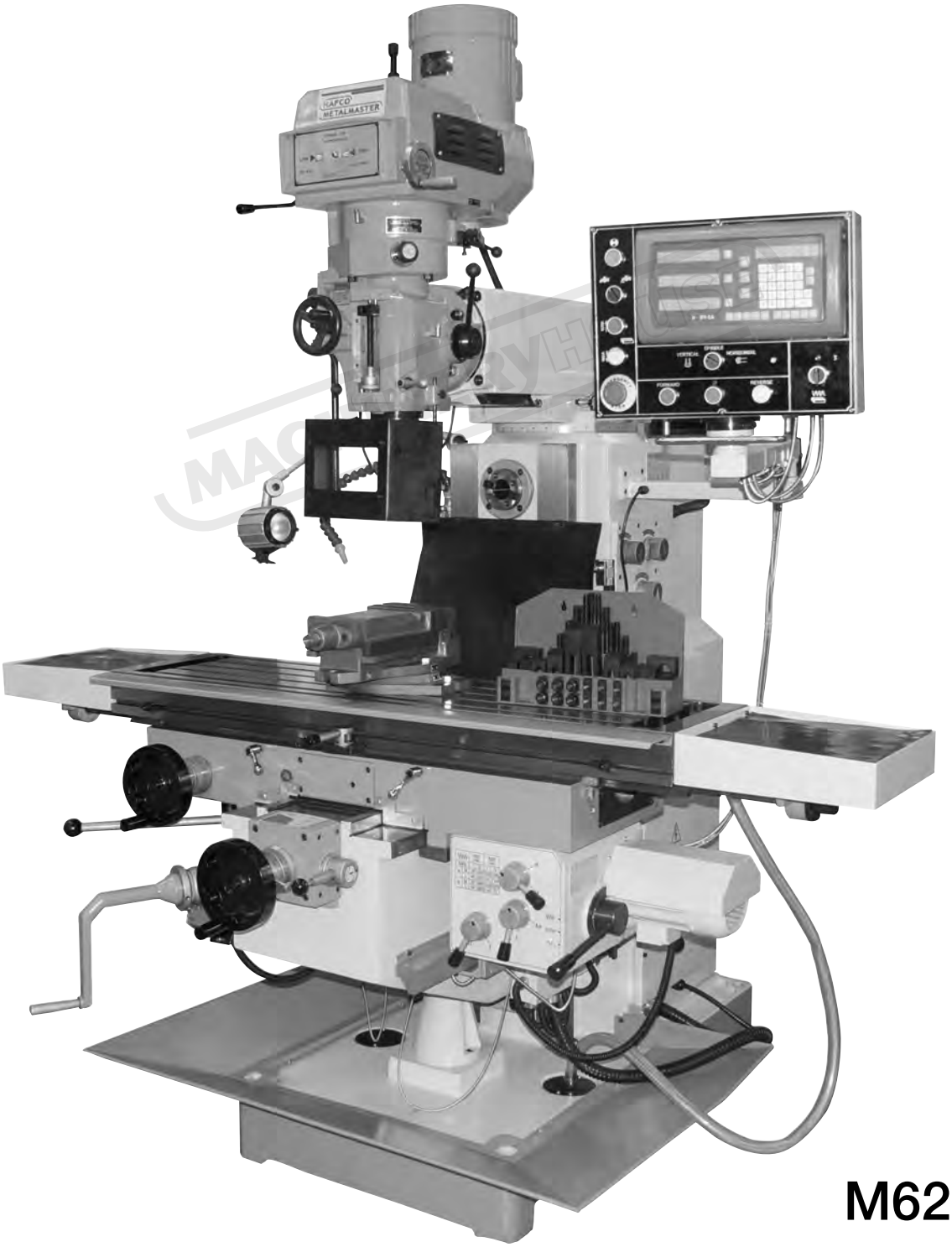
INSTRUCTION MANUAL

BM-67HV
Turret Milling Machine - Horizontal - Vertical (415V)
(X) 1000mm (Y) 300mm (Z) 400mm



M621D

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1 Safety Instruction

1. 1 GENERAL SAFETY RULES

Operator must read the instruction carefully before operating the machine, and the manager of safety department should assure the operator knows the requirements well.

1.1.1 The operation, maintenance and repair of the machine must be done by qualified person who have been trained to have the ability to forecast the potential risks. Only safety-conscious persons who are fully aware of the risks can operate the machine.

1.1.2 To those people who assemble, operate, or maintain the machine must be confirmed to have read and understood the operating instructions.

1.1.3 After stopping the machine, the tool will still run for a period of time due to inertia, do not open the tool guard and touch the tool with your hand before it comes to stop running.

1.1.4 Do not detach or modify any part of the safety guard. The machine should be disconnected from the power supply during maintenance or repair.

WARNING! NEVER CONTACT THE CUTTERS AND OTHER DRIVING PARTS WITH HANDS IF THEY ARE STILL MOVING

1.1.5 Assign special persons to operate, maintain and adjust the machine.

1.1.6 Operate the machine in technically perfect condition. Only the

producer or qualified person can completely repair the machine.

1.1.7 Stop the machine immediately if abnormal phenomena appear, check and repair the machine by specialized persons in time.

1.1.8 Disassembly and assembly the machine with the hoisting equipment, which is of enough load capacity.

1.1.9 Observe all safety instructions and warnings attached to the machine, make sure they are always complete and perfectly legible.

1.1.10 Do safety inspection before operating. Ensure the stroke limit switches, stop block and emergency stop button safe and reliable.

1.1.11Reinstall the removed guards and safety devices in place after maintaining.

1.1.12 Do maintenance or adjustment only after switching the machine off and disconnecting the machine from the power source.

1.1.13 Always keep children away from the machine. Operating personal must be at least 18 years old.

1.1.14 Do not wear loose clothing, gloves, neckties or jewelry (rings, watches, etc). Keep the sleeves and the edges of the work uniform tight. Always be sure to wear safety goggles and wear safety shoes during operation.

1.1.15 Put the long hair into a safety hat during operation no matter the operator is a man or a woman.

1.1.16 It is recommended to wear suitable hearing protection equipment when necessary to reduce the risk of hearing loss.

1.1.17 Provide adequate light around the machine, and keep the perimeter around the machine dry, clean and in good order. In addition, do not place anything near the machine; otherwise it becomes an obstacle

during operation.

1.1.18 Do not remove the guards from their working place during operation.

1.1.19 Disconnect the power supply before leaving the machine.

1.1.20 Restart the machine only after the guards and safety devices are replaced to their position and in their good function.

1.1.21 Do not place tools, work pieces, or other items, which not be in use on the machine, especially on the moving parts.

1.1.22 Clamp workpiece and tools completely and reliably and take off the wrench from chuck before starting the spindle running.

1.1.23 Stop the machine before adjusting the position of the coolant nozzles.

1.1.24 Do not use compressed air to remove dust and chips etc. deposited on the machine, switchboard, control unit etc.

1.1.25 Both operators and the maintenance men should read the descriptions carefully on the caution plate attached on the machine. They should observe the OPERATION MANUAL in their work. During operation and maintenance, care should be taken so that this caution plate is not dirtied or damaged.

1.1.26 Always bear in mind where the emergency stop button is so that you can operate it without delay in case of an emergency.

1.1.27 Start the machine according to the starting procedures strictly.

1.1.28 Keep your hands away from the moving parts of the machine during operation.

1.1.29 When removing chips caught around the tooling system, avoid taking them out directly by hand, there is cutting hazards. It is safer with

proper tool when doing this. Be sure to stop the machine when removing chips from the machine.

1.1.30 Prior to starting test operation, read this manual carefully so as to be familiar with this machine.

1.1.31 Contact the manufacturer if for some reason the OPERATION MANUAL should become unreadable.

1.1.32 When install a tool, stop the spindle and the feed in each axis.

1.2 Additional Safety Rules For Milling Machine

1.2.1 Read and understand the entire instruction manual before operating the machine.

Warning: Failure to comply with this instruction may cause serious injury.

1.2.2 Always wear approved safety glasses/suit while operating machine tool.

1.2.3 Make certain the machine is properly grounded.

1.2.4 Before operating the machine, remove tie, rings, watches, other jewelry, Keep the sleeves and the edges of the work uniform tight. Always be sure to wear safety goggles and wear safety shoes during operation. Do not wear gloves while operating machine tool.

1.2.5 Keep the floor around the machine clean and away from scrap materials, oil and grease , etc.

1.2.6 Keep all guards of the machine securely in place at all times when working. For maintenance purpose, use extreme caution and replace the guards immediately after maintenance.

1.2.7 Make sure workpiece and cutter be fitted and clamped well, and make sure the cutter doesn't touch the workpiece before starting up the machine.

1.2.8 Must shut off power supply before adjusting or maintaining the machine.

1.2.9 The operator must keep clear-minded when operating the machine and pay attention to what he is doing. It is not allowed to operate the machine when the operator is tired, after drinking or taking medicines.

1.2.10 Use tools properly. Don't force a tool or an attachment to do work which was not designed. Sharp tools should be used. Deformed or dull tools should not be used.

1.2.11 Make certain the motor switch is in OFF position before connecting the machine with power supply.

1.2.12 Never attempt to operate or adjust the machine when the procedure is not understood.

1.2.13 be careful, the handle of the spindle sleeve rapidly rebound.

1.2.14 It is advised that the operator should change machining position on the table frequently in order to prolong the life of the machine.

1.2.15 Lubricate the machine in time according to the lubricating demand.

1.2.16 Keep the electrical elements clean, do not clean the electrical elements with kerosene or gas.

1.2.17 Be sure that the spindle rotation of the machine comes to rest before changing spindle speed.

1.2.18 It is forbidden to process flammable and explosive metal, for example :pure aluminum, magnesium and so on.

1.2.19 The machine should never be used in flammable, explosive or humid environment

1.2.20 The machine should be disassembled and assembled supported by the lifting mechanism with sufficient bearing capacity.

1.2.21 Always stop the machine before adjusting the position of the cooling nozzle.

1.2.22 Make sure that the operating site should kept well ventilated. It is recommended that ventilation equipment should be provided on the operating site.

1.2.23 The sound pressure of the machines is 75 db (a).

The sound power of the machines is 90 db (a).

2. Working environment and note of caution symbol

2.1The milling machine is designed for operating on the site:

—The height above sea level doesn't exceed 1000m.

—The ambient temperature range doesn't exceed 5℃～40℃.

—The relative humidity doesn't exceed 50% within＋40℃ and 90% within＋20℃.

—Transportation temperature range is within -25℃～+55℃

__ The light in the working environment should not be lower than 500 lux.

2.2 Do not use the machine in an environment of electric dirt, explosion, metal fretted, gas and steam which can destroy insulation .

2.3 Do not use the machine in an environment of impact and vibration.

3. Usage and structure

This milling machine is designed for milling, drilling on general metal workpiece.

Warning: Do not process flammable and explosive metal, e.g. pure aluminum and magnesium etc.

The machine consists of body, knee, worktable, main transmission structure, feed box , ram, coolant, lubrication, electric apparatus and so on. (fig.1)

The structure of the machine:

3.1 The body is composed of knee, base, column , and the column that is fixed on the base with screws .

3.2 Knee is in front of the column, and is connected with the column through rectangle guideways, which can lift and lower along vertical guideway.

3.3 Sliding saddle connects with knee through rectangle guideways. Worktable connects with sliding saddle through swallowtail guideways, and the sliding saddle connects with the knee and table. Worktable and the sliding saddle can be moved by lead screw and screw nut drive.

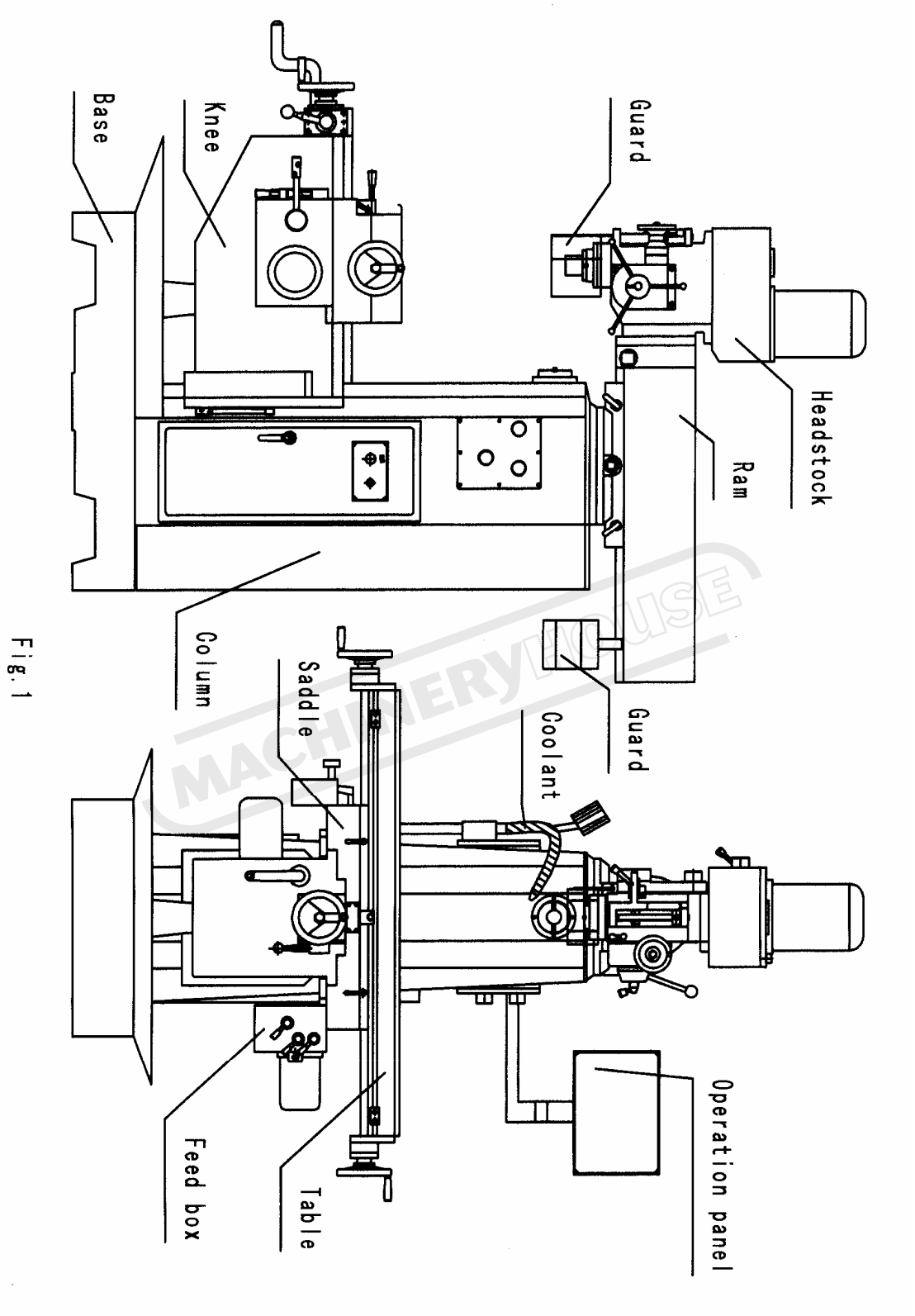


Fig.1

3.4 Main transmission adopts gear drive structure .

3.5 The ram consists of ram and hanging frame, the fixed base that is installed on the column, and is connected with ram through swallowtail ways, hanging frame locate the forward part of the the ram.

3.6 The feed box is installed at the bottom & at the right of sliding saddle, and is driven directly by motor,

3.7 The coolant system consists of coolant pump, coolant tube and tank that is in the base.

3.8 Lubrication system contains immersed oil splash lubrication, lubrication pump and hand pump lubrication .

3.9 Electric box is in the column, and integarated operation panel is on the left of the column, which enables convenient operation.

The worktable in the longitudinal and cross directions is moved by manual feed or power feed, the power feed of the table cross & longitudinal direction is provided by a feed box. The feed box has eight kinds of feed speed and one rapid speed. Main transmission adopts gears transmission structure, high efficiency, big torque, wide speed change range, so expand the working extent.

4. Operation

4.1 Read the manual carefully before operating the machine, make familiar with structure of the machine, functions of each handle, and buttons, coolant & lubrication, transmission system and electrical system. (fig.2)

4.2 Check whether lock structure has been loosened before starting the machine, and whether lifting or lowering movement of spindle sleeve and electrical equipment are normal, whether grounding wire is corrected and reliable.

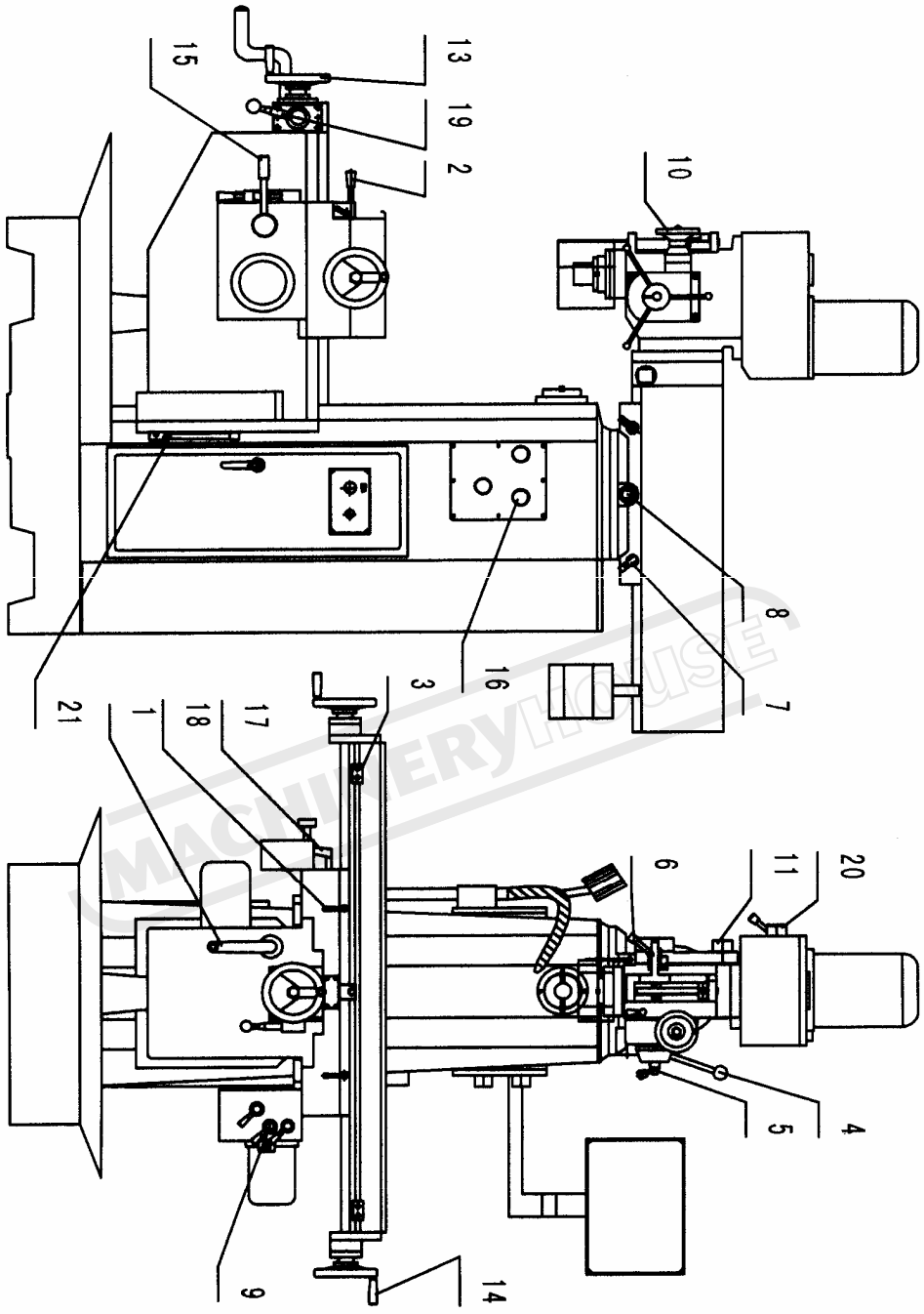


Fig.2

No.	Name
1	crank
2	handle
3	stopper
4	handle
5	handle
6	handle
7	lever
8	worm
9	handle
10	handwheel
11	handle
12	handle
13	handwheel
14	handwheel
15	handle
16	handle
17	handle
18	handle
19	handle
20	handle
21	lever

4.3 Three modes of the spindle sleeve feed : micro feed, power feed, manual feed

4.3.1 Microfeed

First, make sure handle (6) on the left of the headstock is opposite to the position of handle (6) in Fig. 1, tighten right handle (5) to make bevel gear in handle base merge with worm, then turn the handwheel (10) in front of the headstock to realize the micro feed.

4.3.2 When the handle (5) is loose, two feed modes are provided: power feed, manual feed

4.3.2.1 Power feed

First, ensure handle (5) is loose, adjust handle (6) to the position according to fig. 1. There are stopper and travel scale on the headstock, and they are used to stop spindle and control machining depth. Lockhandle (12) can clamp the spindle sleeve at any position.

Do not lock the handle when the spindle feeds.

4.3.2.2 Manual feed

Make certain locking handle (5) loosened, turn handle (4) directly to realize the manual feed.

4.3.3 Before starting the spindle, check whether handle (6) on the left of the headstock is opposite to the position of handle (6) in fig.1, and whether spindle quill is loosened, otherwise don't start machine .

4.3.4 Switch on power, check the directions of spindle rotation, coolant pump rotation direction is consistent with the requirements before operation. Examine whether power feed travel limit direction is consistent with the designed direction, otherwise, must adjust the power supply wires . Judge the vertical spindle turning direction: watch from top to bottom , it is positive

direction if the spindle turns clockwise .

4.3.5 No power feed when the spindle reverses.

4.4 Table feed

4.4.1 Feed box is at the bottom & at the right of the sliding saddle, and it is driven by motor. Speed can be changed through the handle (9).

4.4.2 Longitudinal table feed handles (14) locate at the two ends of the table, so the operation is convenient. Table power feed handle (2) is in the middle of the table, and it controls table stop & table movement(left or right), travel stopper(3) is used to limit the position. When working , adjust stopper (3) to target position and fix.

4.4.3 Table cross feed

Table cross feed structure is in front of the knee.

Manual feed : First, place handle (19) in the middle position, then turn handle (13) to move table .

Power feed : Adjust handle (19) up or down, then the table will move forward & backward.

WARNING:

The speed should be changed only when the machine is in standstill state.

1. First, place handle (2) and handle (19) in the middle position.

2. Start power feed box motor to keep it run.

3. Adjust handle (9) to proper position to select the proper feed speed .

4. Change handle (2) and handle (19) to the target position to realize

power feed.

4.5 Knee

Knee is in front of the column, and is connected with the column through rectangle guideways. Turn handle (1) to move knee to proper position.

CAUTION: Must loosen lockhandles (21) before moving table.

4.6 Vertical movement of the knee

Automatic lifting and lowering structure is installed on the left of the knee. Travel of vertical movement of the knee is limited by travel limit switches that locate at the top and at the bottom of the column

4.6.1 Crank (1) will automatically loosen when the knee feeds automatically.

4.6.2 When lifting or lowering the knee by hand, please push crank (1) into the knee, then turn it .

CAUTION:

1. The lock structure of the knee lifting or lowering movement and the knee power feed adopt interlocking structure, then the knee will not move when the lockhandle is locked. Must loosen the lockhandle when the knee moves. And the lockhandle is on the right of the knee.

2. In order to lubricate conveniently, the oil-cups are set on two sides of the vertical guideways. To prolong machine's life, please often lubricate the machine with oil-gun.

4.7 Must clamp lockhandle before the machine works. To obtain better effect, please select vertical milling cutter with tri-blade. Must raise the table near the spindle nose; while selecting vertical milling cutter with two-blade ,You'd better select micro feed during operation.

4.8 The headstock can be tilted ±45° in vertical plane.

First, loosen locknut no more than 1-2 pitches while tilting, and not too loose either. turn the worm on the right side of the headstock with spanner (S21~24), the headstock will tilt to the required position, and finally lock the locknut and start to work.

4.9 In the horizontal plane, the headstock can be swiveled ±180° around the vertical column axis. When swiveling , loosen four locknuts at the bottom of the ram first, and swivel the ram to proper position, then lock the four locknuts.

4.10 The headstock can be moved in the cross direction. Loosen two lockhandles on the right side of the ram before moving it, then turn the worm with spanner to make the headstock and ram move, then clamp the two lockhandles.

4.11 Swivel the ram 180° when the horizontal milling arbor and hanger work together .

4.12 Must wear approved safety glasses/face or shields while working.

4.13 Must clean the iron crumbs and dirts, and coat anti-rust oil when work is over.

4.14 Must shut off power supply when operators find faults during the operation, please ask technicians to check and repair if necessary.

5. Transmission system

5.1 Main transmission system (Fig. 2)

5.1.1 Vertical spindle:

Power is passed to the spindle through sliding gear .

5.1.2 Horizontal spindle:

Horizontal spindle is driven by the motor, and through belt pulley and gears

to horizontal spindle, so horizontal spindle can acquires 12 steps of rotation speed.

5.2 Speed change

5.2.1 Vertical spindle:

First, shut off the power source before changing the speed , please adjust handle (20) on the left of the headstock to proper position according to the illustration of the scutcheon.

5.2.2 Horizontal spindle:

First, cut off the power supply before speed changes, please adjust handle (16) on the right of the headstock to proper position according to the instruction of the scutcheon .

