	40	80	120	127	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			
	30	60	32	36	38	40	44	46	48	52	56			

mm	40	80	120	127	lever	9	5	1	1	Serial No.
a	28	28	28	42						
b	60	60	60	60						
feed	0.12	0.16	0.20	0.30						
										Date

Figure 10 Feed and threading rates portion of machine plate

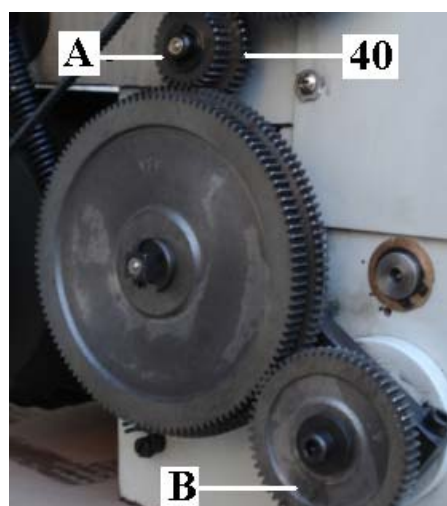


Figure 11 Interchangeable gear positions



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 threads-per-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 14 and 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	40 80 40 127	Level a / b		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	
				30	60	32	36	38	40	44	46	48	52	56	
METRIC THREAD TABLE															
 mm	 a b	40 80 40 127	Level		7	1	1	4	7	1	1	1	7	1	1
			a	30	28	30	30	30	30	30	42	60	60	60	
			b	60	60	60	45	30	36	30	36	30	36	30	
				0.5	0.7	0.75	0.8	1	1.25	1.5	1.75	2	2.5	3	
FEEDING TABLE															
 " / 32"	 a b	40 80 40 127	Level		9	1	9	1	Item No.						
			a	28	28	45	45	4950							
			b	60	60	60	60	Serial No.							
			Feed	0.005	0.007	0.007	0.011	Date							

Figure 14 Feed and threading rates portion

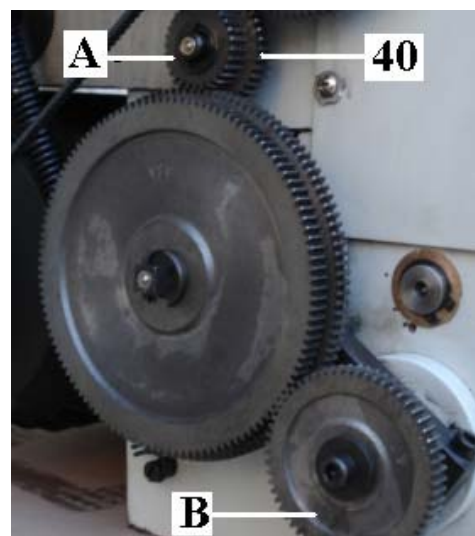


Figure 15 Interchangeable gear positions of machine plate



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.

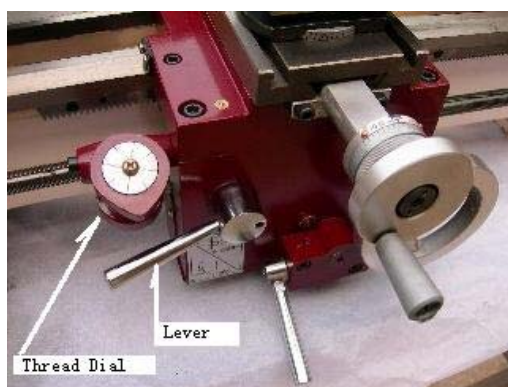
Figure 19.



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.

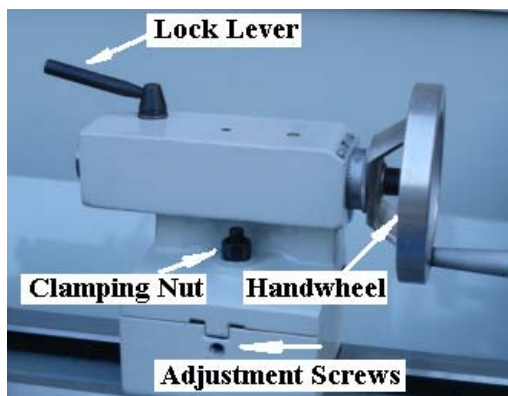
Tailstock Controls (1)



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

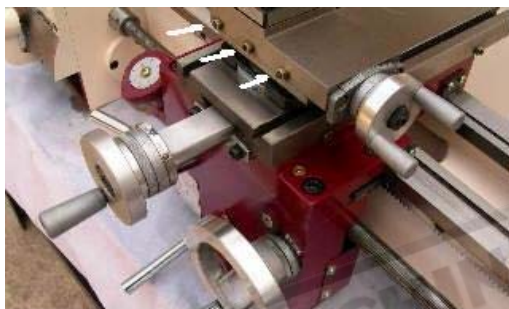
SECTION6: ADJUSTMENTS

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

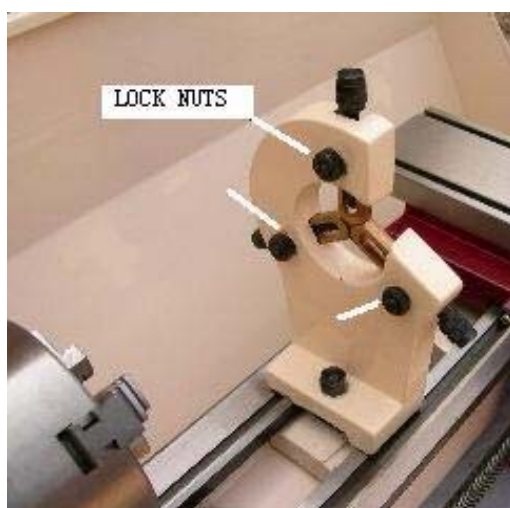


Figure 29

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

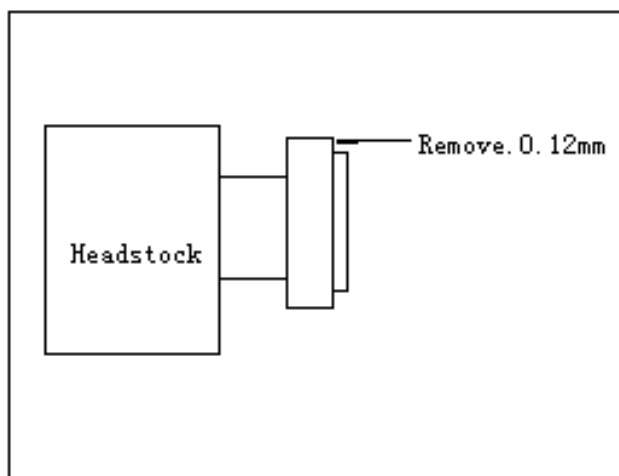


Figure 30.

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.

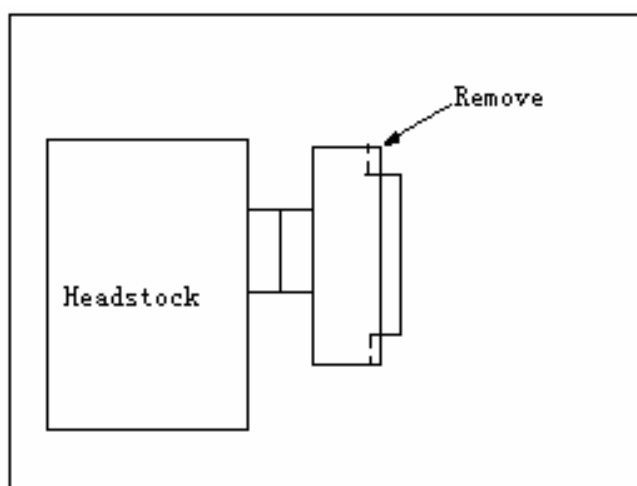


Figure 31

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 .

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.

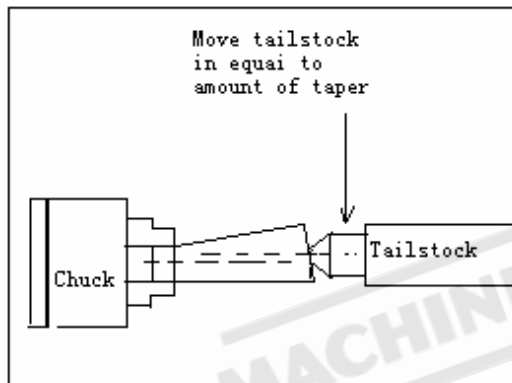


Figure 33

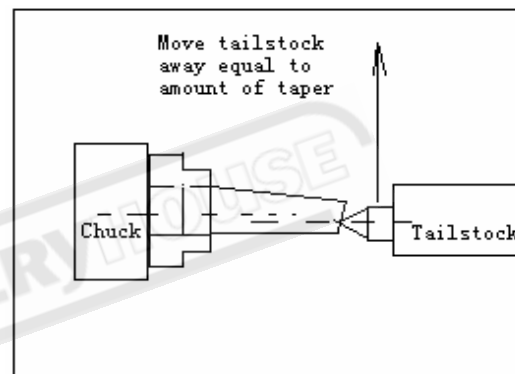


Figure 34

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**.

