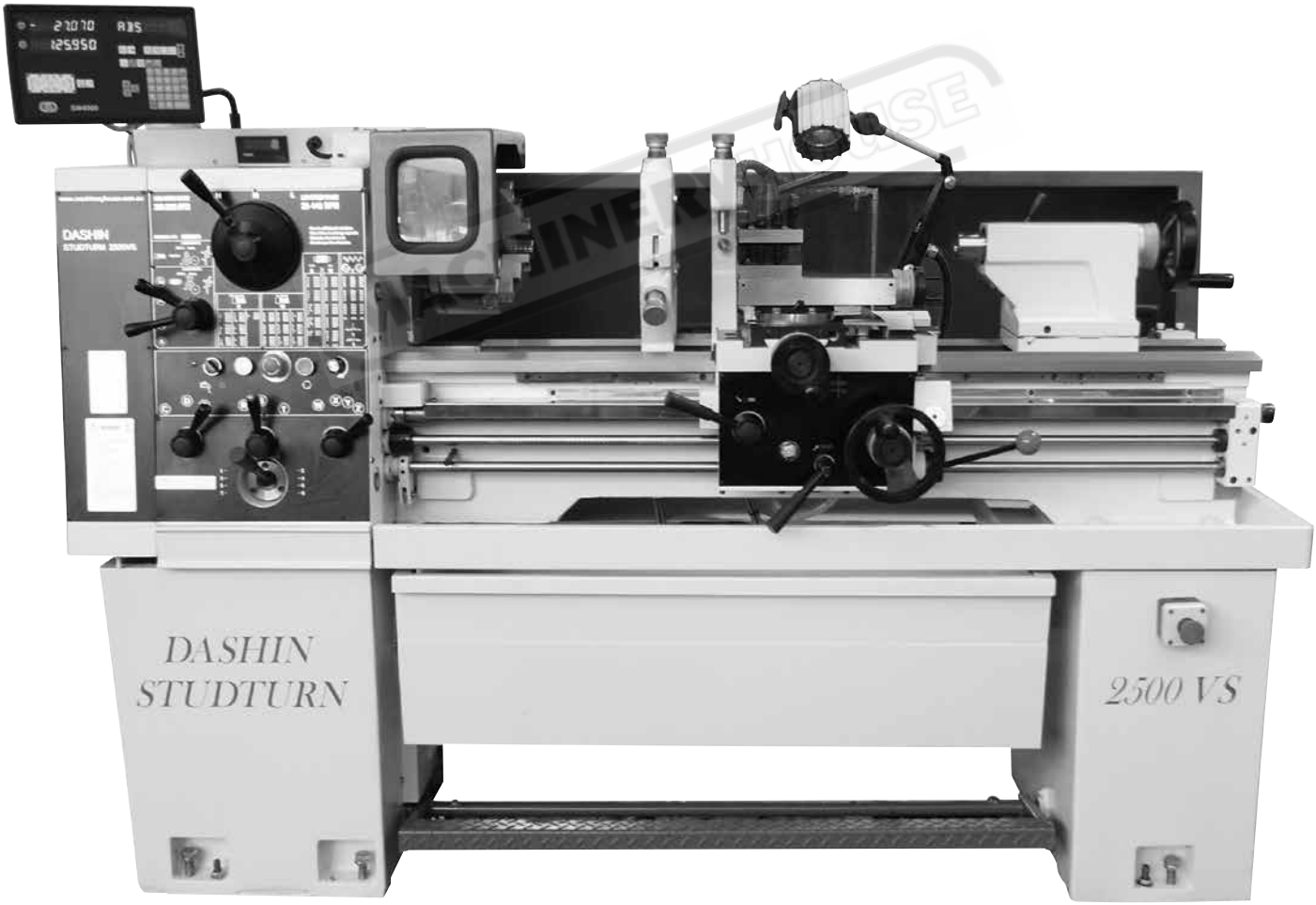
INSTRUCTION MANUAL

Schools / TAFE
Studturn Centre Lathe - with DRO (415V)
360 x 1000mm



L249VS

STUDTURN LATHE

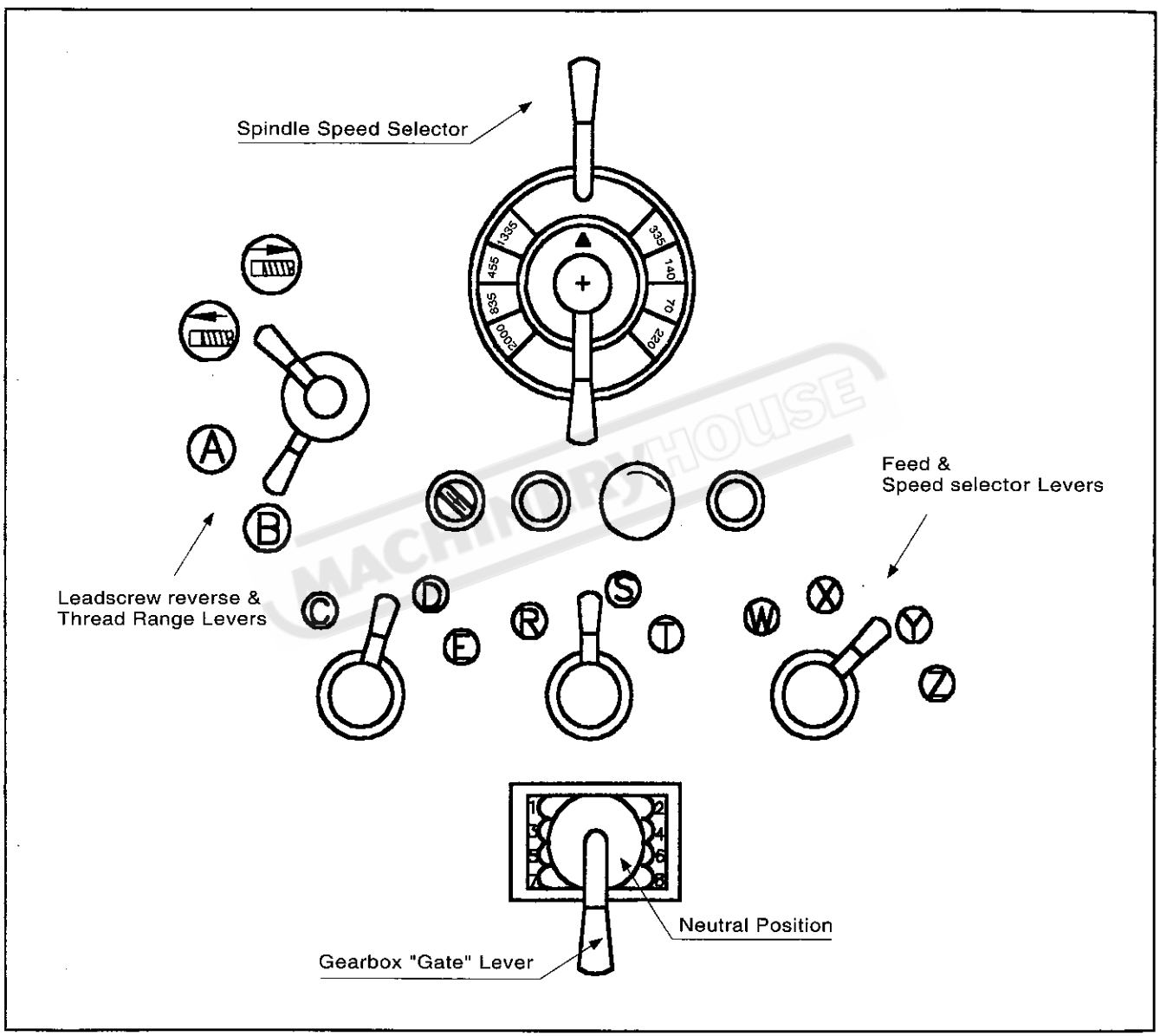
INSTRUCTION & SPARE PARTS MANUAL

IMPORTA

PLEASE READ THESE INSTRUCTIONS CAREFULLY BEFORE OPERATING THE MACHINE

Before this machine leaves the factory the controls are pre-set as detailed below; to avoid damage by accidental starting on high speeds and coarse feeds.

Before starting the machine check the settings and ensure that the controls are in the correct positions.



1. Spindle rotation control lever
   To set in the neutral position.
2. Spindle speed selector
   To set in the neutral position.
3. Leadscrew reverse lever
   To set in the neutral position.
4. Thread range lever A/B.
   To set in the B position.
5. Thread/feed select lever C/D/E.
   To set in the D position.
6. Thread/feed select lever R/S/T.
   To set in the S position.
7. Thread/feed select lever W/X/Y/Z.
   To set in the Y position.
8. Gearbox "gate" lever
   To set in the neutral position.

MAIN SPECIFICATIONS:

Height of center	178mm.(7")
Swing over bed	360mm.(14-1/4")
Distance between centers	750mm.(30") 1000mm.(40")
Swing over cross slide	215mm.(8-5/8")
Swing in gap	560mm.(22")
Width of gap from faceplate	150mm.(6")
Spindle nose	Camlock D-1-5.
Spindle bore	42mm.(1-5/8")
Spindle bore taper	M.T.No.5
Taper of centers	M.T.No.3
Spindle speed; Steps;	8(optional 16)
Ranges; (8)	70, 140, 220, 335, 455, 835, 1335, 2000 rpm.
optional (16)	35, 70 ,75, 110, 140, 165, 220, 225, 335, 415,
	455, 665, 835, 1000, 1335, 2000 rpm.
Varispeed; Steps;	2 Infinitely variable; Forward/Reverse.
Low speed ranges;	35--440 rpm.
High speed ranges;	200--2500 rpm.
Main motor; Standard model;	3.75kw (5HP)
Optional model;	3.75/2.25kw (5/3HP)
Varispeed model;	3.0kw (4HP)
Width of bed	250mm. (10")
Length of bed	1560mm. (61") 1820mm.(71")
Cross slide travel	210mm. (8-1/4")
Top slide travel	95mm. (3-3/4")
Tailstock travel	145mm. (5-3/4")
Tailstock barrel diameter	50mm. (2")
Leadscrew diameter	28.57mm. (1-1/8")
Leadscrew Pitch	6mm. or 4 TPI.
Number & range of Metric threads	27; 0.4--7mm.
Number & range of Imperial threads	36; 4--72TPI.
Number & range of Module threads	18; 0.3--3.5mm.
Number & range of D.P. threads	21; 8--44D.P.
Range of longitudinal feeds	0.03--0.4mm. (0.0012-0.016")
Range of cross feeds	0.01--0.13mm. (0.0004-0.0053")
Approx. Net/Gross weight	900/1100kgs. (2000/2400lbs.)
Packing sizes (L.xW.xH.)	2135x915x1525mm. (84"x36"x60")

STANDARD EQUIPMENT & ACCESSORIES SUPPLIED WITH LATHE:

- Motor and relative electric control system.
- Coolant System.
- Speed meter of spindle (Varispeed only).
- 4-way toolpost, Max. toolholder size 20x20 mm. (3/4"x3/4").
- Threading dial indicator (Metric or Imperial one only).
- Center sleeve and two centers.
- Levelling blocks and screws.
- Service tools and toolbox.
- Instruction and spare parts manual.

OPTIONAL EQUIPMENT & ACCESSORIES MAY SUPPLIED AS OREDRS:

- 3 jaw universal chuck.
- 4 jaw independent chuck.
- Steady rest.
- Follow rest.
- Slotted faceplate.
- Rotating center.
- Halogen worklamp.
- Micrometer bedstop.
- Full length splash guard.
- Quick change toolpost.
- Chip safety guard.
- Dual Inch/Metric dials for cross and top slides.
- Chuck safety guard.
- One-Piece Stainless Leadscrew Cover.
- Magnetic Brake System.

LIFTING MACHINE BEFORE UNPACKING

Normally, each lathe was packed with seaworthy strong wooden case. Before unpacking the wooden case to lifting or unloading the lathe, must be ensure the following notes:

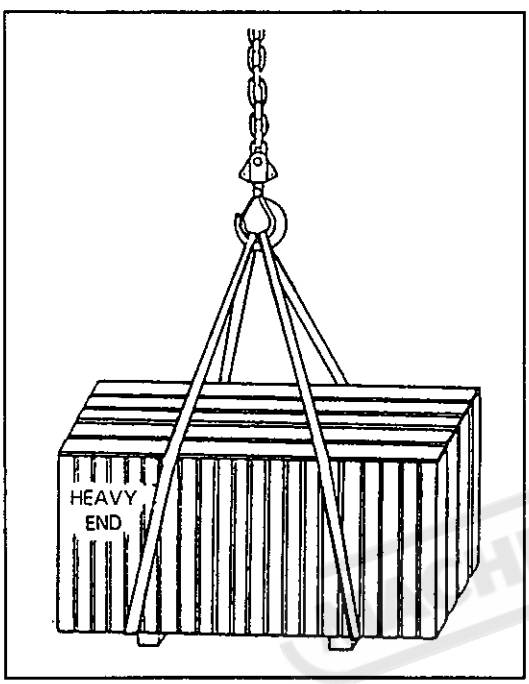
1.The capacity of lift equipment is adequate for the machines.

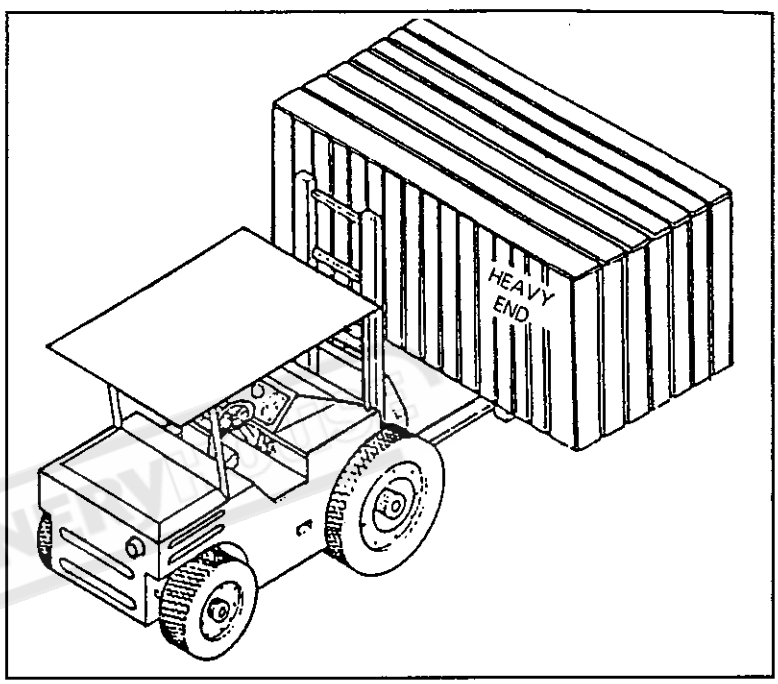
2.keep the heavy end fully supported and balanced when lifting.

3.The MACHINE WEIGHTS (Approx. Gross weights):

1100KGS(2400LBS)

4.The only recommended lifting equipments are hoist/crane and forklift as shown belows:





WARNING: Headstock end of Lathe is "HEAVY END", Make sure this end is fully supported.

UNPACKING AND LIFTING

UNPACKING THE WOODEN CASE

1. Locate the wooden case on a flat and sufficient area for easy working.
2. Clean the area and space.
3. Wear gloves and suitable safety equipments.
4. Use the claw hammer or nail extractor to pull out nails, especially the nails on sheet bands at four top corners.
5. Open the top cover first.
6. Pull down the four side covers carefully. WARNING; Be careful of sharp nails.
7. Remove any broken wood pieces that might cause damage to the lathe.
8. Remove all the accessories packed on the wooden base.
9. Loosen and remove all the nuts mounted to the thru bolts, holding the lathe to the wooden shipping skid.
10. Clean all the nails and packing materials around the area.

LIFTING

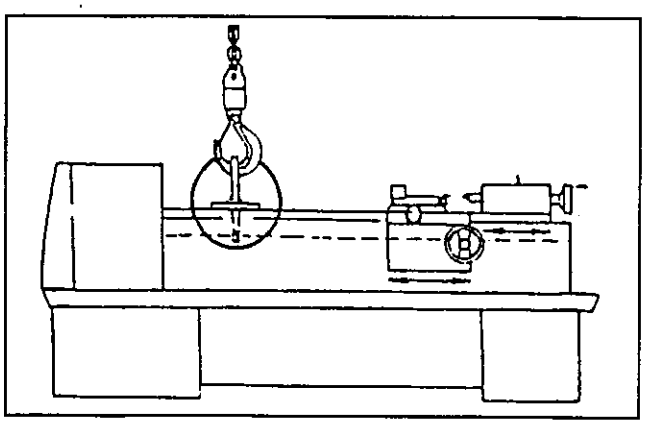
PREPARATION AND SAFETY CHECK

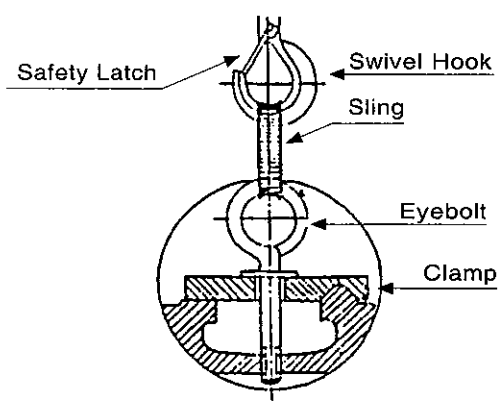
1. Remove all loose items of equipment and accessories from lathe.
2. Move the tailstock and carriage assembly to the far end of the lathe and clamp them in place. (see drawing below)
3. Make sure that the eyebolt and clamp are tightened on the bed correctly.
4. "NEVER"used a damaged sling and "DO-NOT" use more than one(1) sling.
5. "NEVER" wrap the sling around the bed to lift the machine; the leadscrew, feedshaft and control rod will become bent or damaged nagating the warranty on the machine.
6. Only a hoist or crane are recommended for lifting the lathe. Fork lift blades should never be put under the lathe for lifting.
7. Make sure that the lifting hook is a "Swivel" type with safety latch.
8. Just before making the final lift, make sure one(1) person makes a final examination all around the lathe double checking everything.
9. Lift cleanly of all ground obstacles and do not drag the machine across the floor.
10. Remember that vibration during transport can cause friction between the sling and the machine.

LIFTING THE MACHINE

1. Lift the lathe by hoist/crane as shown in the drawing below.
2. Make sure that a safety-latch type swivel hook is used and that the eyebolt clamp was tightened properly to the bed.
3. If the larger swivel hook can not fit into the eyebolt, an intermediate sling can be used as shown in the drawing below.
4. Carefully and slowly lift the lathe clear of the wooden base or ground and if necessary, reposition the carriage or tailstock to achieve a better balance before lifting any higher or further.
5. If you reposition the carriage or tailstock make sure you re-tighten and lock them in place.
6. After a full load is on the main hook, check to make sure that the lifting hook swivels freely and not putting any twisting stress on the eyebolt which might lossen it up.
7. Lift and move the lathe very slowly to avoid tilting or rocking the machine which could become dangerous.
8. Keep the lathe low to the ground with only the necessary ground clearance to move the machine freely over the surface.
9. For transhipping the lathe without repacking onto a skidbase, it is recommended to lift the machine straight up to the desired height and drive a flat bed truck underneath it for loading. This is a safer method of moving the machine than moving with a crane.

BEFORE LIFING; Help balance the load by sliding the tailstock to the extreme opposite end of the bed ways and lock it in place. If necessary, move carriage assembly to tailstock end for balance position and lock it.



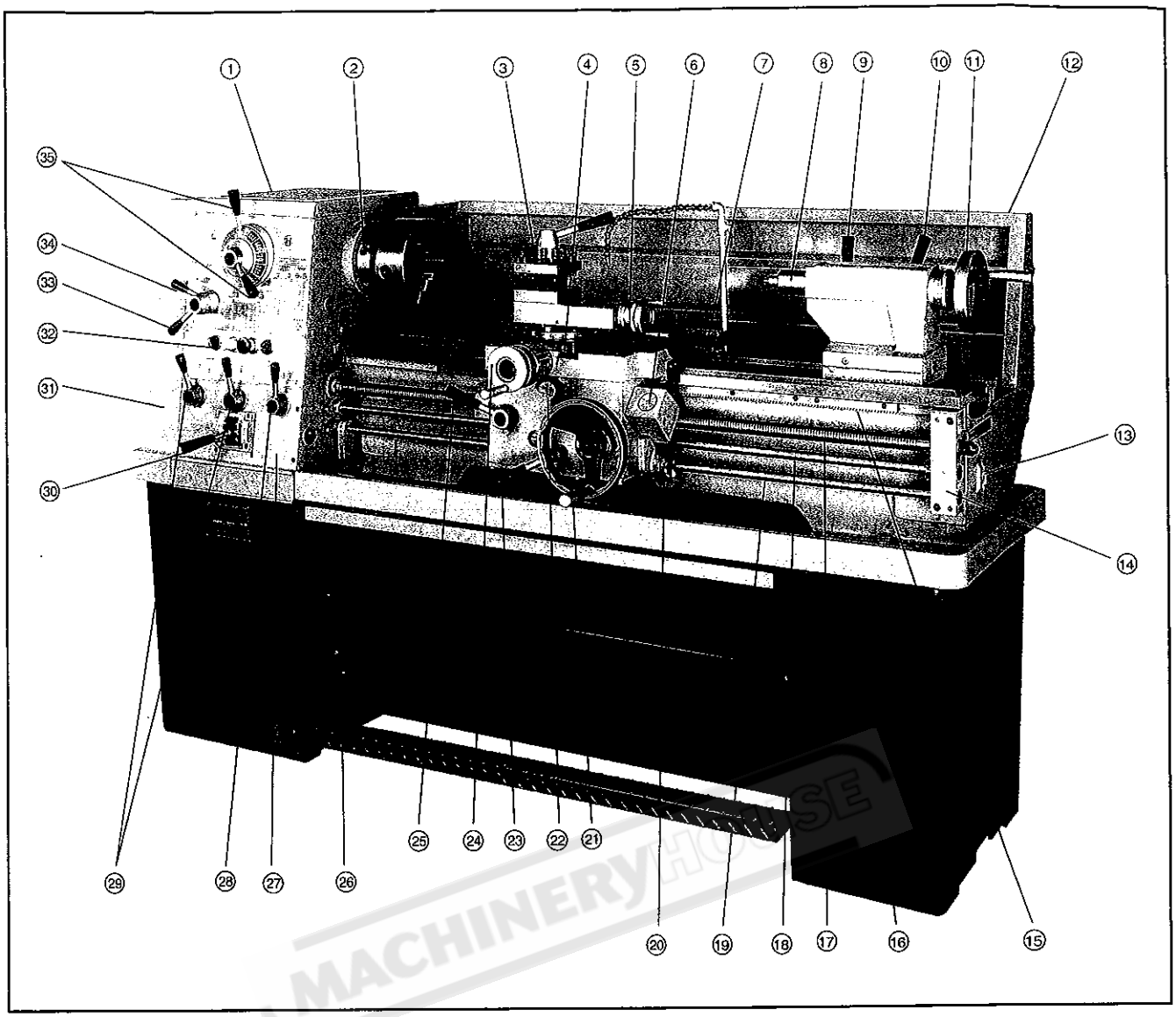


WARNING

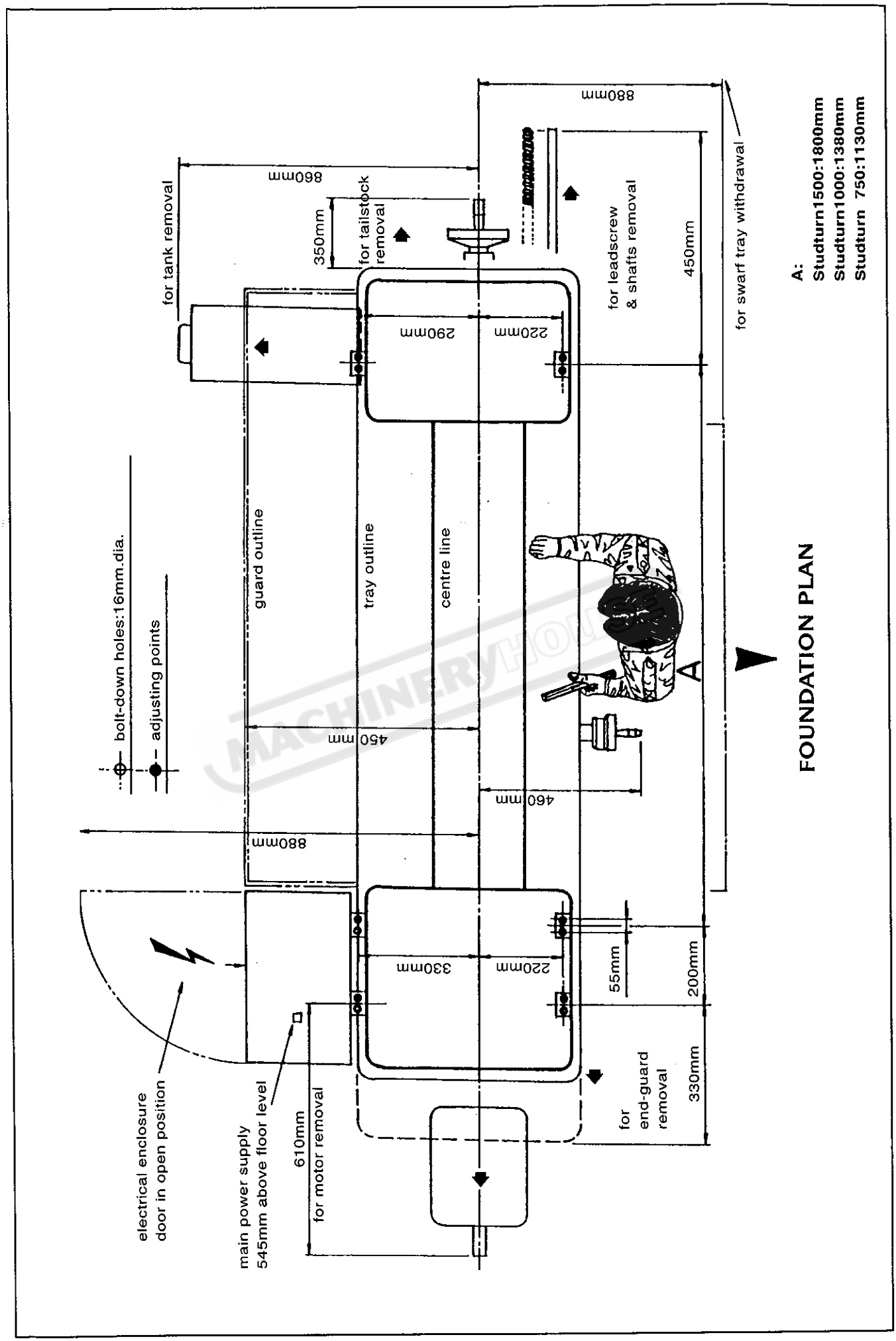
MANUFACTURER AND/OR DISTRIBUTORS SHALL NOT BE LIABLE FOR ANY INJURIES AND/OR PROPERTY DAMAGES RESULTING FROM THE FAILURE TO LEFT AND/OR MOVE A MACHINE SAFETY AND CORRECTLY.

OPERATING SAFETY PRECAUTIONS

1. ARE YOU A PROPERLY TRAINED PERSONNEL TO USE THIS LATHE?
2. READ THIS INSTRUCTION MANUAL CAREFULLY BEFORE OPERATION.
3. ENSURE YOU KNOW HOW TO STOP THE LATHE BEFORE STARTING IT.
4. ENSURE YOU ARE IN GOOD HEALTH AND SPIRIT TO OPERATE THE LATHE.
5. KEEP ALL GUARDS, COVERS AND DOORS IN PLACE AND CLOSED.
6. KEEP THE LATHE AND WORK AREA NEAT, CLEAN AND ORDERLY.
7. WEAR AND UTILISE SUITABLE PROTECTIVE CLOTHING AND EQUIPMENT.
8. DO NOT WEAR RINGS, WATCHES, TIES OR LOOSE SLEEVED CLOTHING.
9. NEVER LAY ANYTHING ON THE WORKING SURFACE OF THE LATHE.
10. STOP LATHE IMMEDIATELY ANYTHING UNEXPECTED HAPPENS.
11. DO NOT TOUCH OR REACH OVER ROTATING OR MOVING PARTS.
12. DO NOT PERFORM ANY SET-UP WORK WHILE LATHE IS RUNNING.
13. DO NOT OPERATE THE LATHE IN EXCESS OF ITS RATED CAPACITY.
14. DO NOT INTERCHANGE CHUCKS OR OTHER SPINDLE MOUNTING ITEMS WITHOUT CHECKING FOR CORRECT LOCKING.
15. DO NOT USE OTHER WORKHOLDING DEVICE WITHOUT CHECKING WITH ITS MANUFACTURER.
16. DISCONNECT LATHE FROM POWER SOURCE BEFORE PERFORMING ANY MAINTANENCE OR CHANGING TOOLING.
17. ISOLATE LATHE WHEN LEAVING IT UNATTENDED.



1. Headstock
2. Main spindle
3. 4-way toolpost
4. Cross slide
5. Top slide
6. Threading dial indicator
7. Carriage
8. Tailstock barrel
9. Tailstock barrel lock lever
10. Tailstock clamp lever
11. Tailstock handwheel
12. Full length splash guard
13. Bed
14. End bracket
15. Rack
16. Plinth
17. Leadscrew
18. Feed shaft
19. Rotation control shaft
20. Rotation control lever
21. Apron handwheel
22. Logitudinal/Cross feed change knob
23. Feed engage lever
24. Cross slide handwheel
25. Threads cutting engage lever
26. Chip pan
27. Feed Gearbox
28. Thread/feed change lever
29. Thread/feed speed change lever
30. Thread/feed "Gate" lever
31. End gear train cover
32. Control panel
33. Thread/feed speed change lever
34. Leadscrew reverse lever
35. Spindle speed select lever


880mm
860mm
for tank removal
350mm
for tailstock removal
for leadscrew & shafts removal
450mm
for swarf tray withdrawal
290mm
220mm
A:
Studturn1500:1800mm
Studturn1000:1380mm
Studturn 750:1130mm
bolt-down holes:16mm.dia.
adjusting points
guard outline
tray outline
centre line
450mm
460mm
880mm
A
FOUNDATION PLAN
330mm
220mm
55mm
200mm
330mm
for end-guard removal
electrical enclosure door in open position
main power supply 545mm above floor level
610mm
for motor removal

WARNING: DISCONNECT ALL ELECTRIC POWER BEFORE CLEANING OR LEVELLING LATHE

Cleaning
Before operating any controls, remove the anticorrosion coating from all slideways and the end gear train, see Fig. 1,using white spirit or Kerosene.

Do not use cellulose solvents for cleaning as they will damage the paint finish.
Oil all bright machined surfaces immediately after cleaning, using machine oil or slideway lubricant; use heavy oil or grease on the end gears.

Installing
Locate the machine on a solid foundation, allowing sufficient area all round for easy working and maintenance (see Foundation Plan). The lathe may be used free-standing or bolted to the foundation.

Free-standing: Position lathe on foundation and adjust each of the six mounting feet to take equal share of the load. Then using a machinists precision level on the bedways (as in Fig 2) adjust the feet to level up machine. Periodically at least every six(6) months check bed level to ensure continued lathe accuracy.

Fixed installation: Position lathe over six bolts (5/8 in. or 16mm. diam.) set into the foundation to correspond with holes in the mounting feet; dimensions are shown on foundation plan. Accurately level the machine, as in Fig. 2 then tighten hold-down bolts. Re-check bed level.

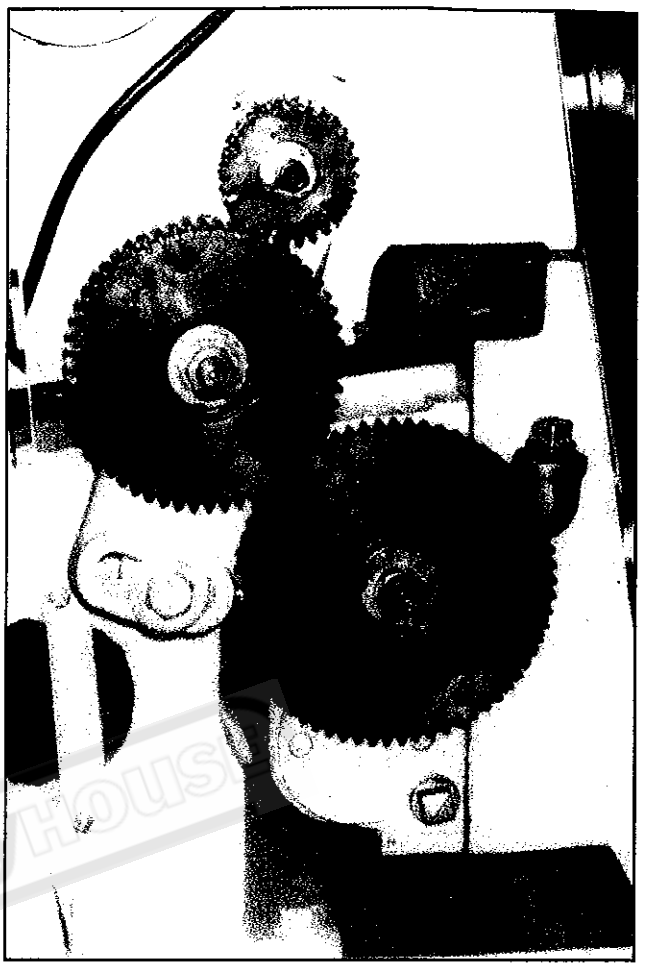


Fig.1

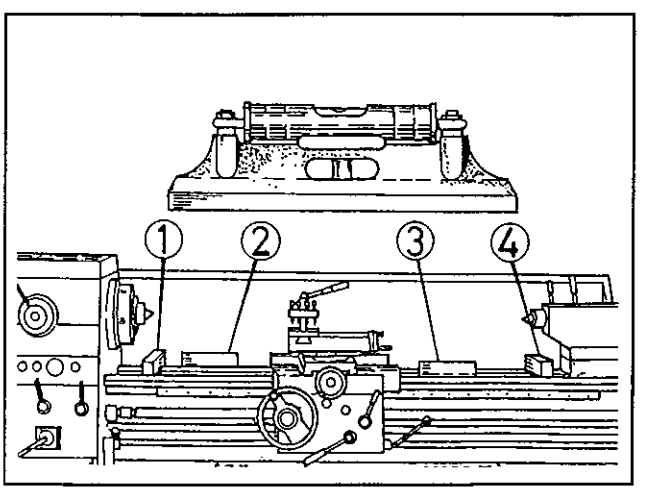


Fig.2

ELECTRIC SUPPLY CONNECTION (Fig.3,4,5)

Input wires should be connected to main terminal box below the electrical box in back of head-stock on head-end plinth. The connecting wires/cable should be big enough for more than 5HP motor as well as short from the power source. Main motor rotation must be clockwise viewed from the pulley end. Should motor run in wrong direction, interchange any two of the three phase lines. (Appropriate wiring diagrams are attached on elactrical box cover.)

WARNING: All electrical power connections must be provided by a qualified electrician. Proper grounding and fused main disconnector are necessary.

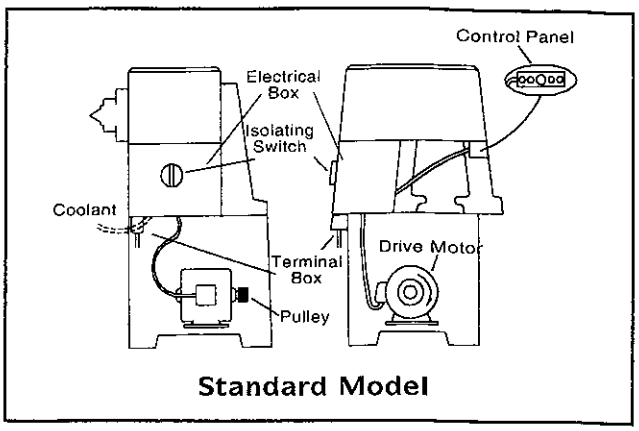


Fig.3

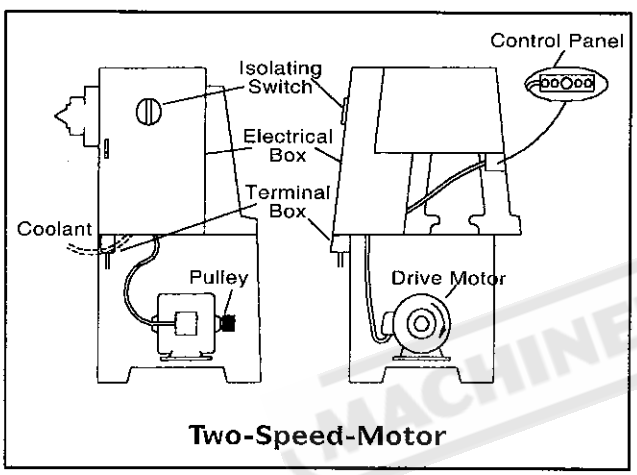


Fig.4

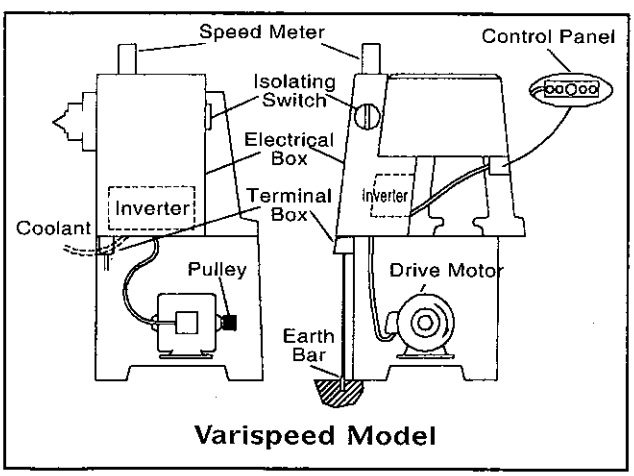


Fig.5

LUBRICATION CHECKS

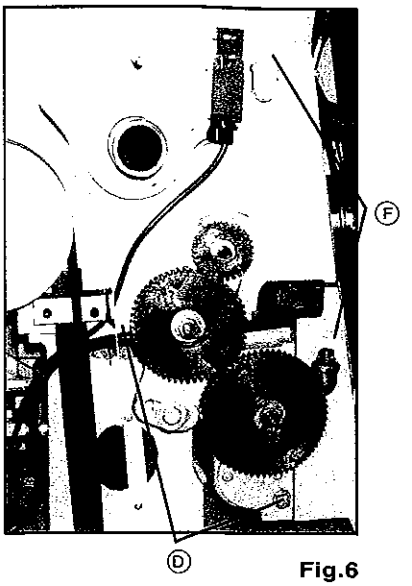


Fig.6

Before operating the machine and trouble-free operation keep the lathe clean and regularly lubricated are very important.

