

# Warco GH 18

Drilling and Milling machine

## OPERATING INSTRUCTION



**Notice: Please read the instruction carefully before operation**

## **Reading required before operation:**

1. The operator must be familiar with operation point and technical function of the machine.
2. Before start, please check each parts, hands shanks are keep in the right place, spindle sleeve, Electrical apparatus are in the normal state.
3. Before operating, please do lubrication carefully according the lubrication chart.
4. Workpiece, tools must be clamped stable.
5. The worktable should be locked when drilling. Using Using special clamp when processing small Workpiece. Never use your hands hold workpiece.
6. While milling, spindle sleeve should be clamped.
7. When to start the machine, spindle should rotate clockwise.
8. You should choose a good feed speed (if the machine equip automatic feeding device ),adjusted the schedule set blocks. Manual feed should step by step, so as not to overexert cause an accident.
9. The machine should be stopped when adjust speed, travel, clamping tools or cleaning.
10. When the machine is running, do do not touch the workpiece, tools or drive parts.
11. When operating, you must notice and control the condition of the machine. If some abnormal happened, stop machine timely and ask professional to maintain.
12. When operating, the operator not allowed leave the machine. If must, please stop the machine and cut off the power.
13. If much scrap iron on the broach, please stop and clean it using brush, never use your hands or blow with the mouth.
14. When two or more people work in the same machine, one person must responsible for the safety, unified command, to prevent the accident.
15. Stop the machine when coming off work, the operator should do cleaning and Maintenance of equipment and by the requirement, guide way lubrication, the surrounding site cleaning and hygiene, product parts well organized, and shut off the power.

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# 1. Function and use

## 1.1 Function

This machine is bench drilling and milling machine, the work table can longitudinal and lateral movement, spindle vertical arrangement, spindle box can move up and down. It can use for drilling, milling, boring, grinding, tapping. Spindle box can be in the vertical plane turning around 45 °, the work table could feed automatic by this equipment of feeding device. The spindle drove by gears and AC motor, we can read the LCD or limb to know the working depth. This machine novel structure, drive stable and easy to operate. It is the best choice to process small parts and instrument.

## 1.2 Use

This machine suitable for processing of kinds of small to medium size parts, especially for nonferrous material, plastic, nylon. It has a simple structure, the advantages of flexible operation, widely used for single piece or a batch of mechanical processing.

# 2. Technical parameters

Drilling capacity	32mm
End milling capacity	16mm
Face milling capacity	63mm
Tapping capacity	12mm
Spindle travel	75mm
Distance from spindle to column	198mm
Distance from spindle to table	55-405mm
Taper of spindle	MT3/R8
Spindle speed	95-1420/115-1700 r/min
Table size	700×190mm
T-slots size	12mm
Cross Table Travel	190mm
Longitudinal Table Travel	320mm
Motor power	750W
Voltage/Hz	220V (380) / 50HZ (60HZ)
N.W/G.W	170/200KG

### 3. Structure

#### 3.1 Structure picture:



#### 3.2 Operation component

1	Carriage lock screw	9	Power
2	Table hand-wheel	10	Spindle forward start switch
3	Table lock handle	11	Spindle reverse start switch
4	Spindle feeding hand shank	12	Spindle stop switch
5	Micro-feeding switch	13	Emergency stop
6	Micro-feeding hand shank	14	Spindle sleeve lock handle
7	Speed changing handle shank	15	Spindle move crank
8	Drilling/Tapping change switch	16	Transverse feeding hand-wheel

#### 3.3 Operation panel

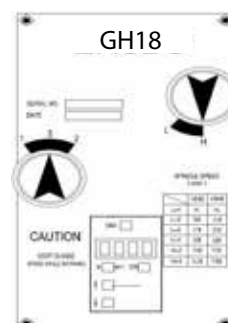
##### (1) Electrical panel

Electrical operation panel is the control panel of the machine, to control the spindle drive and stop by the panel button, to realize the control to the spindle.

##### (2) Main panel

Main spindle speed tachometer: You can get different speed by speed changing handle according the speed tachometer.

Spindle feed depth display: you can read the feeding depth on the display when you operate the spindle feeding hand shank or micro-feeding hand shank (if equipped with display)



### 3.4 Drive system

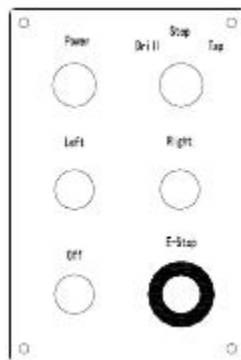
This machine drive system mainly composed of motor, gears and spindle. Motor connected to the power supply, drive gear, which drives the spindle rotation. Use the speed changing hand shank to change gears set, to change the spindle speed.

(As the picture)

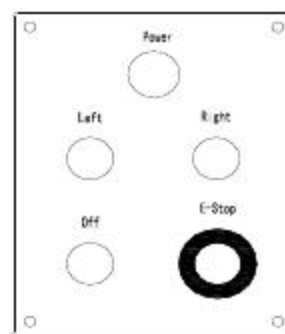
	50Hz	60Hz
L--1	95	115
L--2	180	220
L--3	270	320
H--1	500	600
H--2	930	1120
H--3	1420	1700

## 4.Operation process.

### 4.1 Normal operation.



A

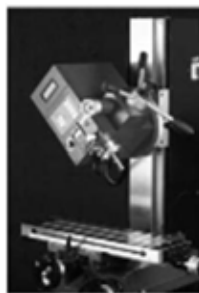


B

- (1) Switch on the power and the power light on, means the machine has electricity.
- (2) Turn on the emergency switch.
- (3) Choose the drilling or tapping button.
- (4) When the switch is Drill, press the Right button, the spindle will forward; press the Off button, the spindle stopped; press Left button, the spindle reverse.
- (5) When the switch is Tap, adjust the location of block. Depress the feeding hand shank, the spindle forward. When the block pressure the micro switch, the spindle reverse, screw tap get out the work piece (picture 4A)
- (6) The picture 4B is electrical panel without tapping function. Press the Right button, the spindle will forward; press the Off button, the spindle stopped; press Left button, the spindle reverse.
- (7) You should lock the micro feeding switch when use micro feeding function. Then, to rotate the micro feeding hand shank.



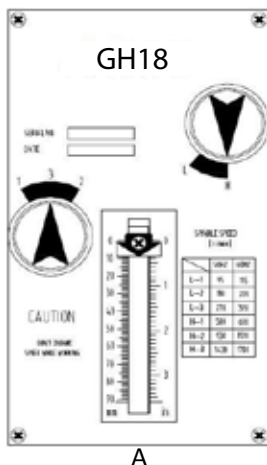
(8) Oblique milling function: spindle box can rotate. Loosen hex nut, choose the angle you need, then, lock the nut.



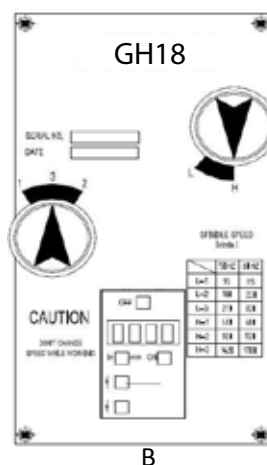
(9) Press the Off button, the machine will stop. If there is an emergency, press the emergency switch. Then, restart the machine.

