



# B2229

## COMBINATION LATHE & MILL

### USER MANUAL



# **B2229 LATHE/MILL COMBINATION**

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## **GENERAL SAFETY INSTRUCTIONS**

**EXTREME CAUTION SHOULD BE USED IN OPERATING ALL POWER TOOLS. KNOW YOUR POWER TOOL, BE FAMILIAR WITH ITS OPERATION. READ THE OWNER'S MANUAL AND PRACTICE SAFE USAGE PROCEDURES AT ALL TIMES.**

- ❑ **CONNECT** your machine **ONLY** to the matched and specified power source.
- ❑ **WEAR SAFETY GLASSES, RESPIRATORS, HEARING PROTECTION** and **SAFETY SHOES** when operating heavy machinery. **Always wear safety glasses.**
- ❑ **DO NOT** wear loose clothing or jewellery when operating machinery.
- ❑ **A Safe Environment is important.** Keep the area free of dust, dirt and other debris in the immediate vicinity of the machine.
- ❑ **BE ALERT!** Do Not Use prescription or other drugs that may affect your ability or judgement to safely use this machine.
- ❑ **DISCONNECT** the power source when making adjustments or repairs.
- ❑ **NEVER** leave an operating tool unattended.
- ❑ **NEVER** reach over the table when the tool is in operation.
- ❑ **ALWAYS** keep bits sharp and properly aligned.
- ❑ **ALWAYS** keep all safety guards in place and ensure their proper function.
- ❑ **ALWAYS** make sure that any tools used for adjustments are removed before operating the machine.
- ❑ **ALWAYS** secure your work with the appropriate clamps or vises.
- ❑ **ALWAYS** keep bystanders safely away while operating machinery.
- ❑ **THINK SAFETY. WORK SAFELY.** Never attempt a procedure if it does not feel safe or comfortable.
- ❑ **FOR SAFETY REASONS,** always turn the mill head to the right or to the left while working on the lathe.

As part of the growing line of Craftex metalworking equipment, we are proud to offer the B2229 Combination Lathe/Mill. The Craftex name guarantees Craft Excellence. By following the instructions and procedures laid out in this owner's manual, you will receive years of excellent service and satisfaction. The B2229 is a professional tool and like all power tools, proper care and safety procedures should be adhered to.

## **SPECIFICATIONS**

### **Turning**

Distance between centers	20"
Swing over Bed	16 ½"
Max. Longitudinal Travel	18"
Max. Cross Travel	8"
Spindle Taper	MT 4
Travel of Tail Stock Barrel	3"
Taper of Tail Stock	MT 3
Spindle Hole Diameter	1 1/8"
Spindle Speed	7 steps 160-1360 R.P.M
Longitudinal Lead Screw Threads can be cut	6 T.P.I./4 mm
Inch Thread can be cut	4-120T.P.I. / 0.2-6mm
Range of Automatic Feeding	0.002-0.014 inch/ 0.05-0.35mm

### **Drilling & Milling**

Spindle Taper	MT 3
Spindle Travel	41/4"
Max. Distance Between Spindle Center & Column	11"
Max. Distance Between Nose & Table	12"
Spindle Speed	16 steps 120-3000 R.P.M
Table Size	18 1/2" x 61/4"
Drilling Capacity	7/8"
End Mill Capacity	1 1/8"
Diameter of End mill Cutter Holder	31/8"

### **Other Information**

Motor Mill	¾ HP/ 1PH.
Motor Lathe	¾ HP/ 1PH.
Motor Voltage	10.5 AMP.
Net Weight	512 LBS
Gross Weight	612 LBS



## Mounting of B2229 Combination Lathe/Mill

1. Carefully open the crate and check for any damage to the machine before you go any further.
2. The machine should be lifted with the aid of an engine hoist or a forklift. Use lifting straps as shown in Fig. (1). Please follow safe guidelines when lifting machine from crate.
3. Before you move the machine into place make sure the foundation is level and will support the weight of the machine. You must also make sure that the base you are using is solid enough to support the weight of the machine without noticeable deflection. Do not place the machine in direct sunlight to avoid deformity and loss of accuracy of the machine.
4. The B2229 comes with two  $\frac{3}{4}$  HP motors, one for the lathe the other for the mill/drill. The machine is supplied with a standard 110 volt, 10.5 amp plug and should be installed on the appropriate electrical circuit according to the National and Local Standards.
5. The base should be bolted to the foundation to prevent the machine from tipping over. The machine is now ready to be lifted onto the base.
6. Carefully lift the machine as shown in Fig. (1) and place on stand. Line up the bolt holes and fasten to the base.
7. With the aide of a 6" precision level you can level the machine in longitudinal and cross direction. Once level then tighten the foundation bolts.

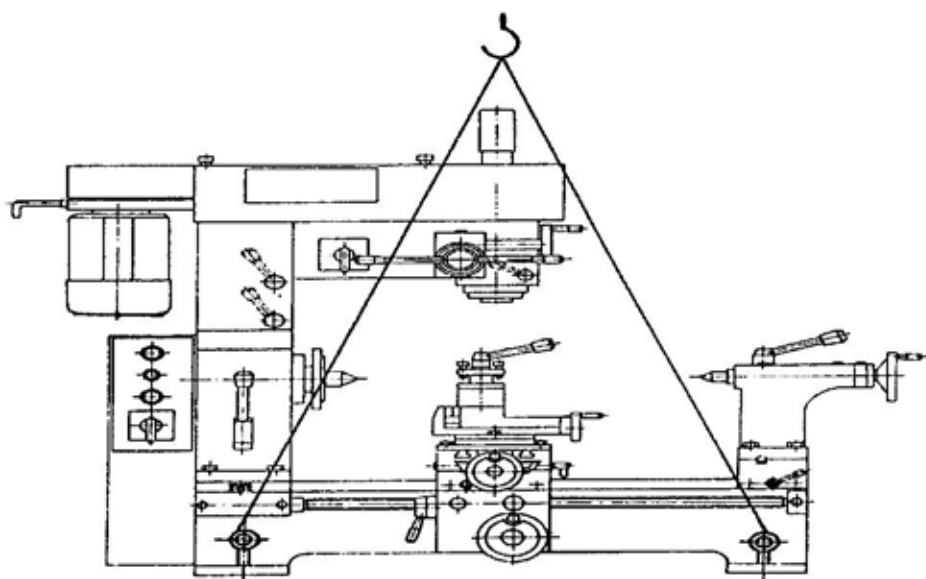


Fig. 1.

## Cleaning and Lubricating

### Cleaning

1. The machine has been coated with an anti-grease protective coat on the processing face before packing. This grease must be completely removed before operating the machine. Commercial degreaser, kerosene or similar solvent can be used to remove the grease. Do not let the solvent touch any of the rubber parts or belts otherwise they may erode.
2. With the aide of a brush and degreaser you can clean the lead screw and the rack.
3. By moving the saddle and the tailstock forward and backwards this will allow you to clean the rest of the bed.

### Lubricating

1. Now that you have cleaned all the protective coating from your machine you must now lubricate the bed.
2. The machine lubricating points should be lubricated according to Fig. (2).
3. The drive bearings should be lubricated with grease regularly, and cleaned once a year. The gears in the headstock should be lubricated by No. 70 or HL-70 gear oil. Fill to the level of the oil gauge.
4. The oil in the headstock should be changed regularly, with the first time after about half a month. The second time after 45 days, and then it should be changed every six months.

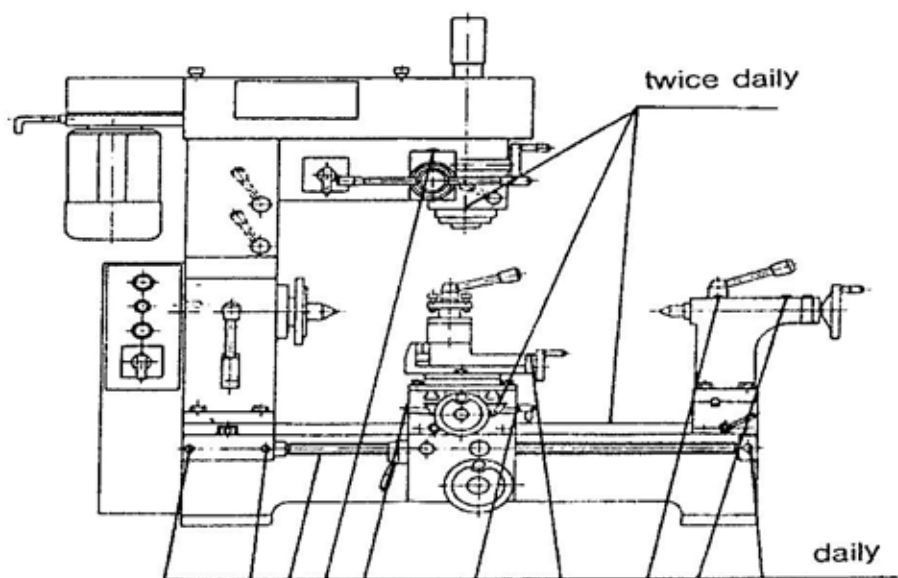


Fig. 2

# Electrical System

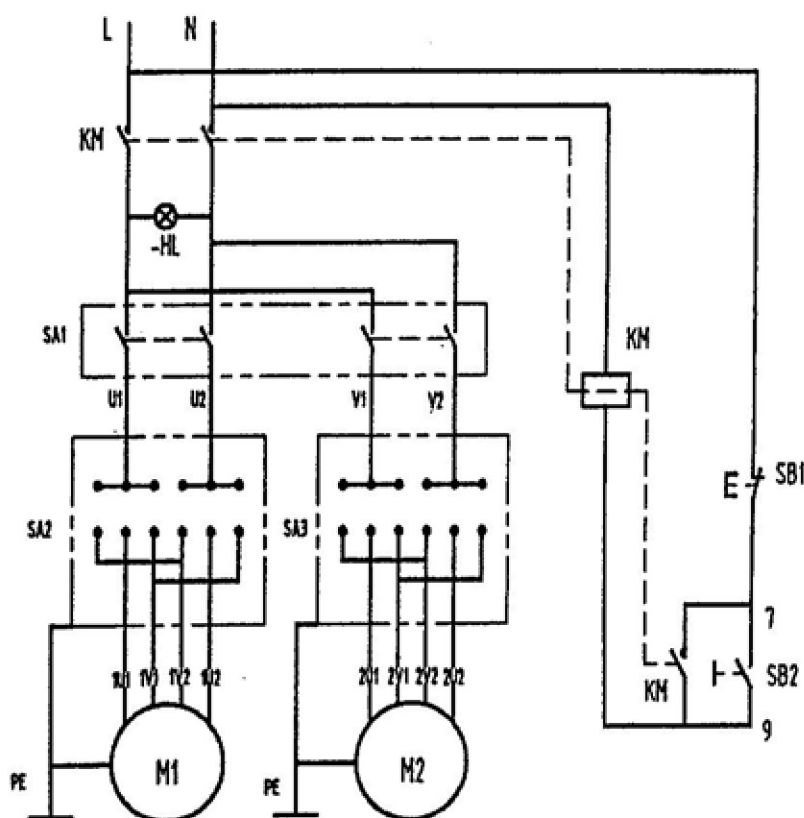
## Composition

The system consists of alternating current contactor (K), red emergency button (S1), green (S2), pilot (HL), micro switch (S3, S4, S5), shift switch. The system has the protection of lose-voltage, and cuts off the current when the cover is opened.

