

# INSTRUCTION MANUAL

## AL-340A Centre Lathe (240V) 356 x 1000mm Turning Capacity - 39mm Bore



**L179**

**AL-340A series lathe after 12-2011  
(with new type 4 knob feed box)**

# OPERATION MANUAL & PARTS LIST



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## Preface

For an efficient and appropriate way of utilization, also for extending the machine's life, all the operators are requested to carefully read the instruction of this Manual before start to operate.

Most of the operators think, according to their own experience, they can handle the machine appropriately and hopeful to neglect what so important items in this booklet. Anyhow, we may say, as per previous experiencing, that many of the breakdowns are resulted from ignoring the instructions of the Manual. Although you have our one-year's warranty for the damage caused by the defect of the machine, either in material or functional, we will not take any responsibility for any damages arise out of improper operation.

In the mean time, besides specification, operator should also thoroughly and deeply acknowledge the character, function and maintenance of this machine before starting.

Generally, in addition to the description stated in coming chapter, you are requested to notice the following points:

1. Never install the machine in the place where the sun shines directly or where the radiation of heat can reach for avoiding from affecting the accuracy of the machine.
2. Use only the recommended lubrication oil.
3. Clean the machine every time when finish working, or a cover will be a plus to prevent the dust.
4. Try to get rid of chips or dusts especially in the grooves of the machine. Keep it as clean as possible or it may be scratched.
5. Whenever the grooves of the machine damaged by falling in extra articles, don't ever try to move Apron. It needs to be repaired to resume its work.

Hope this Operation Manual can be of great assistance and provide you more convenience when operating. The content of this Manual is the best solution derived from our long terms of manufacturing and operating experience. We wish to service you always with a policy of upgrading quality and a conviction in pursuit of perfection.

## 1. Safety Rules for Lathes

Safety is a combination of operator common sense and alertness at all times when lathe is being used. Study these safety rules and general safety rules before operating and retain for future use.

(1) Do not grip a component with grease or oil on it.

Grip all components firmly.

Do not attempt to hold components that are too awkward or too difficult to hold.

Do not hold components that are too heavy for the machine.

Know how to hold components properly when lifting.

(2) Be sure to clean oil or grease from hand tools, levers and handles.

Be sure there is enough texture on the surface of the hand tool or lever handle for proper safe hand contact.

(3) Grip hand tools and lever handles firmly.

Always choose the proper hand tool and appropriate grip position on the lever handle.

Do not use hand tools or lever handles in an awkward position.

Do not apply excessive force.

(4) Always use the recommended gripping position to grasp hand tools and lever handles.

(5) Do not allow turning or hand tools to be caught in the chuck or other holding device.

(6) Do not use broken, chipped or defective tools.

(7) Be sure work piece cannot move in chuck or other holding device.

(8) Beware of irregular shaped work pieces.

(9) Beware of large burrs on work pieces.

(10) Always select the correct tool for the job.

(11) Do not run the machine unattended.

(12) Do not use tools without handles.

(13) Always support the work piece as necessary using chucks, steadies and centers.

(14) Correctly locate tool in socket heads and screw slots.

(15) Beware of obstructions that prevent complete tightening of screws-ensure screw is tight.

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(16) Do not rush work.

(17) Never substitute the wrong size tools if the correct sized tool is not available or cannot be located in the shop.

(18) Do not move guards while lathe is under power.

(19) Do not place hand or body in path of moving objects.

Beware of moving lathe parts that can fall.

Beware of where you are moving your hand or body in relationship to the lathe.

Beware of holding a tool or other parts inserted in or attached at the chuck or work piece.

Beware of hands or other parts of the body that may in position to be hit by a chuck or work piece.

(20) Beware of accidentally moving levers or turning the power on.

(21) Know the function of each and every control.

(22) Never place hand on chuck or workpiece to stop rotation of the spindle.

(23) Make sure power has been turned off when lathe is unused for sometime.

(24) Allow chuck to stop before operating it.

(25) Always check chuck area for chuck keys and loose items.

(26) Never start spindle with chuck key in the chuck.

(27) Do not allow distractions to interfere with lathe operations.

Do not operate lathe whilst talking.

(28) Beware of lathe dangers when attending to other aspects of lathe operation. E.g. whilst operating tailstock.

(29) Beware of loose clothing near the rotating parts of the lathe.

(30) Beware of loose hair near the rotating parts of the lathe.

(31) Beware of performing another operating while in close proximity to rotating parts on the lathe.

(32) Always attend to filing and deburring operations.

Always pay attention to file or deburring tools close to the chuck , files and deburring tools may catch on chuck.

(33) Be sure lathe is in neutral position when placing gauges on components gripped in the chuck.

(34) Be sure motor is not running when using gauges on the machine.

(35) Always wear protection before operating the lathe.

Always wear the correct protection for even a short time when operating the lathe.

Never remove protection for even a short time when operating the lathe.

Wear protection devices correctly.

Know the correct way to wear protective devices.

(36) Beware of material flying from the lathes.

(37) Keep protective guards at the point of operation.

Know how to set or attach protective guards properly.

Never use the wrong protective guard.

(38) (a) When the chuck and workpiece are in motion never reach over, under or around a workpiece to make an adjustment.

(b) Never reach over, under or around a workpiece to retrieve anything.

(c) Beware of where you leave your tools during set up.

(d) Never reach over, under or around workpiece to move hand tool/lathe to another position.

(e) Never reach over, under or around the workpiece to tighten a lathe part.

(f) Never reach over, under or around workpiece to remove swarf.

(39) Know the proper procedure for applying loads.

Never apply force from an awkward position.

(40) Never mount a workpiece too large for the lathe.

(41) Never mount a workpiece too large for the operator to handle.

(42) Use the equipment necessary for handling workpiece.

(43) Never apply undue force on the accessory or control lever.

(44) Secure all workpiece.

(45) Secure all jaws, nuts, bolts and locks.

(46) Always use the excessive force in polishing, filling and deburring.

(47) Never take cuts beyond lathe's capability.

(48) Never use excessive force in polishing, filling and deburring.

(49) Always use the proper hand tool to remove swarf. Never hurry to remove swarf beware of swarf wrapped around the chuck or workpiece.

(50) Never change gears by moving them with your hands.

(51) Beware of tools/lathe parts falling on controls.

## 2. Machine Specification (C0632A)

Bench lathe are especially suitable for machining, tool tooms and repairing working shops to machine shafts, spindle, sleeves, and disc work piece of middle or small types. They can also be used to cut imperial, diametric and module thread, and with compact construction and reasonable composition, they can cut very well. They are easy and reliable to operate, convenient to repair high in efficiency, and low noise.

### Technical specification

|                                       |  |
|---------------------------------------|--|
| Swing over bed.....                   | 330mm                                  |
| Swing over support.....               | 198mm                                  |
| Swing over gap.....                   | 476mm                                  |
| Center height.....                    | 166mm                                  |
| Distance between centers.....         | 750mm/1000mm                           |
| Bed width.....                        | 187mm                                  |
| Bed height.....                       | 290mm                                  |
| Motor output.....                     | 1.5kw                                  |
| Voltage.....                          | 220V or 380V                           |
| Spindle bore.....                     | 38mm                                   |
| Cam lock system.....                  | D1-4                                   |
| Spindle speed.....                    | 70-2000r.p.m                           |
| Spindle taper.....                    | MT No.5                                |
| Cross slide travel.....               | 160mm                                  |
| Compound slide travel.....            | 95mm                                   |
| Leadscrew diameter.....               | 22mm                                   |
| Feed rod diameter.....                | 19mm                                   |
| Cutting tool (Max. section).....      | 16mm×16mm                              |
| Imperial thread.....                  | 4-56T.P.I                              |
| Metric thread.....                    | 0.4-7mm                                |
| Longitudinal feed.....                | 0.052-1.392mm/rev                      |
| Cross-feed.....                       | 0.014-0.380mm/rev                      |
| Tailstock quill diameter & taper..... | 32mm No.3                              |
| Weights (Approx.).....                | 750mm      1000m                       |
|                                       | NW(kg)      460      495               |
|                                       | GW(kg)      555      585               |
| Packing Size(cm).....                 | 168×76×78    193×76×78                 |
|                                       | (With Stands) 168×76×152    193×76×152 |

## 2. Machine Specification (C0636A)

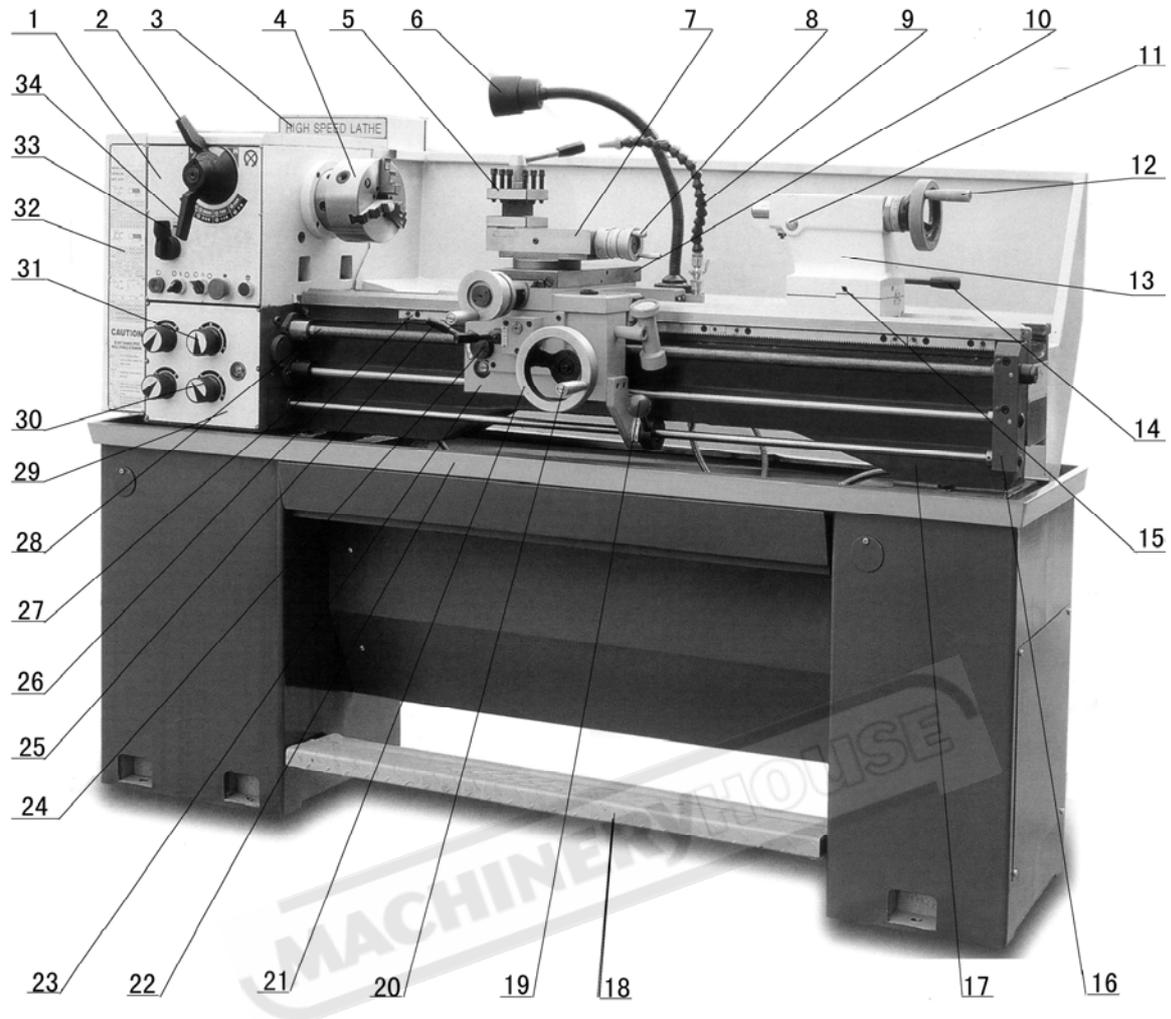
Bench lathe are especially suitable for machining, tool tooms and repairing working shops to machine shafts, spindle, sleeves, and disc work piece of middle or small types. They can also be used to cut imperial, diametric and module thread, and with compact construction and reasonable composition, they can cut very well. They are easy and reliable to operate, convenient to repair high in efficiency, and low noise.

### Technical specification

|                                       |  |
|---------------------------------------|--|
| Swing over bed.....                   | 358mm                                  |
| Swing over support.....               | 223mm                                  |
| Swing over gap.....                   | 502mm                                  |
| Center height.....                    | 179mm                                  |
| Distance between centers.....         | 750mm/1000mm                           |
| Bed width.....                        | 187mm                                  |
| Bed height.....                       | 290mm                                  |
| Motor output.....                     | 1.5kw                                  |
| Voltage.....                          | 220V or 380V                           |
| Spindle bore.....                     | 38mm                                   |
| Cam lock system.....                  | D1-4                                   |
| Spindle speed.....                    | 70-2000r.p.m                           |
| Spindle taper.....                    | MT No.5                                |
| Cross slide travel.....               | 160mm                                  |
| Compound slide travel.....            | 95mm                                   |
| Leadscrew diameter.....               | 22mm                                   |
| Feed rod diameter.....                | 19mm                                   |
| Cutting tool (Max. section).....      | 16mm×16mm                              |
| Imperial thread.....                  | 4-56T.P.I                              |
| Metric thread.....                    | 0.4-7mm                                |
| Longitudinal feed.....                | 0.052-1.392mm/rev                      |
| Cross-feed.....                       | 0.014-0.380mm/rev                      |
| Tailstock quill diameter & taper..... | 32mm No.3                              |
| Weights (Approx.).....                | 750mm      1000m                       |
|                                       | NW(kg)      470      505               |
|                                       | GW(kg)      565      595               |
| Packing Size(cm).....                 | 168×76×78    193×76×78                 |
|                                       | (With Stands) 168×76×152    193×76×152 |

## Operation Manual

### 3. Constructional Indication



- |                                 |                                      |
|---------------------------------|--------------------------------------|
| 1. Headstock                    | 18. Foot-Brake                       |
| 2. Speed Selector               | 19. Spindle Control Lever            |
| 3. Eclectic Control Box         | 20. Longitudinal Traverse Hand wheel |
| 4. Spindle With Three-Jaw Chuck | 21. Longitudinal Traverse Hand Lever |
| 5. Tool Post                    | 22. Chip Tray                        |
| 6. Work Lamp                    | 23. Apron                            |
| 7. Compound Rest                | 24. Feed Axis Selector               |
| 8. Compound Rest Handle         | 25. Thread Cutting Engagement Lever  |
| 9. Coolant                      | 26. Rack                             |
| 10. Cross Slide                 | 27. Control Rod                      |
| 11. Quill Clamp Body            | 28. Lead screw                       |
| 12. Quill Travers Handle        | 29. Gear Box                         |
| 13. Tailstock                   | 30. Feed Box Selector                |
| 14. Tailstock Clamp Lever       | 31. Feed Box Selector                |
| 15. Tailstock Set-Over Screw    | 32. Gear Box Cover                   |
| 16. Support Body                | 33. Feed Direction Selector          |
| 17. Bed                         | 34. Speed Selector Lever             |

## 4. Unpacking and Installation

### 4.1. Unpacking

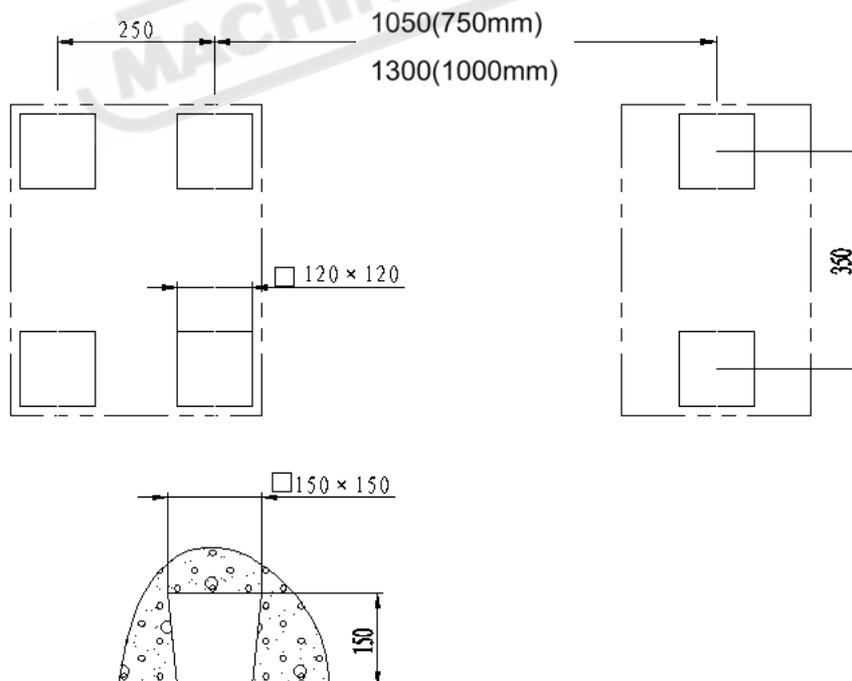
Unload the machine with a tackle, using clamping plates and eyebolts. Keep the machine in balance by moving the tailstock and the bed slide to the right. Avoid using sling chains as they could damage to feed rod and leadscrew. Lift the lathe carefully and place it softly into the floor or workbench.

### 4.2. Cleaning

Before taking the machine into operation, using kerosene (paraffin) or white spirit to remove the anti-corrosive coating or grease from all slideways and gear train. Don't use lacquer thinner or other caustic solvents. Oil all bright machine surfaces immediately after cleaning. Use heavy oil or grease on the change gears.

### 4.3. Installation

Place the lathe on a solid foundation. A concrete floor is the best base for the machine. (If necessary, use an under frame operational). Make sure there is sufficient area around the lathe for easy work and maintenance. Use a precision level on the bedways to make further adjustment for level condition, then tighten the foundation bolts evenly and finally recheck for level condition.



## 5. Lubrication

Before putting the lathe into operation, make the following lubrication check.

### 5.1. Headstock

The bearing of the headstock turns in an oil bath. Ensure that the oil level reaches three quarters of the oil gauge glass.

For exchanging the oil, remove the end cover and the change gears with swing frame. Drain off the oil by removing the drain plug on the bottom of the headstock. To fill, take off the headstock cover.

Check the oil level regularly. The first oil change should be made after 3 month, then change it once a year.

