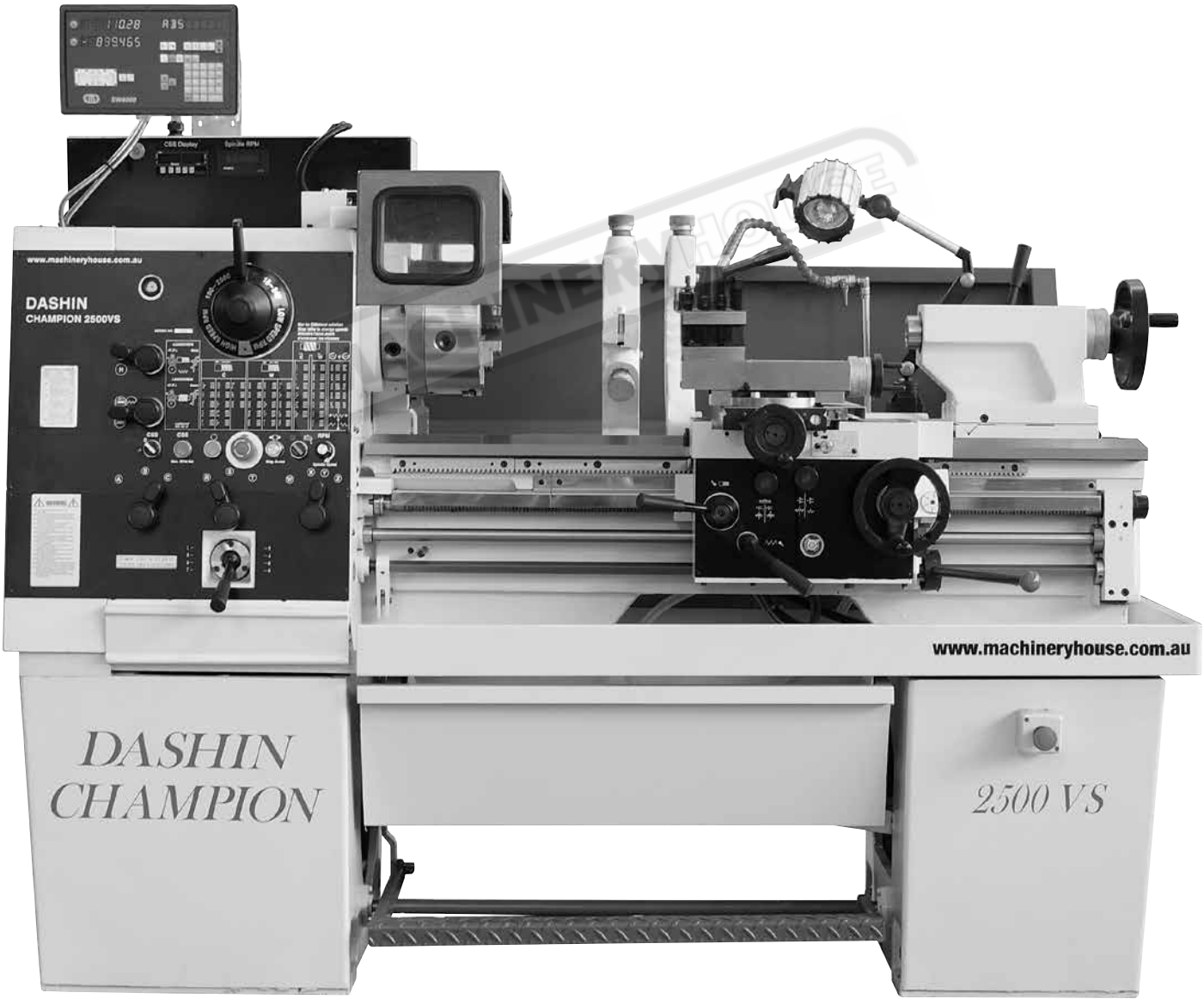
INSTRUCTION MANUAL

Schools / TAFE
Champion Centre Lathe - with DRO (415V)
390 x 760mm



L252VS

DASHIN

CHAMPION 2500VS

METALWORKING LATHE

INSTRUCTION & SPARE PARTS MANUAL

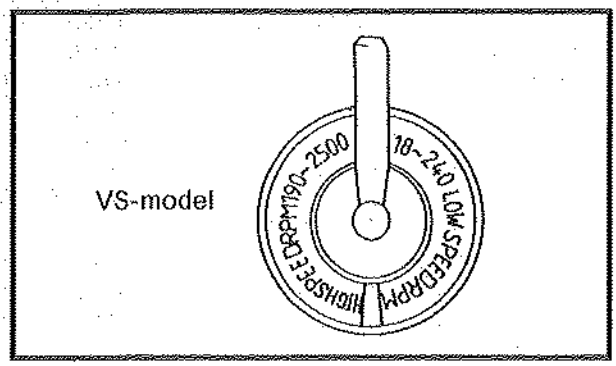
7407

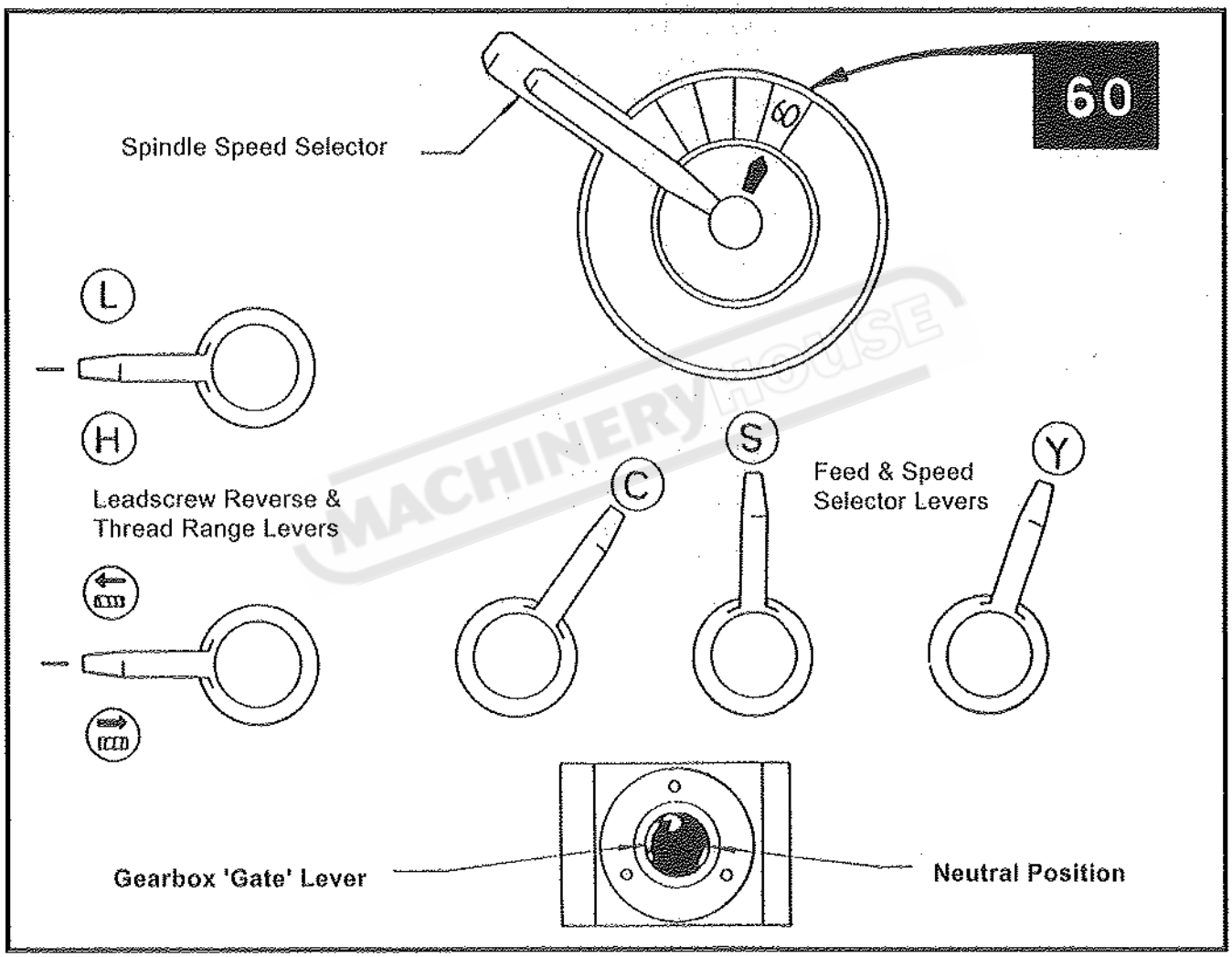
IMPORTANT

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

The spindle rotation lever is set in the neutral position.

2.SPINDLE SPEED SELECTOR

The spindle speed selector lever is set at 60rpm.
Vs model at neutral.

3.LEADSCREW REVERSE & THREAD RANGE LEVERS

The leadscrew reverse lever and the thread range lever are both set in the neutral position.

4.FEED & SPEED SELECTOR LEVERS

The three Feed and Speed selector levers are set (from left to right) at positions (C) (S) and (Y) respectively.

5.GEARBOX 'GATE' LEVER

The gearbox 'gate' lever is set in the neutral position.

MAIN SPECIFICATIONS:

Height of center	190mm. (7-1/2")
Distance between centers	1250mm(50") 1000mm.(40") 760mm(30")
Swing over bed	390mm. (15-1/4")
Swing over cross slide	240mm. (9-1/2")
Swing in gap	610mm. (24")
Width of gap in front of faceplate	150mm. (6")
Spindle nose	D-1-6
Spindle bore	54mm (2-1/8")
Spindle bore taper	M. T. No. 6
Taper of center	M. T. No. 4
Spindle speed; Steps:	16
Ranges	25,35,45,60,80,110,140,190,260,360,475,630,845,1140,1520,2000Rpm.
VS-model: Steps	2 Infinitely variable Forward/Reverse.
Low speed range	18--240 RPM.
High speed range	190--2500 RPM.
Main motor	5.5kw (7.5HP.)
VS-model Inverter	5.5kw (7.5HP.)
Width of bed	270mm. (11")
Length of bed	2200mm. (86-1/2"), 1950(76-3/4"), 1710mm(67-1/4")
Cross slide travel	230mm. (9-1/4")
Top slide travel	120mm. (4-3/4")
Tailstock travel	155mm. (6"-1/8")
Tailstock barrel diameter	58.5mm. (2-5/16")
Leadscrew diameter	31.75mm. (1-1/4")
Leadscrew pitch	6mm or 4 T.P.I.
Number & range of Metric threads	39;0.2--14mm.
Number & range of Imperial threads	45; 2--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	0.04--1.0mm. (0.0015--0.04")
Range of cross feeds	0.02--0.5mm.(0.0008-0.02")
Approx. Net/Gross weight	1300/1500kgs. (2860/3300 lbs.) 1550 model 1150/1350kgs (2530/2970lbs) - 1540 model 1000/1200 (2200/2640lbs) - 1530 model
Overall dimension (L. X W. X H.)	2515 X 1067 X 1650mm. (99" X 42" X 63") 1550 model 2210 X 1067 X 1650mm. (87" X 42" X 63") 1540 model 1970 X 1067 X 1650mm. (77" X 42" X 63") 1530 model

STANDARD EQUIPMENT & ACCESSORIES SUPPLIED WITH LATHE:

Motor & relative electric control system.
Digital RPM indicator for spindle (VS. model)
4 way tool post Max. toolholder size 25 x 25mm (1" x 1")
Threading dial indicator.
Coolant system.
Centers & center sleeve.
Leveling blocks and screws.
Service tools and tool box.
Instruction and spare parts manual.

OPTIONAL EQUIPMENTS & ACCESSORIES:

Depends on orders, it may included with the following.
3 jaw universal chuck.
4 jaw independent chuck.
Steady rest.
Follow rest.
14" slotted faceplate.
Rotating center.
Halogen work lamp.
Micrometer bed stop.
Full length rear splash guard.
Dual Inch / Metric dials for cross and compound slides.
Quick change toolpost.
Chuck safety guard.
Magnetic brake system...etc.

LIFTING MACHINE BEFORE UNPACKING

Each lathe is packed in a seaworthy strong wooden case. Before unpacking the wooden case or unloading the lathe, ensure the following.:

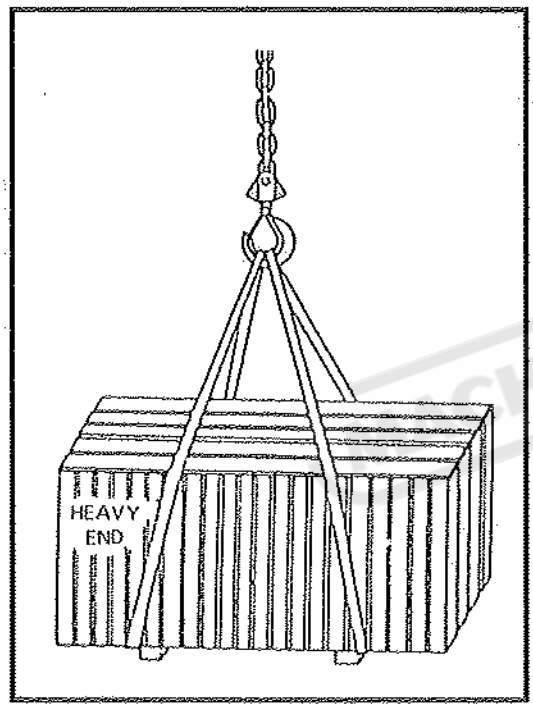
1.the capacity of lift equipment is adequate for the machine.

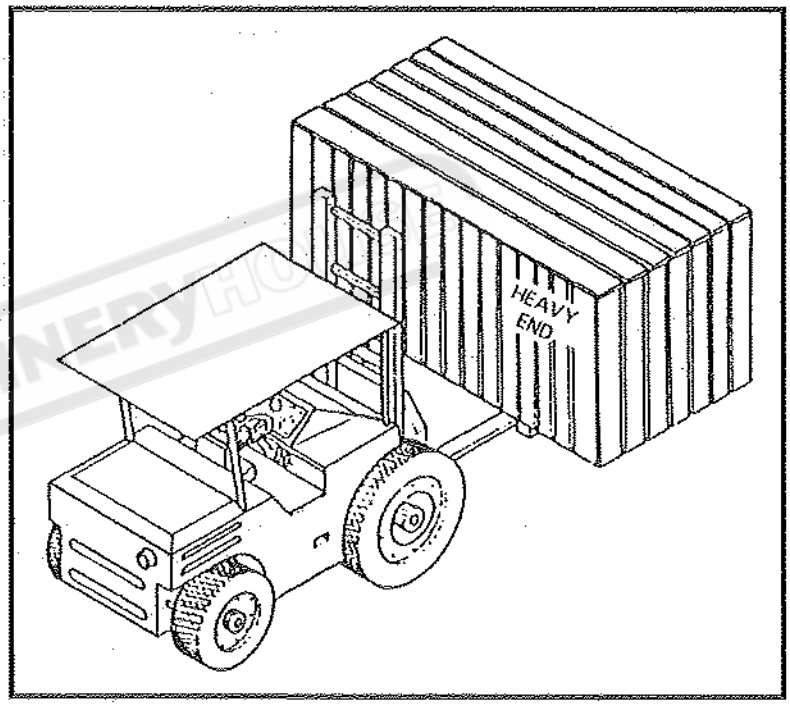
2.keep the heavy end fully supported and balanced when lifting.

3.the MACHINE WEIGHTS Approx.

1500KGS (3300LBS)

4.the only recommended lifting equipment is hoist/crane or forklift as shown below:





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 equipment.
4.Use 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 wooden 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

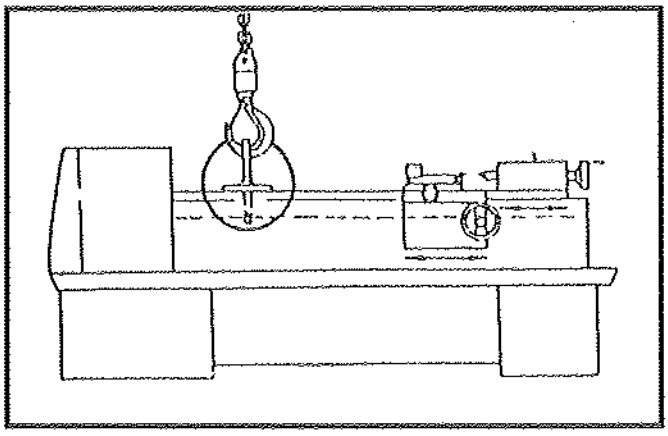
PREPARATION AND SAFETY CHECK

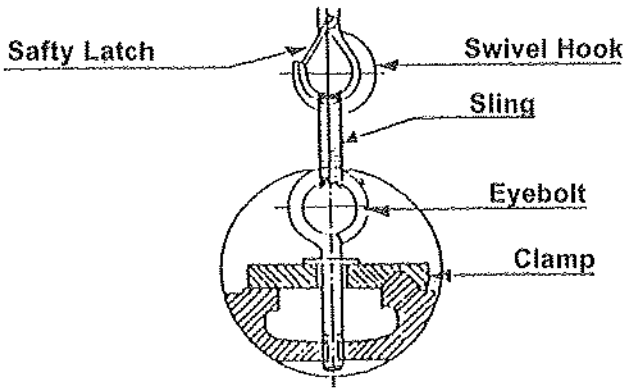
1. Remove all loose items of equipment and accessories from lathe.
2. Move the tailstock and carriage assembly to the far end of the lathe and clamp them in place. (see drawing below)
3. Make sure that the eyebolt and clamp are tightened on the bed correctly.
4. "NEVER" used a damaged sling and "DO-NOT" 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 negating the warranty on the machine.
6. Only a hoist or crane is 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 will 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 moving.
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 is not putting any twisting stress on the eyebolt which might loosen it.
7. Lift and move the lathe very slowly to avoid tilting or rocking the machine.
8. Keep the lathe low to the ground with only the necessary ground clearance to move the machine freely over the surface.
9. For re-shipping the lathe without repacking onto a skid, 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 LIFTING: 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

UNAUTHORIZED LIFTING OF THE MACHINE BY NON-CERTIFIED RIGGERS AND ANY NEGLECT CAUSED BY SUCH ACTION MAY CAUSE SERIOUS DAMAGE TO PERSONS AND PROPERTY.
MANUFACTURER AND DISTRIBUTORS SHALL NOT BE LIABLE FOR ANY DAMAGES RESULTING FROM THE FAILURE TO USE LICENSED AND CERTIFIED RIGGERS TO LIFT AND/OR MOVE THIS EQUIPMENT.

OPERATING SAFETY PRECAUTIONS

1.ARE YOU PROPERLY TRAINED TO USE THIS LATHE?

2.READ THIS INSTRUCTION MANUAL CAREFULLY BEFORE OPERATION.

3.ENSURE YOU KNOW HOW TO STOP THE LATHE BEFORE STARTING IT. (i.e.Emergency Stop.)

4.ENSURE YOU ARE IN GOOD HEALTH 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 UTILIZE SUITABLE PROTECTIVE CLOTHING AND EQUIPMENT.

8.DO NOT WEAR RINGS, WATCHES, TIES OR LOOSE SLEEVED CLOTHING.

9.NEVER LAY ANYTHING ON THE WORKING SLIDES OF THE LATHE.

10.STOP LATHE IMMEDIATELY IF 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.

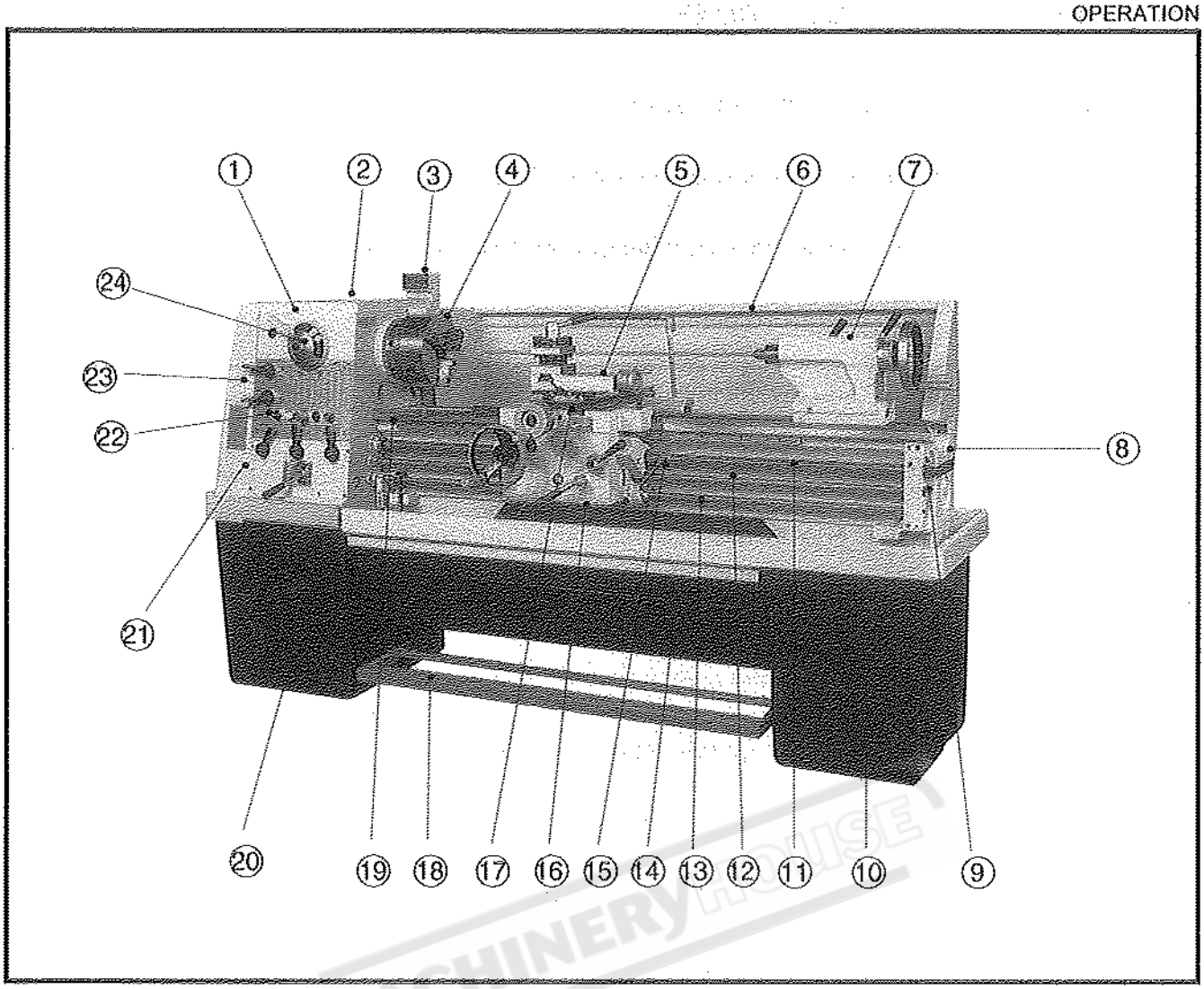
13.DO NOT OPERATE THE LATHE IN SUCH A WAY TO EXCEED ITS RATED CAPACITY.

14.DO NOT INTERCHANGE CHUCKS OR OTHER SPINDLE MOUNTING ITEMS WITHOUT CHECKING FOR CORRECT LOCKING.

15.DO NOT USE ANY WORKHOLDING DEVICE WITHOUT FIRST CHECKING WITH ITS MANUFACTURER.

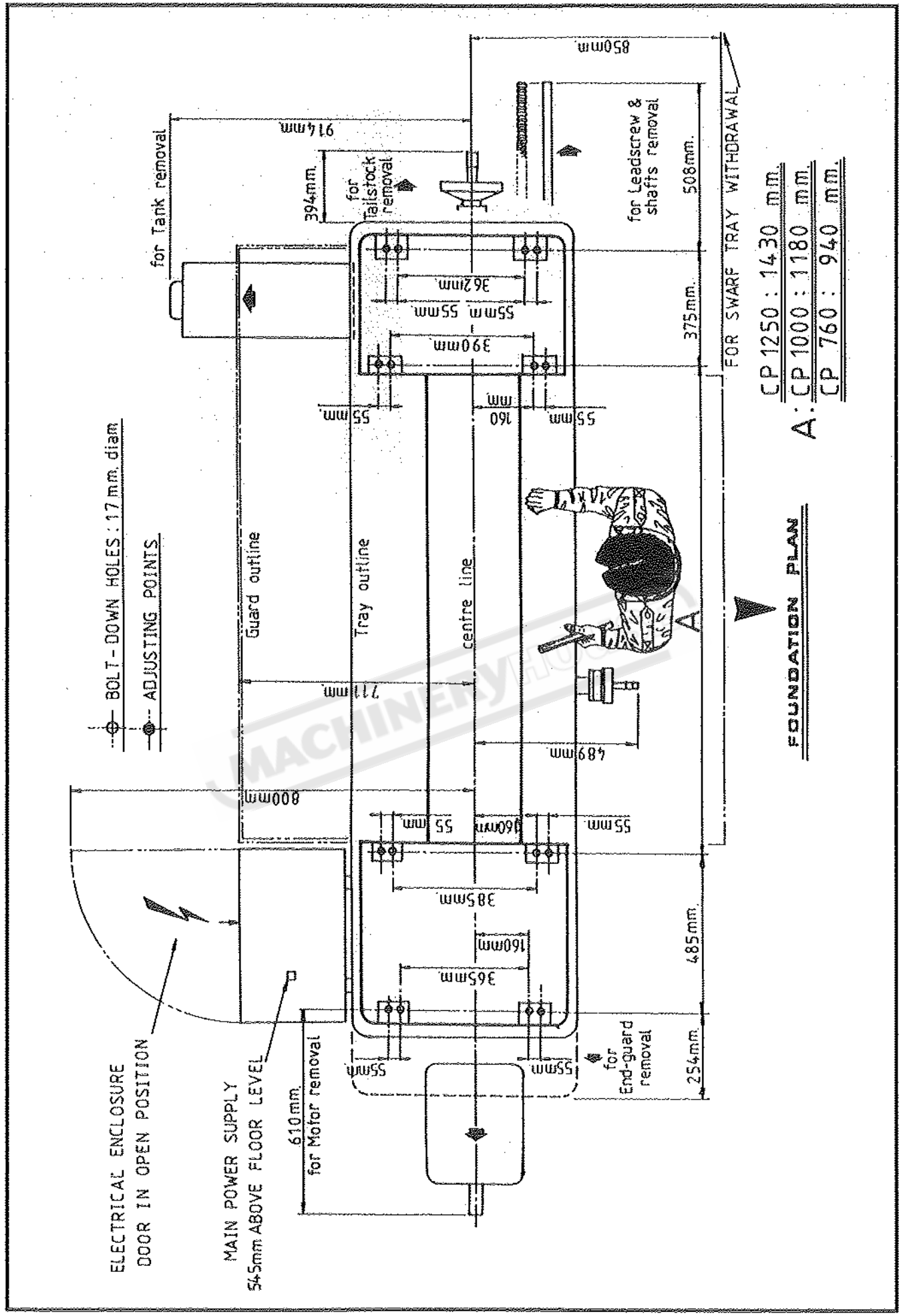
16.DISCONNECT LATHE FROM POWER SOURCE BEFORE PERFORMING ANY MAINTANENCE OR CHANGING TOOLING.

17.ISOLATE POWER TO LATHE WHEN LEAVING IT UNATTENDED.



LEGEND

1.HEADSTOCK
2.ELECTRICAL CABINET
3.SPEED METER (VS MODEL)
4.SPINDLE & CHUCK
5.TOP SLIDE
6.SPLASH GUARD
7.TAILSTOCK
8.BED
9.END BRACKET
10.TAIL-END PLINTH
11.LEADSCREW
12.FEED ROD
13.SWITCH ROD
14.CHIP TRAY
15.ROTATION CONTROL LEVER
16.APRON
17.SADDLE & CROSS SLIDE
18.FOOT BRAKE
19.GAP PIECE
20.HEAD-END PLINTH
21.FEED GEAR BOX
22.CONTROL PANEL
23.END COVER (GEAR TRAIN)
24.SPINDLE SPEED SELECTOR


FOUNDATION PLAN
A: CP 1250 : 1430 mm.
CP 1000 : 1180 mm.
CP 760 : 940 mm.
FOR SWARF TRAY WITHDRAWAL
850mm
914mm
for Tank removal
394mm.
for Tailstock removal
for Leadscrew & shafts removal
508mm.
362mm
55mm
55mm
390mm
375mm.
55mm
160mm
55mm
BOLT-DOWN HOLES: 17mm. diam
ADJUSTING POINTS
Guard outline
Tray outline
centre line
711mm
489mm
800mm
55mm
55mm
55mm
385mm
160mm
365mm
485mm.
55mm
55mm
for End-guard removal
254mm.
610mm.
for Motor removal
ELECTRICAL ENCLOSURE
DOOR IN OPEN POSITION
MAIN POWER SUPPLY
545mm ABOVE FLOOR LEVEL

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 UNAPPROVED 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 eight 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 eight 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.

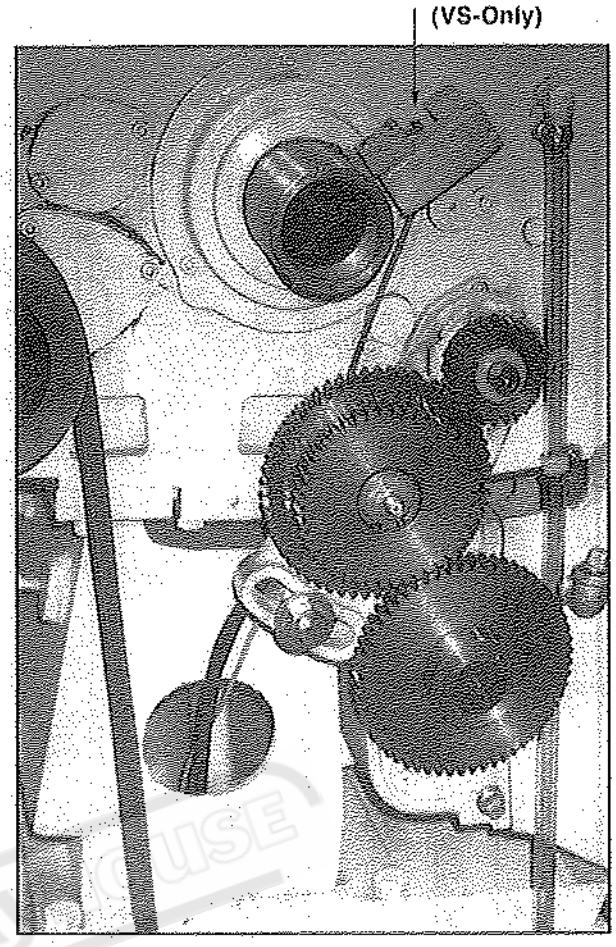


Fig. 1

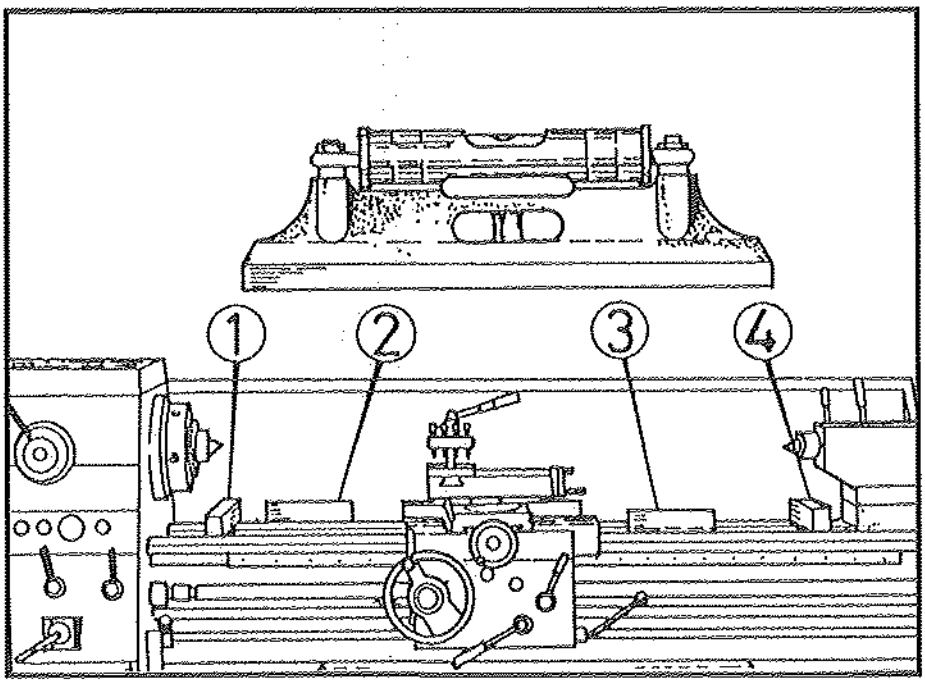


Fig. 2

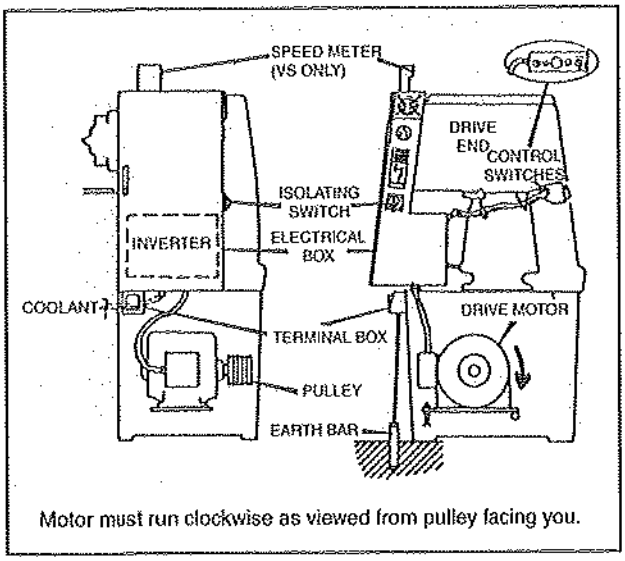
ELECTRIC SUPPLY CONNECTION

Input wires should be connected to main terminal box below the electrical box in back of headstock/main motor base.

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 included in Servicing and Maintenance Section of this manual.

WARNING; All electrical power connections must be provided by a local licensed electrician. Proper grounding and fused main disconnects are necessary. (Shown on Fig. 3, speed meter, Amperemeter, exhaust fan, work lamp socket, Inverter, earth bar are optional equipment for VS model only).



Motor must run clockwise as viewed from pulley facing you.

Fig. 3

LUBRICATION CHECKS

Before operating the machine make the following important checks:

1. That the oil tank in the head-end plinth is filled to correct level indicated by dipstick with Shell Tellus Oil 37 or equivalent.
2. That the gearbox is filled to level marked on oil sight window with Shell Tellus Oil 37.
3. That the carriage apron is filled to level mark on oil sight window with Shell Tonna T68 or Tonna 33.
4. In addition, apply an oil can to the points shown on lubrication diagram which require daily oiling. Use light machine oil or way lubricant.
5. Before each working shift, operate the manual lubrication pump to ensure adequate lubrication of carriage slideways.

NOTE: When the lathe motor is switched on, the oil sight window in front of the headstock should fill with oil-indicating that the pump is operative. If this does not occur stop the machine and investigate the cause.

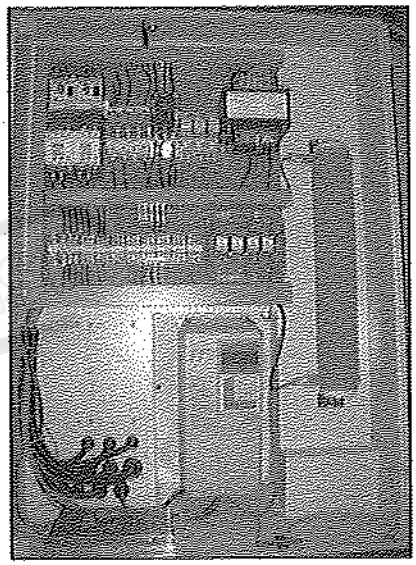


Fig. 4

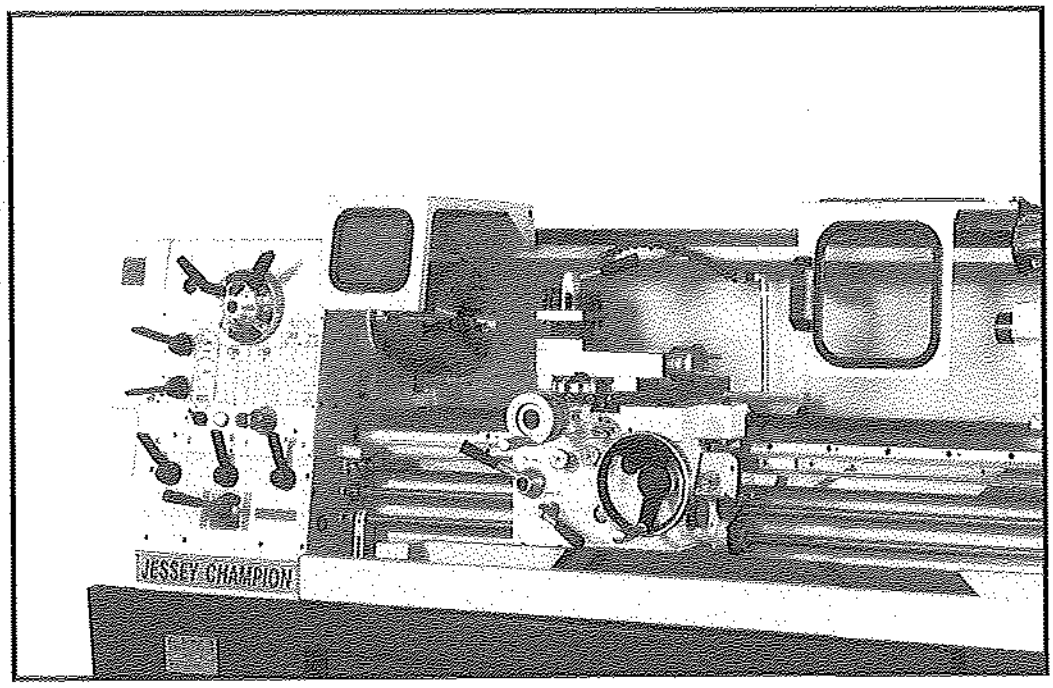


Fig. 5

CHUCKS AND CHUCK MOUNTING

When fitting chucks or faceplates, ensure that the spindle and chuck tapers are scrupulously clean and that all cams lock in the correct positions; see Fig.6. 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.6.)

Now mount the chuck or faceplate on the spindle nose and tighten the six cams in opposing 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; 21 in.faceplates should not be run at speeds greater than 625 rev/min. and 14 in. faceplates at not more than 840 rev/min.

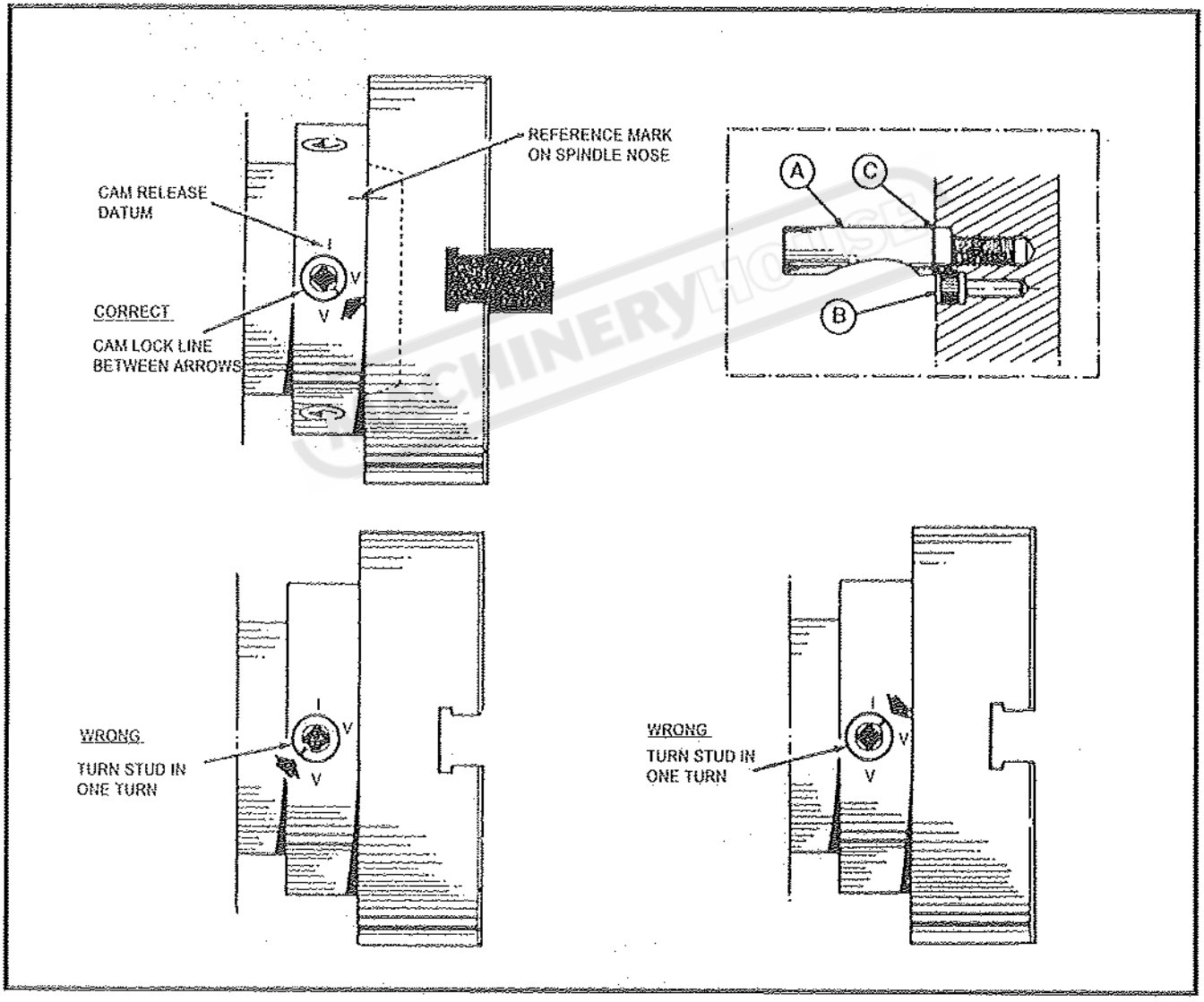


Fig. 6

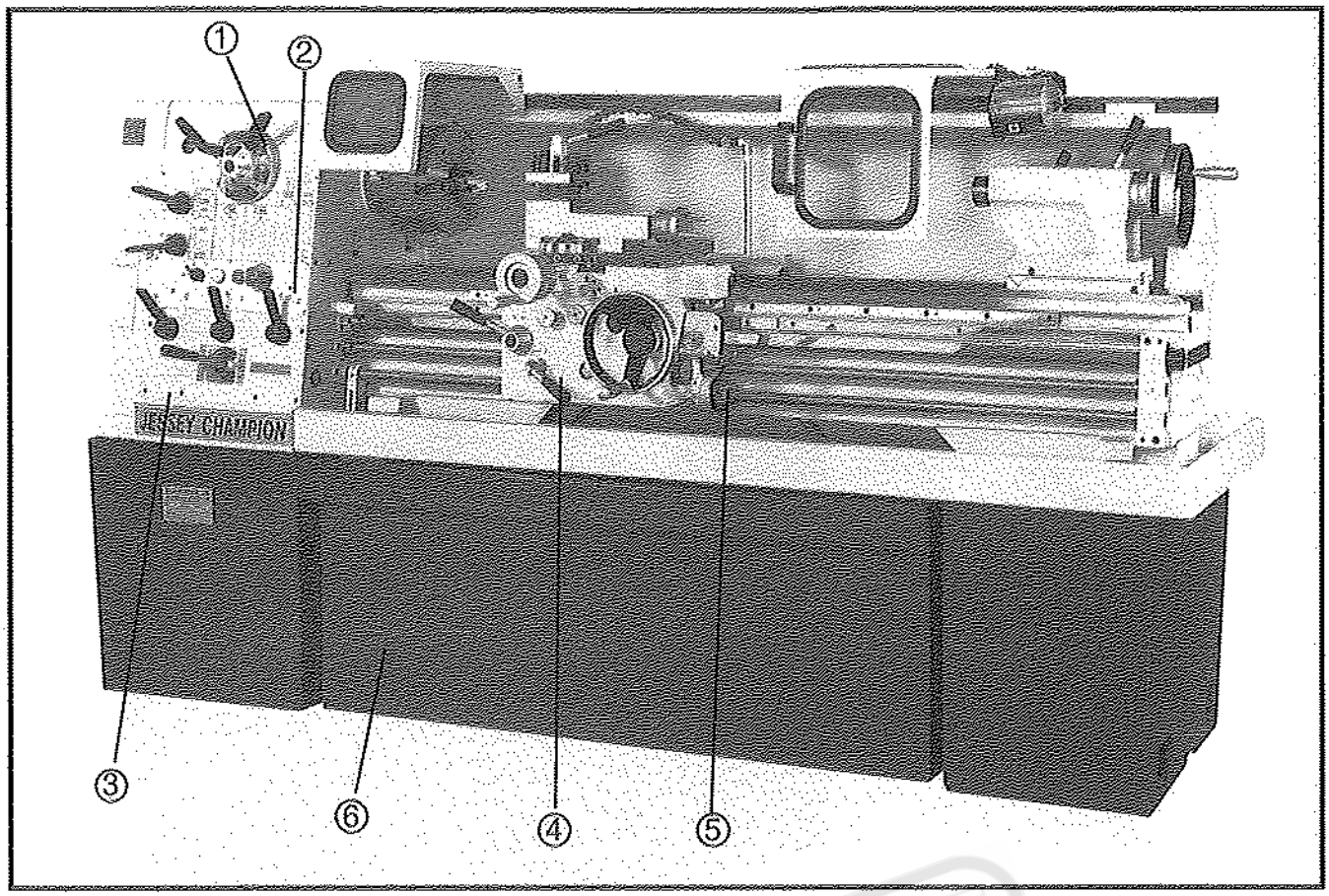


Fig.7

LATHE CONTROLS (See Fig. 7)

1.Spindle speed selector.
2.Electrical control panel.
3.Apron,surfacing or sliding feeds.
4.Gearbox,threads and feed.
5.Spindle forward-off-reverse control.
6.Chip Trolley (OPT).