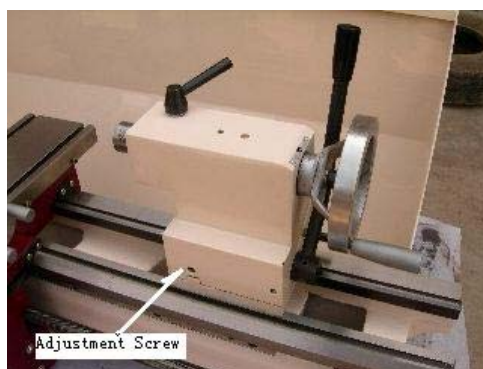


Figure 35.

- 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

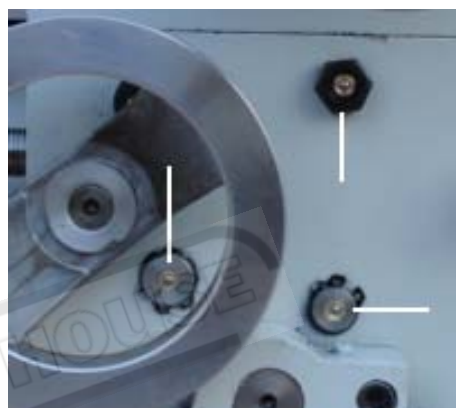


Figure 36 .Apron lubrication point

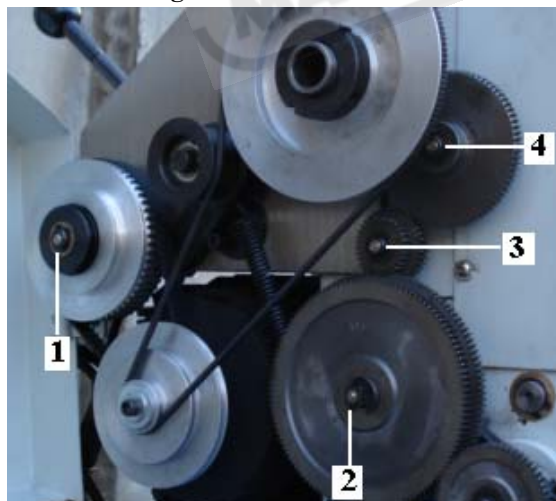


Figure 38. Oil ball on gear hubs



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**.

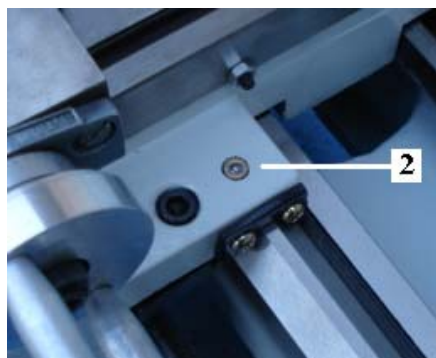


Figure 40 Way lubrication point

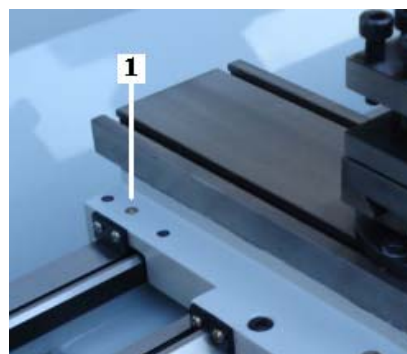


Figure 41 Way lubrication point



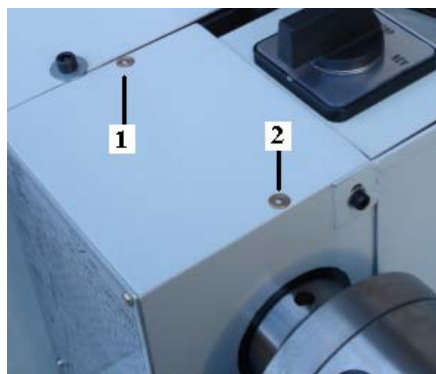
Figure 42. leadscrew bearing lubrication point



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

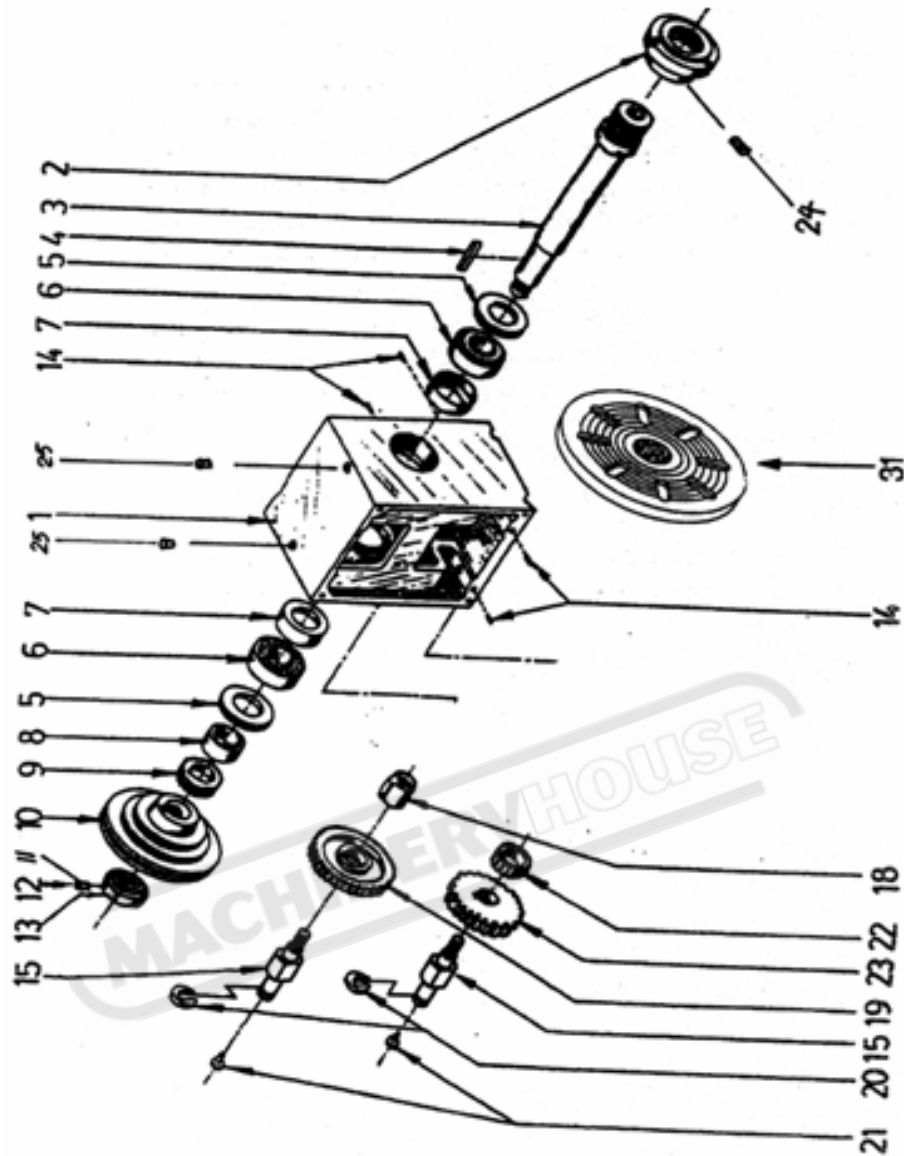
Motor

Horsepower-----¾HP/550w

Standard Accessories:

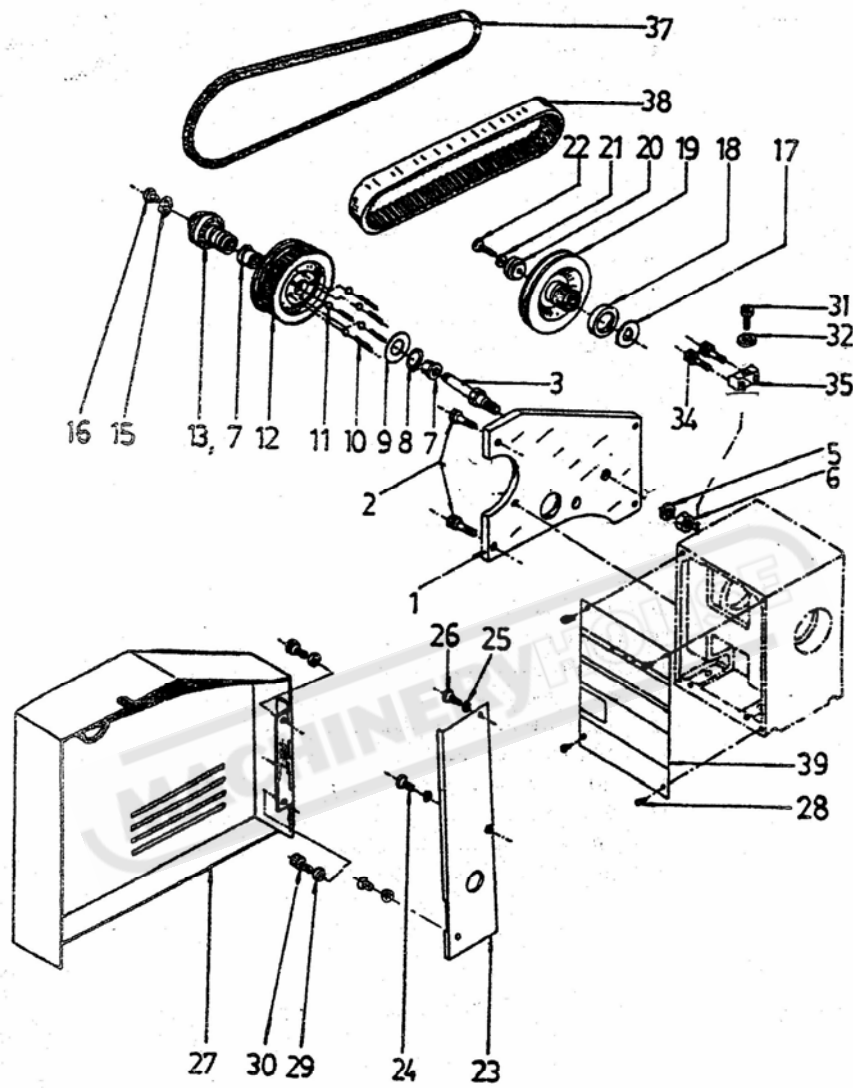
-----4 " (100mm) - 3-Jaw Chuck w/Two Sets of Jaws
 -----7¼ " (187mm) - 4—Jaw Chuck w/Reversible Jaws
 -----7.5" (190mm) Face Plate
 -----4-Way Tool Post
 -----Follow Rest/Steady Rest
 -----# 2 Morse Taper Dead Center
 -----# 3 Morse Taper Dead Center
 -----Tool Box & Tool Kit