### 5.2. Gearbox

Remove the end cover to expose the filling plug. Through it the Shell is filled to the oil level in the oil gauge glass regularly. The first oil change should be made after three months, then change it once a year.

### 5.3. Apron

The oil bath is filled with Shell through the filling plug on the right side of the apron. Check the oil level in the oil gauge glass on the front regular. The first oil change should be made after three months, then change it once a year.

For exchanging the oil, drain away oil by taking off the drain plug on the bottom of the apron.

### 5.4. Change gears

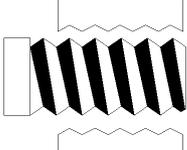
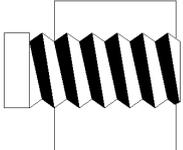
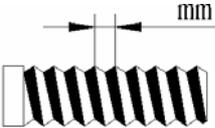
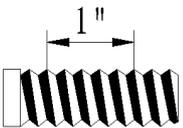
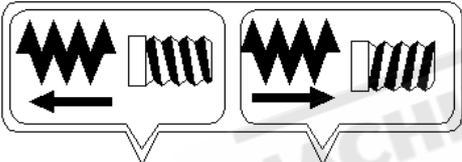
Lubricate the change gears with thick machine oil or grease once a month.

### 5.5. Other parts

There are other lubricating points on the input shaft bracket of the gearbox, the handwheel on the apron, the longitudinal and cross slide, the thread dial indicator, the tailstock and the bracket, use the grease gun to put a few drops of oil from time to time. Lubricate the apron worm and worm gear, half nut and leadscrew twice a month. Apply a light oil film to the bed way and all other bright parts like the tailstock quill, feed rod etc. once a day.

## 6. Test Running

### 6.1. Operation symbols

|   |  |   |  |
|---|--|---|--|
| <br>Red      Green | <p><b>Power</b><br/>                 Green: on<br/>                 Red: off</p>       | <br>Red<br>Green  | <p><b>Coolant</b><br/>                 Green: on<br/>                 Red: off</p> |
|                    | <p>Half nut opened</p>   |   | <p>Half nut closed</p>   |
|                    | <p>Metric thread</p>   |   | <p>Imperial thread</p>   |
|                  | <p>Right-hand thread and longitudinal feed toward the headstock side (left figure)</p> | <p>Left-hand thread and longitudinal feed toward the headstock side (right figure)</p>  |  |
|   |     | <p>Longitudinal feed engaged (upward).<br/>                 Both Longitudinal feed disengaged (central).<br/>                 Cross feed engaged (downward)</p> | <p><b>OIL</b></p>  |
|                  | <p>Don't change speed while is running</p>   |    | <p>JOG</p>   |
|                  | <p>Electrical control (Danger)</p>   |    | <p>STOP</p>  |
|                  | <p>Pilot Lamp</p>  |    | <p>STOP</p>  |

## **6.2. Spindle speed control**

### **(A). Identification before operation**

Ensure that lubrication has been carried out as described before.

When the main spindle is rotating. The gearbox and feed axis of the bedslides are put into operation. The forward/reverse switch should be on neutral. The feed axis selector and feed/thread selector handle are in disengaged position. Under these circumstances, both the longitudinal traverse handwheel and cross traverse handle can be operated by hand.

### **(B). Main spindle rotation**

The main spindle rotation is selected by forward/reverse switch.

### **(C). Main spindle speed**

The speed of the main spindle is selecting by (high/low) speed selector (2) and 4 steps speed selector (34). For both high and low speed, there are 4 different positions. For correct speed, please refer to the speed chart. When selector (2) is on “high”, we can get the four speeds, according to the graph.

Never change the speed before the motor has stopped completely!

Adjusting the speed can be assisted by turn the main spindle by hand.

### **(D). Running-in**

Running in should be done at lowest possible spindle speed. Let the machine to run at lowest speed for about twenty minutes, and then check for irregularities. If everything seems in order, gradually increase the speed.

### **(E). Operation**

Use only high peripheral speed type chucks.

The maximum spindle speed for chuck plate of 255mm diameter should not be more than 1255r.p.m. When thread cutting or auto feeding are not in use, the feed/thread selector should be in neutral position, so as to ensure disengagement of the leadscrew and the feed rod. To avoid unnecessary wear, the thread dial indicator should be out of mesh with the leadscrew.

## 7. Thread and Feed Selection

### 7.1. Thread and feed selection

All feed and threads are given on the feed thread tables, fitted on the front and inside of the gear box cover (32), by setting the four feed selector handles (30), (31) etc.

#### (A). Hand feed operation

The movement of carriage is made by the longitudinal traverse handwheel (21), cross sliding by the cross traverse handle, and compound rest by the compound rest traverse handle (8), the carriage is anchored by turning the carriage lock screw in clockwise direction.

#### (B). Replacement of change gears

Take off the end cover firstly, and then loosen both the hexagon nut of the clamping bolt and the clamping screw of the swing frame to exchange the transmission shaft gear with another gear. And the change of driven gear is made by loosen the 120T and 127T gear shaft clamping nut, it is necessary for suitable back lash to intermediate the gears in both cases.

For any special threads not covered by the thread table, our engineering department is available to specify the most convenient change gearing required.

#### (C). Automatic feed operation and change

Ensure that 30T change gear at the transmission shaft and 60T at the driven shaft are set with 127T intermediate gear as shown on the feed and thread table. Then turn the feed direction selector (33) to left hand or right hand side according to the direction of feeding which you need and set the feed/thread selector (31) at “any” position, make sure the feed selector handle (2), (30) is engaged, thus the feed rod will rotate. When the feed axis selector (24) on the apron is pulled out and operated upward, we can obtain a longitudinal feed and cross feed can be obtained by pushing the selector in and operating it downward. (Make sure the thread cutting engagement lever ((25) at disengaged position before operating the feed axis selector.)

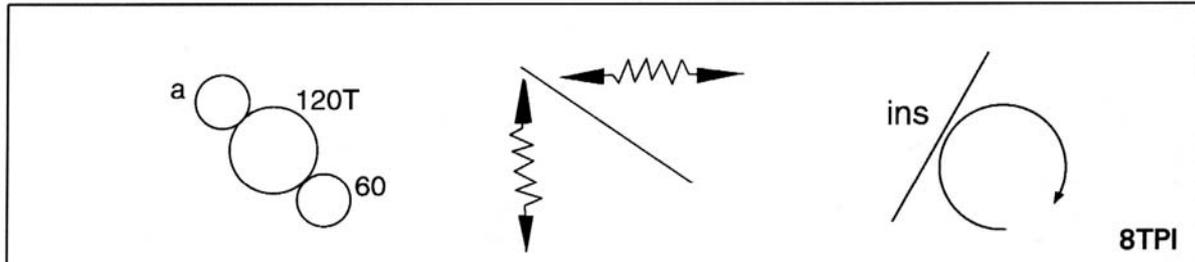
Feed direction can be changed by turning feed direction selector ( It have 32 kinds of feed speeds each in longitudinal and cross feed can be obtained by means of the feed selector handles (31), (30) etc.

### 7.2. Feed and thread tables

#### (A) .Feed table

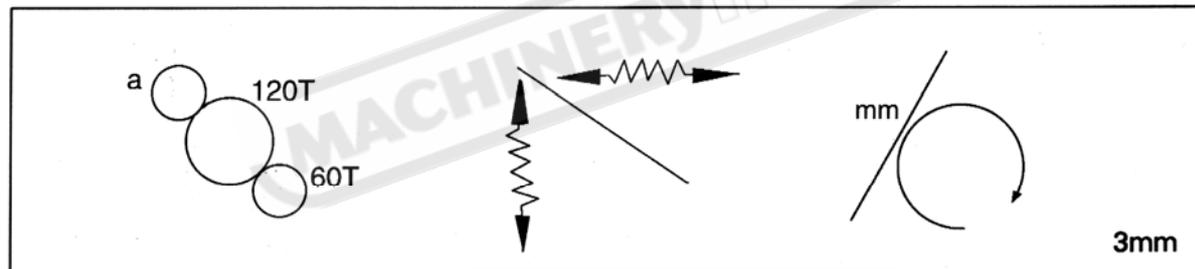
(a) Longitudinal and cross feed table for Imperial lathe

Operation Manual



| a     |   | 60T            |                |                |                | 30T            |                |                |                |
|-------|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| LEVER |   | T              | S              | R              | V              | T              | S              | R              | V              |
| A     | D | .0548<br>.0187 | .0512<br>.0175 | .0411<br>.0140 | .0328<br>.0112 | .0274<br>.0094 | .0256<br>.0087 | .0205<br>.0070 | .0164<br>.0056 |
| B     | D | .0274<br>.0094 | .0256<br>.0087 | .0205<br>.0070 | .0164<br>.0056 | .0137<br>.0047 | .0128<br>.0044 | .0102<br>.0035 | .0082<br>.0028 |
| A     | C | .0137<br>.0047 | .0128<br>.0044 | .0102<br>.0035 | .0082<br>.0028 | .0069<br>.0024 | .0064<br>.0022 | .0051<br>.0017 | .0041<br>.0014 |
| B     | C | .0069<br>.0024 | .0064<br>.0022 | .0051<br>.0017 | .0041<br>.0014 | .0034<br>.0012 | .0031<br>.0011 | .0025<br>.0009 | .0020<br>.0007 |

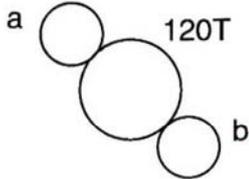
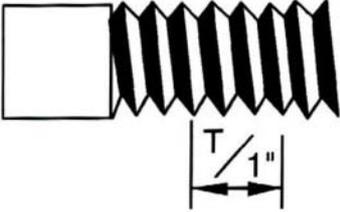
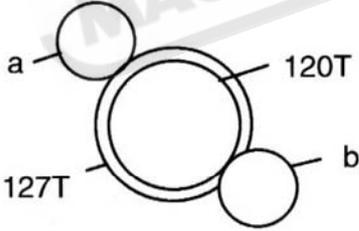
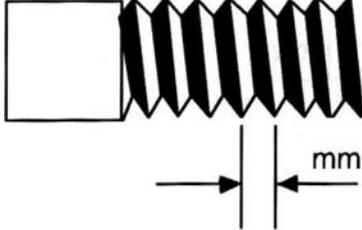
(b) Longitudinal and cross feed table for Metric lathe



| a     |   | 60T           |               |               |              | 30T          |              |              |              |
|-------|---|---------------|---------------|---------------|--------------|--------------|--------------|--------------|--------------|
| LEVER |   | T             | S             | R             | V            | T            | S            | R            | V            |
| A     | D | 1.392<br>.380 | 1.300<br>.351 | 1.044<br>.282 | .835<br>.226 | .696<br>.188 | .650<br>.175 | .522<br>.141 | .418<br>.113 |
| B     | D | .696<br>.188  | .650<br>.176  | .522<br>.141  | .418<br>.113 | .348<br>.094 | .325<br>.088 | .261<br>.070 | .208<br>.056 |
| A     | C | .348<br>.094  | .325<br>.088  | .261<br>.070  | .208<br>.056 | .174<br>.047 | .162<br>.044 | .130<br>.035 | .104<br>.028 |
| B     | C | .174<br>.047  | .162<br>.044  | .130<br>.035  | .104<br>.028 | .087<br>.024 | .081<br>.022 | .065<br>.017 | .052<br>.014 |

**(B). Thread tables**

**(a) Thread tables for Imperial leadscrew**

|       |   |   |       |       |  |       |        |     |       |             |
|-------|---|---|-------|-------|--|-------|--------|-----|-------|-------------|
|       |   |    |       |       |    |       |        |     |       | <b>8TPI</b> |
| a     |   | 60  | 60    | 60    | 60   | 40    | 40     | 56  | 40    | 60          |
| b     |   | 60  | 54    | 57    | 60   | 44    | 46     | 54  | 52    | 63          |
| LEVER |   | 4   | 1     | 1     | 1  | 1     | 1      | 2   | 1     | 3           |
|       |   | V   | V     | V     | V  | V     | V      | V   | V     | V           |
| A     | D | 4   | 4 1/2 |       | 5  | 5 1/2 |        | 6   | 6 1/2 | 7           |
| B     | D | 8   | 9     | 9 1/2 | 10   | 11    | 11 1/2 | 12  | 13    | 14          |
| A     | C | 16  | 18    | 19    | 20   | 22    | 23     | 24  | 26    | 28          |
| B     | C | 32  | 36    | 38    | 40   | 44    | 46     | 48  | 52    | 56          |
|       |   |  |       |       |  |       |        |     |       | <b>8TPI</b> |
| a     |   | 56  | 60    | 60    | 30   | 60    | 60     | 30  | 60    | 56          |
| b     |   | 60  | 60    | 60    | 60   | 60    | 60     | 60  | 60    | 63          |
| LEVER |   | 4   | 1     | 3     | 4  | 1     | 3      | 1   | 3     | 3           |
|       |   | R   | R     | S     | T  | V     | R      | T   | V     | V           |
| A     | D | 7.0   | 6.0   |       | 5  |       | 4.5    | 4.0 |       |             |
| B     | D | 3.5   | 3.0   |       | 2.5  |       | 2.25   | 2.0 | 1.8   | 1.6         |
| A     | C | 1.75  | 1.5   | 1.4   | 1.25   | 1.2   |        | 1.0 | 0.9   | 0.8         |
| B     | C |   | 0.75  | 0.7   |  | 0.6   |        | 0.5 | 0.45  | 0.4         |

Operation Manual

(b) Thread tables for Metric leadscrew

|       |   |      |       |       |      |       |        |     |       |     |
|-------|---|------|-------|-------|------|-------|--------|-----|-------|-----|
|       |   |      |       |       |      |       |        |     |       |     |
| a     |   | 56   | 60    | 60    | 30   | 60    | 60     | 30  | 60    | 56  |
| b     |   | 60   | 60    | 60    | 60   | 60    | 60     | 60  | 60    | 63  |
| LEVER |   | 4    | 1     | 3     | 4    | 1     | 3      | 1   | 3     | 3   |
|       |   | R    | R     | S     | T    | V     | R      | T   | V     | V   |
| A     | D | 7.0  | 6.0   |       | 5    |       | 4.5    | 4.0 |       |     |
| B     | D | 3.5  | 3.0   |       | 2.5  |       | 2.25   | 2.0 | 1.8   | 1.6 |
| A     | C | 1.75 | 1.5   | 1.4   | 1.25 | 1.2   |        | 1.0 | 0.9   | 0.8 |
| B     | C |      | 0.75  | 0.7   |      | 0.6   |        | 0.5 | 0.45  | 0.4 |
|       |   |      |       |       |      |       |        |     |       |     |
| a     |   | 60   | 60    | 60    | 60   | 40    | 40     | 56  | 40    | 60  |
| b     |   | 60   | 54    | 57    | 60   | 44    | 46     | 54  | 52    | 63  |
| LEVER |   | 4    | 1     | 1     | 1    | 1     | 1      | 2   | 1     | 3   |
|       |   | V    | V     | V     | V    | V     | V      | V   | V     | V   |
| A     | D | 4    | 4 1/2 |       | 5    | 5 1/2 |        | 6   | 6 1/2 | 7   |
| B     | D | 8    | 9     | 9 1/2 | 10   | 11    | 11 1/2 | 12  | 13    | 14  |
| A     | C | 16   | 18    | 19    | 20   | 22    | 23     | 24  | 26    | 28  |
| B     | C | 32   | 36    | 38    | 40   | 44    | 46     | 48  | 52    | 56  |

### 7.3. Thread cutting operation

In order to obtain the desired thread, all correct change gears must be installed in strict accordance with the chart, failure to do so will give incorrect threads.

Rotate the leadscrew by operating the feed/thread selector to any position and be sure the feed selector handle is engaged. Operate downward the thread cutting engagement lever (25), and it will be engaged with the leadscrew to obtain the longitudinal travel of carriage, namely, the thread cutting feed. Make sure the feed axis selector is disengaged (at neutral position) before operating the thread cutting engagement lever (25) since there is an interlock mechanism between the auto feeding and thread cutting engagement.

Direction of thread cutting can be chosen by turning the feed directing selector (33) at the headstock. There are 31 Nos. of thread pitches each in Imperial, 26 Nos. of Metric pitches those which can be obtained by turning the feed selector handles .

#### (A). Thread dial indicator

The thread dial indicator is installed on the right hand side of the apron; the indicator is used for thread cutting to engage with the leadscrew.

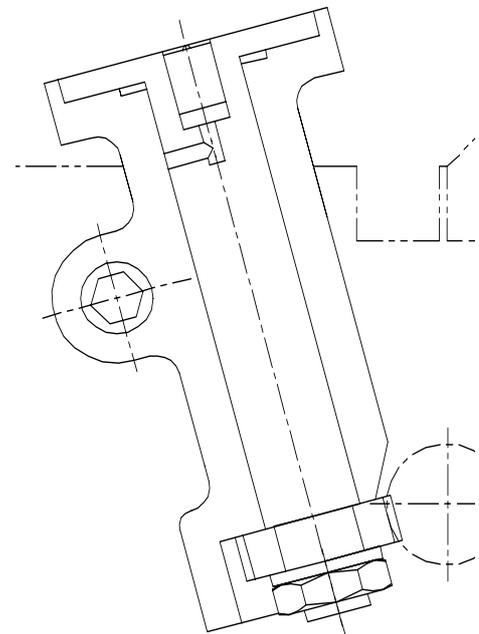
For minimum wear the thread dial indicator should be disengaged by swing the pinion out of mesh with the leadscrew when not in use.

Imperial threads on Imperial leadscrew machines or Metric threads on Metric leadscrew machine.

For these threads it is recommended that the thread dial indicator be used this allows the half nut of leadscrew to be engaged at the end of each thread cutting

pass, provided that they are re-engaged in accordance with the indicator table mounted on the left hand side of the apron.

| INDICATOR TABLE  |       |       |       |       |       |
|------------------|-------|-------|-------|-------|-------|
| T.P.I            | SCALE | T.P.I | SCALE | T.P.I | SCALE |
| 4                | 1-4   | 13    | 1     | 44    | 1-4   |
| 4 $\frac{1}{2}$  | 1     | 14    | 1.3   | 46    | 1.3   |
| 4                |       | 16    | 1-8   | 48    | 1-8   |
| 5                | 1     | 18    | 1.3   | 52    | 1-4   |
| 5 $\frac{1}{2}$  | 1     | 19    | 1     | 56    | 1-8   |
| 5                | 1.3   | 20    | 1-4   | 64    | 1-8   |
| 6 $\frac{1}{2}$  | 1     | 22    | 1.3   | 72    | 1-8   |
| 7                | 1     | 23    | 1     | 76    | 1-4   |
| 8                | 1-8   | 24    | 1-8   | 80    | 1-8   |
| 9                | 1     | 26    | 1.3   | 88    | 1-8   |
| 9 $\frac{1}{2}$  | 1     | 28    | 1-4   | 92    | 1-8   |
| 10               | 1.3   | 32    | 1.3   | 96    | 1-8   |
| 11               | 1     | 36    | 1-4   | 104   | 1-8   |
| 11 $\frac{1}{2}$ | 1     | 38    | 1.3   | 112   | 1-8   |
| 12               | 1-4   | 40    | 1-8   |       |       |



pass, provided that they are

## Operation Manual

### (1) Imperial leadscrew machines (Imperial threads only)

The table shows:

T.P.I: threads per inch to be cut.

