

INSTRUCTION MANUAL

Schools / TAFE

Champion 1530 Centre Lathe - with DRO (415V)
390 x 762mm



L252D

High Speed Precision Lathes

CHAMPION

INSTRUCTION & PARTS MANUAL

(Original instructions)

Web Site: www.machineryhouse.com.au/

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OPERATOR WITH WELL TRAINING AND SKILLED OPERATOR

Requirements as following:

Just the one whom had read the operation manual and really understand it thoroughly or the one whom had under the training by original manufacturer are authorized to operating this machine.

Please read and understand the operating manual before work on this machine.

This operating manual must always be available for operator at any time.

Make sure that only authorized personnel work on the machine.

Just well-trained technicians can operate the “hydraulic”, “pneumatic” & “electrical” control system.

Environmental protection

Local environmental safety regulations must be observed when handling dangerous substances.

Observe respective safety regulation for products when using oils, grease and other chemical substances. Special care and attention must be taken to prevent any damage to the environment when topping up or changing oils.

Dangerous substances (such as oil, grease batteries etc.) must be disposed of correctly.

EXPECTED USE AND LIMITS OF USE

The machine is designed only for cold metal cutting. Other purpose of working is prohibited. The materials, such as wood, glass, metal powder, ceramic and poisonous materials, etc are not allowed to be used on this machine.

The machine can cut the material like cast iron, steel, copper, aluminum, doing the turning, boring, drilling and tapping etc. jobs.

In addition, it is informed in operation manual for maintenance, setting and cleaning etc.

NOTE: The machine is NOT allowed to work with flammable metal working fluids or materials as aluminum or magnesium, which can cause fire and explosion or noxious dust.

MACHINERYHOUSE

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PHYSICAL ENVIRONMENT AND OPERATING CONDITIONS

The machine is designed for not using at the potentially explosive environment. Generally, the machine should be installed under the following conditions:

- a. The minimum requirement for all electrical equipment is correct operation between air temperature of $+5^{\circ}\text{C}$ and $+45^{\circ}\text{C}$.
- b. Electrical equipment is capable of operating correctly when the relative humidity does not exceeding 50% at a maximum temperature of $+45^{\circ}\text{C}$.
- c. Electrical equipment is capable of operating correctly at altitudes up to 1000 m above mean sea level.
- d. Electrical equipment is designed to withstand to protected against the effects of transportation, and storage temperature within a range of -25°C to $+55^{\circ}\text{C}$ and for short periods not exceeding 24h at up to $+70^{\circ}\text{C}$.
- e. Atmosphere: Free from excessive dust, acid fume, corrosive gases and salt.
- f. Avoid exposing to direct sunlight or heat rays.
- g. Avoid exposing to vibration environmental.
- h. Have to connect to the factory grounding system correctly .
- i. Away from electric magnetic interference source sites, such welding, discharge machine.

ELECTRICALLY SUPPLY

The following AC supply information:

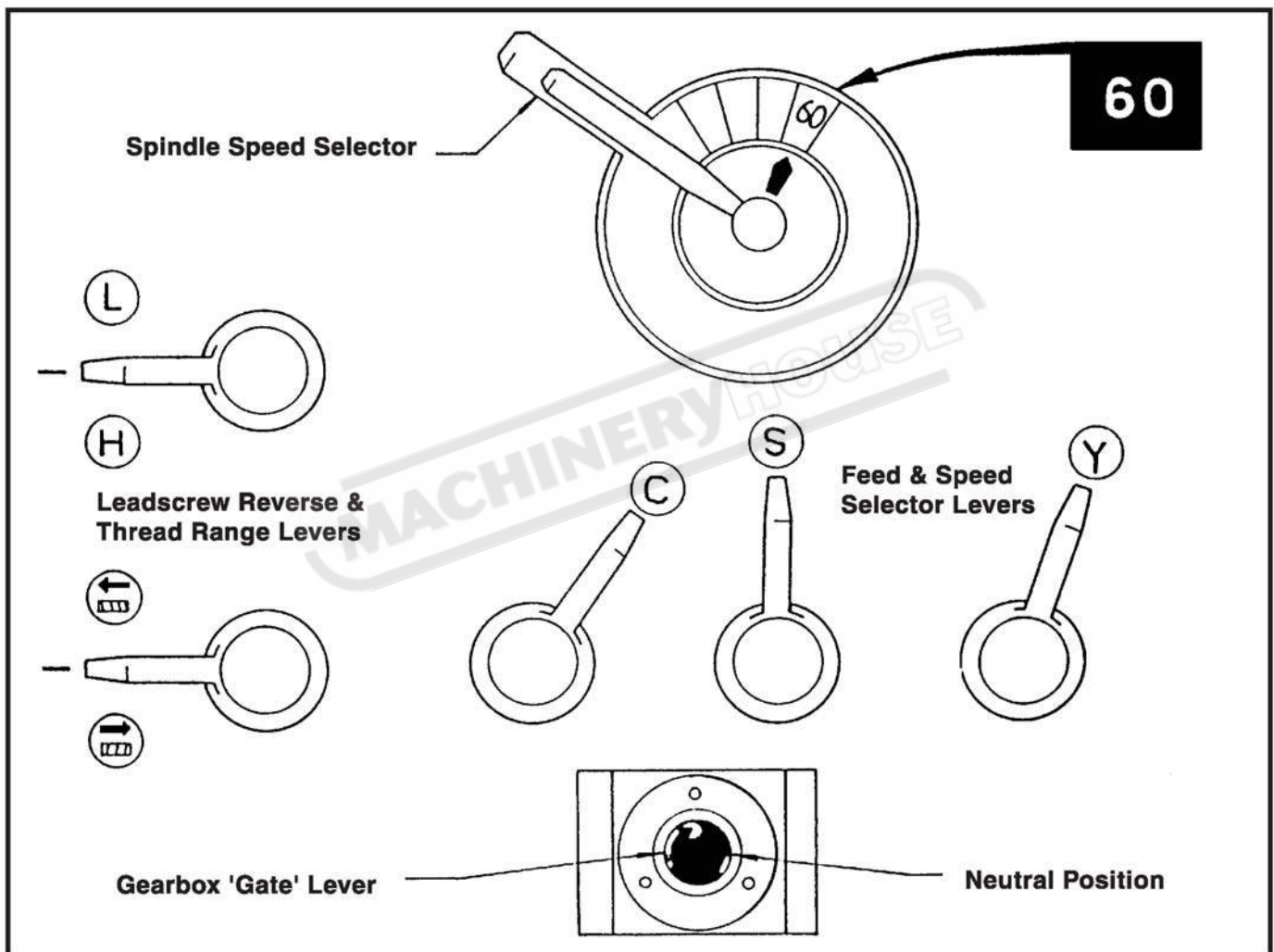
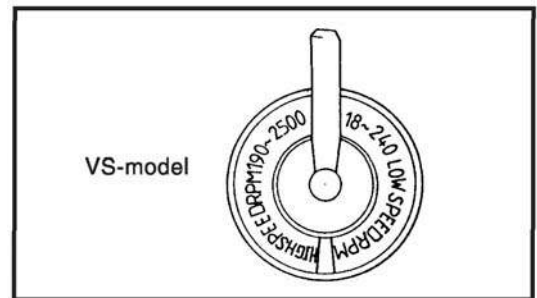
- a. Voltage Steady state voltage: 0.9 to 1.1 of nominal voltage.
- b. Frequency 0.99 to 1.01 of nominal frequency continuously;0.98 to 1.02 short time.
- c. Harmonic distortion not exceeding 10 % of the total r.m.s. voltage between live conductors for the sum of the 2nd through to the 5th harmonic.
- d. Voltage interruption Supply interrupted or at zero voltage for not more than 3 ms at any random time in the supply cycle with more than 1 s between successive interruptions.
- e. Voltage dips Voltage dips not exceeding 20 % of the peak voltage of the supply for more than one cycle with more than 1 s between successive dips.

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 50RPM.

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

CHAMPION 1530/1540/1550

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	25,35,45,60,80,110,140,190,260,360,475,630,845,1140,1520,2000
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.R
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

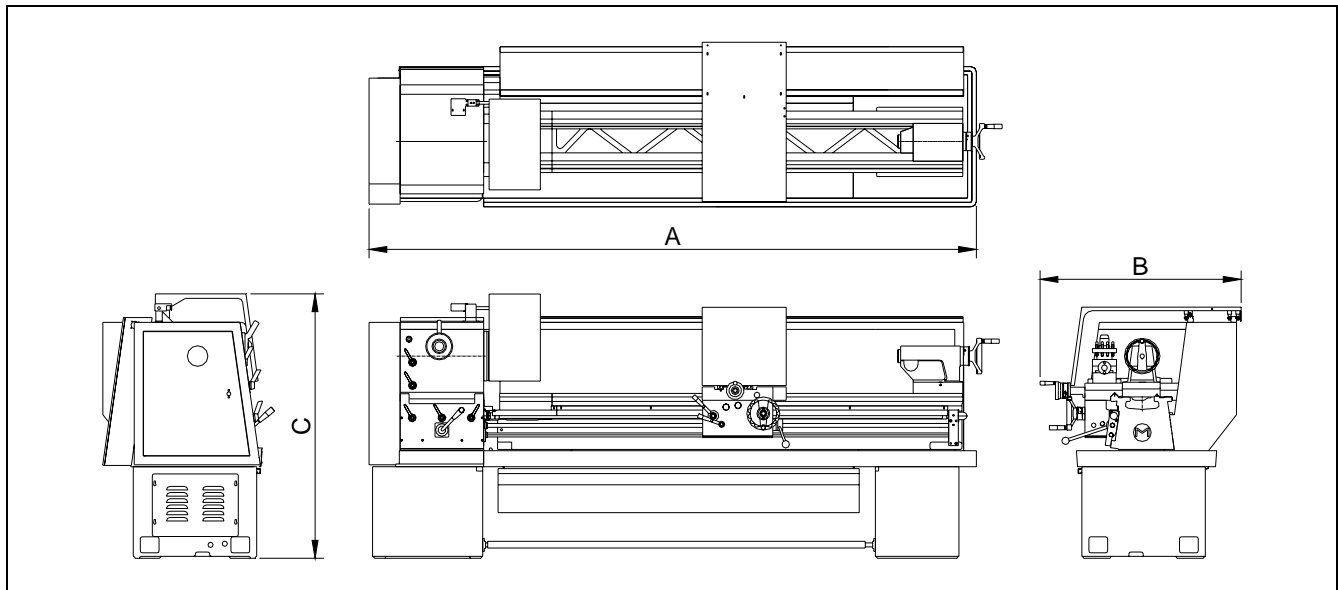
STANDARD EQUIPMENT & ACCESSORIES SUPPLIED WITH LATHE:

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.

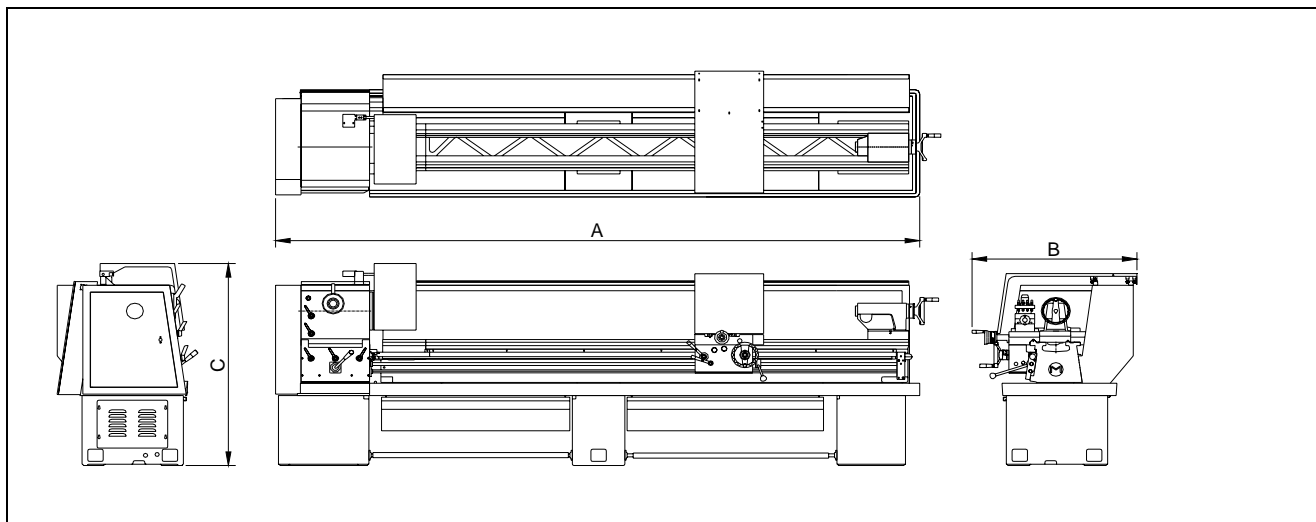
OPTIONAL EQUIPMENTS & ACCESSORIES:

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.

CONVENTIONAL LATHE Overall drawing



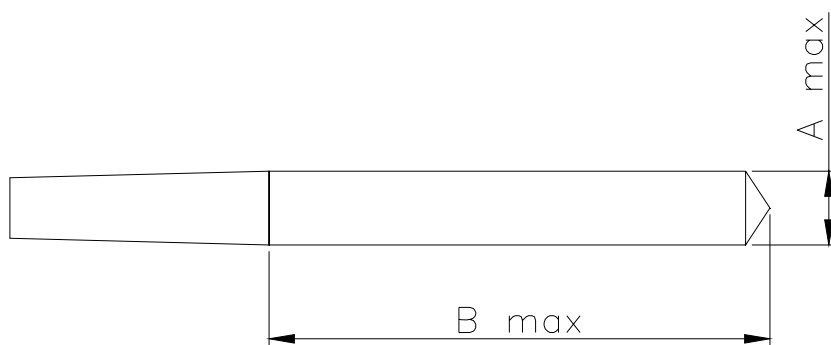
Model		A	B	C
Prince 1330	Prince 750	1550	724	1175
Prince 1340	Prince 1000	1800	724	1175
Studturn 1430	Studturn 750	1610	888	1223
Studturn 1440	Studturn 1000	1864	888	1223
Champion 1530	Champion 760	1955	1031	1232
Champion 1540	Champion 1000	2205	1031	1232
Champion 1550	Champion 1250	2455	1031	1232
Major 1840	Major 1800-1000	2237	1086	1325
Major 1860	Major 1800-1500	2745	1086	1325
Major 1880	Major 1800-2000	3254	1086	1325
Major 2040	Major 2000-1000	2237	1086	1349
Major 2060	Major 2000-1500	2745	1086	1349
Major 2080	Major 2000-2000	3254	1086	1349
Major 2240	Major 2200-1000	2237	1086	1375
Major 2260	Major 2200-1500	2745	1086	1375
Major 2280	Major 2200-2000	3254	1086	1375
General 2660	General 2600-1500	3900	2000	1700
General 2680	General 2600-2000	4425	2000	1955
General 3060	General 3000-1500	3900	2000	1700
General 3080	General 3000-2000	4425	2000	1955
Trainer 1330	Trainer 1330	1640	1060	1580
Trainer 1340	Trainer 1340	1940	1060	1580
Trainer 1430	Trainer 1430	1640	1060	1900
Trainer 1440	Trainer 1440	1940	1060	1900



Major 18120	Major 1800-3000	4265	1086	1325
Major 20120	Major 2000-3000	4265	1086	1349
Major 22120	Major 2200-3000	4265	1086	1375
General 26120	General 2600-3000	5425	2000	1955
General 26160	General 2600-4000	6425	2000	1955
General 30120	General 3000-3000	5425	2000	1955
General 30160	General 3000-4000	6425	2000	1955

TOOL INFORMATION

MODEL	Tool shank(mm)	Tailstock drill A(mm)	Tailstock drill B(mm)	Tailstock drill Max. Weight(kg)
PRINCE	20	18	100	3.5
STUDTURN	20	18	100	3.5
CHAMPION	25	24	120	5
MAJOR	25	24	120	7
GENERAL	25	31	150	10
TRAINER	20	18	100	3.5
KNIGHT	25	24	120	5



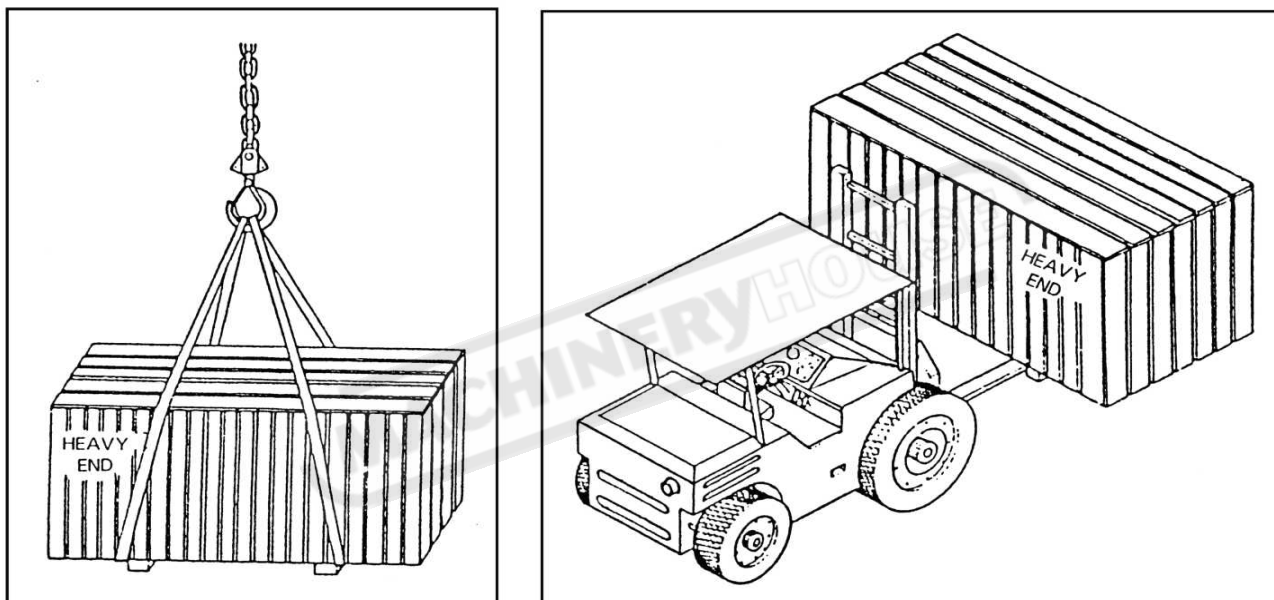
LIFTING MACHINE BEFORE UNPACKING

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

1. the capacity of lift equipment is adequate for the machines.
2. keep the heavy end fully supported and balanced when lifting.
3. the MACHINE WEIGHTS (Approx. Gross weights):

1500KGS(3300LBS)

4. the only recommended lifting equipments are hoist/crane and forklift as shown below:



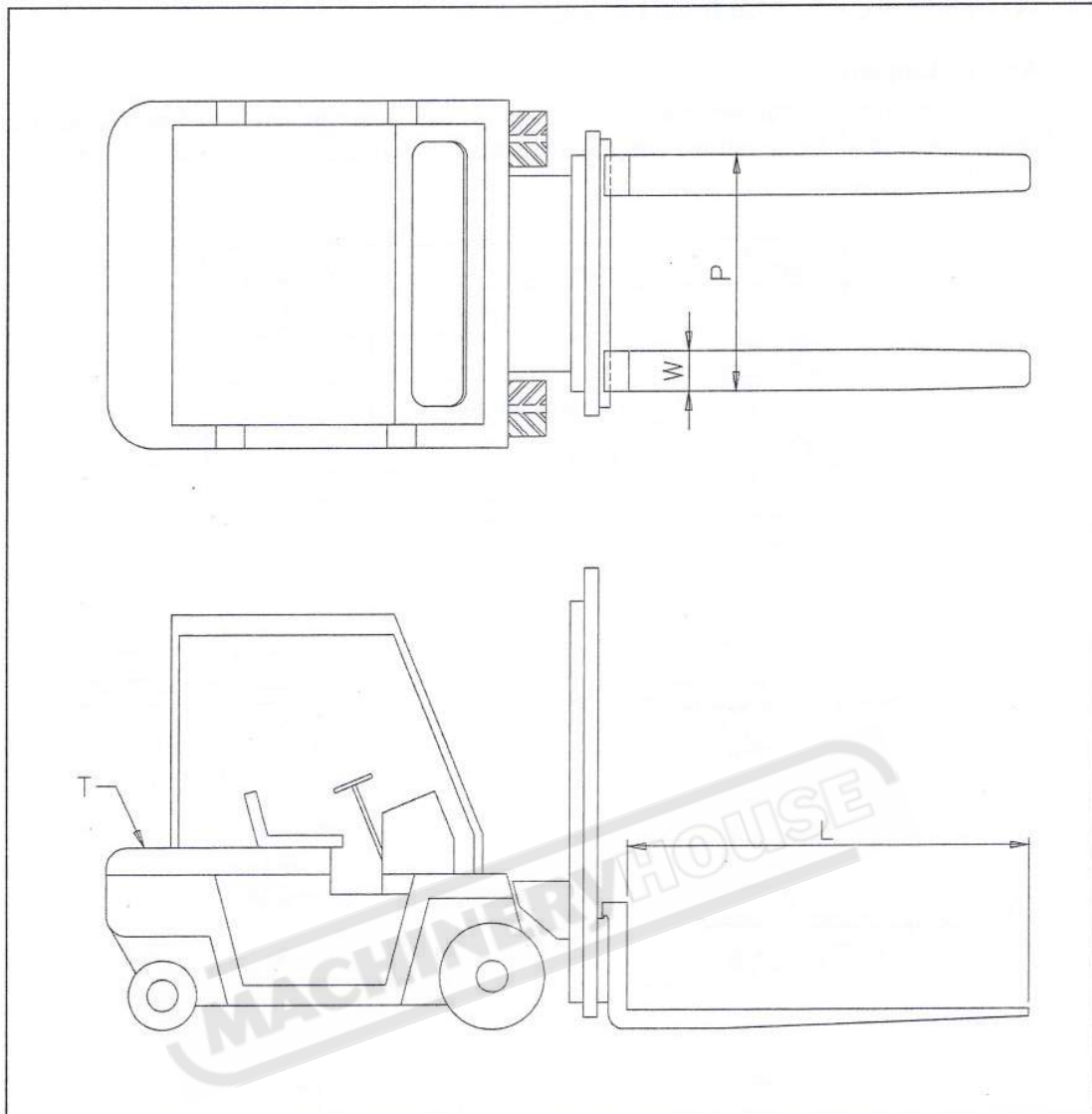
WARNING: Headstock end of Lathe is "HEAVY END", Make sure this end is fully supported.

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

THE FORKLIFT TRUCK CAPACITY



T(ton)	L	W	P
2.5	1350	1200	1100
4.5	1820	1500	1250
8	2450	1800	1850
12	2450	1800	2000

Please pay attention to transport and lift this high precision machine for avoiding any strong extrusions or collisions. The lifting capacity of forklift truck must be sufficient for the machine. Table shows the forklift truck capacity.

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.

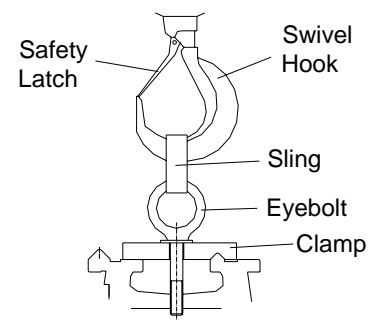
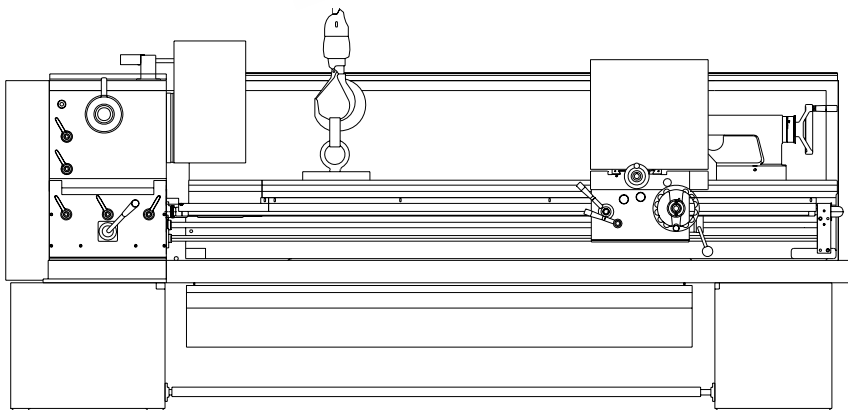
LIFTING THE MACHINE

1. Lift the lathe by hoist/crane as shown in the drawing 6. below.
2. Make sure that a safety-latch type swivel hook is used and that the eyebolt clamp was tightened properly to the bed.
3. If the larger swivel hook can not fit into the eyebolt, an intermediate sling can be used as shown in the drawing below.
4. Carefully and slowly lift the lathe clear of the wooden base or ground and, if necessary, reposition the carriage or tailstock to achieve a better balance before lifting any higher or further.
5. If you reposition the carriage or tailstock, make sure you re-tighten and lock them in place.

6. 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.

- After a full load is on the main hook, check to make sure that the lifting hook swivels freely and not putting any twisting stress on the eyebolt which might loosen it up.
7. Lift and move the lathe very slowly to avoid tilting or rocking the machine which could become dangerous.
 8. Keep the lathe low to the ground with only the necessary ground clearance to move the machine freely over the surface.
 9. For transshipping the lathe without repacking onto a skidbase, it is recommended to lift the machine straight up to the desired height and drive a flat bed truck underneath it for loading. This is a safer method of moving the machine than moving with a crane.

BEFORE 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 NEGLIGENCE 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

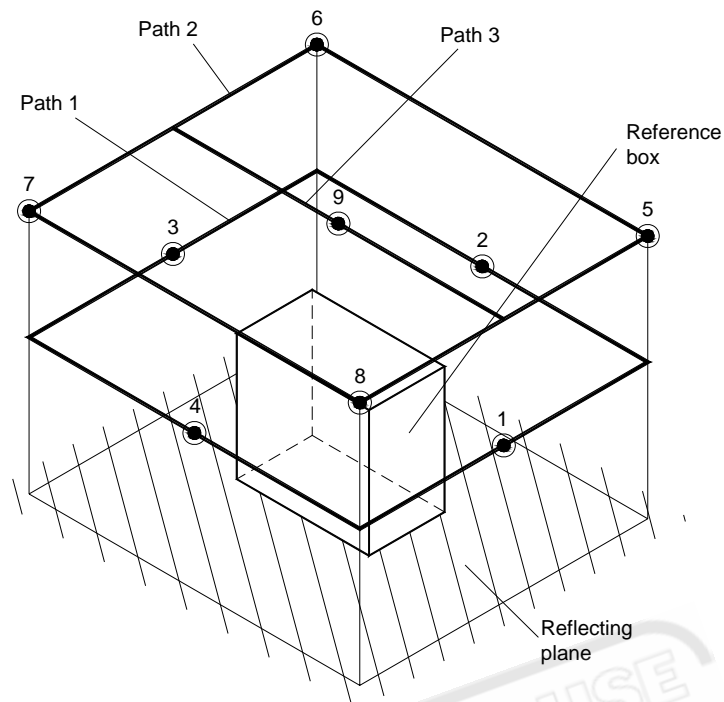
1. ARE YOU PROPERLY TRAINED PERSONNEL TO USE THIS LATHE?
2. READ THIS INSTRUCTION MANUAL CAREFULLY BEFORE OPERATION.
3. ENSURE YOU KNOW HOW TO STOP THE LATHE BEFORE STARTING IT
4. ENSURE YOU ARE IN GOOD HEALTH AND SPIRIT TO OPERATE THE LATHE.
5. KEEP ALL GUARDS, COVERS AND DOORS IN PLACE AND CLOSED.
6. KEEP THE LATHE AND WORK AREA NEAT, CLEAN AND ORDERLY.
7. WEAR AND UTILISE SUITABLE PROTECTIVE CLOTHING AND EQUIPMENT.
8. DO NOT WEAR RINGS, WATCHES, TIES OR LOOSE SLEEVED CLOTHING.
9. NEVER LAY ANYTHING ON THE WORKING SURFACE OF THE LATHE.
10. STOP LATHE IMMEDIATELY ANYTHING UNEXPECTED HAPPENS.
11. DO NOT TOUCH OR REACH OVER ROTATING OR MOVING PARTS.
12. DO NOT PERFORM ANY SET-UP WORK WHILE LATHE IS RUNNING.
13. DO NOT OPERATE THE LATHE IN EXCESS OF ITS RATED CAPACITY.
14. DO NOT INTERCHANGE CHUCKS OR OTHER SPINDLE MOUNTING ITEMS WITHOUT CHECKING FOR CORRECT LOCKING.
15. DO NOT USE OTHER WORKHOLDING DEVICE WITHOUT CHECKING WITH ITS MANUFACTURER.
16. DISCONNECT LATHE FROM POWER SOURCE BEFORE PERFORMING ANY MAINTANENCE OR CHANGING TOOLING.
17. ISOLATE LATHE WHEN LEAVING IT UNATTENDED.
18. **THE MACHINE IS NOT ALLOWED TO WORK WITH FLAMMABLE METAL WORKING FLUIDS OR MATERIALS AS ALUMINUM OR MAGNESIUM, WHICH CAN CAUSE FIRE AND EXPLOSION OR NOXIOUS DUST.**
19. **DON'T WEAR GLOVES DURING OPERATION, ONLY WHEN LOADING AND UNLOADING WORKPIECE COULD WEAR GLOVES.**
20. BALANCE REQUIREMENTS ON WORKPIECE CLAMPING DEVICE SHALL BE FOLLOWED: WORKPIECE CLAMPING DEVICES SHALL ONLY BE MODIFIED IN ACCORDANCE WITH THE CLAMPING DEVICE MANUFACTURER'S RECOMMENDATIONS.
21. SHALL BE PROVIDED THAT MACHINING UNBALANCED WORKPIECE MAY CREATE AN EJECTION HAZARD AND THAT MEANS OF MINIMING THE RISK IS COUNTER BALANCING OR MACHINING AT REDUCED SPEED.
22. **CHUCK GUARD AND CHIP GUARD ARE ABLE TO REDUCE MOST OF RISKS, BUT UNAVAILABLE TO PREVENT 100% RISK.**
23. Machine can't be started if safety device is opened.

THE EXPECTED LIFE OF THE MACHINE IS COUNTED AS:
8 HRS X 5.5 DAYS X 45 WEEKS X 10 YEARS = 19800 HRS
WHICH TO BE UNDER NORMAL OPERATION AND WELL MAINTENANCE.

IT IS NOT NECESSARY TO REPLACE MANY COMPONENTS EXCEPT THOSE ARE CONSUMABLE.

NOISE LEVEL

Equivalent A-weighted Sound pressure level according to EN ISO 3746: 75.6 dB(A) for, MJ 2260

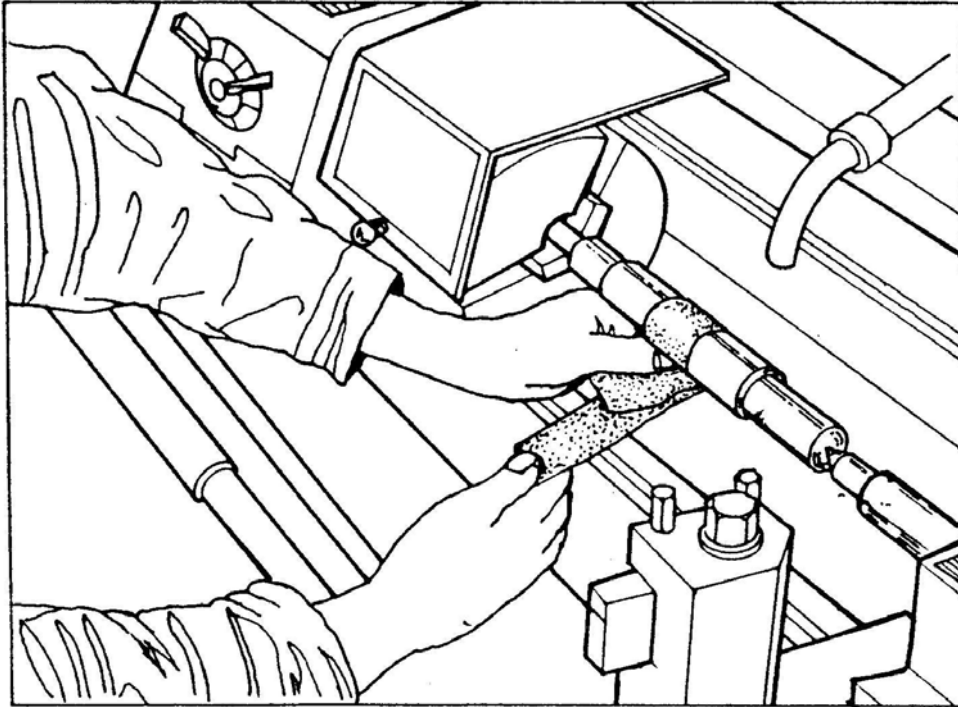


NOTE:

Uncertainty, K in decibels: 4.0 dB (A) according to EN ISO 4871

The figure quoted is emission levels and are not necessarily safe working levels. Whilst there is a correlation between the emission and exposure levels, this cannot be used reliably to determine whether or not further precautions are required. Factors that influence the actual level of exposure of the workforce include characteristics of the workroom, the other sources of noise, etc. i.e. the number of machines and other adjacent processes. Also the permissible exposure level can vary from country to country. This information, however, will enable the user of the machine to make a better evaluation of the hazard and risk.

ACCIDENTS AT LATHES BY USING EMERY CLOTH



DANGER: Any strips of Emery Cloth there is a Danger of Trapping.

HAZARDS

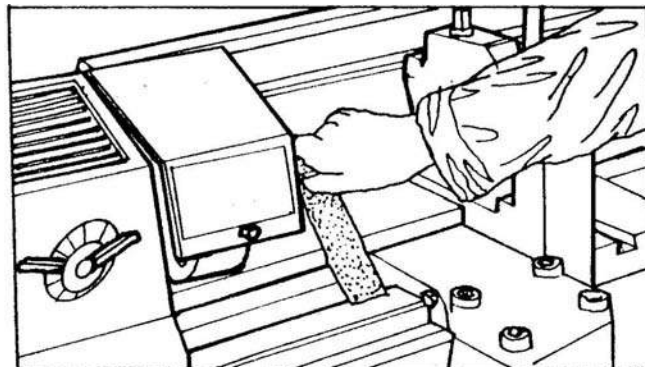
A high proportion of all accidents at metalworking lathes involve the use of Emery Cloth and result in injuries such as broken or occasionally amputated fingers. Emery Cloth is used to deburr, polish or size a wide range of cylindrical, tapered and threaded metal components while they are rotating in lathes. Most accidents happen when each end of a strip of Emery Cloth is held in separate hands and passed around the back of the component being finished. If the Cloth is wrapped around the fingers and/or becomes snagged on the component while it is tightly gripped, then a serious injury is the likely result.

PRECAUTIONS

Emery cloth should NEVER be used at CNC lathes. Employers should assess the need to use emery cloth on components in a lathe.

Such operations may not be necessary if:

- (a) the finish being sought is only cosmetic. For such finishes the component may be held in one hand and polished by Emery Cloth held in the other. Alternatively a finishing belt or machine be used.
- (b) a sizing operation can be successfully performed either by turning or by further operations machine. In a dedicated polishing, finishing or grinding machine.



DANGER: Emery Cloth should never be held loose in the hand.

If the required tolerance is only achievable by the use of Emery Cloth against rotating components, then the Emery Cloth should be applied using either:

(a) A backing board of good quality wood as figure (a)

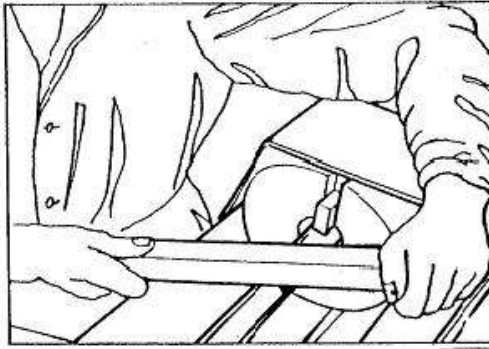


Fig a

(b) A toolpost onto which the Emery Cloth may be placed as figure (b);

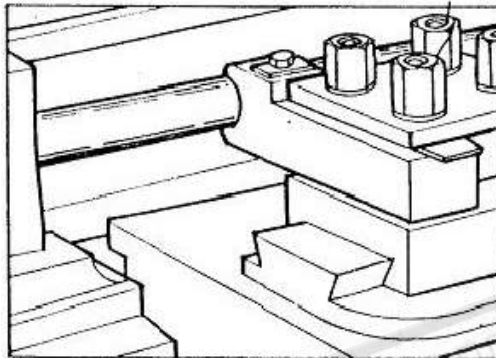


Fig b

(c) A 'nutcracker' consisting of two backing boards which are lined with Emery Cloth and joined at end and shaped so that they may encompass the surface to be finished as figure (c) ;

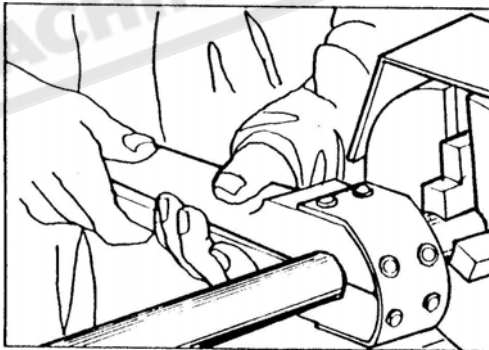


Fig c

(d) Or hand-held abrasive-impregnated wire brushes.