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	

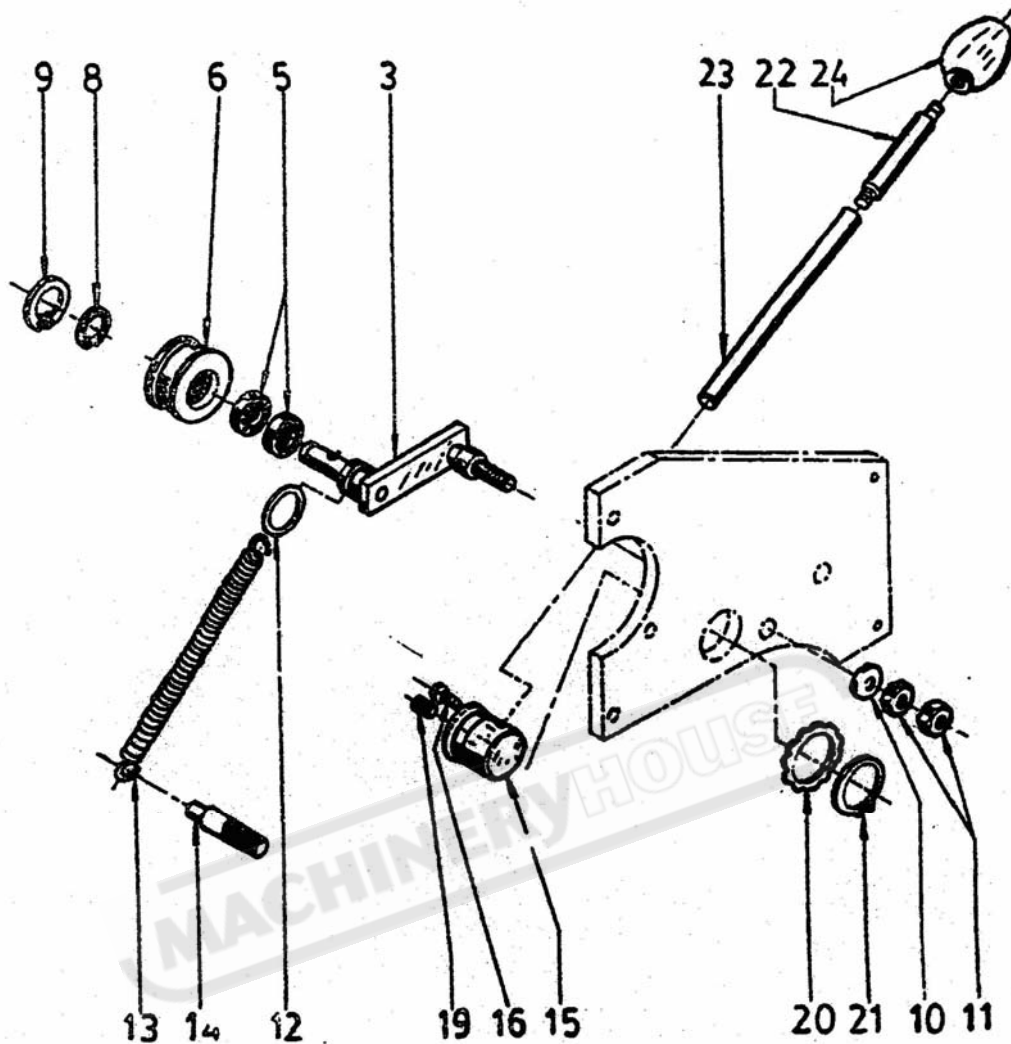
Drive Assembly



Driver Assembly

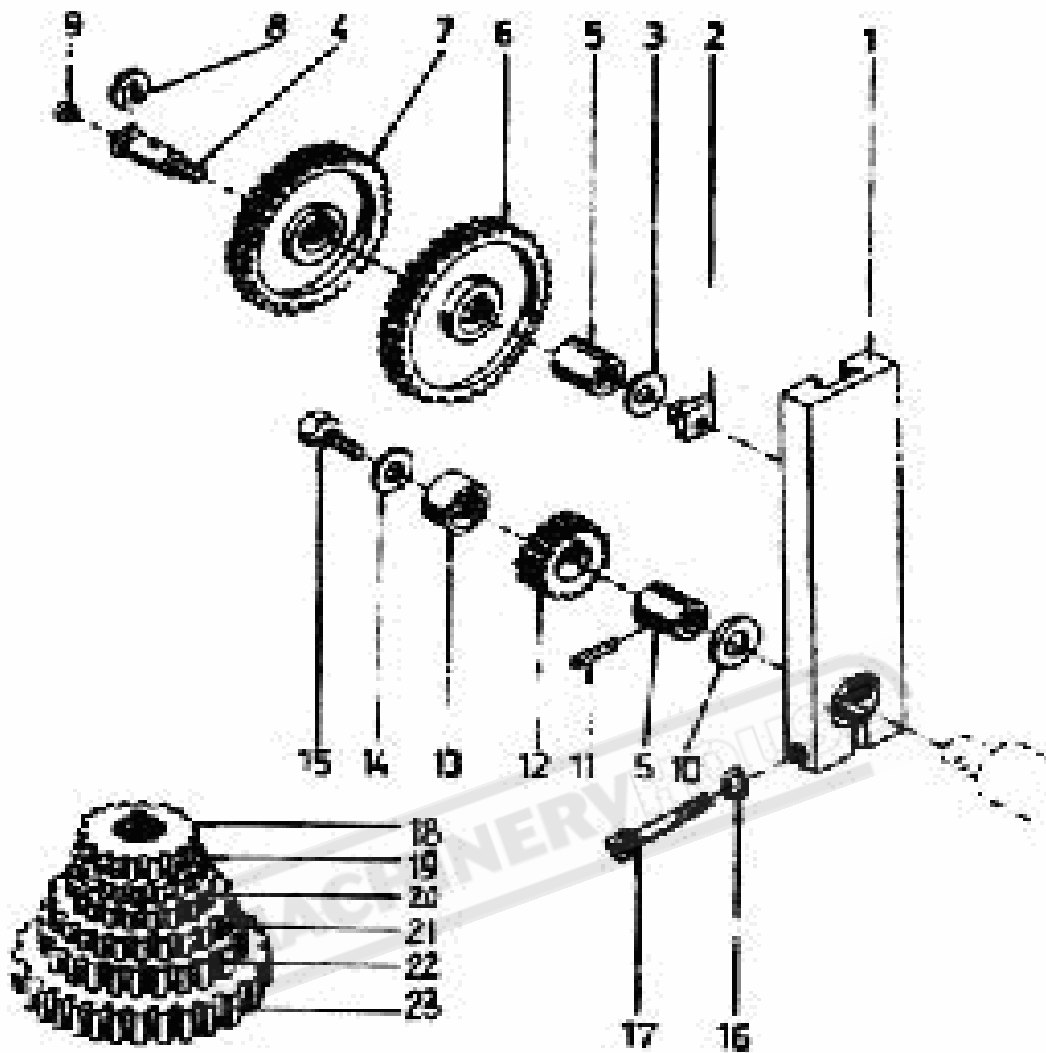
1----	1044-----	Bracket Platw
2----	TS-150404-----	Hex Socket Cap Screw M8X20
3----	1026-----	Belt Pulley Shaft
5----	TS-1551071-----	Hex Nut M10
6----	TS-1540071-----	Hex Nut M10
7----	1031-----	Bushing
8----	BD920N-D08-----	Snap Ring 25
9----	1027-----	Washer
10----	1025-----	Spring
11----	BD920N-D11-----	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