ELECTRICAL CONTROL PANEL (See Fig.8)

Except the lathe isolator switch,all the electrical controls are fitted into front face between headstock and gearbox.

1.To press the GREEN button for main motor drive on Clutch model, and the indicator lamp glows whilst the motor running.
2.To press the GREEN button for jogging on no clutch model and VS model.
3.To press the RED mushroom-head to stop all the electrical supply.
4.The WHITE pilot lamp glows to show the main supply ON.
5.The BLACK select knob for coolant pump switch ON/OFF.
6.The BLACK select turning knob on VS model for spindle speed control

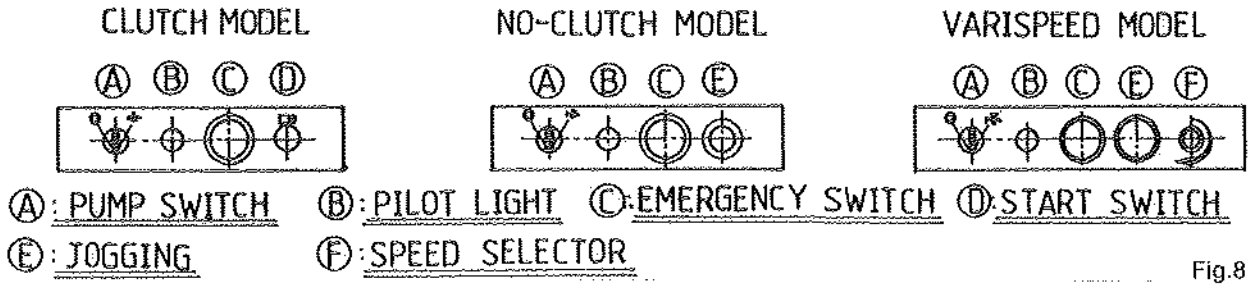


Fig.8

NOTE: The Led Digital RPM indicator reflects the main spindle speed which is controlled by the speed selector knob on varispeed model.

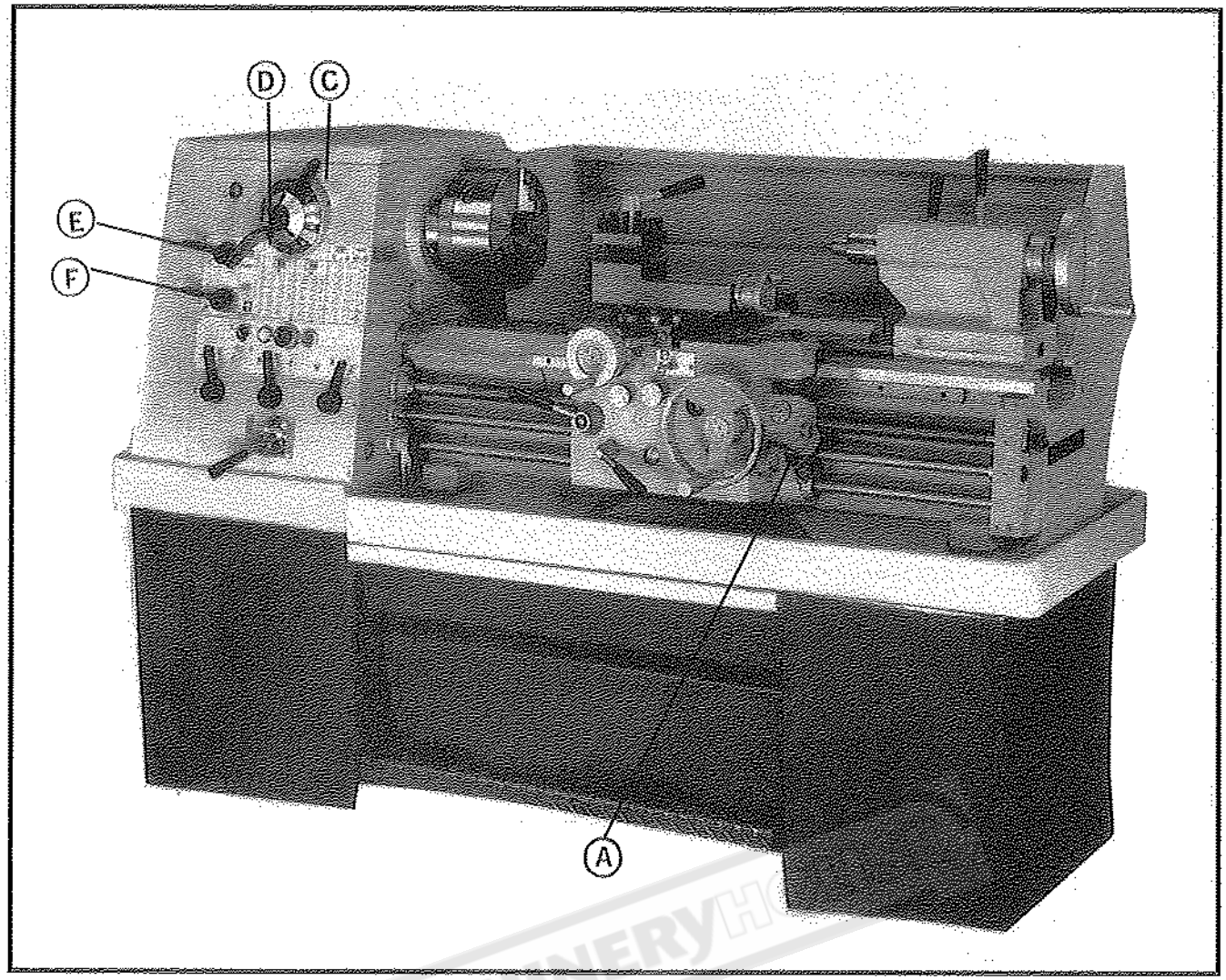


Fig.9

SPEED CONTROLS (Standard lathes)

SPINDLE ROTATION: Selected by the lever controls A (Fig 9). The apron gated lever A for forward off reverse selections.

Clutch Model; with the main motor running, to move gate lever-A out and downward to engage forward rotation of spindle; or upward to engage reverse rotation. Return to neutral position for spindle stop.

No clutch Model with the same function as above mentioned of clutch model but the lever control the limit switches to start main motor with forward or reverse running instantly.

FOOTBRAKE: A foot pedal located between machine base plinths operates the spindle brake and at the same time returns rotation selector levers A to the neutral position on Clutch Model. But on the No clutch Model, the footbrake operates the spindle brake and cut off the power to the drive motor. After the footbrake is applied, the levers A should be returned to the neutral position to re-start the spindle rotation.

SPINDLE SPEEDS: Selected by the grouped dial controls on the headstock. There are sixteen (16) available speeds that are shown directly on the lever-operated dial (C), in four (4) groups--each of which is further divided into four (4) displayed colored spindle speeds.

Rotate this dial with the large handle to bring the required speed-group uppermost and opposite the fixed 4-colors datum plate. Then, rotate the other handle (D) until the appropriately colored arrow is aligned with the required speed on the uppermost dial group. To free the spindle for hand rotation; set any one of the blank spaces on the group-dial to the mid-position of the fixed color datum.

WARNING: NEVER SHIFT HANDLES (C) (D) AND FEEDS LEVERS (E) (F) ON THE HEADSTOCK WHILE THE SPINDLE IS ROTATING.

MAGNETIC BRAKE (OPTIONAL EQUIPMENT)

This special equipment not only base on placing orders, but also have to indicate supply with Foot Brake & front moveable chip tray, or without Foot Brake but supply with front moveable chip trolley instead of chip tray at different costs. Whatever any models lathes, such as standard model or clutch model or varispeed model, equipped with/ without foot brake pedal, to apply the footbrake pedal or return the rotation selector lever A to neutral position, the main spindle will stop quickly. The other functions of each model will keep at the same as normally.

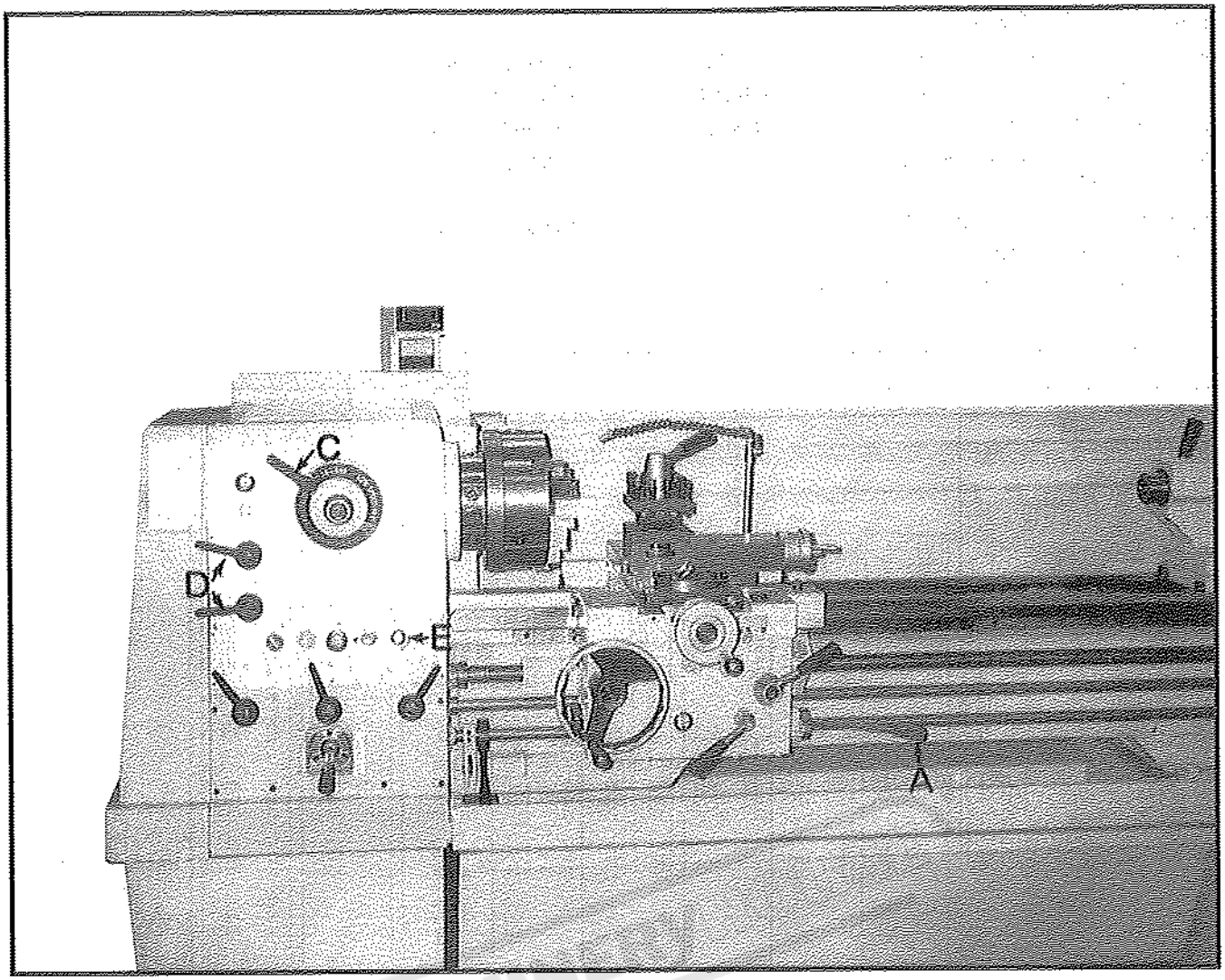


Fig.9.1

VARISPEED LATHES

SPEED CONTROLS

Spindle Rotation: Selected by the control levers A (Fig.9-1). The apron lever A for Forward-Off-Reverse selection. To move lever A out and downward to engage forward rotation of spindle; or upward to engage reverse rotation. Return to neutral position for spindle stop and off power to motor.

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

SPINDLE SPEEDS: A spindle speed selector lever (C) on the headstock provides High and Low Speed ranges selection. STOP THE SPINDLE First and then rotate the selector (C) to engage "HIGH" or "LOW" speed ranges.

Rotate the selector turning knob (E) on control panel to the mininum position by counter clockwise. Then, to operate the control lever (A) for spindle rotation, and turning the select turning knob (E) Clockwisely from mininum to the desire constant speed slowly. The spindle speed will be displayed by the Digital 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.

IMPORTANT NOTICE: NEVER SHIFT SELECTOR (C) AND FEEDS LEVER (D) ON THE HEADSTOCK WHILE THE SPINDLE IS ROTATING.

THREADS AND FEEDS

All the threads and feeds directly available from the gearbox are shown on the data plate (Fig.10) fitted on the front of the headstock (Fig.11) The setting of control levers are shown on (Fig. 12).

THREADS AVAILABLE:

45 IMPERIAL THREADS:2--72TPI.

39 METRIC THREADS: 0.2--14mm.

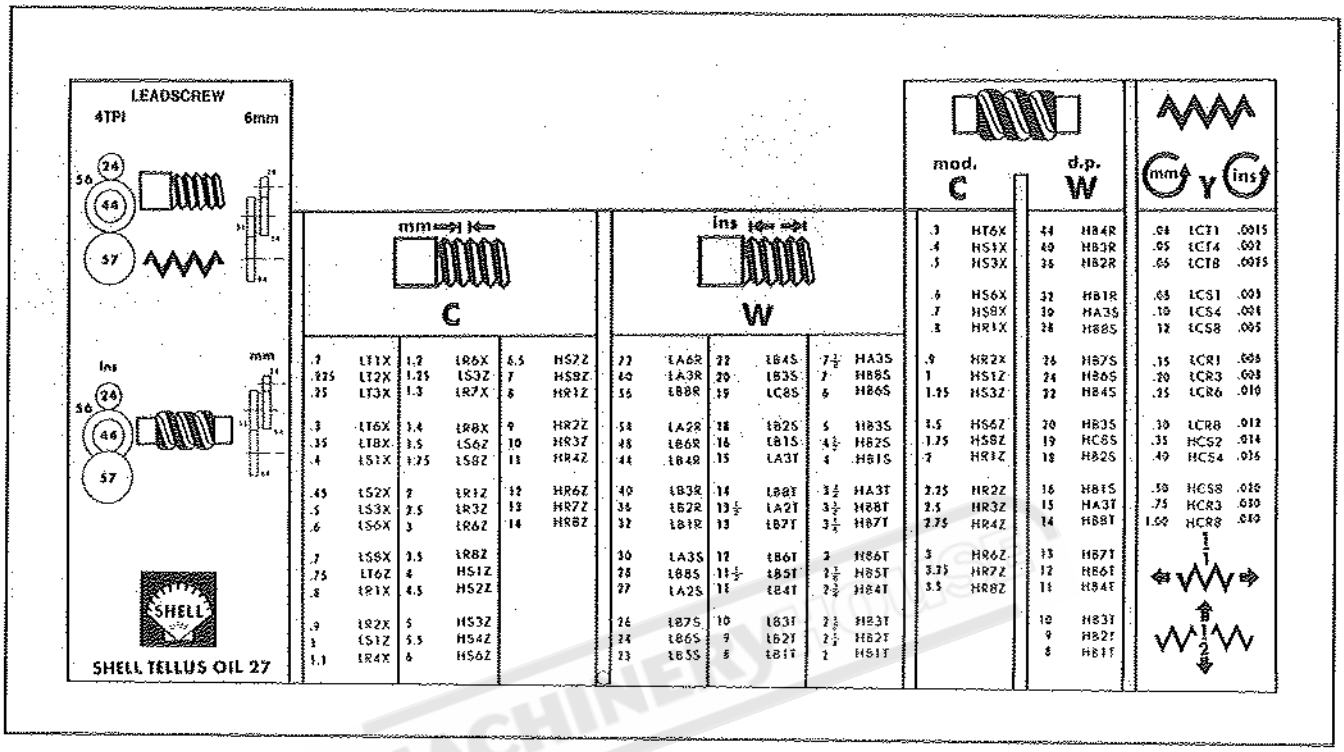
18 METRIC MODULES: 0.3--3.5Mod.

21 DIAMETRAL PITCHES: 8-44 D.P.

FEEDING RANGES: The feeding speed per spindle revolution ranges;

LONGITUDINAL (SLIDING)FEEDS: 0.04--1.0mm (0.0015"--0.04")

CROSS (SURFACING) FEEDS:0.02--0.5mm (0.00075"--0.02") or half sliding.



NOTE: The end gear train should be engaged as in the diagrams shown on the data plate to suit threading requirements. Any special threads not shown on data plate may request by special orders.

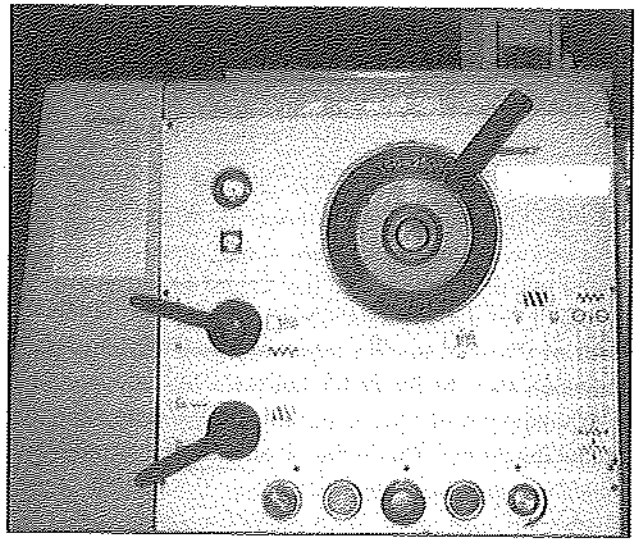


Fig.11

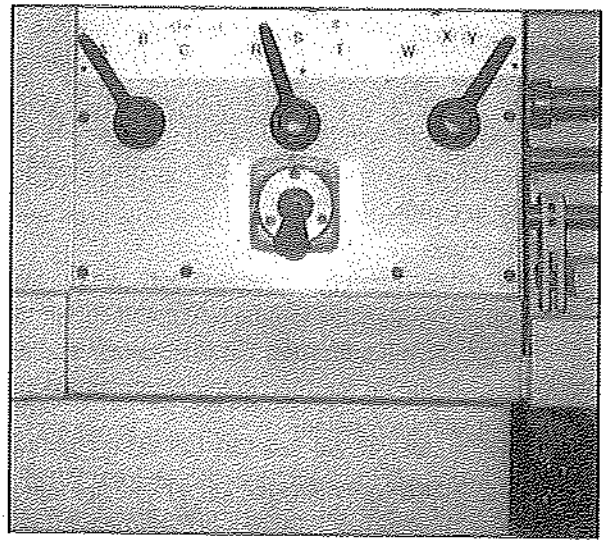


Fig.12

NOTICE: Recommend to shift four change levers on feed gearbox at low speed running (below 625RPM)

THREADING DIAL INDICATOR (INCH LATHE)

Located on the right hand side of the apron, the dial is used to assist in locating the starting point for cutting inch threads (Fig.13)
To engage, swing the indicator upward meshing the pinion gears into the leadscrew correctly and tighten the set screw.
Note: when not performing threading functions, release the set screw and swing the thread dial 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.
For EVEN numbered 'inch' threads, engage the half-nut at any line on the dial as it passes the datum mark.
For ODD numbered 'inch' threads, engage the half-nut at any numbered line on the dial as it passes the datum mark.
For fractional numbered threads (ex. 1/2 or 1/4 TPI) you have to engage the half-nut lever at EXACTLY THE SAME NUMBERED LINE per each cut.
Please also study the data plate for threading mounted on the side of the apron near the threading indicator dial.
The threading dial indicator may not be used for Module, D.P. and Metric thread cutting. To cut these threads, the half-nut must be kept closed on the leadscrew from the start of the thread until the end. When the end of the thread is reached, the tool must be quickly withdrawn from the workpiece, while stopping the spindle. Then while the half-nuts are still engaged, reverse the spindle which will move the carriage backwards towards the starting point. When the starting point is reached, re-engage the motor forward and move the cutting tool into the workpiece at the desired spot.

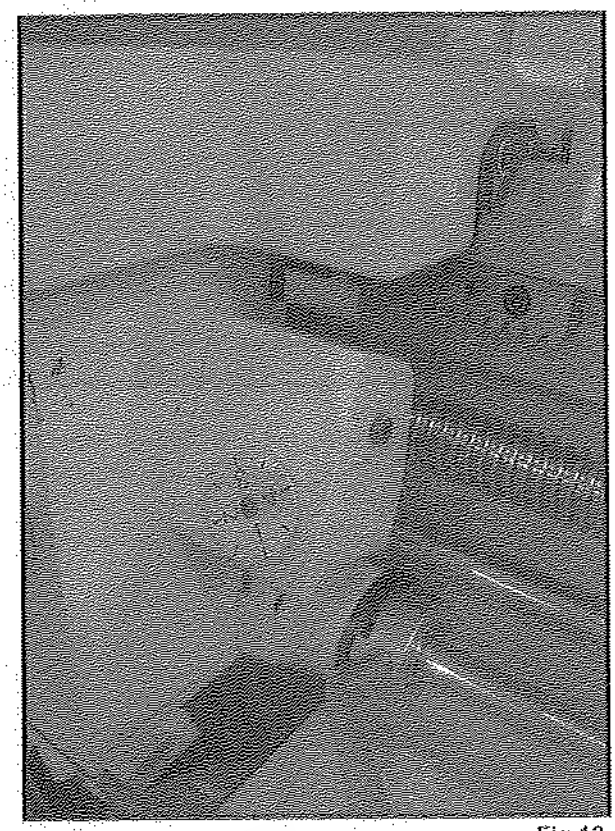


Fig.13

MULTI-START THREADS

Multi-start threads can be cut on the lathe in 3 ways:
1.By repositioning the top slide one pitch forward for each start. (NOTE: the top slide must be set at 90 deg. to the axis of the cross slide). The accuracy of the method depends largely on the skill of the operator.
2.By using an accurately divided driver plate and turning the workpiece one division forward for each start.
3.By advancing the driver gear (Fig.14) a calculated number of turns to advance the spindle by one pitch of the thread to be cut.
The accuracy of this method is based upon the machine. With this lathe, the ratio between the spindle and the drive gear shaft in low range is 1:2 and in high range 2:1.
In order to use this method, the number of teeth on the driver gear must be divisible by the numbers of starts being cut. The driver gear is then advanced by half this number of teeth when in the low range, and conversely, by twice the number of teeth when in the high range.
The limitation of this method depends upon whether the number of starts required can be divided equally into the number of teeth on the driver gear without a numeric remainder.
On the standard end gear train for this machine, the driver gear has 24 teeth. Therefore, two(2); three(3); or four(4) start threads can be readily cut. For other numbers of starts, a choice must be made of methods 1 or 2.

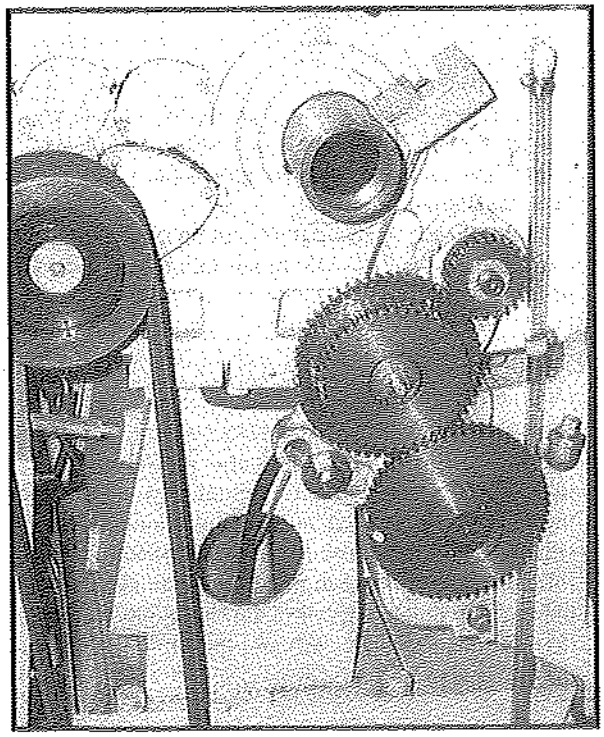


Fig.14

THREADING DIAL INDICATOR (METRIC LATHE)

Located on the right hand side of apron, the dial indicator is used to assist in locating the starting point for cutting Metric threads. (Fig. 13-1) Even for both left-hand or right -hand apron handwheel lathes.

To engage: swing the indicator upward meshing the pinion gears into the leadscrew correctly and tighten the set screw.

NOTE: when not performing threading functions, release the set screw and swing the dial 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 as the same location on the dial as it comes around past the datum mark.

The dial indicator is equipped with 5 pinion gears on its shaft, but only the bottom gear is able to engage on leadscrew. The rest of the pinion gears are used for various pitch engagements. The machine has pinion gear 14T on when the machine is delivered.

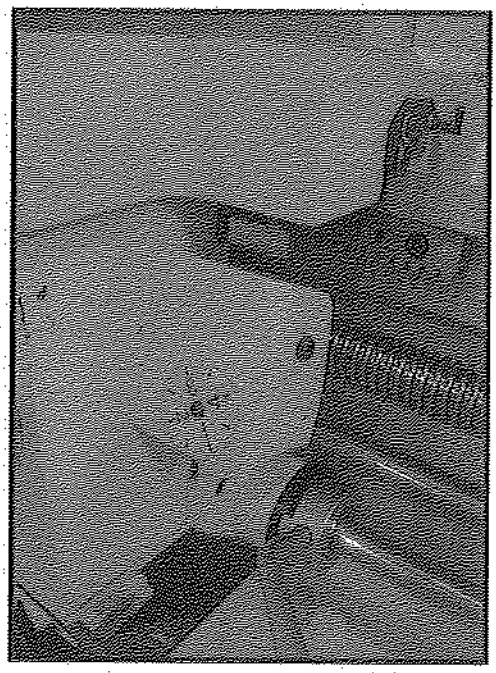


Fig.13-1

Refering to the indicator table as Fig.13-2 for 0.2/0.25/0.35 /0.4/0.5mm pitch threads cutting, engage the half-nut at 1 and 4 numbered line on the dial as it passes the datum mark. For 0.7 / 1 / 1.4 / 1.75 / 2 mm pitches cutting, engage the half-nut at numbered line 2 and 5 only. For 3.5 / 7 / 1.4 mm pitches cutting, engage the half-nut at numbered line 3 and 6 only . For 0.8 / 4 mm pitches cutting, engage the half-nut at numbered line 1 only.

For the other pitches not shown on 14T column ,you have to change the pinion gear that engages on leadscrew. For example; to cut 0.3 / 0.45 / 0.6 / 0.75 / 0.9 / 1.2 / 1.5 / 3 / 4.5 / 6 / 9 mm pitches, by using 18T pinion gear and engage the half-nut at numbered line from 1 thru 6. But for 0.8 / 4 / 12 mm pitches , by using 18T pinion gear engage at numbered line 1 and 3 and 5 only. For 1.3 / 6.5 / 13 mm pitches, only by using 13T pinion gear and engage at numbered line 1. For 1.25 / 2.5 / 5 / 8 / 10 mm pitches, by using 20T pinion gear and engage at numbered line according to table shown. For 1.1 / 1.8 / 5.5 / 11 mm pitches,use 22T pinion gear and engage as shown on table.

The 1mm pitch thread can be cut by using any one pinion gear, but engage the half-nut at different line as shown on table.

The threading dial indicator may not be used for cutting Module, D.P. and Inch threads. To cut these threads, 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-nuts are still engaged, reverse the spindle rotation which will move the carriage back-wards towards the starting point. When the starting point is reached, restart the spindle forward and feed the cutting tool into the workpiece at the desired spot.

INDICATOR TABLE

GEAR	PITCH					SCALE
13T	1	1.3	6.5	13		1
14T	0.2	0.25	0.35	0.4	0.5	1.4
	0.7	1	1.4	1.75	2	2.5
	3.5	7	1.4			3.6
	0.8	4				1
18T	0.2	0.25	0.3	0.4	0.45	
	0.5	0.6	0.75	0.9	1	
	1.2	1.5	2	3	4.5	1-6
	6	9				
	0.8	4	12			1.3.5
20T	0.2	0.25	0.4	0.5	0.8	1.4
	1	1.25	2	2.5	4	2.5
	5	10				3.6
	8					1
22T	0.2	0.25	0.4	0.5	1	1.4
	1.1	2	5.5	11		2.5
						3.6
	1.8					1

Fig.13-2

APRON AND SLIDE CONTROLS

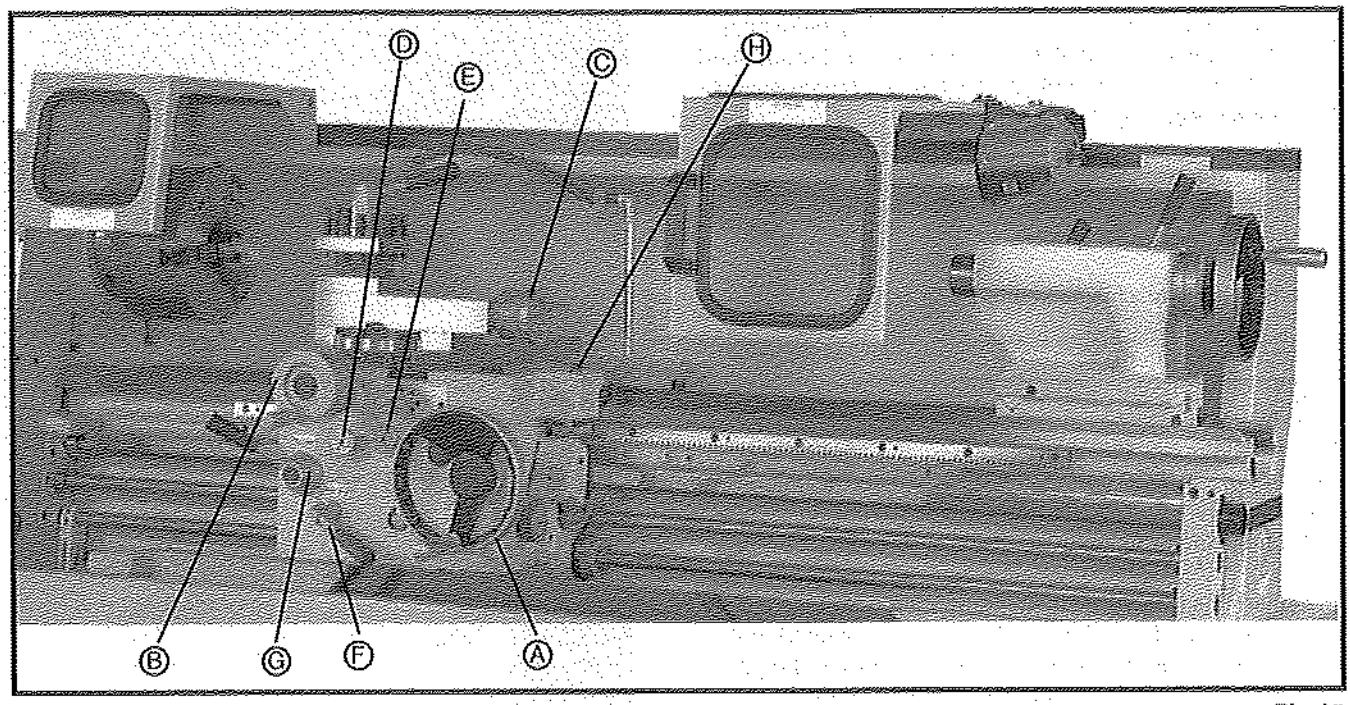


Fig.15

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

1. Push pull knob (D) selects power crossfeed (Cross-slide) or longitudinal feeds; Push in for longitudinal, pull out for crossfeed operation.
2. Push-pull knob (E) controls forward or reverse feed direction.
3. Lever (F) is pulled up for power feed engagement, and pushed down for manual operation.
4. Lever (G) is pressed down to engage leadscrew for thread cutting.

NOTE: Do not use headstock feed reversing lever for reversing feed; use only for left-hand thread cutting. Operate push-pull knob (E) for reverse feeds.

FEED TRIP DEVICE:

A trip mechanism is incorporated into the apron power drive.Trip loads are preset at the factory. If necessary, it may be re-adjusted by the knurled Knob on the left side of left-hand apron. (Fig.25) (On the right side of the right-hand Apron).

NOTE: The apron handwheel (A) is disengaged from its gear train during the power operation and thread cutting by pulling the handwheel outwards to make it turn freely on the shaft.

CROSS-SLIDE AND TOPSLIDE

Both handwheels carry dials graduated in inch or metric dimensions. The cross-slide dial is graduated to indicate changes in workpiece DIAMETER and the topslide is graduated to indicate tool movement. The solid or T-slotted topslide 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 topslide should be positioned with the toolblock located directly over the rotatable base to give maximum support, particularly when using parting off tools and in heavy cuts.

SADDLE LOCK SCREW (H):

This locks the saddle to the bed for facing or cut off operations.

WARNING: Make sure you "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). Additional clamping may be obtained by tightening the large nut (B) located in a recess below the handwheel. (Fig.16)

Release this clamping nut before attempting to move the tailstock and in cases when the need for extra clamping is not necessary.

The tailstock barrel is locked by lever (C).

The tailstock can be set-over for production of shallow tapers or for re-alignment. Release the clamping lever and adjust screws (S) at each side of the base to move tailstock laterally across the base. An indication of the set-over is given by the datum mark (D) at the tailstock end face, as shown in (Fig. 17). Apply the clamp lever after adjustment of set-over.

The barrel is graduated in inch and metric scales. Standard tang drills with M.T.4 shank can be used, but barrel travel will be reduced by the difference in length of the standard M.T.4 shank and the tang length.

SAFETY STOP

Stop pin (E) is fitted to prevent the tailstock from inadvertently sliding off the end of the bed.
Always ensure the pin is secure and replaced after removal.

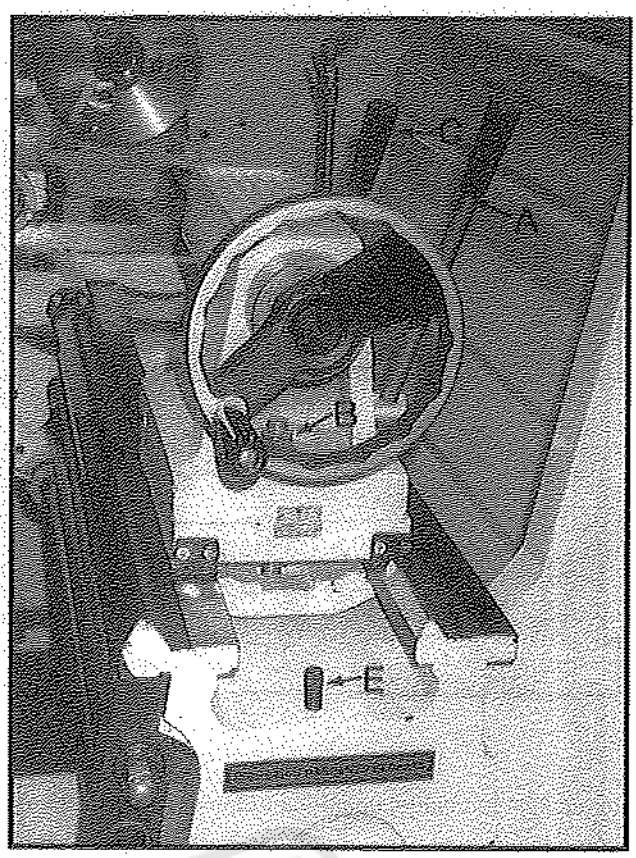


Fig.16

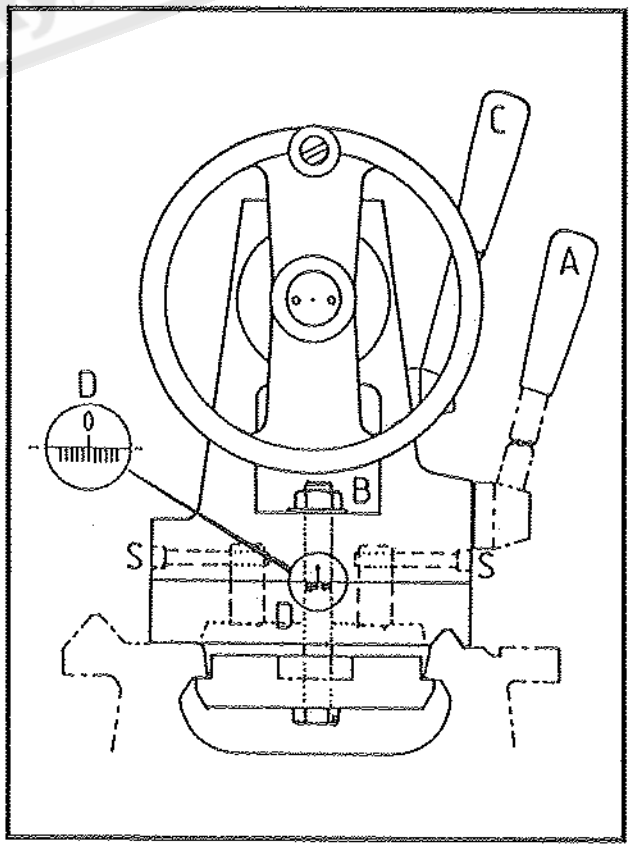


Fig.17

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 periods to ensure continued lathe accuracy.

HEADSTOCK CHECK: Take a light cut with a keen tool over a 6 in.(150mm) length of 2 in. dia. (50mm) steel bar gripped in the chuck but not supported at the free end. Micrometer readings at each end of the turned length (at A and B of Fig.18) should be the same.

To correct a difference in readings, slacken the four head-stock hold-down screws (J) shown in (Fig.19.) and adjust the set-over pad (K) beneath the headstock to pivot the headstock about the dowel (L). Tighten all screws after adjustment and repeat the test-cut/micrometer-reading sequence until micrometer readings are identical, i.e. machine cuts absolutely parallel.

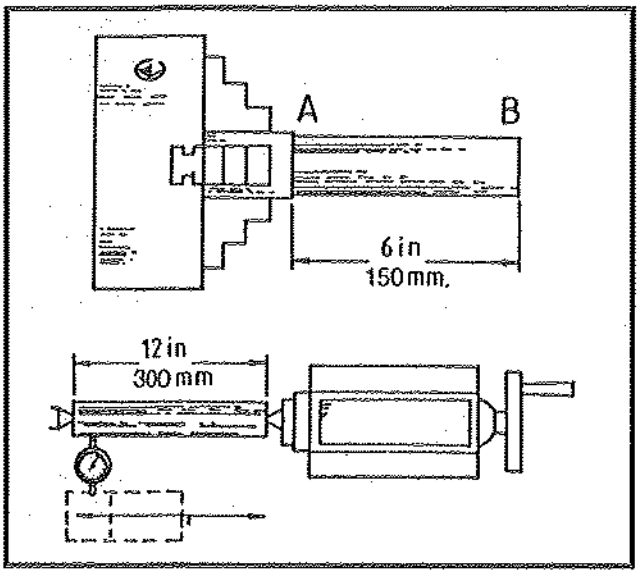


Fig.18

TAILSTOCK CHECK: Using 12 in. (300 mm) ground steel bar fitted between headstock and tailstock centres, check the alignment by fitting a dial-test indicator to the topslide and traversing the centre line of the bar (lower sketch, Fig.18).
To correct error release the tailstock clamp lever and adjust the two set-over screws provided.
Continue with checking and correction until the alignment is perfect.

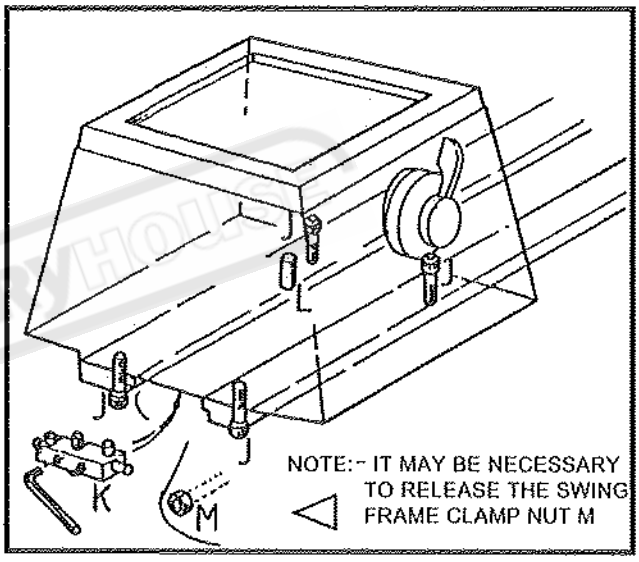


Fig.19

END GEAR TRAIN

Power from the headstock to gearbox is transmitted through a gear train enclosed by the headstock end guard. Intermediate gears are carried on an adjustable swing-Frame (M) shown in (Fig.20)
Gears must be thoroughly cleaned before fitting and backlash maintained at .005 in. (.127mm) for correct meshing.
Lubricate gears regularly with thick machine oil or grease.

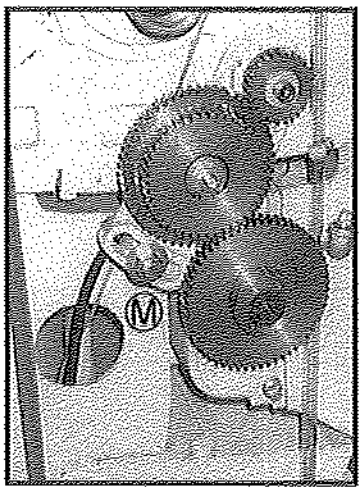


Fig.20

DRIVING BELTS

To check the driving belts tension first, isolate from electric power then apply light finger pressure at a point midway between motor and headstock pulleys should produce about 1/2" (13mm) movement of each belt when under correct tension. (Fig.21)

To alter belt tension, remove the cover plate in back of headstock plinth and adjust the two screws (X) on the hinged motor platform (Fig.22).
Ensure that the Motor axis is kept level and both pulleys are aligned correctly.

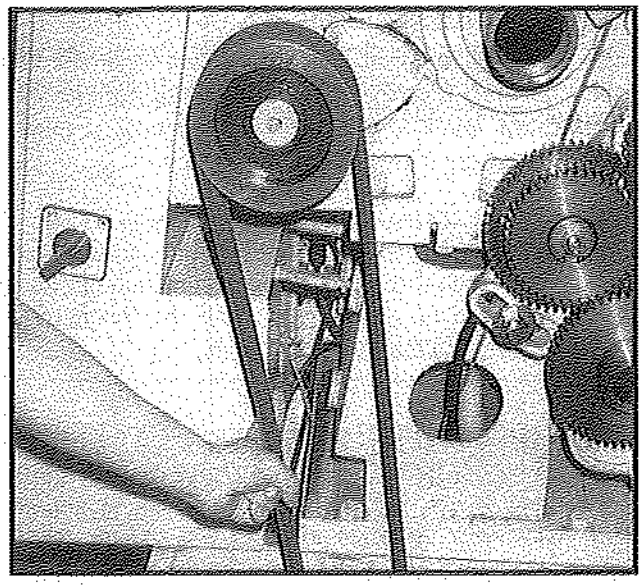


Fig.21

LEADSCREW SHEARPIN Fig.23

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

To replace a sheared pin, first disengage drive to the leadscrew by setting the righthand lever of the gearbox to an intermediate position. Then rotate leadscrew (F) until the broken pinhead faces you for removal.
Now rotate flanged sleeve (A) to allow the pin shank to be pushed out of the slot in the housing (B).

Reposition the sleeves and align the holes to fit a new pin. (E)

CAUTION: USE ONLY CORRECT REPLACEMENT SHEARPINS AS SUPPLIED IN TOOLBOX AS SPAREPARTS.

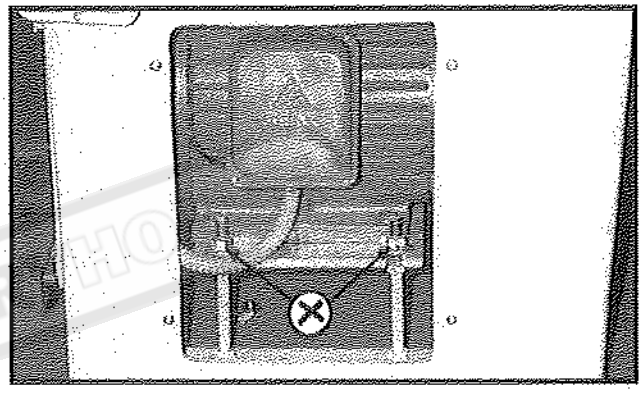


Fig.22

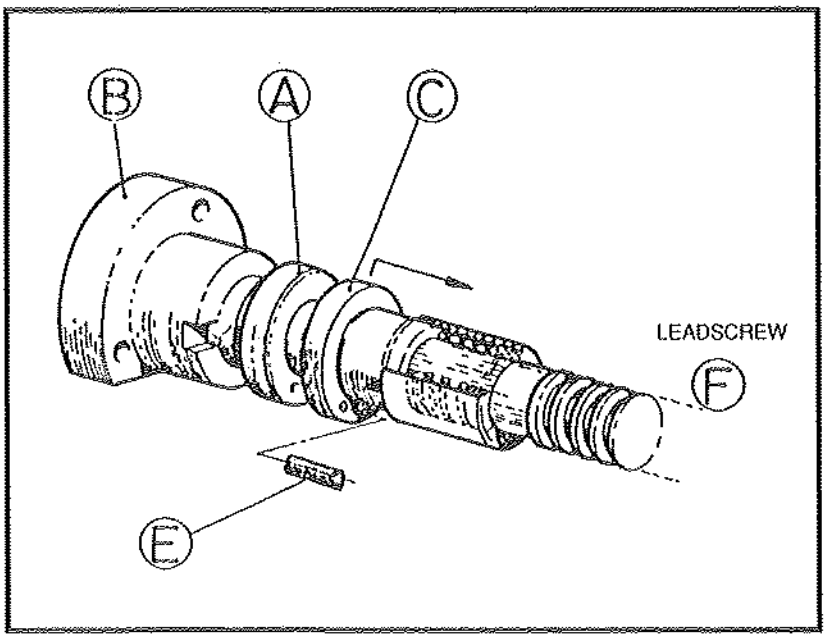


Fig.23

SLIDEWAYS

Tapered gib-strips are fitted to slideways of cross and compound slides and any slackness which may develop can be ractified by resetting the gibs with the adjusting screws provided.