## Operation

The machine is operated by two ¼ HP motors, one for the lathe and the other for the milling. Located on the front of the machine is a switch that engages either the milling or lathe operation. The selector switch must be turned to the operation you wish to engage. The pilot light shows that you have power running to the machine, now push the green button. To disengage the machine push the red emergency button.

**WARNING:** While operating the lathe, make sure the mill head is turned either to the right or the left for safety reasons. Failure to do so could result in serious damage to the machine and injury to the operator.



SA1 Switch Working Diagram

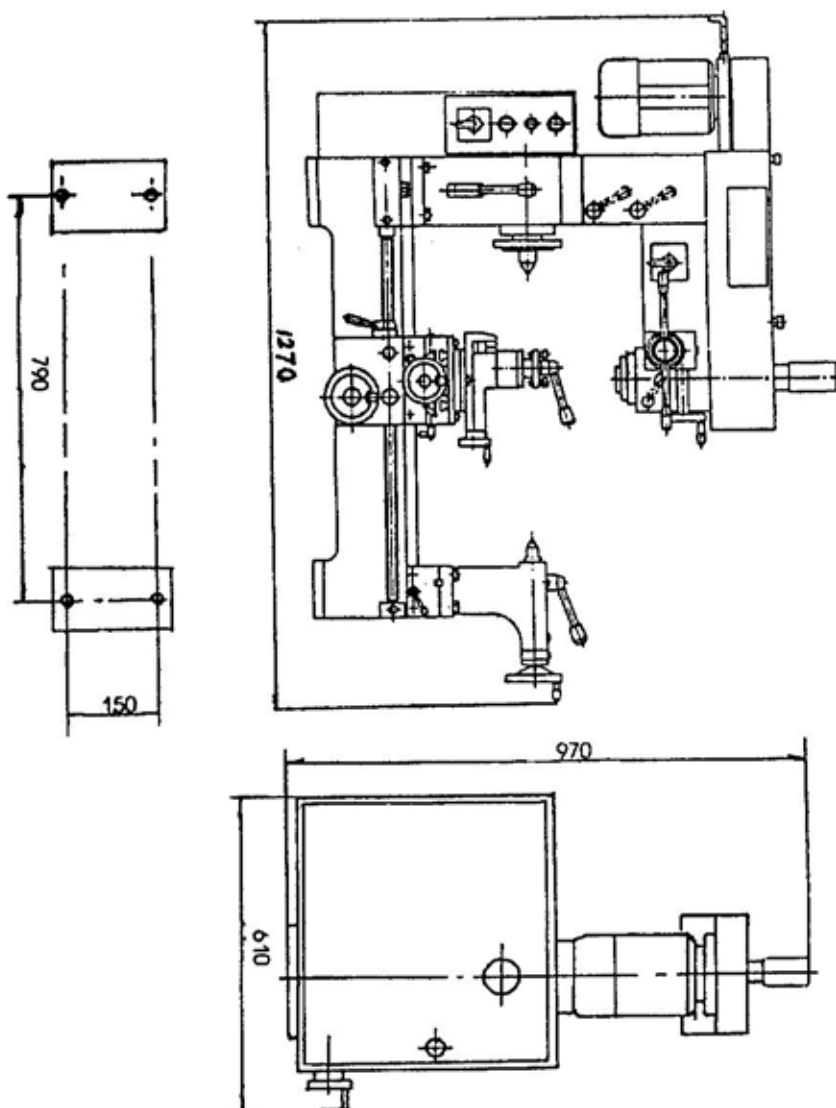
Position Points	Turning	Stop	Drilling
L-U1	×	—	—
N-U2	×	—	—
L-V1	—	—	×
N-V2	—	—	×

SA2,SA2 Switch Working Diagram

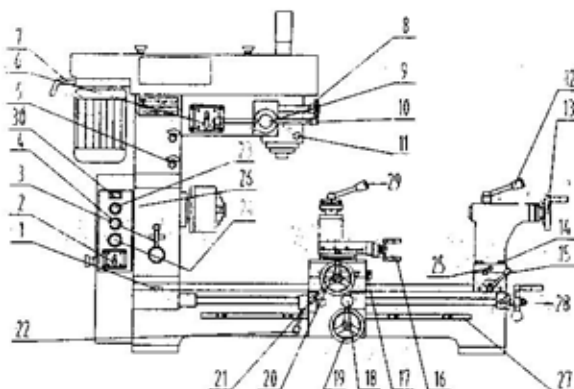
Position Points	Forward	0	Reverse
U1-U1	×	—	×
U2-U2	×	—	×
U1-V1	×	—	—
U2-V2	×	—	—
U1-V2	—	—	×
U2-V1	—	—	×

Single Phase 110V/60Hz

## General Dimension



## Operation: Explanation



**Fig.3.**

- (1) Lead Screw Clutch Lever.
- (2) Shift Switch.
- (3) Change Lever.
- (4) Start Switch.
- (5) Drilling – milling stock lock lever.
- (6) Drilling – milling shift switch.
- (7) Drilling – milling belt lock lever.
- (8) Drilling – milling micro feed lever.
- (9) Drilling – milling micro feed clutch lever.
- (10) Drilling – milling spindle feed lever.
- (11) Drilling – milling spindle lock lever.
- (12) Tail stock barrel lock lever.
- (13) Tail stock hand wheel.
- (14) Screw.
- (15) Tail stock lock lever.
- (16) Tool post feed hand wheel.
- (17) Slide lock lever.
- (18) Cross-feed clutch lever.
- (19) Longitudinal feed hand wheel.
- (20) Cross-feed hand wheel.
- (21) Saddle lock lever.
- (22) Half nuts lever.
- (23) Pilot.
- (24) Master Switch/ Emergency switch.
- (25) Returning screw.
- (26) Main spindle pulley lock lever.
- (27) Rack.
- (28) Ball crank lever.
- (29) Tool post lock lever.
- (30) Drill / lathe switch

## Operation

### Caution

1. Please read the manual before operating the B2229 Combination Lathe/Mill. Become familiar with the controls and the functions. This will help prolong the life and service of your machine.
2. Always make sure the work area is well lit. This will help avoid any accidents from happening due to lack of light.
3. Check lubricating areas to make sure they have sufficient grease.
4. Always clamp the work piece firmly, to prevent it from flying off and injuring someone.
5. Stop the machine when adjusting tool or working piece.

### Lathe Spindle Drive

1. Before starting the machine you should check the tension of the belt. The belt should depress about  $\frac{1}{2}$ " under normal finger pressure. If the tension of the V belt is too tight this could ruin the bearings. The tension of the belts can be adjusted by using lever (26) Fig. (3) located behind the machine and above the motor.
2. The main spindle is operated by utilizing the switch (2). Select the direction forward or reverse. Should you need to change direction please turn the shift switch to the middle position and wait. After a moment you can turn the switch in the new direction you wish to go.
3. The machine belt can be adjusted to give the operator 7 speeds as shown in Fig. (4).

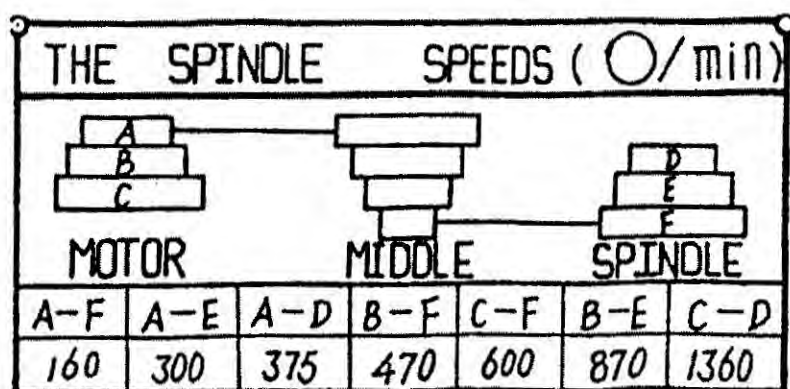


Fig. 4

## Operation Continued

### Drilling – Milling Spindle Drive

1. The milling/drilling part of this machine has a reverse and forward switch (6) Fig. (3). Turn the switch to the desired direction, then make sure you have turned the motor switch for the mill on, now push the green button and the milling operation can begin.
2. The spindle feeding can be changed by lever (10). If you require the use of the micro feed, pull out the clutch lever (9), then you can operate the micro feed lever (8). Fig. (3)
3. Pushing lever (7) can change the speed of the drilling/milling spindle. Loosen the belt and change the position of the belt. Then tighten the lever and continue. There are sixteen speeds that can be obtained. See Fig (5).

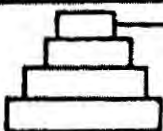
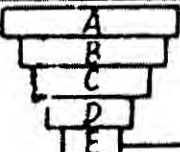
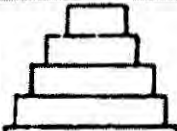
THE DRILLING-MILLING UNIT SPEEDS (O/min)							
							
MOTOR		MIDDLE		SPINDLE			
-A	-B	-A	-C	-A	-D	-B	-A
E-	E-	D-	E-	C-	E-	D-	B-
120	200	310	350	400	450	530	600
-B	-C	-B	-D	-C	-D	-C	-D
C-	D-	A-	C-	B-	B-	A-	A-
660	900	1380	1450	1670	2140	2350	3000

Fig. 5

## Operation Continued

### LONGITUDINAL FEED

**Hand Feeding:** Lever (1) in the left position, half- nut lever (22) in original position, turn the hand wheel (19), now the longitudinal hand feeding can be made. Fig. (3)

**Automatic Feeding:** Position lever (1) to the right. Place half-nut lever (22) in the clutch position, now cross feeding can be done. By changing lever (3) position and gear A, B, C, D, there are twelve automatic feed rates that can be obtained as follows. Please refer to Fig. (3) and Chart (1)

A		A	24	30	36	42
			I	II	III	IV
		I	0.2	0.25	0.30	0.35
		II	0.1	0.125	0.15	0.175
		III	0.05	0.063	0.075	0.088
		I	0.008	0.010	0.012	0.014
		II	0.004	0.005	0.006	0.007
		III	0.002	0.0025	0.003	0.0035

Chart. 1

### Cross Feed

**Hand Feeding:** can be completed by operating turning lever (20) directly Fig. (3).

**Automatic Feeding:** Position lever (1) to the right, half-nut lever (22) in original position. Pull out the cross feed clutch lever (18), now the cross automatic feed is engaged. By changing the gear A, B, C, D, there are 12 automatic feed rates that can be obtained.

