

HQ400/3A、HQ400/3B POWER FEED
MULTI—PURPOSE MACHINE

OPERATING MANUAL

CHIZHOU HOUSEHOLD MACHINE—TOOL WORKS
THE PEOPLE'S REPUBLIC OF CHINA

MAILING ADDRESS: 16 DONGHU ROAD, GUICHI CITY,
ANHUI 247154, P. R. CHINA

IMPORTANT TIPS

- Read all instructions—a few minutes now may save hours later.
- Follow safety rules for power tools.
- Check bags and cartons for parts.
- Keep the machine clean, lubrication, and adjusted as instructed.
- Do not leave cleaning rags, tools or other materials on machine bed or around moving parts of the machine.
- Work only with sharpened tools.
- Check oil level regularly.
- After working with coolant, clean wet surfaces thoroughly and oil these surfaces.
- Clamp all workpieces and tools firmly.
- To prevent unnecessary wear of the slides and to assure optimum working results, all movements other than the feed must be clamped.
- Switch spindle speeds only when the machine is off.
- Never clean machine with compressed air.

I. TECHNICAL DATA

TURNING

Swing over bed	420mm
Distance between centers	400mm, 500mm.
Longitudinal travel	410mm, 510mm.
Cross travel	80mm
Spindle bore	20mm
Spindle taper	M. T. 3
Tailstock barrel taper	M. T. 3
Range of spindle speed	7 speeds 160~1360r. P. m
Thread can be cut	metric; 18 steps 0.2~3mm imperial; 27 steps 8~120t. p. i
Amount of power feed	8 steps 0.050~0.175mm/r

DRILLING AND MILLING

Max. drilling diameter	15mm
Max. milling diameter	12mm
Max. vertical milling cutter diameter	20mm
Max. vertical milling face diameter	63mm
Spindle taper	M. T. 3
Spindle travel	80mm
Range of spindle speed	14 speeds 117~1300r. p. m.
Table size (L×W)	200×150mm

OTHERS

Motor capacity	0.55kw
Voltage, Frequency	according to requirements of the country delivered to
Overall dimension (L×W×H)	970×580×890mm, 1070×580×890mm
Net weight	155kg, 162kg

2. ACCESSORIES

STANDARD ACCESSORIES

Serial No.	Specification		Quantity	Remark
1.	Three-jaw chuck	80 or 100mm	1	
2.	Centers	M. T. 3	2	
3.	Drill chuck	JsB1~13mm	1	
4.	Tie rod		1	
5.	Tie rod washer		1	
6.	Drill stock		1	
7.	Toolpost wrench		1	
8.	Opening wrench		1	
9.	Wedge		1	
10.	Allen wrench	4mm	1	
		5mm	1	
		6mm	1	
		8mm	1	for HQ400/3A
11.	Gear	24T	1	
		25T	1	
		27T	1	
		30T	1	
		33T	1	
		36T	1	
		42T	1	
		48T	1	
		60T	1	
		75T	1	
		120T	1	
12.	Duplex gear	60T/120T	1	
		125T/127T	1	

SPECIAL ACCESSORIES

Serial No.	Specification	Quantity
1.	Lathe tool	1 set
2.	Multi—purpose machine vice	1set
3.	Milling force cutting cutter chuck	1set
4.	Reversible thread tapping tools	1set

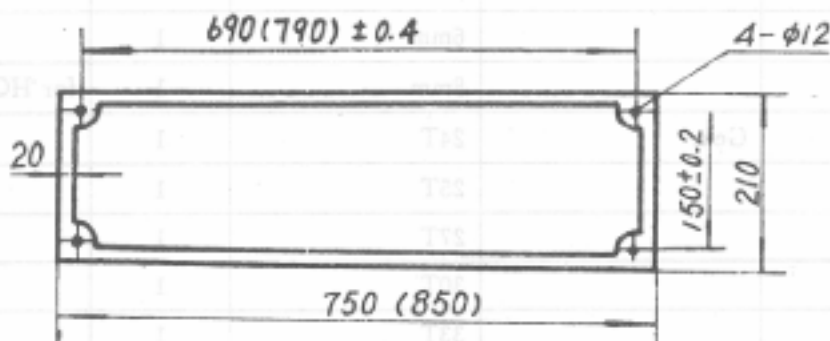
3. INSTALLATION

There are four shafts on the two sides of the bed for lifting. Pulling out the shafts and tying up the ones with rope, the machine may be lifted and carried.