To adjust the cross-slide, slacken the rear screw (A) and tighten the front screw (B) (Fig.24), making only a slight alteration with constant checking for smooth action.

The topslide is adjusted by both ends screw (S) only.
Tapered gib is fitted in the front wing of the saddle adjusted by screw (C) (Fig.25).
The flat gib is fitted in the rear wing of the saddle and adjusted by 3 set screws with nuts.

Ensure that slideways are thoroughtly cleaned and lubricated before making any adjustment. Avoid over- adjust -ment which will only result in stiff, jerky action of the slide concerned.

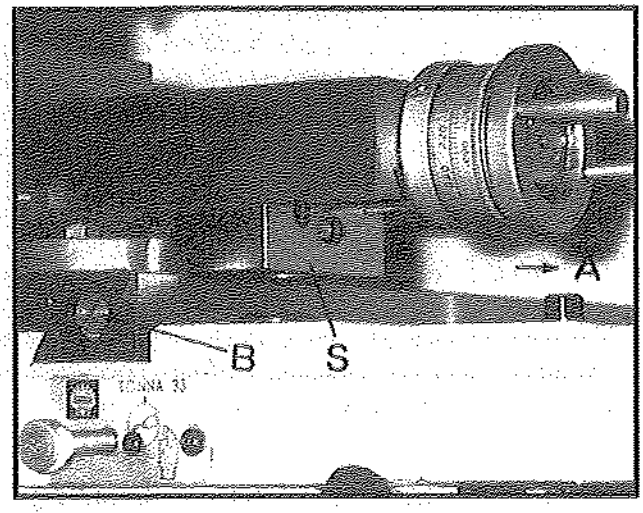


Fig.24

CROSS-SLIDE NUT

This is adjustable for elimination of backlash which may develop after prolonged service.
Reduce backlash by loosening the rear caphead screw (A), then carefully screw in the small and central screw (B) to adjust a wedge within the spilt nut.
Make only a slight alteration each time and operate the cross-slide repeatedly through full travel to be sure of smooth action.

AFTER ADJUSTMENT RE-TIGHTEN SCREW (A) AND CHECK AGAIN.

CAUTION: TURNING IN THE ADJUSTING SCREW (B) TOO MUCH WILL CAUSE THE WEDGE TO JAM AND NOT RETURN FOR SMOOTH TRAVEL.

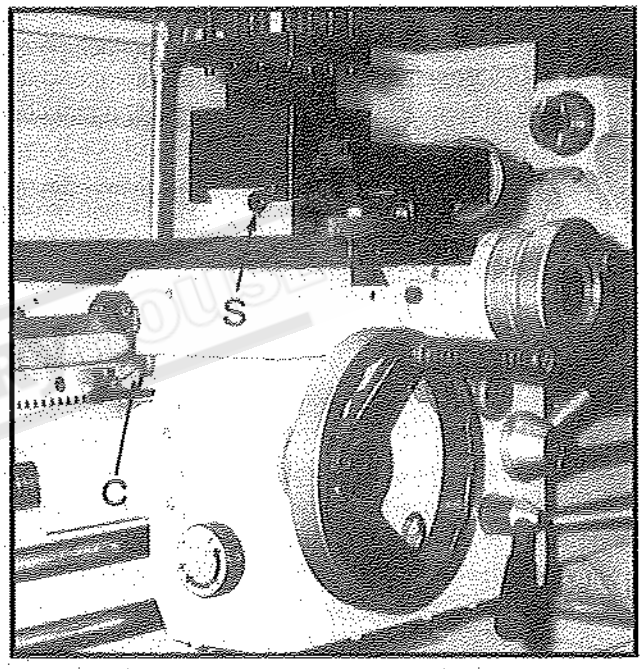


Fig.25

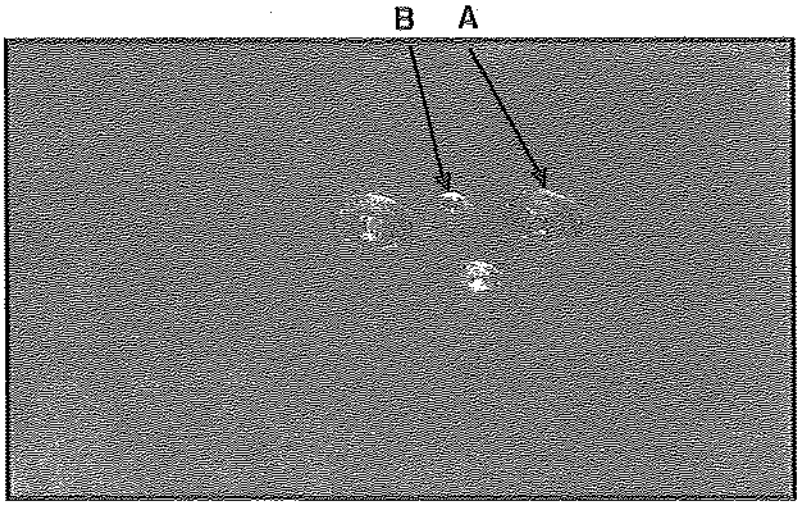


Fig.26

SPINDLE BRAKE

There are two braking systems provided for spindle brake and power cut off to the drive motor on VS model. First, the Inverter installed in the electrical box includes an electrical brake control system itself. The preset parameter command to switch off the power source and executesautomatic braking of the drive motor within few seconds. Second, apply the footbrake pedal for quick braking of the main spindle. The footpedal connecting rod passes a switch which when the footpedal is depressed cause shutdown of motor power; electronic Inverter braking and drum. (Fig. 27)
The standard model provided the second one mechanism function only. But clutch model did not cut off power to motor, will return the control lever to neutral automatically.The brake shoes are designed to wear out. When braking performance deteriorates, replace brake shoes (Parts No.A-9801). Brake shoes are a non-warranted item.

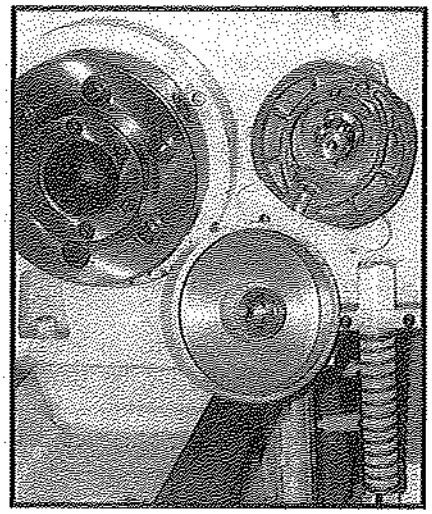


Fig.27

MAGNETIC BRAKE (OPTIONAL EQUIPMENT)

In case, the equipment was mounted on back gear shaft of headstock for any models, usually, during the lathes power on, its electrical system controlled the braking drum to clamp the brake disc on shaft (Fig.27A) for main spindle quick stop situation. To release the braking system for main spindle movement by press the braking button with white lamp flash on control panel besides the Emergency Stop button. To re-start the lathe, the white lamp will shut off automatically and return all the control system and operating functions of any models normally. The brake shoes are designed to wear-out neutrally. When braking performance deteriorates, to adjust the gap of brake drum by insert the same one precision gauge block into the gap at equally positions for very fine adjustment. Too much wear-out of the brake shoes may cause the adjustment un-available. To replace the brake shoes are necessary.

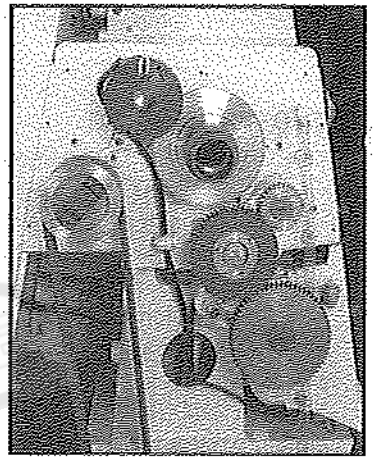


Fig.27.1

NOTE: All the brake shoes are non-warranted item.

SPINDLE BEARING

A set of pre-loaded Taper Roller bearings are incorporated on the main spindle and are pre-set on assembly. If the main spindle begins to have too much runout, it may perhaps be caused by wearing of the spindle bearings and/or the end thrust adjusting nut may have become loosened. To adjust the bearing, open the end cover, loosen the bearing cover and release two (2) set screws (S) on the thrust nut (N) (Fig.28).
Then tighten the nut (N) by G-type lock spanner carefully.
After adjusting the end thrust nut, re-tighten the two set screws.

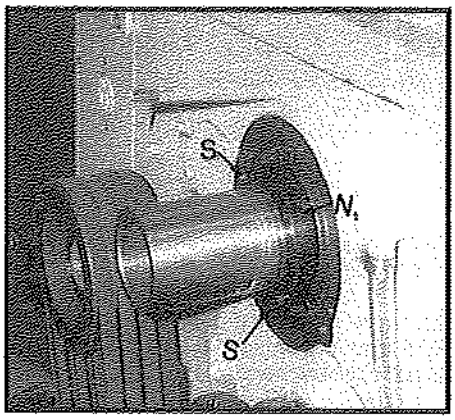


Fig.28

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

LUBRICATION

Headstock (Standard Lathes)
Headstock bearings, gears and drive shafts are jet-lubricated from an oil distributor located beneath the headstock cover; the oil is supplied by an impeller-type pump attached to a tank in the head-end plinth. (Fig.29)
The oil pump is driven by a vee belt from the main motor, ensuring continuous supply while the main motor is running. Evidence of the oil supply is shown on an oil sight in the headstock front face. A self-adjusting jockey pulley ensures constant belt tension.
A large pipe returns oil from the bottom of the headstock into the tank. Ensure that the oil level in the tank is kept topped, to the mark on the filler-cap dipstick. (Fig.30) Check oil level weekly and change the oil every year by Shell Tellus 37 oil (I.S.O.V.G37) or equivalent grade.

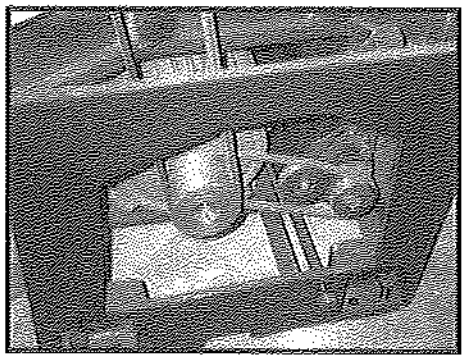


Fig.29

LUBRICATION

Headstock (VS model)

Spindle bearings, gearing and drive shafts are jet-lubricated from an oil distribution tray located beneath the headstock top cover; supplied by a self priming type ; electric pump fitted into the headstock end plinth (Fig 29-1) The oil pump is synchronized with the main motor, ensuring a continuous supply of lubricant to the headstock while the motor is running. Evidence of the oil supply is shown on an oil-sight glass in the headstock front face. Oil is contained in a large underbed tank containing 3 gallons (13. 5 litres). This level should be checked every week, through the mark on the filler cap dipstick. (Fig 30) Change the oil every year by I.S.O. VG 32oil equivalent grade as below: Where the specified lubricant is unobtainable, a grade with the following characteristics can be used:

Gravity, API 15.6˚C	30.5
Viscosity Kin., cST@40˚C	31.78
@100˚C	5.33
Viscosity Index	100
Pour Point, ˚C	-15
Flash Point, COC, ˚C	226
Color, D1500	0.5
TAN, mg KOH/g	0.10
Carbon Residue Rams%	0.06

NOTE: WE RECOMMEND THE OIL BE CHANGED WITHIN THE FIRST THREE (3) MONTHS FOR A NEW MACHINE.

To drain the oil; remove the belts on the drive motor, release the clamp on the hose to the headstock, slip the delivery hose into an empty container of more than 3 gallons capacity and start the lathe to pump out the oil from the tank into the container. The small quantity of oil left in the tank below the level of the pump intake can be drained off through the drain plug.

Gearbox

All gears are splash lubricated from an integral oil bath. An oil level sight window is furnished in end face of gearbox. Top up or refill gearbox with Shell Tellus oil 37 (I.S.O.VG 37) through filler elbow (F).
Approximate quantity of oil is one half gallon (2.2 liters.)
Note: Use only clean container for refilling or topping up oil level.
To drain gearbox, unscrew drain plug (D) in end of gearbox casting.

NOTE: WE RECOMMEND THE OIL BE CHANGED WITHIN THE FIRST THREE (3) MONTHS FOR A NEW MACHINE.

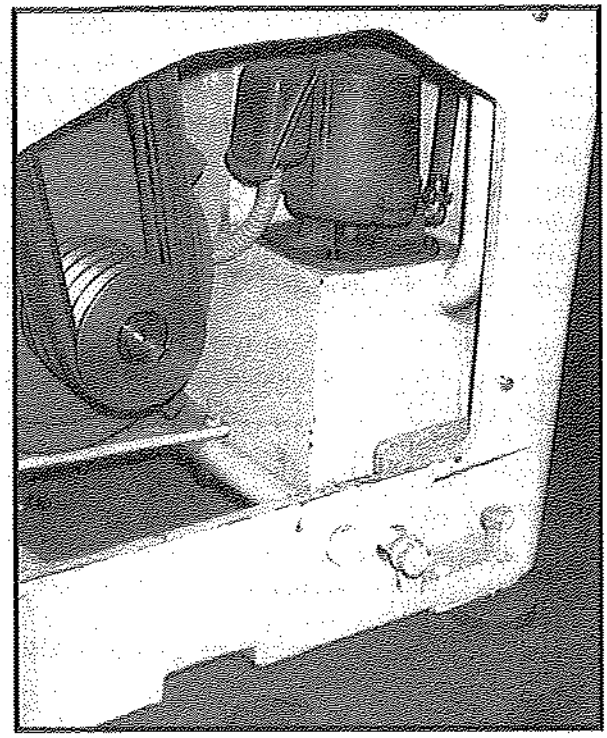


Fig.29.1

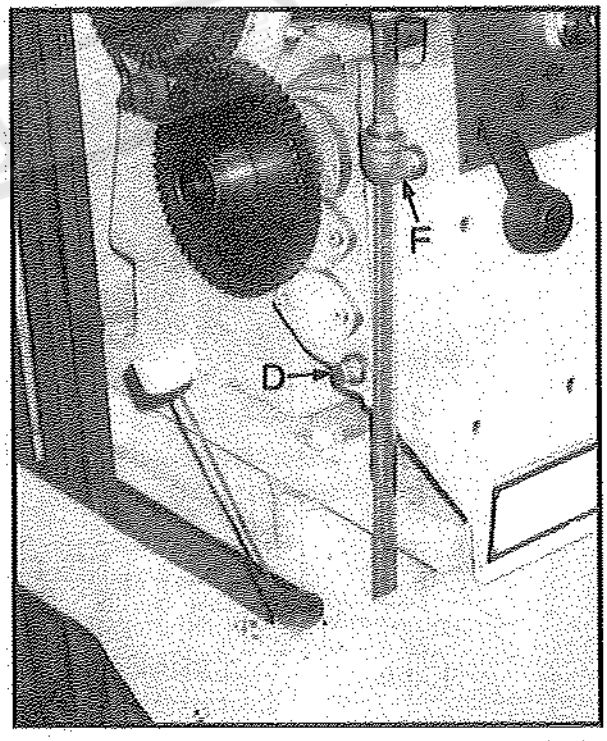


Fig.30

APRON AND SLIDEWAY LUBRICATION

A manually-operated pump (A) (Fig.31) is incorporated in the apron; drawing oil from the apron reservoir, it enables the operator to ensure that the slideways of bed and cross-slide are kept adequately lubricated.
Operate the pump until oil flows from the slideways to ensure that the system is primed.
When the oil level of the apron reservoir falls below the mark on the sight-glass, the system should be topped up through the filler on the saddle with I.S.O VG68 oil or equivalent. When the specified lubricant is unobtainable a grade with the following characteristics can be used:

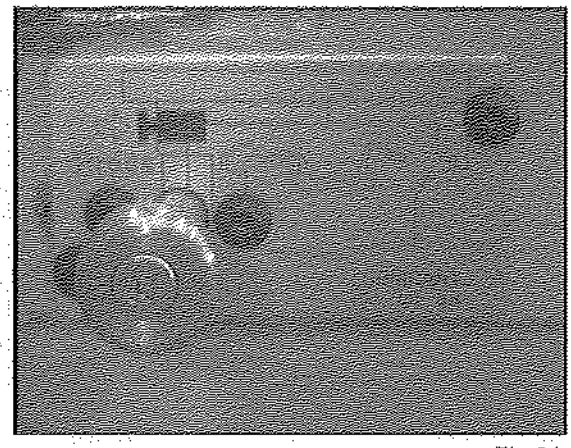


Fig.31

Gravity, API 15.6°C	29.1
Viscosity Kin., cSt @40°C	68
@100°C	8.62
Viscosity Index	98
Pour Point, °C	-15
Flash Point, COC, °C	252
Color, D1500	L1.5
TAN, mg KOH/g	0.12
Carbon Residue Rams%	0.10

Reservoir capacity is approximately 0.4 gallons (1.8 liters).
A drain plug is provided on the bottom plate of the apron.

NOTE: WE RECOMMEND TO CHANGE OIL WITHIN 3 MONTHS FOR A NEW MACHINE.

DO NOT MIX LUBRICANTS. When alternative lubricants are to be used, the system or reservoir should be drained and flushed out before refilling with the equivalent grade.

REGULAR ATTENTION

For trouble-free operation keep the lathe clean and regularly lubricated.
The following Chart (Fig.32) shows the recommend attention and frequency.

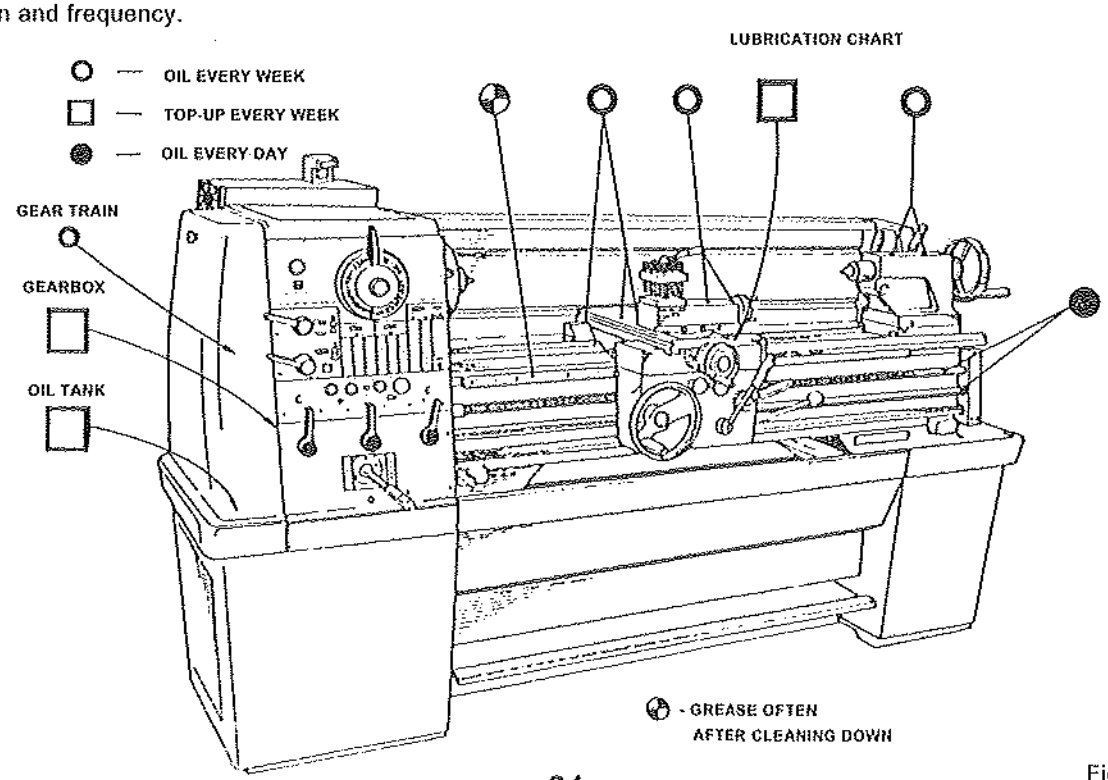


Fig.32

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

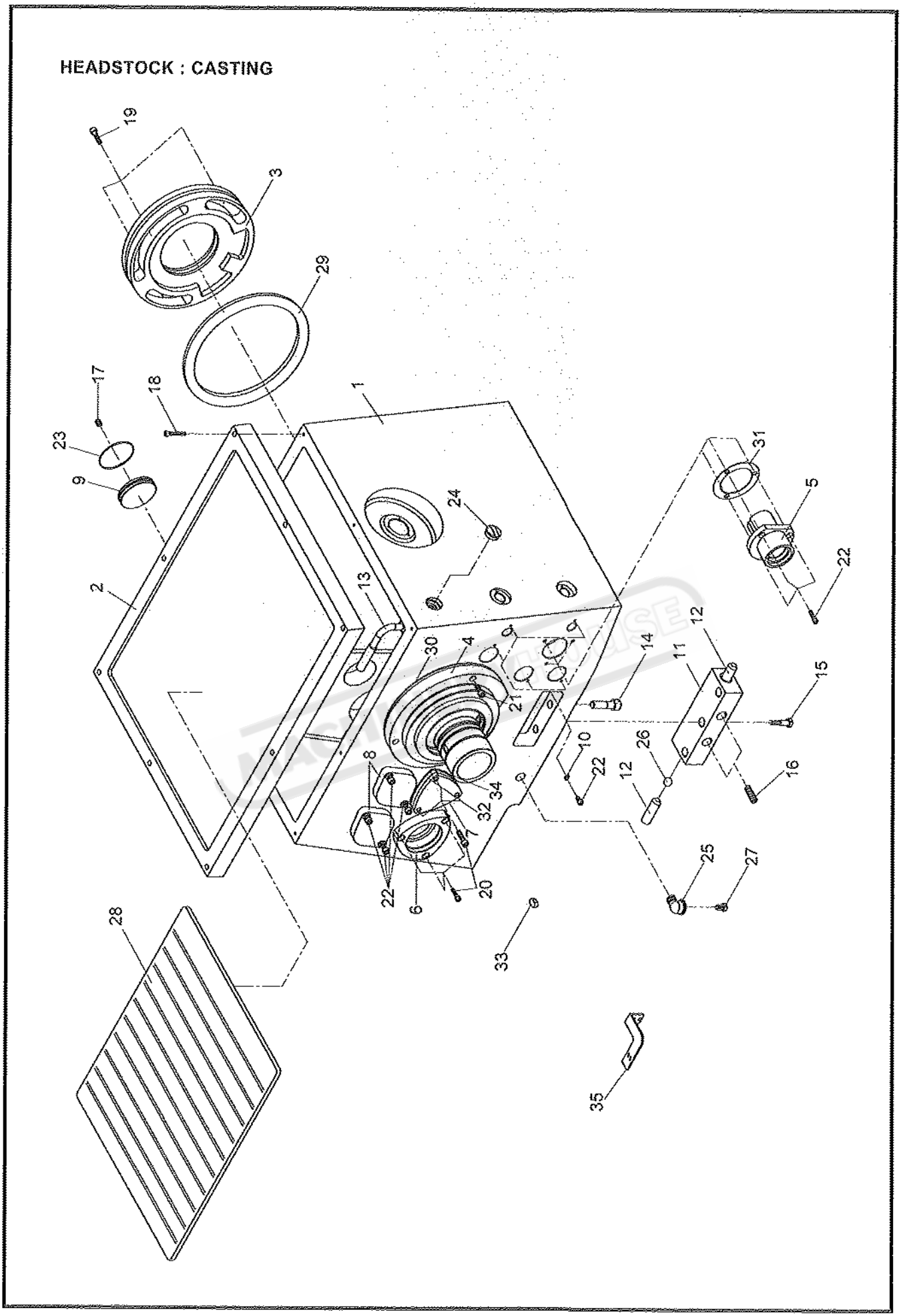
TROUBLE	PROBABLE CAUSES	REMEDY
Overheating of headstock bearings	1.Oil level in headstock is too low or too full. 2.Quality and viscosity of oil is wrong. 3.Oil is too dirty. 4.Oil hole in bearing is obstructed by dirt. 5.Bearing obstructed by dirt. 6.Badly worn bearing. 7.Bearing is not in proper position.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

TROUBLE	PROBABLE CAUSES	REMEDY
Deflection of bending long workpiece.	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 product accuracy.	Accuracy fails on machine. (Ref. to inspection record)	Recheck the accuracy of machine and adjust.
Difficult 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.
Difficulty in cutting 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 halfnut enlargement. 9.Threading dial indicator not properly engaging with leadscrew. 10.Too much infeed per cut or spindle speed too fast.	Adjust the thrust nut at the end of leadscrew. Adjust the gib. Adjust the backlash or replace it. Replace it. Replace or adjust the end gear. Straighten it. Replace threading tool and reset it. Engage the halfnut 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 brake shoes. 2.Fails on controlled limit switch.	Replace brake shoes. Adjust the limit switch position or replace it.
Fail lubricant on slide way.	1.Oil pump in apron obstructed by dirt. 2.Oil tube slip off pump. 3.Oil pipe and hole obstructed by dirty or broken pipe under the saddle.	Clean the pump and replace oil. Reclamp the tube with pump. Clean the pipe and hole or replace the pipe.
Failure on power feeding.	The trip load pressure is too weak.	Adjust the load pressure knob on apron.

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 what is rated for machine. 2.Connecting cable too small. 3.Improper or loose connection of lead. 4.Failure on spindle select knob. 5.Overload.	Check power source voltage. Enlarge connecting cable. Recheck all leads connecting. Replace it. Reduce cutting speed and depth or feed rate.
Wrong rotation.	Wrong sequence of phases.	Reverse any two leads connecting to motor.
Motor noisy and vibrating.	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 motor feet for equal mounting. Straighten or replace it. Stiffen mounting place or add shims under foot pad.
Overheat in motor.	1.Excess belt tension. 2.Cooling 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. 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 stream too light 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.
Lubrication pump failure of headstock. (VS model)	1.Wrong rotation. 2.Lubricant not enough. 3.Overload relay off.	Reverse any two leads to pump. Replenish lubricant into tank. Reset overload relay.
Inverter alarm. (VS model)	1.Operation error. 2.Wrong set of parameter.	Switch off for 20 seconds and switch on again as reset. Referring to instruction manual of inverter or contact with distributor.

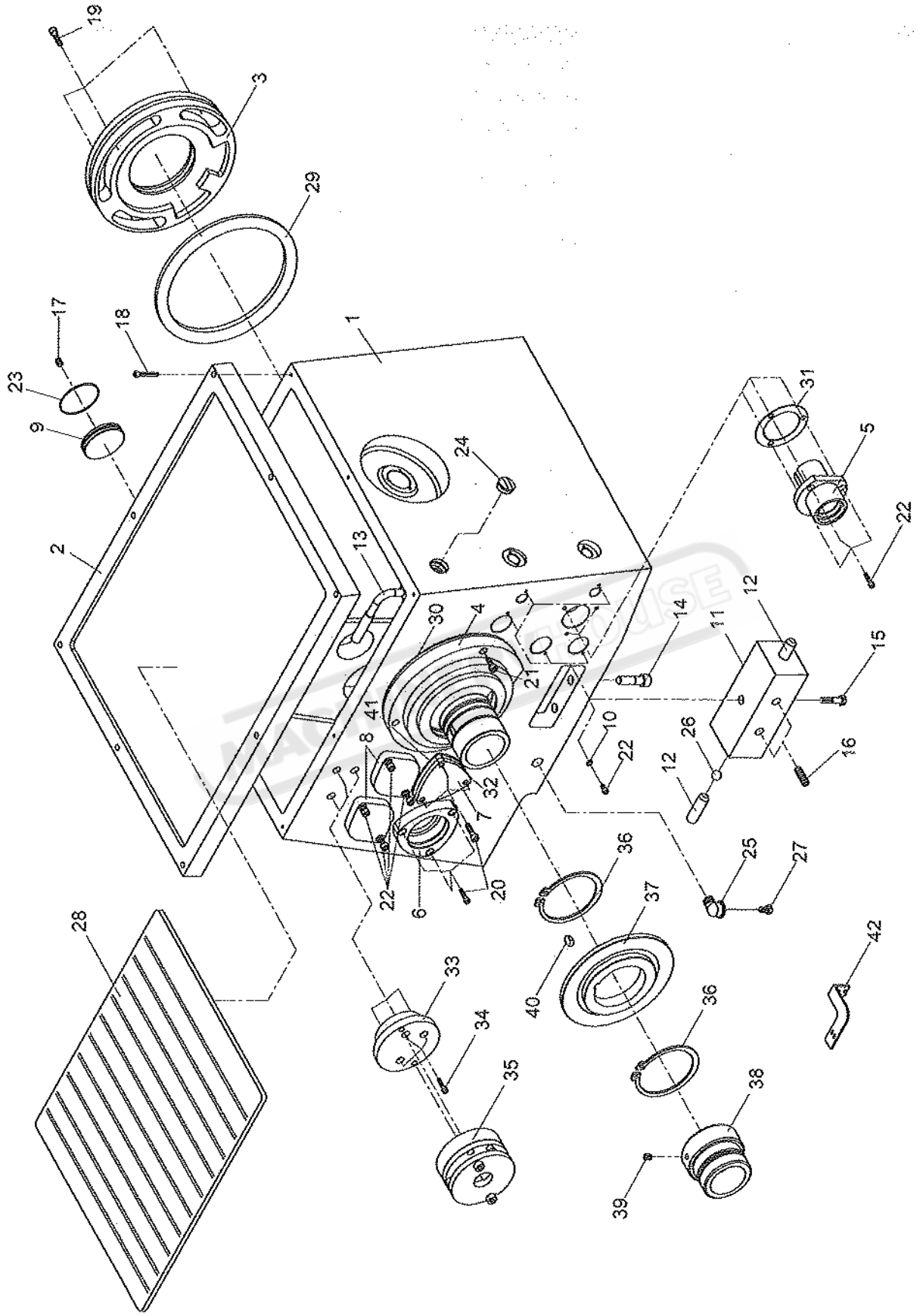
PARTS LIST

HEADSTOCK : CASTING



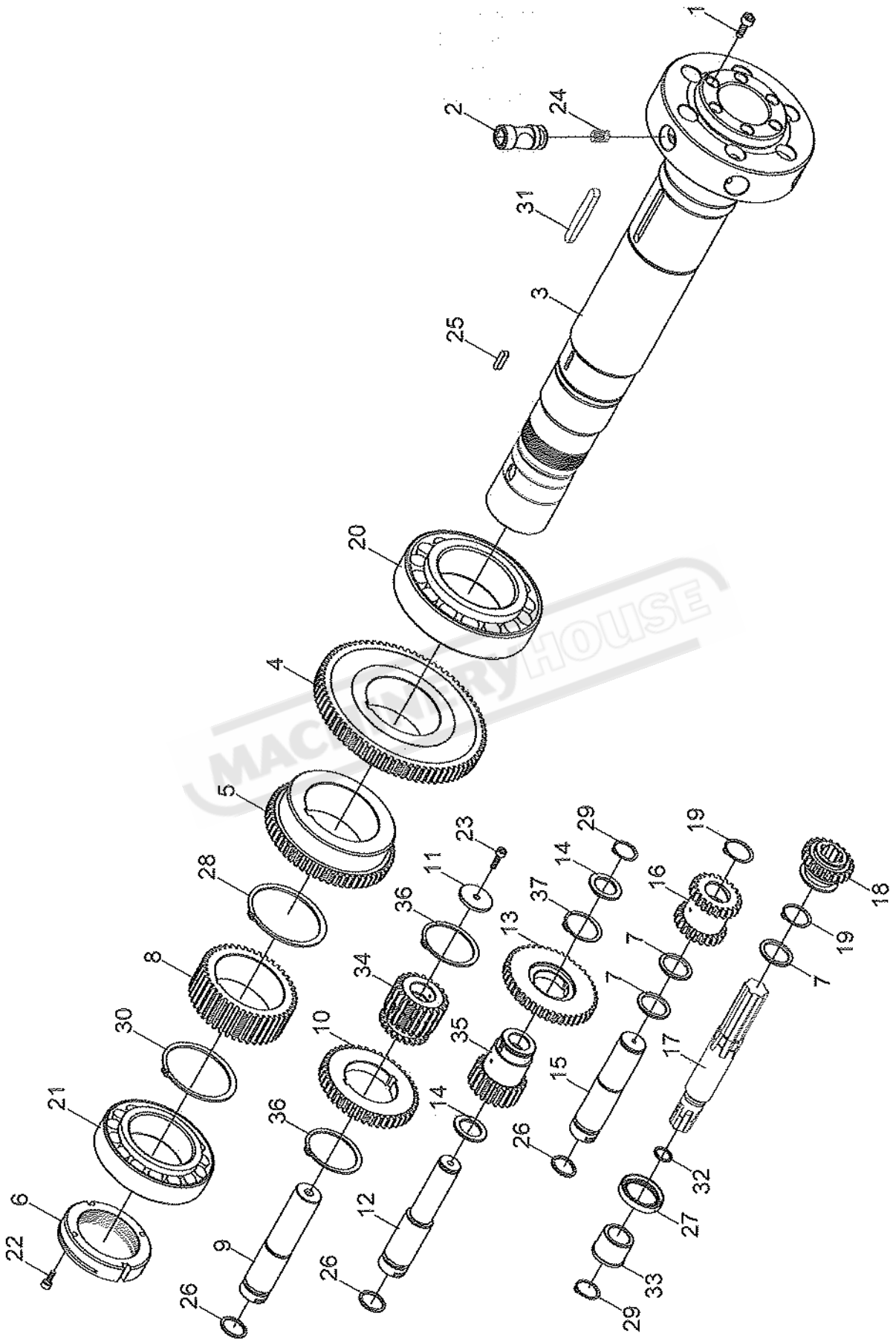
NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-1001	Headstock Casting	1
2.	C-1002	Headstock Cover	1
3.	C-1003	Front Bearing Cover	1
4.	C-1004	Rear Bearing Cover	1
5.	C-1005	Flanged Bearing	1
6.	C-1006	Bearing Housing	1
7.	C-1007-2	Cover	1
8.	C-1008	Cover	2
9.	C-1009	Bore Plugs	3
10.	R-1030	Washers	5
11.	C-1011	Set-Over Pad	1
12.	C-1012	Pins	2
13.	C-1154	Pipe	1
14.	A-1241	Socket Head Cap Screw (M12x35)	4
15.	A-1424	Hexagon Head Bolt (M10x30)	3
16.	A-1113	Socket Headless Set Screw (M12x20)	2
17.	A-1108	Socket Headless Set Screw (M10x10)	3
18.	A-1209	Socket Head Cap Screw (M6x45)	8
19.	A-1207	Socket Head Cap Screw (M6x35)	3
20.	A-1205	Socket Head Cap Screw (M6x25)	6
21.	A-1204	Socket Head Cap Screw (M6x20)	3
22.	A-1202	Socket Head Cap Screw (M6x12)	11
23.	A-6021	O-Ring (G55)	3
24.	A-9502	Oil Sight (ϕ32)	1
25.	A-1127	Elbow (3/4"PT)	1
26.	A-9205	Ball (ϕ3/8")	2
27.	A-1121	Plug (3/8"PT)	1
28.	C-1002-1	Foam Plate	1
29.	C-1003-1	Gasket	1
30.	C-1004-1	Gasket	1
31.	C-1005-1	Gasket	1
32.	C-1007-1	Gasket	1
33.	A-7269	Key (12x8x20)	1
34.	C-1007	Gasket	1
35.	C-3089	Frame	1

HEADSTOCK : CASTING(MAGNETIC BRAKE SYSTEM-OPTION)



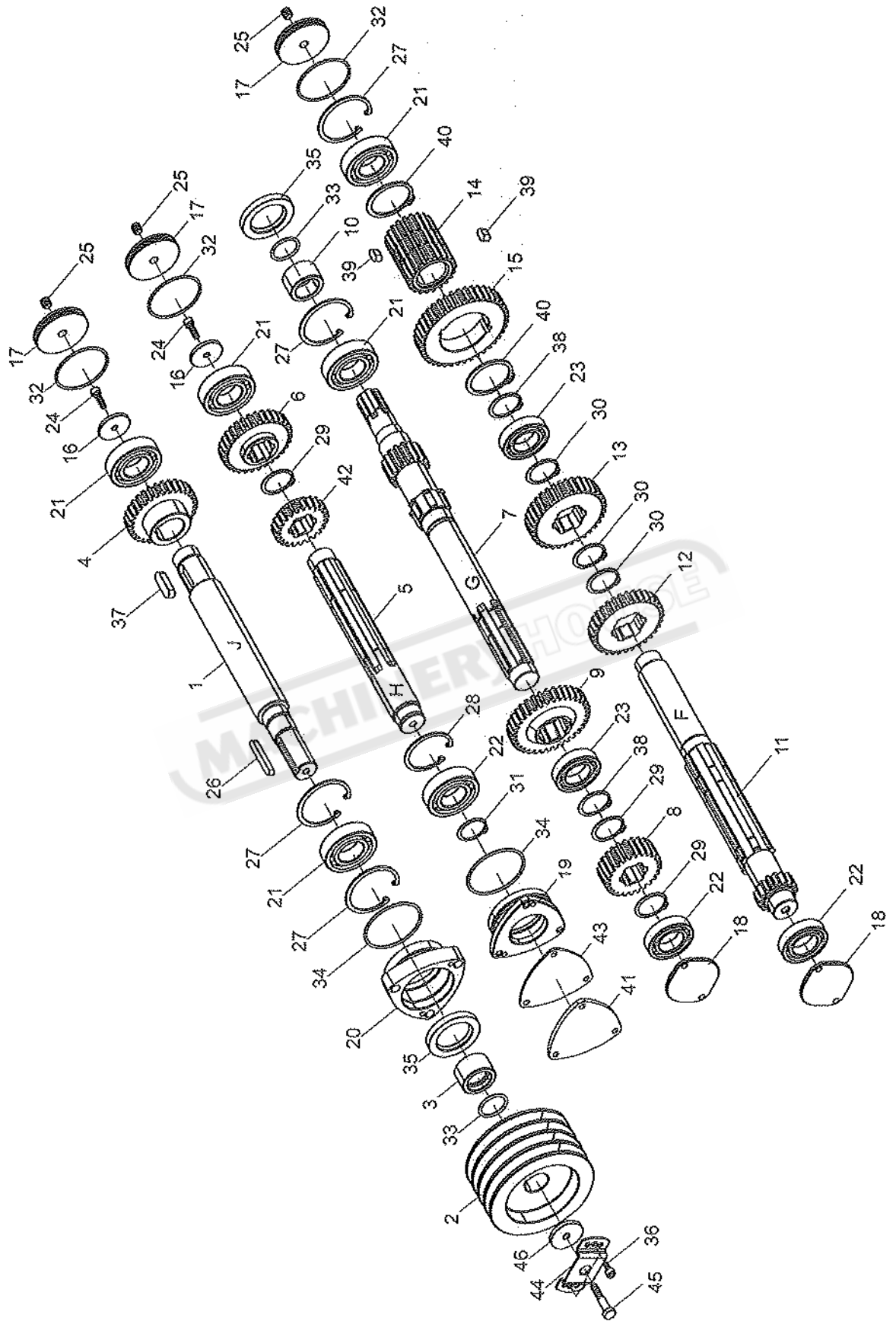
NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-1001	Headstock Casting	1
2.	C-1002	Headstock Cover	1
3.	C-1003	Front Bearing Cover	1
4.	C-1004	Rear Bearing Cover	1
5.	C-1005	Flanged Bearing	1
6.	C-1006	Bearing Housing	1
7.	C-1007-2	Cover	1
8.	C-1008	Cover	2
9.	C-1009	Bore Plugs	3
10.	R-1030	Washers	5
11.	C-1011	Set-Over Pad	1
12.	C-1012	Pins	2
13.	C-1154	Pipe	1
14.	A-1241	Socket Head Cap Screw (M12x35)	4
15.	A-1424	Hexagon Head Bolt (M10x30)	3
16.	A-1113	Socket Headless Set Screw (M12x20)	2
17.	A-1108	Socket Headless Set Screw (M10x10)	3
18.	A-1209	Socket Head Cap Screw (M6x45)	8
19.	A-1207	Socket Head Cap Screw (M6x35)	3
20.	A-1205	Socket Head Cap Screw (M6x25)	6
21.	A-1204	Socket Head Cap Screw (M6x20)	3
22.	A-1202	Socket Head Cap Screw (M6x12)	11
23.	A-6021	O-Ring (G55)	3
24.	A-9502	Oil Sight (ϕ 32)	1
25.	A-1127	Elbow (3/4"PT)	1
26.	A-9205	Ball (ϕ 3/8")	2
27.	A-1121	Plug (3/8"PT)	1
28.	C-1002-1	Foam Plate	1
29.	C-1003-1	Gasket	1
30.	C-1004-1	Gasket	1
31.	C-1005-1	Gasket	1
32.	C-1007-1	Gasket	1
33.	C-1170	Brake Base	1
34.	A-1258	Socket Head Cap Screw (M8x35)	3
35.	FA-4001	Caliper Brake	1
36.	A-3333	Circlip (S72)	2
37	C-1177	Main Spindle Brake Disc	1
38.	J-1067	Adapter	1
39.	A-1139	Socket Headless Set Screw (M6x8)	3
40.	A-7269	Key (12x8x20)	1
41.	C-1007	Gasket	1
42.	C-8039	Frame	1

HEADSTOCK : SPINDLE & GEARS



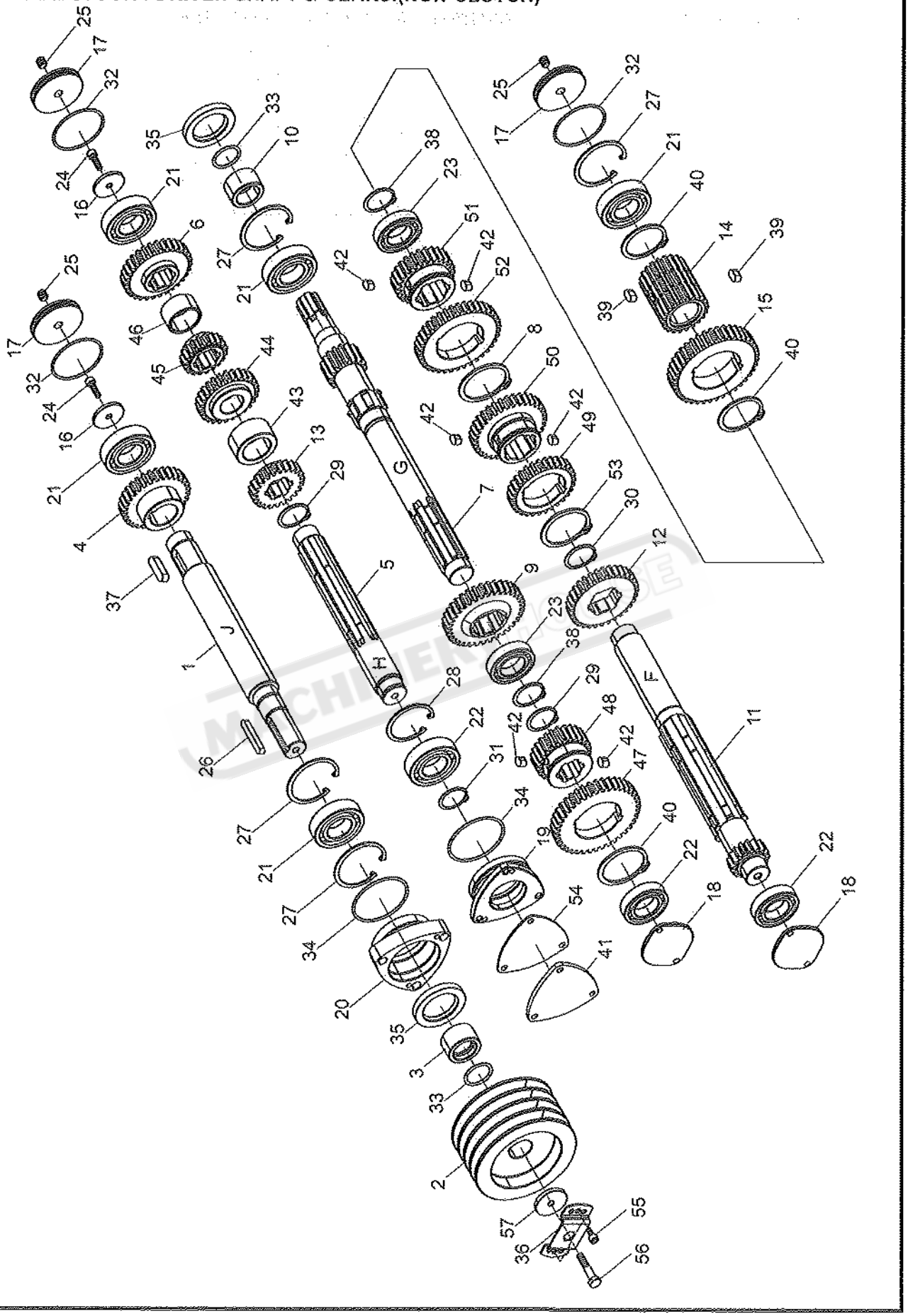
NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-1016	Cam Screw	6
2.	C-1018	Cams	6
3.	C-1019	Main Spindle	1
4.	C-1020	Spindle Gear (75T)	1
5.	C-1021	Spindle Gear (56T)	1
6.	C-1022	Nut	1
7.	C-1031	Collars	3
8.	C-1021	Gear (42T)	1
9.	C-1026	Shaft (E)	1
10.	C-1027A	Sliding Gear (42T)	1
11.	C-1028	Washer	1
12.	C-1029-1	Shaft (D)	1
13.	C-1030	Gear (42T)	1
14.	C-1222	Collar	2
15.	C-1032	Shaft (C)	1
16.	C-1033	Double Gear (21T/21T)	1
17.	C-1035	Shaft (B)	1
18.	C-1036	Gear (21T)	1
19.	A-3312	Circlip (S30)	2
20.	A-2020	Front Bearing (#32218)	1
21.	A-2019	Rear Bearing (#32215)	1
22.	A-1203	Socket Head Cap Screw (M6x16)	2
23.	A-1204	Socket Head Cap Screw (M6x20)	1
24.	A-8401	Cam Spring	6
25.	A-7224	Key (6x6x25)	1
26.	A-6013	O-Ring (P25)	3
27.	A-5018	Oil Seal (35.50.8)	1
28.	A-3323	Circlip (S85)	1
29.	A-3309	Circlip (S25)	2
30.	A-3321	Circlip (S80)	1
31.	A-7225	Key (10x8x75)	1
32.	A-6009	O-Ring (P21)	1
33.	C-1035-1	Collar	1
34.	C-1027B	Gear (21T)	1
35.	C-1030-2	Gear (21T)	1
36.	A-3325	Circlip (S60)	2
37	A-3328	Circlip (S40)	1

