

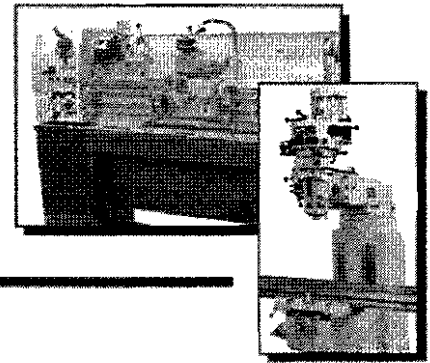


MACHINERY DIVISION

6465 18 MILE ROAD
STERLING HEIGHTS, MI 48314

PHONE:
(586) 731-3600 • 1-800-860-1740

FAX:
(586) 731-7464 • 1-800-862-1740



MODEL RD-1000 DRILL PRESS

THANK YOU FOR PURCHASING WITH KBC MACHINERY. ALL KBC MACHINES ARE BACKED BY OUR 1 YEAR PARTS REPLACEMENT WARRANTY. WHEN USED AS INTENDED, AND WITH PROPER MAINTENANCE THIS MACHINE WILL PROVIDE YOU WITH YEARS OF TROUBLE-FREE SERVICE. IF YOU NEED PARTS SIMPLY FILL OUT THE PARTS REQUEST FORM, AND FAX OR E-MAIL YOUR REQUEST. ALL OTHER QUESTIONS PLEASE CONTACT US @ :

**KBC MACHINERY
6465 18 MILE ROAD
STERLING HEIGHTS, MI 48314
PH (800) 860-1740
FAX (800) 862-1740
MACHINERY@KBCTOOLS.COM
WWW.KBCTOOLSANDMACHINERY.COM**



PARTS REQUEST FORM

YOUR COMPANY NAME: _____

STATE/PROVINCE _____

YOUR NAME _____

PHONE # + EXT _____

FAX # _____

MACHINE INFO:

MAKE/MANUFACTURER _____

MODEL NUMBER _____

YEAR MADE _____

SERIAL# _____

PARTS REQUESTED:

PART#

DESCRIPTION

PLEASE INCLUDE COPY(S) OF THE PARTS DRAWING FROM THE
MANUAL AND CIRCLE THE PARTS NEEDED

FAX PARTS REQUEST TO (800) 862-1740

E-MAIL PARTS REQUEST TO: machinery@kbctools.com

THANKS; KBC MACHINERY - MICHIGAN

RD-1000

TEST CERTIFICATE
FOR
RADIAL DRILLING MACHINE MODEL Z3032x10

Max. DRILLING DIAMETER: 32 mm

SERIAL: NUMBER: 3 0 3 0 4 8 J

RADIAL DRILLING MACHINE MODEL ^{Z3025×10A}
_{Z3032×10}

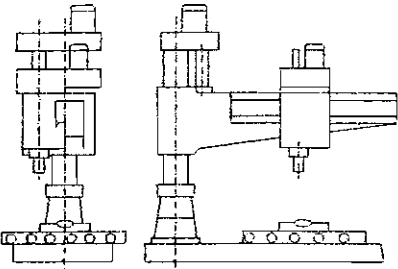
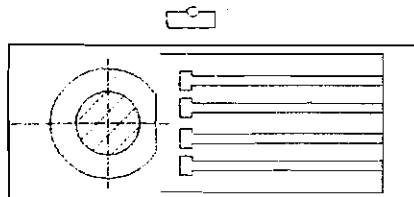
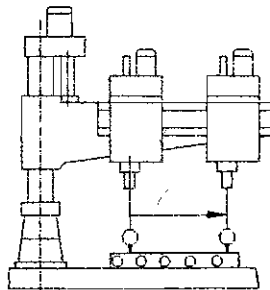
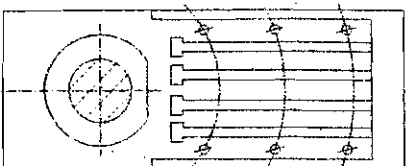
LIST OF SPAER PARTS

SERIAL NO: 3 0 3 0 4 8 1

GUILIN ZHENGLING NO. 2 MACHINE CO., LTD

GUILIN ZHENGLING NO.2 MACHINE CO., LTD	Test Certificate for Radial	
	Drilling Machine Model Z3032×10	P·1

GB/T4017-1997

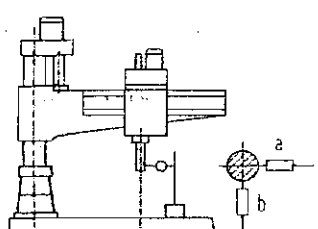
NO	Diagram	Object	Permissible (mm)	Actual
G0		A—BASE PLATE Leveling of the base plate	0.1/1000	0.05
G1		Checking of flatness of the base plate	0.1 for a measuring length of 1000 (flat to concave)	0.07
G2		B - ABM Checking of parallelism of the Saddle movement to the base plate	0.3 for any measuring length over 1000	0.18
G3		Checking of radial moment of arm parallel to base plate at three positions of saddle equally spaced along movement of arm	0.5 for any measuring length over 300	0.05

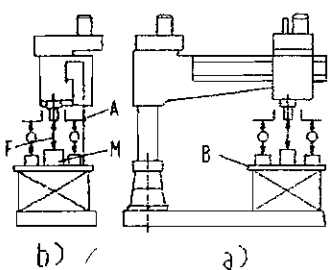
GUILIN ZHENGLING NO.2 MACHINE CO., LTD		Test Certificate for Radial Drilling Machine Model Z3032 × 10		P • 2	
NO	Diagram	Object	Permissible (mm)	Actual	
G4		C - SPINDLE Measurement of run-out of the internal taper of the spindle (spindle retracted): a) at the mouth of taper b) at a distance of $l=300\text{mm}$ (12 in) from the spindle nose	a) 0.025 b) 0.05	0.02 0.04	
G5		Checking of squareness of the spindle axis to the base plane	0.2/1000	0.15	
G6		Checking of squareness of the vertical movement of the spindle to the base plate: a) in a plane parallel to the plane of symmetry of the machine; b) in the plane perpendicular to the plane of symmetry of the machine	a) 0.1/300 b) 0.05/300	0.07 0.05	

GUILIN ZHENGLING NO.2 MACHINE CO., LTD	Test Certificate for Radial	
	Drilling Machine Model Z3032×10	P·3

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NO	Diagram	Object	Permissible (mm)	Actual
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G7		Displacement of The spindle axis when column and spindle head are clamped	a) 0.06 b) 0.10	0.04 0.06
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PI	 <p>A—Special equipment B— Base of the load cell M— The load cell F— The axial force is 900kg</p>	Measurement of deflect-on of the spindle axis from its position square with the table under an axial force applied to the spindle: a) in a plane parallel to the plane of symmetry of the machine b) in a plane perpendicular to the plane of symmetry of the machine	3/1000	2.32
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GUILIN ZHENGLING
NO.2 MACHINE CO., LTD

Test Certificate for Radial
Drilling Machine Model Z3032×10

P·4

The Radial Drilling Machine Model Z3032×10 had been tested according to the specified standard (GB/T4017-1997) and technical requirements and found satisfactory for dispatch. Serial NO:

Checked by:

檢驗員 13

Chief of inspection department:

田

Director of works:

蔡
昭

Date:

2006

3

7

List for repairing assistant part

Drawing No.	Name	Material	Pcs	Remark
21020	Spindle guide bush	HT200	1	
21304	Helical gear	40Cr	1	
21306	Helical gear	40Cr	1	
22011	Shift fork	HT200	1	
22012	Sleeve	HT200	1	
22013	Sleeve	HT200	1	
23017	Worm wheel	HT300	1	
23303	Worm shaft	45	1	
26304	Spindle sleeve	45	1	
26305	Spindle	40Cr	1	
27304A	Gear	45	1	
27318	Gear shaft clutch	45	1	
23306A	Clutch (down)	20Cr	1	
23317A	Clutch (up)	20Cr	1	

RD-1000

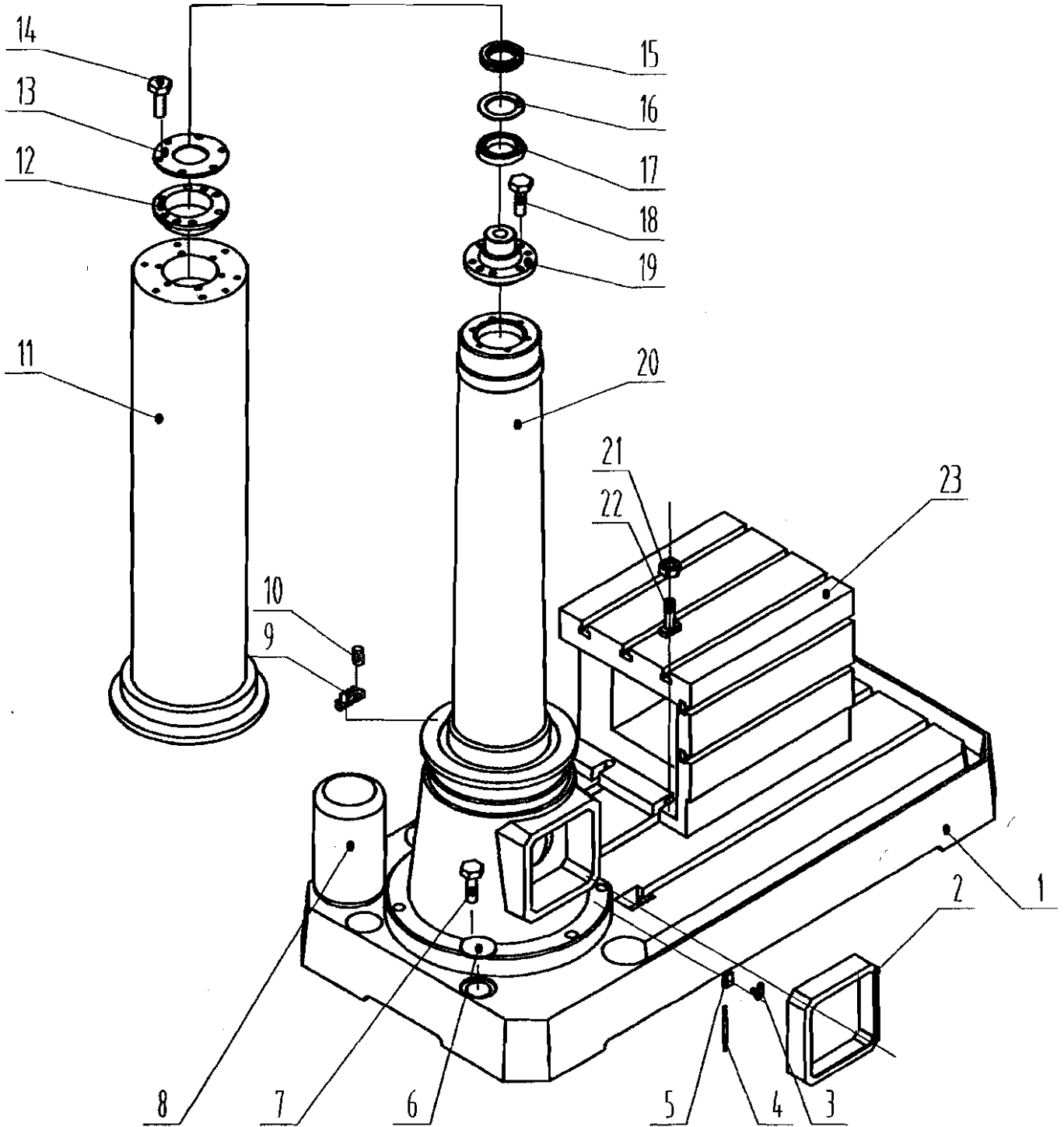
LIST OF SPAER PARTS
FOR
RADIAL DRILLING MACHING MODEL Z3032×10

Max. DRILLING CIAMETER: 32mm

SERIAL NUMBER: 3 0 3 0 4 8

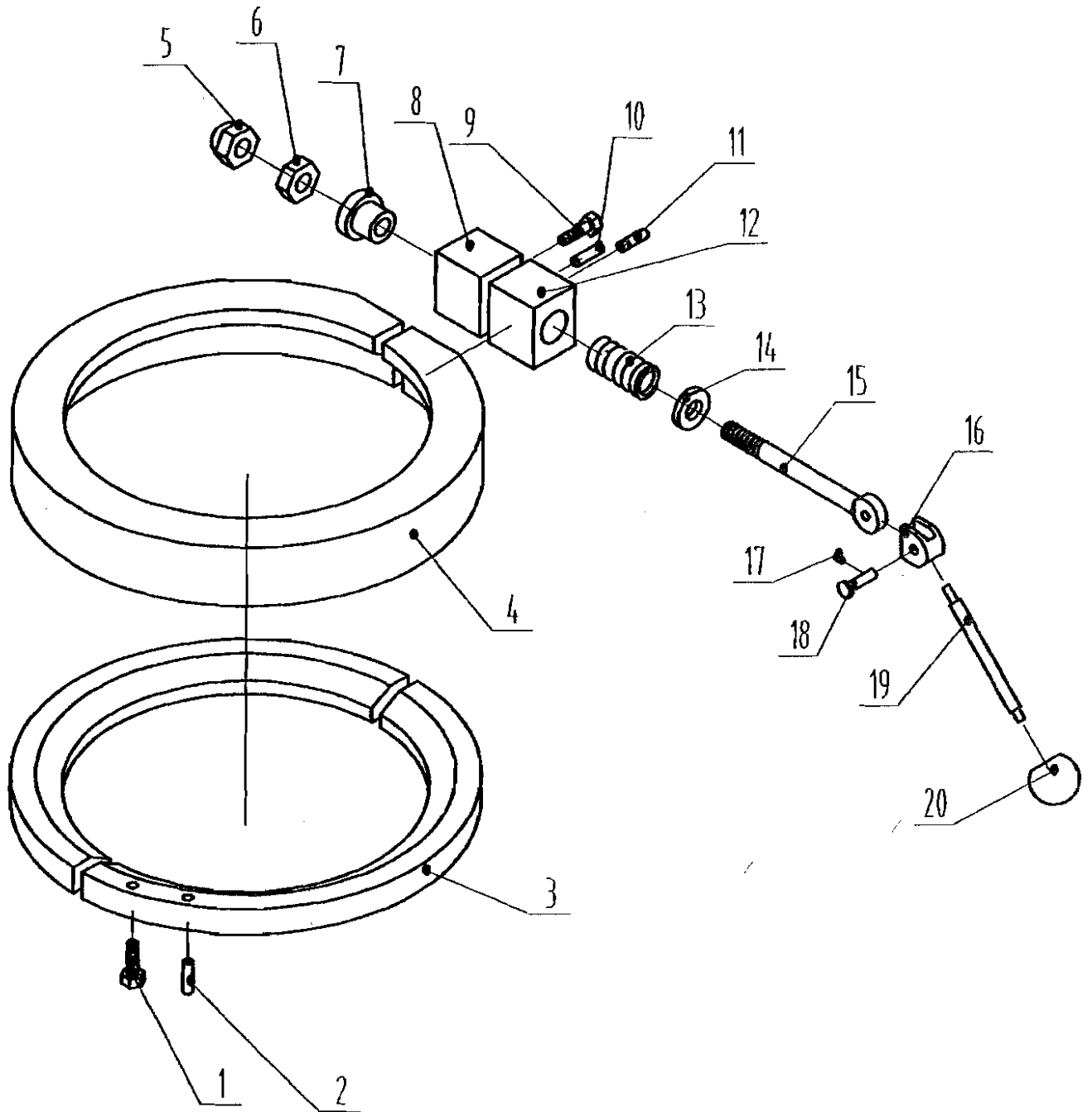
NO •	SER NO •	Description	Qty	Remarks
1	27011	Bed	1	
2	29011B	Cover of the Electrical Door	1	
3	GB68	Bolt	8	M4×14
4	29326	Turning Shaft	1	
5	SZS72-2-31	Hinge	4	20
6	47321	Cover	4	
7	GB21	Bolt	6	M20×80
8	AOB-25	Electrical Pump	1	600W 2000r/min
9	SZSQ75-1	Separator	16	
10	SZSQ75-2	Rolling Column	16	
11	27015	Outer Column	1	
12	27017	Eccentric Sleeve	1	
13	27302	Round Flat Spring	1	
14	GB70	Bolt	6	M14×40
15	8113	Single-Row Thrust Ball Bearing	1	65×90×18
16	27301	Washer	1	
17	113	Single-Row Radial Bearing	1	65×100×18
18	GB21	Bolt	6	M12×35
19	27016	Top of the Column	1	
20	27012A	Inner Column	1	
21	GB52	Flat Nut	2	M20
22	GB37	T-Head Bolt	2	M20×95
23	200011	Box Bench	1	