The oil bath designed headstock, feed gearbox and apron, the self-splash lubricated all the spindle, shafts, gears and bearings. The reservoirs contained oil should be reach to the level mark on oil sight windows. The headstock and feed gearbox recommend with I.S.O. VG32 oil or equivalent. The apron recommend with I.S.O. VG68 oil or equivalent.

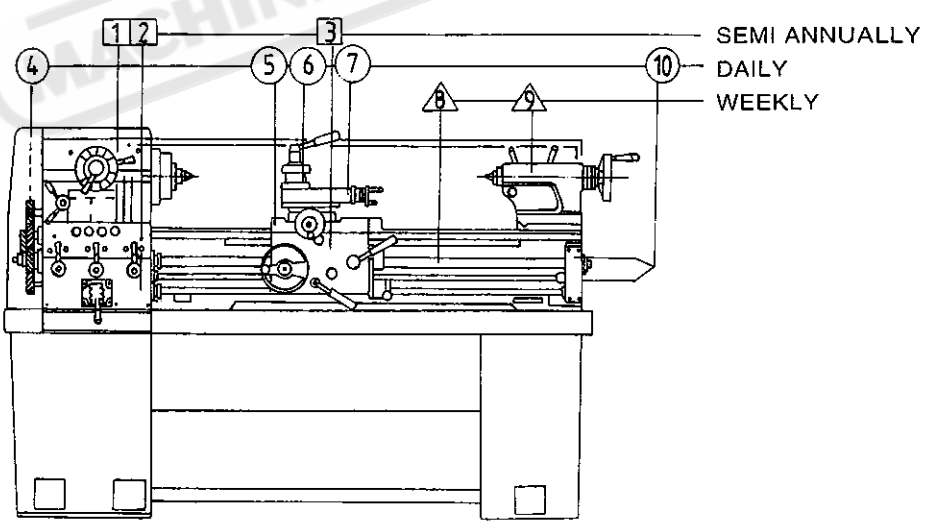
To replenish or exchange the oil in headstock and feed gearbox by open the end gear cover; to replenish the oil from both filler elbows (F) and to drain the oil from both drain plug (D) (Fig.6). For the apron, to replenish the oil from the oil cap on saddle and to drain the oil from drain plug at the bottom of apron.

To the slideways, leadscrew, feed rod and all the oilers located on saddle, cross slide, top slide, tailstock and end bracket etc..Apply an oil can to all the points shown on lubrication chart which require daily oiling. Use light machine oil or way lubricants.

DO NOT MIX LUBRICANTS; When alternative lubricants are to be used, the oil reservoir should be drained and flushed out before refilling with new oil.

NOTE: RECOMMEND AN OIL CHANGE IN THE HEADSTOCK, FEED GEARBOX & APRON WITHIN THE FIRST 3 MONTHS FOR A NEW MACHINE.

LUBRICATION CHART



RECOMMEND OIL

1 2 ISO VG37

OTHERS : ISO VG T68

CHUCKS AND CHUCK MOUNTING

When fitting chucks or faceplates, first ensure that the spindle and chuck tapers are scrupulously clean and that all cams lock in the correct positions; see Fig.7. It may be necessary when mounting a new chuck to re-set the camlock 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 (see inset, Fig.7.)

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 readjust 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 on the spindle nose.
This will assist subsequent remounting.

DO NOT INTERCHANGE CHUCKS OR FACE PLATES BETWEEN LATHES WITHOUT CHECKING FOR CORRECT CAM LOCKING.

IMPORTANT: Take careful note of speed limitations when using faceplates; 12 in. faceplates should not be run at speeds greater than 1000 RPM. and 14 in. faceplates at not more than 830 RPM.

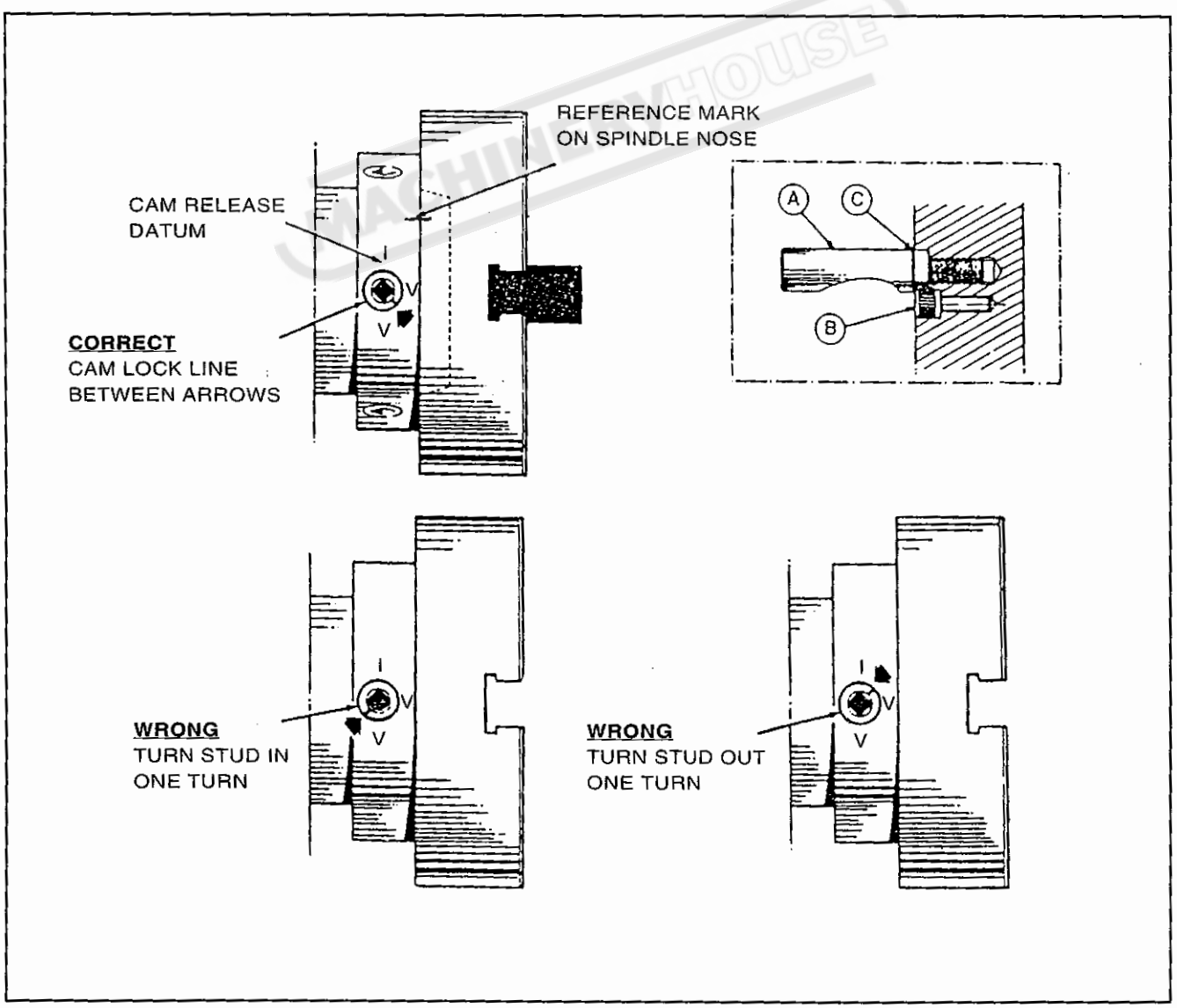


Fig.7

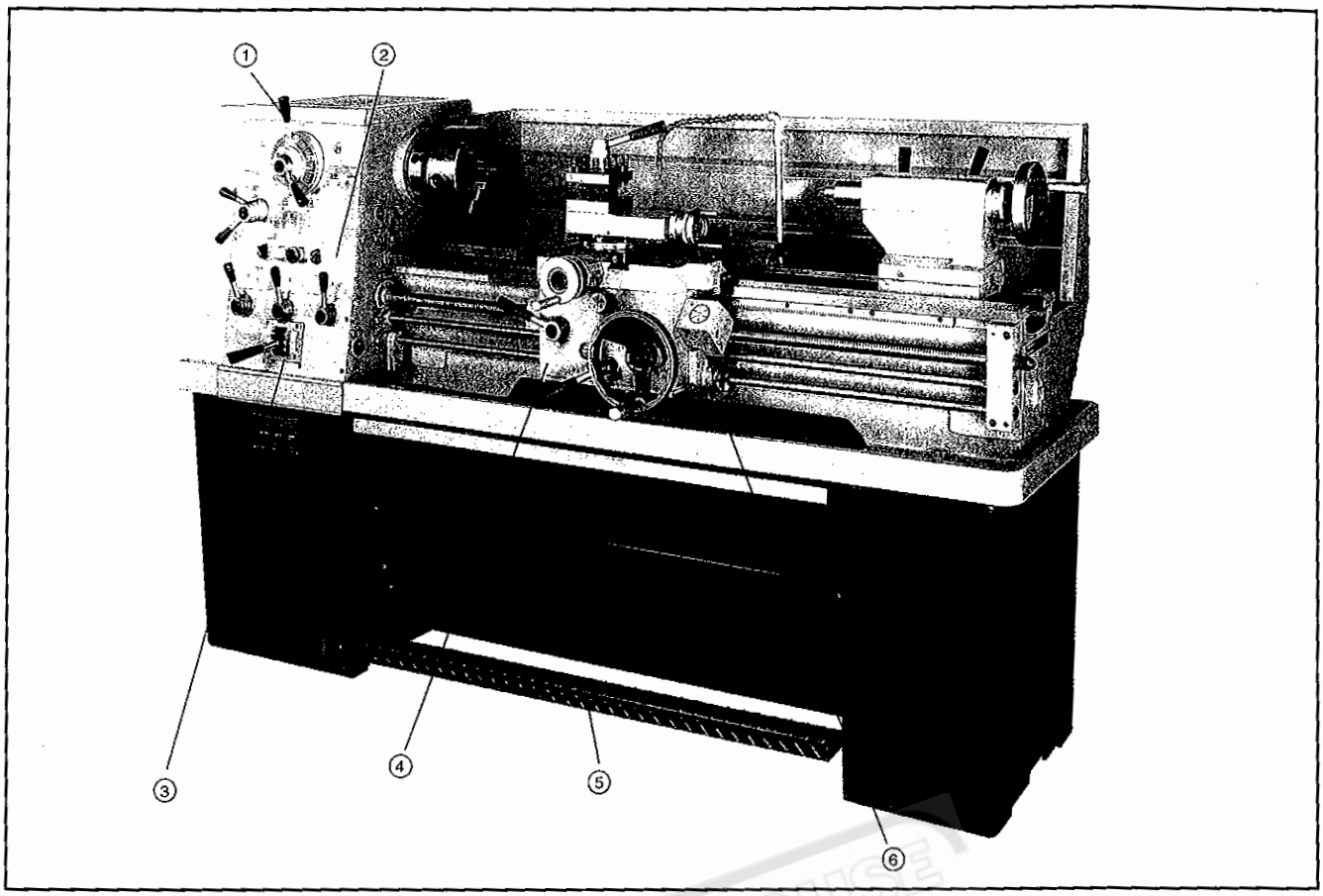


Fig.8

LATHE CONTROLS (Fig.8)

1. Spindle speeds select levers
2. Control pannel
3. Gearbox, threads and feeds
4. Apron, sliding & surfacing feeds
5. Footbrake
6. Spindle rotation control lever

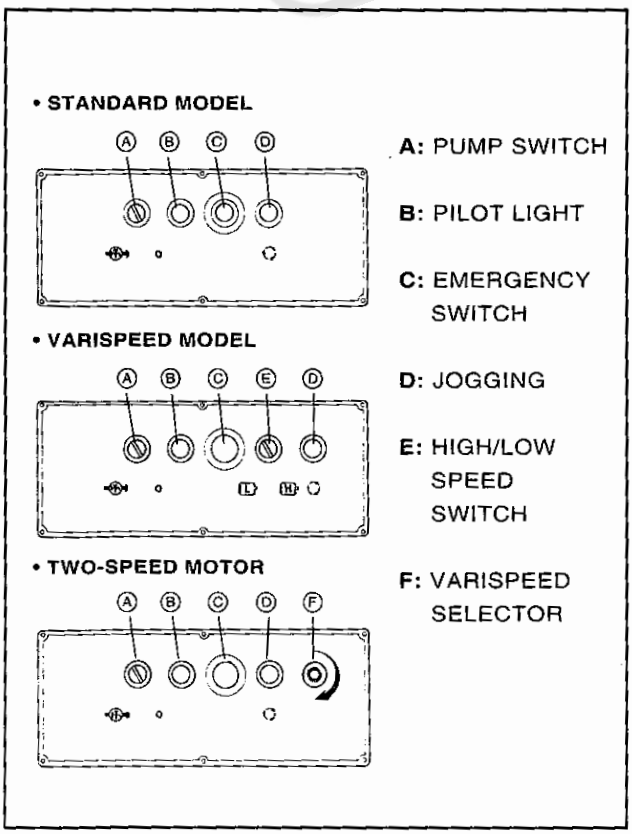


Fig.9

CONTROL PANEL (Fig.9)

Except the lathe isolate switch, all the electrical controls are fitted into front face between headstock and feed gearbox. The control knobs & button switches functions as belows:

1. The BLACK select knob--A for coolant pump switch ON/OFF.
2. The WHITE pilot lamp--B glows to show the main supply ON.
3. The RED mushroom-head button--C to stop all the electrical controls.
4. The GREEN push button--D to press for spindle jogging.
5. The BLACK select knob--E for two speed motor High/Low selection.
6. The Black turning knob--F for spindle speed control on Varispeed model.

NOTE: The speed meter reflects the spindle speed which is controlled by the turning knob on Varispeed model.

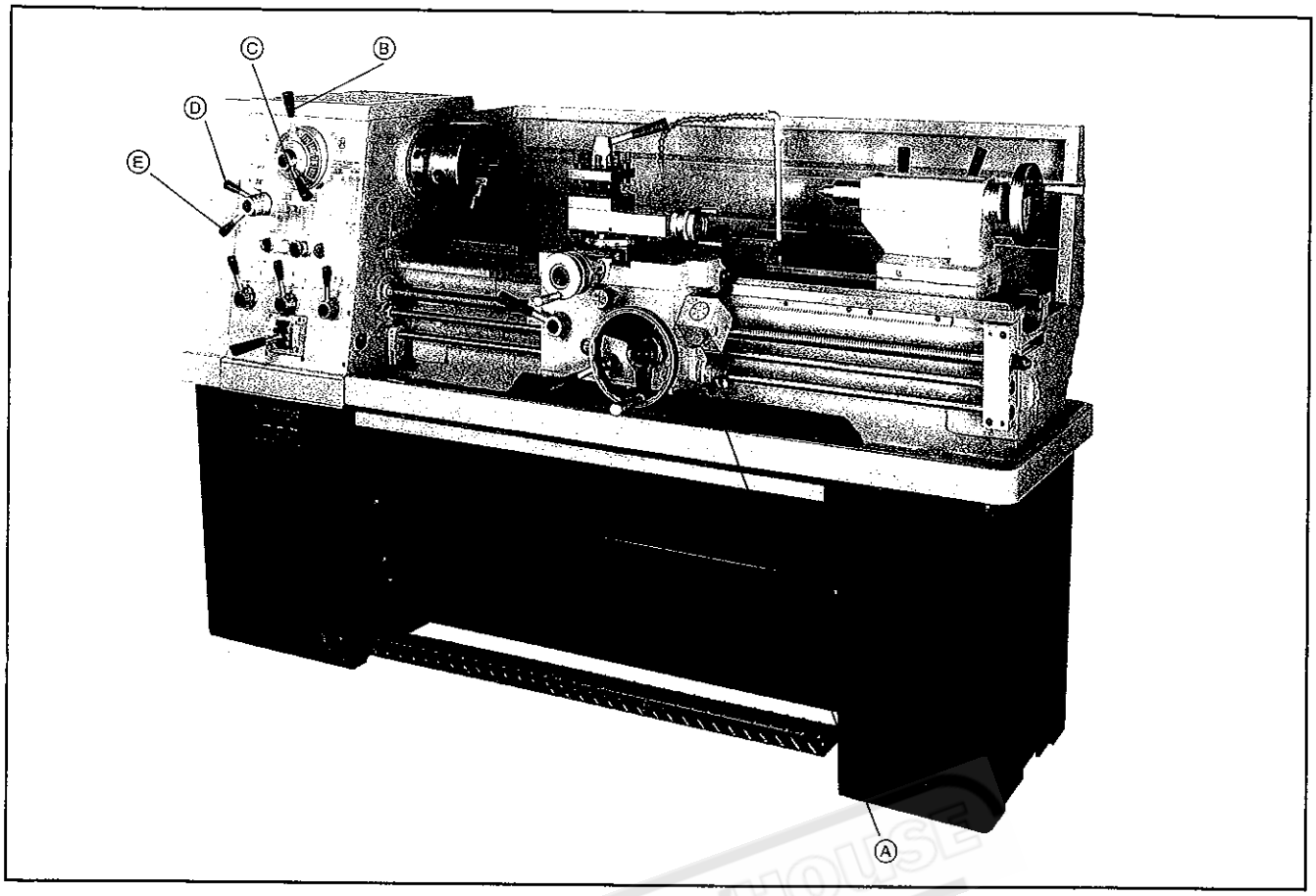


Fig.10

SPEED CONTROLS (Fig.10)

SPINDLE ROTATION: Selected by the control lever-A, the apron gate lever-A for Forward-off -Reverse selection; To move the lever out and downward to engage forward rotation of spindle, or upward to engage reverse rotation. Return to neutral position for spindle stop.

FOOTBRAKE: A foot pedal located between machine base plinths operates the spindle brake and cut off the power to the drive motor. After the foot-brake is applied, the lever-A should be returned to the neutral position to re-start the spindle rotation.

SPINDLE SPEEDS: There are eight(8) or sixteen(16)--optional available speeds selected by two control levers B & C on the headstock. When the lever-B upright at neutral, the free spindle easy for hand turning; Turn the lever-B to right 90 and bring the four(4) high speed red dial to the uppermost for selection; (but eight(8) speed red dial on the optional model) turn the lever-C with its arrow to the selected speed on dial. On the other hand, turn the lever-B to left 90 and bring the four(4)low speed blue dial to the uppermost for selection; (but eight(8) speed blue dial on the optional model) turn the lever-C with its arrow to the selected speed on dial. Both red high speed dial and blue low speed dial on optional models are shown two speeds in one column with L & H marks, to select the desire speed by turn the speed select knob on control panel to L or H.

WARNING: NEVER SHIFT SPEED CONTROL LEVERS B & C AND FEED LEVERS D & E ON THE HEADSTOCK WHILE THE SPINDLE IS ROTATING. RECOMMEND TO PRESS THE JOGGING BUTTON ON PANEL FOR HELPFUL THE LEVER CHANGES.

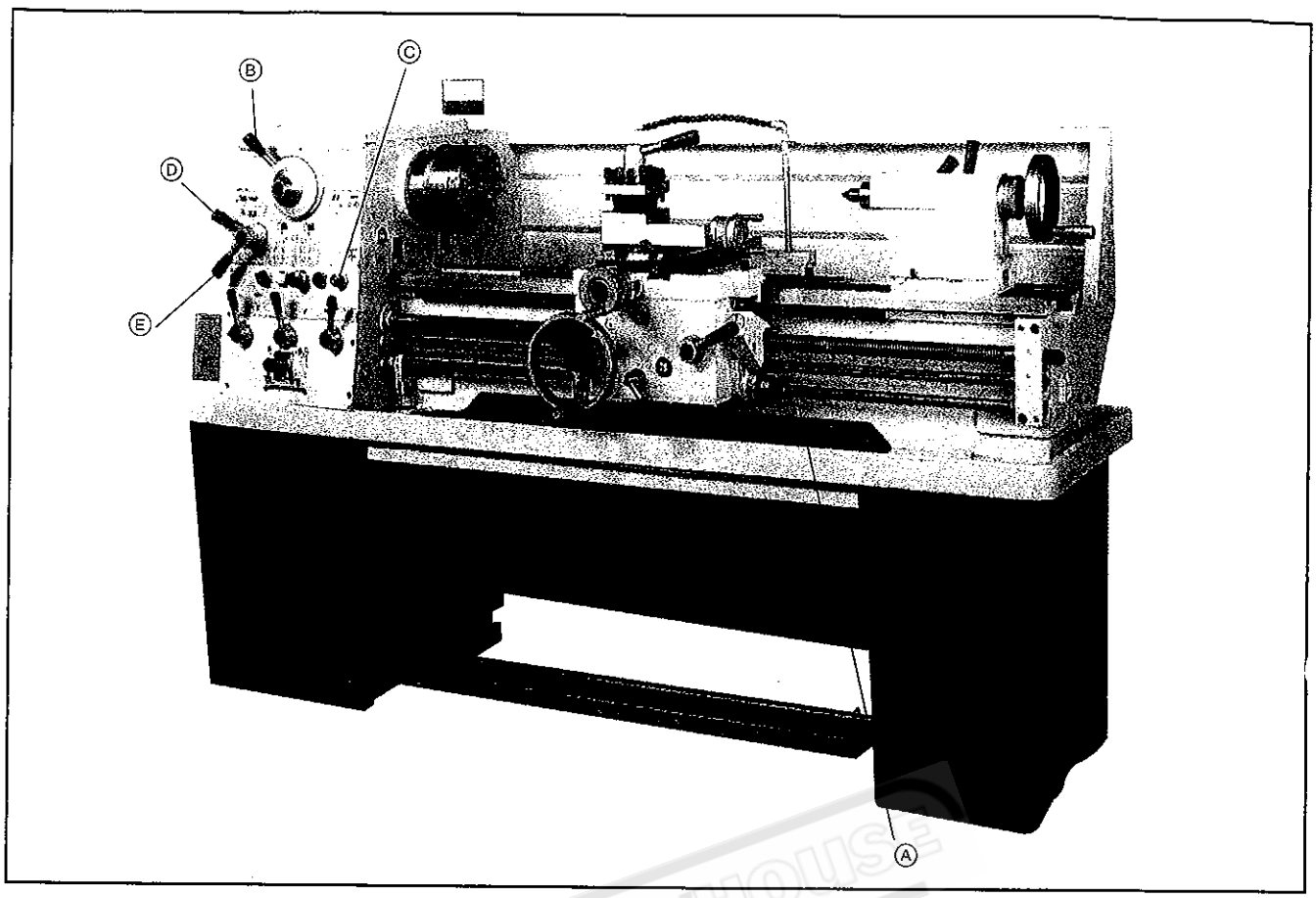


Fig.11

SPEED CONTROLS ON VARISPEED MODEL (Fig.11)

SPINDLE ROTATION: Same as the standard model selected by the control lever-A, which provided Forward-off-Reverse selection. To move the lever-A out and downward to engage forward rotation of spindle, or upward to engage reverse rotation. Return to neutral position for the spindle stop within very few seconds depends on its own Inverter preset parameter braking function.

FOOTBRAKE: Same as standard model, after the footbrake is applied, operates the spindle braking and cut off the power to the drive motor. The control lever-A should be returned to neutral position for restart the spindle rotation.

MAGNETIC BRAKE: If the lathe equiped with the magnetic brake (option) and without footbrake; to operate the control lever-A return to neutral position for spindle stop quickly and automatically

SPINDLE SPEEDS: A spindle speed select lever-B on the headstock provides High and Low speed ranges selection. STOP THE SPINDLE first and then rotate the select lever-B to engage "HIGH" or "LOW" speed ranges. Rotate the select turning knob-C on control panel to the minimum position by counter clockwise. Then, to operate the control lever-A for spindle rotation, and turning the select turning knob-C clockwisely from minimum to the desire constant speed slowly. The spindle speed will be displayed by the speed meter built on the top of the electrical box. Both of the two speed ranges provides the best torque characteristics of the drive motor for full lathe functions. A complete set of special parameter has been pre-set by the keyboard into the Digital Inverter. DO-NOT change or ALTER these parameter setting without the written consent of MANUFACTURER, as to do so will automatically void the machine warranty.

WARNING: NEVER SHIFT SELECT LEVER-B AND FEEDS LEVER-D & E ON THE HEADSTOCK WHILE THE SPINDLE IS ROTATING.

THREADS AND FEEDS

All the threads and feeds directly available from the feed gearbox are shown on the data plate (Fig.14) fitted on the front of the headstock (Fig.12). The setting of control levers as shown on (Fig.13).

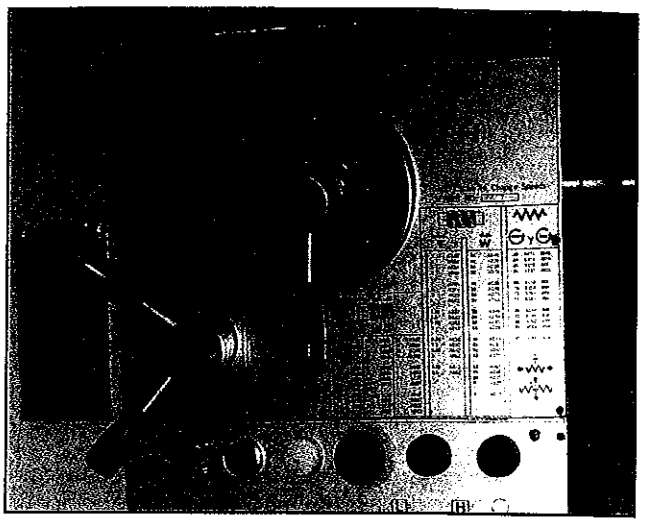


Fig.12

Threads available:

36--Whitworth Threads: 4--72 TPI.
27--Metric Threads: 0.4--7 mm.
21--Diametral Pitch Threads: 8--44 D.P.
18--Module Pitch Threads: 0.3--3.5 mm.
Feeding ranges:
The feeding speed per revolution ranges;
Longitudinal (Sliding) Feeds: 0.03--0.4 mm.
(0.0012"--0.016")
Cross (Surfacing) Feeds: 0.01--0.13 mm.
(0.0004"--0.0053")
Any special threads not shown on data plate, may request by special orders.

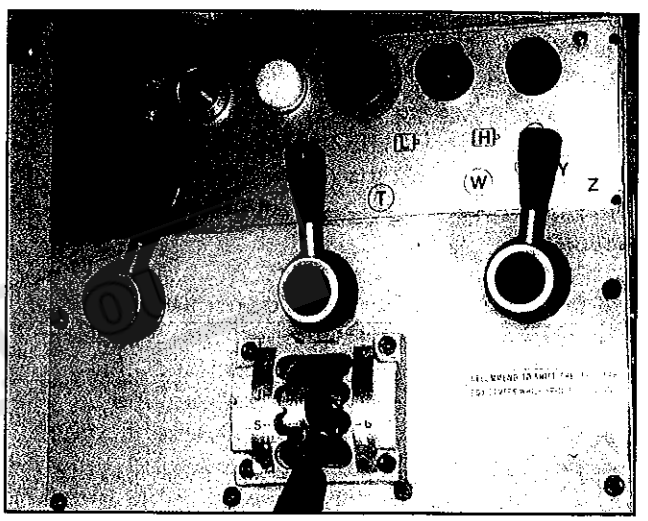


Fig.13

Important Notice:

The end gear train should be engaged as in the diagrams shown on data plate for different Metric or Imperial systems lathe to suit threading requirements. Recommend to shift four (4) change levers on feed gearbox while the spindle slow running.

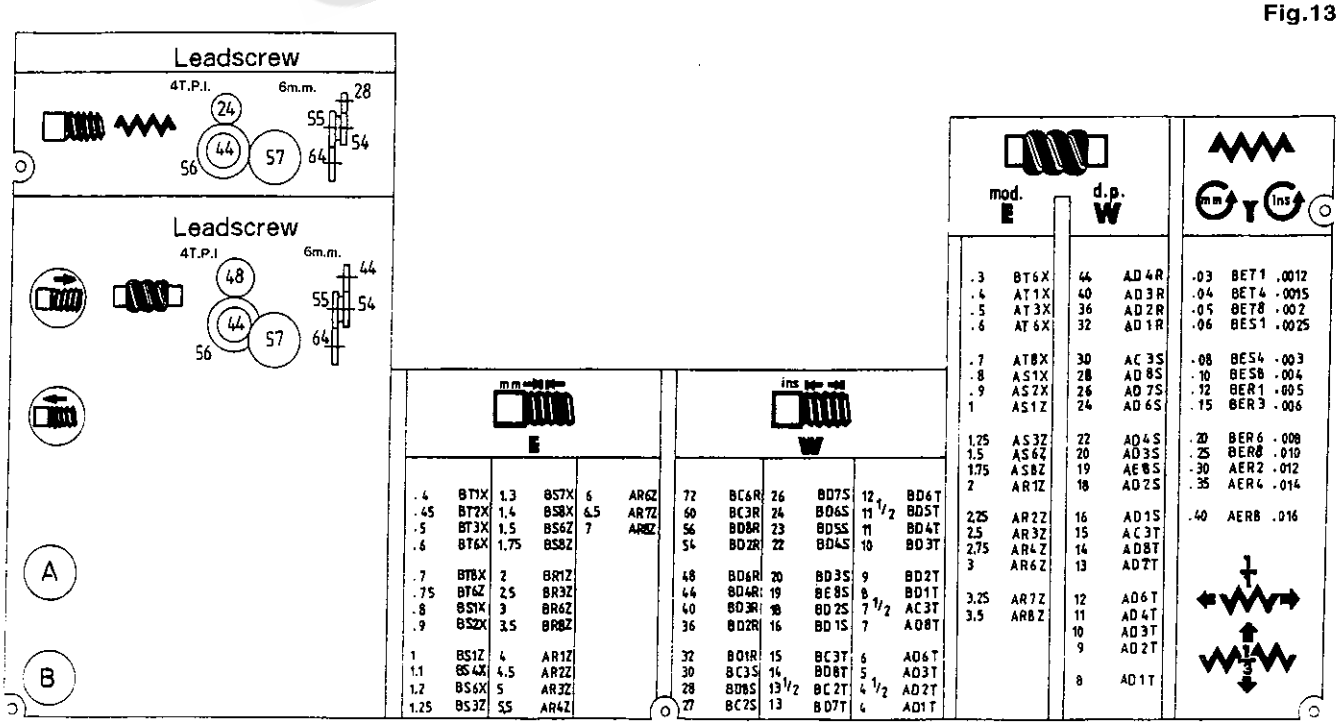


Fig.14

THREADING DIAL INDICATOR

Located on the right hand side of the apron, (except special request) the dial indicator is used to assist in locating the starting point for threads cutting. (Fig.15). To engage, swing the indicator upward meshing the pinion gear into the leadscrew correctly and tighten the set screw. When not performing threading functions, release the set screw and swing the indicator away from the leadscrew. This will prevent excessive wearing of the drive pinion. To cut threads with the carriage feed, engage the half-nut lever at the same location on the dial as it comes around past the datum mark.

INCHES LATHE for Inch threads cutting:
For EVEN numbered INCH threads, engage the half-nut at any line on the dial as it pass the datum mark. For ODD numbered INCH threads, engage the half-nut at any numbered line on the dial as it pass the datum mark. For fractional numbered threads (ex.1/2 or 1/4) you have to engage the half-nut at EXACTLY the same NUMBERED line per each cut. Please also study the data plate for threading which mounted on the side of apron near the indicator. (Fig.16)

METRIC LATHE for Metric threads cutting:
The Metric indicator equipped with 5 pinions on its shaft, but only the bottom one able to engage on leadscrew. The rest pinions as spare for various pitches engagement. When the machine on delivery, the engaged pinion is 14T. Refering to the Indicator Table (Fig.17), For example, to cut the 0.4/0.5/0.7/1.0/1.4 /1.75/2.0/3.5/7.0/14.0 mm pitch threads, engage the half-nut at per 1 thru 6 any line on the dial as it pass the datum mark. To cut the 0.8/4.0 mm pitch thread engage the half-nut at numbered line 1 only. For the other pitches not shown on 14T gear column, you have to change the pinion for engage on leadscrew. For example to cut 0.45/0.6/0.75/0.9/1.2/1.5/ 3.0/4.5/6.0/9.0 mm pitches, by using 18T pinion and engage the half-nut at numbered line 1 thru 6 per each cut. But for 0.8/4.0/12.0 mm pitches on 18T pinion, to engage the half-nut at numbered line per 1 & 3 &5 only. To cut 1.25/2.5/5.0/10.0 mm pitches, by using the 20T pinion and engage the halfnut at per 1 & 4 or per 2 & 5 or per 3 & 6 only. In the other hand, the 1.0mm pitch can be cut by using any one pinions, but engage the half-nut at different line as shown on table.

The INCH Indicator not able to use for Metric, D.P. and Module threads cutting; the METRIC Indicator also not able to use for INCH, D.P. and Module threads cutting. In this case, the half-nut must be kept closed on the leadscrew from the start of the thread cutting until finished.

When the end of thread is reached, the tool must be quickly withdrawn from the workpiece, while stopping the spindle. Then, while the half-nut are still engaged, reverse the spindle rotation which will move the carriage backward toward the starting point. Restart the spindle forward and infeed the tool into the workpiece at the desired spot.

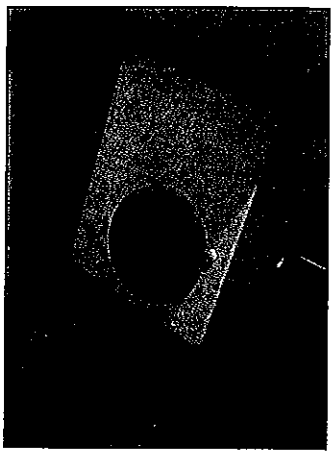


Fig.15

INDICATOR TABLE					
T.P.I	SCALE	T.P.I	SCALE	T.P.I	SCALE
4	1-8	13	1-4	27	1-4
4 1/2	1.3 / 2.4	13 1/2	1.3 / 2.4	28	1-8
5	1-4	14	1-8	30	1-8
6	1-8	15	1.3 / 2.4	32	1-8
7	1-4	16	1-8	36	1-8
7 1/2	1.3 / 2.4	18	1-8	40	1-8
8	1-8	19	1-4	44	1-8
9	1-4	20	1-8	48	1-8
10	1-8	22	1-8	54	1-8
11	1-4	23	1-4	56	1-8
11 1/2	1.3 / 2.4	24	1-8	60	1-8
12	1-8	26	1-8	72	1-8

Fig.16

INDICATOR TABLE						
GEAR	PITCH					SCALE
13T	1	1.3	6.5	13		1
14T	0.4	0.5	0.7	1	1.4	1.4 / 2.5 / 3.6
	1.75	2	3.5	7	14	
	0.8	4				1
18T	0.4	.45	0.5	0.6	0.75	1-6
	0.9	1	1.2	1.5	2	
	3	4.5	6	9		
	0.8	4	12			1.3.5
20T	0.4	0.5	0.8	1.	1.25	1.4 / 2.5 / 3.6
	2	2.5	4	5	10	
	8					1
22T	0.4	0.5	1	1.1	2	1.4 / 2.5 / 3.6
	5.5	11				
	0.8					1

Fig.17

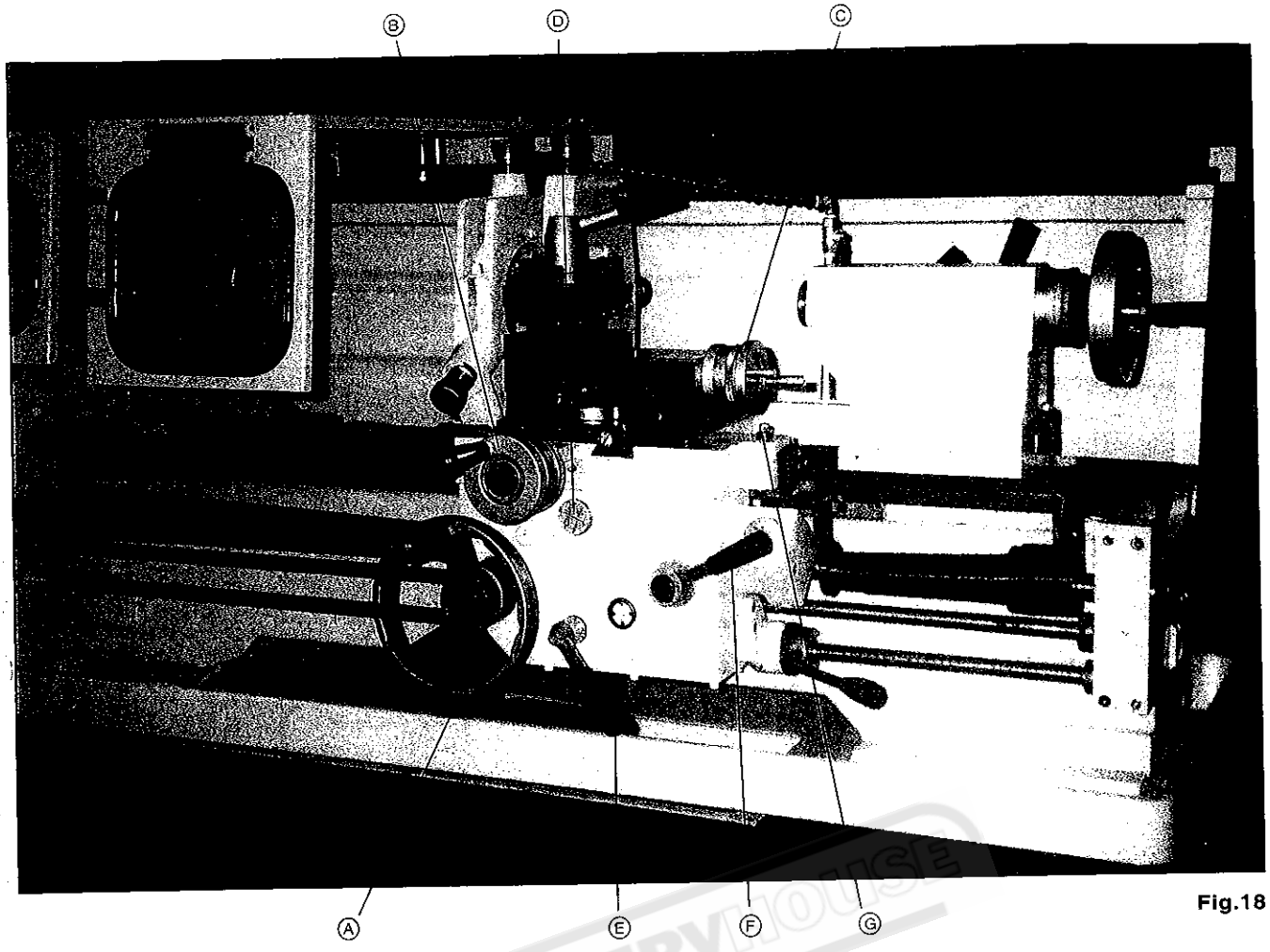


Fig.18

APRON AND SLIDE CONTROLS (Fig.18)

In addition to manual operation of the saddle by rotating apron handwheel--A, or the cross slide by handwheel--B, or the top slide by handwheel--C, Power feed is available to the saddle and cross slide.