HEADSTOCK : DRIVEN SHAFT & GEARS. (VARISPEED)



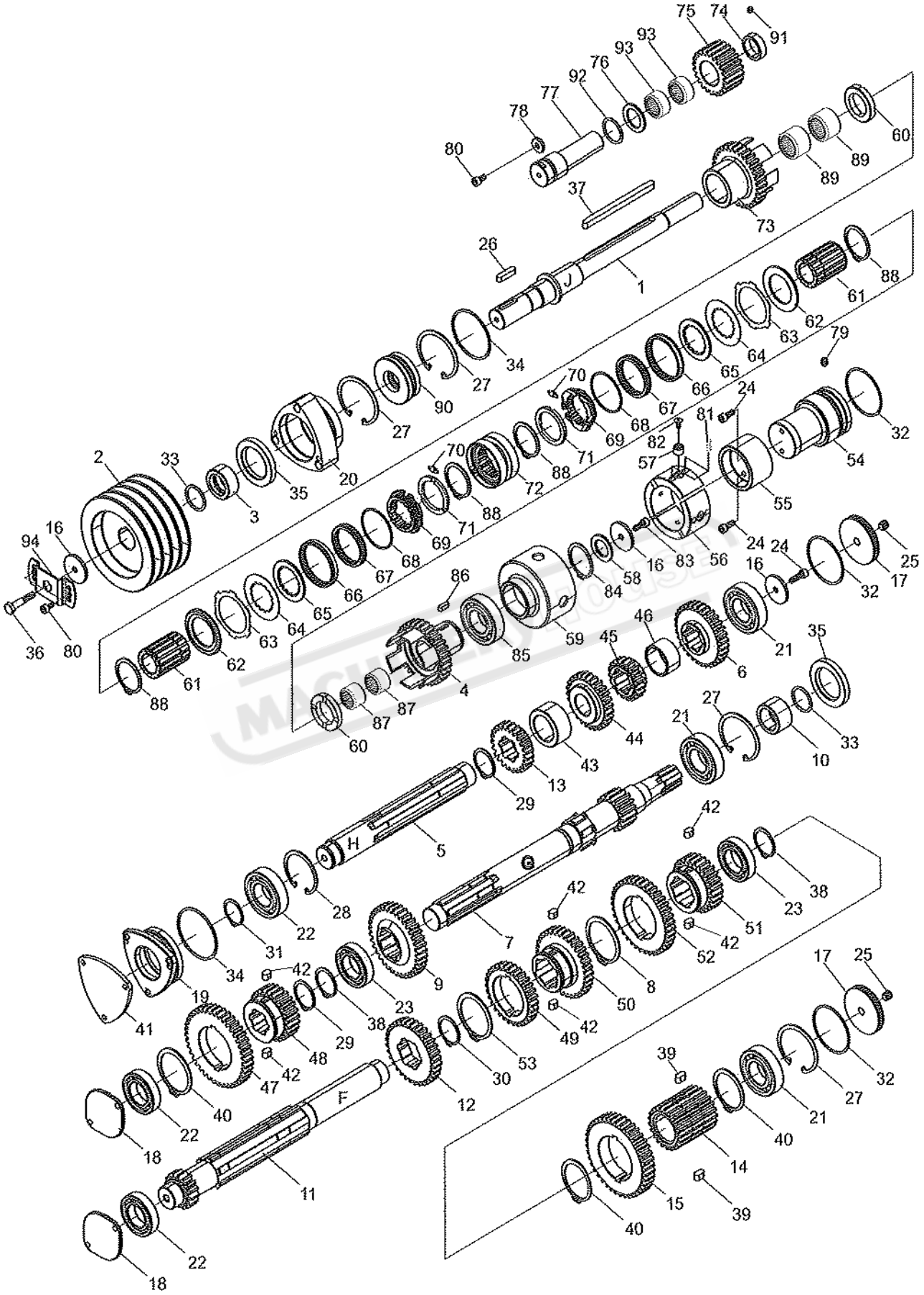
NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-1038	Shaft (J)	1
2.	C-1040-1	Pulley	1
3.	C-1041	Spacer	1
4.	C-1042	Gear (31T)	1
5.	C-1043	Shaft (H)	1
6.	C-1050	Gear (31T)	1
7.	C-1052	Shaft (G)	1
8.	C-1053-1	Gear (25T)	1
9.	C-1054	Gear (35T)	1
10.	C-1055	Collar	1
11.	C-1056	Shaft (F)	1
12.	C-1057-1	Gear (32T)	1
13.	C-1058-1	Gear (34T)	1
14.	C-1060A	Compound Gear (21T)	1
15.	C-1060B	Gear (40T)	1
16.	C-1028	Washer	2
17.	C-1009	Plug	3
18.	C-1008	Cover	2
19.	C-1007-1	Bearing Housing	1
20.	C-1006	Bearing Housing	1
21.	A-2036	Bearing (#6206)	5
22.	A-2029	Bearing (#6006)	3
23.	A-2030	Bearing (#6007)	2
24.	A-1204	Socket Head Cap Screw (M6x20)	2
25.	A-1108	Socket Headless Set Screw (M10x10)	3
26.	A-7226	Key (7x7x50)	
27.	A-3206	Circlip (R62)	4
28.	A-3205	Circlip (R55)	1
29.	A-3324	Circlip (S34)	3
30.	A-3316	Circlip (S42)	3
31.	A-3312	Circlip (S30)	1
32.	A-6021	O-Ring (G55)	3
33.	A-6014	O-Ring (P28)	2
34.	A-6028	O-Ring (AN6230/9)	2
35.	A-5020	Oil Seal (TC40x60x10)	2
36.	A-1202	Socket Head Cap Screw (M6x12)	2
37.	A-7227	Key (10x8x35)	1
38.	A-3314	Circlip (S35)	2
39.	A-7275	Key (8x8x15)	2
40.	A-3331	Circlip (S58)	2
41.	C-1007-2	Cover	1
42.	C-1045	Gear (23T)	1
43.	C-1007	Gasket	1
44.	C-1096	Clamp Plate	1
45.	A-1425	Hexagon Head Screw (M8x20)	1
46.	T-1005	Washer	1

HEADSTOCK : DRIVEN SHAFT & GEARS.(NON-CLUTCH)



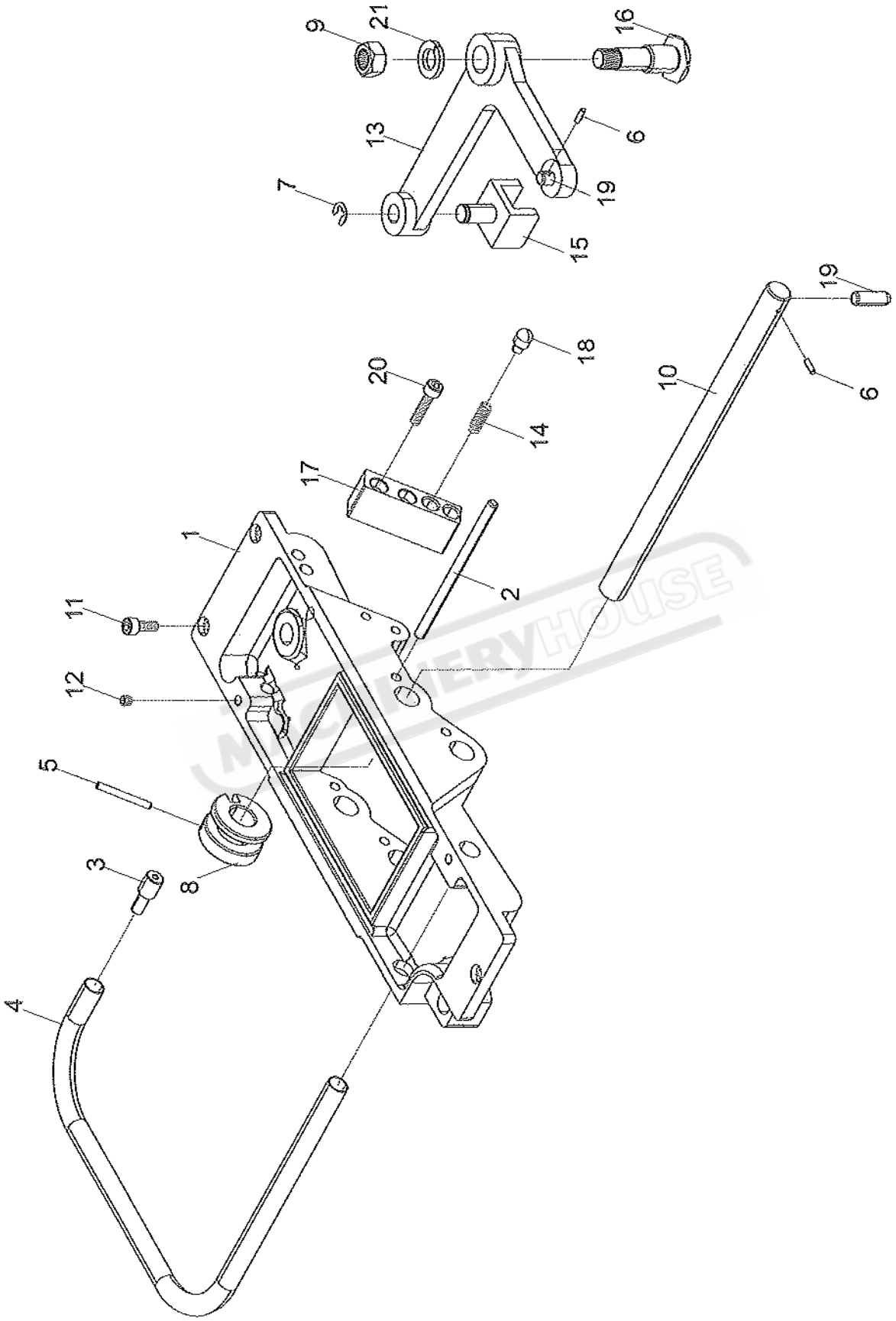
NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-1038	Shaft (J)	1
2.	C-1040-1	Pulley	1
3.	C-1041	Spacer	1
4.	C-1042	Gear (31T)	1
5.	C-1043	Shaft (H)	1
6.	C-1050	Gear (31T)	1
7.	C-1052	Shaft (G)	1
8.	A-3346	Circlip (S56)	1
9.	C-1054	Gear (35T)	1
10.	C-1055	Collar	1
11.	C-1056	Shaft (F)	1
12.	C-1057-1	Gear (32T)	1
13.	C-1045	Gear (23T)	1
14.	C-1060A	Compound Gear (21T)	1
15.	C-1060B	Gear (40T)	1
16.	C-1028	Washer	2
17.	C-1009	Plug	3
18.	C-1008	Cover	2
19.	C-1007-1	Bearing Housing	1
20.	C-1006	Bearing Housing	1
21.	A-2036	Bearing (#6206)	5
22.	A-2029	Bearing (#6006)	3
23.	A-2030	Bearing (#6007)	2
24.	A-1425	Socket Head Cap Screw (M8x20)	2
25.	A-1108	Socket Headless Set Screw (M10x10)	3
26.	A-7226	Key (7x7x50)	1
27.	A-3206	Circlip (R62)	4
28.	A-3205	Circlip (R55)	1
29.	A-3324	Circlip (S34)	2
30.	A-3316	Circlip (S42)	1
31.	A-3312	Circlip (S30)	1
32.	A-6021	O-Ring (G55)	3
33.	A-6014	O-Ring (P28)	2
34.	A-6028	O-Ring (AN6230/9)	2
35.	A-5020	Oil Seal (TC40x60x10)	2
36.	C-1096	Clamp Plate	1
37.	A-7227	Key (10x8x35)	1
38.	A-3314	Circlip (S35)	2
39.	A-7275	Key (8x8x15)	2
40.	A-3331	Circlip (S58)	3
41.	C-1007-2	Cover	1
42.	A-7247	Key (8x8x12)	6
43.	C-1046	Spacer	1
44.	C-1047	Gear (27T)	1
45.	C-1048	Gear (19T)	1
46.	C-1049	Spacer	1
47.	C-1053A	Gear (40T)	1
48.	C-1053B	Gear (25T)	1
49.	C-1058A	Gear (34T)	1
50.	C-1058B	Gear (30T)	1
51.	C-1059A	Gear (26T)	1
52.	C-1059B	Gear (38T)	1
53.	A-3345	Circlip (S52)	1
54.	C-1007	Gasket	1
55.	A-1202	Socket Head Cap Screw (M6x12)	2
56.	A-1425	Hexagon Head Screw (M8x20)	1
57.	T-1005	Washer	1

HEADSTOCK : CLUTCH SHAFT & GEARS



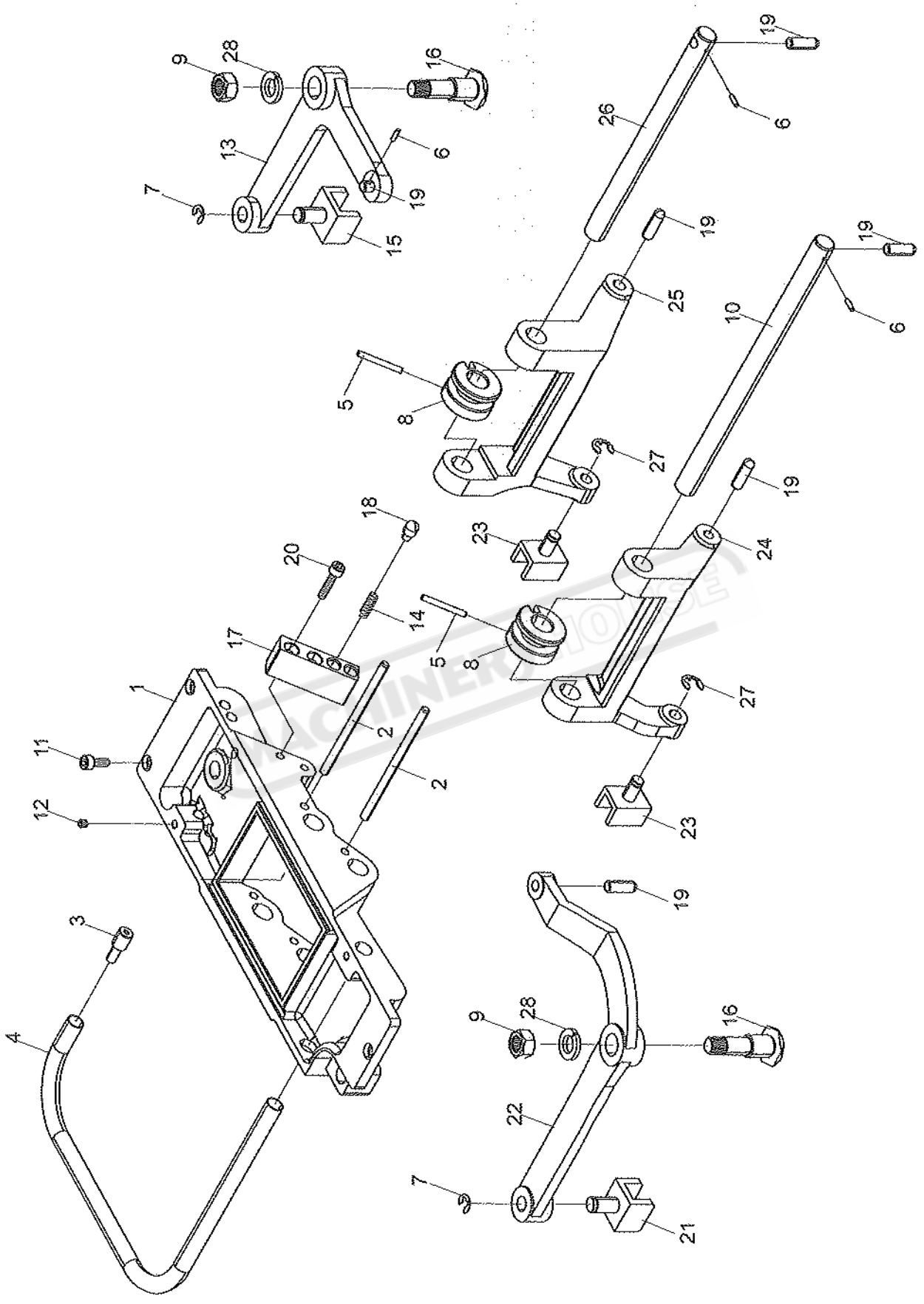
NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-1201	Shaft (J)	1
2.	C-1040-1	Pulley	1
3.	C-1211	Spacer	1
4.	C-1203	Gear (31T)	1
5.	C-1043	Shaft (H)	1
6.	C-1050	Gear (31T)	1
7.	C-1052	Shaft (G)	1
8.	A-3346	Circlip (S56)	1
9.	C-1054	Gear (35T)	1
10.	C-1055	Collar	1
11.	C-1056	Shaft (F)	1
12.	C-1057-1	Gear (32T)	1
13.	C-1045	Gear (23T)	1
14.	C-1060A	Compound Gear (21T)	1
15.	C-1060B	Gear (40T)	1
16.	C-1028	Washer	3
17.	C-1009	Plug	2
18.	C-1008	Cover	2
19.	C-1007-1	Bearing Housing	1
20.	C-1212	Bearing Housing	1
21.	A-2036	Bearing (#6206)	3
22.	A-2029	Bearing (#6006)	3
23.	A-2030	Bearing (#6007)	2
24.	A-1204	Socket Head Cap Screw (M6x20)	3
25.	A-1108	Socket Headless Set Screw(M10x10)	2
26.	A-7230	Key (7x7x30)	1
27.	A-3206	Circlip (R62)	4
28.	A-3205	Circlip (R55)	1
29.	A-3324	Circlip (S34)	2
30.	A-3316	Circlip (S42)	1
31.	A-3312	Circlip (S30)	1
32.	A-6021	O-Ring (G55)	3
33.	A-6014	O-Ring (P28)	2
34.	A-6028	O-Ring (AN6230/9)	2
35.	A-5020	Oil Seal (TC40x60x10)	2
36.	A-1425	Hexagon Head Screw (M8x20)	1
37.	A-7246	Key (8x8x125)	1
38.	A-3314	Circlip (S35)	2
39.	A-7275	Key (8x8x15)	2
40.	A-3331	Circlip (S58)	3
41.	C-1007-2	Cover	1
42.	A-7247	Key (8x8x12)	6
43.	C-1046	Spacer	1
44.	C-1047	Gear (27T)	1
45.	C-1048	Gear (19T)	1
46.	C-1049	Spacer	1
47.	C-1053A	Gear (40T)	1
48.	C-1053B	Gear (25T)	1
49.	C-1058A	Gear (34T)	1
50.	C-1058B	Gear (30T)	1
51.	C-1059A	Gear (26T)	1
52.	C-1059B	Gear (38T)	1
53.	A-3345	Circlip (S52)	1
54.	C-1215	Brake Shaft	1
55.	C-1216	Brake Disc	1
56.	C-1217	Pads	4
57.	M-1218	Pegs	4
58.	C-1209	Washer	1
59.	C-1219	Brake Housing	1
60.	C-1207	Washer	2
61.	C-1418C	Hubs	2
62.	C-1410C	End Flanges	2
63.	C-1447C	Outer Plates	10
64.	C-1444C	Inner Plates	12
65.	C-1450C	Lock Plates	2
66.	C-1462C	Locking Plates	2
67.	C-1430C	Adjusting Nuts	2
68.	C-1488	Springs	2
69.	C-1407C	Track Rings	2
70.	C-1382C	Bearing Assembly	6
71.	C-1494C	Thrust Washers	2
72.	C-1399C	Operating Collar	1
73.	C-1202	Gear (31T)	1
74.	C-1222-1	Washer	1
75.	C-1204	Gear (22T)	1
76.	C-1222	Washer	1
77.	C-1221	Shaft (A)	1
78.	R-1030	Washer	1
79.	A-1106	Socket Headless Set Screw (M8x8)	1
80.	A-1202	Socket Head Cap Screw (M6x12)	2
81.	A-8410	Spring	8
82.	A-1612	Flat Head Cap Screw (M6x16)	4
83.	A-1525	Socket Head Cap Screw (M6x16)	1
84.	A-3328	Circlip (S40)	1
85.	A-2047	Bearing (#6008)	1
86.	A-7256	Key (5x5x16)	1
87.	A-2110	Needle Bearing (TLA2220)	2
88.	C-1388C	Circlip	4
89.	A-2132	Bearing (TLA3020)	2
90.	A-2048	Bearing (#5206)	1
91.	A-1100	Socket Headless Set Screw (M6x6)	1
92.	A-6013	O-Ring (P25)	1
93.	A-2131	Bearing (TLA2516)	2
94.	C-1096	Clamp Plate	1

HEADSTOCK : CONTROL FRAME ASSEMBLY (VARISPEED)



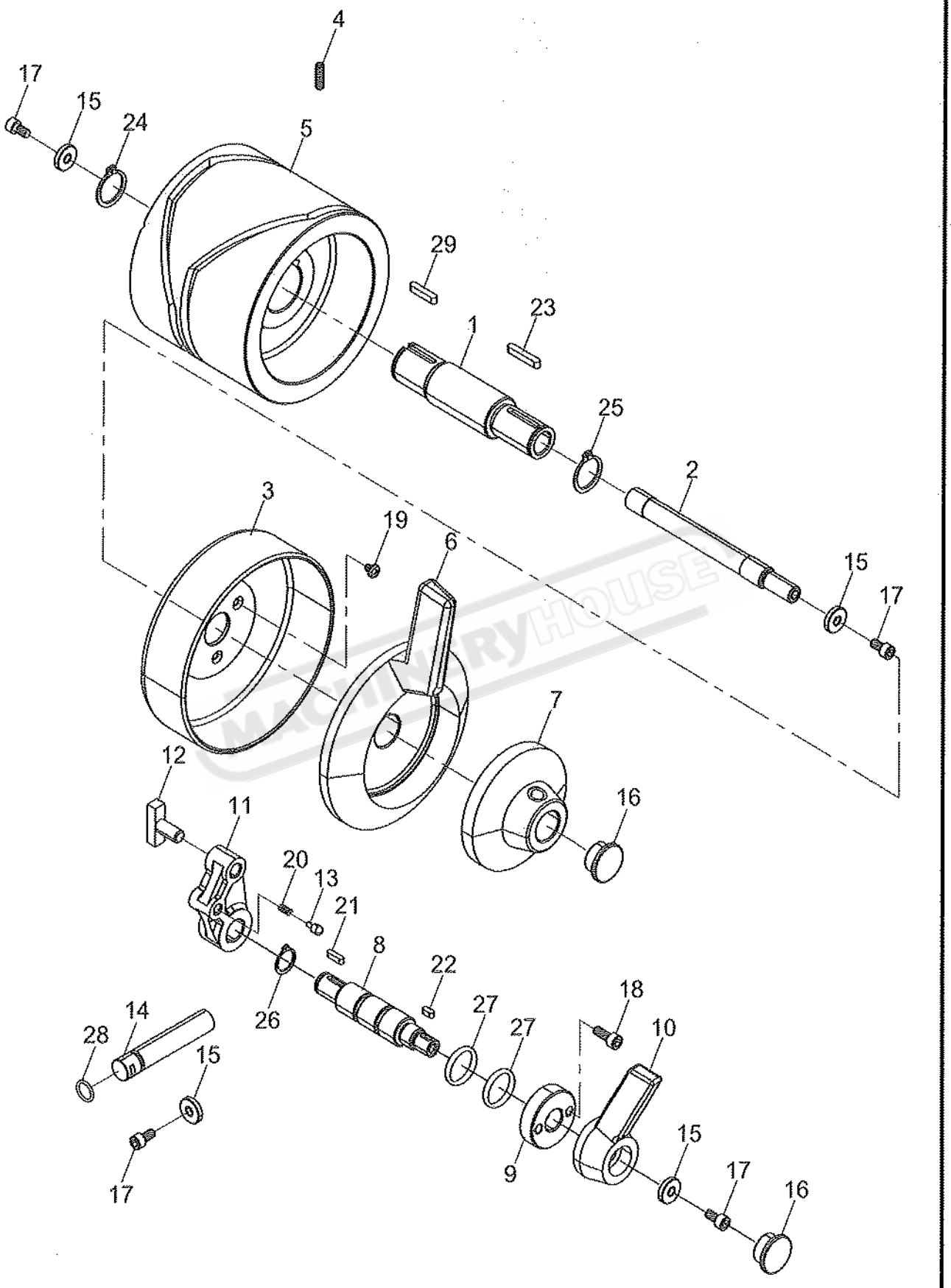
NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-1061	Lever Frame	1
2.	C-1062	Rod	1
3.	C-1063	Peg	1
4.	C-1064	Lubrication Pipe	1
5.	A-4003	Pin (ϕ 4x36)	1
6.	A-4000	Pin (ϕ 3x10)	2
7.	A-3102	Circlip (E8)	1
8.	C-1068	Collar Assembly	1
9.	A-1703	Nut (M12)	1
10.	C-1070	Rod	1
11.	A-1203	Socket Head Cap Screw (M6x16)	3
12.	A-1100	Socket Headless Set Screw (M6x6)	2
13.	C-1073	Lever	1
14.	A--8402	Spring	1
15.	C-1074-2	Shift Fork	1
16.	C-1075	Bolt	1
17.	C-1076	Bracket	1
18.	C-1077	Plunger	1
19.	C-1156	Pin	2
20.	A-1205	Socket Head Cap Screw (M6X25)	2
21.	A-1805	Spring Washer (ϕ 12)	1

HEADSTOCK : CONTROL FRAME ASSEMBLY



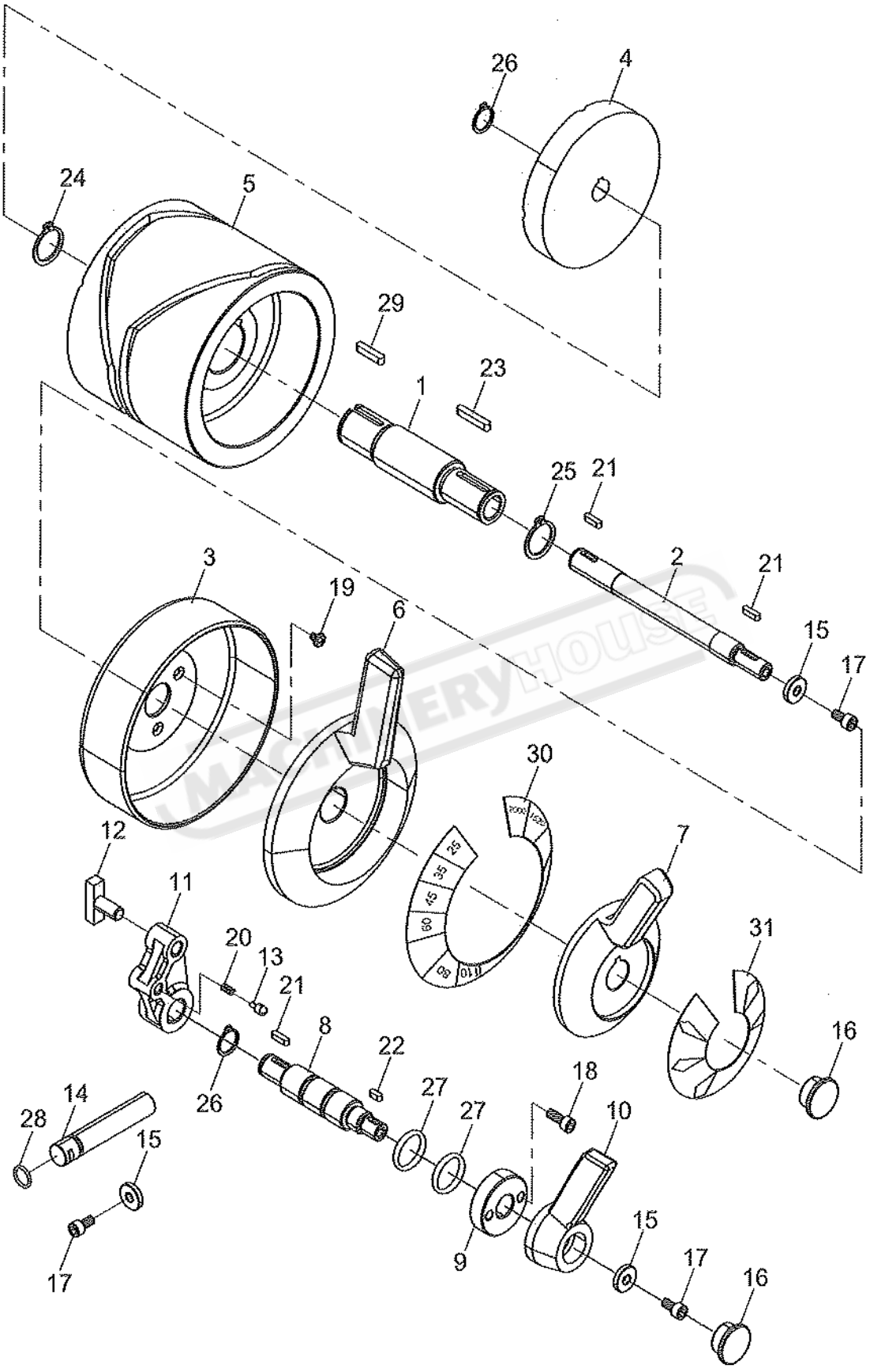
NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-1061	Lever Frame	1
2.	C-1062	Rod	2
3.	C-1063	Peg	1
4.	C-1064	Lubrication Pipe	1
5.	A-4003	Pin (ϕ 4x36)	2
6.	A-4000	Pin (ϕ 3x10)	2
7.	A-3102	Circlip (E8)	2
8.	C-1068	Collar Assembly	2
9.	A-1703	Nut (M12)	2
10.	C-1070	Rod	1
11.	A-1203	Socket Head Cap Screw (M6x16)	3
12.	A-1100	Socket Headless Set Screw (M6x6)	2
13.	C-1073	Lever	1
14.	A-8402	Spring	1
15.	C-1074-2	Shift Fork	1
16.	C-1075	Bolt	2
17.	C-1076	Bracket	1
18.	C-1077	Plunger	1
19.	C-1156	Pin	6
20.	A-1205	Socket Head Cap Screw (M6X25)	2
21.	C-1074-1	Shift Fork	1
22.	C-1072	Lever	1
23.	C-1066	Shift Fork	2
24.	C-1065	Lever Bracket Assembly	1
25.	C-1069	Lever Bracket Assembly	1
26.	C-1070	Rod	1
27.	A-3103	Circlip (E10)	2
28.	A-1805	Spring Washer (ϕ 12)	2

HEADSTOCK : CONTROLS (VARISPEED)



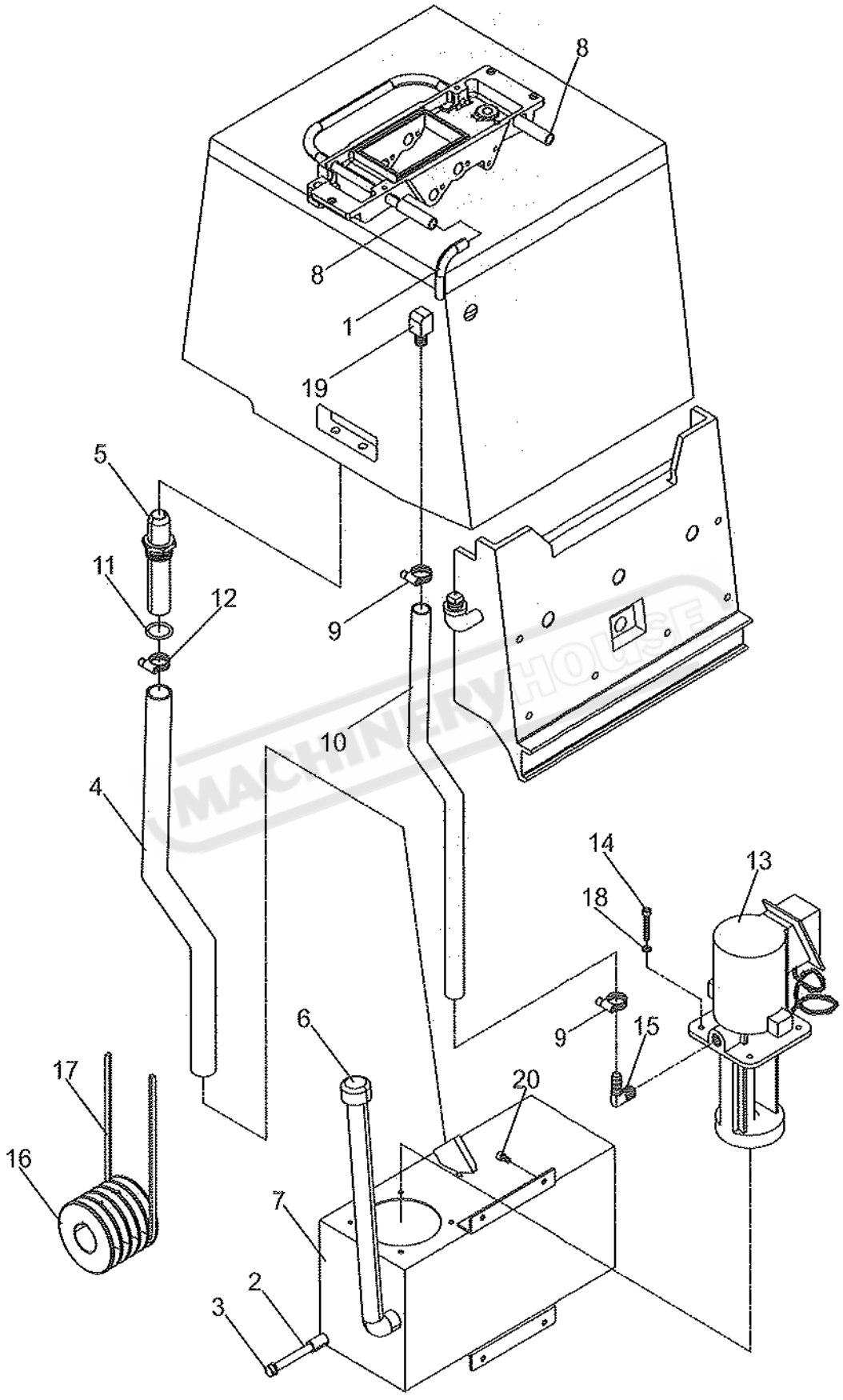
NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-1078	Cam Shaft	1
2.	C-1079-1	Shaft	1
3.	C-1080	Selector Housing Assembly	1
4.	A-1104	Socket Headless Set Screw (M6x20)	2
5.	C-1082	Drum Cam	1
6.	C-1083	Range Selector	1
7.	C-1084-1	Speed Selector	1
8.	C-1085	Shafts	2
9.	C-1086	Collars	2
10.	C-1087	Handles	2
11.	C-1089	Shift Levers	2
12.	C-1090	Shift Pads	2
13.	C-1091	Detents	2
14.	C-1092	Detents Bars	2
15.	R-1030	Washers	6
16.	C-2075	Plugs	3
17.	A-1202	Socket Head Cap Screw (M6x12)	6
18.	A-1203	Socket Head Cap Screw (M6x16)	4
19.	A-1606	Cross Recessed Head Screw (M5x6)	3
20.	A-8403	Spring	2
21.	A-7202	Key (4x4x15)	2
22.	A-7201	Key (4x4x10)	2
23.	A-7208	Key (5x5x30)	1
24.	A-3308	Circlip (S24)	1
25.	A-3310	Circlip (S28)	1
26.	A-3302	Circlip (S16)	2
27.	A-6007	O-Ring (P18)	4
28.	A-6004	O-Ring (P12)	2
29.	A-7207	Key (5x5x25)	1

HEADSTOCK : CONTROLS



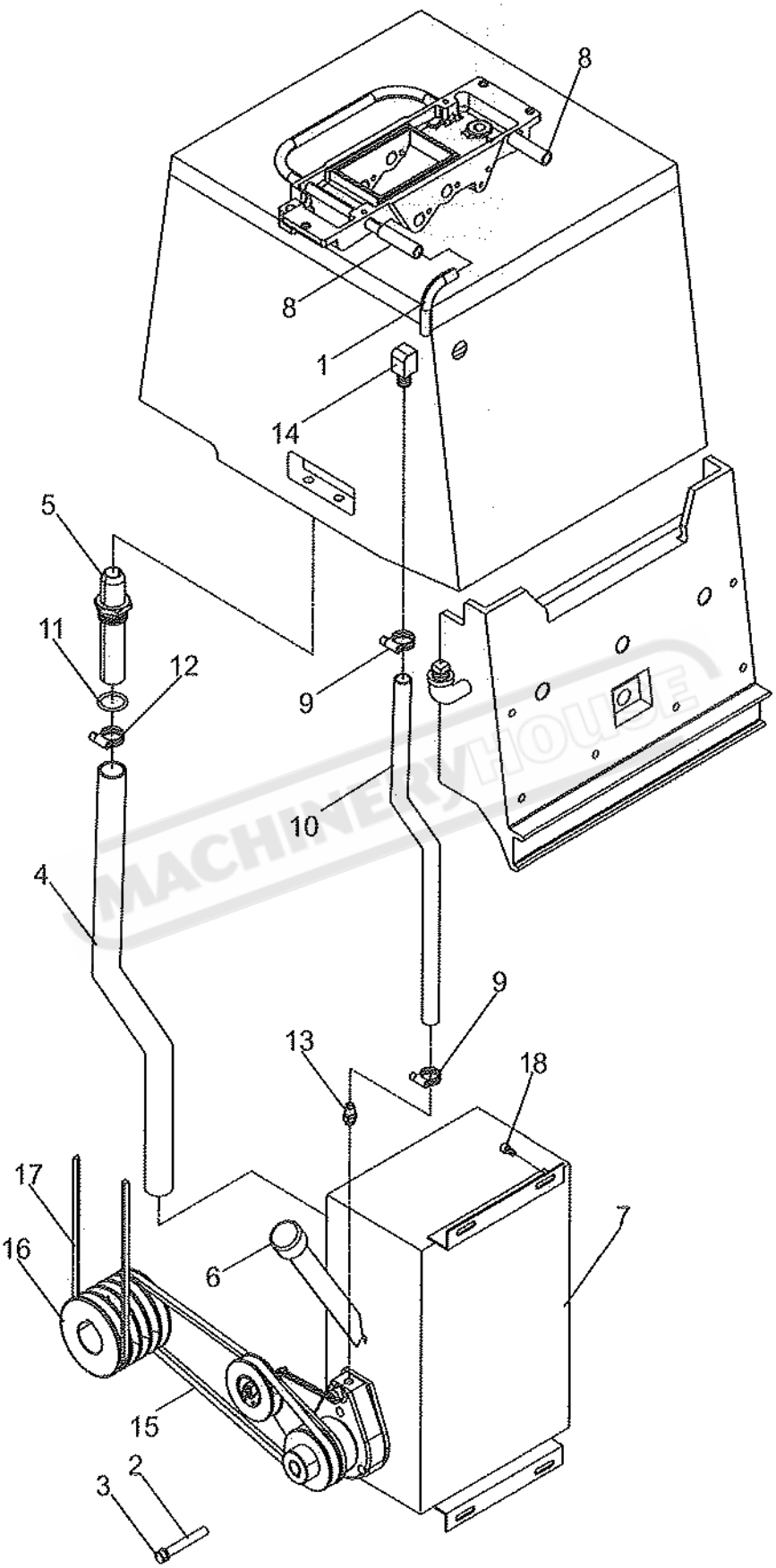
NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-1078	Cam Shaft	1
2.	C-1079	Shaft	1
3.	C-1080	Selector Housing Assembly	1
4.	C-1081	Plate Cam	1
5.	C-1082	Drum Cam	1
6.	C-1083	Range Selector	1
7.	C-1084	Speed Selector	1
8.	C-1085	Shafts	2
9.	C-1086	Collars	2
10.	C-1087	Handles	2
11.	C-1089	Shift Levers	2
12.	C-1090	Shift Pads	2
13.	C-1091	Detents	2
14.	C-1092	Detents Bars	2
15.	R-1030	Washers	5
16.	C-2075	Plugs	3
17.	A-1202	Socket Head Cap Screw (M6x12)	5
18.	A-1203	Socket Head Cap Screw (M6x16)	4
19.	A-1606	Cross Recessed Head Screw (M5x6)	3
20.	A-8403	Spring	2
21.	A-7202	Key (4x4x15)	4
22.	A-7201	Key (4x4x10)	2
23.	A-7208	Key (5x5x30)	1
24.	A-3308	Circlip (S24)	1
25.	A-3310	Circlip (S28)	1
26.	A-3302	Circlip (S16)	3
27.	A-6007	O-Ring (P18)	4
28.	A-6004	O-Ring (P12)	2
29.	A-7207	Key (5x5x25)	1
30.	NC-06	Speed Chart	1
31	NC-08	Arrow Plate	1

HEADSTOCK : LUBRICATION (VARISPEED)



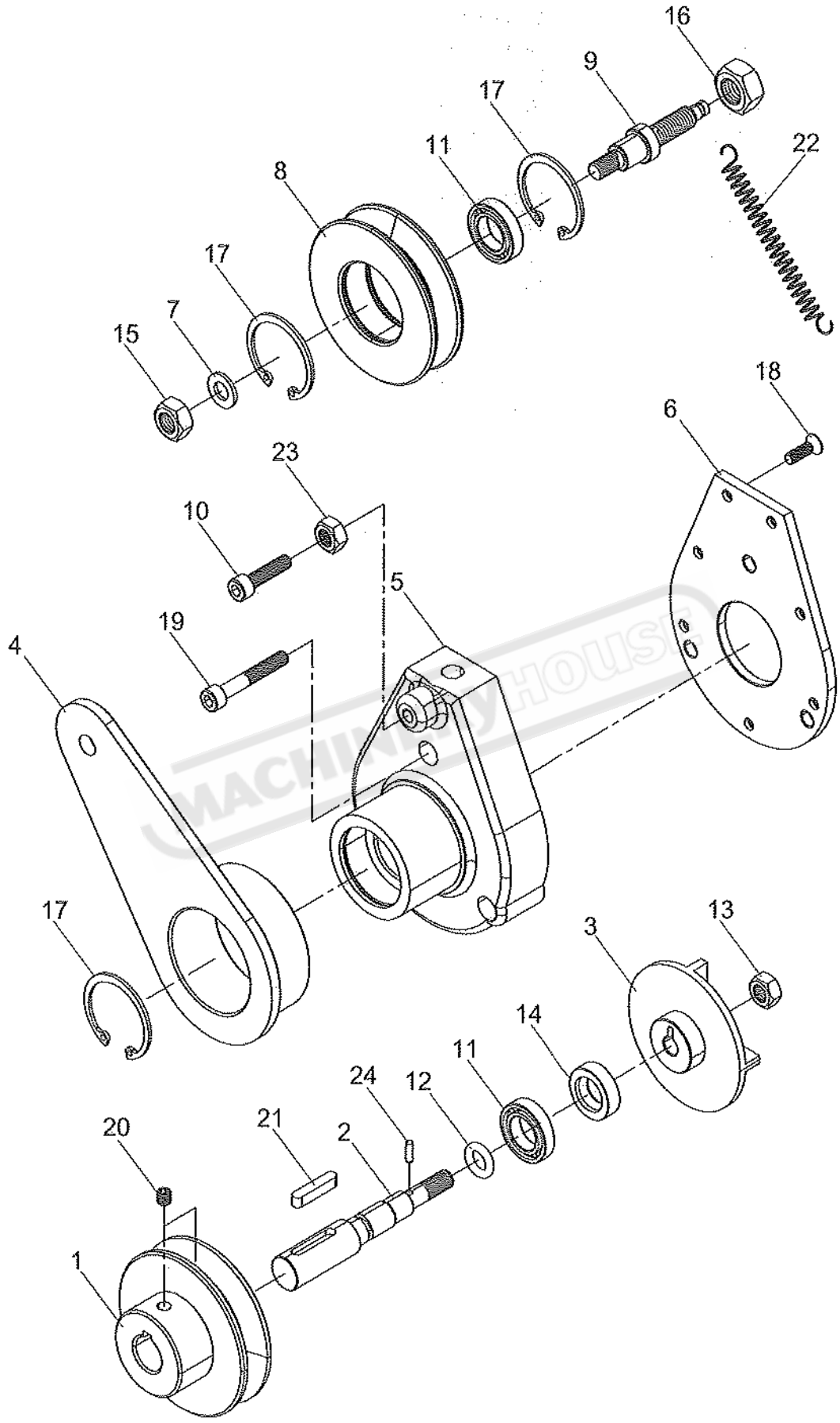
NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-1154	Connector	1
2.	A-4106	Drain Pipe	1
3.	A-1173	Plug	1
4.	A-4123	Return Hose	1
5.	C-1101	Adaptor	1
6.	C-1102-1	Dipstick Cap	1
7.	C-1105-1	Oil Tank	1
8.	A-4115	Hoses	2
9.	A-4111	Clamp	2
10.	A-4124	Inlet Hose	1
11.	A-6013	O-Ring (P25)	1
12.	A-4110	Clamp	1
13.	A-4102	Pump	1
14.	A-1206	Socket Head Cap Screw (M6x12)	4
15.	A-4101	Elbow	1
16.	C-7028-6	Motor Pulley	1
17.	A-0109	Vee Belt A-72"	4
18.	A-1901	Washer (ϕ6)	4
19.	A-0498	Elbow	1
20.	A-1202	Socket Head Cap Screw (M6x12)	4

