

HQ400 HQ400/1

MULTI——PURPOSE MACHINE

OPERATION MANUAL

CHIZHOU HOUSEHOLD MACHINE-TOOL WORKS

THE PEOPLE'S REPUBLIC OF CHINA

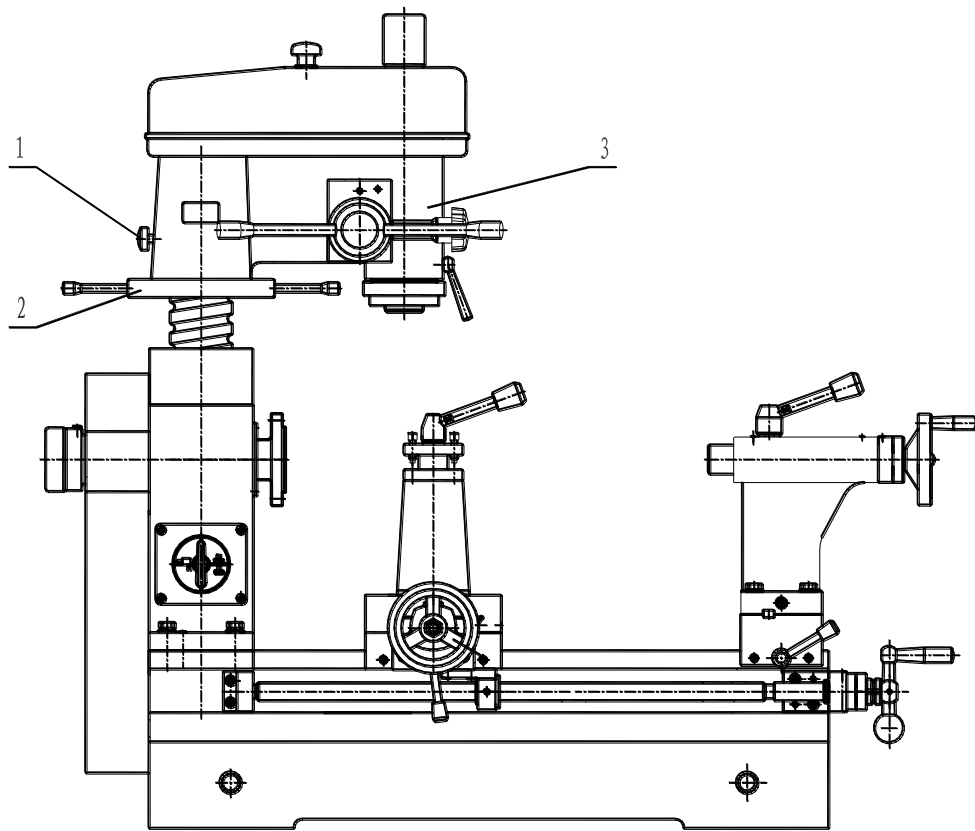
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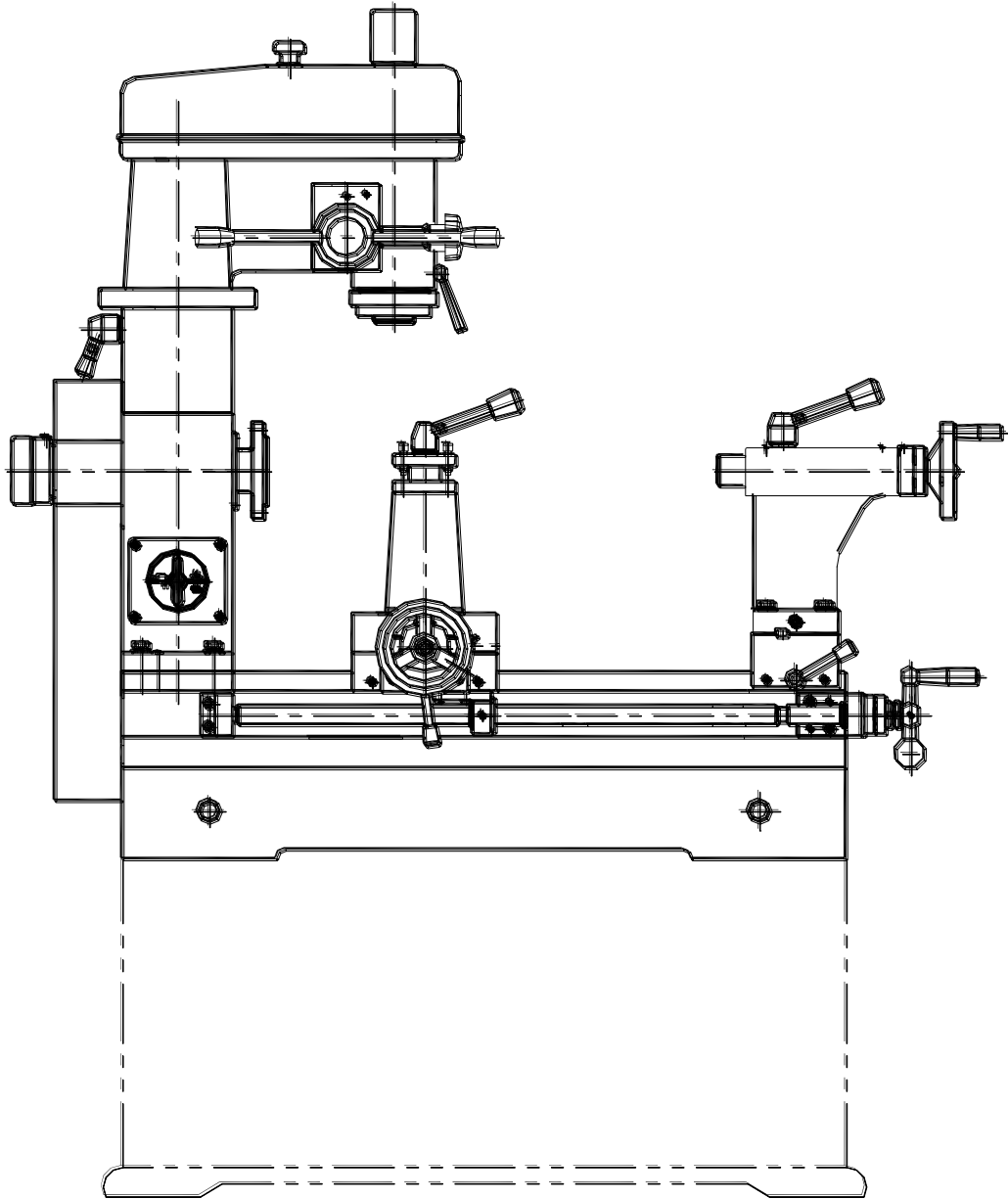
This booklet is for the model 400 and 400/1 machines. The 400/1 machine is the same as 400 machine except the drilling—milling unit. The unit of 400/1 may be not only swivelled 360°, but also raised 80mm. The working scope of 400/1 is expanded.

MODEL 400/1 MULTI—PURPOSE MACHINE INSTRUCTION OF UP—AND—DOWN MOVEMENT OF DRILLING—MILLING HEAD



Unlocking screw 1, rotate disk 2, the drilling—milling head may be arised or get down. When it is in wanted place ,the screw 1 must be locked firstly ,then you may perform the processing of drilling or milling.

1、 OUTSIDE DRAWING (400)



2. TECHNICAL SPECIFICATIONS

TURNING

Centre—height.....	210mm
Max. turning diameter(for steel or iron)	40mm
Max. distance between centers.....	400mm
Max. longitudinal travel.....	380mm
Max. cross travel.....	120mm
Taper of hole in spindle.....	Morse No.3
Taper of hole in tailstock barrel.....	Morse No.3
Spindle bore.....	20mm
Spindle speed.....	500,900,1600r.p.m.

DRILLING AND MILLING

Max. drilling diameter.....	15mm
Max. milling diameter.....	12mm
Max. vertical milling cutter diameter.....	20mm
Max. vertical milling face diameter.....	63mm
Max. spindle stroke.....	85mm
Taper of hole in spindle.....	Morse No.3
Spindle speed.....	375,500,675,900,1180,1600r.p.m.
Area of table (L×W)	200×150mm ²

OTHERS

Electric motor.....	550W,220V/50Hz
Overall dimensions(L×W×H), mm.....	970×580×890
Net weight	155Kg

3. APPLICATION

Model HQ400 Multi—Purpose Machine is capable of doing turning, drilling, and milling, and suitable for processing metal, wood, and other materials.