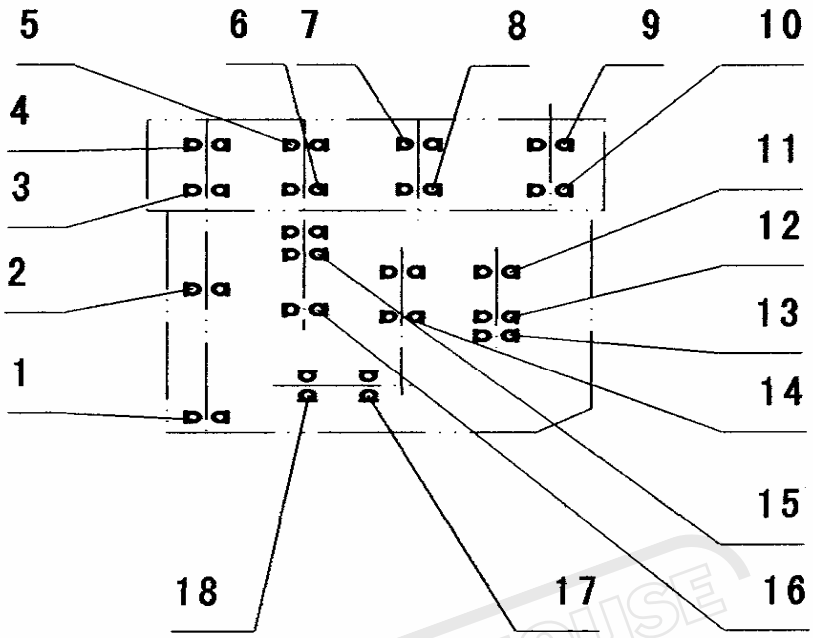
6. Main parameters

No.	Specification	Parameter
1	Max. manual drilling dia.	ϕ 50mm (1 31/32") (cast iron)
2	Max. automatic drilling dia.	ϕ 12mm (15/32") (cast iron) ϕ 10mm (25/64") (steel)
3	Max. vertical milling dia.	ϕ 25 mm(63/64")
4	Spindle taper	7:24 ISO40
5	Spindle speed steps	8 setps (vertical) 12 setps (horizontal)
6	Spindle speed range	90~2000r.p.m. (vertical) 38~1310 r.p.m.(horizontal)
7	Vertical. spindle feed capacity	0.08; 0.15; 0.25 3setps mm / round
8	Distance from vertical spindle to surface of column	780mm (30 11/16")
9	Distance from vertical spindle nose to table surrface	180mm ~ 580mm (7 5/64")~(22 13/16")
10	Distance from horizontal spindle center to table surface	70mm ~470mm(2 3/4")~(18 1/2")
11	Spindle sleeve travel	120mm (4 23/32")
12	Table size	1320mm×320mm (52"×12 19/32")
13	Table travel	800mm×300mm (manual) (31 31/64")×(11 13/16") 750mm×250mm (digital readout) (29 33/64")×(9 27/32")
14	Lifting and descending travel of the table	400 mm (15 47/64")
15	Main motor power	2.2 KW
16	Overall dimension (L×W×H)	1710mm×1720mm×2330mm (67 3/8"×67 3/4"×91 3/4")
17	Net weight	1800 Kg
Notice: The specifications are subjected to modifications and improvements without notice.		

7. Bearing list of vertical and horizontal spindles (Fig. 3)

NO.	Name	Model	Qty
1	bearing	32012/P5	1
2	bearing	7008AC/P5	1
3	bearing	16009/P6	1
4	bearing	6208-Z/P6	1
5	bearing	6305/P6	1
6	bearing	6204/P6	1
7	bearing	6304/P6	1
8	bearing	6004-Z/P6	1
9	bearing	61908-RZ/P6	1
10	bearing	6005-Z/P6	1
11	bearing	6004-Z/P6	1
12	bearing	51105	1
13	bearing	61905/P6	1
14	bearing	6202/P6	2
15	bearing	51100	1
16	bearing	6003	2
17	bearing	61805	1
18	bearing	61906	1
19	bearing	2007111/P6	1
20	bearing	7308E/P6	1
21	bearing	205/P6	5
22	bearing	307/P6	1

Vertical spindle



Horizontal spindle

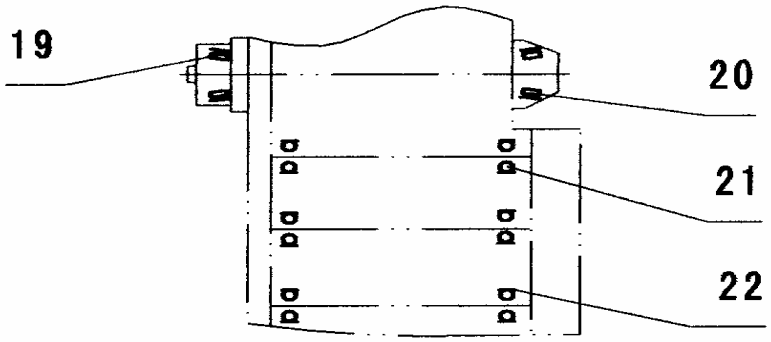


Fig . 3

Bearing list of table part (Fig. 4)

NO.	Name	Model	Qty	Remark
1	bearing	61901	2	
2	bearing	32005	2	
3	bearing	6004-2RZ	1	
4	bearing	6005-2RZ	1	
5	bearing	6004	1	
6	bearing	61904-2RZ	1	
7	bearing	6206	1	
8	bearing	7204C-Z	2	
9	bearing	61904-2RZ	6	
10	bearing	6204-Z	1	
11	bearing	61806-2RZ	2	
12	bearing	6203-Z	5	
13	bearing	6004-Z	5	
14	bearing	6006-Z	1	

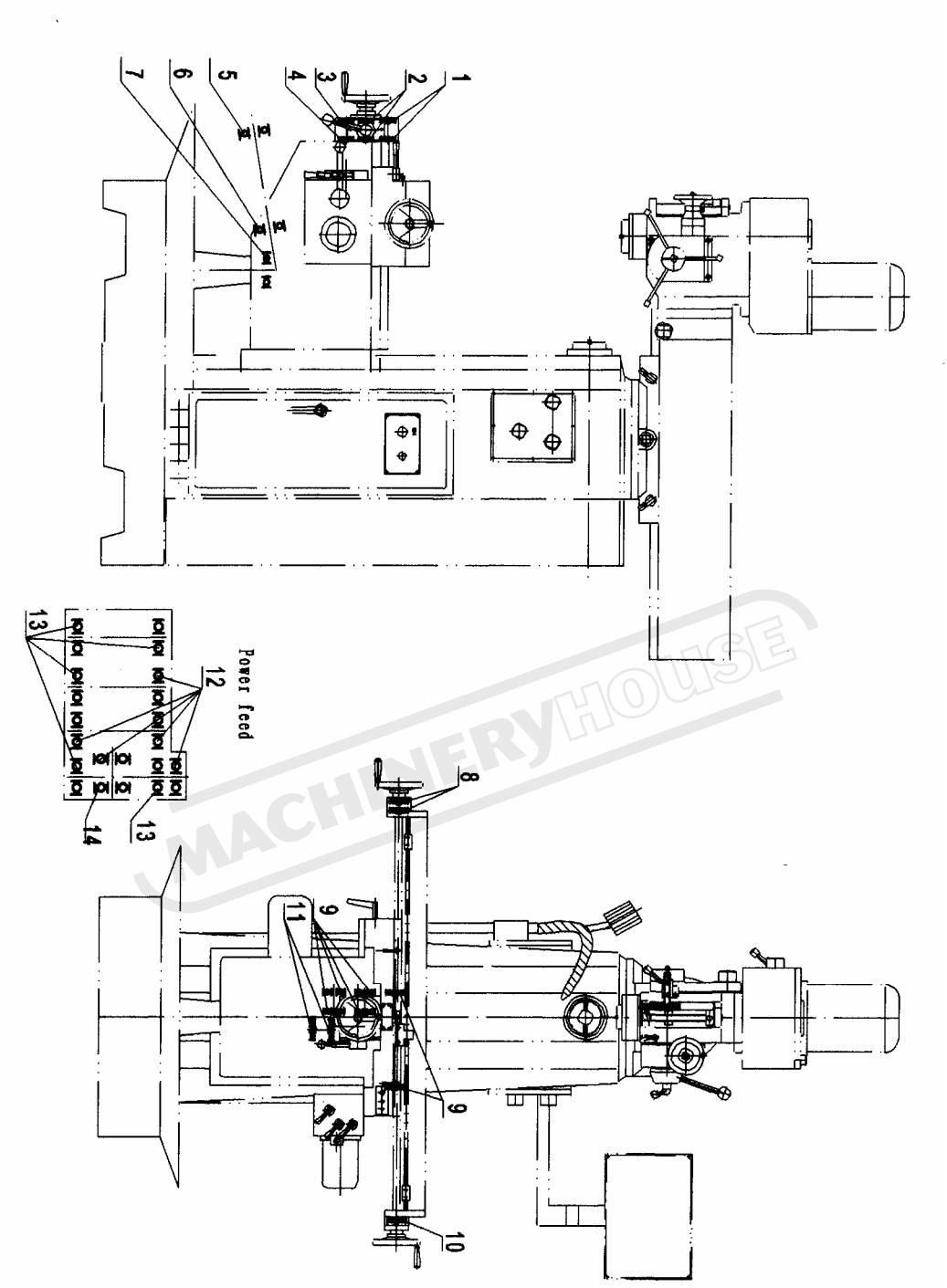


Fig . 4

8. Adjustment

8.1 Adjustment for longitudinal and cross guideways gibs of the table.

8.1.1 Longitudinal gib adjustment:

First, loosen screw (1) on the small end of gib, then adjust screw (2) on the big end to proper position, tighten screw (1) properly finally.(Fig. 5 a).

8.1.2 Cross gib adjustment:

Remove crumb board(2) at the two ends of the table,loosen screw(1) at one end, and adjust screw (3) at the other end to proper position, then tighten screw (1) properly and fix the crumb boards. (Fig.5 b).

8.2 Adjustment for the gibs which are between the knee and the column guideway.

First, remove crumb board (3), loosen screw (1), adjust screw (2) to proper position, then tighten screw (1) properly and fix the crumb boards.

(Fig.5 c).

8.3 Adjustment of the ram :

Adjust screw(1) directly to realize adjustment of the ram.

8.4 Adjustment of the backlash between the lead screw and the screw nut. (Fig.6) :

Too much backlash between the lead screw and screw nut will influence machining accuracy and surface roughness of the parts.

First,loosen screw (2) , adjust screw (1) to proper position, tighten screw (1) with screw (2) next.

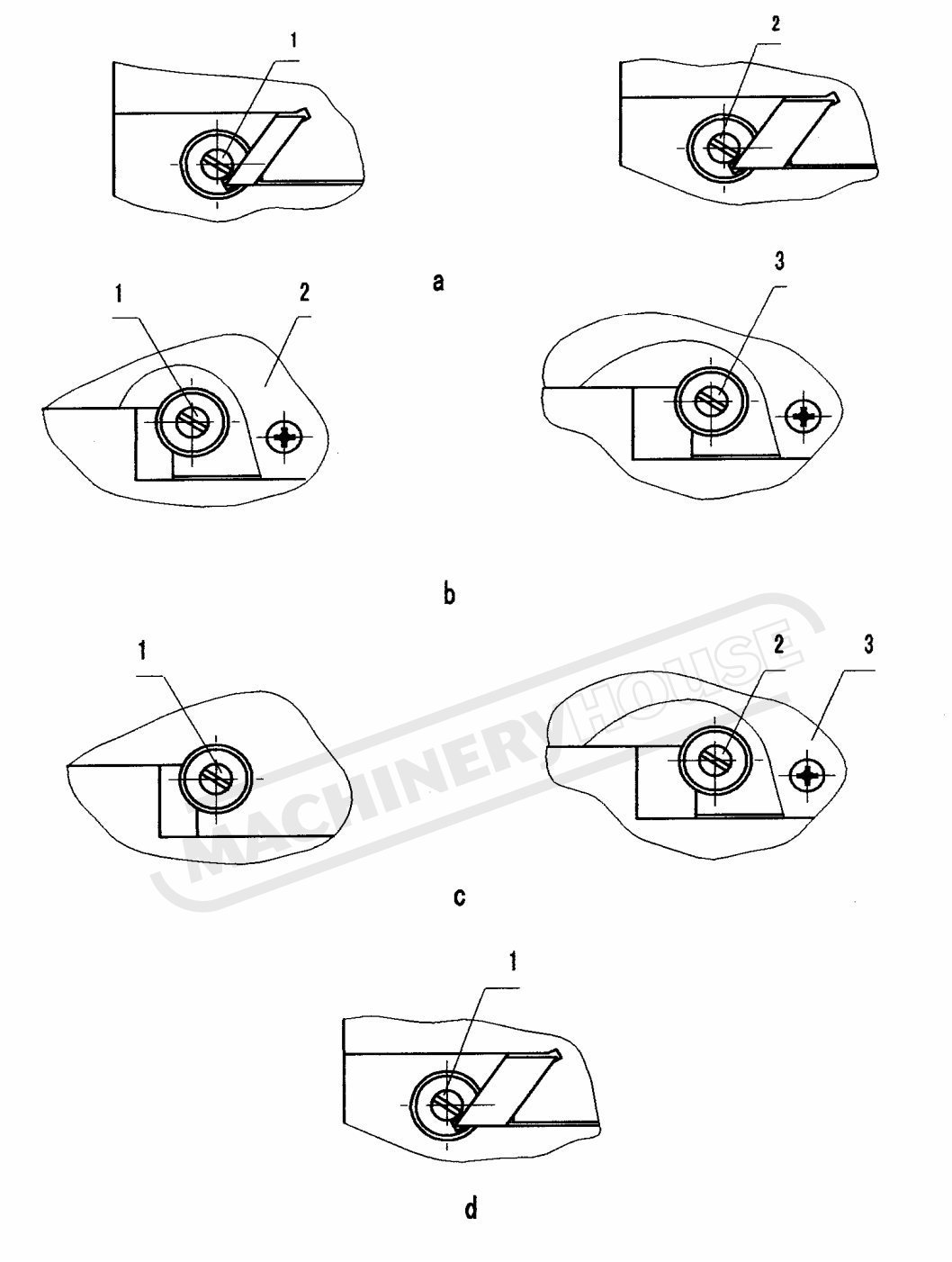
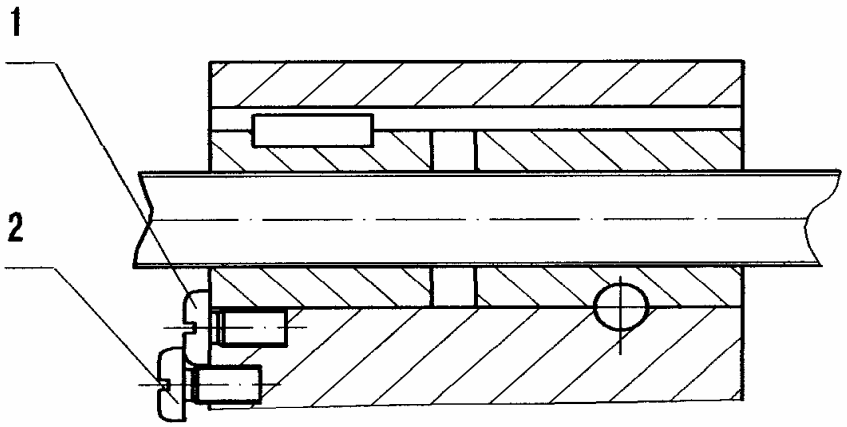
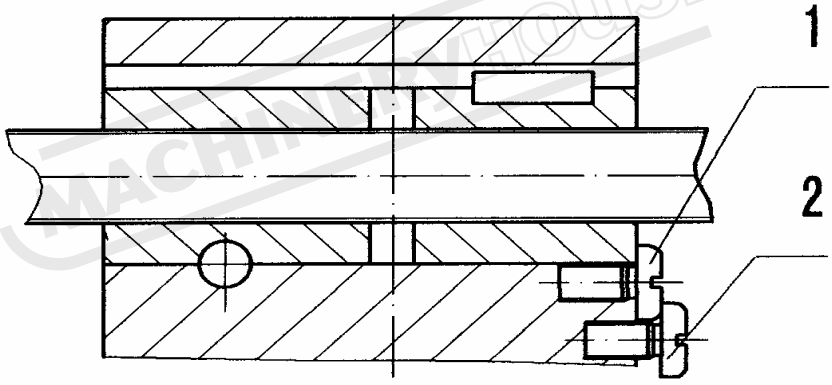


Fig . 5



Longitudinal screw



Cross screw

Fig . 6

9. Coolant and lubrication

9.1 The coolant pump`s flow is 25 l/minute. Coolant is sent to nozzle through coolant pipe and is forcibly sprayed to the processing workpiece by a coolant pump.

The valve is used to control the flow of coolant spraying to cutting area exactly. The coolant is contained at the bottom of the machine.

MSDS Safety information

Name: JN-8 water-soluble antirust cutting liquid

Ingredients: Non hazardous ingredient

Skin: NO

Ingestion: NO

Carcinogenicity: NO

Appearance and (odor): semi- transparence liquid /no odor .

Anti-rust property : first-class gray cast iron

single piece (drop) 48h eligible ; fold pieces 8h eligible

rust test: 55±2℃ cast iron 48h eligible; aluminum 4h eligible

eliminate foam :eligible

PH value: 8.5 extensive test paper

Surface tensility:<40dyn/cm

PB value:>700

μ <0.083

Effects of exposure: skin: slight irritation.

Explanation Of Carcinogenicity: none.

First aid:

eyes: flush thoroughly.

skin: wash w/soap & water

ingestion: if >1/2 liter (pint), immediately swallow 1-2 glasses of water & call a physician.

Inhalation: No volatilization at normal temperature,but it will volatilize to be hydrocarbon at high temperature.Call a physician .

Extinguishing Media:No.

Handling and Disposal

Spill Release Procedures: if a little, absorbed with sawdust, or shovel up; If a great lot, prevent spills from entering sewers, drains, soils,and reclaim spill with an approved recycling facility.

Warning:

1. **Cutting liquid can not be directly drained, it should be reclaimed and processed under the laws and regulations.**
2. **Vapor of coolant which may have a influence to health may arise when the temperature of the tools or the spindle rotation speed is high. So care should be taken that the operating site must kept well ventilated. It is recommended that ventilation equipment should be provided on the operating site.**

9.2 Lubrication (fig . 7)

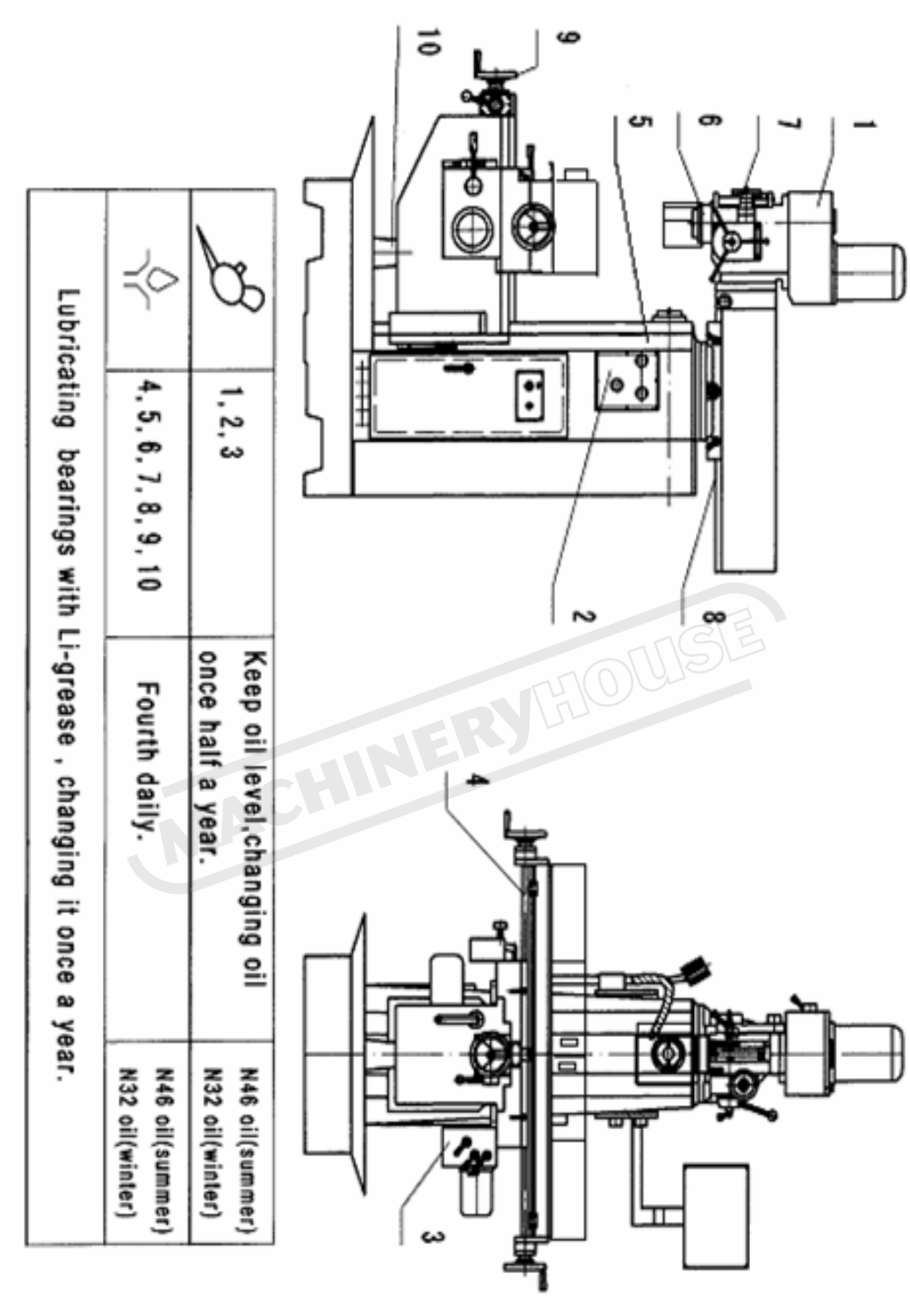
To be a great extent, machine life depends on the reasonable lubrication.

9.2.1 lubricating oil must be clean, nonacid, anhydrous and with no hard solid. Lubricate machines according to the requirement.

9.2.2 Main transmission gears and feed box gears adopt immerged oil splash lubrication and have forcible automatic lubrication structure. In order to make lubrication system work normally, the lubrication oil tank should be cleaned regularly, once 3 months at the beginning, then once every half a year later.

Please often check out oil level of the lubrication oil tank , supply lubrication oil in time when the oil surface is lower than the center of the oil sign,.

9.2.3 Longitudinal & cross lead screws, saddle-table guideways, saddle-knee



	1, 2, 3	Keep oil level,changing oil once half a year.	N46 oil(summer) N32 oil(winter)
	4, 5, 6, 7, 8, 9, 10	Fourth daily.	N46 oil(summer) N32 oil(winter)
Lubricating bearings with Li-grease , changing it once a year.			

Fig . 7

guideways, knee- column guideways and so on, should be lubricated with N46 lubricative oil at least four times every shift.

9.2.4 Bearing cover of mill holder of hanging frame adopts oil-gun injection lubrication. Operators should often add oil and clean dirts .

9.2.5 Other parts which need lubricating oil have been mounted with oil-cup, every shift must add with N46 lubricative oil at least 4 times.

MSDS Safety information

Name: N46 lubricating oil

Health Hazards Data

Ingredients: Non hazardous ingredient
Relative consistency: <1
Inhalation: NO
Skin: NO
Ingestion: NO
Carcinogenicity: NO
Effects of exposure: skin: slight irritation.
Explanation Of Carcinogenicity: none.
First aid: eyes: flush thoroughly. skin: wash w/soap & water
ingestion: if >1/2 liter (pint), immediately give 1-2 glasses of
water & call a physician. don't induce vomiting/give anything by mouth.
If unconscious ,call a physician.

Fire and Explosion Hazard Information

Flash Point Text: 180℃
Extinguishing Media: CO_2, form, dry chemical & water fog.
Hazard: PREVENT RUNOFF FROM FIRE CONTROL OR DILUTION FROM ENTERING STREAMS, SEWERS OR DRINKING WATER SUPPLY.

Physical/Chemical Properties

Solubility in Water: Negligible
Appearance and odor: Dark amber liquid /no odor .

Reactivity Data

Stability Indicator: YES

Stability Condition to avoid: Extreme heat .

Materials To avoid: Strong oxidizers ,combustible material.

Hazardous Polymerization Indicator: NO

Handling and Disposal

Spill Release Procedures: first,cut off fire source, if a little, deal with sawdust, or shovel up; If a great lot, prevent spill from entering sewers, drains, soils, then reclaim spill with an approved recycling facility.

Warning: Waste oil should be reclaimed and processed under local laws and regulations.

10. Transport installation and trial run

10.1 The temperature range of transportation and storage of the machine tool is between -25℃ and +55℃.

10.2 Transportation

Must load or unload machine complying with outer sign on the packing box. Any impact or vibration is prohibited. Must open the box carefully, otherwise it will scratch the paint on the machine surface. After opening the box, check all the accessories according to the packing list, check if there is something wrong or damaged, please inform us in time in order to solve it well, then convey the machine with forklift. Please set a steel wire rope according to fig.8 when conveying the machine with crane, and insert some pads or soft cloth between the machine surface and the steel wire rope, Remember to disassemble the crumb tray, and ask for help if necessary during the transportation .