CAUTION: protecting the controls and the painted surface.

A rigid base as shown in fig. 1 is given by yourself. Place the machine on it and fixed the machine with bolts. Level the surface of the table with admissible error 0.1mm in 1000mm.

Fig. 1. Plan of the base



4. CONSTRUCTION AND CONTROLS

The machine consists of the bed, the headstock, the drilling—milling unit, the table, the rotation base, the electrical motor, etc. the milling—drilling unit can be swivelled 360° on the base(headstock). The height of the unit of model HQ400/3A can be adjusted.

Loose the screw (7), rotate the lever (6) (see fig. 2), the drilling—milling unit of HQ400/3A can be adjusted up or down. After adjusted the height of the unit at the suitable position, tie the screw (7).

ELECTRICAL SYSTEM

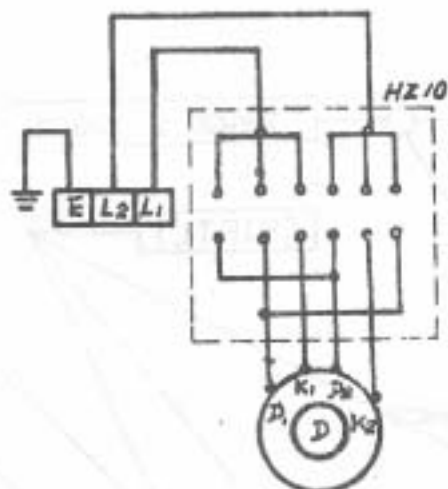
The standard machine is wired for 220V. 50Hz. 1Ph

On special order, some machines are wired for 110V/380V/440V. 50Hz/60Hz.

1Ph/3Ph. The yellow-green wire spliced on the housing is grounding

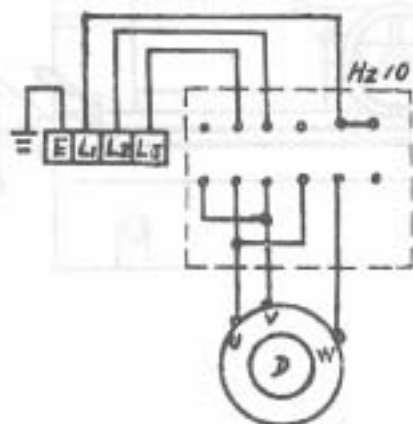
Fig. 2 Circuit diagram

Single phase



SWITCH POSITION POINTS	TURNING	OFF	DRILLING MILLING
L ₁ - D ₁	x	-	-
L ₁ - D ₂	-	-	x
L ₂ - D ₂	x	-	-
L ₂ - D ₁	-	-	x
L ₁ - K ₁	x	-	x
L ₂ - K ₂	x	-	x

Three phase



SWITCH POSITION POINTS	TURNING	OFF	DRILLING MILLING
L ₁ - U	x	-	-
L ₁ - V	-	-	x
L ₂ - U	-	-	x
L ₂ - V	x	-	-
L ₃ - W	x	-	x