It is being extensively used in jobbing shops, schools teaching laboratories testing, occupation training, particularly in family for processing ideal motor car parts, household utensils, and artwares.

4. CONSTRUCTION AND FEATURES

The machine consists of the bed, the headstock, the drilling—milling head, the table, the tailstock, the rotation base, the electric motor, ect. and concentrates the functions of turning, drilling and milling. The drilling—milling head can rote 360^0 on the rotation base, It has advantages of compact construction, excellent properties, easy operation, multiple purposes.

5. DRIVE SYSTEM(Fig.1)

SPINDLE DRIVE

Rotation of the spindle(7) is provided by the movement of the claw clutch(3), the claw clutch being driven from the motor by means of the V—belt(2) and the cone pulleys (1)(4). Changing the position of the V-belt on the cone pulleys, three different speeds of 500, 900, 1600r.p.m. can be obtained for the spindle.

DRILLING—MILLING SPINDLE DRIVE

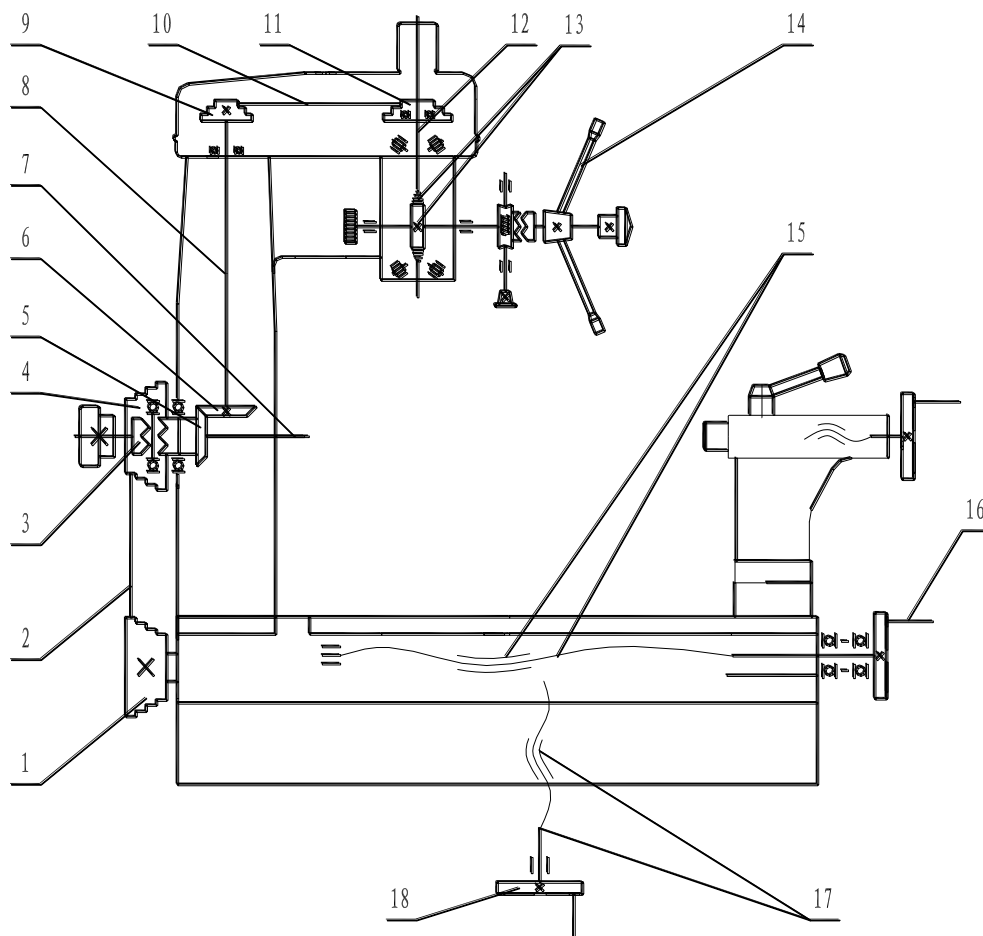
While the motor drives the driving shaft(8) by the v—belt, the cone pulleys, and the double bevel gears(5)(6), rotation of the drilling—milling spindle (12) is brought about by the V—belt(10) and the cone pulleys(11) (9) mounted on the drilling—milling spindle and the driving shaft.

The position of the V—belts(2)(10)on the cone pulleys being changed, the drilling-milling spindle may revolve at a speed of 375,500,675,900,1180, or 1600r.p.m.

FEED—MOTION

Turning the lever for vertical motion (14), the tool moves vertically by the gear—rack mechinism(13). Turning the handwheel for transverse motion(18) or the lever for longitudinal motion(16), the tool moves crosswise or longitudinally by the relevant screw feed mechanism(17 or 15).

Fig.1 Transmission diagram



6. ELECTRICAL SYSTEM(Fig.2)

The machine is driven by a 550W,220V/50Hz, single phase motor. To the special order, we can also supply the motors with 110V/220V/380V/440V,50Hz/60Hz, single/three phase. The motor is controlled by the HZ10 switch. In front of the socket, a fuse must be connected with wire. If the supply power is 110V, the fuse must be 20A, otherwise it must be 10A.

HZ10—combined switch instruction

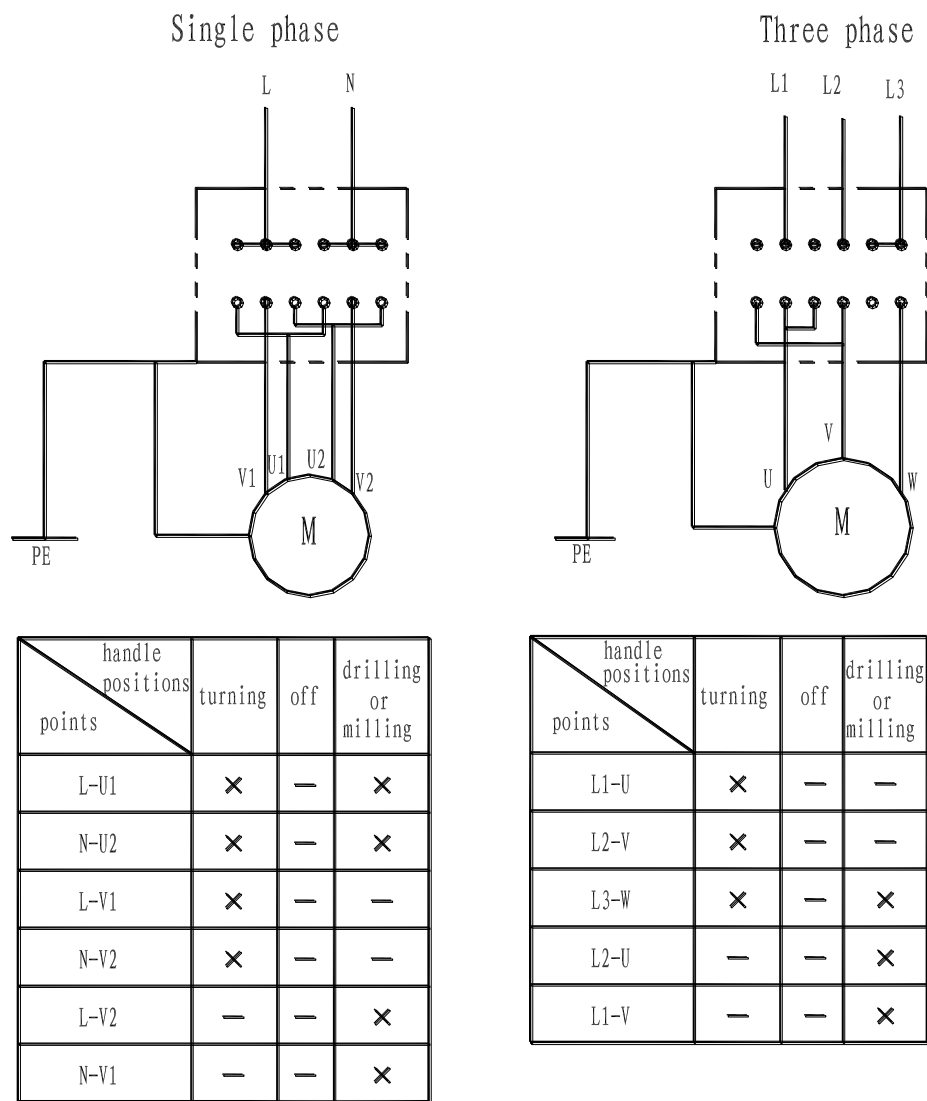


Fig.2 Diagram of electrical system

7. LUBRICATION(Fig.3)

All oil sites on the machine are oiled with engine oil in accordance with the regulations mentioned in figure 3.