HEADSTOCK : LUBRICATION



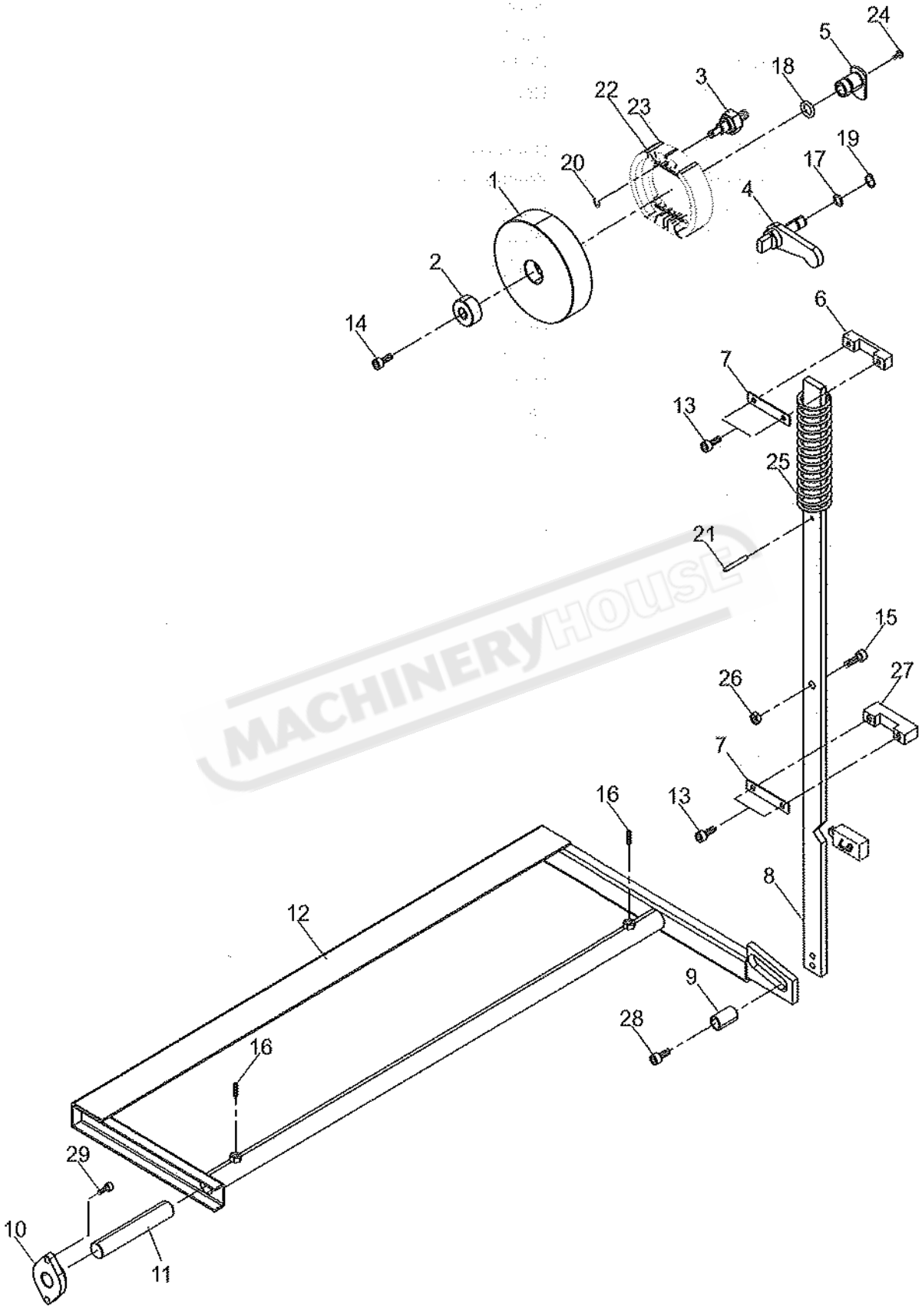
NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-1154	Connector	1
2.	A-4106	Drain Pipe	1
3.	A-1173	Plug	1
4.	A-4123	Return Hose	1
5.	C-1101	Adaptor	1
6.	C-1102	Dipstick Cap	1
7.	C-1105	Oil Tank	1
8.	A-4115	Hoses	2
9.	A-4111	Clamp	2
10.	A-4124	Inlet Hose	1
11.	A-6013	O-Ring (P25)	1
12.	A-4110	Clamp	1
13.	A-1180	Outlet	1
14.	A-0498	Elbow	1
15.	A-0124	Vee Belt (50HZ) A-34"	1
	A-0123	Vee Belt (60HZ) A-33"	1
16.	C-7028-6	Motor Pulley (50Hz)	1
	C-7028-3	Motor Pulley (60Hz)	1
17.	A-0109	Vee Belt (50Hz) A-72"	4
	A-0110	Vee Belt (60Hz) A-73"	4
18.	A-1202	Socket Head Cap Screw (M6x12)	4

BRAKE : PUMP ASSY



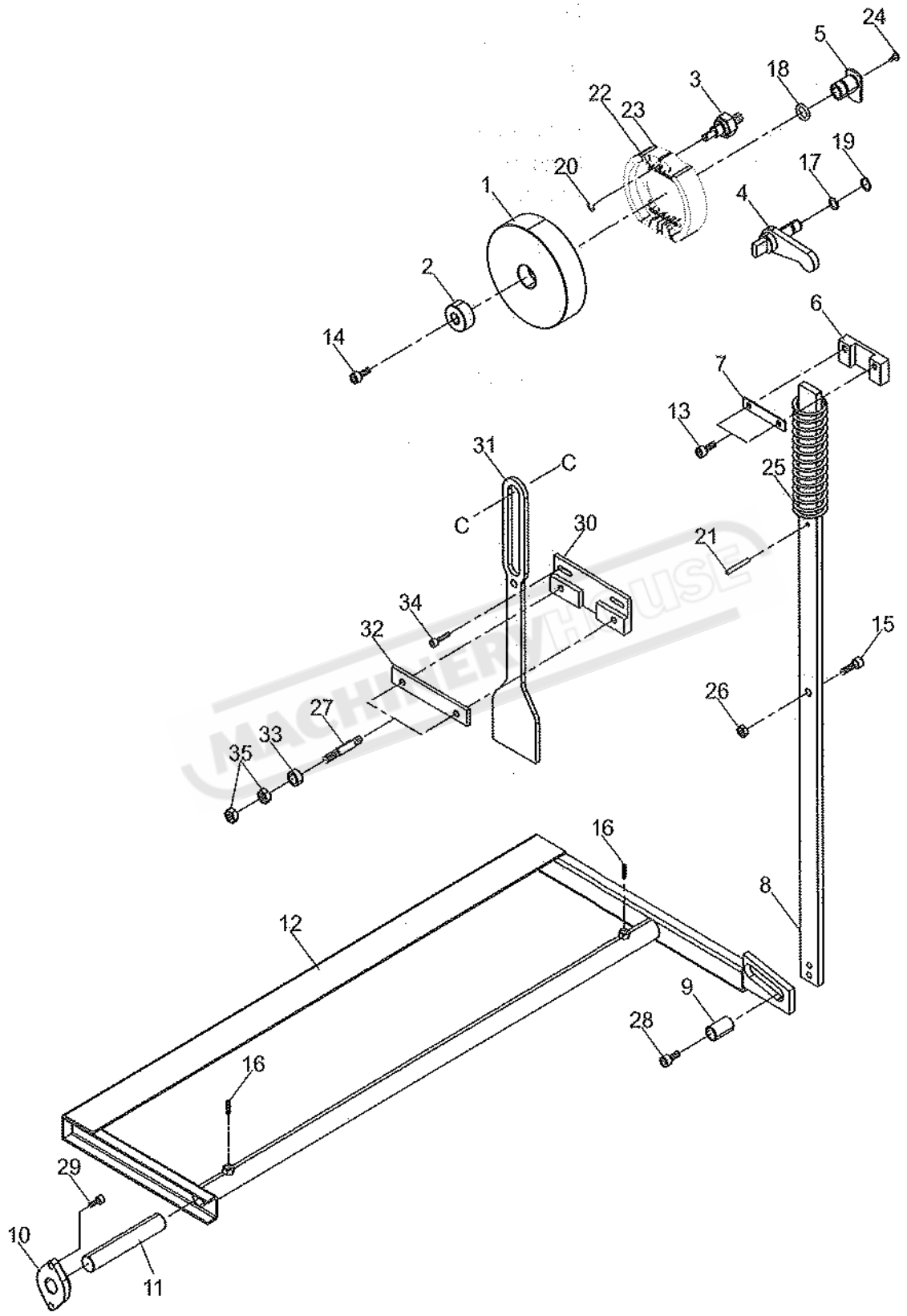
NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-1106	Pulley	1
2.	C-1107	Shaft	1
3.	C-1109	Impeller	1
4.	C-1110	Plate	1
5.	C-1111	Housing	1
6.	C-1112	Backplate	1
7.	A-1918	Washer (ø8)	1
8.	C-1114	Pulley	1
9.	C-1115	Shaft	1
10.	A-1517	Socket Head Cap Screw (M6x25L)	1
11.	A-2037	Bearing (#6301ZZ)	2
12.	A-6001	O-Ring	1
13.	A-1707	Nylon Nut (5/16")	1
14.	A-5013	Oil Seal (TC12x25x7)	1
15.	A-1701	Nut (M8)	1
16.	A-1702	Nut (M10)	1
17.	A-3201	Circlip (R37)	3
18.	A-1608	Cross Recessed Head Screw (M5x15L)	7
19.	A-1208	Socket Head Cap Screw (M6x40L)	3
20.	A-1101	Socket Headless Set Screw (M6x10L)	2
21.	A-7207	Key (5x5x25)	1
22.	A-8404	Spring	1
23.	A-1700	Nut (M6)	1
24.	A-4006	Pin (ø3x10)	1

BRAKE : MECHANISM (NON-CLUTCH & VARISPEED)



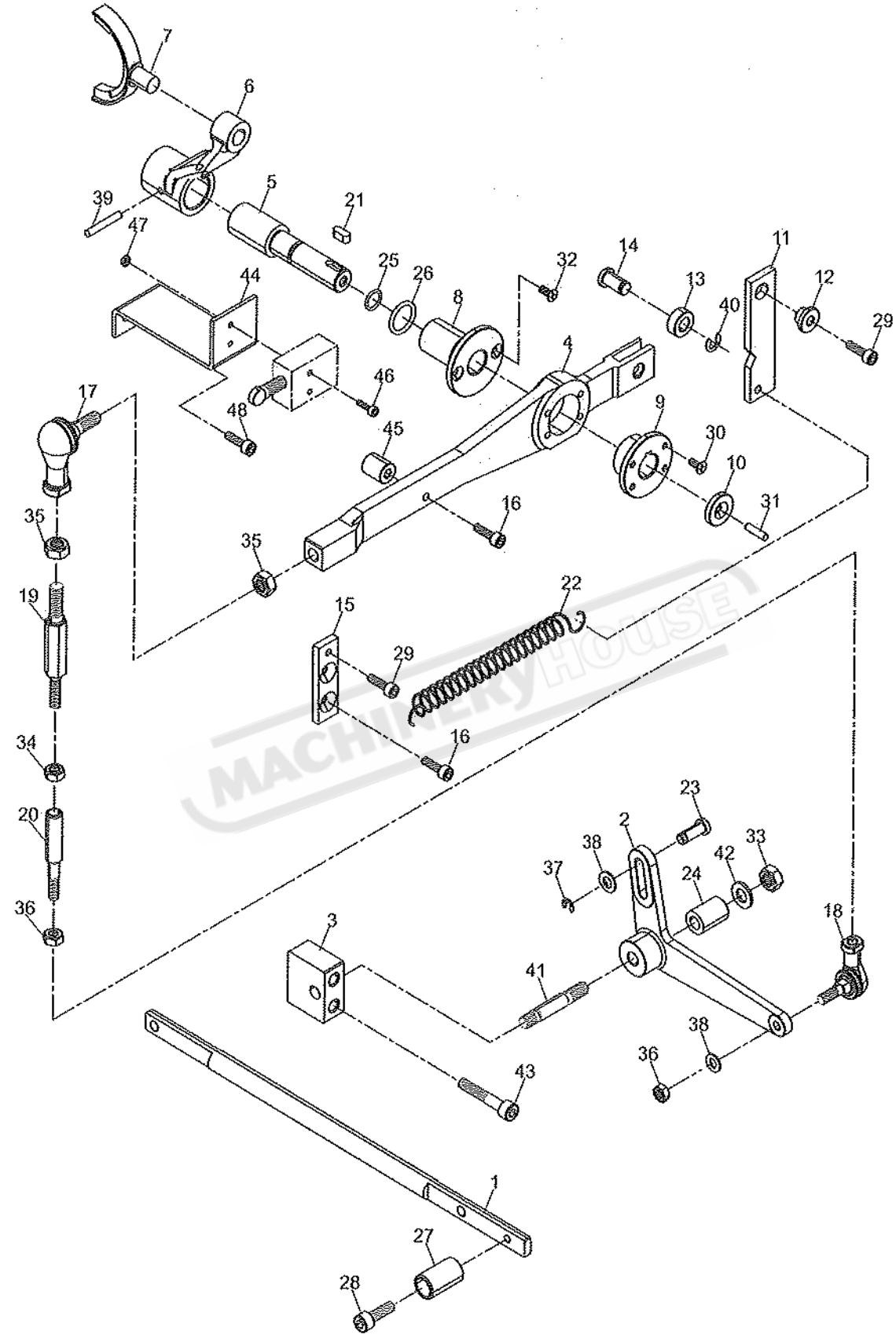
NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-1117-1	Drum	1
2.	C-1117-2	Collar	1
3.	C-1118	Stud	1
4.	C-1119	Catch Assembly	1
5.	C-1120	Bush	1
6.	C-1122	Guide Blocks	1
7.	C-1123	Strap Plate	2
8.	C-1124	Operation Bar	1
9.	C-1125	Pivot	1
10.	C-7009	Flanges	2
11.	C-7010	Connect Shafts	2
12.	C-7011	Pedal	1
13.	A-1205	Socket Head Cap Screw (M6x25)	4
14.	A-1213	Socket Head Cap Screw (M8x20)	1
15.	A-1219	Socket Head Cap Screw (M10x20)	1
16.	A-1106	Socket Headless Set Screw (M8x8)	2
17.	A-6003	O-Ring (P10A)	1
18.	A-6030	O-Ring (P16)	1
19.	A-3300	Circlip (S14)	1
20.	A-3100	Circlip (E6)	1
21.	A-4009	Pin (ϕ 5x40)	1
22.	A-8516	Spring	2
23.	A-9801	Brake Shoes Assembly	1
24.	A-1509	Flat Head Cap Screw (M5x10)	1
25.	A-8423	Spring	1
26.	A-1702	Nut (M10)	1
27.	C-1122-2	Guide Blocks	1
28.	A-1215	Socket Head Cap Screw (M8x30)	1
29	A-1203	Socket Head Cap Screw (M6x16)	4

HEADSTOCK : MECHANISM (CLUTCH)



NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-1117-1	Drum	1
2.	C-1117-2	Collar	1
3.	C-1118	Stud	1
4.	C-1119	Catch Assembly	1
5.	C-1120	Bush	1
6.	C-1122	Guide Blocks	1
7.	C-1123	Strap Plate	1
8.	C-1124	Operation Bar	1
9.	C-1125	Pivot	1
10.	C-7009	Flanges	2
11.	C-7010	Connect Shafts	2
12.	C-7011	Pedal	1
13.	A-1205	Socket Head Cap Screw (M6x25)	2
14.	A-1213	Socket Head Cap Screw (M8x20)	1
15.	A-1219	Socket Head Cap Screw (M10x20)	1
16.	A-1106	Socket Headless Set Screw (M8x8)	2
17.	A-6003	O-Ring (P10A)	1
18.	A-6030	O-Ring (P16)	1
19.	A-3300	Circlip (S14)	1
20.	A-3100	Circlip (E6)	1
21.	A-4009	Pin (ϕ5x40)	1
22.	A-8516	Spring	2
23.	A-9801	Brake Shoes Assembly	1
24.	A-1509	Flat Head Cap Screw (M5x10)	1
25.	A-8423	Spring	1
26.	A-1702	Nut (M10)	1
27.	C-1246	Pivot	2
28.	A-1215	Socket Head Cap Screw (M8x30)	1
29	A-1203	Socket Head Cap Screw (M6x16)	4
30.	C-1255	Guide Block	1
31.	C-1248	Operating Guider	1
32.	C-1256	Strap Plate	1
33.	C-1259	Bush	2
34.	A-1205	Socket Head Cap Screw (M6x25)	2
35.	A-1702	Nut (M10)	4

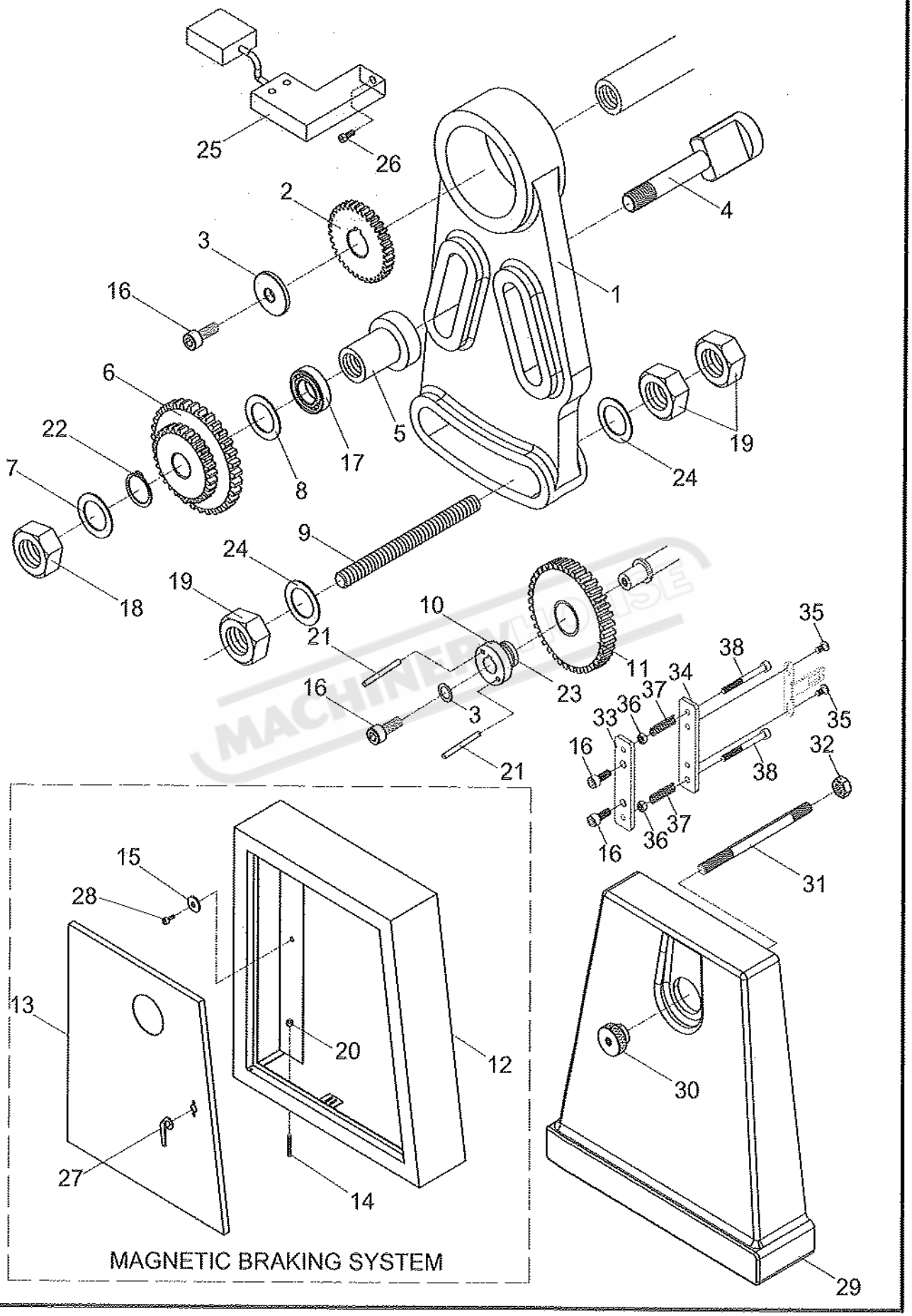
CLUTCH LINKAGE



NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-1249	Operating Bar	1
2.	C-1244	Lever	1
3.	C-1242	Bracket	1
4.	C-1230	Operating Lever	1
5.	C-1227	Shift Shaft	1
6.	C-1226	Shift Lever	1
7.	C-1228	Shift Fork	1
8.	C-1229	Sleeve	1
9.	C-1231	Bush	1
10.	C-3015	Washer	1
11.	C-1235	Pivot Plate	1
12.	C-1236	Bush	1
13.	C-1233	Roller	1
14.	C-1234	Roller Pin	1
15.	C-1238	Plate	1
16.	A-1204	Socket Head Cap Screw(M6x20)	2
17.	A-9901	Universal Jointer	1
18.	A-9900	Universal Jointer	1
19.	C-1240	Adjusting Rod	1
20.	C-1241	Adjusting Rod	1
21.	A-7213	Key (6x6x15)	1
22.	C-1237	Spring	1
23.	C-1247	Shaft	1
24.	C-1245	Bush	1
25.	A-6005	O-Ring (P14)	1
26.	A-6010	O-Ring (P22A)	1
27.	C-1125	Bush	1
28.	A-1214	Socket Head Cap Screw (M8x25)	1
29.	A-1203	Socket Head Cap Screw (M6x16)	2
30.	A-1608	Flat Head Cap Screw (M5x16)	4
31.	A-4005	Pin (ϕ5x20)	1
32.	A-1607	Flat Head Cap Screw (M5x12)	2
33.	A-1721	Nylon Nut (M10)	1
34.	A-1725	Nut (M8-L)	1
35.	A-1702	Nut (M10)	2
36.	A-1701	Nut (M8)	2
37.	A-3100	Circlip (E6)	1
38.	A-1902	Washer (ϕ8)	2
39.	A-4008	Pin (ϕ5x36)	2
40.	A-3101	Circlip (E7)	2

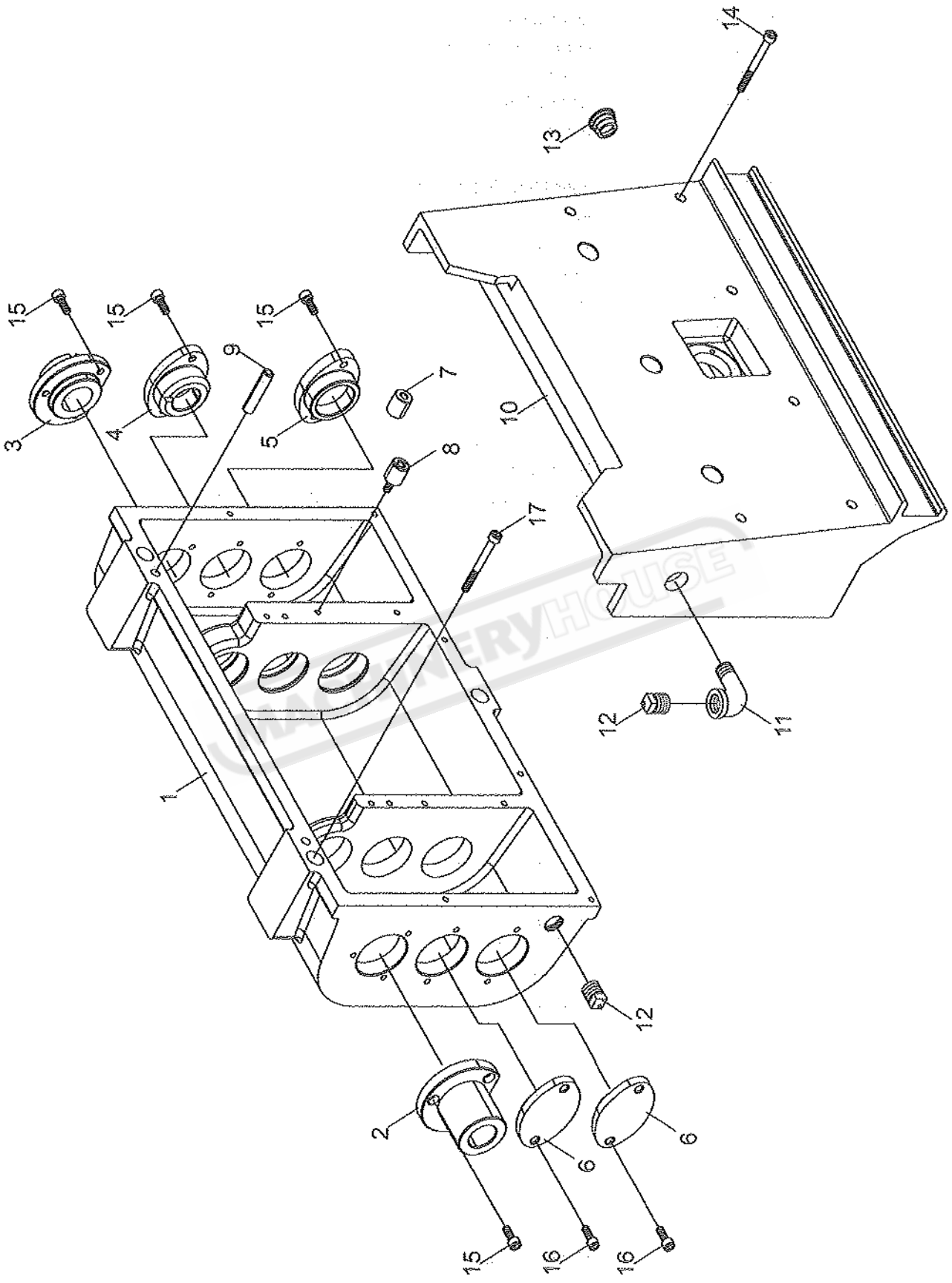
NO.	PART NO.	DESCRIPTION	QUANTITY
41.	C-1246	Pivot	1
42.	A-1908	Washer (ϕ10)	1
43.	A-1217	Socket Head Cap Screw (M8x45)	2
44.	C-1273	Switch Plate	1
45.	R-4018	Collar	1
46.	A-1622	Flat Head Driver Screw (M4x30)	2
47.	A-1729	Nut (M4)	2
48.	A-1202	Socket Head Cap Screw	2

SWING FRAME : END GEARS & COVER



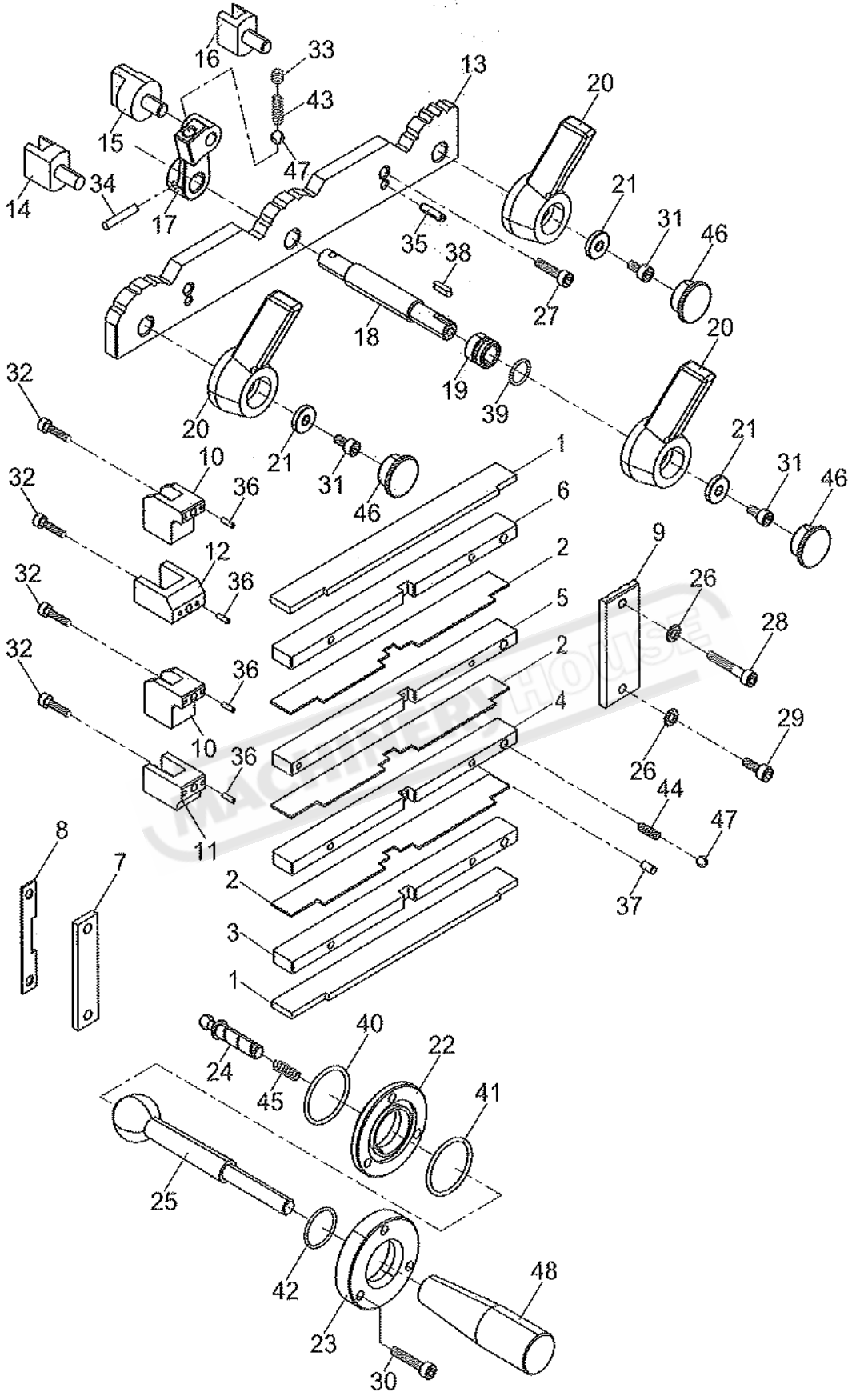
NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-1126	Swing Frame	1
2.	C-1127	Gear (24T)(Inches)	1
	C-1147	Gear (28T)(Metric)	1
3.	C-1028	Collar	2
4.	C-1129	Gear Shaft	1
5.	C-1130	Gear Collar	1
6.	C-1131	Idler Gear (44/56T) (Inches)	1
	C-1149	Idler Gear (54/55T) (Metric)	1
7.	C-1132	Washer	1
8.	C-1133	Spacer	1
9.	M-1134	Stud	1
10.	C-1135	Bush	1
11.	C-1136	Gear (57T) (Inches)	1
	C-1148	Gear (64T) (Metric)	1
12.	C-1171	End Cover (OPTION)	1
13.	C-1172	Door (OPTION)	1
14.	A-1148	Socket Headless Set Screw (M8x30L) (OPTION)	2
15.	A-1801	Spring Washer (ø1/4" (OPTION)	7
16.	A-1203	Socket Head Cap Screw (M6x16L)	4
17.	A2026	Bearing (#6004)	2
18.	A-1703	Nut (M12)	1
19.	A-1720	Nut (M16)	3
20.	A-1701	Nut (M8) (OPTION)	2
21.	C-1145	Shear Pin (ø3x32)	2
22.	A-3203	Circlip (R42)	2
23.	A-3314	Circlip (S35)	1
24.	C-1128	Washer	2
25.	C-8039	Bracket for Sensor (VS)	1
26.	A-1202	Socket Head Cap Screw (M6x12L) (VS)	1
27.	A-9012	Handle (OPTION)	1
28.	A-1202	Socket Head Cap Screw (M6x12L)	7
29.	C-1140	End Cover	1
30.	C-1138	Knurl Nut	1
31.	T-8002	Stud	1
32.	A-1701	Nut (M8)	1
33.	C-8125	Bracket (CE)	1
34.	C-8124	Bracket (CE)	1
35.	A-1536	Cross Recessed Head Screw (M5x12L) (CE)	2
36	A-1700	Nut (M6) (CE)	2
37.	A-8429	Spring (CE)	2
38.	A-1307	Socket Head Cap Screw (M5x70L) (CE)	2

GEARBOX : CASTINGS



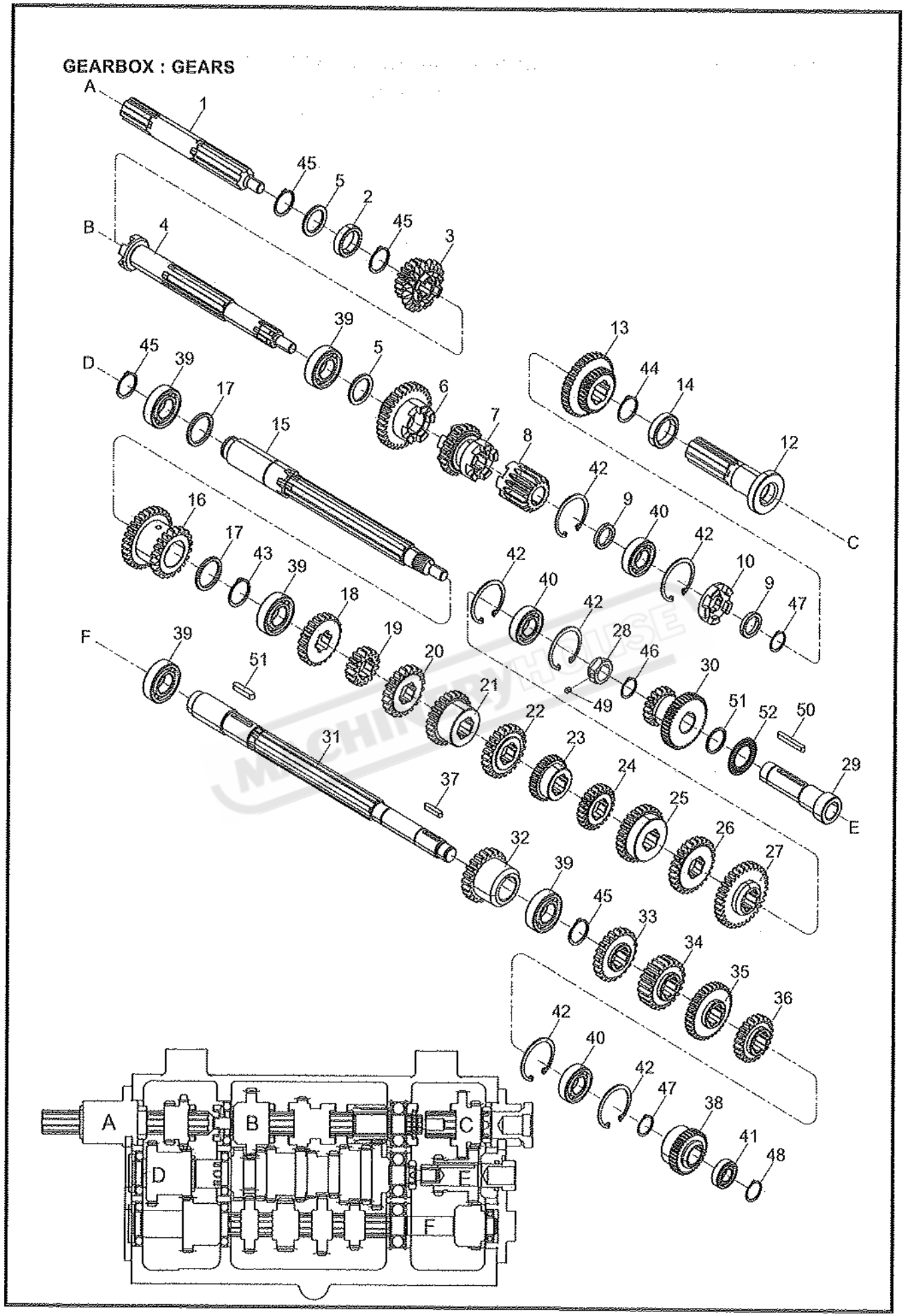
NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-2001	Feed Gearbox Casting	1
2.	C-2002	Flanged Bearing	1
3.	C-2003	Flanged Bearing	1
4.	C-2004	Flanged Bearing	1
5.	C-2005	Flanged Bearing	1
6.	C-2006	Cover	2
7.	C-2007	Top Spacer	2
8.	C-2008	Bottom Spacer	2
9.	C-2009	Dowel	2
10.	C-2010	Front Cover	1
11.	A-1127	Elbow (3/4"PT)	1
12.	A-1126	Plug (3/4"PT)	2
13.	A-9501	Oil Sight	1
14.	A-1236	Socket Head Cap Screw (M6x90)	6
15.	A-1203	Socket Head Cap Screw (M6x16)	10
16.	A-1204	Socket Head Cap Screw (M6x20)	4
17.	A-1290	Socket Head Cap Screw (M10x60)	3

GEARBOX : CONTROLS



NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-2013	Top & Bottom Plate	2
2.	C-2014	Dividing Plate	3
3.	C-2015-1	Guide Plate	1
4.	C-2015-2	Guide Plate	1
5.	C-2015-3	Guide Plate	1
6.	C-2015-4	Guide Plate	1
7.	C-2016	Bar Setter	1
8.	C-2017	Spacer	2
9.	C-2018	Detent Plate	1
10.	C-2019	Fork	2
11.	C-2020	Fork	1
12.	C-2021	Fork	1
13.	C-2022	Select Bar	1
14.	C-2023	Select Fork (Left)	1
15.	C-2024	Select Fork (Mid.)	1
16.	C-2025	Select Fork (Right)	1
17.	C-2026	Select Lever	3
18.	C-2028	Handle Shaft	3
19.	C-2029	Bush	3
20.	C-1087	Handle	3
21.	R-1030	Washer	3
22.	C-2032	Seating	1
23.	C-2033	Cover	1
24.	C-2034	Selector	1
25.	C-2035	Selector Lever	1
26.	A-1801	Washer (1/4")	2
27.	A-1205	Socket Head Cap Screw (M6x25)	2
28.	A-1207	Socket Head Cap Screw (M6x35)	2
29.	A-1203	Socket Head Cap Screw (M6x15)	2
30.	A-1206	Socket Head Cap Screw (M6x30)	3
31.	A-1202	Socket Head Cap Screw (M6x12)	3
32.	A-1292	Socket Head Cap Screw (M5x20)	4
33.	A-1106	Socket Headless Set Screw	3
34.	A-4203	Pin	3
35.	A-4005	Pin (ϕ 5x20)	2
36.	A-4000	Pin (ϕ 3x10)	8
37.	A-4004	Pin (ϕ 5x10)	8
38.	A-7202	Key (4x4x15)	3
39.	A-6006	O-Ring (P15)	3
40.	A-6018	O-Ring (P38)	1

NO.	PART NO.	DESCRIPTION	QUANTITY
41.	A-6017	O-Ring (P36)	1
42.	A-6015	O-Ring (P29)	1
43.	A-8405	Spring	3
44.	A-8406	Spring	4
45.	A-8407	Spring	1
46.	C-2075	Plug	3
47.	A-9202	Ball (ϕ 1/4")	7
48.	A-9107	Handle	1


GEARBOX : GEARS
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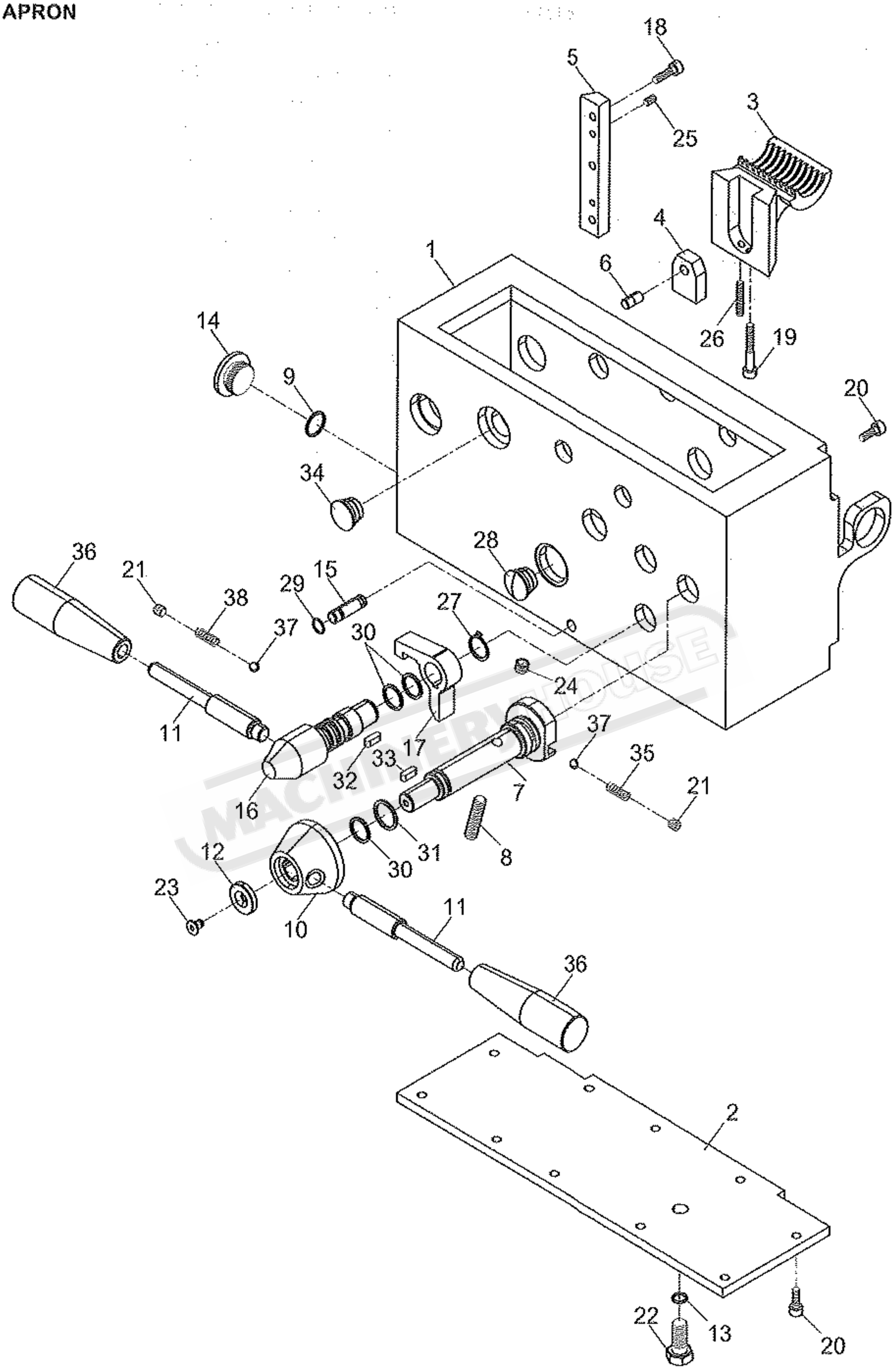
NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-2037	Shaft (A)	1
2.	C-2038	Collar	1
3.	C-2039	Gear (19T/19T)	1
4.	C-2040	Shaft (B)	1
5.	C-2041	Collar	2
6.	C-2042	Gear (32T)	1
7.	C-2043	Gear (23T)	1
8.	C-2044	Gear (16T)	1
9.	C-2045	Spacer	2
10.	C-2046	Clutch	1
11.	A-7215	Key (6x6x30)	1
12.	C-2048	Shaft (C)	1
13.	C-2049	Gear (35T/35T)	1
14.	C-2050	Collar	1
15.	C-2051	Shaft (D)	1
16.	C-2052	Gear (30T/20T)	1
17.	C-2053	Collar	2
18.	C-2054	Gear (22T)	1
19.	C-2055	Gear (16T)	1
20.	C-2056	Gear (20T)	1
21.	C-2057	Gear (24T)	1
22.	C-2058	Gear (23T)	1
23.	C-2059	Gear (27T)	1
24.	C-2060	Gear (24T)	1
25.	C-2061	Gear (28T)	1
26.	C-2062	Gear (26T)	1
27.	C-2063	Gear (32T)	1
28.	C-2064	Nut	1
29.	C-2065	Shaft (E)	1
30.	C-2066	Gear (18T/45T)	1
31.	C-2067	Shaft (F)	1
32.	C-2068	Gear (22T)	1
33.	C-2069	Gear (22T)	1
34.	C-2070	Gear (22T)	1
35.	C-2071	Gear (33T)	1
36.	C-2072	Gear (22T)	1
37.	A-7207	Key (5x5x25)	1
38.	C-2074	Gear (36T)	1
39.	A-2004	Bearing (16005)	5
40.	A-2034	Bearing (6204)	3

NO.	PART NO.	DESCRIPTION	QUANTITY
41.	A-2003	Bearing (16003)	1
42.	A-3204	Circlip (R47)	6
43.	A-3312	Circlip (S30)	1
44.	A-3310	Circlip (S28)	1
45.	A-3309	Circlip (S25)	4
46.	A-3307	Circlip (S22)	1
47.	A-3306	Circlip (S20)	2
48.	A-3303	Circlip (S17)	1
49.	A-1100	Socket Headless Set Screw (M6x6L)	1
50.	A-7210	Key (5x5x40)	1
51.	A-6013	O-Ring (P25)	1
52.	A-2055-1	Bearing (NTB2542)	1