1. Push-Pull knob--D selects power feed on surfacing (Cross slide) or sliding feeds; Push in for sliding feed, pull out for surfacing feed.
2. The feed engage lever--E is pull up for power feed engagement, and push down for manual operation.
3. The half-nut engage lever--F is pressed down to engage the leadscrew for threads cutting.
4. The reversing feeds and left-hand thread cutting by change the feed reversing lever on headstock.

CROSS SLIDE AND TOP SLIDE

Both handwheels carry dials graduated in Inch or Metric dimensions. The cross slide dial is graduated to indicate changes in workpiece diameter and the top slide is graduated to indicated tool movement. Both dials available to graduated with dual dimensions by special request. The solid or T-slotted top slide is mounted on a rotatable base to the cross slide which is graduated 90-0-90 degrees. Care should be exercised when rotating the base ensuring that the correct spanner is used to slacken the lock nuts and that they are adequately tightened after adjustment. Whenever possible the top slide should be positioned with the toolblock located over the rotatable base to give maximum support. Particularly, when using parting off tools and heavy cutting.

SADDLE LOCK SCREW (G)

It is lock the saddle to the bed for surfacing or cut off operations.

NOTICE: Make sure UNLOCK the saddle lock screw before attempting to move the carriage. Otherwise damage to the machine may occur.

TAILSTOCK

Can be freed for movement along the bed by unlocking the clamp lever--A. The tailstock barrel is locked by lever--B(Fig.19).

SAFETY STOP

Stop pin--C is fitted to prevent the tailstock inadvertently sliding off the end of the bed. Always ensure that the pin is secure and replaced after removal.

BARREL

Tailstock barrel is graduated in Inch and Metric scales for the approximate length on travel. The taper of the center is MT. No. 3, standard tang drill or sleeve with M.T. No.3 shank can be used directly. But barrel travel will be reduced by the difference in length of the standard shank and tang length.

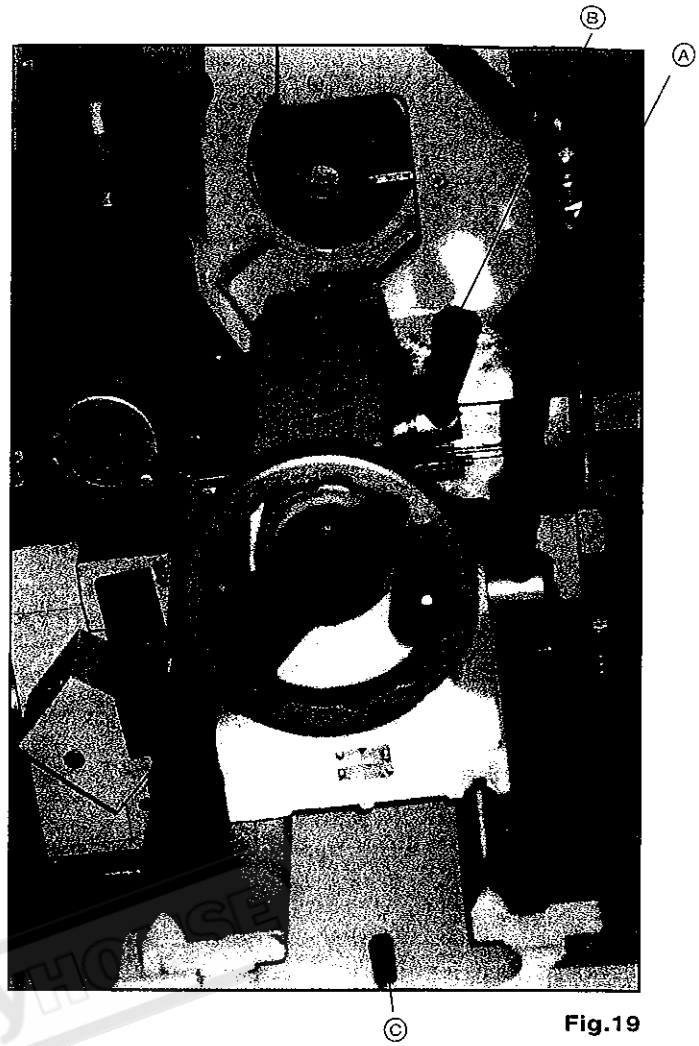


Fig.19

SET-OVER

The tailstock can be set-over for production of shallow tapers or for realignment. To release the clamp lever--A and both fixed screws under the front and rear of the tailstock base and then adjusting screw--S at each side of the base to move the tailstock body laterally across the base.(Fig.20) An indication of the set-over is given by the datum mark--D at the tailstock end face as shown on Fig.20. Retighten both fixed screws andApply the clamp lever after adjustment of set-over.

CLAMP LEVER ADJUSTMENT

The clamp lever act as a crank arm to lift the clamping plate clamped on bed. To adjust the height of bolt--E by its locking nut--F (Fig.20) which under the clamp plate for given the stable clamp force and the proper position of clamp lever on clamped.

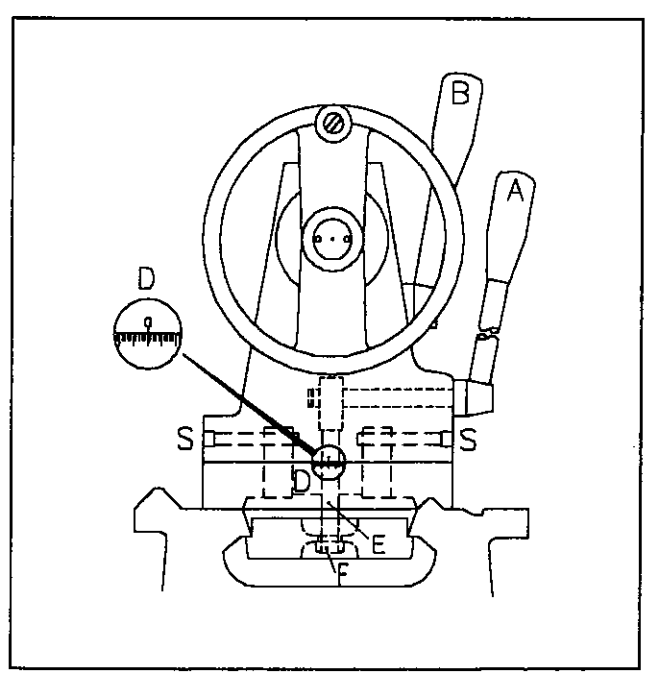


Fig.20

LATHE ALIGNMENT

With the lathe installed and running, we recommend a check on the machine alignment before commencing work. Check levelling and machine alignment at regular 6 months to ensure continued lathe accuracy.

HEADSTOCK CHECK

Take a light cut with a keen tool over a 150mm (6") length of 50mm (2") dia. steel bar gripped in the chuck, but not support at the free end. Micrometer reading at each end of the turned length at A and B of Fig.21 should be the same.

To correct a difference in readings, slacken the four headstock hold-down screws--J shown on Fig. 22, and adjust the set-over pad--K beneath the headstock. To make the spindle nose end forward to operator by loosen screw-A and tighten the screw-B. To make the spindle nose end backward from operator by loosen screw-B and tighten screw-A. Tighten all hold-down screws after adjustment and repeat the test-cut and micrometer-reading sequence until micrometer readings are identical, i.e. machine now cutting absolutely parallel.

TAILSTOCK CHECK

Using 300mm (12") ground steel bar fit between headstock and tailstock centres, check the alignment by fitting a dialtest indicator to the top slide and traversing the center line of the bar. (Lower sketch on Fig.21).

To correct error by release the tailstock clamp lever and both fixed screw under the front and rear of the tailsrock base, then adjust the two set-over screws provided. Continue with checking and correction until the alignment is perfect. Retighten both fixed screws.

END GEAR TRAIN

Power from the headstock to the feed gearbox is transmitted through a gear train enclosed by the headstock end-guard. The intermediate gears are carried on an adjustable swing frame--M shown on Fig. 23. Gears must be throughly cleaned before fitting and backlash maintained at 0.127mm (0.005") for correct meshing. Lubricate gears regularly with thick oil or grease.

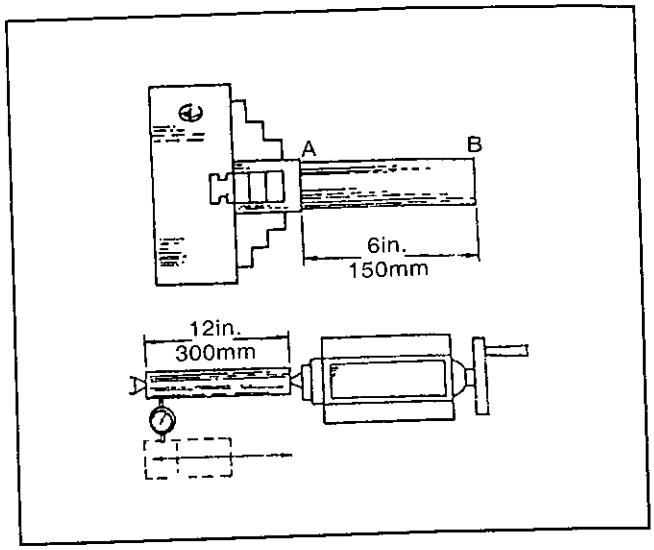


Fig.21

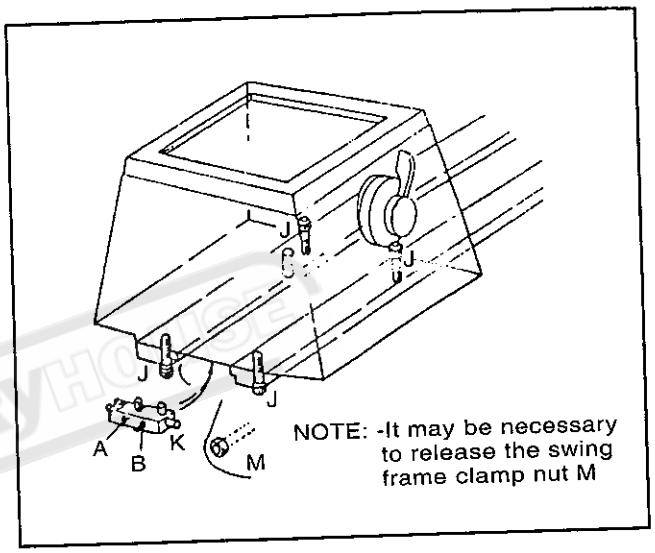


Fig.22

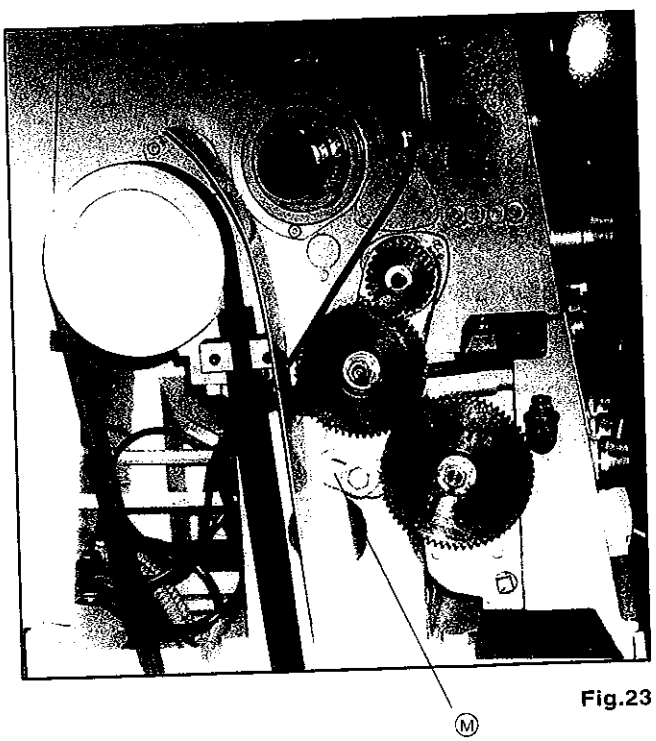


Fig.23

BELTS TENSION (FIG.24)

To check the driving belts tension, apply light finger pressure at a point midway between motor and headstock pulleys should produce about 13 mm (1/2") movement of each belt when under correct tension. To alter belts tension, remove the motor cover in back side of headstock plinth and adjust the two supporting screws (X) on the hinged motor platform. (Fig.25). Ensure that the motor axis is kept level and both pulleys are aligned correctly.

LEADSCREW SHEAR PIN (Fig.26)

The transmission is protected against severe overload by a shear pin (E) into the leadscrew drive, just to the right of the feed gearbox.

To replace a sheared pin, first disengage the drive to the leadscrew by setting the righthand lever of the feed gearbox to an intermediate position. Then rotate leadscrew (L) until the broken pinhead on the collar (C) face to you for removal. Next to rotate the drive shaft (B) to allow the pin shank to be pushed out of the slot in the flanged housing (A).

Reposition the drive shaft (B) and align the holes on collar (C) to fit a new pin. Use only correct replacement shear pin of 4mm spring steel. The spare pins are supplied with machine in the toolbox.

FEED ROD SHEAR PIN (Fig.27)(Fig.28)

The power transmission from feed gearbox to feed rod is connected by a shear pin(E). To replace a sheared pin, same as above mentioned to free the gears engagement to feed rod; Then rotate the feed drive shaft (D) and feed rod (F) to get both pin holes face to you for removal the sheared pin head and shank.

Reposition the drive shaft and align feed rod the holes to fit a new pin. Use only correct new shear pin of 5 mm spring pin. The spare pins are supplied with machine in the toolbox.

FEED ROD OVERLOAD CLUTCH (FIG.28)

The overload clutch on feed rod to protect against severe overload. Between the feed drive shaft (D) and feed rod (F) are coupled by a pair of steel balls (B) and tension springs (P) along with the torque adjusting screws (A). The overload torque may cause the steel ball slip in the gap of drive shaft.

Please don't treat this device as a automatic feed stop; the over torque will not to slip the feed rod and cause serious damage.

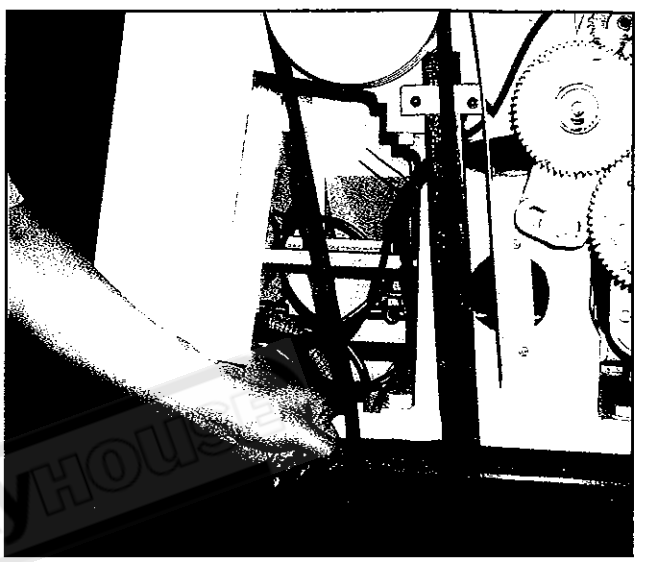


Fig.24

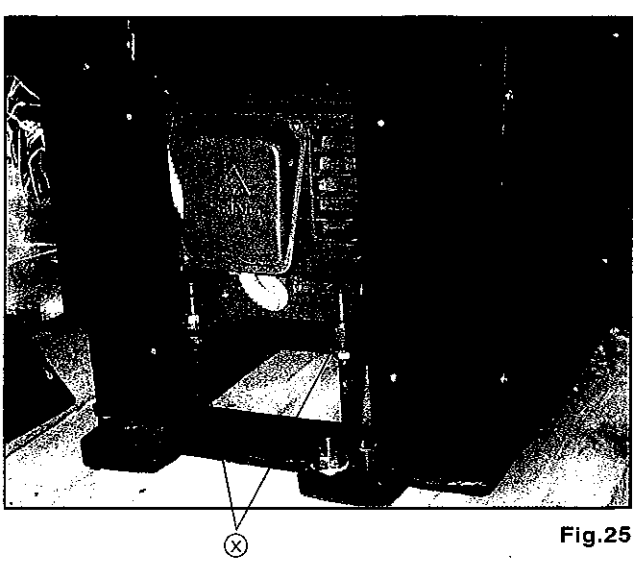


Fig.25

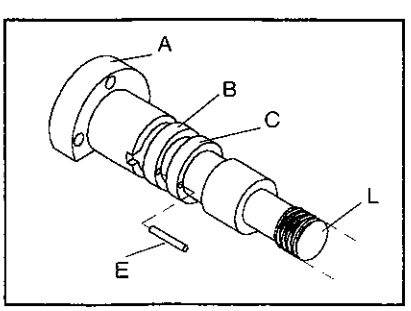


Fig.26

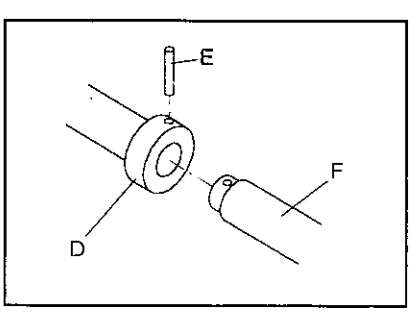


Fig.27

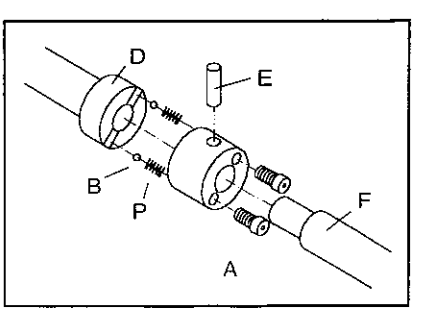


Fig.28

SLIDEWAYS ADJUSTMENT

Tapered gib-strips are fitted to slideways of saddle, cross and top slides, any slackness which may develop can be rectified by restting the gibs with the adjusting screws provided.

SADDLE ADJUSTING (Fig.29)

The excess clearance between saddle and bedways must be closely adjusted. Slacken the right side gib adjusting screw (A) and fasten the left side gib adjusting screw (B). The gib will take off play between saddle & the bedways.

The back clamp of saddle equipped with straight gib underneath the bedways. To adjust the clearance by slacken the three nuts (N) on the gib adjusting screws (M), then fasten the screws (M) by key wrench. After the adjustment, re-tighten the nuts (N).

CROSS SLIDE ADJUSTING (Fig.30)

In order to eliminate the excess clearance between the saddle and cross slide; To slacken the gib adjusting screw (A) at rear end of cross slide, and tighten the gib adjusting screw (B) at the front end. Making only a slight alteration with constant checking for smooth action. After proper adjustment, retighten the rear end adjusting screw (A).

TOP SLIDE ADJUSTING (Fig.31)

The top slide available to adjust the taper gib as cross slide. To slacken the rear gib adjusting screw (A) and fasten the front gib adjusting screw (B). After proper adjustment re-tighten the rear end screw (A).

NOTE: Ensure that slideways are throughly cleaned and lubricated before making any adjustment. Avoid over adjustment which will only result in stiff and jerky action of the slide concrened.

BACKLASH ADJUSTMENT OF CROSS SLIDE

The backlash on cross slide may develop in service. There are two possibility may need to adjust as belows:

(1) Lossen the set screw (B) on handwheel (Fig. 32), to adjust or tighten the plug (A) of handwheel to eliminate the backlash on handwheel.

(2) To release the lock screw of cross slide and rotate the cross silde handwheel to move it backward till the cross slide nut of its screw get out of saddle as Fig. 32. Tighten the adjusting screw (C) slightly and repeat the handwheel rotating for the cross slide movement sequence until the backlash was eliminated and smooth movement. Re-tighten the lock screw of cross slide.

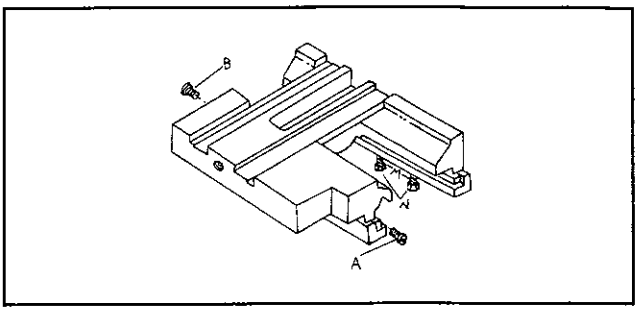


Fig.29

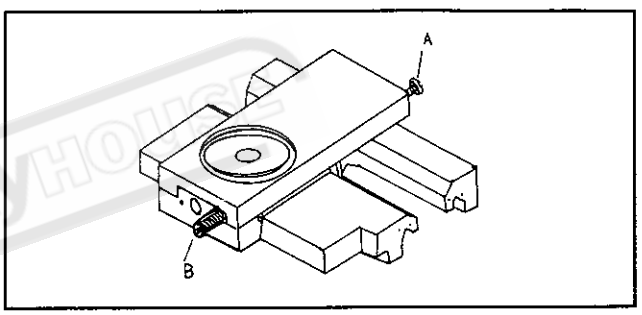


Fig.30

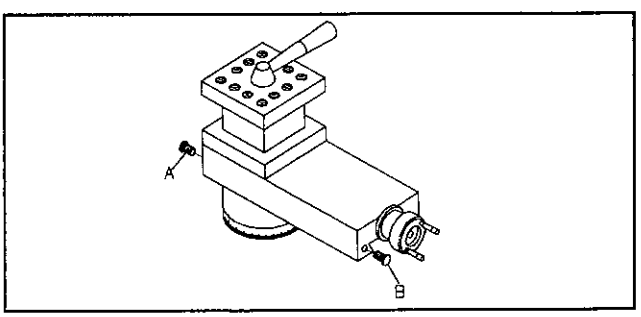


Fig.31

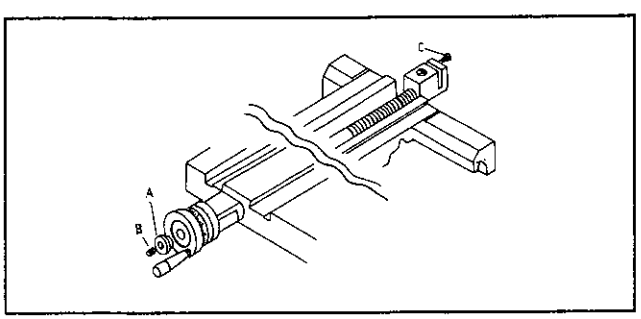


Fig.32

LEADSCREW ADJUSTMENT (Fig.33)

As the leadscrew got slackness, will cause the threads cutting incorrect. To eliminate the slackness, by loosen the dome nut (A) first, then tighten the nut (B) secondly and re-tighten the dome nut(A) finally.

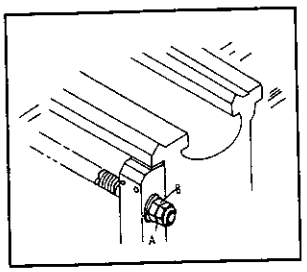


Fig.33

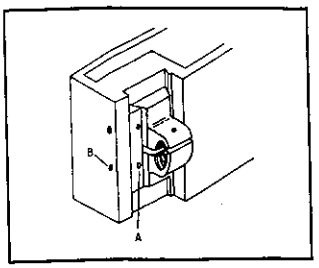


Fig.34

HALF-NUT ADJUSTMENT (Fig.34)

The half-nut unit may worn out the slideways on open/close motion. The provided adjustable gib can be eliminated the clecrance. To dismantle the apron from saddle and took off the leadscrew and feed rod. Loosen the set screws (A) and tighten the adjusting screw (B) to get the proper and smooth movement of half-nut; then re-tighten the set screws (A).

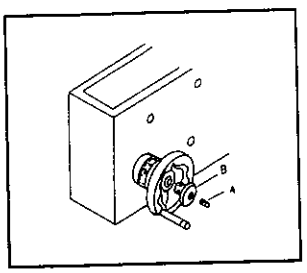


Fig.35

APRON HANDWHEEL ADJUSTMENT (Fig.35)

The clearance of the apron handwheel adjustable by loosen the set screw (A) and tighten the plug (B) to proper position; retighten the set screw (A) after adjusted.

SPINDLE BEARING ADJUSTMENT (Fig.36)

The main spindle have too much runout may caused on wearing of the bearings and/or the end trust adjusting nut have loosen up. To adjust the bearing, open the end gear cover, release the bearing cover and loosen the set screws (S) on the trust nut (N). Then, tighten the nut (N) by G-type lock spanner carefully. After adjusting the end trust nut, retighten the set screws (S).

NOTE: Over tightening the end trust bearing nut will cause excessive heat build-up in the bearing and premature bearing wear.

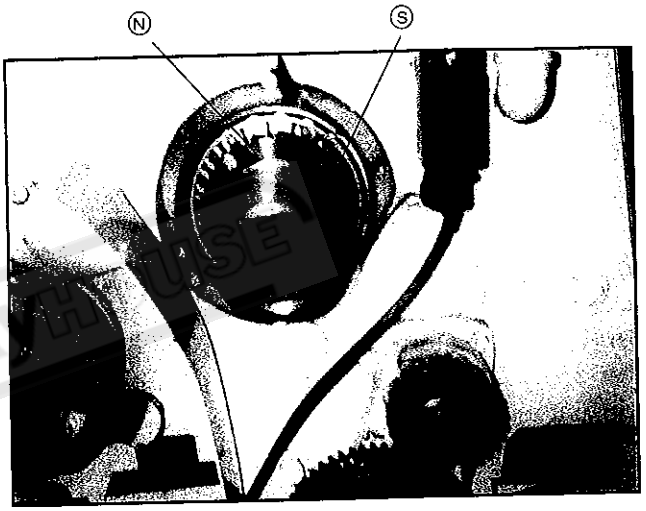


Fig.36

SPINDLE BRAKE REPLACEMENT (Fig.37)

Inside the end gear cover, the driven pulley behind the main spindle, as a brake drum with its built-in braking unit. During apply the footbrake pedal for quick braking of the main spindle; The foot pedal connecting rod passes a switch to shutdown of motor power at the same time along with expanding the brake shoes to stop the pulley. The brake shoes are designed to wear out and are non-warranted items. To replace the deteriorated brake shoes by dismantle the driven pulley for replace the new brake shoes assembly of Parts No. A-9800.

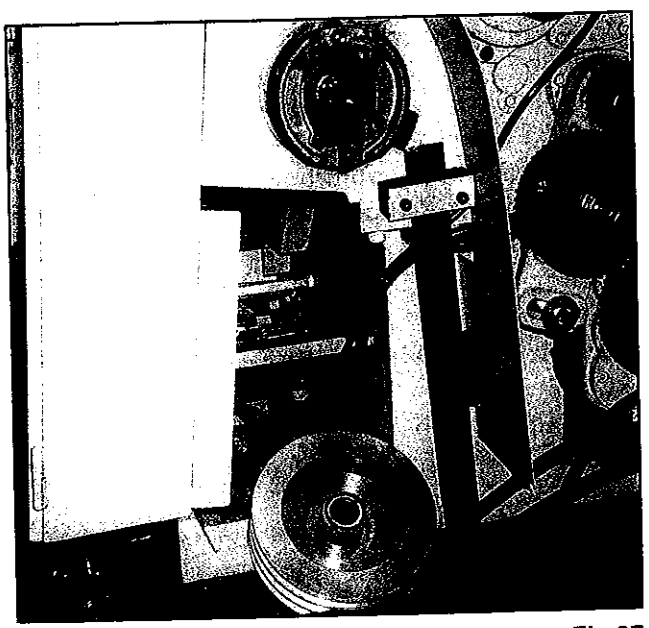


Fig.37

PREVENTIVE MAINTENANCE

DAILY INSPECTION

In principle, the daily inspection of lathe is carried out on basis of each shift. The inspection work should be done as the following:

1.Check before starting the motor.

(A)Clean-up of machine; Dust, chips and any other articles should be removed from sliding ways of machine. To make sure the rotating and sliding parts performing easy and smoothly operation. All the other static parts have to clean often to avoid the corrosion.

(B)Greasing and oiling; Regular oiling should be done every day to keep the machine properly lubricated. (Ref. to Lubrication Chart).

(C)Check running parts; The main spindle, leadscrew, feed rod and cross slide etc., would be examined and adjusted to proper fitness without too tight or loose.

(D)Check the sensitivity and reliability of all manual controls; To try the functions of spindle speed changing levers, feeds select levers, feeds and threads engaging levers and rotation control lever all with sensitive and reliable action.

(E)Check the fixture and fig; To examine the headstock, tailstock, tool holder etc., all the mounting fixtures and figs with correct lock and clamp.

2.Check after starting the motor.

(A)To check electrical control system; To examine all the buttons, pilot lamp, switches and rotation control lever operate sensitively and strictly.

(B)To check mechanical control devices; To examine the spindle speed change, feeds and threads change, automatic stop and foot braking should be sensitive, security and reliable.

(C)To check noise and vibration; To start the lathe with maximum spindle speed at no load basics, check the noise and vibration should be lower than the level.

(D)Lubrication check; To examine all the lubricating reserviors with enough oil on the level mark of oil sight. To oiling all the oilers on slideways and end gear train, leadscrew & feed rod.

(E)coolant system check; to examine the quantity of coolant oil in tank and switch on the pump for inspecting its function and leakage.

3.Caution on operation.

(A)Temperature of bearings; After half hour running, to examine the main spindle bearing temperture by hand feeling with normal warm up.

(B)Abnormal noise and vibration; To stop the lathe immediately for inspection and adjustment.

(C)Miss accuracy of products; When the products is out of limit accuracy, to stop the lathe at once for finding the causes of defects.

(D)Safety affairs;
ISOLATE MACHINE WHEN LEAVING IT UNATTENDED.
STOP RUNNING FOR CHANGING SPINDLE SPEEDS.
NOT ALLOWED TO LEFT ANY TOOLS AND PRODUCTS ON LATHE.

4.Check after operation.

(A)Release all engaging device; To switch off the isolate and emergency switches and placed the spindle speed lever, feeds lever , half-nut lever, rotation control lever etc..in the neutral position.

(B)Tool collection; All the tools should be returned to original position such as tool box and tool cabinet.

(C)Proper location; The tailstock, carriage, saddle, cross & top slides should be placed on proper location.

(D)Clean-up machine; To remove the chips and coolants completely from the machine and oiling the slide ways and bright surface to prevent any corrosion.

WEEKLY INSPECTION

1.Lubricating system.

(A)Check oil reserviors and replenish with fresh oil to the level.

(B)Clean-up the end gear train, leadscrew and feed rod then lubricate with fresh oil.

2.Coolant system.

Clean-up the whole system including the chip pan, filter, hopper, chutes and tank, removal chips and dirt. Replenish with new coolants.

3.Transmission system.

(A)Check the v-belts and adjust its tension from motor plate.

(B)Check the end gear train with proper engagement and adjustment.

MONTHLY INSPECTION

1.Clean-up exactly; removal all the dust, chips and any other matters from lathe.

2.Check electrical system; To examine all the connection wires, cables, switches and terminals which may damaged by chips occasionally or loosen on vibration.

3.Check the vibration and levelling; To examine the abnormal vibration which may cause on lost levelling, adjusted and tighten levelling screws.

SEMI-YEARLY INSPECTION

1.Exchange oil in headstock, feed gearbox and apron; To drain and cleanup the mentioned oil reserviors and replenish with fresh recommend lubricating oil. (Recommend an oil change within 3 months for new machine.)

2.Check the oil leakage; The oil reserviors gaskets (packing) may damaged and leaking, replace it.

3.Check and adjust the backlash; To examine the backlash on cross slide, and the clearance on leadscrew and other handwheels. To adjust and tighten the relative screws or nuts according to the instructions listed in the previous chapters.

4.Check the levelling; To examine the levelling by adjusting and tighten the levelling screws.

5.Check the accuracy; To examine and adjust (if necessary) the alignment, clearance etc. as the accuracy test record accordingly.

6.Check the gears and bearings; The abnormal noise may cause on worn gears and bearings, if necessary replace it.

YEARLY INSPECTION

More carefully to do the semi-yearly inspections as the above mentioned.

1.Repaint; After one year operation, recommend to repaint the machine with the same colours.

2.Check the exposed parts; Which may damaged, corroded or deformed, to repair or replace it, if necessary.

TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSES	REMEDY
Overheat of headstock bearings	1.Oil level in headstock is too low or too much.	Replenish or discharge the oil to the proper level.
	2.Quality and viscosity of oil is wrong.	Replace the oil with recommended one.
	3.Oil is too dirty.	Replace the oil.
	4.Oil hole in bearing obstructed by dirt.	Remove the dirt from the oil hole.
	5.Bearing obstructed by dirty.	Clean the bearing and renew oil.
	6.Badly worn bearing.	Replace bearing.
	7.Bearing is not inproper position.	Dismantle and reassemble it.
	8.Bent or sprung main spindle.	Straighten or replace it.
	9.Too much end thrust.	Adjust thrust nut.
Oil leakage	1.Plug of drain not tight.	Resealing and tighten.
	2.Case cracking.	Repaired by special welding.
	3.Leakage from overflow.	Tighten cover screws.
	4.Packing or gasket damaged.	Replace packing or gasket.
	5.Leakage from overflow on spindle bearing housing.	Less oil flow to bearing or enlarge oil return flow.
Excess noise or vibration of machine.	1.Badly worn bearing.	Replace bearing.
	2.Lose levelling.	Recheck levelling & tighten.
	3.Badly worn V belts.	Replace V belts.
	4.Lose belt tension.	Adjust belt tension.
	5.Badly worn gear.	Replace gear.
	6.Bent or sprung shaft.	Straighten or replace shaft.
	7.Pulley loosen.	Tighten pulley set screw.
	8.Clamp of workpiece in loose status.	Tighten clamp.
	9.Bearing trust too loose.	Tighten end trust nut.
	10.Headstock not tighten on bed.	Tighten fixed screws.
	11.Excess clearance between the carriage and bed.	Adjust the gib and tighten back clamp.
	12.Excess clearance in cross or compound slide.	Adjust taper gib.
	13.Cutting tool failure.	Replace correct cutting tool or regrind it.
	14.Tool holder not tight enough.	Tighten again.
	15.Weak tool shank or too long.	Replace rigid tool or reset.
	16.Unbalance of workpiece while high speed running.	Balance workpiece or reduce spindle speed.

TROUBLE SHOOTING

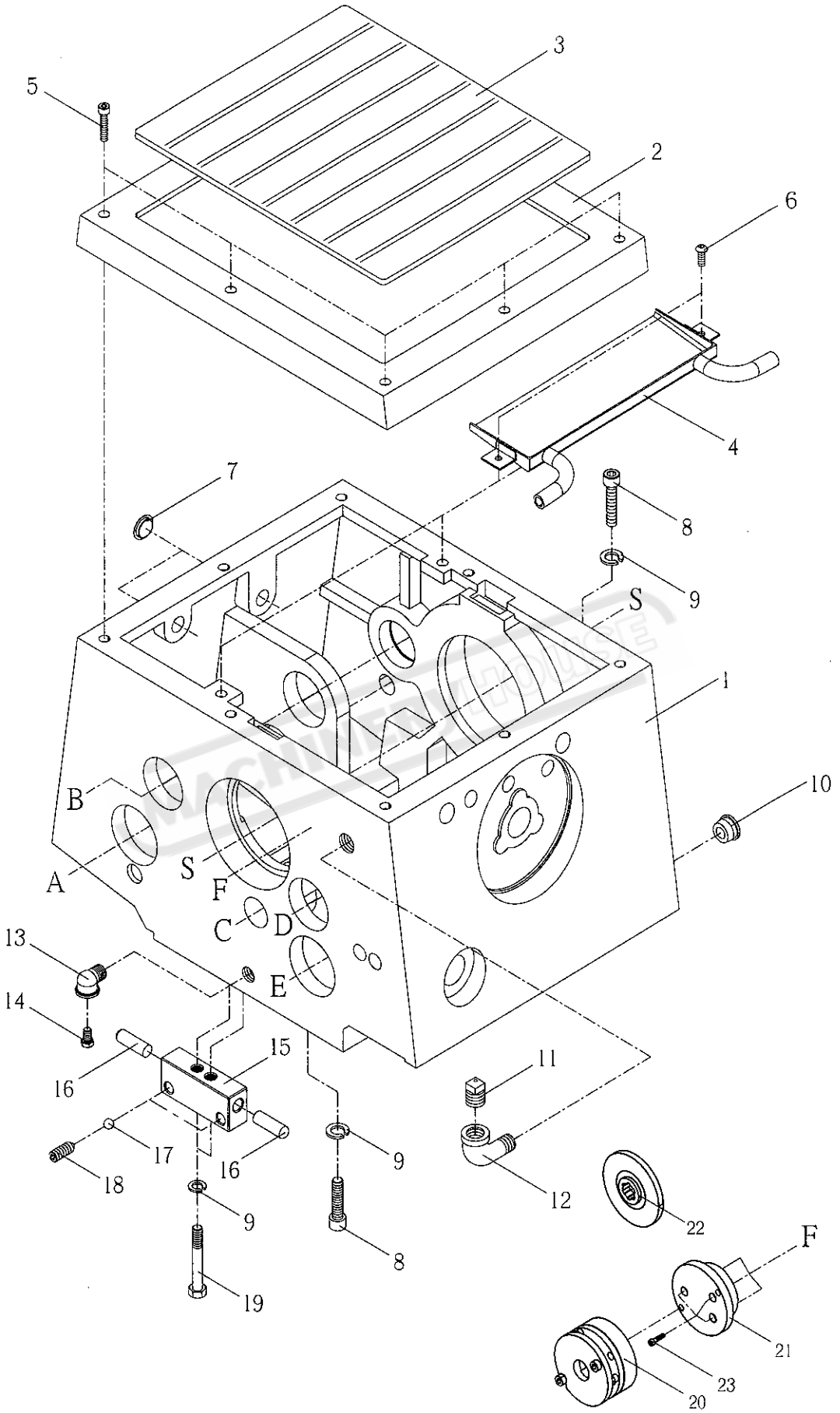
TROUBLE	PROBABLE CAUSES	REMEDY
Bending on long workpiece cutting.	1.Feed value too large. 2.Workpiece too thin or too long.	Reduce feed value. Use follow rest to support and adjust tool position.
Failure on prodcuts accuracy.	Accuracy fail on machine.(Ref. to Inspection record)	Recheck the accuracy of machine and adjust.
Uneasy to hold change levers.	Set spring broken or too weak.	Adjust set screw or replace the spring.
Misalignment of chuck with spindle nose.	Incorrect position of cam.	Adjust the cam and lock it in proper position.
Uneasy to cut thread.	1.Excess clearance of leadscrew in axial direction. 2.Excess clearance on carriage or cross-slide. 3.Worn thread or nut in cross-slide. 4.Worn leadscrew or halfnut. 5.Worn end gear or incorrect engagement. 6.Bent leadscrew. 7.Incorrect threading tool and wrong positioning. 8.Incorrect engage the halfnut. 9.Threading dial indicator not inproper engaged leadscrew. 10.Too much infeed per cut or too fast spindle speed.	Ajdust the trust nut at the end of leadscrew. Adjust the gib. Adjust the backlash or replace it. Replace it. Replace or ajdust the end gear. Straighten it. Replace threading tool and reset it. Engage the halfunt exactly. Adjust the indicator engagement on leadscrew. Reduce the infeed per cut or spindle speed.
Tailstock clamp not stable.	The ecentric clamping height too long or too short.	Adjust the nut on clamp bolt.
Failure on foot brake.	1.Badly worn on brake shoes. 2.Fails on controled limit switch.	Replace brake shoes. Adjust the limit switch position or replace it.
Failure on power feeding.	1.The half-nut lever not disengage at all. 2.Feeds change lever incorrect positioning. 3.The safety latch and interlock pin failure.	Disengage half-nut lever exactly. Push-in or pull-out the lever exactly. Replace the safety latch or interlock pin.
Failure lubricating on slideways.	Oilers obstructed by dirty or damaged.	Replace the oilers.

TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSES	REMEDY
Fails to start.	1.Circuit not complete. 2.Power may be off. 3.Overload relay off.	Check switch, leads, fuse etc. replace or reconnect properly. Check cable connection. Reset overload relay.
Incorrect spindle speed.	1.Voltage below rated. 2.Connecting cable too small. 3.Inproper or loose connection of lead. 4.Failure on spindle select knob. 5.Overload.	Check power source voltage. Reset input voltage of parameter according to power supply.(VS.model) Enlarge connecting cable. Recheck all leads connecting. Replace it. Reduce cutting speed and deepth or feed rate.
Wrong rotation.	Wrong sequence of phases.	Reverse any two leads connecting for motor.
Motor noisy and vibration.	1.Motor loosely mounted. 2.Strained mounting frame. 3.Bent or sprung motor shaft. 4.Foundation inadequate or motor feet uneven.	Tighten mounting bolts. Shim to motor feet for equal mounted. Straighten or replace it. Stiffen mounting place or add shims under foot pad.
Overheat in motor.	1.Excess belt tension. 2.Cooled fan failure. 3.Badly worn on bearing. 4.Short grease in bearing. 5.Overload. 6.Incorrect speed range running continuous.	Adjust belt tension. Check the fan in proper work. Replace bearing. Replenish grease. Reduce cutting speed or feed rate. Change speed range and adjust speed select knob.
Coolant pump failure.	1.Wrong rotation. 2.Coolant not enough or return filter obstructed. 3.Overload relay off.	Reverse any two leads to pump. Replenish coolant or clean return filter in chip tray. Reset overload relay.
Varispeed model inverter alarm.	1.Operation error. 2.Parameters inproper setting. 3.Circuit not complete. 4.Footbrake switch keep in touch. 5.Inverter problems.	Power switch off for 20sec. re-switch on as reset. Changing the parameters or contact with manufacturer. Check the power source and reconnect properly. Re-positioning the switch and tighten it. Return the inverter to manufacturer for repair or replace.

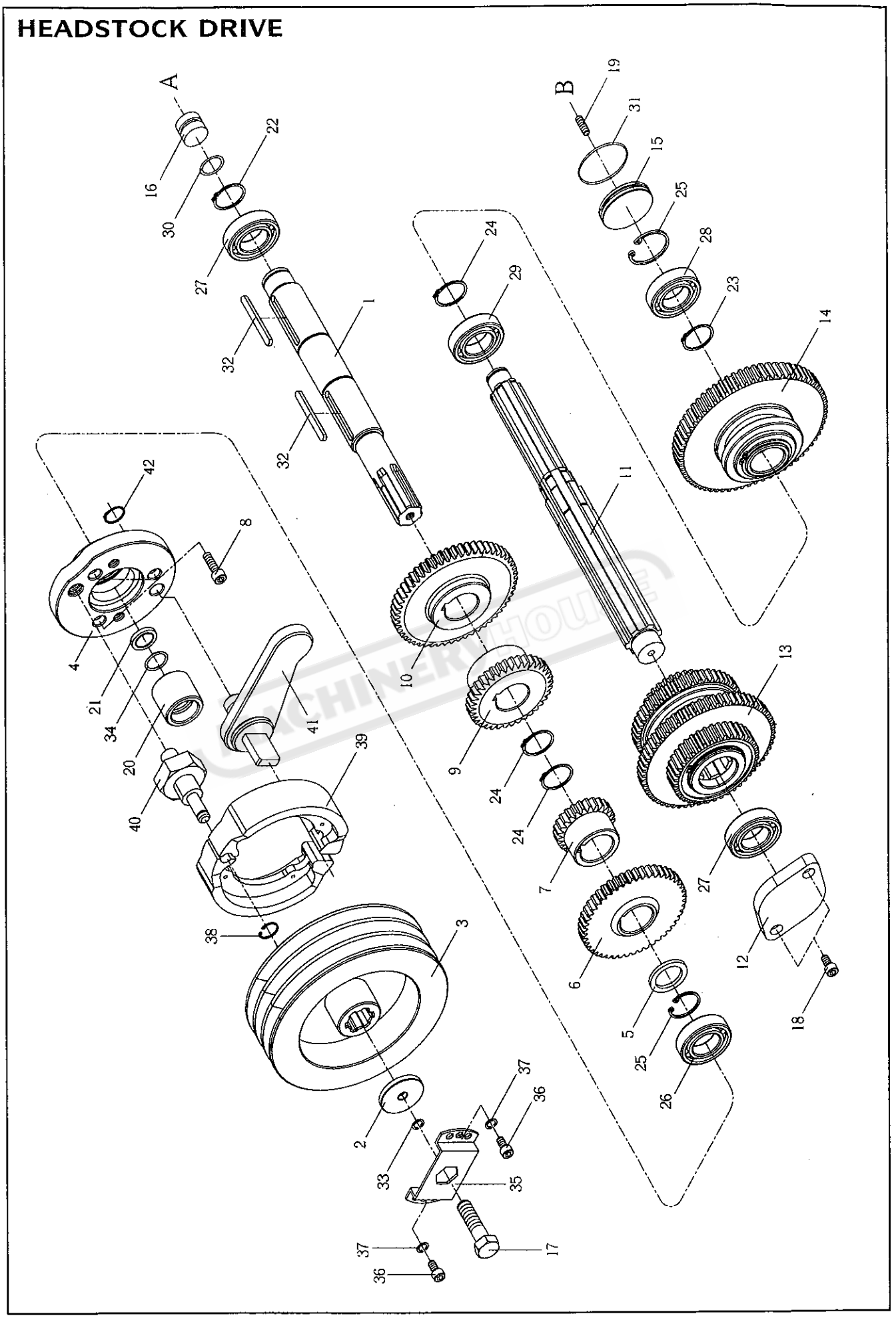
SPARE PARTS INDEX

HEADSTOCK CASING



HEADSTOCK CASING

NO.	PART NO.	DESCRIPTION	QUANTITY
1.	T-1001	Headstock Casting	1
2.	T-1002	Headstock Cover	1
3.	T-1002-1	PVC Pad	1
4.	T-1003	Tray	1
5.	A-1208	Socket Head Cap Screw (M6 x 40)	8
6.	A-1510	Cross Recessed Head Screw (M6 x 12)	2
7.	A-4505	Plug	2
8.	A-1208	Socket Head Cap Screw (M10 x 40)	4
9.	A-1807	Spring Washer (ø10)	6
10.	A-9501	Oil Sight (ø29)	1
11.	A-0488	Plug (1/2PT)	1
12.	A-0489	Elbow (1/2PT)	1
13.	A-0578	Elbow (3/8PT)	1
14.	A-0507	Plug (3/8PT)	1
15.	T-1079	Set Over Pad	1
16.	C-1012	Pins	2
17.	A-9205	Steel Ball	2
18.	A-1112	Socket Headless Set Screw (M12 x 12)	2
19.	A-1441	Hexagon Head Screw (M10 x 40)	2
20.	FA-4001	Caliper Brake (with footbrake)(Optional)	1
	FA-4001	Caliper Brake (w/o footbrake) (Optional)	1
21.	M-1154	Brake Shoes (with footbrake) (Optional)	1
	M-1154	Brake Shoes (w/o footbrake) (Optional)	1
22.	M-1155	Brake Disk (w/o footbrake) (Optional)	1
	M-1155	Brake Disk (w/o footbrake only) (Optional)	1
23.	A-1258	Socket Head Cap Screw (M5x35)	3/6
19.	A-1441	Hexagon Head Screw (M10 x 40)	2
20.	FA-4001	Caliper Brake (with footbrake)(Optional)	1
	FA-4001	Caliper Brake (w/o footbrake) (Optional)	1
21.	M-1154	Brake Shoes (with footbrake) (Optional)	1
	M-1154	Brake Shoes (w/o footbrake) (Optional)	1
22.	M-1155	Brake Disk (w/o footbrake) (Optional)	1
	M-1155	Brake Disk (w/o footbrake only) (Optional)	1
23.	A-1258	Socket Head Cap Screw (M5x35)	3/6

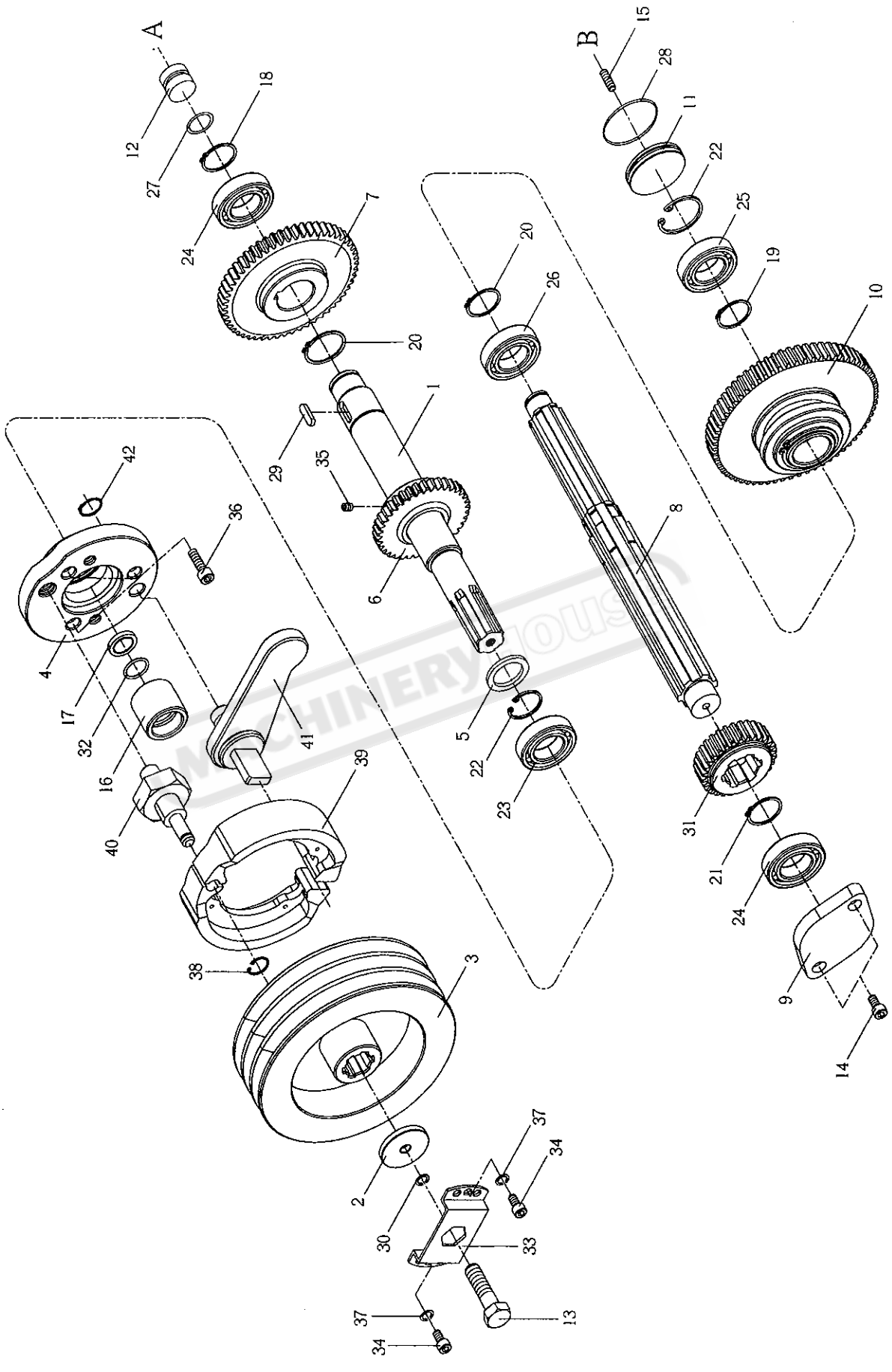

HEADSTOCK DRIVE
A
B
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42

HEADSTOCK DRIVE

NO.	PART NO.	DESCRIPTION	QUANTITY
1.	T-1004-1	Shaft (A)	1
2.	T-1005	Washer	1
3.	T-1006-1	Pulley	1
4.	T-1007-1	Bearing Cap	1
5.	C-2041	Washer	1
6.	T-1009	Gear 47T	1
7.	T-1010	Gear 25T	1
8.	A-1204	Socket Head Cap Screw (M6 x 20)	3
9.	T-1012	Gear 37T	1
10.	T-1013	Gear 55T	1
11.	T-1018	Shaft (B)	1
12.	T-1019	Cover	1
13.	T-1020	Gear 38/60/48/30T	1
14.	T-1021	Gear 66/22T	1
15.	T-1022	Cover	1
16.	R-1003	Plug	1
17.	A-1431	Hexagon Bolt (M12 x 25)	1
18.	A-1203	Socket Head Cap Screw (M6 x 16)	2
19.	A-1106	Socket Headless Set Screw (M8 x 8)	1
20.	T-1014	Collars	1
21.	A-5010	Oil Seal (35 x 50 x 7)	1
22.	A-3309	Circlip (S25)	1
23.	A-3310	Circlip (S28)	1
24.	A-3312	Circlip (S30)	3
25.	A-3204	Circlip (R47)	2
26.	A-2042	Bearing #6005	1
27.	A-2043	Bearing #6205	2
28.	A-2034	Bearing #6204	1
29.	A-2029	Bearing #6006	1
30.	A-6030	O-Ring (P16)	1
31.	A-6025	O-Ring (P41)	1
32.	A-7218	Key (6 x 55)	2
33.	A-1802	Spring Washer	1
34.	A-6013	O-Ring (P25)	1
35.	J-1024	Clamp	1

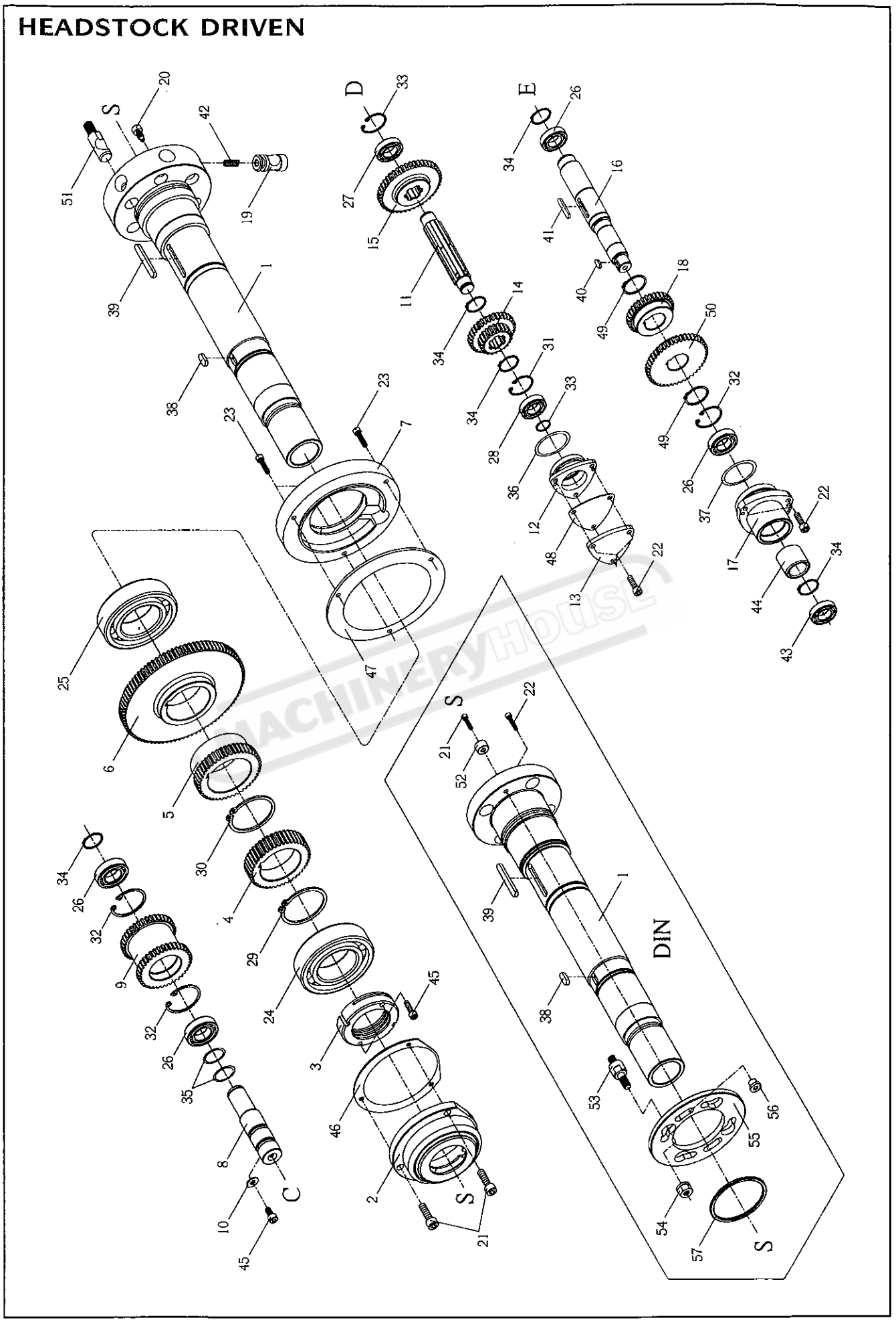
NO.	PART NO.	DESCRIPTION	QUANTITY
36.	A-1202	Socket Head Cap Screw (M6 x 12)	2
37.	A-1812	Spring Washer (Φ6)	2
38.	A-3102	Circlip (E8)	1
39.	A-9800	Brake Shoe Assembly	1
40.	T-1016	Stud	1
41.	T-1015	Brake Shoes Controller	1
42.	A-3322	Circlip (S12)	1

HEADSTOCK DRIVE (VARISPEED)



HEADSTOCK DRIVE (VARISPEED)

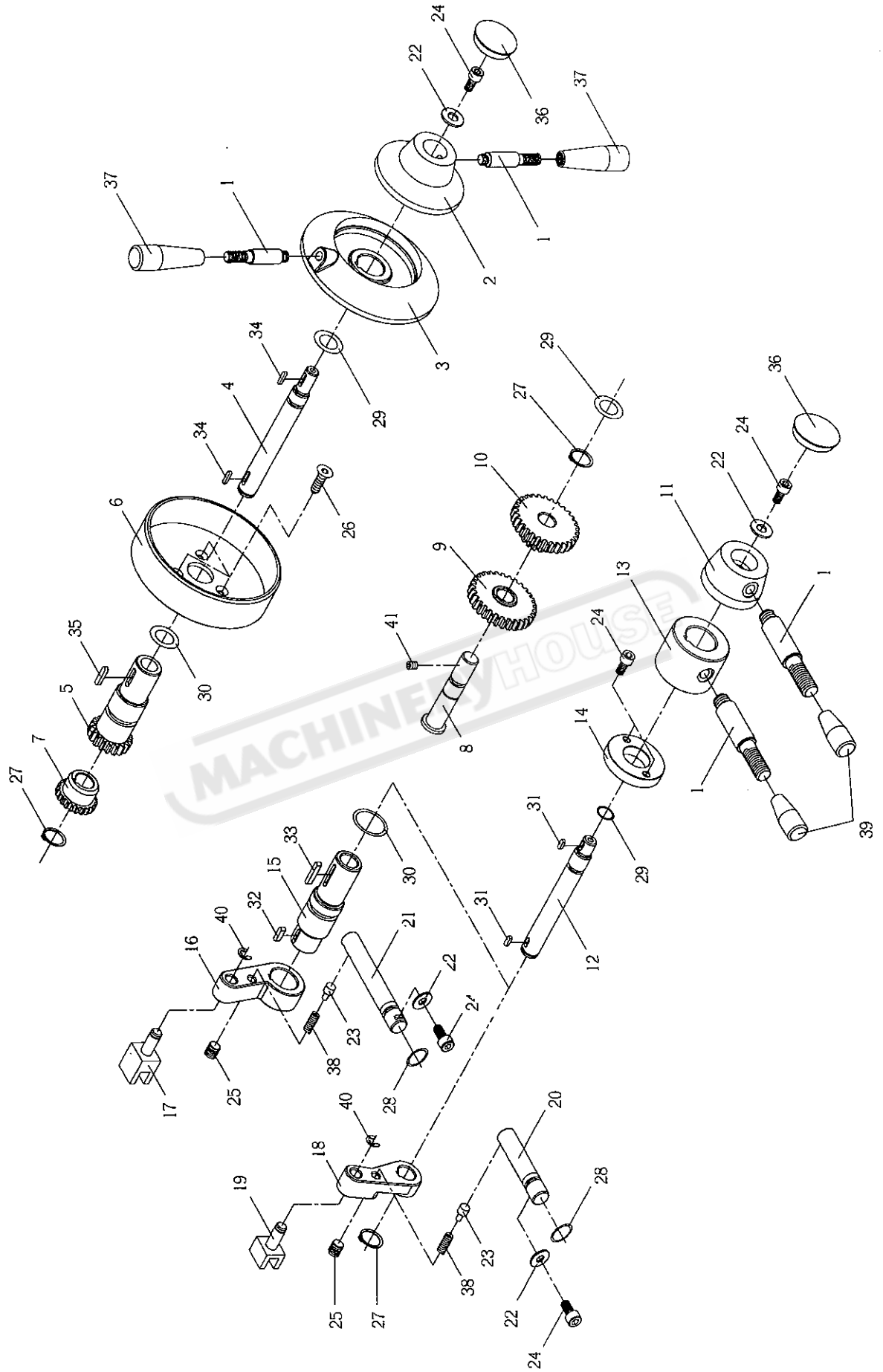
NO.	PART NO.	DESCRIPTION	QUANTITY
1.	T-1004	Shaft (A)	1
2.	T-1005	Washer	1
3.	T-1006-1	Pulley	1
4.	T-1007-1	Bearing Cap	1
5.	C-2041	Washer	1
6.	T-1009-1	Gear 37T	1
7.	T-1013	Gear 55T	1
8.	T-1018	Shaft (B)	1
9.	T-1019	Cover	1
10.	T-1021	Gear (66/22T)	1
11.	T-1022	Cover	1
12.	R-1003	Plug	1
13.	A-1431	Hexagon Bolt (M12 x 25)	1
14.	A-1203	Socket Head Cap Screw (M6 x 16)	2
15.	A-1106	Socket Headless Set Screw (M8 x 8)	1
16.	T-1014	Collars	1
17.	A-5010	Oil Seal (35 x 50 x 7)	1
18.	A-3309	Circlip (S25)	1
19.	A-3310	Circlip (S28)	1
20.	A-3312	Circlip (S30)	2
21.	A-3328	Circlip (S40)	1
22.	A-3204	Circlip (R47)	2
23.	A-2042	Bearing #6005	1
24.	A-2043	Bearing #6205	2
25.	A-2034	Bearing #6204	1
26.	A-2029	Bearing #6006	1
27.	A-6030	O-Ring (P16)	1
28.	A-6025	O-Ring (P41)	1
29.	A-7214	Key (6 x 20)	1
30.	A-1802	Spring Washer (Φ8)	1
31.	T-1020-5	Gear (30T)	1
32.	A-6013	O-Ring (P25)	1
33.	J-1024	Clamp	1
34.	A-1239	Socket Head Cap Screw (M5 x 15)	2
35.	A-1101	Socket Headless Set Screw (M6 x 10)	1
36.	A-1204	Socket Head Cap Screw (M6 x 20)	3
37.	A-1812	Spring Washer (Φ6)	2
38.	A-3102	Circlip (E8)	1
39.	A-9800	Brake Shoe Assembly	1
40.	T-1016	Stud	1
41.	T-1015	Brake Shoes Controller	1
42.	A-3322	Circlip (S12)	1


HEADSTOCK DRIVEN
DIN
S
D
E
C
MACHINERYHOUSE

HEADSTOCK DRIVEN

NO.	PART NO.	DESCRIPTION	QUANTITY
1.	T-1025	Main Spindle (S)	1
	T-1025-2	DIN Main Spindle (S)	1
2.	T-1026	Cover	1
3.	T-1027	Thrust Nut	1
4.	T-1028	Gear 44T	1
5.	T-1029	Gear 46T	1
6.	T-1030	Gear (90T)	1
7.	T-1031	Bearing Cap	1
8.	T-1033	Shaft (C)	1
9.	T-1034	Gear 38/38T	1
10.	R-1030	Washer	1
11.	T-1037	Shaft (D)	1
12.	T-1038	Bearing Cap	1
13.	T-1039	Cover	1
14.	T-1040	Gear 22/33T	1
15.	T-1041	Gear 44T	1
16.	T-1043	Shaft (E)	1
17.	T-1044	Bearing Cap	1
18.	T-1045A	Gear 33T	1
19.	T-9003	Camlock	6
20.	T-9004	Cam Screw	6
21.	A-1203	Socket Head Cap Screw (M6 x 16)	4
22.	A-1204	Socket Head Cap Screw (M6 x 20)	8
23.	A-1206	Socket Head Cap Screw (M6 x 30)	3
24.	A-2045	Bearing #32212	1
25.	A-2019	Bearing #32215	1
26.	A-2042	Bearing #6005	4
27.	A-2034	Bearing #6204	1
28.	A-2026	Bearing #6004	1
29.	A-3325	Ciriclip (S60)	1
30.	A-3326	Ciriclip (S65)	1
31.	A-3203	Ciriclip (R42)	1
32.	A-3204	Ciriclip (R47)	3
33.	A-3306	Ciriclip (S20)	2
34.	A-3309	Ciriclip (S25)	5
35.	A-6012	O-Ring (P24)	2
36.	A-6019	O-Ring (P46)	1
37.	A-6021	O-Ring (G55)	1
38.	A-7221	Key (8 x 20)	1
39.	A-7223	Key (8 x 60)	1
40.	A-7213	Key (6 x 15)	1
41.	A-7216	Key (6 x 35)	1
42.	A-8503	Spring	6
43.	A-5015	Oil Seal (TC25 x 40 x 10)	1
44.	T-1046	Bush	1
45.	A-1202	Socket Head Cap Screw (M6 x 12)	3
46.	T-1026-1	Gasket	1
47.	T-1031-1	Gasket	1
48.	T-1039-1	Gasket	1
49.	A-3312	Ciriclip (S30)	2
50.	T-1045B	Gear 44T	1
51.	T-9002	Camlock Stud	6
DIN (Optional)			
52.	T-1087	Pad	2
53.	T-1088	Pivot	4
54.	R-1050	Nut	4
55.	T-1085	Retainer	1
56.	T-1086	Stud	2
57.	T-1023	Spacer	1

HEADSTOCK CONTROLS

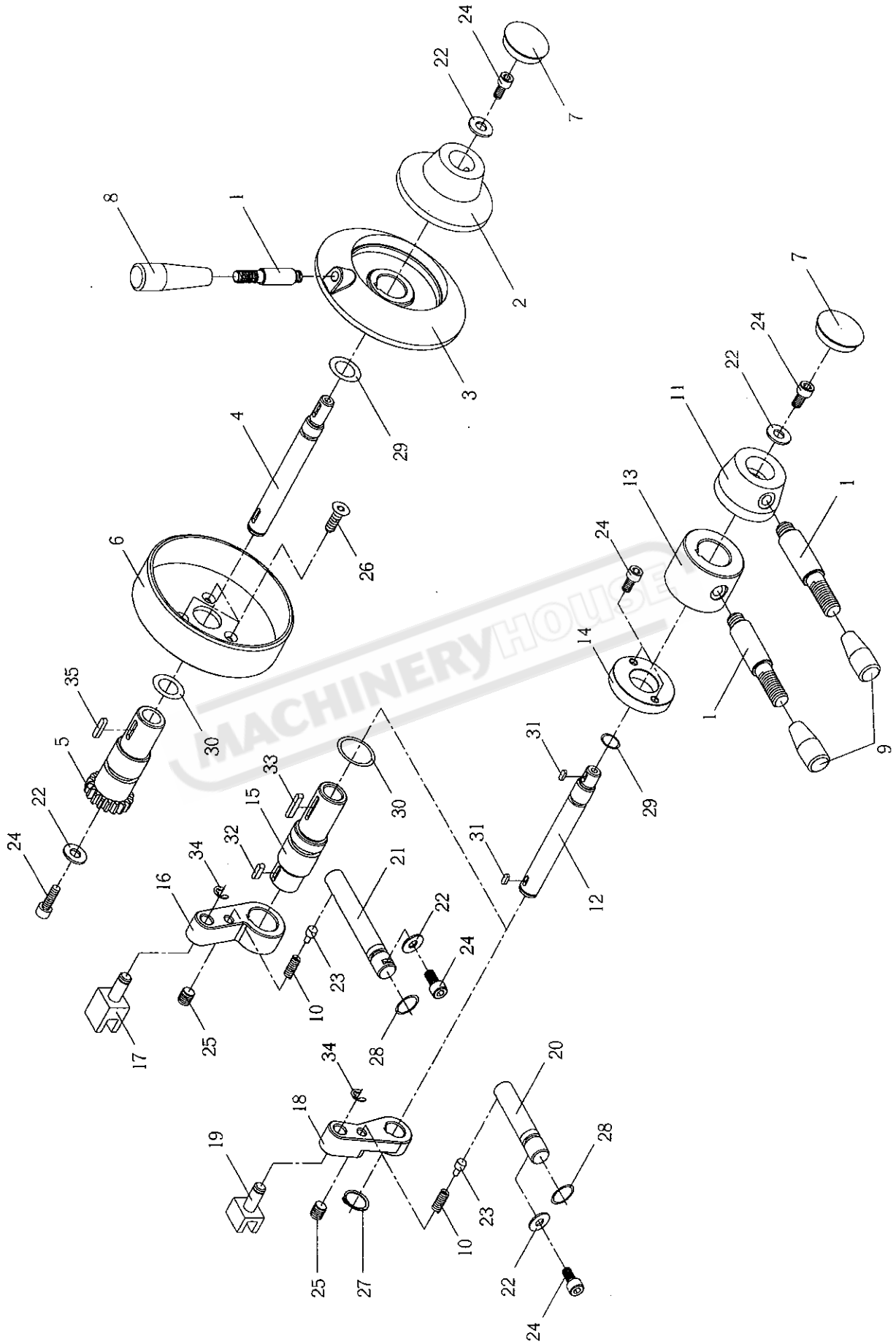


HEADSTOCK CONTROLS

NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-1087-3	Control Lever	4
2.	T-1048	Speed Selector	1
3.	T-1050	Range Selector	1
4.	T-1049	Shaft	1
5.	T-1051	Control Pinion 18T	1
6.	T-1052	Housing	1
7.	T-1053	Control Gear 18T	1
8.	T-1054	Shaft	1
9.	T-1055	Gear 30T	1
10.	T-1056	Gear 15/30T	1
11.	T-1067	Feed Change Boss	1
12.	T-1068	Shaft	1
13.	T-1069	Feed Change Boss	1
14.	T-1070	Collar	1
15.	T-1071	Shaft	1
16.	T-1072	Shift Lever	1
17.	T-1073	Fork	1
18.	T-1074	Shift Lever	1
19.	T-1075	Fork	1
20.	T-1076	Dentate Bar	1
21.	T-1077	Dentate Bar	1
22.	R-1030	Washer	4
23.	C-1091	Detent	2
24.	A-1202	Socket Head Cap Screw (M6 x 12)	6
25.	A-1106	Socket Headless Set Screw (M8 x 8)	2
26.	A-1509	Flat Head Cap Screw (M5 x 10)	3
27.	A-3302	Circlip (S16)	3
28.	A-6002	O-Ring (P10)	2
29.	A-6004	O-Ring (P12)	3
30.	A-6013	O-Ring (P25)	2
31.	A-7201	Key (4 x 10)	2
32.	A-7202	Key (4 x 15)	1
33.	A-7203	Key (4 x 25)	1
34.	A-7205	Key (5 x 15)	2
35.	A-7206	Key (5 x 20)	1

NO.	PART NO.	DESCRIPTION	QUANTITY
36.	C-2075	Plug	2
37.	A-9100	PVC Handle	2
38.	A-8565	Spring (S01-03-14)	2
39.	A-9110	PVC Handle	2
40.	A-3103	Circlip (E10)	2
41.	A-1169	Socket Headless Set Screw (M8 x 10)	1

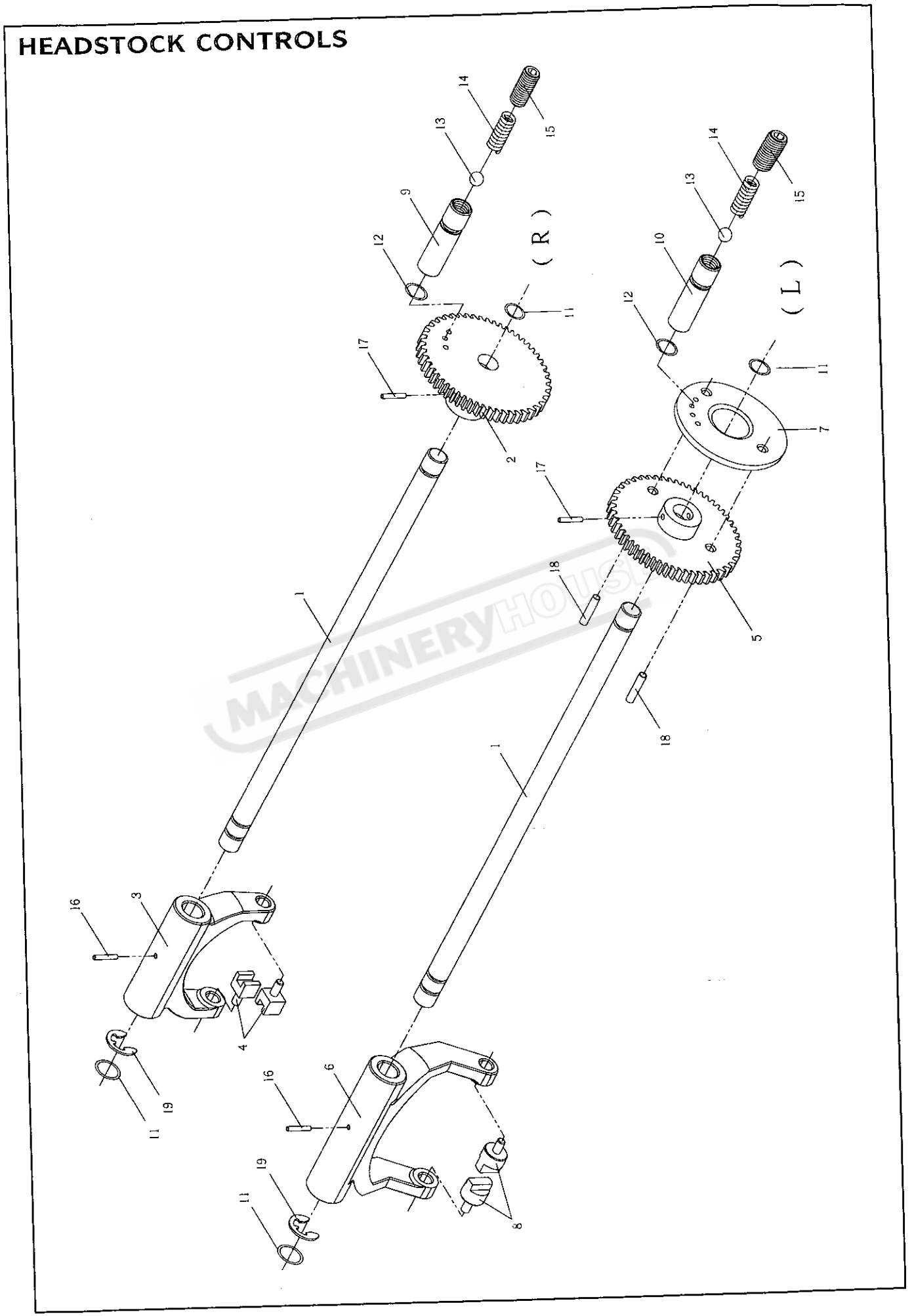
HEADSTOCK CONTROLS (VARISPEED)



HEADSTOCK CONTROLS (VARISPEED)

NO.	PART NO.	DESCRIPTION	QUANTITY
1.	T-1047	Control Lever	3
2.	T-1048	Speed Selector	1
3.	T-1050	Range Selector	1
4.	T-1049	Shaft	1
5.	T-1051	Control Pinion 18T	1
6.	T-1052	Housing	1
7.	C-2075	Plug	2
8.	A-9100	PVC Handle	1
9.	A-9110	PVC Handle	2
10.	A-8565	Spring (S01-03-14)	2
11.	T-1067	Feed Change Boss	1
12.	T-1068	Shaft	1
13.	T-1069	Feed Change Boss	1
14.	T-1070	Collar	1
15.	T-1071	Shaft	1
16.	T-1072	Shift Lever	1
17.	T-1073	Fork	1
18.	T-1074	Shift Lever	1
19.	T-1075	Fork	1
20.	T-1076	Dentate Bar	1
21.	T-1077	Dentate Bar	1
22.	R-1030	Washer	5
23.	C-1091	Detent	2
24.	A-1202	Socket Head Cap Screw (M6 x 12)	7
25.	A-1106	Socket Headless Set Screw (M8 x 8)	2
26.	A-1509	Flat Head Cap Screw (M5 x 10)	3
27.	A-3302	Circlip (S16)	1
28.	A-6002	O-Ring (P10)	2
29.	A-6004	O-Ring (P12)	2
30.	A-6013	O-Ring (P25)	2
31.	A-7201	Key (4 x 10)	2
32.	A-7202	Key (4 x 15)	1
33.	A-7203	Key (4 x 25)	1
34.	A-3103	Circlip (E10)	2
35.	A-7206	Key (5 x 20)	1