COLUMN & BED

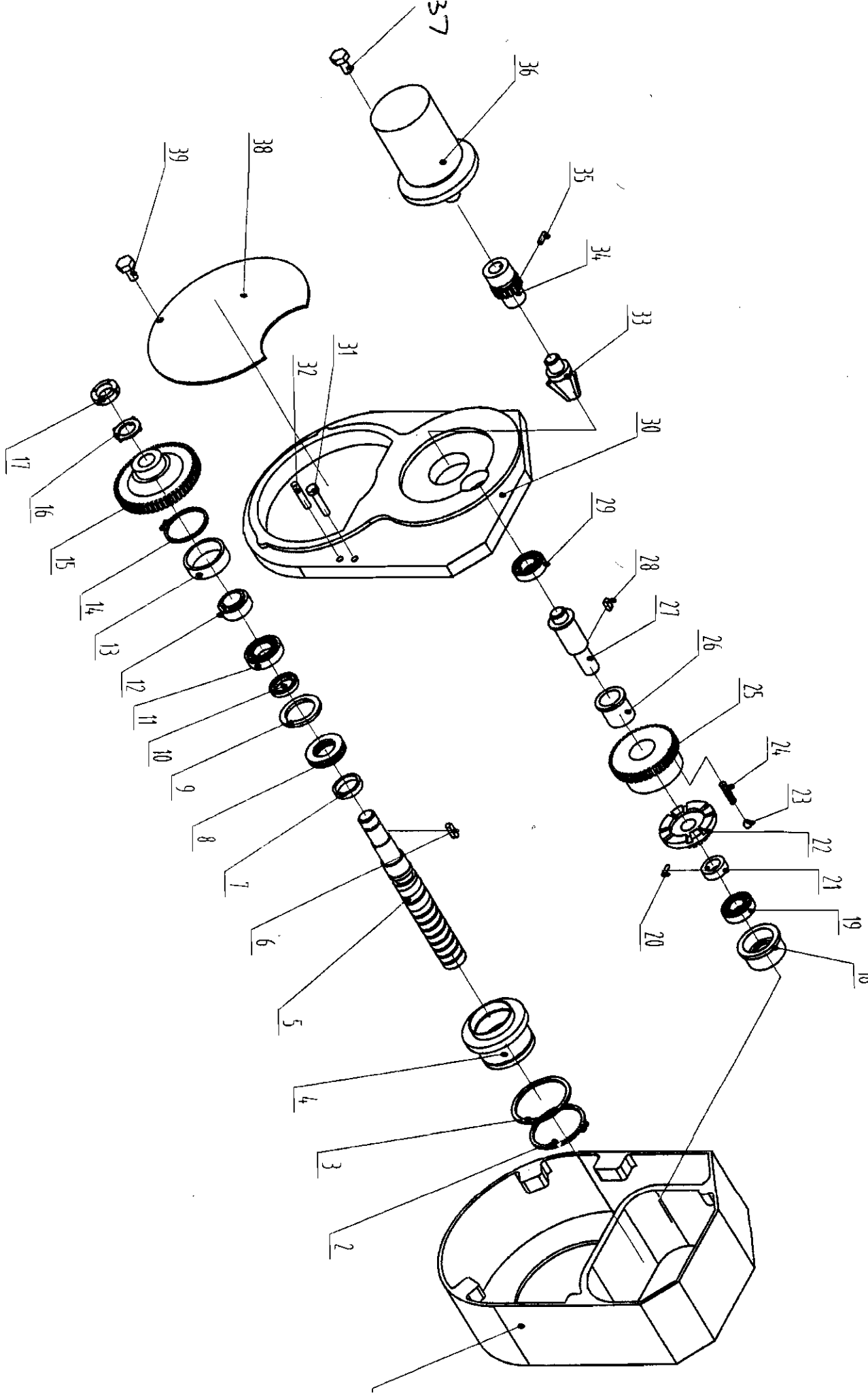


NO •	SER NO •	Description	Qty	Remarks
1	GB70	Blot	8	M8×30
2	GB118	Conic Pin	4	8×40
3	27013	Clamping Ring	1 set	
4	27014	Clamping Ring	1	
5	GB923	Domed Nut	1	
6	GB52	Flat Nut	1	M16
7	GB849	Spherical Washer	16	
8	27312	Clamping Lump	1	
9	GB70	Bolt	4	M6×50
10	GB120	Cylindrical Pin	8	8×55
11	GB75	Bolt	1	M8×20
12	27313	Clamp Ping	1	
13	Q81-1	Compression Spring	1	2×25×200
14	27326	Washer Lump	1	
15	27315	Ball-Head Screw		
16	27316	Eccentric	1	
17	GB882	Pin Shaft	1	16f9×50
18	GB91	Looking Pin	1	4×20
19	27317	Lever	1	
20	Z16-1	Plastic Knob	1	M12×40

COLUMN CLAMP MECHANISM

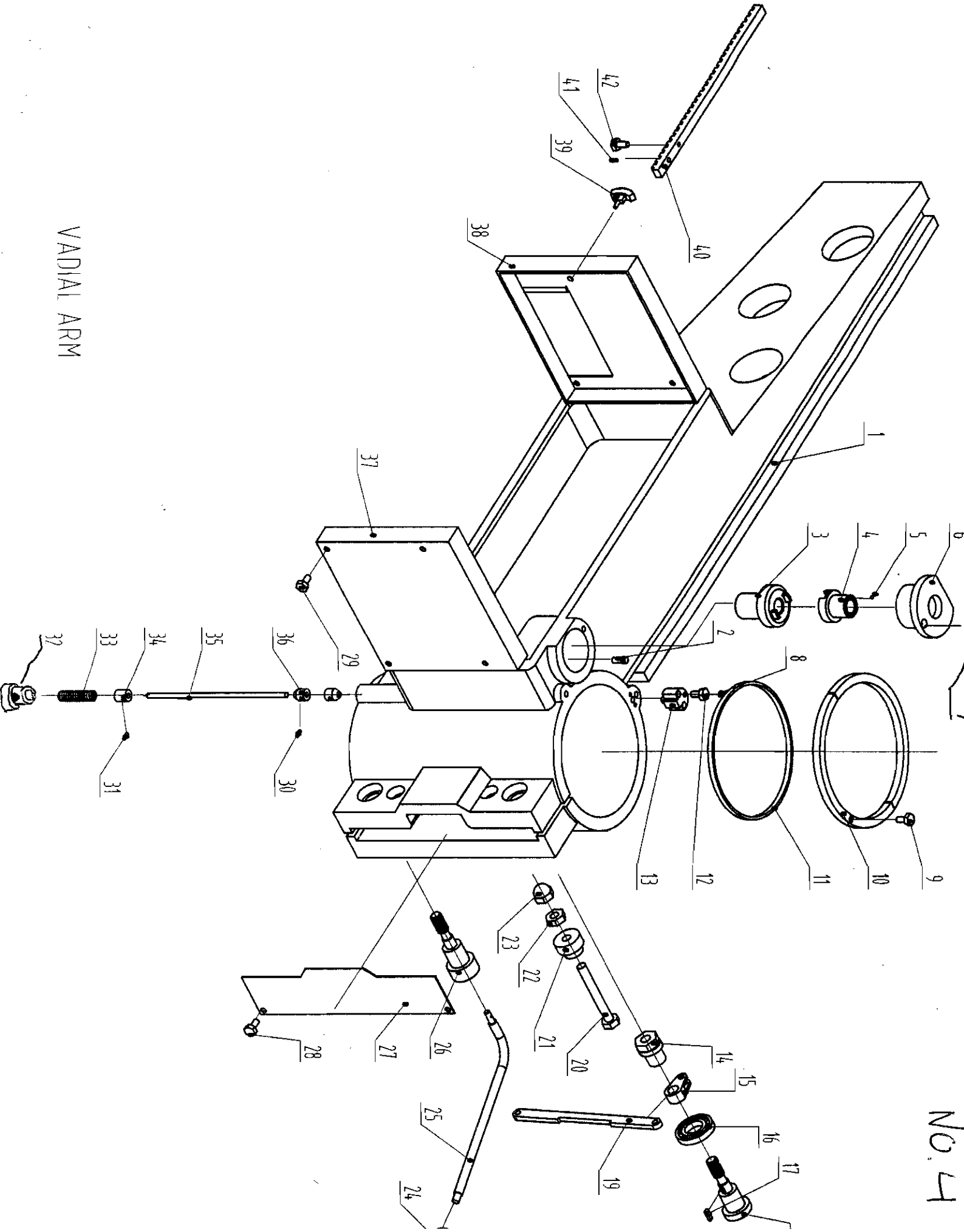


NO	SER NO	Description	Qty	Remarks
1	27018	Elevating Gear Box	1	
2	GB894	Shaft Spring Retainer	1	70
3	GB51-2A	O-Ring	1	80×3.1
4	27310	Bearing Seat	1	
5	27314	Lead Screw	1	
6	GB1096	Flat Key	1	6h9×6×25
7	27311	Washer	1	
8	8106	Single-Row Thrust Ball Bearing	1	30×47×11
9	27308	Washer	1	
10	27309	Washer	1	
11	105	Single-Row Radial Ball Bearing		
12	27306	Nut	1	
13	27307	Sleeve	1	
14	GB893	Hole Spring Retainer	1	55
15	27305	Gear	1	
16	GB858	Stop Motion Washer	1	22
17	GB812	Round Nut	1	M22×1.5
18	27021	Sleeve	1	
19	104	Single-Row Radial Ball Bearing	1	20×42×12
20	27319	Washer		
21	GB119	Cylindrical Pin	1	4×30
22	27318	Gear Clutch	1	
23	GB308	Steel Ball	1	10/16"
24	Q811-1	Compression Spring	10	1.6×10×35
25	47314	Gear	1	
26	47023	Shaft Sleeve	1	
27	27320	Small Shaft	1	
28	GB1096	Flat Key	1	6h9×6×16
29	104	Single-Row Radial Ball Bearing	2	20×47×12
30	27019	Elevating Gear Box Cover	1	
31	GB70	Bolt	5	M8×30
32	GB118	Table Pin	3	8×40
33	27022A	Splattering Implement	1	
34	27304A	Gear	1	
35	GB71	Bolt	1	
36	Y802-4	Motor	2	p=750W n=1390r/min
37	GB21	Bolt	4	M10×28
38	27303	Cover	1	
39	GB67	Half-Head Bolt	3	M6×10



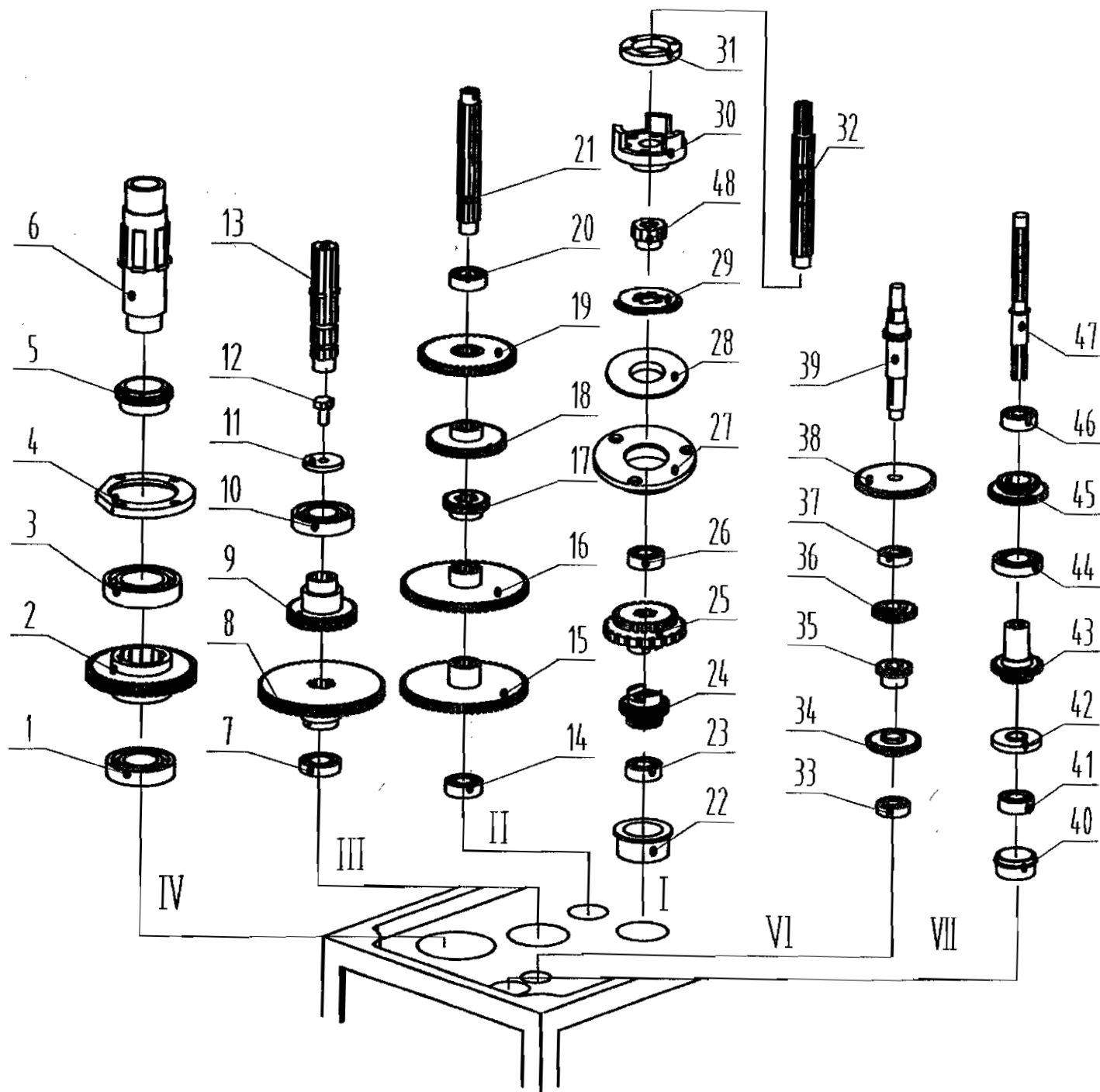
NO	Ser NO	Description	Qty	Remarks
1	28011	Arm	1	
2	28306	Collide Pin	1	
3	28311	Elevating	1	
4	28015	Inserance Nut	1	
5	GB308	Sleet Ball	16	10Vb
6	28014	Pressure Ring	1	
7	GB70	Bolt	5	M10×16
8	GB118	Conic Pin	1	8×40
9	GB65	Bolt	16	M5×16
10	28016	Pressure Ring	2 set	
11	28902	Scraper Ring	2	
12	GB70	Bolt	2	M6×35
13	28303	Guiding Key	2	6d4×6×16
14	28012A	Nut	2	
15	28307	Locking Board	2	
16	8107	Single-Row Thrust Ball Bearing	2	35×52×12
17	GB1096	Flat Key	2	6d4×6×16
18	28310	Locking Shaft	1	
19	28308	Connecting Rod	1	
20	GB21	Bolt	2	M16×130
21	GB97	Finishing Washer	2	16
22	GB52	Finishing Nut	2	M16
23	GB923	Domed Nut	2	M16
24	Z16-1	Plastic Knob	1	M12×20
25	28302	Lever	1	
26	28304	Lever Seat	1	
27	28301	Board	1	
28	GB67	Half-Head Board	6	M6×10
29	GB70	Bolt	1	M6×45
30	GB71	Bolt	2	M4×6
31	GB877	Conic Pin	1	2×12
32	48305	Bolt	1	
33	Q81-1	Compression Spring	2	1.2×12×32
34	48307	Washer	1	
35	28312	Collide Rod	1	
36	28013	Spacing Sleeve	2	
37	28313A	Assembling Design of Right Box Cover	1	
38	28314A	Assembling Design of Right Box Cover	1	
39	MS305	Lock	1	h=35
40	28305	Rack	2	
41	GB118	Conic Pin	4	8×25
42	GB70	Bolt	4	M6×16