(10) The circuit board equipped with overload protection. If overloaded, the machine will stop automatically. Restart ,the machine will recover to work.

#### 4.2 Spindle depth shows. (A, B)



A



B

(1) Picture A is the spindle box panel equipped with automatic tapping function. Adjust the scaleplate to "0" scale, you can read the depth feeding the spindle,

(2) With digital depth display (picture B)

① Press " ON/OFF" to start, maybe the depth display is not on "0". Then press "ZERO"turn to "0".

② Press "mm/in" to realize metric/inch.

#### 4.3 Operating steps.

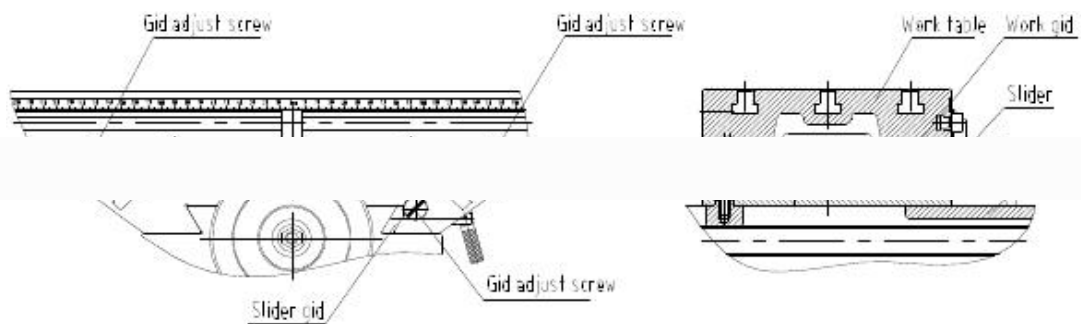
(1) When install clamps, you must stop the machine.

- (2) Cleaning up the inner bore (MT3/R8) and cutter arbor, put the cutter arbor into the spindle inner bore, lock the draw bar.
- (3) put the workpiece on the work table and fixed it, adjust the work table.
- (4) Loosen the column lock handle, adjust the spindle box up and down.
- (5) Start the machine and choose a speed, counterclockwise rotate the spindle feeding handle to process the workpiece.
- (6) When milling, you must lock the spindle, spindle box and gib, in order to ensure the precision.
- (7) Open the top protection cover when change the drilling chuck or milling head, loosen the draw bar 2-3 teeth, knock taper shank make it separate from the spindle. Then loosen the draw bar by hand.
- (8) Cut off the power when finished work. Clean the machine, do anti-rust and lubrication processing.

#### 4.4 Gib adjustment.

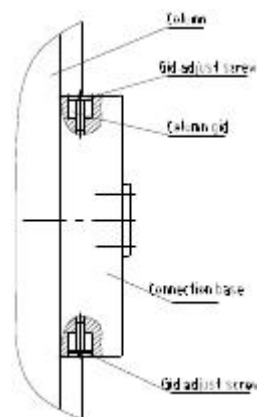
The machine gib should be adjusted after long time running, to eliminate the clearance error, secure the machine at the best work state.

- (1) The Longitudinal gib between table and saddle.
- (2) The cross gib between saddle and table.



Method of adjustment: adjust the adjusting screw till the handwheel shake easily and smoothly. Pull the table without loosen feeling.

- (3) "Z" axis gib between column and connection.



Method of adjustment: adjust the adjusting screw till the handwheel shake easily and smoothly and the spindle box without loosen feeling.

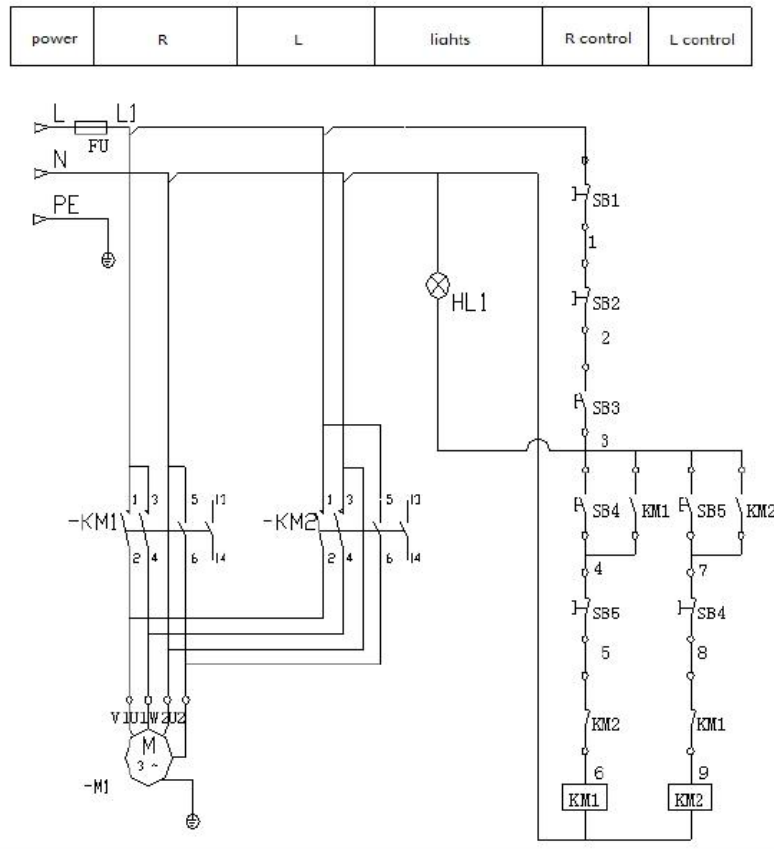
#### 5. Electric system:



## 5.1 Machine summary

This machine has two input power:220V(110V) single phase OR 380V three phase. You can choose with automatic tapping function OR without automatic tapping function.