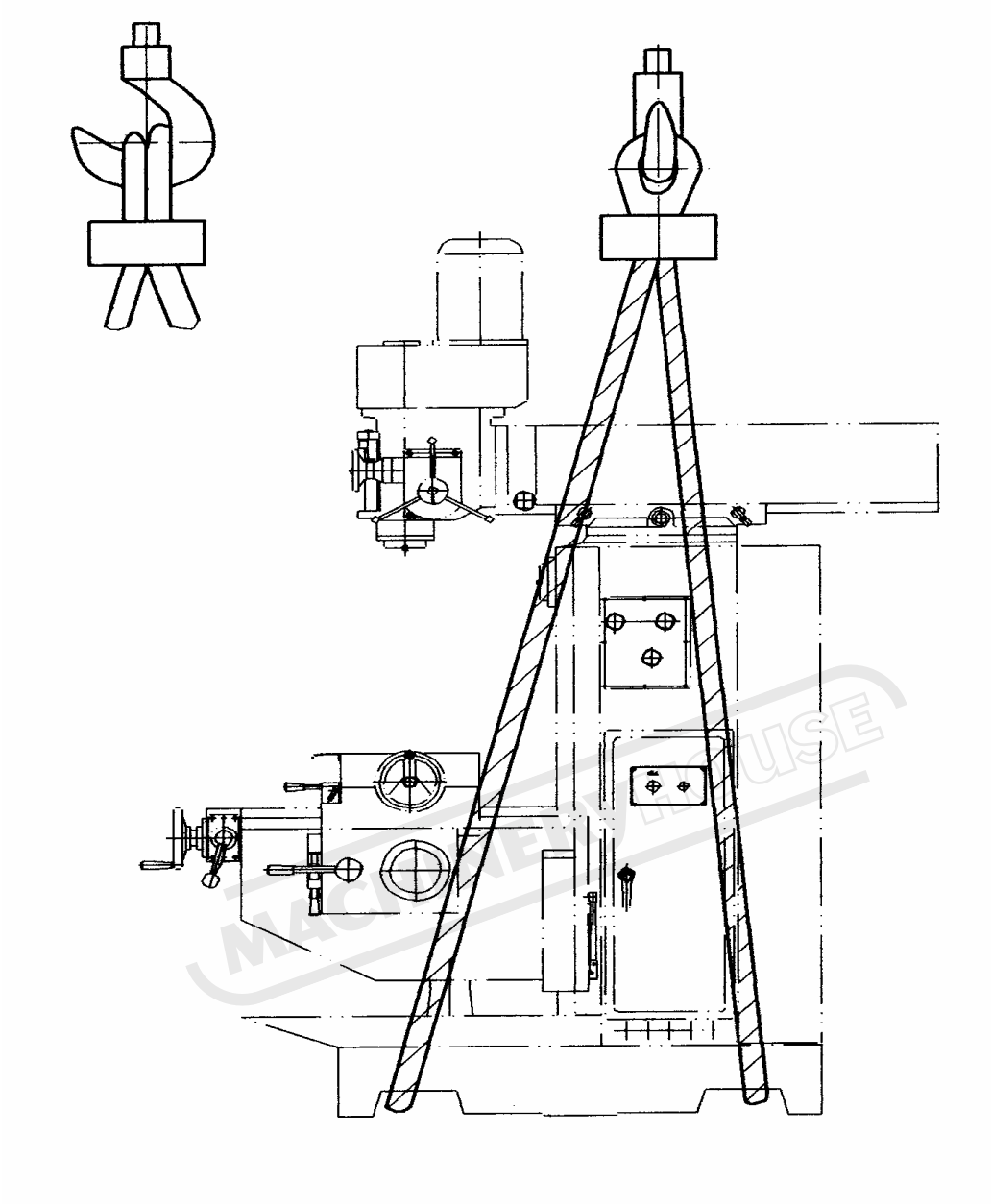


Fig.8

Caution:

1. The steel-wire rope should not touch machine surface, each hand lever, handle and handwheel. Do put wood block or soft cloth on the interface between the steel-wire rope and the machine edge to avoid

damaging the paint.

2. Before conveying the machine with the crane, move worktable to the front end of the knee, and keep the table`s two ends that locate on the knee have the same length, tighten the longitudinal & cross lockhandles at the same time .

10.3 Installation

In order to make machine steady and keep the working precision, it must be installed on the concrete foundation, which should be built according to the dimension of the foundation fig. 9. The foundation should be built on solid soil. The machine will be put on the foundation after it is already dry, then fix the bolts on the concrete , must correct it carefully, make sure it's level and the allowance is under 0.04/1000 mm in cross and longitudinal directions after tighting the bolts.

10.4 Trial run

10.4.1 Before trial run, please clean the anti-rust oil on some parts of the machine carefully, then coat thin lubricating-oil on the outer surface.

10.4.2Loosen lockhandle or screws in three directions (X, Y, Z) of machine before the trial run.

10.4.3 Pour lubrication oil into the gear box and the other lubrication points right, then do an overall check.

10.4.4 Check whether the machine`s each handwheel and handle is reliable and flexible.

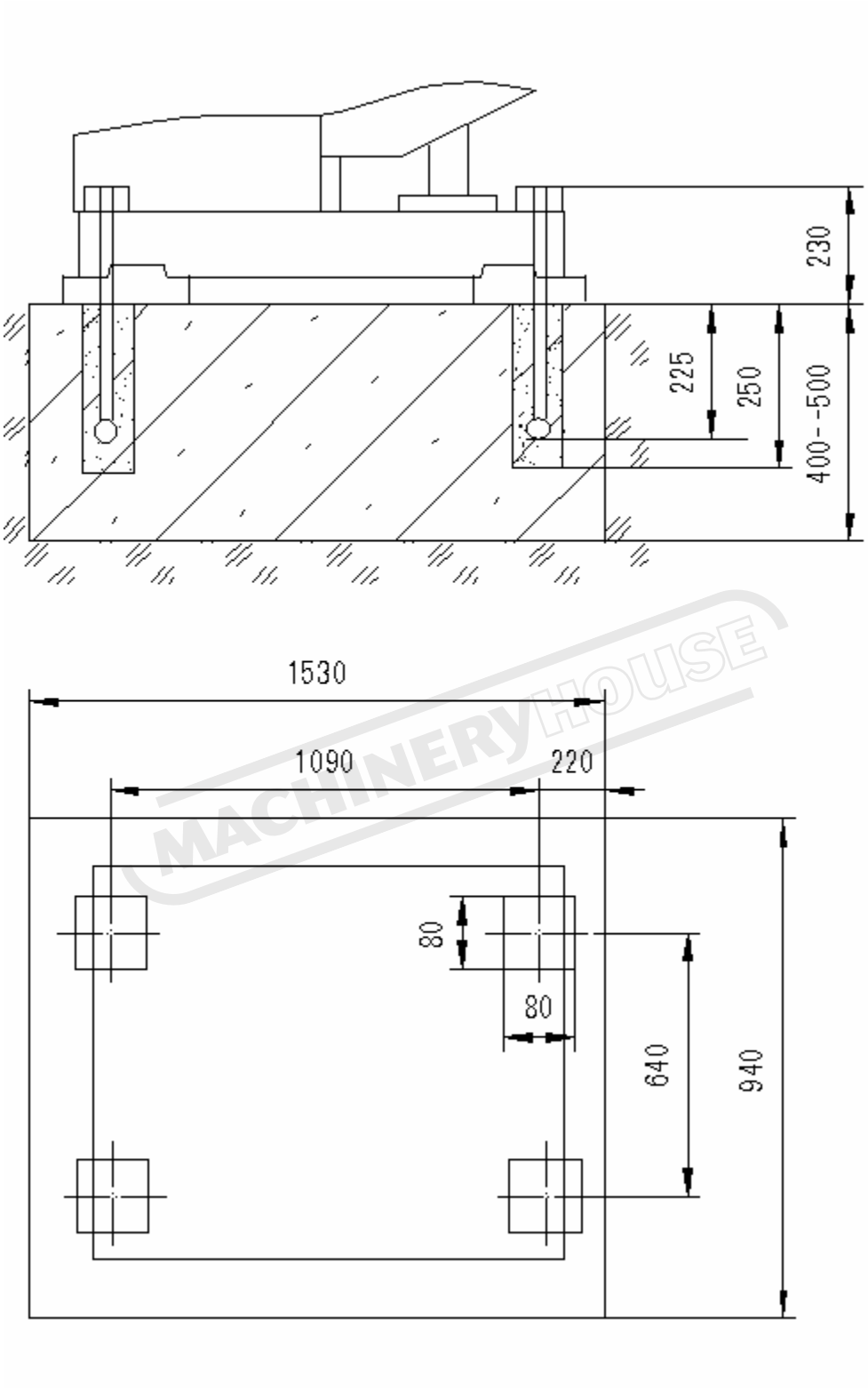


Fig . 9

10.4.5 Please check whether the main motor turns right before starting the spindle and whether the feed motor phase sequence is consistent with the main motor.

10.4.6 Trial run: First, press the button to check whether each travel limit position is right and reliable,then start to idle at the lowest speed for more than 30 minutes. Then increase the speed step by step and inspect whether the speed change structure is flexible & reliable.

Caution:

Care must be taken when loading or unloading the machine during the transport.

11. Machine maintenance

11.1 Before operating the machine, must pour lubricant to parts that need lubricate every day.

11.2 Check gear box's oil quantity daily and if the oil surface is lower than the oil sign , add lubricant then .

11.3 After finishing the work, please clean the worktable and each lead screw, and add a little lubricant oil.

11.4 Check whether each gib for the movement of guideways is loose, please properly adjust them if necessary.

11.5 In order to prolong the life of the table, please often change the workpiece's clamping position on the table.

11.6 Check electrical apparatus frequently, and remove all the dirt in time.

12. Simple malfunction and obviation

12.1 When the radial run out of spindle is too much and there is much noise in the headstock, please adjust the upper round locknut to eliminate the

clearance.

12.2 When table& knee rises and falls unstably with strange sound , check whether gibs are loose and whether the lubrication effect of the ways surface is good, adjust gib or add oil if needed.

12.3 When strange sound occurs in the headstock, check out whether gear speed change handle is in the place, whether the oil is enough and whether the shifting fork is damaged.

12.4 When the whole machine shakes during working, check whether each lockhandle is locked.

Caution :

1. **Before repairing the machine, the power supply must be shut off , the main switch must be placed and locked in "off" position.**
2. **The machine should be repaired by machinist only.**

13. Electrical system

Please understand the wiring diagram first .

13.1 Power supply: 380V±10%, AC 50±1Hz, 3PH. advise user to fix 30A circuit breaker. Before connection, please check whether the outer power supply is the same as required power source of the machine, and make sure the gounding wire is right and reliable.

13.2 Ask machinists to repair the machine when malfunction happens.

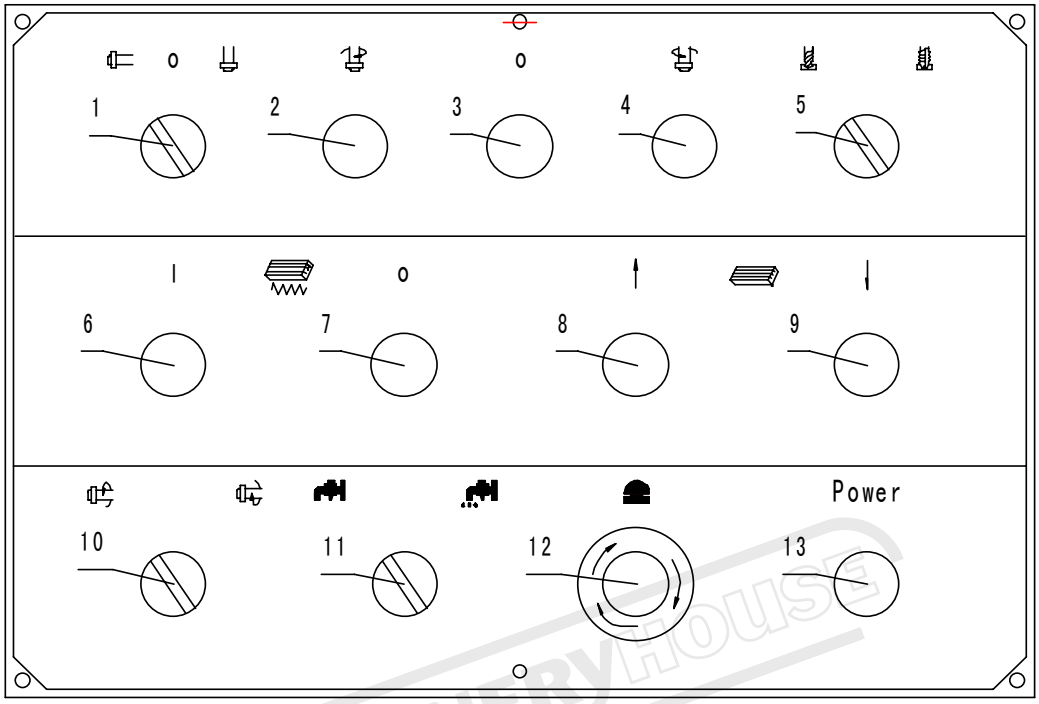
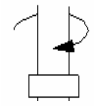
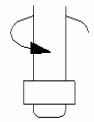


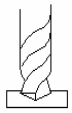
Fig.11 (operation panel)

: horizontal spindle;

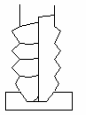

: vertical spindle;


: CW rotary vertical spindle;


: CCW rotary vertical spindle;


: milling ;

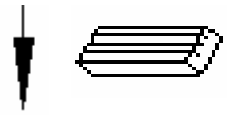

: switch off.


: tapping;


: switch on ;


: table longitudinal feed ;


: table up;


:table down;

: CW rotary  horizontal spindle;

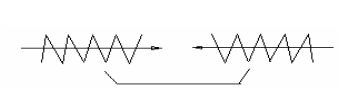

: CCW rotary horizontal spindle;

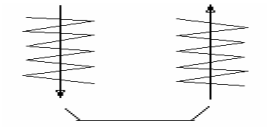

: cooling valve close;


:The mark denotes cooling valve open;

:Emergency button;

: point moving push button, it can change speed smoothly.





longitudinal feed feed cross feed

CCW: counterclockwise rotation.

CW: clockwise rotation.

13.2 Electrical protection modes of the machine: Short - circuit protection, Over current protection, E-stop, O-voltage protection and power-off while door opened protection.Close spindle guard first before switching on power supply every time. Turn E-stop button , and switch (10) of horizontal milling & switch (11) of coolant return , and switch (1) of convertion of vertical and horizontal spindles to zero position, then start to work. Please press E-stop immediately if accident occurs. Turn E-stop knob (12) clockwise, and reset switch (10), switch (11), and switch(1) to zero-positon after obviating malfunction, then start to work. (Fig.11)

CAUTION : Spindle rotating direction is consistent with operating buttons sign.

13.3 Main power switch and point moving push button are set on the door of the electrical box that locates on the right of the column (fig.1). Power electrify button (13)、E-stop knob switch (12)、spindle CW push button (2)、spindle

CCW push button (4)、spindle Stop push button (3)、conversion of horizontal spindle and vertical spindle switch (1), horizontal spindle CW or CCW switch (10) , longitudinal table feed push button (6), longitudinal table feed stop push button (7), coolant switch on or off(11), table lifting push button (8), table lowering push button(9), conversion of drilling and tapping switch(5)are set on operation panel. (Fig.11)

13.4 Machine functions: milling , drilling & tapping.

13.4.1 Milling & drilling mode: Turn switch (5) to drilling or milling mode position, then turn switch(1) to vertical spindle position, and press CW button (2), then the vertical spindle CW turn .(Fig.11)

13.4.2 Tapping mode: Turn switch (5) to tapping mode position, vertical spindle only can manually feed. Preset the tapping depth, press CW push button(2), the vertical spindle CW turns. The stopblock meets the travel limit switch that is in nether position when reach the preset depth, which makes the vertical spindle CCW turn at once, and the tap will be out from the screw, then the vertical spindle returns to the original position and stops, at the same time CW turn instead of CCW turn.(Fig.11)

13.4.3 CW and CCW turn function of Vertical spindle: CW and CCW turn of vertical spindle can be changed conveniently. Too frequent change may cause serious injury to motor, so operators change them at most 8 times / minute.

13.5 Switch (10) controls the CW and CCW turn of the horizontal spindle, and switch (11) controls the on/off of the coolant pump.(Fig.11)

13.6 Automatic table rises or falls (Fig. 2)

13.6.1 First loosen locking handle (21)of the table, then press push button(8)to lift the table; press push button(9)to lower the table.

(Fig.2 & Fig.11)

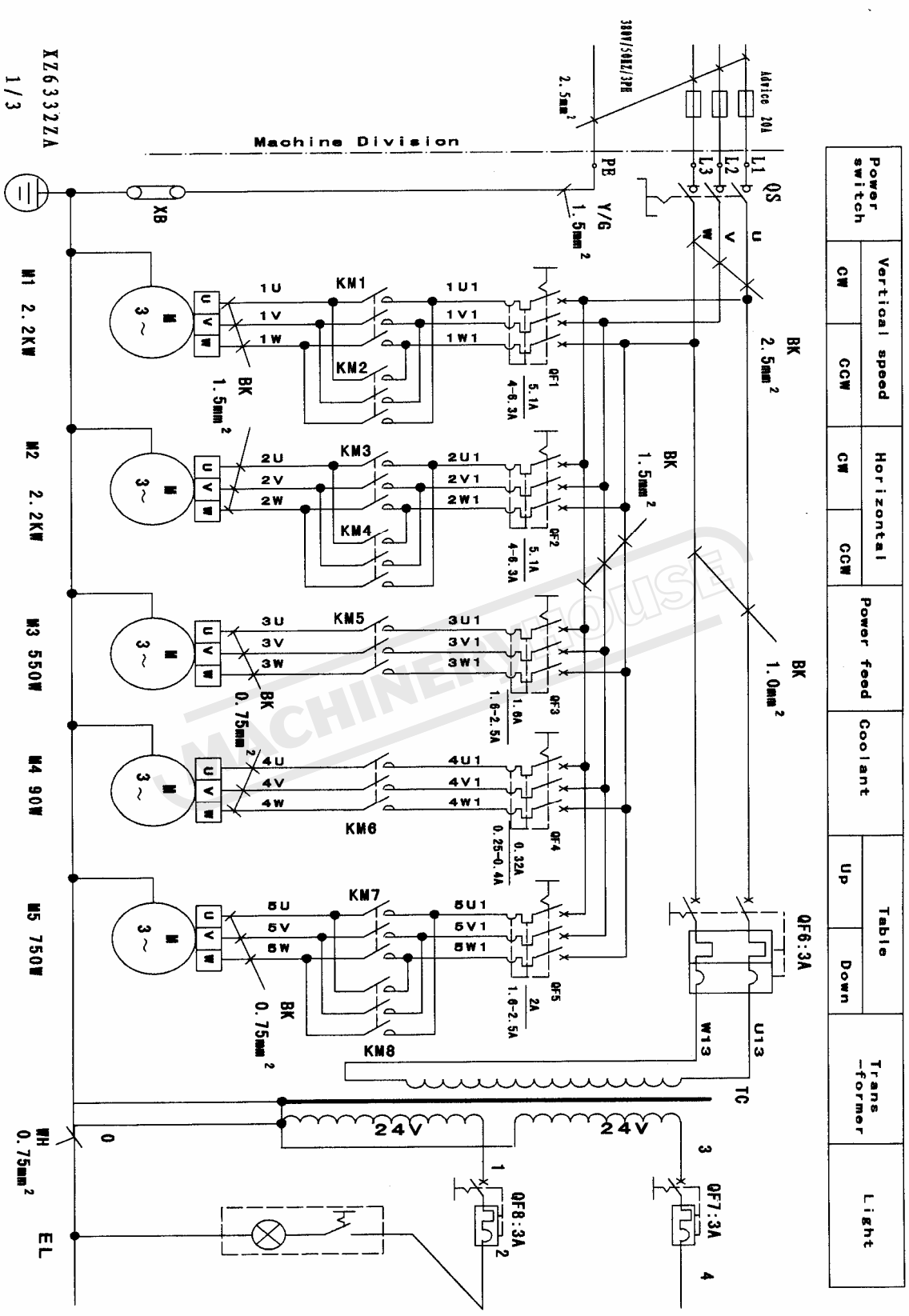
WARNING :

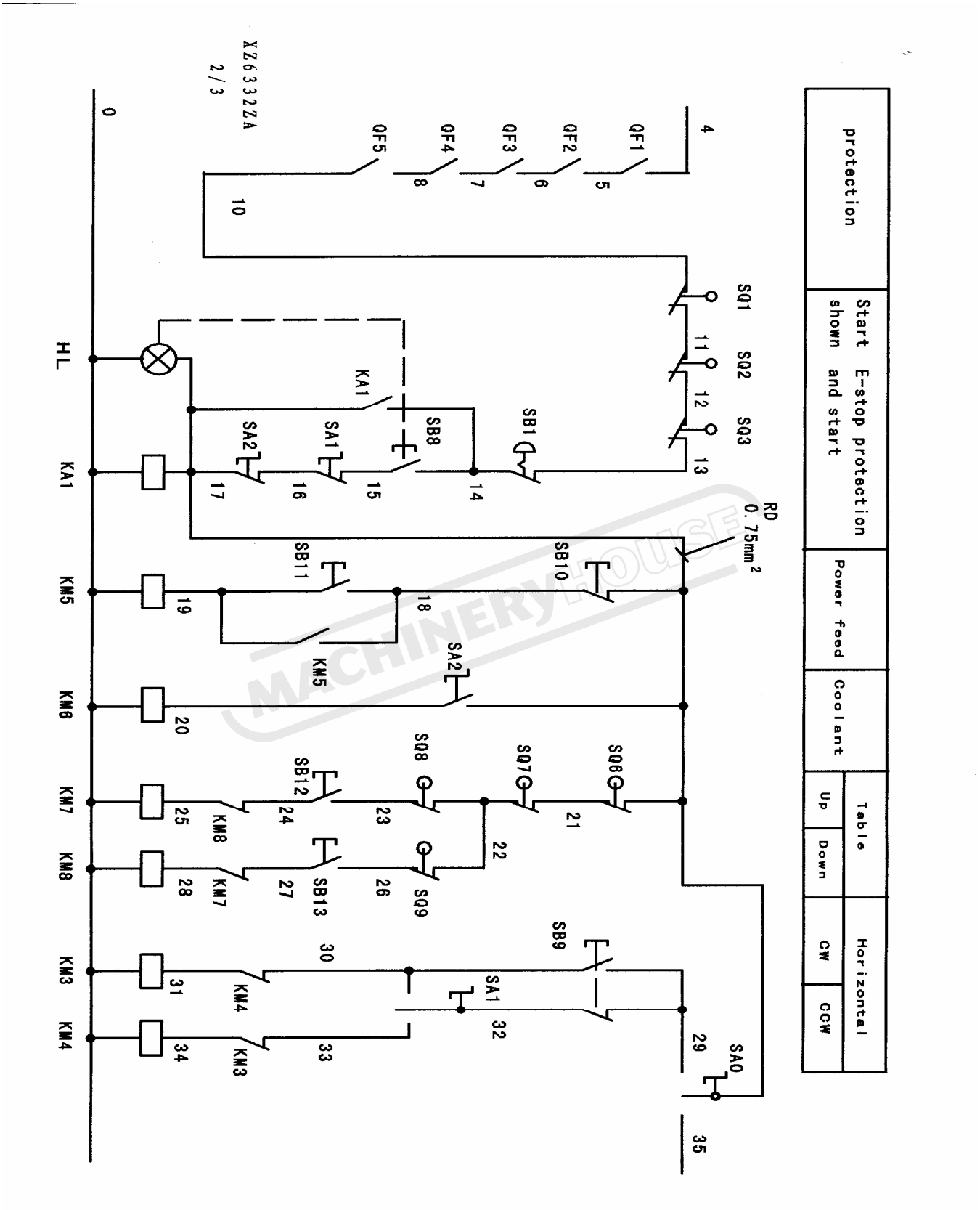
Make sure that the crank handle (1) disengages when the table automatically moves upwards or downwards . The table cannot move automatically while the locking lever (21) is locked. (Fig. 2)

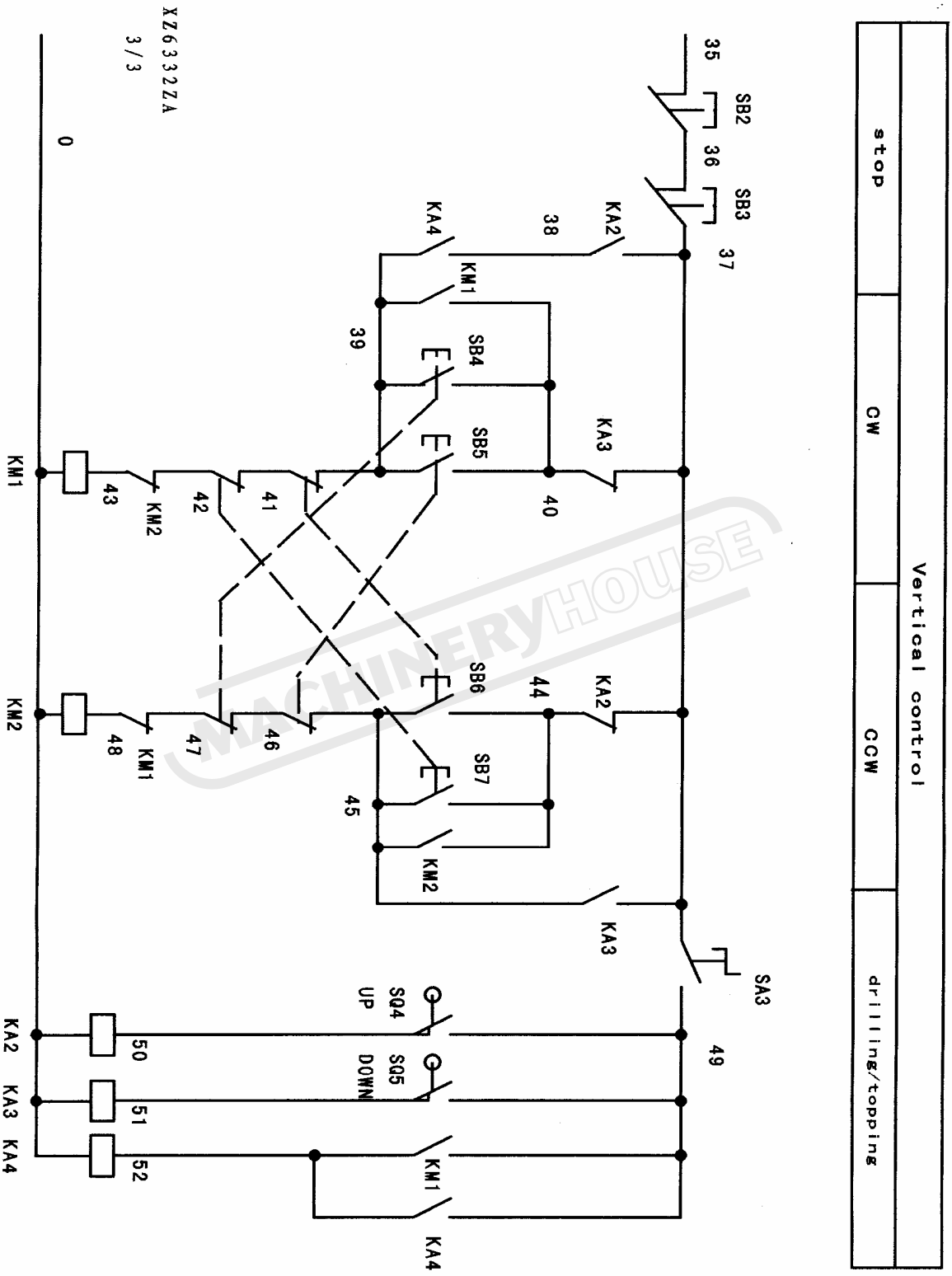
Table vertical movement direction （up and down） is consistent with the illustration on the operation panel . Otherwise, the limit switches that locate at the top & at the bottom of the column do not work.