VADIAL ARM

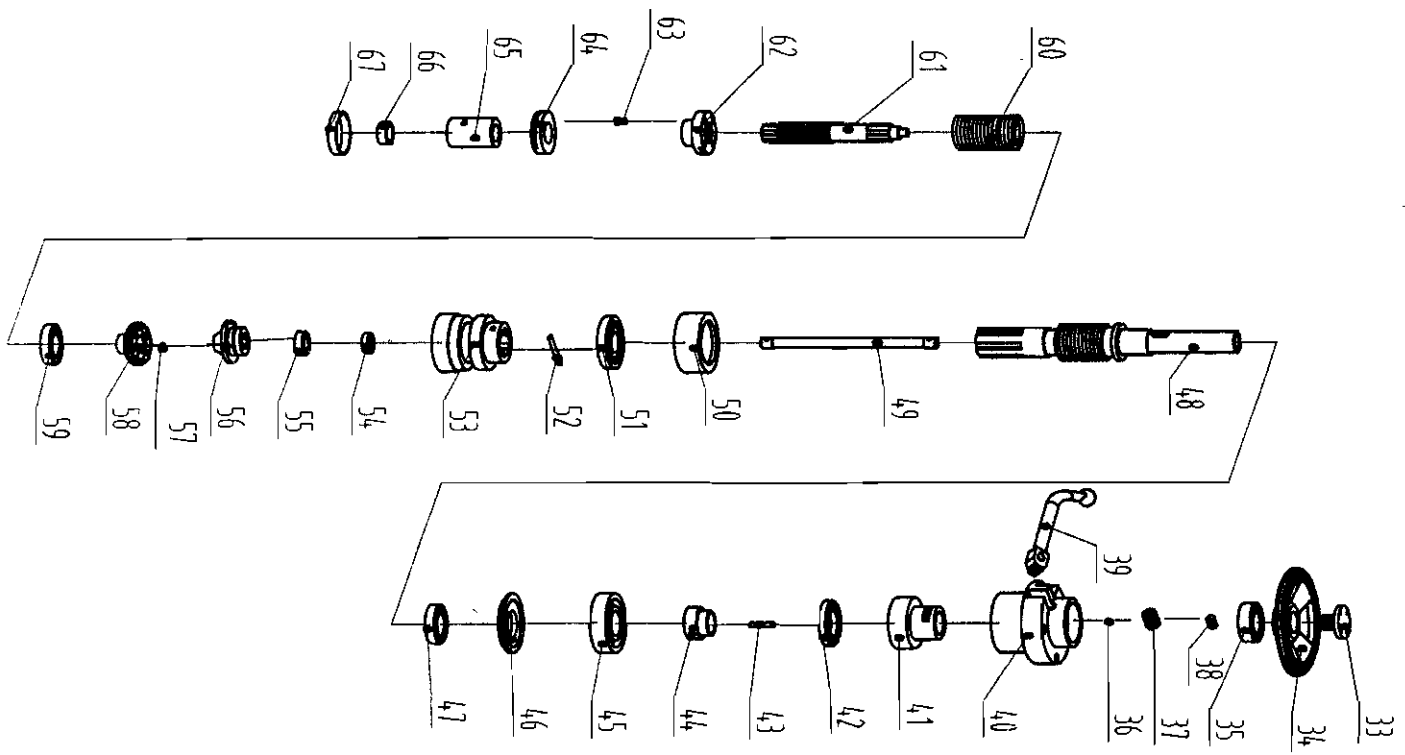
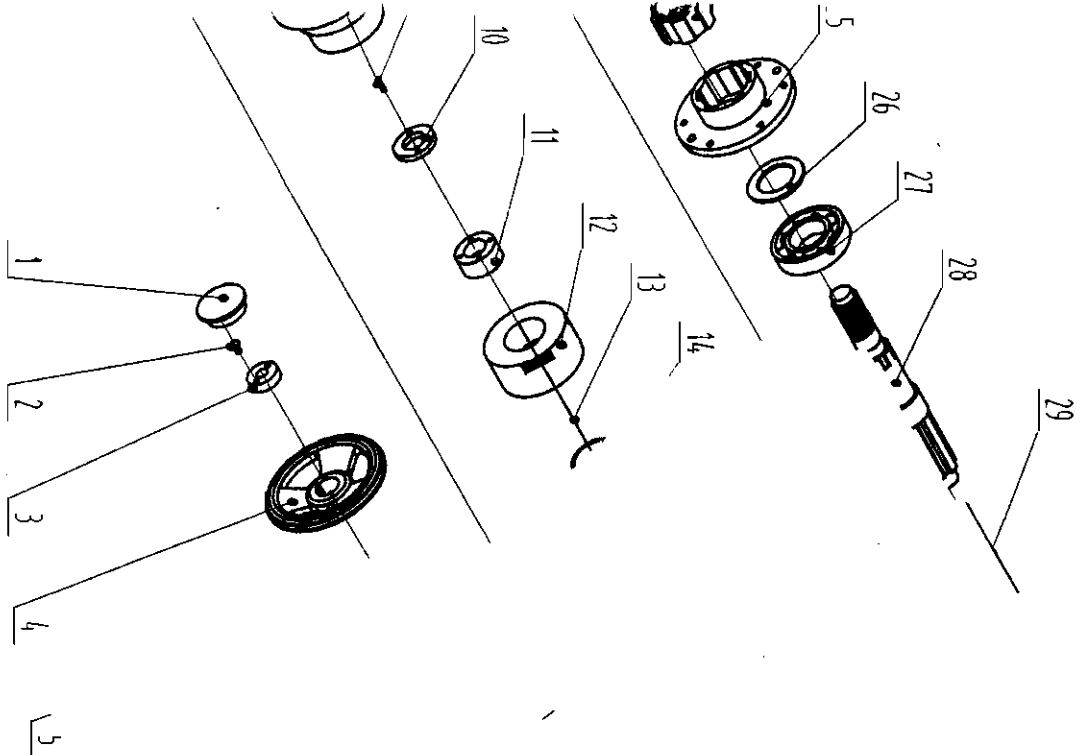


NO •	Ser NO •	Description	Qty	Remarks
1	208	Single-Row Radial Ball Bearing	1	40×80×18
2	21304	Helical Gear	1	
3	50210	Single-Row Radial Ball Bearing	1	50×90×20
4	21012	Pressure Cover	1	
5	21303	Gear	1	
6	21020	Spindle Guiding Sleeve	1	
7	205	Single-Row Radial Ball Bearing	1	25×52×15
8	21327	Double Cluster Gear	1	
9	21306	Helical Gear	1	
10	52027	Single-Row Radial Ball Bearing	1	35×72×17
11	21305	Retainer	1	
12	GB30-76	Bolt	1	M10×25
13	21325	Shaft III	1	
14	50204	Single-Row Radial Ball Bearing	1	20×47×14
15	21320	Gear	1	
16	21321	Gear	1	
17	21322	Gear	1	
18	21323	Gear	1	
19	21324	Gear	1	
20	204	Single-Row Radial Ball Bearing	1	20×47×14
21	21319	Shaft II	1	
22	21017	Bearing Seat	1	
23	204	Single-Row Radial Ball Bearing	1	20×47×14
24	21315	Double Cluster Gear	1	
25	21318	Double Cluster Gear	1	
26	204	Single-Row Radial Ball Bearing	1	20×47×14
27	21016	Bearing Seat	1	
28	21030	Washer	1	
29	a • 21312	Outer Friction Disc	6	
	b • 21313	Inner Friction Disc	7	
30	21309	Clutch Body	1	
31	21310	Nut	1	
32	21316A	Shaft	1	
33	50202	Single-Row Radial Ball	1	15×35×11