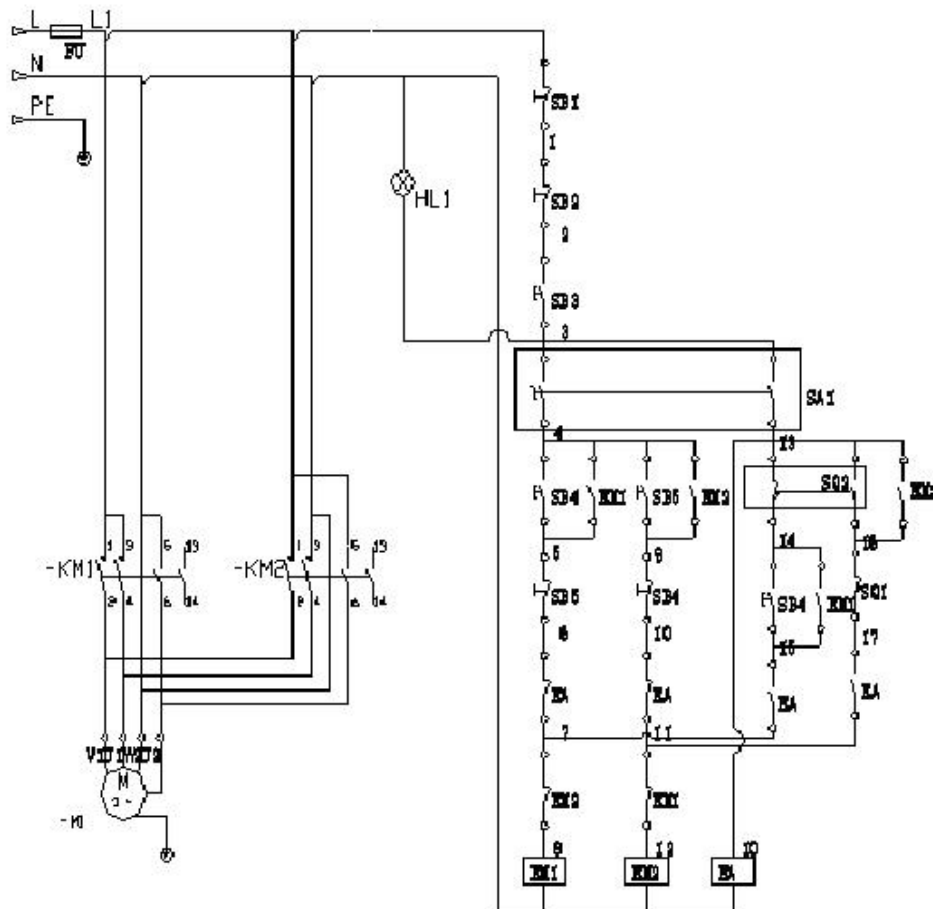
## 5.2 Electrical schematic diagram and BOM list



**PICTURE A 220V (110V) with automatic tapping function**

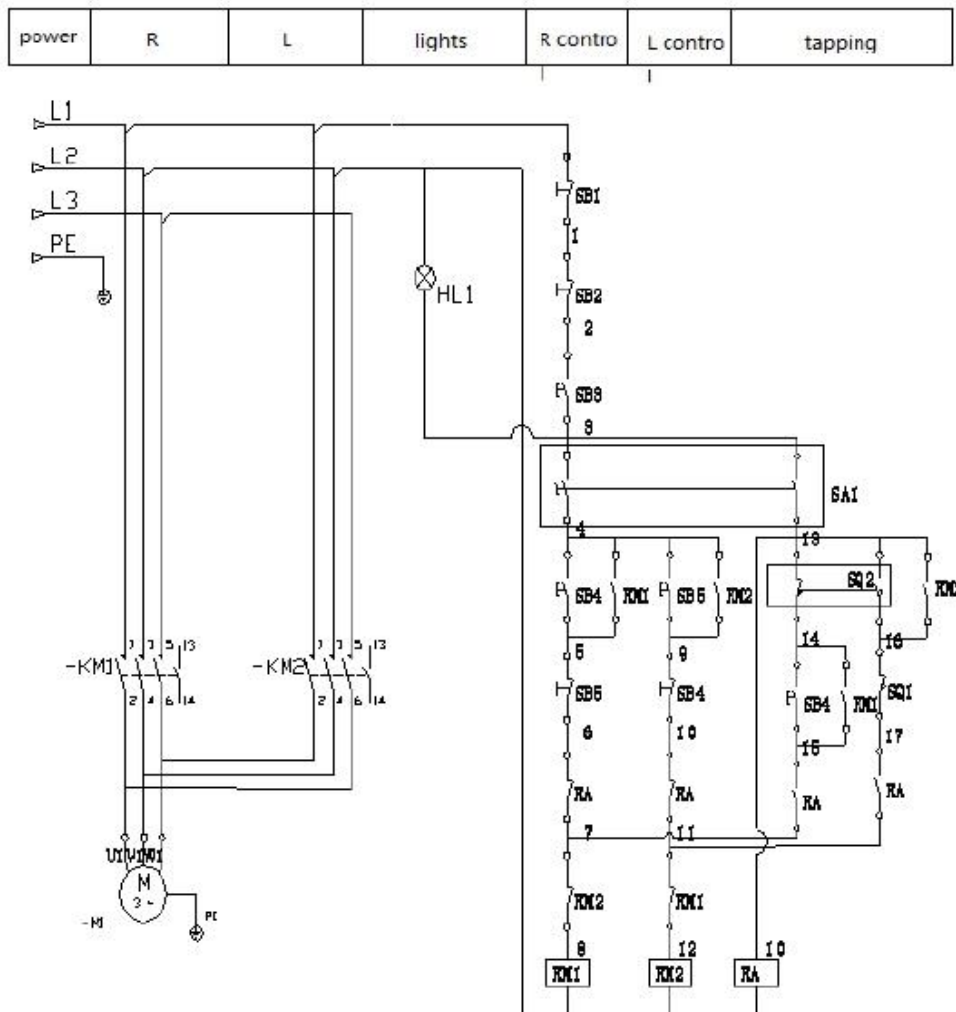
code	description	model	brand
KM1	contactor	LC1E1210 M5+LADN11	Schneider
KM2	contactor	LC1E1210 M5+LADN11	Schneider
KA	Intermediate relay	RXM2LB2BD+RXZE1M2C	Schneider
SQ1	micro switch	V-156-1C25	Omron
SQ2	micro switch	V-156-1C25	Omron
SB3	button with lights	Y090	ONPOW
SA	three knob	YW1S-3E20	ONPOW
SB4	start button	YW1B-M1E10G+YW1B-M1E10G+YW-E01	ONPOW
SB5	start button	YW1B-M1E10G+YW-E01	ONPOW
SB2	stop button	YW-E01	ONPOW
SB1	emergency stop button	HBYS	ONPOW
FU	fuse+base	BF-015	Syg

power	R	L	lights	R control	L control	tapping
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**PICTURE B 220V (110V) without automatic tapping function**