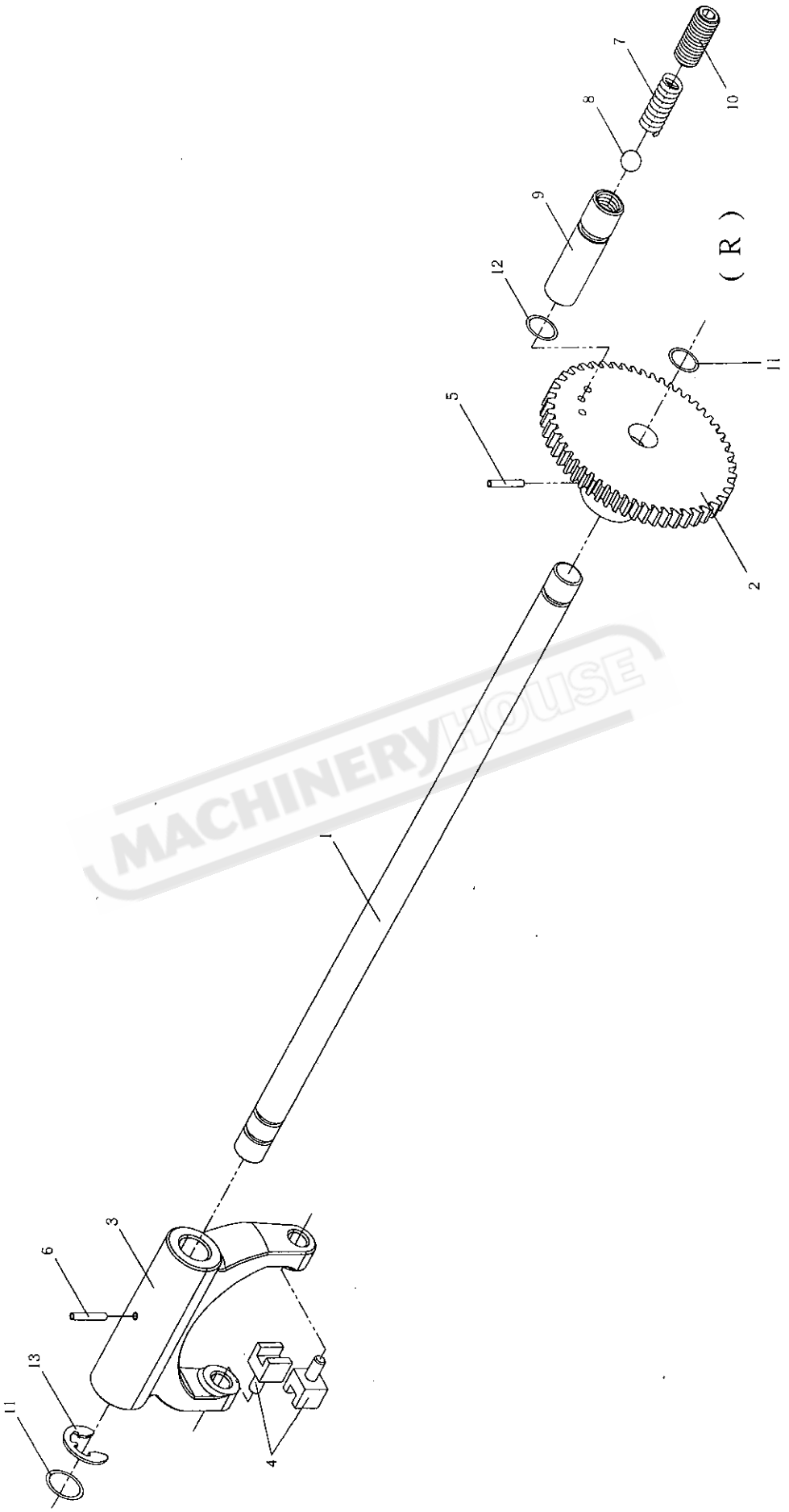
HEADSTOCK CONTROLS



HEADSTOCK CONTROLS

NO.	PART NO.	DESCRIPTION	QUANTITY
1.	T-1057	Shifting Shaft	2
2.	T-1058	Gear 38T	1
3.	T-1059	Shifting Crank	1
4.	T-1060	Shift Fork	2
5.	T-1061	Gear 31T	1
6.	T-1062	Shifting Crank	1
7.	T-1066	Plate	1
8.	R-1064	Shift Pad	2
9.	T-1064	Bushing	1
10.	T-1065	Bushing	1
11.	A-6004	O-Ring (P12)	4
12.	A-6005	O-Ring (P15)	2
13.	A-9205	Steel Ball (3/8")	2
14.	A-8504	Spring	2
15.	A-1112	Socket Headless Set Screw (M12 x 12)	2
16.	A-4007	Pin (5 x 30)	2
17.	A-4028	Pin (5 x 25)	2
18.	A-4036	Pin (5 x 12)	2
19.	A-3104	Circlip (E12)	2

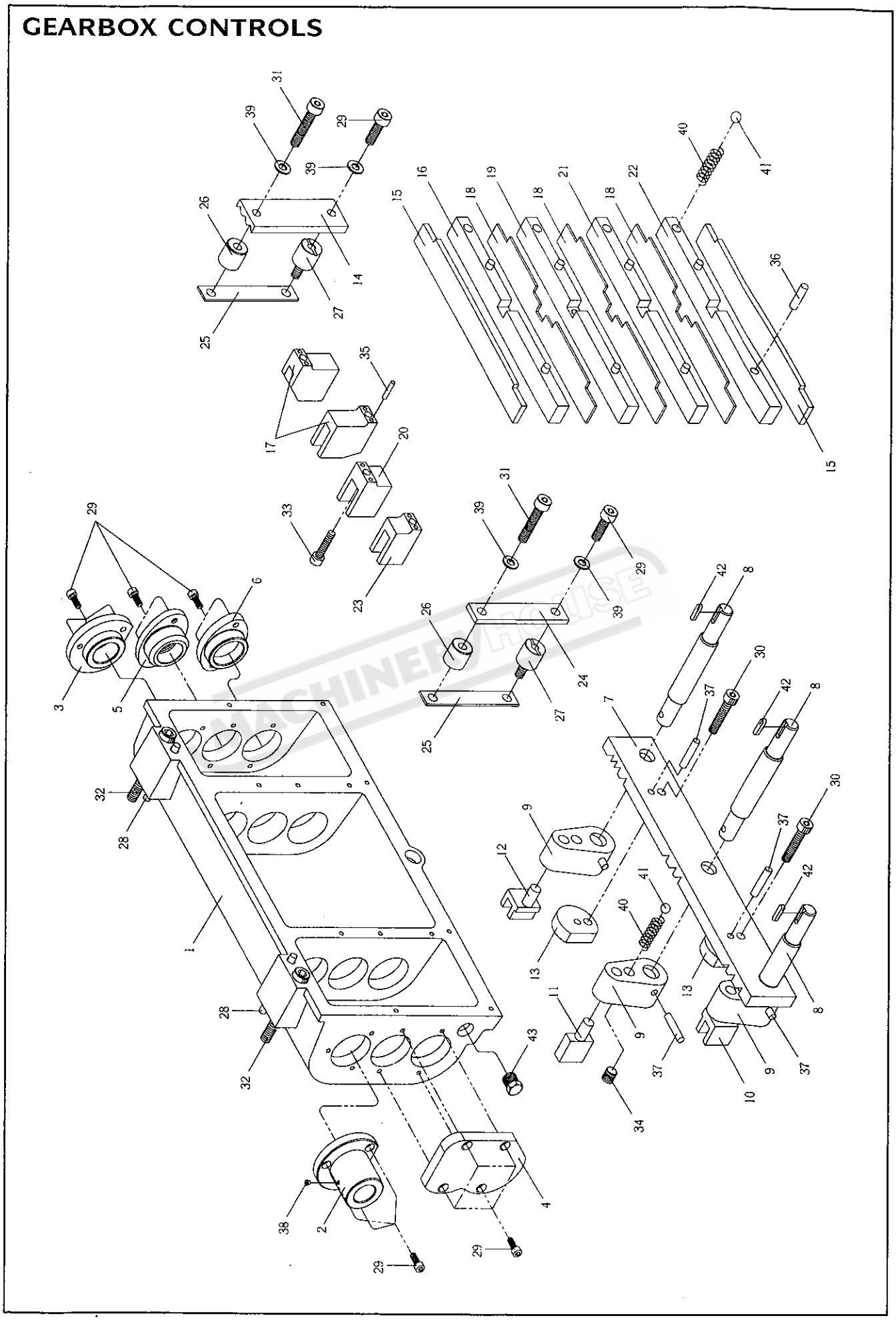
HEADSTOCK CONTROLS (VARISPEED)



HEADSTOCK CONTROLS (VARISPEED)

NO.	PART NO.	DESCRIPTION	QUANTITY
1.	T-1057	Shifting Shaft	1
2.	T-1058	Gear 38T	1
3.	T-1059	Shifting Crank	1
4.	T-1060	Shift Fork	2
5.	A-4028	Pin (5 x 25)	1
6.	A-4007	Pin (5 x 30)	1
7.	A-8504	Spring	1
8.	A-9205	Steel Ball (3/8")	1
9.	T-1064	Bushing	1
10.	A-1112	Socket Headless Set Screw (M12 x 12)	1
11.	A-6004	O-Ring (P12)	2
12.	A-6005	O-Ring (P15)	1
13.	A-3104	Circlip (E12)	1

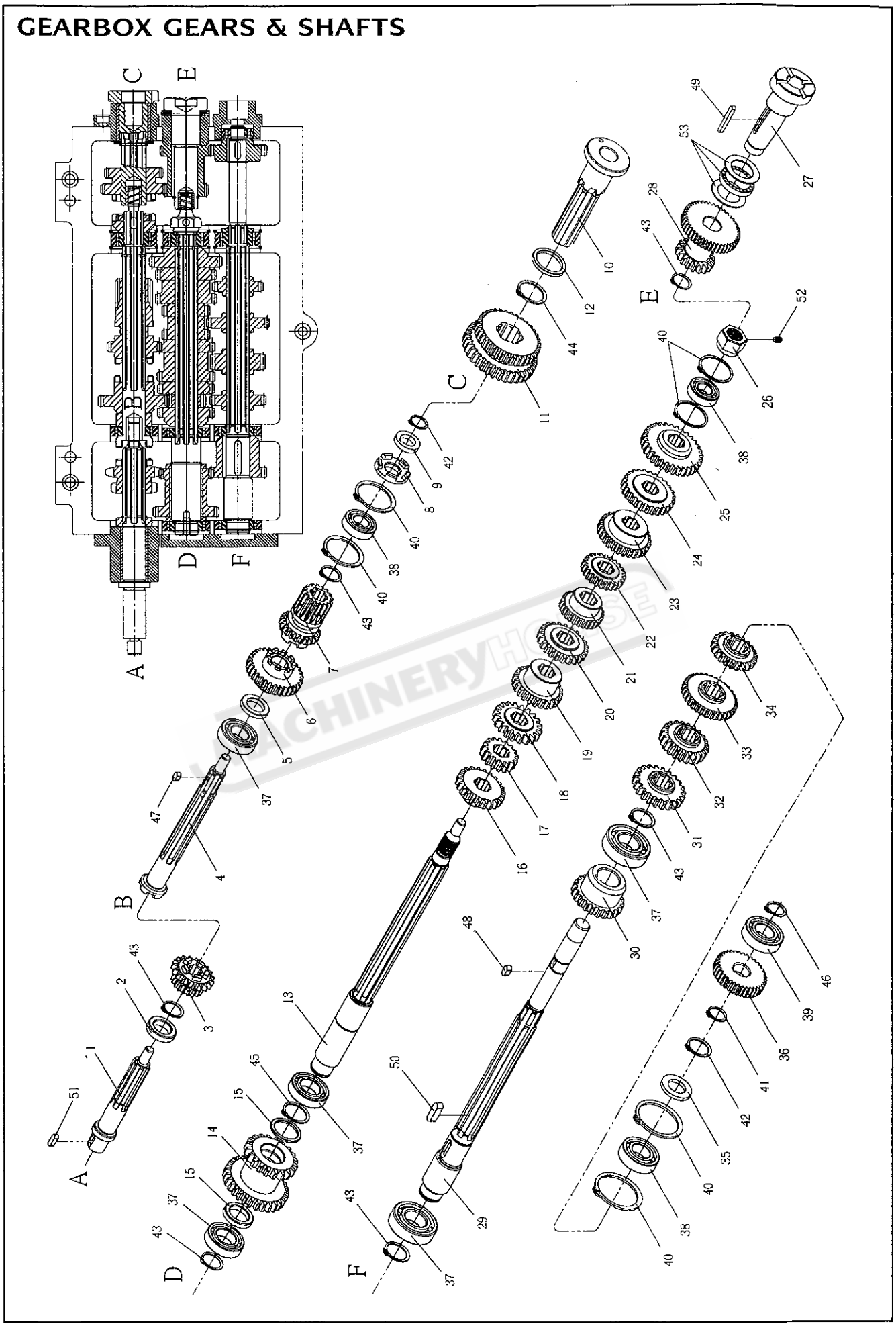
GEARBOX CONTROLS



GEARBOX CONTROLS

NO.	PART NO.	DESCRIPTION	QUANTITY
1.	T-2001	GearBox Casting	1
2.	T-2004	Flanged Bearing	1
3.	T-2016	Flanged Bearing	1
4.	T-2018	Cover	1
5.	T-2035	Flanged Bearing	1
6.	T-2045	Flanged Bearing	1
7.	T-2047	Selector Bar	1
8.	T-2051	Selector Shaft	3
9.	T-2053	Lever	3
10.	T-2054	Shift Fork	1
11.	T-2055	Shift Pad	1
12.	T-2056	Shift Fork	1
13.	T-2057	Pad	2
14.	T-2067	Detent Plate	1
15.	T-2068	Bar	2
16.	T-2069	Gear Bar	1
17.	T-2070	Fork	2
18.	T-2071	Plate	3
19.	T-2072	Gear Bar	1
20.	T-2073	Fork	1
21.	T-2074	Gear Bar	1
22.	T-2075	Gear Bar	1
23.	T-2076	Fork	1
24.	C-2016	Plate	1
25.	C-2017	Bar	2
26.	C-2007	Spacer	2
27.	C-2008	Spacer	2
28.	T-7006	Pin	2
29.	A-1203	Socket Head Cap Screw (M6 x 16)	16
30.	A-1206	Socket Head Cap Screw (M6 x 30)	2
31.	A-1208	Socket Head Cap Screw (M6 x 40)	2
32.	A-1233	Socket Head Cap Screw (M8 x 80)	3
33.	A-1240	Socket Head Cap Screw (M5 x 25)	4
34.	A-1106	Socket Headless Set Screw (M8 x 8)	3
35.	A-4000	Pin (3 x 10)	8
36.	A-4004	Pin (5 x 10)	8
37.	A-4006	Pin (5 x 25)	5
38.	A-9300	Oiler	1
39.	A-1801	Spring Washer	4
40.	A-8506	Spring (S01-03-17)	7
41.	A-9202	Ball Φ1/4"	7
42.	A-7202	Key (4 x15)	3
43.	A-1124	Drain Plug (1/2"PT)	1

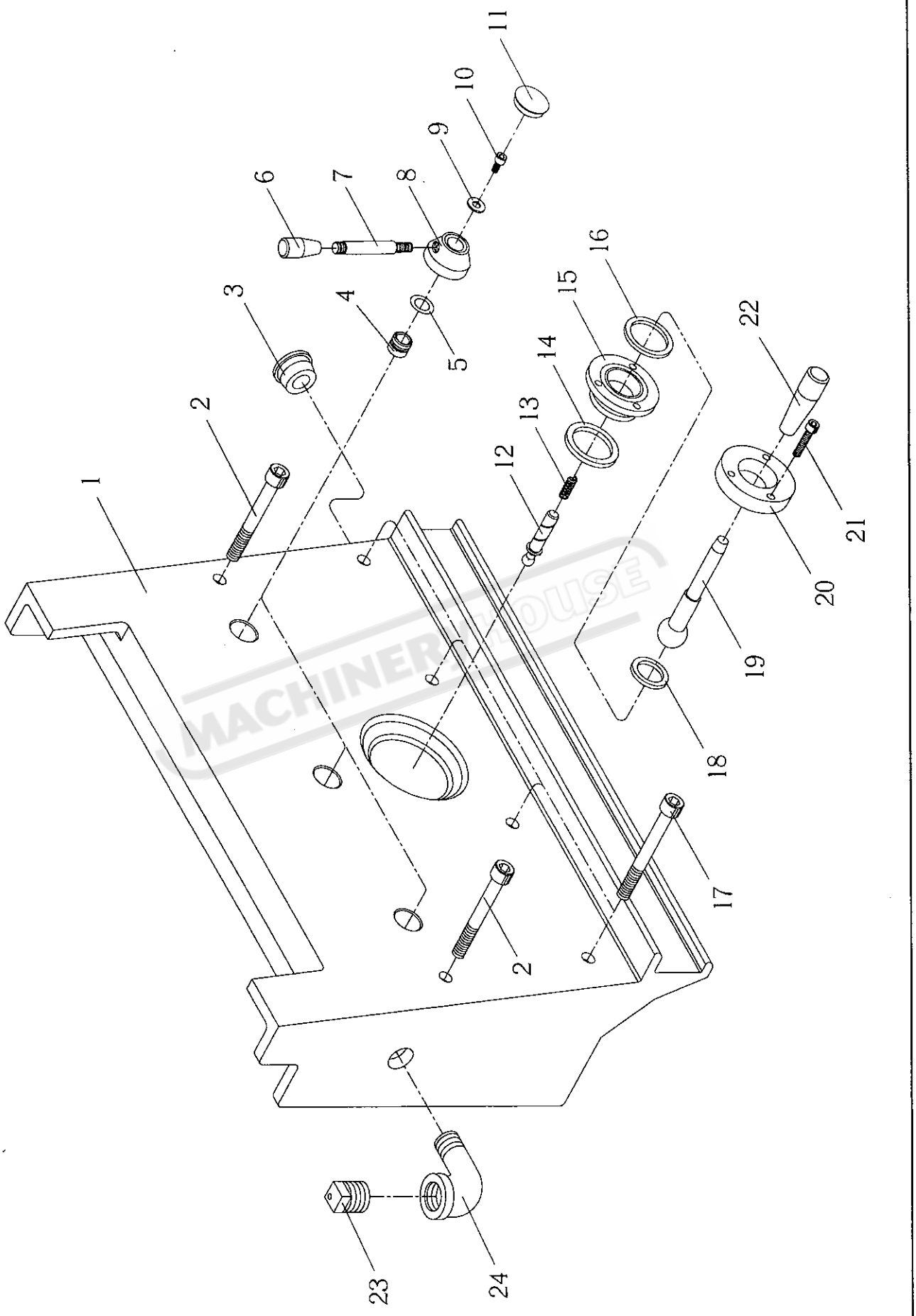
GEARBOX GEARS & SHAFTS



GEARBOX GEARS & SHAFTS

NO.	PART NO.	DESCRIPTION	QUANTITY
1.	T-2003	Drive Shaft (A)	1
2.	T-2005	Washer	1
3.	T-2006	Gear 19/19T	1
4.	T-2007	Top Shaft (B)	1
5.	T-2008	Spacer	1
6.	T-2009	Gear 38T	1
7.	T-2010	Gear 23/19T	1
8.	T-2011	Clutch	1
9.	T-2012	Washer	1
10.	T-2013	Driven Shaft (C) / Leadscrew	1
11.	T-2014	Gear 35/35T	1
12.	T-2015	Washer	1
13.	T-2019	Middle Shaft (D)	1
14.	T-2020	Gear 30/20T	1
15.	T-2021	Washer	2
16.	T-2022	Gear 22T	1
17.	T-2023	Gear 19T	1
18.	T-2024	Gear 20T	1
19.	T-2025	Gear 24T	1
20.	T-2026	Gear 23T	1
21.	T-2027	Gear 27T	1
22.	T-2028	Gear 24T	1
23.	T-2029	Gear 28T	1
24.	T-2030	Gear 26T	1
25.	T-2031	Gear 38T	1
26.	T-2032	Nut	1
27.	T-2033-1	Driven Shaft (E) / Feed Rod	1
28.	T-2034	Gear 24/30T	1
29.	T-2037	Bottom Shaft (F)	1
30.	T-2038	Gear 22T	1
31.	T-2039	Gear 22T	1
32.	T-2040	Gear 22T	1
33.	T-2041	Gear 33T	1
34.	T-2042	Gear 22T	1
35.	T-3012	Washer	1
36.	T-2044	Gear 36T	1
37.	A-2100	Bearing 16004	5
38.	A-2033	Bearing 6203	3
39.	A-2046	Bearing 6001	1
40.	A-3202	Circlip (R40)	6
41.	A-3301	Circlip (S15)	1
42.	A-3303	Circlip (S17)	2
43.	A-3306	Circlip (S20)	6
44.	A-3307	Circlip (S22)	1
45.	A-3309	Circlip (S25)	1
46.	A-3322	Circlip (S12)	1
47.	A-7204	Key (5 x 10)	1
48.	A-7205	Key (5 x 15)	1
49.	A-7209	Key (5 x 35)	1
50.	A-7215	Key (6 x 30)	1
51.	A-7216	Key (6 x 35)	1
52.	A-1100	Socket Headless Set Screw (M6 x 6)	1
53.	A-2055	Bearing 2542	1

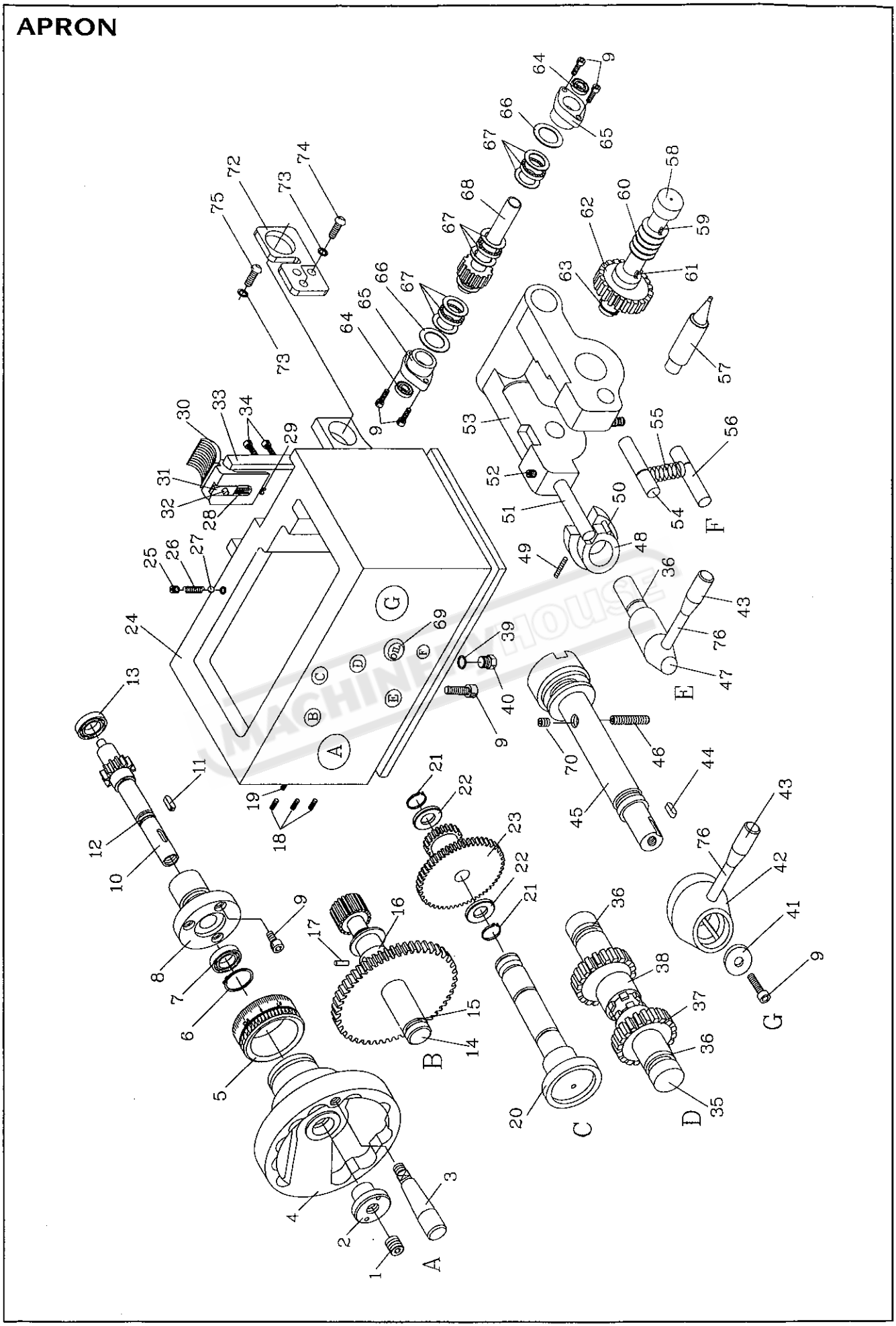
GEARBOX COVER & LEVERS



GEARBOX COVER & LEVERS

NO.	PART NO.	DESCRIPTION	QUANTITY
1.	T-2002	GearBox Cover	1
2.	A-1235	Socket Head Cap Screw (M6 x 70)	2
3.	A-9501	Oil Sight	1
4.	C-2029	Bush	3
5.	A-6005	O-Ring (P14)	3
6.	A-9110	Handle	3
7.	C-1087-3	Lever	3
8.	C-1087-2	Change Boss	3
9.	R-1030	Washer	3
10.	A-1202	Socket Head Cap Screw (M6 x 12)	3
11.	C-2075	Plug	3
12.	C-2034	Plunger	1
13.	A-8507	Spring (S01-14-30)	1
14.	A-6018	O-Ring (P38)	1
15.	C-2032	Collar	1
16.	A-6017	O-Ring (P36)	1
17.	A-1236	Socket Head Cap Screw (M6 x 90)	4
18.	A-6015	O-Ring (P29)	1
19.	T-2059	Lever	1
20.	C-2033	Selector Cover	1
21.	A-1206	Socket Head Cap Screw (M6 x 30)	3
22.	A-9107	Handle	1
23.	A-0488	Plug (1/2PT)	1
24.	A-0489	Elbow (1/2PT)	1

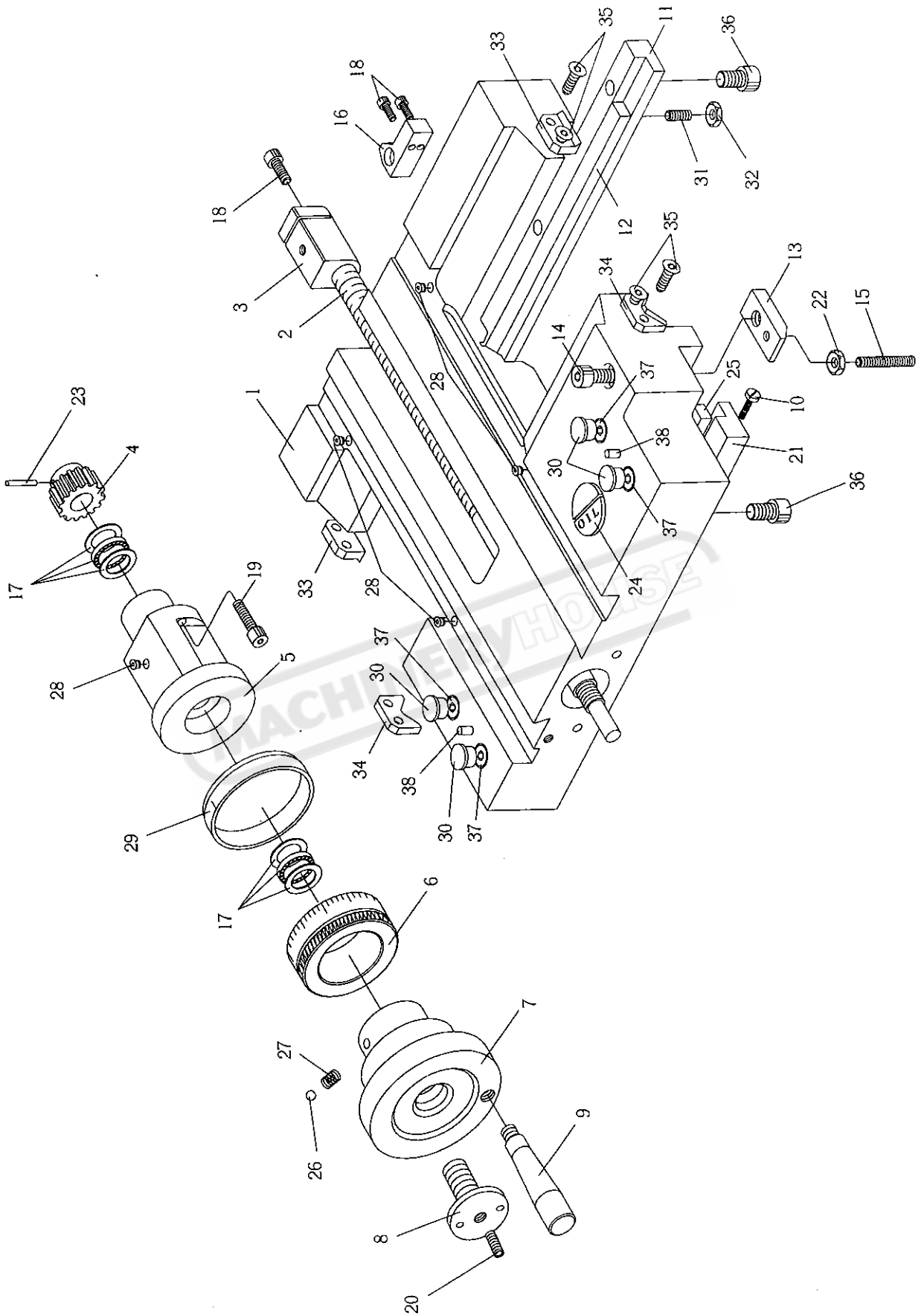
APRON



APRON

NO.	PART NO.	DESCRIPTION	QUANTITY
1.	A-1104	Socket Headless Set Screw (M6 x 20)	1
2.	T-4010	Plug	1
3.	T-4007	Handle	1
4.	T-3002	Hand Wheel	1
5.	T-3006-1	Indexing Dial (Metric)	1
	T-3006-2	Indexing Dial (Imperial)	1
6.	A-3313	Circlip (S32)	1
7.	A-2025	Bearing (#6003Z)	1
8.	T-3008	Bushing	1
9.	A-1203	Socket Head Cap Screw (M6 x 16)	16
10.	T-3005	Gear Shaft	1
11.	A-7206	Key (5 x 5 x 20)	1
12.	A-6030	O-Ring (P16)	1
13.	A-2046	Bearing (#6001Z)	1
14.	T-3009	Pinion Shaft	1
15.	T-6007	O-Ring (P18)	1
16.	T-3010	Gear 59T	1
17.	A-4009	Pin (5 X 40)	1
18.	A-1101	Socket Headless Set Screw (M6 x 10)	3
19.	A-1106	Socket Headless Set Screw (M8 x 8)	1
20.	T-3011	Push-Pull Lever	1
21.	A-3304	Circlip (S18)	2
22.	T-3012	Washer	2
23.	T-3013	Gear 48/20T	1
24.	T-3301-1	Apron Casting (Right Hand)	1
	T-3301-2	Apron Casting (Left Hand)	1
25.	A-1142	Socket Headless Set Screw (M8 x 6)	1
26.	A-8509	Spring	2
27.	A-9202	Steel Ball	2
28.	A-1105	Socket Headless Set Screw (M6 x 30)	1
29.	A-1207	Socket Head Cap Screw (M6 x 35)	1
30.	T-3022-1	Half-Nut Set (Metric)	1
	T-3022-2	Half-Nut Set (Imperial)	1
31.	C-3004	Strip	1
32.	C-3008	Pin	1
33.	R-3028	Gib	1
34.	A-1205	Socket Head Cap Screw (M6 x 25)	2
35.	T-3014	Shaft	1
36.	A-6005	O-Ring (P14)	3
37.	T-3015	Gear 25T	1
38.	T-3016	Worm Wheel	1
39.	A-6001	O-Ring (P9)	1
40.	A-1426	Hexagon Head Screw	1
41.	A-1917	Washer (M6)	1
42.	T-3019-1	Boss	1
43.	A-9107	Handle	2
44.	A-7205	Key (5 x 5 x 15)	1
45.	T-3020	Cam Shaft	1
46.	A-1110	Socket Headless Set Screw (M10 x 55)	1
47.	T-3025-1	Wormbox Lever	1
48.	T-3026	Safety Latch	1
49.	A-1131	Socket Headless Set Screw (M6 x 25)	1
50.	A-4007	Pin (5 x 30)	1
51.	T-3034	Pin	1
52.	A-1100	Socket Headless Set Screw (M6 x 6)	2
53.	T-3030-1	Worm Set (Right Hand)	1
	T-3030-2	Worm Set (Left Hand)	1
54.	C-3056	Pin	1
55.	A-8510	Spring	1
56.	C-3018	Pin	1
57.	T-3036	Interlock Shaft	1
58.	T-3031	Shaft	1
59.	A-7207	Key (5 x 5 x 25)	1
60.	T-3032	Worm	1
61.	A-7204	Key (5 x 5 x 10)	1
62.	T-3033	Gear 30T	1
63.	A-3302	Circlip (S16)	1
64.	A-5016	Oil Seal (25 x 38 x 8)	2
65.	T-3028	Worm Bushing	1
66.	A-6017	O-Ring (P36)	2
67.	A-2055	Bearing (#2542)	3
68.	T-3027	Pinion	1
69.	A-9501	Oil Sight	1
70.	A-1108	Socket Headless Set Screw (M10 x 10)	1
72.	T-3038-1	Bracket	1
73.	A-1812	Spring Washer (Φ6)	4
74.	A-1510	Cross Recessed Head Screw (M6 x 12)	2
75.	A-1512	Cross Recessed Head Screw (M6 x 10)	2
76.	C-5026-1	Lever	2

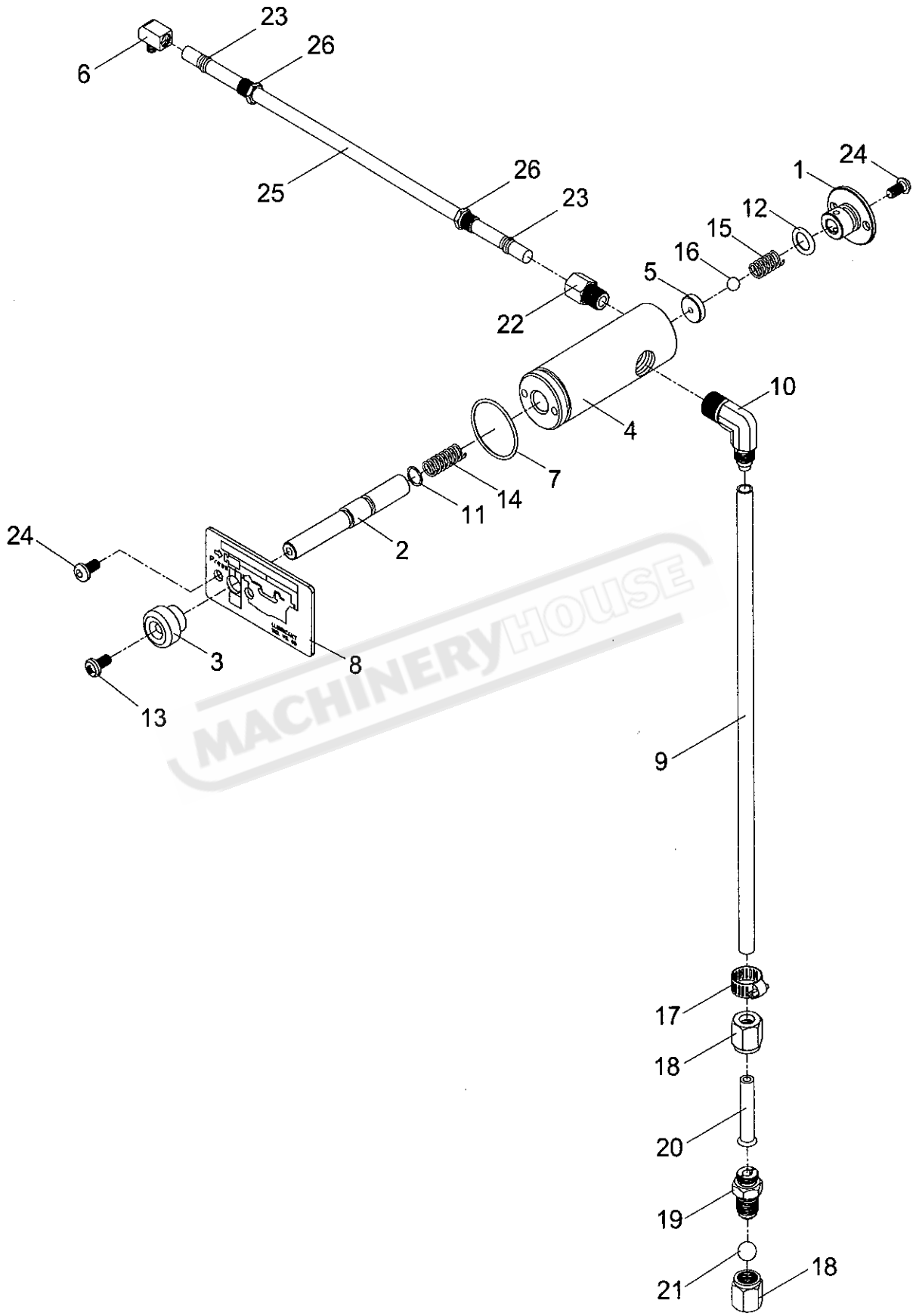
SADDLES ASSEMBLIES



SADDLES ASSEMBLIES

NO.	PART NO.	DESCRIPTION	QUANTITY
1.	T-4001	Saddle Casting	1
2.	T-4003-1	Cross Feed Screw (Metric)	1
	T-4003-2	Cross Feed Screw (Inch)	1
3.	T-4004-1	Cross Feed Nut (Metric)	1
	T-4004-2	Cross Feed Nut (Inch)	1
4.	T-4005	Cross Feed Pinion	1
5.	T-4006	Keep Assembly	1
6.	T-4008-1	Indexing Dial (Metric)	1
	T-4008-2	Indexing Dial (Imperial)	1
7.	T-4009	Cross Handwheel	1
8.	T-4010	Plug	1
9.	T-4007	Handle	1
10.	C-4032	Gib Screw	2
11.	C-4020-1	Rear Strip	1
12.	C-4021-1	Rear Gib	1
13.	T-4015	Strip	1
14.	A-1234	Socket Head Cap Screw (M10 x 65)	1
15.	A-1134	Socket Headless Set Screw (M8 x 40)	1
16.	J-4014	Bracket	1
17.	A-2021	Bearing #51103	2
18.	A-1203	Socket Head Cap Screw (M6 x 16)	3
19.	A-1515	Socket Head Cap Screw (M6 x 20)	2
20.	A-1103	Socket Headless Set Screw (M6 x 16)	1
21.	T-4013	Front Strip	1
22.	A-1701	Nut (M8)	1
23.	A-4006	Pin (5 x 25)	1
24.	F-4008	Oil Cap	1
25.	T-4014	Front Gib	1
26.	A-9202	Steel Ball	2
27.	A-8511	Spring	2
28.	A-9304	Oiler (6mm)	5
29.	T-4022	Collar	1
30.	A-4505	Plug	4
31.	A-1105	Socket Headless Set screw (M6 x 30)	3
32.	A-1700	Nut (M6)	3
33.	T-4023	Flat Wiper	2
34.	T-4024	Vee Wiper	2
35.	A-1605	Cross Ressed Screw (M5 x 10)	8
36.	A-1215	Socket Head Cap Screw (M8 x 30)	4
37.	A-1218	Socket Head Cap Screw (M8 x 50)	4
38.	A-4012	Pin (Φ5 x 55)	2