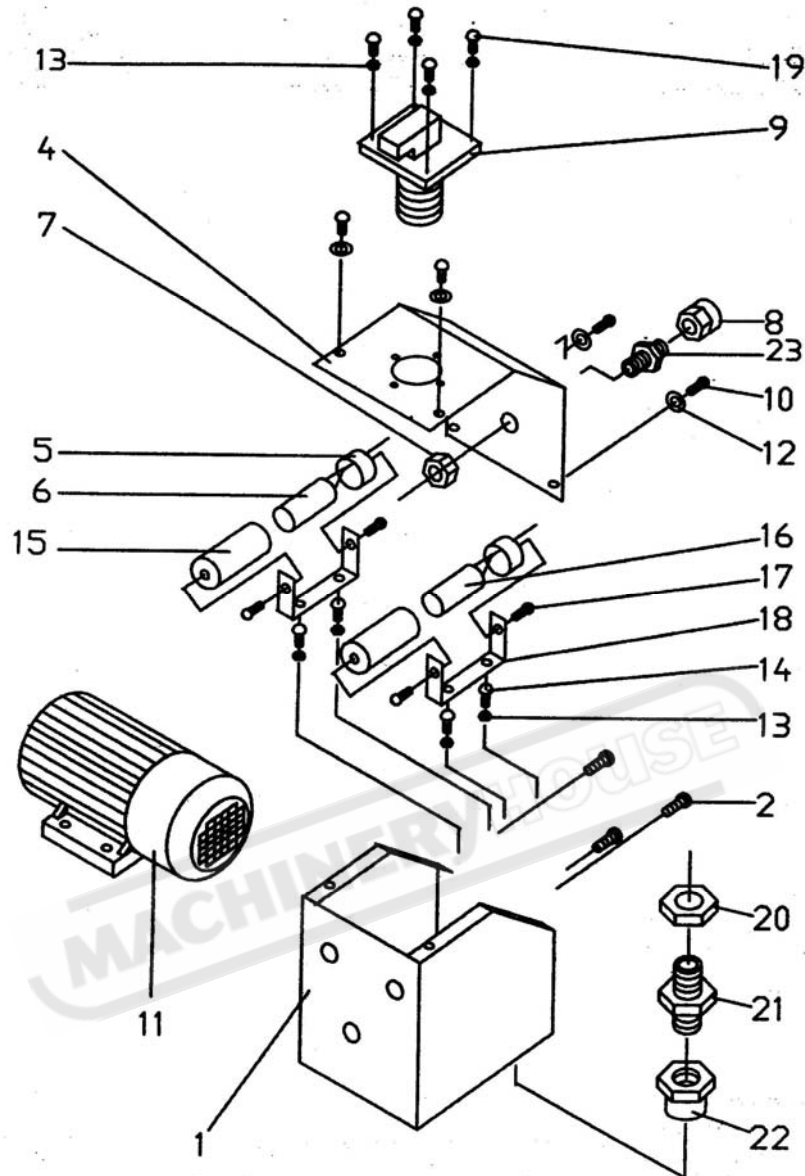
3-----1035-----Shaft	14----1050-----Stud Bolt
5-----BD920N-TR05-----Ball Bearing	15----1032-----Toggle
6-----1039-----Roller	16----1051-----Cap Screw M6X12
8-----BD920N-TR08-----Snap Ring 12	19----TS-152403-----Set Screw M8X8
9-----BD920N-TR09-----Snap Ring 28	20----1034-----Wave Washer
10----TS1550071-----Washer	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



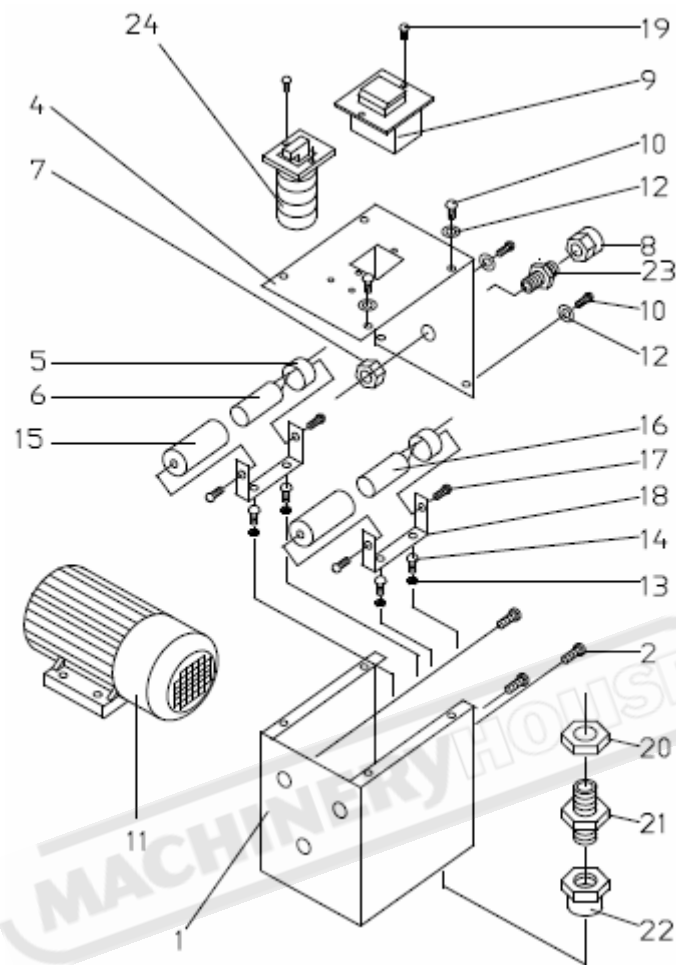
1-----2003-----Bracket	13-----2008-----Spacing Ring
2-----2004-----T-Nut	14-----TS-1550041-----Washer
3-----TS-1550041-----Washer	15-----TS-150302-----Cap Screw M6X8
4-----2005-----Shaft	16-----TS-155104-----Lock Washer 6
5-----2009-----Bushing	17-----TS-150308-----Cap Screw M6X35
6-----2001-----Gear 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



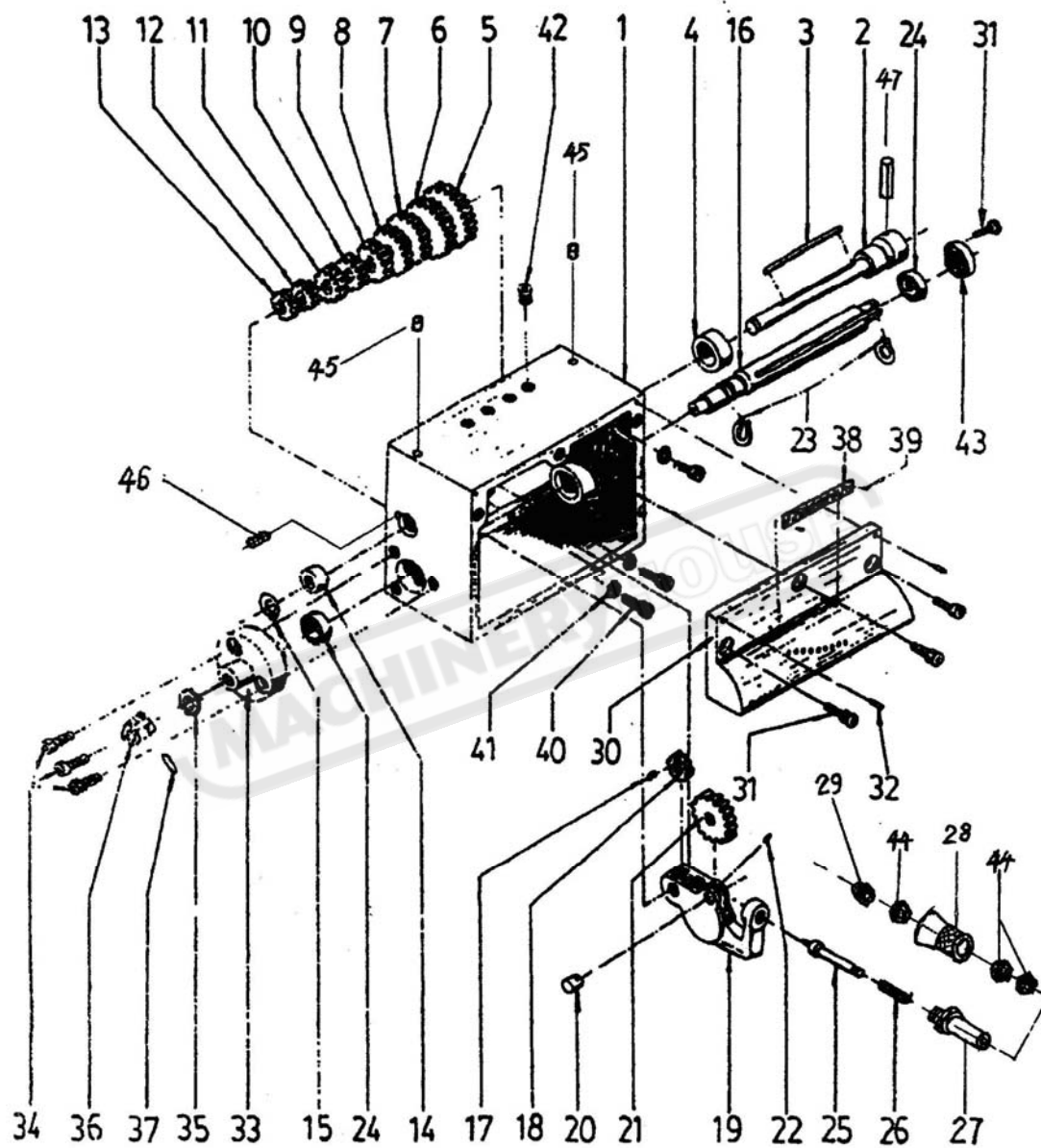
1-----10002-----Housing	13----TS-1540031-----Nut M4
2-----BD920N-E02-----Cap Screw M5X10	14----TS-150202-----Cap Screw M4X8
4-----10001-----Cover	15----10003-----Cover
5-----BD920N-E05-----Cover	16----10004-----Small Condenser
6-----BD920N-E06-----Big Condenser	17----10005-----Cap Screw M4X6
7-----BD920N-E07-----Nut 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