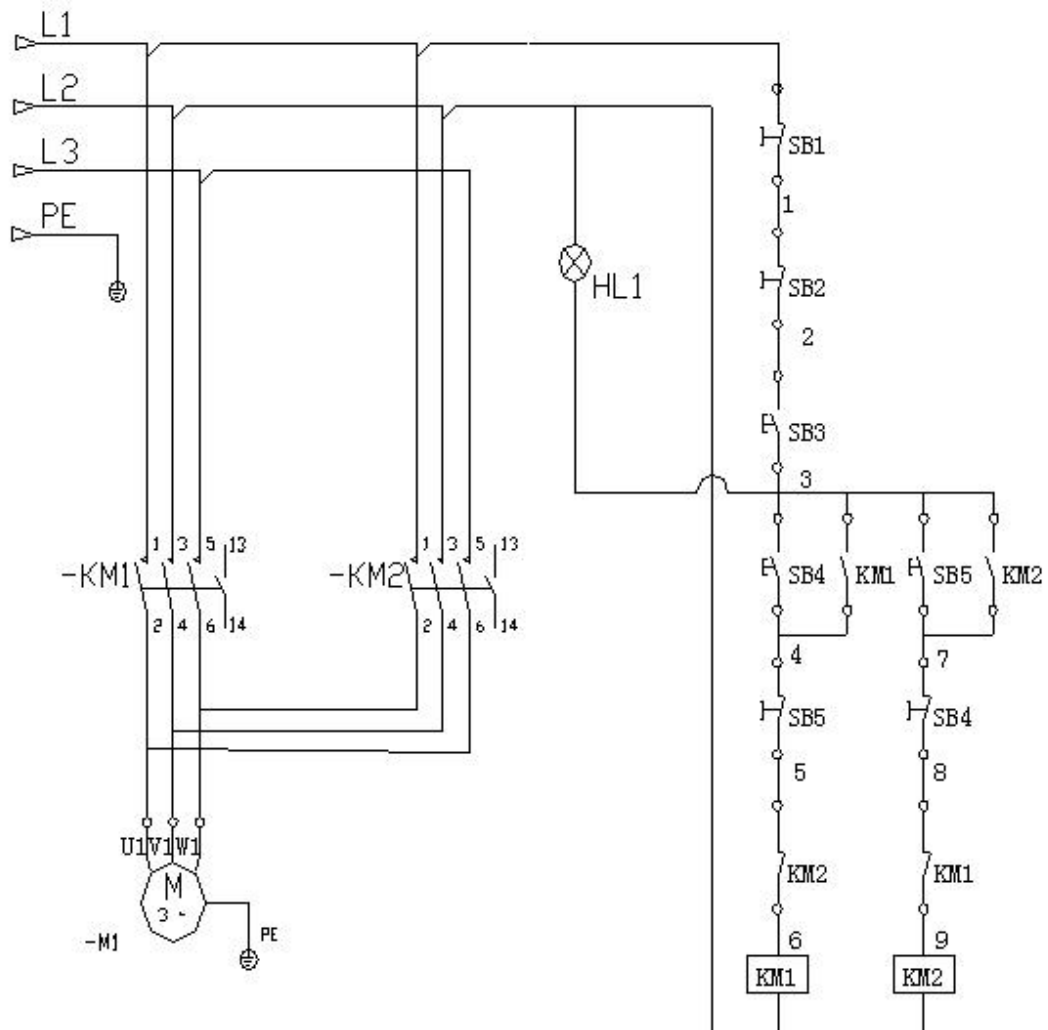
code	description	model	brand
KM1	contactor	LC1E1210 M5+LADN11	Schneider
KM2	contactor	LC1E1210 M5+LADN11	Schneider
SB3	button with lights	Y090	ONPOW
SB4	start button	YW1B-M1E10G+YW-E01	ONPOW
SB5	start button	YW1B-M1E10G+YW-E01	ONPOW
SB2	stop button	YW-E01	ONPOW
SB1	emergency stop	HBY5	ONPOW
FU	fuse+base	BF-015	Syg



**PICTURE C 380V with automatic tapping function**

code	description	model	brand
KM1	contactor	LC1E1210 Q5+LADN11	Schneider
KM2	contactor	LC1E1210 Q5+LADN11	Schneider
KA	intermediate relay	RXM2LB2BD+RXZE1M2C	Schneider
SQ1	micro switch	V-156-1C25	Omron
SQ2	micro switch	V-156-1C25	Omron
SB3	button with lights	Y090	ONPOW
SA	three knob	YW1S-3E20	ONPOW
SB4	start button	YW1B-M1E10G+YW1B-M1E10G+YW-E01	ONPOW
SB5	start button	YW1B-M1E10G+YW-E01	ONPOW
SB2	stop button	YW-E01	ONPOW
SB1	emergency stop	HBYS	ONPOW

power	R	L	lights	R contro	L control
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**Picture D 380V without automatic tapping function**

code	description	model	brand
KM1	contactor	LC1E1210 Q5+LADN11	Schneider
KM2	contactor	LC1E1210 Q5+LADN11	Schneider
SB3	button with lights	Y090	ONPOW
SB4	start button	YW1B-M1E10G+YW-E01	ONPOW
SB5	start button	YW1B-M1E10G+YW-E01	ONPOW
SB2	stop button	YW-E01	ONPOW
SB1	emergency stop	HBY5	ONPOW

Above machine could equip low-pressure control for choice. There should be a protect switch before input the power.

### **5.3 Electrical equipment maintenance**

You must cut off the power before repair this machine, electrical equipment should keep clean. The voltage for the motor not allowed exceed 10% error. For better operating, must carefully for electrical equipment maintenance and repair work.

### **6. Safety instructions**

- (1) To prevent electric shock accidents, avoid damage to the body, when using power tools, machine tools and equipment, should strengthen the basic safety protection;
- (2) To keep machine surrounding environment clean, clutter environment exist safety hazard.
- (3) Do not put the machine in wet or damp areas, around the machine is not allowed to store flammable liquids (such as gasoline, etc.)
- (4) Children should keep distance with the work place.
- (5) The machine should have safety grounding device
- (6) Do not operate the machine when tired.
- (7) Drink and use the anesthetic is not allowed to operate the machine.
- (8) Do not wear loose clothes or jewelry when operating.
- (9) The operator should wear working cap, be sure to cover the long hair.
- (10) The operator must wear protective glasses to prevent debris into the eyes.
- (11) The operator need keep correct posture and body balance during working.

### **7. Maintenance.**

Regular maintenance is better for the machine working state and working accuracy than repair after use the machine bad.

#### **7.1 Daily maintenance**

- (1) Add lubricating oil before use every day.
- (2) If noise occur due to the spindle temperature overheat, stop the machine and check immediately to ensure the precision.
- (3) Before coming off work, clean the workspace, loosen the vise, milling cutter and work piece; turn off power, clear the iron filings and dust on the machine and add lubricating oil or anti-rust oil according the manual.

#### **7.2 Weekly maintenance.**

- (1) Cleaning and oiling vertical and horizontal screw.
- (2) Check all sliding and rotation surface, if lack of lubrication, add lubricating oil.

### **7.3 Monthly maintenance.**

- (1) Adjust the vertical and horizontal panel.
- (2) Lubricate the worm gear, endless screw and bearings.

### **7.4 Annual maintenance.**

- (1) Adjust the workbench level to maintain accuracy
- (2) Check the electric wire, plug, switch (at least once a year) in order to avoid loose or abrasion.

## **8. Common failures and troubleshooting**

### **1) The spindle not work after turn power on.**

- (1) Voltage is wrong, the main switch interrupt. –Adjust the input voltage, open the main switch.
- (2) Fuse in the switch box blowout. –Change new fuse.
- (3) Power is too strong, the over-load protective relay automatic separate. –Pressure overload protective relay, it will return to the correct position.

### **2) Motor overheating or without power**

- (1) Overdrive. –Reduce the feeding load.
- (2) Low voltage. –Adjustment to the accurate voltage.
- (3) Electrical switch contact loss. –Change a new one.
- (4) Overload protective relay doesn't work. – Wiring or change a new one.
- (5) Poor contact fuse or wires. –Turn off the power supply immediately , replace a new fuse.
- (6) Cutting tools damaged. –Change new tools.

### **3) Too high temperature of the spindle bearing.**

- (1) Lubricant failure. –Add lubricant.
- (2) Too tight installation of the spindle bearing. –Turn the shaft by hand to feel .If too tight, unscrew the spindle lock nut.
- (3) Long time high speed rotation. –Reduce the cutting quantity slightly.