WARNING

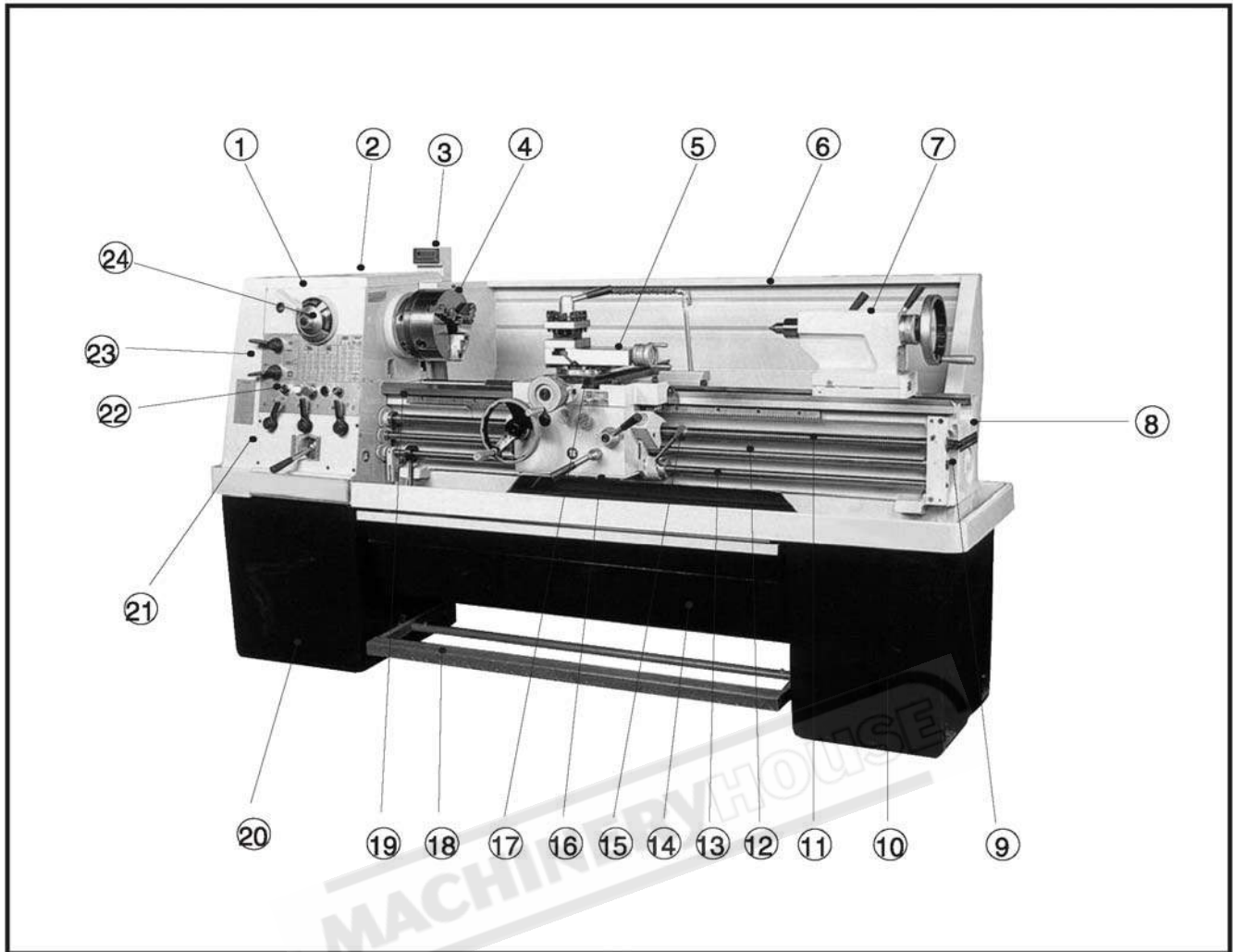
Gloves should never be worn when polishing is being carried out.

Where none of the above methods is reasonably practicable and it is necessary to use Emery Cloth for polishing the outside diameters of components, the Emery Cloth should be used in long strips with one end passed beneath the component.

Force should be applied by pulling both ends of the cloth upwards, never allowing the cloth to go slack or to wrap around either the operator's finger or the components.

For polishing the ends of components, only very short lengths or pads of cloth should be used which are incapable of causing entanglements.

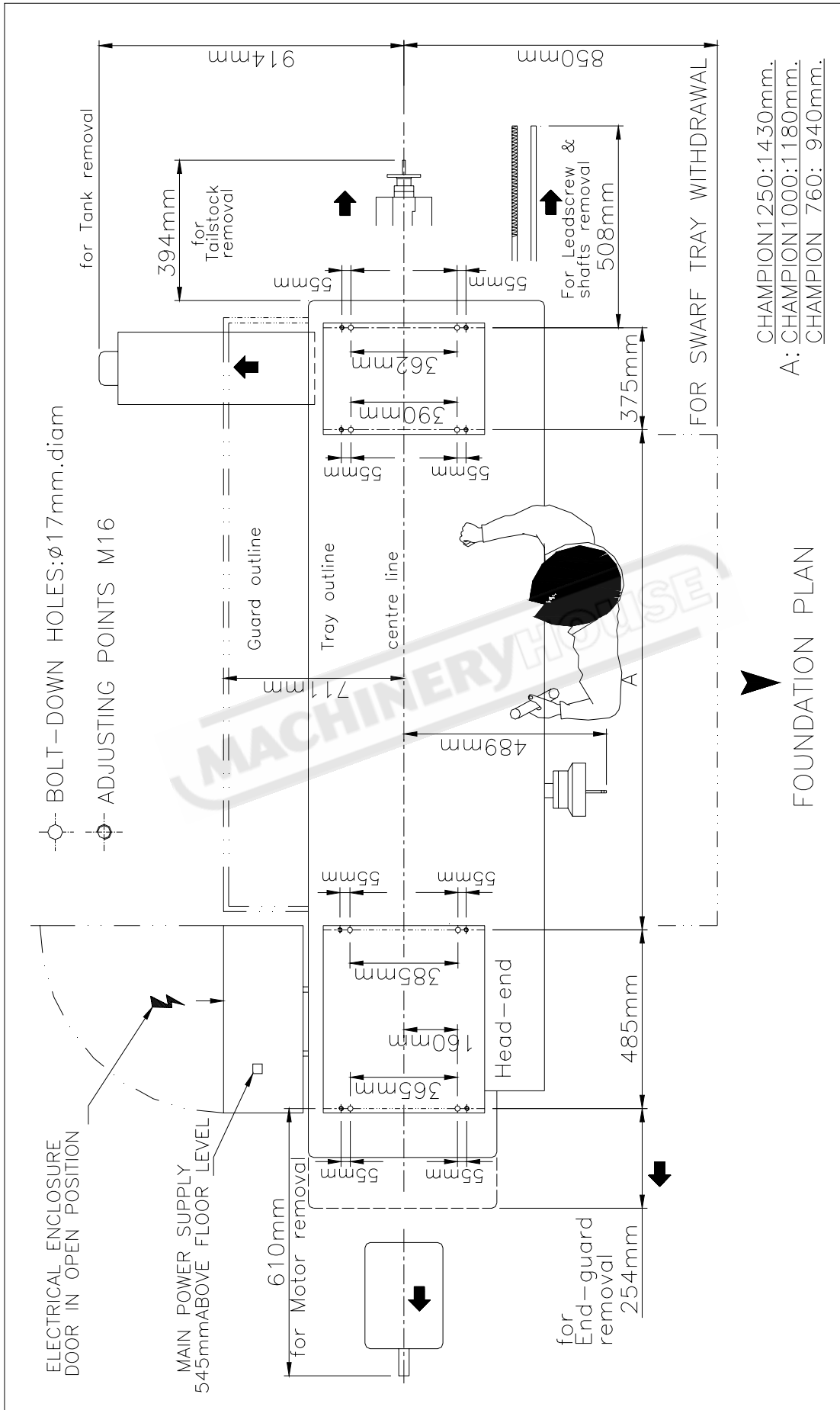
OPERATION



LEGEND

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

FOUNDATION PLAN



CONNECTION OF EXTRACTION SYSTEM

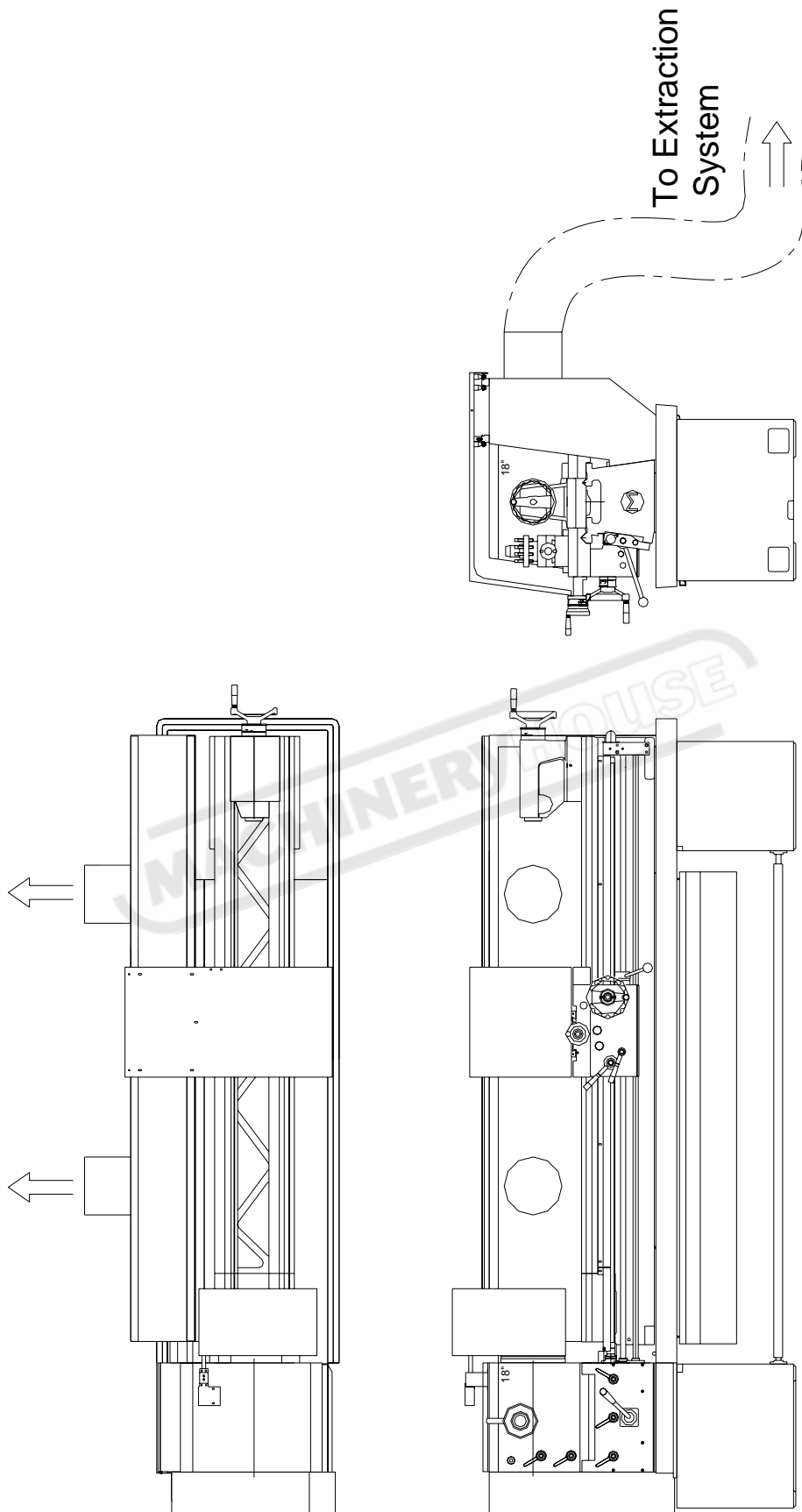


ILLUSTRATION OF HAZARD REGION

Arrow shows the directions of movement in the danger area.

Item	Name
1	Chip Guard (moveable guard)
2	Chuck Guard
3	Headend Guard
4	Rear Guard
5	The area between the leadscrew and second rod

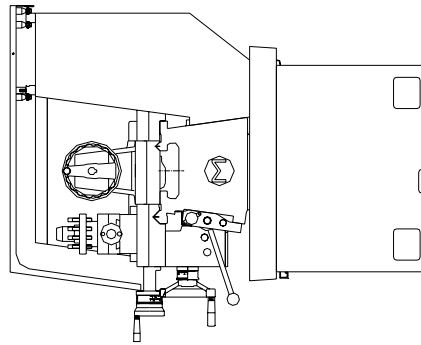
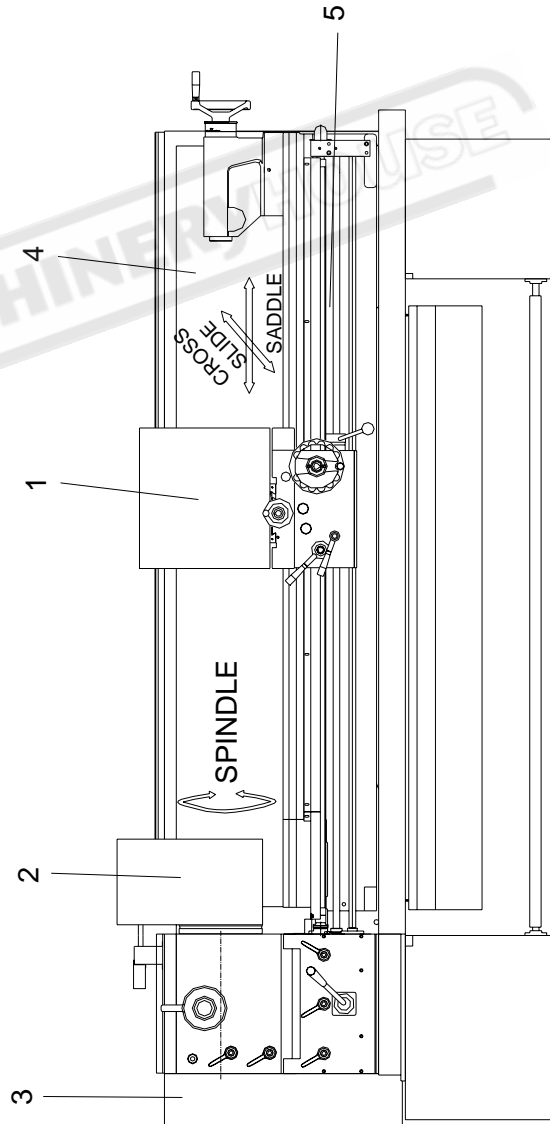
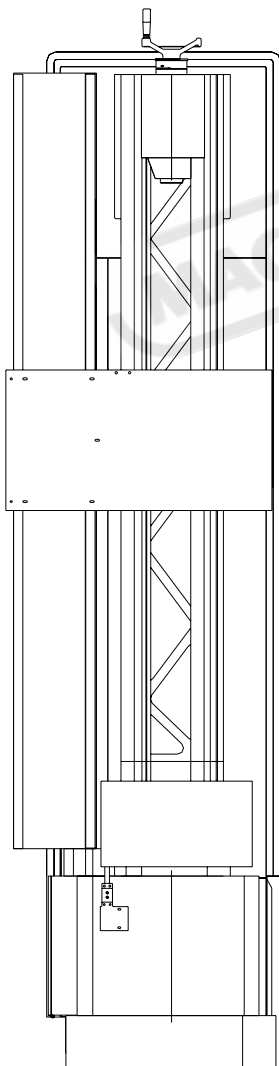
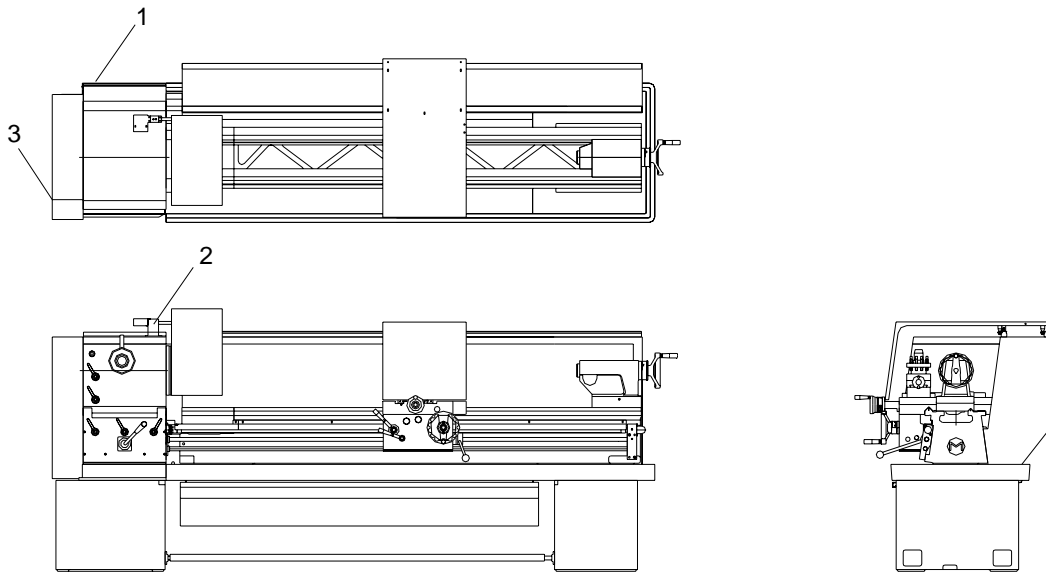


ILLUSTRATION OF SAFETY DEVICE POSITION



Item	Name	Description
1	Power switch door (interlock)	Switch on: Power is supplied, and machine will be in a controlled condition. Switch off: Power is not supplied, and machine will stop at once. Safety door lock switch. Machine can't be started if door is opened.
2	Chuck guard (limit switch)	Machine can't be started if door is opened.
3	Left side door (interlock)	Safety door lock switch. Machine can't be started if door is opened.

SAFTY OF MACHINE TOOL GUARDS

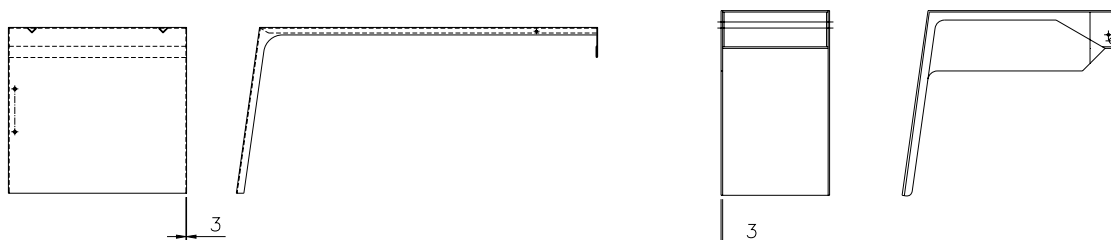
NOTE: CHUCK GUARD AND CHIP GUARD ARE ABLE TO REDUCE MOST OF RISKS, BUT UNAVAILABLE TO PREVENT 100% RISK.

Turning machine must now comply with the following European Safety Standard:

EN12840 Safety-Manually Controlled Turning machines with or without automatic control

The machine is supplied as standard with 3mm mild steel chuck guard and chip guard.

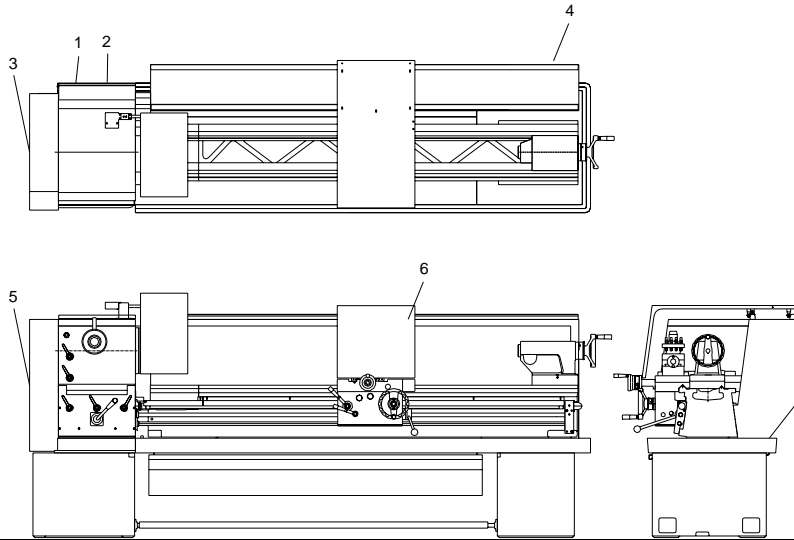
Note: The strength of the machine guarding have been calculated to contain the ejection of a chuck jaw when running at the maximum speed of the machine spindle with chuck diameter and jaw weights as specified above.



CHIP GUARD

CHUCK GUARD

THE POSITION OF WARNING AND SIGN



Label & Plates	
1	<p>JESCO CE nameplate</p> <p>JESCO MACHINERY LTD. P.O.BOX 14-9, Taiping (411), Taichung, Taiwan. TEL : 886-4-22702676 FAX : 886-4-22706295 E-mail : jesco1@ms22.hinet.net http : //www.jesco.com.tw</p> <p>MODEL <input type="text"/> SERIAL No. <input type="text"/> YEAR OF BUILD <input type="text"/> NET WEIGHT(KG) <input type="text"/> SPINDLE RPM <input type="text"/> WIRING DIAGRAM <input type="text"/></p> <p><input type="checkbox"/> VOLTS <input type="checkbox"/> PHASE <input type="checkbox"/> HERTZ <input type="checkbox"/> AMPS</p> <p>SHORT CIRCUIT CAPCITY <input type="text"/> KA</p>
2	<p>Electric shock! Operate carefully.</p>
3	<p>On the whipping hazard and stating that exposed stock bars shall be guarded.</p>
4	<p>Coolant drain port</p>
5	<p>Please don't open it when operation.</p>
6	<p>High speed! Do not put hands near it when machine operation.</p>

CLEANING OR LEVELLING LATHE

WARNING: DISCONNECT ALL ELECTRIC POWER BEFORE CLEANING, LEVELLING OR MAINTENANCE LATHE.

CLEANING

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

DO NOT USE CELLULOSE SOLVENTS FOR CLEANING AS THEY WILL DAMAGE THE PAINT FINISH.

Oil all bright machined surfaces immediately after cleaning, using machine oil or slideway lubricant; use heavy oil or grease on the end gears.

INSTALLING

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

FREE-STANDING

Position lathe on foundation and adjust each of the eight/ten mounting feet to take equal share of the load. Then using a machinist's 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/ten 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.

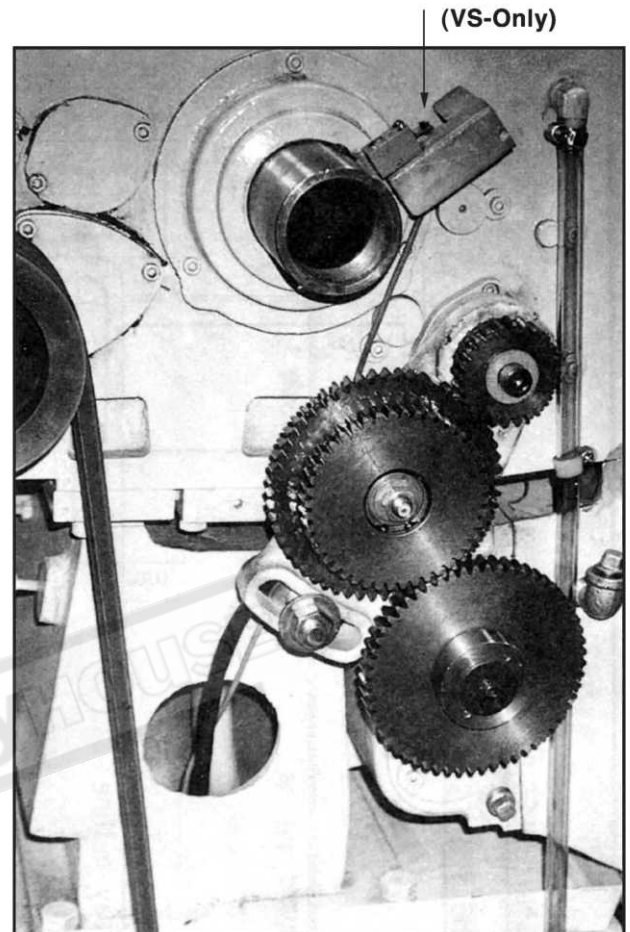


Fig.1

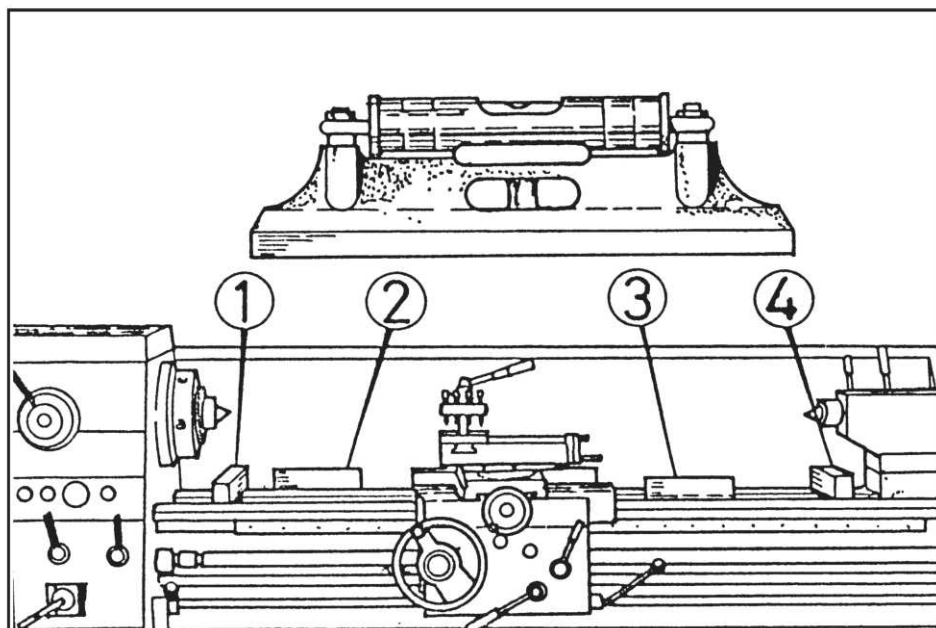


Fig. 2

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 qualified electrician. Proper grounding and fused main disconnects are necessary. (Shown on Fig.3 speed meter, Ampere meter, exhaust fan work lamp socket. Inverter, earth Bar are optional equipment for VS- model only.)

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 ISO. VG. 37 or equivalent.
2. That the gearbox is filled to level marked on oil sight window with ISO. VG. 32.
3. That the carriage apron is filled to level mark on oil sight window with ISO. VG 68.
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.

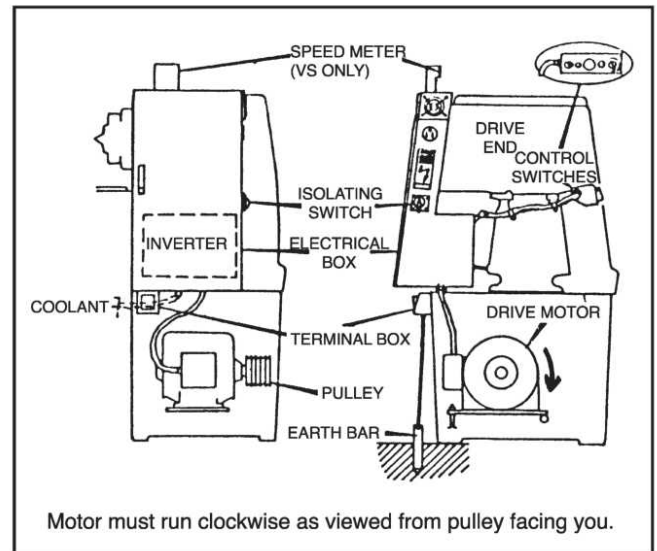


Fig.3



Fig.4

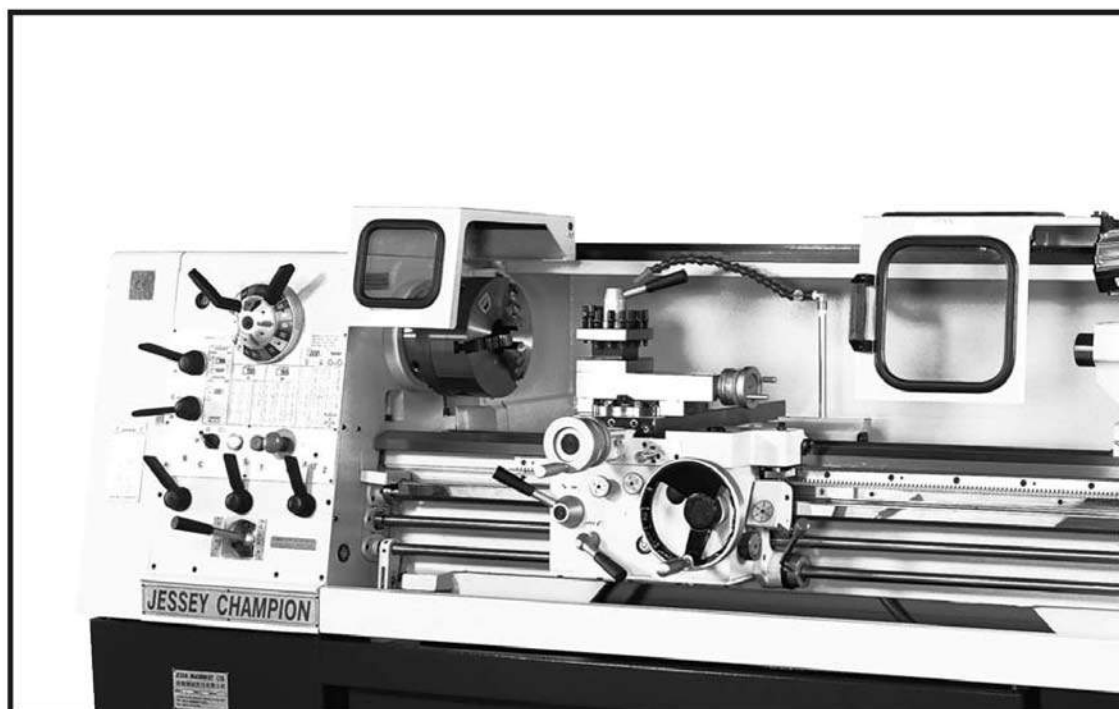


Fig. 5

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 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.

WARNING

Chuck should be CE approval of EN 1550, the relevant required markings in it. Take careful note of speed limitations when using chucks and faceplates.

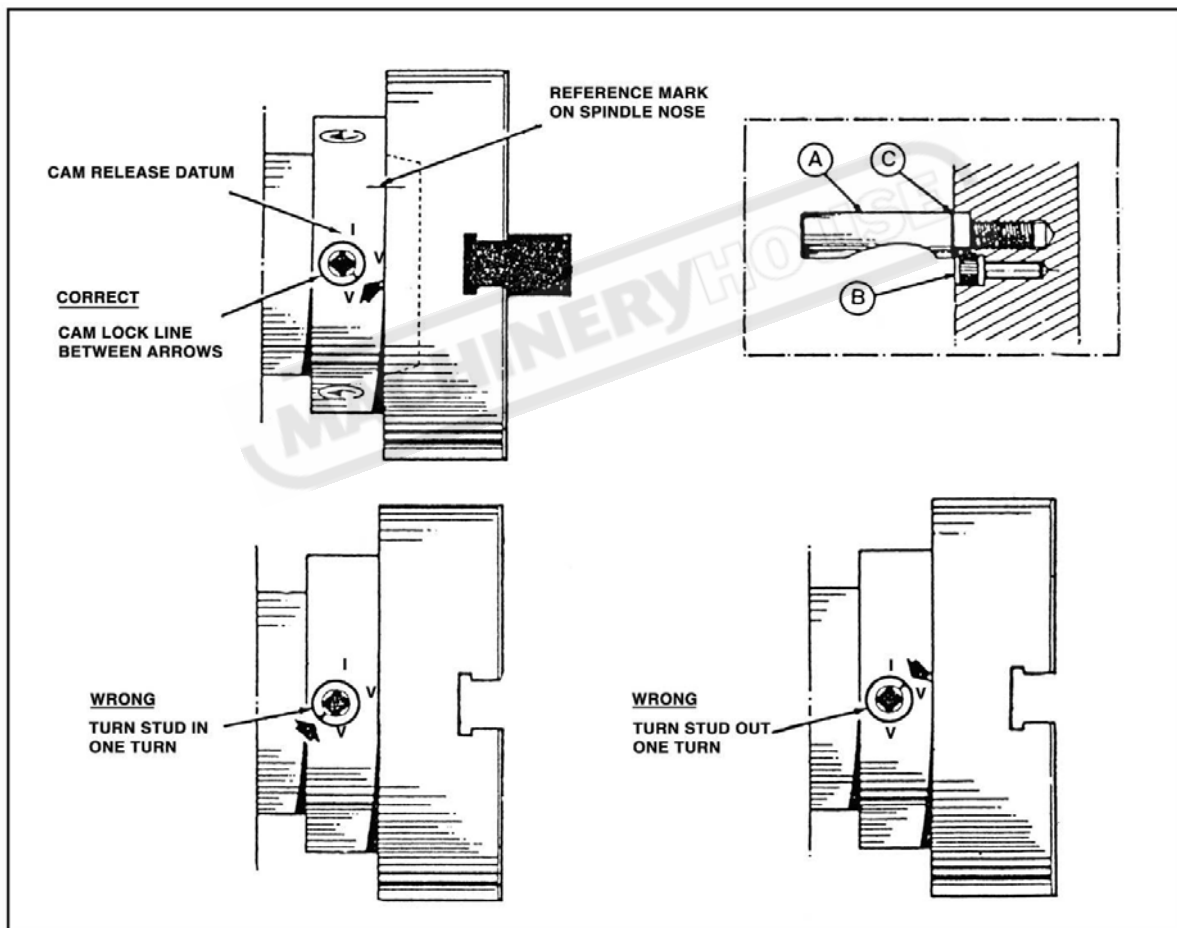


Fig.6

NOTE:

1. Balance requirements on workpiece clamping device shall be followed: Workpiece clamping devices shall only be modified in accordance with the clamping device manufacturer's recommendation.
2. Shall be provided that machining unbalanced workpiece may create an ejection hazard and that means of minimizing the risk is counter balancing or machining at reduced speed.
3. The machine is not allowed to machine the aluminum or magnesium alloy, which can cause additional, hazards e.g. fire and explosion or noxious dust.
4. **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.

CHUCK JAW DETAIL

Top jaws should be designed to hold the workpiece as close to the chuck face as possible. Excessive jaw height reduces the effective gripping force available and is detrimental to accuracy. As a general rule, the height of the grip point above the chuck face should not exceed one quarter of the chucks' diameter.

Large, heavy top jaws should be avoided if possible since the loss of gripping force due to centrifugal effects at high spindle speeds is increased. If heavy jaws are unavoidable, it may be necessary to restrict the spindle speed below the chucks' maximum recommended speed to ensure that sufficient gripping force is retained to hold the workpiece.

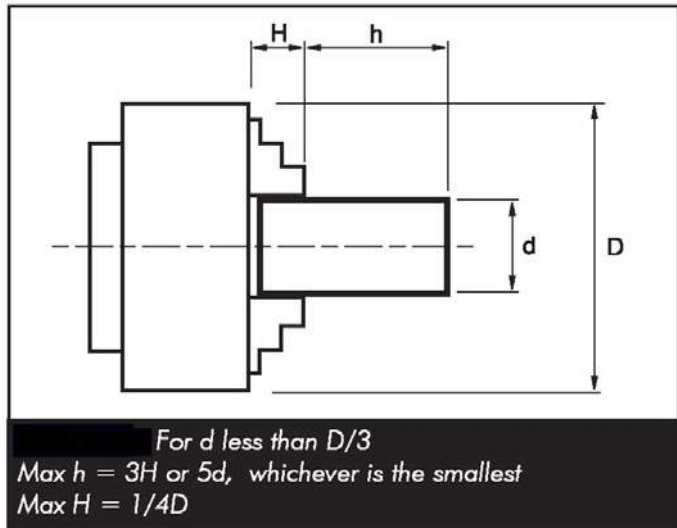
All top jaws in a set should be of equal weight to ensure that no out-of-balance forces occur. In the case of workpieces with a residual out-of-balance, this may be corrected by designing the top jaws to counteract the imbalance component. Alternatively, it may be necessary to restrict the machine to low speeds to avoid possible vibration problems.

Ideally, top jaws should not extend beyond the chuck periphery. If this is unavoidable, the amount of projection should be restricted within safe limits bearing in mind that the loss in gripping force due to centrifugal effect is a function of the product of top jaw mass and the distance to the jaws' centre of mass about the chucks' rotational axis. Precautions should also be taken to ensure that projecting top jaws will not collide with tooling during the machining cycle.

Care should be exercised in machining workpieces whose length protrudes excessively beyond the chuck jaws. As a general guide, for workpieces up to approximately one third of the chuck diameter whose inner end face is located close to the chuck, machining should not be carried out at a distance greater than five times the workpiece diameter or three times the axial length gripped by the jaws measured from the outer end of the jaws.

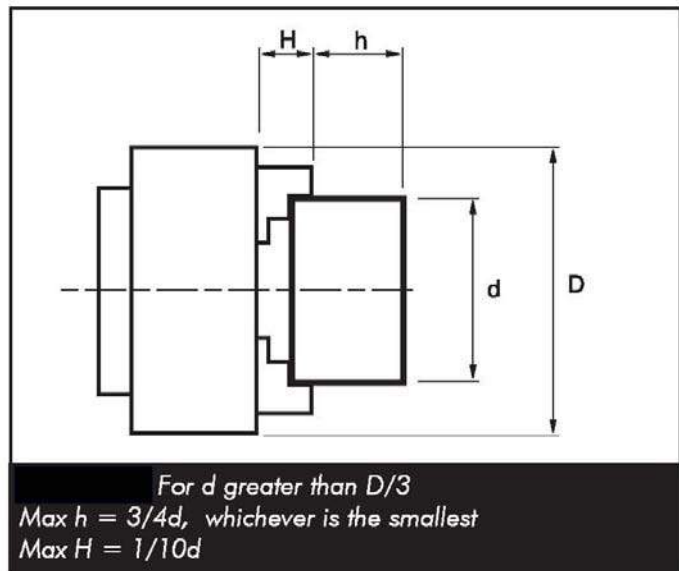
The lesser of these values should be used and the maximum height of the top jaw should be restricted to one quarter of the chuck diameter.

The proportions for this condition are shown below.



When the workpiece diameter is greater than approximately one third of the chuck diameter and the workpiece is well supported axially close to its outer periphery, the distance to the machine point from the outer end face of the jaws should not normally exceed three quarters of the workpiece diameter. This is based on the assumption that the axial length of the workpiece gripped by the jaws is not less than one tenth of the workpiece diameter.

The proportions for this condition are shown below.