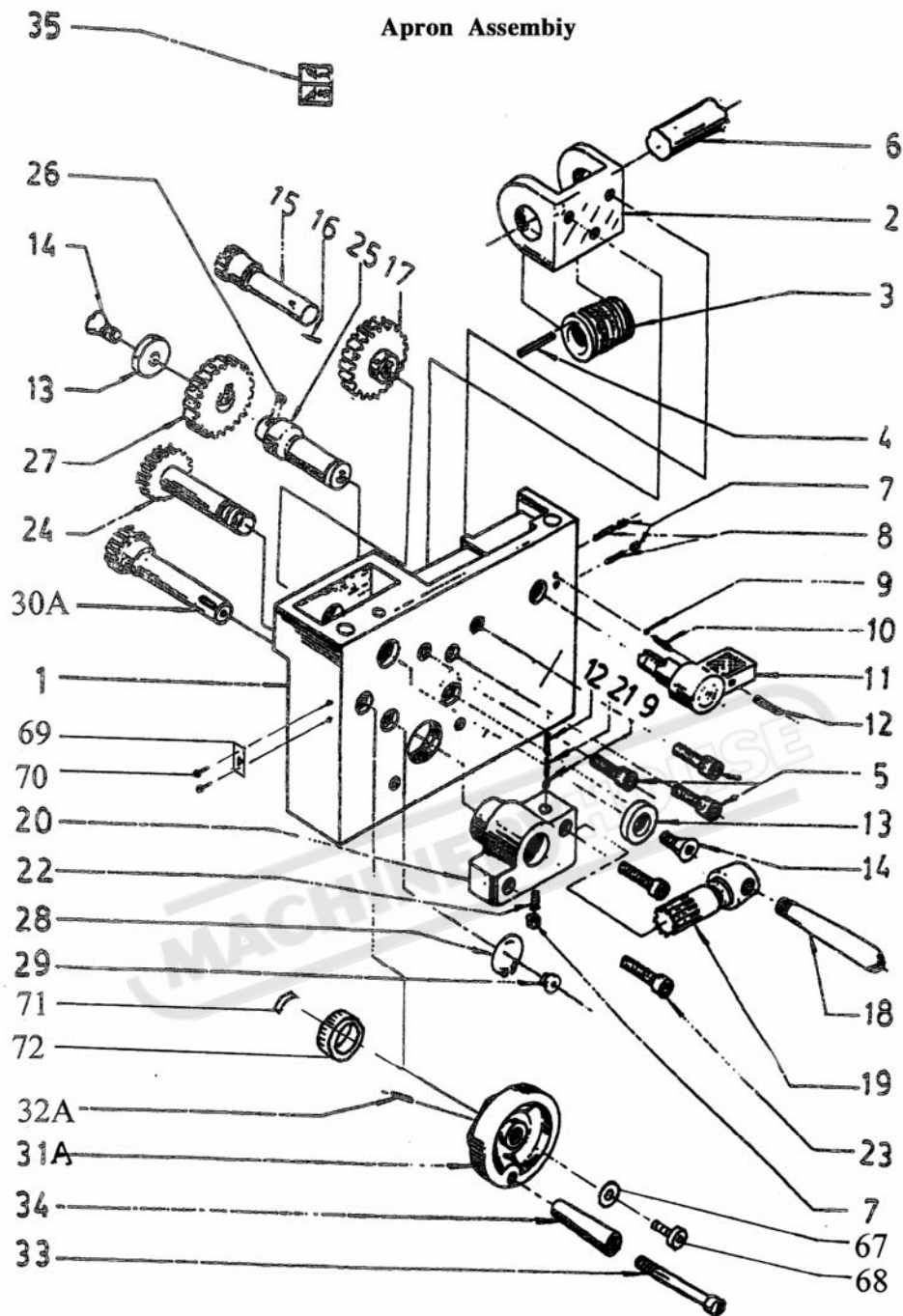
1-----10002-----Housing	13-----TS-1540031-----Nut M4
2-----BD920N-E02-----Cap Screw M5X10	14-----TS-150202-----Cap Screw M4X8
4-----10001-----Cover	15-----10003-----Cover
5-----BD920N-E05-----Cover	16-----10004-----Small Condenser
6-----BD920N-E06-----Big Condenser	17-----10005-----Cap Screw M4X6
7-----BD920N-E07-----Nut 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

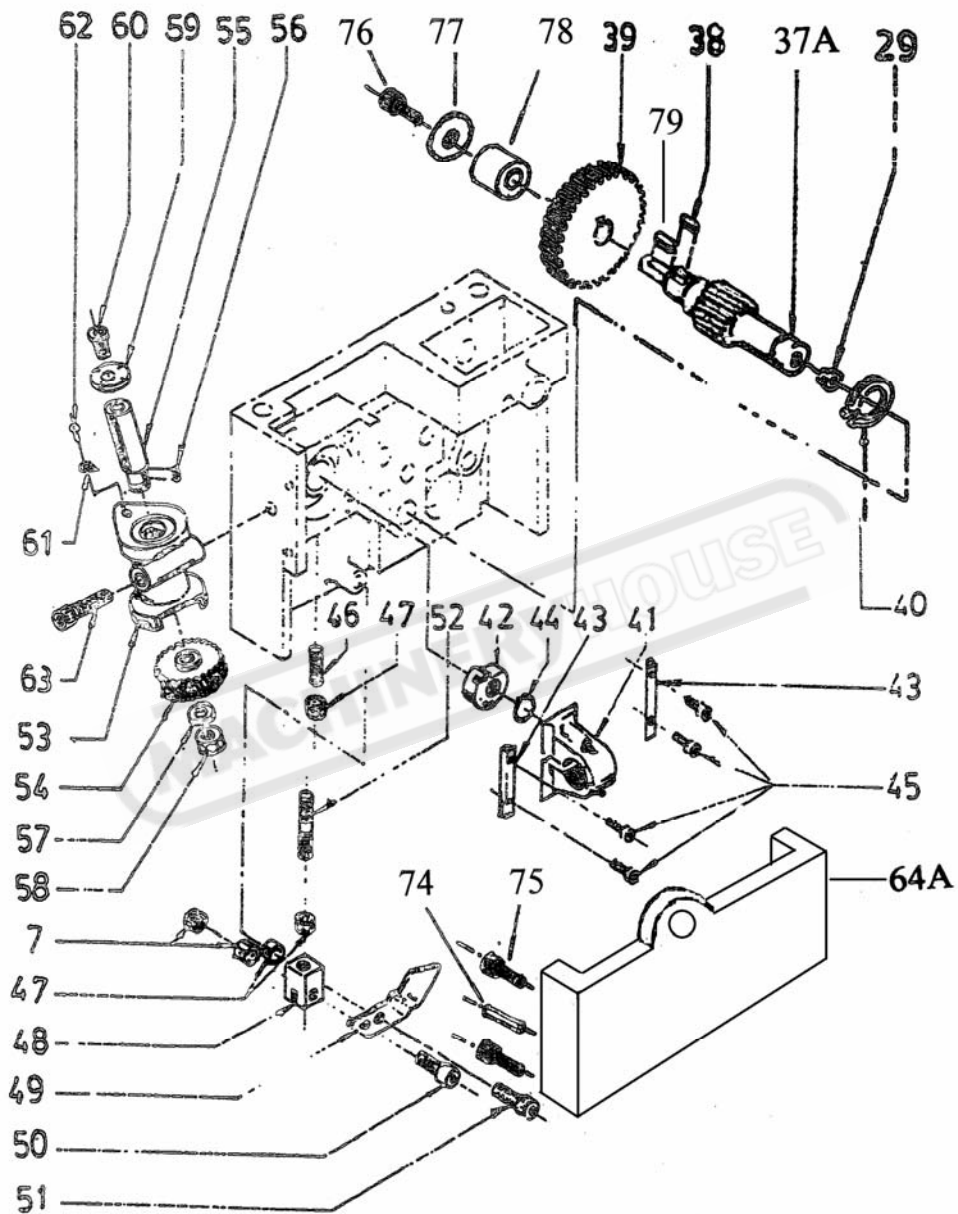
1----	3001-----	Gear Box Cassting
2----	3009-----	Shaft
3----	BD920N-GB03-----	Key
4----	3019-----	Bushing
5----	3018-----	Gear 28T
6----	3017-----	Gear 26T
7----	3016-----	Gear 24T
8----	3015-----	Gear 23T
9----	3014-----	Gear 22T
10----	3013-----	Gear 20T
11----	3012-----	Gear 19T
12----	3011-----	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