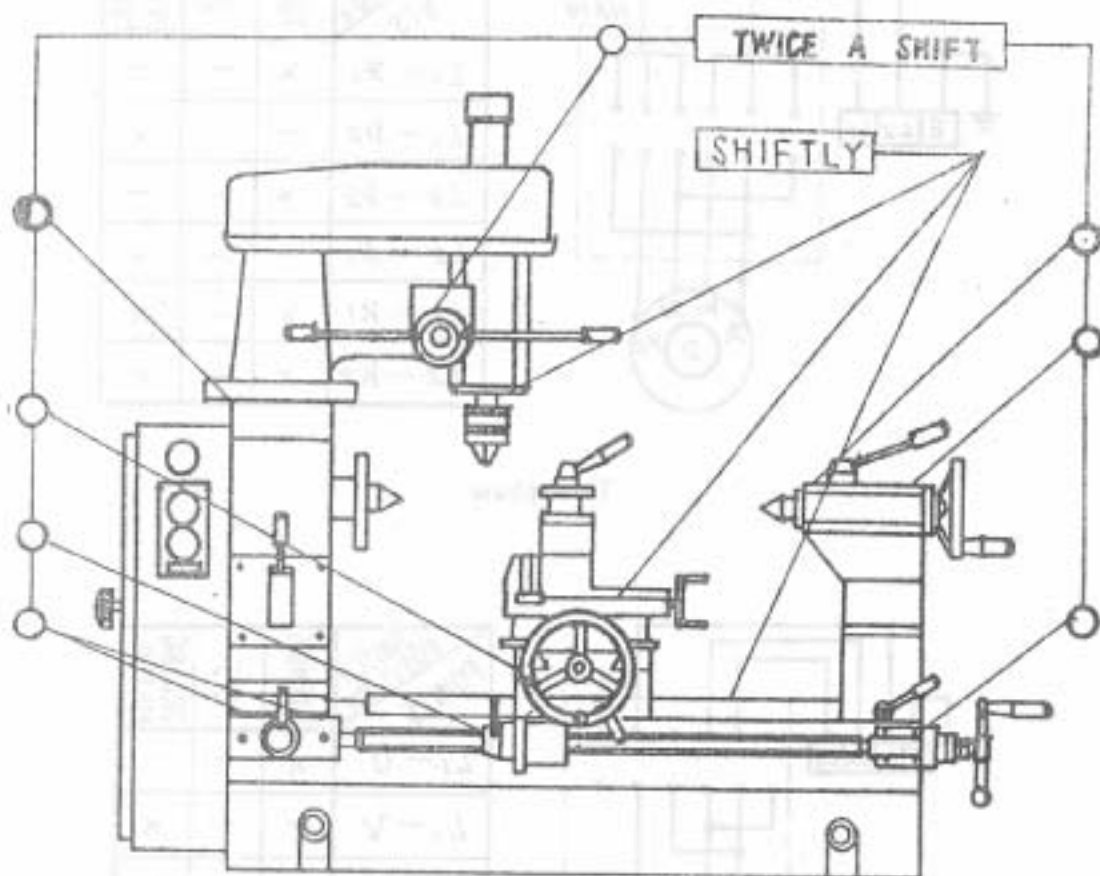
6. LUBRICATION

All oil sites on the machine should be oiled with the regulations mentioned in fig. 3.

The leadscrew, the slide, and the drilling—milling quill should be oiled with engine oil to the operating condition of the machine. All bearing should be greased periodically and cleaned once a year.

The oil in the headstock should be change periodically.

Fig. 3. Lubrication chart



7. OPERATION

Before operating the machine, you should read the OPERATING MANUAL carefully to acquaint the construction of the machine, the functions of the control system, and the demands of lubrication. And loose the slide lock lever, the drilling-milling quill clamp lever, etc., clean the machine with uncorrosion kerosene, then clean the machine with dry cotton goods, oil the machine slide with lubricating-oil.

Loose the screw(7), rotate the lever(6) (see fig. 4), the drilling-milling unit of HQ400/3A can be adjusted up or down. After adjusted the height of the unit at the suitable position, tie the screw(7).