Scale: the dial numbers at which the half nut of leadscrew may be engaged.

### (2) Metric leadscrew machines (Metric thread only)

The table shows:

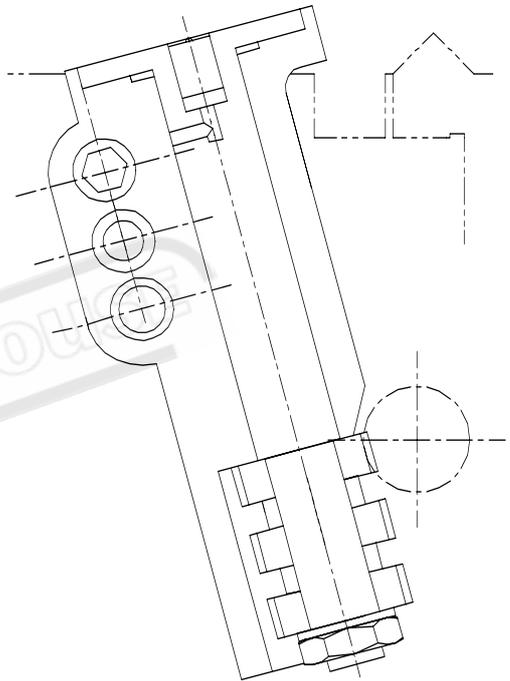
IN column 1: millimeter pitches to be cut.

28T, 30T, 32T: The number of teeth in “pitch-off gear” arranged to mesh with the leadscrew (this being selected from the stack, stored on the bottom of the dial spindle)

Dial graduation:

The dial numbers at which the half nut may be engaged under No. of teeth of pick-off gear.

| mm   | INDICATOR TABLE: METRIC<br>DIAL GRADUATION |              |          |
|------|--|--------------|----------|
|      | 28T  | 30T          | 32T      |
| 0.40 |  | 1,3,5,7,9,11 |          |
| 0.45 |  | 17           |          |
| 0.50 |  | 1,3,5,7,9,11 |          |
| 0.60 |  | 1,3,5,7,9,11 |          |
| 0.70 | 1,4,7,10                                   |              |          |
| 0.75 |  | 1,3,5,7,9,11 |          |
| 1.00 |  | 1,3,5,7,9,11 |          |
| 1.25 |  | 1,3,5,7,9,11 |          |
| 1.50 |  | 1,3,5,7,9,11 |          |
| 1.75 | 1,4,7,10                                   |              |          |
| 2.00 |  |              | 1,4,7,10 |
| 2.25 |  | 1            |          |
| 2.50 |  | 1,3,5,7,9,11 |          |
| 2.80 | 1,7  |              |          |
| 3.00 |  | 1,3,5,7,9,11 |          |
| 3.50 | 1,4,7,10                                   |              |          |
| 4.00 |  |              | 1,4,7,10 |
| 4.50 |  | 17           |          |
| 5.00 |  | 1,3,5,7,9,11 |          |
| 5.60 | 1  |              |          |
| 6.00 |  |              | 1,4,7,10 |
| 7.00 | 1,4,7,10                                   |              |          |

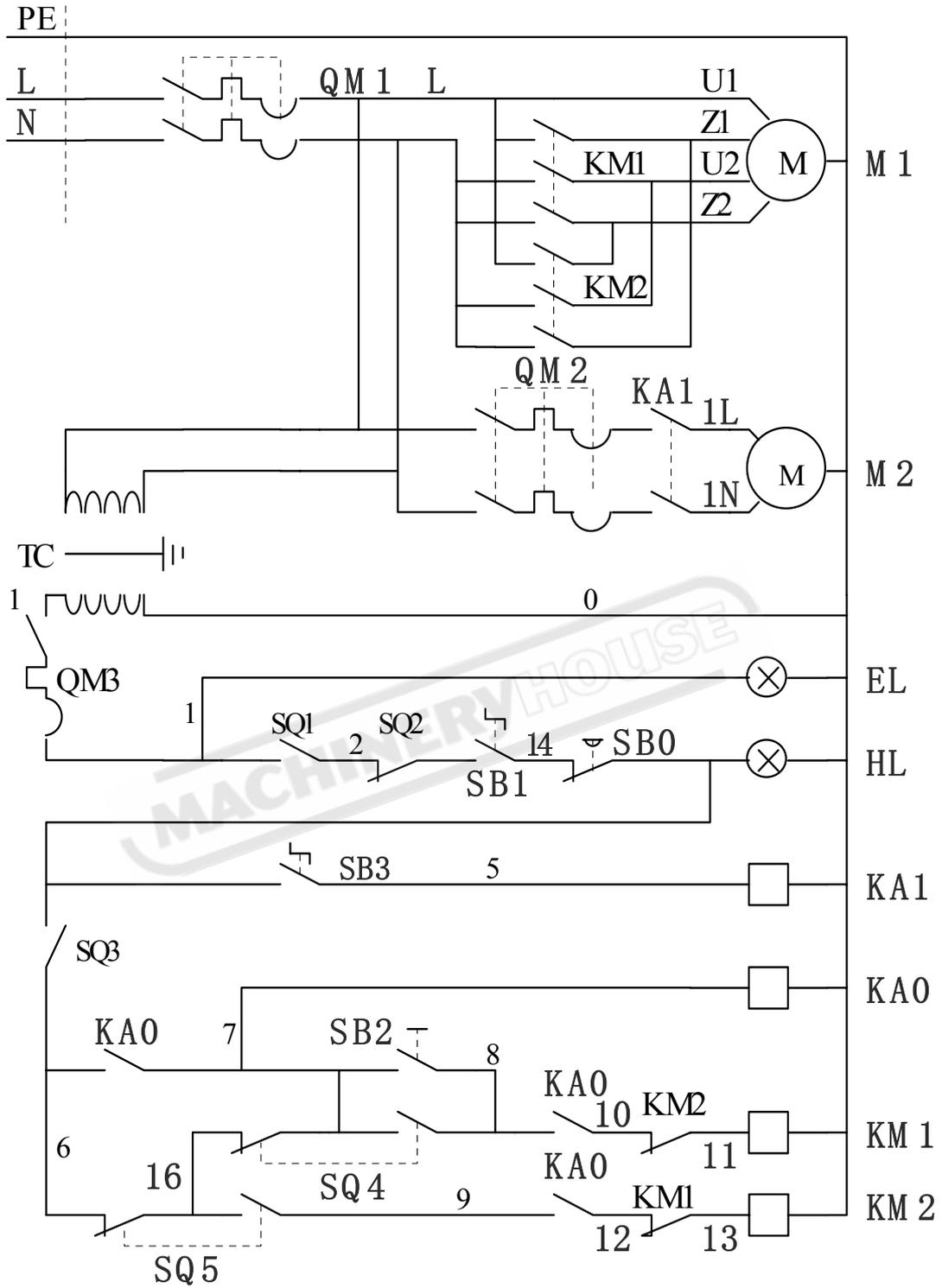


### (3) Imperial threads on Metric leadscrew machines or Metric threads on Imperial lead screw machines

For these threads the half nut is kept engaged throughout the cutting of any one thread. This involves reversing the whole drive by means of the spindle control lever (19) at each end of the thread cutting pass whilst at the same time relieving or increasing the cut as required. (Threads ‘A’ may also be by this method)



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Wiring Diagram for 1 Phases

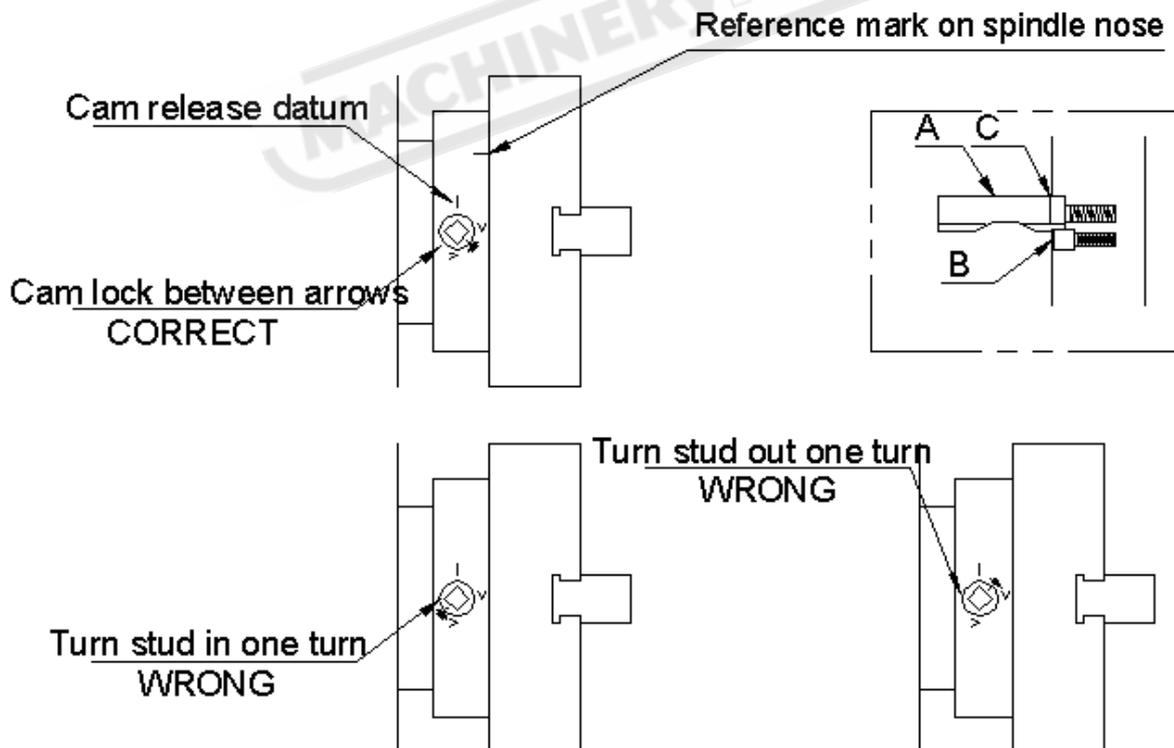
## 9. Chucks and Chuck Mounting

When fitting chucks or faceplates, first ensure that spindle and chuck tapers are scrupulously clean and that all cams lock in the correct positions, see Fig1. It may be necessary when mounting a new chuck to re-set the cam lock studs (A). To do this, remove the cap-head locking screws (B) and set each stud so that the scribed ring (C) is flush with the rear face of the chuck-with the slot lining up with the locking screw hole.

Now mount the chuck or faceplate on the spindle nose and tighten the six cams in turn. When fully tightened, the cam lock line on each cam should be between the two V marks on the spindle nose.

If any of the cams do not tighten fully within these limit marks, remove the chuck or faceplate and re-adjust the stud as indicated in the illustration. Fit and tighten the locking screw (B) at each stud before remounting the chuck for work. A reference mark should be made on each correctly fitted chuck or faceplate to coincide with the reference mark scribed in the spindle nose.

This will assist subsequent remounting. Do Not Interchange Chucks or faceplates between lathes without checking for correct cam locking.



## 10. Maintenances and Servicing

### 10.1. Lathe alignment

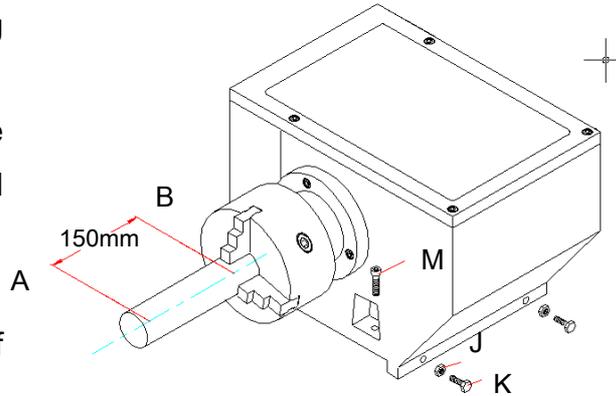
When the lathe is installed and ready for use, it is recommended to check the machine alignment before commencing work.

Alignment and leveling should be checked regularly to insure continued accuracy.

Adopt this procedure as follow:

Take a steel bar with a diameter of appr.50mm and a length of appr.200mm.

Span it in the chuck without using the center. Then cut off a chip over a length of 150mm and measure the difference in A and B.

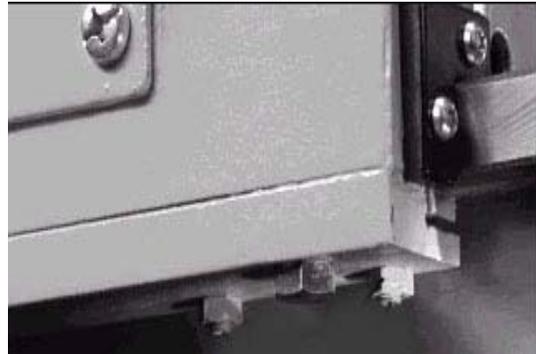


In order to correct a possible difference, loosen the screw (M) clamping the headstock on the bed and nut (J). Adjust the headstock with setscrew (K). Repeat the above procedure until all measuring is correct, Then clamping the nut (J),The lathe will be cutting correctly.

### 10.2. Saddle strip

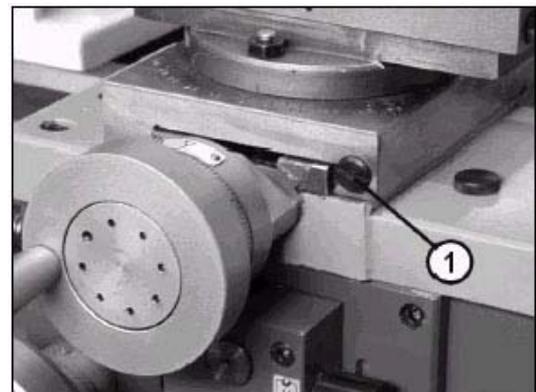
Wear on the rear saddle gig strip may be accommodated by adjustment of the socket head set screws.

The procedure for adjustment is to first take off the rear splash guard (when fitted), release the hexagon nuts and turn the socket head set screws slightly in clockwise and then re-clomp the hexagon nuts. Care should be taken to avoid over adjustment, a 45° turn at the socket head set screw approximately 0.125(0.005") take up in the gib.



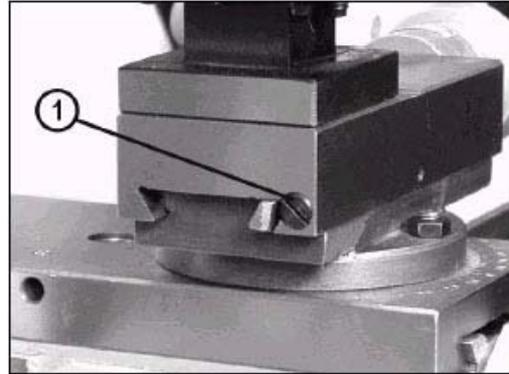
### 10.3. Cross slide

Wear on the taper-gib strip may be adjusted for by clockwise rotation of the slotted head screw on the front face of the cross slide. The procedure is to first slacken the similar screw at the rear then retighten this after adjustment to clamp the gib in its new position.



#### 10.4. Compound rest

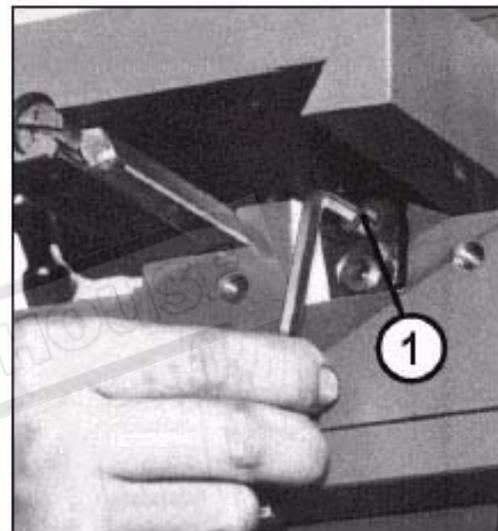
It is the same procedure as cross slide. To take up for wear on the compound rest taper gibe strip can adjust the slotted head screw on the tool post side of the compound rest by clockwise rotation. The procedure is to first slacken the similar screw at the opposite side then re-tighten this after adjustment to clamp the gib in its new position.



#### 10.5. Cross slide nut

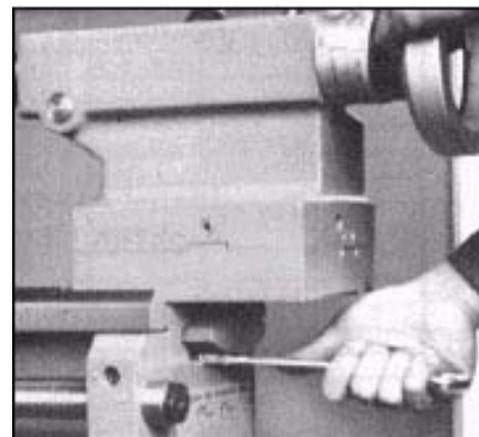
Provision is made for the elimination of backlash in the cross slide nut, the procedure for adjustment being as follows:

Take off the dust plate which is mounted on the rear face of saddle groove, turn the cross traverse handle by clockwise to move the cross feed nut until it reaches the end edge of the feed rod. Turn the socket head cap screw in a clockwise direction as required. Care should be taken to avoid over adjustment; a 45° turn at the socket head cap screw represents approximately 0.125mm (0.005") take up of backlash.