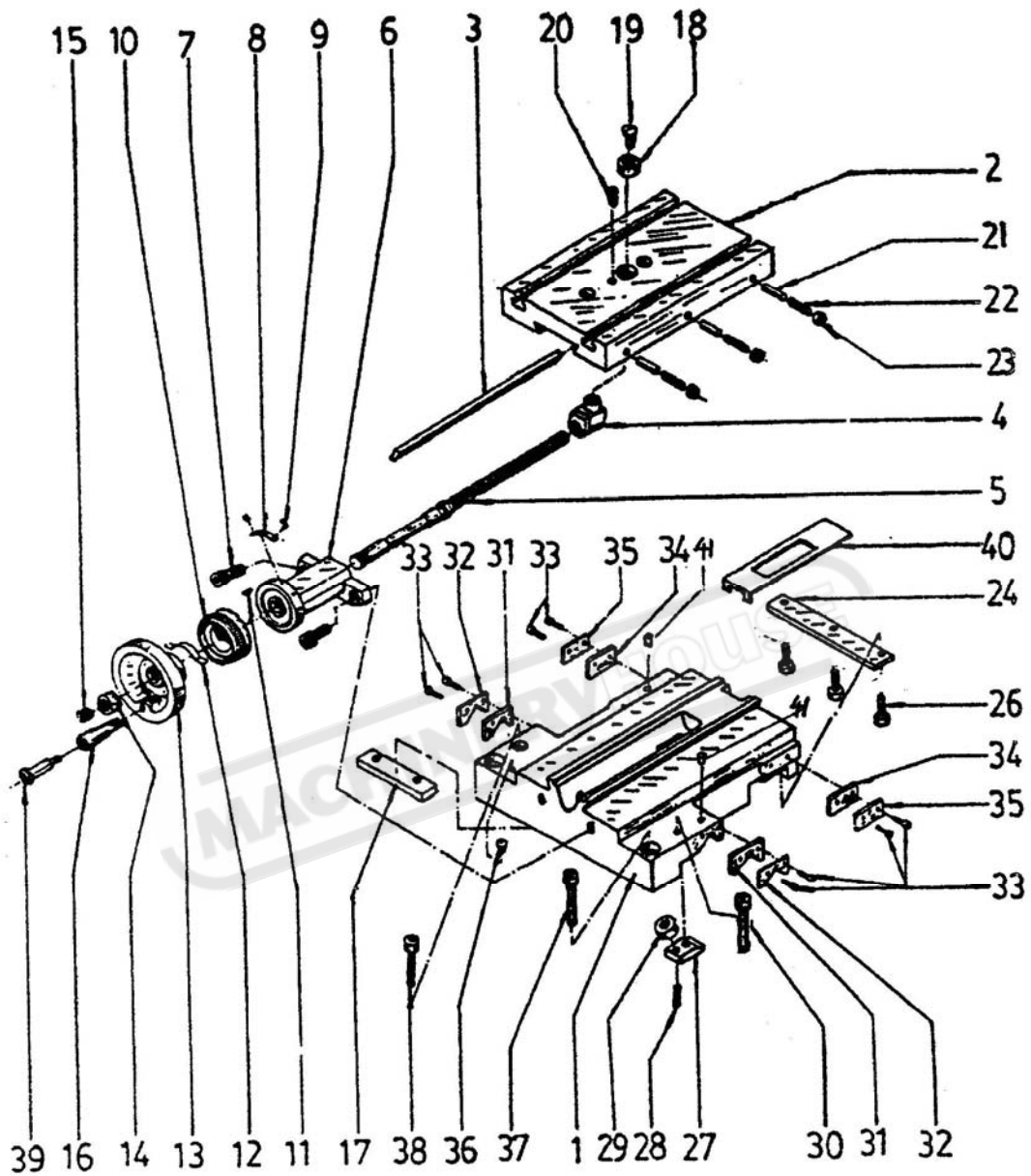
Apron Assembly (cont' d)



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	

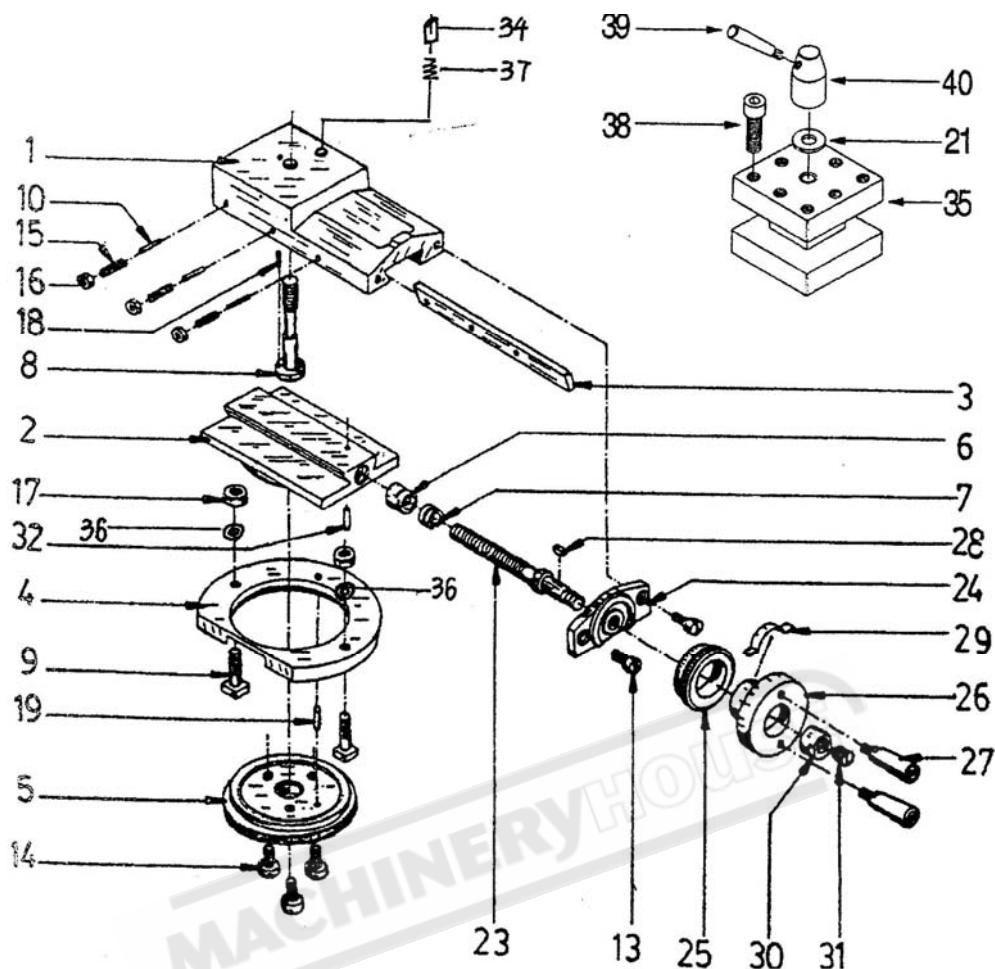
Saddle and Cross Slide Assembly



Saddle And Cross Slide Assembly

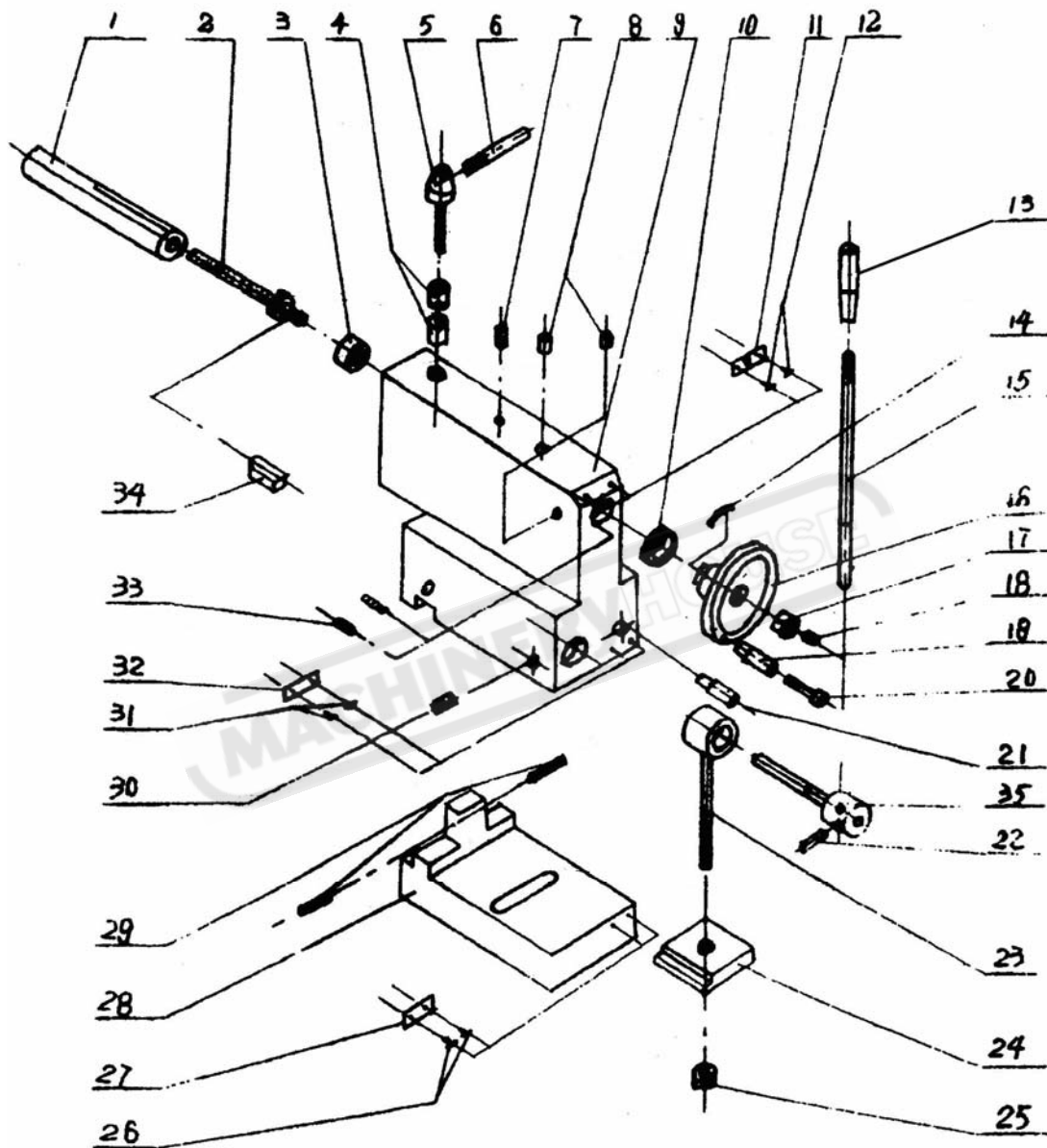
1----	5005-----	Saddle
2----	5006-----	Cross Slide
3----	5002-----	Gib
4----	5036-----	Nut
5----	5018-----	Lead Screw
6----	5019-----	Bracket
7----	TS-150304-----	Hex Socket Cap Screw M5X16
8----	5026-----	Plate
9----	BD902N-CS09-----	Rivet 2x5
10----	5020-----	Graduated Ring
11----	BD920N-CS11-----	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-2 Assembly