### **4) The spindle rotation lack of motivation**

- (1) The change speed switch did not reach the designated position. –Rotation speed control handle to appropriate position.
- (2) Motor burning off. –Change a new one.

### **5) The work table mobile imbalance.**

- (1) Too much clearance. –Adjust to appropriate position.
- (2) Lock screw is to loose. –Tighten and fixed on the appropriate position.
- (3) Feeding too much. –Reduce the cutting depth

## **6) Spindle swing when processing, the work piece surface roughness.**

- (1) The spindle bearing gap is too big. –Adjust bearing clearance to the appropriate state or change a new one
- (2) The spindle moves up and down is too loose. – Tighten within two bearing cover, but do not make the two bearing inner cover too tight
- (3) Conical surface gap is too big. –Adjust the bolt tension to the appropriate size.
- (4) Chuck is loose.- Tighten the chuck.
- (5) Mill cutter not sharp. –Grind the cutter
- (6) The work piece not stable. – Clamp the jig.

## **7) Micro feed work not stable.**

- (1) The clutch is loose. –Tighten the clutch
- (2) Worm gear and worm excessive wear. –Change a new set.
- (3) The hand wheel retaining screw loose. –Tighten the screw.

## **8) The poor work precision.**

- (1) The work piece is unbalance. –Clamping work piece, should according to the principle of balance.
- (2) Knock the work piece by hammer commonly. –Knock work piece by hammer is forbidden.
- (3) The poor precision of the work table level.– Use after a period of time to check and maintain the accuracy of the work table.

## **9. Accessory**

### **9.1 Standard accessory.**

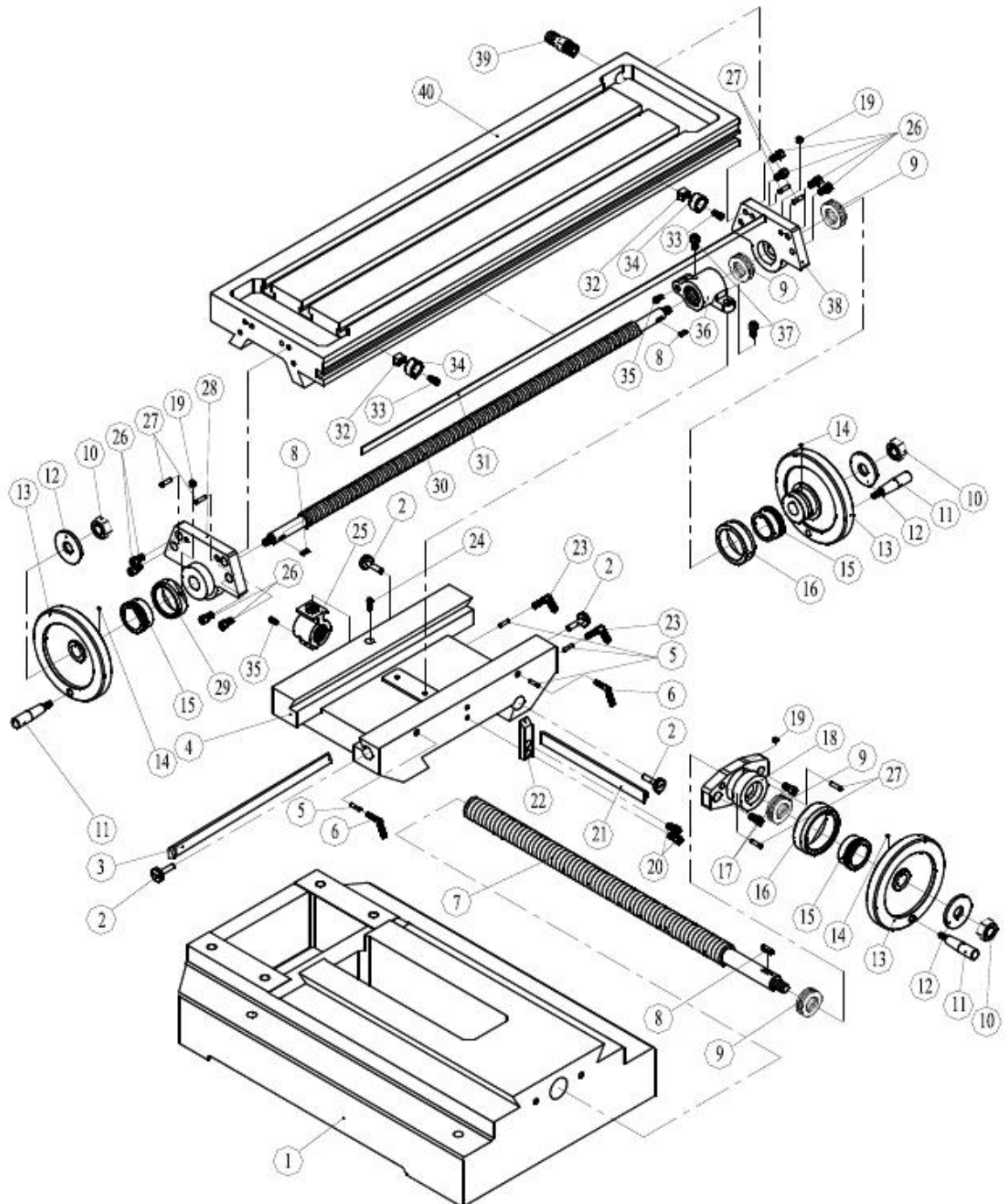
- ① double-ended spanner 19mmx22mm 1 piece
- ② internal hexagonal wrench 5mm,6mm each one piece.
- ③ extension rod MT3 or R8 1 piece
- ④ drilling chuck 1-13mm 1 piece
- ⑤ pull rod 1 piece
- ⑥ rod gasket 1 piece
- ⑦ oiler 1 piece