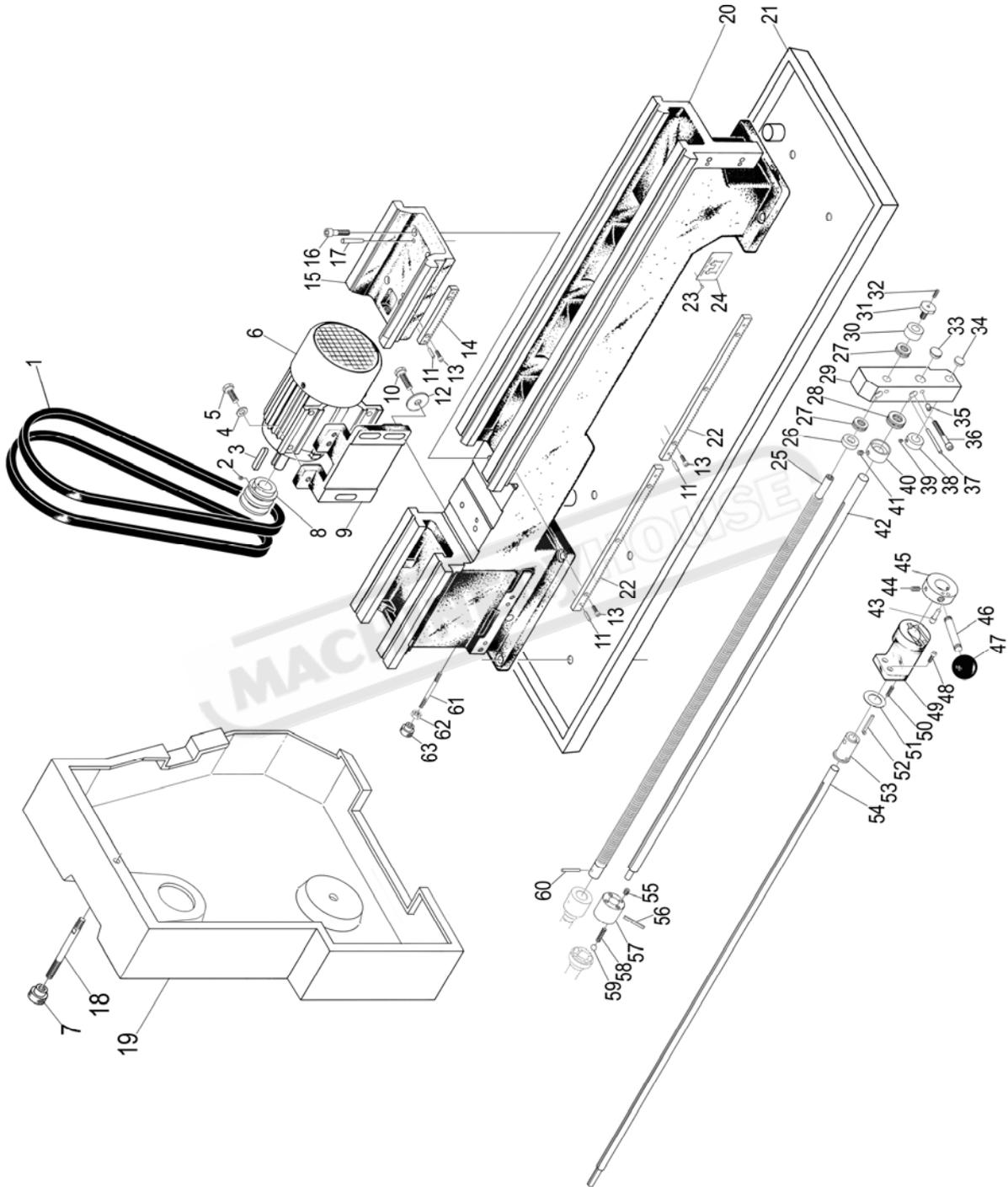


#### 10.6. Tail stock bed clamp

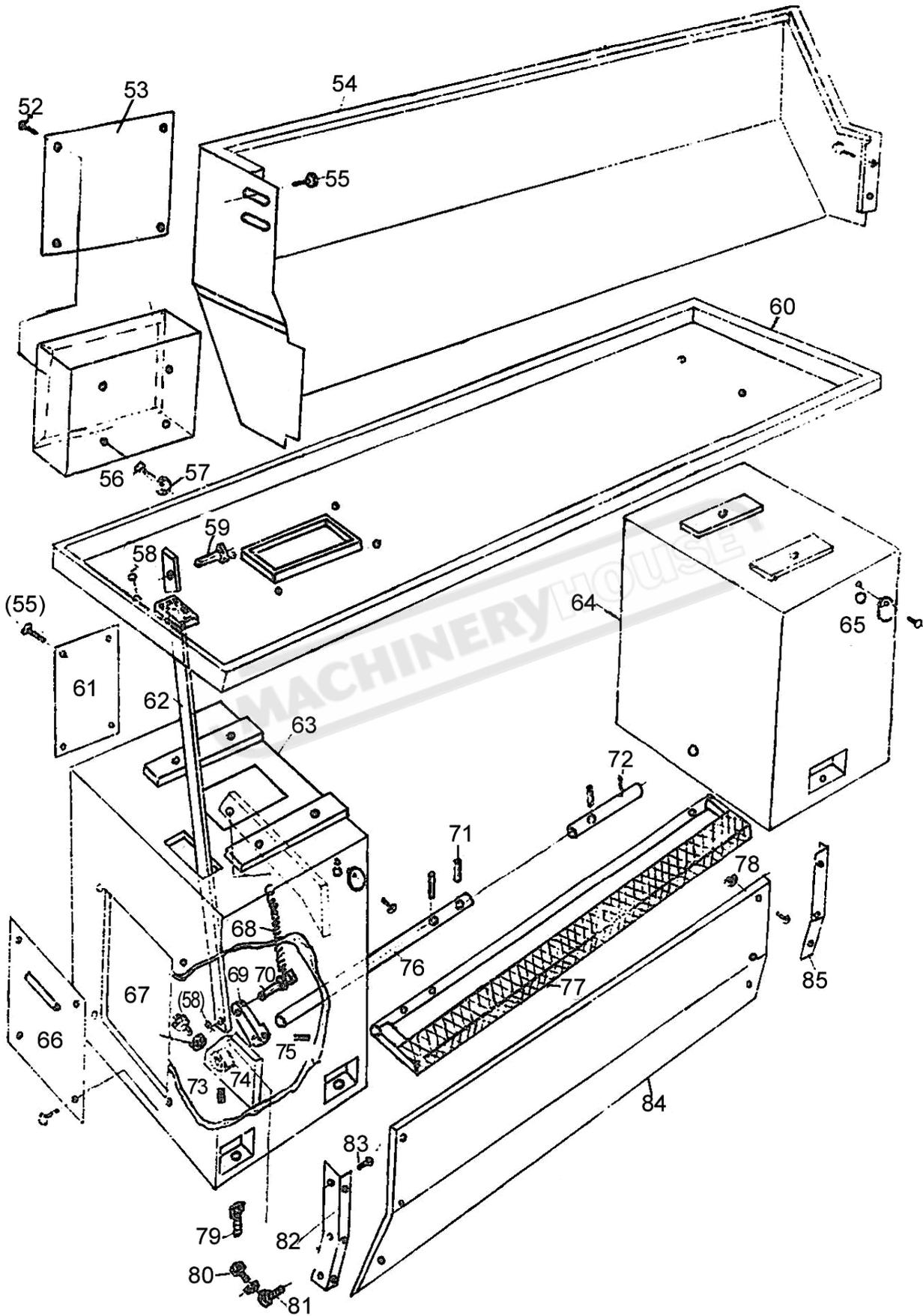
The angular lock position of the bed clamp lever is adjusted by means of the self-locking hexagon headed bolt located on the underside of the tailstock and between the bed ways.



# 11.Bed Assembly (1/2)



### 11. Bed Assembly (2/2)



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| No. | Part No.     | Name                  | Specification |
|-----|--------------|-----------------------|---------------|
| 1   | GB1171-74    | Belt                  | A813          |
| 2   | GB77-85      | Screw                 | M6×12         |
| 3   | GB1096-79    | Key                   |               |
| 4   | GB97.1-86    | Washer                | 8             |
| 5   | GB5783-86    | Bolt                  | M8×25         |
| 6   | 90S-4        | Motor                 |               |
| 7   | 33-6032      | Clamping Knob         |               |
| 8   | 32-01107     | Pulley                |               |
| 9   | 32-01103a    | Bracket               |               |
| 10  | GB5783-86    | Bolt                  | M10×30        |
| 11  | GB117-86     | Pin                   | 6×26          |
| 12  | 32-01222     | Washer                |               |
| 13  | Gb70-85      | Screw                 | M6×25         |
| 14  | 32-01203     | Rack                  |               |
| 15  | 32-01102     | Bridge                |               |
| 16  | GB70-85      | Screw                 | M10×40        |
| 17  | GB881-86     | Taper Pin             | 8×60          |
| 18  | 33-6030      | Position Stud         |               |
| 19  | 32C-04513b   | Cover (32A)           |               |
| 19  | 36C-04513b   | Cover (36A)           |               |
| 20  | 32C-01101-1  | Lathe Bed (1000)      |               |
| 20  | 32C-01101-2  | Lathe Bed (750)       |               |
| 21  | 33-6032      | Clamping Knob         |               |
| 22  | 32-01204-1   | Rack (1000)           |               |
| 22  | 32-01204-2   | Rack (750)            |               |
| 23  | GB6170-86    | Nut                   | M10           |
| 24  | 33-6031      | Position Stud         |               |
| 25  | 33-6036B     | Lead screw (1000)     |               |
| 25  | 32C-6036B-2  | Lead screw (750)      |               |
| 26  | 33-6037      | Sleeve                |               |
| 27  | GB301-85     | Bearing               | 8102          |
| 28  | GB301-85     | Bell Steel            | 8104          |
| 29  | 33-6035      | Bracket               |               |
| 30  | 33-6038      | Bearing Cover         |               |
| 31  | 33-6039      | Lock Screw            |               |
| 32  | GB78-85      | Socket Head Set Screw | M6×20         |
| 33  | 32-01503     | Plug                  |               |
| 34  | 32-01504     | Plug                  |               |
| 35  | GB1155-79    | Ball Cap              | 6             |
| 36  | GB70-85      | Socket Head Cap Screw | M8×60         |
| 37  | GB117-86     | Taper Pin             | 5×60          |
| 38  | 33-6053      | Sleeve                |               |
| 39  | GB77-85      | Socket Head Set Screw | M6×8          |
| 40  | CL6132-01-16 | Bearing Cover         |               |
| 41  | GB77-85      | Socket Head Set Screw | M8×10         |

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| No. | Part No.     | Name                  | Specification |
|-----|--------------|-----------------------|---------------|
| 42  | 33-6040B     | Feed Rod (1000)       |               |
| 42  | 32C-6040B-2  | Feed Rod (750)        |               |
| 43  | 33-6049      | Position Setting Pin  |               |
| 44  | GB79-85      | Socket Head Set Screw | 8×16          |
| 45  | 33-6048      | Gated Block           |               |
| 46  | 33-6050      | Spindle Control Lever |               |
| 47  | GB4141.11-84 | Spherical Knob        |               |
| 48  | GB70-85      | Socket Head Cap Screw | M6×16         |
| 49  | 33-6045      | Bracket               |               |
| 50  | GB2089-80    | Compression Spring    | 1×6×20        |
| 51  | 33-6047      | Thrust Piece          |               |
| 52  | GB818-85     | Screw                 | M5×6          |
| 53  | 32-12206a    | Cover                 |               |
| 54  | 32-01224-1   | Splash Guard (1000)   |               |
| 54  | 32-01224-2   | Splash Guard (750)    |               |
| 55  | GB823-85     | Screw                 | M6×10         |
| 56  | GB818-85     | Screw                 | M6×20         |
| 57  | GB97.1-86    | Washer                | 6             |
| 58  | GB91-86      | Pin                   | 2×12          |
| 59  | 32-11212     | Pin                   |               |
| 60  | 32C-01240-1  | Oil Plate (1000)      |               |
| 60  | 32C-01240-2  | Oil Plate (750)       |               |
| 61  | 32-01230     | Rear Connecting Plate |               |
| 62  | 32-11208     | Brake Pull Rod (32A)  |               |
| 62  | 36-11208     | Brake Pull Rod (36A)  |               |
| 63  | 32-01229     | Left Mounting Feet    |               |
| 64  | 32-01228     | Right Mounting Feet   |               |
| 65  | 32-01234     | Round Cover           |               |
| 66  | 32-01231     | Cover Plate           |               |
| 67  | 32-11213     | Cap-Shape Screw       |               |
| 68  | 32-11204     | Draw Spring           |               |
| 69  | 32-11206     | Pedal Arm             |               |
| 70  | 32-11205     | Pin                   |               |
| 71  | GB879-86     | Pin                   | 3×25          |
| 72  | 32-11201     | Shaft                 |               |
| 73  | GB78-86      | Screw                 | M8×6          |
| 74  | 32-11209     | Nut                   |               |
| 75  | GB879-86     | Pin                   | 5×40          |
| 76  | 32-11203     | Pedal Shaft           |               |
| 77  | 32-11202-1   | Brake (1000)          |               |
| 77  | 32-11202-2   | Brake (750)           |               |
| 78  | GB823-86     | Screw                 | M6×10         |
| 79  | GB5781-86    | Screw                 | M12×50        |
| 80  | GB823-86     | Screw                 | M6×10         |

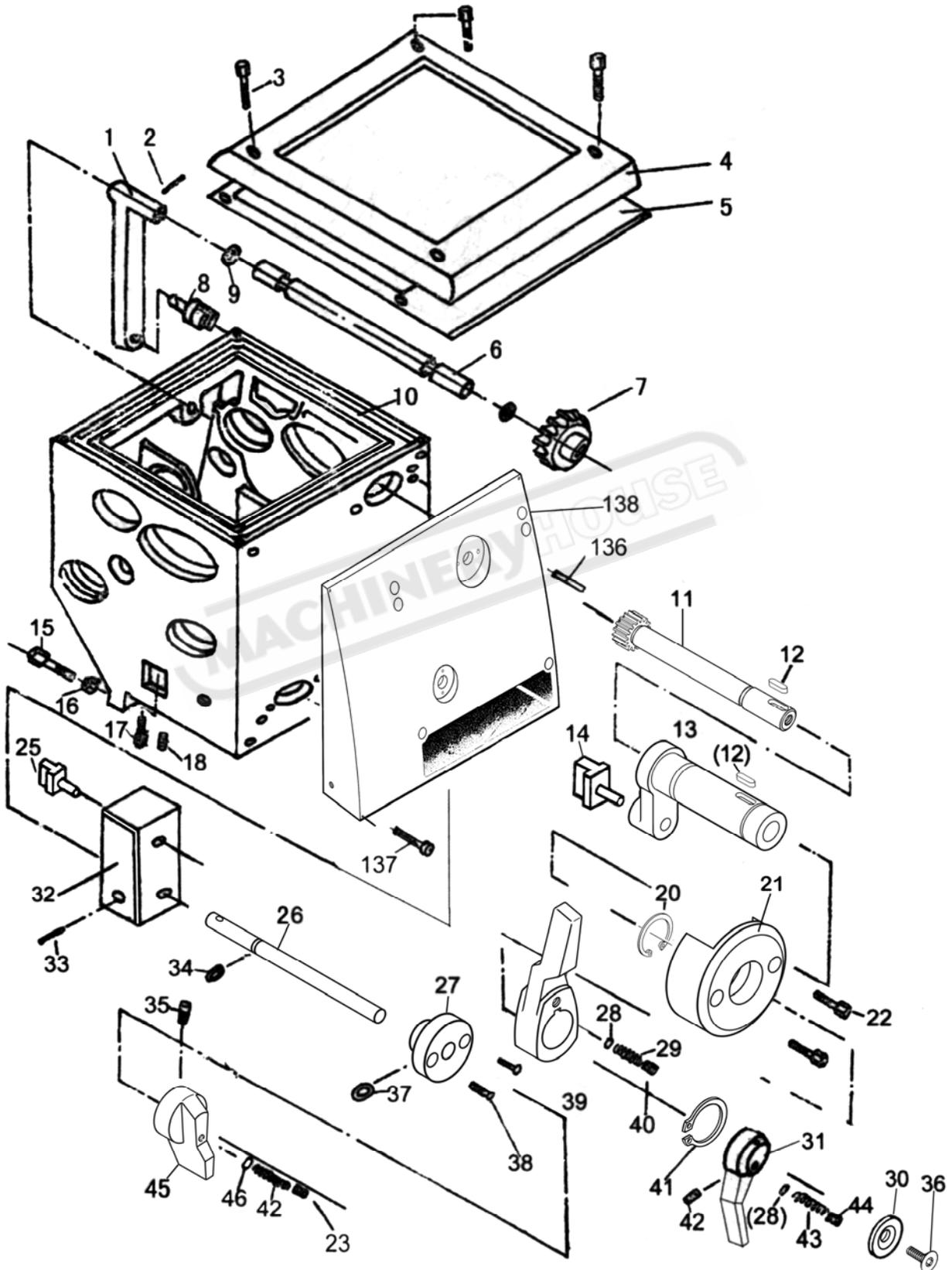
*Operation Manual*

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| No. | Part No.     | Name               | Specification |
|-----|--------------|--------------------|---------------|
| 81  | 32-01232     | Screw              |               |
| 82  | 32-01245     | Left Plate         |               |
| 83  | GB823-86     | Screw              | M6×10         |
| 84  | 32-01247-1   | Front Plate (1000) |               |
| 84  | 32-01247-2   | Front Plate (750)  |               |
| 85  | 32-01246     | Right Plate        |               |
| 86  | 32-01213     | Key                |               |
| 87  | 32-01201     | Sleeve             |               |
| 88  | 33-6043B     | Started Rod (1000) |               |
| 88  | 32C-6043B-2  | Started Rod (750)  |               |
| 89  | GB77-85      | Screw              | M8×10         |
| 90  | GB879-86     | Pin                | 5×40          |
| 91  | 33-2017a     | Sleeve             |               |
| 92  | CL6132-01-38 | Spring             |               |
| 93  | GB308-84     | Steel Ball         | 6             |
| 94  | 6220-2085    | Shear pin          |               |