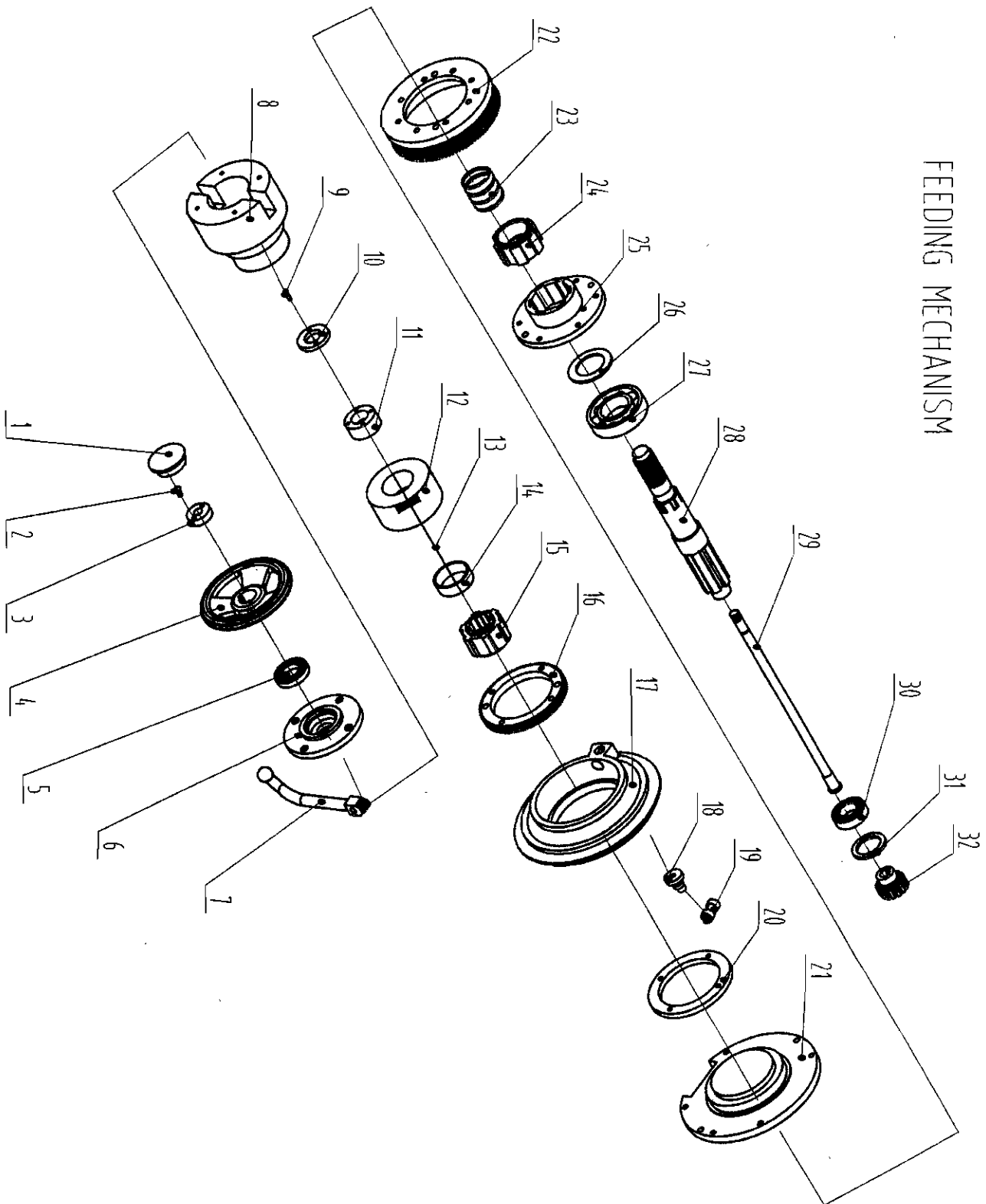
UPPER GEAR BOX



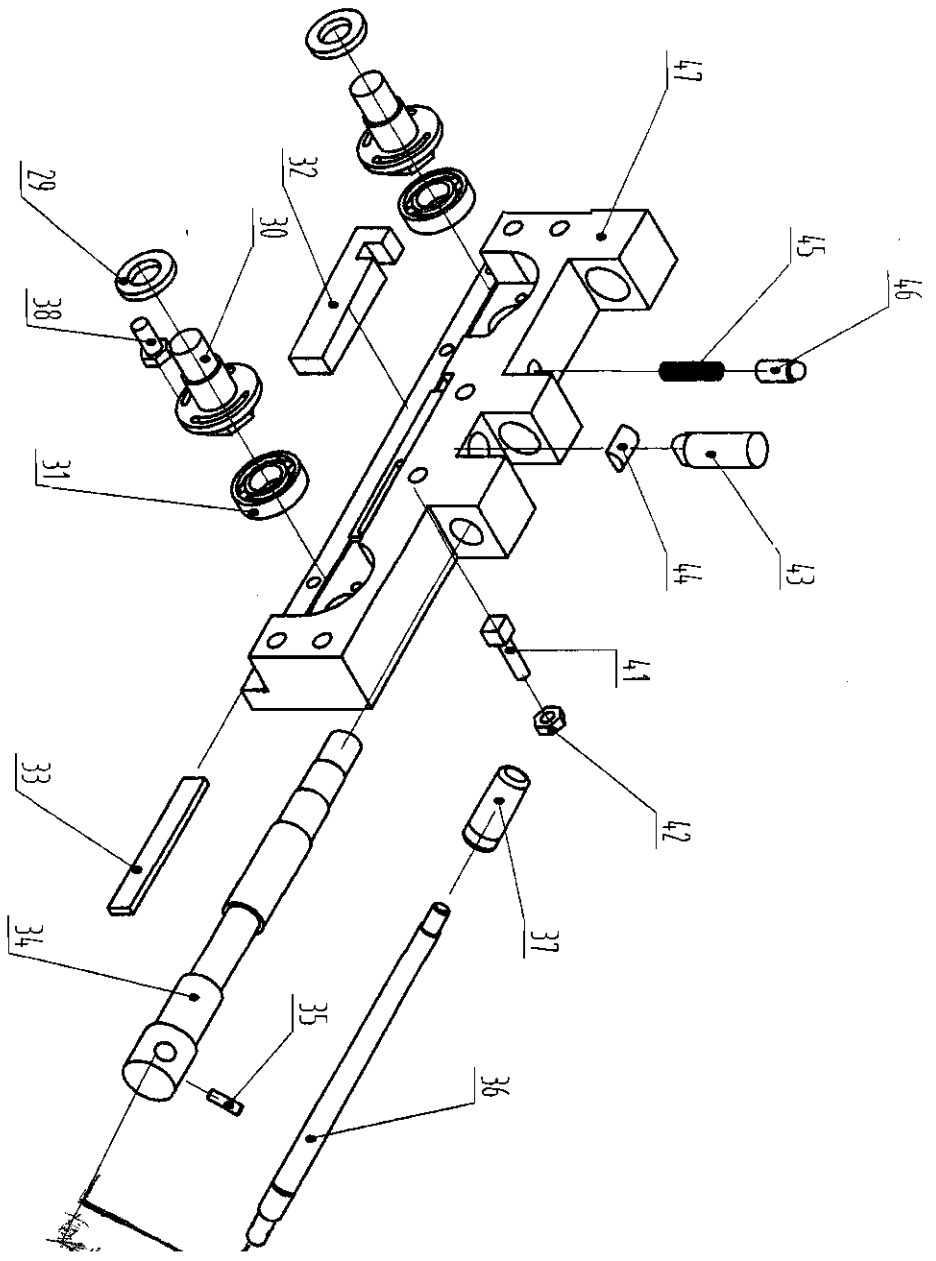
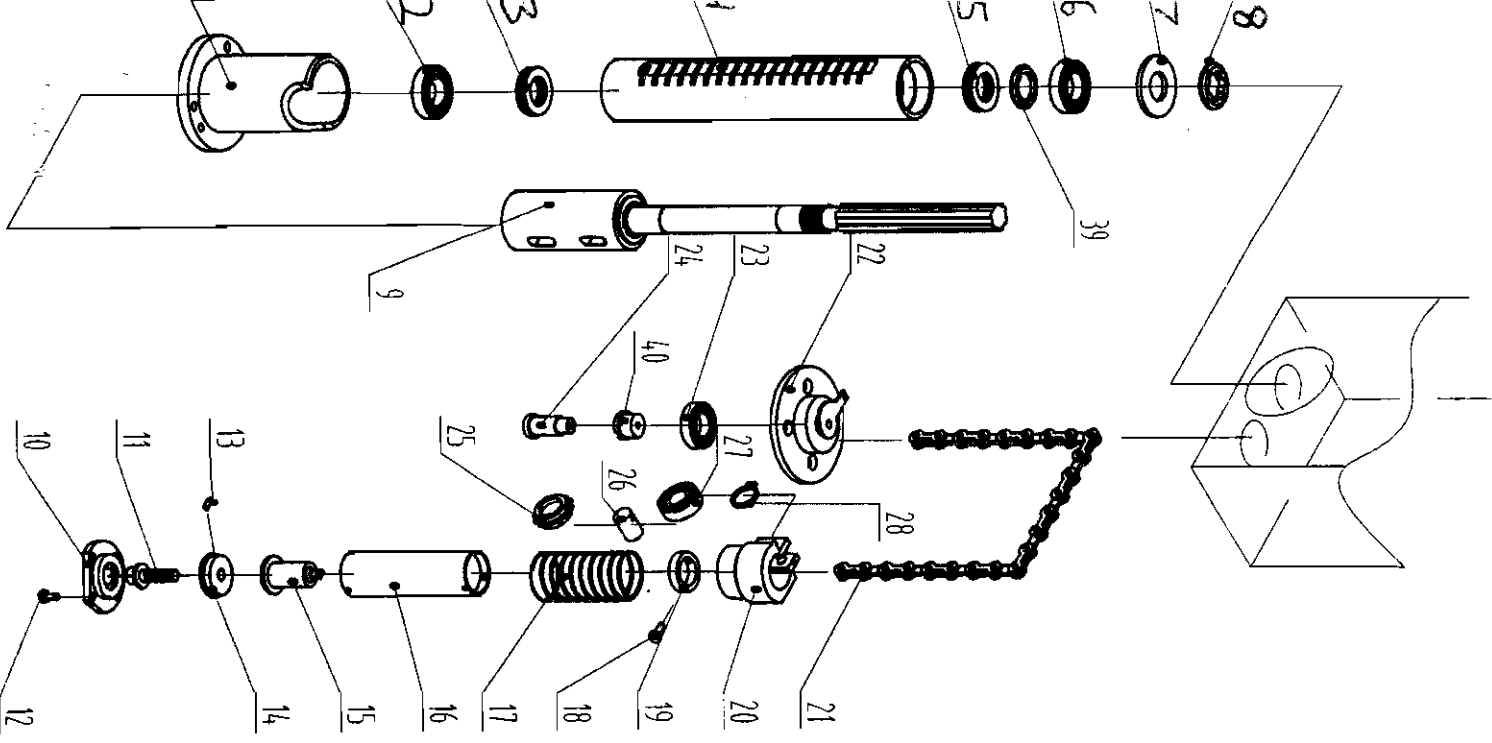
		Bearing		
34	22313	Gear	1	
35	22311	Gear	1	
36	22309	Gear	1	
37	202	Single-Row Radial Ball Bearing	1	15×35×11
38	22308	Gear	1	
39	22312	Gear Shaft	1	
40	22302	Bearing Seat	1	
41	104	Single-Row Radial Ball Bearing	1	20×42×12
42	22303	Blocking Oil Washer	1	
43	22305	Gear	1	
44	7000106	Single-Row Radial Ball Bearing	1	30×55×9
45	22307	Gear	1	
46	303	Single-Row Radial Ball Bearing	1	17×47×14
47	22304	Shaft	1	
48	21314	Clutch Washer		



FEEDING MECHANISM



NO •	Ser NO •	Description	Qty	Remarks
1	23327	Cover	1	
2	GB71-76	Bolt	2	M5×15
3	23328	Nut	1	
4	23018	Hand Wheel	1	
5	700015	Single-Row Radial Ball Bearing	1	25×47×8
6	23019	Cover	1	
7	23321	Hand Handle	2	
8	23020	Bearing Sleeve	1	
9	GB65-76	Bolt	2	M4×18
10	23329	Round Nut	1	
11	23330	Round Nut	1	
12	23326	Pushing Sleeve	1	
13	GB308-64	Steel Ball	36	9CIV
14	23309	Retainer	1	
15	23310	Teeth Clutch	1	
16	23325	Gear Ring	1	
17	23021	Graduation Disc	1	
18	23324	Whirl Button	1	
19	23322	Gear Lump	1	
20	23320	Redainer	1	
21	23016	Worm Sleeve	1	
22	23017	Worm Wheel	1	
23	Q81-1	Spring	1	2.5×40×46
24	23312	Teeth Clutch	1	
25	23311	Worm wheel Rind	1	
26	23319	Spacer	1	
27	208	Single-Row Radial Ball Bearing	1	40×80×18
28	23313	Horizontal	1	
29	23318	Shaft	1	
30	105	Single-Row Radial Ball Bearing	2	25×47×12
31	23316	Spacer	1	
32	23317	Gear	1	
33	43302	Bolt	1	
34	23015	Hand Wheel	1	
35	8205	Single-Row Radial Ball Bearing	1	25×47×15



SPINDLE & BALANCING MECHANISM
SPINDLE BOX CLAMPING MECHANISM

No •	Ser No •	Description	Qty	Remarks
36	GB308-64	Steel Ball	1	8DIV
37	Q81-1	Spring	1	1.2×7×16
38	GB71-76	Bolt	1	M10×12
39	43301	Hand Handle	1	
40	23011	Bearing Seat	1	
41	23302	Rack Sleeve	1	
42	7000106	Single-Row Radial Ball Bearing	1	30×55×9
43	GB119-76	Pin	1	5×35
44	23308	Sliding Sleeve	1	
45	306	Single-Row Radial Ball Bearing	1	30×72×19
46	23301	Washer	1	
47	8106	Single-Row Radial Ball Bearing	1	30×47×11
48	23303	Worm Shaft	1	
49	23307	Bull Rod	1	
50	23013	Sleeve	1	
51	107	Single-Row Radial Ball Bearing	1	35×62×14
52	GB117-76	Pin	1	5×45
53	23304	Inner Gear Sleeve	1	
54	19	Single-Row Radial Ball Bearing	1	9×24×7
55	8102	Single-Row Radial Ball Bearing	1	15×28×9
56	23316A	Clutch	1	
57	GB308-64	Steel Ball	4	10DIV
58	23317	Gear Wheel	1	
59	8106	Single-Row Radial Ball Bearing	1	30×47×11
60	Q81-1	Spring	1	4×40×80
61	23306	Shaft	1	
62	43315	Nut		
63	GB30-76	Bolt	2	M5×10
64	43316	Nut	1	
65	43015	Splined Sleeve	1	
66	43313	Sleeve	1	
67	43312	Sleeve	1	

No •	Ser No •	Description	Qty	Remarks
1	26011	Guiding Sleeve	1	
2	D106	Single-Row Radial Ball Bearing	2	30×55×13
3	D8106	Single-Row Radial Ball Bearing	1	30×47×11
4	26304	Spindle Sleeve	1	
5	D8106	Single-Row Radial Ball Bearing	1	30×47×11
6	D106	Single-Row Radial Ball Bearing	1	30×55×13
7	26302	Cover	1	
8	26301	Locking Nut	2	
9	26305	Spindle	1	
10	26013	Support	1	
11	26311	Adjust	1	
12	Gb65-76	Bolt	4	M6×14
13	Gb119-76	Cylindrical Pin	3	4×8
14	26310	Seating Plug	1	
15	26309	Support Seat	1	
16	26308	Sleeve	1	
17	Q81-1	Spring	1	5×40×275
18	GB71-76	Bolt	3	M4×8
19	26306	Spring	1	
20	26012	Sprocket Support	1	
21	A13	Bike Chain	1	T=12.744 3.4×7.8
22	26314	Cam	1	
23	105	Single-Row Radial Ball Bearing	1	25×47×12
24	26316	Shaft	1	
25	46314	Sprocket	1	
26	GB119-76	Pin	1	H8×30
27	100	Single-Row Radial Ball Bearing	1	10×26×8
28	GB893-76	Hole Spring Retainer	2	26
29	GB894-76	Washer	2	20
30	25304A	Eccentric Shaft	2	
31	1504	Double-Row Radial Spherical Ball Bearing	2	20×47×18
32	25313	Wedge Lump	1	
33	25309	Adjust Washer	2	
34	25314	Eccentric Shaft	1	
35	GB119-76	Pin	1	5×30
36	25301	Hand Handle	1	
37	JB1342-73	Hand Handle Sleeve	1	M5×50
38	GB30-76	Bolt	2	M6×16
39	26303	Sleeve	2	
40	26315	Bearing Seat	1	
41	25307	Bolt	1	
42	GB52-76	Nut	1	M8
43	25311	Pressure Column	1	
44	25312	Pressure Lump	1	
45	Q81-1	Spring	1	1.6×8×40
46	25308	Position	1	
47	25011A	Clamping Seat	1	

RD-1000

OPERATION MANUAL
FOR
RADIAL DRILLING MACHING MODEL Z3032×10

Max. DRILLING CIAMETER : 32mm

SERIAL NUMBER : 3 0 3 0 4 8

Operation Manual for Radial Drilling
Machine Model Z3032*10

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Operation Manual for Radial Drilling
Machine Model Z3032*10

(1) APPLICATIONS

Radial Drilling Machine Model Z3032*10 is a machine of versatile applications and suitable for drilling, counterboring, reaming, boring spot facing and tapping operations in machinery industries, for machining workpieces of medium and small sizes.

(2) TECHNICAL SPECIFICATIONS

1 Max. drilling diameter:	32mm
2 Distance from the center line of spindle to column:	
Maximum	1000mm
Minimum	200mm
3 Distance from spindle nose to the surface of base plate:	
Maximum	1064mm
Minimum	264mm
4 Horizontal traverse of spindle :	800mm
5 Vertical travel of arm on column:	550mm
6 Elevating speed of arm:	1.13m/min
7 Swivel angle of arm:	360°
8 Spindle taper:	Morse No • 4
9 Range of spindle speeds:	71-1800rpm
10 Spindle speeds steps :	8
11 Range of feeds:	0.13-0.54mm/rev
12 Feed steps:	4
13 Spindle travel:	250mm
14 Drilling depth per revolution of graduated dial:	102mm
15 Maximum permitted torque of spindle:	250N.m
16 Maximum permitted resistance force of spindle feed:	10kN
17 Power of the main motor:	2.2 kW
18 Power of arm elevating motor:	0.75kW
19 Power of cooling pump motor:	0.06kW
20 Weight of the machine (Approx):	1400kg
21 Overall dimensions (L × W × H):	1730 × 746 × 2354mm

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(3) TRANSPORTATION AND INSTALLATION

1 Transportation (Fig • 3-2)

Excessive tilting, especially turning the case upside-down are not allowed during transportation. After unpacking the case, shift the table along the longitudinal plane of the machine to adjust the center of gravity and then secure it for handling. Soft materials should be padded at places where the ropes and the surface of the machine come contact to prevent damage to the machine.

2 Installation (Fig • 3-3)

The maximum floor space required for installing the machine is shown in Fig. 3-1. i. e. turn the arm round the column by 360° to make a circle with the arm lengths as radius, the diameter of the circle is 2650 mm.