### **9.2 Special accessory**

- ① milling chuck
- ② flat tongs
- ③ rack
- ④ feeding device

## 10. Drilling and milling machine drawing and parts list

### Base and worktable assembly

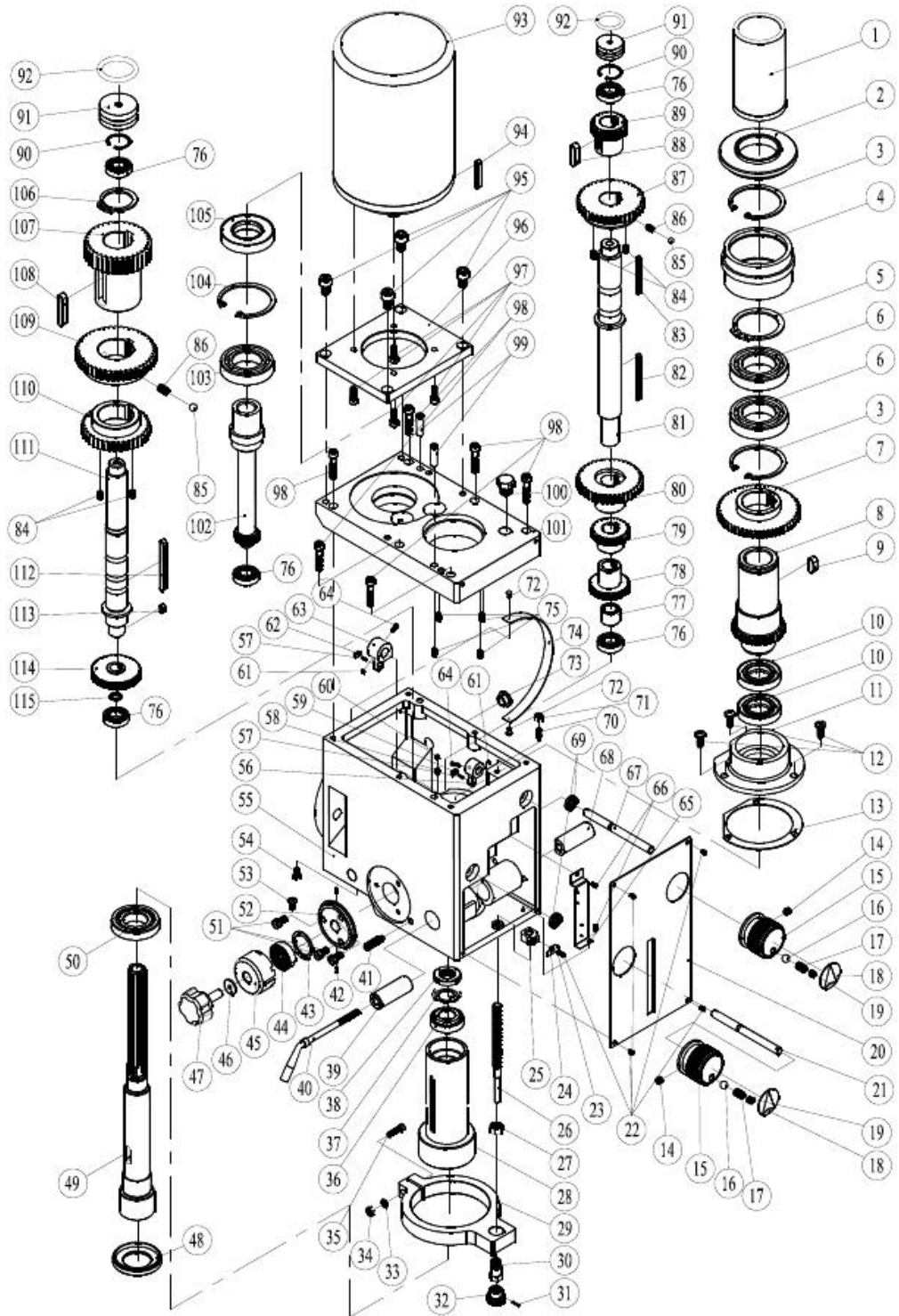




### Base and worktable part list

NO	code	description	QTY	NO	code	description	QTY
1	ZX32G-01-001	Base	1	21	ZAY7025FG-01-040	panel	1
2	WMD30V-02-011	Screw	4	22	WMD30V-02-004	pointer	1
3	ZX32G-01-007	Panel	1	23	ZAY7025FG-01-050	Brake tight handle	2
4	ZX32G-01-003	Carriage	1	24	GB70-85	inner hexagon screw M8*50	1
5	GB119-2000	cylindrical pin 6*12	4	25	ZAY7025FG-01-019 /Ø19E	nut	1
6	HY7310.12-1	Hand shank B-M8*63	2	26	GB70-85	inner hexagon screw M6*25	8
7	ZX32G-01-009	Y lead screw	1	27	GB118-2000	cylindrical pin 6*12	6
8	GB1096-79	key 5*16	3	28	ZX32G-01-005	lead screw base B	1
9	GB/T301-1995	Ball bearing51103	4	29	ZAY7025FG-01-035 (1)	dial cover B	1
10	GB6183-86	Lock nut M10	3	30	ZX32G-01-008	Lead screw X	1
11	HY8310.4-1	Handle M10*80	3	31	ZX32G-01-010	Table scale plate	1
12	GB96-85	gasket10	3	32	WMD20V-02-005	nut	2
13	ZAY7025FG-01-022	Hand wheel	3	33	GB70-85	inner hexagon screw M6*10	2
14	WMD20V-01-029	Leaf spring	3	34	WMD20V-02-004	Stop dog	2
15	ZX32G-01-011/011A	dial	3	35	GB70-85	inner hexagon screw M5*20	2
16	ZAY7025FG-01-021(1)	Y dial cover	2	36	ZAY7025FG-01-026/ 026E	nut	1
17	GB70-85	inner hexagon screwM8*20	2	37	GB70-85	inner hexagon screw M6*25	2
18	ZAY7025FG-01-021	Lead screw base C	1	38	ZX32G-01-006	Lead screw base A	1
19	GB1185-89	Oil cup 6	3	39	WMD30V-02-008	Pipe joint	1
20	GB70-85	inner hexagon screwM6*12	2	40	ZX32G-01-004	Work table	1