The surfaces of the slides, the leadscrew, and the drilling—milling sleeve are oiled with engine oil according to the operating condition of the machine.

All rolling bearings should be greased regularly and washed once a year.

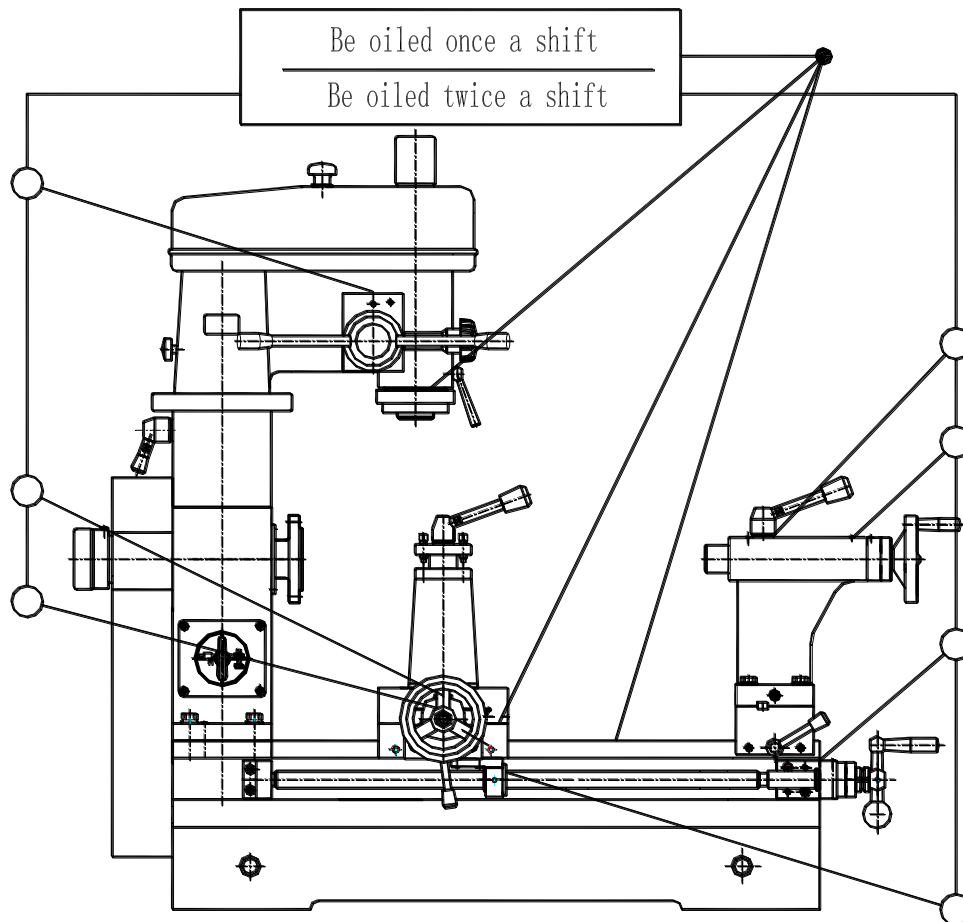


Fig. 3 Diagram of lubrication

8. LIFT AND INSTALLATION

There are four shafts for lifting the machine on the two sides of the bed. Pulling out the shafts and tying up the ones with the lifting ropes. The machine may be lift and carried. (attend to protecting the control level of the machine and the painted surface)

A rigid base is given by the user in dimensions shown in figure 4, the machine is placed on it and then fixed to it with the screw bolts. The surface of the table is levelled, the admissible error is 0.1mm in 1000mm.

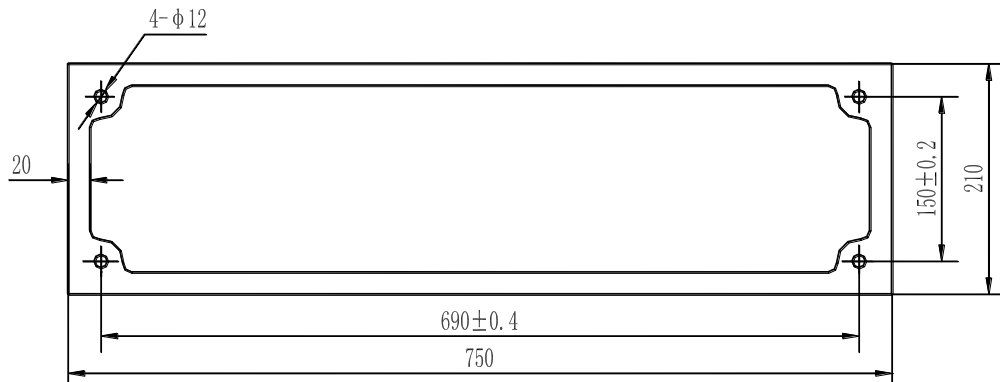


Fig.4 Plan of base

9. OPERATION(Fig.5)

Before the machine is put into service, the operator must read the operating instruction manual carefully to acquaint himself with the construction of the machine, the functions of the control part, and the demands of lubrication.

The carriage lock lever(14), the tailstock lever(12), the drilling—milling sleeve clamp lever(7), and the rotation—shaft clamp lever(3) must be made loose; the machine is washed with uncorrosive kerosene, and then cleaned with dry cotton goods and oiled.

Pulling out or pushing in the clutch operating handwheel(1), turning the Hz10 combined switch(2), and operating the relative levers, you may perform the processing you need.