8. DRIVE SYSTEM

Fig. 5 Transmission system diagram

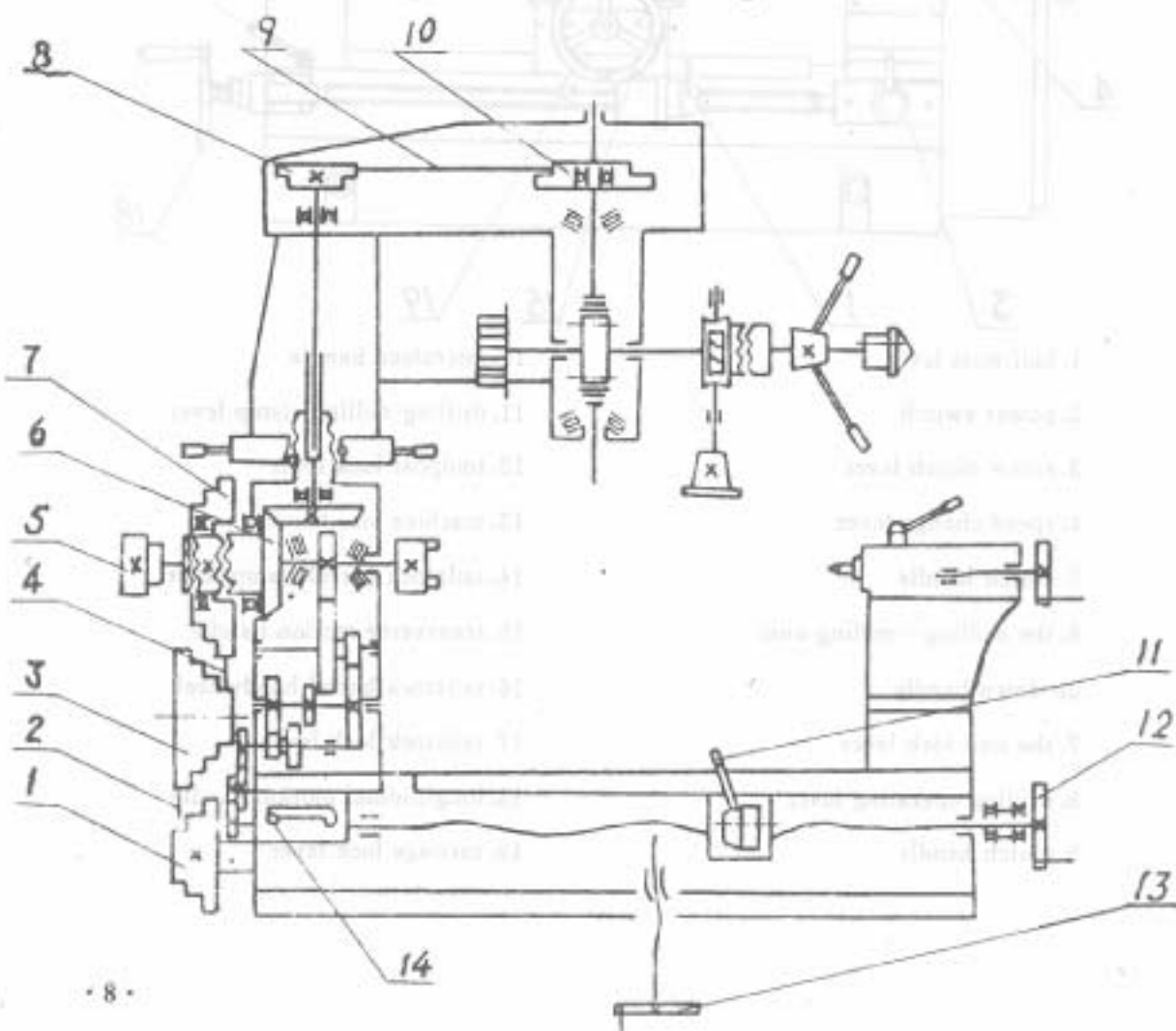
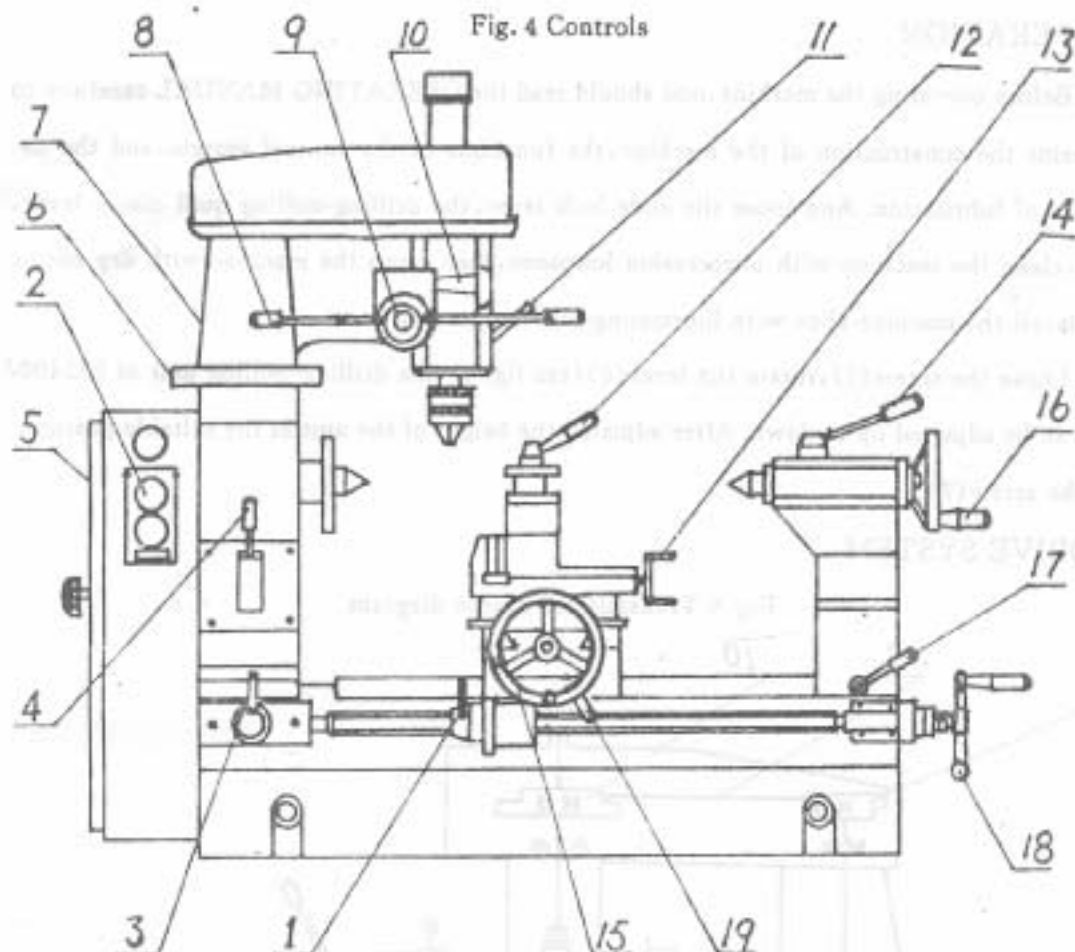