# Headstock assembly

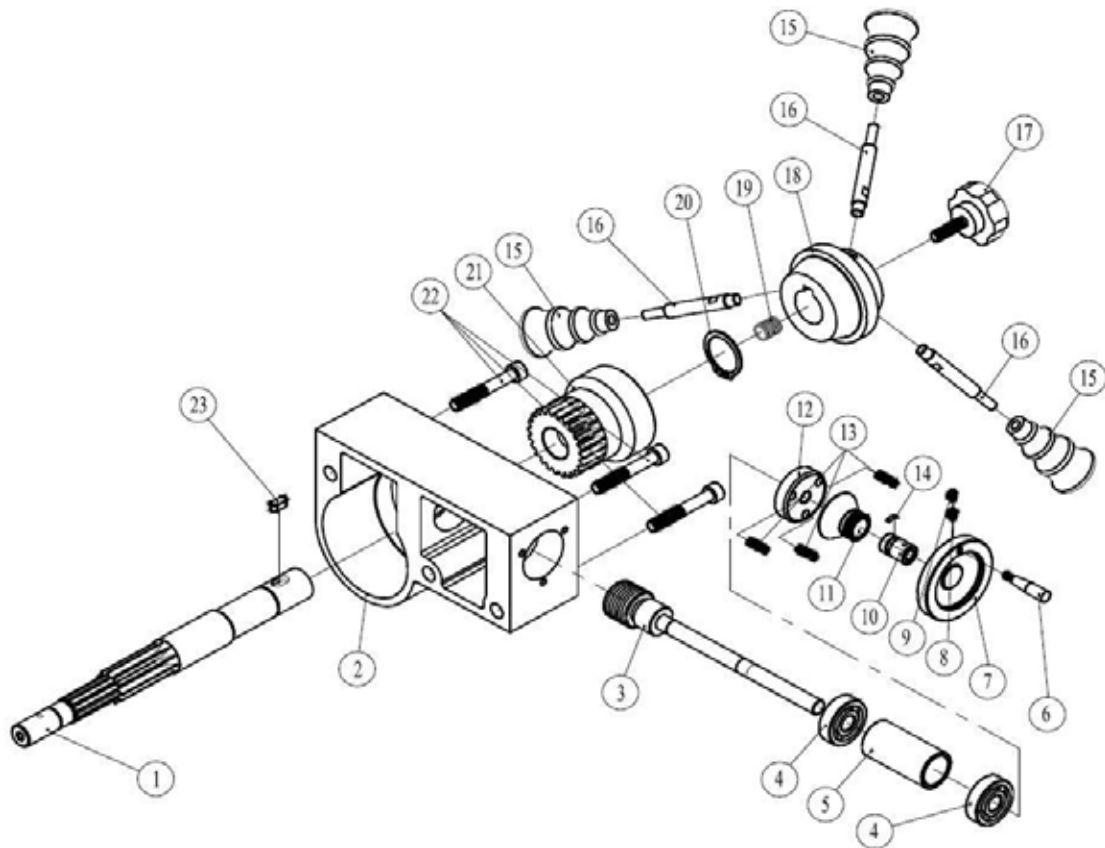


### Headstock assembly parts list

NO	code	description	QTY	NO	code	description	QTY
1	ZX32G-02-006	The spindle dustproof set	1	29	ZAY7025FG-02-030A	Support ring	1
2	ZX32G-02-005	Seal receptacle	1	30	ZAY7025FG-02-055	Barrel	1
3	GB893.1-86	Stop ring 62	2	31	GB879.1-2000	Spring round pin 3*14	1
4	ZAY7025FG-02-022	Bearing pedestal	1	32	ZAY7025FG-02-056	Nut	1
5	GB894.1-86	Stop ring 35	1	33	GB93-87	Gasket 6	1
6	GB276-94	Bearing 6007	2	34	GB41-2000	Hex nut M6	1
7	ZAY7025FG-02-025	gear	1	35	GB70-85	inner hexagon screw M6*25	1
8	ZAY7025FG-02-024	splined sleeve	1	36	GB297-94	Bearing 30205	1
9	GB1096-79	Flat key 8*14	1	37	GB858-88	Gasket 25	1
10	GB1387.1-92	Oil seal 30*42*7	2	38	GB810-88	Nut M25*1.5	1
11	ZX32G-02-028	Seal receptacle	1	39	ZX32G-02-003	Brake block A	1
12	GB818-85	Screw M5*16	3	41	GB75-85	Screw M10*35	1
13	ZX32G-02-028(1)	Gasket	1	42	GB79-86	Spring pin 3*12	2
14	GB/T78-2000	Screw M6*8	2	43	GB894.1-86	Stop ring 18	1
15	ZAY7025FG-02-029	Gear shift handle	2	44	ZAY7025FG-02-044	volute spiral spring	1
16	GB308	Ball 6.5	2	45	ZAY7025FG-02-048	Spring box	1
17	GB2089-1994	Compressed spring 08*5*25	2	46	ZAY7025FG-02-047	Spacer	1
18	ZAY7025FG-02-043	Indicator	2	47	ZAY7025FG-02-046	Screw handle	1
19	GB/T77-2000	Screw M8*8	2	48	ZAY7025FG-02-032	Spindle dustproof cover	1
20	ZX32G-00-003	Name plate	1	49	ZAY7025FG-02-033	Spindle	1
21	ZX32G-02-008	Gear shift lever B	1	50	GB297-94	Bearing 30207	1
22	TSO7380	Screw M4*6	5	51	GB818-85	Screw M5*10	3
23	GB95-85	Gasket 4	1	52	ZAY7025FG-02-045	Spring base	1
24	ZAY7025FG-02-058	Indicator	1	53	GB68-85	Screw M5*10	1
25	ZAY7025FG-02-057	Fax base	1	54	JB/ZQ4450-86	Purge cock M2*1	1
26	ZAY7025FG-02-054	Rod screw	1	55	ZX32G-02-001	Spindle box body	1
27	GB6172-2000	Hexagon thin nutM14	1	56	ZAY7025FG-02-041	Shift fork B	1
28	ZX32G-02-012	Spindle sleeve	1	57	GB879-2000	Spring round pin 4*10	2

NO	code	description	QTY	NO	code	description	QTY
58	GB75-85	Screw M6*10	1	87	ZAY7025FG-02-018	Gear	1
59	ZAY7025FG-02-010	Copper billet 2	1	88	GB1096-79	Flat key 5*16	1
60	GB77-2000	Screw M6*8	2	89	ZAY7025FG-02-016	Gear	1
61	GB41-2000	Hex nut M6	2	90	GB893.1-86	Stop ring 28	2
62	ZAY7025FG-02-037	Copper billet 1	1	91	ZAY7025FG-02-017	Sealing plug	2
63	ZAY7025FG-02-038	Fork A	1	92	GB3452.1-82	Ring0 23.6*3.55	2
64	GB70-85	inner hexagon screw M4*20	2	93		Motor	1
65	ZX32G-02-014	Micro switch bracket	1	94	GB1096-79	Flat key 6*36	1
66	GB818-2000	Screw M4*8	2	95	GB70-85	inner hexagon screw M8*12	4
67	ZX32G-02-008	Gear shift lever B	1	96	ZX32G-02-010	Motor plate	1
68	ZX32G-02-004	Brake block B	1	97	GB70-85	inner hexagon screw M6*16	4
69	GB8977.1-88	framework oil seal10*22*7	2	98	GB70-85	inner hexagon screw M6*40	6
70	GB75-85	Screw M6*20	1	99	GB118-2000	Taper pin 8*35	2
71	GB41-2000	Hex nut M6	1	100	ZAY7025FG-02-049	Oil dam	1
72	GB827-86	Rivet 2.5*5	2	101	ZX32G-02-002	Case cover	1
73	GB8316.2	Oil pointer BM16*1.5	1	102	ZAY7025FG-02-002	Motor shaft	1
74	ZX32G-02-013	Angle gauge	1	103	GB276-94	Bearing 6006	1
75	GB71-85	Screw M5*10	4	104	GB893.1-86	Stop ring 55	1
76	GB276-94	Bearing 6001-Z	5	105	GB1387.1-92	Oil seal 30*55*10	1
77	ZAY7025FG-02-35	Spacer bush	1	106	GB894.1-86	Stop ring 16	1
78	ZAY7025FG-02-005	Gear	1	107	ZAY7025FG-02-012	gear	1
79	ZAY7025FG-02-009	Gear	1	108	GB1096-79	Flat key 6*25	1
80	ZAY7025FG-02-013	Gear	1	109	ZAY7025FG-02-011	Gear	1
81	ZAY7025FG-02-015	Transmission shaft 2	1	110	ZAY7025FG-02-007	Gear	1
82	GB1096-79	Flat key 5*70	1	111	ZAY7025FG-02-006	Transmission shaft	1
83	GB1096-79	Flat key 5*36	1	112	GB1096-79	Flat key 5*60	1
84	GB71-85	Screw M5*10	4	113	GB1096-79	Flat key 5*10	1
85	GB308-89	Ball 6.5	2	114	ZAY7025FG-02-003	Gear	1
86	ZAY7025FG-02-008	Spring	2	115	ZAY7025FG-02-036	Spacer bush	1