APRON



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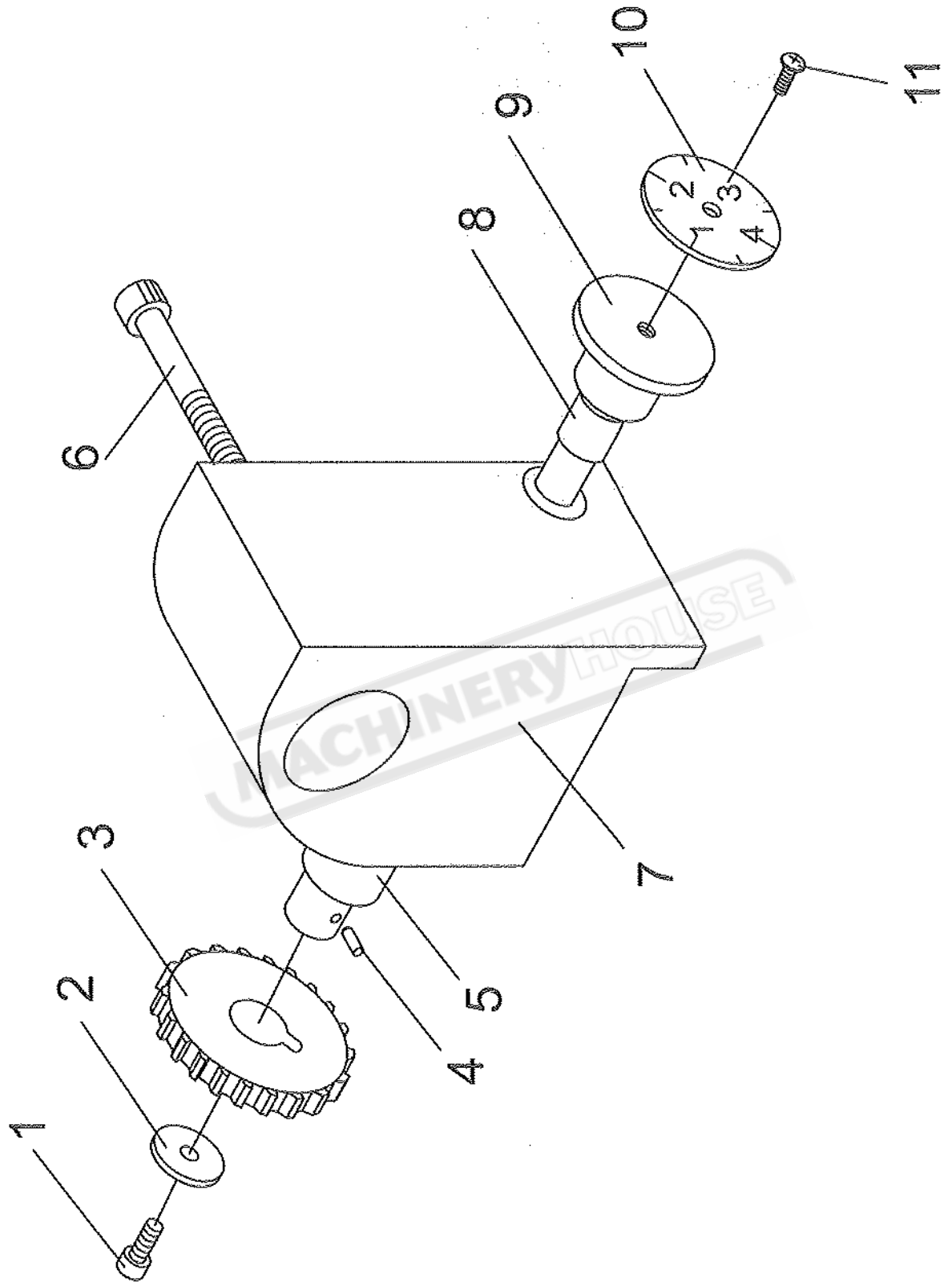
MACHINERYHOUSE

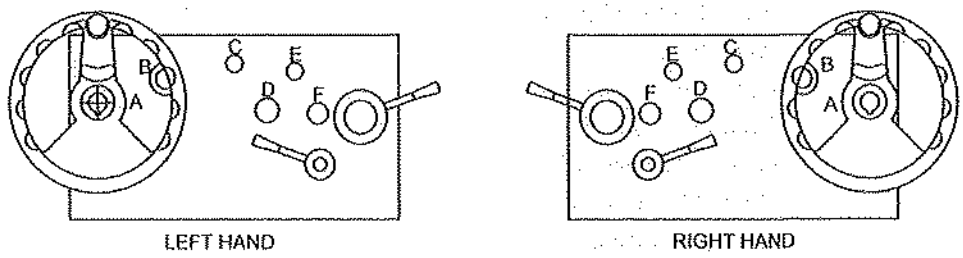
NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-3301-1	Apron Casting (R.H).	1
	C-3301-2	Apron Casting (L.H.)	1
2.	C-3002-1	Bottom Plate (R.H.)	1
	C-3002-2	Bottom Plate (L.H).	1
3.	C-3303-1	Half Nut (Metric)	1
	C-3303-2	Half Nut (Inch)	1
4.	C-3004	Guide Plate	1
5.	C-3005	Gib	1
6.	C-3008	Stud	1
7.	C-3010-1	Camshaft (R.H).	1
	C-3010-2	Camshaft (L.H.)	1
8.	A-1132	Socket Headless Set Screw (M10x40)	1
9.	A-6008	O-Ring (P20)	1
10.	C-3013	Handle Boss	1
11.	C-5026-1	Handle	2
12.	C-3015	Washer	1
13	A-6004	O-Ring (P12)	1
14.	C-3017	Plug	1
15.	C-3018	Pin	1
16.	C-3019	Lever Assembly	1
17.	C-3020	Latch	1
18.	A-1204	Socket Head Cap Screw (M6x20)	3
19.	A-1208	Socket Head Cap Screw (M6x40)	1
20.	A-1203	Socket Head Cap Screw (M6x16)	11
21.	A-1106	Socket Headless Set Screw (M8x8)	2
22.	A-1426	Hexagon Bolt (M12x16)	1
23.	A-1610	Socket Flat Head Screw (M6x12)	1
24.	A-1166	Socket Headless Set Screw (M10x10)	1
25.	A-1101	Socket Headless Set Screw (M6x8)	2
26.	A-1105	Socket Headless Set Screw (M6x30)	1
27.	A-3304	Circlip (S18)	1
28	A-9501	Oil Sight	1
29.	A-6000	O-Ring (P7)	1
30.	A-6007	O-Ring (P18)	3
31.	A-6012	O-Ring (P24)	1
32.	A-7205	Key (5x5x15)	1
33.	A-7228	Key (4x4x20)	1
34	A-4505	Plug	1
35.	A-8405	Spring	1
36.	A-9107	Handle	2
37.	A-9202	Ball (ϕ 1/4')	2
38.	A-8406	Spring	1

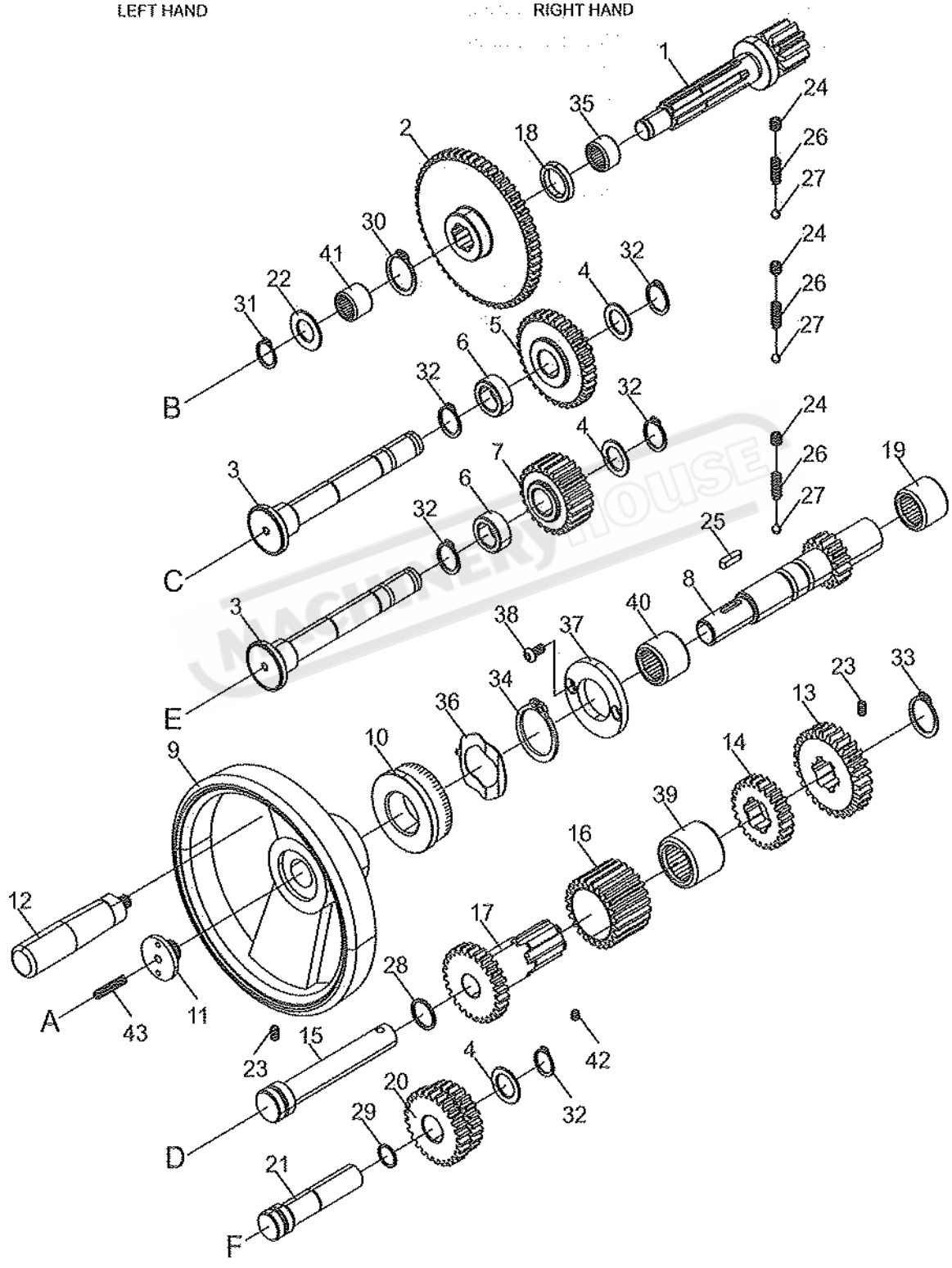
THREADING DIALS



NO.	PART NO.	DESCRIPTION	QUANTITY
1.	A-1231	Socket Head Cap Screw (M6x10)	1
2.	A-1901	Washer (ϕ6)	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

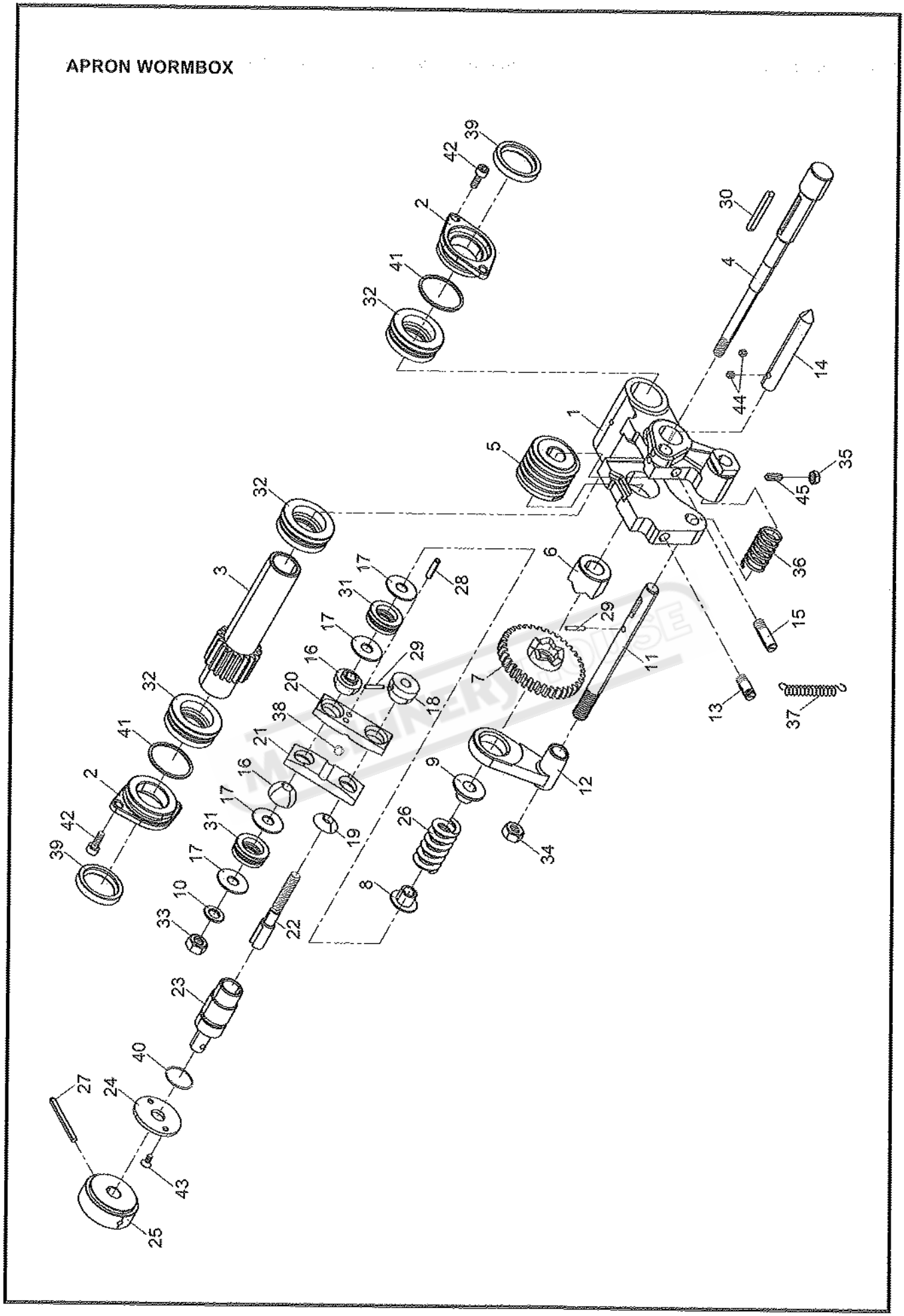
APRON CONTROLS





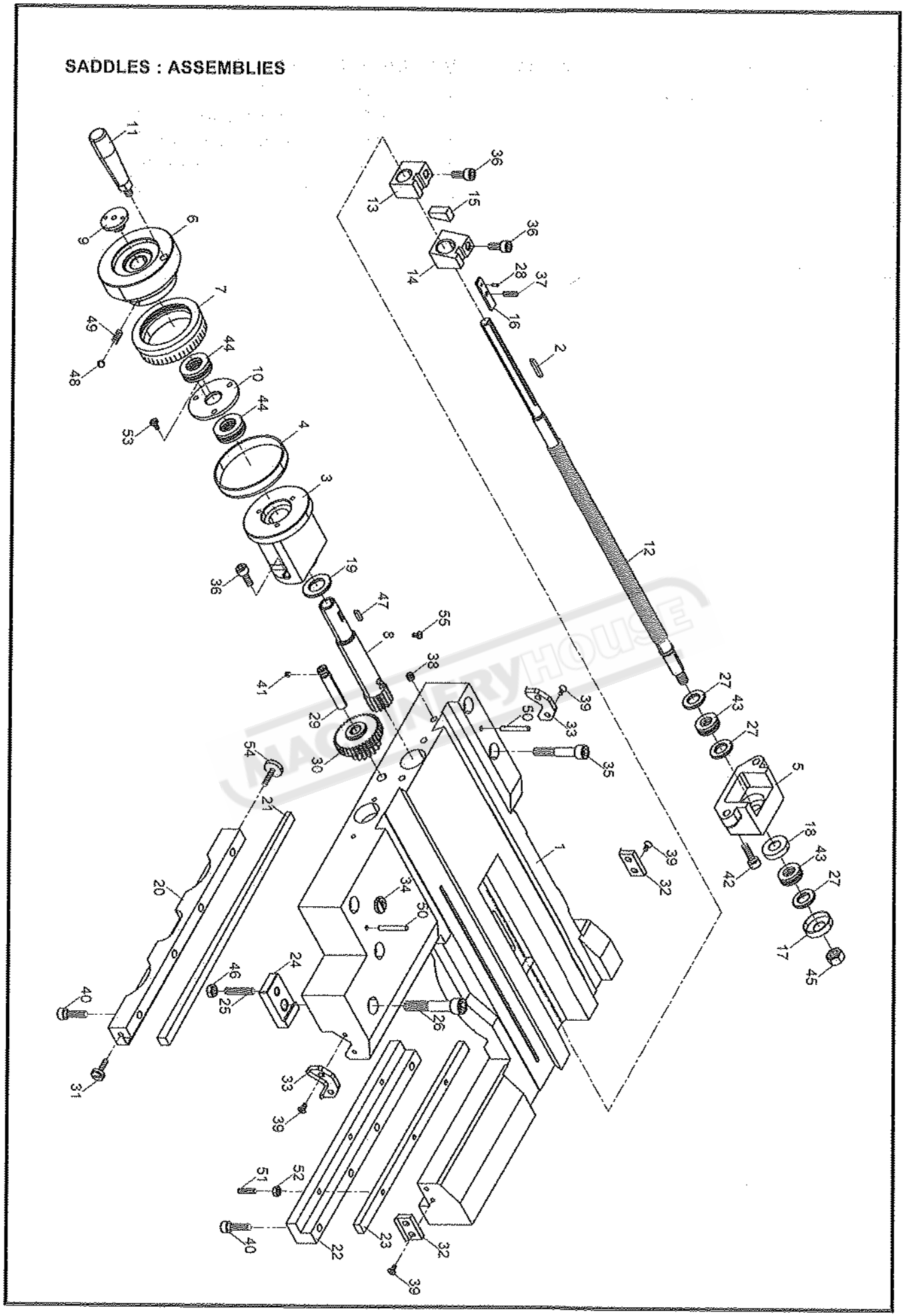
NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-3021	Rack Pinion	1
2.	C-3022	Gear (56T)	1
3.	C-3023	Shaft (C.E.)	2
4.	C-3024	Washer	3
5.	C-3025	Gear (15/33T)	1
6.	C-3026	Collar	2
7.	C-3028	Gear (24T)	1
8.	C-3029	Shaft (A)	1
9.	T-6008	Handwheel	1
10.	C-3093	Dial (Metric)	1
	C-3093-1	Dial (Inches)	1
11.	C-3032	Plug	1
12.	C-3034	Handle	1
13.	C-3035	Gear (27T)	1
14.	C-3036	Gear (24T)	1
15.	C-3037	Shaft (O)	1
16.	C-3038	Pinion Gear	1
17.	C-3039	Pinion Shaft	1
18.	C-3021-1	Washer	1
19.	A-2068	Bearing (NA6905)	1
20.	C-3042	Gear (24T/26T)	1
21.	C-3043	Shaft (F)	1
22.	C-3012	Washer	1
23.	A-1101	Socket Headless Set Screw (M6x10)	2
24.	A-1106	Socket Headless Set Screw (M8x8)	3
25.	A-7206	Key (5x5x20)	1
26.	A-8405	Spring	3
27.	A-9202	Ball (ϕ 1/4")	3
28.	A-6009	O-Ring (P21)	1
29.	A-6007	O-Ring (P18)	1
30.	A-3307	Circlip (S22)	1
31.	A-3302	Circlip (S16)	1
32.	A-3304	Circlip (S18)	5
33.	A-3310	Circlip (S28)	1
34.	A-3313	Circlip (S32)	1
35.	A-2127	Bearing (RNA6922)	1
36.	A-3106	Wave Washer (BW6204)	1
37.	C-3094	Collar	1
38.	A-1510	Socket Round Head Cap Screw (M6x12)	2
39.	A-2129	Needle Bearing (TAF304030)	1
40.	A-2050	Bearing (RNA4905)	1
41.	A-2066	Bearing (BA105)	1
42.	A-1100	Socket Headless Set Screw (M6x6)	1
43.	A-1105	Socket Headless Set Screw (M6x30)	1

APRON WORMBOX



NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-3044-1	Worm Set, R.H.	1
	C-3044-2	Worm Set, L.H.	1
2.	C-3045	Bush Assembly	2
3.	C-3046	Pinion	1
4.	C-3048	Trip Shaft	1
5.	C-3049	Worm	1
6.	C-3050	Bush	1
7.	C-3051	Clutch Gear Assembly	1
8.	C-3052-1	Collar	1
9.	C-3052-2	Collar	1
10.	C-3053	Washer	1
11.	C-3054	Rod	1
12.	C-3055	Lever	1
13.	C-3056	Stud	1
14.	C-3057	Inter-Lock Shaft	1
15.	C-3058	Stud	1
16.	C-3059	Dent	2
17.	C-3060	Washer	4
18.	C-3061	Dent	1
19.	C-3063	Dent	1
20.	C-3064	Plate	1
21.	C-3065	Plate	1
22.	C-3066	Adjusting Shaft	1
23.	C-3067	Coupling Assembly	1
24.	C-3069	Adapting Plate	1
25.	C-3070	Adjusting Knob	1
26.	C-3092	Spring	1
27.	A-4011	Pin (øx50)	1
28.	A-4005	Pin (øx20)	2
29.	A-4001	Pin (øx20)	1
30.	A-7229	Key (5x5x45)	1
31.	A-2000	Bearing (#1528 AS)	2
32.	A-2002	Bearing (#3047 AS)	3
33.	A-1719	Nylon Nut (3/8")	1
34.	A-1712	Nut (1/2"UNC)	1
35.	A-1700	Nut (M6)	1
36.	A-8408	Spring	1
37.	A-8409	Spring	1
38.	A-9205	Ball (ø3/8")	1
39.	A-5009	Oil Seal (SC30x40x6)	2
40.	A-6009	O-Ring (P21)	1
41.	A-6020	O-Ring (P42)	2
42.	A-1203	Socket Head Cap Screw (M6x16L)	4
43.	A-1601	Cross Recessed Head Screw (3//16"x3/8")	2
44.	A-1100	Socket Headless Set Screw (M6x6L)	2
45.	A-1103	Socket Headless Set Screw (M6x16L)	1

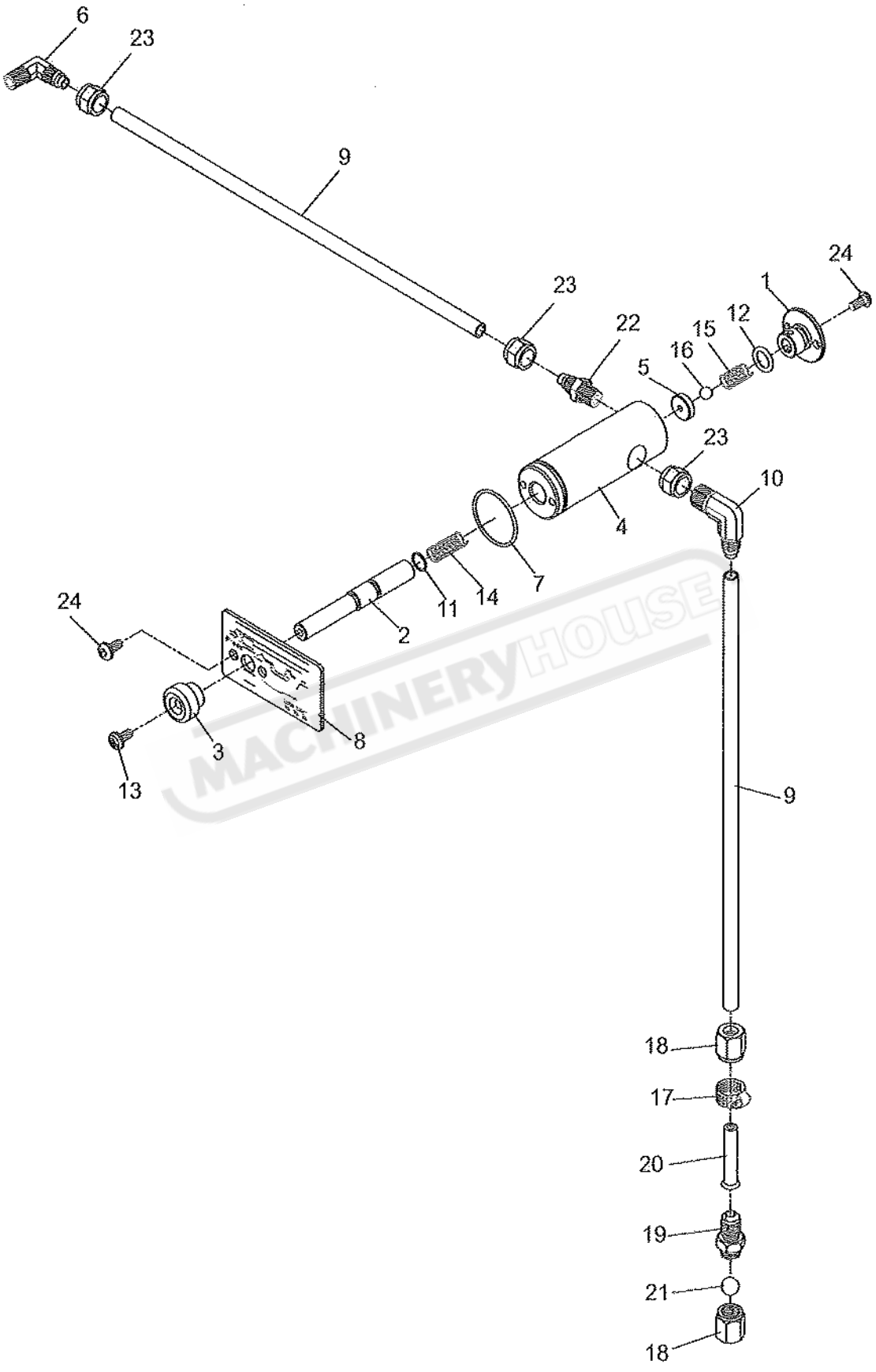
SADDLES : ASSEMBLIES



NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-4001	Saddle Casting	1
2.	A-7209	Key (5x5x35)	1
3.	C-4002	Keep Assembly	1
4.	C-4003	Collar	1
5.	C-4004	Bracket	1
6.	C-4005-2	Handwheel	1
7.	C-4006-1	Index Ring (Metric)	1
	C-4006-2	Index Ring (Inches)	1
	C-4006-4	Index Ring (Dual Dial):Inches	1
	C-4006-3	Index Ring (Dual Dial): Metric	1
8.	C-4007	Pinion	1
9.	C-3032	Plug	1
10.	C-4009	Collar	1
11.	C-4011	Handle	1
12.	C-4012-1	Leadscrew (Metric)	1
	C-4012-2	Leadscrew (Inches)	1
13.	C-4013-1	Nut Assembly (Metric)	1
	C-4013-2	Nut Assembly (Inches)	1
14.	C-4014-1	Nut Assembly (Metric)	1
	C-4014-2	Nut Assembly (Inches)	1
15.	C-4015	Gib	1
16.	C-4016	Guide Plate	1
17.	C-4017	Shield	1
18.	C-4018	Shield	1
19.	C-8033	Spacer	1
20.	C-4020	Strip (Front)	1
21.	C-4021	Gib (Front)	1
22.	C-4020-1	Strip (Rear)	1
23.	C-4021-1	Gib (Rear)	1
24.	C-4022	Clamp	1
25.	A-1134	Socket Headless Set Screw (M8x40)	1
26.	A-1253	Socket Head Cap Screw (M12x70)	1
27.	C-4026	Washer	3
28.	A-4023	Pin (ϕ 3x6)	1
29.	C-4030	Shaft	1
30.	C-4031	Gear	1
31.	C-4032	Gib Screw	1
32.	C-4033	Flat Wipper	2
33.	C-4034	Vee Wipper	2
34.	A-9503	Plug	1
35.	A-1243	Socket Head Cap Screw (M10x65)	4

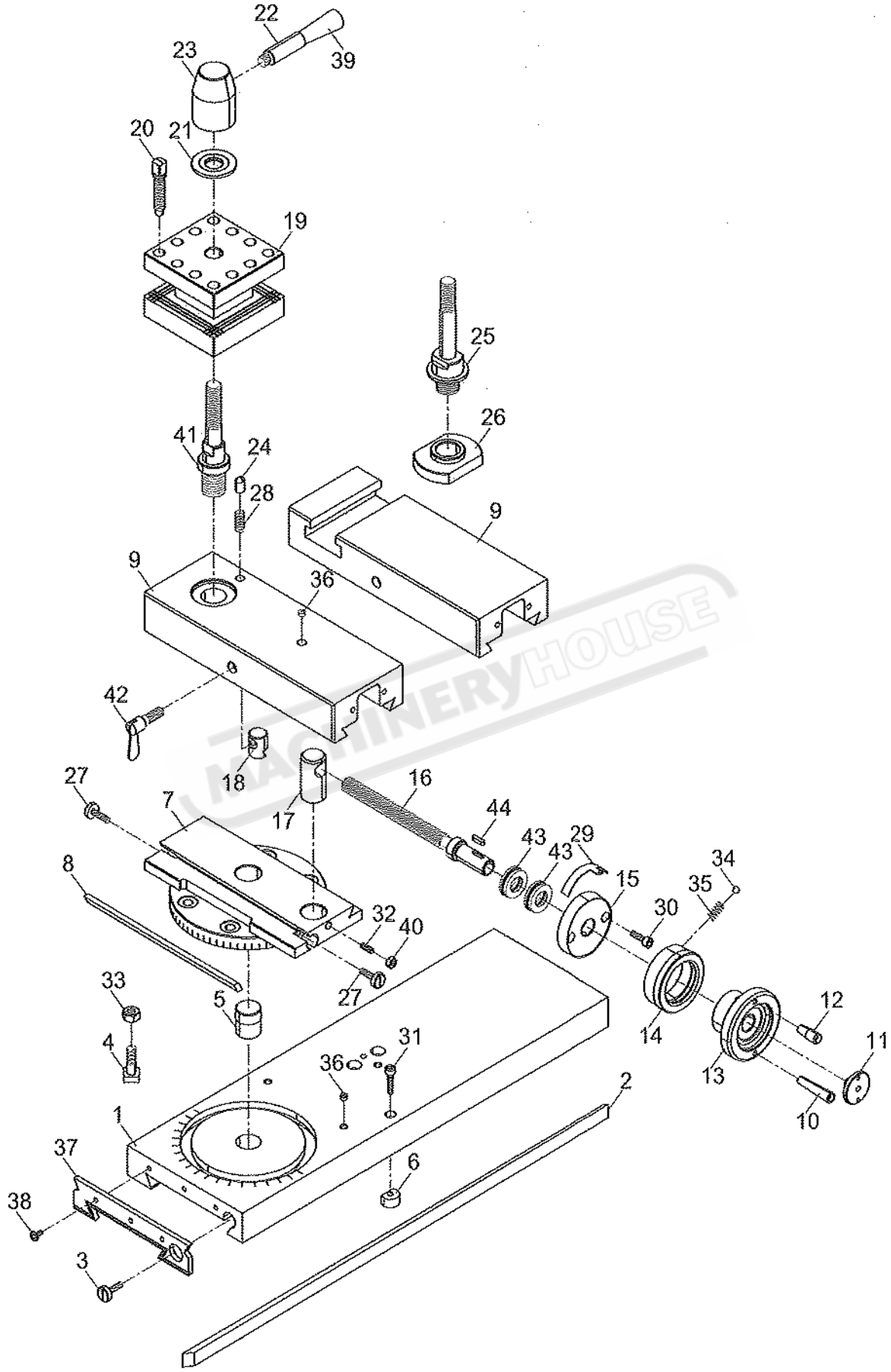
NO.	PART NO.	DESCRIPTION	QUANTITY
36.	A-1213	Socket Head Cap Screw (M8x20)	4
37.	A-1104	Socket Headless Set Screw (M6x20)	1
38.	A-1106	Socket Headless Set Screw (M8x8)	1
39.	A-1605	Cross Recessed Head Screw (M5x10)	8
40.	A-1215	Socket Head Cap Screw (M8x30)	8
41.	A-1100	Socket Headless Set Screw (M6x6)	1
42.	A-1214	Socket Head Cap Screw (M8x25)	2
43.	A-2000	Bearing (#1528)	2
44.	A-2001	Bearing (#AS2035)	2
45.	A-1734	Nylon Nut (M12xP1.25)	1
46.	A-1701	Nut (M8)	1
47.	A-7202	Key (4x4x15)	1
48.	A-9202	Ball (ϕ 1/4")	2
49.	A-8410	Spring	2
50.	A-4009	Pin (5x40)	2
51.	A-1131	Socket Headless Set Screw (M6x25)	3
52.	A-1700	Nut (M6)	3
53.	A-1509	Round Head Cap Screw (M5x10)	3
54.	C-4047	Gib Screw	1
55.	A-1513	Round Head Screw (M4x5)	1

SADDLE LUBRICATION



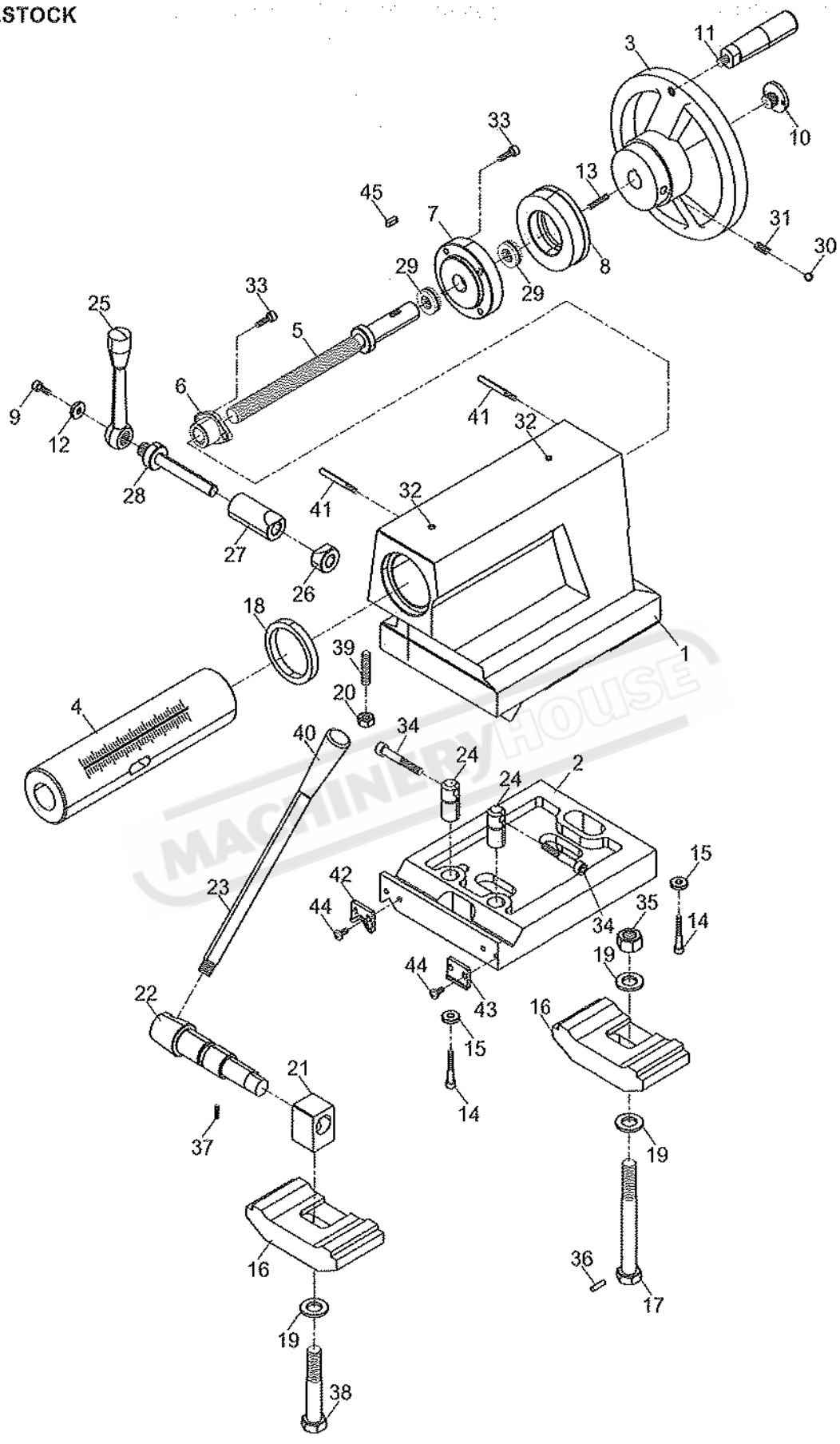
NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-4036	Cover	1
2.	C-4037	Axle	1
3.	C-4038	Button	1
4.	C-4039	Pump	1
5.	C-4040	Plug	1
6.	A-9619	Joint	1
7.	A-6016	O-Ring (AS568-024)	1
8.	NC-40	Name Plate	1
9.	A-9313	Tube	2
10.	A-9308	Inlet Valve	1
11.	A-6000	O-Ring (P7)	1
12.	A-6002	O-Ring (P10A)	1
13.	A-1509	Cross Recessed Head Screw (M5×10)	1
14.	A-8412	Spring	1
15.	A-8413	Spring	1
16.	A-9206	Ball(φ 3/16")	1
17.	A-9317	Clamp	1
18.	A-9311	Nut	2
19.	A-9312	By-pass	1
20.	A-9315	Sleeve	1
21.	A-9205	Ball(φ 3 /8")	1
22.	A-9610	Jointer (6mm)	1
23.	A-9634	Nut	3
24.	A-1509	Round Head Cap Screw (M5×10)	4

SADDLES : ASSEMBLIES



NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-5001	Cross Slide Assembly	1
2.	C-5002	Gib	1
3.	C-4032	Gib Screw	2
4.	C-5004	Bolts	4
5.	C-5005	Pivot	1
6.	C-5006	Locking Pad	1
7.	C-5007	Swivel Slide	1
8.	C-5008	Gib	1
9.	C-5009	Top Slide	1
	C-5009-2	Slotted Top Slide	1
10.	C-5010	Long Handle	1
11.	C-5011	Plug	1
12.	C-5012	Short Handle	1
13.	C-5013-2	Handwheel Assembly	1
14.	C-5014-1	Index Ring (Metric)	1
	C-5014-2	Index Ring (Inch)	1
	C-5014-7	Index Ring (Dual Dial) (Metric)	1
	C-5014-8	Index Ring (Dual Dial) (Inch)	1
15.	C-5015	Keep Assembly	1
16.	C-5017-1	Leadscrew (Metric)	1
	C-5017-2	Leadscrew (Inch)	1
17.	C-5018-1	Nut (Metric)	1
	C-5018-2	Nut (Inch)	1
18.	C-5019	Pad	1
19.	C-5023-2	4 Way Toolpost	1
20.	C-5024-2	Square Head Screws	12
21.	C-5025	Washer	1
22.	C-5026-1	Handle	1
23.	C-5027-1	Handle Boss	1
24.	C-5028	Stoper	1
25.	C-9062	Slotted Top Slide Stud	1
26.	C-9063	Slotted Top Slide Nut	1
27.	C-4032	Gib Screw	2
28.	A-8512	Spring	1
29.	NC-30	Marking Plate (Dual Dial Only)	1
30.	A-1204	Socket Head Cap Screw (M6x20)	2
31.	A-1205	Socket Head Cap Screw (M6x25)	1
32.	A-1103	Socket Headless Set Screw (M6x20)	2
33.	A-1708	Nut (3/8")	4
34.	A-9202	Ball (ϕ 1/4")	2
35.	A-8411	Spring	2
36.	A-9300	Oilers (1/4")	6
37.	C-5029	Wipper	1
38.	A-1509	Cross Recessed Head Screw (M5x10)	3
39.	A-9107	Handle	1
40.	A-1700	Nut (M6)	2
41.	C-5022	Top Slide Stud	1
42.	A-4516	Handle Set Screw (M6)	1
43.	A-2021	Bearing (51103)	2
44.	A-7202	Key (4x4x15)	1

TAILSTOCK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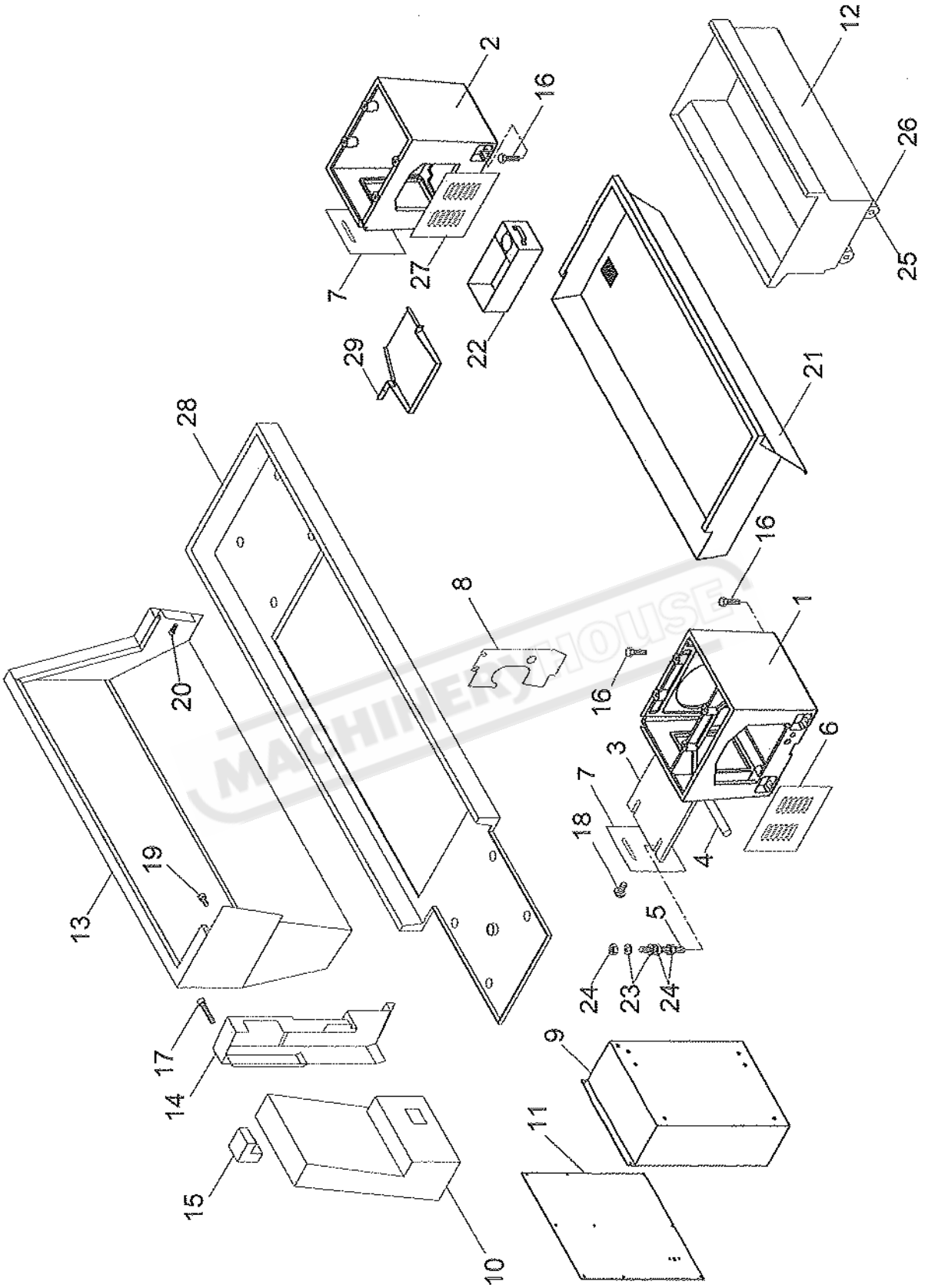
NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-6001	Tailstock Casting	1
2.	C-6002	Tailstock Base	1
3.	C-6003	Handwheel	1
4.	C-6004	Barrel	1
5.	C-6005-1	Leadscrew (Metric)	1
	C-6005-2	Leadscrew (Inch)	1
6.	C-6006-1	Nut (Metric)	1
	C-6006-2	Nut (Metric)	1
7.	C-6007	Keeper	1
8.	C-6008-1	Index Ring (Metric)	1
	C-6008-2	Index Ring (Inch)	1
9.	A-1203	Socket Head Cap Screw (M6x16)	1
10.	C-3032	Plug	1
11.	C-3034	Handle	1
12.	R-1030	Washer	1
13.	A-1105	Socket Headless Set Screw (M6x30)	1
14.	A-1208	Socket Head Cap Screw (M6x40)	2
15.	R-1030	Washers	2
16.	C-6015	Clamp Plate	2
17.	A-1437	Hexagon Head Bolt (M16x140)	1
18.	A-5025	Oil Seal (58.72.9)	1
19.	A-1907	Washer (ϕ 16)	3
20.	A-1702	Nut (M10)	1
21.	C-6022	Pivot Block	1
22.	C-6023	Crank Shaft	1
23.	C-6024	Lever	1
24.	C-6025	Pins	2
25.	C-6029	Handle	1
26.	C-6030	Clamp Bush	1
27.	C-6031	Clamp Bush	1
28.	C-6032	Shaft	1
29.	A-2022	Thrust Bearing (#51104)	2
30.	A-9202	Ball (ϕ 1/4")	2
31.	A-8414	Spring	2
32.	A-9300	Oilers (ϕ 1/4")	2
33.	A-1204	Socket Head Cap Screw (M6x20)	6
34.	A-1261	Socket Head Cap Screw (M8x55)	2
35.	A-1720	Nut (M16)	1
36.	A-4005	Pin (ϕ 5x20)	1
37.	A-1130	Socket Headless Set Screw (M5x15)	1
38.	A-1430	Hexagon Head Bolt (M16x90)	1
39.	A-1132	Socket Headless Set Screw (M10x40)	1
40.	A-9107	Handles	1