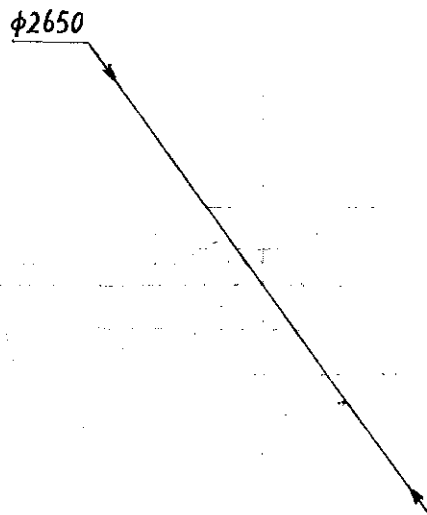


Fig • 3-1 Floor space required for the machine

Before the machine is secured to the foundation, never unclamp the column, otherwise the machine might dump as the arm is swung around the column. When installing the machine, fix the foundation bolts on the base plate first and then set the machine on the foundation. After this, place steel pads under the base plate. The level of the machine is mainly carried out by adjusting the three steel pads 1, 2 and 3. Each of the readings taken by the spirit level in transverse and longitudinal planes of the machine should not exceed 0.04/1000 mm. Thereafter adjust each of the remaining accuracies and each of the reading taken should not exceed the actual errors recorded in the Test Certificate. The holes for foundation bolts are filled with concrete mortar after the machine has been carefully leveled, then grout the foundation round the base plate and the pads with concrete mortar so

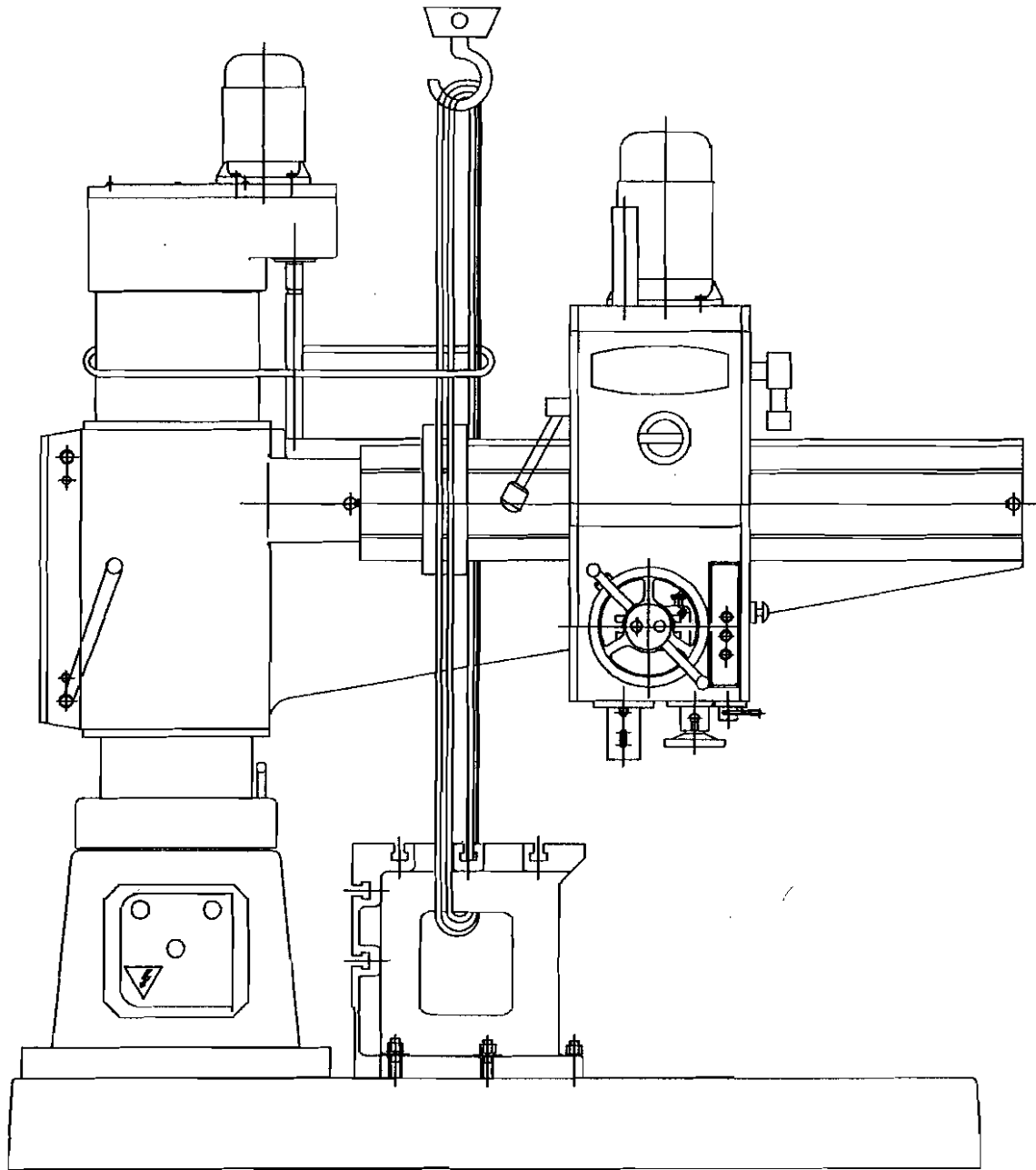
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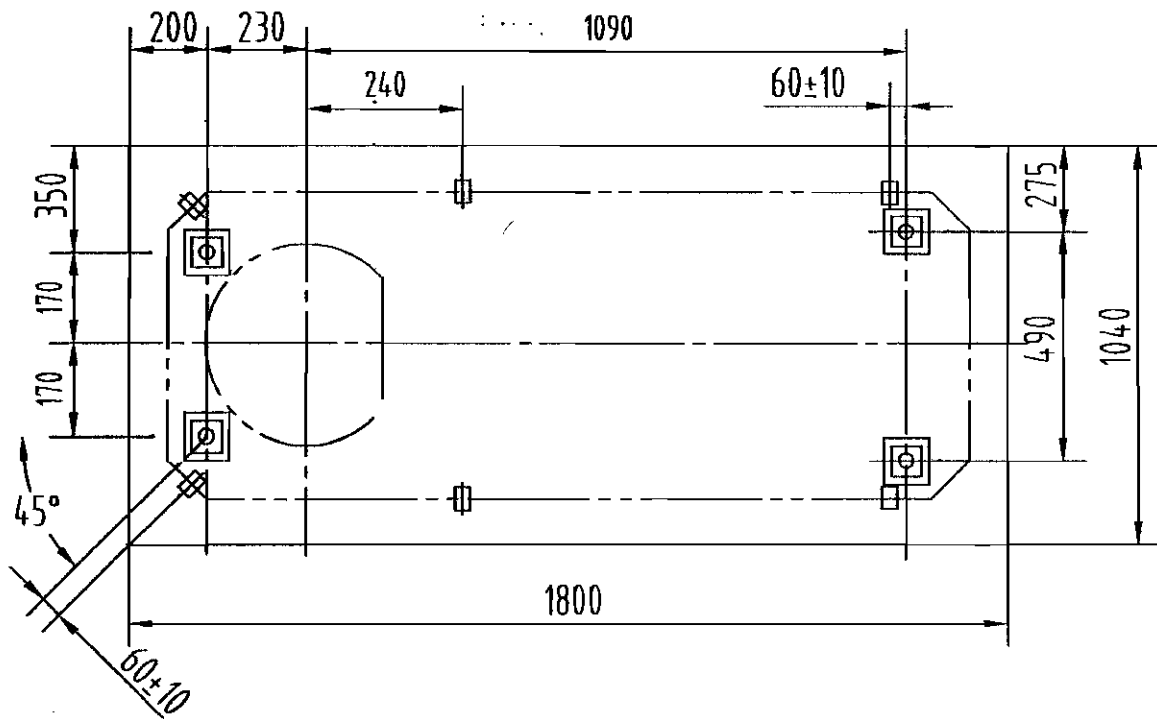
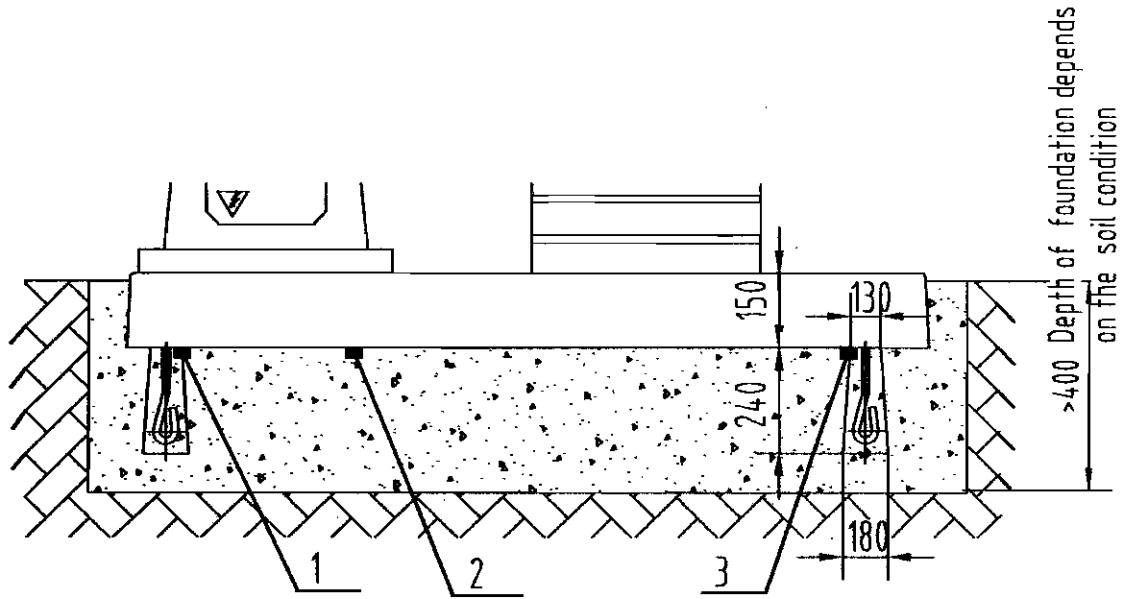
as to set them securely. When the concrete gets perfectly dry, the foundation bolts should be tightened. Finally check by spirit level to avoid the deformation of the machine. Only after the preparation for trial run of the machine have been done, then the machine can be put into operation.

3 • Preparations for Trial Run

After the machine has been installed, connect it to the electric circuit to make sure whether the wires are connected correctly. The rust preventives oil which are coated on the external surfaces of the machine should be cleaned by means of cotton cloth. When cleaning the guiding surface of the column, the kerosene must be prevented from flowing into the surface of the arm sleeve. After the cleaning, drop some machine oil No • 30 onto the column guide surface, then lower the arm by 50 mm, and after the exposed part of the column guide surface has been cleaned and lubricated, elevate the arm for about 100 mm, afterwards clean again and fully lubricate the exposed parts of the column. The arm can now be allowed to ascend or descend for a large distance. Method of operation as described above has to be followed or it will cause the danger of scoring the guiding surface of the column.

The machine can be started to run only when it is assured that everything is normal. The moving parts of the machine has to be checked at the same time to make sure they are operating normally. If that is so, run the machine idle for 30 minutes, and when it is found favorable, the machine can then be regular operation.





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(4) MACHINE CONTROLS

Controls means of machine are showed in Fig • 4-3 and listed in the list of the uses of control levers, hand wheels & push -buttons. Before starting the machine, first switch on the main switch 2, the machine can then be operated.

1 • Starting of the Spindle

Starting the spindle, depress the push-button, signal lamp above it will light up. Now if turn the lever 15 to the forward or reverse position as shown in Fig • 4-1, the spindle will be started to rotate clockwise or counterclockwise.

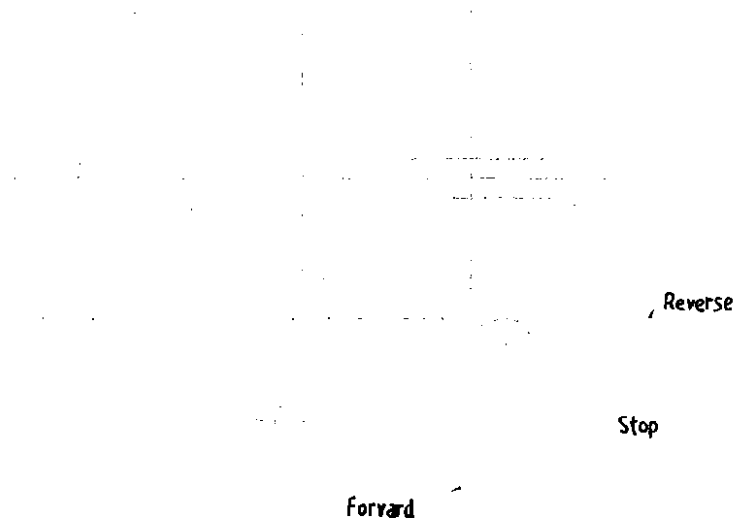


Fig • 4-1 Operation positions of lever 15

2 • The change of the Spindle Speeds and Feeds

Turn the lever 9 to have the figure of desired spindle revolution rate align with the arrow above it, the spindle will be rotated at needing speeds. Turn the lever 7 to have the figure of desired spindle feed rate align with the narrow above it, that desirable spindle feed will be get.

3 • Spindle Feeds

Power feed:

Press down the lever 14 to its limit position and pull out the lever 10 to engage the power feed. The spindle will feed downwards when it rotates forward and will feed upwards when it rotates reverse. For disengaging the power feed, just lift up the lever 14.

Hand feed:

Push the lever 10 and turn clockwise or counterclockwise, the spindle will be carried to feed upward or downward

Fine hand feed:

Lift up lever 14 to horizontal position and pull out the lever 10, the fine feed will be carried out by turning the hand wheel 17

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Pre-determined depth cutting :

Turn the knob 8 to position as shown in Fig • 4-2 A (1), then the graduated dial have been deprived of mesh and turn the graduated dial to the value of depth desired aligned with "0" line of the counter-scale on the headstock. Now turn the knob 8 to the position as show in Fig 4-2 A (2), the graduated dial is meshed and then engage the feed. When the cutting depth reaches the pre-determined depth value handle 14 raises automatically and the predetermined depth cutting procedure is accomplished.

Tapping :

Tapping is carried out in the same manner as manual feeding.

4 • Clamping and Unclamping of the Headstock and Column.

Clamping or releasing of the headstock is carried out by operating lever 6. Press down the lever 6 to limit position, the headstock is clamped. Shift up the lever 6 to limit position, headstock is released.

Clamping or releasing of the column carried out by operating the lever 4. Press down the lever 4 to limit position, column is clamped. Shift up the lever to limit position, column is released.

5 • The Elevation, Clamping and Releasing of the Arm

Clamping or releasing of the arm is carried out by lever 5. The arm will be clamped when the lever 5 is turned to right position, the arm will be released if shift lever 5 is turned to left position.

Notice: Only after the arm is releasing, the arm can be ascended or descended. Press down button 12, the arm descend, and press down button 13, the arm ascend. Release the button, the machine stop ascending and descending

6 • The Precaution When Turing the Arm.

As there is no collector ring provided for machine, when rotate the arm by hand must take care that the arm is not allowed to rotate continuously in one direction.