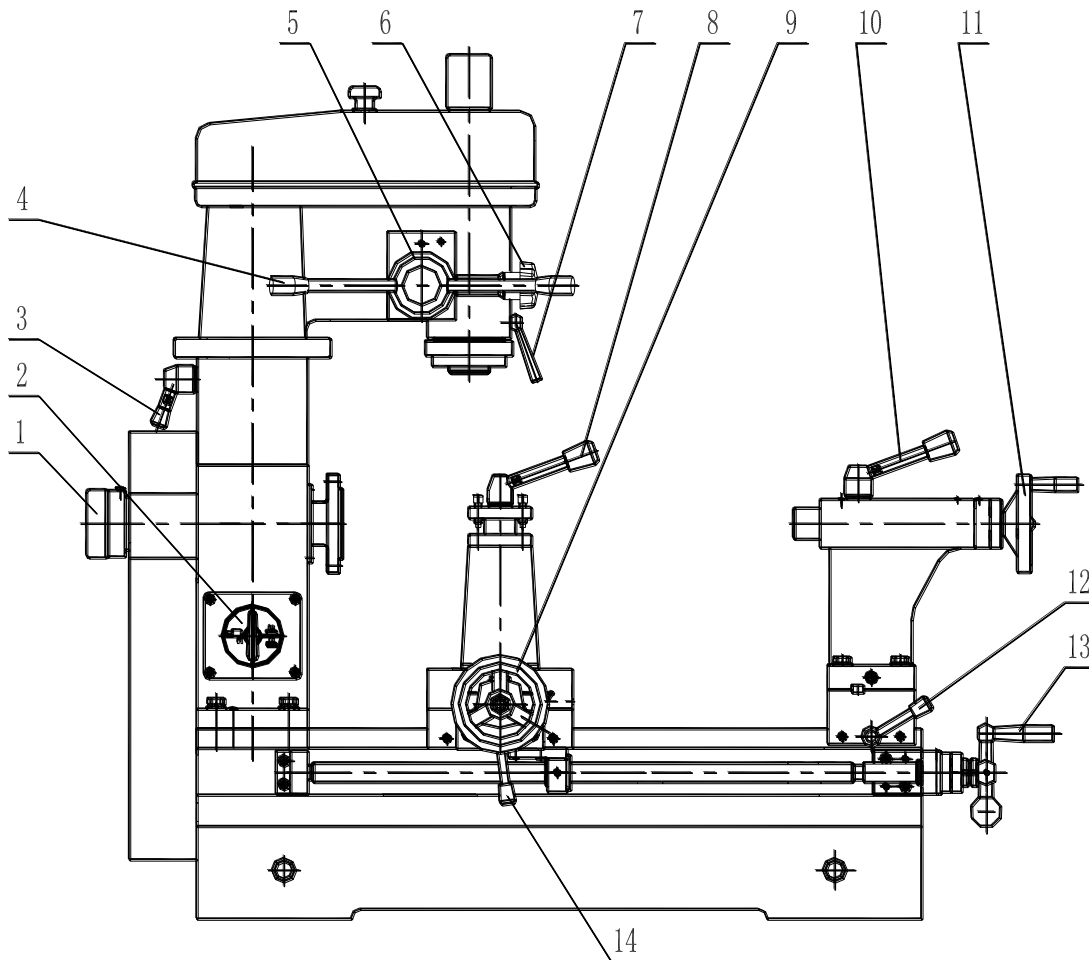


Fig.5 Diagram of control-part positions

- | | |
|---------------------------------------|---|
| 1 Clutch operating handwheel | 8 Tool post lock lever |
| 2 Hz10 combined switch | 9 Handwheel for transverse motion |
| 3 Rotation—shaft clamp lever | 10 Tailstock barrel clamp lever |
| 4 Lever for vertical motion | 11 Tailstock barrel adjusting handwheel |
| 5 Clutch operating handle | 12 Tailstock lock lever |
| 6 Micro-feed handle | 13 Lever for longitudinal motion |
| 7 Drilling-milling sleeve clamp lever | 14 Carriage lock lever |

10. MAINTENANCE

All oil sites must be lubricated before the machine is started

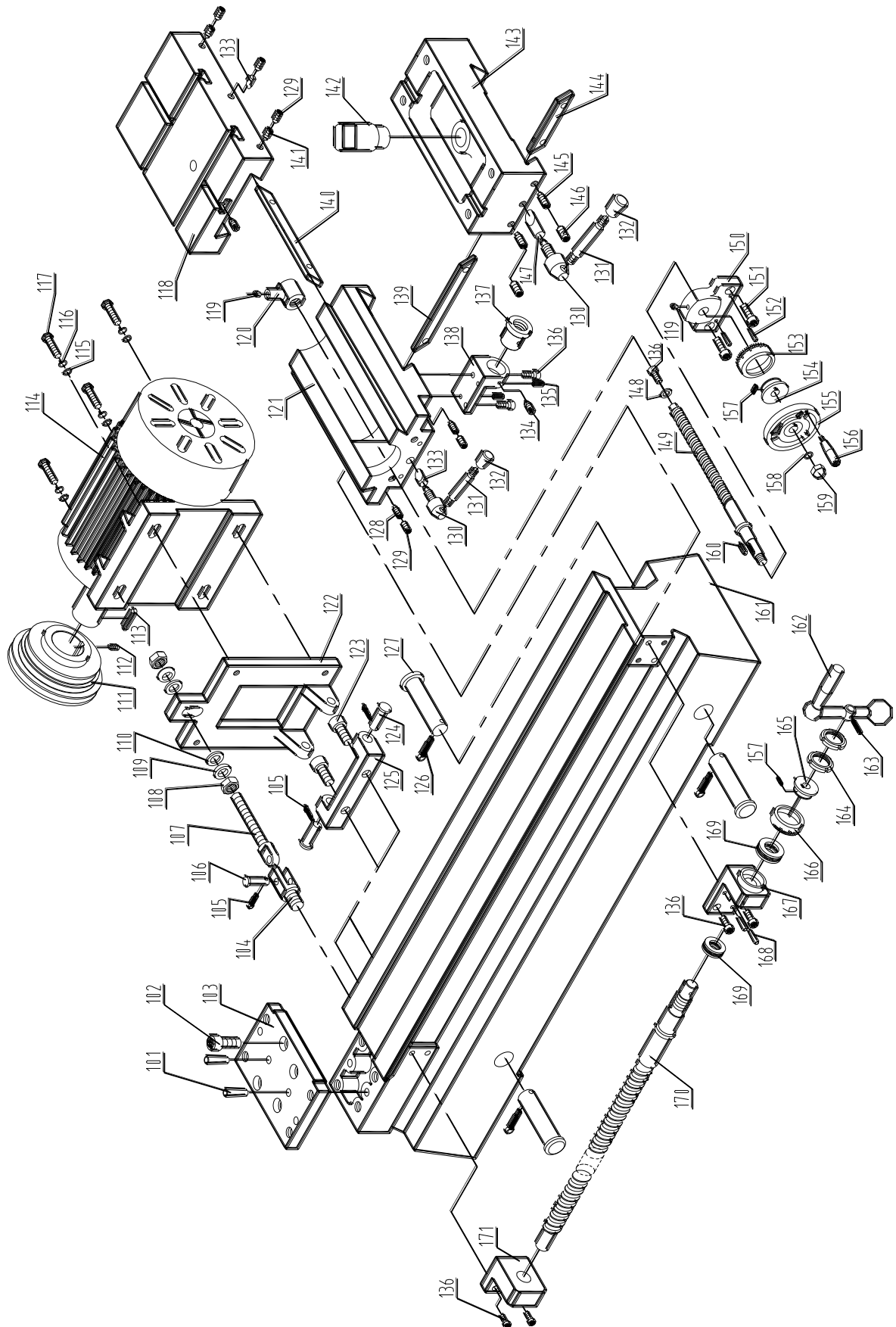
Range of work is not allowed to be in excess of the working ability of the machine.

While the machine is out of order, or sends out abnormal noise in operation. It must be stopped at once, and then checked and repaired.

11. ACCESSORIES

Serial No.	Name	Specification	Quantity	Remarks
1	Three-Jaw Chuck	80mm or 100mm	1	
2	Stationary centers	Morse No.3	2	
3	Drill-Chuck	13mm	1	
4	Drillstock		1	
5	Facing Cutter		1	Supplied according to the contract
6	Tie rod		1	
7	Tie-rod washer		1	
8	V-belts	1000mm	1	
		710mm	1	
9	Tool-Post Wrench		1	
10	Double end Wrench	10~12mm	1	
11	Inner Hexagonal Wrenches	4mm	1	
		6mm	1	
		8mm	1	For 400/1
12	Wedge		1	