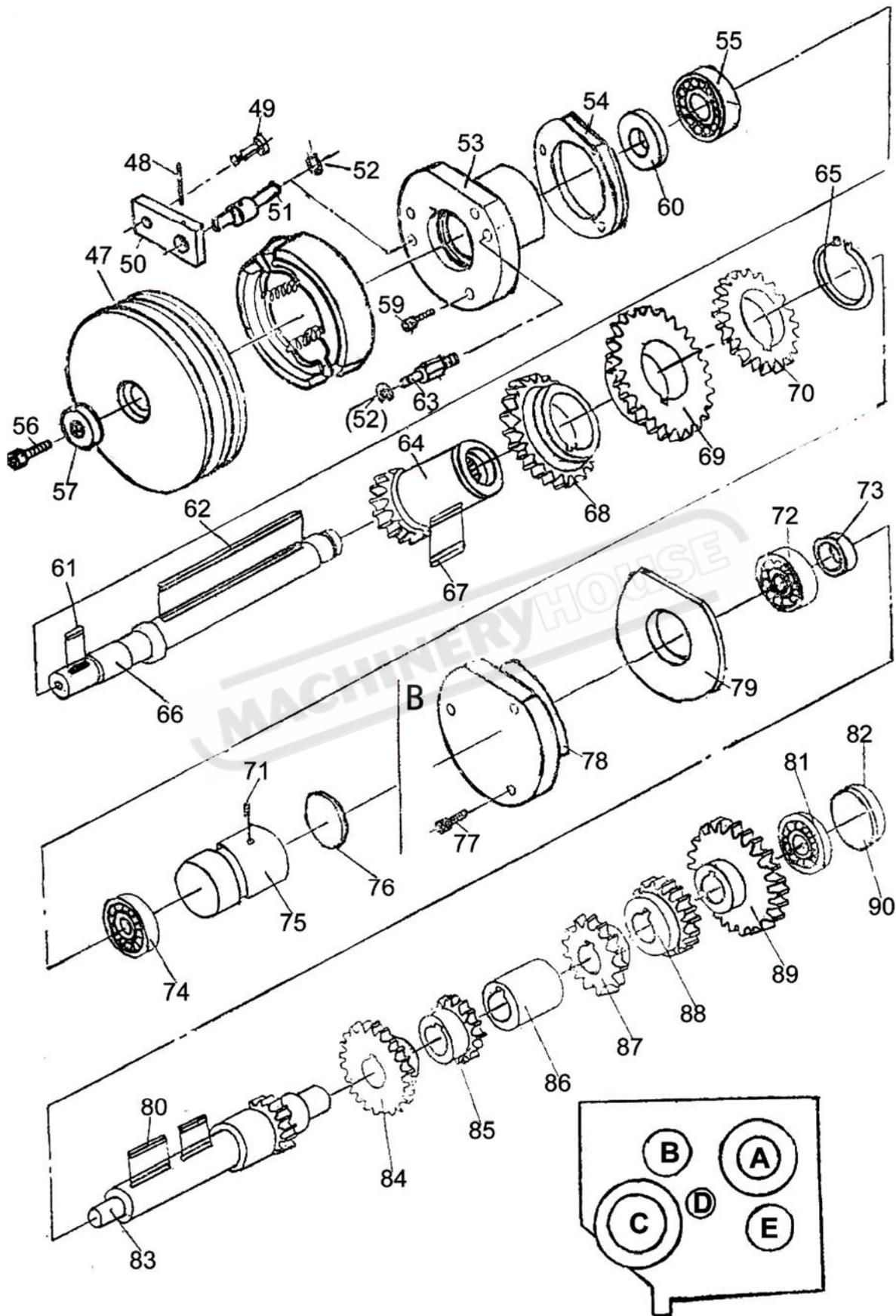
MACHINERYHOUSE

### 12.Headstock Assembly (1/3)

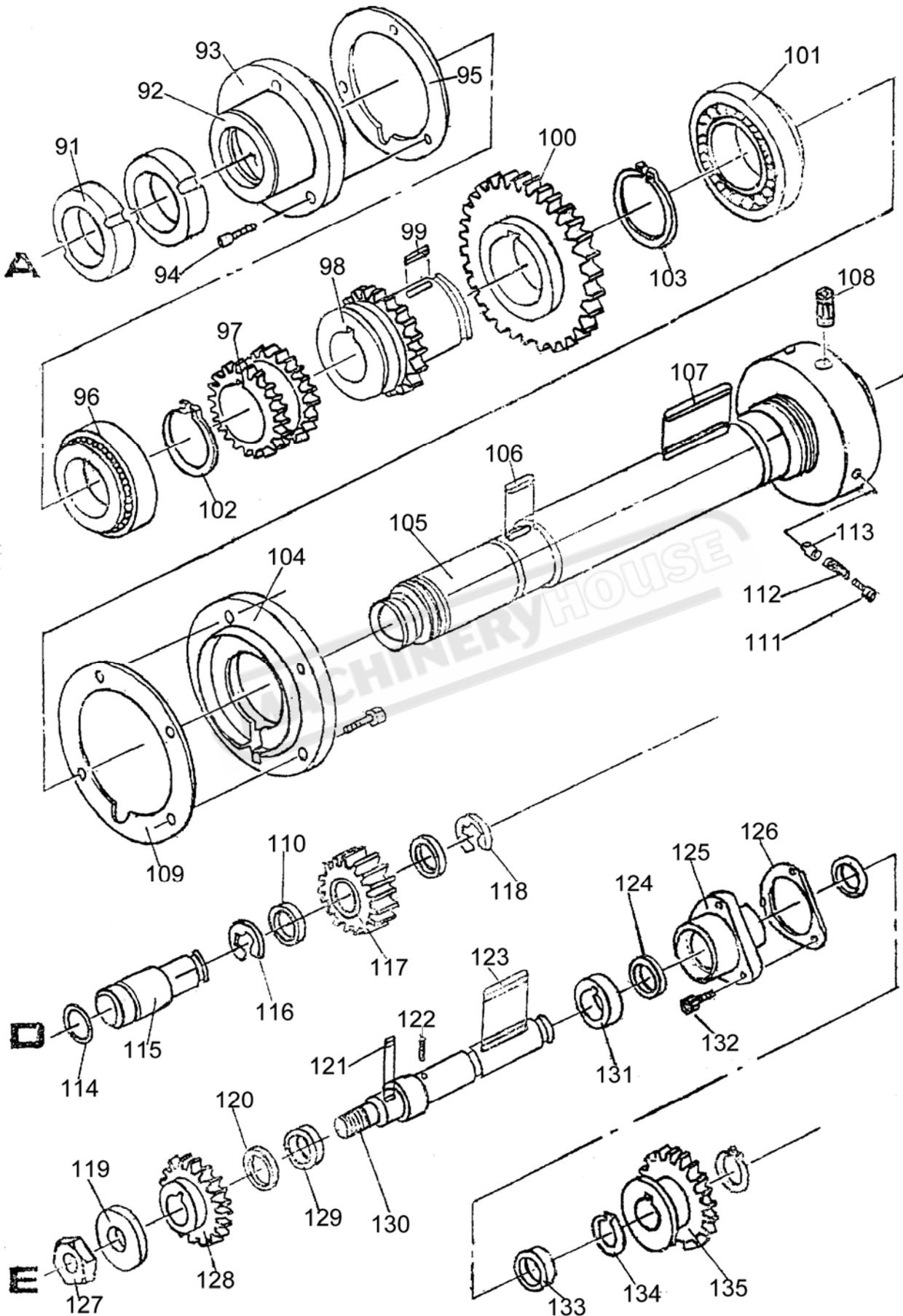


Operation Manual

### 12.Headstock Assembly (2/3)



### 12.Headstock Assembly (3/3)



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| No. | Part No.       | Name                        | Specification |
|-----|----------------|-----------------------------|---------------|
| 1   | 32C-04109      | Shift Lever                 |               |
| 2   | GB879-86       | Pin                         | 5×32          |
| 3   | GB70-85        | Screw                       | M6×18         |
| 4   | 32C-04112b     | Casting Cover               |               |
| 5   | 32C-04506      | Gasket                      |               |
| 6   | 32-04232       | Shaft                       |               |
| 7   | 32-04234       | Gear                        |               |
| 8   | 32-04233       | Shift Lever                 |               |
| 9   | GB1235-76      | O-Ring                      | 14×2.4        |
| 10  | 32C-04107      | Main Casting (32A)          |               |
| 10  | 36C-04107      | Main Casting (36A)          |               |
| 11  | 32C-04254b     | Gear Shaft (32A)            |               |
| 11  | 36C-04254b     | Gear Shaft (36A)            |               |
| 12  | GB1096-79      | Key                         | 5×14          |
| 13  | 32C/36C-04216b | Thrift Collar ( 32A / 36A ) |               |
| 14  | 32-04403       | Shift Fork                  |               |
| 15  | GB5783-86      | Screw                       | M8×45         |
| 16  | GB6172-86      | Nut                         | M8            |
| 17  | GB70-85        | Screw                       | M10×35        |
| 18  | GB78-85        | Screw                       | M8×12         |
| 19  | 32-04240       | Washer                      |               |
| 20  | GB1235-76      | O-Ring                      | 30×3.1        |
| 21  | 32C-04115b     | Cover                       |               |
| 22  | GB70-85        | Screw                       | M6×30         |
| 23  | GB78-85        | Screw                       | M6×16         |
| 25  | 32-04402       | Shift Fork                  |               |
| 26  | 32C-04255b     | Shaft                       |               |
| 27  | 32C-04235b     | Collar                      |               |
| 28  | GB308-84       | Bell Steel                  | 6             |
| 29  | GB2089-80      | Spring                      | 1×6×7         |
| 30  | 32C-04242      | Washer                      |               |
| 31  | 32C-04114      | Handle                      |               |
| 32  | 32-04111       | Shift Shaft                 |               |
| 33  | GB879-86       | Pin                         | 4×18          |
| 34  | GB1235-76      | O-Ring                      | 10×1.9        |
| 35  | GB78-85        | Screw                       | M6×16         |
| 36  | 32C-04243      | Screw                       |               |
| 37  | GB1235-76      | O-Ring                      | 20×2.4        |
| 38  | GB70-85        | Screw                       | M4×12         |
| 39  | 32C-04116b     | Handle                      |               |

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| No. | Part No.   | Name         | Specification |
|-----|------------|--------------|---------------|
| 40  | GB78-85    | Screw        | M8×8          |
| 41  | GB894.1-86 | Circlip      | 30            |
| 42  | GB2089-80  | Spring       | 0.6×4.4×16    |
| 43  | GB2089-80  | Spring       | 1×6×20        |
| 44  | GB78-85    | Screw        | M8×10         |
| 45  | 32C-04110b | Handle       |               |
| 46  | GB308-84   | Bell Steel   | 5             |
| 47  | 32-04122   | Pulley       |               |
| 48  | GB879-86   | Pin          | 5×25          |
| 49  | 32-11212   | Pin          |               |
| 50  | 32-11210   | Rocker       |               |
| 51  | 32-11209   | Rocker Shaft |               |
| 52  | GB894.1-86 | Circlip      | 8             |
| 53  | 32-04124   | Cover        |               |
| 54  | 32-04501-1 | Gasket       |               |
| 55  | GB276-98   | Thrust       | 105E          |
| 56  | GB70-85    | Screw        | M8×15         |
| 57  | 32-04253   | Washer       |               |
| 59  | GB70-85    | Screw        | M6×16         |
| 60  | HG4-692-67 | Oil Seal     | SD25×40×10    |
| 61  | GB1096-79  | Key          | 8×20          |
| 62  | GB1096-79  | Key          | 6×120         |
| 63  | 32-11211   | Shaft        |               |
| 65  | GB894.1-86 | Circlip      | 35            |
| 66  | 32-04252   | Shaft        |               |
| 64  | 32-04217   | Collar       | 2×2           |
| 67  | GB1096-79  | Key          | 5×50          |
| 68  | 32-04218   | Gear         | 2×29          |
| 69  | 32-04219   | Gear         | 2×46          |
| 70  | 32-04220   | Gear         | 2×38          |
| 71  | GB78-85    | Screw        | M8×16         |
| 72  | GB276-88   | Thrust       | 204E          |
| 73  | 32-04211   | Washer       |               |
| 74  | GB276-88   | Thrust       | 203           |
| 75  | 32-04106   | Front Plug   |               |
| 76  | GB1235-76  | O-Ring       | 40×3.1        |
| 77  | GB70-85    | Screw        | M4×12         |
| 78  | 32-04123   | Behind Cover |               |
| 79  | 32-04502-1 | Gasket       |               |
| 80  | GB1096-79  | Key          | 6×55          |

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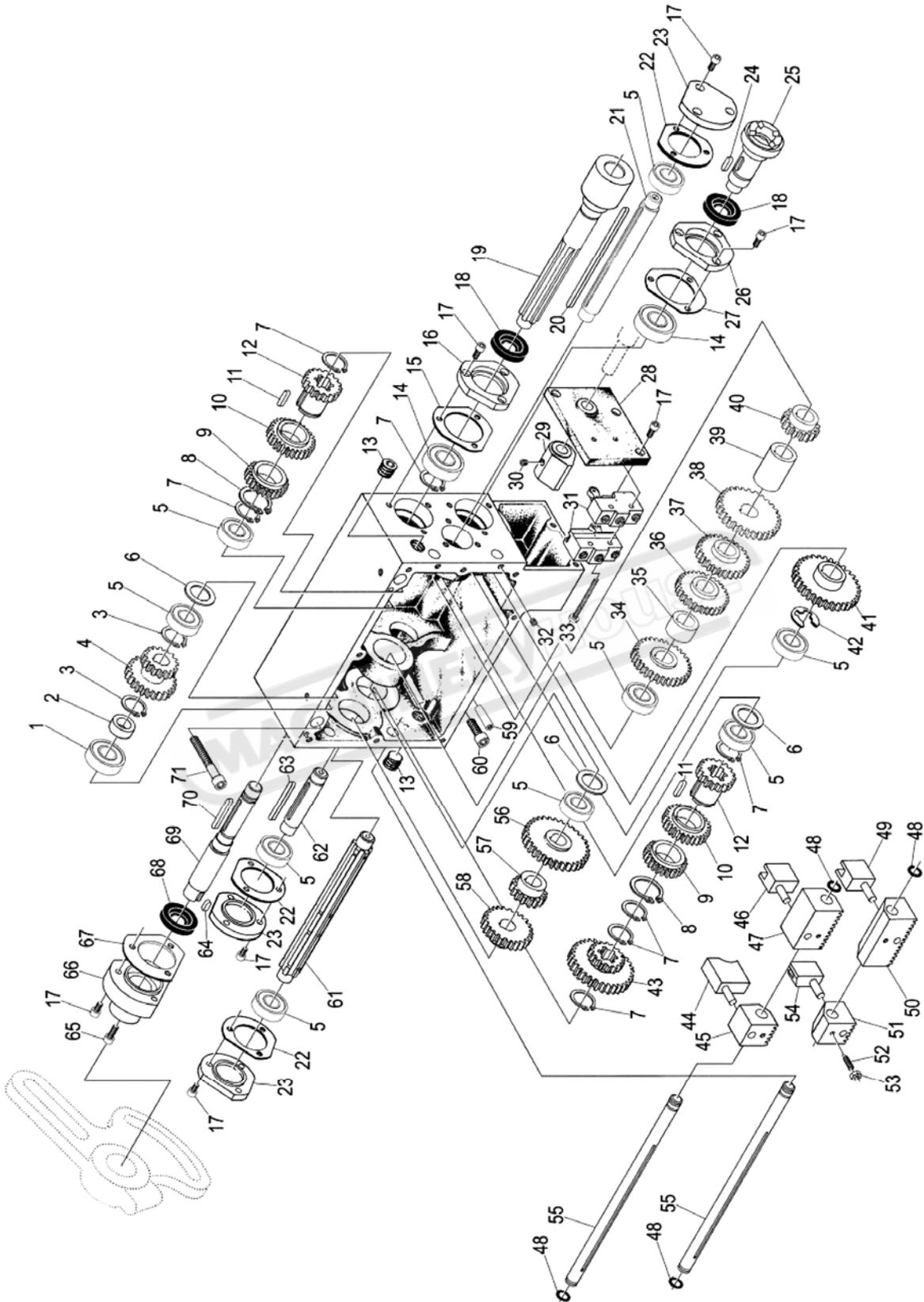
| No. | Part No.   | Name         | Specification |
|-----|------------|--------------|---------------|
| 81  | GB276-88   | Thrust       | 204D          |
| 82  | GB1235-76  | O-Ring       | 47×3.1        |
| 83  | 32-04212   | Shaft        | 2.25×16       |
| 84  | 32-04210   | Gear         | 2×51          |
| 85  | 32-04209   | Gear         | 2×43          |
| 86  | 32-04221   | Washer       |               |
| 87  | 32-04222   | Gear         | 2×26          |
| 88  | 32-04223   | Gear         | 2×34          |
| 89  | 32-04224   | Gear         | 2.25×53       |
| 90  | 32-04225   | Front Plug   |               |
| 91  | 32-04208   | Nut          |               |
| 92  | 32-04102   | Collar       |               |
| 93  | 32-04103   | Behind Cover |               |
| 94  | GB78-85    | Screw        | M6×25         |
| 95  | 32-04503   | Gasket       |               |
| 96  | GB297-89   | Thrust       | 7210E         |
| 97  | 32-04207   | Gear         | 2×37          |
| 98  | 32-04227   | Gear         | 2.25×37       |
| 99  | GB1096-79  | Key          | 8× 18         |
| 100 | 32-04226   | Gear         | 2.25×74       |
| 101 | GB297-89   | Thrust       | 7212D         |
| 102 | GB894.1-86 | Circlip      | 50            |
| 103 | GB894.1-86 | Circlip      | 72            |
| 104 | 32-04108   | Front Cover  |               |
| 105 | 32-04228   | Spindle      |               |
| 106 | GB1096-79  | Key          | 6×40          |
| 107 | GB1096-79  | Key          | 8×85          |
| 108 | 32-04231   | Cam          |               |
| 109 | 32-04505   | Gasket       |               |
| 110 | GB276-88   | Thrust       | 7000104E      |
| 111 | GB70-86    | Screw        | M8×18         |
| 112 | 32-04229   | Spindle      |               |
| 113 | 32-04230   | Pin          |               |
| 114 | GB1235-76  | O-Ring       | 25×2.4        |
| 115 | 32-04238   | Shaft        |               |
| 116 | GB893.1-86 | Circlip      | 42            |
| 117 | 32-04237   | Gear         |               |
| 118 | GB893.1-86 | Circlip      | 42            |
| 119 | 32-04206   | Washer       |               |
| 120 | 32-04204   | Washer       |               |