13.6.2 Locking lever (21) must be loosened before manual feed or power feed .

13.7 Ask machinists to repair the machine when malfunction occurs.


XZ6332ZA
1/3
Machine Division
380V/50HZ/3PH
2.5mm²
Advice 20A
L1
L2
L3
QS
PE
Y/G
1.5mm²
XB
U
V
W
BK
2.5mm²
BK
1.5mm²
BK
1.0mm²
M1 2.2KW
M2 2.2KW
M3 550W
M4 90W
M5 750W
M
3~
1U
1V
1W
2U
2V
2W
3U
3V
3W
4U
4V
4W
5U
5V
5W
KM1
KM2
KM3
KM4
KM5
KM6
KM7
KM8
1U1
1V1
1W1
2U1
2V1
2W1
3U1
3V1
3W1
4U1
4V1
4W1
5U1
5V1
5W1
QF1
5.1A
4-6.3A
QF2
5.1A
4-6.3A
QF3
1.6A
1.6-2.5A
QF4
0.32A
0.25-0.4A
QF5
2A
1.6-2.5A
QF6:3A
QF7:3A
QF8:3A
BK
0.75mm²
BK
0.75mm²
W13
U13
TC
24V
24V
WH
0.75mm²
0
1
2
3
4
EL
Power switch
Vertical speed
CW
CCW
Horizontal
CW
CCW
Power feed
Coolant
Table
Up
Down
Trans-former
Light


protection
Start E-stop protection shown and start
Power feed
Coolant
Table
Up
Down
Horizontal
CW
CCW
XZ6332ZA
2/3
0
4
QF1
QF2
QF3
QF4
QF5
5
6
7
8
10
SQ1
SQ2
SQ3
11
12
13
HL
KA1
KM5
KM6
KM7
KM8
KM3
KM4
KA1
SB8
SB1
SA2
SA1
14
15
16
17
RD
0.75mm²
SB11
SB10
18
19
KM5
SA2
20
SQ8
SQ7
SQ6
SB12
23
21
24
25
KM8
22
KM7
28
27
SB13
26
SQ9
SB9
30
31
KM4
SA1
32
33
KM3
34
29
SA0
35



No.	Name	Legend	Specification	Qty	Manufacturer	Certif-icate
1	Three-phase asynchronous motor	M1	Y100L-4 3PH 380V 50Hz 2.2kW V1	1	Lianyungang motor factory	CE
2	Three-phase asynchronous motor	M2	Y100L-4 3PH 380V 50Hz 2.2kW B3	1	Lianyungang motor factory	CE
3	Three-phase asynchronous motor	M3	Y2-712-2 3PH 380V 50Hz 550W B5	1	Nantong Weifen motor factory	CE
4	Coolant pump	M4	AB-25 3PH 380V 50Hz 90W	1	Nantong Weifen motor factory	CE
5	Three-phase asynchronous motor	M5	Y90S-6 3PH 380V 50Hz 750W B5	1	Lianyungang motor co.,ltd	CE
6	Switch	QS	LW42B2M-2825/G	1	Shanghai Tianyi electronic co.,ltd.	CE
7	Circuit breaker	QF1-QF2	GV2-M10C (4-6.3A)	2	Schneider electric	CE
		QF3-QF5	GV2-M07C (1.6-2.5A)	2	Schneider electric	CE
		QF4-	GV2-M03C (0.25-0.4A)	1	Schneider electric	CE
8	Circuit breaker	QF6	C65N (2P4A)	1	Schneider electric	CE
9	Circuit breaker	QF7 QF8	C65N (1P4A)	2	Schneider electric	CE
10	Control transformer	TC1	JBK5-200 200VA I:0-380V O:0-24V(160VA) 0-110V(40VA)		Juche group co.,ltd.	CE
11	AC contactor	KM1-KM8	LC1-12 22 (AC:24V 50Hz)	8	Schneider electric	CE
12	Intermediate relay	KA1 KA4	CA2-DN22C(AC24V)	4	Schneider electric	CE

No.	Name	Legend	Specification	Qty	Manufacturer	Certi-ficate
13	E-stop button	SB1	LA42J-01/R	1	Shanghai Tianyi electronic co.,ltd.	CE
14	Push button	SB2 SB3 SB10	LA42P-01/B "S"	3	Shanghai Tianyi electronic co.,ltd.	CE
15	Push button	SB9	LA42P-11/W "S"	1	Shanghai Tianyi electronic co.,ltd.	CE
16	Push button	SB4、SB5 SB11、SB12	LA42P-11/W "S"	4	Shanghai Tianyi electronic co.,ltd.	CE
17	Push button	SB6、SB7 SB13	LA42P-11/W "S"	3	Shanghai Tianyi electronic co.,ltd.	CE
18	Push button	SB8	LA42TD-10/AC 24VG	1	Shanghai Tianyi electronic co.,ltd.	CE
19	Knob switch	SA0	LA42X3-20/B "S"	1	Shanghai Tianyi electronic co.,ltd.	CE
19	Knob switch	SA1	LA42X3-22/B "S"	1	Shanghai Tianyi electronic co.,ltd.	CE
20	Knob switch	SA2、SA3	LA42X2-11/B "S"	2	Shanghai Tianyi electronic co.,ltd.	CE
21	Inching switch	SQ1-SQ3 SQ6-SQ9	ZR236-11Z/M20	7	Schmersal industrial switchgear manufacture(Shanghai) co.,ltd	CE
21	Inching switch	SQ4-SQ5	LXW16-16/51C	2	Zhejiang detai electrical co.,ltd	CE
26	Indicating lamp	EL	JC-38 （AC：24V 50W）	1	Nantong jinxing electromechanical co.,ltd.	CE
27	Flexible conduit		Φ8mm~ϕ25mm		Shanghai Hangyu pipe casting manufactory	
28	Metric bushing		M20×1.5		Wujin Sufa machine tool fittings co.,ltd.	

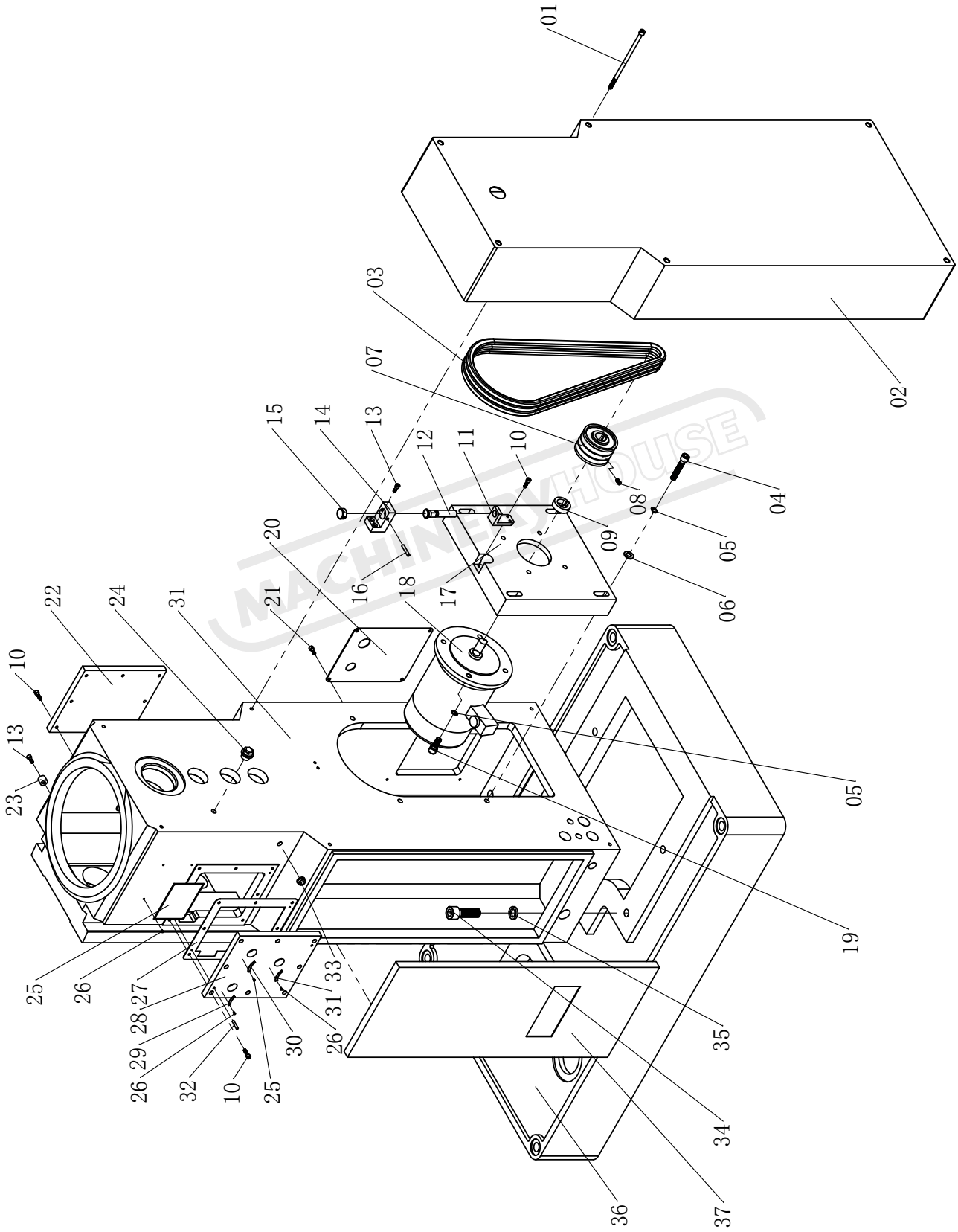
14. Accuracy list

NO.	Test illustration	Allowance(mm)	Measure value
1	adjustable flatness of the machine	A: cross 0.04/1000 B:longitudinal 0.04/1000	
2	flatness of table	0.04/200	
3	run out of spindle bore(Ver. /Hor.)	End spindle face 0.02 300mm to spindle 0.04	
4	kick of vertical spindle	0.02	
5	perpendicularity between vertical spindle rotation and table surface	A: cross ver. plane 0.10/200 B:longitudinal ver. plane 0.10/200	
6	perpendicularity between sleeve ver. movement and table surface	A: cross ver. plane 0.10/100 B:longitudinal ver. plane 0.10/100	
7	the parallelism between movement of table and surface of table	A:cross 0.05/200 B:longitudinal 0.05/200	
8	straightness of basis "T"- slot	0.03/ 200	
9	arallelism between table movenent and basis "T"- slot	0.15/200	
10	perpendicularity between cross and longitudinal movement of table	0.10 / 200	
11	straightness of the vertical movement of knee	A: cross 0.05/ 200 B:longitudinal 0.05/ 200	
12	perpendicularity between vertical guideway and table surface	A:cross 0.10/200 B:longitudinal 0.10/200	
13	parallelism between table surface and the movement of ram	0.10/200	
14	parallelism between table surface and the rotation of ram	left 30° 0° right 30° 0.10/ 200	
15	the parallelism between hor. Spindle rotation axis and worktable surface	0.10/ 200	
16	parallelism between the cross movement of table and hor. spindle rotation axis	A: cross ver. plane 0.10/200 B:longitudinal ver. plane 0.10/200	
17	parallelism between hor. spindle axis and the guideway of ram	A: vertical plane 0.10/ 200 B: horizontal plane 0.10/ 200	
18	coaxiality between the hole axis of bracket of milling arbor and axis of horizontal spindle	A: vertical plane 0.10 B:horizontal plane 0.10	
Inspector:		Date:	

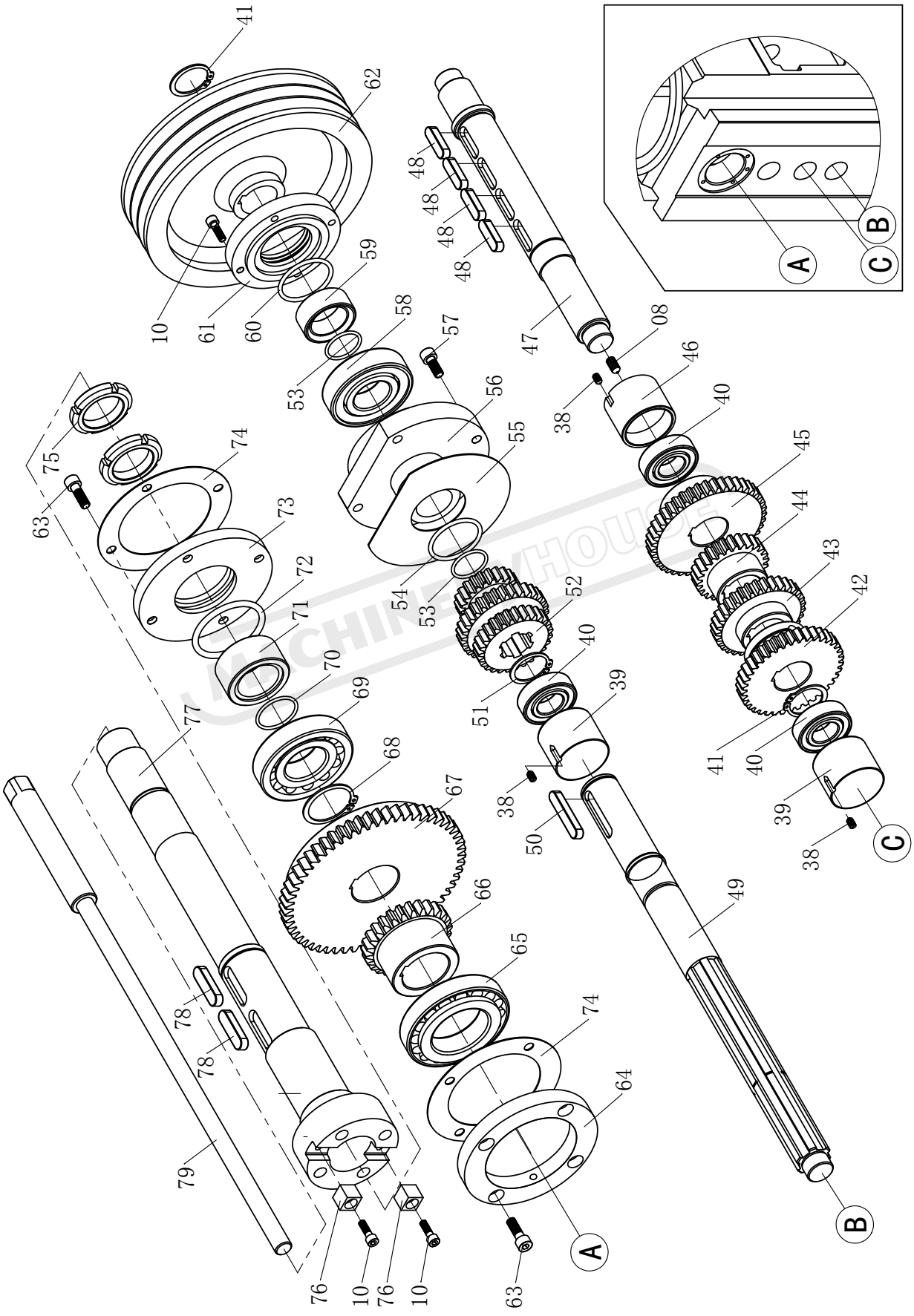
15. Packing list

No.	Name	Model	Qty
1	Machine		1
2	Drilling chuck	ϕ16	1
3	Spindle arbor		1
4	Wedge shifter		1
5	Reduction sleeve	R8/MT3 R8/MT2	each 1
6	Wrench	S8-10 S16-18 S21-24	each 1
7	Inner hexagonal spanner	5, 6 ,8 , 10	each 1
8	Vice	160	1
9	Milling chuck		1set
10	Horizontal milling arbor		2 sets
11	Crank handle		1
12	Drawbar		2
13	Operation manual		1
14	Quality certificate		1
15	Packing list		1
Inspector:		Date:	

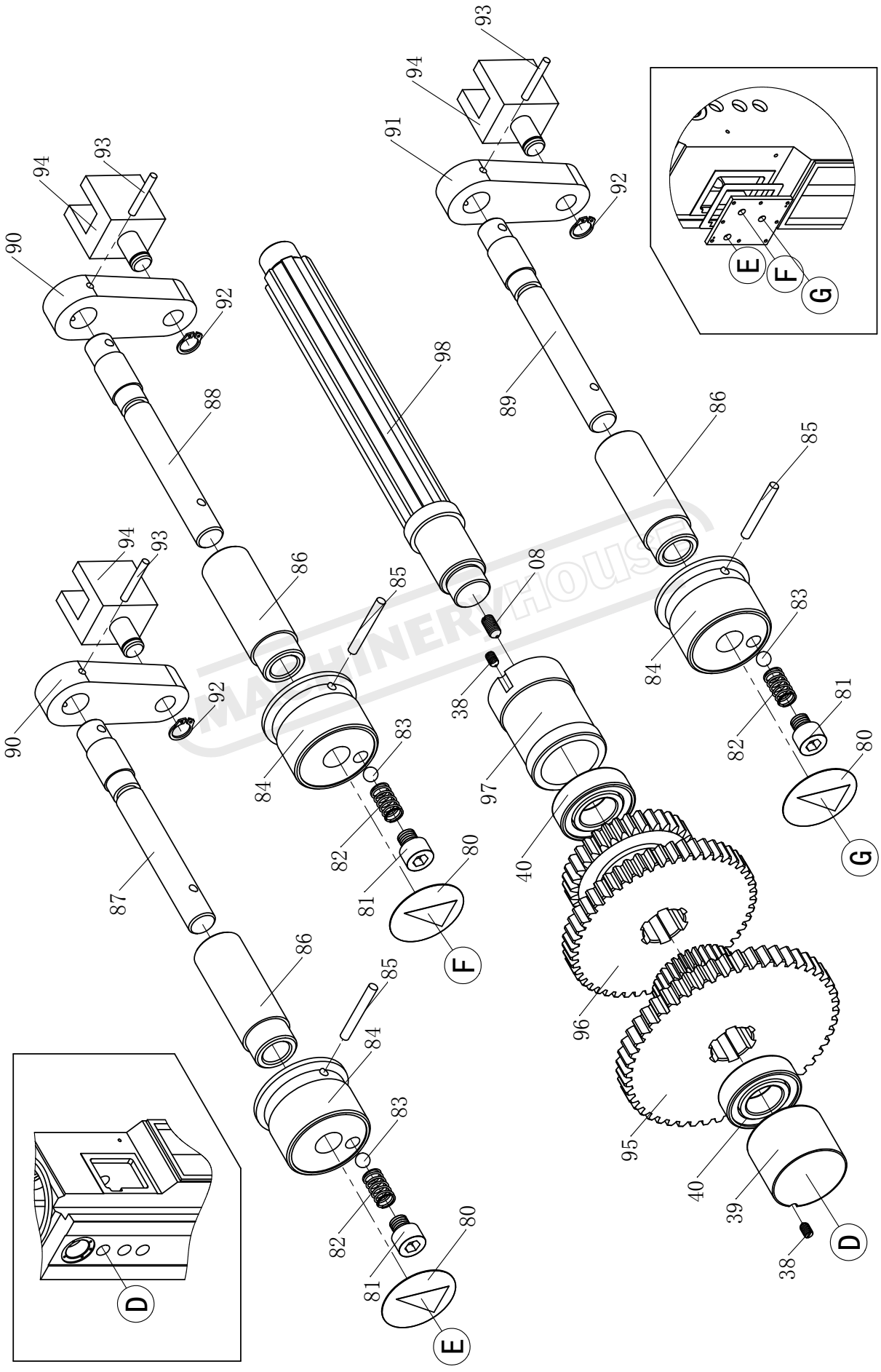
01 Column & base part



01 Column & base part



01 Column & base part



01 Column & base parts

No.	Name of item	Qty
01001	Bolt	6
01002	Rear cover	1
01003	Belt	3
01004	M12×65 Hexagon socket head cap screw	4
01005	12 Spring washer	8
01006	12 Plain washer	4
01007	Belt wheel	1
01008	M8×16 Set screw	3
01009	Sleeve	1
01010	M6×20 Hexagon socket head cap screw	24
01011	Stop	1
01012	Adjusting screw	1
01013	M6×16 Hexagon socket head cap screw	3
01014	Stop	1
01015	Plug	1
01016	6×35 Taper bolt	1
01017	Motor base plate	1
01018	2.2kW motor	1
01019	M12×30 Hexagon socket head cap screw	4
01020	Cover	1
01021	M6×16 Cross recessed pan head screw	4
01022	Cover board	1
01023	Stop	1
01024	Oil plug	1
01025	Rotating speed sign	1
01026	2.5×5 Rivet	10
01027	Oil proof rubber pad	1
01028	Cover board	1
01029	Indicator drop	1

01 Column & base parts

No.	Name of item	Qty
01030	Indicator drop	1
01031	Indicator drop	1
01032	Taper bolt	2
01033	Oil gage	1
01034	M20×65 Hexagon socket head cap screw	5
01035	20 Spring washer	5
01036	Base	1
01037	Door	1
01038	M6×10 set screw	5
01039	Plug	3
01040	25×52×15 Bearing	5
01041	35 retaining ring	2
04042	Gear	1
01043	Gear	1
01044	Gear	1
01045	Gear	1
01046	Plug	1
01047	Shaft	1
01048	10×8×36 key	4
01049	Splined shaft	1
01050	10×8×55 key	1
01051	34 retaining ring	1
01052	Gear	1
01053	30×2.62 sealing ring	2
01054	45×3.55 sealing ring	1
01055	Oil proof rubber pad	1
01056	Flange	1
01057	M8×20 hexagon socket head cap screw	4
01058	35×80×21 bearing	1

01 Column & base parts

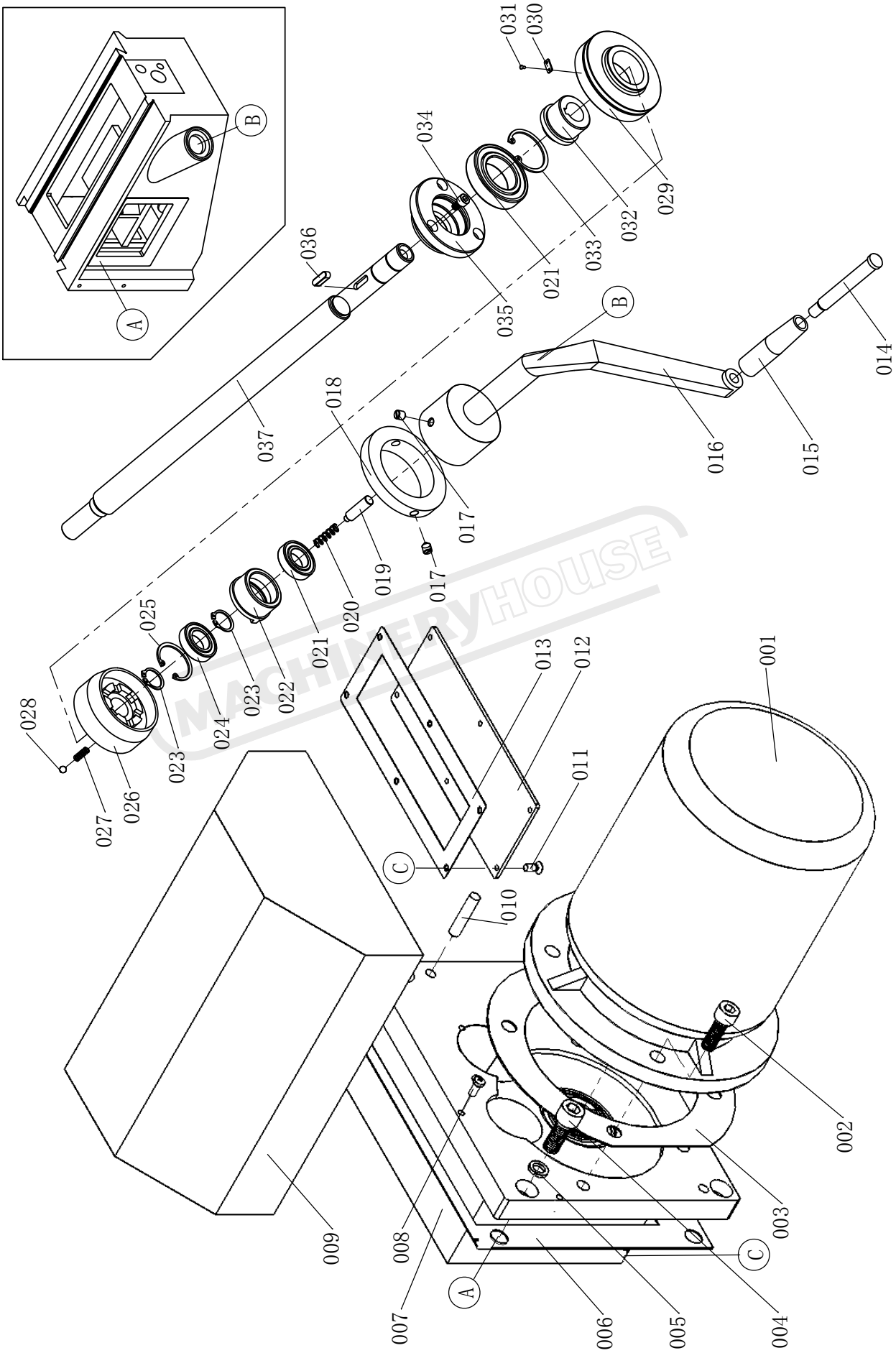
No.	Name of item	Qty
01059	Bush	1
01060	46.2×3.55 Sealing ring	1
01061	Blanking cover	1
01062	Belt pulley	1
01063	M8×25 Hexagon socket head cap screw	8
01064	End cover	1
01065	50×90×23 Bearing	1
01066	Gear	1
01067	Gear	1
01068	45 Retaining ring	1
01069	40×90×25.25 Bearing	1
01070	35.5×2.65 Sealing ring	1
01071	Bush	1
01072	60×5.3 Sealing ring	1
01073	End cover	1
01074	Oil proof rubber pad	2
01075	Nut	2
01076	Key	2
01077	Horizontal spindle	1
01078	12×8×45 Key	2
01079	Draw bar	1
01080	Indicator drop	3
01081	M10×10 Hexagon socket head cap screw	3
01082	8×30×1.6 Spring	3
01083	8 steel ball	3
01084	Handle seat	3
01085	5×40 Taper bolt	3
01086	Bush	3
01087	Shaft	1