BED ASSEMBLY

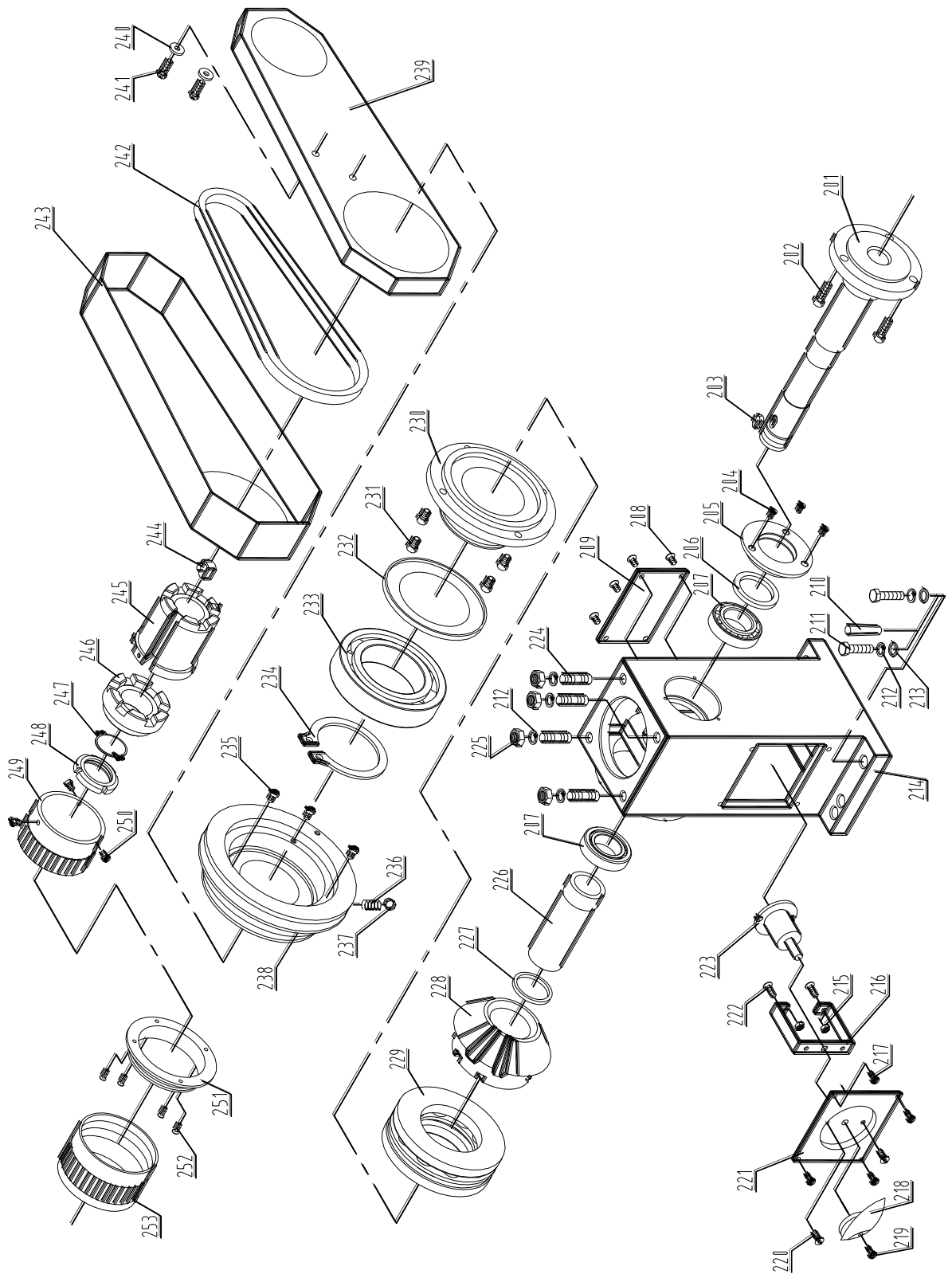


Bed Assembly

Index No.	PartNo.	Description	Size	Qty
101	GB/T 117-86	Pin	8×40	2
102	GB/T70-85	Screw	M10×25	4
103	HQ400-11-001(2)	Fixed Block		1
104	HQ400-11-028	Movable Joint Seat		1
105	GB/T91-76	Splint Pin	3×20	3
106	HQ400-11-029	Pin		1
107	HQ400-11-030	Movable Joint Bolt		1
108	GB/T6170-86	Hexagon Nut	M10	2
109	GB/T849-76	Global Washer	10	2
110	GB/T850-76	Taper washer	10	2
111	HQ400-11-031	Cone Pulley		1
112	GB/T71-85	Set Screw	M6×8	2
113	GB/T1096-76	Flat Key	6×25	1
114	YL7144	Motor	550W	1
115	GB/T97-76	Flat Washer	8	4
116	GB/T93-76	Spring Shim	8	4
117	GB5780-86	Hexagon Cap Screw	M8×25	4
118	HQ400-11-003	Cross Slide		1
119	JB/T7940.4-95	Oil Cup	6	2
120	HQ400-11-019	Cross Feed Nut		1
121	HQ400-11-002	Longitudinal Slide		1
122	HQ400-11-024	Motor Seat		1
123	GB/T70-85	Socket Cap Screw	M8×16	2
124	HQ400-11-027	Pin		2
125	HQ400-11-025	Pivot Block		1
126	GB/T91-76	Split Pin	5×35	3
127	HQ400-11-013	Sling Lever		3
128	GB/T75-85	Set Screw	M8×12	2
129	GB/T77-85	Set Screw	M8×12	5
130	HQ400-11-022	Locking Bolt		2
131	JB/T7271.6-94	Locking Lever	M6×50	2
132	JB/T7271.3-94	Knob	M6×20	2
133	HQ400-11-014	Locking Pin		2
134	GB/T71-85	Set Screw	M6×8	1
135	GB/T879-86	Pin	5×20	2
136	GB/T70-85	Socket Cap Screw	M6×12	7
137	HQ400-11-009	Longitudinal Feed Nut		1
138	HQ400-11-008	Bracket For Longitudinal Feed Screw		1
139	HQ400-11-017	Gib Strip		1
140	HQ400-11-018	Gib strip		1

IndexNo.	PartNo.	Description	Size	Qty
141	GB/T75-85	Set Screw	M8×16	2
142	HQ400-11-034	Square Column		1
143	HQ400-11-004	Tail stock Base		1
144	HQ400-11-016	Gib Strip		1
145	GB/T75-85	Screw	M8×25	2
146	GB/T77-85	Set Screw	M8×20	2
147	HQ400-11-015	Locking Pin		1
148	HQ400/3-01-013	Washer		1
149	HQ400-11-020	Cross Feed Screw		1
150	HQ400-11-021	Bracket For Cross Feed Screw		1
151	GB/T70-85	Socket Cap Screw	M8×16	2
152	GB/T117-76	Taper Pin	φ5×25	2
153	HQ400-11-007	Dial		1
154	HQ400-11-007B	Neck Bush		1
155	JB/T7273.3-94	Hand wheel	B-12×125	1
156	JB/T7270.1-94	Handle	M8×65	
157	HQ400-11-006C	Reed		2
158	GB/T97.1-85	Flat Washer	10	1
159	GB/T923-88	Acorn Nut	10	1
160	GB/T1096-76	Flat Key	4×20	1
161	HQ400-11-001	Lathe Bed		1
162	JB/T7270.9-94	Grip	12×50	1
163	GB/T879-86	Pin	4×20	1
164	GB/T810-88	Bearing Locking Nut	M14×1.5	2
165	HQ400-11-006B	Inner Convention		1
166	HQ400-11-006(1)	Dial		1
167	HQ400-11-010	Bracket For Longitudinal Feed Screw		1
168	GB/T117-76	Pin	5×20	2
169	GB/T301-95	Single-Row Radial Thrust Ball Bearing	51103	2
170	HQ400-11-005	Longitudinal Feed Screw		1
171	HQ400-11-011	Bracket		1