Fig. 4 Controls



1. half-nuts lever

2. power switch

3. screw clutch lever

4. speed change lever

5. clutch handle

6. the drilling-milling unit
up-down handle

7. the unit lock lever

8. drilling operating lever

9. clutch handle

10. microfeed handle

11. drilling-milling clamp lever

12. toolpost lock lever

13. machine vice handle

14. tailstock barrel clamp lever

15. transverse motion handle

16. tailstock barrel handwheel

17. tailstock lock lever

18. longitudinal motion handle

19. carriage lock lever

SPINDLE DRIVE

Change the position of belts on the pulleys, 7 different speeds as shown in fig. 6 may be obtained for the spindle.

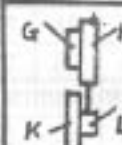
Fig. 6 Spindle speeds (r. p. m.)

motor				spindle		
A	B	C		D	E	F
A-F	A-E	A-D	B-F	C-F	B-E	C-D
160	300	375	470	600	870	1360

DRILLING-MILLING DRIVE

Change the position of the belts on the pulleys, 14 different speeds as shown in fig. 7 may be obtained for the drilling-milling spindle.

Fig. 7 Drilling-milling spindle speeds (r. p. m.)

drilling-milling unit	spindle	motor				spindle		
		A B C				D E F		
		A - F	A - E	A - D	B - F	C - F	B - E	C - D
	K - G	150	290	360	450	575	836	1300
	L - H	117	220	276	345	440	640	1000

FEED MOTION

Place the lever (14) (see fig. 5) on the right to take off the screw from the driven system, move the lever (11) to engage the half-nuts, move the handwheels (11) or (12), the toolpost movement by manual is provided by leadscrew-nut mechanism.

Place the lever (14) on the left, move lever (11) to engage the half-nuts, the spindle movement drives the gear mechanism, the toolpost obtains power feed movement.

Change the gear A, 8 different amounts of power feed as shown in fig. 8 may be obtained.

THREAD CUTTING

The spindle is at the lowest speed, place the lever (14) on the left move the lever (11) to engage the half-nuts, The spindle rotation drive gear mechanism and the leadscrew-nut mechanism, the threading is provided by the toolpost movement.

Change the gears A and D, 16 different metric threads and 16 different imperial threads as shown in fig. 8 may be obtained.