01 Column & base parts

No.	Name of item	Qty
01088	Shaft	1
01089	Shaft	1
01090	Rockerarm	1
01091	Rockerarm	1
01092	12 Retaining ring	3
01093	4×30 Taper bolt	3
01094	Shifting fork	3
01095	Gear	1
01096	Gear	1
01097	Plug	1
01098	Splined shaft	1

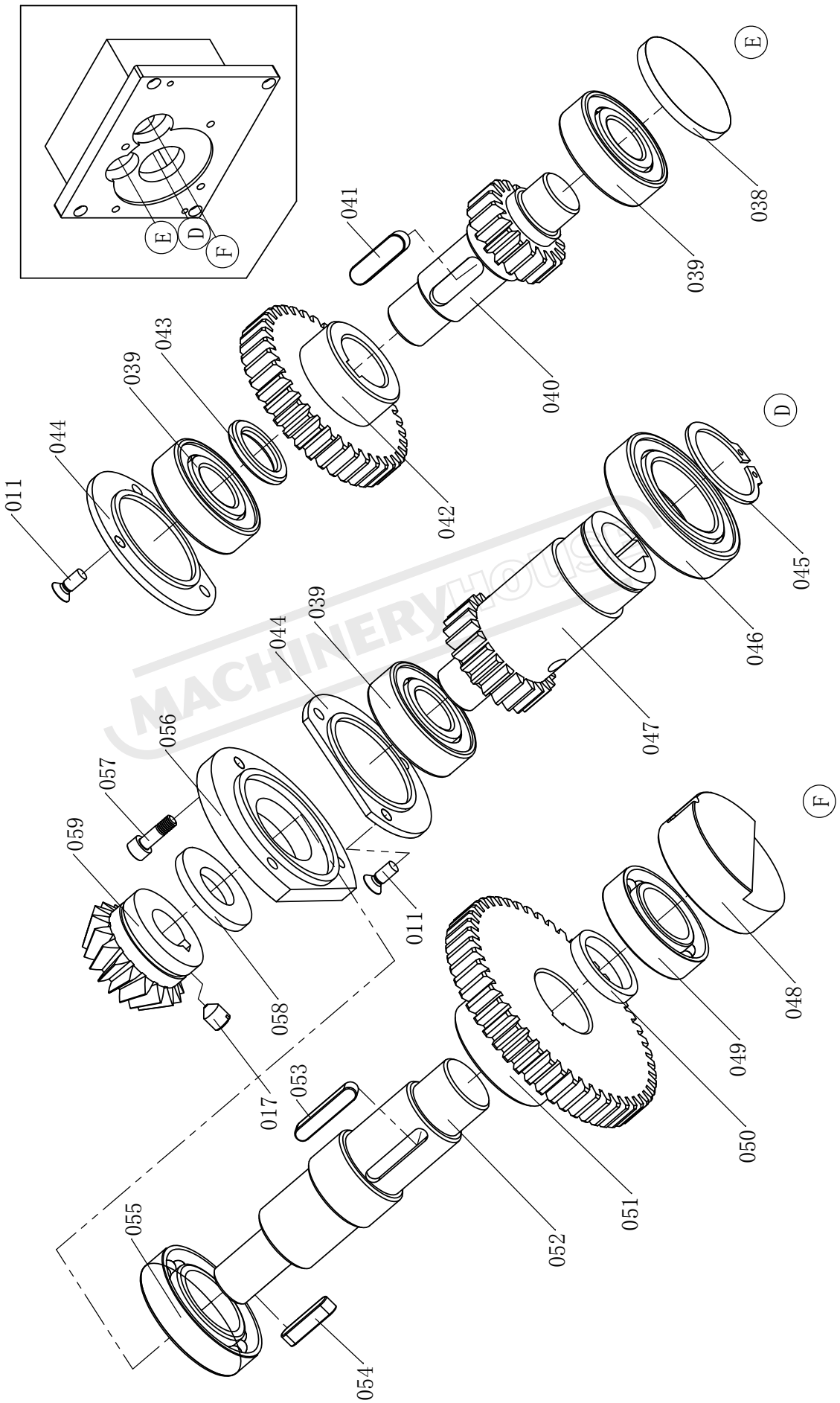
02 Knee part

Power lifting&falling structure



02 Knee part

Power lifting&falling structure



02 Knee part
Power lifting&falling structure

No.	Name of item	Qty
02001	380v 0.75Kw Motor	1
02002	M10X30 Hex. socket head bolt	4
02003	Oil-proof rubber washer	1
02004	M12X30 Hex. socket head bolt	4
02005	12 Washer	4
02006	Oil-proof rubber washer	1
02007	Box	1
02008	M5X12 Crose recessed pan head Screw	3
02009	Cover	1
02010	Pin	2
02011	M5X12 Crose recessed pan head Screw	12
02012	Cover board	1
02013	Oil-proof rubber washer	1
02014	Handle seat	1
02015	Handle bush	1
02016	Handle	1
02017	Hex. socket setscrew	6
02018	Adapter sleeve	1
02019	Shaft	1
02020	0.8X7X30 Spring	1
02021	20X42X12 Bearing	2
02022	Collar	1
02023	20 Distance ring	2
02024	20X37X9 Bearing	1
02025	37 Distance ring	1
02026	Clutch	1
02027	0.8X5X16 Spring	2
02028	6 Steel ball	2
02029	Dial	1

02 Knee part
Power lifting&falling structure

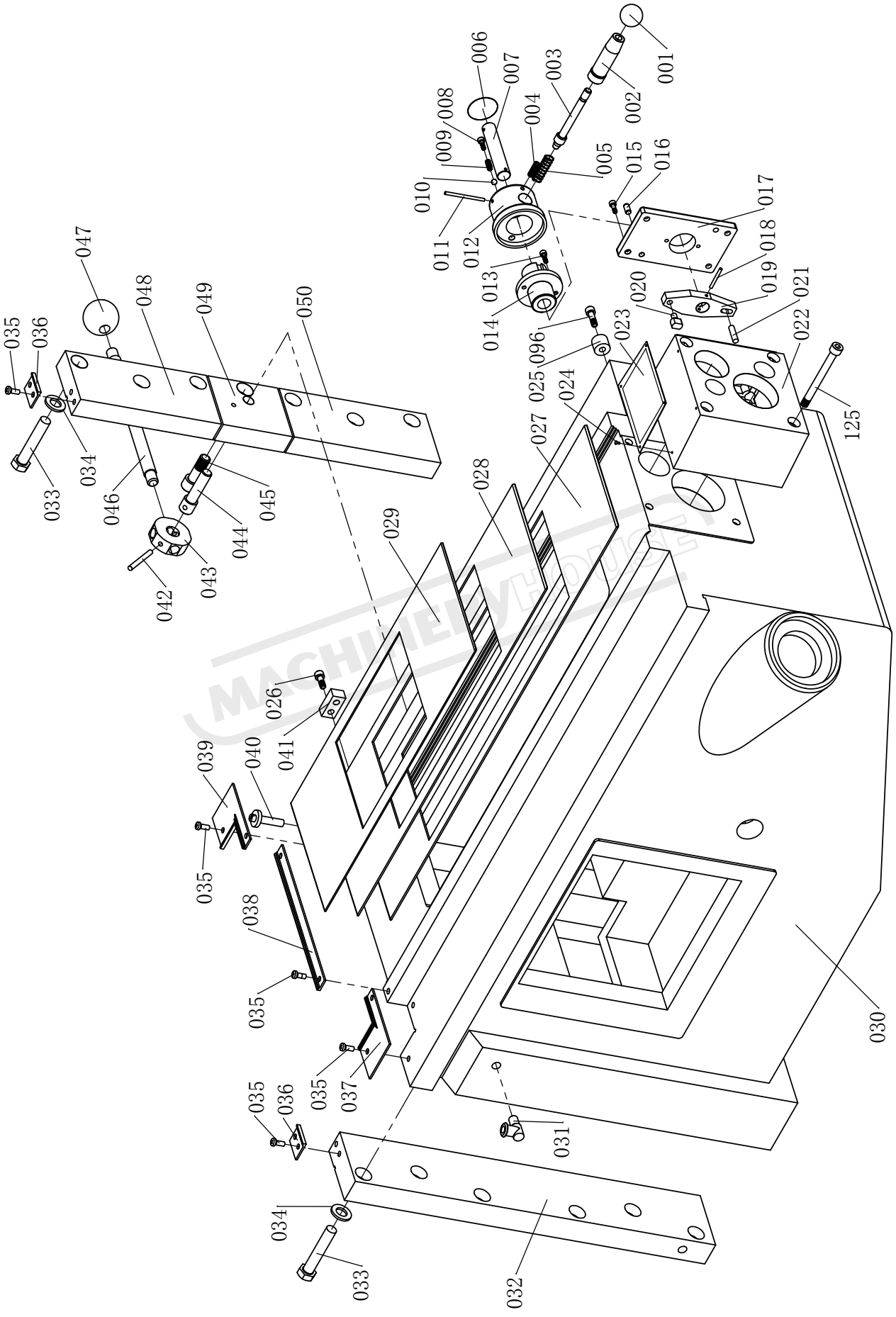
No.	Name of item	Qty
02030	Scutcheon	1
02031	Rivet	2
02032	Distance sleeve	1
02033	42 Distance ring	1
02034	M6×10 Hex. socket head bolt	3
02035	Bearing housing	1
02036	6×20 Key	1
02037	Elevating shaft	1
02038	Blanking cover	1
02039	20×47×14 Bearing	3
02040	Gear shaft	1
02041	8×7×28 Key	1
02042	Gear	1
02043	Collar	1
02044	End cover	2
02045	Shaft retaining ring	1
02046	35×62×14 Bearing	1
02047	Gear shaft	1
02048	Bush	1
02049	25×47×12 Bearing	1
02050	Washer	1
02051	Gear	1
02052	Shaft	1
02053	6×6×32 Key	1
02054	6×6×25 Key	1
02055	30×55×12 Bearing	1
02056	End cover	1
02057	M5×16 Hex. socket head bolt	3
02058	Washer	1

02 Knee part

Power lifting&falling structure

No.	Name of item	Qty
02059	Bevel gear	1

02 knee part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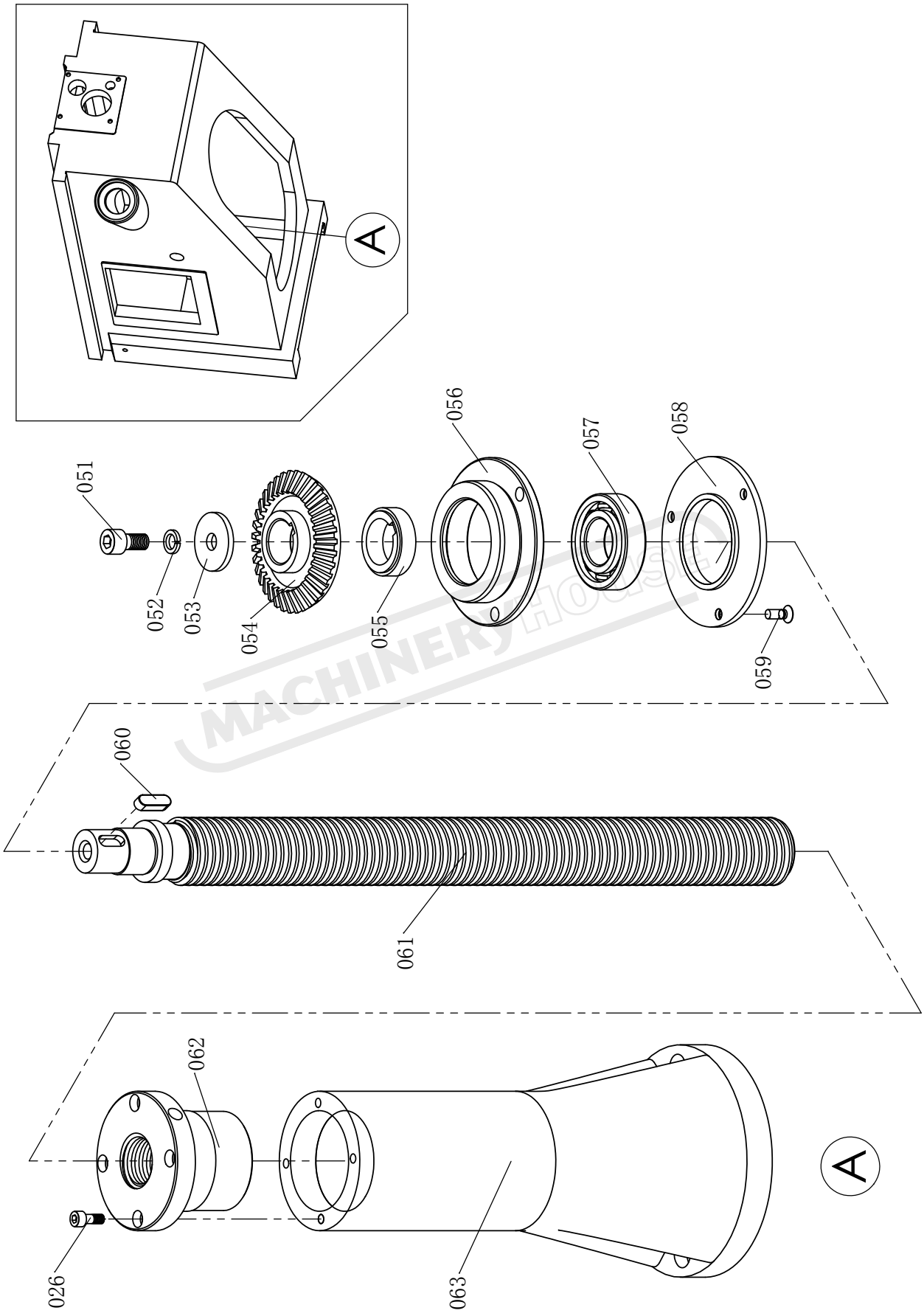
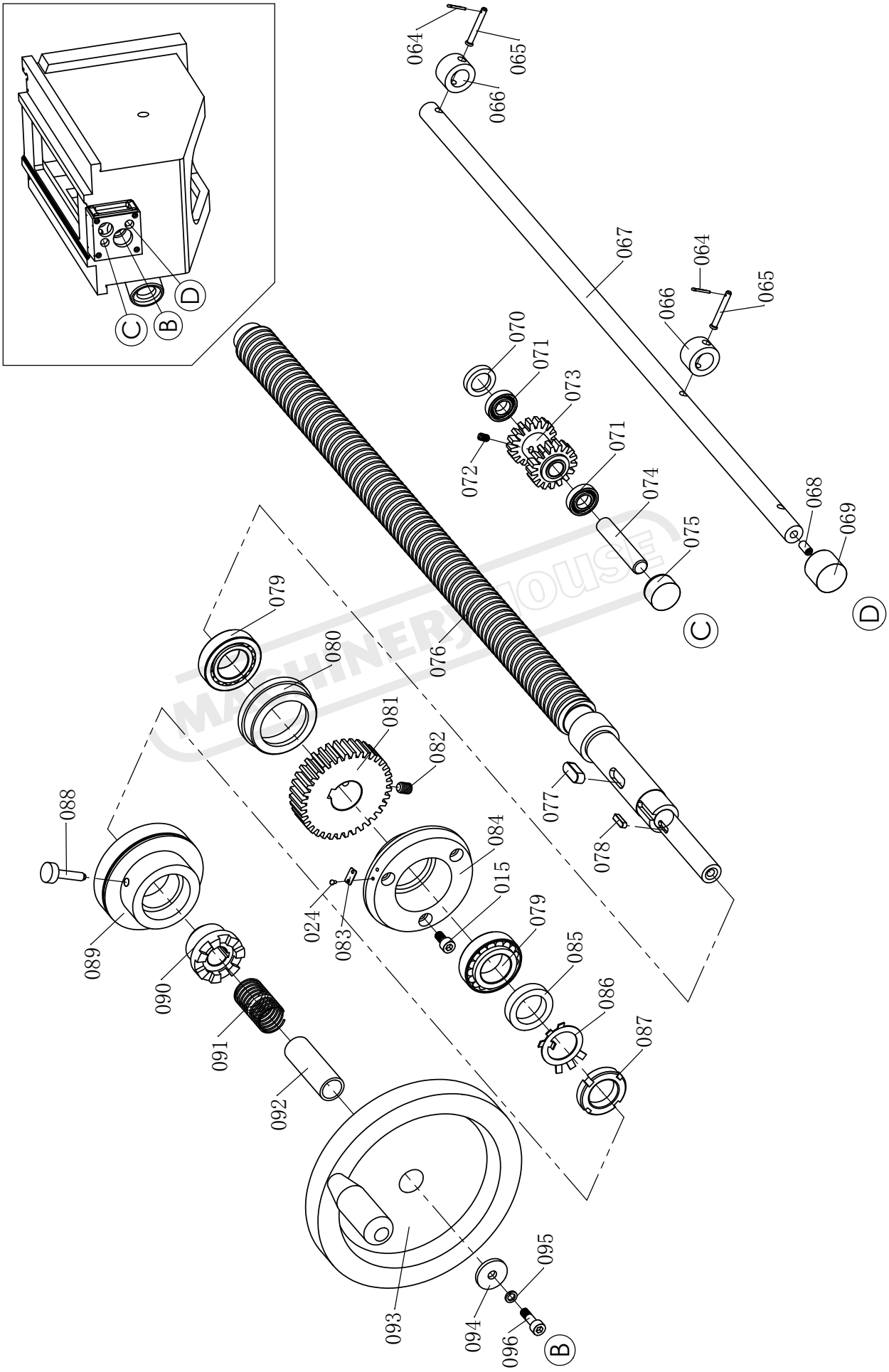
02 knee part



02 knee part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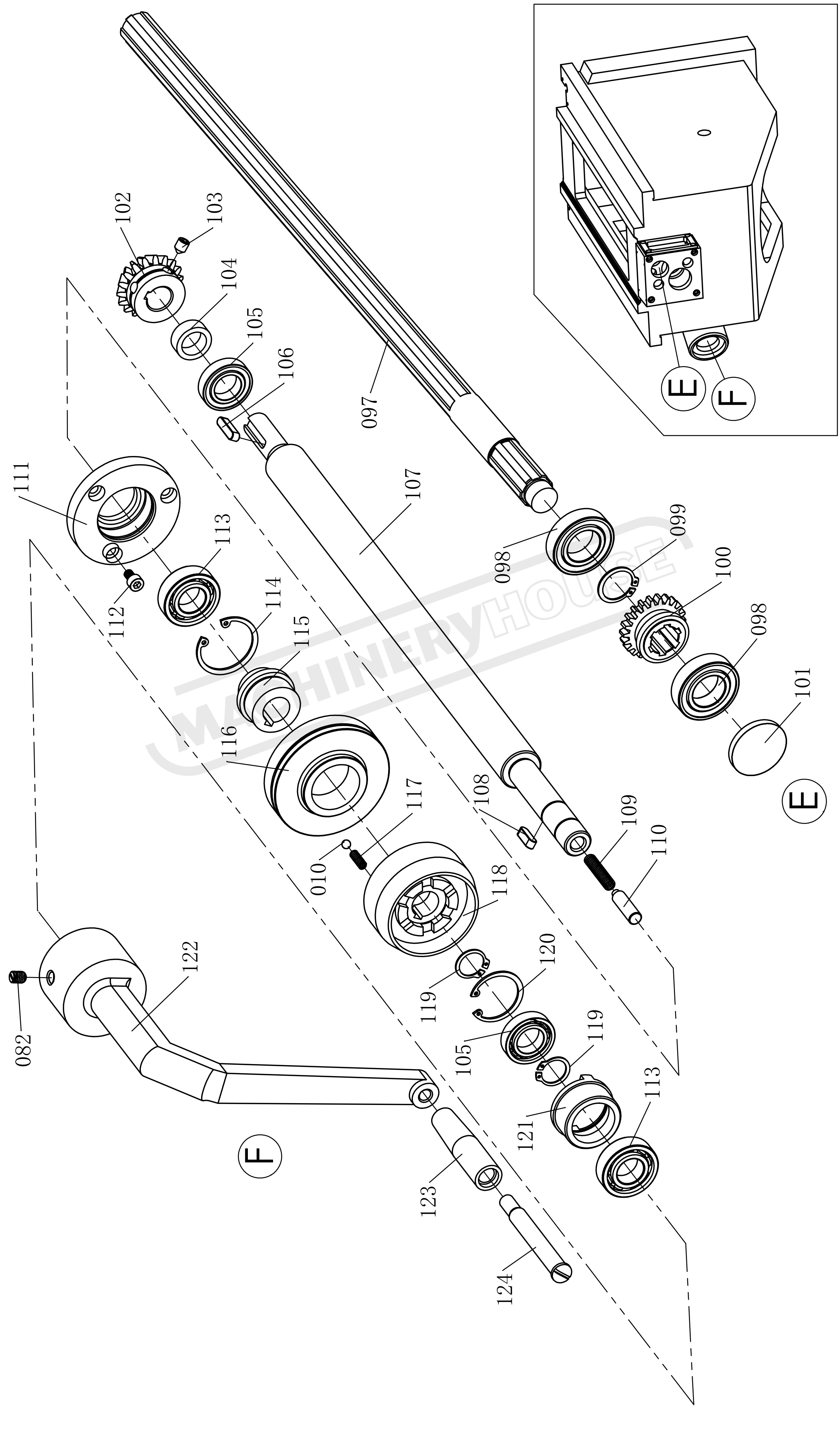
02 knee part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02 Knee Part

No.	Name of item	Qty
02001	A-M8×25 Ball knob	1
02002	Handle bush	1
02003	Handle lever	1
02004	M6×20 Setscrew with slotted flat end	1
02005	1×10×30 Pressure spring	1
02006	Scutcheon	1
02007	Shaft	1
02008	M8×8 Hex. setscrew with flat end	1
02009	0.8×5×15 Pressure spring	2
02010	6 Steel ball	3
02011	3×50 Taper pin	1
02012	Handle seat	1
02013	M4×12 Hex. socket head bolt	2
02014	Collar	1
02015	M6×12 Hex. socket head bolt	8
02016	6×12 Taper pin	2
02017	Cover board	1
02018	3×30 Cylinder pin	1
02019	Junction plate	4
02020	Shifting block	1
02021	A6×24 Cylinder pin	4
02022	Controling box	1
02023	Scutcheon	1
02024	2×4 Rivet	6
02025	Stop	1
02026	M6×16 Hex. socket head bolt	6
02027	Wiper	1
02028	Wiper	1
02029	Wiper	1

02 Knee Part

No.	Name of item	Qty
02030	Saddle	1
02031	Oil cup	5
02032	Pressure plate	1
02033	M12×65 Hexagon head bolt	12
02034	Washer	13
02035	M5×12 Cross recessed pan head screw	14
02036	Wiper	2
02037	Wiper	1
02038	Wiper	1
02039	Wiper	1
02040	Adjusting screw	2
02041	Stop	1
02042	5×50 Taper bolt	1
02043	Lock sleeve	1
02044	Lead screw	1
02045	M12×35 Hex. socket head bolt	1
02046	Control lever	1
02047	Ball knob	1
02048	Pressure plate	1
02049	Pressure plate	1
02050	Pressure plate	1
02051	M10×20 Hex. socket head bolt	1
02052	10 Elastic washer	5
02053	Washer	1
02054	Bevel gear	1
02055	Spacer	1
02056	Bearing housing	1
02057	30×62×16 Deep groove ball bearing	1
02058	Gland	1

02 Knee Part

No.	Name of item	Qty
02059	M6×16 cross recessed countersunk flat head screw	3
02060	8×20 Flat key	1
02061	Elevating screw	1
02062	Nut	1
02063	Stanchion	1
02064	1.6×10 Cotter pin	2
02065	Wrist	2
02066	Collar	2
02067	Shaft	1
02068	M6×12 Hex. Flat end setscrew	1
02069	Collar	1
02070	Spacer	1
02071	12×24×6 Deep groove ball bearing	2
02072	M5×8 Setscrew with slotted taper end	1
02073	Dual articulated gear	1
02074	Staff	1
02075	Bearing cap	1
02076	Cross lead screw	1
02077	8×22 Flat key	1
02078	4×14 Flat key	1
02079	25×47×15 Tapered roller bearing	2
02080	Bearing housing	1
02081	Gear	1
02082	M8×10 Setscrew with slotted taper end	3
02083	Indicator drop	2
02084	Bearing housing	1
02085	Spacer	1
02086	Check washer	1
02087	Round nut	1