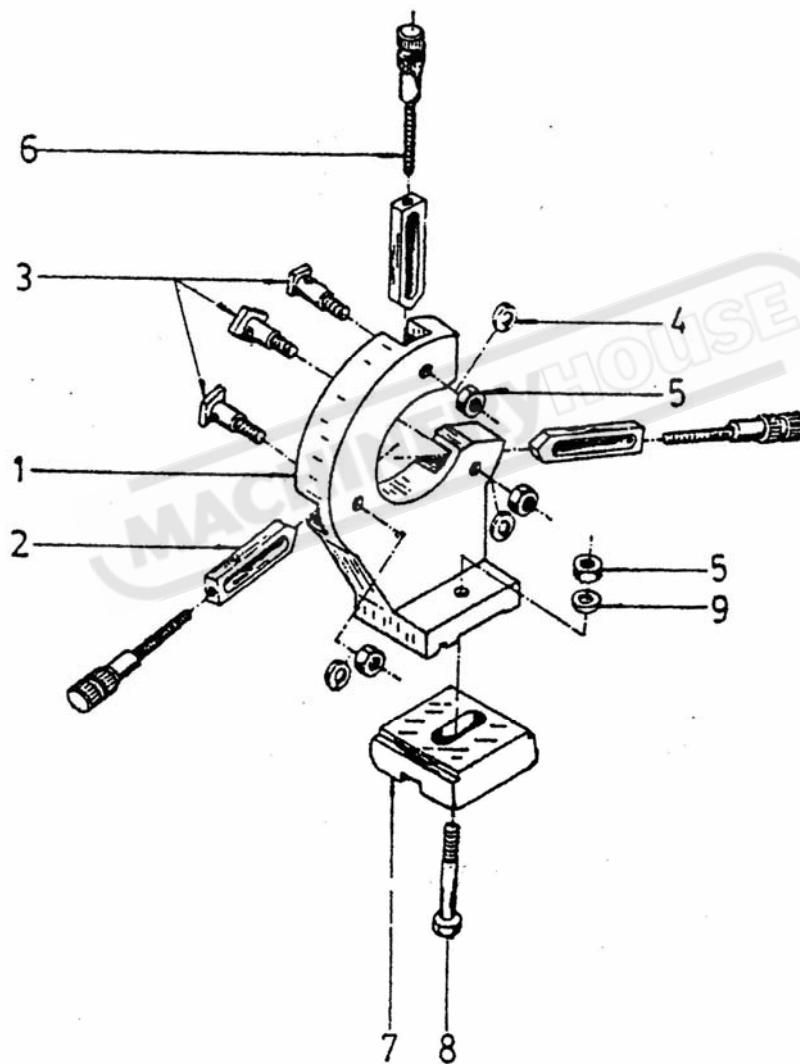


Tailstock-2 Assembly

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

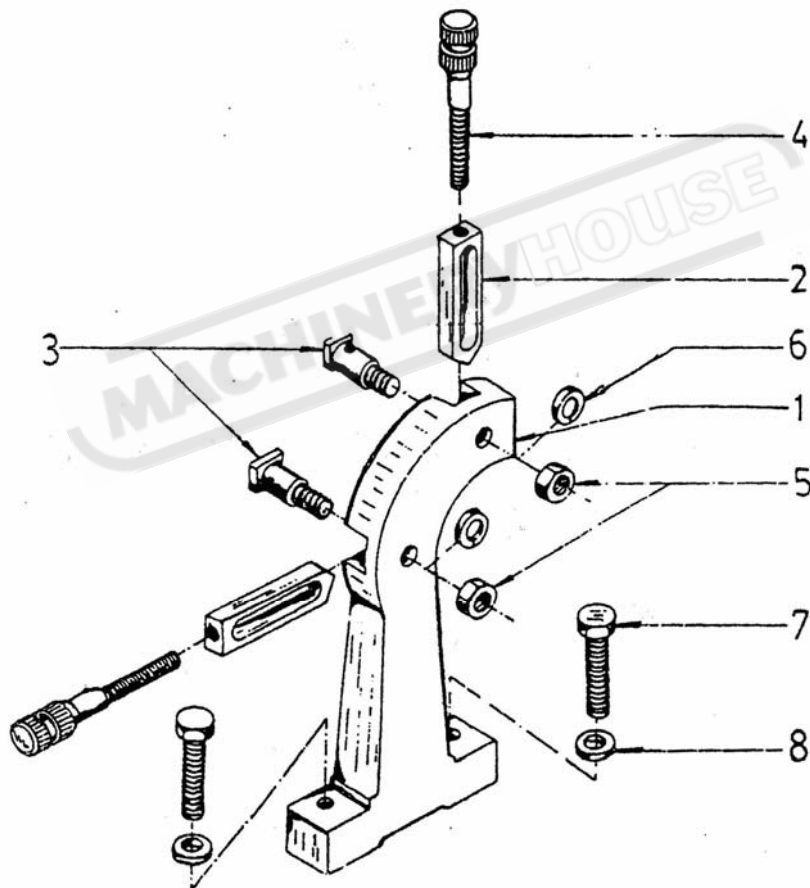
Center Rest Assembly (optional accessories)

- | | |
|-----------------------|-----------------|
| 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 |

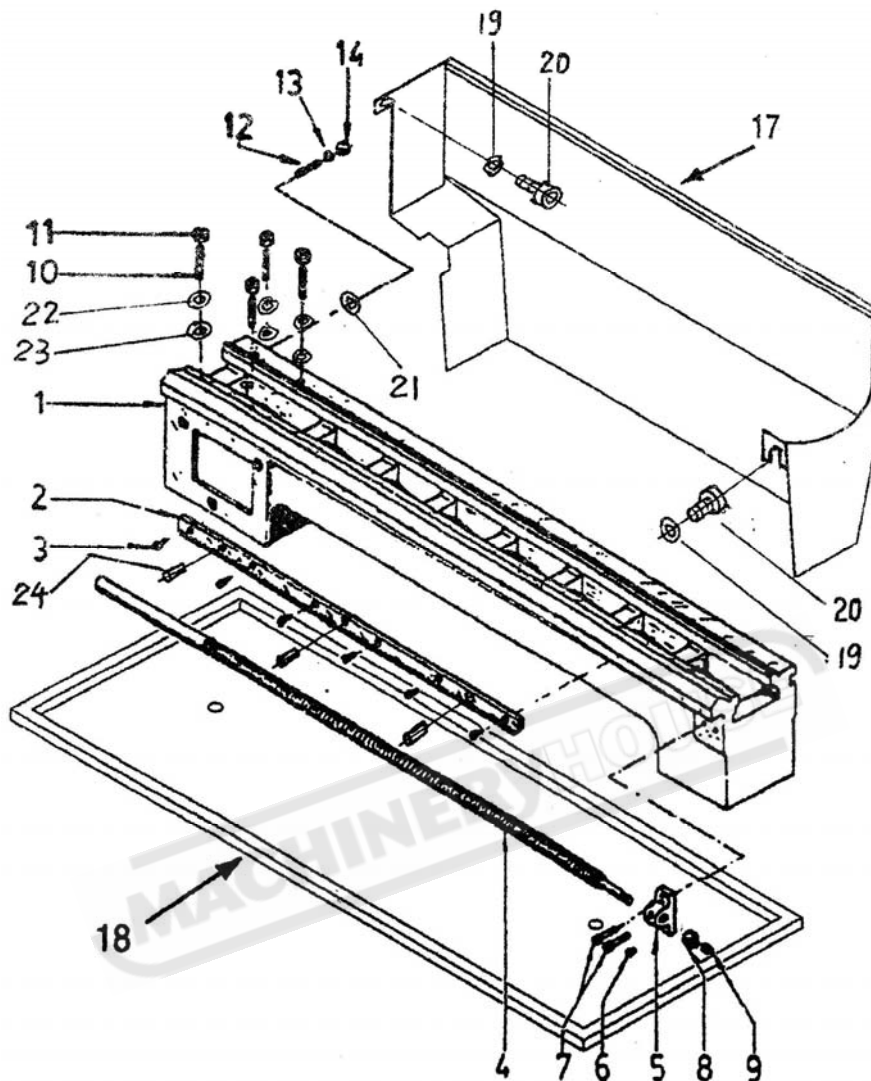


Travel Rest Assembly (optional accessories)