**Thread Cutting:** Main spindle in low speed, position lever (1) to the right, and engage the half-nut lever (22). Cutting different thread pitch (inch or metric) can be accomplished by changing lever (3) and gear A, B, C, D. Refer to Fig. (3) and Chart. (2)

		A	24	27	30	33	36	39	42	48	60
		I	4	4.5	5	/	6	/	7	8	10
		II	8	9	10	11	12	13	14	16	20
		III	16	18	20	22	24	26	28	32	40
		I	/	/	/	/	18	/	/	24	30
		II	/	27	30	33	36	39	42	48	60
	III	/	54	60	66	72	78	84	96	120	
	A	36	42	48	60	72					
		II	0.75	/	1	1.25	1.5				
		III	1.5	1.75	2	2.5	3				
		I	3	3.5	4	5	6				
		A	36	42	48	60	72				

Chart 2



## Operation Continued

### Tail Stock

1. The tailstock can slide freely along the bed way and can be locked anywhere on the bed way by turning the lock lever (15) Fig. (3).
2. Before the machine was shipped the tailstock center and the spindle center where in the same line. It is possible that during shipping the tailstock may have loosened and may not still is in line. To adjust this loosen screw (14), adjust the two returning screws (25) to make any correction required so centers are aligned. Fig (3).

### Threading Dial

The threading dial performs the function of indicating the proper time to engage the half-nut so that the tool will enter the same groove of the thread on each successive cut. Threading dial is marked with lines numbered 1.2.3.4.5.6, and a single line is marked on the housing of the threading dial (fixed line). The chart below is the same as the one riveted on the threading dial. When cutting threads engage the half-nut at the proper numbers shown on the scale column of the threading dial plate. 1-6 on the scale means the half-nuts can be engaged on any of the numbered lines 1.2.3.4.5.6. In the first cutting, if you engage the half-nut for successive cutting only when matching the numbered lines with the fixed line. 1.4 means that the half-nut can be engaged on 1.2 for successive cutting. Refer to Indicator Table Below.

INDICATOR TABLE							
TPI	SCALE	TPI	SCALE	TPI	SCALE	TPI	SCALE
8	14	12	1-6	20	14	32	14
9	1-6	14	14	22	14	40	14
10	14	16	14	<del>24</del>	1-6		
11	14	18	1-6	28	14		

## **Operation Continued**

### **Warm up Procedure**

1. Check all the operating handles to see whether they work properly and reliably. Make sure the tightness of the guide way is correct for its movement.
2. On the first test run of the lathe you should start the spindle to run at the lowest speed for 15 minutes to allow for a break-in period. This should be done for all speeds until you have reached the maximum speed of the lathe. At each step of the way this will allow you to make sure that there are no unusual sounds or other problems.
3. Never change the speed or the direction of the lathe until the machine has come to a **complete stop**.
4. Before putting the machine into normal operation the operator should carefully and thoroughly read this manual. This will allow the lathe to always perform with precision, accuracy and a longer life.

## **Maintenance**

### **Daily Maintenance**

1. Fill with lubricant before starting the machine everyday. Refer to lubricating Fig. (2).
2. Keep the work area clean and free from all debris.
3. If you hear strange noises or the temperature of the spindle gets too hot, stop the machine at once and check over all areas of the machine to ensure you are not damaging the machine in any way.

### **Weekly Maintenance**

1. Clean the lead screw and lubricate.
2. Check that there is plenty of lubricant on all the rotating and sliding surfaces.

### **Monthly Maintenance**

1. Adjust all the gib space of the saddle.
2. Lubricate the worm gear, half-nut and bearings in order to prevent wearing.

## **Trouble Shooting**

**Caution: Before checking machine, please turn off the current.**

1. Turn on the current, spindle does not run.
  - (a) The voltage is not right and the main switch is turned off. Check and adjust the input voltage and turn the main switch on.
  - (b) Wire connector loose, check and repair.
2. The motor is too hot or not enough power.
  - (a) The voltage is too low, check and correct.
  - (b) Wire connector is not good (this can easily make the motor short circuit, turn off the current and correct).
  - (c) Check the belt to make sure it is not defective then adjust belt to the correct tension.
  - (d) Too much load on the motor or working time is too long, reduce work load and work time.
3. Temperature of main spindle bearings is too high.
  - (a) Require more grease to lubricate fill according to oil gauge.
  - (b) The bearing assembly is too tight, run the spindle by hand easily, adjust spindle back nut.
  - (c) High speed turning for too long, slightly reduce the cutting amount.
4. Making small taper when external turning.
  - (a) It is not in the same line between the spindle center and the tail stock center. Adjust the tail stock center according to the operational manual.
  - (c) The moving line of the carriage is not parallel to the spindle center, loosen the lock screw of the head stock and adjust the spindle center then lock in place.
5. The surface of the work piece is very rough after machining.
  - (a) The space of the spindle bearing is too big, adjust to correct position, or use new one.
  - (b) The space between the saddle and the gib is too big, adjust and correct the position.
  - (c) The tool is dull, sharpen or use new bit.
  - (d) The work piece is not correctly locked in place, lock down tightly.



## CRAFTEX 2 YEAR LIMITED WARRANTY

Craftex warrants every product to be free from defects in materials and agrees to correct such defects where applicable. This warranty covers **two years** for parts and 90 days for labour (unless specified otherwise), to the original purchaser from the date of purchase but does not apply to malfunctions arising directly or indirectly from misuse, abuse, improper installation or assembly, negligence, accidents, repairs or alterations or lack of maintenance.

*Proof of purchase is necessary.*

All warranty claims are subject to inspection of such products or part thereof and Craftex reserves the right to inspect any returned item before a refund or replacement may be issued.

This warranty shall not apply to consumable products such as blades, bits, belts, cutters, chisels, punches etceteras. Craftex shall in no event be liable for injuries, accidental or otherwise, death to persons or damage to property or for incidental contingent, special or consequential damages arising from the use of our products.

### RETURNS, REPAIRS AND REPLACEMENTS

To return, repair, or replace a Craftex product, you must visit the appropriate Busy Bee Tools showroom or call 1-800-461-BUSY. Craftex is a brand of equipment that is exclusive to Busy Bee Tools.

For replacement parts directly from Busy Bee Tools, for this machine, please call 1-800-461-BUSY (2879), and have your credit card and part number handy.

- All returned merchandise will be subject to a minimum charge of 15% for re-stocking and handling with the following qualifications.

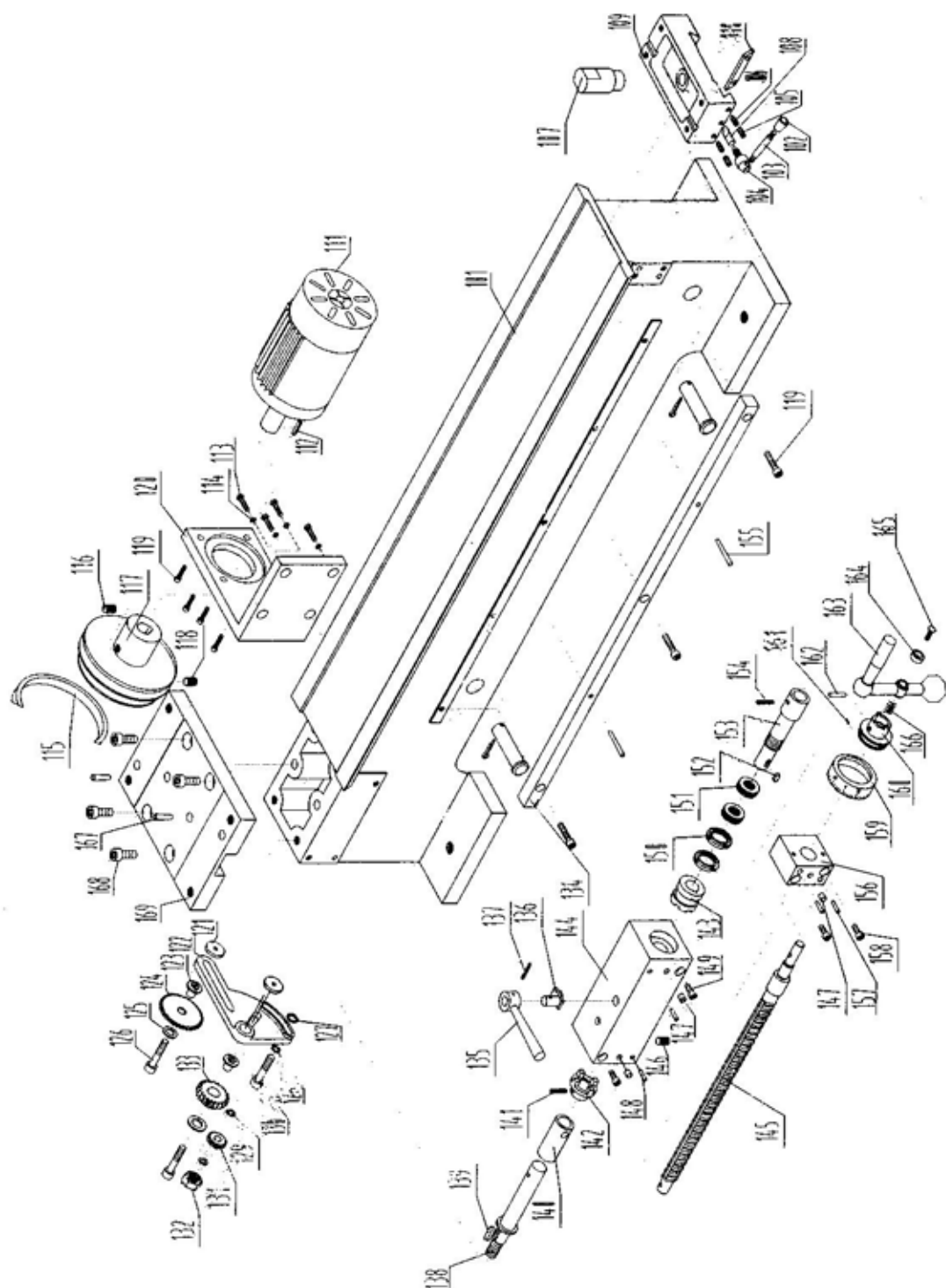
Returns must be pre-authorized by us in writing.

- We do not accept *collect* shipments.
- Items returned for warranty purposes must be insured and shipped pre-paid to the nearest warehouse
- Returns must be accompanied with a copy of your original invoice as proof of purchase. Returns must be in an un-used condition and shipped in their original packaging a letter explaining your reason for the return. Incurred shipping and handling charges are not refundable.
- Busy Bee will repair or replace the item at our discretion and subject to our inspection.
- Repaired or replaced items will be returned to you pre-paid by our choice of carriers.
- Busy Bee reserves the right to refuse reimbursement or repairs or replacement if a third party without our prior authorization has carried out repairs to the item.
- Repairs made by Busy Bee are warranted for 30 days on parts and labour.
- Any unforeseen repair charges will be reported to you for acceptance prior to making the repairs.
- The Busy Bee Parts & Service Departments are fully equipped to do repairs on all products purchased from us with the exception of some products that require the return to their authorized repair depots. A Busy Bee representative will provide you with the necessary information to have this done.