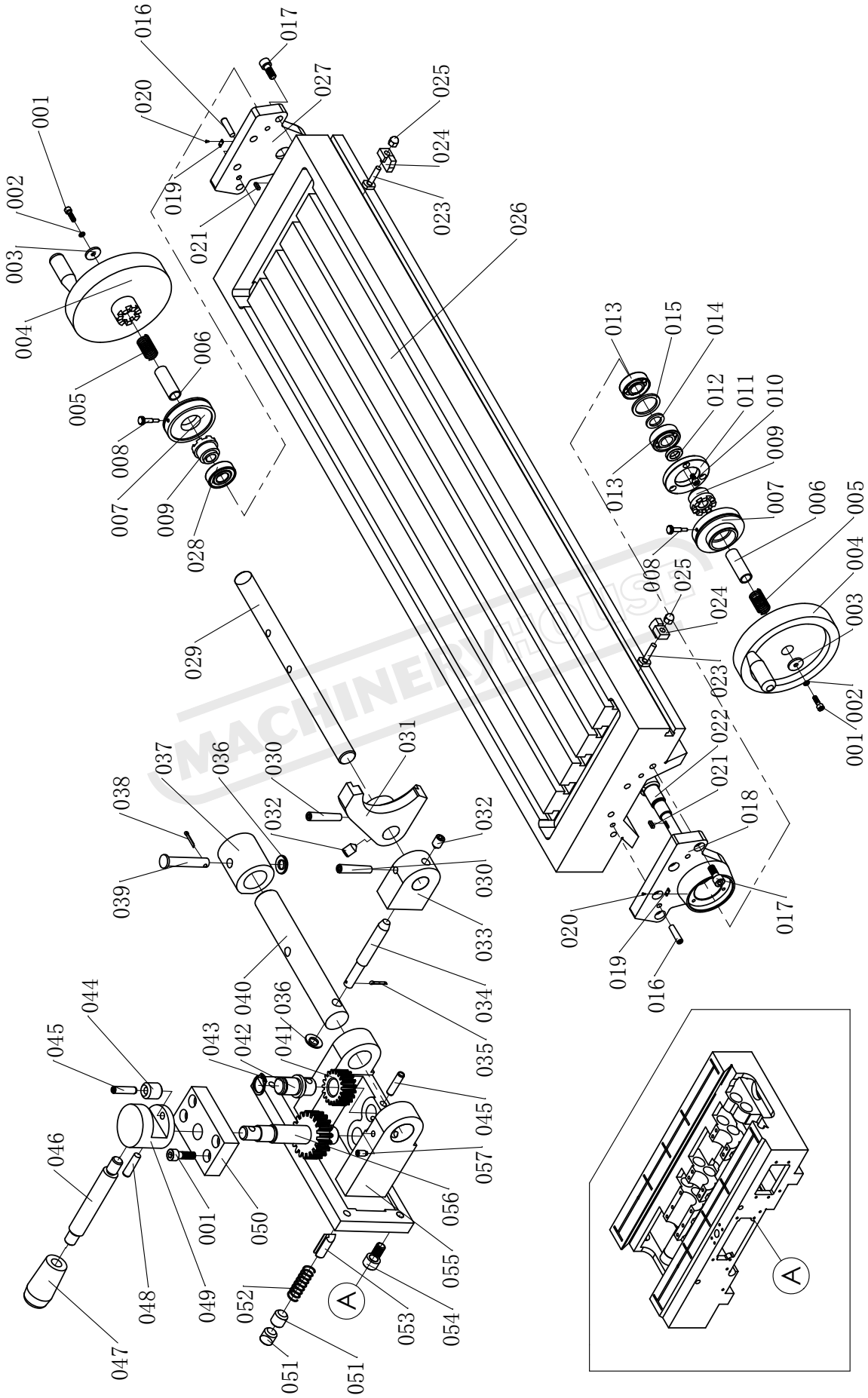
02 Knee Part

No.	Name of item	Qty
02088	Knurled screw	1
02089	Indexing ring	1
02090	Clutch	1
02091	1×22×30 Pressure spring	1
02092	Collar	1
02093	Handwheel	1
02094	Washer	1
02095	Elastic washer	1
02096	M6×20 Hex. socket head bolt	4
02097	Spline shaft	1
02098	25×47×12 Deep groove ball bearing	2
02099	25 Circlip	1
02100	Gear	1
02101	Bearing cap	1
02102	Bevel gear	1
02103	M8×10 Setscrew with slotted taper end	1
02104	Spacer	1
02105	20×37×9 Deep groove ball bearing	1
02106	6×25 Flat key	1
02107	Elevating shaft	1
02108	6×20 Flat key	2
02109	1×17×35 Pressure spring	1
02110	Shaft	1
02111	Bearing housing	1
02112	M6×10 Hex. socket head bolt	3
02113	20×42×12 Deep groove ball bearing	2
02114	42 Circlip	1
02115	Spacer	1
02116	Indexing ring	1

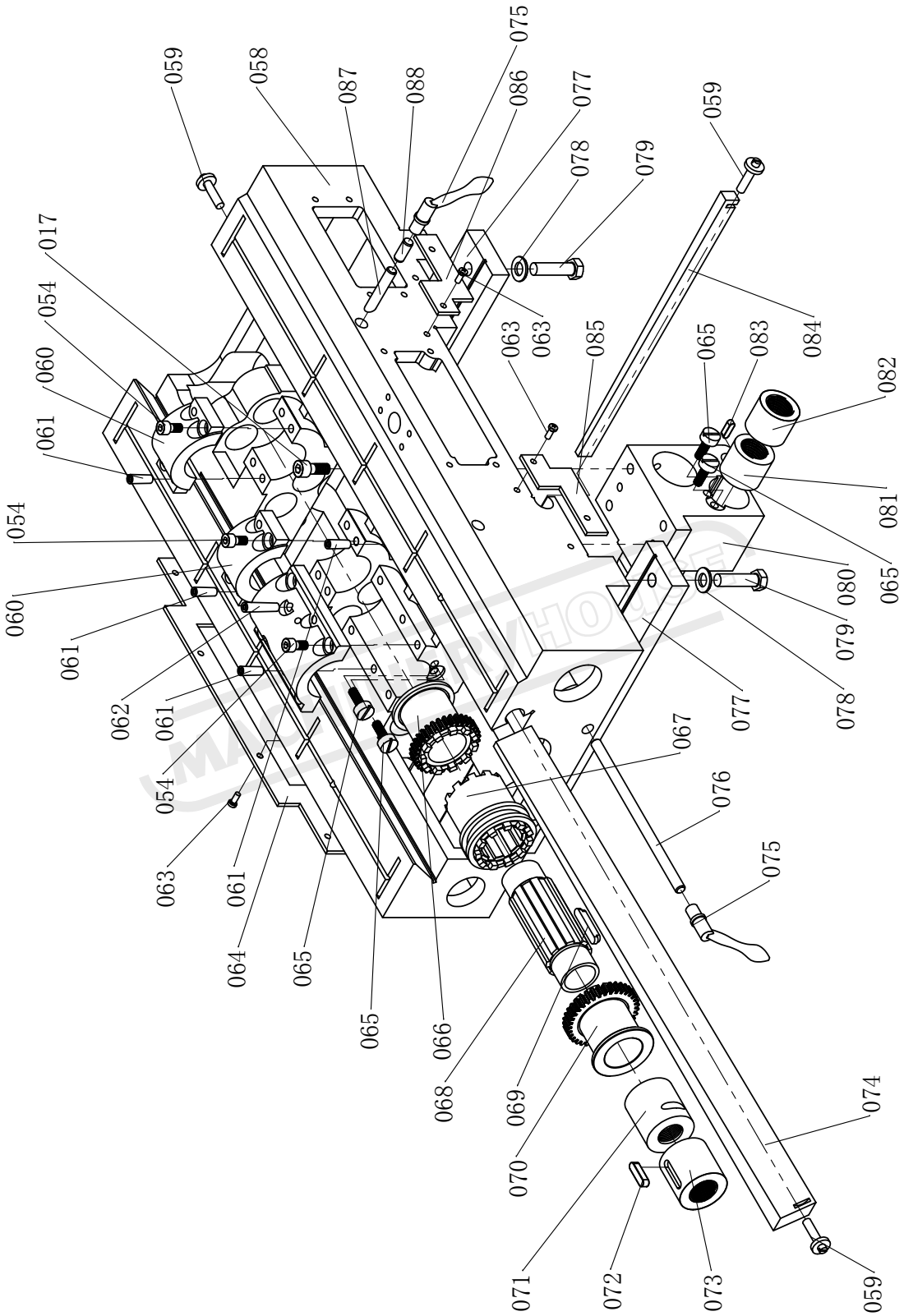
02 Knee Part

No.	Name of item	Qty
02117	0.8×5×16 Pressure spring	2
02118	Clutch	1
02119	20 Circlip	2
02120	37 Circlip	1
02121	Clutch	1
02122	Hand lever	1
02123	Bushing	1
02124	Handlebar	1
02125	M8×85 Hex. socket head bolt	4

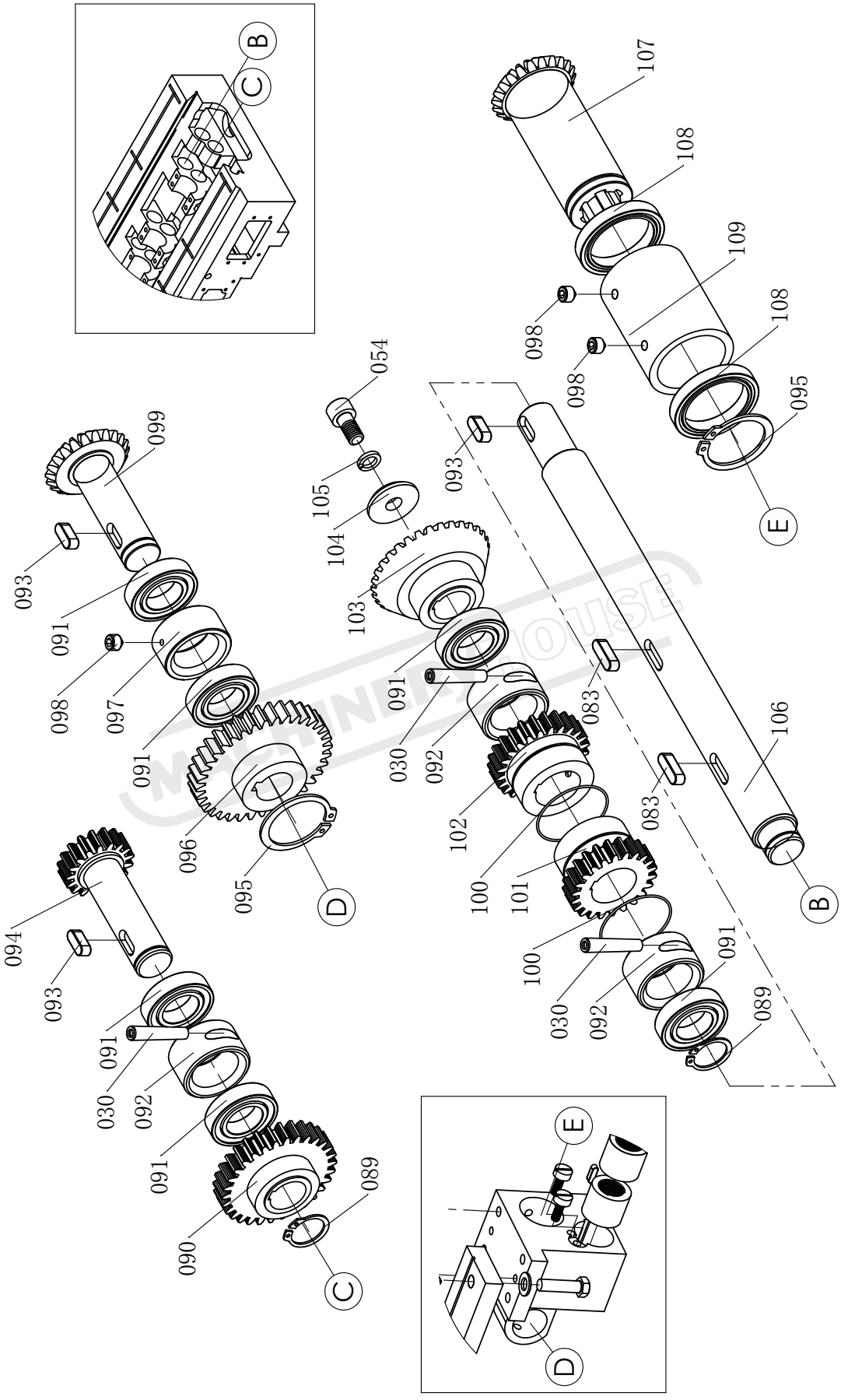
03 Table part



03 Table part



03 Table part



03 Table part

No.	Name of item	Qty
03001	M6×20 Hexagon socket head cap screw	6
03002	6 Spring washer	2
03003	Spacer	2
03004	Handwheel	2
03005	1×22×30 Pressure spring	2
03006	Collar	2
03007	Dial scale	2
03008	Knurled screw	2
03009	Clutch	2
03010	M6×12 Hexagon socket head cap screw	3
03011	Bearing cap	1
03012	Collar	1
03013	20×47×14 Bearing	2
03014	Spacer	1
03015	Spacer	1
03016	A8×35 Screw taper pin	4
03017	M10×25 Hexagon socket head cap screw	12
03018	Bracket（left）	1
03019	Scutcheon	2
03020	2×4 Rivet	4
03021	4×14 Flat key	2
03022	Leads crew	1
03023	M8×10 T-Bolt	2
03024	Block	2
03025	Hexagon nut	2
03026	Table	1
03027	Bracket（right）	1
03028	20×47×14 Bearing	1
03029	Shaft	1

03 Table part

No.	Name of item	Qty
03030	A6×35 Screw taper pin	5
03031	Shifting fork	1
03032	M8×12 Setscrew with hex. socket flat end	2
03033	Shifting block	1
03034	Shifting pin	1
03035	2×12 Cotter pin	1
03036	8 Flat washer	2
03037	Bush	1
03038	3.2×12 Cotter pin	1
03039	B8×45 Wrist	1
03040	Shaft	1
03041	Gear	1
03042	Shaft	1
03043	15 Retaining ring	1
03044	Idler wheel	1
03045	A6×24 Screw cylindrical pin	2
03046	Handle lever	1
03047	Grip	1
03048	A6×24 Screw taper pin	1
03049	Lever boss	1
03050	Stop	1
03051	M12×12 Setscrew with hex. socket flat end	2
03052	1.2×8×35 Pressure spring	1
03053	Dowel pin	1
03054	M8×16 hexagon socket head cap screw	13
03055	Plate	1
03056	Gear shaft	1
03057	M5×10 Setscrew with hex. socket head	1
03058	Saddle	1

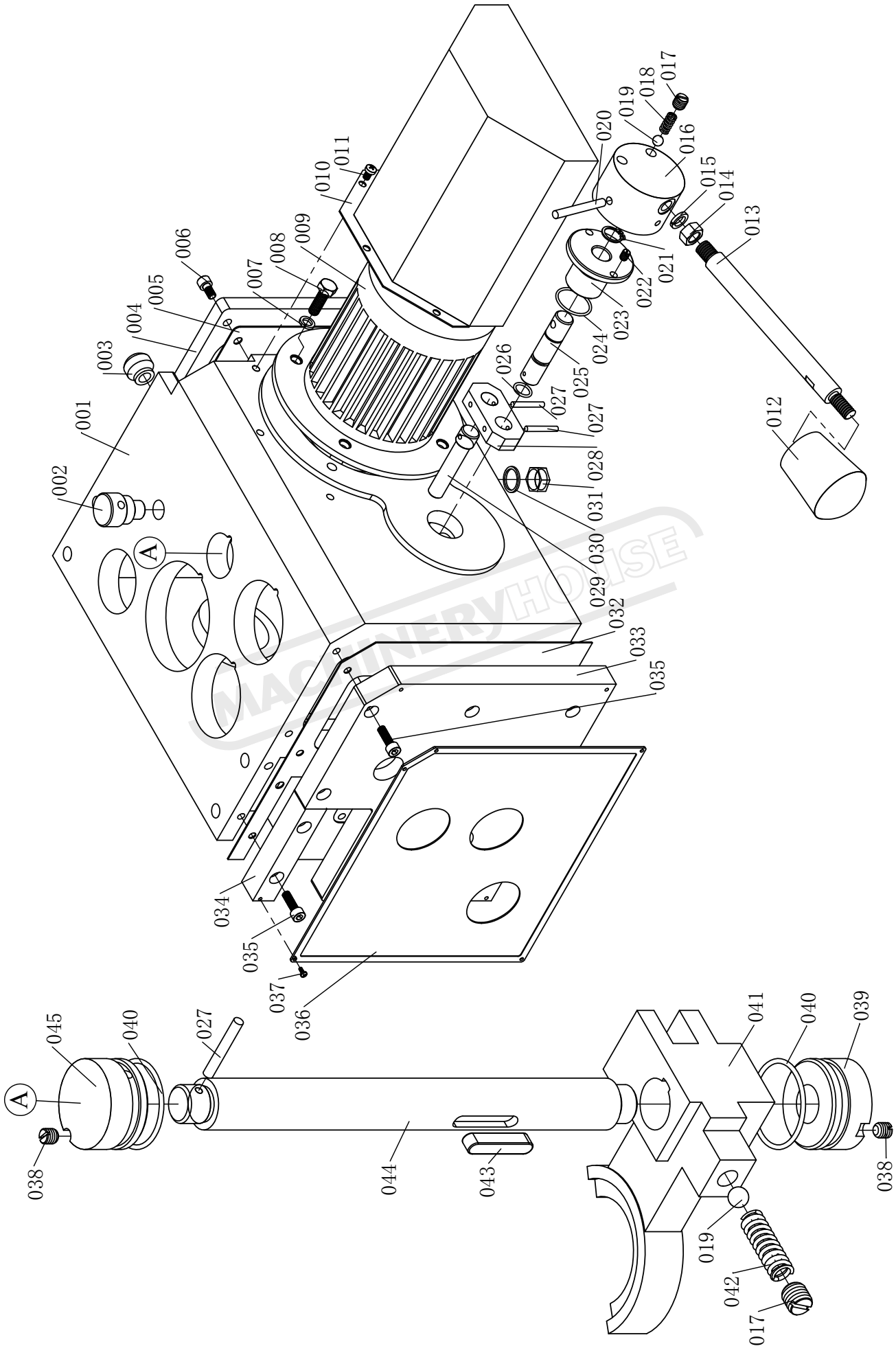
03 Table part

No.	Name of item	Qty
03059	Adjusting screw	4
03060	Gear cover	2
03061	A8×25 Screw taper pin	8
03062	A8×40 Screw taper pin	2
03063	M5×12 Cross recessed head screw	8
03064	Wiper	1
03065	Bolt	4
03066	Gear	1
03067	Sliding bush	1
03068	Spline housing	1
03069	Sliding key	1
03070	Gear	1
03071	Nut	1
03072	8×30 Flat key	1
03073	Nut	1
03074	Gib	1
03075	M12×58×25 Screw	4
03076	Pressure plate	2
03077	Stop	2
03078	12 Plain washer	10
03079	M12×45 Hexagon head bolt	10
03080	Nut base	1
03081	Nut	1
03082	Nut	1
03083	6×20 Flat key	3
03084	Gib	1
03085	Wiper	1
03086	Wiper	1
03087	Pressure plate	2

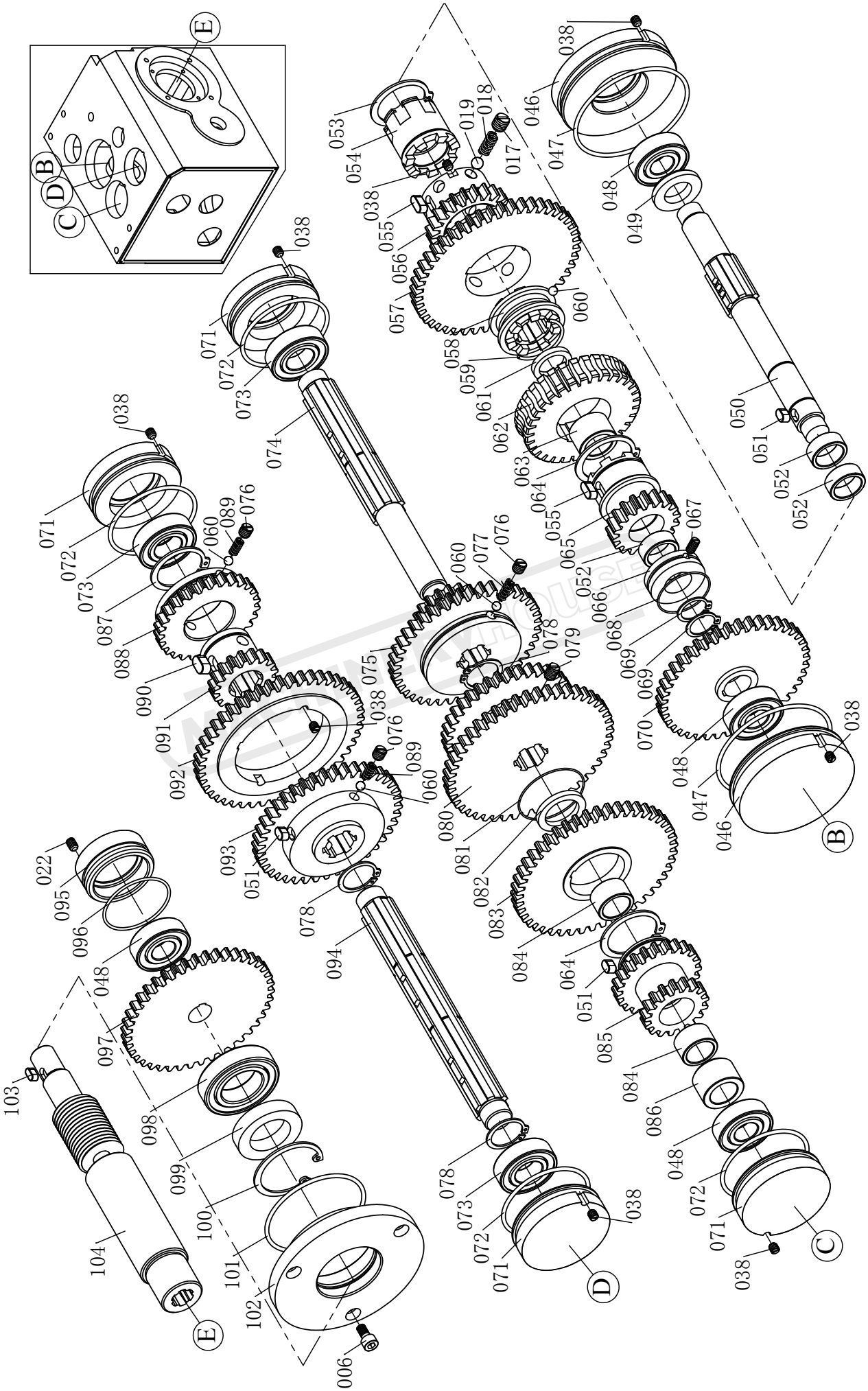
03 Table part

No.	Name of item	Qty
03088	A10×26 Taper bolt	2
03089	20 Retaining ring	2
03090	Gear	1
03091	20×37×9 Bearing	6
03092	Spacer	3
03093	6×16 Flat key	3
03094	Gear	1
03095	35 Retaining ring	2
03096	Gear	1
03097	Spacer	1
03098	M8×8 Setscrew with hex. socket taper end	3
03099	Gear shaft	1
03100	38 Locking collar	2
03101	Gear	1
03102	Gear	1
03103	Bevel gear	1
03104	Spacer	1
03105	8 Spring washer	1
03106	Shaft	1
03107	Gear shaft	1
03108	35×47×7 Bearing	2
03109	Spacer	1