- 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

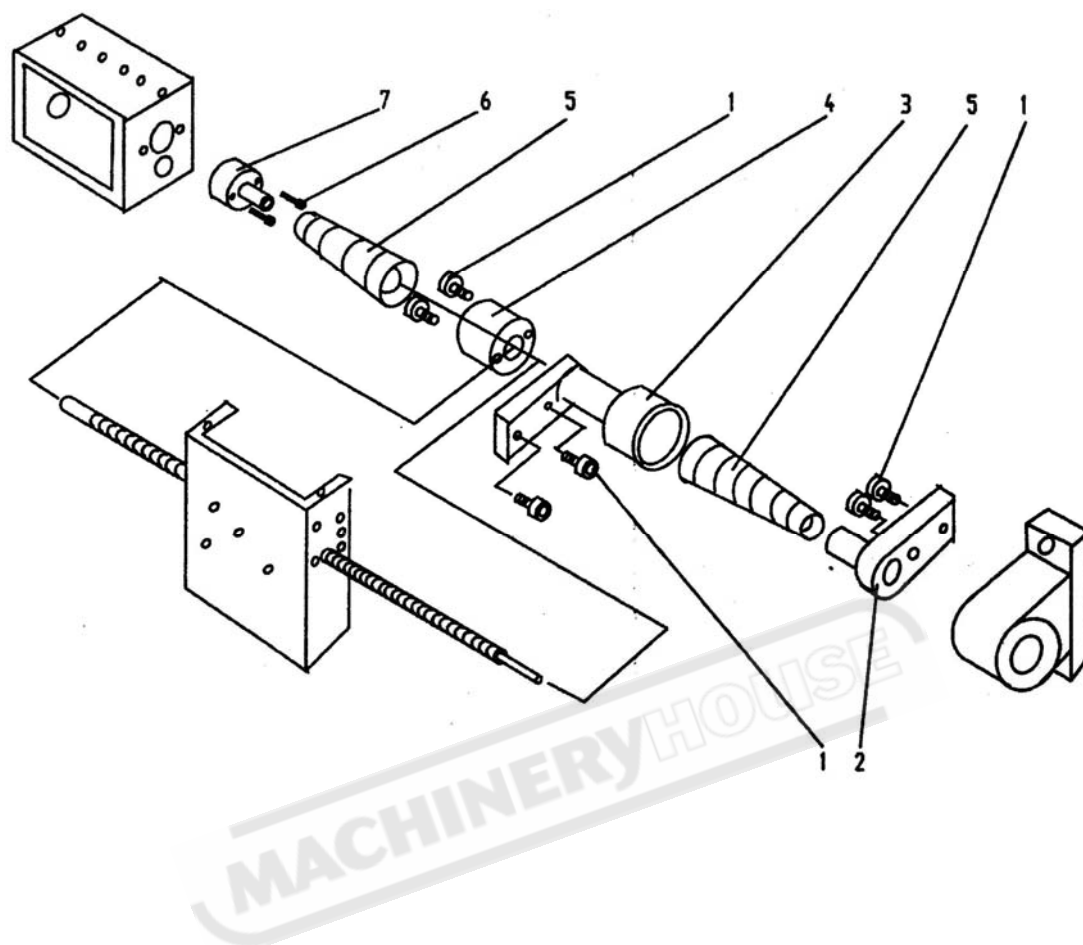


Lathe Bed Assembly



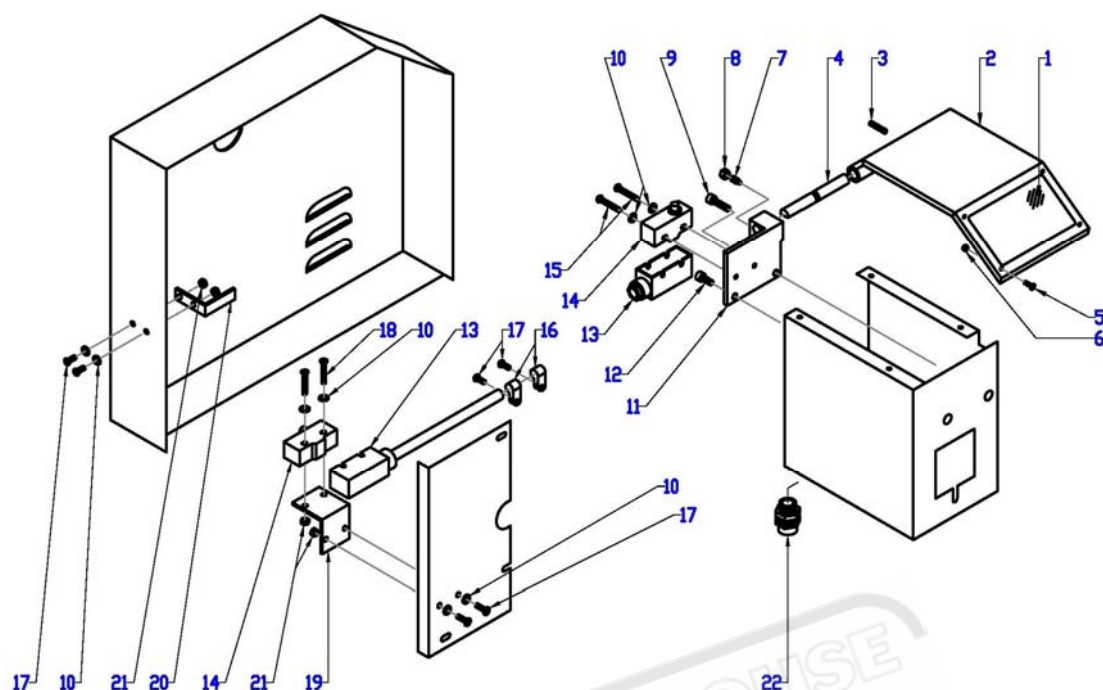
1-----7001-----Bed	13----TS-1551041-----Lock Washer 6
2-----7002-----Rack	14----TS-1540041-----Hex Nut M6
3-----TS-150102----- Cap Screw M4X10	17----7006-----Chip Shield
4-----7003-----Leadscrew	18----7007-----Chip Pan
5-----7004-----Bracket	19----7008-----Washer 5
6-----BD920N-B06-----Oil Port 6	20----7009-----Cap Screw M5X10
7-----TS-1503051----- Cap Screw M6X16	21----7010-----Big Washer 6
8-----7006-----Nut	22----7011-----Lock Washer 8
9-----BD920N-B09-----Set Screw M8X8	23----7012-----Washer 8
10----7005-----Stud M8X50	24----7013-----Lock Pin 4x16
11----TS-1540061-----Hex Nut M8	
12----TS-1523071-----Set Screw M6X35	

Feed Screw Assembly (optional accessories)



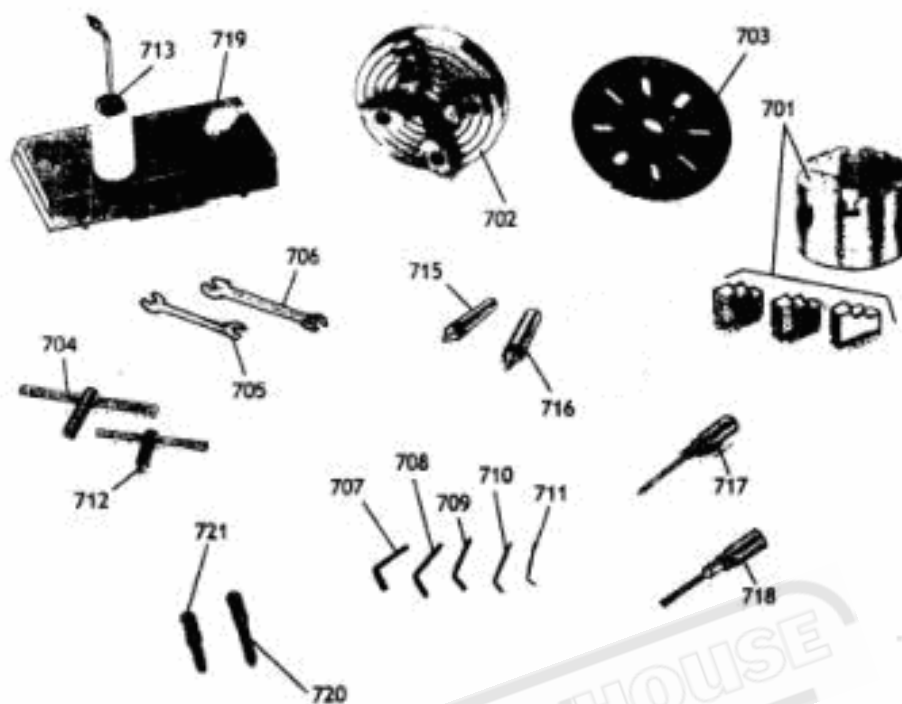
- | | | | |
|--------|-------------|-------------|-------|
| 1----- | GB301----- | Cap Screw | M4X10 |
| 2----- | P09301----- | Bracket | |
| 3----- | P09302----- | Bracket | |
| 4----- | P09303----- | Bracket | |
| 5----- | P09304----- | Screw Cover | |
| 6----- | GB302----- | Cap Screw | M4X35 |
| 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 (optional accessories)
703-----	190mm (7.5") Face Plate (optional accessories)
704-----	Four-Jaw Chuck Key (optional accessories)
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