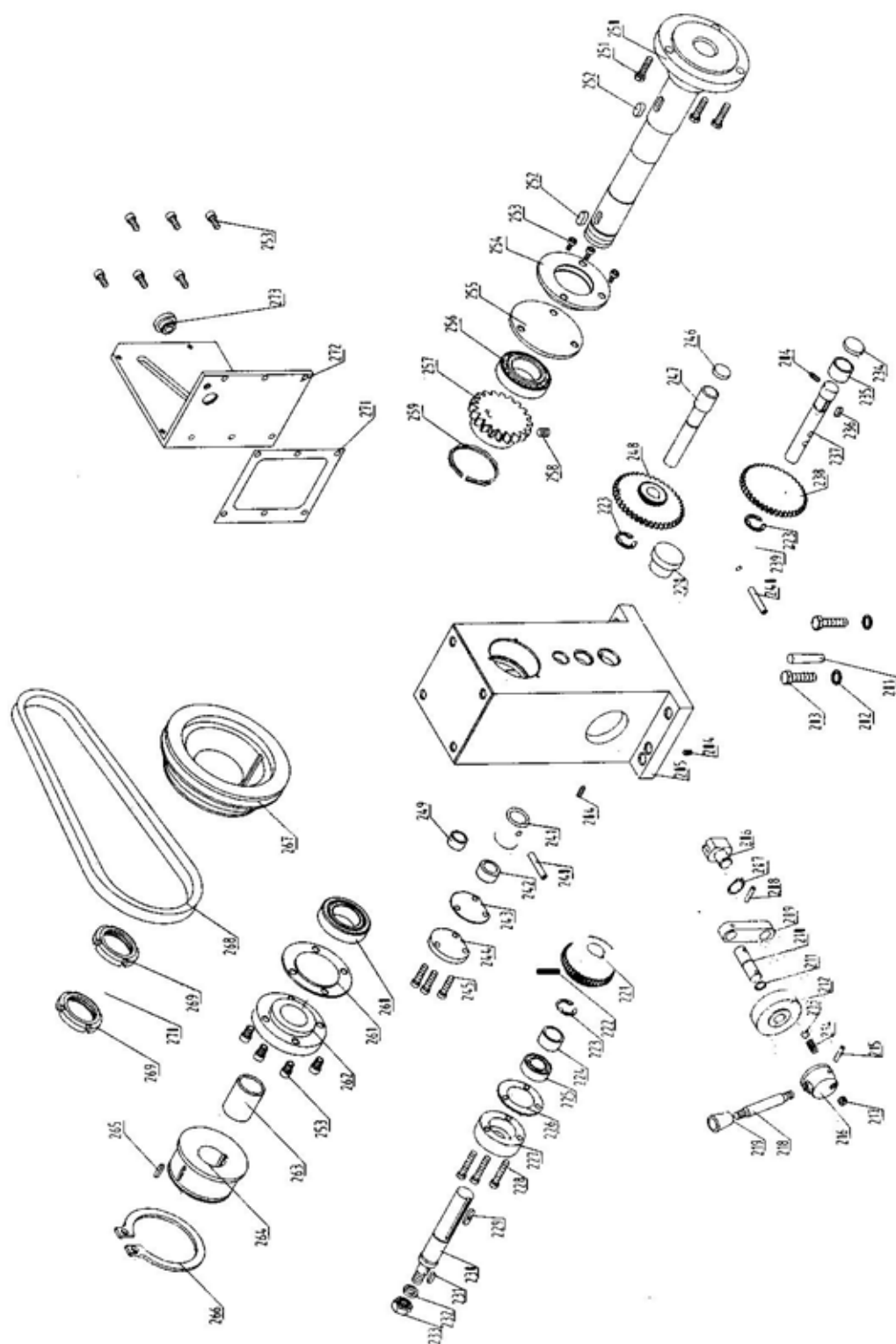
For faster service it is advisable to contact the nearest Busy Bee location for parts availability prior to bringing your product