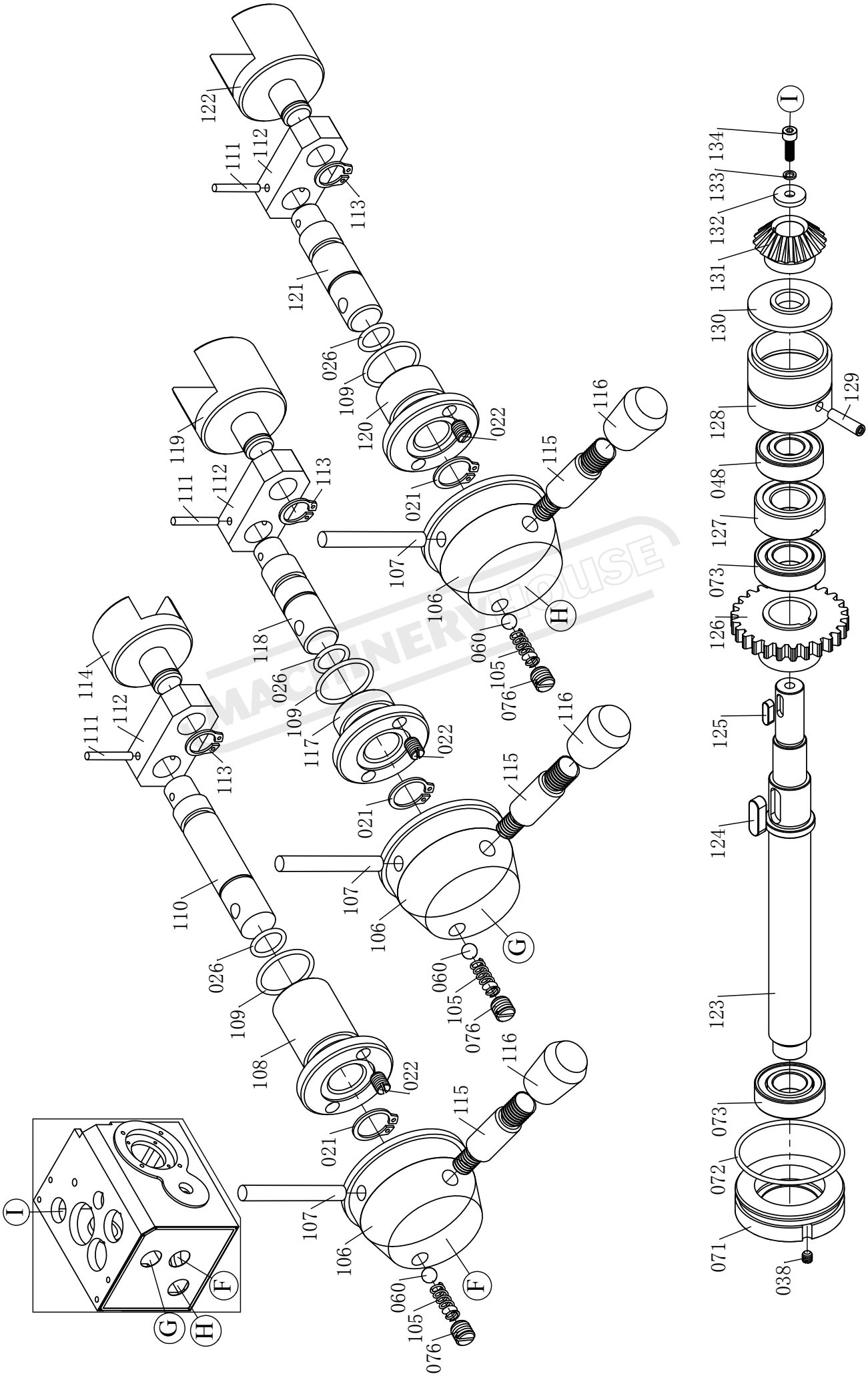
04 Feeding box part



04 Feeding box part



04 Feeding box part



04 Feeding box part

N0.	Name	Qty
04001	Feeding box	1
04002	Oil plug	1
04003	A10(M16×1.5) Oil scale	1
04004	Cover board	1
04005	Spacer	1
04006	M6×12 Hex. socket head bolt	7
04007	8 Spring washer	4
04008	M8×25 Bolt	4
04009	Motor	1
04010	Protector	1
04011	M5×8 Cross recessed pan head screw	3
04012	M12×60 Grip	1
04013	Lever	1
04014	M10 Nut	1
04015	10 Spring washer	1
04016	Lever boss	1
04017	M10×10 Setscrew with slotted flat end	9
04018	1.2×6.5×16 Pressure spring	9
04019	8 Steel ball	9
04020	A6×55 Taper pin	1
04021	15 Shaft retaining ring	4
04022	M6×8 Setscrew with slotted flat end	6
04023	Bush	1
04024	26.5×1.8 O-Ring	1
04025	Shaft	1
04026	11.8×1.8 O-Ring	4
04027	A4×30 Taper pin	3
04028	Junction plate	1
04029	Shaft	1

04 Feeding box part

N0.	Name	Qty
04030	Φ20×Φ16.2×1.5 Copper backing	1
04031	M16×1.5 Oil plug	1
04032	Spacer	1
04033	Cover board	1
04034	Block	1
04035	M6×22 Hex. socket head bolt	8
04036	Name plate	1
04037	M2.5×6 Cross recessed pan head screw	5
04038	M6×6 Setscrew with slotted flat end	29
04039	Plug	1
04040	31.5×1.8 O-Ring	2
04041	Shifting block	1
04042	1.6×8×30 Pressure spring	3
04043	6×30 Flat key	1
04044	Shaft	1
04045	Plug	1
04046	Bearing cap	2
04047	80×2.65 O-Ring	2
04048	6203-Z Bearing	5
04049	Collar	1
04050	Shaft	1
04051	6×10 Flat key	3
04052	Collar	3
04053	38 Shaft retaining ring	1
04054	Collar	1
04055	6×14 Flat key	2
04056	Gear	1
04057	Gear	1
04058	Clutch	1

04 Feeding box part

N0.	Name	Qty
04059	Positioning ring	1
04060	6 Steel ball	13
04061	Spacer	1
04062	Worm wheel	1
04063	Collar	1
04064	Retaining ring	1
04065	Gear	1
04066	Retaining ring	1
04067	M6×12 Setscrew with slotted taper end	1
04068	Φ1×130 Iron wire	1
04069	Retaining ring	2
04070	Gear	1
04071	Bearing cap	5
04072	60×2.65 O-Ring	5
04073	6004-Z Bearing	5
04074	Spline shaft	1
04075	Gear	1
04076	M8×8 Setscrew with slotted flat end	9
04077	1×5×16 Pressure spring	2
04078	Retaining ring	3
04079	M8×12 Setscrew with slotted taper end	1
04080	Gear	1
04081	Φ1×400 Iron wire	1
04082	Spacer	1
04083	Gear	1
04084	Collar	2
04085	Gear	1
04086	Collar	1
04087	Retaining ring	1

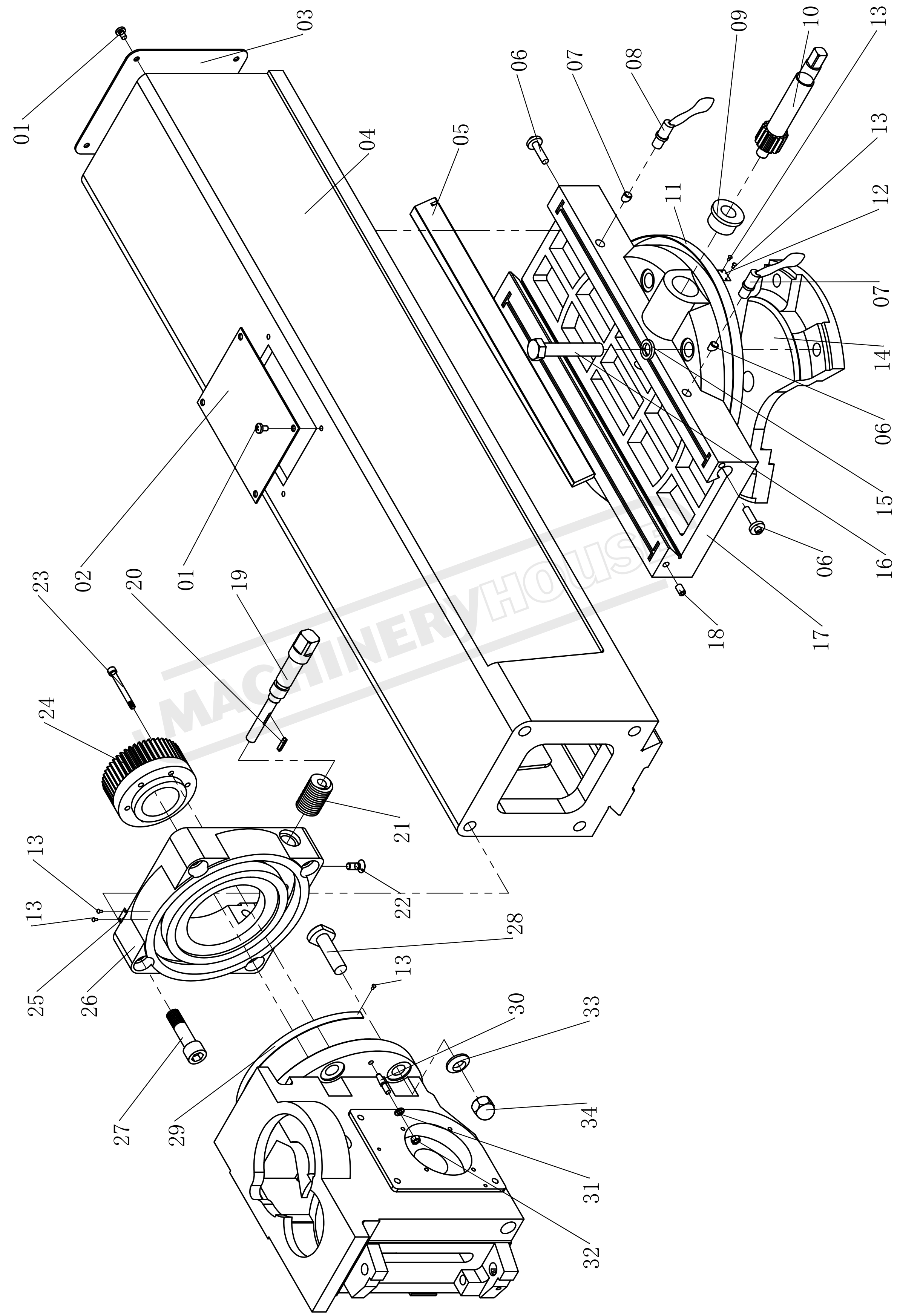
04 Feeding box part

N0.	Name	Qty
04088	Gear	1
04089	1×5×12 Pressure spring	4
04090	8×14 Flat key	1
04091	Gear	1
04092	Gear	1
04093	Gear	1
04094	Spline shaft	1
04095	Bearing cap	1
04096	46.2×1.8 O-Ring	1
04097	Gear	1
04098	6006-Z Bearing	1
04099	FB3047 Joint ring	1
04100	47 Retaining ring for hole	1
04101	69×2.65 O-Ring	1
04102	Bearing house	1
04103	5×10 Flat key	1
04104	Worm	1
04105	0.8×5×16 Pressure spring	3
04106	Lever boss	3
04107	A6×50 Taper pin	3
04108	Bush	1
04109	21.2×1.8 O-Ring	3
04110	Shaft	1
04111	A3×22 Taper pin	3
04112	Board	3
04113	12 Shaft retaining ring	3
04114	Shifting fork	1
04115	Lever	3
04116	A-M10×32(black) Grip	3

04 Feeding box part

N0.	Name	Qty
04117	Bush	1
04118	Shaft	1
04119	Shifting fork	1
04120	Bush	1
04121	Shaft	1
04122	Shifting fork	1
04123	Shaft	1
04124	8×25 Flat key	1
04125	5×16 Flat key	1
04126	Gear	1
04127	Bush	1
04128	Bearing house	1
04129	A6×26 Taper pin	1
04130	Spacer	1
04131	Taper gear	1
04132	Spacer	1
04133	Retainer ring	1
04134	M5×16 Hex. socket head bolt	1

05 Ram part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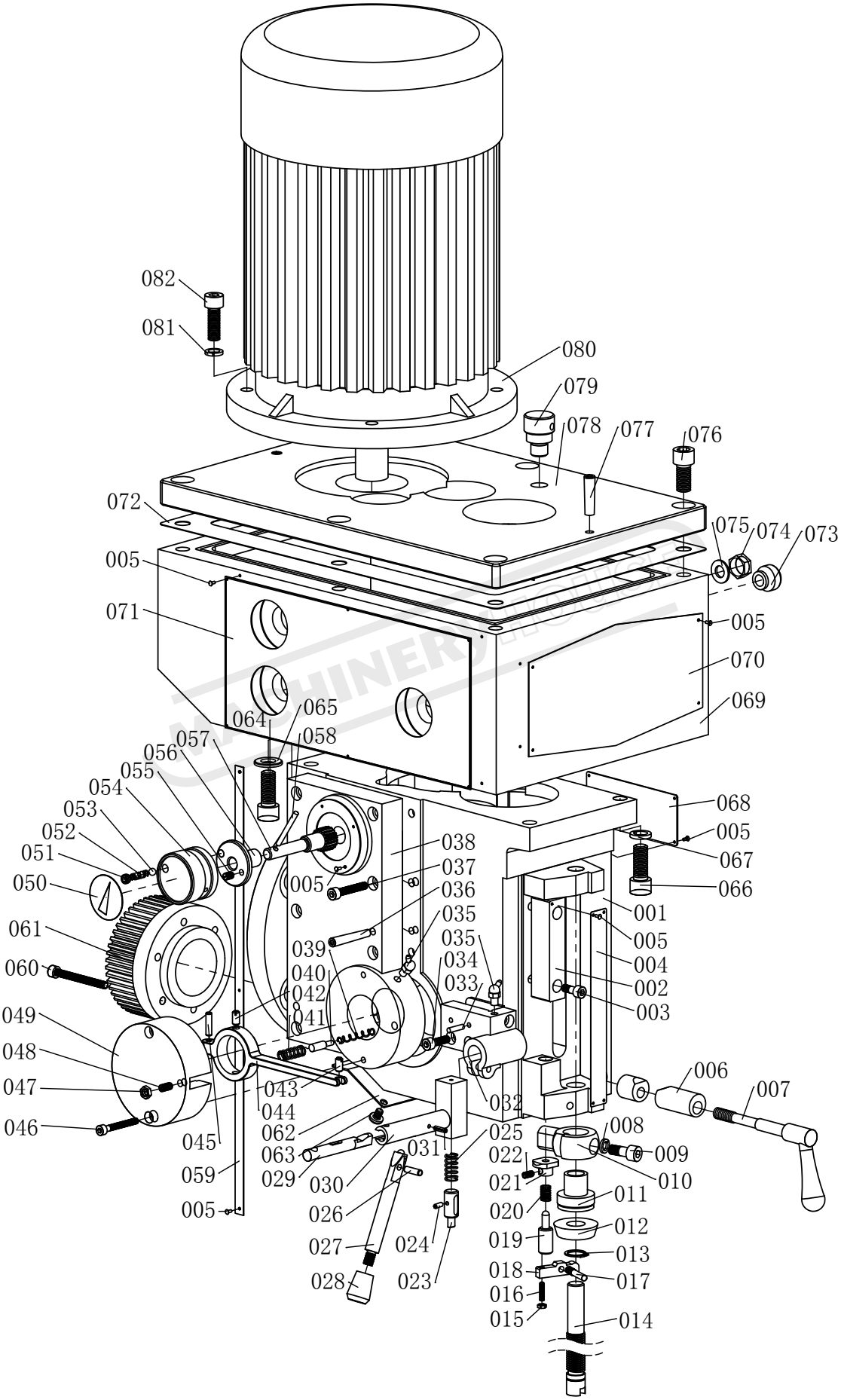
05 Ram part

No.	Name of item	Qty
05001	M6×10 Cross recessed pan head screw	8
05002	Cover board	1
05003	Cover board	1
05004	Ram	1
05005	Gib	1
05006	Adjusting screw	2
05007	Block	2
05008	Handlebar	2
05009	Supporting bushing	1
05010	Gear shaft	1
05011	Angle scale	1
05012	Indicator drop	1
05013	2.5×5 Rivet	8
05014	Spider wheel	1
05015	16 circlip	4
05016	M16×90 bolt	4
05017	Revolving bed	1
05018	8 oil cup	2
05019	Shaft	1
05020	4×20 Key	1
05021	Worm wheel	1
05022	Locating screw	1
05023	M6×60 Hexagon socket head cap screw	6
05024	Bevel gear	1
05025	Indicator drop	1
05026	Junction plate	1
05027	M16×60 Hexagon socket head cap screw	4
05028	T- bolt	4
05029	Scale	1

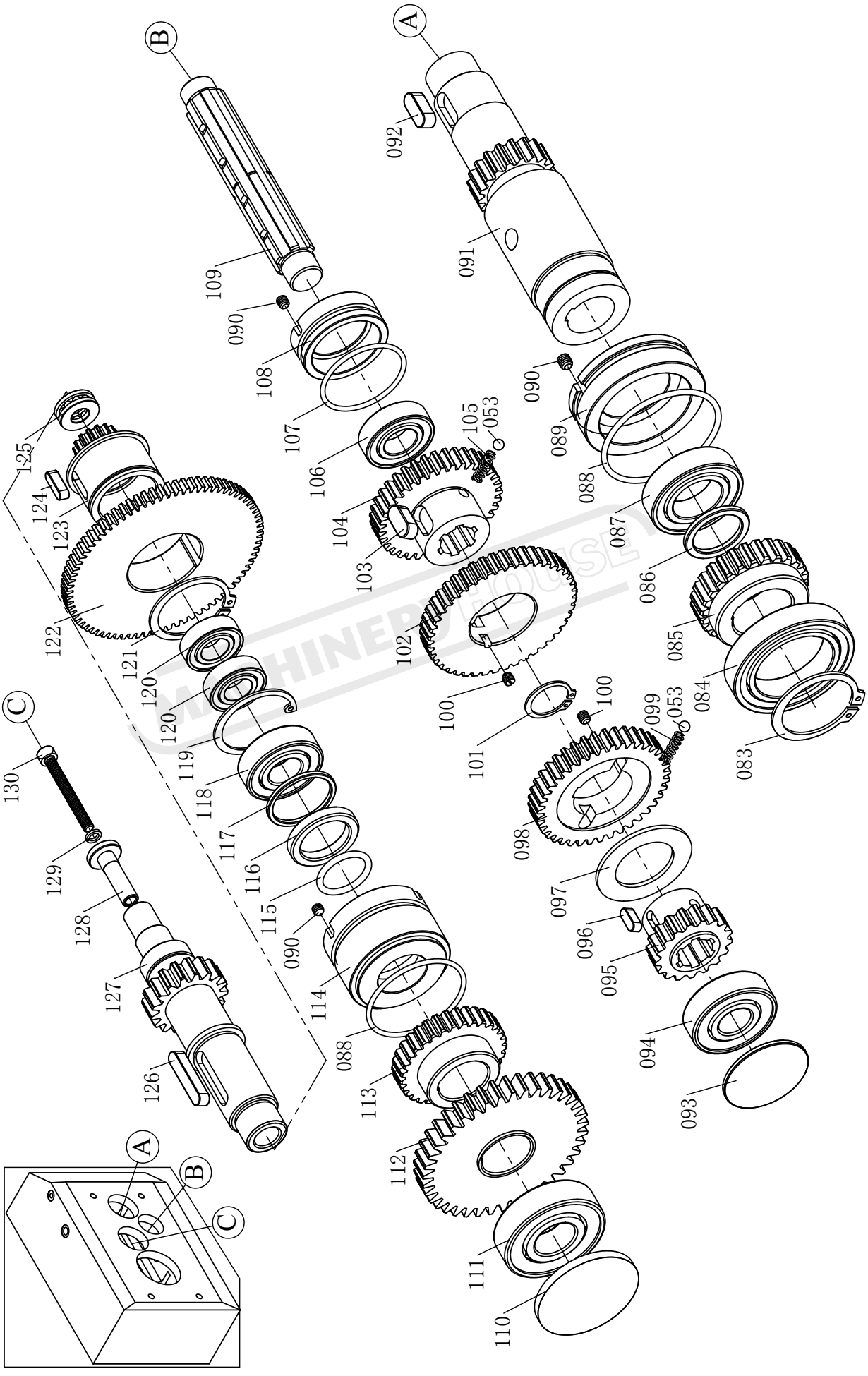
05 Ram part

No.	Name of item	Qty
05030	Conical bolt	1
05031	6 Washer	1
05032	6 Nut	1
05033	16 Washer	4
05034	M16 Acorn nut	4