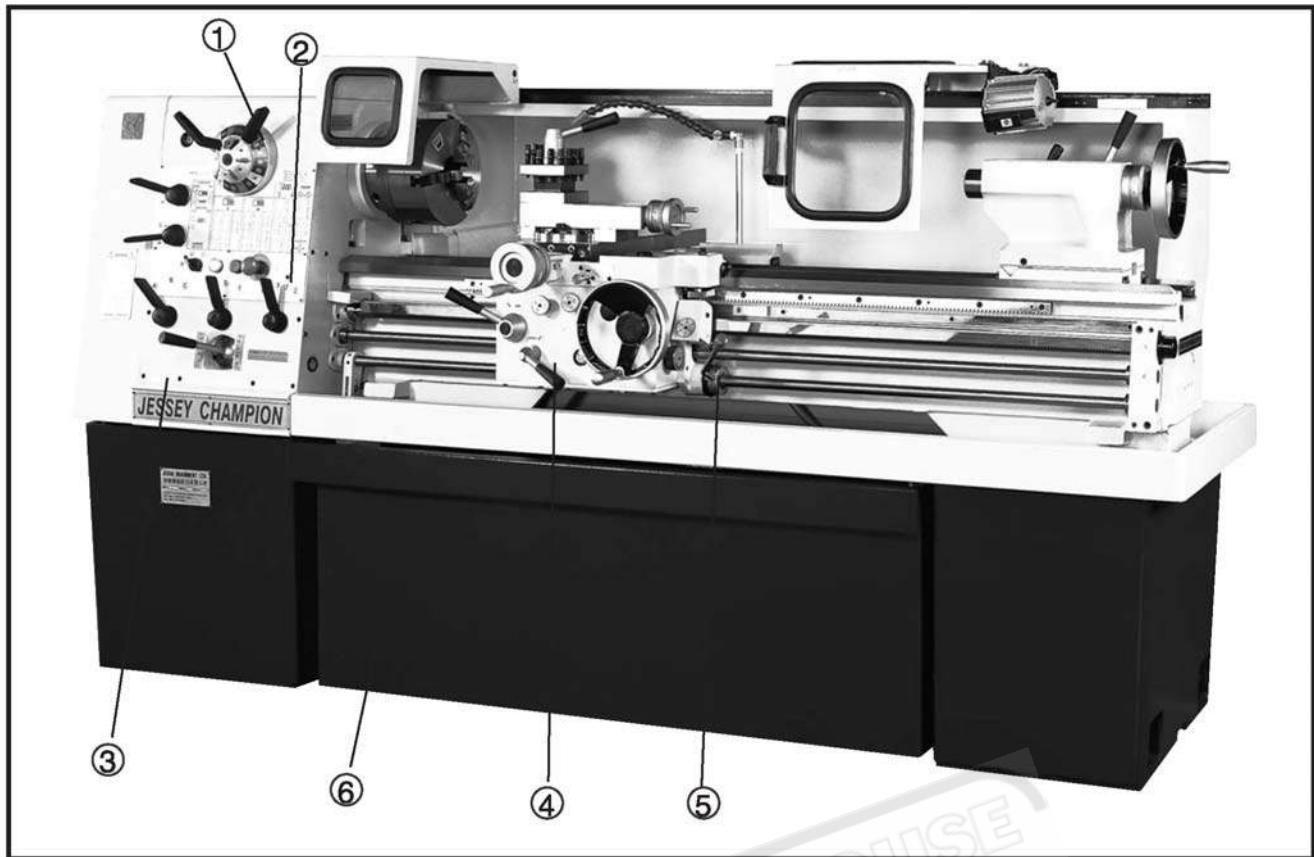


Fig.7

LATHE CONTROLS (See Fig. 7)

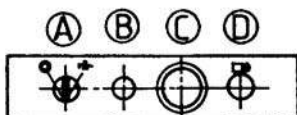
1. Spindle speed selector.
2. Electrical control panel.
3. Apron, surfacing or sliding feeds.
4. Gearbox, threads and feed.
5. Spindle forward-off-reverse control.
6. Footbrake.

ELECTRICAL CONTROL PANEL (See Fig.8)

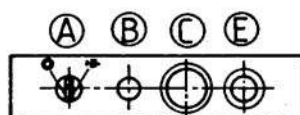
Except the lathe isolator switch, all the electrical controls are fitted into front face between headstock and gearbox.

1. The GREEN button to press 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 VS model.
3. To press the RED mushroom-head button 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.

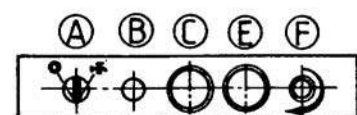
CLUTCH MODEL



NO-CLUTCH MODEL



VARISPEED MODEL



- (A) : PUMP SWITCH (B) : PILOT LIGHT (C) : EMERGENCY SWITCH (D) : START SWITCH**
(E) : JOGGING (F) : SPEED SELECTOR

Fig.8

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

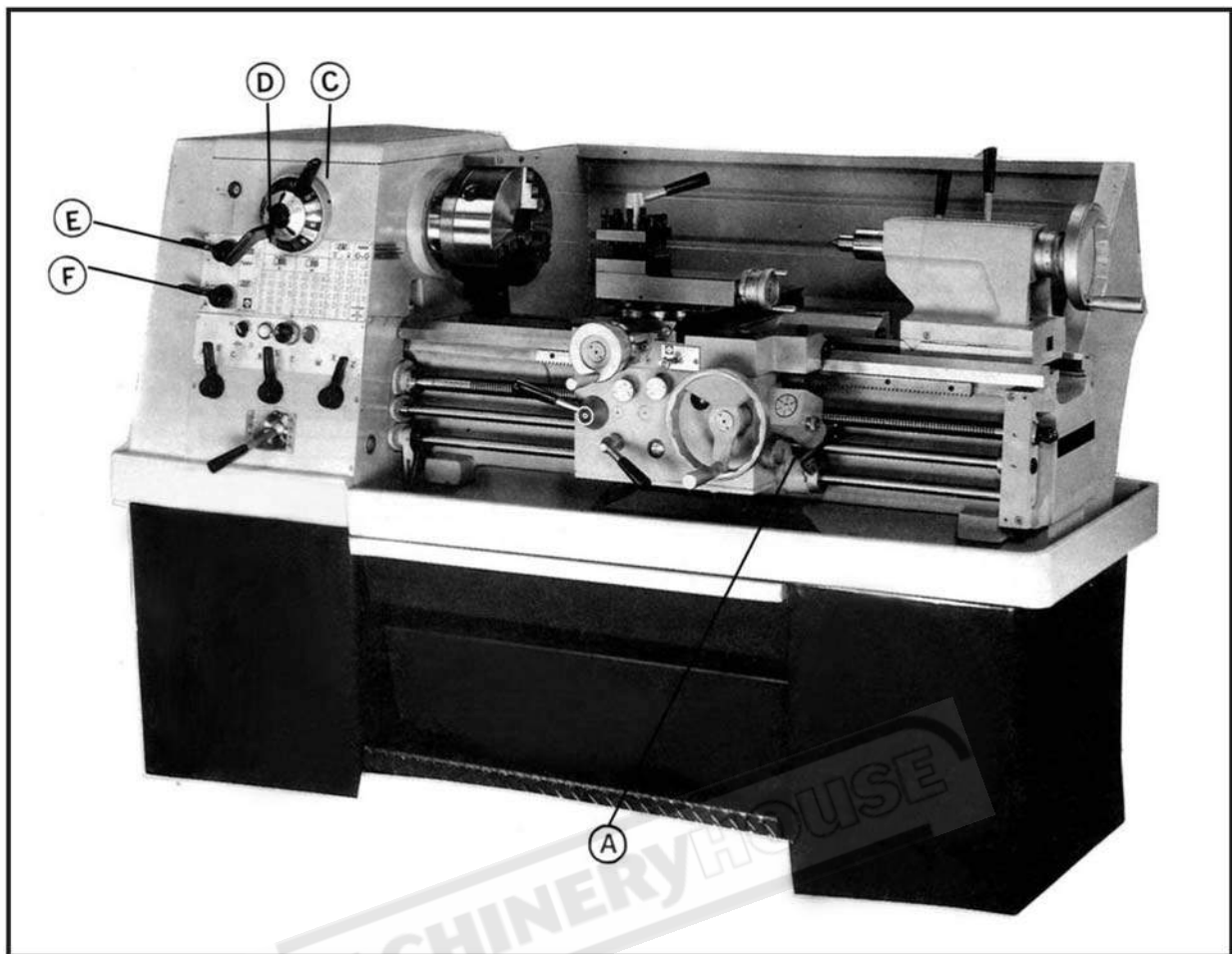


Fig9

SPEED CONTROLS (Standard lathes)

SPINDLE ROTATION:

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

After started 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.

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, but the main motor keep running.

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.

SPINDLE SPEEDS:

Selected by the grouped dial controls on the headstock. There are sixteen (16) available speeds are shown directly on the lever-operated dial (C), in four (4) groups-each of which is further divided into four displayed (4 colours) spindle speeds. Rotate this dial with the large handle to bring the required speed-group uppermost and opposite the fixed 4-colors datum plate (B). Then, rotate the other handled dial (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.



Fig9-1

VARI SPEED 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 minimum position by counter clockwise. Then, to operate the control lever (A) for spindle rotation, and turning the select turning knob (E) Clockwisely from minimum to the desire constant speed slowly. The spindle speed will be displayed by the Digital speed meter (B) 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.

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 setscrew. Note: when not performing threading functions releases the setscrew and swing the thread 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 threads cutting. To cut these threads, the half-nut must be kept closed on 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-nut are still engaged, reverse the spindle, which will move the carriage backwards toward the starting point. When the starting point is reached, re-engage the spindle forward and move the cutting tool into the workpiece at the desired spot.

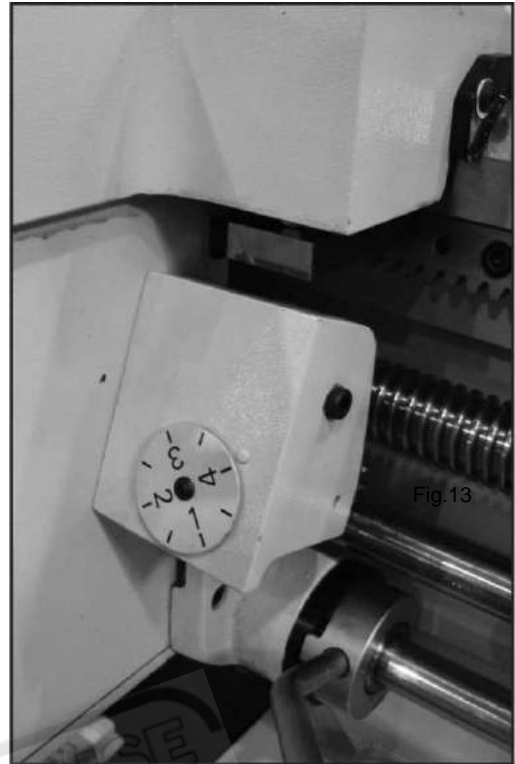


Fig.13

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.

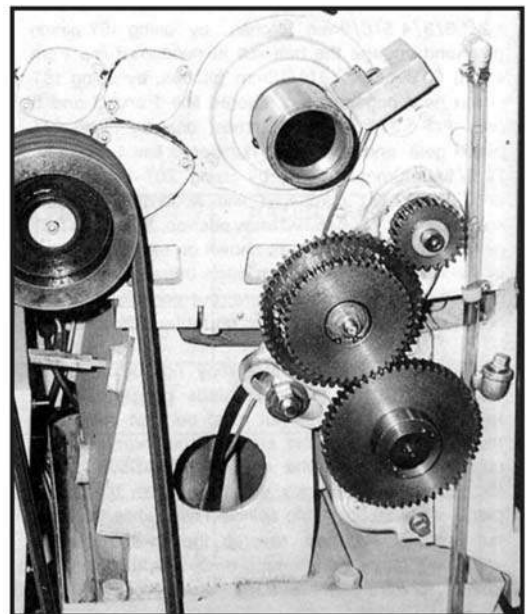


Fig.14

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 setscrew. NOTE: when not performing threading functions releases the setscrew 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.

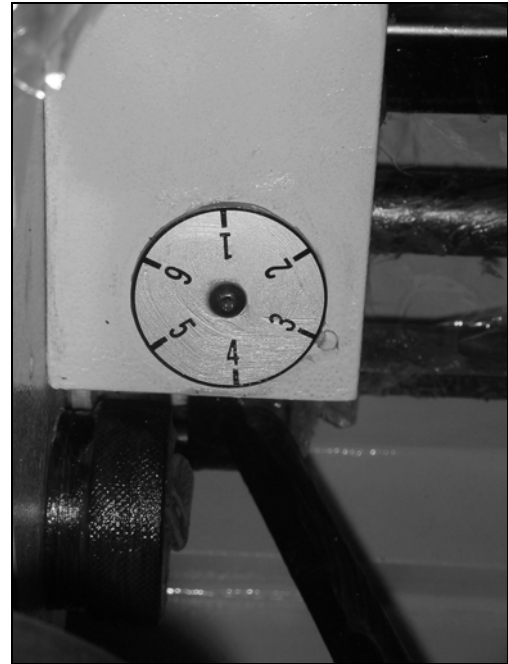


Fig.13-1

Referring to the indicator table as Fig.16 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 1.25/2.5/5/8/10mm 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 or 4
	0.7	1	1.4	1.75	2	2 or 5
	3.5	7	1.4			3 or 6
	0.8	4				1
18T	0.2	0.25	0.3	0.4	0.45	1, 2, 3
	0.5	0.6	0.75	0.9	1	
	1.2	1.5	2	3	4.5	4, 5, 6
	6	9				
20T	0.8	4	12			1, 3 or 5
	0.2	0.25	0.4	0.5	0.8	1 or 4
	1	1.25	2	2.5	4	2 or 5
	5	10				3 or 6
22T	8					1
	0.2	0.25	0.4	0.5	1	1 or 4
	1.1	2	5.5	11		2 or 5
						3 or 6
	0.8					1

Fig.13-2

APRON AND SLIDE CONTROLS

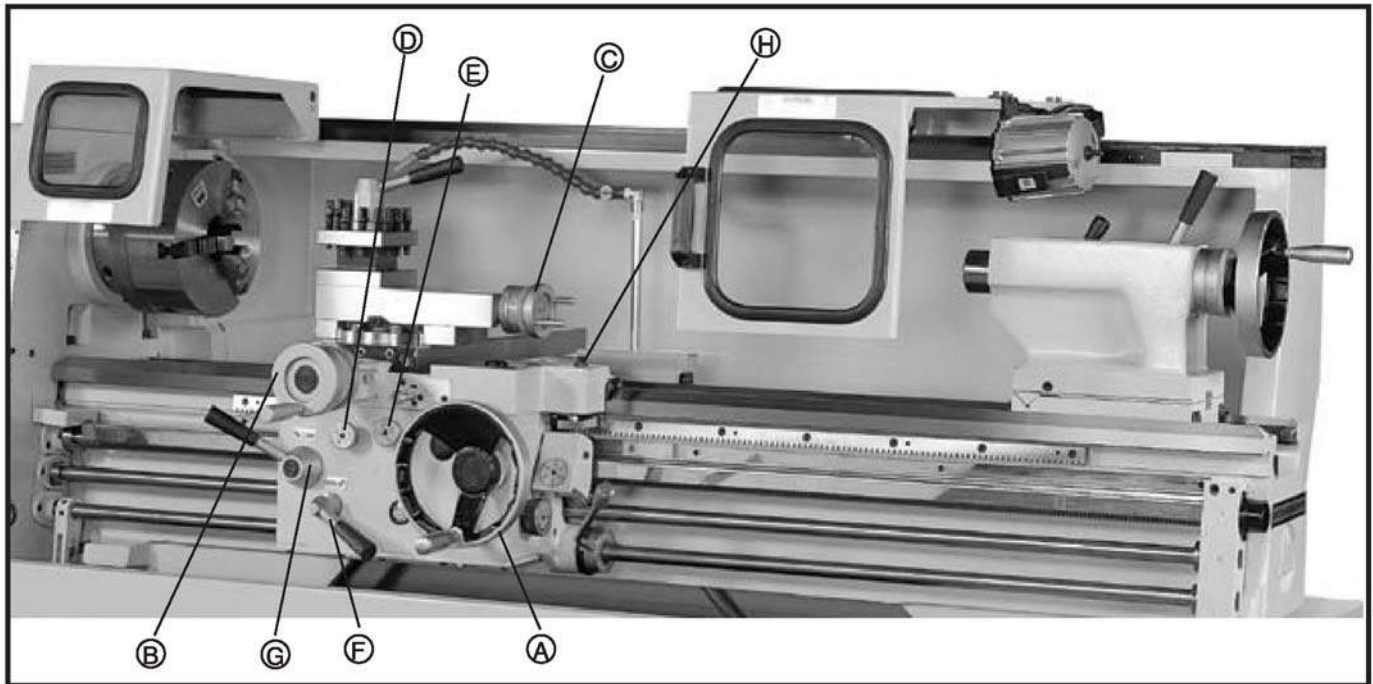


Fig.15

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 surfacing (Cross-slide) or sliding feeds; Push in for sliding, pull out for surfacing operation.
2. Push-pull knob (E) controls forward or reverse feed direction.
3. Lever (F) is pull up for power feed engagement, push down for manual operation.
4. Lever (G) is pressed down to engage leadscrew for threads 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 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 free turn 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 over the rotatable base to give maximum support, particularly when using parting off tools and heavy cutting.

SADDLE LOCK SCREW (H):

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

WARNING:

Make sure you "UNLOCK" the saddle lock screw before attempting to move the carriage or 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.17-1) Release this clamping nut before attempting to move the tailstock and on completion of the need for extra clamping. The tailstock barrel is locked by lever (C).

The tailstock can be set-over for production of shallow tapers or for re-alignment. To release the clamping lever (A) and clamping nut (B), also the both locking screws (O). (Fig.17) Then, adjust screws (S) (Fig.16,16-1) 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.17-1). Apply the clamp lever (A) and locking screws (O) after adjustment of set-over.

Both clamping bolts (P) (Fig. 17) can be adjust the length for the clamping lever (A) and clamping nut (B) to make sure both clamping plates are well clamp with bedways.

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 tank length..

SAFETY STOP

Stop pin (E) (Fig.16) is fitted to prevent the tailstock inadvertently sliding off the end of the bed.

Always ensure that the pin is secure and replaced after removal

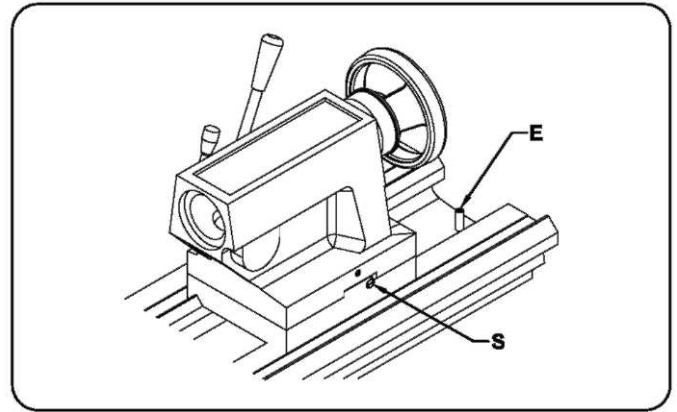


Fig.16

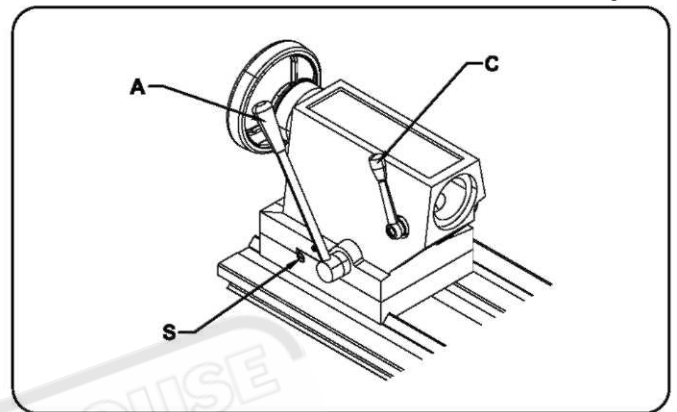


Fig.16-1

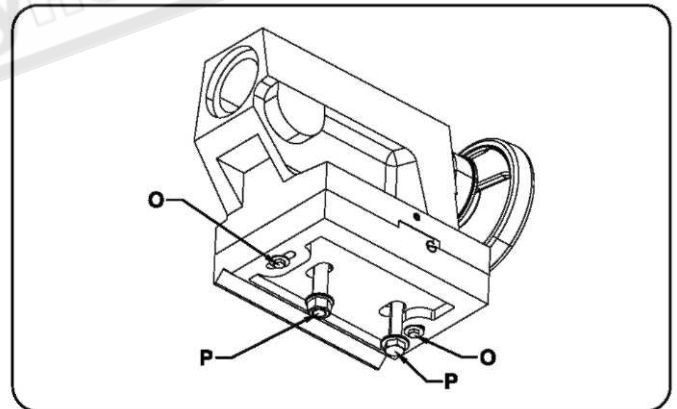


Fig.17

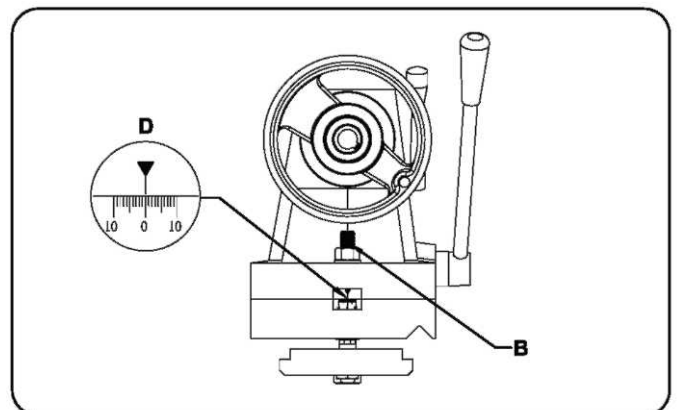


Fig.17-1

SERVICING & MAINTENANCE

LATHE ALIGNMENT

With the lathe installed and running, we recommend a check on the machine alignment before commencing work. Check leveling 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-headstock 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 now cutting absolutely parallel.

TAILSTOCK CHECK:

Using 12 in. (305 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.

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 oil or grease.

COOLANT LEVEL

Make a regular check of the coolant tank level (this can be seen clearly from the rear of the machine). Replenish coolant as necessary.
e.g. BOTION S-525V, B-3EP
or the equivalent.

WARNING: Prohibiting using of flammable working fluids or flammable workpiece.

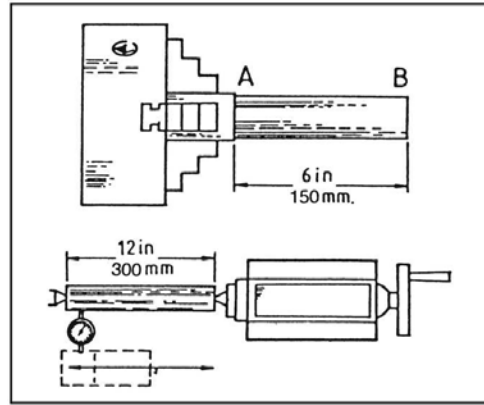


Fig.18

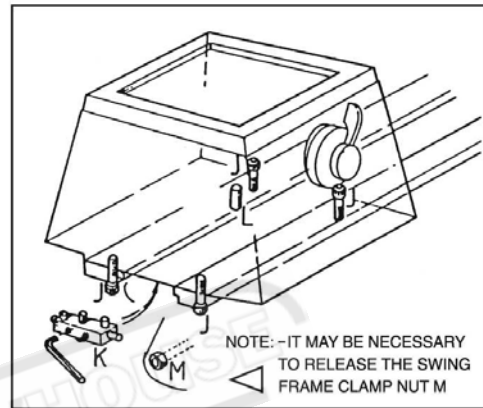


Fig.19

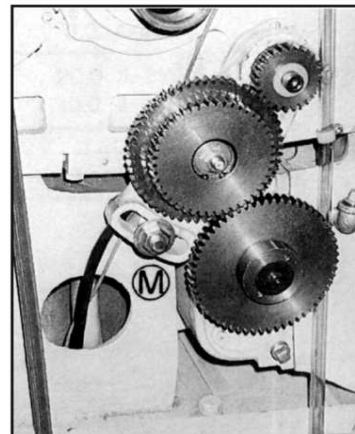


Fig.20

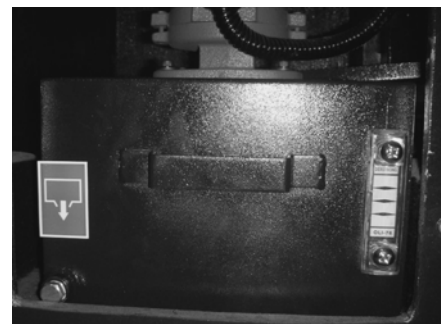


Fig.20-1

DRIVING BELTS

To check the driving belts tension, 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.

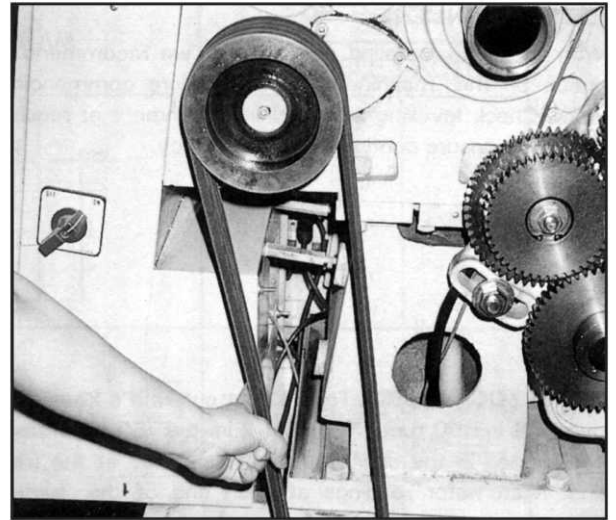


Fig.21

LEADSCREW SHEARPIN Fig.23

The transmission is protected against severe overload by a shear pin (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 right-hand lever of the gearbox to an intermediate position. Then rotate leadscrew (F) until the broken pinhead face you for removal. Now rotate flanged sleeve (A) to allow the pin shank to be pushed out of the slot in the bottom of housing (B).

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

CAUTION:

USE ONLY CORRECT REPLACEMENT SHEARPIN AS SUPPLIED IN TOOLBOX AS SPAREPARTS.

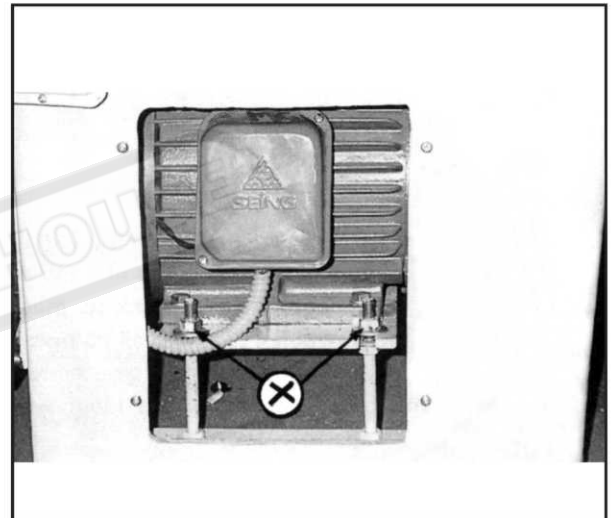


Fig.22

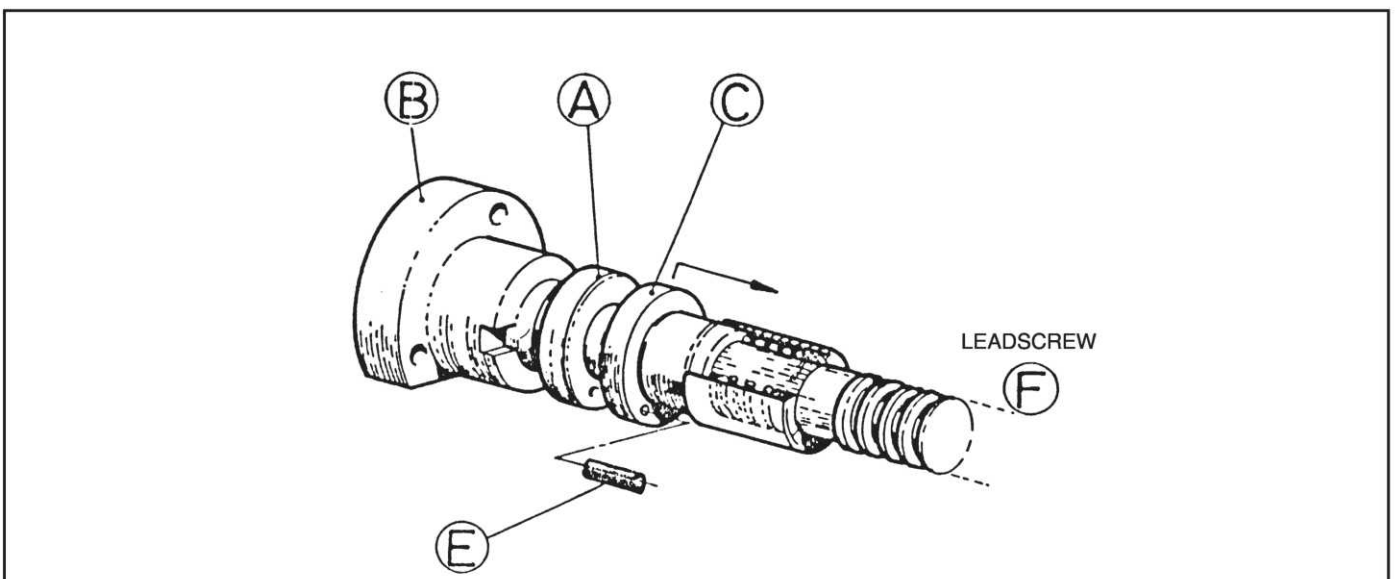


Fig.23

SLIDEWAYS

Tapered gib-strips are fitted to slideways of cross and compound slides and any slackness, which may develop, can be rectified 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 Gib adjusting screws (s) to slacken the 4-way toolpost end screw and tighten the handwheel end screw as above. (Fig. 23) Tapered gibs are fitted to each wing of the saddle.

Both gibs are adjusted by slacken the small ends gib adjusting screws (D) and tighten the large ends gib adjusting screw (C). (Fig. 24)

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

CROSS-SLIDE NUT (Fig. 26)

This is adjustable for elimination of slackness, which may develop in service.

Reduce backlash by loosening the rear caphead screw (E), then carefully screw in the small and central screw (G) to adjust a wedge within the split nut. Make only a slight alteration at a time and operate the cross-slide repeatedly through full travel to be sure of smooth action. Re-tighten the screw (E) after adjustment.

CAUTION:

TOO MUCH SCREW IN THE ADJUSTING SCREW (G) WILL CAUSE THE WEDGE SINK AND CANT RETURN FOR FUNCTIONING.

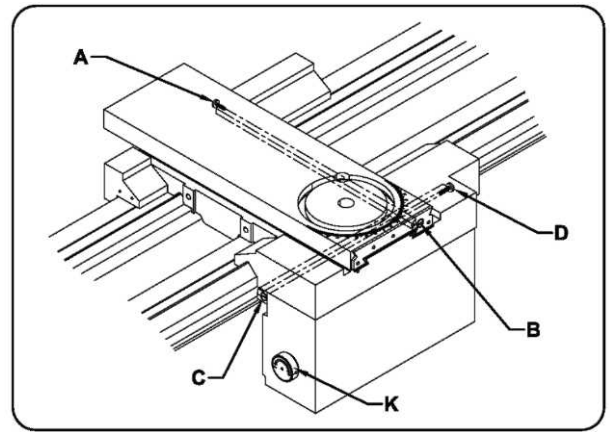


Fig.24

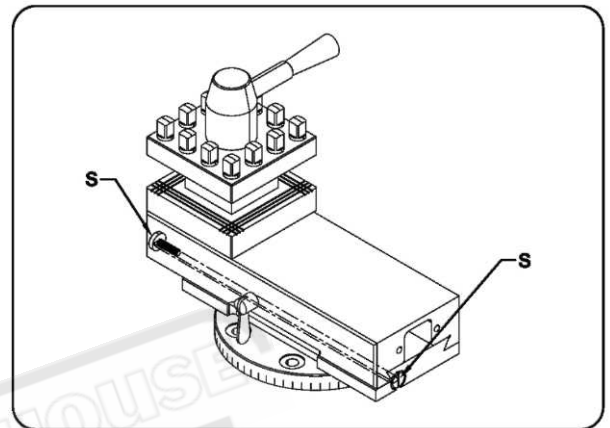


Fig.25

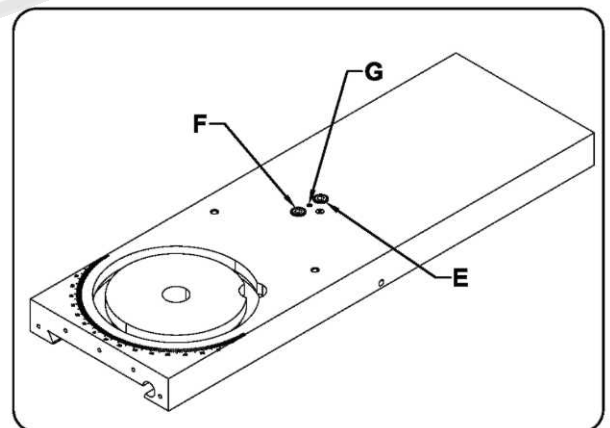


Fig.26

SPINDLE BRAKE (Fig. 29) (STANDARD MODEL)

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 executes automatic 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.

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.27) 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.

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

SPINDLE BEARING (Fig. 28)

A set of pre-loaded Taper Roller bearings are incorporated on the main spindle, and are preset on assembly. If the main spindle begins to have too much runout, it perhaps be caused by wearing of the bearings and/or the end thrust adjusting nut have loosened up.

To adjust the bearing, open the end cover, remove bearing cover and release two set screws (S) on the thrust nut (N). Then tighten the nut (N) by G-type lock spanner carefully. After adjusting the end thrust nut, re-tighten the two setscrews.

NOTE:

Over tighten the end thrust nut will cause excessive heat build-up in the bearings and premature bearing wear.

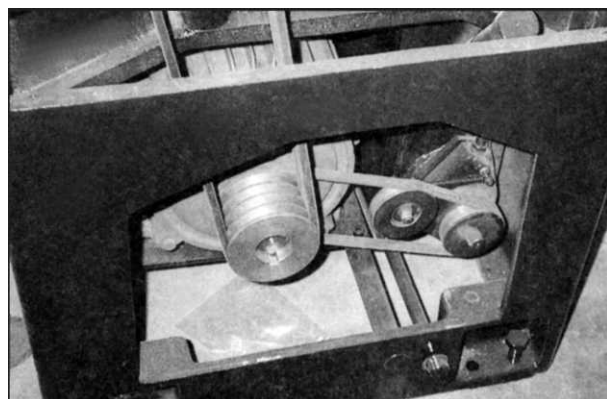


Fig.29

LUBRICATION (STANDARD MODEL)

Headstock bearings, gears and drive shafts are jet-lubricated from an oil distributor located beneath the headstock cover; the oil 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 up to the mark on the filler-cap dipstick. (Fig. 30) Check oil level weekly and change the oil every year by (I.S.O. VG 37) or equivalent grade.

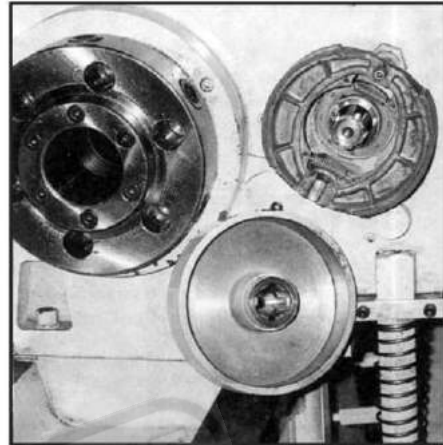


Fig.27

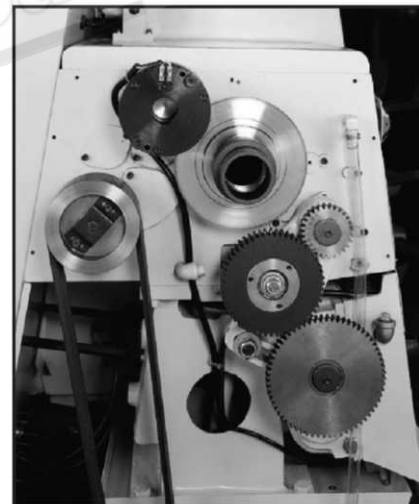


Fig.27A

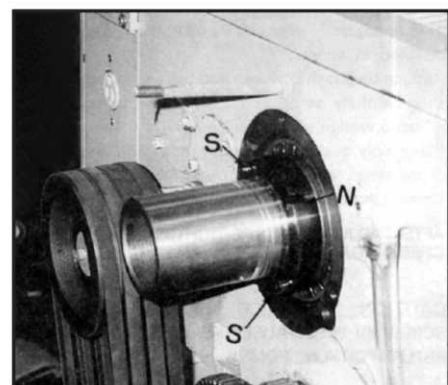


Fig.28

(VARIABLE SPEED 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 continues 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 liters). 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 32 oil or equivalent grade as below: Where the specified lubricant is unobtainable, a grade with the following characteristics can be used:

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

NOTE:

WE RECOMMEND AN OIL CHANGE WITHIN THE FIRST 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 off the delivery hose to an empty container of more than 3 gallons capacity and start the lathe to pump out the oil from the tank and deliver 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 I.S.O.VG 37 oil through filler elbow (F). (Fig.33) Approximate quantity of oil is half gallon (2.2 litres.)

Note: Use only clean container for refilling or topping up oil level. To drain gearbox, unscrew drain plug (D) in end of gearbox casting.

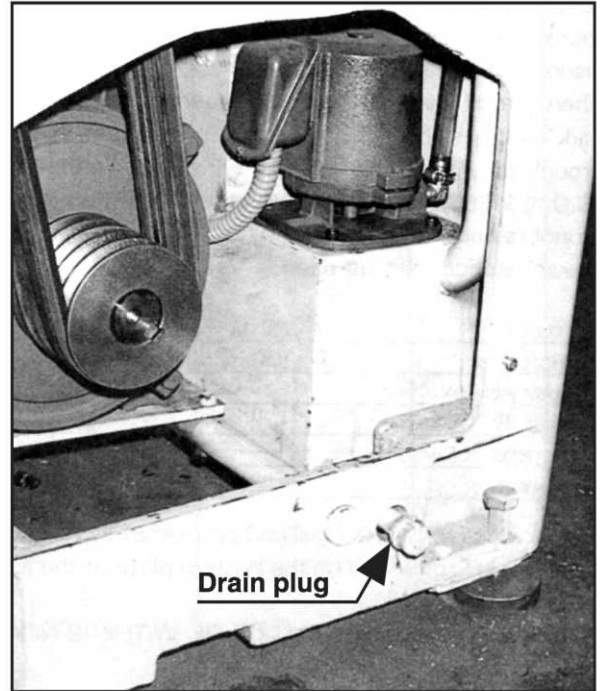


Fig.29-1

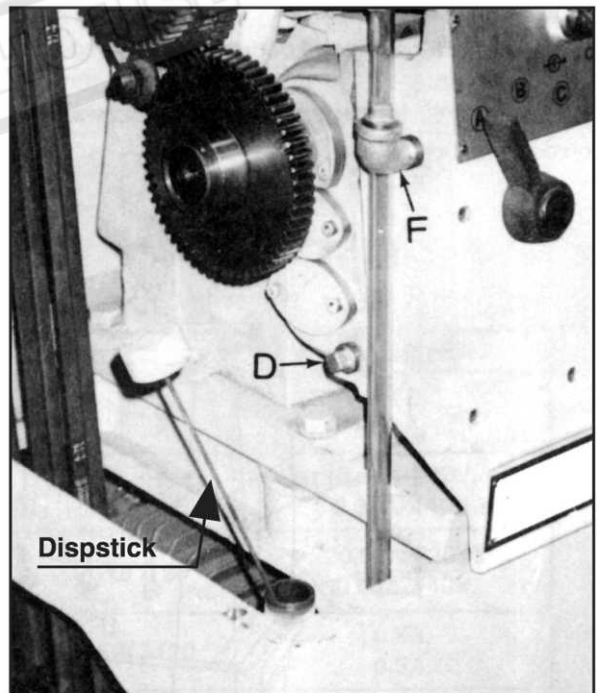


Fig.30

NOTE:

WE RECOMMEND AN OIL CHANGE WITHIN THE FIRST 3 MONTHS FOR A NEW MACHINE.