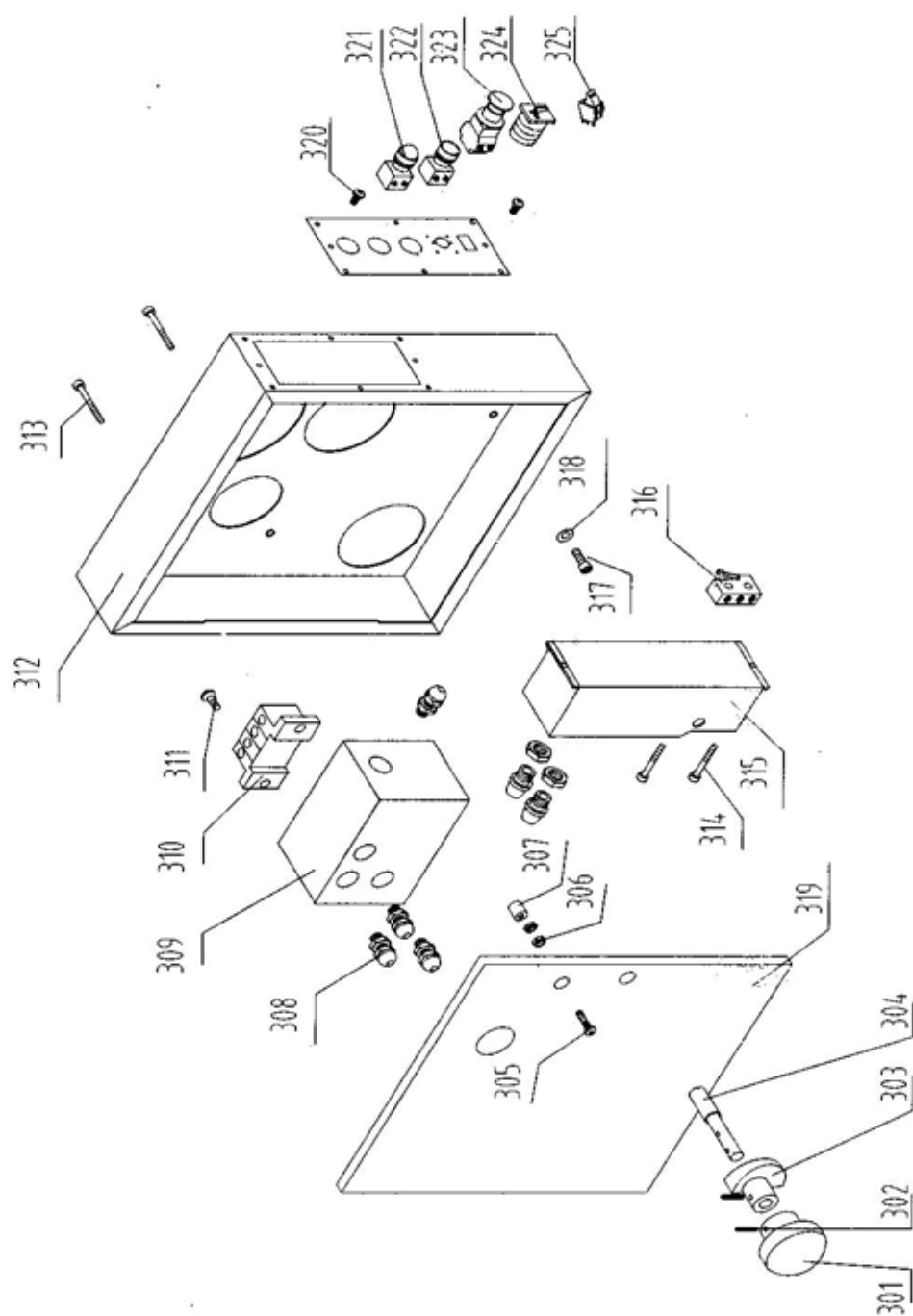
## Bed Assembly



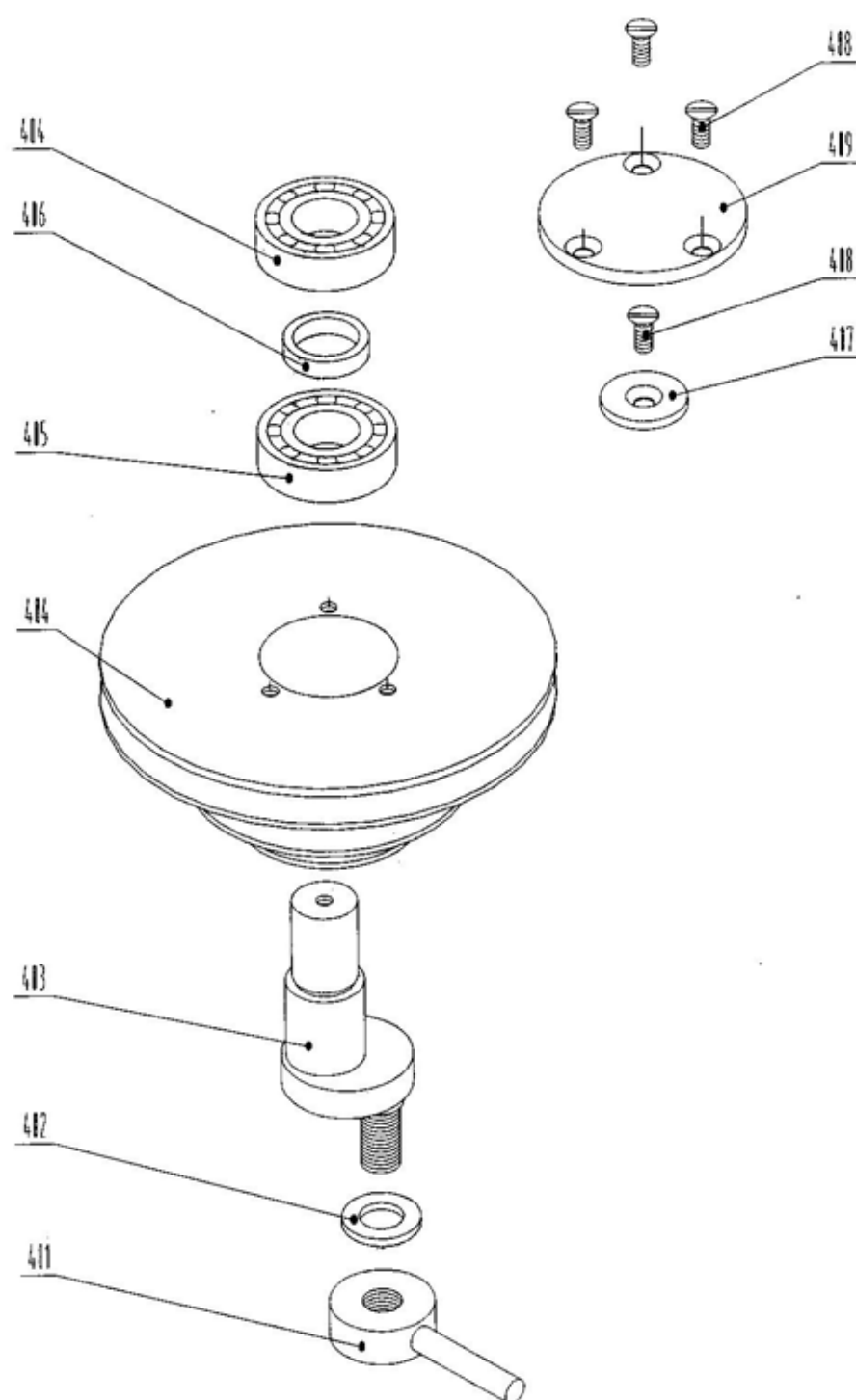
# Headstock Assembly



# Headstock Guard Assembly



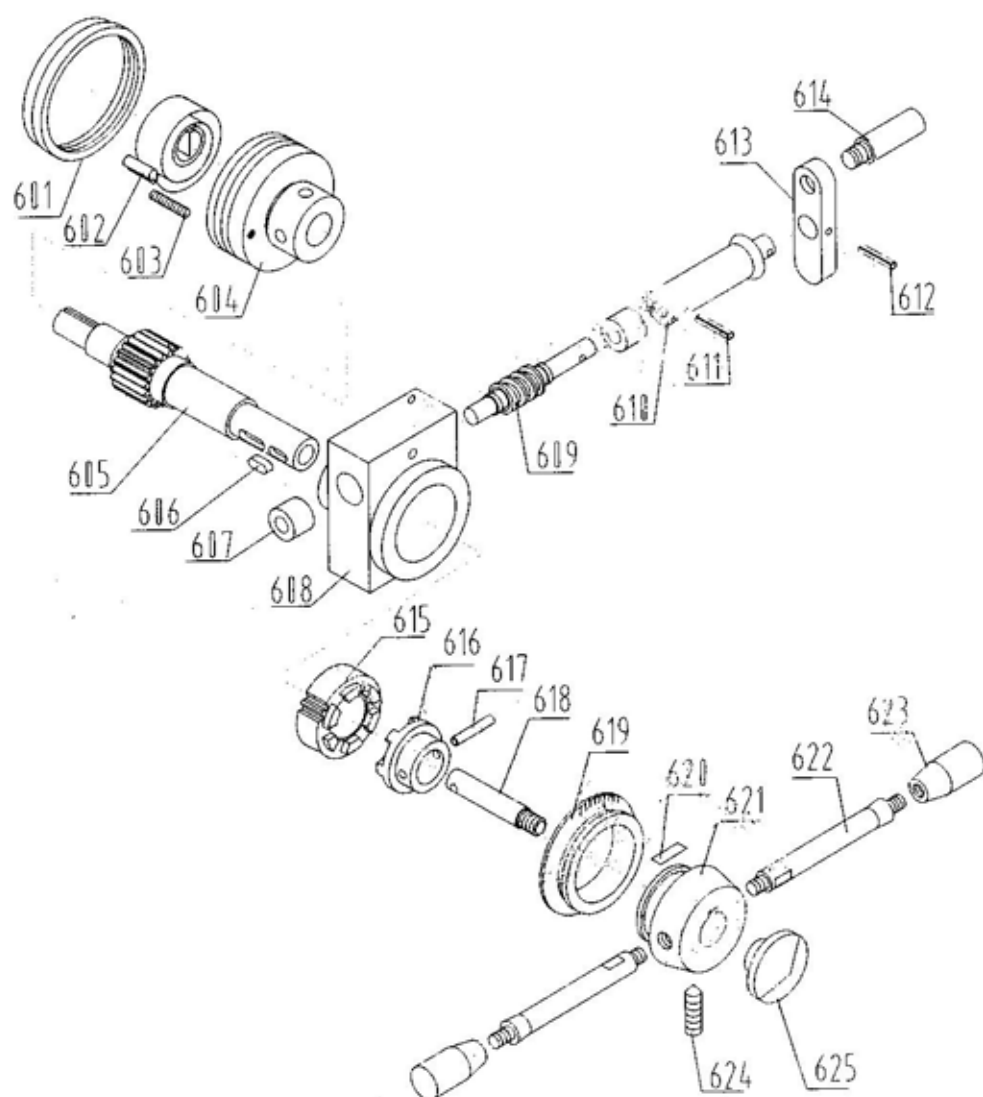
## Middle pulley Assembly



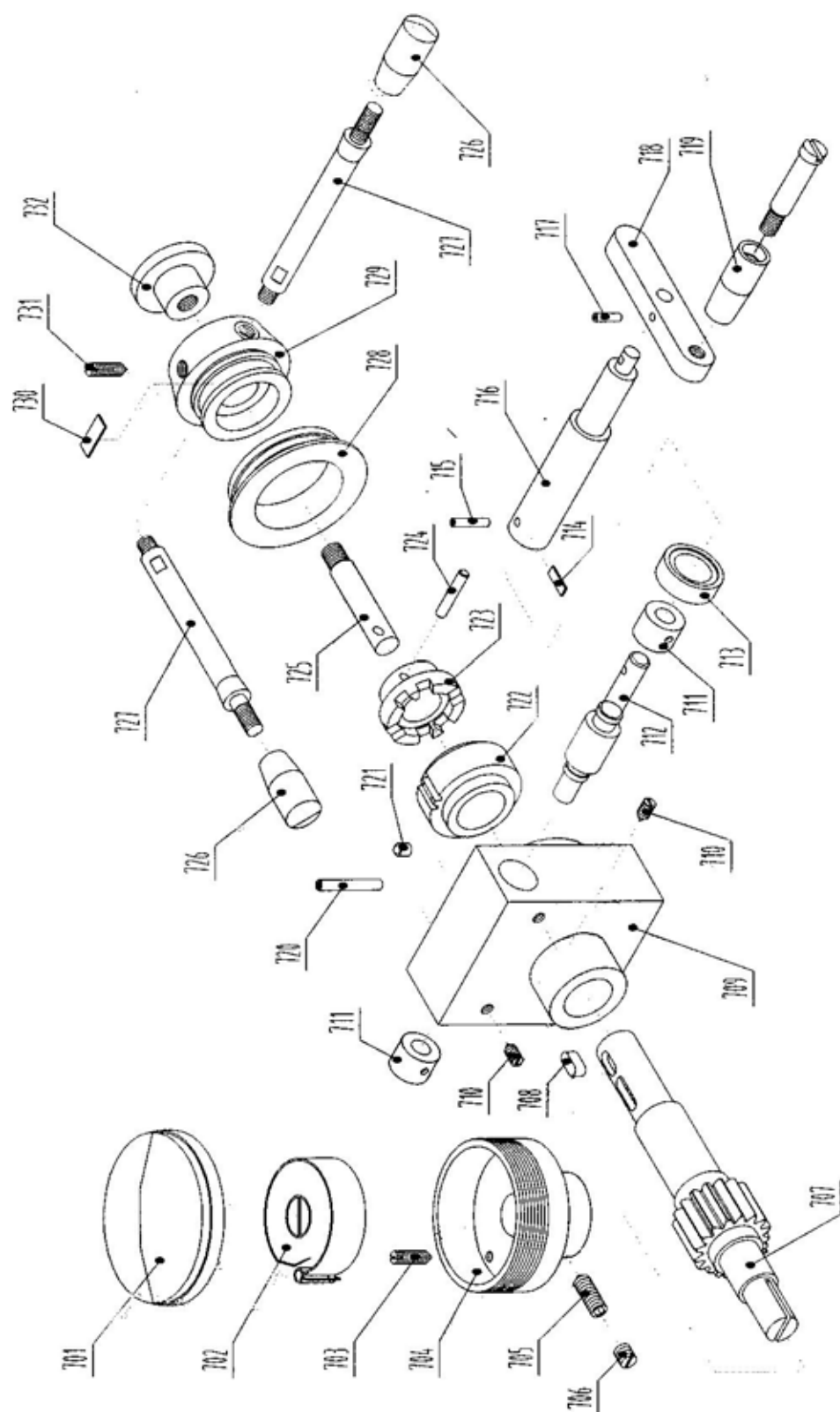




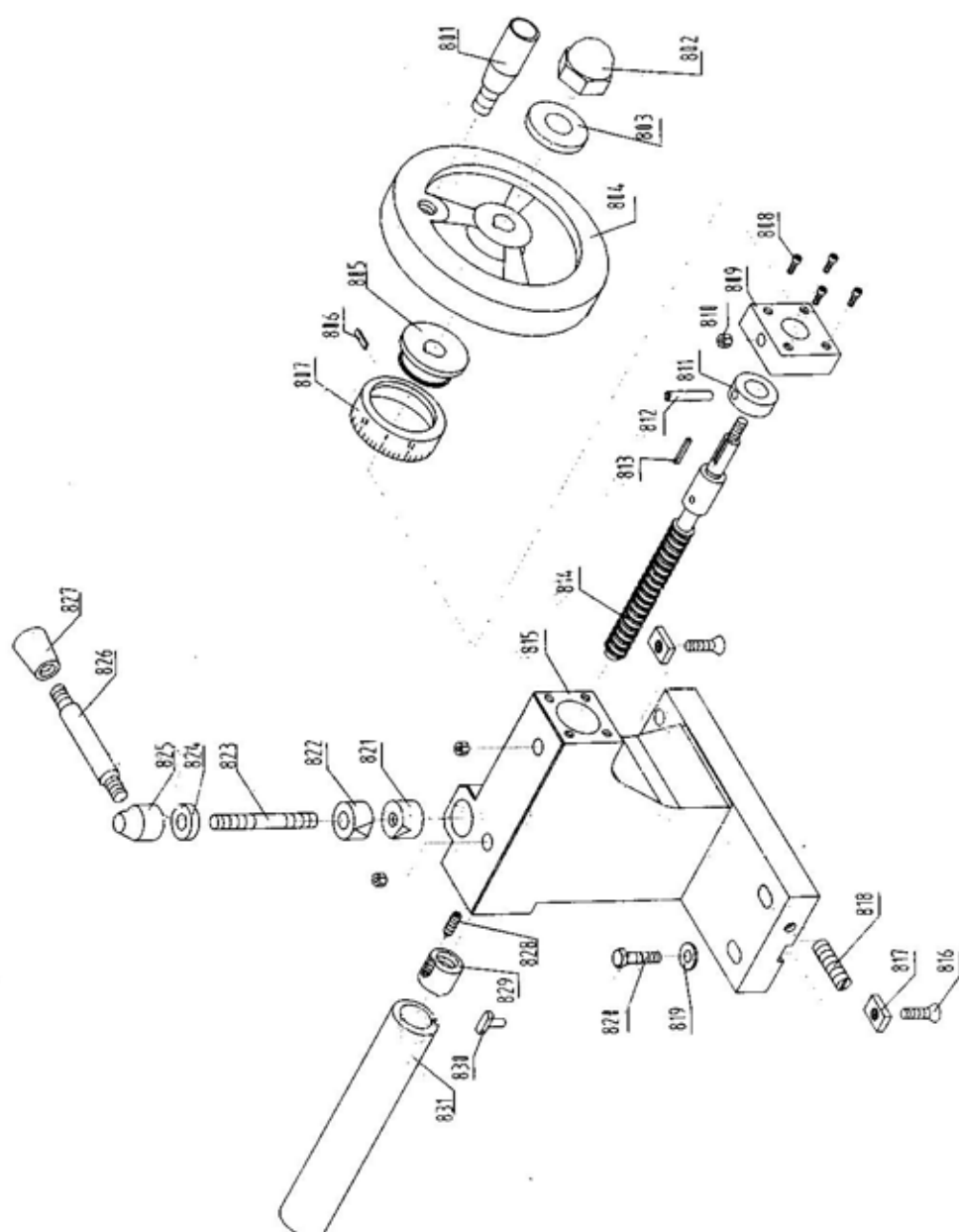
# Milling & Drilling feed Assembly



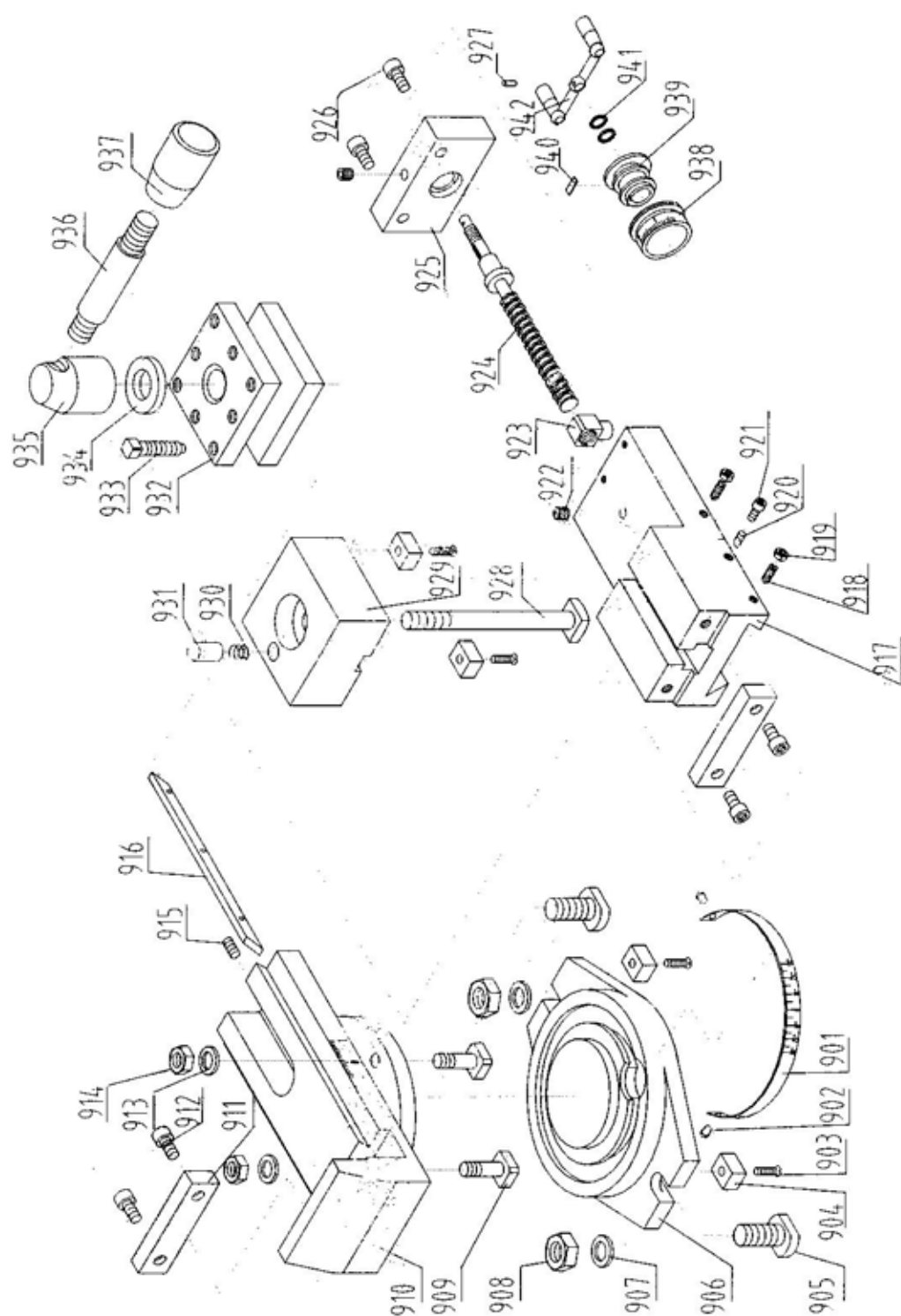
# Spindle Feeding Assembly



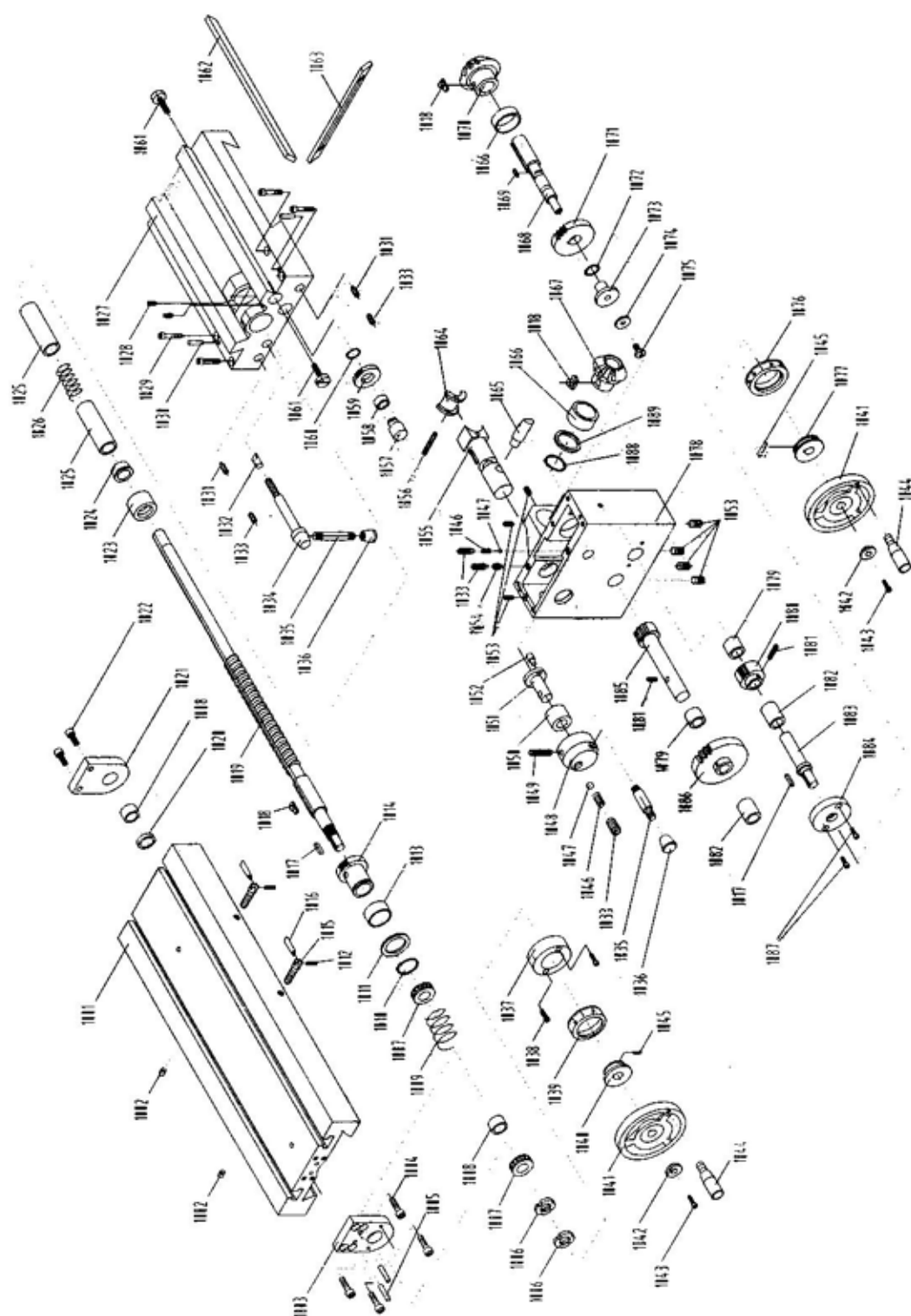
# Tailstock Assembly



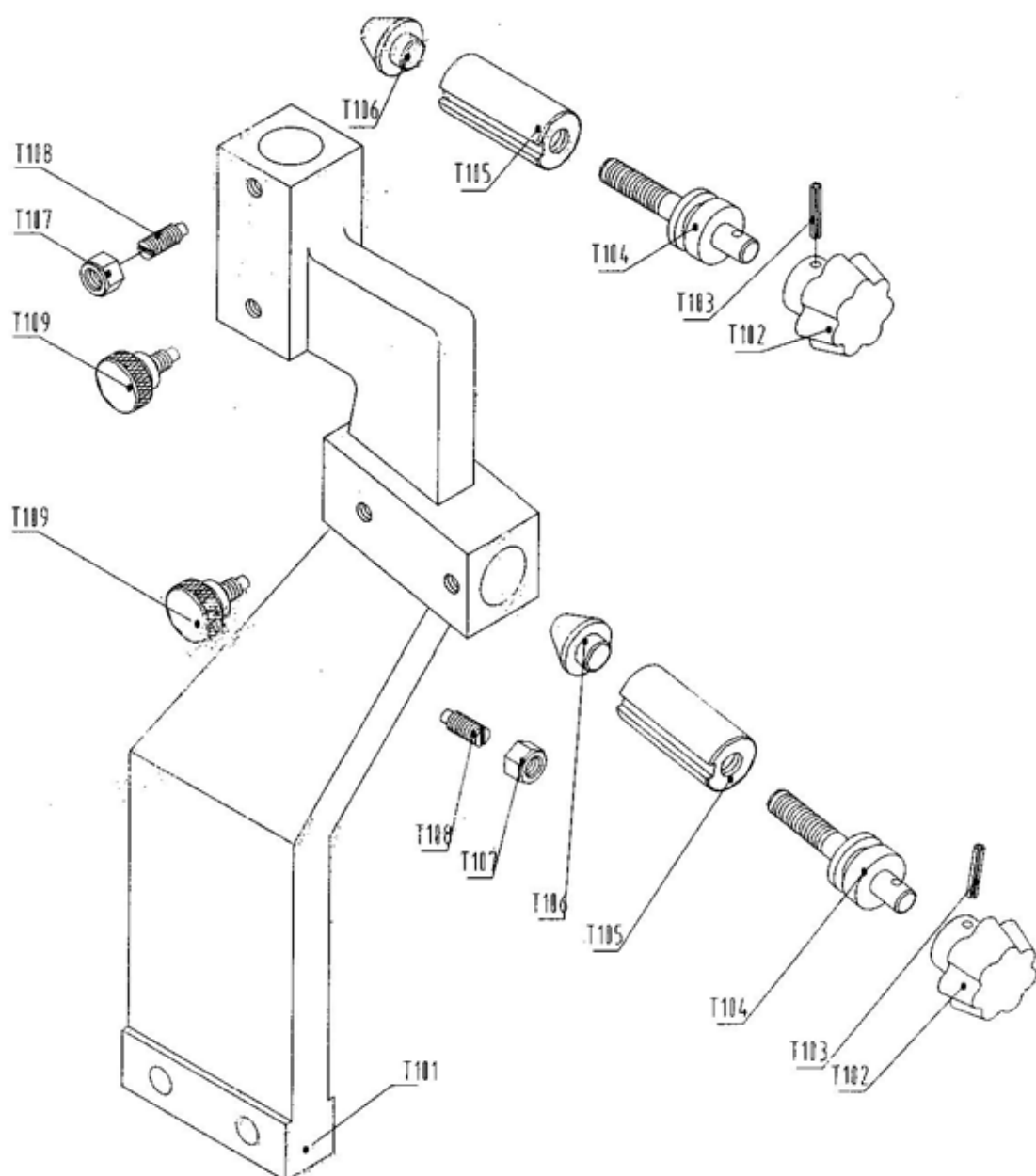
# Tool Post Assembly



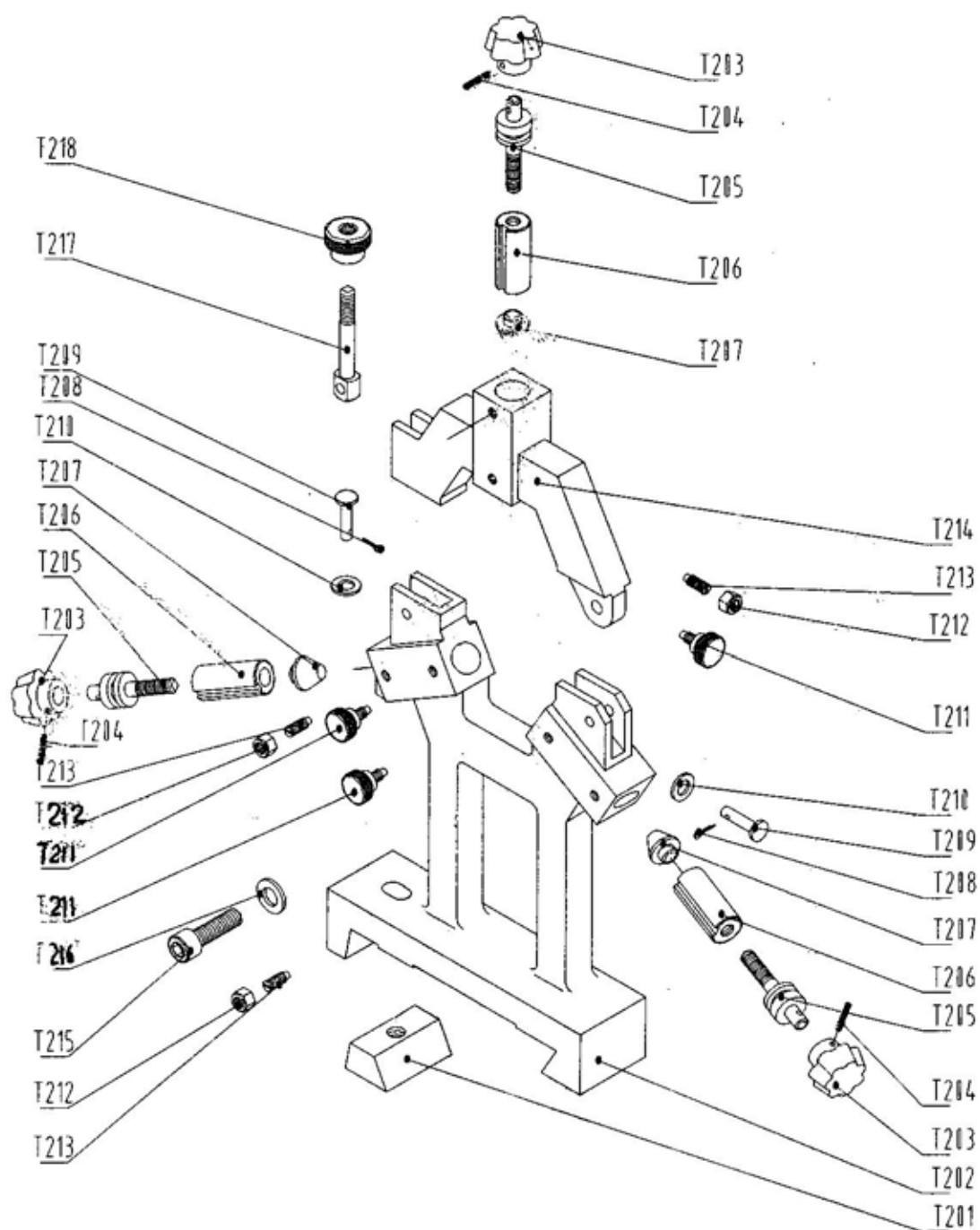