HEAD ASSEMBLY

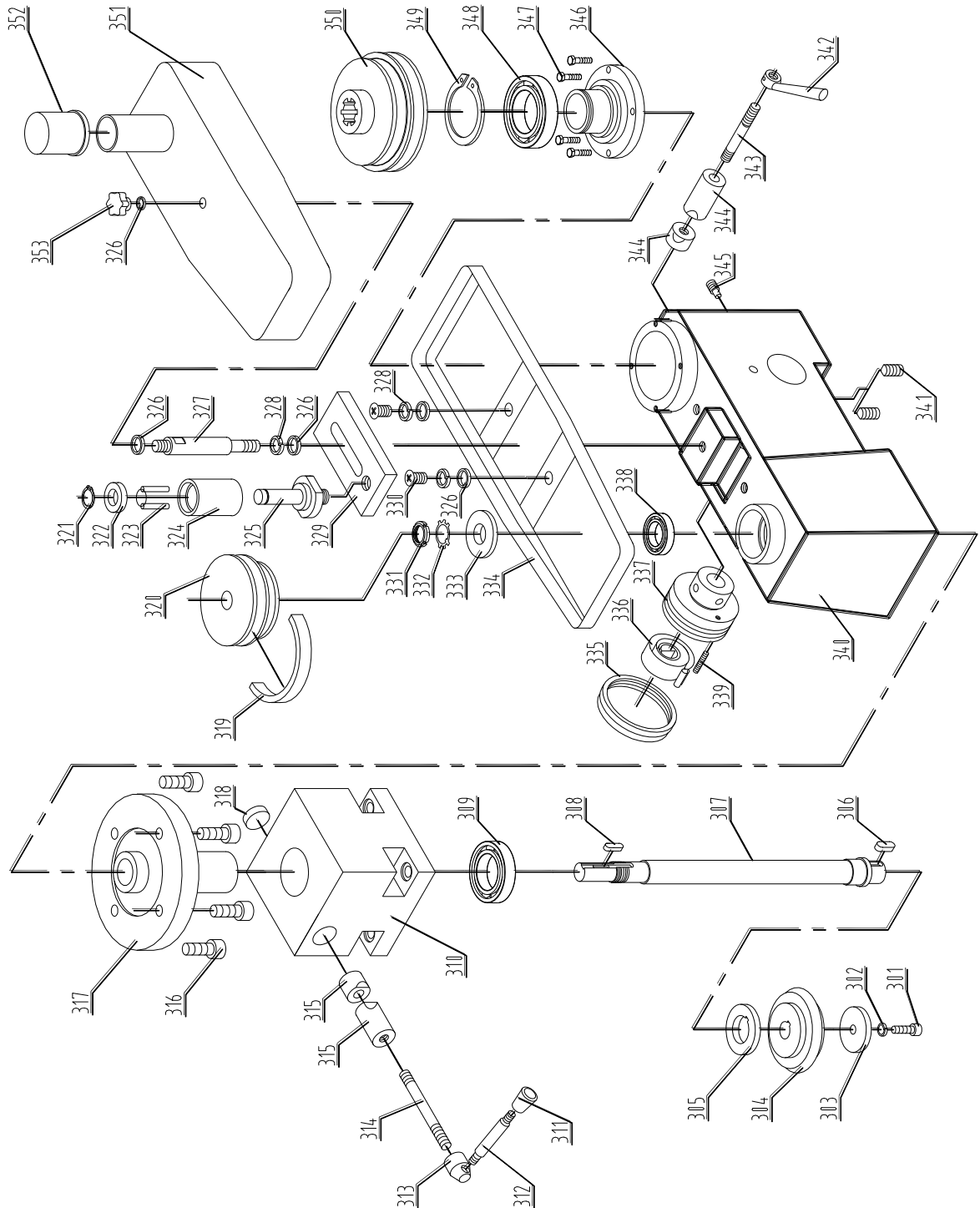


Headstock Assembly

Index No.	PartNo.	Description	Size	Qty
201	HQ400-12-002	Lathe Spindle		1
202	GB/T70-85	Socket Cap Screw	M6×12	3
203	GB/T1096-79	Flat Key	8×12	1
204	GB/T68-85	Sunk Screw	M4×8	3
205	HQ400-12-003	Main shaft Gland		1
206	HQ400-12-019	Oil Seal Of Spindle		1
207	GB/T297-94	Single-Row Tapered Roller Bearing	2007102	2
208	GB/T68-85	Sunk Screw	M5×8	4
209	HQ400-12-011	Cover Plate		1
210	GB117-86	Pin	8×40	2
211	GB/T5780-86	Hexagon Head Screw	M10×40	4
212	GB/T93-87	Spring Shim	10	8
213	GB/T848-85	Washer	10	4
214	HQ400-12-001	Headstock		1
215	GB/T6170-86	Hexagon Nut	M4	2
216	HQ400-12-016	Switcher Frame		1
217	GB/T67-85	Sunk Screw	M5×12	4
218		Switcher Handle		1
219	GB/T67-85	Sunk Screw	M3×8	1
220	GB/T68-85	Sunk Screw	M5×6	2
221	HQ400-12-015	Switcher Base		1
222	GB/T67-85	Button-Head Screw	M4×8	2
223		Switcher	HZ10	1
224	GB/T898-88	Double Screw Bolt	M10×35	4
225	GB/T6170-86	Hexagon Nut	M10	4
226	HQ400-12-005	Bush		1
227	HQ400-12-013	Compensating Collar		1
228	HQ400-12-004	Bevel Gear Wheel		1
229	GB/T301-95	Single-Row Radial Thrust Ball Bearing	8113	1
230	HQ400-12-009	Bearing Seat		1
231	GB/T70-85	Socket Cap Screw	M5×10	4
232	HQ400-12-014	Bearing Cover		1
233	GB/T276-94	Single-Row Ball Bearing	113	1
234	GB/T894.1-86	Circlip For Shaft	65	1
235	GB/T67-85	Button Head Screw	M6×8	3
236	GB/T2089-86	Helical Compression Spring	5×0.5×20	1
237	GB/T308-84	Steel Ball	Φ5	1
238	HQ400-12-010	Cone Pulley		1
239	HQ400-12-018	Pulley Shell(B)		1

Index No.	PartNo.	Description	Size	Qty
240	GB/T97.1-85	Flat Washer	6	2
241	GB/T65-85	Button Head Screw	M6×15	2
242	GB/T1171-74	V-Belt	O-1000	1
243	HQ400-12-017	Pulley Shell(A)		1
244	HQ400-12-008	T-Key		1
245	HQ400-12-006	Claw Clutch(A)		1
246	HQ400-12-007	Claw Clutch(B)		1
247	GB/T858-88	Stop Washer	30	1
248	GB/T812-88	Bearing Locking Nut	M30×1.5	1
249	HQ400-12-012	Clutch Operating Hand wheel		1
250	GB/T65-85	Set Screw	M5×5	3
251	HQ400-00-023	Protector Socket		1
252	GB/T867-86	Rivet	2.5×6	4
253	HQ400-00-022	Protector		1