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. VG 68 oil, or equivalent. When the specified lubricant is unobtainable a grade with the following characteristics can be used:

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

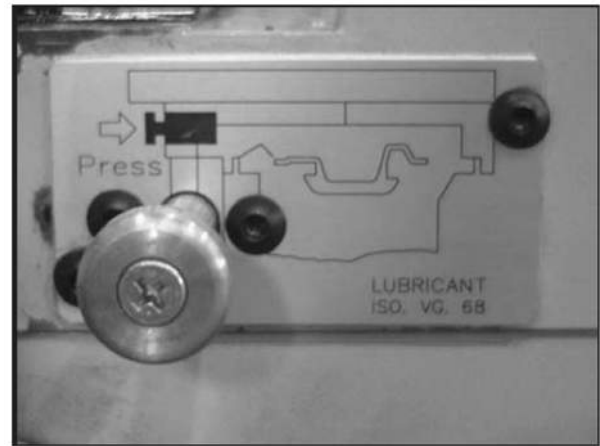


Fig.31

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

NOTE:

WE RECOMMEND AN OIL CHANGE WITHIN THE FIRST 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.

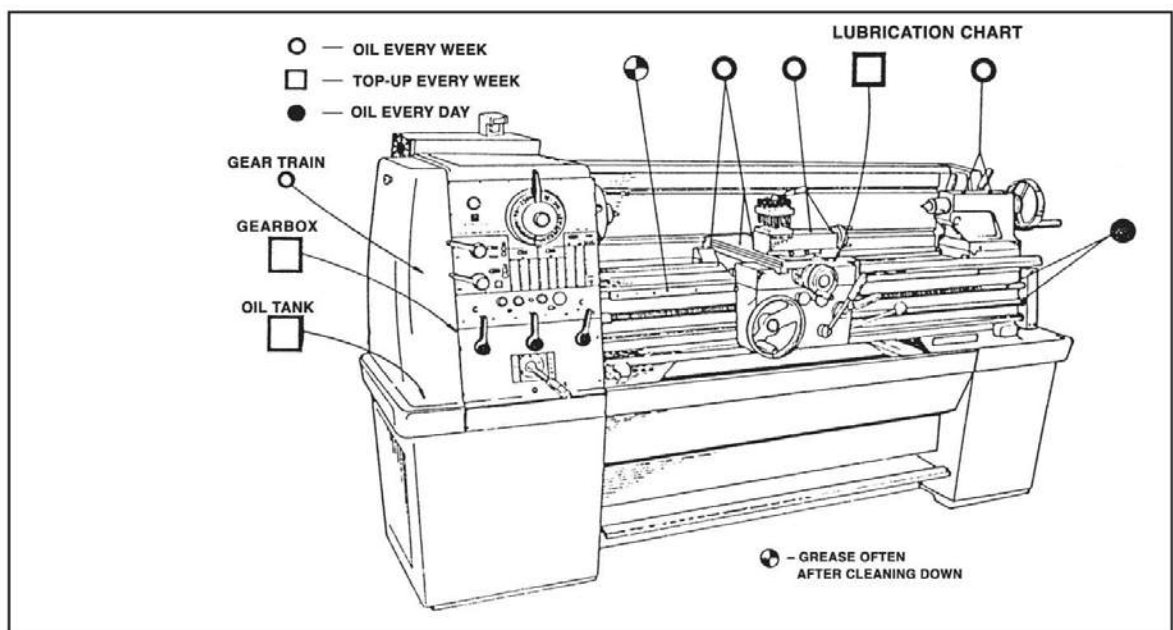


Fig.32

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, chip 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.
- (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 function 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 lever.
- (D) Lubrication check: To examine all the lubricating reservoirs with enough oil on the lever mark of oil sight. To oiling all the oilers on sideways and end gear train, leadscrew and 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 bearing: After half hour running, to examine the main spindle bearing temperature 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 product 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 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 and top slide 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 reservoirs 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 tray, 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 leveling: To examine the abnormal vibration, which may cause on lost leveling, adjusted and tighten leveling screws.

SEMI-YEARLY INSPECTION

1. Exchange oil in headstock, feed gearbox and apron: To drain and cleanup the mentioned oil reservoirs and replenish with fresh recommend lubricating oil. (Recommend an oil change within 3 months for new machine)
2. Check the oil leakage: The oil reservoirs 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 leveling: To examine the leveling by adjusting and tighten the leveling 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 repainting the machine with the same color.
2. Check the exposed parts: Which may damaged, corroded or deformed, to repair or replace it , if necessary.

MACHINERYHOUSE

TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSES	REMEDY
Overheat of headstock bearings	<ol style="list-style-type: none"> 1. Oil level In headstock Is too low or too much. 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 dirty. 6. Badly worn bearing. 7. Bearing is not in proper position. 8. Bent or sprung main spindle. 9. Too much end thrust. 	<p>Replenish or discharge the oil to the proper level.</p> <p>Replace the oil with recommended type.</p> <p>Replace the oil..</p> <p>Remove the dirt from the oil hole</p> <p>Clean the bearing and renew oil.</p> <p>Replace bearing.</p> <p>Dismantle and reassemble it.</p> <p>Straighten or replace it.</p> <p>Adjust thrust nut.</p>
Oil leakage	<ol style="list-style-type: none"> 1. Plug of drain not tight. 2. Case cracking. 3. Leakage from overflow. 4. Packing or gasket damaged. 5. Leakage from overflow on spindle bearing housing. 	<p>Resealing and tighten.</p> <p>Repaired by special welding.</p> <p>Tighten cover screws.</p> <p>Replace packing or gasket.</p> <p>Less oil flow to bearing or enlarge oil return flow.</p>
Excess noise or vibration of machine	<ol style="list-style-type: none"> 1. Badly worn bearing. 2. Lost levelling. 3. Badly worn V belts. 4. Loose belt tension. 5. Badly worn gear. 6. Bent or sprung shaft. 7. Pulley lossened 8. Clamp of workpiece in loose status. 9. Bearing thrust too loose. 10. Headstock not tighten 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. 	<p>Replace bearing.</p> <p>Recheck levelling & tighten.</p> <p>Replace V belts.</p> <p>Adjust belt tension.</p> <p>Replace gear.</p> <p>Straighten or replace shaft.</p> <p>Tighten pulley set screw.</p> <p>Tighten clamp.</p> <p>Tighten end thrust nut.</p> <p>Tighten fixed screws.</p> <p>Adjust the gib and tighten back clamp.</p> <p>Adjust taper gib.</p> <p>Replace correct cutting tool or regrind it. Check speeds and feeds.</p> <p>Tighten again check for debris..</p> <p>Replace with rigid tool or reset.</p> <p>Balance workpiece or reduce spindle speed.</p>

TROUBLE	PROBABLE CAUSES	REMEDY
Bending on long workpiece cutting.	<ol style="list-style-type: none"> 1. Feed value too large. 2. Workpiece too thin or too long. 	<p>Reduce feed value.</p> <p>Use follow rest to support and adjust tool position.</p>
Failure on products accuracy.	Accuracy fails on machine. (Ref. to inspection record)	Recheck the accuracy of machine and adjust.
Uneasy to hold change levers.	Set spring broken or too weak.	Adjust set screw or replace the spring.
Misalignment of chuck with spindle nose.	Incorrect position of cam.	Adjust the cam and lock it in proper position.
Uneasy to cut thread.	<ol style="list-style-type: none"> 1. Excess clearance of leadscrew in axial direction. 2. Excess clearance on carriage or cross-slide. 3. Worn thread or nut in cross-slide. 4. Worn leadscrew or halfnut. 5. Worn end gear or incorrect engagement 6. Bent leadscrew. 7. Incorrect threading tool and wrong positioning. 8. Incorrect engage the halfnut. 9. Threading dial indicator not properly engaging with leadscrew. 10. Too much infeed per cut or too fast spindle speed. 	<p>Adjust the thrust nut at the end of leadscrew.</p> <p>Adjust the gib.</p> <p>Adjust the backlash or replace it.</p> <p>Replace it.</p> <p>Replace or adjust the end gear.</p> <p>Straighten it.</p> <p>Replace threading tool and reset it.</p> <p>Engage the halfnut exactly.</p> <p>Adjust the indicator engagement on leadscrew.</p> <p>Reduce the infeed per cut or spindle speed.</p>
Tailstock clamp not stable.	The eccentric clamping height too long or too short.	Adjust the nut on clamp bolt.
Failure on foot brake.	<ol style="list-style-type: none"> 1. Badly worn brake shoes. 2. Fails on controlled limit switch. 	<p>Replace brake shoes.</p> <p>Adjust the limit switch position or replace it.</p>
Fail lubricant on slide way.	<ol style="list-style-type: none"> 1. Oil pump in apron obstructed by dirty. 2. Oil tube slip off pump. 3. Oil pipe and hole obstructed by dirty or broken pipe under the saddle. 	<p>Clean the pump and replace oil.</p> <p>Reclamp the tube with pump.</p> <p>Clean the pipe and hole or replace the pipe.</p>
Failure on power feeding.	The trip load pressure is too weak.	Adjust the load pressure knob on apron.

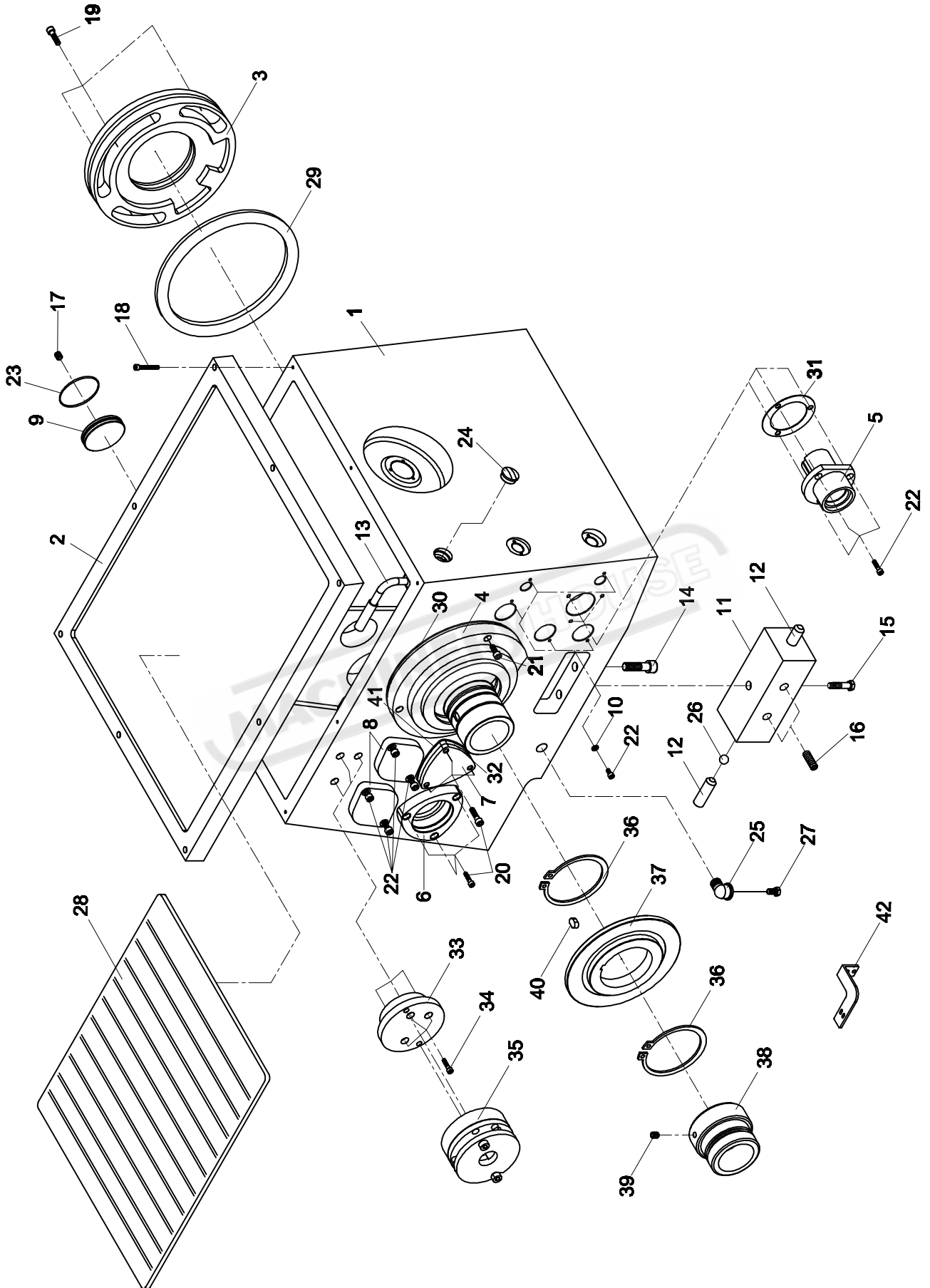
TROUBLE	PROBABLE CAUSES	REMEDY
Fails to start.	<ol style="list-style-type: none"> 1. Circuit not complete. 2. Power may be off. 3. Overload relay off. 	<p>Check switch, leads, fuse etc, replace or reconnect properly.</p> <p>Check cable connection.</p> <p>Reset overload relay.</p>
Incorrect Spindle speed.	<ol style="list-style-type: none"> 1. Voltage below what is rated. 2. Connecting cable too small. 3. Improper or loose connection of lead. 4. Failure on spindle select knob. 5. Overload. 	<p>Check power source voltage. Reset input voltage of parameter according to power supply. (VS-model)</p> <p>Enlarge connecting cable.</p> <p>Recheck all leads connecting.</p> <p>Replace it.</p> <p>Reduce cutting speed and depth or feed rate.</p>
Wrong rotation.	Wrong sequence of phases.	Reverse any two leads connecting for motor.
Motor noisy and vibration.	<ol style="list-style-type: none"> 1. Motor loosely mounted. 2. Strained mounting frame. 3. Bent or sprung motor shaft. 4. Foundation inadequate or motor feet uneven. 	<p>Tighten mounting bolts.</p> <p>Shim to motor feet for equal mounted.</p> <p>Straighten or replace it.</p> <p>Stiffen mounting place or add shims under foot pad.</p>
Overheat in motor.	<ol style="list-style-type: none"> 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. 	<p>Adjust belt tension.</p> <p>Check the fan in proper work.</p> <p>Replace bearing.</p> <p>Replenish grease.</p> <p>Reduce cutting speed or feed rate.</p> <p>Change speed range and adjust speed select knob.</p>
Coolant pump failure.	<ol style="list-style-type: none"> 1. Wrong rotation. 2. Coolant not enough or return filter obstructed. 3. Overload relay off. 	<p>Reverse any two leads to pump.</p> <p>Replenish coolant or clean return filter in chip tray.</p> <p>Reset overload relay</p>
Lubrication pump failure of headstock. (VS-model)	<ol style="list-style-type: none"> 1. Wrong rotation. 2. Lubricant not enough. 3. Overload relay off. 	<p>Reverse any two leads to pump.</p> <p>Replenish lubricant into tank.</p> <p>Reset overload relay.</p>
Inverter alarm. (VS-model)	<ol style="list-style-type: none"> 1. Operation error. 2. Wrong set of parameter. 	<p>Switch off for 20 seconds and switch on again as reset.</p> <p>Referring to instruction manual of Inverter or contact with manufacturer.</p>

CHAMPION SERIES

SPARE PARTS LIST

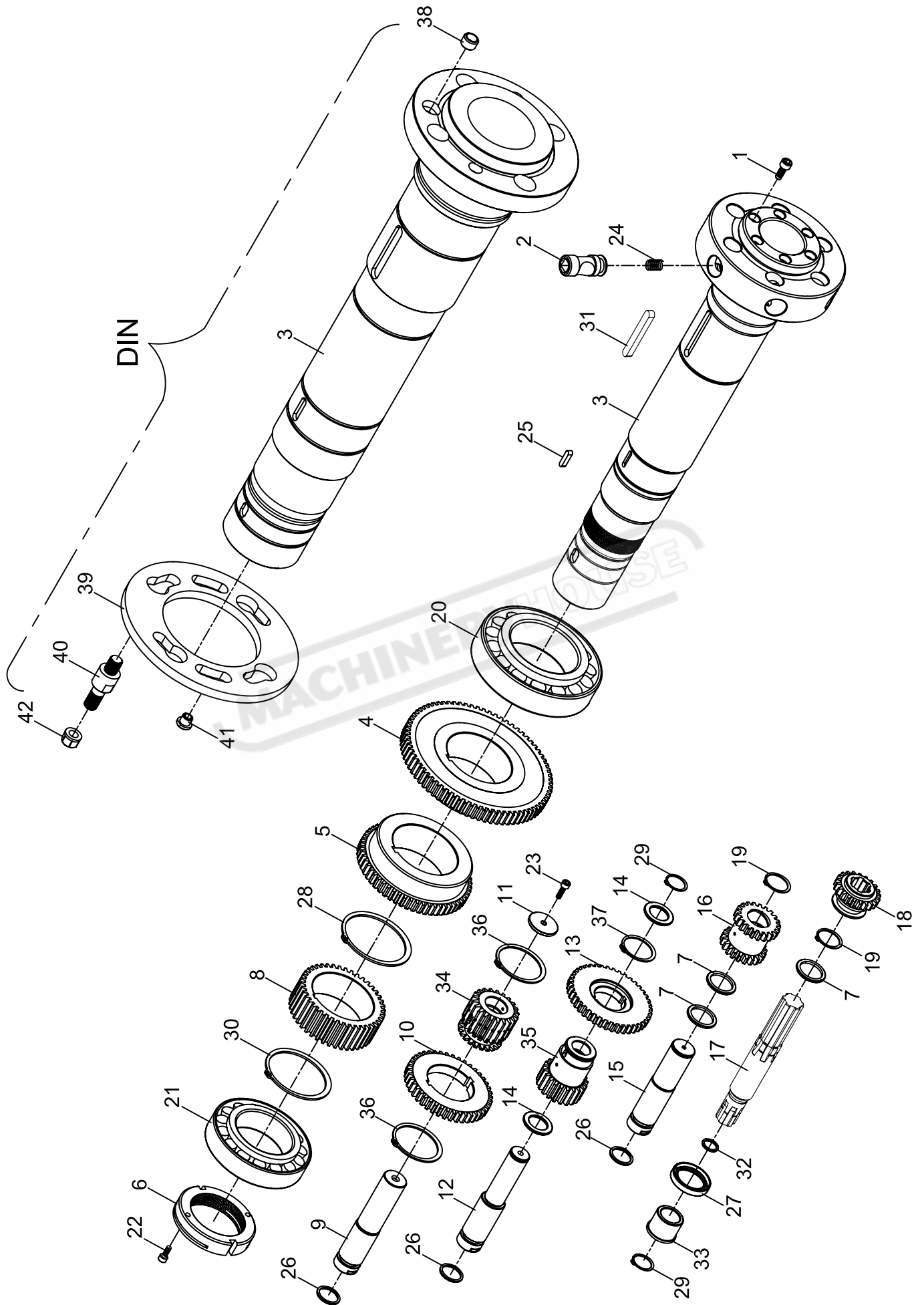
<u>NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
1.	C-1001	Headstock Casting	1
2.	C-1002	Headstock Cover	1
3.	C-1003	Front Bearing Cover	1
	C-1003-3	Front Bearing Cover (DIN)	1
4.	C-1004	Rear Bearing Cover	1
5.	C-1005	Flanged Bearing	1
6.	C-1006	Bearing Housing	1
7.	C-1007-2	Cover	1
8.	C-1008	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 (M12x35L)	4
15.	A-1424	Hexagon Head Bolt (M10x30L)	3
16.	A-1113	Socket Headless Set Screw (M12x20L)	2
17.	A-1108	Socket Headless Set Screw (M10x10L)	3
18.	A-1209	Socket Head Cap Screw (M6x45L)	8
19.	A-1207	Socket Head Cap Screw (M6x35L)	3
20.	A-1205	Socket Head Cap Screw (M6x25L)	6
21.	A-1204	Socket Head Cap Screw (M6x20L)	3
22.	A-1202	Socket Head Cap Screw (M6x12L)	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.	A-7269	Key (12x8x20)	1
34.	C-1007	Gasket	1
35.	C-8039	Frame	1
36.	C-1094	Balance Ring (V,S)	1
37.	A-1700	Nut (M6) (V,S)	2~6
38.	A-1101	Socket Headless Set Screw (M6X10) (V,S)	3
39.	A-1103	Socket Headless Set Screw (M6X16) (V,S)	1~3
40.	A-1812	Spring Washer (ϕ 6)	1~3

HEADSTOCK : CASTING(MAGNETIC BRAKE SYSTEM-OPTIONAL)



<u>NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
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 (M12x35L)	4
15.	A-1424	Hexagon Head Bolt (M10x30L)	3
16.	A-1113	Socket Headless Set Screw (M12x20L)	2
17.	A-1108	Socket Headless Set Screw (M10x10L)	3
18.	A-1209	Socket Head Cap Screw (M6x45L)	8
19.	A-1207	Socket Head Cap Screw (M6x35L)	3
20.	A-1205	Socket Head Cap Screw (M6x25L)	6
21.	A-1204	Socket Head Cap Screw (M6x20L)	3
22.	A-1202	Socket Head Cap Screw (M6x12L)	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 (M8x35L)	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 (M6x8L)	3
40.	A-7269	Key (12x8x20)	1
41.	C-1007	Gasket	1
42.	C-8039	Frame	1

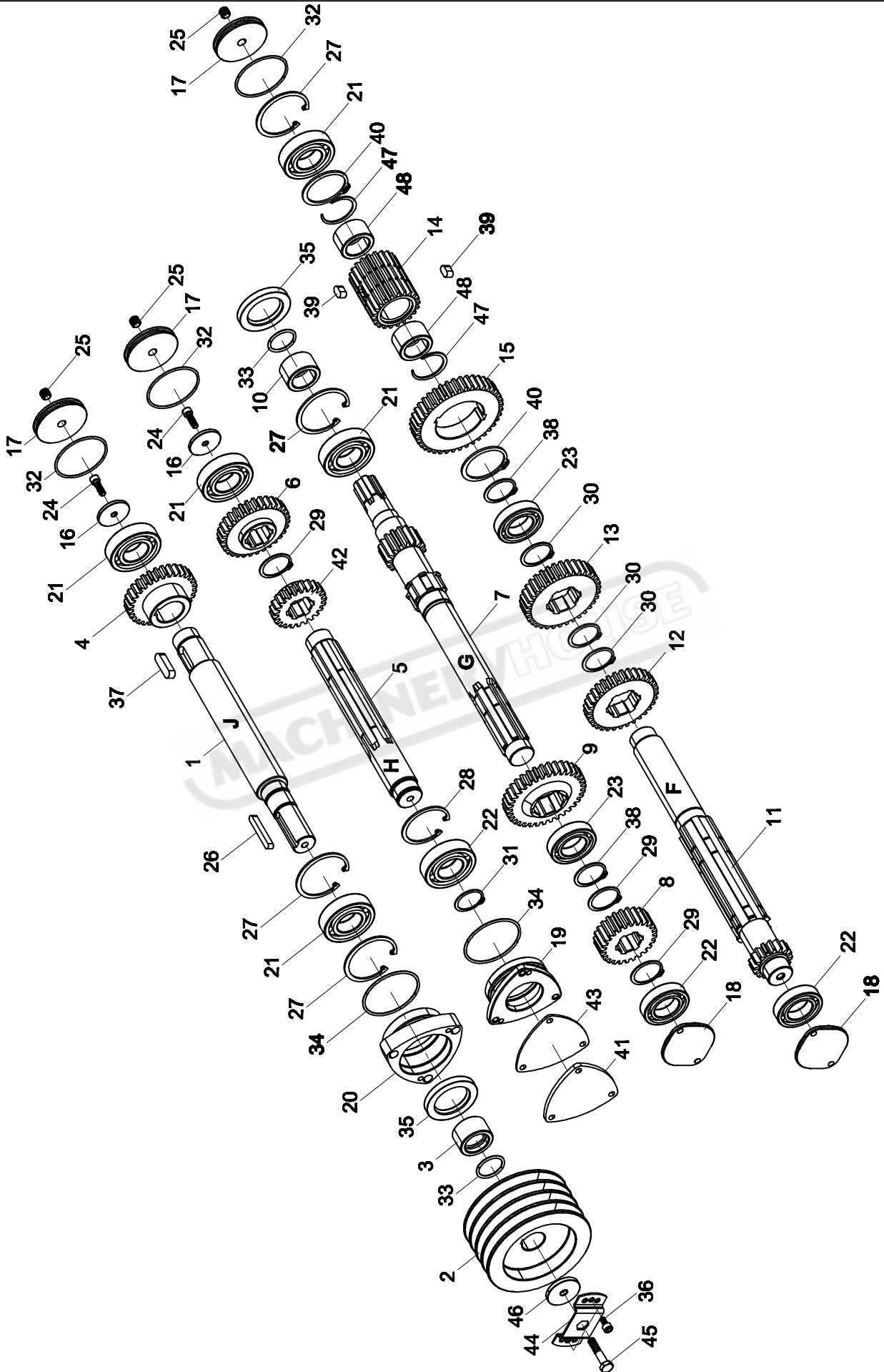
HEADSTOCK : SPINDLE & GEARS



<u>NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
1.	C-1016	Cam Screw	6
2.	C-1018	Cams	6
3.	C-1019	Main Spindle	1
	C-1161	Main Spindle (DIN)	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-1024	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-1030-2	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 (M6x16L)	2
23.	A-1204	Socket Head Cap Screw (M6x20L)	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 (50.35.8)	1
28.	A-3323	Circlip (S85)	1
29.	A-3309	Circlip (S25)	2
30.	A-3321	Circlip (S80)	1
31.	A-7225	Key (10x10x75)	1
32.	A-6009	O-Ring (P21)	1
33.	C-1035-1	Collar	1
34.	C-1027B	Gear (21T)	1
35.	C-1030-1	Gear (21T)	1
36.	A-3325	Circlip (S60)	2
37.	A-3328	Circlip (S40)	1
38.	C-1162	Pad	1
39.	C-1163	Retainer	1
40.	C-1165	Pivot	4
41.	C-1164	Stud	2
42.	C-1169	Nut	4

HEADSTOCK : DRIVEN SHAFT & GEARS. (VARISPEED)

Ver-01

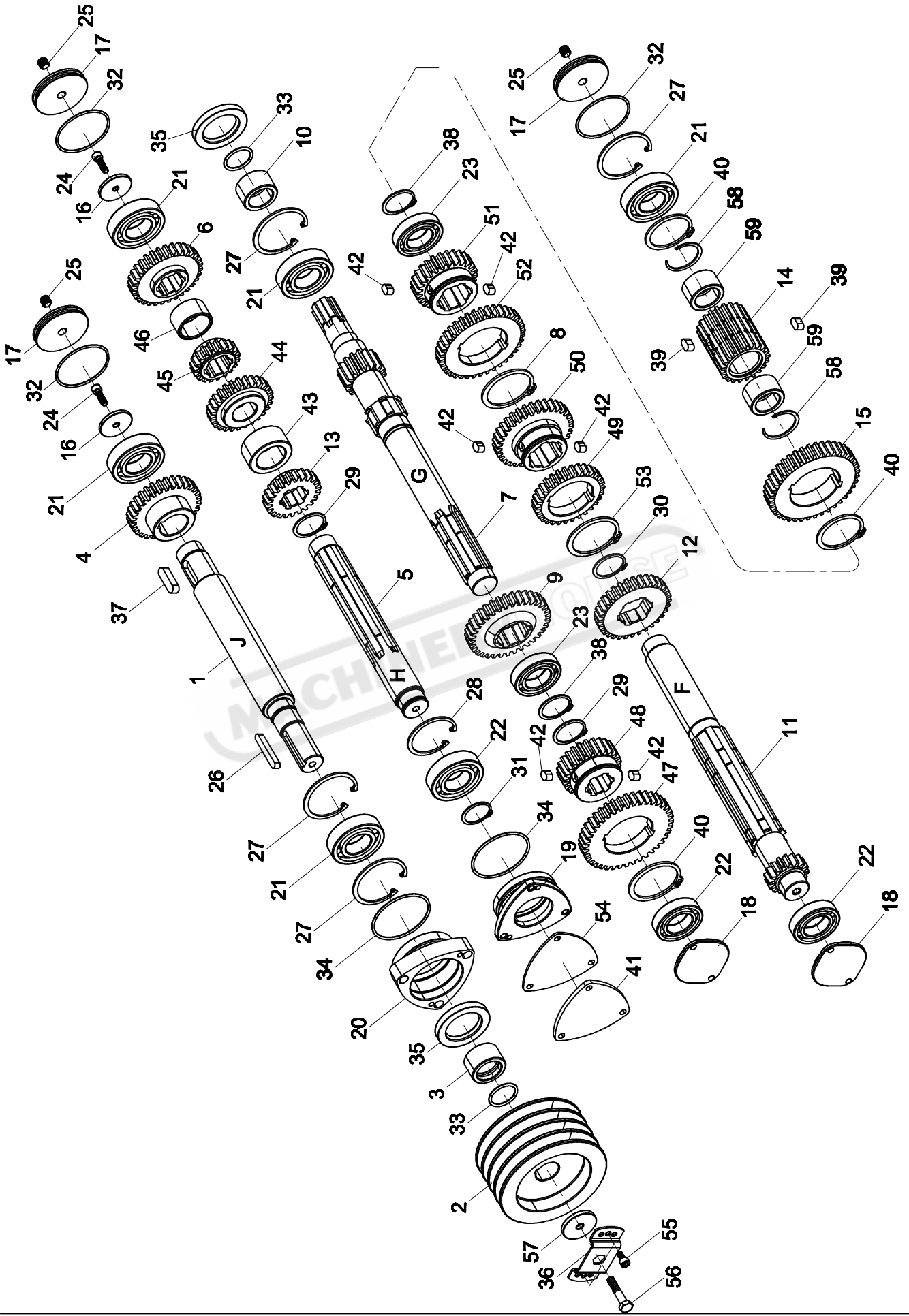


Ver-01

<u>NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
1.	C-1038	Shaft (J)	1	41.	C-1007-2	Cover	1
2.	C-1040-1	Pulley	1	42.	C-1045	Gear (23T)	1
3.	C-1041	Spacer	1	43.	C-1007	Gasket	1
4.	C-1042	Gear (31T)	1	44.	C-1096	Clamp Plate	1
5.	C-1043	Shaft (H)	1	45.	A-1425	Hexagon Head Screw (M8x20L)	1
6.	C-1050	Gear (31T)	1	46.	T-1005	Washer	2
7.	C-1052	Shaft (G)	1	47.	A-8534	Circlip	2
8.	C-1053-1	Gear (25T)	1	48.	A-2269	Needle Bearing (TLA3520)	2
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 (M6x20L)	2				
25.	A-1108	Socket Headless Set Screw (M10x10L)	3				
26.	A-7226	Key (7x7x50)	1				
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 (M6x12L)	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				

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

Ver-01

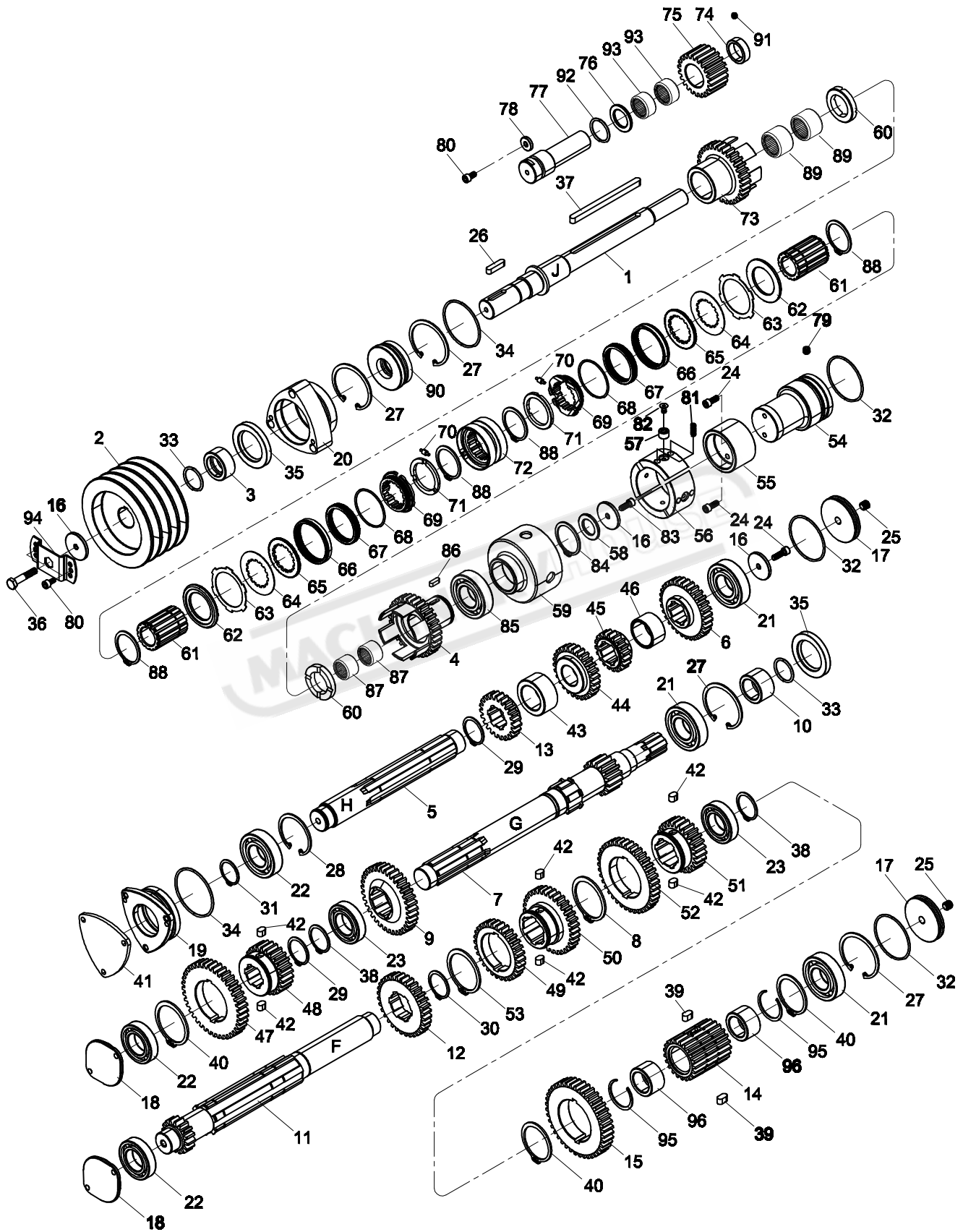


Ver-01

<u>NO.</u>	<u>PART</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
1.	C-1038	Shaft (J)	1	46.	C-1049	Spacer	1
2.	C-1040-1	Pulley	1	47.	C-1053A	Gear (40T)	1
3.	C-1041	Spacer	1	48.	C-1053B	Gear (25T)	1
4.	C-1042	Gear (31T)	1	49.	C-1058A	Gear (34T)	1
5.	C-1043	Shaft (H)	1	50.	C-1058B	Gear (30T)	1
6.	C-1050	Gear (31T)	1	51.	C-1059A	Gear (26T)	1
7.	C-1052	Shaft (G)	1	52.	C-1059B	Gear (38T)	1
8.	A-3346	Circlip (S56)	1	53.	A-3345	Circlip (S52)	1
9.	C-1054	Gear (35T)	1	54.	C-1007	Gasket	1
10.	C-1055	Collar	1	55.	A-1202	Socket Head Cap Screw (M6x12L)	2
11.	C-1056	Shaft (F)	1	56.	A-1425	Hexagon Head Screw (M8x20L)	1
12.	C-1057-1	Gear (32T)	1	57.	T-1005	Washer	1
13.	C-1045	Gear (23T)	1	58.	A-8534	Circlip	2
14.	C-1060A	Compound Gear (21T)	1	59.	A-2269	Needle Bearing (TLA3520)	2
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 (M6x20L)	2				
25.	A-1108	Socket Headless Set Screw (M10x10L)	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 (TC40x62x10)	2				
36.	C-1096	Clamp Plate	1				
37.	A-7232	Key (10x10x35)	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				