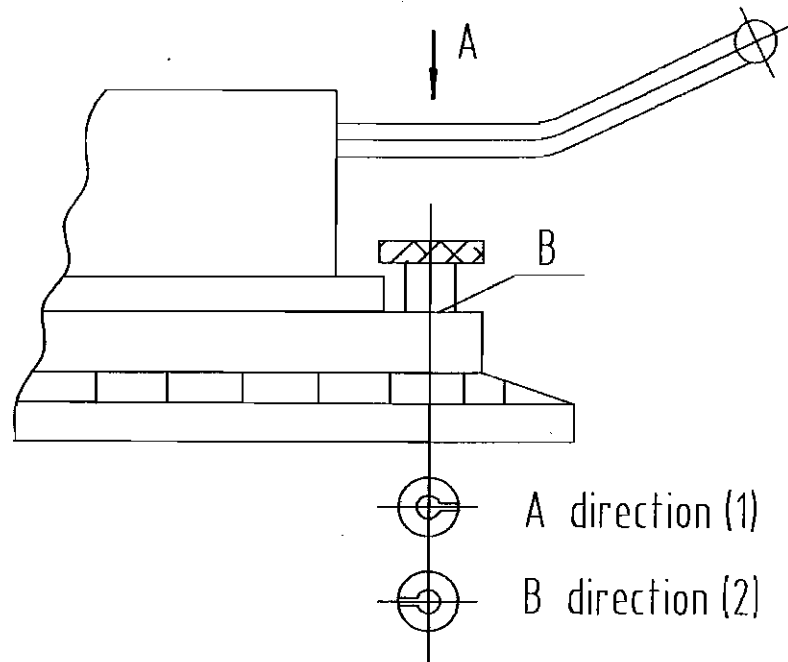
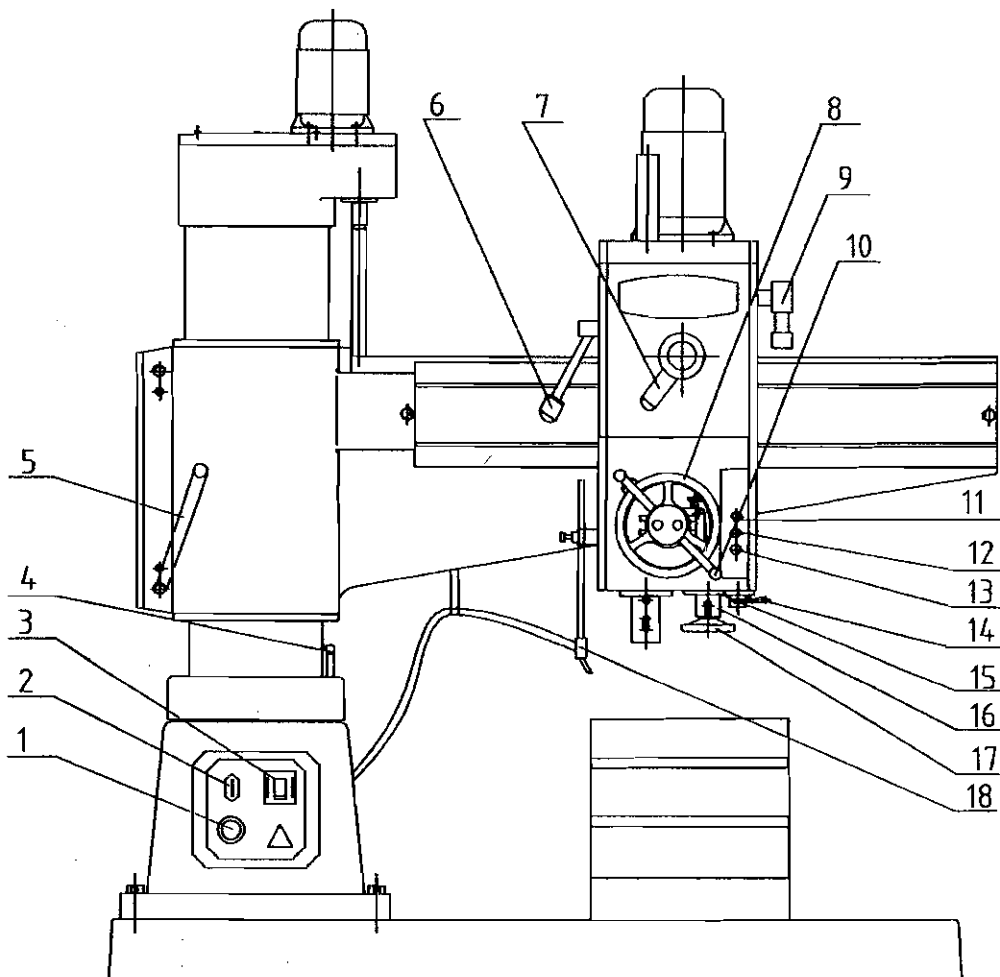


Fig.4-2



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No •	Name	No •	Name
1 •	Push button of no-voltage	10 •	Lever for spindle travel
2 •	Switch for cooling pump motor	11 •	Button for arm ascending
3 •	Power master switch	12 •	Button for arm ascending
4 •	Lever for clamping column	13 •	Urgent stop button
5 •	Lever for clamping arm	14 •	Lever for engaging or disengaging power feed
6 •	Lever for clamping headstock	15 •	lever for spindle turn forward and reverse
7 •	lever for spindle feed change	16 •	Shaft for adjusting balance of spindle
8 •	Hand wheel for headstock traverse	17 •	Hand wheel for fine feed
9 •	Lever for spindle speed change	18 •	Cooling switch

(5) LUBRICATION

1 • Automatic Lubrication

1) Gears and bearing in the upper part of spindle head:

They are lubricated by means of splash lubrication.

2) Worm and worm wheel in the feeding mechanism:

The rotating worm wheel, which is immersed in the oil in lower parts of the headstock, carries the oil of oil tank to all parts of the feeding mechanism so as to lubricate them.

3) The reducing gear box of the elevating mechanism.

They are lubrication by means of splash lubrication.

2 • Manual Lubrication:

1) Arm guideway, surface of the column, graduated dial, spline of spindle, elevating screw and headstock clamping device are lubricated with oil can or grease gun according to the requirements expressed in Fig • 5-1 (When lubricate the spindle, be sure to open a small cover plate on the spindle cover and pour a little oil to lubricate the spindle but don't pour too much)

2) Spindle bearings:

To be lubricated according to the requirements expressed in Fig • 5-1.

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3 • Filling and Draining Oil of Oil Tank

To be carried out according to the requirements expressed in Fig • 5-1 • . Care should be taken that all of the oil leveler which are used for indicating the oil level should be frequently checked by the operator. The highest point of the oil level should exceed the center of the leveler.

When draining out the oil of oil tank in the upper part of headstock and lubricating the upper spindle bearings as well as filling the oil to the lower oil tank, be sure to take off the front cover.

(6) COOLING

For cooling the tools, first turn the switch 2 as shown in Fig • 4-4 • to start the coolant pump motor and supply the coolant. Flow is regulated by a switch .

The coolant tank is located at the back of base plate.

(7) TRANSMISSION SYSTEM

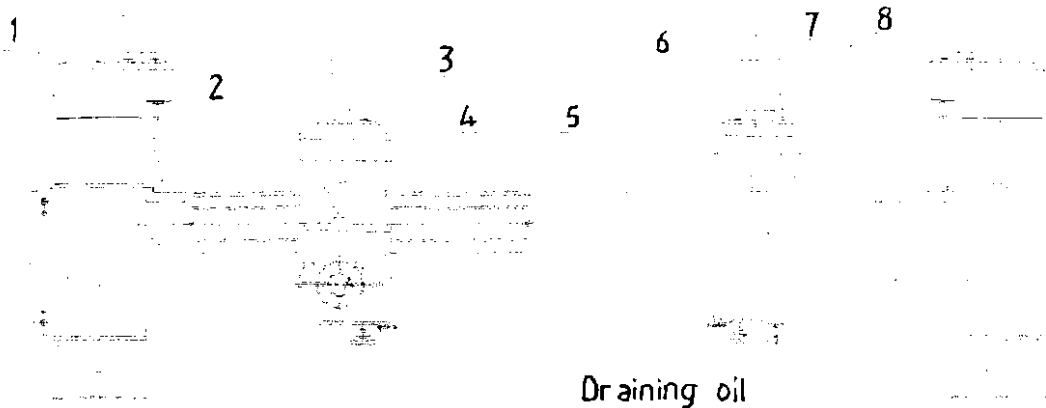
The transmission system can carry out the revolution and the feed of spindle, arm elevation and travel of headstock on arm.

The transmission system is shown in Fig • 7-1 • .

Number of tooth or starts, module, grade of accuracy, material and heat-treatment of the gears, worm wheels, worm and screw rod and etc. are shown in table 1.

The distribution of the rolling bearings are shown in Fig • 7-2 • while their specifications, grade of accuracy and quantity are shown in table 2.

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Fig. 5-1 Machine Lubrication Diagram



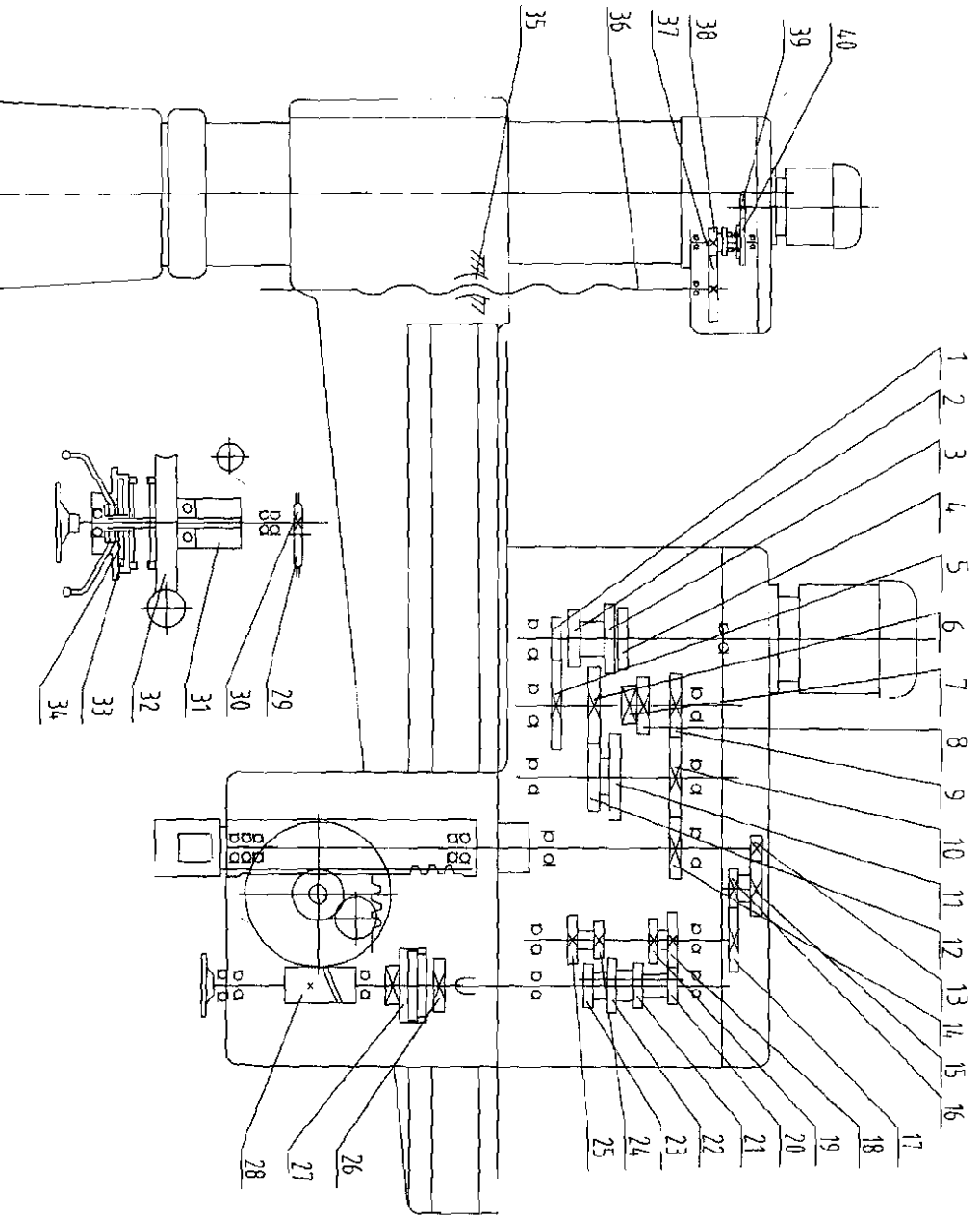
Draining oil
Draining oil after removing
the front covered nameplate

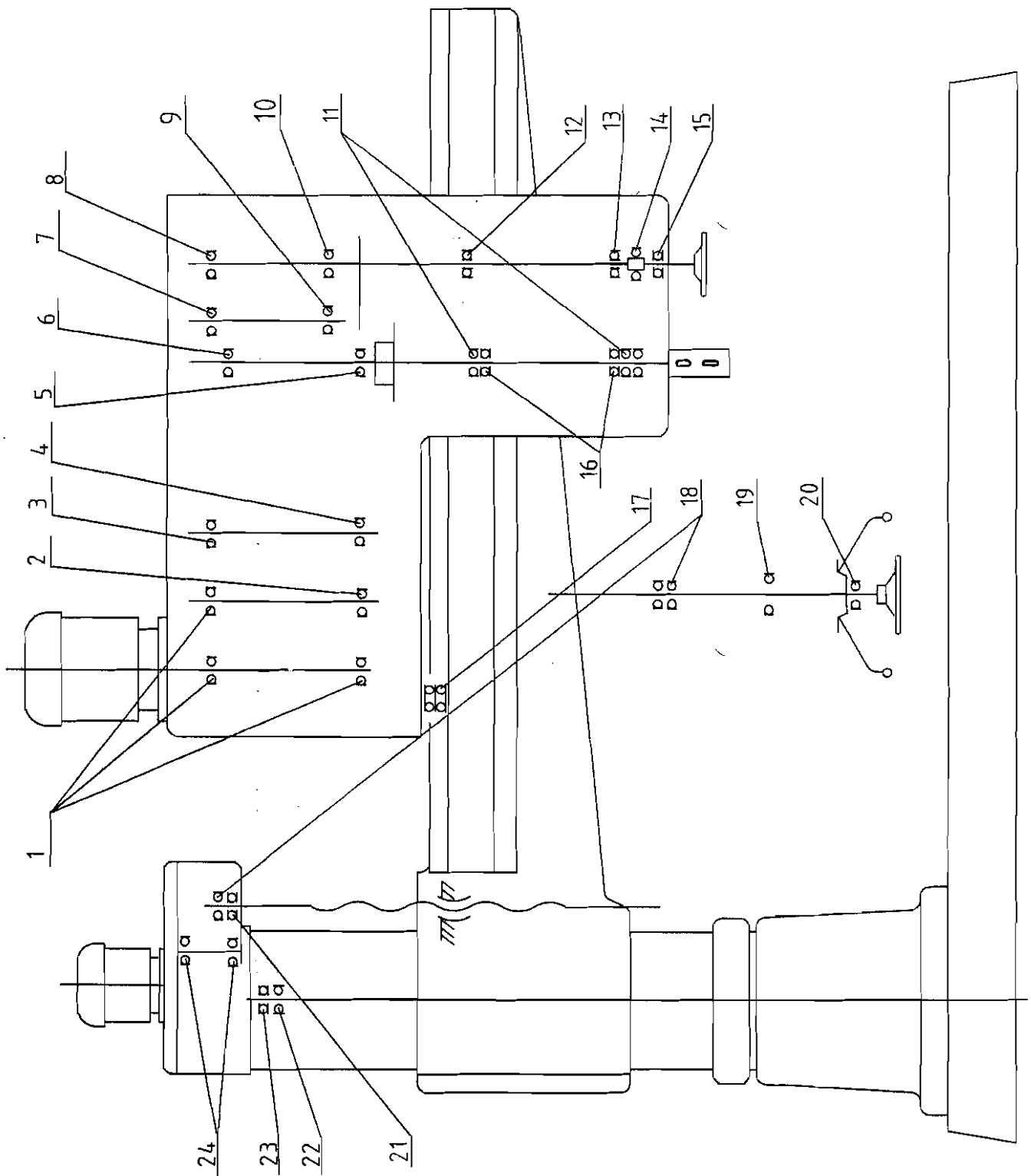
No.	Oil Site	Lubrication Oil	Lubrication Period	Remark
1.	Column surface	Machine Oil No.40	Always Having Oil	
2.	Upper Oil Tank of Spindle Box	Machine Oil No.20	Renew the Oil Every Three Month	Oiling after Removing the Top Cover
3.	Rolling Bearings of Spindle	Calcium Base Grease No.2	Once Every Month	Oiling after Removing the Front Cover Nameplate
4.	Worm and Worm Wheel	Machine Oil No.20	Once Every Shift	
5.	Guideway of Arm	Machine Oil No.40	Always Having Oil	
6.	Clamping Device	Machine Oil No.20	One Time Every Shift	
7.	Elevating Screw	Machine Oil No.40	One Time Every Shift	Only a Few
8.	Oil Tank of Elevating Gear Box	Machine Oil No.20	Renew the Oil Every Three Month	

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Table 2 List of Rolling Bearings

Serial No·	1	2	3	4	5
Type No·	204	50204	50207	205	50210
Specification	20×47×14	20×47×14	35×72×17	52×52×15	50×90×20
Grade of Accuracy	G	G	G	G	G
Pieces	B	1	1	1	11

Serial No·	6	7	8	9	10
Type No·	208	202	303	50202	104
Specification	40×80×18	15×33×11	17×47×14	15×35×11	20×42×12
Grade of Accuracy	G	G	G	G	G
Pieces	1	1	1	1	1

Serial No·	11	12	13	14	15
Type No·	106	107	306	7000106	8205
Specification	30×55×13	35×62×14	30×72×19	30×50×9	25×47×15
Grade of Accuracy	D	G	G	G	G
Pieces	3	1	1	1	1

Serial No·	16	17	18	19	20
Type No·	806	1604	105	208	7000105
Specification	30×47×11	20×52×21	25×47×12	40×80×18	25×47×8
Grade of Accuracy	D	G	G	G	G
Pieces	1	1	1	1	1

Serial No·	21	22	23	24
Type No·	8106	113	8113	104
Specification	30×47×14	66×100×14	65×90×18	20×42×12
Grade of Accuracy	G	G	G	G
Pieces	1	1	1	2

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(8) ELECTRICAL EQUIPMENT

1. General Description

A three-phase AC power supply of 380V, 50HZ is used for the machine. According to special order, the three-phase AC power supplies of 220V, 50HZ; 380V, 60HZ; 420V, 50HZ and 220/440V, 60HZ etc. can also be used for this machine. The voltages for the control circuit, brake circuit and signal lamp of which are 110V, 42V, 24V and 6V respectively, are supplied by transformer.