# Saddle And Apron Assembly



Follow rest Assembly

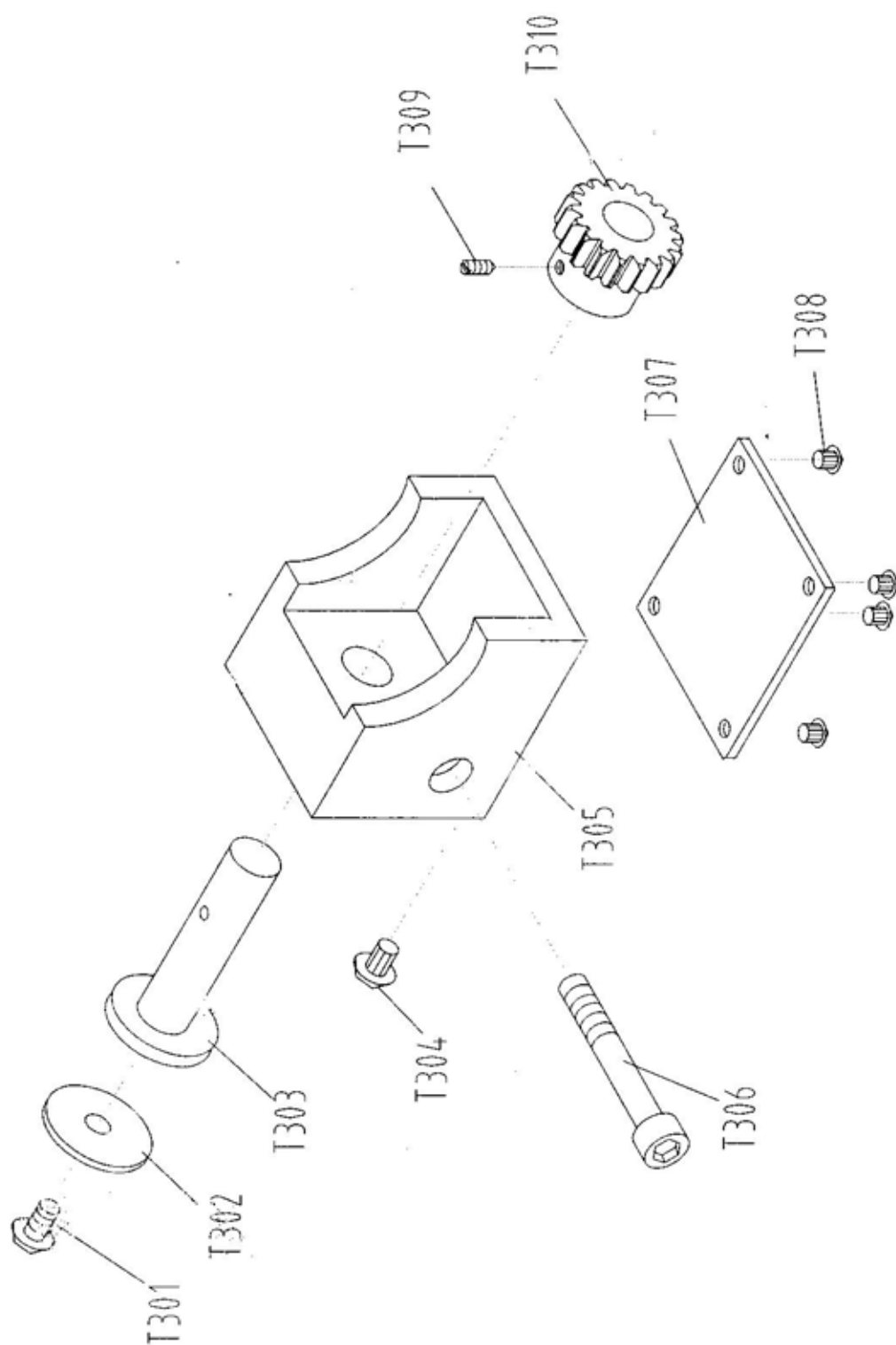


### Steady Rest Assembly

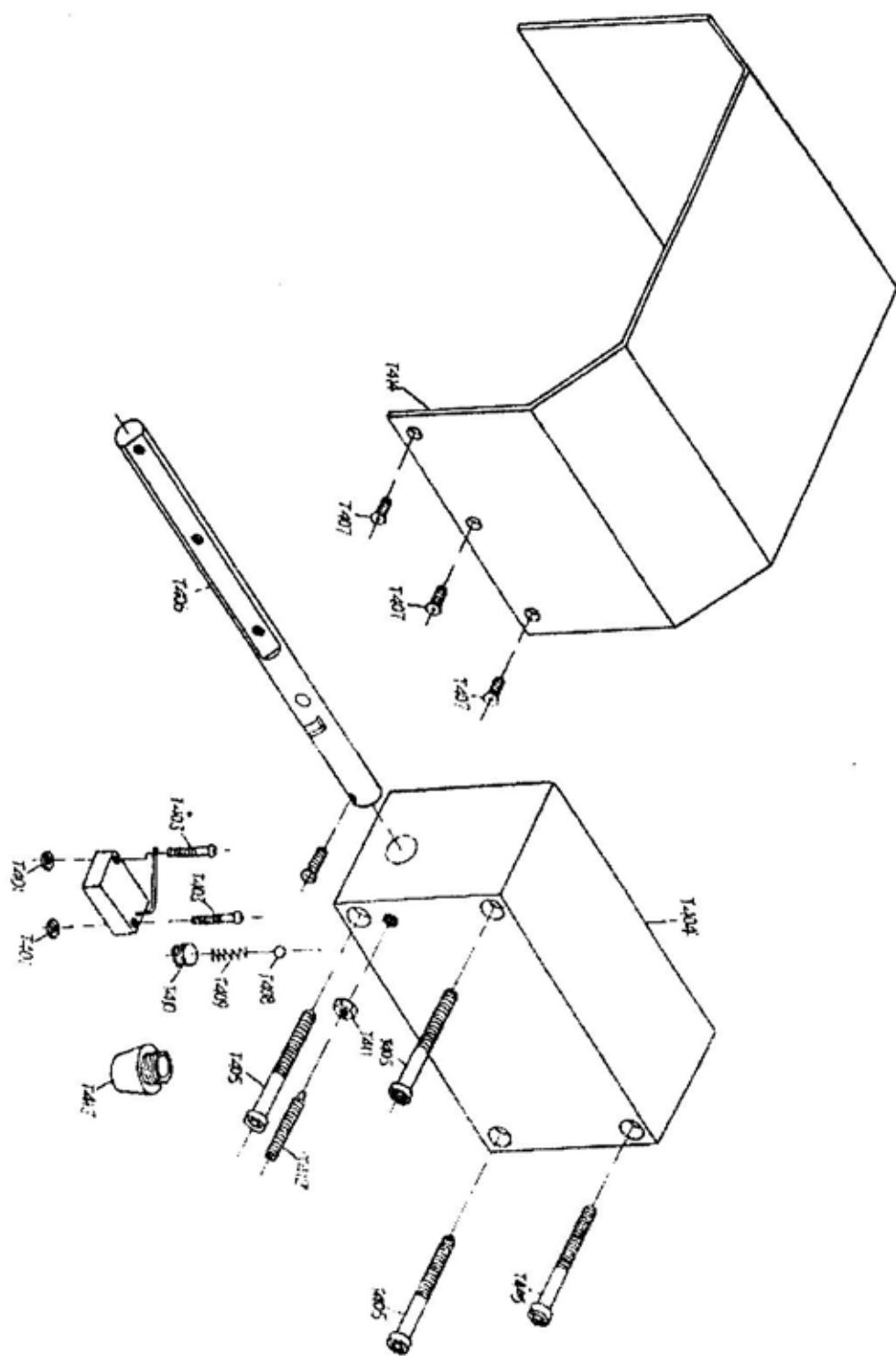




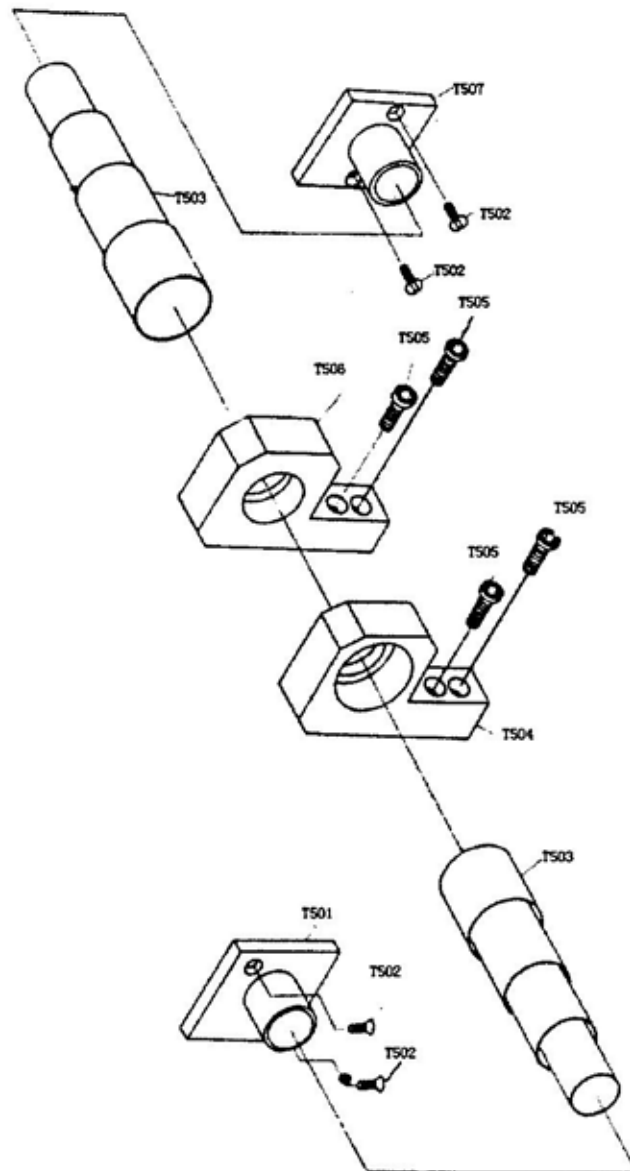
# Threading dial



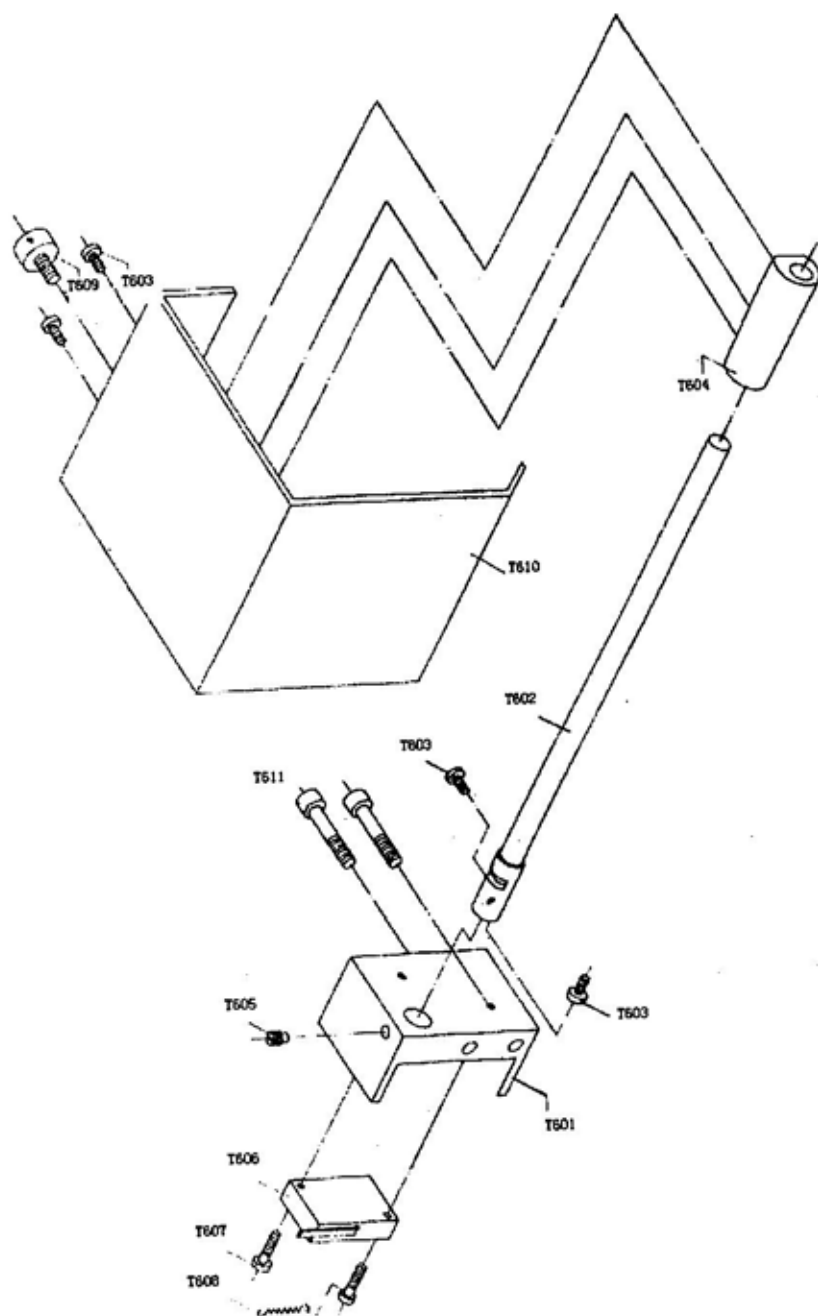
## Protection For Chuck



## Protection For Leadscrew



## Protection For Milling & Drilling



# BED ASSEMBLY

Index No.	Part No.	Description	QTY.
101	HQ500-01-003(2)	Bed	1
102	GB/T4141.2	Handle knob M6×20	1
103	HQ400-00-016	Handle	1
104	HQ400-11-022	Locking screw	1
105	GB/T77	Screw M8×25	2