HEADSTOCK : CLUTCH SHAFT & GEARS

Ver-01

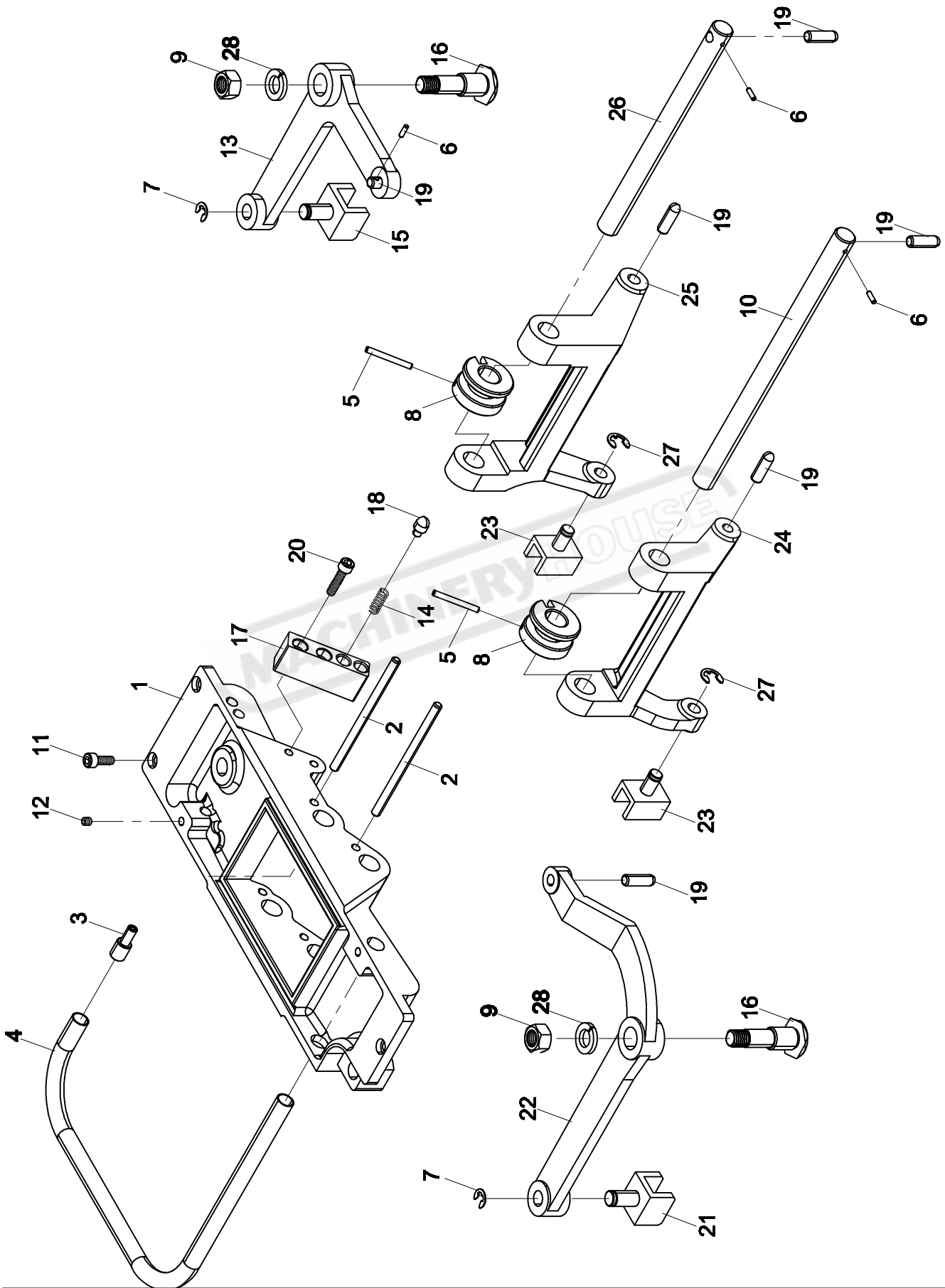


<u>NO.</u>	<u>PART</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
1.	C-1201	Shaft (J)	1	51.	C-1059A	Gear (26T)	1
2.	C-1040-1	Pulley	1	52.	C-1059B	Gear (38T)	1
3.	C-1211	Spacer	1	53.	A-3345	Circlip (S52)	1
4.	C-1203	Gear (31T)	1	54.	C-1215	Brake Shaft	1
5.	C-1043	Shaft (H)	1	55.	C-1216	Brake Disc	1
6.	C-1050	Gear (31T)	1	56.	C-1217	Pads	4
7.	C-1052	Shaft (G)	1	57.	M-1218	Pegs	4
8.	A-3346	Circlip (S56)	1	58.	C-1209	Washer	1
9.	C-1054	Gear (35T)	1	59.	C-1219	Brake Housing	1
10.	C-1055	Collar	1	60.	C-1207	Washer	2
11.	C-1056	Shaft (F)	1	61.	C-1418C	Hubs	2
12.	C-1057-1	Gear (32T)	1	62.	C-1410C	End Flanges	2
13.	C-1045	Gear (23T)	1	63.	C-1447C	Outer Plates	10
14.	C-1060A	Compound Gear (21T)	1	64.	C-1444C	Inner Plates	12
15.	C-1060B	Gear (40T)	1	65.	C-1450C	Lock Plates	2
16.	C-1028	Washer	3	66.	C-1462C	Locking Plates	2
17.	C-1009	Plug	2	67.	C-1430C	Adjusting Nuts	2
18.	C-1008	Cover	2	68.	C-1488	Springs	2
19.	C-1007-1	Bearing Housing	1	69.	C-1407C	Track Rings	2
20.	C-1212	Bearing Housing	1	70.	C-1382C	Bearing Assembly	6
21.	A-2036	Bearing (#6206)	3	71.	C-1494C	Thrust Washers	2
22.	A-2029	Bearing (#6006)	3	72.	C-1399C	Operating Collar	1
23.	A-2030	Bearing (#6007)	2	73.	C-1202	Gear (31T)	1
24.	A-1204	Socket Head Cap Screw (M6x20L)	3	74.	C-1222-1	Washer	1
25.	A-1108	Socket Headless Set Screw (M10x10L)	2	75.	C-1204	Gear (22T)	1
26.	A-7230	Key (7x7x30)	1	76.	C-1222	Washer	1
27.	A-3206	Circlip (R62)	4	77.	C-1221	Shaft (A)	1
28.	A-3205	Circlip (R55)	1	78.	R-1030	Washer	1
29.	A-3324	Circlip (S34)	2	79.	A-1106	Socket Headless Set Screw (M8x8L)	1
30.	A-3316	Circlip (S42)	1	80.	A-1202	Socket Head Cap Screw (M6x12L)	2
31.	A-3312	Circlip (S30)	1	81.	A-8410	Spring	8
32.	A-6021	O-Ring (G55)	3	82.	A-1612	Flat Head Cap Screw (M6x16L)	4
33.	A-6014	O-Ring (P28)	2	83.	A-1525	Socket Head Cap Screw (M6x16L)	1
34.	A-6028	O-Ring (AN6230/9)	2	84.	A-3328	Circlip (S40)	1
35.	A-5020	Oil Seal (TC40x60x10)	2	85.	A-2047	Bearing (#6008)	1
36.	A-1425	Hexagon Head Screw (M8x20L)	1	86.	A-7256	Key (5x5x16)	1
37.	A-7246	Key (8x8x125)	1	87.	A-2110	Needle Bearing (TLA2220)	2
38.	A-3314	Circlip (S35)	2	88.	C-1388C	Circlip	4
39.	A-7275	Key (8x8x15)	2	89.	A-2132	Bearing (TLA3020)	2
40.	A-3331	Circlip (S58)	3	90.	A-2048	Bearing (#5206)	1
41.	C-1007-2	Cover	1	91.	A-1100	Socket Headless Set Screw (M6x6L)	1
42.	A-7247	Key (8x8x12)	6	92.	A-6013	O-Ring (P25)	1
43.	C-1046	Spacer	1	93.	A-2131	Bearing (TLA2516)	2
44.	C-1047	Gear (27T)	1	94.	C-1096	Clamp Plate	1
45.	C-1048	Gear (19T)	1	95.	A-8534	Circlip	2
46.	C-1049	Spacer	1	96.	A-2269	Needle Bearing (TLA3520)	2
47.	C-1053A	Gear (40T)	1				
48.	C-1053B	Gear (25T)	1				
49.	C-1058A	Gear (34T)	1				
50.	C-1058B	Gear (30T)	1				

<u>NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
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 (M6x16L)	3
12.	A-1100	Socket Headless Set Screw (M6x6L)	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 (M6X25L)	2
21.	A-1805	Spring Washer (ϕ 12)	1

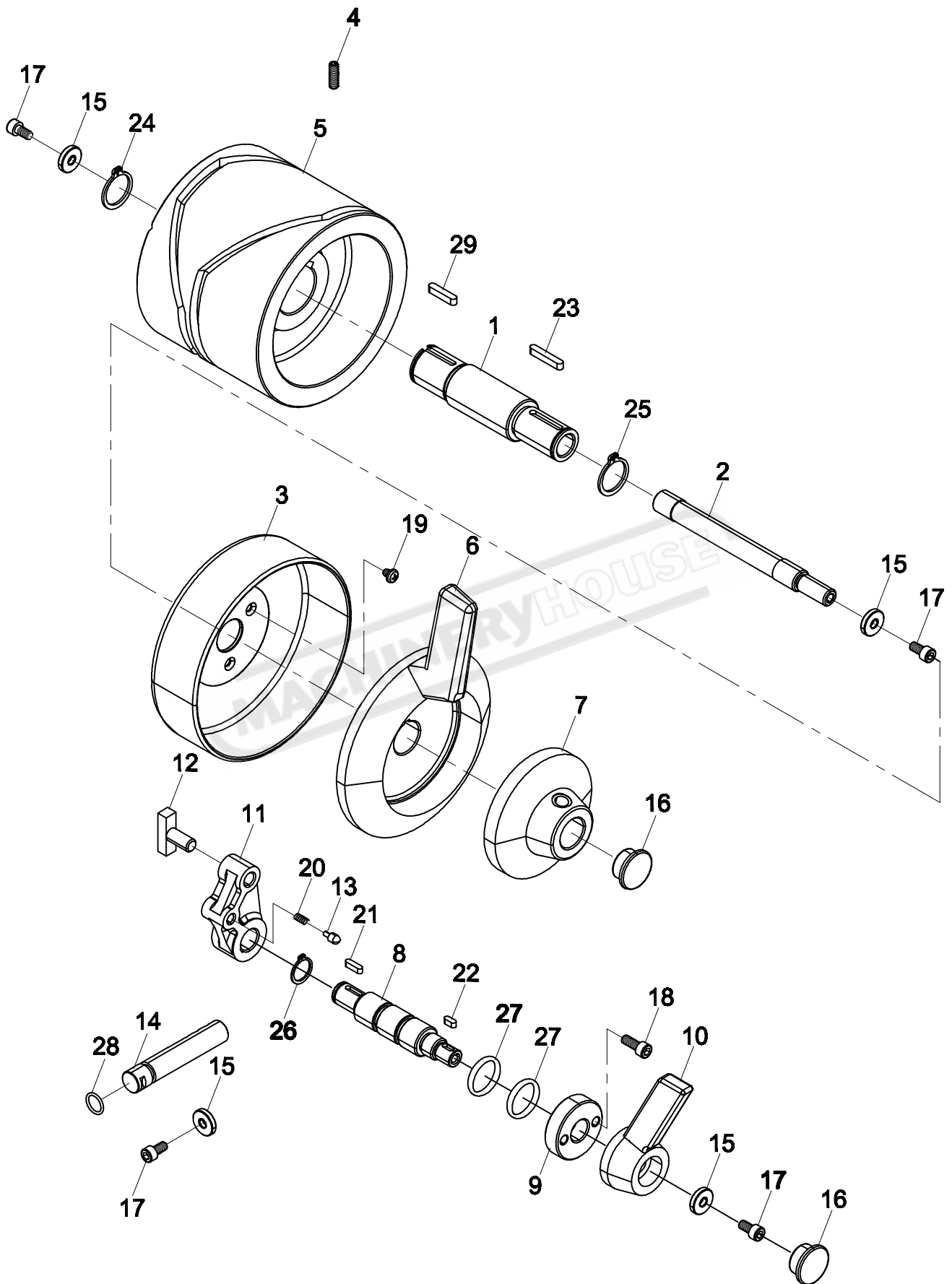
MACHINEHOUSE

HEADSTOCK : CONTROL FRAME ASSEMBLY



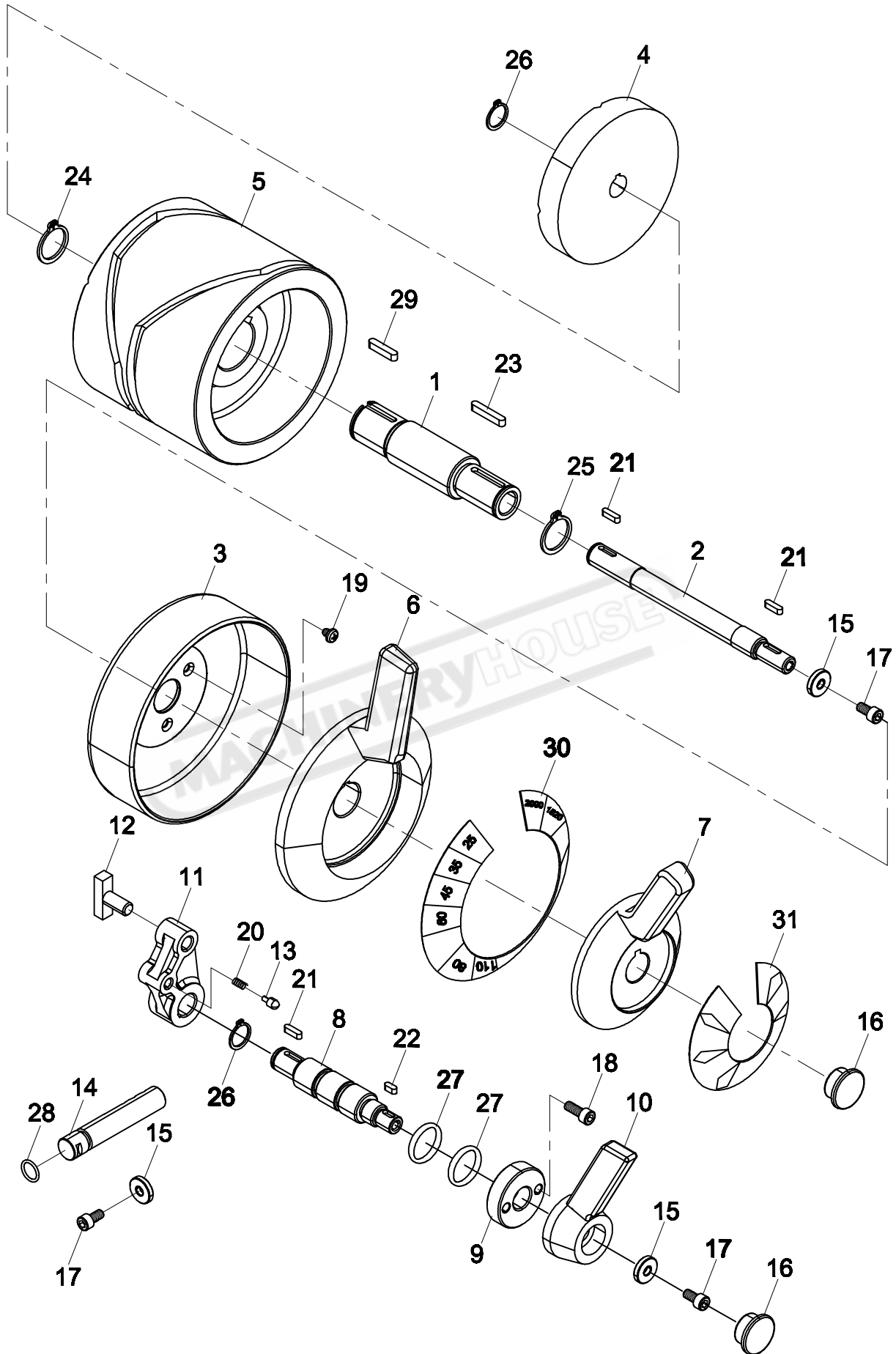
<u>NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
1.	C-1061	Lever Frame	1
2.	C-1062	Rod	2
3.	C-1063	Peg	1
4.	C-1064	Lubrication Pipe	1
5.	A-4003	Pin (ϕ 4x36)	2
6.	A-4000	Pin (ϕ 3x10)	2
7.	A-3102	Circlip (E8)	2
8.	C-1068	Collar Assembly	2
9.	A-1703	Nut (M12)	2
10.	C-1070	Rod	1
11.	A-1203	Socket Head Cap Screw (M6x16L)	3
12.	A-1100	Socket Headless Set Screw (M6x6L)	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 (M6X25L)	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)



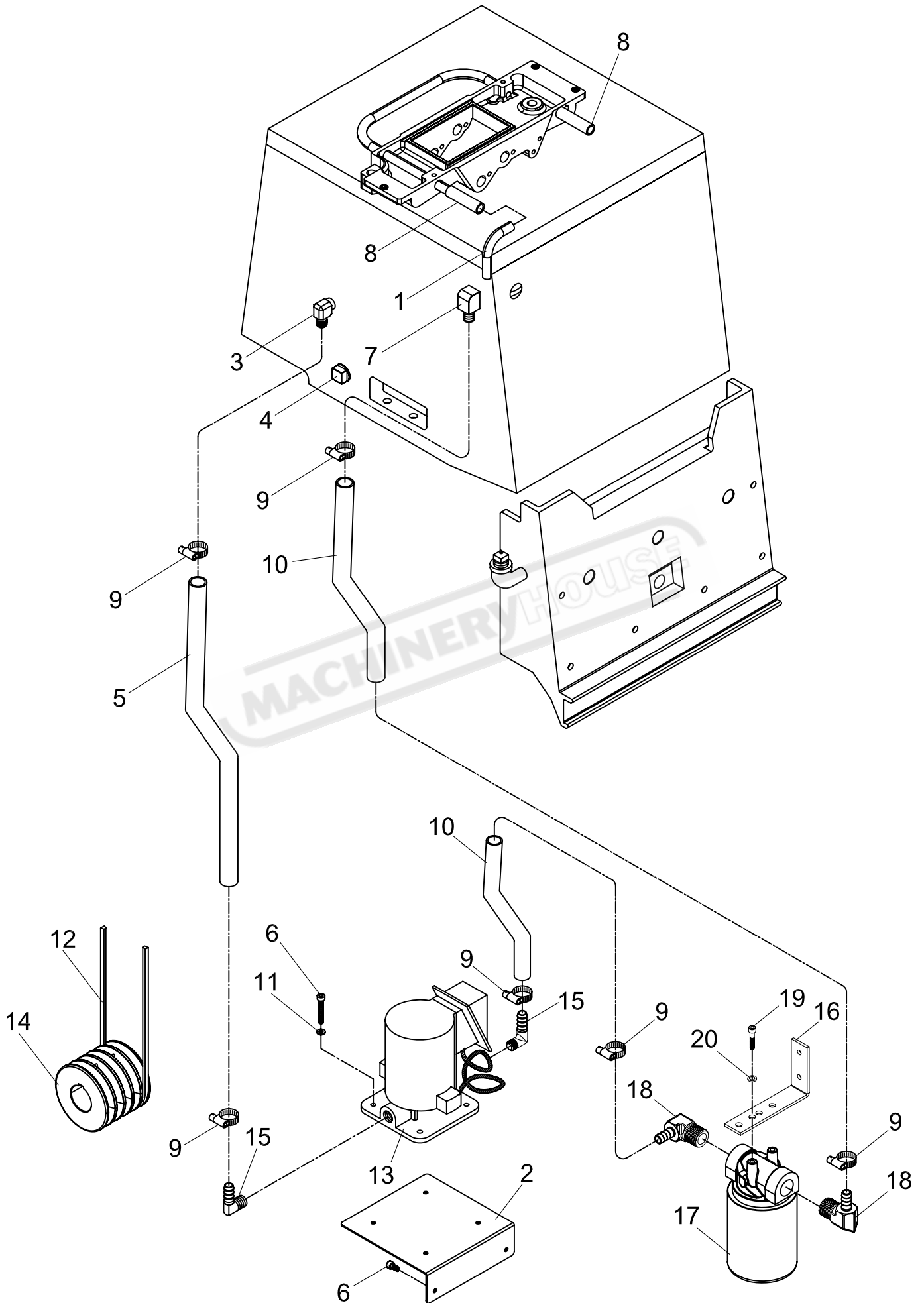
<u>NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
1.	C-1078	Cam Shaft	1
2.	C-1079-1	Shaft	1
3.	C-1080	Selector Housing Assembly	1
4.	A-1104	Socket Headless Set Screw (M6x20L)	2
5.	C-1082	Drum Cam	1
6.	C-1083	Range Selector	1
7.	C-1084-1	Speed Selector	1
8.	C-1085	Shafts	2
9.	C-1086	Collars	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 (M6x12L)	6
18.	A-1203	Socket Head Cap Screw (M6x16L)	4
19.	A-1606	Cross Recessed Head Screw (M5x6L)	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



<u>NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
1.	C-1078	Cam Shzajt	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 (M6x12L)	5
18.	A-1203	Socket Head Cap Screw (M6x16L)	4
19.	A-1606	Cross Recessed Head Screw (M5x6L)	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

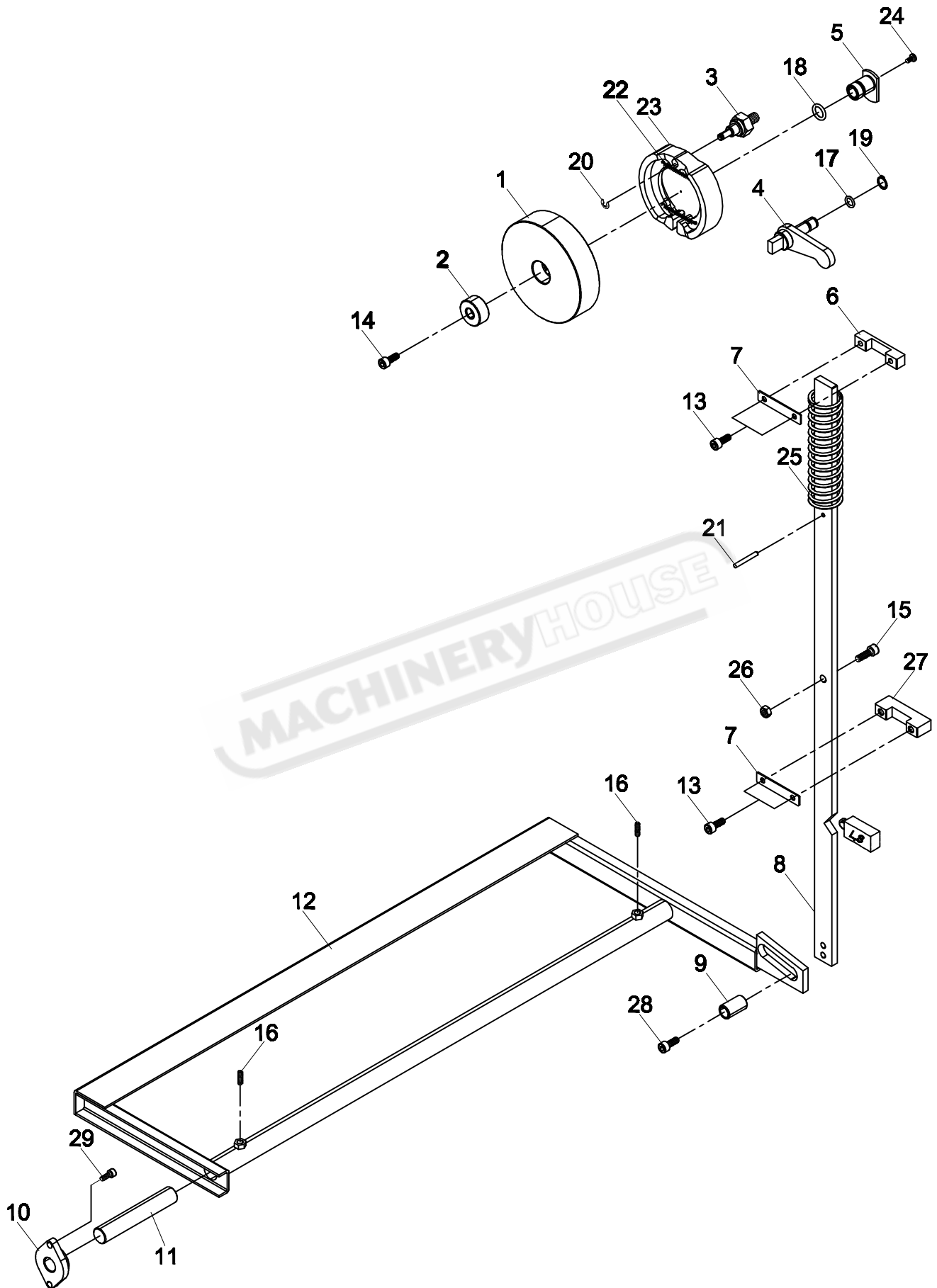
HEADSTOCK:LUBRICATION



<u>NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
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 (ϕ 6)	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 (ϕ 6)	2

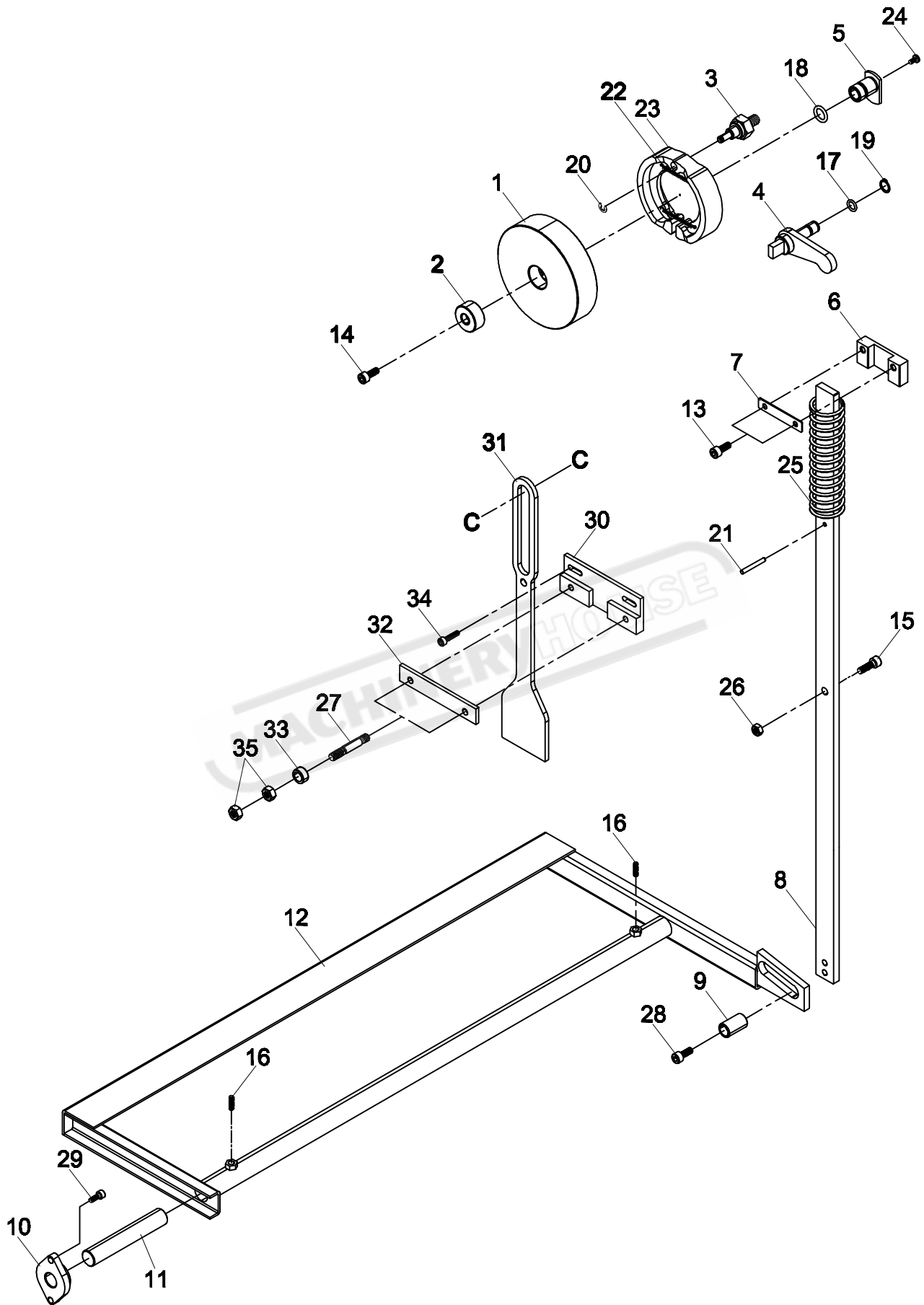
MACHINERYHOUSE

BRAKE:MECHANISM (NON-CLUTCH & VARISPEED)



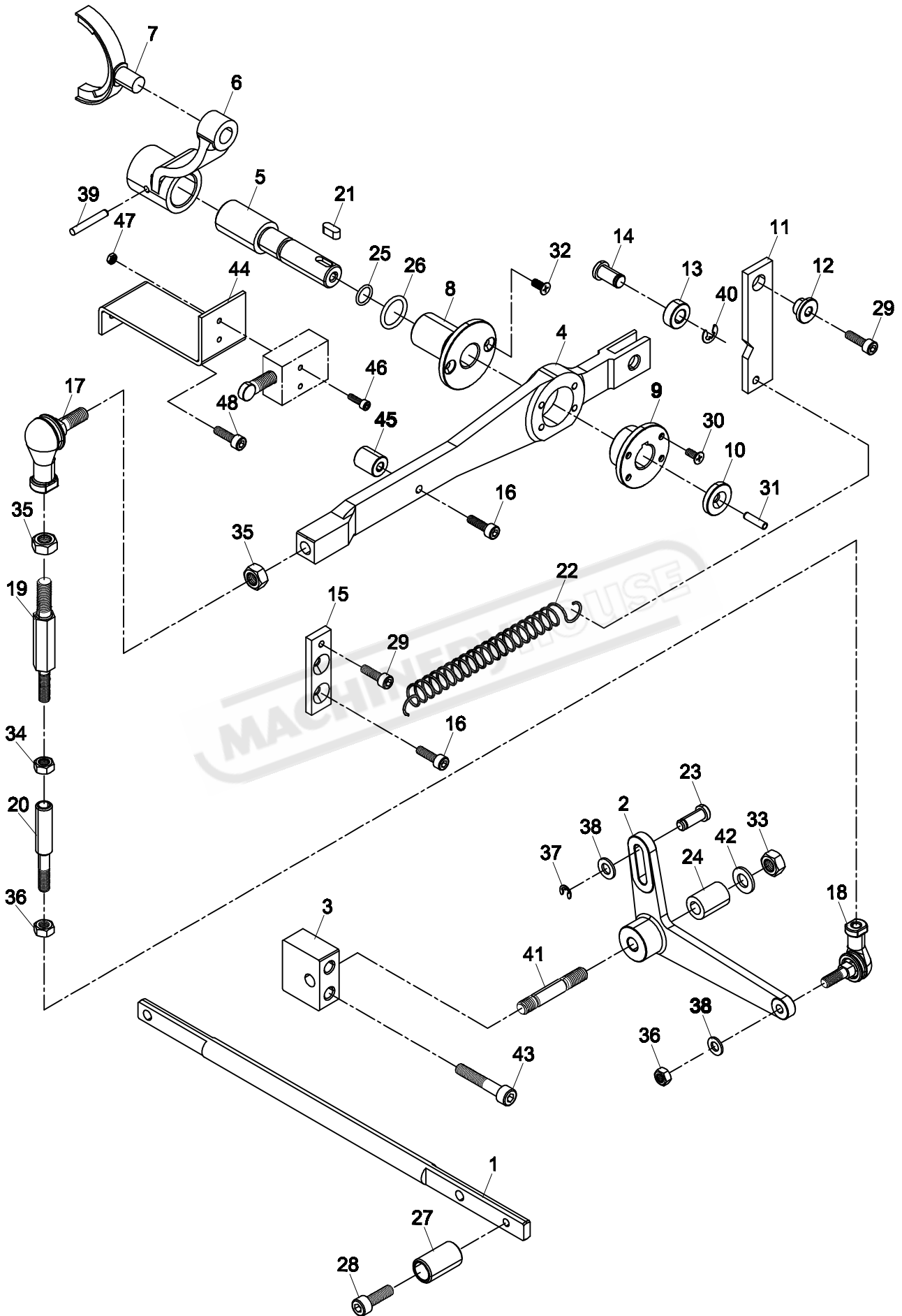
<u>NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
1.	C-1117-1	Drum	1
2.	C-1117-2	Collar	1
3.	C-1118	Stud	1
4.	C-1119	Catch Assembly	1
5.	C-1120	Bush	1
6.	C-1122	Guide Blocks	1
7.	C-1123	Strap Plate	2
8.	C-1124	Operation Bar	1
9.	C-1125	Pivot	1
10.	C-7009	Flanges	2
11.	C-7010	Connect Shafts	2
12.	C-7011	Pedal	1
13.	A-1205	Socket Head Cap Screw (M6x25L)	4
14.	A-1213	Socket Head Cap Screw (M8x20L)	1
15.	A-1219	Socket Head Cap Screw (M10x20L)	1
16.	A-1106	Socket Headless Set Screw (M8x8L)	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 (M5x10L)	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 (M8x30L)	1
29.	A-1203	Socket Head Cap Screw (M6x16L)	4

BRAKE:MECHANISM (CLUTCH)



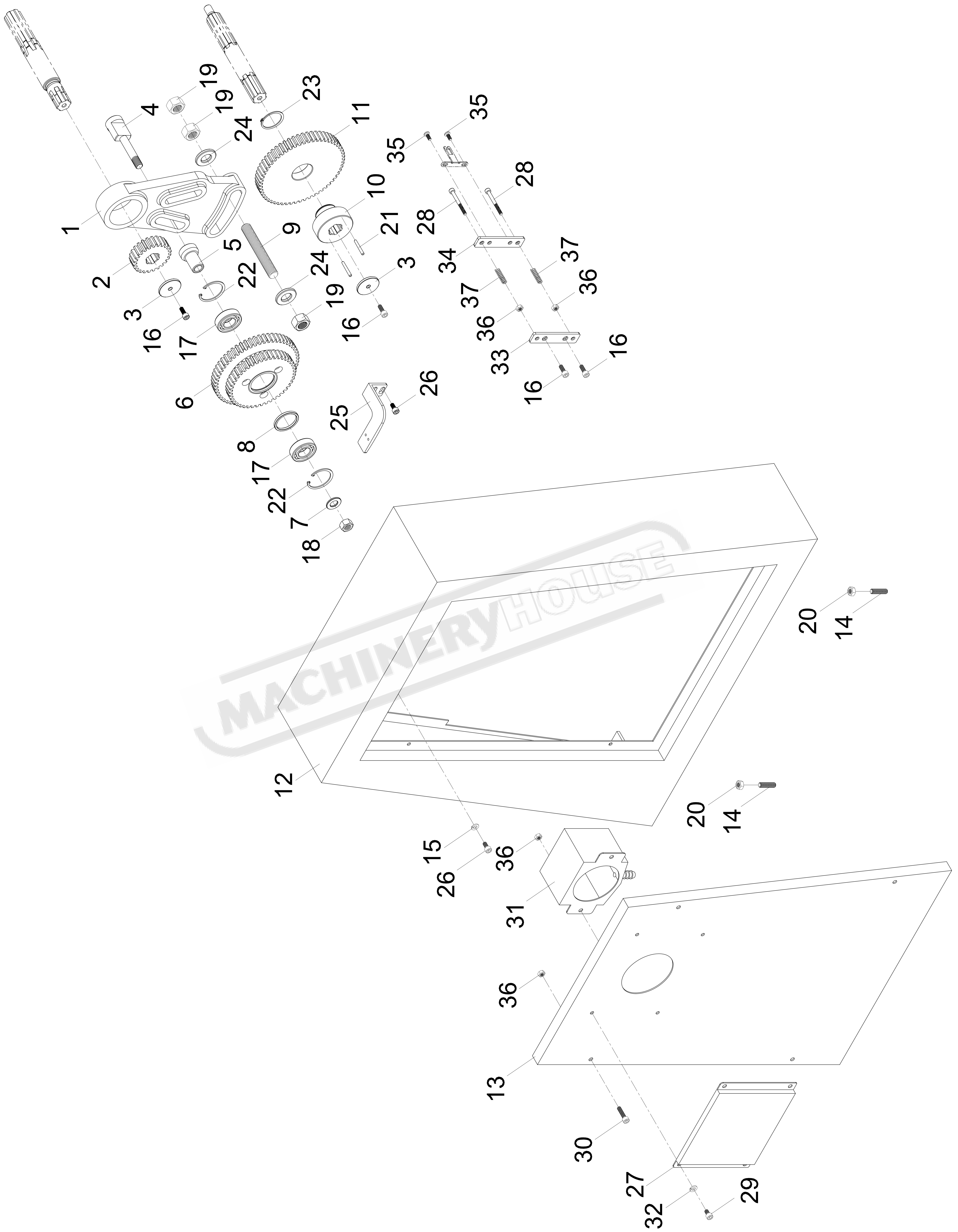
<u>NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
1.	C-1117-1	Drum	1
2.	C-1117-2	Collar	1
3.	C-1118	Stud	1
4.	C-1119	Catch Assembly	1
5.	C-1120	Bush	1
6.	C-1122	Guide Blocks	1
7.	C-1123	Strap Plate	1
8.	C-1124	Operation Bar	1
9.	C-1125	Pivot	1
10.	C-7009	Flanges	2
11.	C-7010	Connect Shafts	2
12.	C-7011	Pedal	1
13.	A-1205	Socket Head Cap Screw (M6x25L)	2
14.	A-1213	Socket Head Cap Screw (M8x20L)	1
15.	A-1219	Socket Head Cap Screw (M10x20L)	1
16.	A-1106	Socket Headless Set Screw (M8x8L)	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 (M5x10L)	1
25.	A-8423	Spring	1
26.	A-1702	Nut (M10)	1
27.	C-1246	Pivot	2
28.	A-1215	Socket Head Cap Screw (M8x30L)	1
29.	A-1203	Socket Head Cap Screw (M6x16L)	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 (M6x25L)	2
35.	A-1702	Nut (M10)	4

CLUTCH LINKAGE



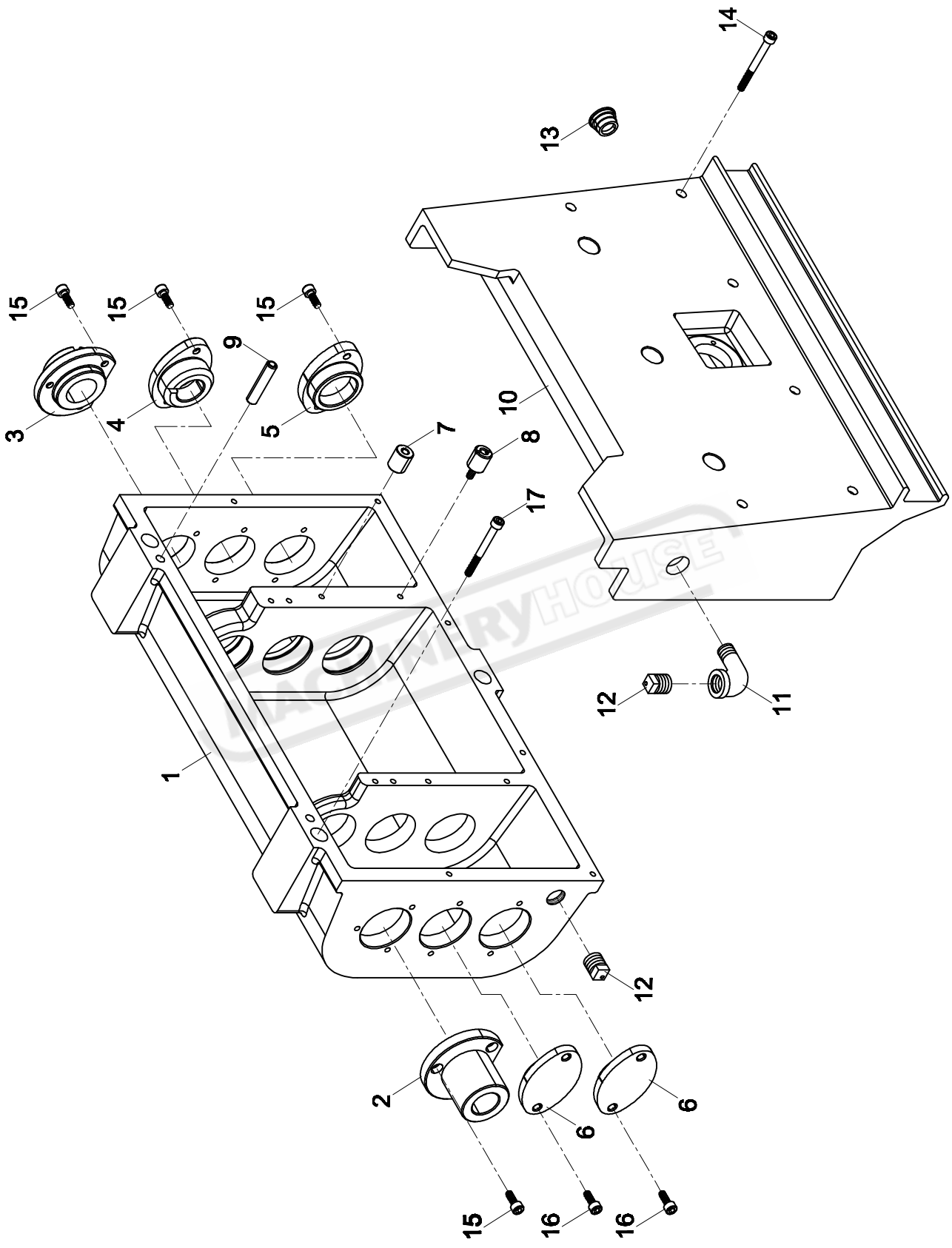
<u>NO.</u>	<u>PART</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
1.	C-1249	Operating Bar	1	41.	C-1246	Pivot	1
2.	C-1244	Lever	1	42.	A-1908	Washer (ϕ 10)	1
3.	C-1242	Bracket	1	43.	A-1217	Socket Head Cap Screw (M8x45L)	2
4.	C-1230	Operating Lever	1	44.	C-1273	Switch Plate	1
5.	C-1227	Shift Shaft	1	45.	R-4018	Collar	1
6.	C-1226	Shift Lever	1	46.	A-1622	Flat Head Driver Screw (M4x30L)	2
7.	C-1228	Shift Fork	1	47.	A-1729	Nut (M4)	2
8.	C-1229	Sleeve	1	48.	A-1202	Socket Head Cap Screw (M6x12L)	2
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 (M6x20L)	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 (M8x25L)	1				
29.	A-1203	Socket Head Cap Screw (M6x16L)	2				
30.	A-1608	Flat Head Cap Screw (M5x16L)	4				
31.	A-4005	Pin (ϕ 5x20)	1				
32.	A-1607	Flat Head Cap Screw (M5x12L)	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 (ϕ 8)	2				
39.	A-4008	Pin (ϕ 5x36)	2				
40.	A-3101	Circlip (E7)	2				