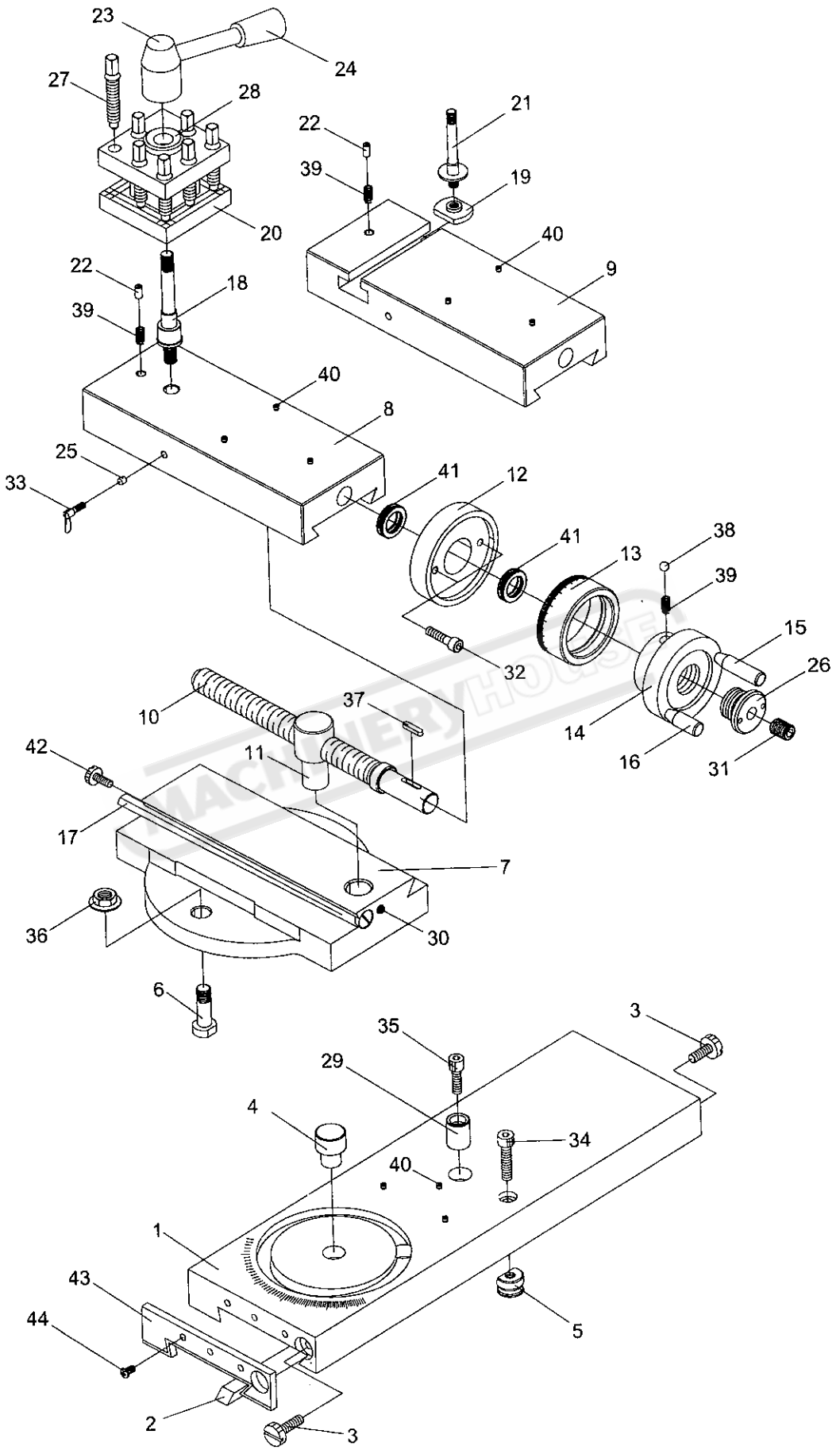
SADDLE LUBRICATION (OPTIONAL)



SADDLE LUBRICATION (OPTIONAL)

NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-4036	Cover	1
2.	C-4037	Axle	1
3.	C-4038	Button	1
4.	C-4039	Pump	1
5.	C-4040	Plug	1
6.	A-9619	Joint	1
7.	A-6016	O-Ring	1
8.	NC-40	Name Plate	1
9.	A-9320	Outlet Tube	1
10.	A-9308	Inlet Valve	1
11.	A-6000	O-Ring (P7)	1
12.	A-6002	O-Ring (P10A)	1
13.	A-1509	Cross Recessed Head Screw (M5×10)	1
14.	A-8412	Spring	1
15.	A-8413	Spring	1
16.	A-9206	Ball(Φ3/16")	1
17.	A-9317	Clip	1
18.	A-9311	Nut	2
19.	A-9312	By-pass	1
20.	A-9315	Sleeve	1
21.	A-9205	Ball(Φ3/8")	1
22.	A-9610	Jointer	1
23.	A-9635	Joint Tube	2
24.	A-1509	Round Head Cap Screw (M5×10)	4
25.	A-9313	Tube	1
26.	A-9634	Nut	2

CROSS & TOP SLIDES

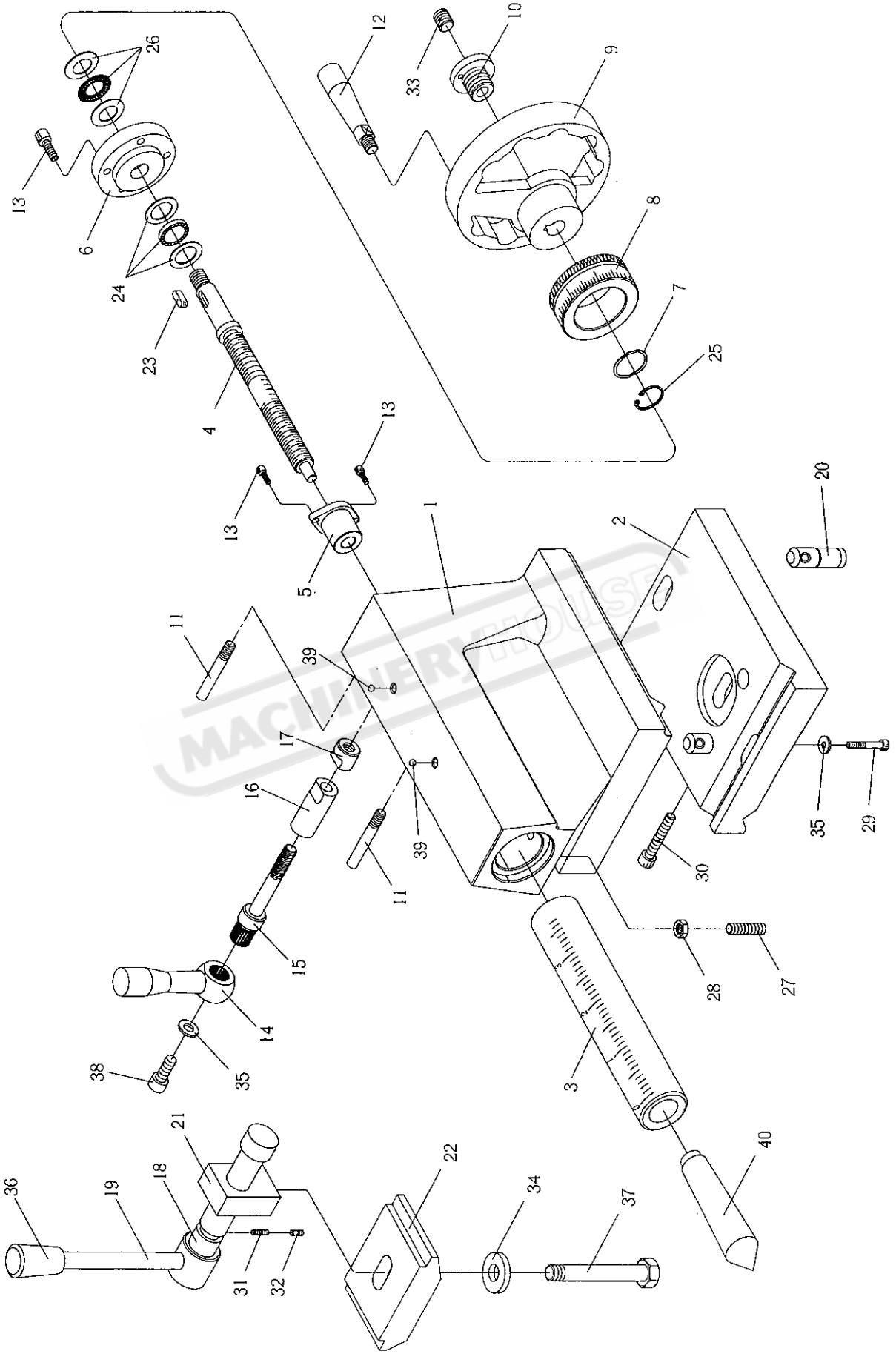


CROSS & TOP SLIDES

NO.	PART NO.	DESCRIPTION	QUANTITY
1.	T-4002	Cross Slide	1
2.	T-4011	Gib	1
3.	C-4032	Gib Screw	2
4.	T-4019	Pivot	1
5.	T-4020	Locking Pad	1
6.	T-4021	Bolt	2
7.	T-5001	Swivel Slide	1
8.	T-5002-1	Top Slide	1
9.	T-5002-2	Slotted Top-Slide	1
10.	T-5003-1	Top Slide Screw (Metric)	1
	T-5003-2	Top Slide Screw (Imperial)	1
11.	T-5004-1	Top Slide Nut (Metric)	1
	T-5004-2	Top Slide Nut (Imperial)	1
12.	T-5005	Keeper	1
13.	T-5006-1	Index Ring (Metric)	1
	T-5006-2	Index Ring (Imperial)	1
14.	T-5007	Handwheel	1
15.	T-5008	Handle (Long)	1
16.	T-5009	Handle (Short)	1
17.	T-5011	Gib	1
18.	T-5012-1	Toolpost Stud	1
19.	T-5013	T-Slot Clamp	1
20.	T-5014	4-way Toolpost	1
21.	T-5012-2	T-Slot Stud	1
22.	T-5016	Position Pin	2
23.	T-5018	Clamp Boss	1
24.	A-9107	Handle	1
25.	T-5020	Pad	1
26.	T-4010	Plug	1
27.	C-5024	Tool Screw	12
28.	C-5025	Washer	1
29.	T-4018	Bushing	1
30.	A-1106	Socket Headless Set Screw (M8 x 8)	1
31.	A-1104	Socket Headless Set Screw (M6 x 20)	1
32.	A-1204	Socket Head Cap Screw (M6 x 20)	2
33.	A-1143	Swivel Set Screw	1
34.	A-1205	Socket Head Cap Screw (M6 x 25)	1
35.	A-1212	Socket Head Cap Screw (M8 x 16)	1

NO.	PART NO.	DESCRIPTION	QUANTITY
36.	A-1731	Nut (3/8")	2
37.	A-7202	Key (4 x 15)	1
38.	A-9202	Steel Ball	2
39.	A-8512	Spring	3
40.	A-9300	Oiler (6mm)	6
41.	A-2021	Bearing 51103	2
42.	T-5010	Gib Screw	2
43.	T-4025	Wiper	1
44.	A-1529	Round Head Cap Screw (5 x 12)	3

TAILSTOCK ASSEMBLY

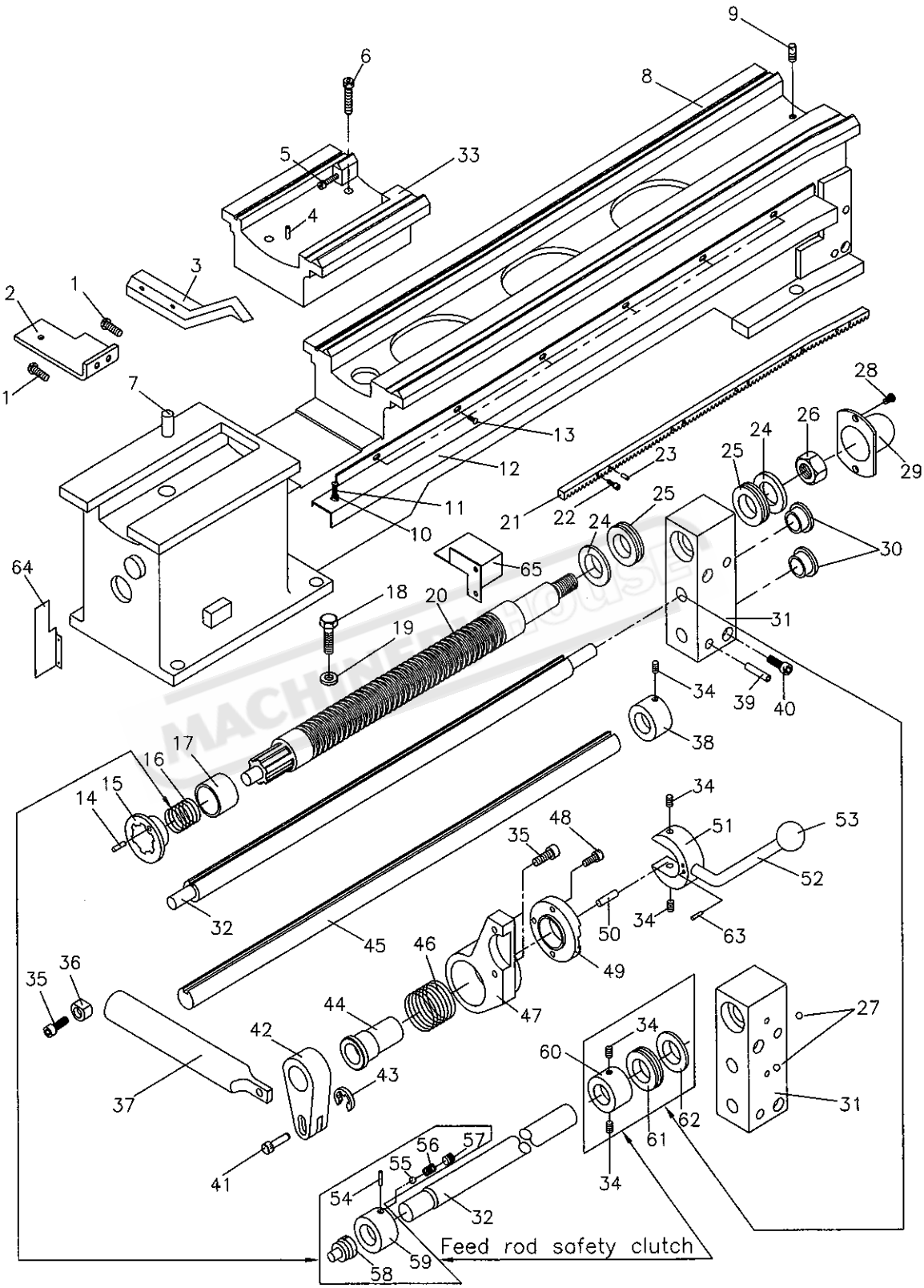


TAILSTOCK ASSEMBLY

NO.	PART NO.	DESCRIPTION	QUANTITY
1.	T-6001	Tailstock Casting	1
2.	T-6002	Tailstock Base	1
3.	T-6020	Barrel	1
4.	T-6003-1	Screw (Metric)	1
	T-6003-2	Screw (Inch)	1
5.	T-6004-1	Nut (Metric)	1
	T-6004-2	Nut (Inch)	1
6.	T-6005	Keeper	1
7.	A-3108	Wave Washer	1
8.	T-6006-1	Index Ring (Metric)	1
	T-6006-2	Index Ring (Inch)	1
9.	T-6008	Handwheel	1
10.	C-3032	Plug	1
11.	C-6026	Stop Pin	2
12.	C-4011	Handle	1
13.	A-1204	Socket Head Cap Screw (M6 x 20)	6
14.	C-6029	Lock Lever	1
15.	T-6025	Locking Screw	1
16.	T-6024	Bushing	1
17.	T-6023	Bushing	1
18.	T-6014	Lever Assembly	1
19.	T-6015	Lever	1
20.	T-6016	Pin	2
21.	T-6017	Pivot	1
22.	T-6018	Clamp	1
23.	A-7214	Key (6 x 20)	1
24.	A-2022	Bearing #51104	1
25.	A-3313	Circlip (S32)	1
26.	A-2001	Bearing #2035	1
27.	A-1111	Socket Headless Set Screw (M10 x 60)	1
28.	A-1702	Nut (M10)	1
29.	A-1208	Socket Head Cap Screw (M6 x 40)	2
30.	A-1217	Socket Head Cap Screw (M8 x 45)	2
31.	A-1101	Socket Headless Set Screw (M6 x 10)	1
32.	A-1100	Socket Headless Set Screw (M6 x 6)	1
33.	A-1131	Socket Headless Set Screw (M6 x 25)	1
34.	R-6024	Washer	1
35.	R-1030	Washer	3

NO.	PART NO.	DESCRIPTION	QUANTITY
36.	A-9107	Handle	1
37.	A-1470	Hexagon Bolt (M12 x 80)	1
38.	A-1525	Round Head Cap Screw (M6 x 16)	1
39.	A-9300	Oilers (1/4")	2
40.	A-4517	MT3 Center	1

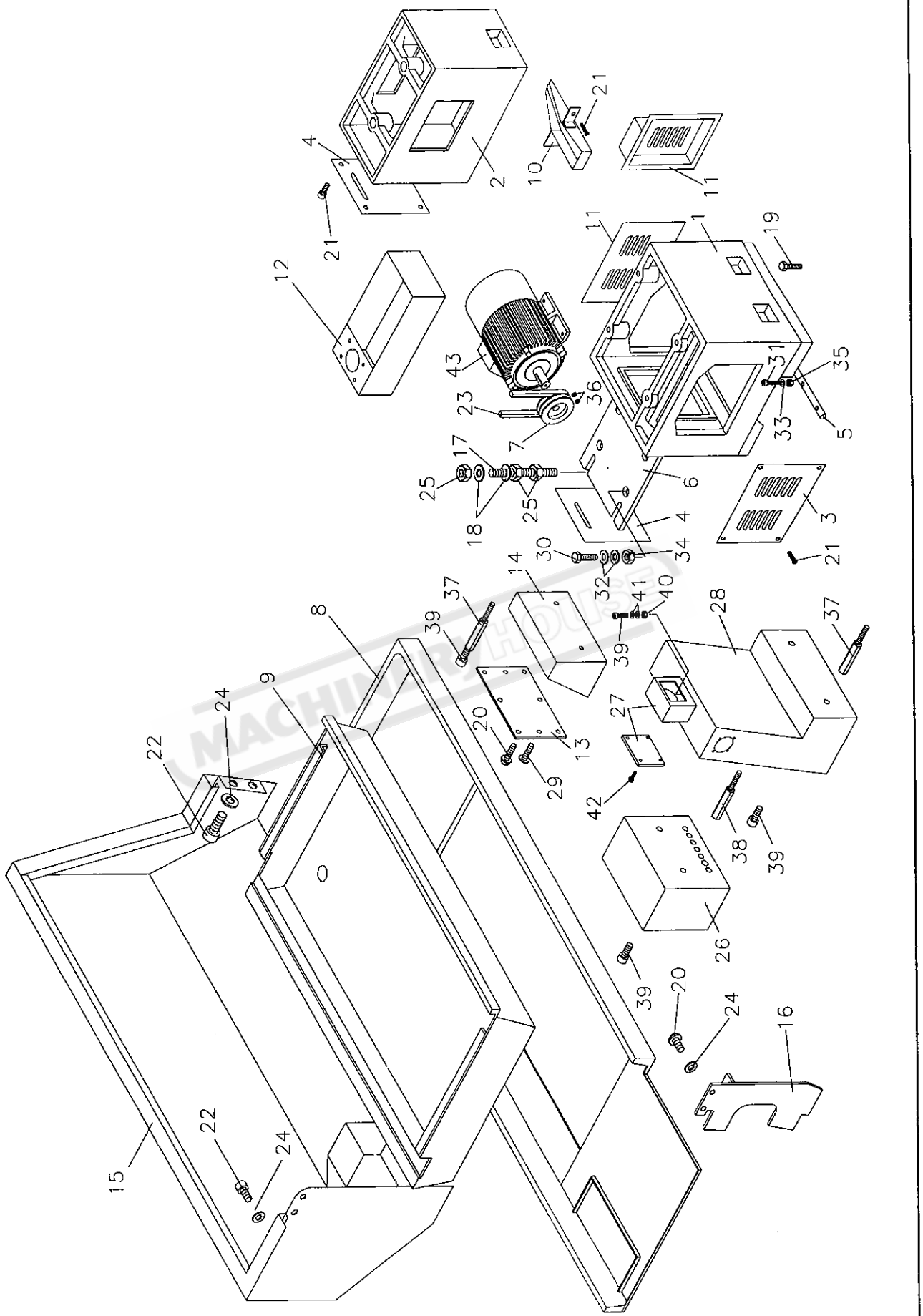
BED ASSEMBLY



BED ASSEMBLY

NO.	PART NO.	DESCRIPTION	QUANTITY
1.	A-1202	Socket Head Cap Screw (M6 x 12)	4
2.	T-7021	Plate	1
3.	T-8024	Guard	1
4.	A-4204	Taper Pin ((Φ6 x 65)	2
5.	A-1242	Socket Head Cap Screw (M8 x 60)	2
6.	A-1257	Socket HeadCap Screw (M12 x 55)	4
7.	T-7003	Dowel	1
8.	T-7701	Gap Bed (750)	1
	T-7701	Gap Bed (1000)	1
	T-7701-1	Straight Bed (750)	1
	T-7701-1	Straight Bed (1000)	1
9.	C-8007	Stop Pin	1
10.	A-1901	Washer (M6)	1
11.	A-1510	Cross Ressced Head Screw (M6 x 12)	1
12.	T-7076	Leadscrew Cover (750) (Optional)	1
	T-7076	Leadscrew Cover (1000) (Optional)	1
13.	A-1509	Cross Ressced Head Screw (M5 x 10)	4/5
14.	A-4014	Pin (Φ4 x 15)	1
15.	T-7008	Collar	1
16.	A-8514	Spring	1
17.	T-7010	Coupleing	1
18.	A-1428	Hexagon Screw (M16 x 65)	6
19.	A-1806	Washer (M16)	6
20.	T-7007-1	Leadscrew (Metric) (750/1000)	1
	T-7007-2	Leadscrew (Inch) (750/1000)	1
21.	T-7004	Rack (750/1000)	1
22.	A-1205	Socket Head Cap Screw (M6 x 25)	5/6
23.	A-4006	Pin (Φ5 x 24)	5/6
24.	T-7023	Washer	2
25.	A-2021	Bearing (#51103)	2
26.	A-1744	Nylon Nut	1
27.	A-9300	Oiler (6mm)	2
28.	A-1511	Cross Ressced Head Screw (M4 x 12)	2
29.	T-8026	Cover	1
30.	C-2075	Plug	2
31.	T-7705	End Bracket	1
32.	T-7009	Feed Rod	1
33.	T-7002	Gap Piece	1
34.	A-1100	Socket Headless Set Screw (M6 x 6)	5
35.	A-1203	Socket Head Cap Screw (M6 x 16)	3
36.	T-7024	Dog	1
37.	T-7020	Rod	1
38.	T-7017	Collar	1
39.	T-7006	Pin	2
40.	A-1218	Socket Head Cap Screw (M8 x 50)	2
41.	T-7018	Pivot	1
42.	T-7019	Lever	1
43.	A-3100	Circlip (E6)	1
44.	R-7033	Sleeve	1
45.	T-7012	Control Rod	1
46.	A-8515	Spring	1
47.	T-7013	Bracket	1
48.	A-1234	Socket Head Cap Screw (M5 x 10)	3
49.	R-7032-2	Gate Ring	1
50.	A-4004	Pin (Φ5 x 10)	1
51.	R-7034	Lever Assembly	1
52.	C-8020	Lever	1
53.	A-9108	Handle	1
54.	A-4010	Pin (Φ5 x 45)	1
55.	A-9202	Ball	2
56.	A-8419	Spring	2
57.	A-1106	Socket Headless Set Screw (M8 x 8)	2
58.	T-2033-1	Driven Shaft (E)	1
59.	T-2081	Coupleing	1
60.	T-2082	Collar	1
61.	A-2001	Bearing (#2035)	1
62.	T-2015	Washer	1
63.	A-4021	Pin (Φ5 x 15)	1
64.	T-7084	Plate	1
65.	T-7754	Switch cover (OPT)	1

PLINTH & SHEET METAL

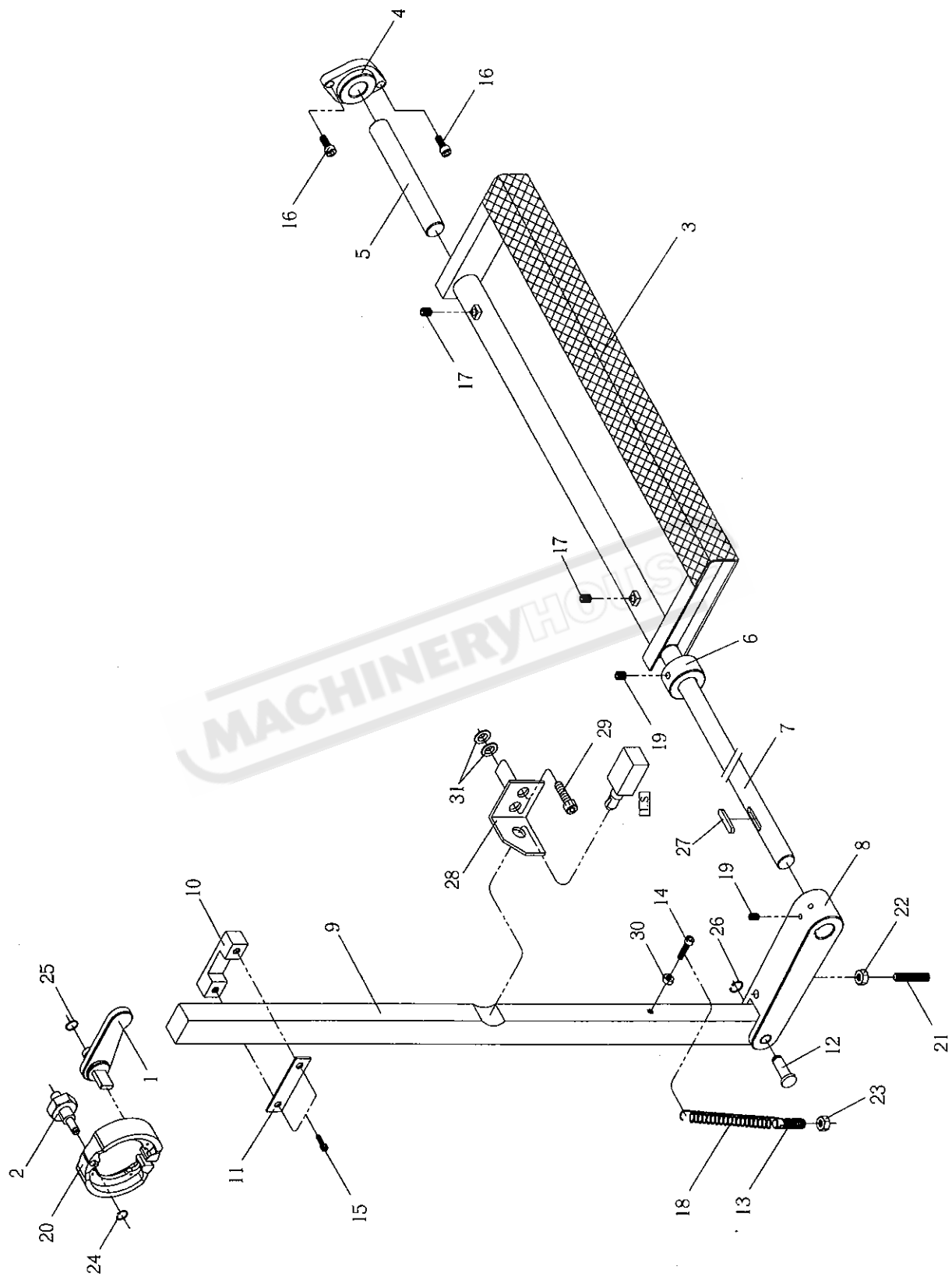


PLINTH & SHEET METAL

NO.	PART NO.	DESCRIPTION	QUANTITY
1.	T-7035	Head End Plinth	1
2.	T-7036	Tail End Plinth	1
3.	T-7037	Motor Cover	1
4.	C-7008	Plinth Cover	2
5.	T-7039	Platform Shaft	1
6.	C-7003	Motor Platform	1
7.	T-7041-6	Pulley (5HP 60HZ)	1
	T-7041-8	Pulley (5HP 50HZ)	1
	T-7041-7	Pulley (3/5HP 60HZ)	1
	T-7041-9	Pulley (3/5HP 50HZ)	1
8.	T-7027	Water Pan (750 / 1000)	1
9.	T-7028	Chip Tray (750 / 1000)	1
10.	T-7066	Hopper	1
11.	T-7060	Standard Motor Fan Cover	1
	T-7062	2-Speed Motor Fan Cover	1
12.	T-7031	Coolant Tank	1
13.	T-7032	Cover	1
14.	T-7033	Electrical Cabinet	1
15.	T-7053	Splash Guard (750 / 1000)	1
	T-7053-1	Deeper Splash Guard (750 / 1000)	1
16.	T-7054	Feed Gear Box Guard	1
	T-7754	Feed Gear Box Guard (Optional)	1
17.	C-7005	Stud	2
18.	C-7006	Washer	4
19.	A-1422	Hexagon Bolt (M16 x 50)	6
20.	A-1614	Round Head Cap Screw (M5 x 8)	6
21.	A-1512	Cross Recessed Screw (M6 x 10)	18
22.	A-1203	Socket Head Cap Screw (M6 x 16)	4
23.	A-0015	Belt (A75)	3
24.	A-1801	Spring Washer	7
25.	A-1712	Nut (1/2")	6
26.	T-7033-3	2-Speed Electrical Cabinet (Optional)	1
	T-7033-8	CE Electrical Cabinet (Optional)	1
27.	C-8038	Varispeed Speed Meter Box (Optional)	1
28.	T-7033-9	Varispeed Electrical Cabinet (Optional)	1
29.	A-1615	Cross Recessed Sheet Metal Screw (M5 x 8)	5
30.	A-1441	Hexagon Bolt (M10 x 40)	4

NO.	PART NO.	DESCRIPTION	QUANTITY
31.	A-1244	Socket Head Cap Screw (M8 x 75)	2
32.	A-1807	Washer (M10)	8
33.	A-1802	Washer (M8)	2
34.	A-1702	Nut (M10)	4
35.	A-1701	Nut (M8)	2
36.	A-1142	Socket Headless Set Screw (M8 x 6)	2
37.	C-8030	Stud (Optional)	2
38.	T-7034	Stud (2-Speed) (Optional)	2
39.	A-1202	Socket Head Cap Screw (M6 x 12) (Optional)	3
40.	A-1700	Nut (M6) (Varispeed) (Optional)	1
41.	A-1801	Washer (Varispeed) (Optional)	2
42.	A-1509	Round Head Cap Screw (M5 x 10) (Optional)	4
43.	Z-1320	Motor (5HP / 4P)	1
	Z-1310	Motor VS model (4HP / 8P)	1
	Z-1340	Motor (3/5HP / 8P/4P)	1
44.	A-1142	Socket Headless Set Screw (M8 x 6)	2

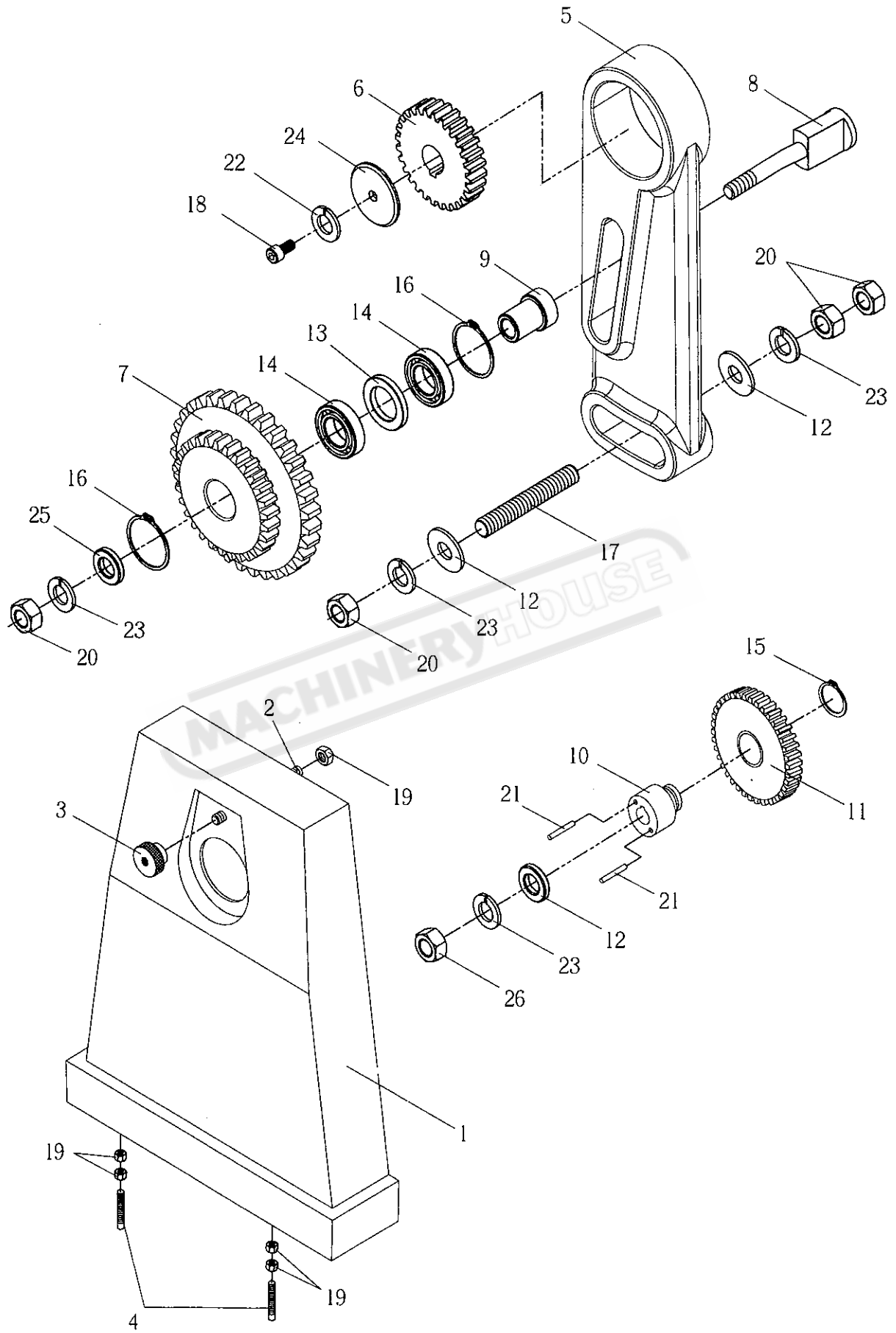
BRAKE ASSEMBLY



BRAKE ASSEMBLY

NO.	PART NO.	DESCRIPTION	QUANTITY
1.	T-1015	Brake Shoes Controller	1
2.	T-1016	Stud	1
3.	T-7042	Pedal	1
4.	C-7009	Flange	1
5.	C-7010	Connect Shaft	1
6.	C-8011	Collars	1
7.	T-7046	Connector	1
8.	T-7047	Lever	1
9.	T-7048	Operation Bar	1
10.	T-7049	Guide Block	1
11.	T-7050	Strap Plate	1
12.	T-7051	Pivot	1
13.	T-7052	Stud	1
14.	A-1205	Socket Head Cap Screw (M6 x 25)	1
15.	A-1207	Socket Head Cap Screw (M6 x 35)	2
16.	A-1203	Socket Head Cap Screw (M6 x 16)	2
17.	A-1169	Socket Headless Set Screw (M8 x 10)	2
18.	A-8501	Spring	1
19.	A-1101	Socket Headless Set Screw (M6 x 10)	2
20.	A-9800	Brake Shoe Assembly	1
21.	A-1140	Socket Headless Set Screw (M8 x 55)	1
22.	A-1701	Nut (M8)	1
23.	A-1708	Nut (3/8")	1
24.	A-3102	Circlip (E8)	1
25.	A-3322	Circlip (S12)	1
26.	A-3103	Circlip (E10)	1
27.	A-7213	Key (6 x 15)	1
28.	T-7063	Angle Plate	1
29.	A-1202	Socket Head Cap Screw (M6 x 12)	2
30.	A-1700	Nut (M6)	1
31.	A-1917	Washer (Φ6)	4