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| No. | Part No.   | Name        | Specification |
|-----|------------|-------------|---------------|
| 121 | GB1096-79  | Key         | 5×18          |
| 122 | GB879-86   | Pin         | 3×10          |
| 123 | GB1096-79  | Key         | 6×50          |
| 124 | 32-04401   | Collar      |               |
| 125 | 32-04101   | Collar      |               |
| 126 | 32-04504   | Gasket      |               |
| 127 | GB6172-86  | Nut         | M12           |
| 128 | 32-04205   | Gear        |               |
| 129 | 32-04507   | Oil Seal    |               |
| 130 | 32-04239   | Shaft       |               |
| 131 | 32-04203   | Washer      |               |
| 132 | GB70-85    | Screw       | M5×16         |
| 133 | 32-04202   | Washer      |               |
| 134 | GB894.1    | Circlip     | 20            |
| 135 | 32-04201   | Gear        |               |
| 136 | GB117-86   | Taper Pin   | 6×35          |
| 137 | GB70-85    | Screw       | M6×30         |
| 138 | 32C-04125b | Frame (32A) |               |
| 138 | 36C-04125b | Frame (36A) |               |

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### 13. Gearbox Control (1/3)



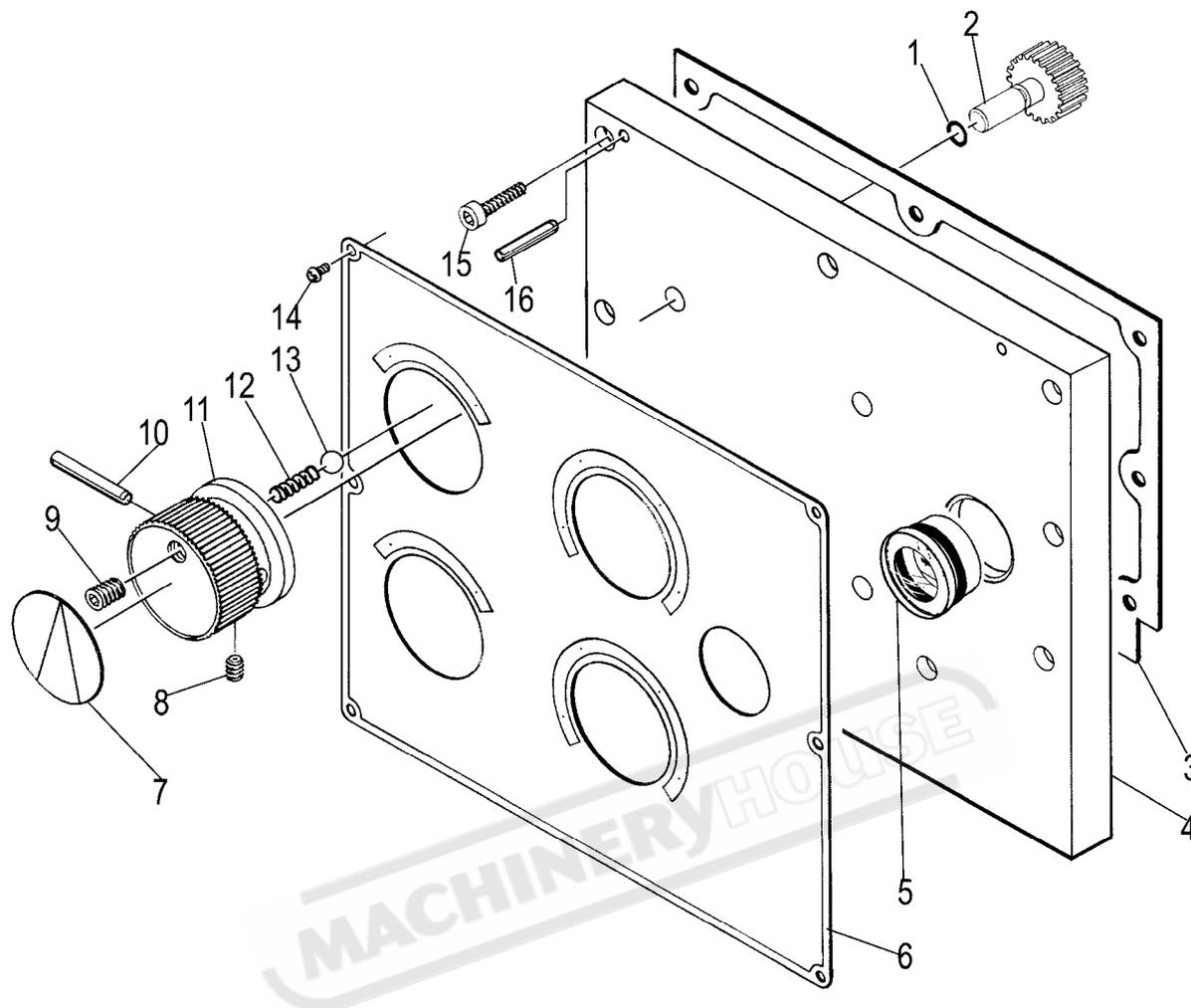
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| No. | Part No.    | Name                     | Specification |
|-----|-------------|--------------------------|---------------|
| 1   | GB/T276-94  | Deep Groove Ball Bearing | 6203-2RS      |
| 2   | 33-2029     | Collar                   |               |
| 3   | GB894.2-86  | Retaining Ring           | 16            |
| 4   | 33-2003     | Gear                     |               |
| 5   | GB894.2-86  | Deep Groove Ball Bearing | 6202-2RS      |
| 6   | 33-2004     | Spacer                   |               |
| 7   | GB894.2-86  | Retaining Ring           | 20            |
| 8   | GB894.2-86  | Retaining Ring           | 28            |
| 9   | 33-2006     | Gear                     |               |
| 10  | 33-2007     | Gear                     |               |
| 11  | GB1096-79   | Double Round Head Key    | C4×22         |
| 12  | 33-2008     | Gear                     |               |
| 13  | Q/ZB285-3   | Oil Plug                 | ZG3/8"        |
| 14  | GB/T276-86  | Deep Groove Ball Bearing | 6004-2RS      |
| 15  | 33-2027-1   | Spacer                   |               |
| 16  | 33-2027     | Bearing Cover            |               |
| 17  | GB70-85     | Socket Head Cap Screw    | M5×12         |
| 18  | HG4-692-67  | Oil Seal                 | 25×40×7       |
| 19  | 6220-2005   | Shaft                    |               |
| 20  | GB1096-79   | Double Round Head Key    | 4×145         |
| 21  | 6220-2013   | Shaft                    |               |
| 22  | 6220-2026-1 | Spacer                   |               |
| 23  | 6220-2026   | Bearing Cover            |               |
| 24  | GB1096-79   | Double Round Head Key    | 5×18          |
| 25  | 6220-2023   | Shaft                    |               |
| 26  | 6220-2025   | Bearing Cover            |               |
| 27  | 6220-2025-1 | Spacer                   |               |
| 28  | 6220-2048   | Switch Cover             |               |
| 29  | 6233-2055   | Engaging Arm             |               |
| 30  | GB80-85     | Socket Head Set Screw    | M6×8          |
| 31  | LXW5-11G2   | Limit Main Switch        |               |
| 32  | GB79-85     | Counter Sunk Flat Screw  | M5×6          |
| 33  | GB67-85     | Button Head Screw        | M4×45         |
| 34  | 6220-2014   | Gear                     |               |
| 35  | 6220-2015   | Spacer                   |               |
| 36  | 6220-2016   | Gear                     |               |
| 37  | 6220-2017   | Gear                     |               |
| 38  | CM6220-2018 | Gear                     |               |

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| No. | Part No.    | Name                    | Specification |
|-----|-------------|-------------------------|---------------|
| 39  | 6220-2019   | Sleeve                  |               |
| 40  | 6220-2020   | Gear                    |               |
| 41  | 6220-2024   | Gear                    |               |
| 42  | GB896-86    | Retaining Ring          | 15            |
| 43  | 6220-2022   | Gear                    |               |
| 44  | 6220-2040B  | Shifting Fork           |               |
| 45  | 6220-2037B  | Rack                    |               |
| 46  | 6220-2039B  | Shifting Fork           |               |
| 47  | 6220-2035B  | Rack                    |               |
| 48  | GB1235-76   | O-Ring                  | 12×1.9        |
| 49  | 6220-2039C  | Shifting Fork           |               |
| 50  | 6220-2036B  | Rack                    |               |
| 51  | 6220-2038B  | Rack                    |               |
| 52  | GB79-85     | Counter Sunk Flat Screw | M4×16         |
| 53  | GB6170-86   | Hexagon Nut             | M4            |
| 54  | 6220-2040C  | Shifting Fork           |               |
| 55  | 6220-2042   | Shaft                   |               |
| 56  | 6220-2012   | Gear                    |               |
| 57  | 6220-2011   | Gear                    |               |
| 58  | 6220-2010   | Gear                    |               |
| 59  | GB118-86    | Taper Pin With Thread   | 8×26          |
| 60  | GB70-85     | Socket Head Cap Screw   | M8×25         |
| 61  | 6220-2021   | Shaft                   |               |
| 62  | 6220-2009   | Shaft                   |               |
| 63  | GB1096-79   | Double Round Head Key   | 4×55          |
| 64  | GB1096-79   | Single Round Head Key   | 5×18          |
| 65  | GB70-85     | Socket Head Cap Screw   | M6×16         |
| 66  | 6220-2028   | Bracket                 |               |
| 67  | 6220-2028-1 | Spacer                  |               |
| 68  | GB9877.1-88 | Oil Seal                | 22×35×7       |
| 69  | 6220-2002   | Impute Shaft            |               |
| 70  | GB1096-79   | Double Round Head Key   | 5×5×45        |
| 71  | GB70-85     | Socket Head Cap Screw   | M8×65         |

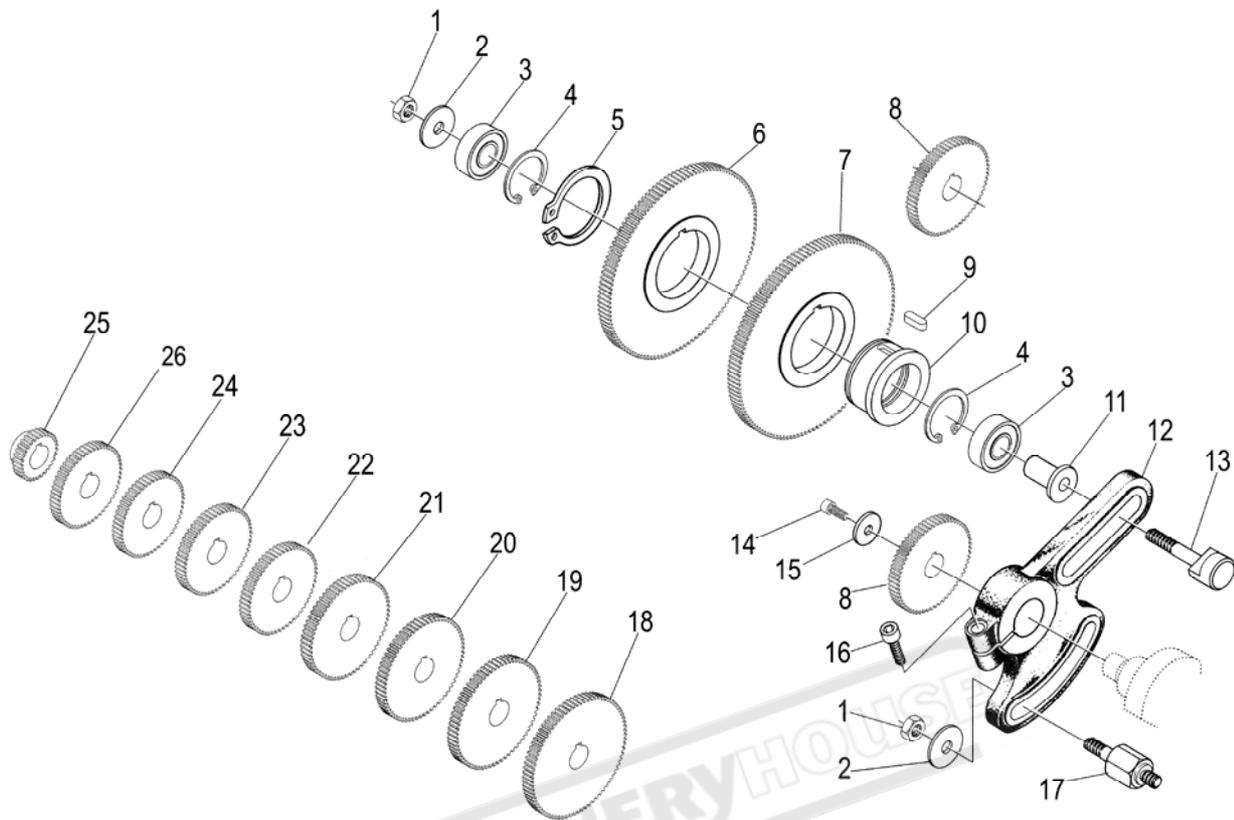
### 13. Gearbox Control (2/3)



| No. | Part No.       | Name                      | Specification |
|-----|----------------|---------------------------|---------------|
| 1   | GB1235-76      | O-Ring                    | 10×1.9        |
| 2   | 6220-2049-01   | Pinion Shaft              |               |
| 3   | 32C-2030-1     | Gasket                    |               |
| 4   | 32C-2030b      | Cover                     |               |
| 5   | GB1160.1-89    | Oil Sight Glass           | A12           |
| 6   | 32C-2030b-2    | Plate                     |               |
| 7   | RUN6246-101099 | Plate                     |               |
| 8   | GB80-85        | Set Screw                 | M6×8          |
| 9   | GB77-85        | Set Screw                 | M8×12         |
| 10  | GB879-86       | Spring Pin                | 5×40          |
| 11  | 6220-2050      | Knob                      |               |
| 12  | GB2089-80      | Spring                    | 1×5×20        |
| 13  | GB308-89       | Steel Ball                | 6             |
| 14  | GB818-85       | Cross Recessed Head Screw | M4×8          |
| 15  | GB70-85        | Screw                     | M5×25         |
| 16  | GB879-86       | Spring Pin                | 4×30          |

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## 13. Gearbox Control (3/3)



| No. | Part No.      | Name                  | Specification |
|-----|---------------|-----------------------|---------------|
| 1   | GB6170-86     | Nut                   | M10           |
| 2   | 32-01222      | Sleeve                |               |
| 3   | GB278-89      | Bearing               | 80203         |
| 4   | GB893.1-87    | Retaining Ring        | 40            |
| 5   | GB894.1-86    | Retaining Ring        | 55            |
| 6   | 32-05230      | Gear                  | M1.25×120T    |
| 7   | 32-05231      | Gear                  | M1.25×127T    |
| 8   | CL6232-05-41  | Gear                  | M1.25×60T     |
| 9   | GB1096-79     | Key                   | 6×18          |
| 10  | 33-6027       | Bearing Housing       |               |
| 11  | 33-6025       | Sleeve                |               |
| 12  | 32C-05112     | Swing Frame           |               |
| 13  | 32-05228      | Setting Bolt          |               |
| 14  | GB70-85       | Socket Hand Cap Screw | M6×15         |
| 15  | CL6132-05-42  | Sleeve                |               |
| 16  | GB70-85       | Screw                 | M8×30         |
| 17  | 33-6029       | Clamping Bolt         |               |
| 18  | CL6132A-15-07 | Change Gear           | M1.25×52T     |
| 19  | CL6132A-15-05 | Change Gear           | M1.25×46T     |

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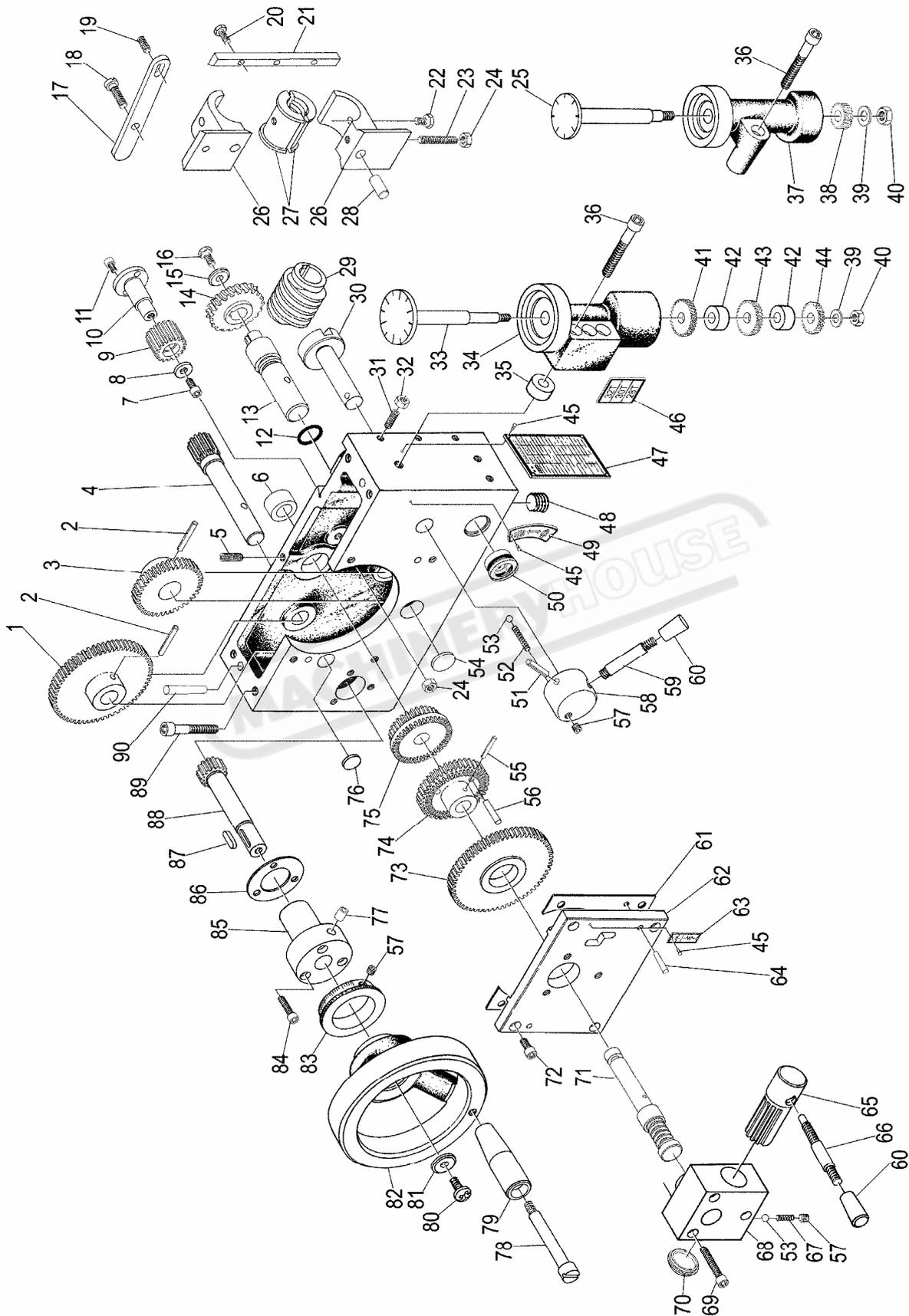
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| No. | Part No.      | Name        | Specification |
|-----|---------------|-------------|---------------|
| 20  | CL6132A-15-04 | Change Gear | M1.25×44T     |
| 21  | 6220-2053     | Change Gear | M1.25×63T     |
| 22  | 6220-2052     | Change Gear | M1.25×57T     |
| 23  | 6220-2051     | Change Gear | M1.25×56T     |
| 24  | 6220-2057     | Change Gear | M1.25×54T     |
| 25  | 32-05242      | Change Gear | M1.25×30T     |
| 26  | CL6232A-15-03 | Change Gear | M1.25×40T     |