The electrical equipments which are adapted to various power supplies are listed in corresponding lists.

The following motors are adopted on the machine for driving various mechanisms:

M1 — main motor

M2 — cooling pump motor

M3 — arm elevating motor

Besides coolant pump motor and power-in switch board, the other electrical equipments are equipped in rotation parts.

2. Circuit specification

The transfer switch QS1 is used as power master switch. And turn switch SB5 is used as cooling pump switch.

1) Zero potential starting and preparation before driving

Switch on breaker QF1, and switch off transfer switch QS1, push zero potential starting button SB2 so that the zero potential relay KA1 is electrified along the circuit 1-2-11-12-0 and simultaneously zero potential protection's indication lamp HL1 is lighted.

When voltage disappears or falls down too much, KA1 is set free, and normally -opened contact 11-12 is switched off and control circuit is cut off. When voltage comes back, KA1 can't get power yet. In order to make motor work, the zero potential starting button SB2 should be pushed again so that KA1 is closed and supply power to control circuit.

2) Driving cooling pump:

Turn cooling pump's knob SB5 to make KA3 close, and then cooling pump rotate.

3) Main motor's rotation

Make option switch SA1 in "positive rotation" position, the contactor KM1 will be switched in along the circuit of 1-2-11-12-13-14-15-0 to make the main motor rotate positively. Make option switch SA1 in "reverse" position, and the contactor KM2 is switched in along the circuit of 1-2-11-12-13-16-17-0 to make main motor rotate inversely. When motor is rotating, contactor KM1, KM2 switch on contact point 12-18, time relay KT1 is electrified, then switch on contact 2-8 to get ready

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for braking in turn. when you want to stop spindle motor, make option switch SA1 in the middle position, contactor KM1 and KM2 is cut off and whose contact 12-18 are switched off. then time relay KT1 is cut off finally contactor KM1 and KM2's contact 8-9, 9-10 are switched in. At this time spindle braking contactor KA2 is switch in along the circuit of 1-2-8-9-10-0, main motor MI is braked by D-C magnetic field after having been rectified through 27-28-V21- V2-W2-W21 -30-29. Time relay KT1'S contact 2-8 are switched off after having been delayed by 1-3 seconds or so, KA2 is cut off and then stopped all equipment. The overload and overcurrent protection breaker QF1 is use for avoiding motor overloading.

4) Arm Elevating :

Push button SB3, arm elevating relay KA4 is switched on along the circuit of 1-2-11-12-19-20-21-22-0 and then arm ascends. Push button SB4, arm descending relay KA5 is switched on along the circuit of 1-2-11-12-19-23-24-25-0 and then arm descends. Releasing button SB3(SB4) may make arm stop ascending (descending).

Using micro-move switch SQ2 for limiting radial ascending limited position.

Using micro-move switch SQ3 for limiting radial descending limited position.

5) Arm Clamping:

The arm can be clamped by means of manual operation. When the arm is clamping, push the interlock switch SQ1 to cut off the contact 12-19 and then to cut off all the control circuit of arm elevating to realize interlock function. Only after the arm is loosing, interlock switch is return to original position. Switch in the circuit 12-19, the arm can be operated for ascending or descending.

6) Urgent Stop of machine :

When any working parts of the machine needs urgent stop to operating because of accident or some other cause in the state of operation, please push the urgent button SB1. At this time push-button SB1 is cut from the contact of 2-11 to stop all parts moving as well as the main motor.

7) Drilling and tapping

When require the machine to drill, turn the option switch SA2 to drilling position. the machine can rotate clockwise and inversely and stop in require cutting depth. When require the machine to tap, turn the option switch SA2 to tapping position to cut off the circuit of consuming energy and of braking, which avoid transformer over-heat and circuit overcurrent because of frequency start. to make breaker QF6 is cut off to make the machine work abnormally.

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3• Open and turn off lighting lamp

Operate the switch on lighting lamp EL1 head to open or turn off it.

4• The maintenance of machine:

The main circuit, transformer, control circuit, braking circuit and lighting circuit are all equipped with short-circuit and overload protection respectively. The function of protection will be realized by breaker QF1, QF2, QF3, QF4, QF5 and QF6.

5• Checking phase order of machine power supply :

When installing machine is over, switch in main power and zero-potential protect relay, unless the ascending or descending button and the check if it is concord with power phase is concord with the practice. If it is concord with power phase is correct. Otherwise exchange the positions of any two lines in power line.

6• Protection for electrical equipments :

The main power should be cut off before checking. Opening the electrical cabinet door should be done by skilled technician

In order to keep the electrical equipments clean, clean dirt, dust and oil dirt periodically etc ..

Test and clean the electrical equipment once a year. Renewing oil and checking for the bearing at least twice a year. The bearing should be changed after the abrasion depth is over 0.1mm.

Voltage should not be exceed 10% of the rated voltage and frequency should not be exceed $\pm 1\%$ of the rated frequency.

Diagram of electrical principle diagram Fig. 8-1.

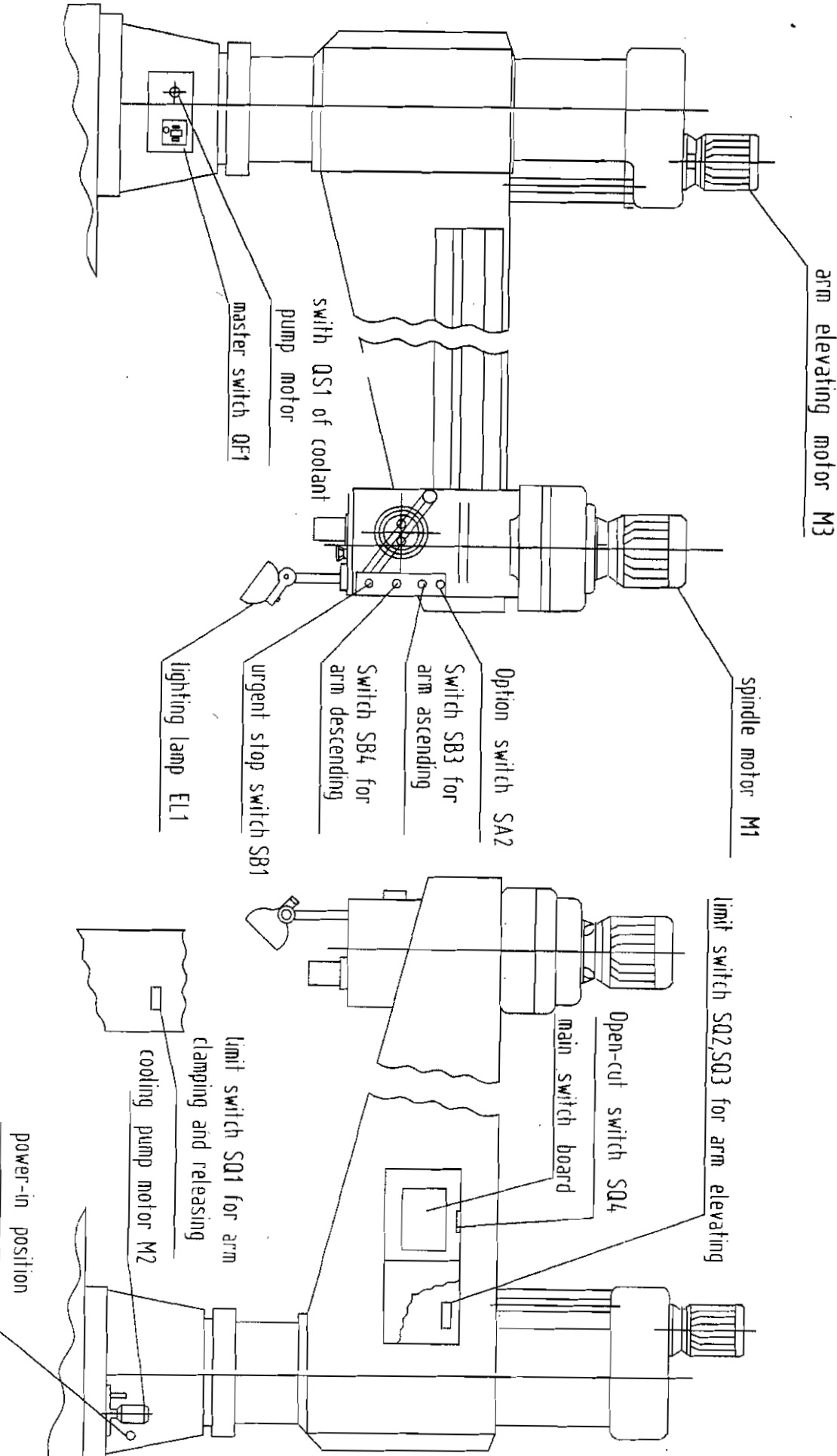
Diagram of electrical equipment Fig. 8-2.

Elementary equipment list Table 1

ELECTRIC EQUIPMENT LIST TABLE 1

de No.	Name	Type	Specifications	Amount	Supplier	Remarks
M1	Spindle's AC Motor	Y100L1-4	2.2kW 380V ^{220V} 1420r/min 7.03A	1		
M2	Motor for cooling pump	A0B-50	60W, 380V, 50Hz 0.35A 2800r/min	1		
M3	Motor for arm elevating	Y802-4	0.75KW, 380V, 50Hz 3.2A 1390r/min	1		
SA1	Option switch	LS2-3	AC.110V	1		
KM1- KM5	AC contactor	CJX1-9/22	Winding voltage AC 130V 2(a)+2(b) 50HZ	5		(3TB4017)
KA1- KA2	Auxiliary relay	JZC1-44	AC. 130V 50HZ	2		(3TH82-44)
KT	Timing Relay	ST3PF-A	AC. 130V 50HZ	1		
SQ1	Limit Switch	JWL1-11	1<a>+1	1		
SQ2 SQ3	Limit Switch	LX5-11N1	1<a>+1	2		
SB1	Urgent button	LA42J-11/R	380V, 5A red Mushroom head	1		
SB2	Control button	LA42PD-11/G	AC 6V (green)	1		with 6V signal lamp
SB3	Control button	LA42P-11/B	380V, 5A (gray)	1		
SB4	Control button	LA42P-11/B	380V, 5A (black)	1		
SB5	Control button	LA42X2-11/B	380V, 5A (black)	1		
SA2	Control button	LA42N2-11/B	380V, 5A (black)	1		
TC1	Control Transformer	JBK5-400	400VA 130V 100VA 380V /6V 5VA /42V 250VA /24V 45VA	1		
QF1	Breaker	DZ47-60 (3P)	20A	1		
QF2	Breaker	DZ47-60 (2P)	3A	1		

Code No	Name	Type	Specifications	Amount	Supplier	R
QF3, QF4	Breaker	DZ47-60 (1P)	3A	2		
QF5	Breaker	DZ47-60 (1P)	10A	1		
QF6	Breaker	DZ47-60 (3P)	10A	1		
QS1	Power switch	JFD11-25/300010	380V	1		red han yellow l
EL1	Signaling Lamp	JC38-A	Furnished 24V, 40W bulb	1		
VC	Gretz rectifier	KBPC25-10	380V dipole 20A	1		
XT1	Connecting terminate	UK5N×21sections+USLKG5×2sections		1		
XT2	Connecting terminate	UK5N×14sections+USLKG5×2sections		1		
XT3	Connecting terminate	UK5N×7sections+USLKG5×2sections		1		
XT4	Connecting terminate	UK5N×3sections+USLKG5×2sections		1		



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(9) PRINCIPAL CONSTRUCTION

1• Spindle Speed Change and Driving Mechanism.

The spindle speed change and driving mechanism is located on the upper part of the headstock. Four driving shafts are provided for this driving mechanism. Eight spindle speeds are obtained through different meshing between sliding gears and the fixed gears. A friction clutch is mounted on shaft 1, which one friction disc can't drive other friction disc when the load of the spindle exceeds the rated value of the motor's power so as to prevent the motor from being overloaded.

Considering the arrangement of the construction, the upper of the headstock is divided into three layers. To dismantle the headstock, first remove the main motor, then take down the motor base. Further remove the plexiglass cover at two sides of the headstock and take down the fixed pin and fixed screw so that the second layer of headstock can then be removed. At this time, all the parts of the transmission system are totally exposed, and each of the driving shafts is able to be taken down from the headstock body.

2• Spindle Feed Change and Driving Mechanism

The mechanism construction, arrangement and dismantle and assemble order is similar with spindle speed change and driving mechanism.

3• Spindle Feed Mechanism

The spindle feed mechanism is composed of worm shaft and horizontal shaft assemblies. Power which is supplied by spindle feed change and driving mechanism is transmitted through worm shaft, then worm and wormwheel, finally through horizontal shaft to spindle sleeve, enable the spindle to obtain the feed motion.

The safety ball clutch can stop power feeding in case the feed resistance exceeds the rated value to realize protection function. When pre-determined depth cutting, it can be stopped when rolling wheel knock the lever.

When dismantling this mechanism, take down the front plate and then ball safety clutch assembly can pulled out from the upper part of worm shaft, the whole worm shaft assembly can then be pulled out from the headstock body.

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When dismantling the horizontal shaft, move up spindle to limit position first, then release spindle balance spring and take down hand wheel, finally the horizontal assembly can be pulled out from headstock body.

For reassembling the horizontal shaft, care must be taken that the spindle should be traveled up to its limit position and the cam must be in balance position.

4• Operation Mechanism

The speeds change of the machine are carried out by hand lever, pry bar and shift fork.

5• Clamping of the Headstock

Press downward the hand lever 6 (shown in Fig • 4-3 •) to its limit position so as to rotate the eccentric cam to have the press block press on guideway of the arm, then clearance between the guideway of the arm and of the headstock is eliminated, and the headstock is therefore clamped on the arm.

6• Spindle and its Balancing Device

The spindle is supported by two points. Balancing of spindle is carried out by eccentric cam and helical spring. The gravitational force of the spindle is kept balance with the spring force through the gear which is mounted together with cam. The balancing force can be regulated by means of spring which is adjusted by the screw 16 (Shown in Fig 4-3).