CAUTION: The lever (14) must remain on the LEFT until the thread cutting process is complete. The tool is withdrawn from the work at the end of the cut by the hand wheel (13) and the motor is reversed bringing the tool back to the start for successive cuts. When the motor is turned from forward to reverse, you must turn the switch from forward to stop at first, wait the motor stop, then turn the switch from stop to reverse. See fig. (4)

		mm	0.2	0.25	0.3	0.35	0.4	0.45	0.5	0.6	0.7	0.75	0.8	1	1.25	1.5	1.75	2	2.5	3
A		24	30	36	42	24	27	30	36	42	36	24	60	60	36	42	60	60	75	
B		120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	
D		60	60	60	60	30	30	60	60	60	24	30	30	24	24	24	30	24	25	
1/4"		I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	

		inch	8	9	10	11	12	14	16	18	20	22	24	27	28	30
A		75	75	75	75	75	75	75	75	75	75	75	25	75	25	
B		125/127	125/127	125/127	125/127	125/127	125/127	125/127	125/127	125/127	125/127	125/127	125/127	125/127	125/127	
D		24	27	30	33	36	42	48	27	60	33	36	27	42	30	
1/4"		I	I	I	I	I	I	I	I	I	I	I	I	I	I	
1/8"		32	33	36	40	42	48	54	60	66	72	94	96	120		
A		75	25	25	75	25	25	25	25	25	25	25	25	25		
B		125/127	125/127	125/127	125/127	125/127	125/127	125/127	125/127	125/127	125/127	125/127	125/127	125/127		
D		48	33	36	60	42	48	27	60	33	36	42	48	60		
1/4"		I	I	I	I	I	I	I	I	I	I	I	I	I		
1/8"		32	33	36	40	42	48	54	60	66	72	94	96	120		

		mm	0.050	0.0020	0.063	0.0025	0.075	0.0030	0.088	0.0035	0.100	0.0039	0.125	0.0049	0.150	0.0059	0.175	0.0059
A		24		30		36		42		24		30		36		42		
B		120/60		120/60		120/60		120/60		120/60		120/60		120/60		120/60		
D		120		120		120		120		120		120		120		120		
1/4"		I		I		I		I		I		I		I		I		
1/8"		32		33		36		40		42		48		54		60		

PARTSLIST

Ref. No.	Description	Qty	Ref. No.	Description	Qty
1A	Pin 8×30	1	44A	Steel ball 5	1
2A	Link board	1	45A	Spring 5×0.5×20	1
3A	Spring pin	2	46A	"V" belt 0—630	1
4A	Pin 12×40	1	47A	Pulley	1
5A	seal ring	1	48A	Screw M6×8	3
6A	Spring 0.8×5×1.5	1	49A	"T"key	1
7A	Steel ball 5	1	50A	Circlip	1
8A	Cover	1	51A	Bearing 113	1
9A	Screw M5×10	17	52A	Bearing pedestal	1
10A	Lever base	1	53A	Nut M10	6
11A	Spring pin 5×20	2	54A	Spring washer 10	9
12A	Screw M10×32	1	55A	Washer 10	10
13A	Lever	1	56A	Double end studs M10×35	4
14A	Knob M10×32	1	57A	Housing	1
15A	Spring pin 3×10	1	58A	Sealring	1
16A	Duplex gear D	1	59A	Cover	1
17A	"E"ring 12	3	60A	Screw M5×8	4
18A	Sleeve	1	61A	"V"belt 0—630	1
19A	Paper washer	1		"V"belt 0—710	1
20A	Oil seal	1	62A	Pulley	1
21A	Oil seal board	1	63A	Shaft	1
22A	Screw M5×20	3	64A	Cover	1
23A	Key 5×20	1	65A	Screw M4×8	7
24A	Shaft D	1	66A	Washer	1
25A	Key4×10	1	67A	Bearing 1000900	2
26A	Clutch A	1	68A	Collar	1
27A	Key 8×12	1	69A	Socket cap screw M6×12	4
28A	Clutch B	1	70A	Oil cover	1
29A	Tab washer 30	1	71A	Paper washer	1
30A	Round nut	1	72A	Pulley bracket	1
31A	Screw M5×6	4	73A	Screw M5×10	1
32A	Handle knob	1	74A	Gear A	1
33A	Sleeve	1	75A	Seal washer	1
34A	Paper washer	1	76A	Bearing Pedestal	1
35A	Cover	1	77A	Key 8×12	1
36A	Screw M5×10	6	78A	Key 8×22	1
37A	Bearing D2007107	2	79A	Socket cap screw M6×12	3
38A	Compensating washer	1	80A	Spindle	1
39A	Sleeve	1	81A	Shaft B	1
40A	Bevel gear	1	82A	Sleeve	1
41A	Bearing pedestal	1	83A	Duplex gear B	1
42A	Bearing pedestal	1	84A	Duplex gear C	1
43A	Screw M5×30	4	85A	Gear C	1