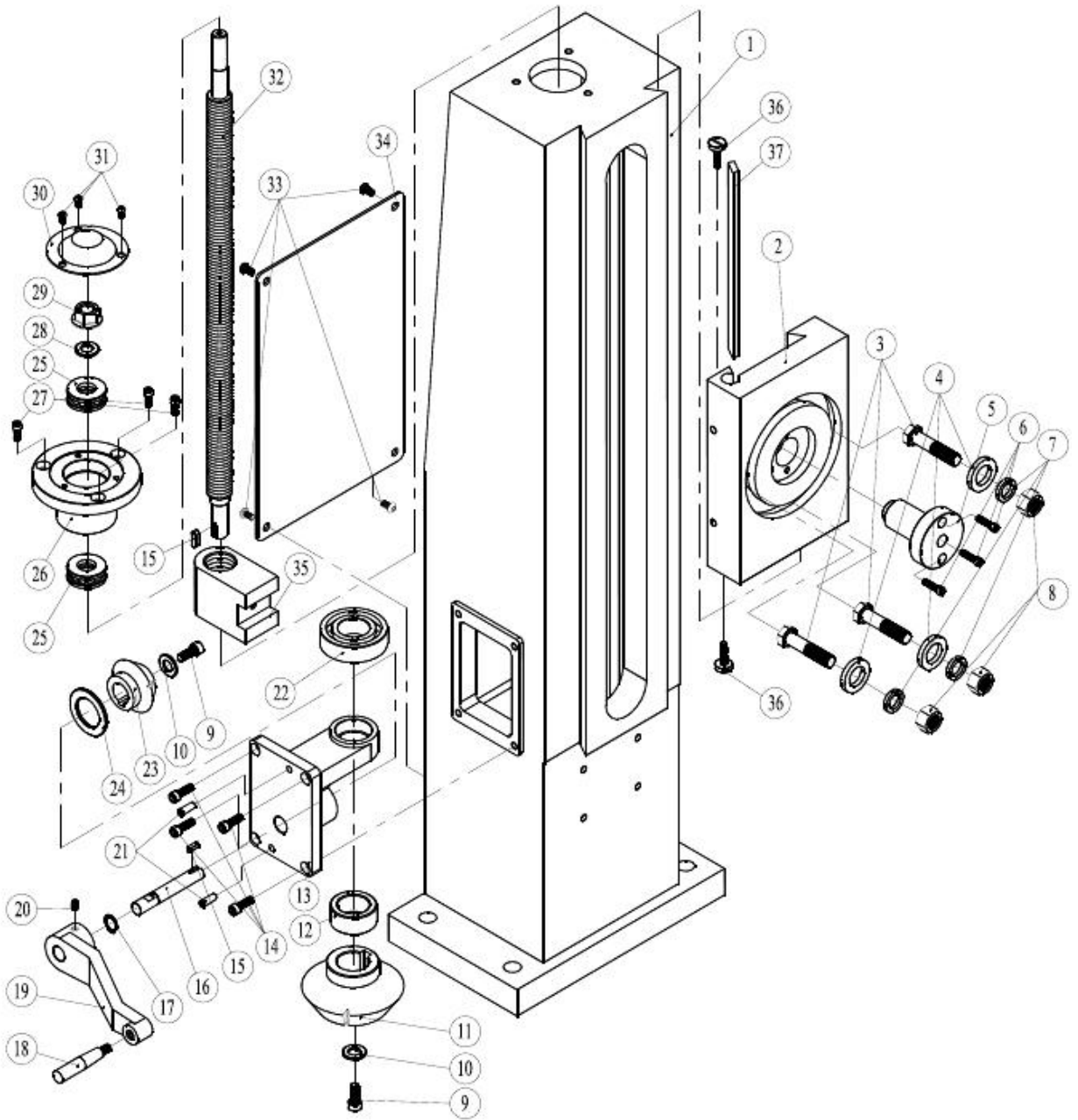
## Micro-feeding assembly



### Micro-feeding assembly part list

NO	code	description	QTY	NO	code	description	QTY
1	ZX32G-03-001	Axis	1	13	GB70-85	inner hexagon screw M4*16	3
2	ZAY7025FG-03-004A	Feeding base	1	14	ZAY7025FG-01-036	reed	1
3	ZAY7025FG-03-003A	Worm	1	15	WMD20V-01-047	Handle cover	3
4	GB276-94	bearing 6200	2	16	ZAY7025FG-03-014	Handle lever	3
5	ZAY7025FG-03-009A	Bush	1	17	ZAY7025FG-03-008	Handle	1
6	GB4141.1-84	Hand shank BM6*40	1	18	ZAY7025FG-03-006	Hand base	1
7	ZAY7025FG-03-012	Hand wheel	1	19	ZAY7025FG-03-005	Spring	1
8	GB77-2000	Screw M6*8	1	20	GB894.1-86	Check ring 35	1
9	GB77-2000	Screw M6*5	1	21	ZAY7025FG-02-002A	Worm gear	1
10	ZAY7025FG-03-013A	Calibration loop	1	22	GB70-85	inner hexagon screw M8*55	3
11	ZAY7025FG-03-011A	Calibration	1	23	GB1096-79	keys 8*16	1
12	ZAY7025FG-03-010A	Worm cover	1				

# Column assembly



### Column assembly part list

NO	code	description	QTY	NO	code	description	QTY
1	ZX32G-04-001	column	1	20	GB/T77-2000	Screw M8*12	1
2	ZX32G-04-002	Connection base	1	21	GB118-2000	Taper pin 6*18	2
3	GB5780-2000	Hexagon bolt M12*55	3	22	GB/T276-94	Bearing 6002	1
4	GB95-85	Flat washer 12	3	23	ZX32G-04-014	Bevel ring B	1
5	ZX32G-04-010	Connection base	1	24	ZX32G-04-007	Adjust pad	1
6	GB70-85	Inner hexagon screwM6*25	3	25	GB/T301-1995	Ball bearing51202	2
7	GB97-85	Spring washer 12	3	26	ZX32G-04-004	Screw base	1
8	GB41-2000	Hex nut M12	3	27	GB70-85	Inner hexagon screwM6*16	3
9	GB70-85	Inner hexagon screwM6*14	2	28	GB95-85	Flat washer 14	1
10	GB96-85	gasket 6	2	29	GB6138-86	Locknut M14	1
11	WMD20A-01-011	Bevel gear B	1	30	ZX32G-04-004	Top cover	1
12	ZX32G-04-013	Bush	1	31	ISO7380	screw M4*8	3
13	ZX32G-04-005	Screw base	1	32	ZX32G-04-003	Lifting screw	1
14	GB70-85	Inner hexagon screwM6*20	4	33	ISO7380	Bolt M5*8	4
15	GB1096-79	key 5*16	2	34	ZX32G-04-011	Backboard	1
16	ZX32G-04-009	Lifting shaft	1	35	ZX32G-04-012	Lifting nut	1
17	GB894.1-86	Check ring 15	1	36	WMD30V-02-011	Bolt	2
18	JB7270.5-1994	Long handle M10*80	1	37	ZX32G-04-015	Column paner	1
19	ZX32G-04-008	Handle	1				