SWING FRAME : END GEARS & COVER



<u>NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
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	1
13.	C-1172	Door	1
	C-1185	Door (5C)	1
14.	A-1148	Socket Headless Set Screw (M8x30L)	2
15.	A-1801	Spring Washer (ϕ 1/4")	6
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)	2
21.	C-1145	Shear Pin (ϕ 3x32)	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)	8
27.	C-7039	Cover	1
28.	A-1307	Socket Head Cap Screw (M5x70L) (CE)	2
29.	A-1231	Socket Head Cap Screw (M6x10L)(CE)	4
30.	A-1205	Socket Head Cap Screw (M6x25L)	4
31.	C-1182	Champing Plate	1
32.	A-1812	Spring Washer (ϕ 6)	4
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)	6
37.	A-8429	Spring (CE)	2

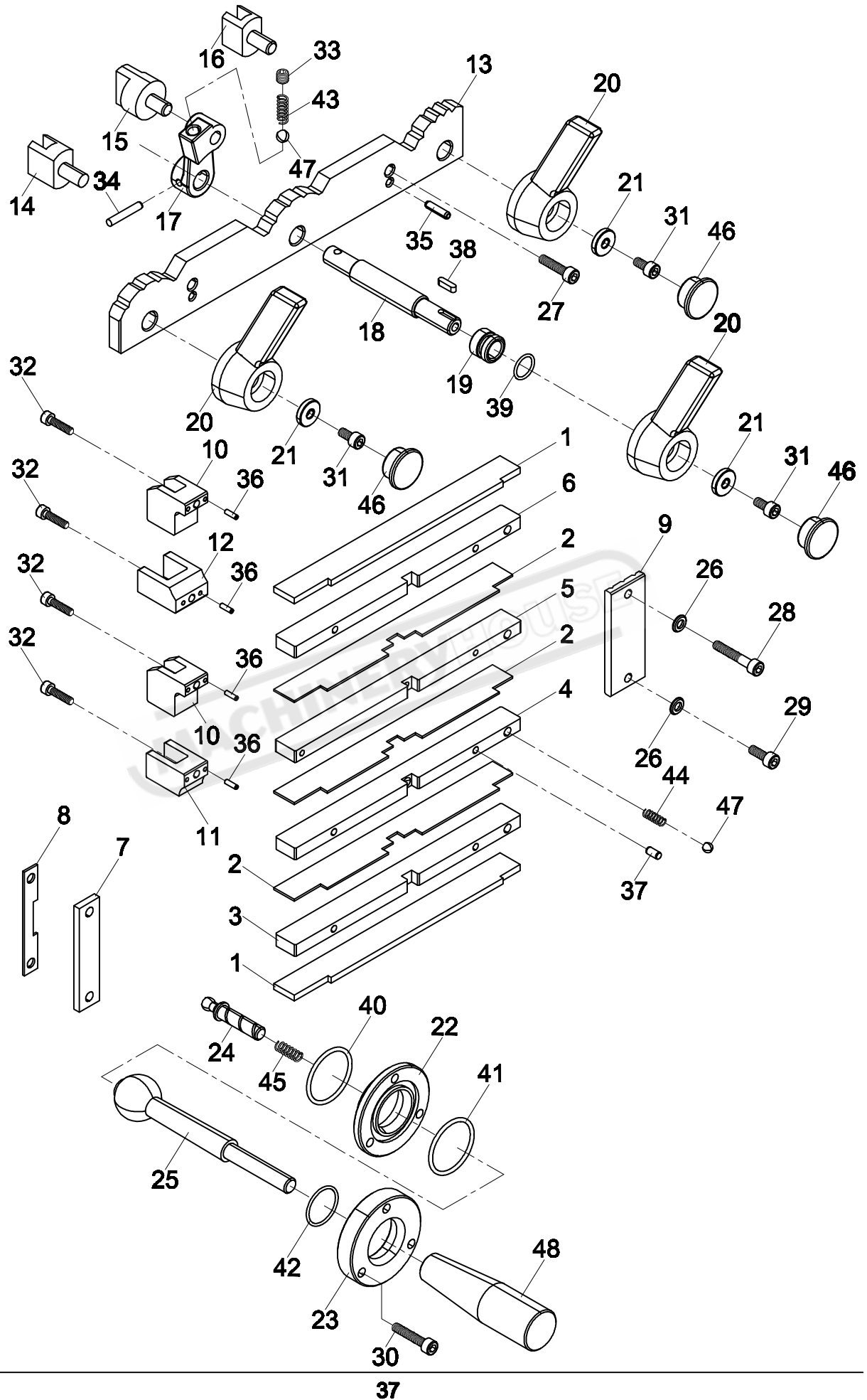
GEARBOX : CASTINGS



<u>NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
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 (M6x90L)	6
15.	A-1203	Socket Head Cap Screw (M6x16L)	10
16.	A-1204	Socket Head Cap Screw (M6x20L)	4
17.	A-1290	Socket Head Cap Screw (M10x60L)	3

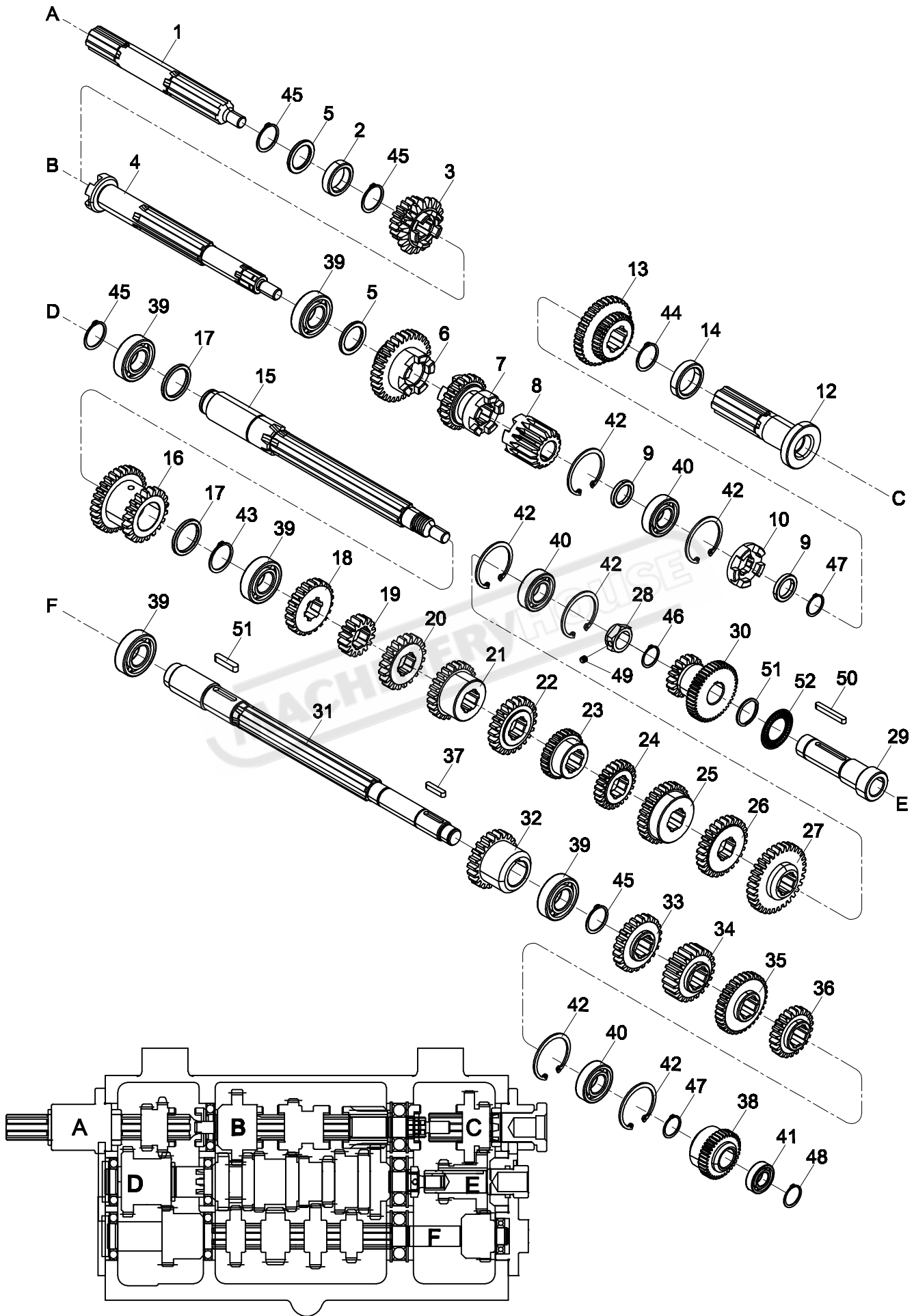
MACHINERYHOUSE

GEARBOX:CONTROLS



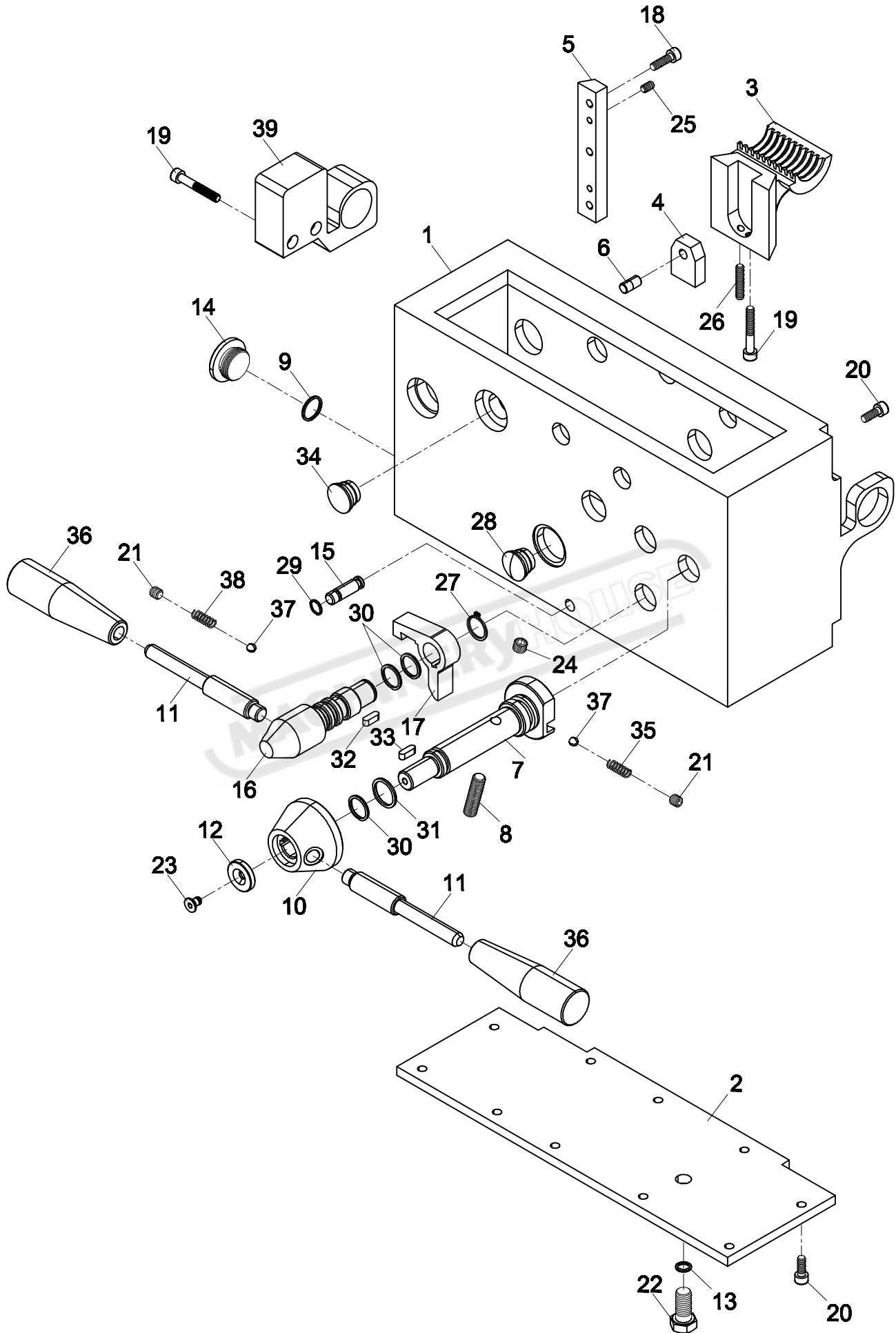
<u>NO.</u>	<u>PART</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
1.	C-2013	Top & Bottom Plate	2	41.	A-6017	O-Ring (P36)	1
2.	C-2014	Dividing Plate	3	42.	A-6015	O-Ring (P29)	1
3.	C-2015-1	Guide Plate	1	43.	A-8405	Spring	3
4.	C-2015-2	Guide Plate	1	44.	A-8406	Spring	4
5.	C-2015-3	Guide Plate	1	45.	A-8407	Spring	1
6.	C-2015-4	Guide Plate	1	46.	C-2075	Plug	3
7.	C-2016	Bar Setter	1	47.	A-9202	Ball (ϕ 1/4")	7
8.	C-2017	Spacer	2	48.	A-9107	Handle	1
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 (M6x25L)	2				
28.	A-1207	Socket Head Cap Screw (M6x35L)	2				
29.	A-1203	Socket Head Cap Screw (M6x15L)	2				
30.	A-1206	Socket Head Cap Screw (M6x30L)	3				
31.	A-1202	Socket Head Cap Screw (M6x12L)	3				
32.	A-1292	Socket Head Cap Screw (M5x20L)	4				
33.	A-1106	Socket Headless Set Screw (M8x8L)	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				

GEARBOX:GEARS



<u>NO.</u>	<u>PART</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
1.	C-2037	Shaft (A)	1	41.	A-2003	Bearing (16003)	1
2.	C-2038	Collar	1	42.	A-3204	Circlip (R47)	6
3.	C-2039	Gear (19T/19T)	1	43.	A-3312	Circlip (S30)	1
4.	C-2040	Shaft (B)	1	44.	A-3310	Circlip (S28)	1
5.	C-2041	Collar	2	45.	A-3309	Circlip (S25)	4
6.	C-2042	Gear (32T)	1	46.	A-3307	Circlip (S22)	1
7.	C-2043	Gear (23T)	1	47.	A-3306	Circlip (S20)	2
8.	C-2044	Gear (16T)	1	48.	A-3303	Circlip (S17)	1
9.	C-2045	Spacer	2	49.	A-1100	Socket Headless Set Screw (M6x6L)	1
10.	C-2046	Clutch	1	50.	A-7210	Key (5x5x40)	1
11.	A-7215	Key (6x6x30)	1	51.	A-6013	O-Ring (P25)	1
12.	C-2048	Shaft (C)	1	52.	A-2055-1	Bearing (NTB2542)	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				

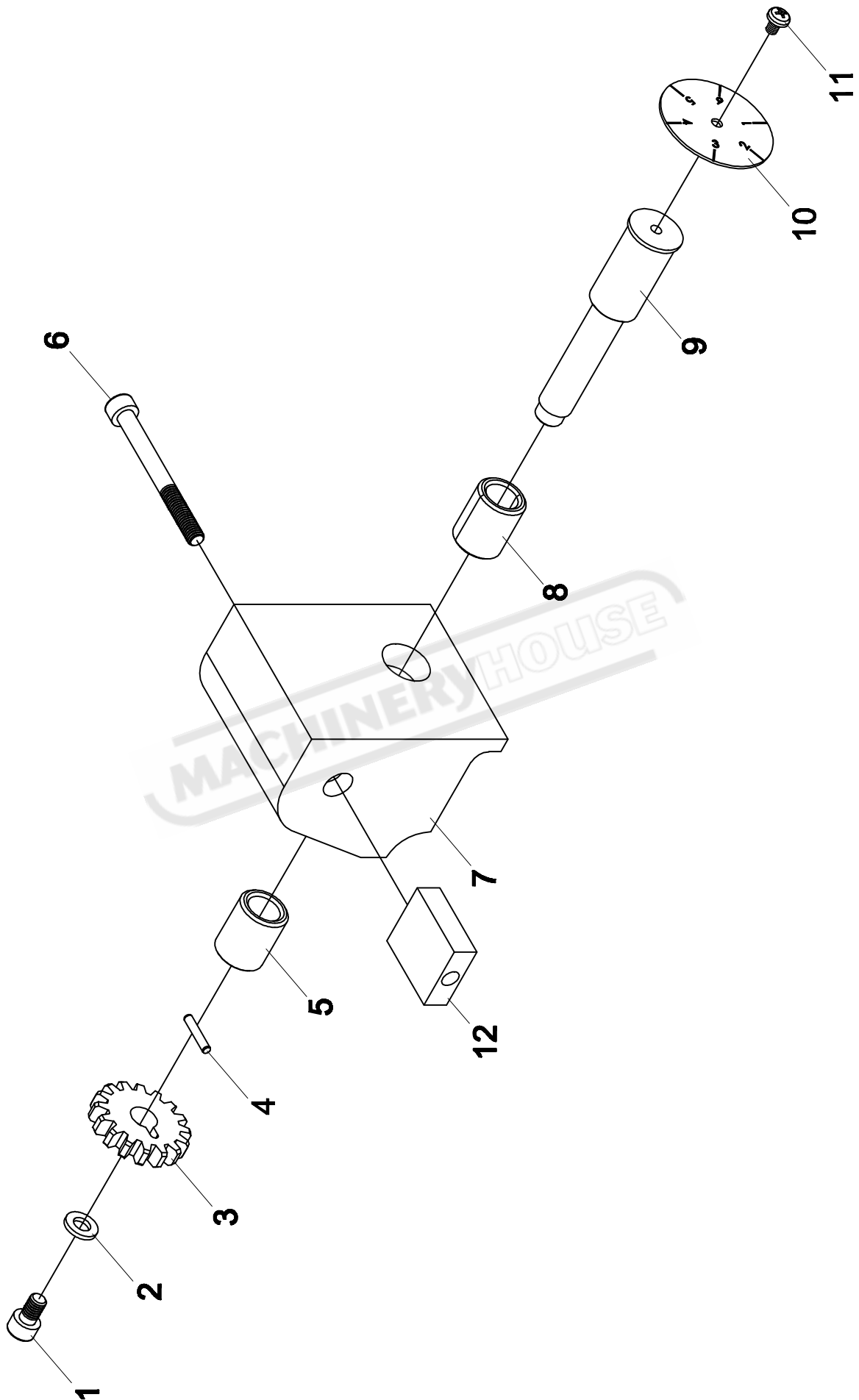
APRON



<u>NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
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 (M10x40L)	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 (M6x20L)	3
19.	A-1208	Socket Head Cap Screw (M6x40L)	3
20.	A-1203	Socket Head Cap Screw (M6x16L)	11
21.	A-1106	Socket Headless Set Screw (M8x8L)	2
22.	A-1426	Hexagon Bolt (M12x16L)	1
23.	A-1610	Socket Flat Head Screw (M6x12L)	1
24.	A-1166	Socket Headless Set Screw (M10x10L)	1
25.	A-1101	Socket Headless Set Screw (M6x8L)	2
26.	A-1105	Socket Headless Set Screw (M6x30L)	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
39.	C-3097	Bracket	1

THREADING DIALS

Ver-01

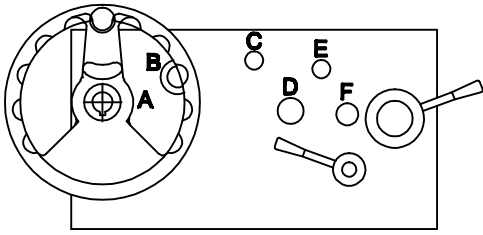


			Ver-01
<u>NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
1.	A-1231	Socket Head Cap Screw (M6x10)	1
2.	A-1901	Washer (ϕ 6)	1
3.	C-3076	Gear 16T (Imperial)	1
	C-3080	Gear 14T (Metric)	1
	C-3081	Gear 13T (Metric)	1
	C-3082	Gear 18T (Metric)	1
	C-3083	Gear 20T (Metric)	1
	C-3084	Gear 22T (Metric)	1
4.	A-4018	Pin (Φ 3x15)	1
5.	T-8020	Bush	1
6.	A-1235	Socket Head Cap Screw (M6x70) (Right Hand)	1
	A-1250	Socket Head Cap Screw (M6x110) (Left Hand)	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
12.	T-3039	Pad (Left Hand)	1

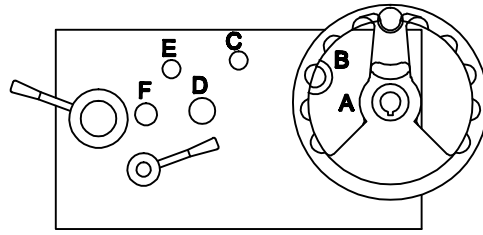
MACHINERYHOUSE

APRON CONTROLS

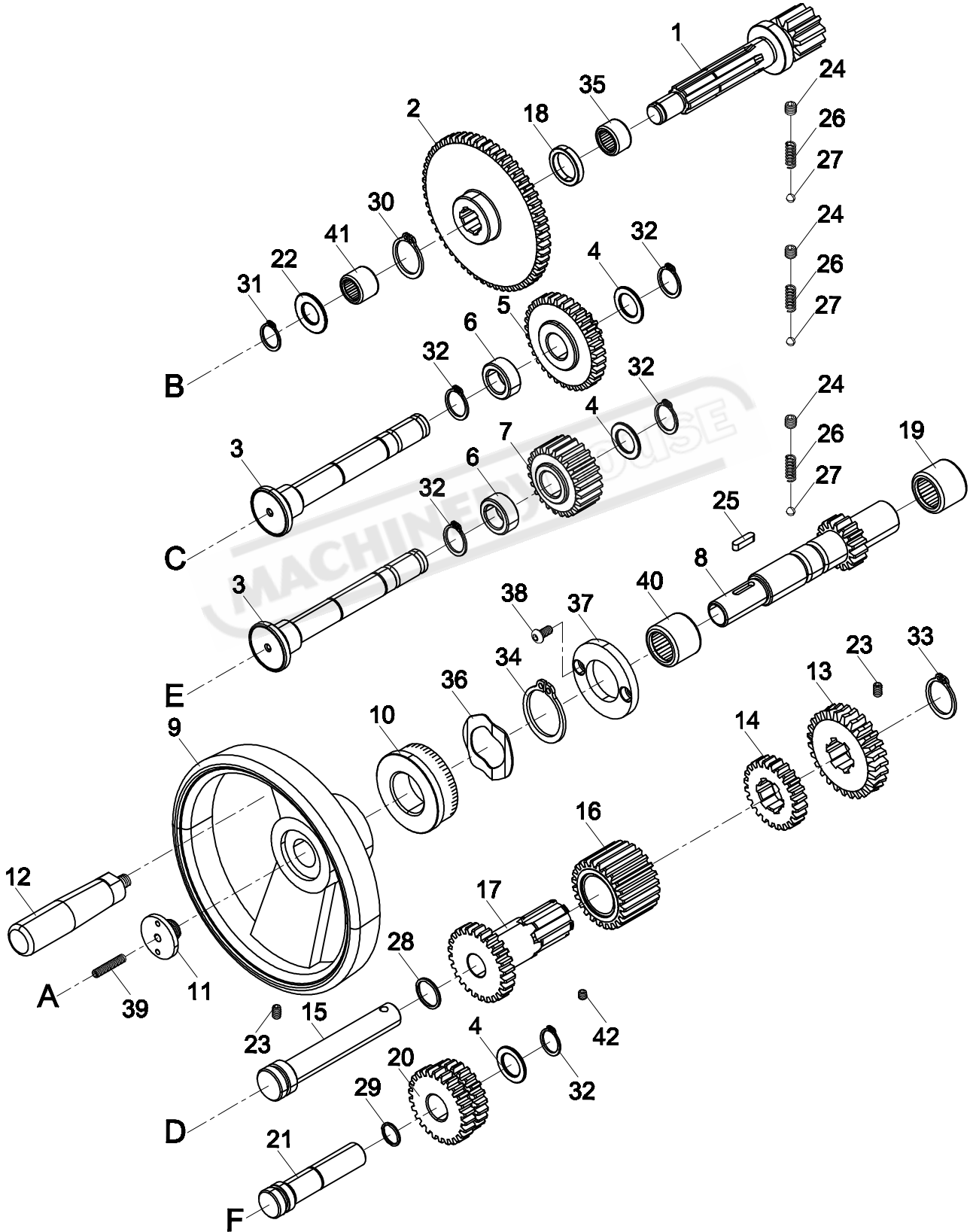
Ver-01



LEFT HAND

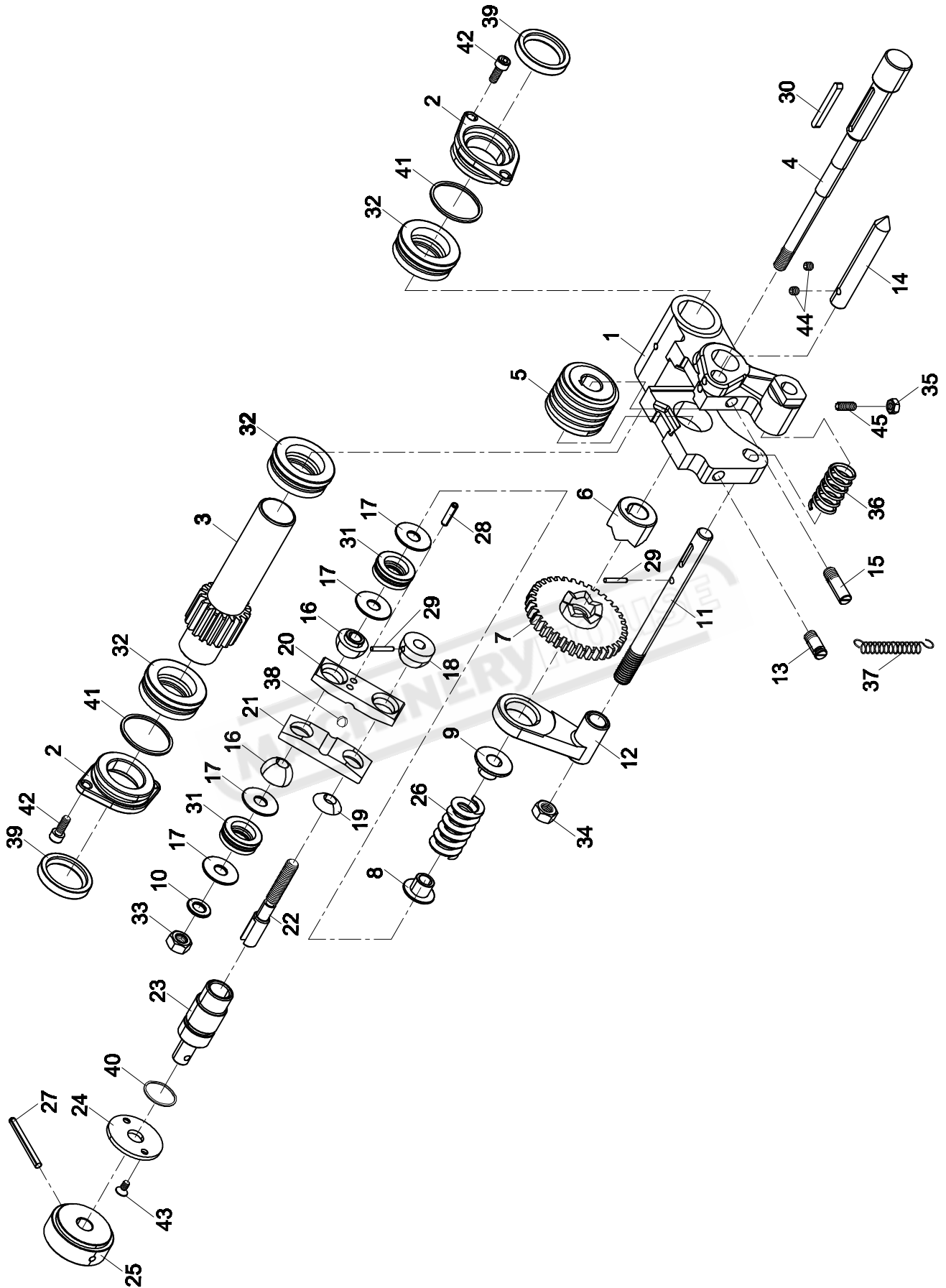


RIGHT HAND



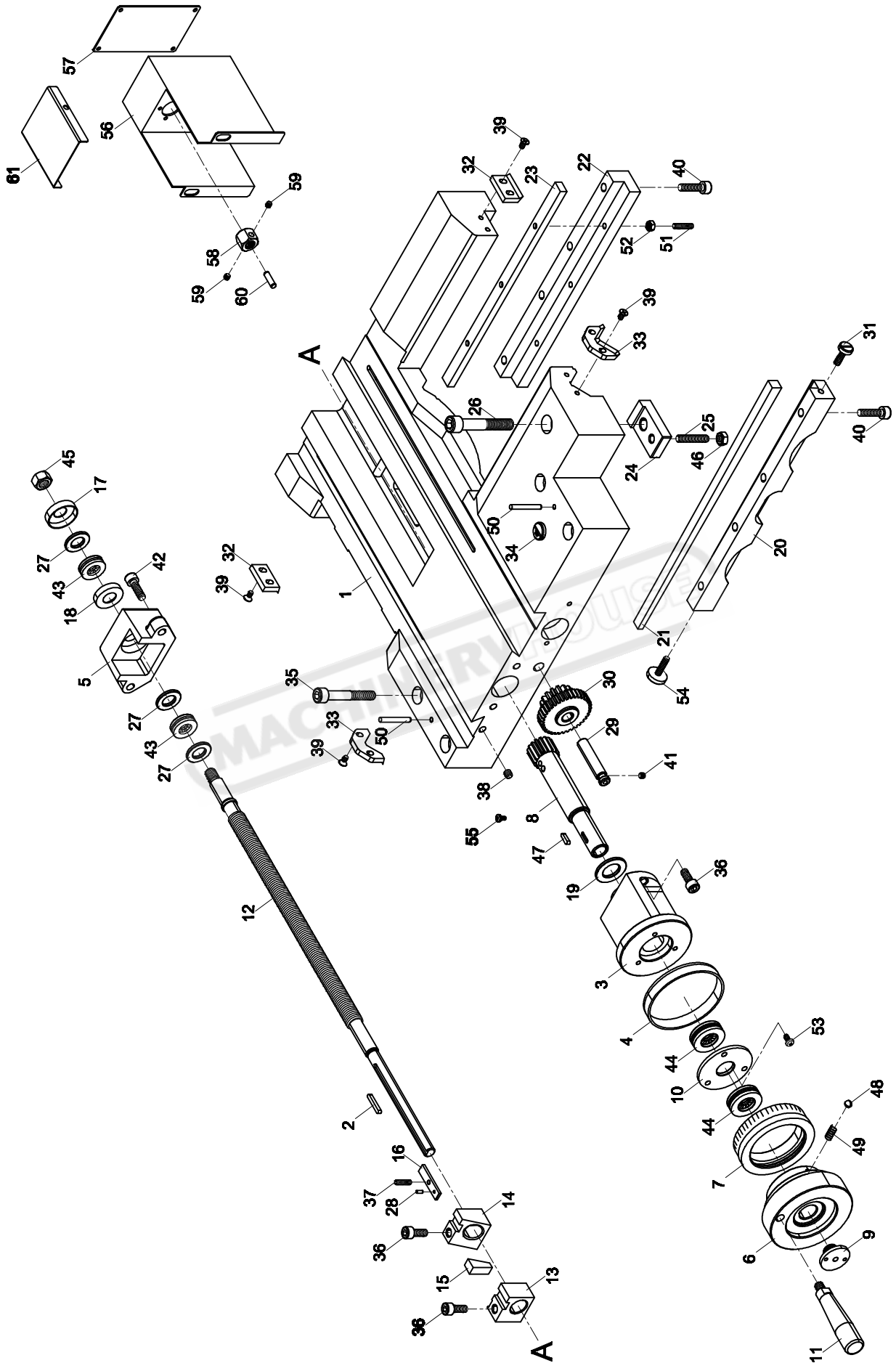
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1.	C-3021	Rack Pinion	1	41.	A-2066	Bearing (BA105)	1
2.	C-3022	Gear (56T)	1	42.	A-1100	Socket Headless Set Screw (M6x6L)	1
3.	C-3023	Shaft (C.E.)	2				
4.	C-3024	Washer	3				
5.	C-3025	Gear (15/33T)	1				
6.	C-3026	Collar	2				
7.	C-3028	Gear (24T)	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 (D)	1				
16.	C-3038RA	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 (M6x10L)	2				
24.	A-1106	Socket Headless Set Screw (M8x8L)	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	2				
39.	A-1105	Socket Headless Set Screw (M6x30L)	1				
40.	A-2050	Bearing (RNA4905)	1				

APRON WORMBOX



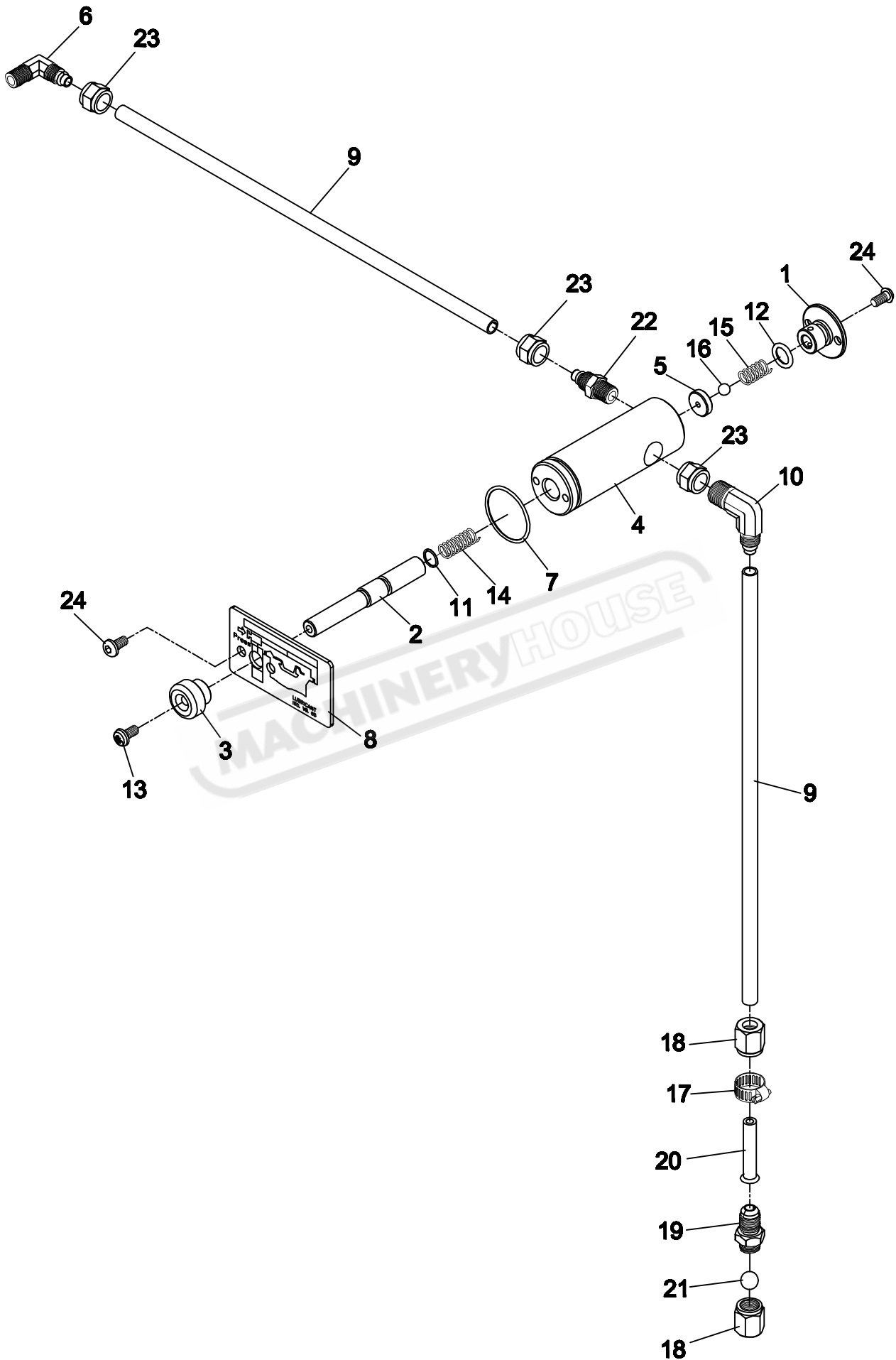
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1.	C-3044-1	Worm Set, R.H.	1	41. A-6020	O-Ring (P42)	2
	C-3044-2	Worm Set, L.H.	1	42. A-1203	Socket Head Cap Screw (M6x16L)	4
2.	C-3045	Bush Assembly	2	43. A-1601	Cross Recessed Head Screw (3/16"x3/8")	2
3.	C-3046RA	Pinion	1	44. A-1100	Socket Headless Set Screw (M6x6L)	2
4.	C-3048	Trip Shaft	1	45. A-1103	Socket Headless Set Screw (M6x16L)	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 (ϕ 5x50)	1			
28.	A-4005	Pin (ϕ 5x20)	2			
29.	A-4001	Pin (ϕ 3x20)	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 (ϕ 3/8")	1			
39.	A-5009	Oil Seal (SC30x40x6)	2			
40.	A-6009	O-Ring (P21)	1			