DRILLING-MILLING HEAD ASSEMBLY

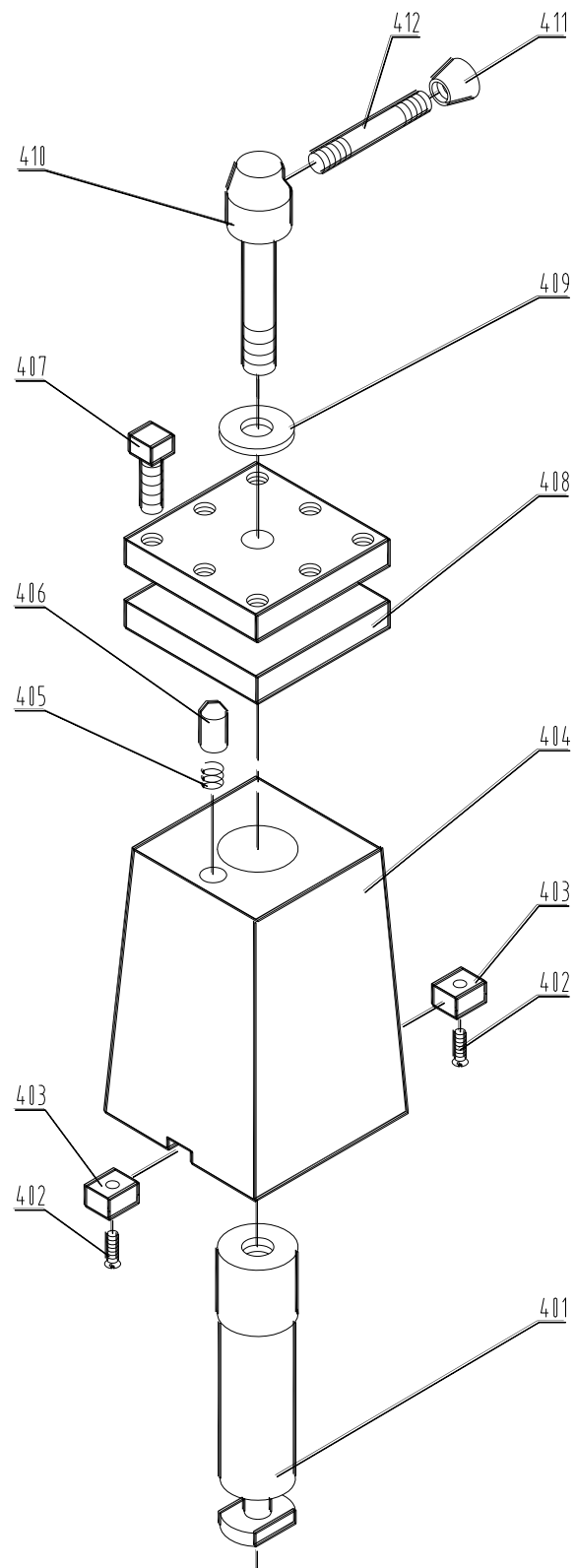


Drilling-Milling Head Assembly

Index	Part			
No.	No.	Description	Size	Qty
301	GB/T70-85	Socket Cap Screw	M5×16	1
302	GB/T93-87	Spring Shim	5	1
303	GB/T892-86	Washer	B28	1
304	HQ400-24-001	Bevel Gear Wheel(B)		1
305	HQ400-24-002	Compensating Collar		1
306	GB/T1096-79	Flat Key	6×14	1
307	HQ400-24-003	Driving Shaft		1
308	GB/T1096-79	Flat Key	5×25	1
309	GB/T276-94	Single-Row Tapered Roller Rearing	30205	1
310	HQ400-24-004	Rotation-Shaft Seat		1
311	JB/T7271.3-94	Knob	M10×32	1
312	HQ400-13-005	Rotation-Shaft Clamp Lever		1
313	HQ400-13-004	Locking Nut		1
314	GB/T899-88	Double-Screw Bolt	A10×85	1
315	HQ400-24-023	Locking Bush		1
316	GB/T70-85	Socket Cap Screw	M10×25	4
317	HQ400-24-008	Rotation-Shaft		1
318	HQ500-02-020	Capping		1
319	GB1171	V-Belt	O-710	1
320	HQ400-24-013	Cone Pulley(E)		1
321	GB/T894-86	Circlip For Shaft	10	1
322	HQ400-21-004	Bush		1
323	GB309-84	Bearing Roller	Ø2.5×24	15
324	HQ400-21-002	Belt Tightener		1
325	HQ400-21-003	Tightener Shaft		1
326	GB/T96-85	Flat Washer	8	5
327	HQ400-24-020	Pulley Shell Bolt		1
328	GB/T93-87	Spring Shim	8	3
329	HQ400-21-001	Tightener Base		1
330	GB/T67-85	Button-Head Screw	M8×14	2
331	GB/T812-88	Bearing Locking Nut	M20×1.5	1
332	GB/T858-88	Stop Washer	20	1
333	HQ400-24-010	Retainer Ring		1
334	HQ400-24-011	Pulley Shell(Bottom)		1
335	HQ400-24-019	Spring Housing Cover		1
336	HQ500-05-006	Spring		1
337	HQ500-05-007	Spring Housing		1
338	GB/T297-94	Single-Row Tapered Roller Bearing	30204	1
339	GB/T71-85	Screw	M5×25	1

Index No.	Part No.	Description	Size	Qty
340	HQ400-24-009	Drilling-Milling Head		1
341	GB/T71-85	Set Screw	M8×16	2
342	JB/T7270.7-94	Hand Handle	BM8×63	1
343	GB/T899-88	Double-Screw Bolt	A8×60	1
344	HQ400-24-022	Locking Bush(A)		1
345	GB/T75-85	Screw	M8×15	1
346	HQ400-24-015	Cone Pulley Seat(F)		1
347	GB/T5780-86	Hexagon Head Screw	M5×16	4
348	GB/T276-94	Single-Row Ball Bearing	6008	1
349	GB/T894-86	Circlip For Shaft	40	1
350	HQ400-24-014	Cone Pulley		1
351	HQ400-24-012	Pulley Shell (Top)		1
352	HQ400-24-021	Cleading		1
353	JB/T7274.4-94	Palm Grip Hand Knob	BM8×32	1

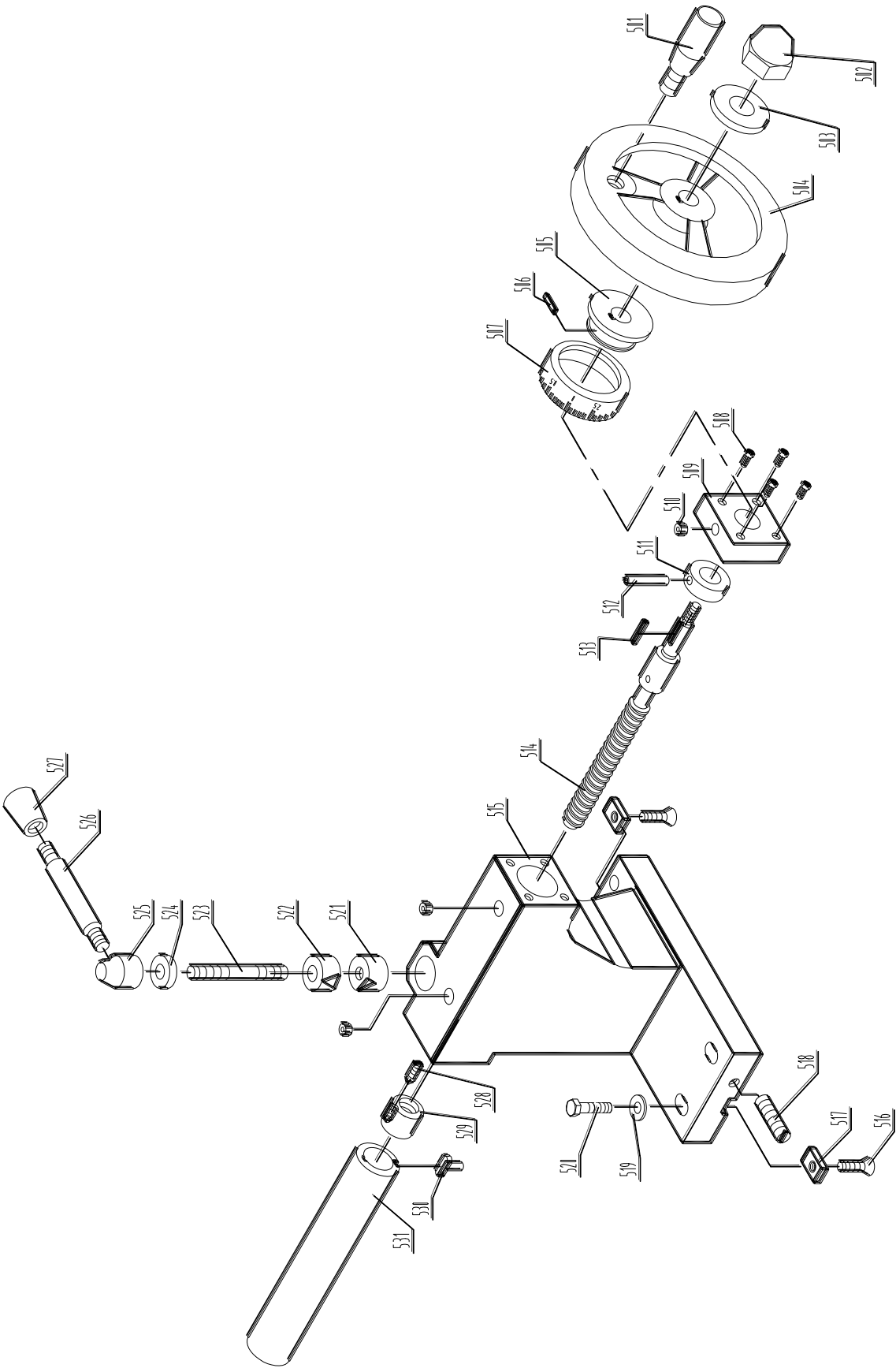
TOOL POST ASSEMBLY



Tool Post Assembly

Index	Part			
No.	No.	Description	Size	Qty
401	HQ400-14-002	Centering Nut		1
402	GB/T68-85	Sunk Screw	M4×12	2
403	GB/T1096-79	Flat Key	B12×14	2
404	HQ400-14-001	Tool Post Seat		1
405	GB/T2089-80	Helical Compression Spring	0.6×5×30	1
406	HQ400-14-007	Set Piece		1
407	GB/T85-88	Tool Post Seat		8
408	HQ400-14-003	Tool Post		1
409	HQ400-14-005	Spacer		1
410	HQ400-14-004	Locking Bolt		1
411	JB/T7271.3-94	Knob	M10×32	1
412	HQ400-14-006	Locking Lever		1