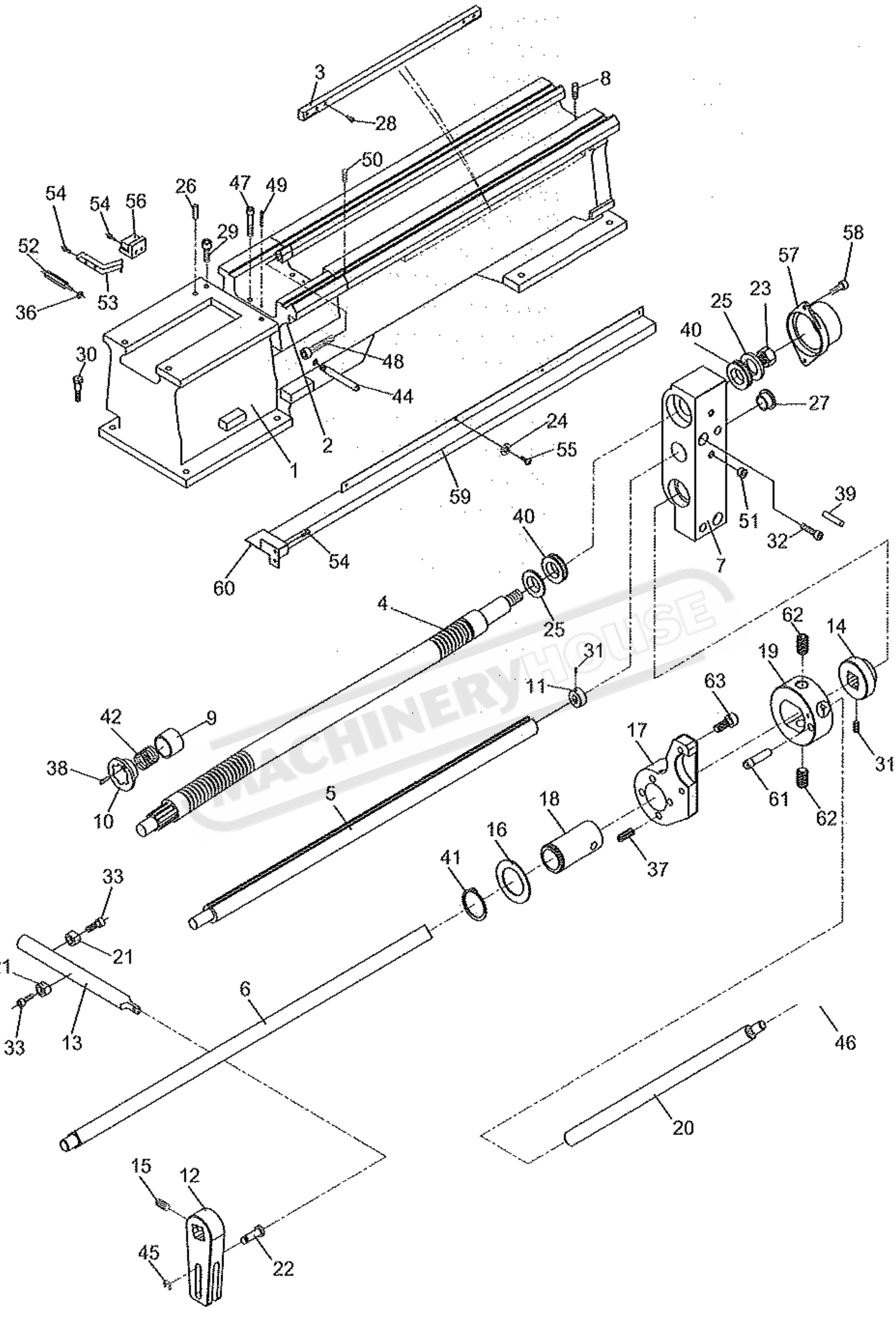
NO.	PART NO.	DESCRIPTION	QUANTITY
41.	C-6026	Stoper	2
42.	C-6035	Wippers (Vee)	2
43.	C-6036	Wippers (Flat)	2
44.	A-1605	Recessed Flat Head Screw (M5x10)	8
45.	A-7205	Key (5x5x15)	1

CABINET & PANELS



NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-7001	Plinth , Head-End	1
2.	C-7002	Plinth , Tail-End	1
3.	C-7003	Platform	1
4.	C-7004	Adjusted Rod	1
5.	C-7005	Adjusted Screw	2
6.	T-7037	Motor Cover	1
7.	C-7008	Rear Cover	2
8.	C-7013	Gearbox Guard	1
9.	C-8025	Electrical Cabinet (Standard)	1
10.	C-8107	Electrical Cabinet (CE Model)	1
	C-8107-1	Electrical Cabinet (VS Model)	1
	C-8107-2	Electrical Cabinet (CE Model W/Clutch)	1
11.	C-8031	Electrical Cabinet Cover (Standard)	1
12.	C-7035	Chip Trolley (OPTIONAL)	1
13.	C-7019	Splash Guard	1
	C-7019-1	Splash Guard (Extra Deepth)	1
14.	C-7020	Brake Guard	1
15.	C-8038	Meter Box (VS Model Only)	1
16.	A-1428	Hexagon Head Bolt (M16x65L)	16
17.	A-1256	Socket Head Cap Screw (M8x85L)	3
18.	A-1512	Cross Recessed Head Screw (M6x12L)	16
19.	A-1202	Socket Head Cap Screw (M6x12L)	2
20.	A-1204	Socket Head Cap Screw (M6x20L)	2
21.	C-7018	Chip Tray	1
22.	C-9029	Coolant Tank	1
23.	A-1905	Washer (ø/2")	4
24.	A-1703	Nut (M12)	6
25.	J-7025	Wheel Shaft (OPTIONAL)	4
26.	J-7026	Wheel (OPTIONAL)	4
27.	T-7037	Cover & Door	1
28.	C-7016	Tray	1
	C-7016-1	Tray (CE & VS Model)	1
29.	C-7014	Chute	1

BED & SHAFTS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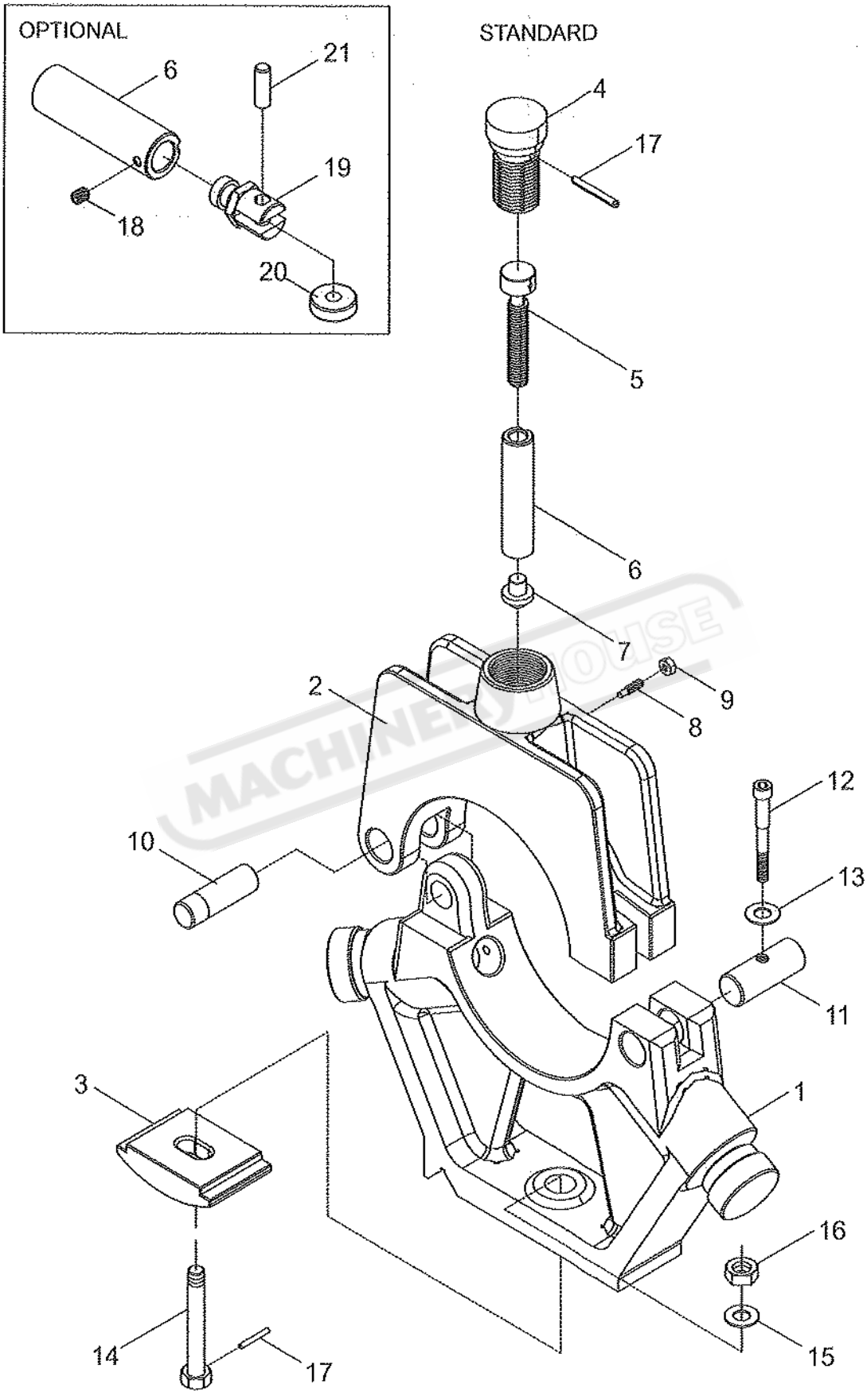
NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-8801-1	Gap Bed (760/1000/1250)	1
	C-8801-2	Straight Bed (760/1000/1250)	1
2.	C-8001-2	Gap Piece	1
3.	C-8002	Rack Set (760/1000/1250)	1
4.	C-8003-1	Leadscrew (Metric) (760/1000/1250)	1
	C-8003-2	Leadscrew (Inch) (760/1000/1250)	1
5.	C-8004	Feed Shaft (760/1000/1250)	1
6.	C-8005RA	Switch Rod (760/1000/1250)	1
7.	C-8806RA	End Bracket	1
8.	C-8007	Stop Pin	1
9.	C-8009	Collar	1
10.	C-8010	Sleeve	1
11.	C-8011-1	Collar	1
12.	C-8012RA	Connector	1
13.	C-8013	Connecting Bar	1
14.	F-8028	Collar	1
15.	A-1123	Socket Headless Set Screw (M8x16L)	1
16.	F-8021	Washer	1
17.	C-8017RA	Bracket	1
18.	F-8016	Bushing	1
19.	F-8019	Lever Assembly	1
20.	F-8020	Lever	1
21.	T-7024	Tracer	2
22.	C-8022	Stud	1
23.	A-1744	Nylon Nut (M16xP1.5)	1
24.	A-1901	Washer (ø1/4")	6
25.	C-8033	Collar	2
26.	T-7003	Pin	1
27.	C-2075	Plug	1
28.	A-1205	Socket Head Cap Screw (M6x25L)	10
29.	A-1241	Socket Head Cap Screw (M12x35L)	4
30.	A-1428	Hexagon Head Bolt (M16x65L)	8
31.	A-1101	Socket Headless Set Screw (M6x10L)	2
32.	A-1258	Socket Head Cap Screw (M8x35L)	2
33.	A-1204	Socket Head Cap Screw (M6x20L)	2
34.	A-1203	Socket Head Cap Screw (M6x16L)	2
35.	A-1104	Socket Headless Set Screw (M6x20L)	2
36.	A-1701	Nut (M8)	2
37.	A-8219	Spring	4
38.	C-2048-1	Pin	1
39.	A-4015	Pin (ø3/8"x38)	2
40.	A-2022	Bearing (#51104)	2

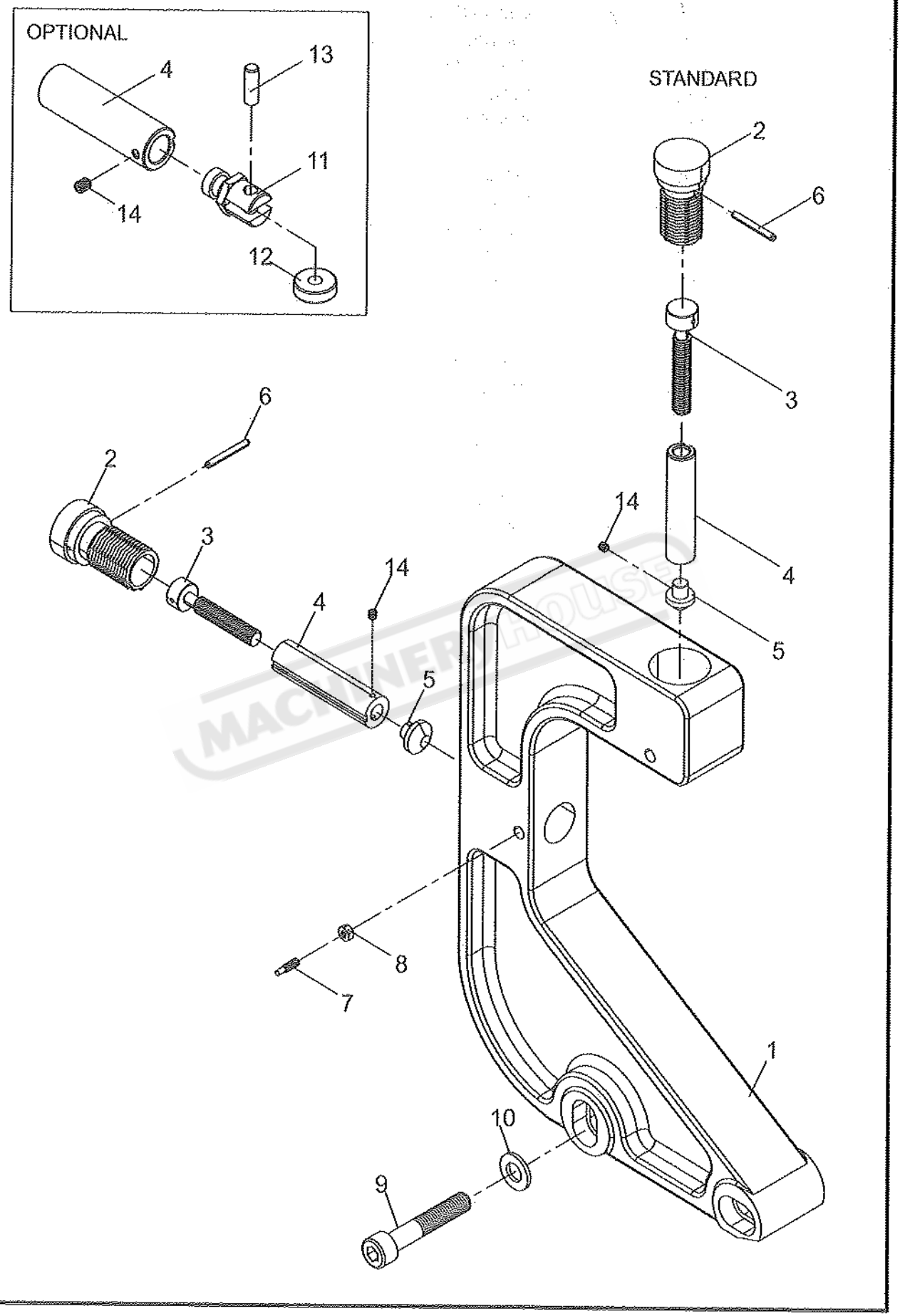
NO.	PART NO.	DESCRIPTION	QUANTITY
41.	A-3313	Circlip (S32)	1
42.	A-8415	Spring	1
43.	A-8416	Spring	1
44.	C-3096	Stop Pin	1
45.	A-3102	Circlip (E8)	1
46.	A-9110	Handle	1
47.	A-1257	Socket Head Cap Screw (M12x55L)	2
48.	A-1181	Socket Head Cap Screw (M8x65L)	2
49.	A-4205	Pin (ø6x75)	2
50.	A-1100	Socket Headless Set Screw (M6x6L)	2
51.	A-9300	Oiler (ø1/4")	2
52.	T-7034	Bolt	2
53.	T-8024	Flow Guard	1
54.	A-1202	Socket Head Cap Screw (M6x12L)	6
55.	A-1509	Socket Round Head Cap Screw (M5x10L)	6
56.	C-8027	Switch Plate	1
57.	F-8008	Cover	1
58.	A-1528	Socket Round Head Cap Screw (M4x8)	2
59.	C-7036	Leadscrew Cover (OPTION)	1
60.	C-7037	Guard (OPTION)	1
61.	F-8018	Stud	1
62.	A-1113	Socket Headless Set Screw (M12x20L)	2
63.	A-1213	Socket Head Cap Screw (M8x20L)	2

STEADY REST-HEAVY DUTY TYPE



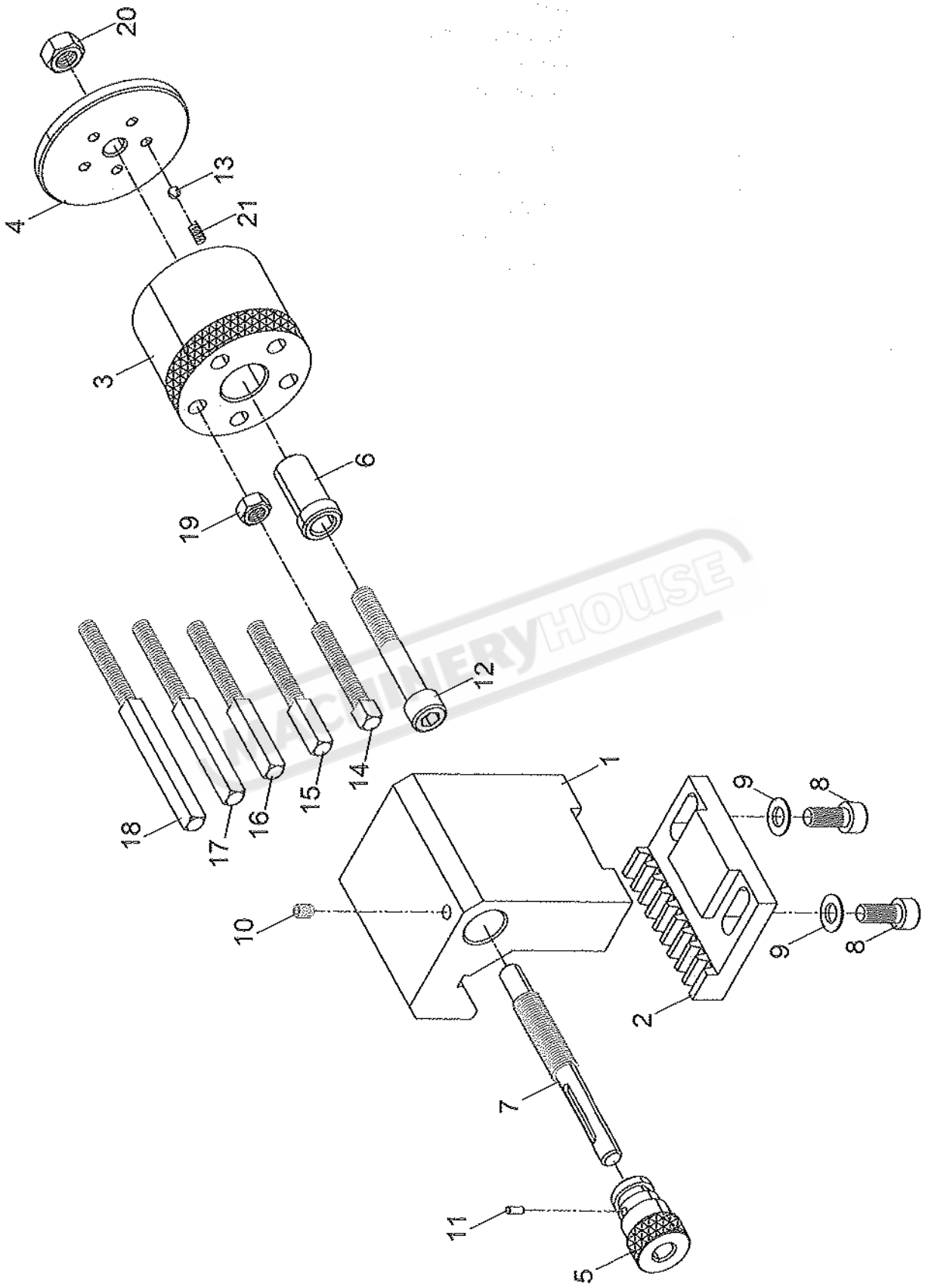
NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-9042	Bottom Body	1
2.	C-9041	Top Body	1
3.	C-6015	Clamp Plate	1
4.	C-9048	Collar	3
5.	C-9047	Adjusting Screw	3
6.	C-9046	Finger	3
7.	C-9045	Finger Pad	3
8.	A-1136	Socket Headless Set Screw (M8x25)	3
9.	A-1701	Nut (M8)	3
10.	C-9040	Pivot	1
11.	C-9044	Pivot	1
12.	A-1228	Socket Head Cap Screw (ϕ3/8"x2 1/4")	1
13.	A-1803	Washer (ϕ3/8")	1
14.	A-1438	Socket Head Cap Screw (M16x100)	1
15.	A-1907	Washer (ϕ16)	2
16.	A-1702	Nut (M16)	1
17.	A-4009	Pin (ϕ5x40)	4
18.	C-9046-2	Socket Headless Set Screw (M6x6) (Optional)	3
19.	C-9046-1	Roller Seat (Optional)	3
20.	A-2039	Bearing (6000ZZ) (Optional)	3
21.	C-9046-2	Pin	3

FOLLOW REST



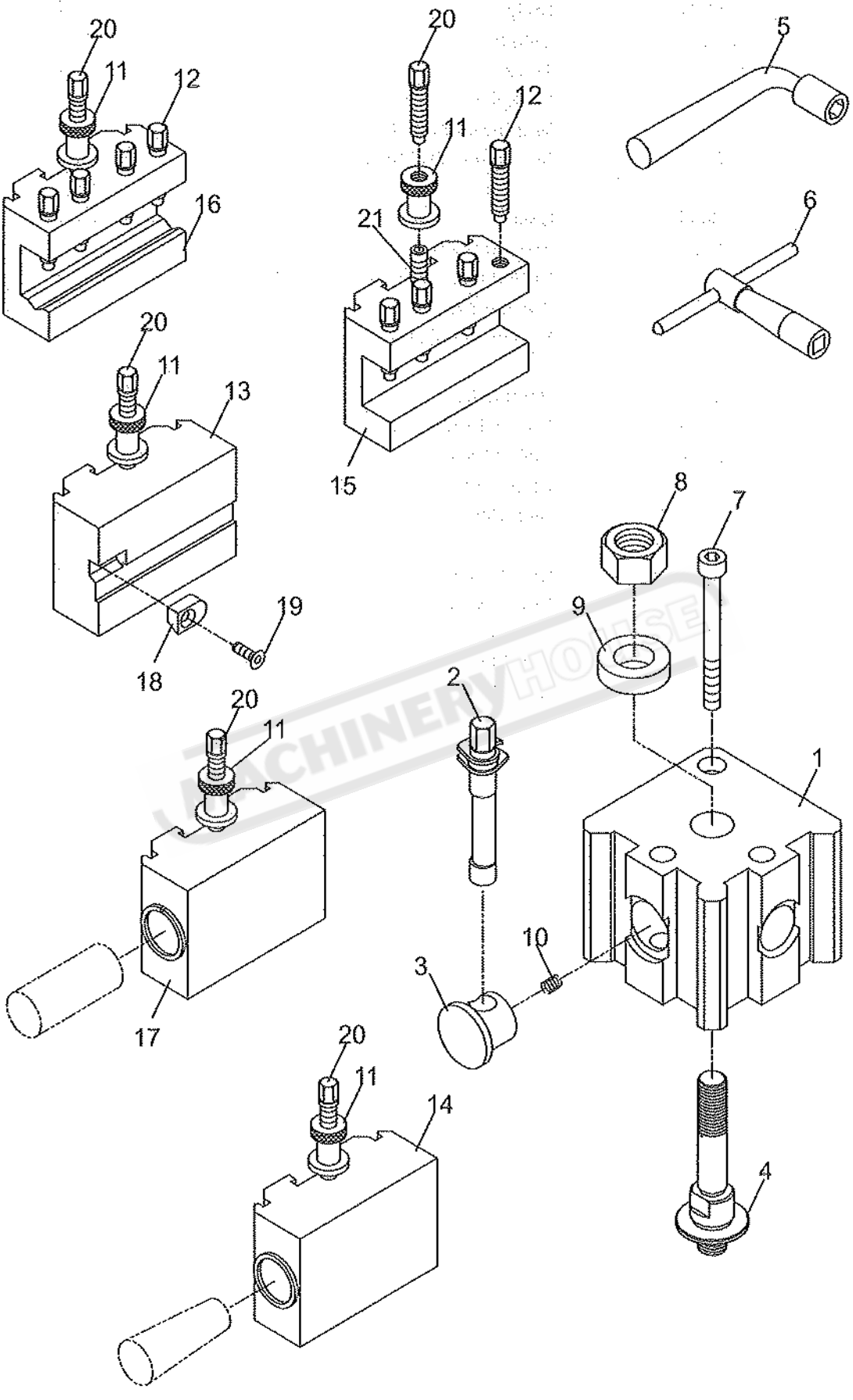
NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-9049	Body	1
2.	C-9048	Collar	2
3.	C-9047	Adjusting Screw	2
4.	C-9046	Finger	2
5.	C-9045	Finger Pad	2
6.	A-4009	Pin (ϕ 5x40)	2
7.	A-1136	Socket Headless Set Screw (M8x25)	2
8.	A-1701	Nut (M8)	2
9.	A-1217	Socket Head Cap Screw (M8x45)	2
10.	A-1802	Washer (ϕ 8)	2
11.	C-9046-1	Roller Seat (Optional)	2
12.	A-2039	Bearing (6000ZZ) (Optional)	2
13.	C-9046-2	Pin (Optional)	2
14.	A-1100	Socket Headless Set Screw (M6x6)(Optional)	2

BEDSTOPS

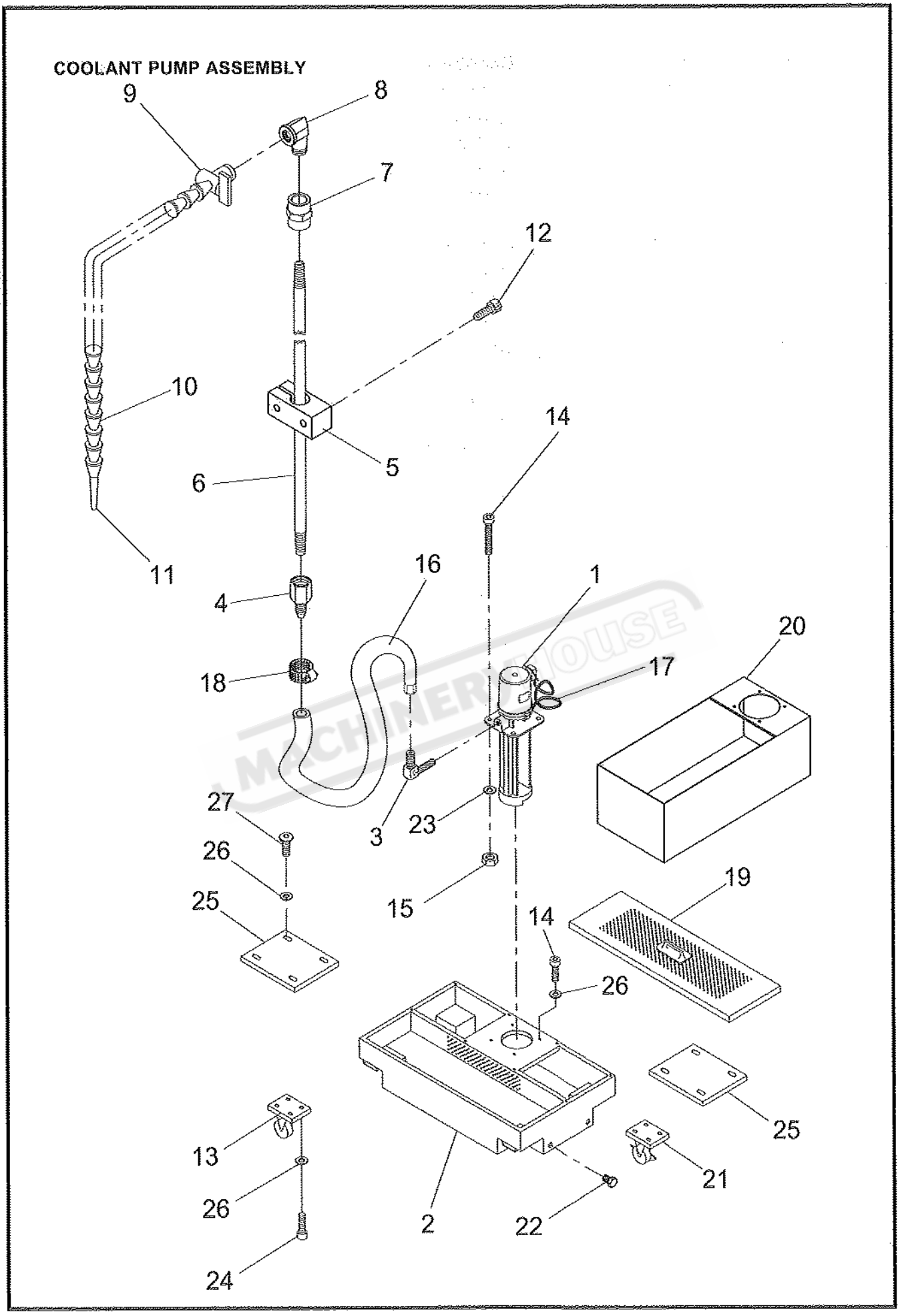


NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-9001	Body	1
2.	C-9002	Clamp	1
3.	C-9053	Turret	1
4.	C-9054	Backplate	1
5.	C-9003-1	Micrometer Dial (Metric)	1
	C-9003-2	Micrometer Dial (Inch)	1
6.	C-9055	Bush	1
7.	C-9005	Spindle (Inch)	1
8.	A-1213	Socket Head Cap Screw (M8x20L)	2
9.	A-1902	Washer (ø8)	2
10.	A-1139	Socket Headless Set Screw (M6x8L)	1
11.	A-4023	Pin (ø3x6)	1
12.	A-1238	Socket Head Cap Screw (M10x55L)	1
13.	A-9202	Ball (ø1/4")	1
14.	C-9056-1	Stop Screw	1
15.	C-9056-2	Stop Screw (83L)	1
16.	C-9056-3	Stop Screw (99L)	1
17.	C-9056-4	Stop Screw (115L)	1
18.	C-9056-5	Stop Screw (134L)	1
19.	A-1701	Nut (M8)	5
20.	A-1702	Nut (M10)	1
21.	A-8519	Spring	1

QUICK CHANGE TOOLPOST



NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-9100	Q.C.T. Body	1
2.	C-9102	Toolholder Cams	2
3.	C-9103	Toolholder Pads	2
4.	C-9062	Toolpost Bolt Assembly	1
5.	A-8528	Toolscrew Wrench	1
6.	A-8529	Cam Clamp Wrench	1
7.	A-1251	Locating Screw (M10x75)	1
8.	A-1720	Nut (M16)	1
9.	R-3011	Washer	1
10.	A-8424	Spring	2
11.	C-9106	Adjusting Stop (On Each Toolholder)	1
12.	C-9107	Tool Clamp Screw (On No. 15/16 Toolholder)	4
13.	C-9108	Part-Off Toolholder	1
14.	C-9109	M.T.3 Taper Toolholder	1
15.	C-9110	Standard Toolholder	1
16.	C-9111	Boring (Vee) Toolholder	1
17.	C-9112	Plain Bore Toolholder	1
18.	C-9113	Blade Clamp	1
19.	A-1611	Socket Flat Head Screw (M6x20)	1
20.	C-9107	Height Adj. Screw (On Each Toolholder)	1
21.	A-1138	Socket Headless Set Screw (M10x100) (On Each Toolholder)	1


COOLANT PUMP ASSEMBLY
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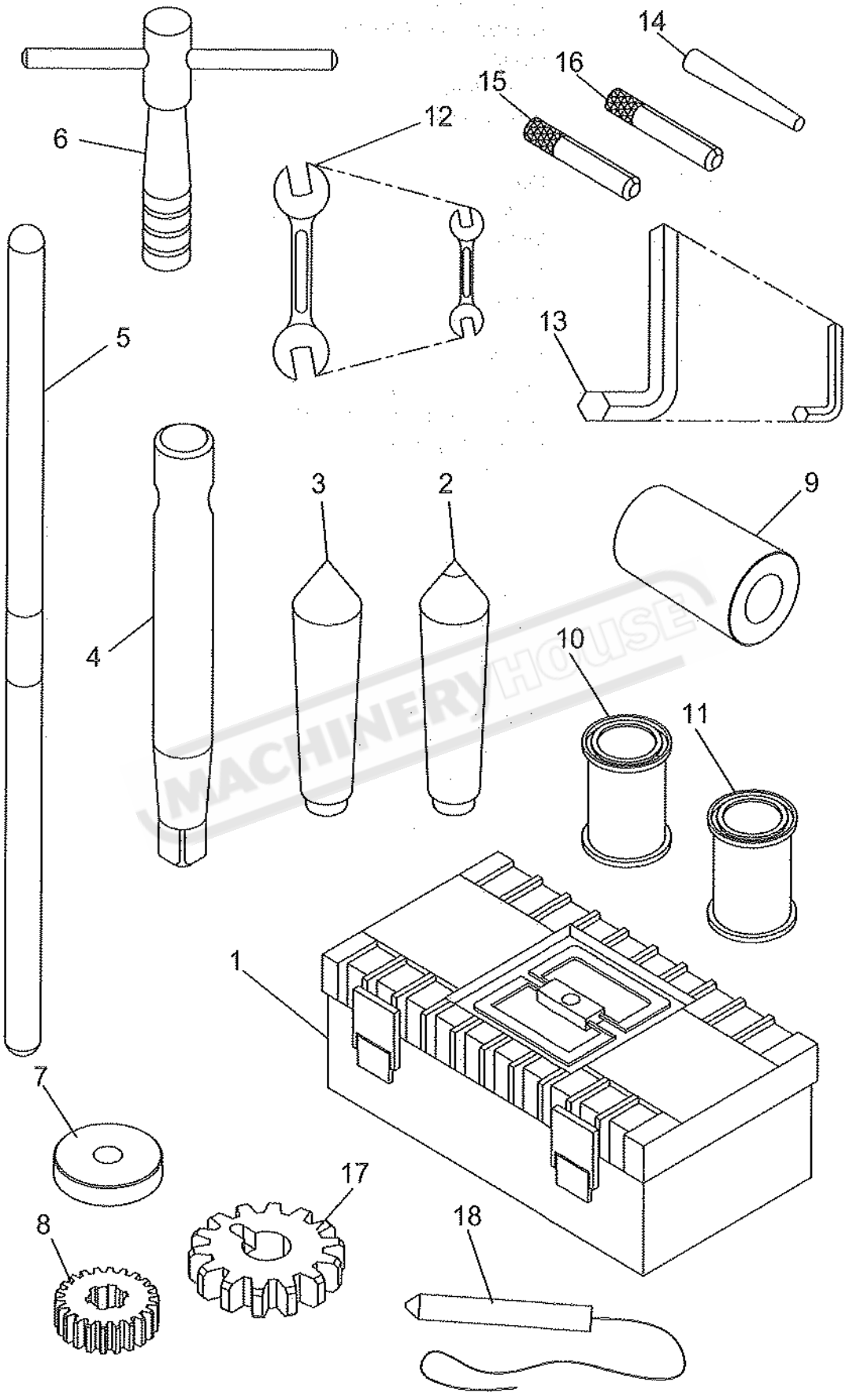
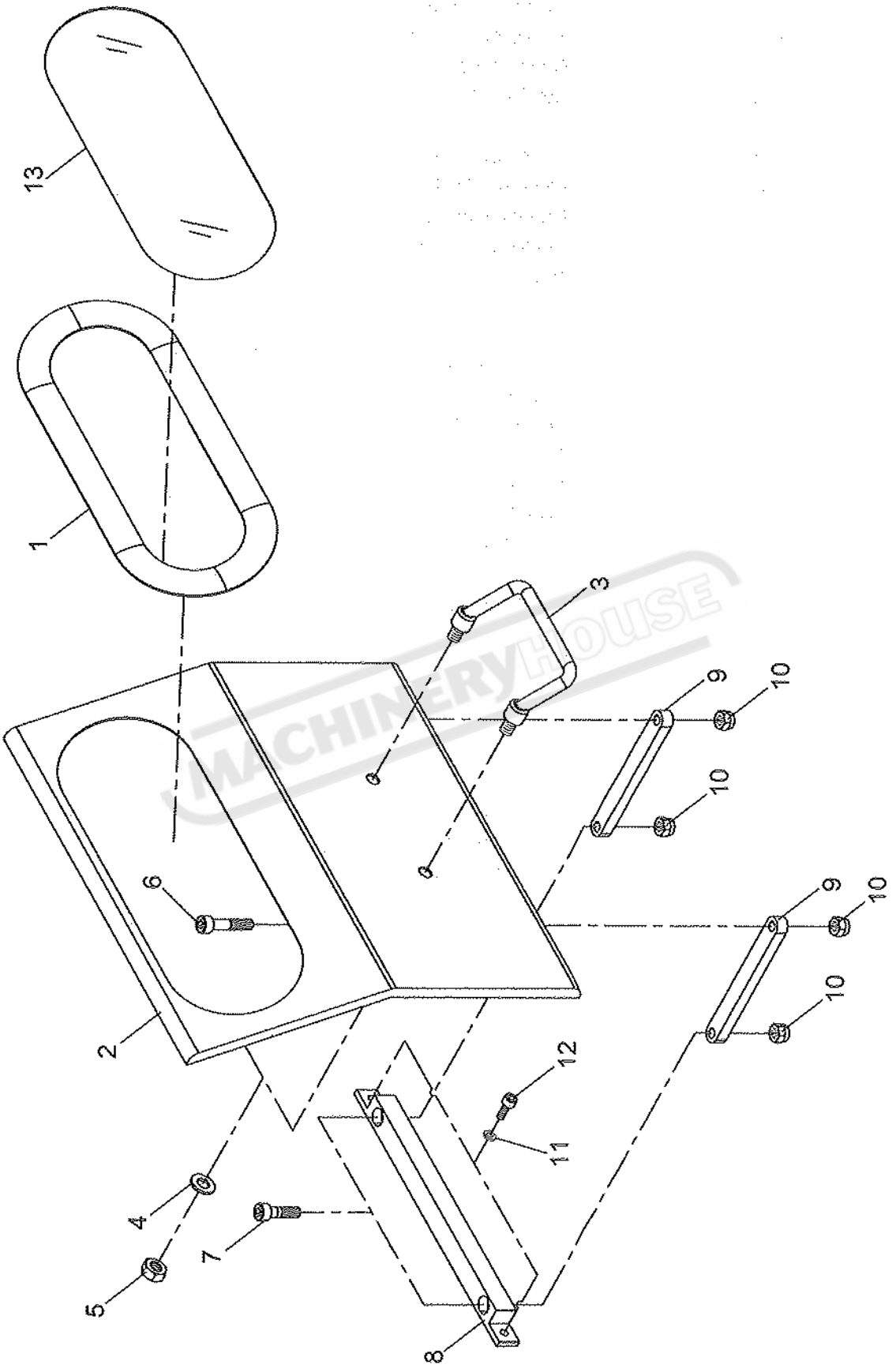
NO.	PART NO.	DESCRIPTION	QUANTITY
1.	Z-1100	(1/8HP Pump)	1
2.	C-1174	Coolant Tank (OPTION)	1
3.	A-4101	Outlet	1
4.	A-4105	Hose Sleeve	1
5.	A-9651	Pipe Bracket	1
6.	A-4106	Pipe	1
7.	A-4116	Jointer	1
8.	A-4108	Elbow	1
9.	A-4107	Valve	1
10.	A-4117	Join Pipe	1
11.	A-4118	Nozzle	1
12.	A-1204	Socket Head Cap Screw (M6x20L)	2
13.	A-0379	Roller Wheel (Caster) (OPTION)	2
14.	A-1432	Socket Head Cap Screw (M6x25L)	8
15.	A-1700	Nut (M6)	4
16.	A-4104	Hose	1
17.	A-4103	Electric Tubing	1
18.	A-9317	Clamp	1
19.	C-1176	Filter Plate (OPTION)	1
20.	C-9029	Coolant Tank	1
21.	A-0378	Roller (OPTION)	2
22.	A-0488	Plug (ø1/2"T) (OPTION)	2
23.	A-1917	Washer (ø6)	4
24.	A-1202	Socket Head Cap Screw (M6x12L)	16
25.	A-0379	Tank Cover (OPTION)	2
26.	A-1901	Washer (ø6)	28
27.	A-1509	Socket Round Head Cap Screw (M5x10L)	8

SERVICE TOOLS & KITS



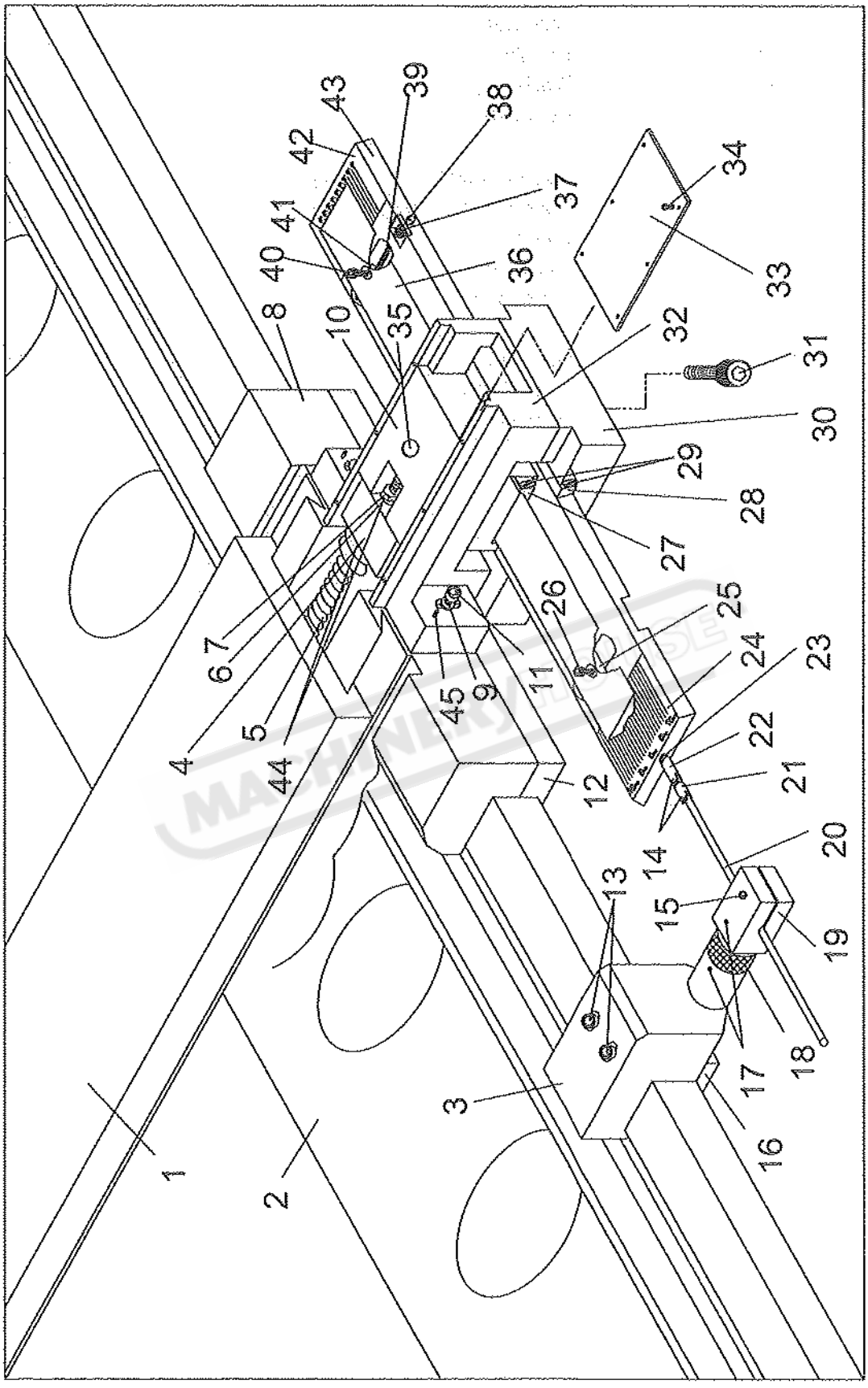
NO.	PART NO.	DESCRIPTION	QUANTITY
1.	Z-4515	Tool Box	1
2.	A-4509	Tailstock Center	1
3.	A-4510	Headstock Center	1
4.	A-4511	Camlock Key	1
5.	A-4512	Key Handle	1
6.	A-4506	Toolscrew Wrench	1
7.	T-9086	Levelling Block	8
8.	C-1146	Change Gear (22T) (Metric)	1
9.	C-1150	Center Sleeve (M.T.#6xM.T.#4)	1
10.	A-4513	Touch Paint	1
11.	A-4514	Touch Paint	1
12.	A-4507-1	Spanner (22x24)	1
	A-4507-2	Spanner (17x19)	1
	A-4507-3	Spanner (12x14)	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	Pin	2
16.	C-2065-1	Pin	2
17.	C-3080	Gear (14T) (Metric Threading Dial)	1
	C-3081	Gear (13T) (Metric Threading Dial)	1
	C-3083	Gear (20T) (Metric Threading Dial)	1
	C-3084	Gear (22T) (Metric Threading Dial)	1
18.	C-1098	Earth Bar With Cable (VS Model)	1

FOLLOWING CHIP GUARD (OPTIONAL)



NO.	PART NO.	DESCRIPTION	QUANTITY
1.	A-9118	Strap	1
2.	C-5041	Chip Guard	1
3.	A-9117	Handle	1
4.	A-1807	Washer (ϕ 10)	2
5.	A-1702	Nut (M10)	2
6.	A-1216	Socket Head Cap Screw (M8x40)	2
7.	A-1215	Socket Head Cap Screw (M8x30)	2
8.	C-5038	Frame	1
9.	R-5030	Swivel Arm	2
10.	A-1743	Locking Nut	4
11.	A-1801	Washer (ϕ 1/4")	2
12.	A-1203	Socket Head Cap Screw (M6x16)	2
13.	A-9121	Window	1