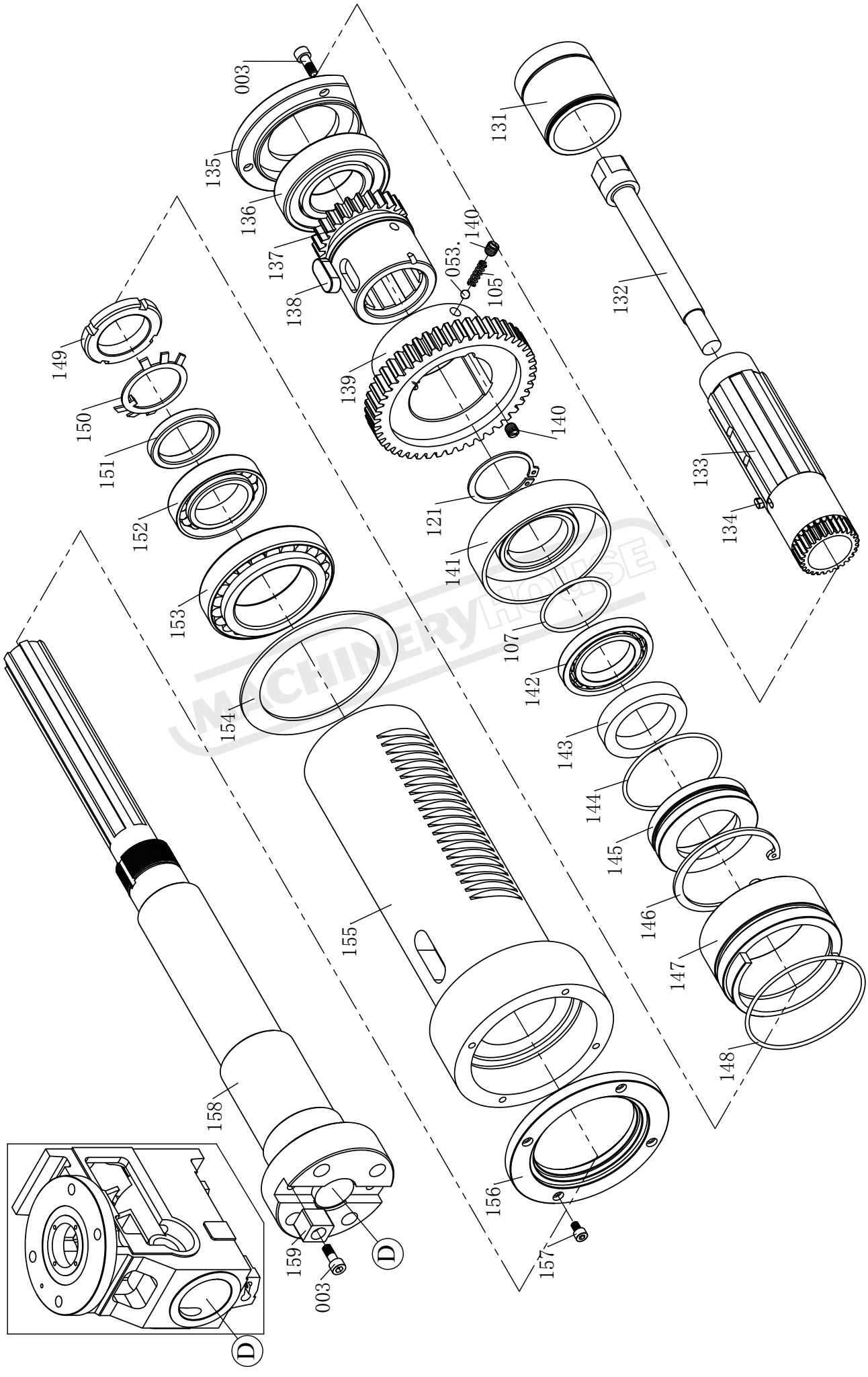
06 Headstock & gear-box part



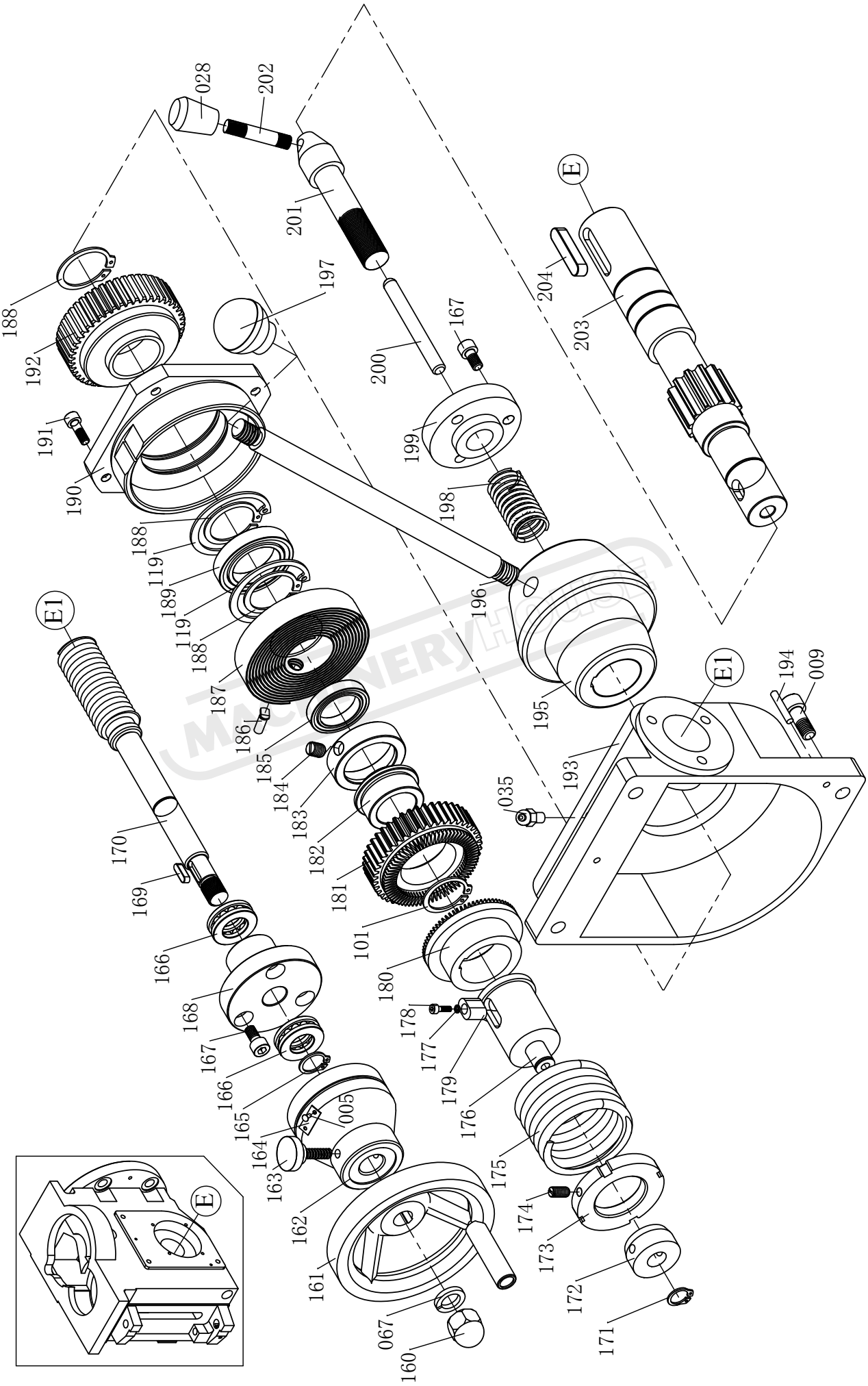
06 Headstock & gear-box part



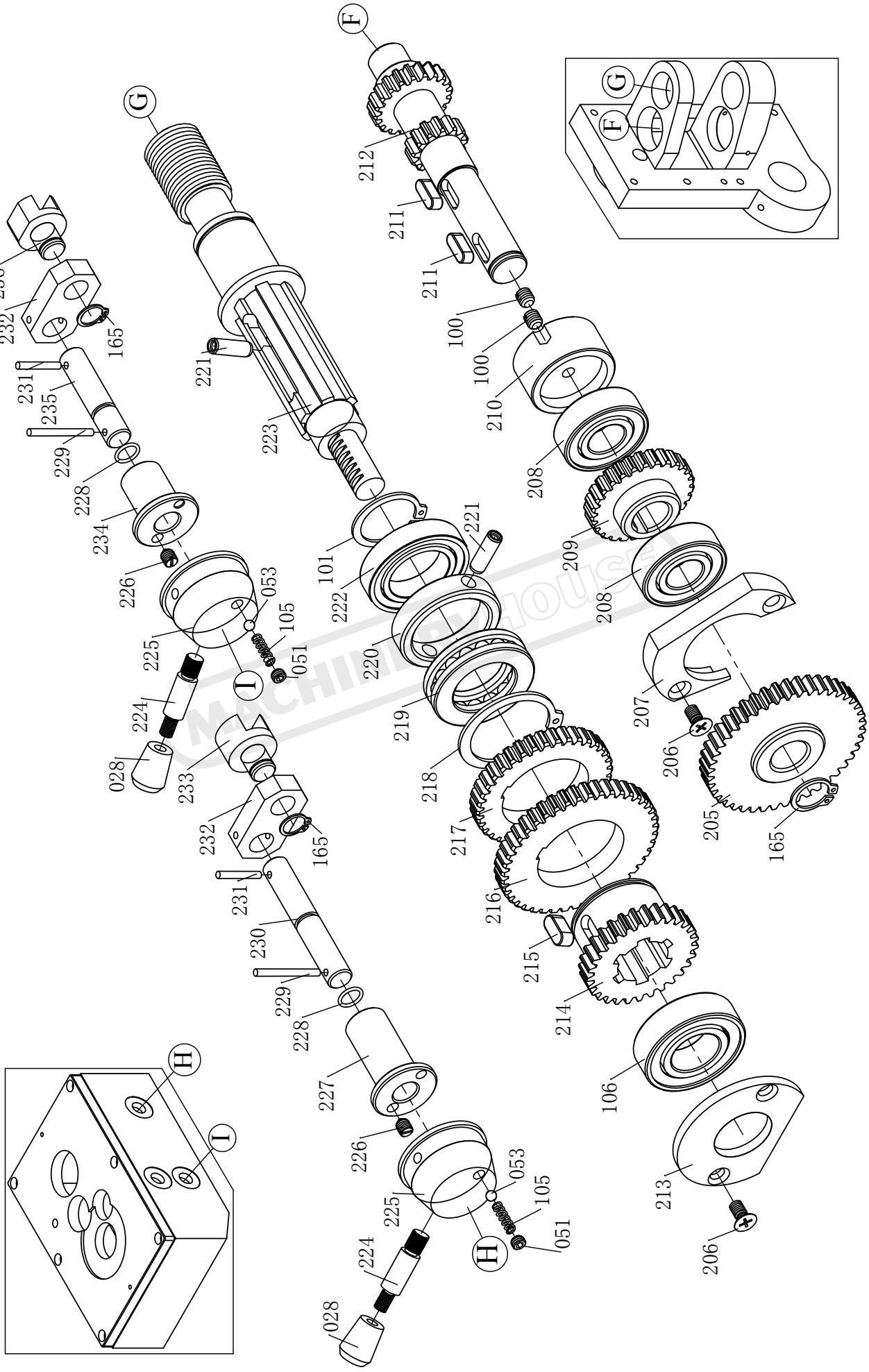
06 Headstock & gear-box part



06 Headstock & gear-box part



06 Headstock & gear-box part



06 Headstock & gear-box part

No.	Name of item	Qty
06001	Headstock	1
06002	Block	1
06003	M6×16 Hex.socket head bolt	7
06004	Scale	1
06005	2×5 Rivet	23
06006	Clamping block	1
06007	Adjustable clamping lever	1
06008	Spring washer 8	1
06009	M8×20 Hex.socket head bolt	4
06010	Limit stop	1
06011	Nut	1
06012	Lock nut	1
06013	16 Shaft retaining ring	1
06014	Screw bolt	1
06015	M4 Hexagon thin nut	1
06016	M4×16 Setscrew with hex.socket flat end	1
06017	Screw pin	1
06018	Pry bar	1
06019	Pin	1
06020	0.8×8×12 Pressure spring	1
06021	Collar	1
06022	M5×10 Setscrew with slotted flat end	1
06023	Shaft	1
06024	3×10 Spring pin	1
06025	1.2×10×22 Pressure spring	1
06026	5×18 Cylindrical pin	1
06027	Control lever	1
06028	Grip	5
06029	Shaft	1

06 Headstock & gear-box part

No.	Name of item	Qty
06030	Bracket	1
06031	3×14 Spring pin	1
06032	Bracket	1
06033	A4×18 Taper pin	2
06034	M6×20 Hex.socket head bolt	3
06035	Oil cup M6	3
06036	A6×45 Screw taper pin	2
06037	M6×35 Hex.socket head bolt	6
06038	Bracket	1
06039	1×5×40 Pressure spring	1
06040	Pin	1
06041	1.2×8×25 Coil spring	1
06042	6×16 Screw cylindrical pin	2
06043	5×14 Spring pin	1
06044	Connecting rod	1
06045	5×24 Cylindrical pin	2
06046	M5×40 Hex.socket head bolt	2
06047	M6 Hexagon thin nut	1
06048	M6×14 Setscrew with hex.socket flat end	1
06049	Cover	1
06050	Indicator	1
06051	M8×5 Setscrew with hex.socket flat end	4
06052	0.8×5×17 Pressure spring	1
06053	6 Steel ball	10
06054	Lever boss	1
06055	M6×10 Setscrew with slotted taper end	1
06056	Collar	1
06057	Gear	1
06058	A4×40 Taper pin	2

06 Headstock & gear-box part

No.	Name of item	Qty
06059	Scale	1
06060	M6×60 Hex.socket head bolt	6
06061	Bevel gear	1
06062	Cover	1
06063	M6×8 Slotted pan head screw	4
06064	M12×30 Hex.socket head bolt	2
06065	12 Plain washer	2
06066	M12×30 Bolt	2
06067	12 Spring washer	3
06068	Name plate	1
06069	Gear-box	1
06070	Sign board	1
06071	Name plate	1
06072	Spacer	1
06073	Oil scale	1
06074	Oil plug	1
06075	10 Plain washer	1
06076	M12×25 Hex.socket head bolt	6
06077	8×35 Screw taper pin	2
06078	Cover	1
06079	Oil plug	1
06080	Motor	1
06081	10 Spring washer	4
06082	M10×30 Hex.socket head bolt	4
06083	40 Shaft retaining ring	1
06084	61908-RZ Bearing	1
06085	Gear	1
06086	Collar	1
06087	6005-Z Bearing	1

06 Headstock & gear-box part

No.	Name of item	Qty
06088	56×2.65 O-Ring	2
06089	Cover	1
06090	M6×6 Setscrew with slotted taper end	4
06091	Shaft	1
06092	8×20 Flat key	1
06093	Cover	1
06094	6304 Bearing	1
06095	Gear	1
06096	6×16 Flat key	1
06097	Cover	1
06098	Gear	1
06099	0.8×5×24 Pressure spring	2
06100	M6×6 Setscrew with slotted flat end	6
06101	25 Shaft retaining ring	2
06102	Gear	1
06103	10×20 Flat key	1
06104	Gear	1
06105	0.8×5×20 Pressure spring	11
06106	6004 Bearing	2
06107	47.5×2.65 O-Ring	2
06108	Cover	1
06109	Shaft	1
06110	Cover	1
06111	6305 Bearing	1
06112	Gear	1
06113	Gear	1
06114	Collar	1
06115	26.5×1.8 O-Ring	1
06116	B30×42×7 Oil seal	1

06 Headstock & gear-box part

No.	Name of item	Qty
06117	Spacer	1
06118	6204 Bearing	1
06119	47 Retaining ring for hole	3
06120	6003 Bearing	2
06121	45 Shaft retaining ring	2
06122	Gear	1
06123	Gear	1
06124	6×20 Flat key	1
06125	51100 Bearing	1
06126	8×40 Flat key	1
06127	Gear	1
06128	Collar	1
06129	6 Spring washer	1
06130	M6×55 Hex.socket head bolt	1
06131	Cap	1
06132	Drag rod	1
06133	Spline bush	1
06134	4×8 Flat key	1
06135	Cover	1
06136	6208-Z Bearing	1
06137	Gear	1
06138	12×28 Flat key	1
06139	Gear	1
06140	M8×8 Setscrew with slotted flat end	3
06141	Collar	1
06142	16009 Bearing	1
06143	B45×62×12 Oil seal	1
06144	69×2.65 O-Ring	1
06145	Collar	1

06 Headstock & gear-box part

No.	Name of item	Qty
06146	75 Retaining ring for hole	1
06147	Collar	1
06148	85×2.65 O-Ring	1
06149	M39×1.5 Round nut	1
06150	39 Check washer	1
06151	Spacer	1
06152	7008AC Bearing	1
06153	32012 Bearing	1
06154	Spacer	1
06155	Sleeve	1
06156	Cover	1
06157	M5×8 Hex.socket head bolt	4
06158	Main shaft	1
06159	Key	2
06160	M12 Nut	1
06161	Handwheel	1
06162	Dial	1
06163	Knurled screw	1
06164	Indicator	1
06165	15 Shaft retaining ring	4
06166	51102 Bearing	2
06167	M6×12 Hex.socket head bolt	6
06168	Flange	1
06169	4×14 Flat key	1
06170	Worm	1
06171	12 Shaft retaining ring	5
06172	Collar	1
06173	Nut	1
06174	M6×12 Setscrew with slotted flat end	1

06 Headstock & gear-box part

No.	Name of item	Qty
06175	4×52×42 Pressure spring	1
06176	Spline sleeve	1
06177	3 Spring washer	1
06178	M3×10 Hex.socket head bolt	1
06179	Key	1
06180	Clutch	1
06181	Gear	1
06182	Collar	1
06183	Collar	1
06184	M8×10 Setscrew with slotted flat end	1
06185	61805 Bearing	1
06186	Pin	1
06187	Spring	1
06188	30 Shaft retaining ring	3
06189	61906 Bearing	1
06190	Spring box	1
06191	M5×16 Hex.socket head bolt	4
06192	Bevel gear	1
06193	Worm gear case	1
06194	4×24 Taper pin	2
06195	Lever boss	1
06196	Lever	3
06197	Grip	3
06198	2×20×40 Pressure spring	1
06199	Cover	1
06200	Girder	1
06201	Lock bolt	1
06202	Handle	2
06203	Gear shaft	1

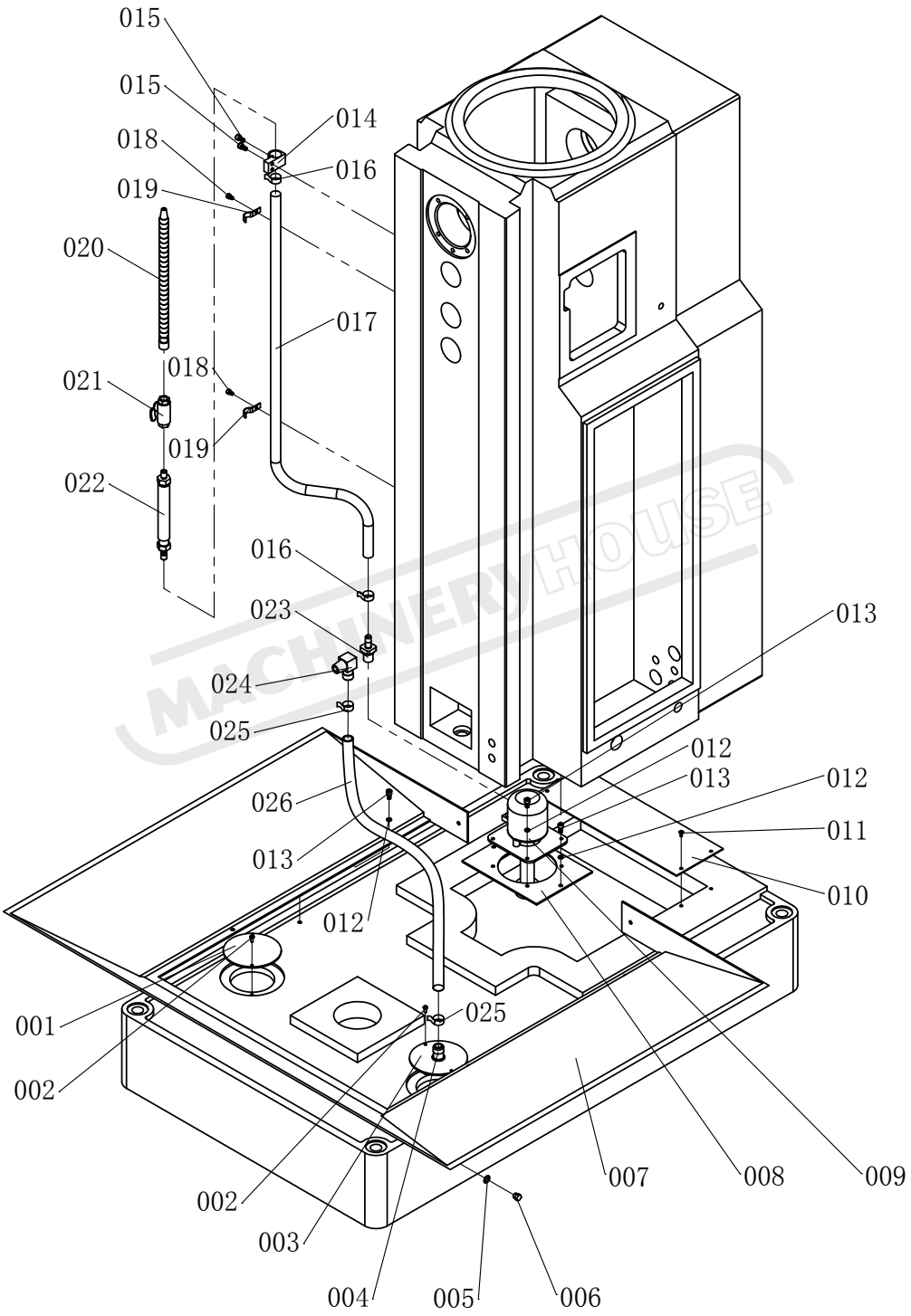
06 Headstock & gear-box part

No.	Name of item	Qty
06204	8×36 Flat key	1
06205	Gear	1
06206	M5×10 Cross-recessed countersunk head screw	4
06207	Spacer	1
06208	6202 Bearing	2
06209	Gear	1
06210	Cover	1
06211	5×14 Flat key	2
06212	Gear shaft	1
06213	Spacer	1
06214	Gear	1
06215	6×14 Flat key	1
06216	Gear	1
06217	Gear	1
06218	36 Shaft retaining ring	1
06219	51105 Bearing	1
06220	Collar	1
06221	A6×18 Screw cylindrical pin	2
06222	61905 Bearing	1
06223	Worm	1
06224	Lever	3
06225	Lever boss	3
06226	M8×10 Setscrew with slotted flat end	3
06227	Collar	1
06228	11.8×1.8 O-Ring	3
06229	A4×45 Taper pin	3
06230	Shaft	1
06231	A4×30 Taper pin	3
06232	Junction plate	3

06 Headstock & gear-box part

No.	Name of item	Qty
06233	Shifting fork	1
06234	Collar	2
06235	Shaft	2
06236	Shifting fork（shifting block）	1

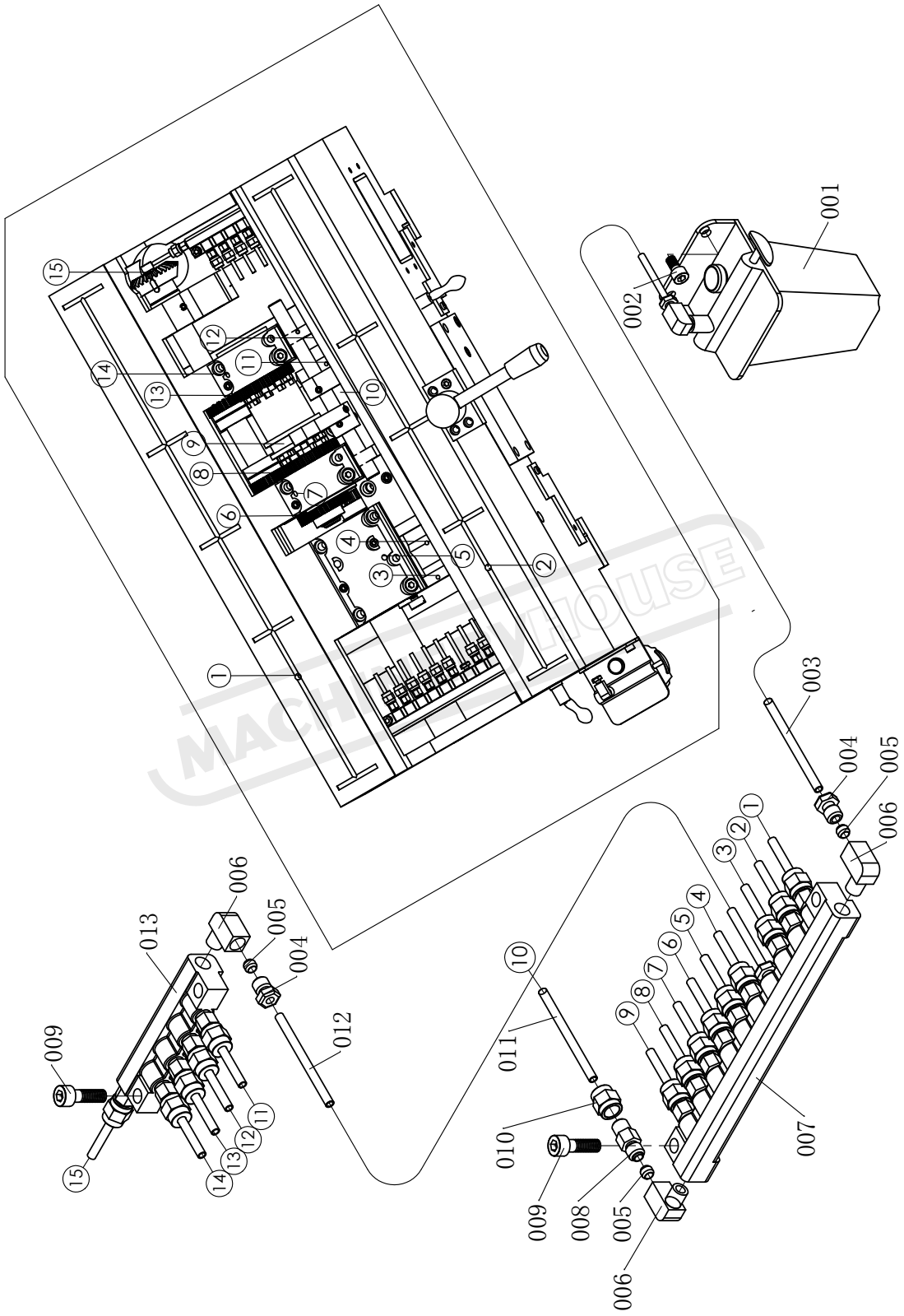
09 Cooling part



09 Cooling part

No.	Name of item	Qty
09001	Cover	1
09002	M4×10 Cross recessed pan head screw	4
09003	Cover	1
09004	Union joint	1
09005	Φ13×Φ10.2×1.5 Copper backing	1
09006	M10×1 Oil plug	1
09007	Container	1
09008	Cooling pump seat	1
09009	AB-25 90w Cooling pump	1
09010	Cover board	1
09011	M4×10 Cross recessed countersunk flat head screw	4
09012	6 Spring washer	12
09013	M6×12 Hexagon socket head cap screw	12
09014	Fixing base	1
09015	M6×16 Hexagon socket head cap screw	3
09016	Φ13~Φ19 Collar	2
09017	PVC Plastic tubing with steel wire φ3/8''×1500	1
09018	M5×8 Hexagon socket head cap screw	2
09019	Pipe clip	2
09020	Adjustable plastic cooling hose	1
09021	G1/2'' Cone valve	1
09022	Union pipe	1
09023	Union joint	1
09024	Union joint	1
09025	Φ16~Φ25 Collar	2
09026	PVC Plastic tubing with steel wire Φ 3/4''×1550	1

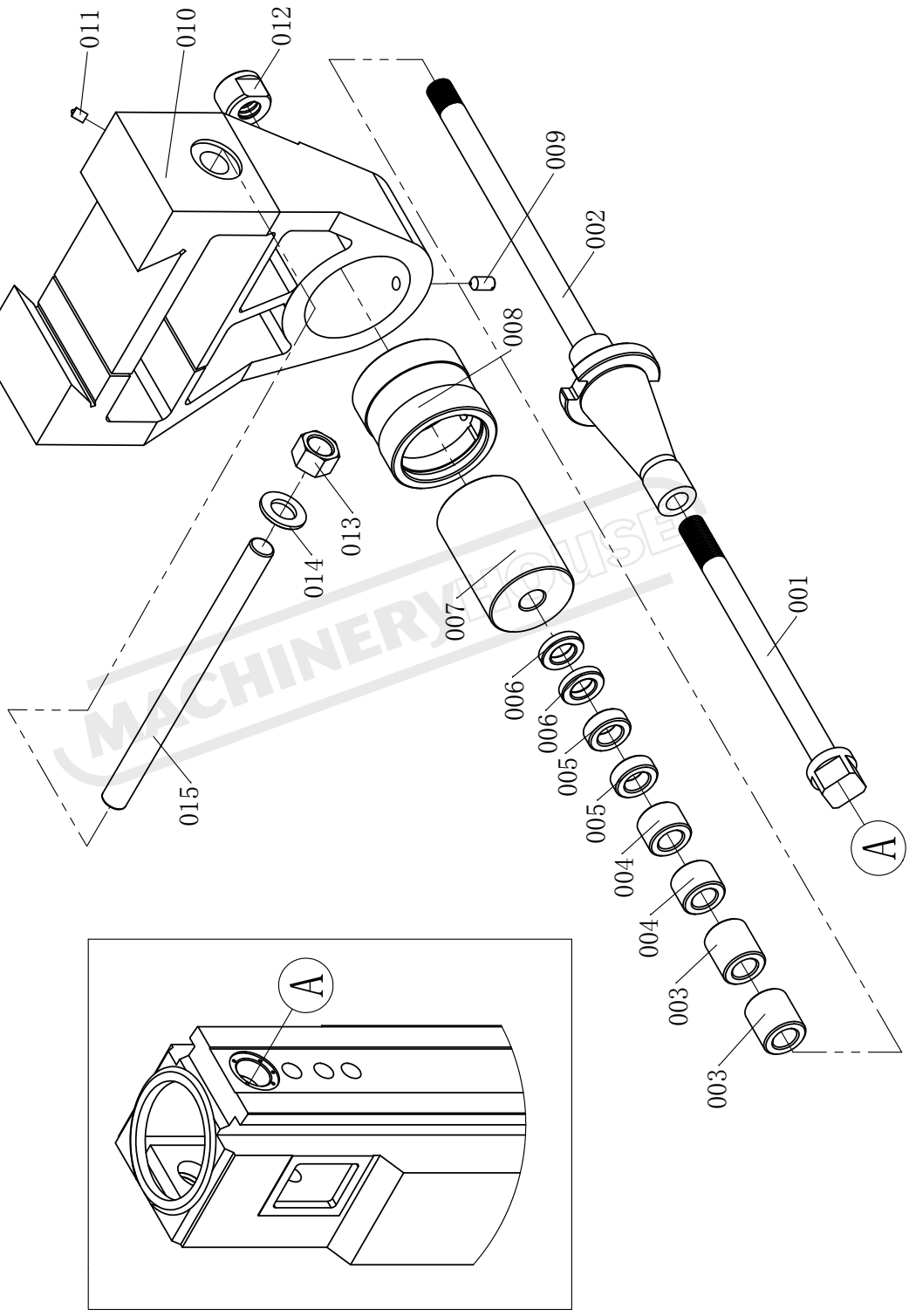
10 Table lubrication part



10 Table lubrication part

No.	Name of item	Qty
10001	M8×1 Lubrication pump	1
10002	M6×25 Hexagon socket head cap screw	2
10003	Oil pipe with protecting sheath	1
10004	M8×1—Φ4.2 Fuel pipe union	4
10005	Φ6×Φ4.1 Dual taper cutting sleeve	19
10006	M8×1/M8×1 Angle coupling	3
10007	M8×1 Oil distributor	1
10008	Gage	15
10009	M6×25 Hexagon socket head cap screw	2
10010	M8×1-4.2 Collar nut	15
10011	Φ4×Φ3×300 Nylon tube	2
10012	Φ4×Φ3×6000 Copper pipe	1
10013	M8×1 Oil distributor	1

F1 Accessories part



F1 Accessories part

No.	Name of item	Qty
F1001	Draw bar	1
F1002	Horizontal milling bar	1
F1003	Distance sleeve	2
F1004	Distance sleeve	2
F1005	Distance sleeve	2
F1006	Distance sleeve	2
F1007	Axle box	1
F1008	Supporting sleeve	1
F1009	M8X16 Holding screw	1
F1010	Bear frame	1
F1011	6 Oil cup	1
F1012	Nut	1
F1013	M16 Nut	1
F1014	16 Washer	1
F1015	Clamp bolt	1