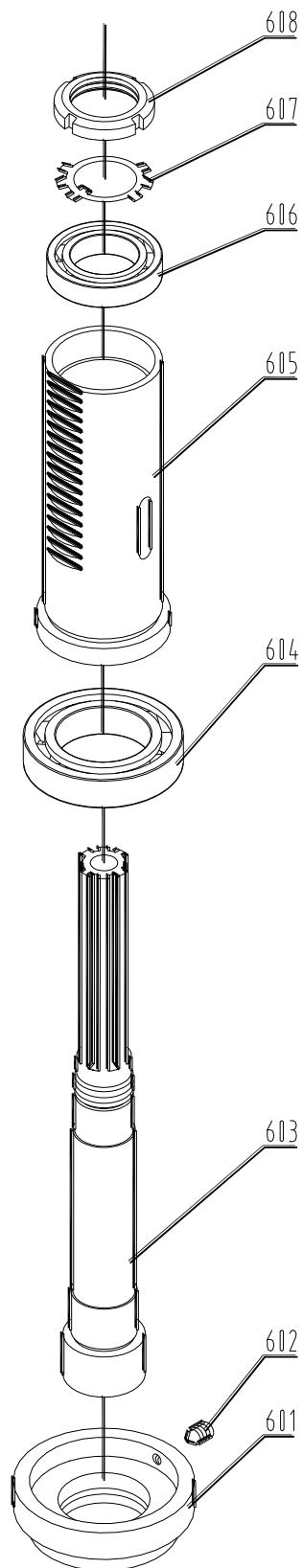
TAIL STOCK ASSEMBLY



Tail Stock Assembly

Index	Part			
No.	No.	Description	Size	Qty
501	JB/T7270.5-94	Handle	M6×50	1
502	GB/T923-88	Acorn Nut	M10	1
503	GB/T97-85	Flat Washer	10	1
504	JB/T7273.3-94	Hand Wheel	B12×100	1
505	HQ400/4-10-015	Neck Bush		1
506	HQ500-10-016	Reed		1
507	HQ400-13-010	Dial		1
508	GB/T70-85	Screw	M5×20	4
509	HQ400-13-009	Feed Screw Socket		1
510	JB/T7940.4-95	Oil Cup	6	3
511	HQ400-13-008	Bracket		1
512	GB/T119-86	Pin	D5×24	1
513	GB/T1096-79	Flat Key	C4×18	1
514	HQ400-13-006	Feed Screw		1
515	HQ400-13-001	Tail Stock Body		1
516	GB/T819-85	Sunk Screw	M5×14	2
517	HQ400-13-004	Key		2
518	GB/T73-85	Sunk Screw	M10×50	2
519	GB/T97.2-85	Washer	10	4
520	GB/T5780-86	Screw	M10×40	4
521	HQ400-13-011	Locking Bush (Bottom)		1
522	HQ400-13-012	Locking Bush (Top)		1
523	GB/T899-85	Double-Screw Bolt	AM10×40	1
524	HQ400-13-013	Washer		1
525	HQ400-13-004	Locking Nut		1
526	HQ400-13-005	Locking Lever		1
527	JB/T7271.3-94	Knob	M10×32	1
528	GB/T71-85	Set Screw	M4×8	1
529	HQ400-13-007	Feed Nut		1
530	HQ400-13-003	T-Key		1
531	HQ400-13-002	Tail Stock Barrel		1

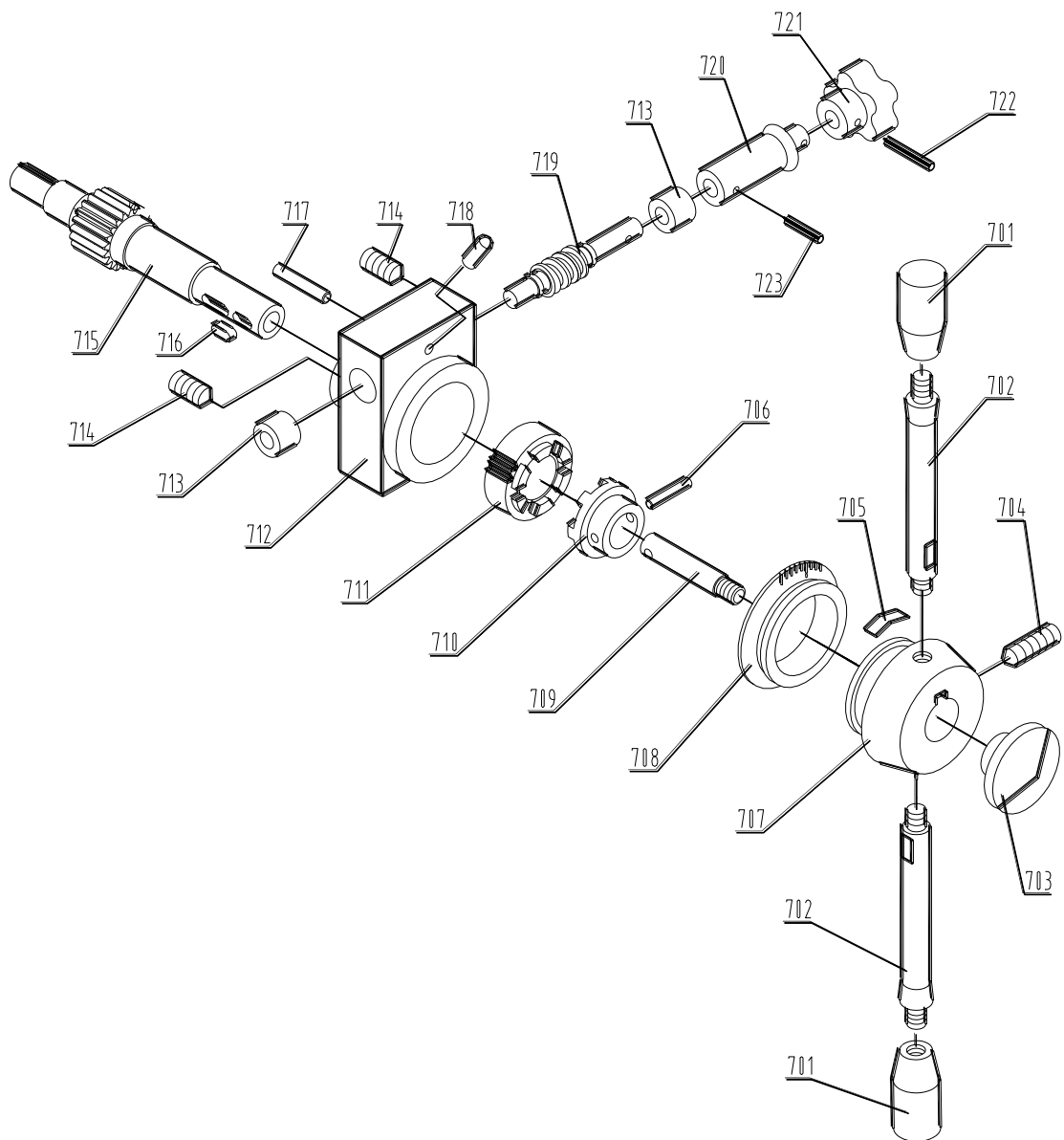
DRILLING-MILLING SHAFT ASSEMBLY



Drilling-Milling Shaft Assembly

Index	Part			
No.	No.	Description	Size	Qty
601	HQ400-22-002	Drilling-Milling Shaft Gland		1
602	GB/T71-85	Set Screw	M5×6	1
603	HQ400-22-004	Drilling-Milling Shaft		1
604	GB/T297-94	Single-Row Tapered Roller Bearing	2007107	1
605	HQ400-22-003	Hollow Shaft		1
606	GB/T297-94	Single-Row Tapered Roller Bearing	2007106	1
607	GB/T858-88	Stop Washer	30	1
608	GB/T812-88	Bearing Locking Nut	M30×1.5	1

DRILLING-MILLING FEED ASSEMBLY



Drilling-Milling Feed Assembly

Index	Part			
No.	No.	Description	Size	Qty
701	JB/T7271.5-94	Knob	BM8×40	2
702	HQ400-23-001	Hand Lever		2
703	JB/T7274.2-94	Knob	BM10×40	1
704	GB/T71-85	Set Screw	M6×18	1
705	HQ400-23-008	Spring Leaf		1
706	GB/T119-86	Pin	5jc4×28	1
707	HQ400-23-013	Hand Wheel		1
708	HQ400-23-007	Dial		1
709	HQ400-23-009	Joint Lever		1
710	HQ400-23-006	Clam Clutch		1
711	HQ400-23-005	Worm-Gear		1
712	HQ500-07-002	Feed Box		1
713	HQ400-23-010	Bush		2
714	GB/T71-85	Set Screw	M×8	2
715	HQ500-07-001	Pinion Shaft		1
716	GB/T1096-86	Flat Key	6×14	1
717	GB/T879-86	Spring Pin	5×35	1
718	JB/T7940.4-95	Oil Cup	6	1
719	HQ400-23-004	Worm		1
720	HQ400-23-011	Joint Lever		1
721	JB/T7274.2-94	Microfeed Handle	12×50	1
722	GB/T879-86	Spring Pin	4×28	1
723	GB/T879-86	Spring Pin	4×20	1