SADDLES:ASSEMBLIES



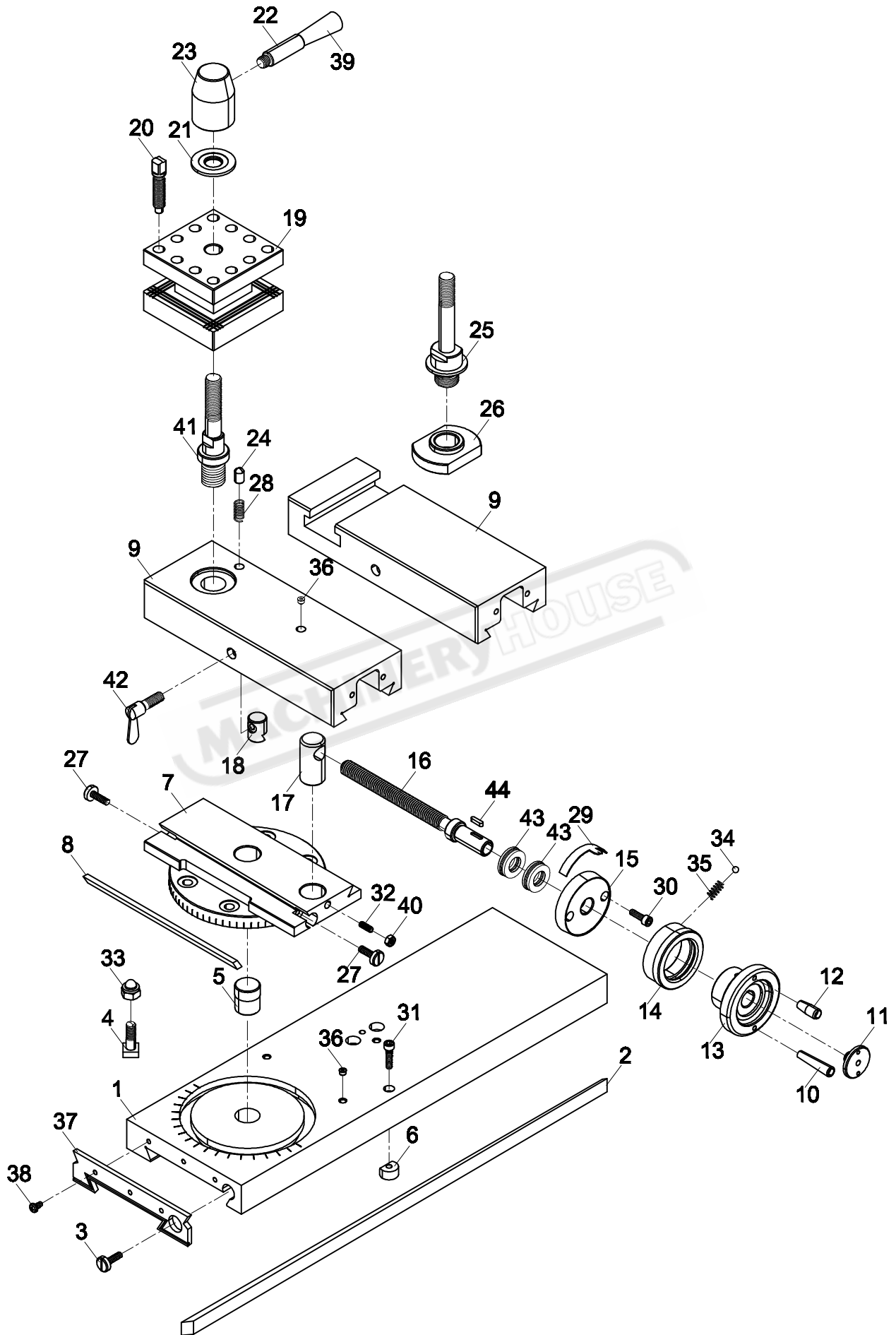
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1.	C-4001	Saddle Casting	1	41.	A-1100	Socket Headless Set Screw (M6x6L)	1
2.	A-7209	Key (5x5x35)	1	42.	A-1214	Socket Head Cap Screw (M8x25L)	2
3.	C-4002	Keep Assemble	1	43.	A-2000	Bearing (#1528)	2
4.	C-4003	Collar	1	44.	A-2001	Bearing (#AS2035)	2
5.	C-4004	Bracket	1	45.	A-1734	Nylon Nut (M12xP1.25)	1
6.	C-4005-2	Handwheel	1	46.	A-1701	Nut (M8)	1
7.	C-4006-1	Index Ring (Metric)	1	47.	A-7202	Key (4x4x15)	1
	C-4006-2	Index Ring (Inches)	1	48.	A-9202	Ball (ψ 1/4")	2
	C-4006-4	Index Ring (Dual Dial):Inches		49.	A-8410	Spring	2
	C-4006-3	Index Ring (Dual Dial): Metric	1	50.	A-4009	Pin (5x40)	2
8.	C-4007	Pinion	1	51.	A-1131	Socket Headless Set Screw (M6x25L)	3
9.	C-3032	Plug	1	52.	A-1700	Nut (M6)	3
10.	C-4009	Collar	1	53.	A-1509	Round Head Cap Screw (M5x10L)	3
11.	C-4011	Handle	1	54.	C-4047	Gib Screw	1
12.	C-4012-1	Leadscrew (Metric)	1	55.	A-1513	Round Head Screw (M4x5L)	1
	C-4012-2	Leadscrew (Inches)	1	56.	C-4054	Junction Box (CSS)	1
13.	C-4013-1	Nut Assembly (Metric)	1	57.	C-4054-1	Cover (CSS)	1
	C-4013-2	Nut Assembly (Inches)	1	58.	C-4055	Nut (CSS)	1
14.	C-4014-1	Nut Assembly (Metric)	1	59.	A-1231	Socket Head Cap Screw (M6x10)	2
	C-4014-2	Nut Assembly (Inches)	1	60.	A-4047	Pin (ψ 6x20) (CSS)	1
15.	C-4015	Gib	1	61.	C-4054-2	Cover (CSS)	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 (M8x40L)	1				
26.	A-1253	Socket Head Cap Screw (M12x70L)	1				
27.	C-4026	Washer	3				
28.	A-4023	Pin (ψ 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 (M10x65L)	4				
36.	A-1213	Socket Head Cap Screw (M8x20L)	4				
37.	A-1104	Socket Headless Set Screw (M6x20L)	1				
38.	A-1106	Socket Headless Set Screw (M8x8L)	1				
39.	A-1605	Cross Recessed Head Screw (M5x10L)	8				
40.	A-1215	Socket Head Cap Screw (M8x30L)	8				

SADDLE LUBRICATION



<u>NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
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 (M5×10L)	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 (M5×10L)	4

SADDLES:ASSEMBLIES

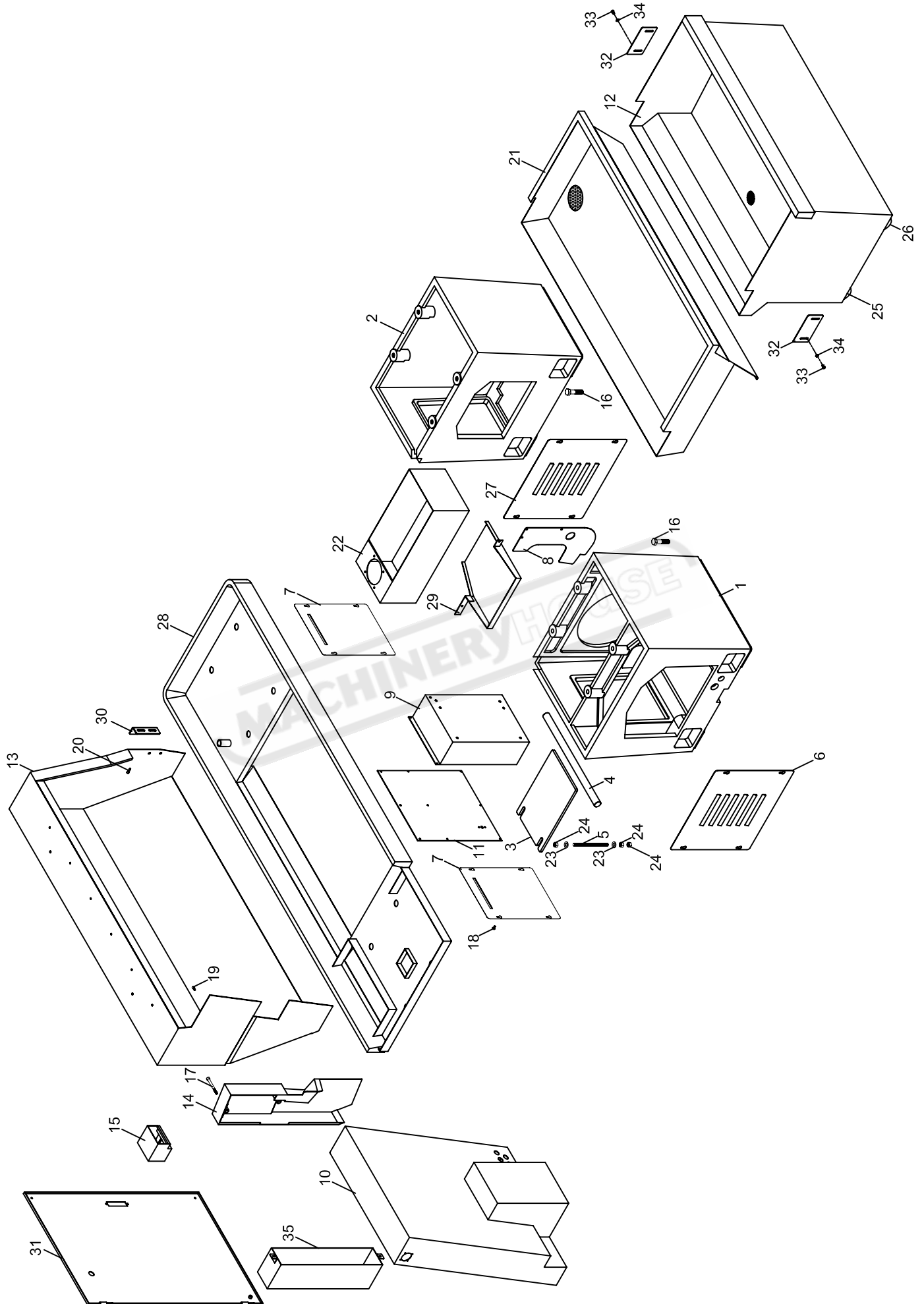


<u>NO.</u>	<u>PART</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
1.	C-5001	Cross Slide Assembly	1	41.	C-5022	Top Slide Stud	1
2.	C-5002	Gib	1	42.	A-4516	Handle Set Screw (M6)	1
3.	C-4032	Gib Screw	2	43.	A-2021	Bearing (51103)	2
4.	C-5004	Bolts	4	44.	A-7202	Key (4x4x15)	1
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.	T-5012-2	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 (M6x20L)	2				
31.	A-1205	Socket Head Cap Screw (M6x25L)	1				
32.	A-1103	Socket Headless Set Screw (M6x20L)	2				
33.	A-1731	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 (M5x10L)	3				
39.	A-9107	Handle	1				
40.	A-1700	Nut (M6)	2				

<u>NO.</u>	<u>PART</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>NO.</u>	<u>PART</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
1.	C-6001RA	Tailstock Casting	1	36.	A-4005	Pin (ϕ 5x20L)	1
2.	C-6002RA	Tailstock Base	1	37.	A-1130	Socket Headless Set Screw (M5x15L)	1
3.	C-6003	Handwheel	1	38.	A-1430	Hexagon Head Bolt (M16x90L)	1
4.	C-6004	Barrel	1	39.	A-1132	Socket Headless Set Screw (M10x40L)	1
5.	C-6005-1	Leadscrew (Metric)	1	40.	A-9107	Handles	1
	C-6005-2	Leadscrew (Inch)	1				
6.	C-6006-1	Nut (Metric)	1	41.	C-6026	Stoper	2
	C-6006-2	Nut (Metric)	1	42.	C-6035	Wippers (Vee)	2
7.	C-6007	Keeper	1	43.	C-6036	Wippers (Flat)	2
8.	C-6008-1	Index Ring (Metric)	1	44.	A-1605	Recessed Flat Head Screw (M5x10L)	8
	C-6008-2	Index Ring (Inch)	1				
9.	A-1203	Socket Head Cap Screw (M6x16L)	1				
10.	C-3032	Plug	1				
11.	C-3034	Handle	1				
12.	R-1030	Washer	1				
13.	A-1105	Socket Headless Set Screw (M6x30L)	1				
14.	A-1208	Socket Head Cap Screw (M6x40L)	2				
15.	R-1030	Washers	2				
16.	C-6015	Clamp Plate	2				
17.	A-1437	Hexagon Head Bolt (M16x140L)	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.	A-7205	Key (5x5x15)	1				
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 (M6x20L)	6				
34.	A-1111	Socket Headless Set Screw (M10x60L)	4				
35.	A-1720	Nut (M16)	1				

CABINET & PANELS

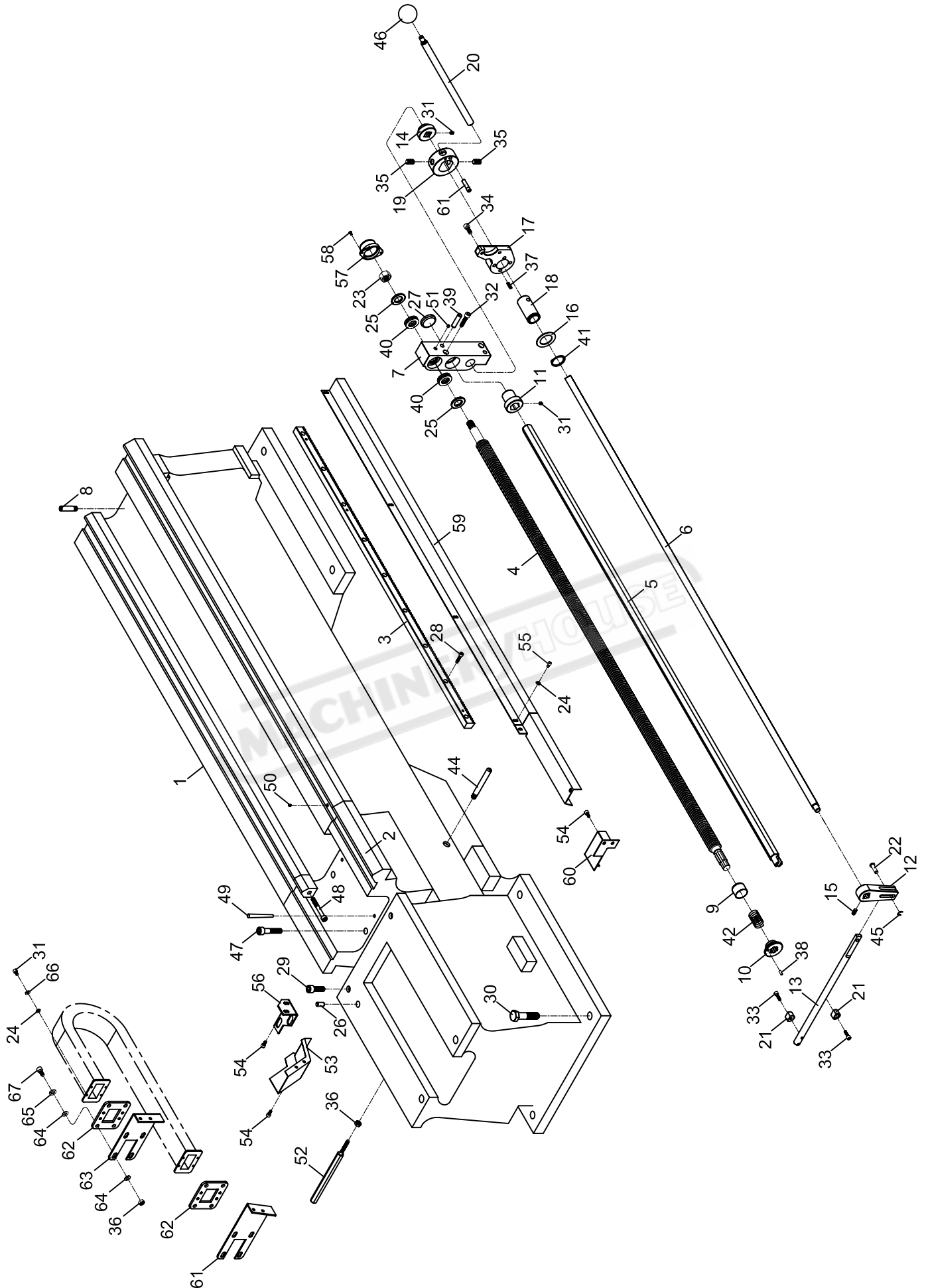
Ver-02



Ver-02

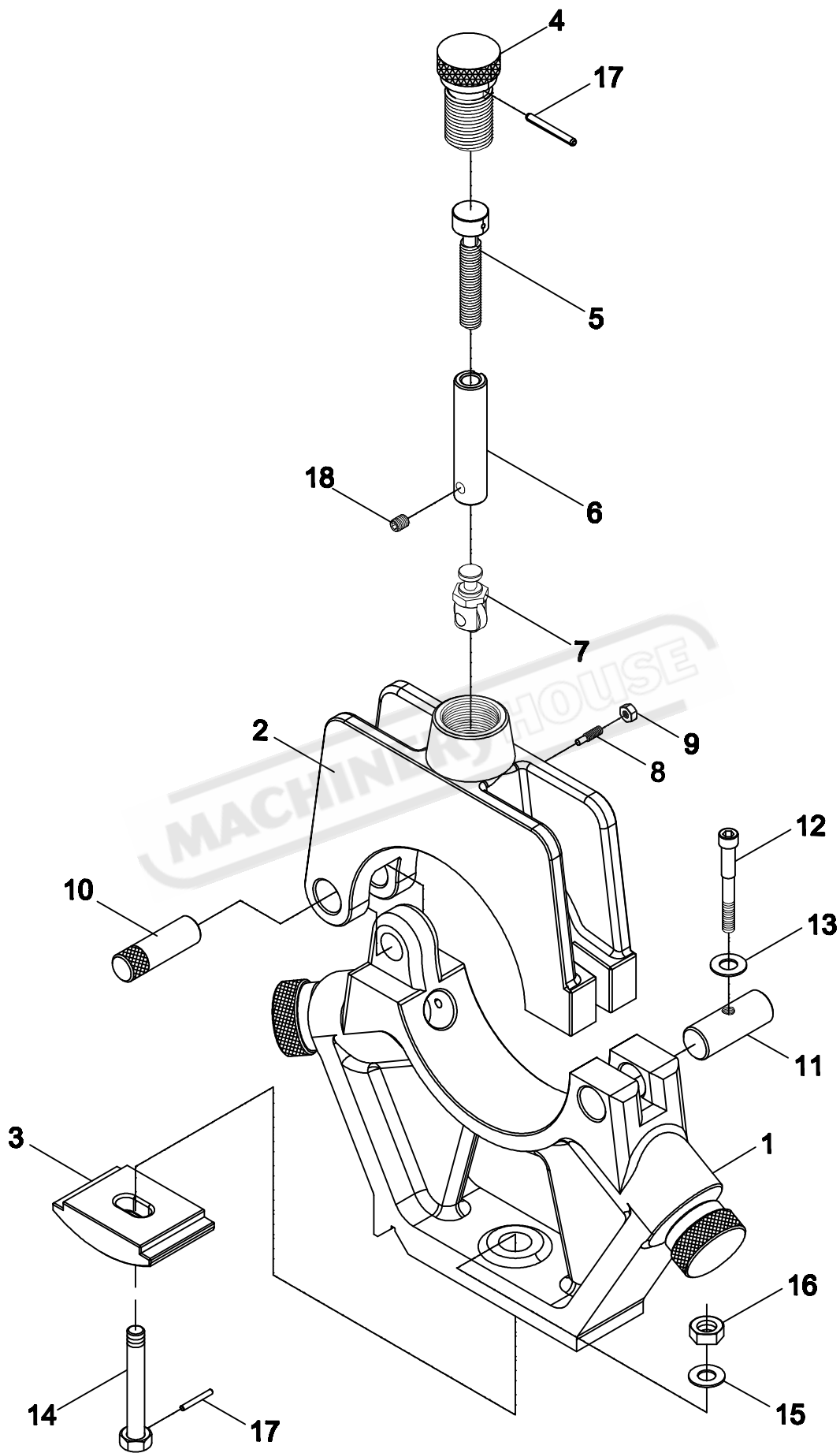
<u>NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
1.	C-7001	Plinth , Head-End	1
2.	C-7002	Plinth , Tail-End	1
3.	C-7003	Platform	1
4.	C-7004	Adjusted Rod	1
5.	C-7005	Adjusted Screw	2
6.	T-7037	Motor Cover	1
7.	C-7008	Rear Cover	2
8.	C-7013	Gearbox Guard	1
9.	C-8025	Electrical Cabinet (Standard)	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-7019-7	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-1510	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 (ϕ 1/2")	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
30.	C-7019-5	Support	1
31	C-8108-4	Electric Cabinet Door	1
	C-8108-5	Electric Cabinet Door (VS)	1
32.	C-7042	Plate	2
33.	A-1510	Button Head Socket Cap Screw (M6x12L)	4
34.	A-1901	Washer (ϕ 6)	4

BED & SHAFTS



<u>NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>NO.</u>	<u>PART</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
1.	C-8801-1	Gap Bed (760/1000/1250)	1	41.	A-3313	Circlip (S32)	1
	C-8801-2	Straight Bed (760/1000/1250)	1	42.	A-8415	Spring	1
2.	C-8001-2	Gap Piece	1	43.	F-8018	Stud	1
3.	C-8002	Rack Set (760/1000/1250)	1	44.	C-3096	Stop Pin	1
4.	C-8003-1	Leadscrew (Metric) (760/1000/1250)	1	45.	A-3102	Circlip (E8)	1
	C-8003-2	Leadscrew (Inch) (760/1000/1250)	1	46.	A-9110	Handle	1
5.	C-8004RA	Feed Shaft (760/1000/1250)	1	47.	A-1257	Socket Head Cap Screw (M12x55L)	2
6.	C-8005RA	Switch Rod (760/1000/1250)	1	48.	A-1181	Socket Head Cap Screw (M8x65L)	2
7.	C-8806RB	End Bracket	1	49.	A-4205	Pin (ψ 6x75)	2
8.	C-8007	Stop Pin	1	50.	A-1100	Socket Headless Set Screw (M6x6L)	2
9.	C-8009	Collar	1	51.	A-9300	Oiler (ψ 1/4")	2
10.	C-8010	Sleeve	1	52.	T-7034	Bolt	2
11.	D-8408VS	Tailend Bracket Stop Bush	1	53.	T-8024	Flow Guard	1
12.	C-8012RA	Connector	1	54.	A-1202	Socket Head Cap Screw (M6x12L)	6
13.	C-8013RA	Connecting Bar	1	55.	A-1509	Socket Round Head Cap Screw (M5x10L)	6
14.	F-8028	Collar	1	56.	C-8027	Switch Plate	1
15.	A-1123	Socket Headless Set Screw (M8x16L)	1	57.	F-8008	Cover	1
16.	F-8021	Washer	1	58.	A-1528	Socket Round Head Cap Screw (M4x8)	2
17.	C-8017RA	Bracket	1	59.	C-7036	Leadscrew Cover (OPTION)	1
18.	F-8016	Bushing	1	60.	C-7037	Guard (OPTION)	1
19.	F-8019	Lever Assembly	1
20.	F-8020	Lever	1	61.	M-8144	Support (OPTION)	1
21.	T-7024	Tracer	2	62.	D-4428VS	Mounting Plate (OPTION)	2
22.	C-8022	Stud	1	63.	M-8145	Support (OPTION)	1
23.	A-1744	Nylon Nut (M16xP1.5)	1	64.	A-1902	Washer (ψ 8)	16
24.	A-1901	Washer (ψ 1/4")	6-14	65.	A-1802	Spring Washer (ψ 8)	8
25.	C-8033	Collar	2	66.	A-1812	Spring Washer (ψ 6)	8
26.	T-7003	Pin	1	67.	A-1213	Socket Head Cap Screw (M8x20L)	8
27.	D-8409VS	Tailend Bracket 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)	2-10				
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-1113	Socket Headless Set Screw (M12x20L)	2				
36.	A-1701	Nut (M8)	2-10				
37.	A-8219	Spring	4				
38.	C-2048-1	Pin	1				
39.	A-4015	Pin (ψ 3/8"x38)	2				
40.	A-2022	Bearing (#51104)	2				

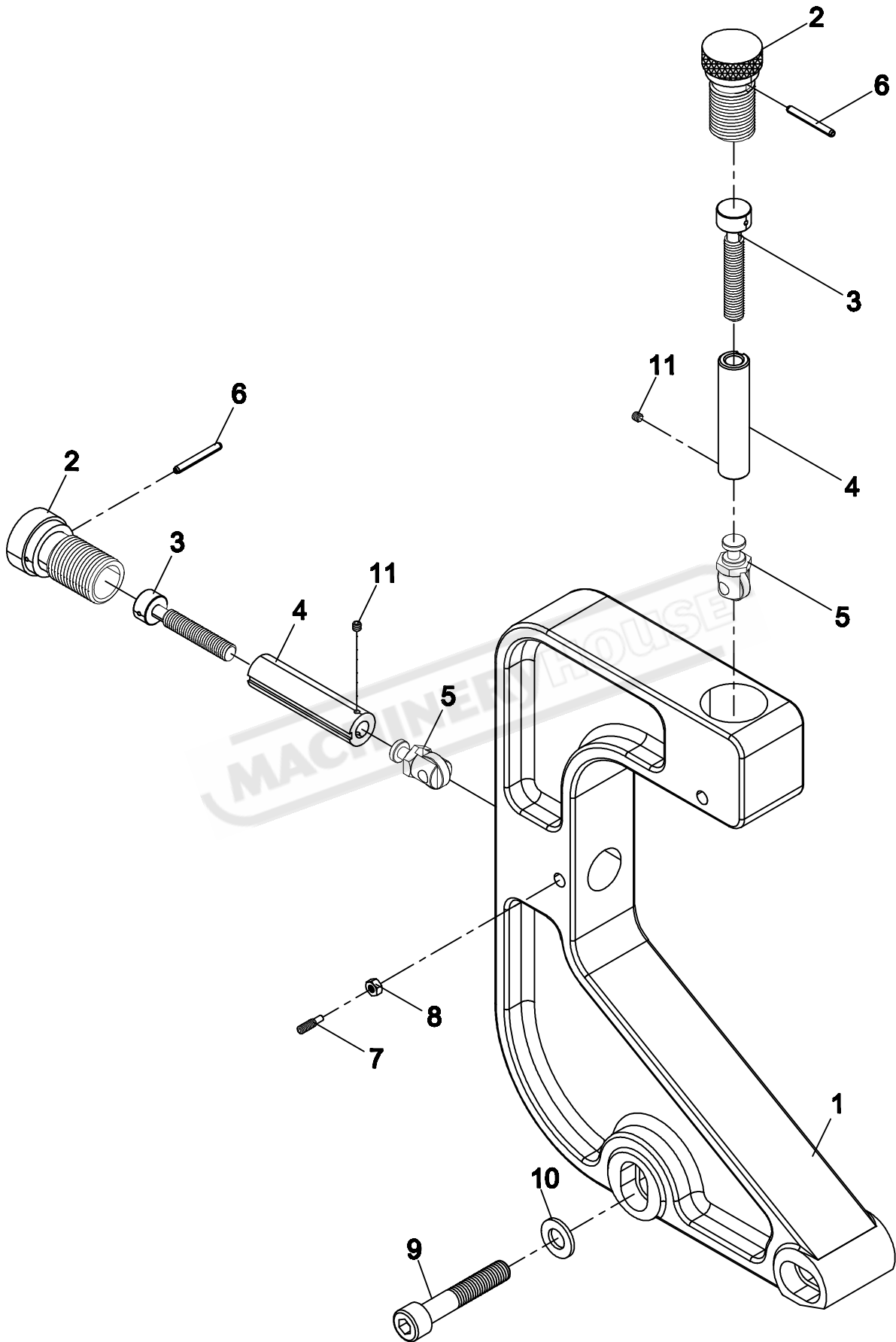
STEADY REST-HEAVY DUTY TYPE



<u>NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
1.	C-9041	Bottom Body	1
	C-9041-1	Bottom Body (ϕ 250mm)	1
2.	C-9042	Top Body	1
	C-9042-1	Top Body (ϕ 250mm)	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-9046-1	Roller Seat	3
8.	A-1013	Dog Point Set Screw (M8x30L)	3
9.	A-1701	Nut (M8)	3
10.	C-9040	Pivot	1
11.	C-9044	Pivot	1
12.	A-1265	Socket Head Cap Screw (M10x45L)	1
13.	A-1908	Washer (ϕ 10)	1
14.	A-1438	Socket Head Cap Screw (M16x100L)	1
15.	A-1907	Washer (ϕ 16)	2
16.	A-1702	Nut (M16)	1
17.	A-4009	Pin (ϕ 5x40)	4
18.	A-1106	Socket Headless Set Screw (M8X8L)	3

MACHINERY HOUSE

FOLLOW REST & BEDSTOPS

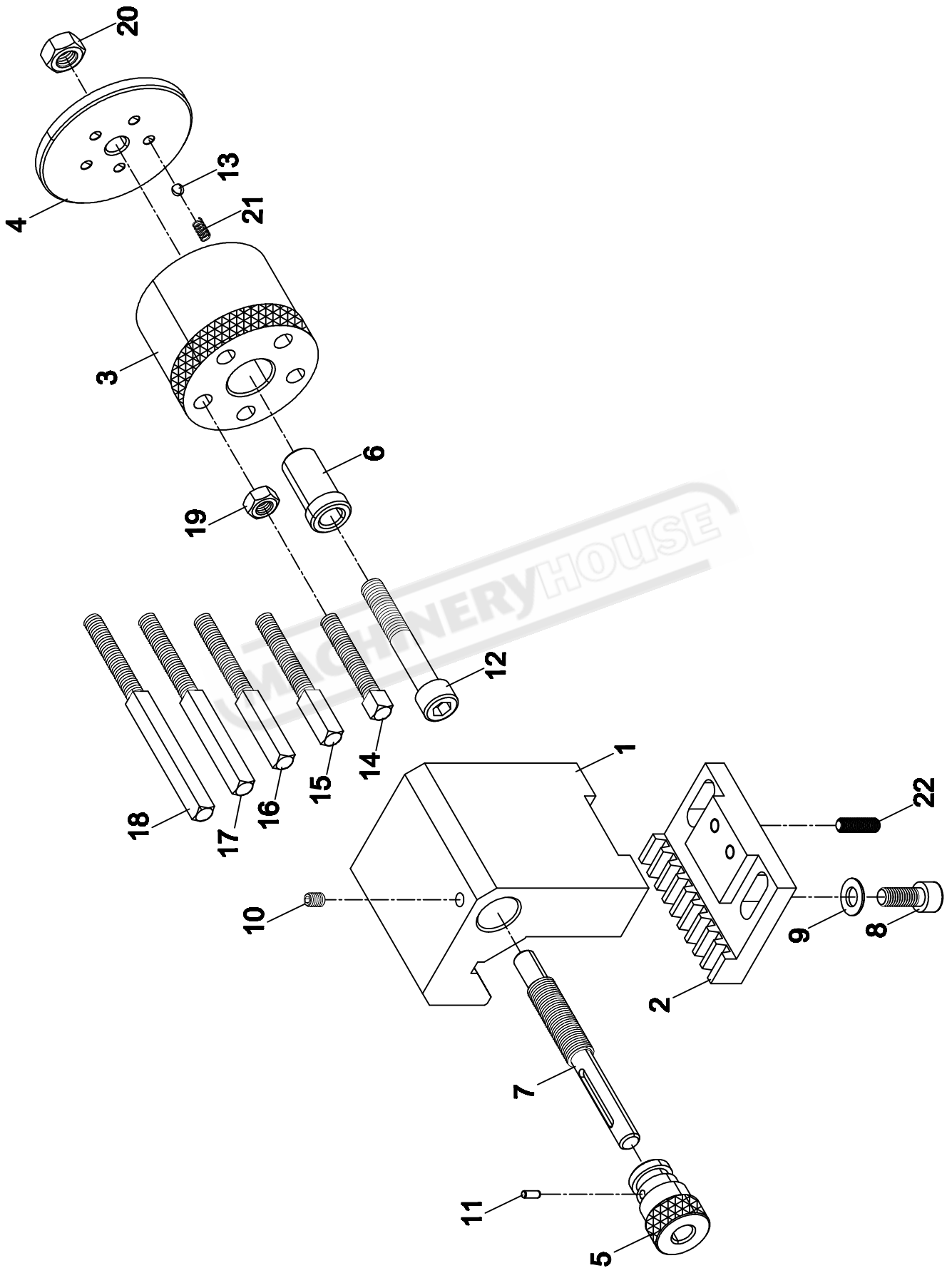


<u>NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
1.	C-9049	Body	1
2.	C-9048	Collar	2
3.	C-9047	Adjusting Screw	2
4.	C-9046	Finger	2
5.	C-9046-1	Roller Seat	2
6.	A-4009	Pin (ϕ 5x40)	2
7.	A-1005	Dog Point Set Screw (M8x20L)	2
8.	A-1701	Nut (M8)	2
9.	A-1270	Socket Head Cap Screw (M8x65L)	2
10.	A-1802	Washer (ϕ 8)	2
11.	A-1106	Socket Headless Set Screw (M8x8L)	2

MACHINERYHOUSE

BEDSTOPS

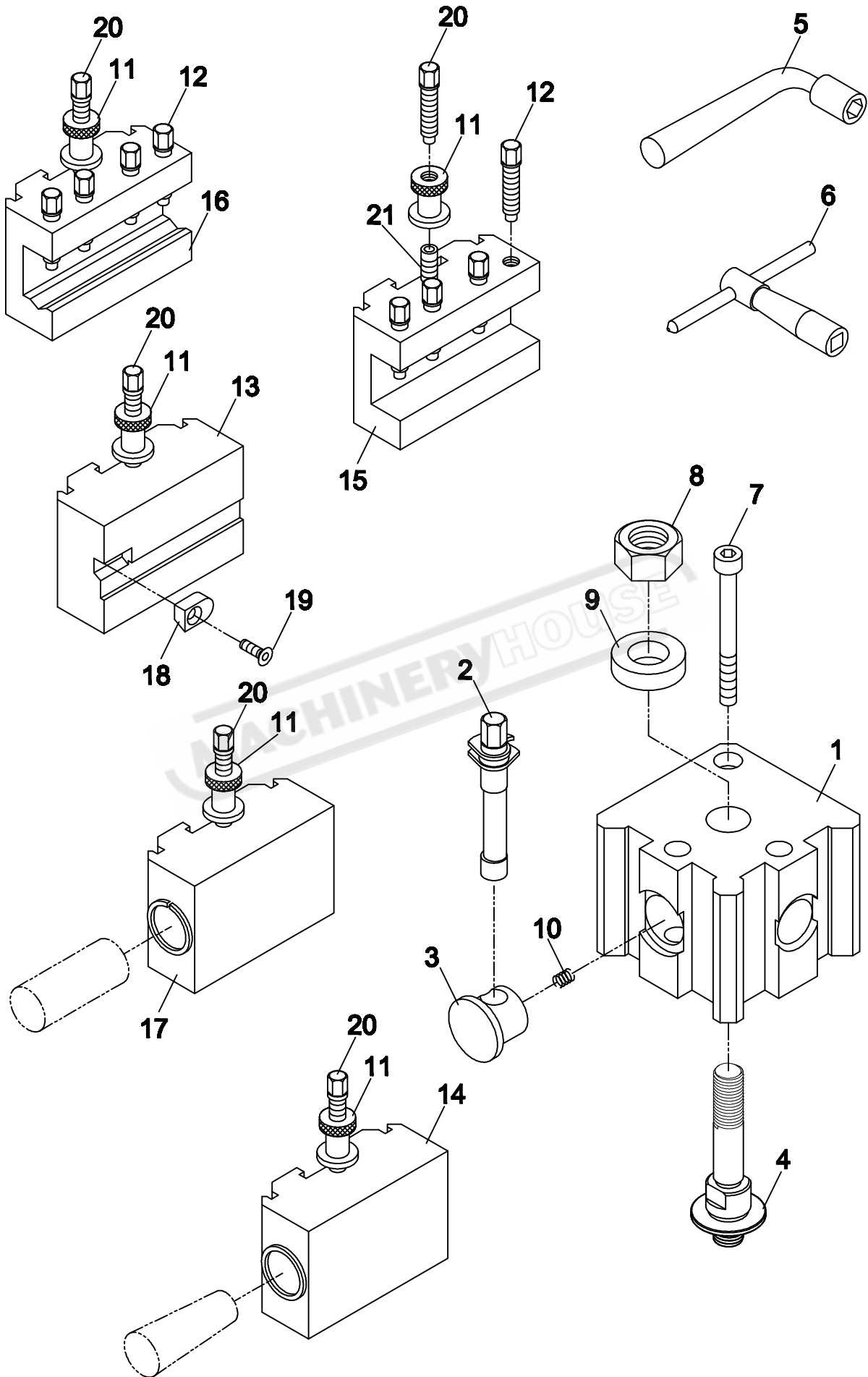
Ver-01



Ver-01

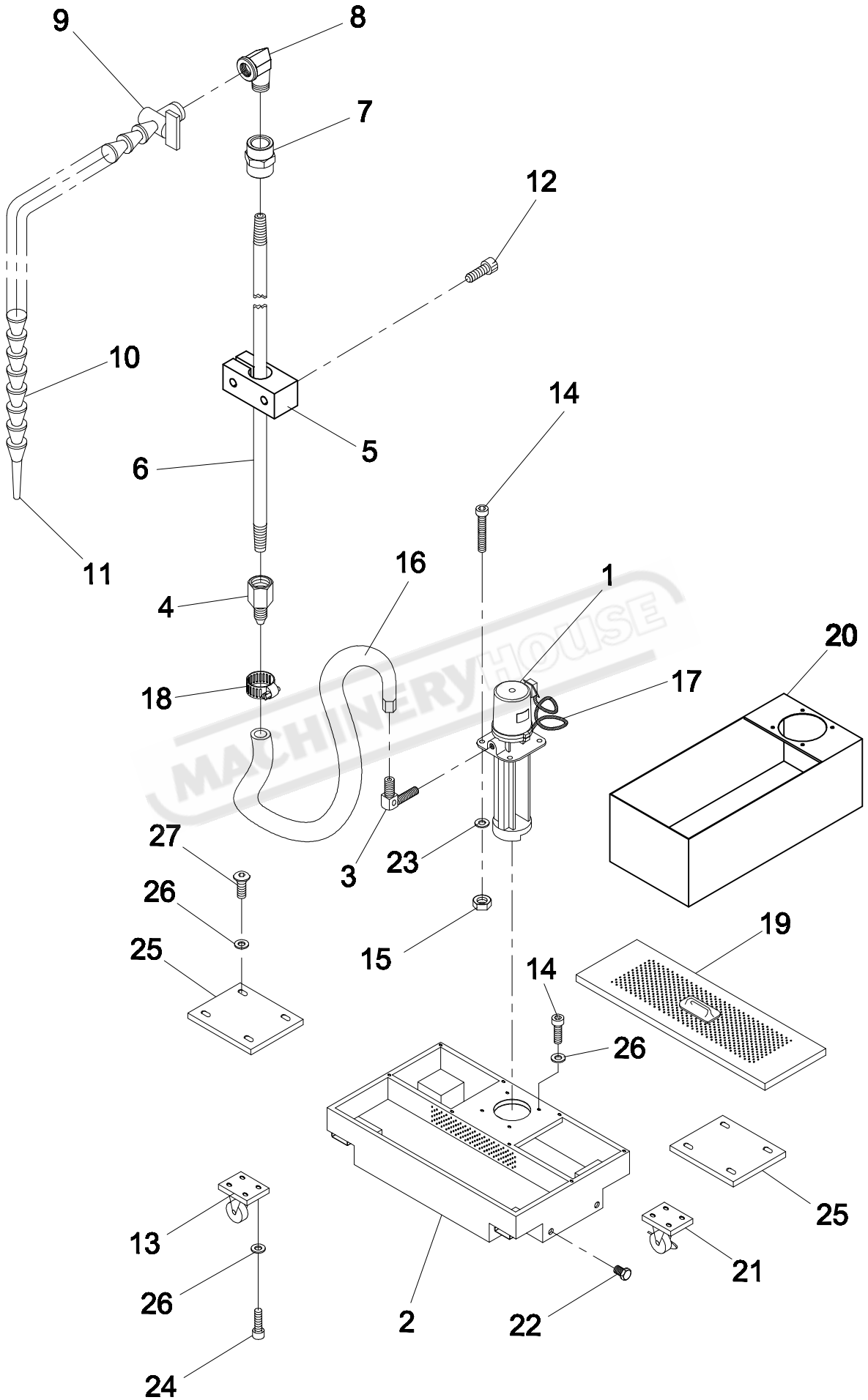
<u>NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
1.	C-9001	Body	1
2.	C-9002	Clamp	1
3.	C-9053	Turret	1
4.	C-9054	Backplate	1
5.	C-9003-1	Micrometer Dial (Metric)	1
	C-9003-2	Micrometer Dial (Inch)	1
6.	C-9055	Bush	1
7.	C-9005	Spindle (Inch)	1
8.	A-1213	Socket Head Cap Screw (M8x20L)	2
9.	A-1902	Washer (ϕ 8)	2
10.	A-1139	Socket Headless Set Screw (M6x8L)	1
11.	A-4023	Pin (ϕ 3x6)	1
12.	A-1259	Socket Head Cap Screw (ϕ 3/8"x64L)	1
13.	A-9202	Ball (ϕ 1/4")	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-1708	Nut (3/8")	1
21.	A-8519	Spring	1
22.	A-1104	Socket Headless Set Screw (M6x20L)	2