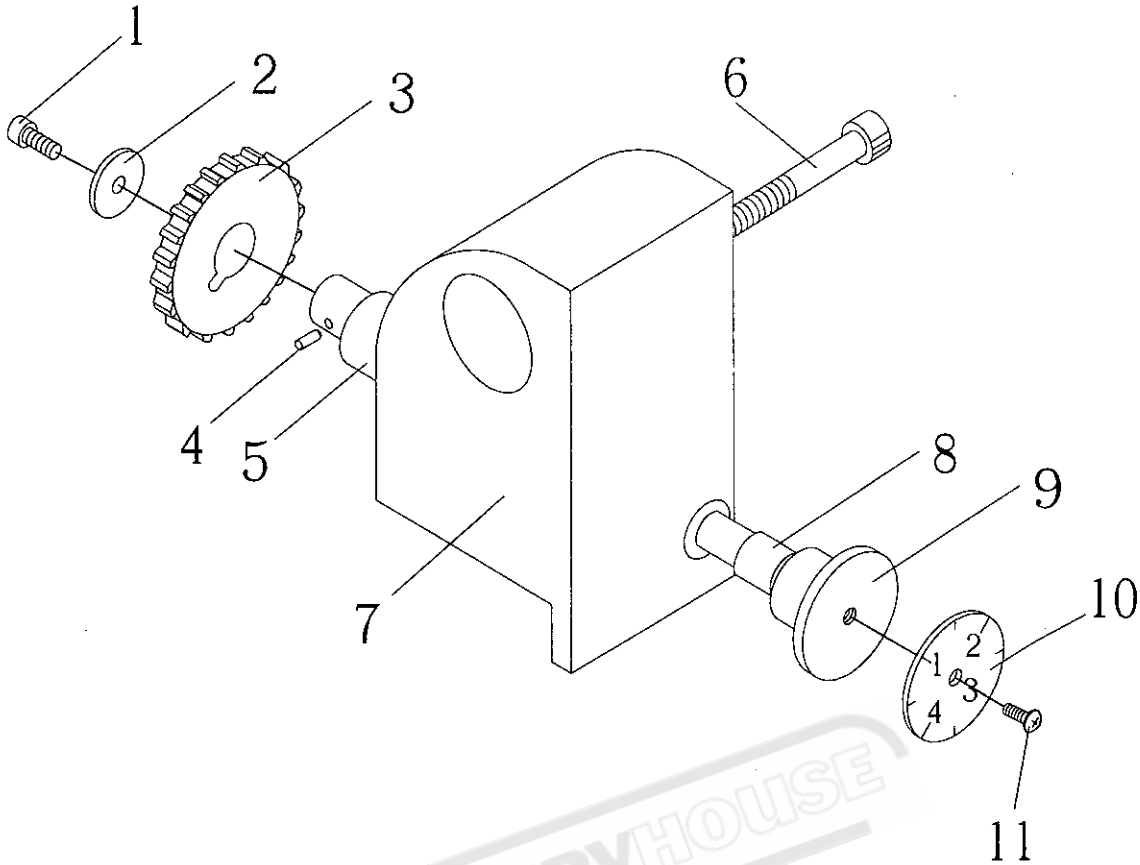
END GEARS TRAIN & COVER



END GEARS TRAIN & COVER

NO.	PART NO.	DESCRIPTION	QUANTITY
1.	T-8001	Cover	1
2.	T-8002	Stud	1
3.	C-1138	Knurl Nut	1
4.	C-1139	Stud	2
5.	T-8005	Swing Frame	1
6.	T-8006-1	Drive Gear 28T (Metric Leadscrew)	1
	T-8006-2	Drive Gear 24T (Inch Leadscrew)	1
7.	T-8008-1	Idler Gear 54/55T (Metric Leadscrew)	1
	T-8008-2	Idler Gear 44/56T (Inch Leadscrew)	1
8.	T-8009	Gear Shaft	1
9.	T-8010	Collar	1
10.	T-8011	Spacer	1
11.	T-8012-1	Driven Gear 64T (Metric Leadscrew)	1
	T-8012-2	Driven Gear 57T (Inch Leadscrew)	1
12.	A-1905	Washer (1/2")	3
13.	C-1133	Washer	1
14.	A-2119	Bearing #6004Z	2
15.	A-3313	Circlip (S32)	1
16.	A-3203	Circlip (R42)	2
17.	T-8005-2	Stud	1
18.	A-1212	Socket Head Cap Screw (M8 x 16)	1
19.	A-1701	Nut (M8)	5
20.	A-1703	Nut (M12)	4
21.	C-1145	Pin	2
22.	A-1802	Spring Washer (Φ8)	1
23.	A-1805	Spring Washer (Φ12)	4
24.	T-8013	Washer	1
25.	A-1911	Washer (Φ12)	1
26.	A-1746	Nut (M12)	1

THREADING DIALS



Imperial

INDICATOR TABLE					
T.P.I.	SCALE	T.P.I.	SCALE	T.P.I.	SCALE
4	1-8	13	1-4	27	1-4
$4\frac{1}{2}$	$\frac{1\,3}{2\,4}$	$13\frac{1}{2}$	$\frac{1\,3}{2\,4}$	28	1-8
5	1-4	14	1-8	30	1-8
6	1-8	15	$\frac{1\,3}{2\,4}$	32	1-8
7	1-4	16	1-8	36	1-8
$7\frac{1}{2}$	$\frac{1\,3}{2\,4}$	18	1-8	40	1-8
8	1-8	19	1-4	44	1-8
9	1-4	20	1-8	48	1-8
10	1-8	22	1-8	54	1-8
11	1-4	23	1-4	56	1-8
$1\frac{1}{2}$	$\frac{1\,3}{2\,4}$	24	1-8	60	1-8
12	1-8	26	1-8	72	1-8

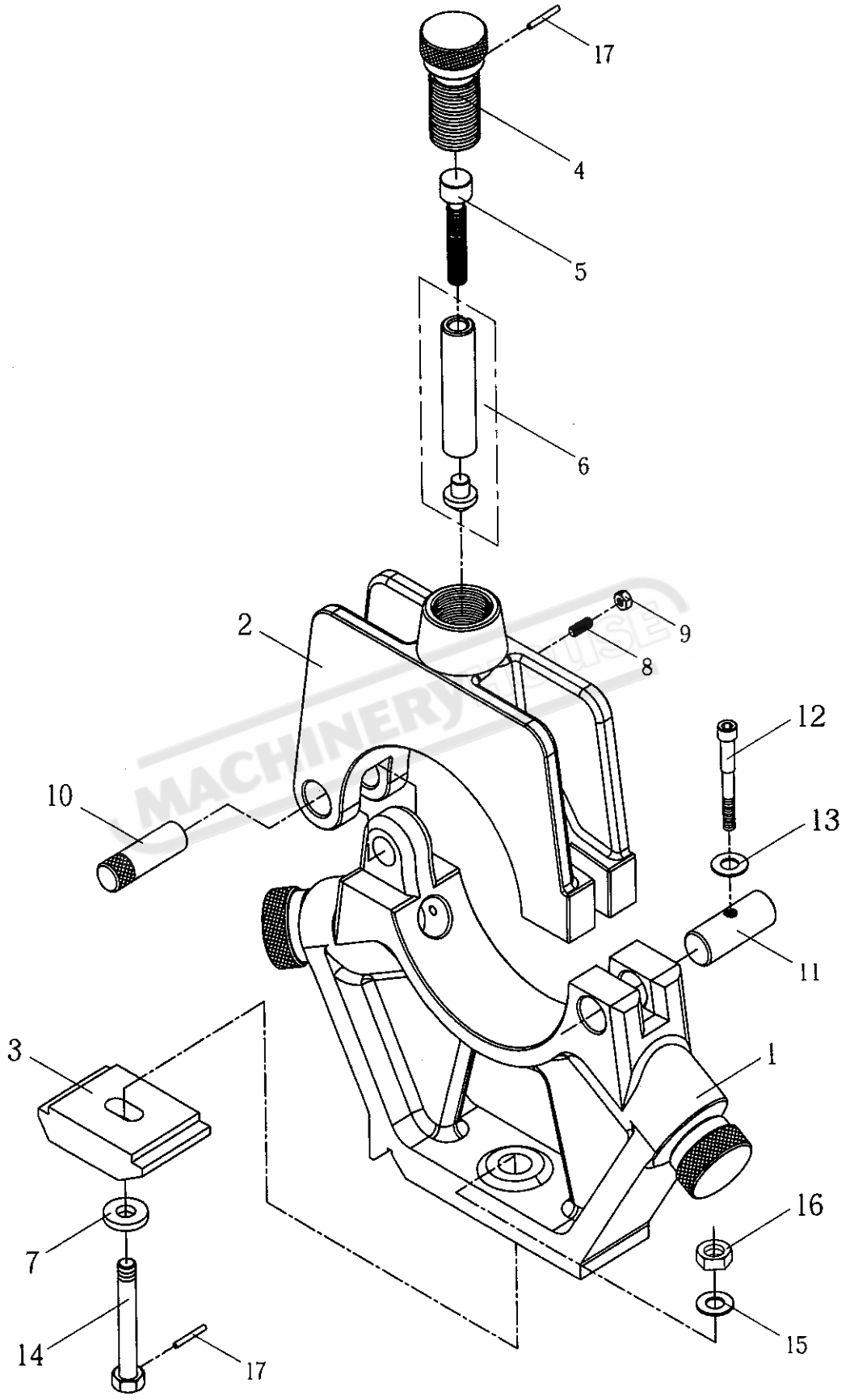
Metric

INDICATOR TABLE						
GEAR	PITCH					SCALE
13T	1	1.3	6.5	13		1
14T	0.4	0.5	0.7	1	1.4	$\frac{1\,4}{2\,5}$ $\frac{}{3\,6}$
	1.75	2	3.5	7	1.4	
	0.8	4				1
18T	0.4	0.45	0.5	0.6	0.75	1-6
	0.9	1	1.2	1.5	2	
	3	4.5	6	9		
	0.8	4	12			1 3 5
20T	0.4	0.5	0.8	1	1.25	$\frac{1\,4}{2\,5}$ $\frac{}{3\,6}$
	2	2.5	4	5	10	
	8					1
22T	0.4	0.5	1	1.1	2	$\frac{1\,4}{2\,5}$ $\frac{}{3\,6}$
	5.5	11				
	0.8					1

THREADING DIALS

NO.	PART NO.	DESCRIPTION	QUANTITY
1.	A-1231	Socket Head Cap Screw (M6x10)	1
2.	A-1901	Washer (M6)	1
3.	C-3076	Gear 16T (Imperial)	1
	C-3080	Gear 14T (Metric)	1
	C-3081	Gear 13T (Metric)	1
	C-3082	Gear 18T (Metric)	1
	C-3083	Gear 20T (Metric)	1
	C-3084	Gear 22T (Metric)	1
4.	A-4018	Pin (Φ3x15)	1
5.	T-8020	Bush	1
6.	A-1242	Socket Head Cap Screw (M8x60)	1
7.	T-8017-3	Guard	1
8	A-2154	Bush	1
9.	T-8019	Stem	1
10.	NC-26	Index Plate (Imperial)	1
	NC-39	Index Plate (Metric)	1
11.	A-1526	Cross Recessed Head Screw (M4x6)	1

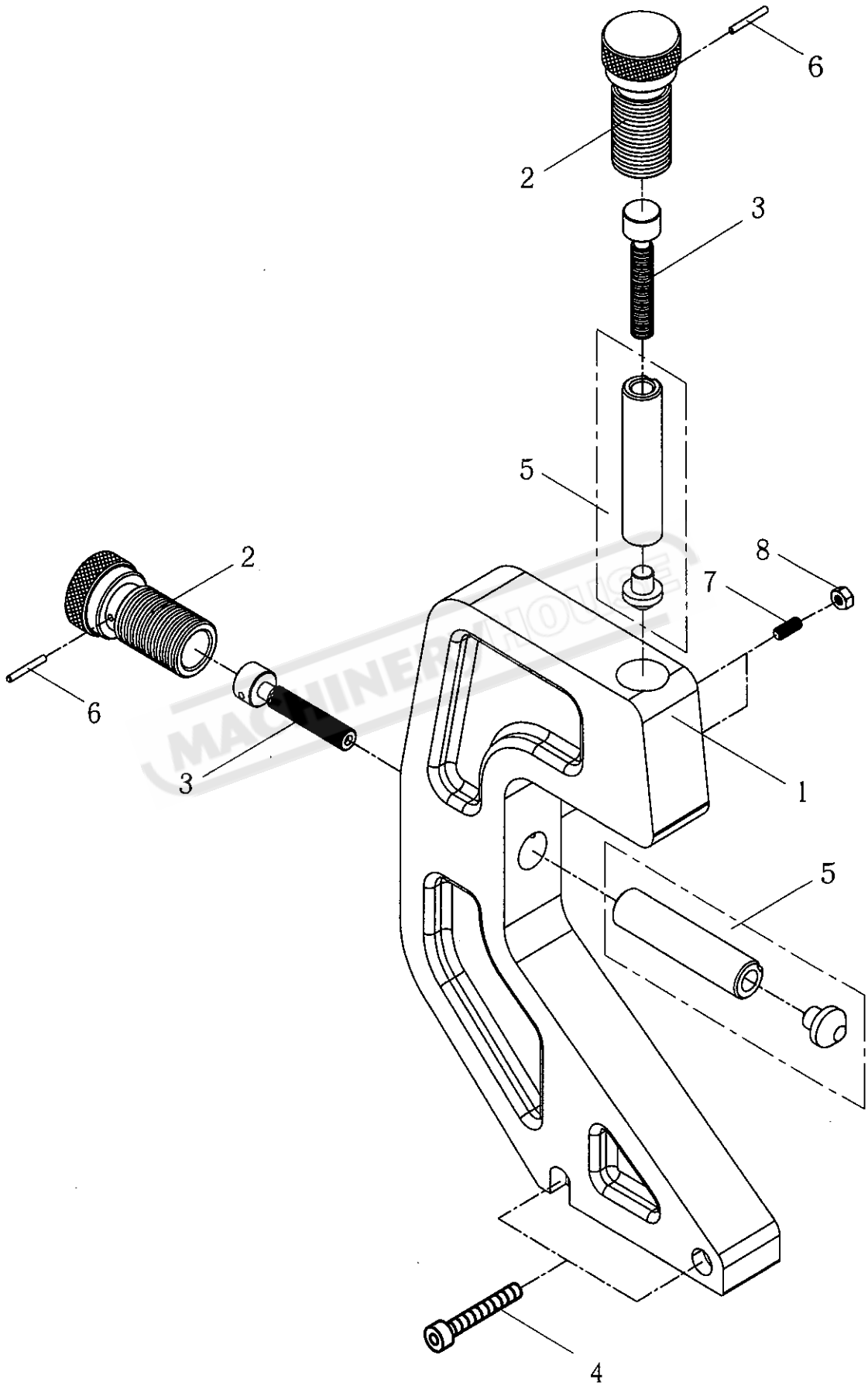
STEADY REST (OPTIONAL)



STEADY REST (OPTIONAL)

NO.	PART NO.	DESCRIPTION	QUANTITY
1.	T-9011	Bottom Body	1
2.	T-9010	Top Body	1
3.	T-6018	Clamp Plate	1
4.	T-9013	Fixture	3
5.	T-9014	Adjusting Screw	3
6.	ZA-2506-1	Finger with Pad	3
7.	C-6037	Washer	1
8.	A-1136	Socket Headless Set Screw (M8 x 25)	3
9.	A-1701	Nut (M8)	3
10.	T-9017-1	Pivot	1
11.	T-9017	Pivot	1
12.	A-1238	Socket Headless Set Screw (M10 x 55)	1
13.	A-1803	Washer (Φ3/8")	1
14.	A-1438	Hexagon Head Bolt (M16 x 100)	1
15.	A-1907	Washer (Φ16)	1
16.	A-1720	Nut (M16)	1
17.	A-4009	Pin	4

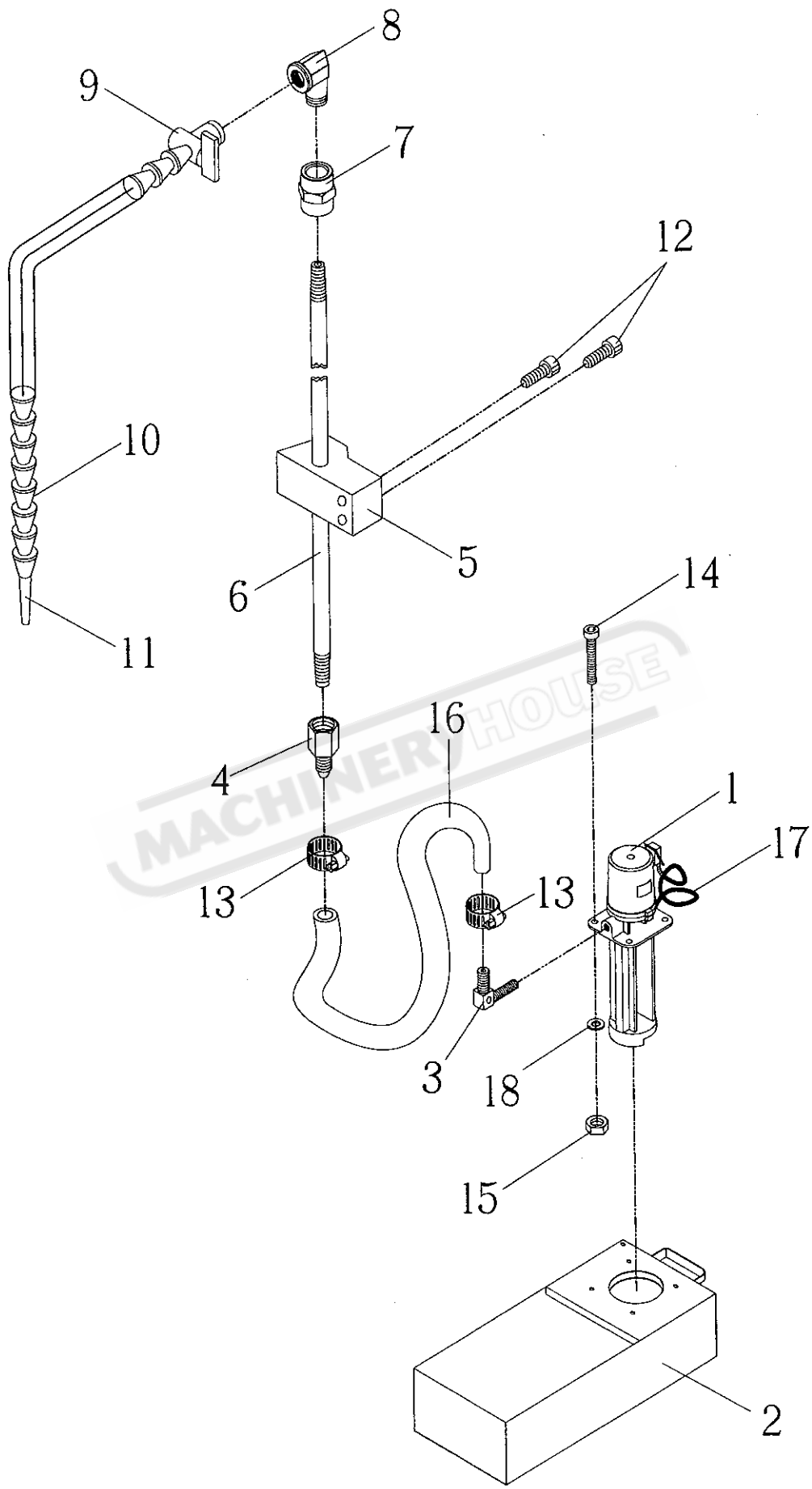
FOLLOW REST (OPTIONAL)



FOLLOW REST (OPTIONAL)

NO.	PART NO.	DESCRIPTION	QUANTITY
1.	T-9012	Body	1
2.	T-9013	Fixture	2
3.	T-9014	Adjusting Screw	2
4.	A-1216	Socket Head Cap Screw (M8 x40)	2
5.	ZA2506-1	Finger With Pad	2
6.	A-4009	Pin	2
7.	A-1136	Socket Headless Set Screw (M8 x 25)	2
8.	A-1701	Nut (M8)	2

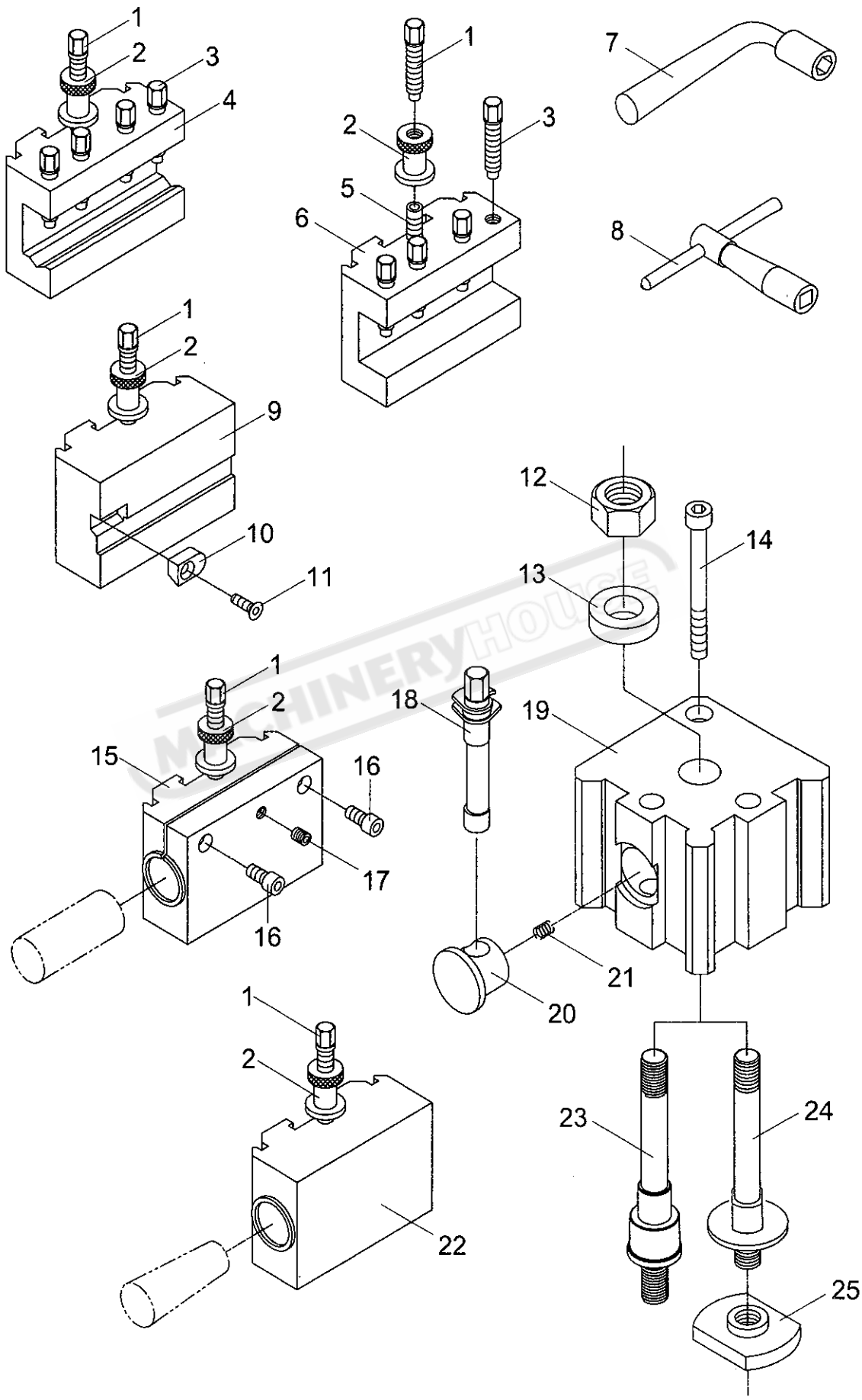
COOLANT EQUIPMENT



COOLANT EQUIPMENT

NO.	PART NO.	DESCRIPTION	QUANTITY
1.	Z1100	Pump	1
2.	T-7031	Coolant Tank	1
3.	A-4101	Outlet	1
4.	A-4105	Hose Sleeve	1
5.	J-4014	Pipe Bracket	1
6.	A-4106	Pipe	1
7.	A-4116	Socket	1
8.	A-4108	Elbow	1
9.	A-4107	Valve	1
10.	A-4117	Flexible Jointer	1
11.	A-4118	Nozzle	1
12.	A-1204	Socket Head Cap Screw (M6x20L)	2
13.	A-4111	Clamper (3/4")	2
14.	A-1205	Socket Head Cap Screw (M6x25L)	4
15.	A-1700	Nut (M6)	4
16.	A-4104	Hose	1
17.	A-4103	Electric Tubing	1
18.	A-1917	Washer (Φ6)	4

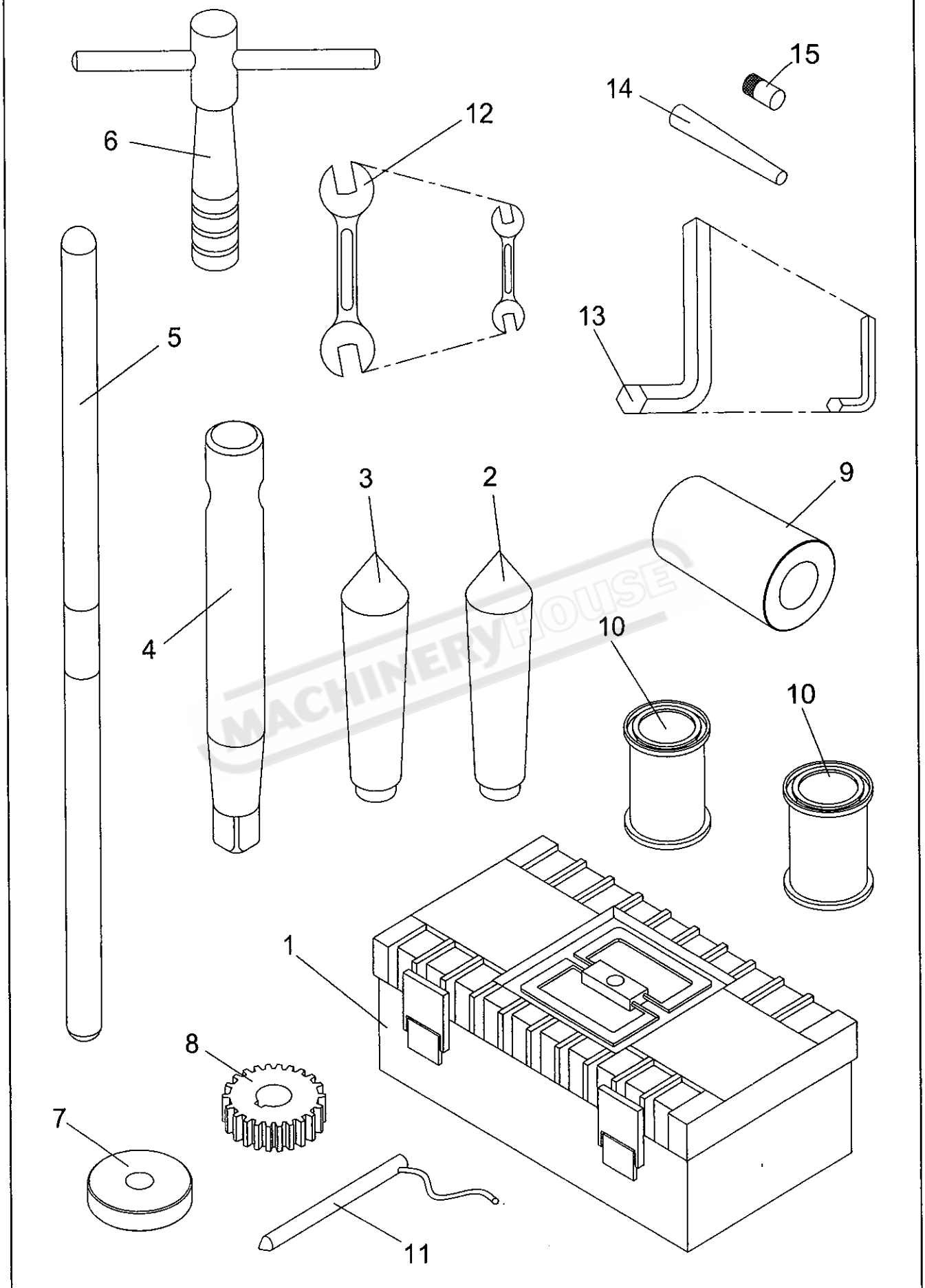
QUICK CHANGE TOOLPOST



QUICK CHANGE TOOLPOST

NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-9107	Height Adj. Screw (On Each Toolholder)	1
2.	C-9106	Adjusting Stop (On Each Toolholder)	1
3.	C-9107	Tool Clamp Screw (On No. :4/6Toolholder)	4
4.	C-9111	Boring (Vee) Toolholder	1
5.	A-1137	Socket Headless Set Screw (M10 x 35) (On Each Toolholder)	1
6.	C-9110	Standard Toolholder	1
7.	A-8528	Cam Wrench	1
8.	A-8529	Toolscrew Wrench	1
9.	C-9108	Part-off Toolholder	1
10.	C-9113	Blade Clamp	1
11.	A-1611	Socket Flat Head Screw (M6 x 20)	1
12.	A-1720	Nut (M16)	1
13.	R-3011	Washer	1
14.	A-1251	Socket Head Cap Screw (M10 x 75)	1
15.	C-9112	Plain Bore Toolholder	1
16.	A-1214	Socket Head Cap Screw (M8 x 25)	2
17.	A-1129	Socket Headless Set Screw (M8 x 20)	1
18.	C-9102	Toolholder Cams	2
19.	C-9100	Q.C.T. Body	1
20.	C-9103	Toolholder Pads	2
21.	A-8424	Spring	2
22.	C-9109	M.T.3 Taper Toolholder	1
23.	T-5012-1	Stud	1
24.	T-5012-2	T-Slot Stud	1
25.	T-5013	T-Slot Clamp	1

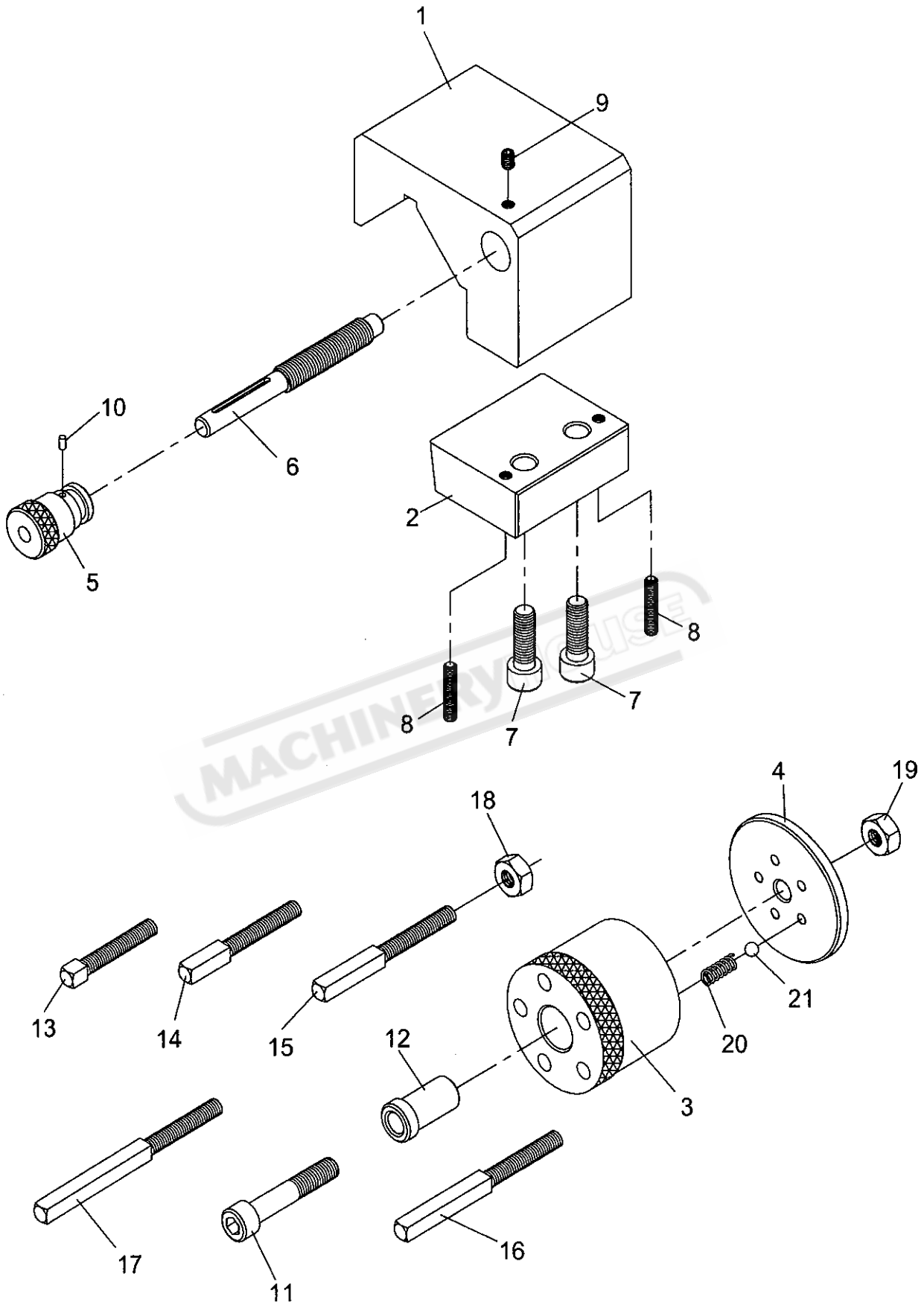
SERVICE TOOLS & EQUIPMENT



SERVICE TOOLS & EQUIPMENT

NO.	PART NO.	DESCRIPTION	QUANTITY
1.	A-4515	Tool Box	1
2.	A-4517	Tailstock Center (M.T.#3)	1
3.	A-4518	Headstock Center (M.T.#3)	1
4.	A-4519	Camlock Key	1
5.	A-4520	Key Handle	1
6.	A-4521	Toolscrew Wrench	1
7.	T-9086	Levelling Block	6
8.	T-8007-1	Gear 44T-(Metric Leadscrew)	1
	T-8007-2	Gear 48T-(Inch Leadscrew)	1
9.	T-9001	Center Sleeve (M.T.#5 x M.T.#3)	1
10.	A-4513	Touch Paint	2
11.	C-1098	Earth Bar With Cable (VS Model)	1
12.	A-4507-1	Spanner (22 x 24)	1
	A-4507-2	Spanner (17 x 19)	1
	A-4507-3	Spanner (12 x 14)	1
	A-4507-4	Spanner (11 x 13)	1
13.	A-4508-1	Allen Key (3mm)	1
	A-4508-2	Allen Key (4mm)	1
	A-4508-3	Allen Key (5mm)	1
	A-4508-4	Allen Key (6mm)	1
	A-4508-5	Allen Key (8mm)	1
	A-4508-6	Allen Key (10mm)	1
14.	C-1145	Taper Pin	6
15.	C-2048-1	Shear Pin	2

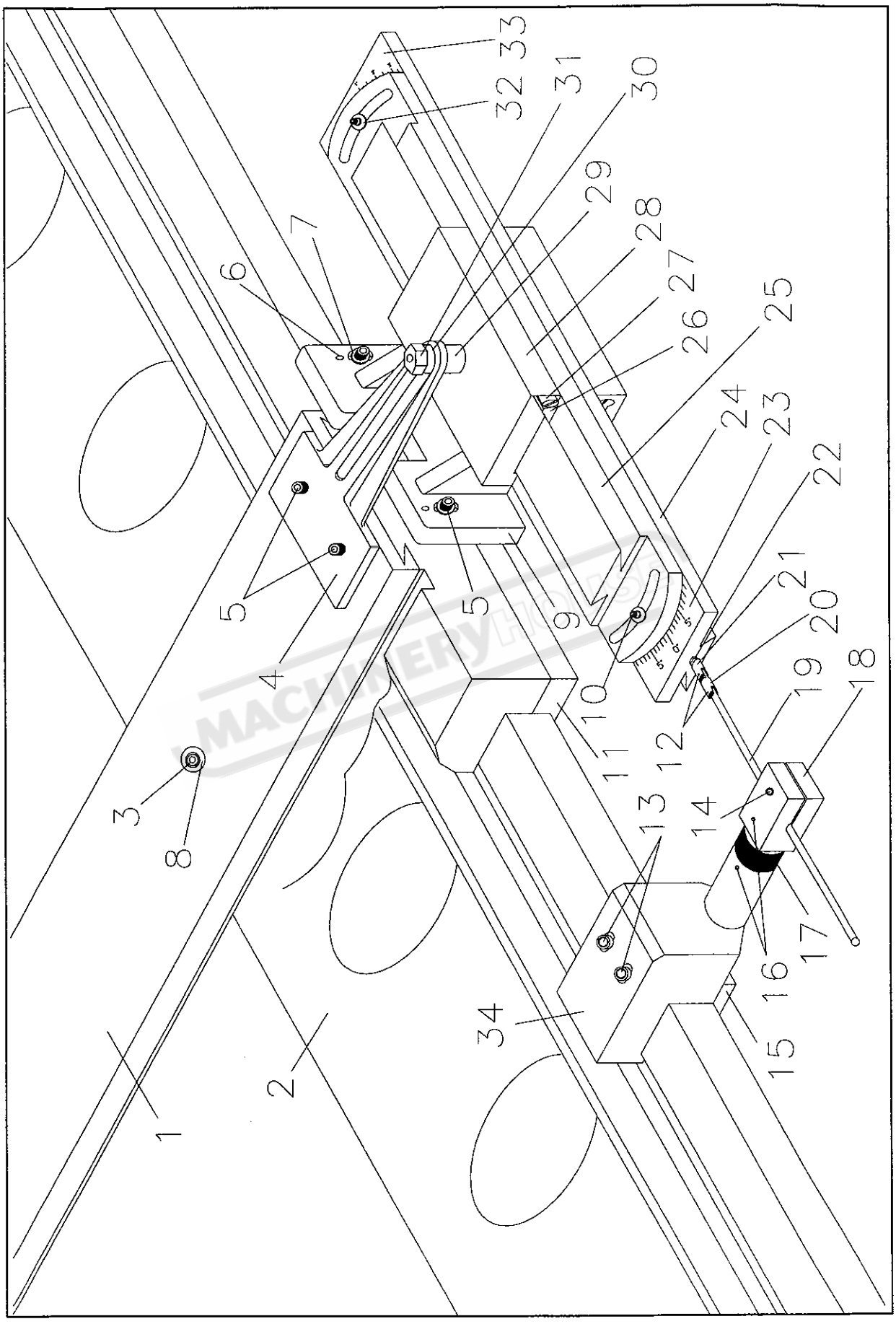
BEDSTOPS (OPTIONAL)