To dismantle the spindle, the horizontal shaft assembly should be taken out first, then the spindle can be taken down from the headstock body. In case of further dismantling spindle balancing spring device, take down the chain from the cam in advance, then remove screws on the cover, spindle balance device can be taken down from the headstock body. Assembling spindle balance device is reassembled according to the contrary procedure.

7• Clamping of column

Press down the hand lever 4 (see in Fig 4-3) so as to rotate the cam to have out-column tightened the inner-column. Thus a large enough positive

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force will act to conical surfaces of the outer and inner column so they will be clamped.

8. Arm Elevation

Inside the elevating mechanism housing is still mounted the arm elevating mechanism. The elevating motor drives the elevating lead screw through the reduction gears and safety ball clutch. As there is a pin which restricts the rotation of the elevating nut, the arm can then be carried to move up and down by revolving the elevating screw. To ensure the adequate lubrication of the moving parts inside the elevating mechanism, a splasher is provided on the driving shaft of the elevating motor. In view of the elevating nut will severely wearing and will escape from the thread of lead screw after a long time service, there is mounted a safety nut.

9. Arm Clamping

Turn the lever 5 (Fig. 4-3) to clamp the arm.

(10) ADJUSTMENT AND MAINTENANS

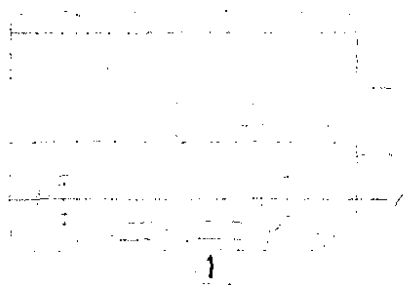


Fig. 10-1

1. Adjustment of the Machine

1) Adjustment of the Machine

When the clamping force is not enough, the headstock will be released. At this time, loose the fastening screw 1 (Shown in Fig. 10-1), move it along the headstock. Now if a circumferential force of 200N (Z3025*10A) or 300N (Z3032*10)

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Machine Model Z3032×10

exerted on the hand wheel will not be able to move the headstock, the adjustment of the clamping force is correct.

Having adjusted the clamping force, be sure to check the condition of releasing; i.e. after the head is released, an acting force not larger than 40N on hand wheel can make the headstock move. Now under a releasing state of the headstock, a 0.04mm thickness sheet gauge is inserted into clearances between the contact surfaces of the headstock and 55° arm guideway as well as vertical guideway, if the gauge only can go a length of not more than 20 mm, the clearance is meeting the requirement and then turn tightly screw.

2) Adjustment of the clamping fore exerted on the column:

If the clamping force exerted on the column is insufficient, release the column and tighten the locking nut on the clamping ring, thereafter clamp column. Now if a horizontal thrust force of 640N(Z3025*10A) or 800N(Z3032*10) exerted on the end of the arm will don't make relative movements to the outer and inner columns, the adjustment is adequate. Having adjusted the clamping force, be sure to check the releasing condition; i.e. after releasing the column, as soon as a horizontal thrust force of 30N exerted on the end of the arm can make the column swivel, the adjustment is adequate.

3) Adjustment of the clamping fore exerted on the arm:

If it is found insufficient with the clamping force exerted on the arm, be sure to rest the arm in a releasing state. Having turning clockwise the locking nut, thereafter turn hand lever 5 (Fig. 4-3) to clamp the arm. At this time check the clearance between the fitting surfaces of the arm sleeve and the column surface by means of a 0.04mm thickness sheet gauge, the adjustment is then satisfied if the gauge can't be inserted into the said clearance.

4) Adjustment of the force for balancing the spindle:

The force for balancing the spindle had been adjusted before the machine was dispatched from our company. When the weight of the cutting tool is out

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of balance, please turn the screw in clockwise direction if the weight of the cutter is light and turn it in counterclockwise direction if the weight of the cutter is weighty.

5) Adjustment of the feed resistance:

The feed resistance had already been adjusted by us before the machine was dispatched from our works, and don't need adjusting again when the machine is put into operation. Under the special condition, when it is necessary to adjust the feed resistance, open the front plate to turn the locking nut and then to regulate the feed resistance. For Z3025*10A, the overload clutch will work when feed resistance is less than 11.2 kN and will stop working when feed resistance is more than 13.2 kN. For Z3032*10, the overload clutch will work when feed resistance is less than 14.0 kN and will stop working when the feed resistance is more than 16.5 kN.

2. The Machine Maintenance

1) The machine should be carefully maintained according to the requirement described in the Operation Manual. The filter should be cleaned periodically, and the oil should be keeping clean.

2) The arm guideway and column guideway must be cleaned constantly with cotton cloth to avoid damage

3) The cutting speed, feed and depth must be selected according to the rated maximum working capacity described in Operation Manual, i.e. the actual working load of the machine should less or equal to permitted maximum torque and maximum feed resistance of spindle.

4) During the process of cuttings, the headstock and the column should be clamped, otherwise there will happen accidents and effect the machine accuracy.

5) The arm is not allowed to rotate continuously as there is no collector ring on the top of the column.

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(11) ACCESSORY, REPAIR PARTS AND QUICK-WEAR PARTS

1. Accessory :

Serial No.	Specifications & Type No.	Description	Pcs.	Remarks
1	450 × 400 × 400	Working table	1	Fixed in machine
2	M20 × 370	Foundation bolt	4	M20×300 for Z3025*10A
3	M20 J11-1	Hexagon nut	8	Four nuts is fixed in machine
4	20 J51-1	Washer	8	Four nuts is fixed in machine
5	M20 × 85 J29-1	T-slot bolt	4	
6	4 × 3 SZSSB2-1	Morse taper sleeve	1	
7	3 × 2	Ditto	1	
8	3 × 1	Ditto	1	
9	1-2; 3; 4 SZSS81-1	Drift		1 pcs per type
10	90; SZSR99-1	Oil gun	1	

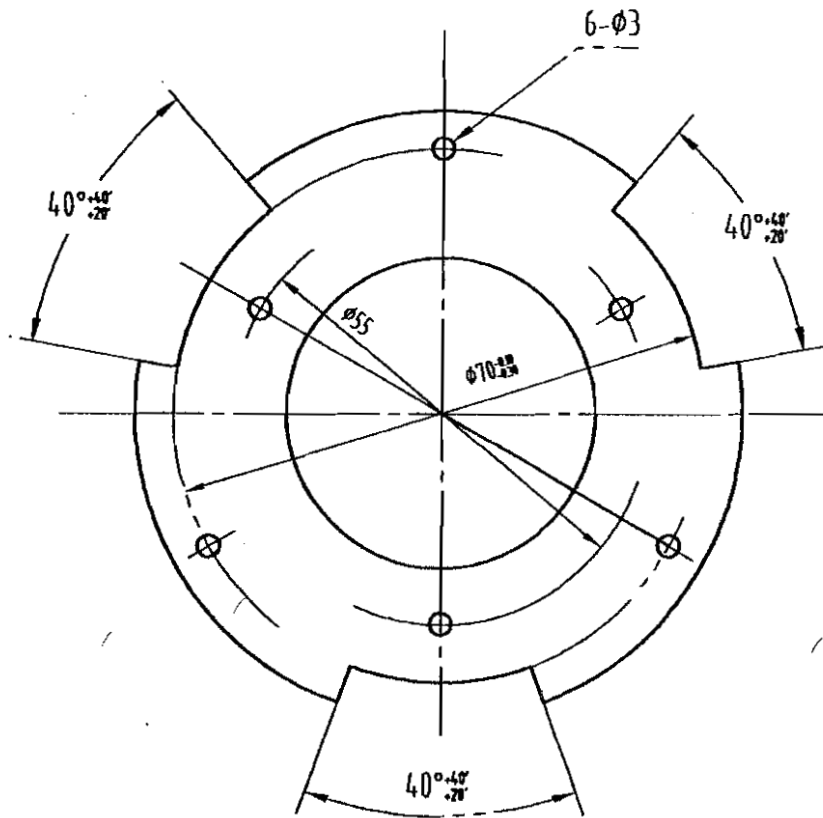
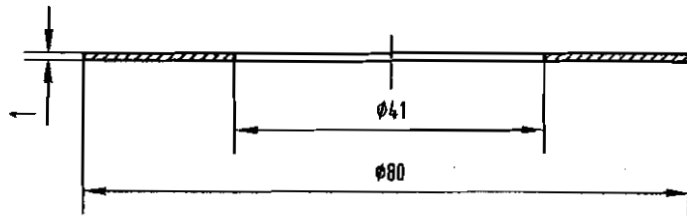
2. Repair Parts

Ser No.	Specifications & Drawing No.	Description	Pcs.	Remarks
1	28311	Elevating nut	1	Fixed in machine and shown in Fig. 11-1
2	21312	Friction disc	6	Shown in Fig. 11-2
3	21313	Friction disc	7	Shown in Fig. 11-3
4	21339	Shifting block	1	Shown in Fig. 11-4
5	21340	Shifting block	1	Shown in Fig. 11-5

3. Quick - Wear Parts

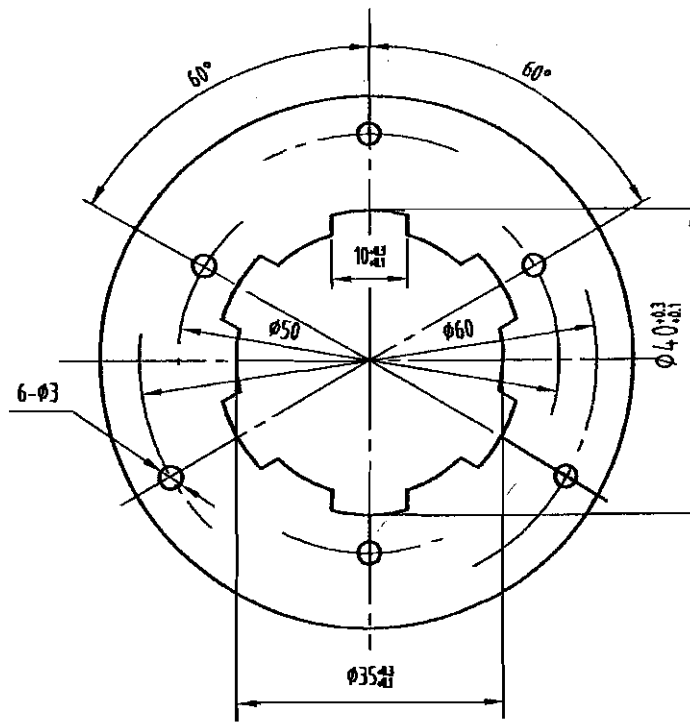
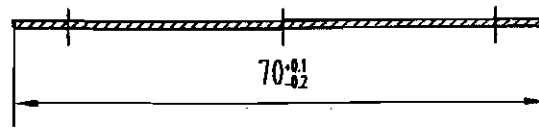
Ser No.	Specifications & Type No.	Description	Pcs.	Remarks
1	ENQ- 20A	Fuse	7	
2	ENQ- 10A	Ditto	3	
3	ENQ-4A	Ditto	1	

Roughness $\sqrt{12.5}$



Heat treatment :
C48 and surface oxidation treatment

Roughness $\sqrt{12.5}$



Heat treatment :
C48 and surface oxidation treatment

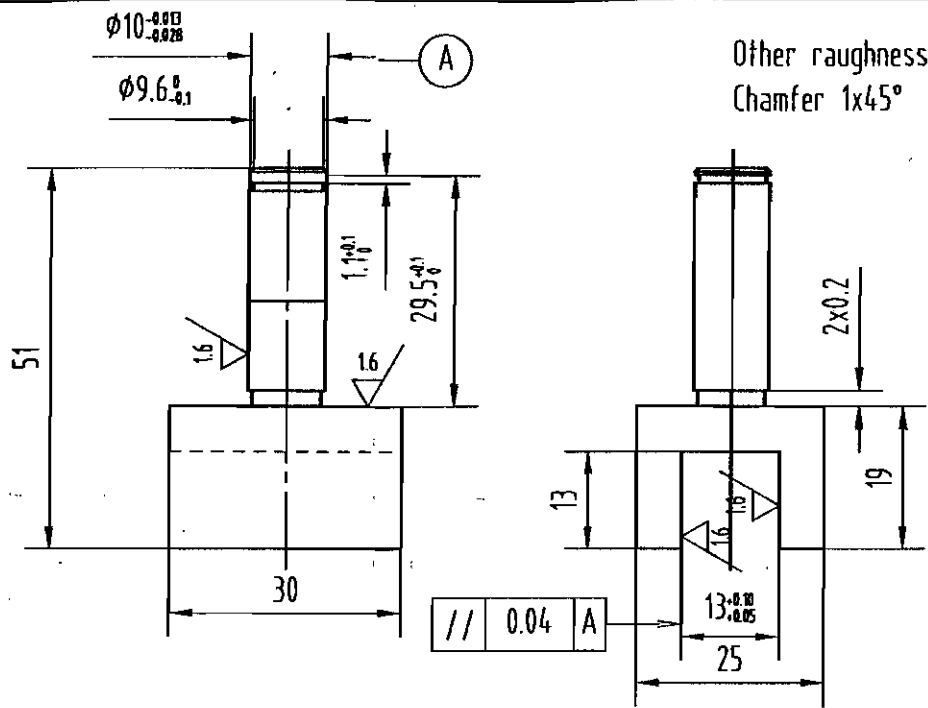


Fig. 11-4 Shifting block
Material: ZQA19-4
Drawing No. : 21339

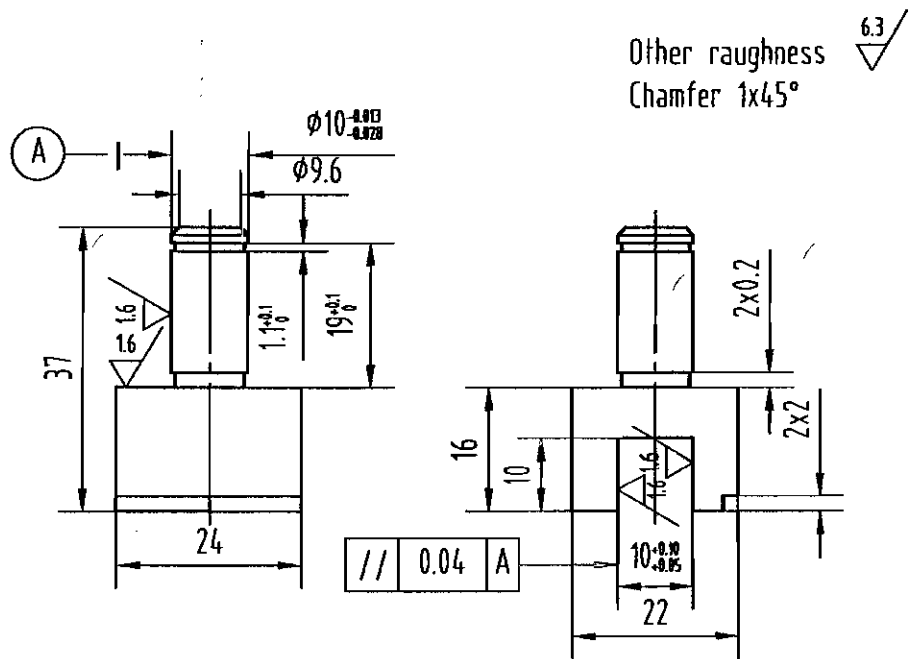


Fig. 11-4 Shifting block