QUICK CHANGE TOOLPOST



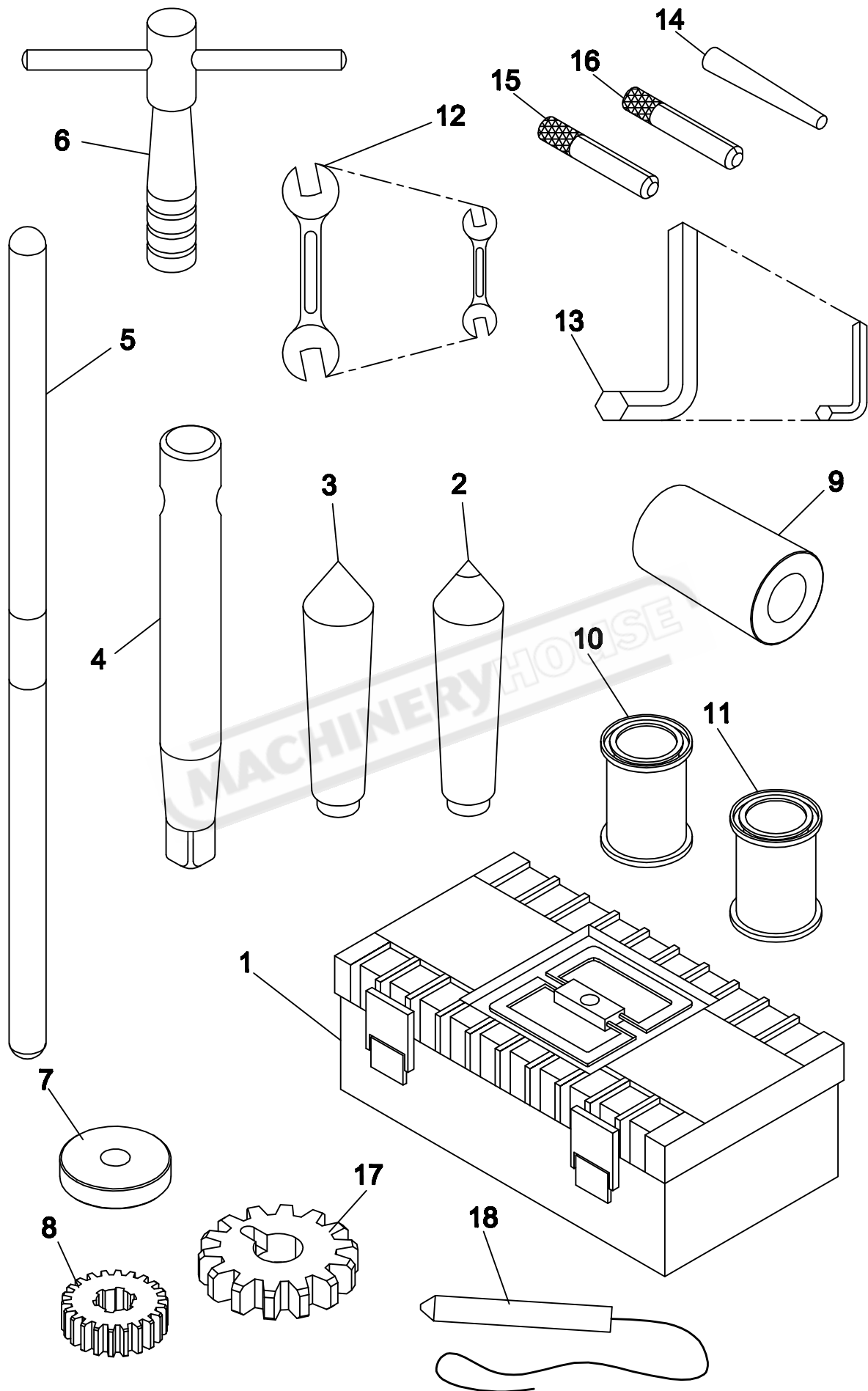
<u>NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
1.	C-9100	Q.C.T. Body	1
2.	C-9102	Toolholder Cams	2
3.	C-9103	Toolholder Pads	2
4.	C-9062	Toolpost Bolt Assembly	1
5.	A-8528	Toolscrew Wrench	1
6.	A-8529	Cam Clamp Wrench	1
7.	A-1251	Locating Screw (M10x75L)	1
8.	A-1720	Nut (M16)	1
9.	R-3011	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 (M6x20L)	1
20.	C-9107	Height Adj. Screw (On Each Toolholder)	1
21.	A-1138	Socket Headless Set Screw (M10x100L) (On Each Toolholder)	1

COOLANT PUMP ASSEMBLY



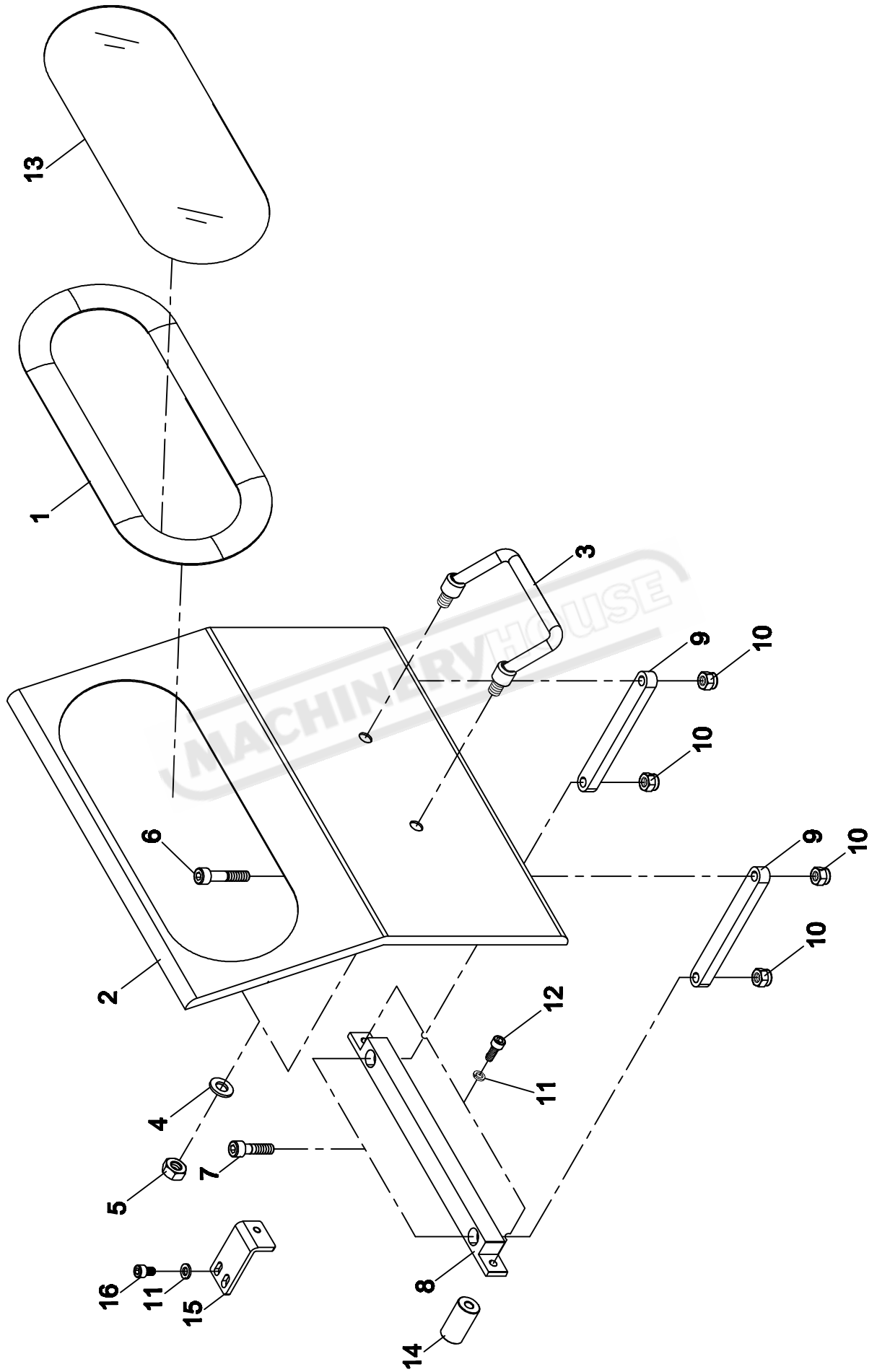
<u>NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
1.	Z-1100	(1/8HP Pump)	1
2.	C-1174	Coolant Tank (OPTION)	1
3.	A-4101	Outlet	1
4.	A-4105	Hose Sleeve	1
5.	A-9651	Pipe Bracket	1
6.	A-4106	Pipe	1
7.	A-4116	Jointer	1
8.	A-4108	Elbow	1
9.	A-4107	Valve	1
10.	A-4117	Join Pipe	1
11.	A-4118	Nozzle	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 (ϕ 1/2"PT) (OPTION)	2
23.	A-1917	Washer (ϕ 6)	4
24.	A-1202	Socket Head Cap Screw (M6x12L)	16
25.	A-0379	Tank Cover (OPTION)	2
26.	A-1901	Washer (ϕ 6)	28
27.	A-1509	Socket Round Head Cap Screw (M5x10L)	8

SERVICE TOOLS & KITS



<u>NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
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 (15T) (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

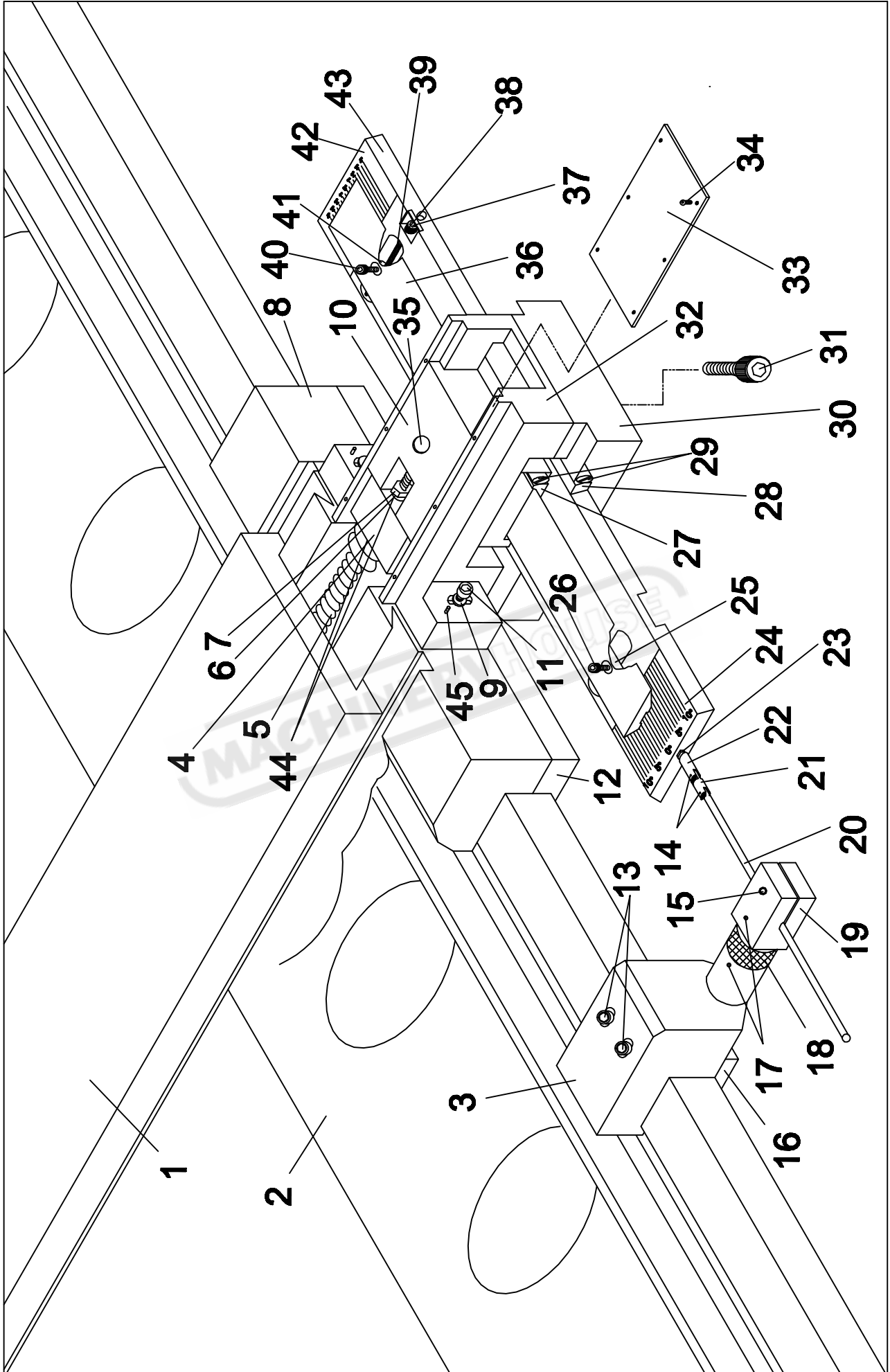
FOLLOWING CHIP GUARD (OPTIONAL)



<u>NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
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 (M8x40L)	2
7.	A-1215	Socket Head Cap Screw (M8x30L)	2
8.	C-5038-1	Frame	1
9.	R-5030	Swivel Arm	2
10.	A-1743	Locking Nut	4
11.	A-1801	Washer (ϕ 1/4")	4
12.	A-1203	Socket Head Cap Screw (M6x16L)	2
13.	A-9121	Window	1
14.	C-5043	Spacer (DRO)	1
15.	C-5044	Frame (DRO)	1
16.	A-1231	Socket Head Cap Screw (M6x10L)	2

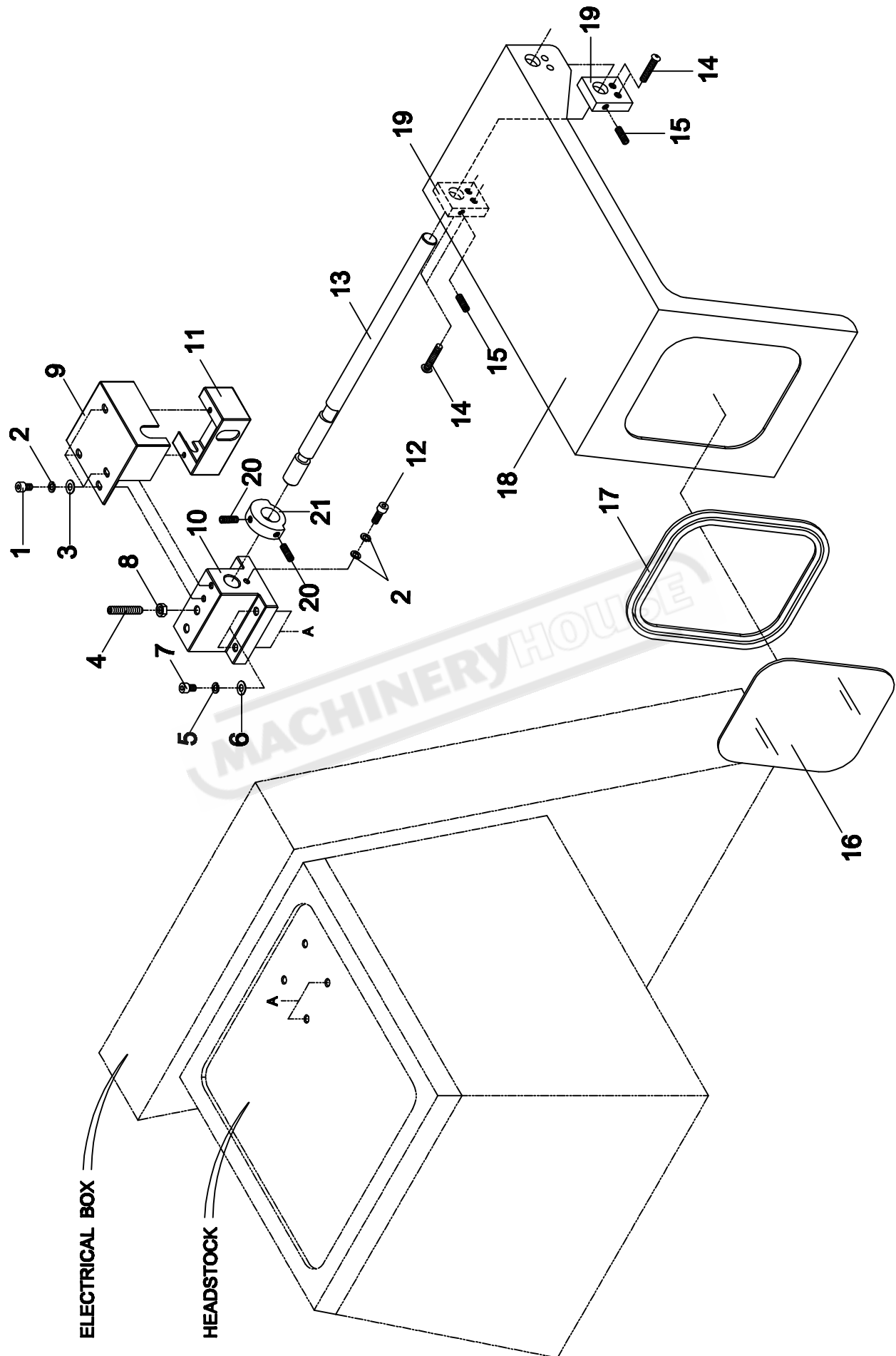
MACHINERYHOUSE

TAPER TURNING ATTACHMENT (OPTIONAL)



<u>NO.</u>	PART NO.	DESCRIPTION	QUANTITY
1.	C-9101	Support Bracket	1
2.	F-9714VS	Gib Strip	1
3.	F-9723VS	Graduated Plate	1
4.	F-9712VS	Graduated Slide	1
5.	C-9100	Anchor Bracket	1
6.	F-9708VS	Slide	1
7.	F-9711VS	Slide Block	1
8.	F-9701VS	Connecting Rod	1
9.	F-9703VS	Eccentric Pin	1
10.	F-9702VS	Clamp Bracket	1
11.	F-9706VS	Cover Plate	1
12.	F-9707VS	Housing Plate Sub Assembly	1
13.	D-4022NC	Gib Adjusting Screw	4
14.	F-9717VS	Pivot Peg	1
15.	F-9718VS	Knob Adjusting	1
16.	F-9720VS	Screw Adjusting	1
17.	F-9719VS	Clamp Nut	1
18.	F-9716VS	Washer Retaining	1
19.	F-9715VS	Clamp Nut	1
20.	F-9704VS	Clamp	2
21.	F-9712VS	Gib Strip	1
22.	F-9709VS	Gib Strip	1
23.	A-1540	Hexagon Socket Flat Head Screw (M4x10L)	5
24.	A-1240	Hexagon Socket Cap Head Screw (M5x25L)	2
25.	A-1258	Hexagon Socket Cap Head Screw (M8x35L)	2
26.	A-1272	Hexagon Socket Cap Head Screw (M10x40L)	4
27.	A-1202	Hexagon Socket Cap Head Screw (M6x12L)	1
28.	A-1207	Hexagon Socket Cap Head Screw (M6x35L)	1
29.	A-1220	Hexagon Socket Cap Head Screw (M10x25L)	1
30.	A-1213	Hexagon Socket Cap Head Screw (M8x20L)	1
31.	A-1100	Hexagon Socket Setscrew (M6x6L)	2
32.	A-1238	Hexagon Socket Cap Head Screw (M10x55L)	2
33.	A-1239	Hexagon Socket Cap Head Screw (M5x15L)	1
34.	A-1902	Washer (ϕ 8)	2
35.	A-4039	Pin (ϕ 10x30L)	2
36.	A-4048	Pin (ϕ 10x45L)	2
37.	A-4001	Pin (ϕ 3x20L)	1
38.	A-1904	Washer (ϕ 10)	1

CHUCK SAFETY GUARD (OPTIONAL)

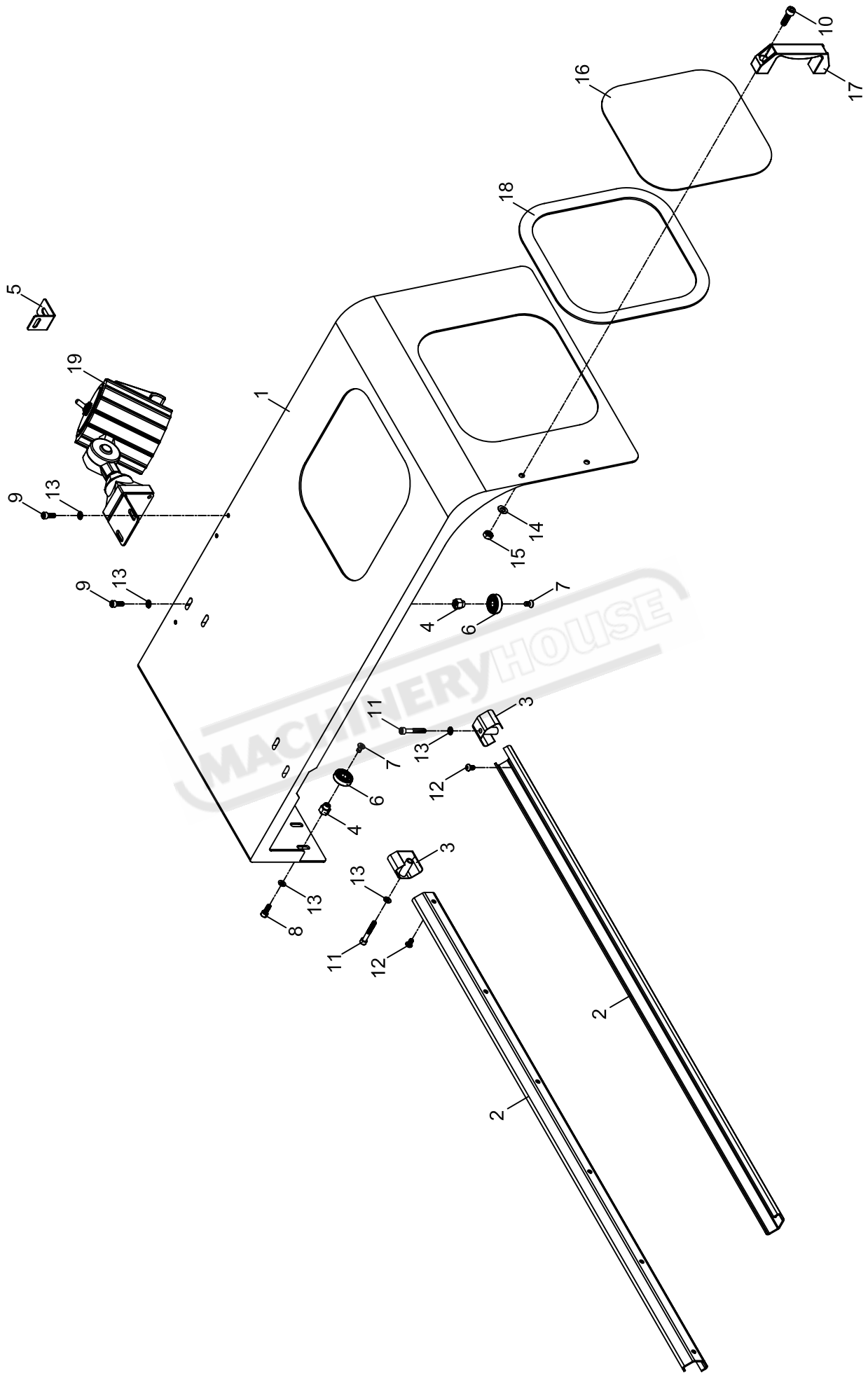


<u>NO.</u>	PART NO.	DESCRIPTION	QUANTITY
1.	A-1509	Button Head Cap Screw (M5 x 10)	4
2.	A-1813	Spring Washer (Φ 5)	6
3.	A-1909	Washer (Φ 5)	4
4.	A-1148	Socket Headless Set Screw (M8 x 30)	1
5.	A-1812	Spring Washer (Φ 1/4")	4
6.	A-1917	Washer (Φ 6)	4
7.	A-1205	Socket Head Cap Screw (M6 x 25)	4
8.	A-1701	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

MACHINERYHOUSE

FULL LENGTH SLIDING CHIP SAFETY GUARD (OPTIONAL)

Ver-02



<u>NO.</u>	PART NO.	DESCRIPTION	Ver-02 QUANTITY
1.	C-8112-2	Chip Safety Guard	1
2.	C-7043	Guidance	2
3.	C-7044	Cover	4
4.	G-7104NC	Hexagon Bolt	8
5.	C-8112-03	Support	1
6.	A-2084	Bring (6200ZZ)	8
7.	A-1610	Flat Head Socket Screw (M6x12)	8
8.	A-1202	Socket Head Cap Screw (M6x12)	4
9.	A-1204	Socket Head Cap Screw (M6x20)	6
10.	A-1214	Socket Head Cap Screw (M8x25)	2
11.	A-1208	Socket Head Cap Screw (M6x40)	4
12.	A-1510	Socket Round Head Cap Screw (M6x12)	12
13.	A-1901	Washer (ϕ 6)	14
14.	A-1902	Washer (ϕ 8)	2
15.	A-1701	Nut (M8)	2
16.	A-9141	Window	2
17.	A-9124	Handle	1
18.	A-9142	Strap	2
19.	ZA2702	Halogen Lamp (Optional)	1
	ZA2701	Halogen Lamp (Long Arm Optional)	1

MACHINERYHOUSE

INSPECTION RECORD

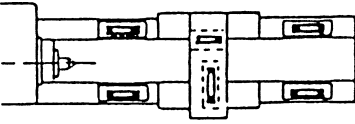
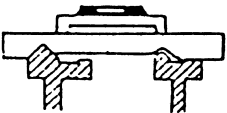
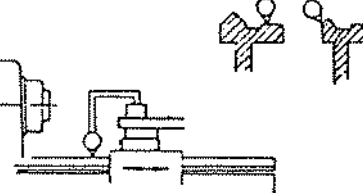
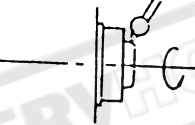
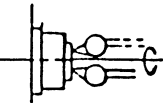
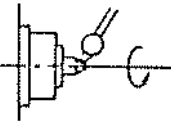
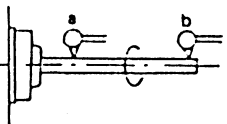
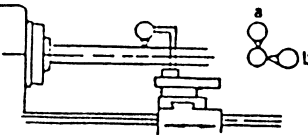
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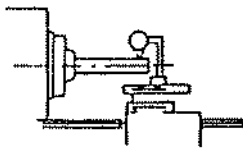
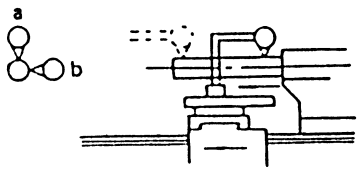
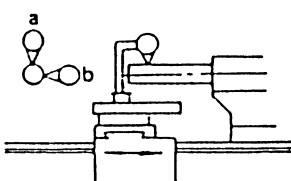
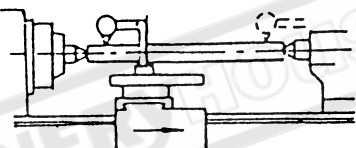
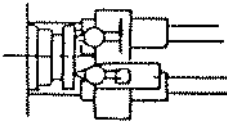
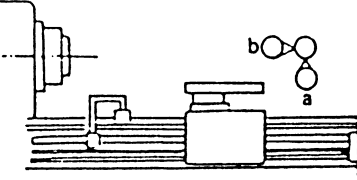
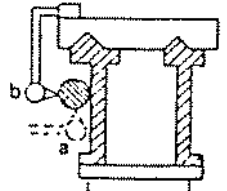
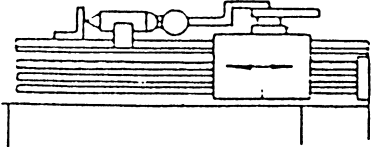
Series No.

Date:

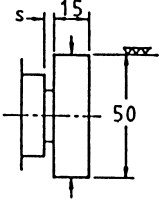
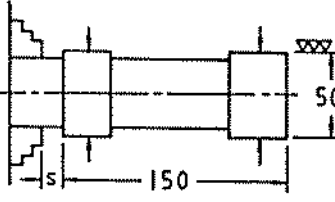
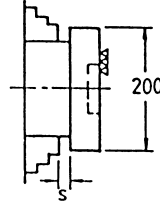
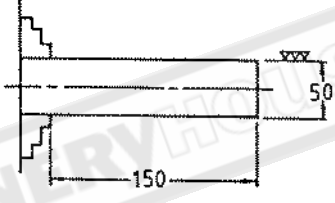
1.ACCURACY TEST.

UNIT: MM.

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

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

2.PRACTICAL

NO.	TESTING ITEM	DIAGRAM	TOLERANCE	
			PERMISSIBLE	ACTUAL
1	Accuracy of outside turning		0.01	
2	Accuracy of cylindrical turning		0.025	
3	Accuracy of face turning		0.02	
4	Heavy load cutting Conditions; Material, mild steel ϕ 50 Spindle speed, 845 RPM. Feed rate, 0.1 mm/rev. Depth of cut in diameter.		ϕ 14	

3.MAIN ELECTRIC SPECIFICATIONS

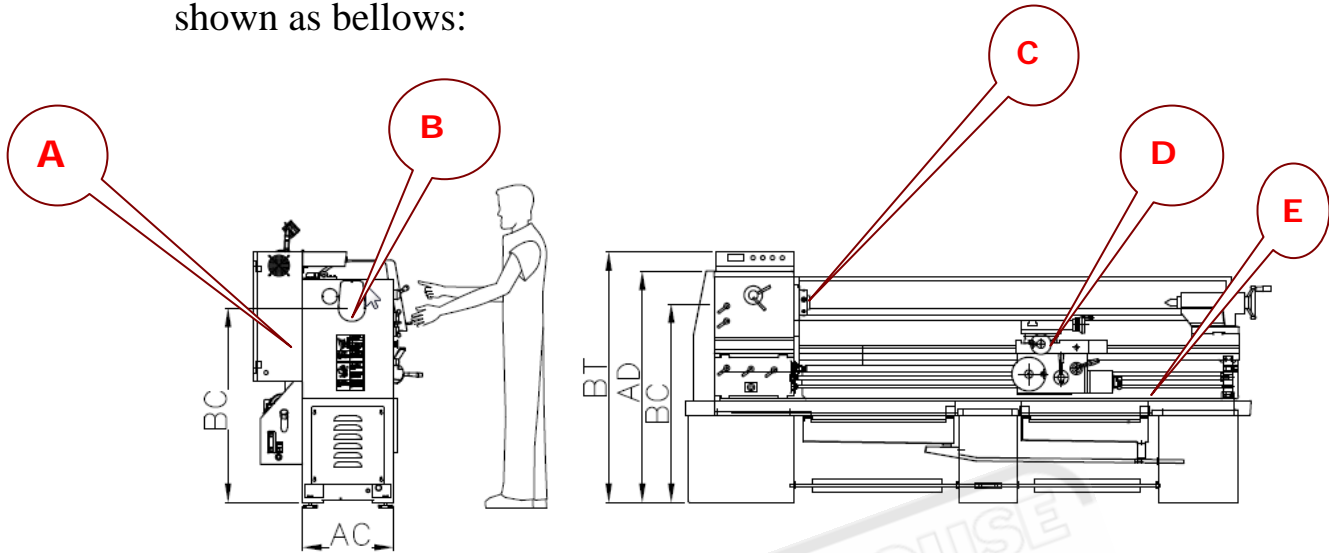
ITEM	H.P.	VOLTAGES	FREQUENCY	R.P.M.	RATED CURRENT
INVERTER (VS MODEL)	7.5	200--240 V. 280--460 V.	0--400HZ.	----	24A. 12A.
DRIVE MOTOR (VS MODEL)	7.5	220V. 440V.	50/60HZ.	940/1140	16.6 A-220V. 8.3 A-440V.
DRIVE MOTOR STANDARD	7.5	220V. 440V.	50/60HZ.	1420/1720	20.0 A-220V. 10.0 A-440V.
COOLANT PUMP	0.125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

RISK AREA:

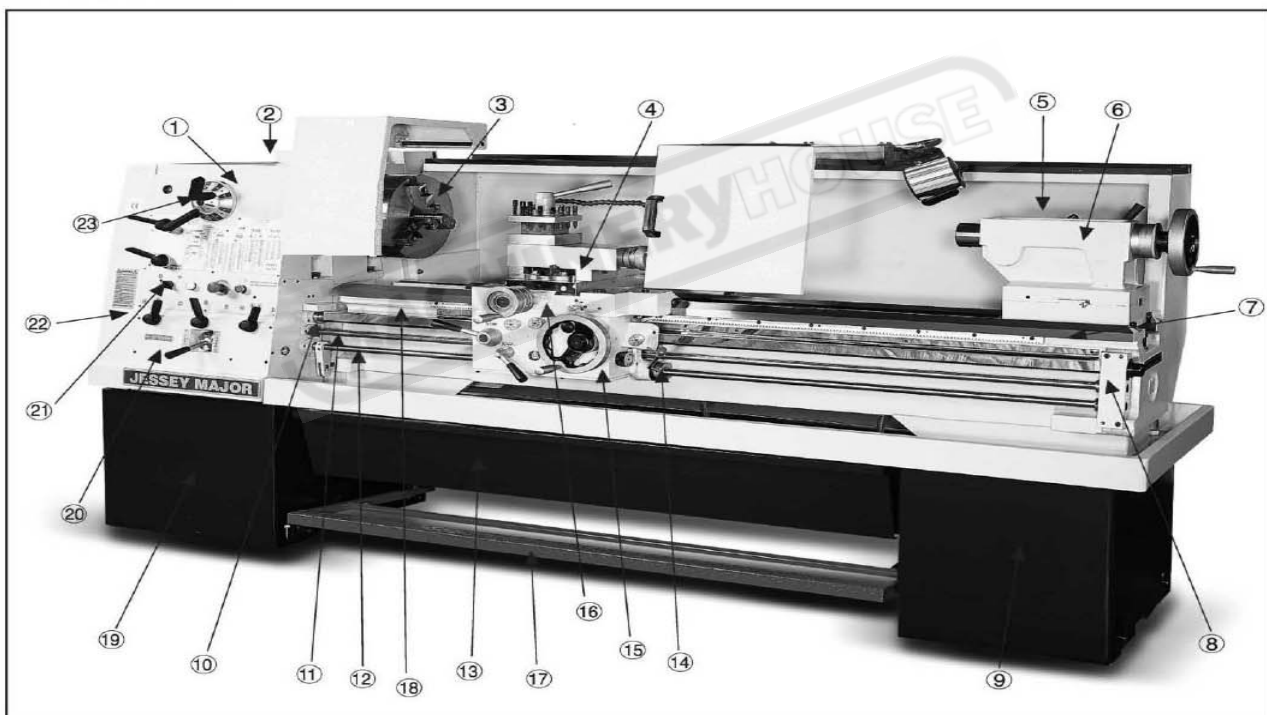
The risk area (Dangerous zone) of machine during operation is shown as bellows:



Introduction of RISK AREA (DANGEROUS ZONE):

RISK CATEGORY	RISK PART	AREA	DANGER CONDITION	ADVERTENCE
Electrical Shock	Control Cabinet	A	During the machine power on, possibility of electrical shock is accompanying.	Keep workers away from electrical cabinet before/during machine running.
	Control Cabinet	A	During the machine maintenance, possibility of electrical shock is accompanying.	Remove and disconnect power source from electrical cabinet before/during machine repair servicing
Entanglement	Gear Box with Belt	B	During the Chuck is turning and running, possibility of entanglement is accompanying.	Keep workers away from gear box with belt before/during machine is running. Fixed Guard and interlock device applied.
	Spindle & Chuck	C	During the Chuck is turning and running, possibility of entanglement is accompanying.	Keep worker's hand away from Chuck before/ during lathe running. Movable chuck guard with interlock device applied.
	Slide	D	During the machine Slide is moving, possibility of entanglement is accompanying.	Keep workers hand away from chuck and Slide before/during it is moving. Especially for rapid movement

Entanglement	FEED & Switch ROD	E	During the machine running and Slide moving,	Keep workers hand away from rod before/during machine running.
Injection chips	Spindle & Chuck	C	During the chuck of machine turning and machining the working device,	Keep workers hand away from rod before/during machine running. Chuck Guard Cover with interlock device , slide cover and Splash guard applied



LEGEND

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