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# 14. Apron



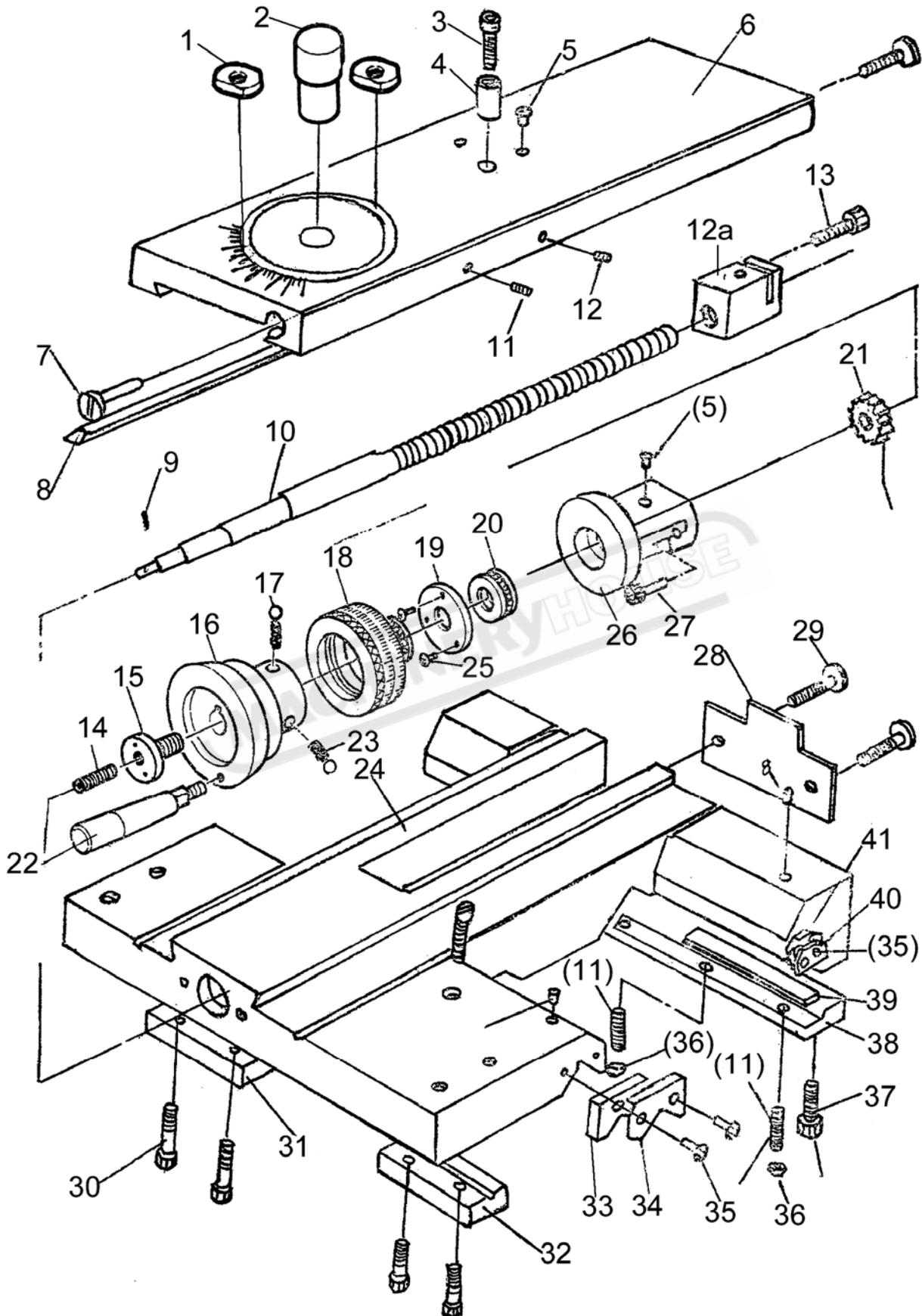
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| No. | Part No.    | Name                                | Specification |
|-----|-------------|-------------------------------------|---------------|
| 1   | 33-4012     | Gear                                | M1.5×60T      |
| 2   | GB879-86    | Spring Pin                          | 5×30          |
| 3   | 33-4030     | Gear                                | M1.5×18T      |
| 4   | 33-4010     | Pinion Shaft                        | M1.5×11T      |
| 5   | GB79-85     | Set Screw                           | M6×16         |
| 6   | 33-4049     | Sleeve                              |               |
| 7   | GB70-85     | Socket Head Cap Screw               | M6×12         |
| 8   | 32-06240    | Washer                              |               |
| 9   | 32-06231    | Gear                                |               |
| 10  | 32-06232    | Idle Shaft                          |               |
| 11  | GB70-85     | Socket Head Cap Screw               | M5×12         |
| 12  | GB1255-76   | O-Ring                              |               |
| 13  | 33-4026     | Shaft                               |               |
| 14  | 32-06429    | Worm Gear                           |               |
| 15  | 33-4028     | Washer                              |               |
| 16  | GB5783-86   | Cap Screw                           | M6×12         |
| 17  | 33-4038     | Interlock Piece                     |               |
| 18  | 33-4051     | Screw                               |               |
| 19  | GB77-85     | Socket Head Set Screw               | M6×12         |
| 20  | GB5783-86   | Hexagon Head Screw                  | M5×20         |
| 21  | 33-4036     | Gib                                 |               |
| 22  | GB5783-86   | Hexagon Head Screw                  | M6×10         |
| 23  | GB77-85     | Socket Head Set Screw               | M6×35         |
| 24  | GB6170-85   | Hexagon Nuts                        | M6            |
| 25  | 33-4040B    | Dial Indicator(For Imperial Use)    |               |
| 26  | 33-4035     | Half Nut Base                       |               |
| 27  | 33-4035 1/2 | Half Nut                            |               |
| 28  | GB119-86    | Pin                                 | 8×16          |
| 29  | 32-06228    | Worm                                |               |
| 30  | 32-06225    | Cam Shaft                           |               |
| 31  | GB80-85     | Socket Head Set Screw               | M5×16         |
| 32  | GB41-86     | Hexagon Nut                         | M5            |
| 33  | 33-4040A    | Dial Indicator (For Metric Use)     |               |
| 34  | 33-4039A    | Thread Dial Body (For Metric Use)   |               |
| 35  | 32-06206    | Washer                              |               |
| 36  | GB70-85     | Socket Head Cap Screw               | M8×50         |
| 37  | 33-4039B    | Thread Dial Body (For Imperial Use) |               |
| 38  | 33-4045A    | Helical Gear(For Imperial Use)      |               |
| 39  | GB95-85     | Washer                              | 8             |
| 40  | GB41-86     | Hexagon Nut                         | M8×50         |
| 41  | 33-4043     | Helical Gear (For Metric Use)       |               |
| 42  | 32-06237    | Spacer                              |               |
| 43  | 33-4042     | Helical Gear (For Metric Use)       |               |
| 44  | 33-4041     | Helical Gear (For Metric Use)       |               |

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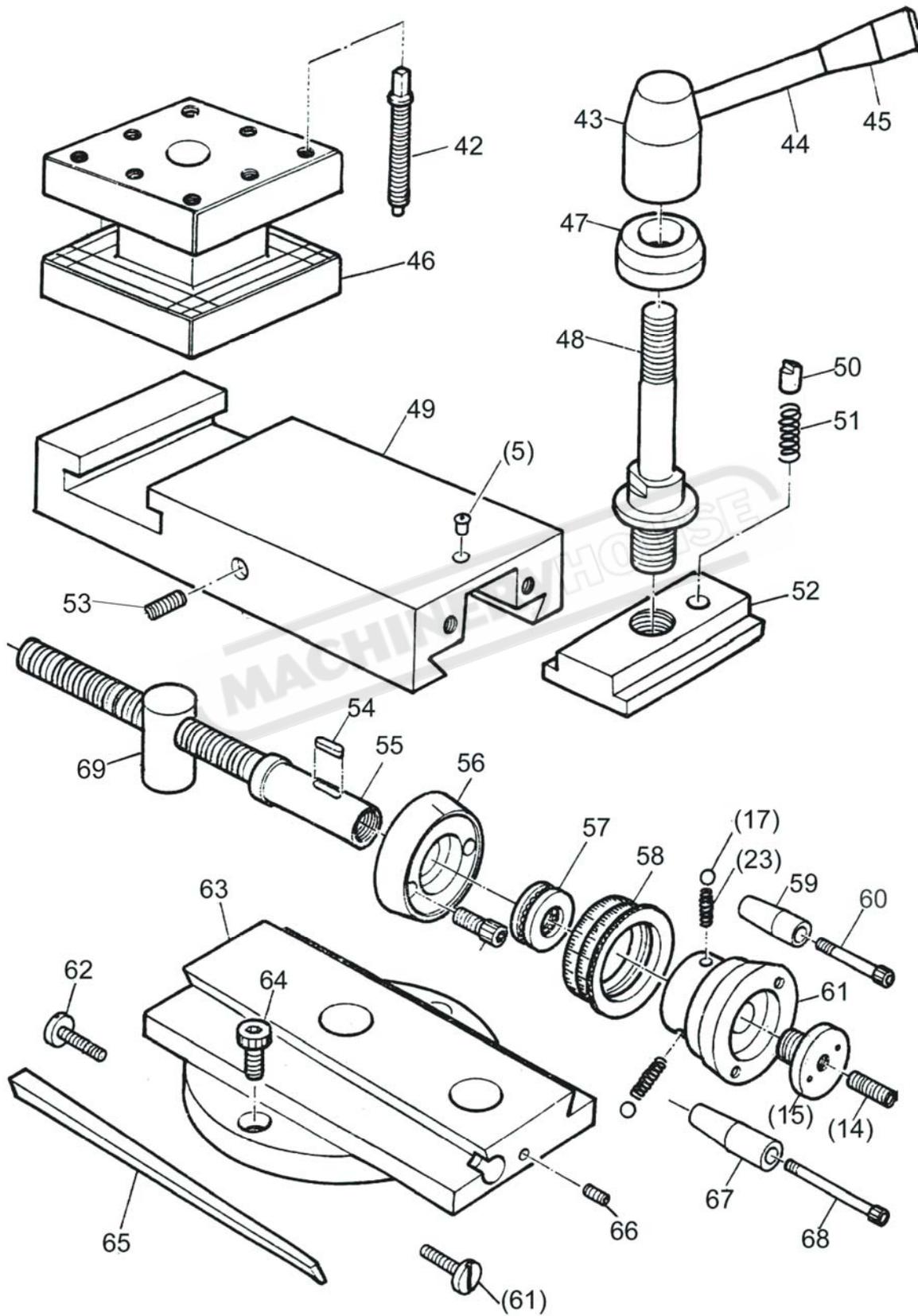
| No. | Part No.     | Name                      | Specification |
|-----|--------------|---------------------------|---------------|
| 45  | GB827-86     | Button Head River         | 2×5           |
| 46  | 33-4048      | Helical Gear Chart        |               |
| 47  | 33-4046      | Indicator Table           |               |
| 48  | Q/ZG285.3    | Drain Plug                | 1/8"          |
| 49  | 33-4050      | Half Nut Indicator        |               |
| 50  | GB1160-89    | Oil Sight Glass           | A20           |
| 51  | GB879-86     | Spring Pin                | 5×35          |
| 52  | Gb2089-80    | Compression Spring        |               |
| 53  | GB308-77     | Steel Ball                |               |
| 54  | 33-4027      | Plug                      |               |
| 55  | GB879-86     | Spring Pin                | 3×25          |
| 56  | GB119-85     | Pin                       | C5×25         |
| 57  | GB77-85      | Socket Head Set Screw     | M6×6          |
| 58  | 33-4033      | Lever Handle              |               |
| 59  | 33-4034      | Lever                     |               |
| 60  | GB1342-73    | Knob                      | M8×40         |
| 61  | 33-4002-1    | Spacer                    |               |
| 62  | 33-4002      | Front Cover               |               |
| 63  | 33-4047      | Feed Direction Indicator  |               |
| 64  | GB117-86     | Taper Pin                 | 5×20          |
| 65  | 33-4020      | Cam Shaft                 |               |
| 66  | 33-4022      | Change Lever              |               |
| 67  | GB2089-80    | Compression Spring        |               |
| 68  | 33-4019      | Bracket                   |               |
| 69  | GB70-85      | Socket Head Cap Screw     | M6×35         |
| 70  | CL6132-06-02 | Plug                      |               |
| 71  | 33-4013      | Shifting Shaft            |               |
| 72  | GB70-85      | Socket Head Cap Screw     | M6×16         |
| 73  | 33-4016      | Clutch Gear               |               |
| 74  | 33-4015      | Clutch Gear               |               |
| 75  | 33-4014      | Clutch Gear               |               |
| 76  | 33-4011      | Plug                      |               |
| 77  | GB1155-79    | Ball Cap                  |               |
| 78  | 33-4008      | Bolt                      |               |
| 79  | 33-4009      | Handle                    |               |
| 80  | GB818-85     | Cross Recessed Head Screw | M6×15         |
| 81  | 33-4007      | Washer                    |               |
| 82  | 33-4005      | Handle Wheel              |               |
| 83  | 33-4006      | Dial                      |               |
| 84  | GB70-85      | Socket Head Cap Screw     | M5×25         |
| 85  | 33-4004      | Bracket                   |               |
| 86  | 33-4004-1    | Spacer                    |               |
| 87  | GB1096-79    | Double Round Head Key     | 5×5×20        |
| 88  | 33-4003      | Gear Shaft                |               |
| 89  | GB70-85      | Socket Head Cap Screw     | M8×30         |
| 90  | GB117-85     | Taper Pin                 | 8×40          |

### 15. Cross Slide & Compound (1/2)



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### 15. Cross Slide Compound(2/2)



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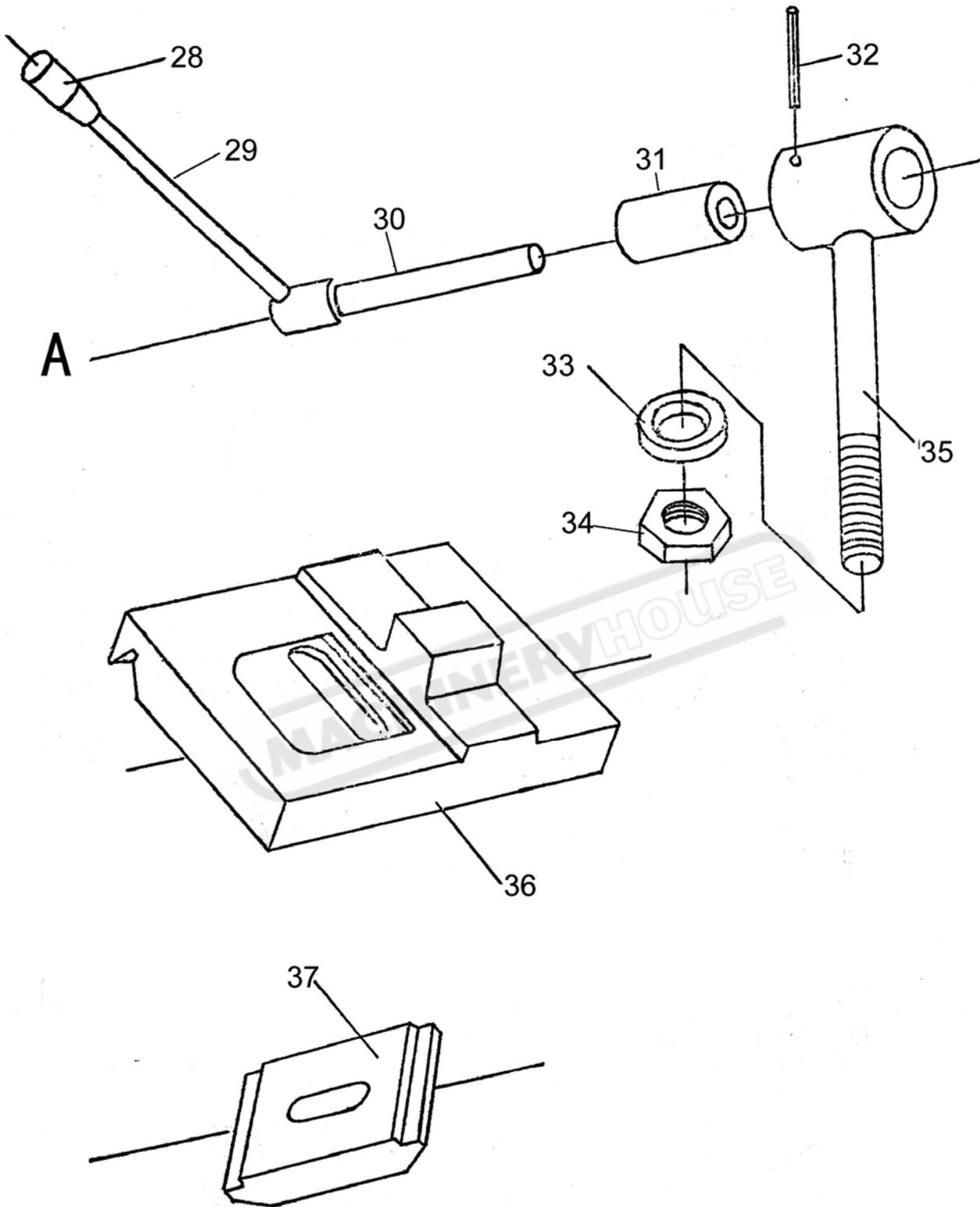
| No. | Part No.     | Name           | Specification |
|-----|--------------|----------------|---------------|
| 1   | CL6132-07-07 | Slide          |               |
| 2   | CL6132-07-08 | Slide Axis     |               |
| 3   | GB70-85      | Screw          | M6×16         |
| 4   | 32-07216     | Bushing        |               |
| 5   | GB1155-79    | Oil Cup        |               |
| 6   | CT32-07-01   | Cross Slide    |               |
| 7   | 33-3023      | Bolt           |               |
| 8   | 33-3022      | Gib            |               |
| 9   | GB879-86     | Pin            | 3×16          |
| 10  | 32C-07229    | Leadscrew      | 2mm           |
| 10  | 32C-07229a   | Leadscrew      | 2.54mm        |
| 11  | GB77-85      | Screw          | 6×26          |
| 12  | GB77-85      | Screw          | M8×10         |
| 12a | 32C-07415    | Nut            | 2mm           |
| 12a | 32C-07415a   | Nut            | 2.54mm        |
| 13  | GB70-85      | Screw          | M6×16         |
| 14  | GB78-85      | Screw          | M6×25         |
| 15  | CL6132-08-12 | Screw          |               |
| 16  | CL6132-07-16 | Handwheel      |               |
| 17  | GB308-84     | Bell Steel     | 6             |
| 18  | CT32-07222M  | Index Ring     | 2mm           |
| 18  | 32-07222a    | Index Ring     | 2.54mm        |
| 19  | CL6132-07-18 | Cover          |               |
| 20  | GB301-84     | Bearing        | 8102          |
| 21  | CM6233-3013  | Gear           |               |
| 22  | 32-07207b    | Lever          |               |
| 23  | GB2089-80    | Spring         | 0.7×5×9       |
| 24  | 32-07101     | Saddle Casting |               |
| 25  | GB818-85     | Screw          | M5×10         |
| 26  | 32-07120     | Keep Rack      |               |
| 27  | GB70-85      | Screw          | M6×25         |
| 28  | 32-07225     | Plate          |               |
| 29  | GB823-76     | Screw          | M8×12         |
| 30  | GB5783-86    | Screw          | M8×20         |
| 31  | 32-07123     | Strip          |               |
| 32  | 32-07141     | Front Strip    |               |
| 33  | 32-07528     | Wiper          |               |
| 34  | 32-07227     | Plate          |               |
| 35  | GB823-76     | Screw          | M4×12         |
| 36  | GB6170-86    | Nut            | M6            |
| 37  | GB5783-86    | Screw          | M8×25         |