Ref. No.	Description	Qty	Ref. No.	Description	Qty
86A	Shaft C	1	140A	Screw M6×8	3
87A	Key 5×14	1	141A	Screw M6×12	7
88A	Sleeve	1	142A	Steel ball $\phi 5$	4
89A	Cover	1	143A	Spring 6.8×5×14	1
90A	Pin 8×40	1	144A	Lever base	1
91A	Bolt M10×40	4	145A	Screw M6×16	1
92A	Oil window	1	146A	Oiler 6	4
93A	Seal ring	1	147A	Link base	1
94A	Bottom board	1	148A	"E" ring	1
101A	Motor	1	149A	Sleeve(right)	1
102A	Screw	1	150A	Key 5×12	1
103A	Pulley	1	151A	Pin B5×60	2
104A	Key B5×25	1	152A	Screw M6×50	2
105A	Bolt M8×25	4	153A	Knob M6×20	4
105A	Spring washer 8	4	154A	Lever M6×50	4
107A	Washer	4	155A	Lever base	1
108A	Nut M10	3	156A	Spring pin	1
109A	Ball face washer-10	2	157A	Spring	1
110A	Cone face washer-10	2	158A	Screw M8×6	1
111A	Motor pedestal	1	159A	Lifting pin	4
112A	Screw M8×16	4	160A	Split pin 5×35	4
113A	Motor bracket	1	161A	Screw M5×12	2
114A	Split pin 3.2×20	3	162A	Cover	1
115A	Pin	2	163A	Pin base	1
116A	Movable joint	1	164A	Pin	1
117A	Pin	1	165A	Half—nut	1
118A	Bolt	1	166A	Half—nut base	1
119A	"T" key	1	167A	Half—nut bracket	1
120A	Gear bracket	1	168A	Screw M8×12	7
121A	Washer	1	169A	Longitudinal lead screw	1
122A	"T" collar	1	170A	Pin B4×6	1
123A	Change gear	1	171A	Bearing 8103	2
124A	Change gear	1	172A	Cone pin B5×20	2
125A	Washer	1	173A	Lead screw Bracket	1
126A	Screw M6×40	1	174A	Scale ring	1
127A	Washer 10	1	175A	Round nut M14×1.5	2
128A	Washer 6	1	176A	Ball—crank handle	1
129A	Screw M6×30	1	177A	Taper pin B4×25	1
130A	Body	1	178A	Lever	1
131A	Clutch B	1	179A	Acorn nut M10	1
132A	Clutch A	1	180A	Handwheel B12×125	1
133A	Spring pin 3×22	1	181A	Scale ring	1
134A	Sleeve(left)	1	182A	Pin B5×25	1
135A	Shaft	1	183A	Lead screw bracket	1
136A	Key 4×12	1	184A	Screw	1
137A	Eccentric pin	1	185A	Screw M8×10	1
138A	Cover	1	186A	Locking pin	2
139A	Lever	1	187A	Longitudinal slide	1