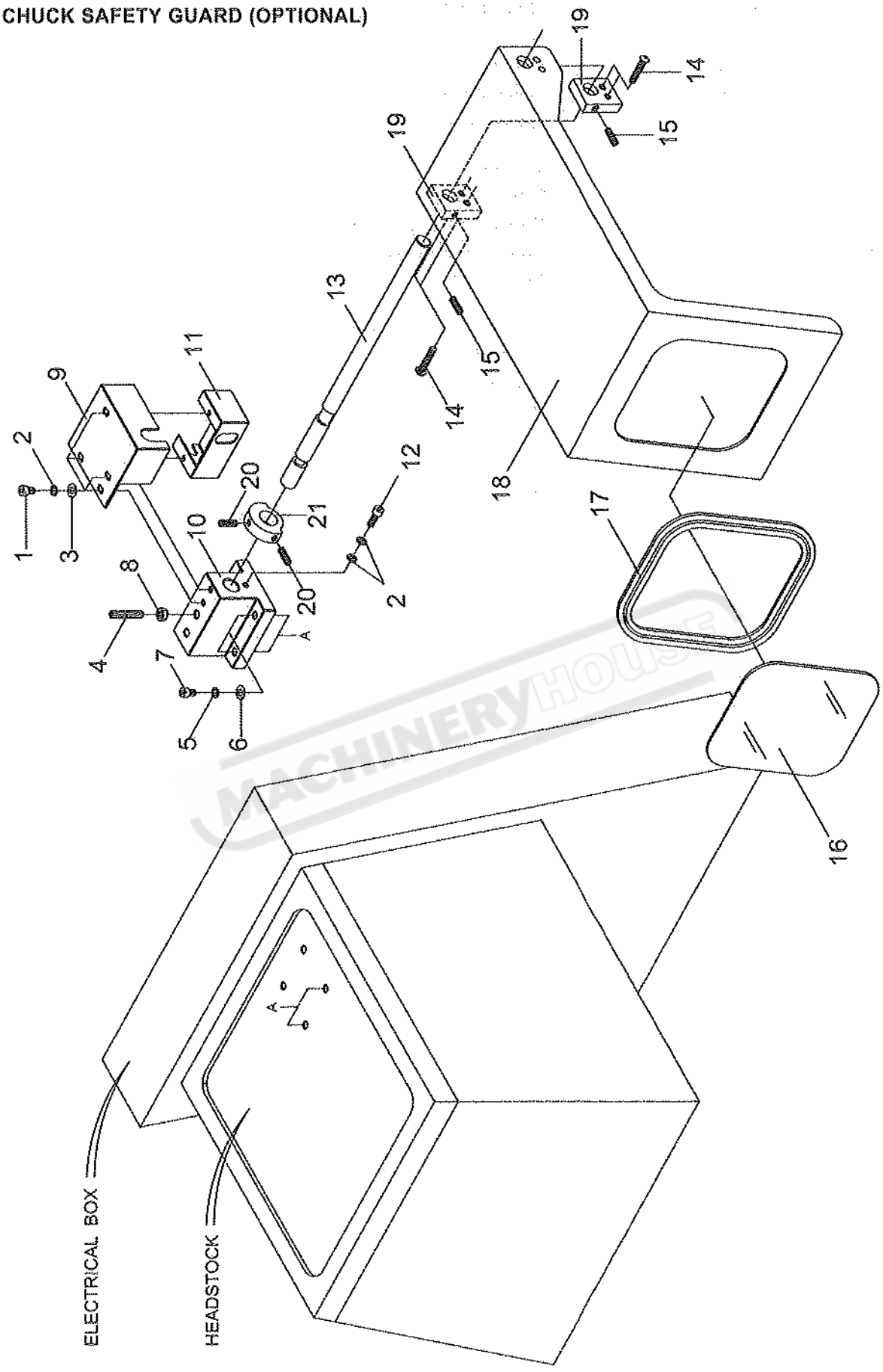
TAPER TURNING ATTACHMENT (OPTIONAL)



75

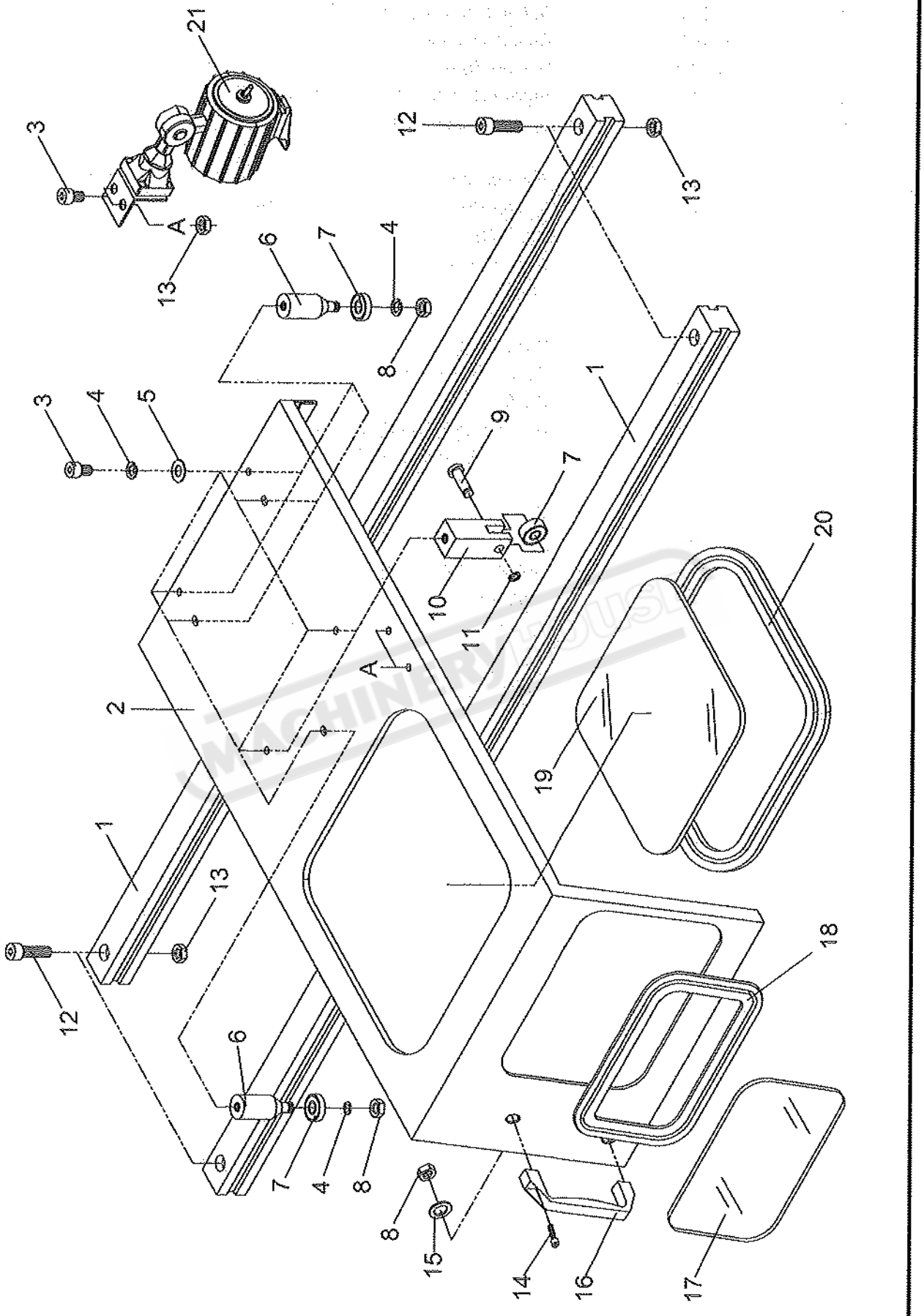
NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-5001	Cross Slide	1
2.	C-8001	Bed	1
3.	C-9086	Clamp	1
4.	C-9079	Guide Block	1
5.	C-4012	Cross Slide Leadscrew	1
6.	C-4026	Washer	1
7.	A-1724	Nylon Nut (M12)	1
8.	C-4001	Saddle Casting Assembly	1
9.	A-1803	Spring Washer (ϕ 3/8")	2
10.	C-9078	Slide Block	1
11.	A-1258	Socket Head Cap Screw (M8x35)	2
12.	C-4020-1	Rear Strip	1
13.	A-1216	Socket Head Cap Screw (M8x40)	2
14.	A-4005	Pin (ϕ 5x20)	2
15.	A-1213	Socket Head Cap Screw (M8x20)	1
16.	C-9087	Strip	1
17.	A-1169	Socket Headless Set Screw (M8x10)	2
18.	R-9098	Connecter	1
19.	R-9099	Holder	1
20.	R-9101	Draw Bar	1
21.	R-9106	Jointer	1
22.	R-9017	Jointer	1
23.	A-1702	Nut (M10)	1
24.	NC-92	Graduated Plate	1
25.	C-9085	Locking Nut	1
26.	A-1202	Socket Head Cap Screw (M6x12)	1
27.	C-9077	Taper Gib	1
28.	C-9074	Taper Gib	1
29.	M-9091	Adjust Screw	1
30.	C-9072	Bottom	1
31.	A-1265	Socket Head Cap Screw (M10x45)	4
32.	C-9071	Bracket	1
33.	C-9080	Cover	1
34.	A-1626	Flat Head Cap Screw (M4x10)	6
35.	C-9076	Slide Block	1
36.	C-9075	Swivel Guide	1
37.	A-4001	Pin (ϕ 3x20)	1
38.	C-9081	Bush	1
39.	C-9082	Adjust Screw	1
40.	A-1205	Socket Head Cap Screw (M6x25)	1
41.	C-9083	Adjust Screw	1
42.	NC-93	Graduated Plate	1
43.	C-9073	Frame	1
44.	A-2000	Bearing (AS1528)	1
45.	A-4007	Pin (ϕ 5x30)	2

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 (ø5)	6
3.	A-1909	Washer (ø5)	4
4.	A-1148	Socket Headless Set Screw (M8 x 30)	1
5.	A-1812	Spring Washer (ø1/4")	4
6.	A-1917	Washer (ø6)	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.	C-8138	Seat	1
11.	C-8141	Switch Box	1
12.	A-1234	Socket Head Cap Screw (M5 x 10)	1
13.	C-8140	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-9139	Window	1
17.	A-9140	Strap	1
18.	C-8137	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

FULL LENGTH SLIDING CHIP SAFETY GUARD (OPTIONAL)



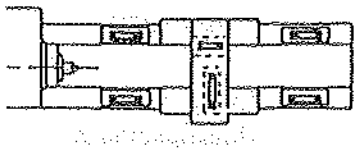
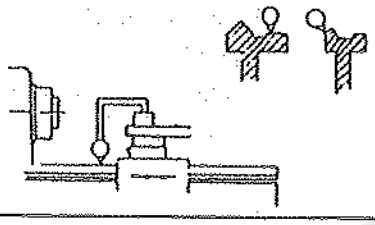
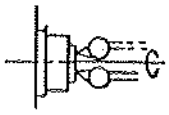
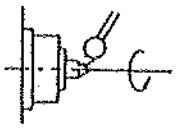
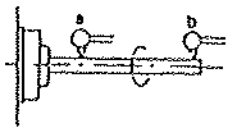
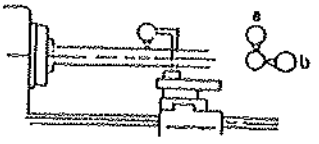
NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-8113	Guidance	2
2.	C-8112	Chip Safety Guard	1
3.	A-1203	Socket Head Cap Screw (M6 x 16)	9
4.	A-1802	Spring Washer (ø8)	12
5.	A-1917	Washer (ø6)	7
6.	C-8116	Pivot	5
7.	A-2044	Bearing#608ZZ	7
8.	A-1701	Nut (M8)	3
9.	M-8022	Pivot	2
10.	C-8115	Guide Block	2
11.	A-3101	Circlip (E6)	2
12.	A-2108	Socket Head Cap Screw (M6 x 40)	4
13.	A-1700	Nut (M6)	6
14.	A-2111	Socket Head Cap Screw (M8 x 12)	2
15.	A-1918	Washer (ø8)	2
16.	A-9124	Handle	1
17.	A-9141	Window	1
18.	A-9142	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

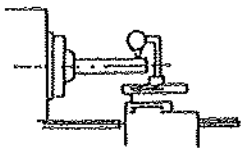
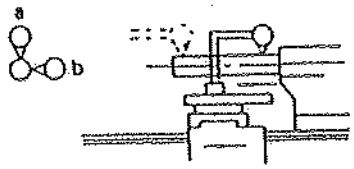
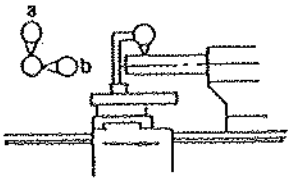
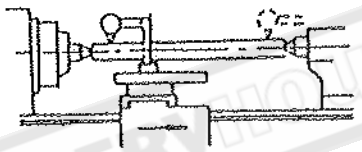
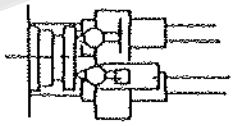
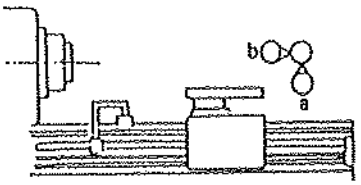
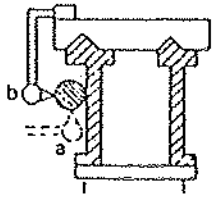
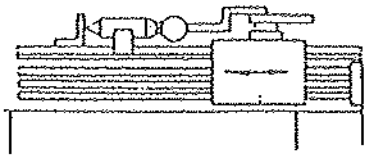
INSPECTION RECORD

Model: Series No. Date:

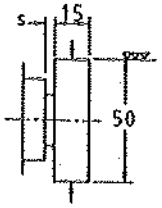
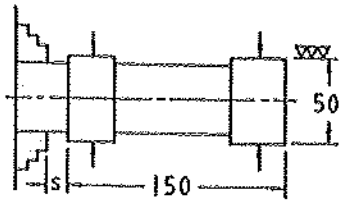
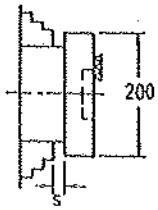
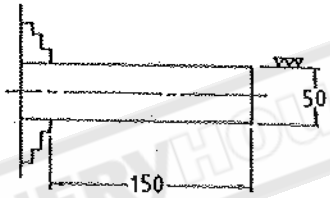
1.ACCURACY TEST.

UNIT: MM.

NO.	INSPECTION ITEM		DIAGRAM	TOLERANCE	
				PERMISSIBLE	ACTUAL
1	Straightness of bed slideway	a. Longitudinal direction (In vertical plane)		0.02	0.02
		b.Transverse direction (In vertical plane)		0.02	0.02
2	Parallelism of bed slideways.			0.02	0.01
3	Spindle nose runout			0.01	0.005
4	Main spindle for axial slip, mearsured at 2 points, displaced by 180°			0.015	0.007
5	True running of center point of main spindle.			0.015	0.005
6	Spindle taper hole runout	a.Nearest spindle nose		0.01	0.006
		b.At a distance of 300mm.		0.02	0.013
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

NO.	INSPECTION		DIAGRAM	TOLERANCE	
				PERMISSIBLE	ACTUAL
8	Movement of compound slide parallel with main spindle in vertical plane (Hand feed)			0.01/150	0.028
9	Parallelism of tailstock spindle with bed ways.	a.In vertical plane (Front end rising)		0.015/100	0.013
		b.In horizontal plane (Front end inclined towards the direction of tool presure.)		0.015/100	0.015
10	Parallelism of bed ways with center line of tailstock spindle hole.	a.In vertical plane (Free end of mandrel rising)		0.02/300	0.016
		b.In horizontal plane (Free end of mandrel inclined towards tailstock end)		0.02/300	0.017
11	Difference in center hight between headstock and tailstock (Mandrel rising towards tailstock end)			0.025	0.016
12	Squareness of motion of cross slide with center line of main spindle			0.02/300	0.018
13	Parallelism of center line of leadscrew end bearing to carriage slide ways	a.In vertical plane		0.1	0.08
		b.In horizontal plane		0.1	0.08
14	Diviations in alignment of center line of leadscrew 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 leadscrew			0.03/300	0.018

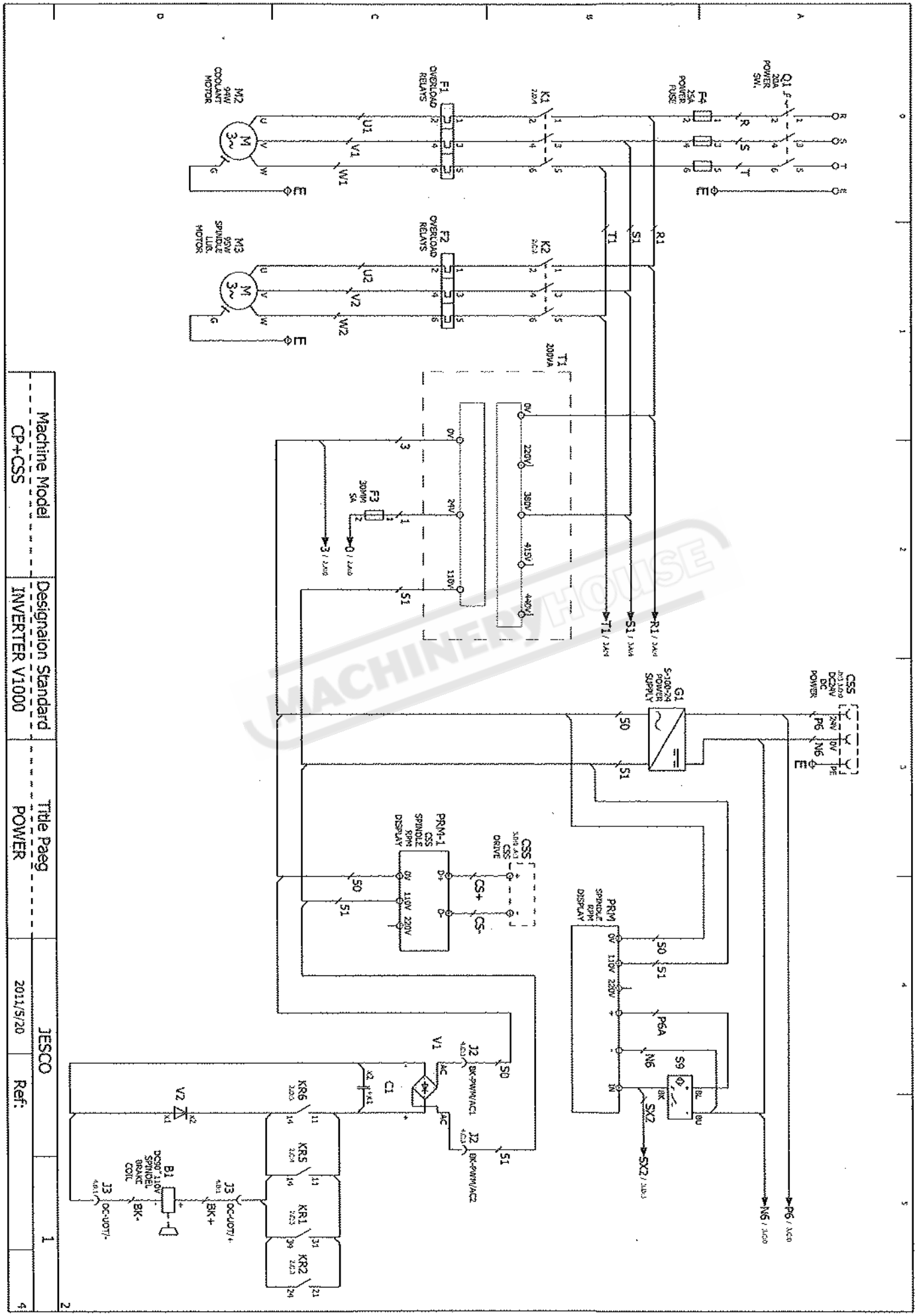
2.PRACTICAL

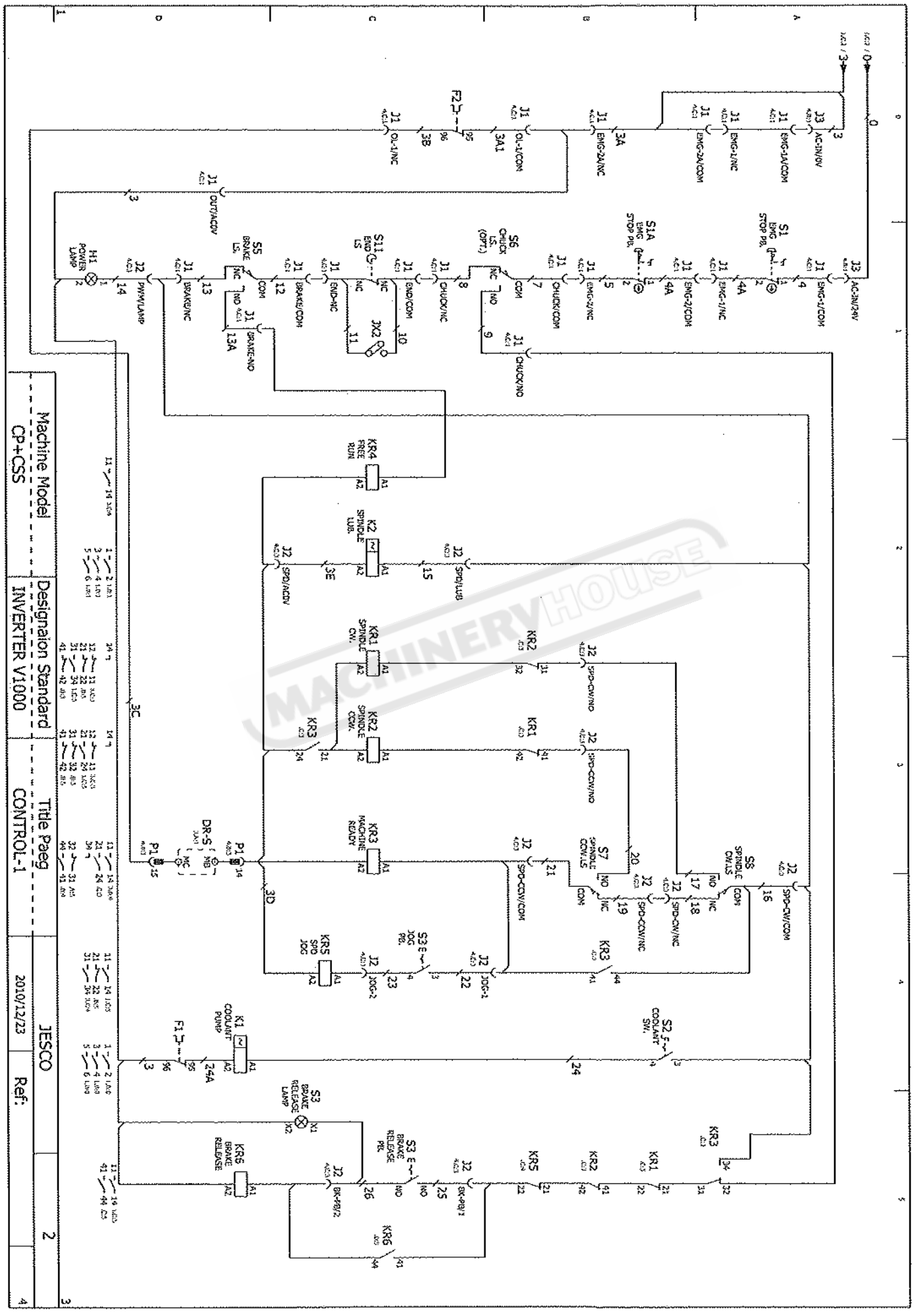
NO.	TESTING ITEM	DIAGRAM	TOLERANCE	
			PERMISSIBLE	ACTUAL
1	Accuracy of outside turning		0.01	0.008
2	Accuracy of cylindrical turning		0.025	0.012
3	Accuracy of face turning		0.02	0.01
4	Heavy load cutting Conditions; Material, mild steel ø50 Spindle speed,845 RPM. Feed rate, 0.1 mm/rev. Deepth of cut in diameter.		ø14	OK

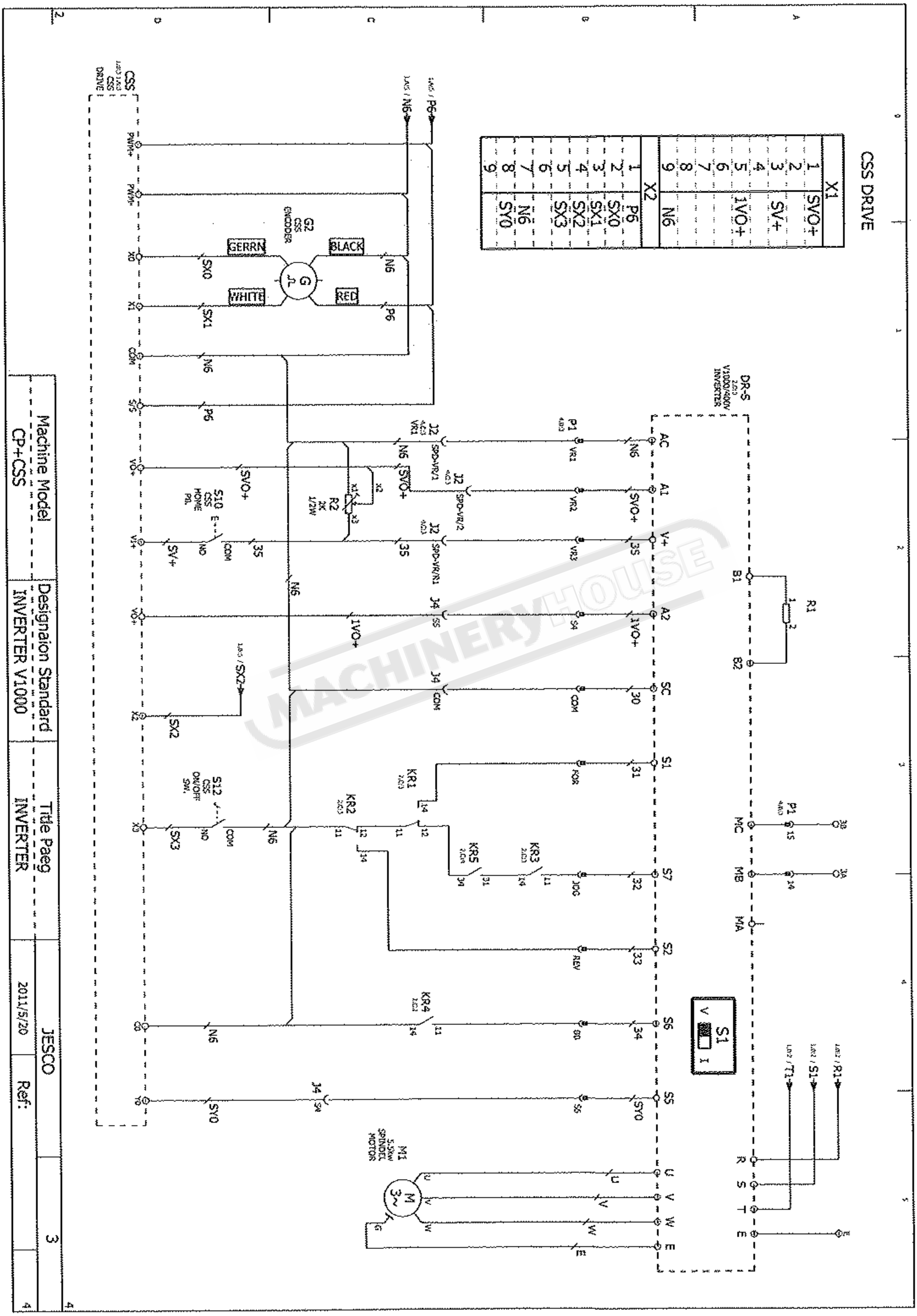
3.MAIN ELECTRIC SPECIFICATIONS

ITEM	H.P.	VOLTAGES	FREQUENCY	R.P.M.	RATED CURRENT
INVERTER (VS MODEL)	7.5	200--240 V. 280--460 V.	0--400HZ.	----	24A. 12A.
DRIVE MOTOR (VS MODEL)	7.5	220V. 440V.	50/60HZ.	940/1140	16.6 A-220V. 8.3 A-440V.
DRIVE MOTOR STANDARD	7.5	220V. 440V.	50/60HZ.	1420/1720	20.0 A-220V. 10.0 A-440V.
COOLANT PUMP	0.125	220V. 440V.	50/60HZ.	2850/3420	0.6A. 0.3A.
LUB. PUMP VS MODEL	0.125	220V. 440V.	50/60HZ.	2850/3420	0.6A. 0.3A.

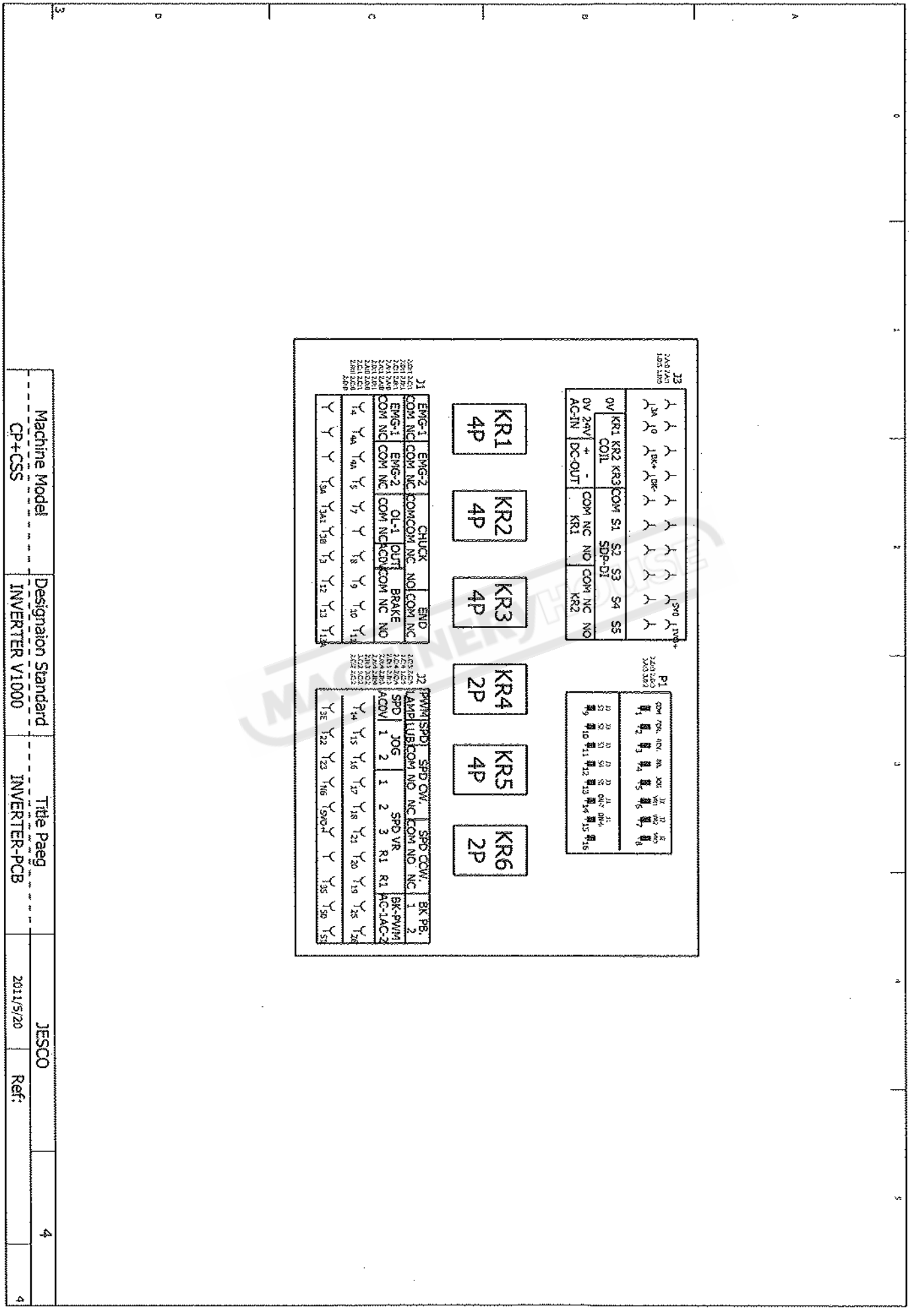
Approved by: Inspected by:


Machine Model
CP+CSS
Designaion Standard
INVERTER V1000
Title Paeg
POWER
JESCO
2011/5/20
Ref:
1
M2 94W COOLANT MOTOR
M3 550W SPINDLE LUB. MOTOR
F1 OVERLOAD RELAYS
F2 OVERLOAD RELAYS
F3 30MM 5A
F4 25A POWER FUSE
Q1 20A POWER SW.
K1
K2
T1 200VA
220V
380V
415V
440V
110V
240V
0V
G1 S-100-24 POWER SUPPLY
CSS DC24V DC POWER
PRM-1 CSS SPINDLE RPM DISPLAY
PRM SPINDLE RPM DISPLAY
CSS INVERTER CSS DRIVE
CS+
CS-
P6A
N6
S9
SX2
V1
V2
C1
KR6
KR5
KR1
KR2
B1 DC90V 110W SPINDEL BRAKE COIL
J2
J3
BK-PWM/AC1
BK-PWM/AC2
BK+
OC-UOT/+
OC-UOT/-


Machine Model
CP+CSS
Designaion Standard
INVERTER V1000
Title Paeg
CONTROL-1
JESCO
2010/12/23
Ref:
2
MACHINERYHOUSE



CSS DRIVE
X1
1 SVO+
2
3 SV+
4
5 1VO+
6
7
8
9 N6
X2
1 P6
2 SX0
3 SX1
4 SX2
5 SX3
6
7 N6
8 SY0
9
G2 CSS ENCODER
BLACK
RED
GERRN
WHITE
DR-S V1000/400V INVERTER
R1
S1
M1 5.5Kw SPINDEL MOTOR
KR1
KR2
KR3
KR4
KR5
S10 CSS HOME POL
S12 CSS ON/OFF SW.
R2
MACHINERYHOUSE
Machine Model CP+CSS
Designaion Standard INVERTER V1000
Title Paeg INVERTER
JESCO
2011/5/20
Ref:
3



Machine Model	Designaion Standard	Title Paeg	JESCO	4
CP+CSS	INVERTER V1000	INVERTER-PCB	2011/5/20	Ref:

CSS Operation

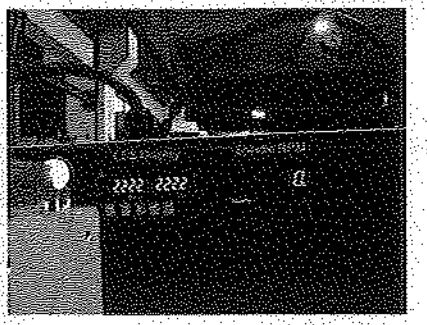
Turning-Condition:

Work-Piece Outside-Diameter: 100mm

Max. Spindle-Speed: 1000rpm Min. Spindle-Speed: 300rpm

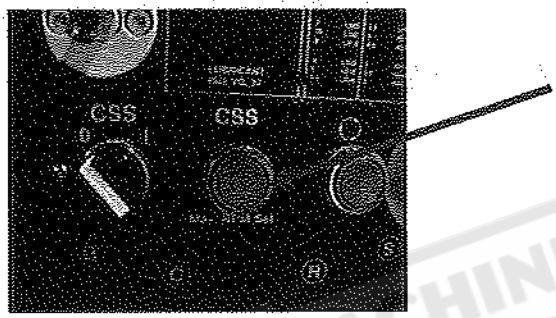
A.) CSS-Function is available to operate in two methods:

or



a.) When machine power-on, CSS-Display will show Operation Method: 1111 1111 or 2222 2222

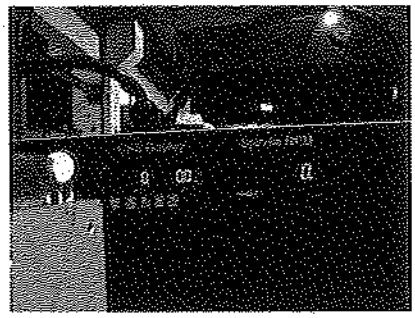
b.) Operation Method also can be switched by press "BLUE"- CSS Button three-seconds



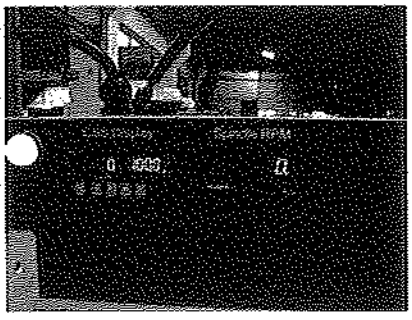
B.) Operation Instruction:

a.) Method: 1111 1111

1.) Set X = 0

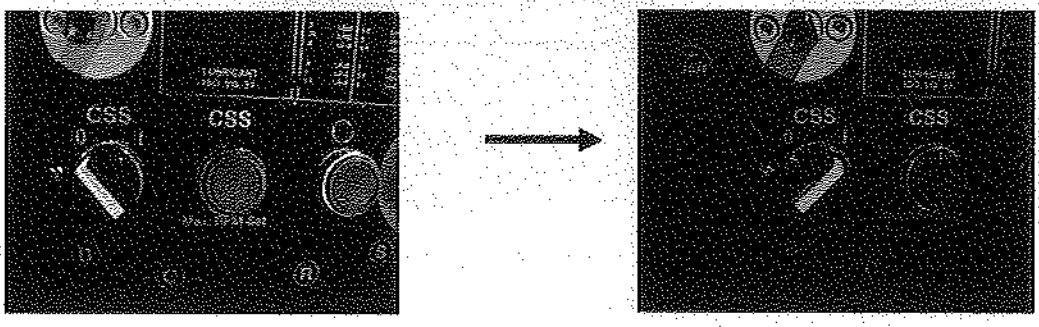


2.) Set Outside-Diameter = 100



3.) Set speed = 220 M/min

4.) Switch CSS Button:

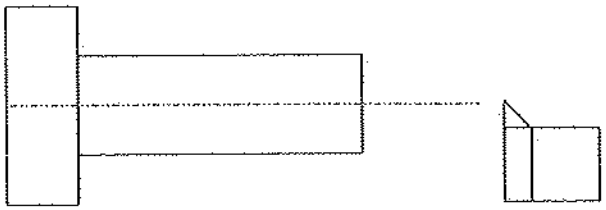


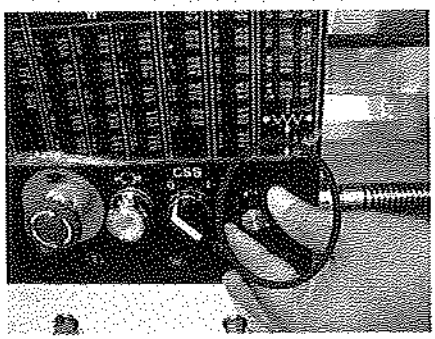
5.) The Speed (M/Min) will be constant, when X-Axis travelling!

b.) Method: 2222 2222

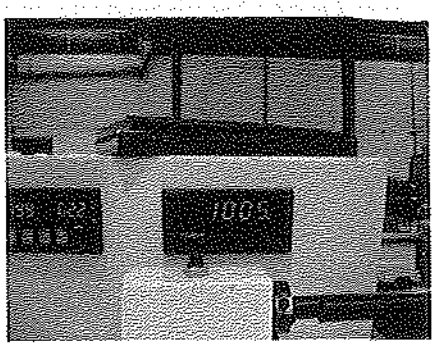
1.) Set Work-Piece Center and set the max. spindle-speed at work-piece center

Move X-Axis at Work-Piece Center, then turn the Select-Turning-Knob (Fig.1) clockwise from 0 to the desired max. spindle-speed 1000rpm(Fig.2). Then, press the Blue-Bottom (Fig.3) on Control Panel.

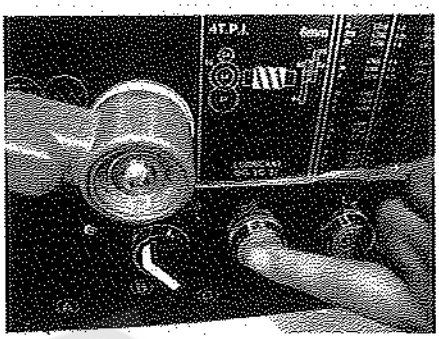




(Fig.1)



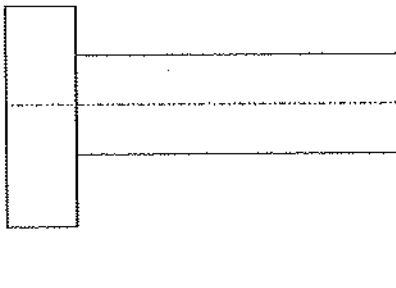
(Fig.2)



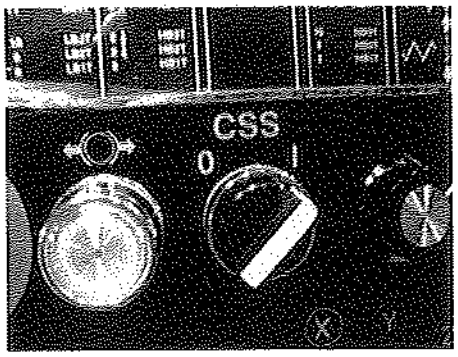
(Fig.3)

2.) Set Work-Piece Outside-Diameter Position and the desired spindle-speed at work-piece Outside-Diameter

Move X-Axis to work-piece outside-diameter position, then turn the Select-Turning-Knob (Fig.1) counterclockwise to the desire min. spindle-speed 300rpm (Fig.4). Then, turn the CSS-Bottom(Fig.5) to Position "1"

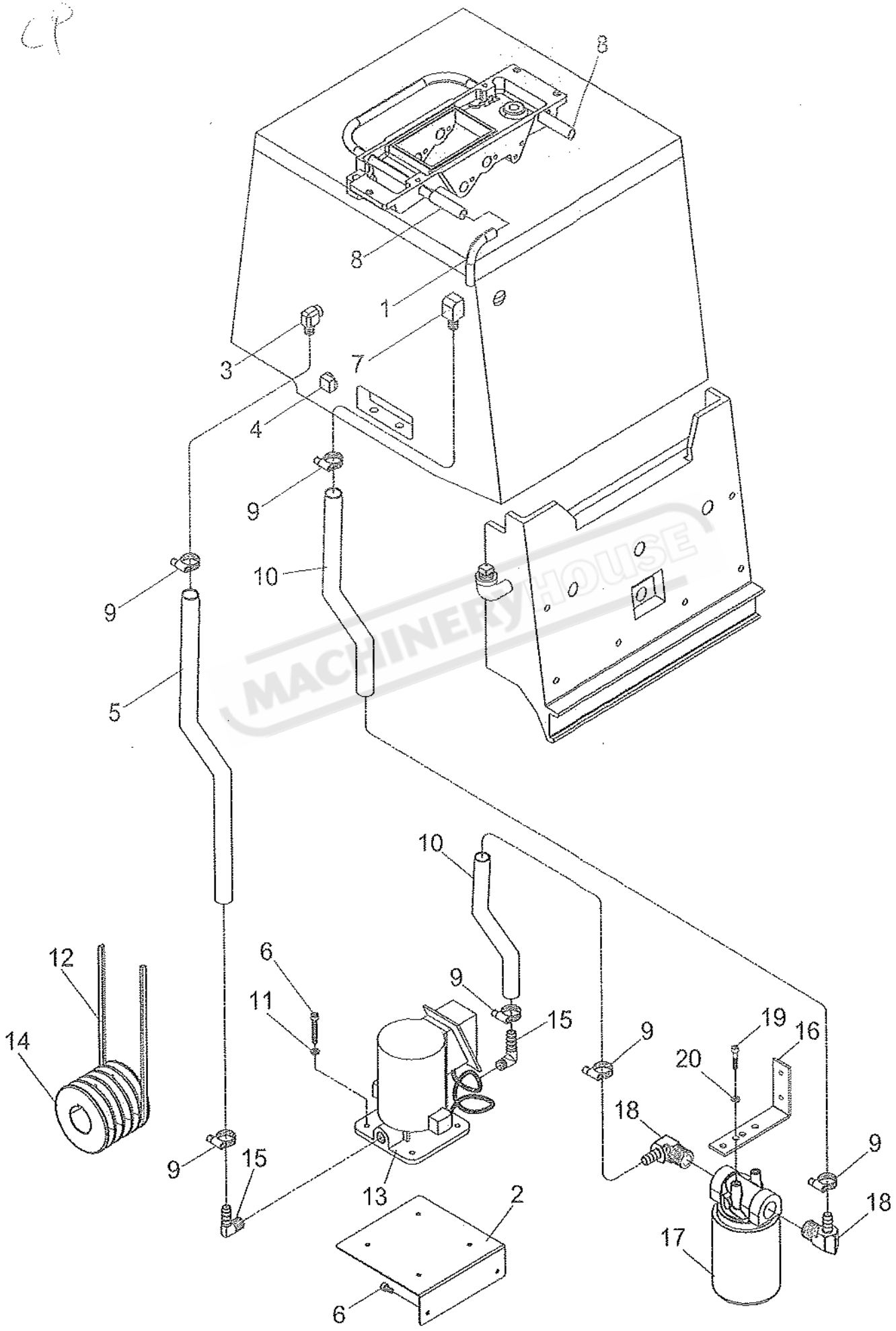


(Fig.4)



(Fig.5)

HEADSTOCK LUBRICATION (VARISPEED)



NO.	PART NO.	DESCRIPTION	QUANTITY
1.	C-1154	Connector	1
2.	C-1183	Frame	1
3.	A-4154	Elbow (3/8"PTx1/2"H)	1
4.	A-1126	Plug (3/4"PT)	1
5.	A-4120	Hose	1
6.	A-1202	Socket Head Cap Screw (M6x12L)	6
7.	A-0498	Elbow	1
8.	A-4115	Hoses	2
9.	A-4111	Clamp	4
10.	AA9803	Hose	2
11.	A-1901	Washer (ϕ6)	4
12.	A-0109	Vee Belt (A-72")	4
13.	A-4102	Pump	1
14.	C-7028-6	Motor Pulley	1
15.	A-4101	Elbow	2
16.	G-7071NC	Frame	1
17.	AA9001	Oil Strainer	1
18.	A-4153	Elbow (1/4"PTx1/8")	1
19.	A-1203	Socket Head Cap Screw (M6x16L)	2
20.	A-1917	Washer (ϕ6)	2