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| No. | Part No.       | Name               | Specification |
|-----|----------------|--------------------|---------------|
| 38  | 32-07132       | Strip              |               |
| 39  | 32-07239       | Strip              |               |
| 40  | 32-07224       | Plate              |               |
| 41  | 32-07526       | Wiper              |               |
| 42  | GB83-86        | Screw              | M10×50        |
| 43  | GB4141.16-76   | Collar             | BM16×32       |
| 44  | CL6132-07-36   | Bolt               |               |
| 45  | GB4141.14-76   | Collar             | M10×50        |
| 46  | CL6132-07-32   | Tool Post (32A)    |               |
| 46  | CL6232-07-32   | Tool Post (36A)    |               |
| 47  | CL6132-07-33   | Washer             |               |
| 48  | CL6132-07-34   | Shaft              |               |
| 49  | CL6132-07-49   | Gib (32A)          |               |
| 49  | CL6232-07-49   | Gib (36A)          |               |
| 50  | CL6132-07-29   | Wiper              |               |
| 51  | GB2089-80      | Spring             | 1×8×11        |
| 52  | CL6132-07-37   | Plate              |               |
| 53  | GB78-85        | Screw              | M8×20         |
| 54  | GB1096-79      | Key                | 4×14          |
| 55  | CL6132A-07-05b | Leadscrew          | 4mm           |
| 55  | CL6132-07-40b  | Leadscrew          | 2.54mm        |
| 56  | CL6132-07-41   | Bracket            |               |
| 57  | GB301-84       | Bearing            | 8103          |
| 58  | CT32-07-09M    | Index Ring         | 4mm           |
| 58  | CT32-07-09     | Index Ring         | 2.54mm        |
| 59  | CL6132-07-43   | Collar             |               |
| 60  | GB70-85        | Screw              | M5×25         |
| 61  | CL6132-07-48   | Handwheel          |               |
| 62  | CL6137-07-28   | Screw              |               |
| 63  | CL6132-07-11   | Swivel Slide (32A) |               |
| 63  | CL6232-07-11   | Swivel Slide (36A) |               |
| 64  | GB70-85        | Screw              | M8×16         |
| 65  | CL6132-07-10   | Gib                |               |
| 66  | GB80-85        | Screw              | M6×16         |
| 67  | CL6132-07-44   | Collar             |               |
| 68  | GB70-85        | Screw              | M5×40         |
| 69  | CL6132A-07-04  | Nut                | 4mm           |
| 69  | CL6132-07-39   | Nut                | 2.54mm        |



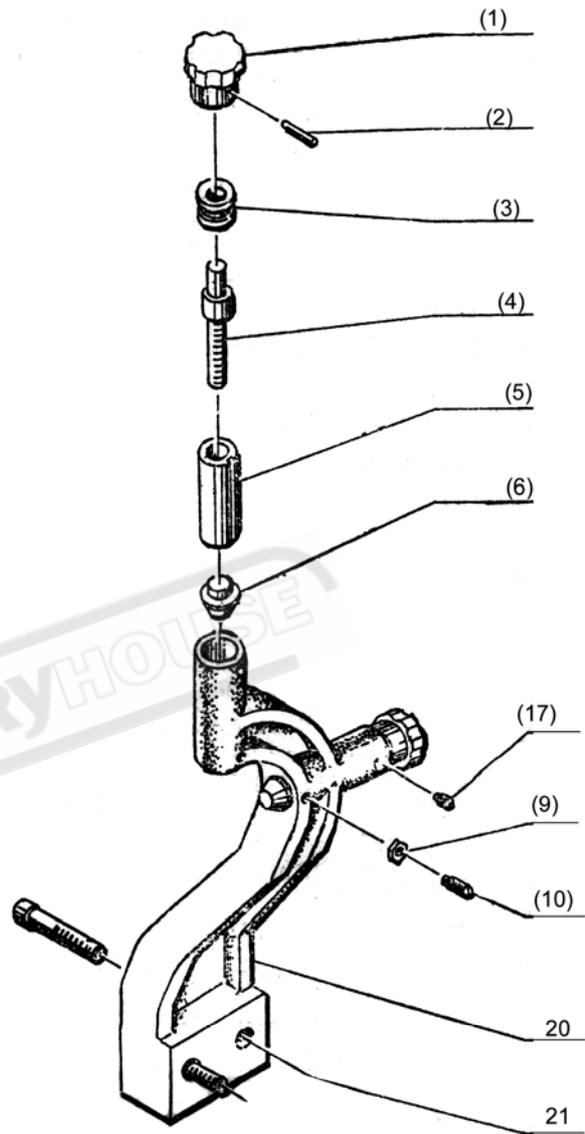
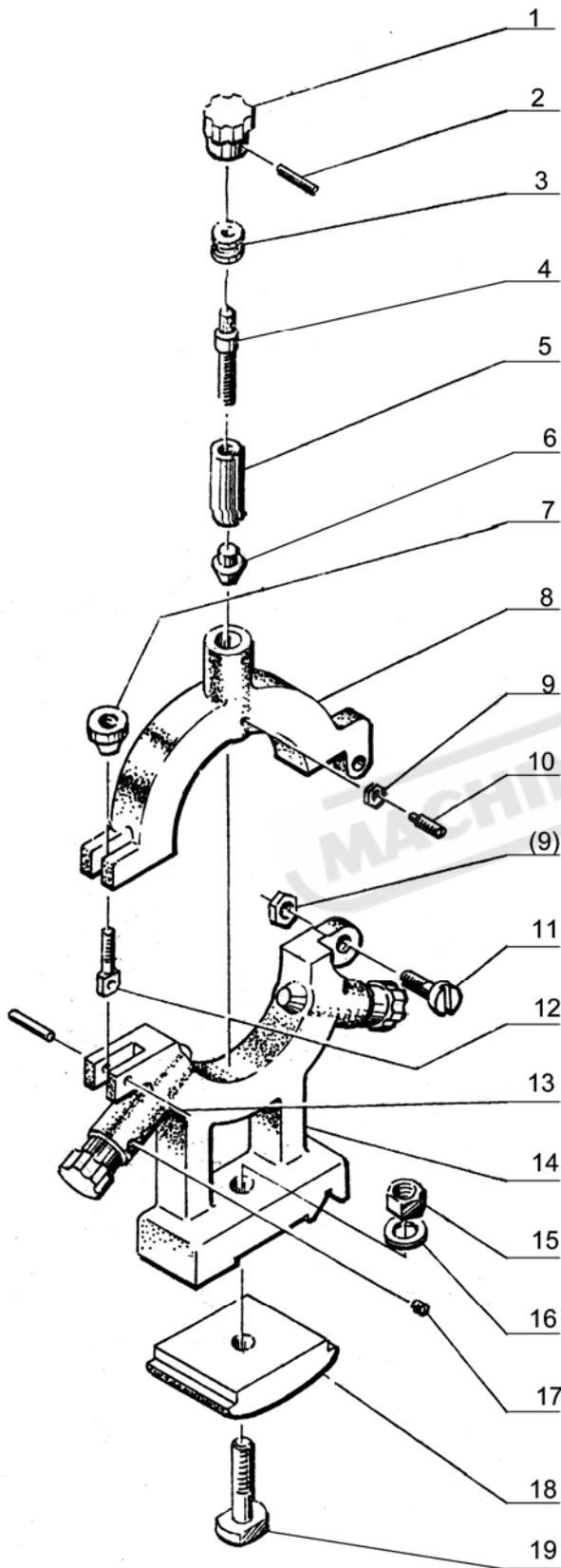
### 16. Tailstock Assembly (2/2)



*Operation Manual*

| No. | Part No.      | Name         | Specification |
|-----|---------------|--------------|---------------|
| 1   | JB1342-76     | Knob         | M8×40         |
| 2   | 32-08401      | Nut          |               |
| 3   | 32-08203      | Screw        |               |
| 4   | GB1096-79     | Key          | 4×15          |
| 5   | GB301-84      | Thrust       | 8102          |
| 6   | 32-08102      | Hanger Cover |               |
| 7   | GB1155-79     | Oil          | 8             |
| 8   | 32-08402      | Index Ring   |               |
| 9   | GB70-85       | Screw        | M4×10         |
| 10  | GB70-85       | Screw        | M6×16         |
| 11  | GB78-85       | Screw        | M6×10         |
| 12  | 32-08207      | Screw        |               |
| 13  | 32-08208      | Shaft        |               |
| 14  | 32-08209      | Screw        |               |
| 15  | GB78-85       | Screw        | M10×45        |
| 16  | 32-08204      | Washer       |               |
| 17  | 32-08501      | Lever        |               |
| 18  | 32-07207b 2/2 | Collar       |               |
| 19  | 32-07207b 1/2 | Screw        |               |
| 20  | GB73-85       | Screw        | M5×18         |
| 21  | 32-08202      | Barrel       |               |
| 22  | 32-08209      | Screw        |               |
| 23  | 32-08103      | Handwheel    |               |
| 24  | GB79-85       | Screw        | M8×35         |
| 25  | GB6172-86     | Nut          | M8            |
| 26  | 32-08101      | Casting      |               |
| 27  | 32-08403      | Lock Block   |               |
| 28  | JB1342-76     | Knob         | M10×50        |
| 29  | 32-08214      | Screw        |               |
| 30  | 32-08213      | Shaft        |               |
| 31  | 32-08211      | Collar       |               |
| 32  | GB879-86      | Pin          | 5×24          |
| 33  | GB97.1-86     | Washer       | B12           |
| 34  | GB6170-86     | Nut          | M12           |
| 35  | 32-08212      | Screw        |               |
| 36  | 32-08105      | Base (32A)   |               |
| 36  | 36-08105      | Base (36A)   |               |
| 37  | 32-08104      | Clamp Plate  |               |

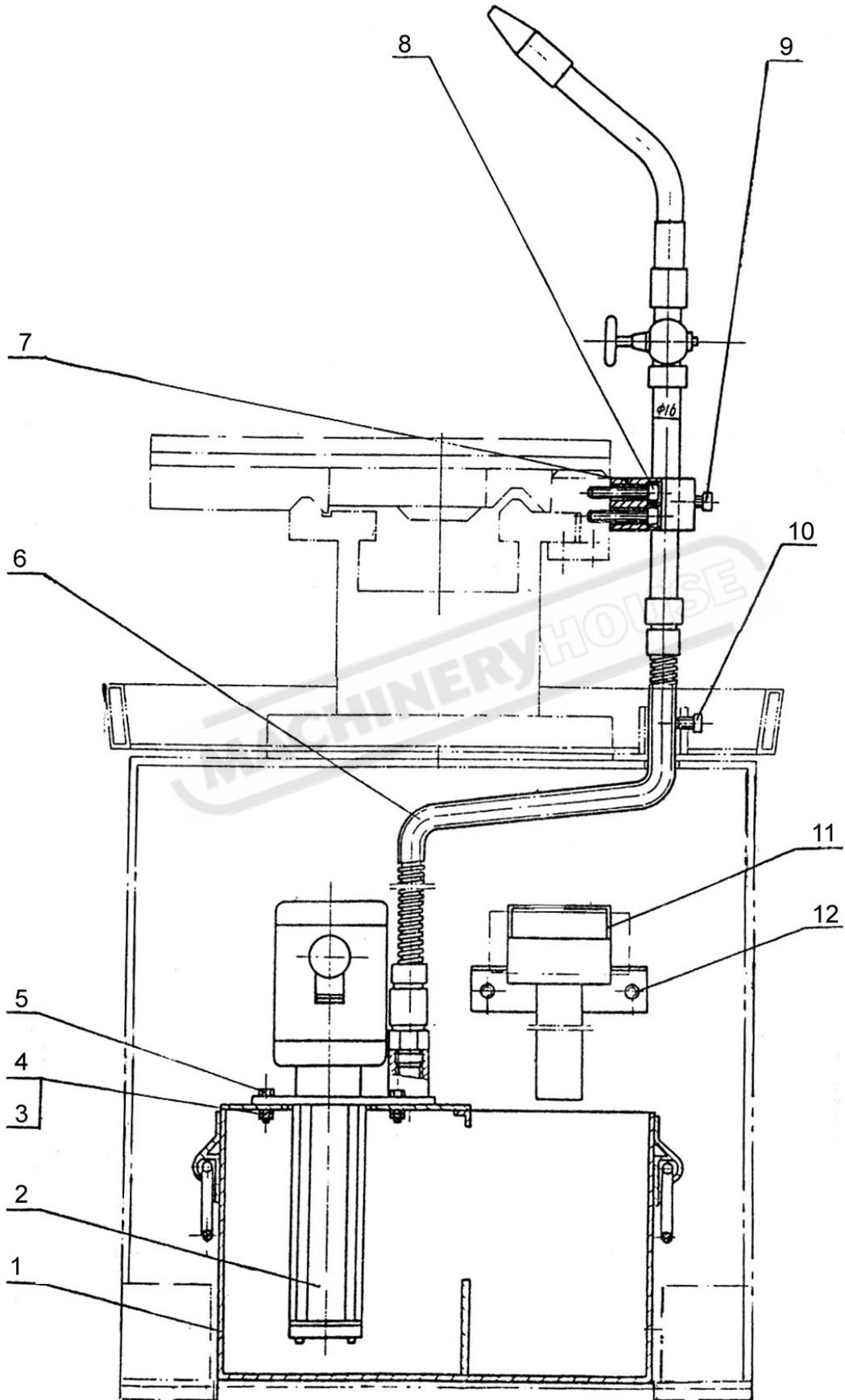
### 17.Steady & Follow Rest



*Operation Manual*

| No. | Part No.  | Name                    | Specification |
|-----|-----------|-------------------------|---------------|
| 1   | JB1360-76 | Knob                    | 32×8          |
| 2   | GB119-86  | Pin                     | 3×18          |
| 3   | 32-10203  | Collar                  |               |
| 4   | 32-10204  | Screw                   |               |
| 5   | 32-10201  | Collar                  |               |
| 6   | 32-10401  | Clapping Head           |               |
| 7   | 32-10205  | Nut                     |               |
| 8   | 32-10101  | Upside Of Center Rest   |               |
| 9   | GB6170-86 | Nut                     | M6            |
| 10  | GB79-85   | Screw                   | M6×18         |
| 11  | GB65-85   | Screw                   | M6×30         |
| 12  | 32-10206  | Screw                   |               |
| 13  | GB879-86  | Pin                     | 5×24          |
| 14  | 32-10102  | Downside Of Center Rest | (32A)         |
| 14  | 36-10102  | Downside Of Center Rest | (36A)         |
| 15  | GB6170-86 | Nut                     | M12           |
| 16  | GB97.1-86 | Washer                  | 12            |
| 17  | GB78-85   | Screw                   | M6×6          |
| 18  | 32-10103  | Clamp                   |               |
| 19  | GB37-85   | Screw                   | M12×65        |
| 20  | 32-10104  | Follow Rest (32A)       |               |
| 20  | 36-10104  | Follow Rest (36A)       |               |
| 21  | GB70-85   | Screw                   | M8×45         |

### 18.Coolant System



*Operation Manual*

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| No. | Part No.   | Name          | Specification |
|-----|------------|---------------|---------------|
| 1   | 32/2-15201 | Coolant Ark   |               |
| 2   | AB-12      | Coolant Pump  |               |
| 3   | GB6170-86  | Nut           | M6            |
| 4   | GB97.1-86  | Washer        | 6             |
| 5   | GB5783-86  | Bolt          | M6×15         |
| 6   | JL15K-400  | Coolant Duct  |               |
| 7   | 32/2-15101 | Casting Cover |               |
| 8   | GB70-85    | Screw         | M5×25         |
| 9   | GB70-85    | Screw         | M5×16         |
| 10  | GB70-85    | Screw         | M5×25         |
| 11  | 32/2-15202 | Return pipe   |               |
| 12  | GB67-85    | Screw         | M6×16         |

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