BEDSTOPS (OPTIONAL)

NO.	PART NO.	DESCRIPTION	QUANTITY
1.	T-9040	Body	1
2.	T-9043	Clamp	1
3.	T-9046	Turret	1
4.	T-9047	Backplate	1
5.	T-9042	Micrometer Dial	1
6.	T-9041	Spindle	1
7.	A-1213	Socket Head Cap Screw (M8 x 20)	2
8.	A-1103	Socket Headless Set Screw (M6 x 16)	2
9.	A-1139	Socket Headless Set Screw (M6 x 8)	1
10.	A-4023	Pin	1
11.	A-1259	Socket Head Cap Screw (3/8" x 2 1/2")	1
12.	T-9048	Bush	1
13.	C-9056-1	Stop Screw (43L)	1
14.	C-9056-2	Stop Screw (58L)	1
15.	C-9056-3	Stop Screw (73L)	1
16.	C-9056-4	Stop Screw (88L)	1
17.	C-9056-5	Stop Screw (103L)	1
18.	A-1707	Nut (5/16")	5
19.	A-1708	Nut (3/8")	1
20.	A-8519	Spring	1
21.	A-9202	Ball (Φ1/4")	1

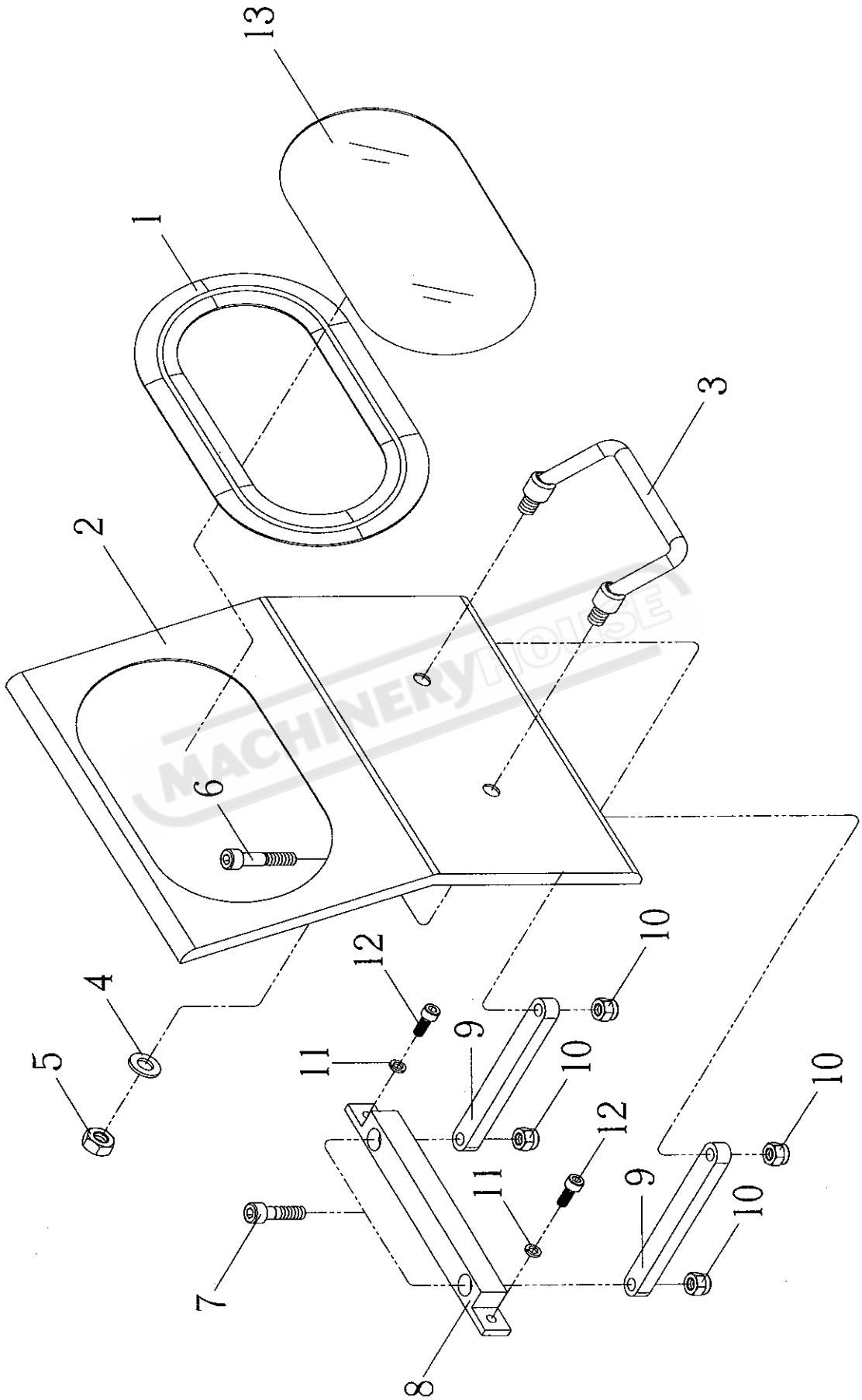
TAPER TURNING ATTACHMENT (OPTIONAL)



TAPER TURNING ATTACHMENT (OPTIONAL)

NO.	PART NO.	DESCRIPTION	QUANTITY
1.	T-4002	Cross Slide	1
2.	T-7001	Bed	1
3.	A-1212	Socket Head Cap Screw (M8 x 16)	1
4.	R-9096	Guide Plate	1
5.	A-1215	Socket Head Cap Screw (M8 x 30)	4
6.	A-4005	Pin (5 x 20)	2
7.	A-1802	Spring Washer	2
8.	T-4018	Bush	1
9.	T-9055	Bracket	1
10.	A-1222	Socket Head Cap Screw (M10 x 35)	2
11.	C-4020-1	Rear Strip	1
12.	A-4005	Pin (5 x 20)	2
13.	A-1216	Socket Head Cap Screw (M8 x 40)	2
14.	A-1213	Socket Head Cap Screw (M8 x 10)	1
15.	T-9063	Strip	1
16.	A-1127	Socket Headless Set Screw (M8 x 10)	2
17.	R-9098	Connecter	1
18.	R-9099	Holder	1
19.	R-9101	Draw Bar	1
20.	R-9106	Jointer	1
21.	R-9107	Jointer	1
22.	A-1706	Nut (M10)	1
23.	NT-49	Graduated Plate	1
24.	T-9056	Frame	1
25.	T-9057	Swivel Guide	1
26.	T-9059	Taper Gib	2
27.	R-5010	Adjusting Screw	2
28.	T-9058	Taper Slide	1
29.	T-9060	Pivot	1
30.	R-9097-1	Bush	1
31.	A-1714	Nut	1
32.	A-1807	Washer (Φ10)	2
33.	NT-50	Graduated Plate	1
34.	T-9062	Clamp	1

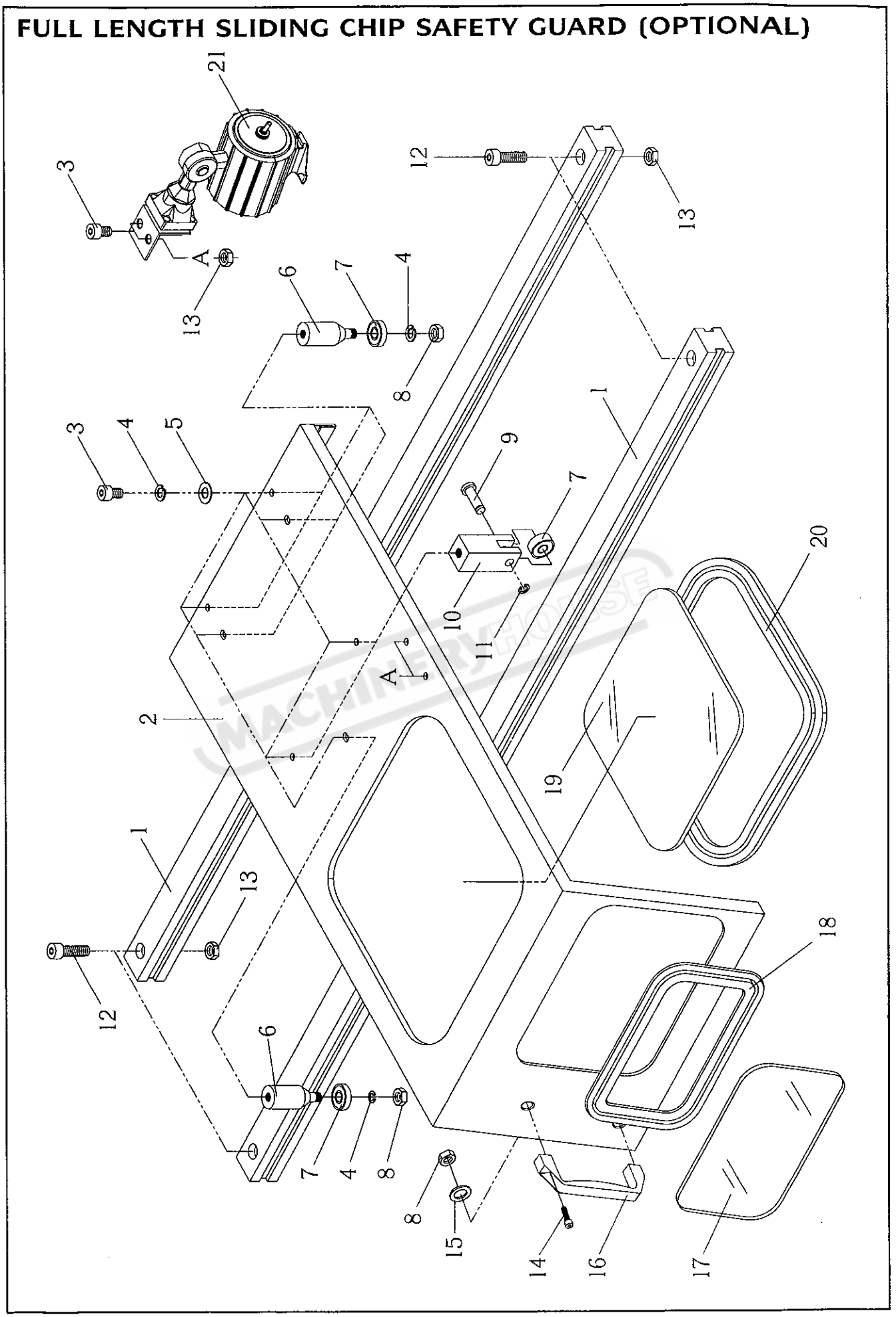
FOLLOWING CHIP GUARD (OPTIONAL)



FOLLOWING CHIP GUARD (OPTIONAL)

NO.	PART NO.	DESCRIPTION	QUANTITY
1.	A-9118	Strap	1
2.	R-5031	Chip Guard	1
3.	A-9117	Handle	1
4.	A-1807	Washer (Φ10)	2
5.	A-1702	Nut (M10)	2
6.	A-1216	Socket Head Cap Screw (M8 x 40)	2
7.	A-1215	Socket Head Cap Screw (M8 x 30)	2
8.	R-5028	Frame	1
9.	R-5030	Swivel Arm	2
10.	A-1743	Locking Nut (M8)	4
11.	A-1801	Washer (Φ1/4")	2
12.	A-1203	Socket Head Cap Screw (M6 x 16)	2
13.	A-9121	Window	1

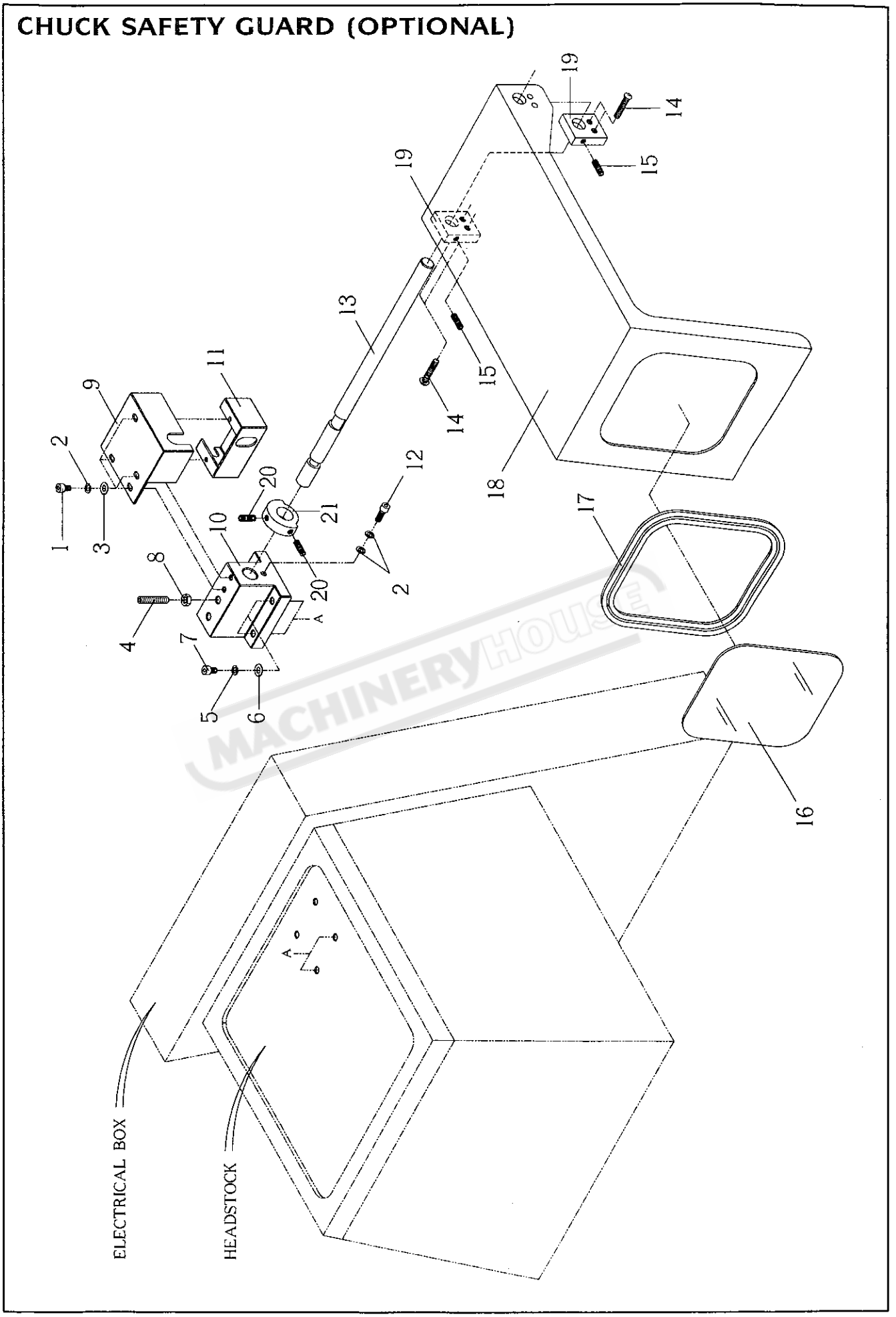
FULL LENGTH SLIDING CHIP SAFETY GUARD (OPTIONAL)



FULL LENGTH SLIDING CHIP SAFETY GUARD (OPTIONAL)

NO.	PART NO.	DESCRIPTION	QUANTITY
1.	T-8033	Guidance	2
2.	T-8039	Chip Safety Guard	1
3.	A-1203	Socket Head Cap Screw (M6 x 16)	9
4.	A-1802	Spring Washer (Φ8)	12
5.	A-1917	Washer (Φ6)	7
6.	C-8116	Pivot	5
7.	A-2044	Bearing#608ZZ	7
8.	A-1701	Nut (M8)	3
9.	M-8022	Pivot	2
10.	C-8115	Guide Block	2
11.	A-3101	Circlip (E6)	2
12.	A-1208	Socket Head Cap Screw (M6 x 40)	4
13.	A-1700	Nut (M6)	6
14.	A-1211	Socket Head Cap Screw (M8 x 12)	2
15.	A-1918	Washer (Φ8)	2
16.	A-9124	Handle	1
17.	A-9126	Window	1
18.	A-9127	Strap	1
19.	A-9128	Window	1
20.	A-9129	Strap	1
21.	ZA2702	Halogen Lamp (Optional)	1
	ZA2701	Halogen Lamp (Long Arm / Optional)	1

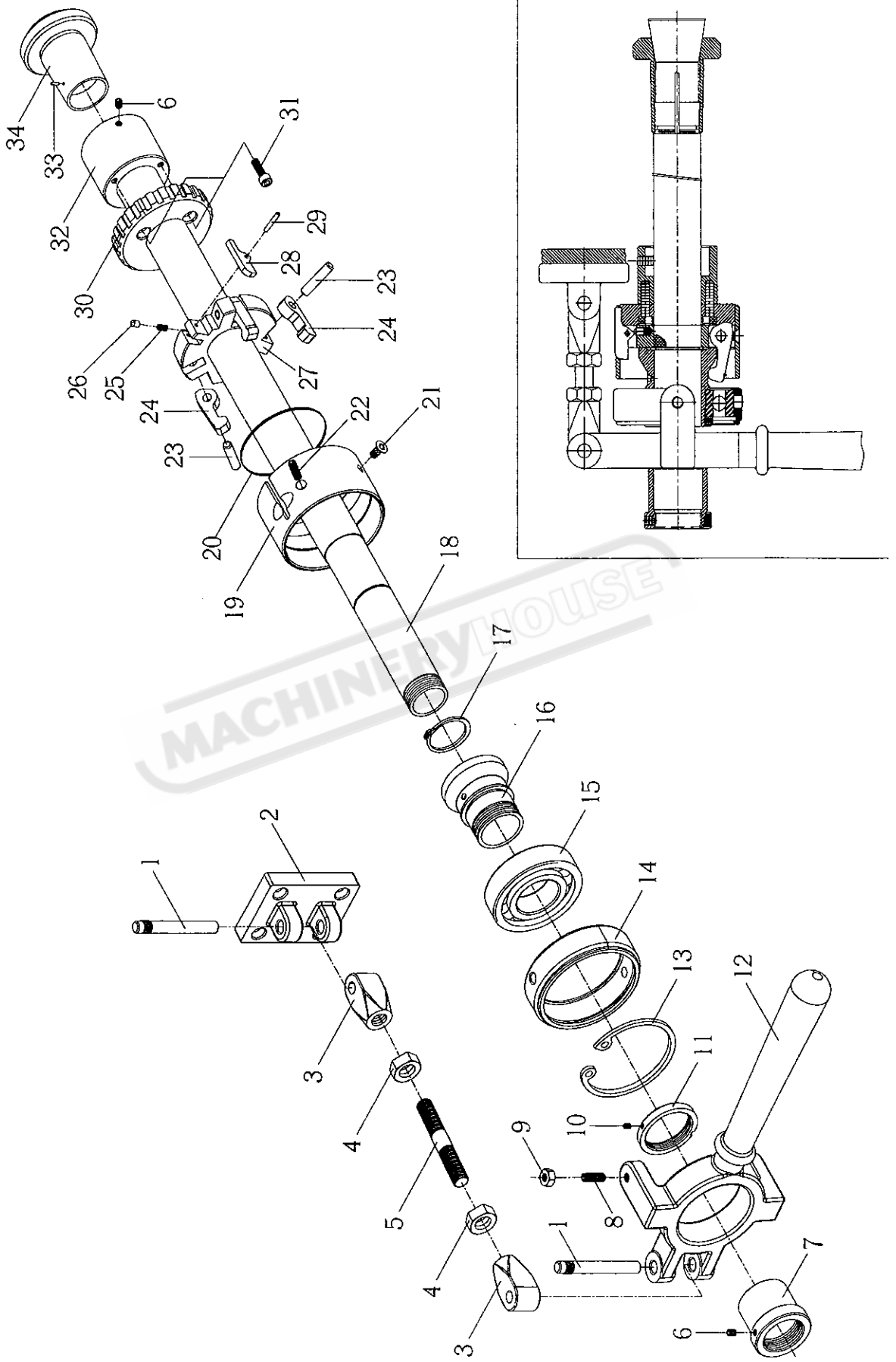
CHUCK SAFETY GUARD (OPTIONAL)



CHUCK SAFETY GUARD (OPTIONAL)

NO.	PART NO.	DESCRIPTION	QUANTITY
1.	A-1509	Button Head Cap Screw (M5 x 10)	4
2.	A-1813	Spring Washer (Φ5)	6
3.	A-1909	Washer (Φ5)	4
4.	A-1148	Socket Headless Set Screw (M8 x 30)	1
5.	A-1812	Spring Washer (Φ1/4")	4
6.	A-1917	Washer (Φ6)	4
7.	A-1205	Socket Head Cap Screw (M6 x 25)	4
8.	A-1701	Nut (M8)	1
9.	C-8142	Switch Cover	1
10.	T-8040	Seat	1
11.	C-8141	Switch Box	1
12.	A-1234	Socket Head Cap Screw (M5 x 10)	1
13.	T-8052	Shaft	1
14.	A-1525	Button Head Cap Screw (M6 x 16)	4
15.	A-1102	Socket Headless Set Screw (M6 x 12)	2
16.	A-9130	Window	1
17.	A-9131	Strap	1
18.	T-8053	Chuck Safety Guard	1
19.	C-8139	Supporter	2
20.	A-1101	Socket Headless Set Screw (M6 x 10)	2
21.	C-8138-1	Limit Dog	1

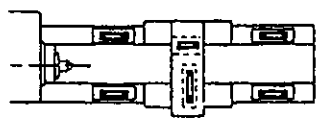
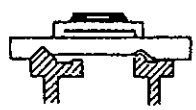
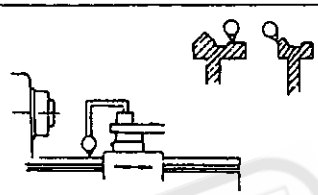
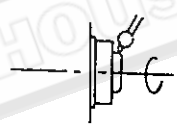
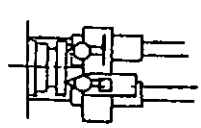
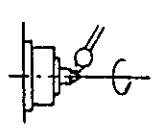
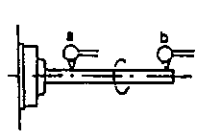
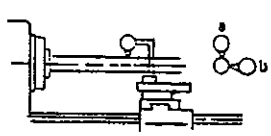
5C COLLECT ATTACHMENT (OPTIONAL)



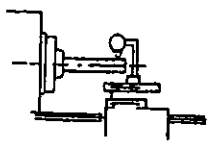
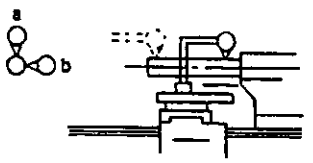
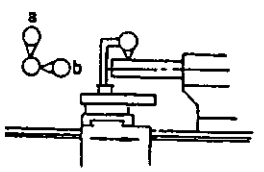
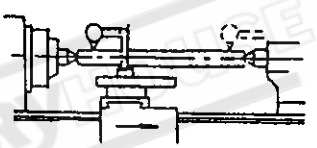
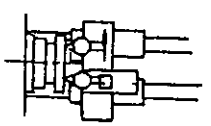
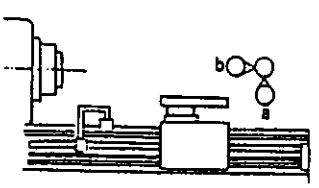
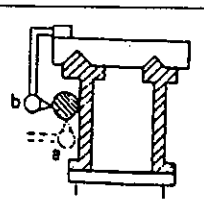
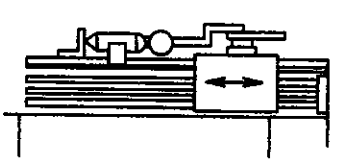
5C COLLECT ATTACHMENT (OPTIONAL)

NO.	PART NO.	DESCRIPTION	QUANTITY
1.	R-9077	Pivot	2
2.	R-9080	Bracket	1
3.	R-9078	Jointer	2
4.	A-1713	Nut (1/2" UNF)	2
5.	R-9079	Stud	1
6.	A-1100	Socket Headless Set Screw (M6 x 6)	4
7.	R-9066	Bushing	1
8.	A-1148	Socket Headless Set Screw (M8 x 30)	2
9.	A-1701	Nut (M8)	2
10.	A-1146	Socket Headless Set Screw (M5 x 5)	1
11.	R-9064	Locking Nut	1
12.	R-9061	Hand Lever	1
13.	A-3211	Circlip (R80)	1
14.	R-9062	Locking Ring	1
15.	A-2120	Bearing (6208ZZ)	1
16.	R-9063	Sleeve	1
17.	A-3313	Circlip (S32)	1
18.	T-9099	Draw Bar	1
19.	R-9068	Collet Sleeve	1
20.	A-8224	Spring	1
21.	A-1609	Flat Head Cap Screw (M5 x 12)	2
22.	A-1131	Socket Headless Set Screw (M6 x 25)	1
23.	R-9071	Pin	3
24.	R-9070	Latch	3
25.	A-8225	Spring (Φ3/16 ")	1
26.	R-9074	Position Pin	1
27.	R-9069	Chuck Assembly	1
28.	R-9072	Fork	1
29.	R-9073	Pin	1
30.	R-9075	Chuck	1
31.	A-1204	Socket Head Cap Screw (M6 x 20)	3
32.	T-9100	Adapter	1
33.	A-4023	Pin (Φ3 x 6)	1
34.	T-9085	Collet (Per Size)	1

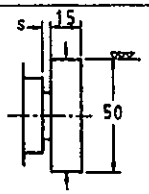
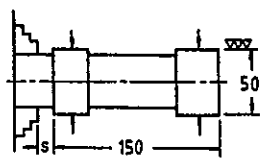
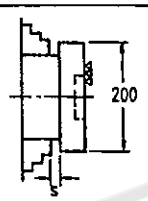
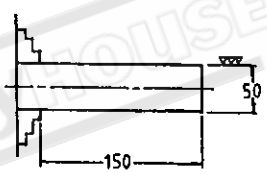
INSPECTION RECORD

NO	INSPECTION TIME		DIAGRAM	TOLERANCE	
				PERMISSIBLE	ACTUAL
1	Straightness of bed slideway	a.Longitudinal direction (In Vertical plane)		0.02	0.02
		b.Transverse direction (In veritical plane)		0.02	0.02
2	Parallelism of bed slideways.			0.02	0.018
3	Spindle nose runout			0.01	0.006
4	Main spindle for axial slip, mearsured at 2 points,displaced by 180			0.015	0.005
5	True running of center point of main spindle.			0.015	0.006
6	Spindle taper hole runout	a.Nearest spindle nose		0.01	0.01
		b.At a distance of 300mm		0.02	0.012
7	Parallelism of center line of main spindle to longitudinal motion of carriage	a.In vertical plane		0.025	0.014
		b.In horizontal plane		0.025	0.015

INSPECTION RECORD

NO	INSPECTION TIME		DIAGRAM	TOLERANCE	
				PERMISSIBLE	ACTUAL
8	Movement of compound slide parallel with main spindle in vertical plane (Hand feed)			0.01/150	0.00
9	Parallelism of tailstock spindle with bed ways.	a.In Vertical plane (Front end rising)		0.015/100	0.012
		b.In horizontal plane (Front end inclined to wards the direction of tool presure.)		0.015/100	0.013
10	Parallelism of bed ways with center line of tailstock spindle hole.	a.In Vertical plane (Free end of mandrel rising)		0.02/300	0.015
		b.In horizontal plane (Free end of mandrel inclined to wards tailstock end)		0.02/300	0.01
11	Difference in center hight between headstock and tailstock (Mandrel rising towards tailstock end)			0.025	0.022
12	Squareness of motion of cross slide with center line of main spindle			0.02/300	0.018
13	Parallelism of center line of lead screw end bearing to carriage slide ways	a.In vertical plane		0.1	0.0
		b.In horizontal plane		0.1	0.0
14	Diviations in alignment of center line of lead screw end bearing with center line of half nut.	a.In vertical plane		0.15	0.1
		b.In horizontal plane		0.15	0.1
15	Pitch error of lead screw			0.03/300	0.025

2.PRACTICAL

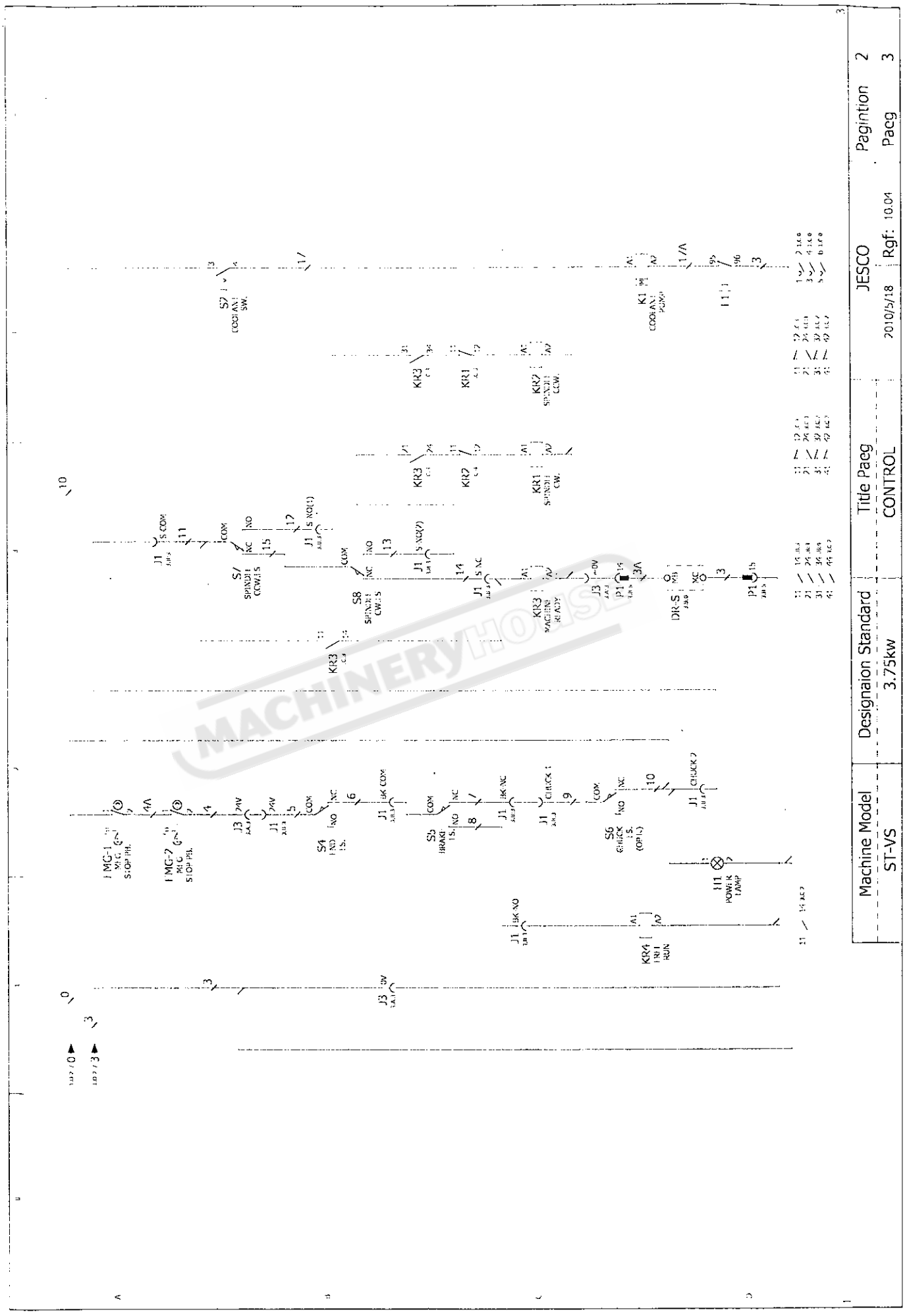
NO	TESTINGITEM	DIAGRAM	TOLERANCE	
			PERMISSIBLE	ACTUAL
1	Accuracy of outside turning		0.01	0.00
2	Accuracy of cylindrical turning		0.025	0.01
3	Accuracy of face turning		0.02	0.01
4	Heavy load cutting conditions; Material, mild steel Ø50 Spindle speed, 830 RPM. Feed rate, 0.1 mm/rev. Deepth of cut in diameter.		MAX. Ø10	

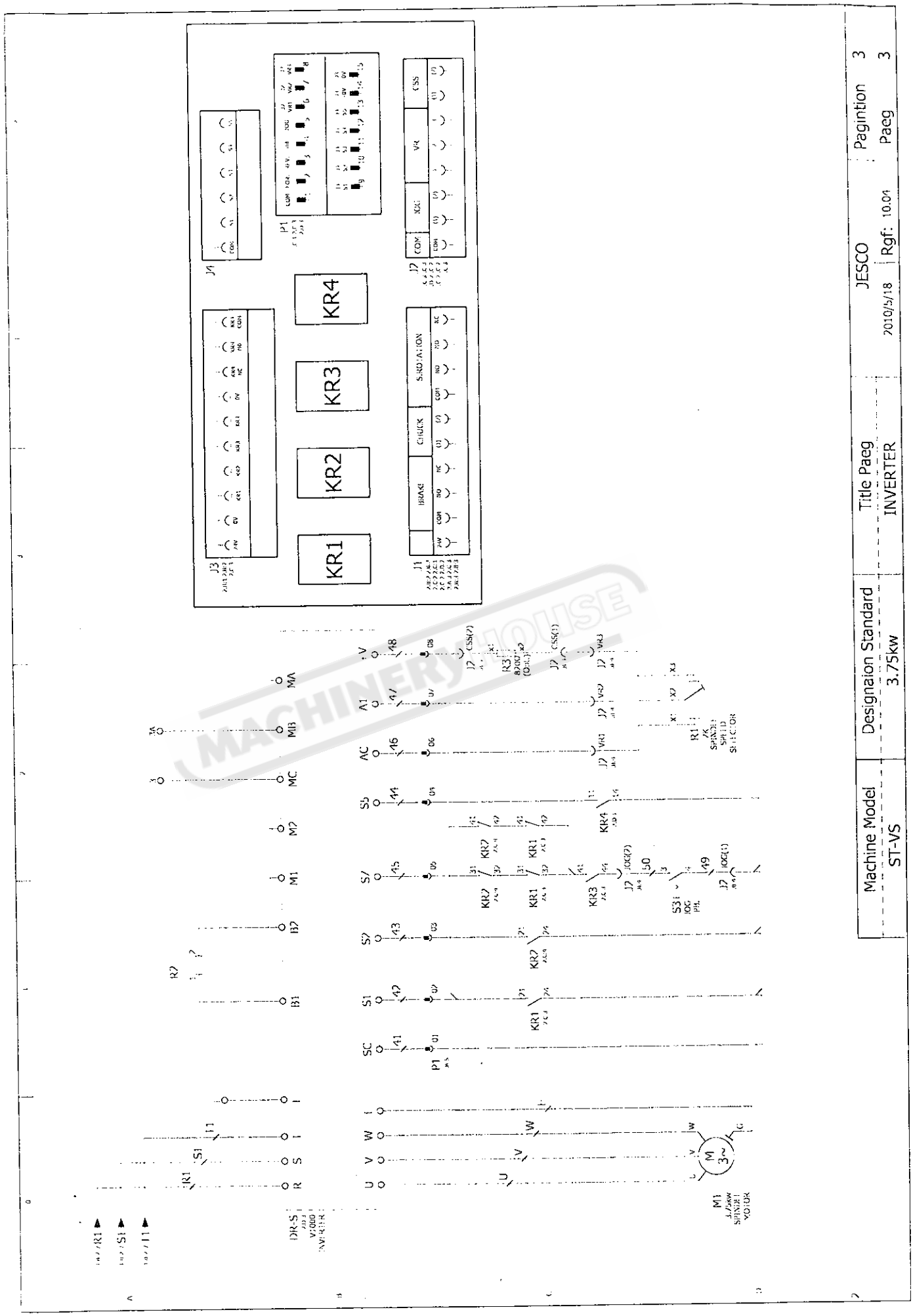
3.MAIN ELECTRIC SPECIFICATIONS

ITEM	H.P	VOLTAGES	FREQUENCY	R.P.M	RATED CURRENT
INVERTER (VS MODEL)	5	200--240V. 280--460V.	0--400 HZ.	----	17.5A. 8A.
DRIVE MOTOR (VS MODEL)	4	220V. 440V.	50/60 HZ.	940/1140	14A-220V. 8A-440V.
DRIVE MOTOR STANDARD	5	220V. 440V.	50/60 HZ.	1420/1710	14A-220V. 8A-440V.
DRIVE MOTOR 2-SPEED	5/3	220V. 440V.	50 HZ. 60 HZ.	1420/710 1720/860	14A-220V. 6A-440V.
COOLANT PUMP	0.125	220V. 440V.	50/60 HZ.	2850/3420	0.6A. 0.3A.

Approved by:

Inspected by:


Machine Model
ST-VS
Designaion Standard
3.75kw
Title Paeg
CONTROL
JESCO
2010/5/18
Pagintion 2
Pacg 3
Rgf: 10.04
MACHINERYHOUSE


KR1
KR2
KR3
KR4
JESCO
2010/5/18
Rgf: 10.04
Pagintion 3
Paeg 3
Title Paeg
INVERTER
Designaion Standard
3.75kw
Machine Model
ST-VS
MACHINERY HOUSE

MOTOR RATED SPECIFICATIONS AND INVERTER PROGRAMING DATAS

Inverter: YASKAWA; Varispeed -V1000 *S/N:8651*

Model no.	*Functions*	Date/Display	Unit
C1-01	Acceleration Time 1	2.0	Sec.
C1-02	Deceleration Time 1	2.5	Sec.
C6-01	Normal/Heavy Duty Selection	0	Symbol
D1-17	Jog Frequency Reference	8.12	Hz
D2-01	Speed Frequency Max. Limit	100	%
D2-02	Speed Frequency Min. Limit	8	%
E1-01	Input voltage setting	415	V
E1-04	Max. Output Frequency	105	Hz
E1-05	Max.Voltage	415	Volts
E1-06	Base Frequency	50	Hz
E2-01	Motor Rated current	6.7	A
H1-05	Multifunction Input Selection	8	Symbol
L1-01	Electronic Thermal Motor Protection Selection	1	Symbol
L3-04	Stall Prevention Selection during Deceleration	3	Symbol