Ref.No.	Description	Qty	Ref.No.	Description	Qty
188A	Gib	1	435A	Bolt M10	2
189A	Locking pin	1	436A	Washer 10	2
190A	Screw M8 x 15	4	437A	Nut M10	2
191A	Screw M8 x 25	2	228	Screw M4 x 12	2
192A	Tail stock base	1	229	Key	2
193A	Gib	1	230	Centering nut	1
194A	Key 4 x 20	1	231	Tool post base	1
195A	Cross lead screw	1	232	Spring 5 x 0.6 x 30	1
196A	Lead screw bracket	1	233	Hollow set pin	1
197A	Gib	1	234	Tool post	1
198A	Longitudinal slide	1	235	Square head bolt	8
199A	Screw M6 x 8	1	236	Compensating washer	1
200A	Lead screw sleeve	1	237	Locking bolt	1
			238	Lever	1
			239	Knob M10 x 32	1
401A	Compensating washer	1			
402A	Nut M8	1	50	Driving shaft	1
403A	Lever	1	51	Key 6 x 14	1
404A	Knob	1	52	Collar	1
405A	Square head bolt	8	53	Socket cap screw	1
406A	Tool post	1	54	Spring washer	1
407A	Hollow set pin	1	55	Washer B28	1
408A	Spring	1	56	Bevel gear B	1
409A	Tool post base	1	57	Roller bearing 7205	1
410A	Key	4	58	Knob M10 x 32	1
411A	Screw M4 x 12	4	59	Clamp lever	1
412A	Bolt M10 x 100	1	60	Clamp bolt	1
413A	Chela	2	61	Washer 10	1
414A	Screw M6 x 12	6	62	Spring washer 10	1
415A	Gib	1	63	Nut M10	1
416A	Nut M5	2	64	Collar	1
417A	Screw M5 x 16	2	65	Rotation seal	1
418A	Locking pin	1	66	Socket cap screw	1
419A	Screw M5 x 8	1	67	Rotation shaft	1
420A	Up—slide	1	68	Drilling—milling housing	1
421A	Oiler	6	69	Roller bearing 7204	1
422A	Lead screw's nut	1	70	Pulley guard(bottom)	1
423A	Lead screw	1	71	Spring housing	1
424A	Lead screw bracket	1	72	Screw M5 x 25	1
425A	Lever BM8 x 25	1	73	Spring	1
426A	Pin 3 x 16	1	74	Spring housing cover	1
427A	Nut M8	2	75	"V" belt 0—710	1
428A	Washer 8	2	76	Retainer ring	1
429A	Screw M5 x 6	1	77	Stop washer 20	1
430A	Down—slide	1	78	Round nut M20 x 1.5	1
431A	Scale	1	79	Cone pulley	1
432A	Bolt M8	2	80	Key 5 x 25	1
433A	Base	1	81	Circlip 10	1
434A	Scale	1			

Ref.No.	Description	Qty	Ref.No.	Description	Qty
82	Bush	1	123	Clutch	
83	Bearing roller 2.5 x 24	15	124	Pin 5 x 28	1
84	Belt tightener	1	125	Worm—gear	1
85	Tightener shaft	1	126	Key 6 x 14	1
86	Tightener base	1	127	Pinion shaft	1
87	Screw M5 x 12	2	128	Screw M14 x 6	1
88	Washer 8	5	129	Screw M8 x 10	1
89	Spring washer 8	5	130	Set screw M8 x 10	1
90	Bolt	1	131	Set screw M8 x 18	1
91	Circlip 40	1	132	Roller bearing 2007106	1
92	Bearing 108	1	133	Round nut M30 x 1.5	1
93	Screw M5 x 16	1	134	Washer 30	1
94	Cone pulley seal	1	135	Quill	1
95	Cone pulley	1	136	Drilling—shaft	1
96	Knob (B)	1	137	Roller bearing 2007107	1
97	Cover	1	138	Oil seal	1
98	Pulley shell (top)	1	139	Drilling—milling shaft gland	1
99	Collar	1	140	Set screw M5 x 6	1
100	Clamp bolt	1	141	Tailstock body	1
101	Clamp lever M6 x 50	1	142	Taper pin 6 x 30	2
102	Knob M6 x 20	1	143	Socket cap screw M10 x 20	4
103	Screw M8 x 15	1	144	Set screw M4 x 8	1
104	Oiler 6	1	145	T—Key	1
105	Worm	1	146	Tailstock harral	1
106	Bush	2	147	Feed nut	1
107	Set screw M5 x 8	2	148	Oil cup 6	1
108	Joint lever	1	149	Locking bush(bottom)	1
109	Microfeed handle	1	150	Locking bush(top)	1
110	Taper pin 3 x 28	1	151	Double—Screw bolt M10 x 40	1
111	Taper pin 4 x 20	1	152	Washer	1
112	Socket cap screw M5 x 30	2	153	Locking nut	1
113	Socket cap screw M5 x 45	1	154	Locking lever	1
114	Feed box housing	1	155	Knob M10 x 32	1
115	Scale ring	1	156	Bracket	1
116	Spring leaf	1	157	Dial	1
117	Lever base	1	158	Handwheel 12 x 100	1
118	Lever	2	159	Flat washer 10	1
119	Knob	2	160	Acorn nut M10	1
120	Set screw M6 x 18	1	161	Handle M6 x 50	1
121	Knob	1	162	Set screw M6 x 12	1
122	Joint lever	1	163	Flat key C4 x 18	1
			164	Feed screw	1