106	GB/T75	Screw M8×14	2
107	HQ400-11-034	Adjusting block	1
108	HQ400-11-015	Locking pin	1
109	HQ400-11-004	Tailstock carriage	1
110	HQ400-11-016	Gib	1
111	YC-7144	Motor (0.55KW)	1
112	GB/T1096	Key A5×16	1
113	GB/T5782	Bolt M10×25	4
114	GB/T97.1	Washer 10	5
115	GB/T1171	V-belt Z630	1
116	GB/T78	Screw M8×8	1
117	HQ500-01-010	Pulley	1
118	GB/T78	Screw M8×6	1
119	GB/T70	Screw M6×20	4
120	HQ400/4-01-005	Motor mount	1
121	HQ400/3-01-009	T-nut	2
122	HQ400/4-01-001	Bracket	1
123	HQ400/3-01-010	T-bushing	2
124	HQ400/3-F-01	Change gear	1
125	HQ400/3-01-011	Washer	2
126	GB/T70	Screw M6×40	2
127	HQ400/3-01-013	Washer	1
128	GB/T97.1	Washer 6	1
129	HQ400/3-01-012	Washer	1
130	GB/T70	Screw M6×30	1
131	HQ400/3-F-01-009	Change gear	1
132	GB/T6170	Hex nut M10	1
133	HQ400/3-F01-015	Gear	1
134	HQ500-01-011	Rack	1
135	GB/T4141.7	Handle A10×80	1
136	HQ500-09-002	Eccentric lever	1
137	GB/T879	Spring pin 3×20	1
138	HQ400/3-04-001	Transmission shaft	1
139	GB/T1096	Key A4×12	1
140	HQ500-09-005	Sleeve	1
141	GB/T879	Spring pin 5×22	1

Index No.	Part No.	Description	QTY.
142	HQ400/3-04-003	Clutch jaw A	1
143	HQ500-09-001	Clutch jaw B	1
144	HQ500-09-003	Transmission box	1
145	HQ400/4-01-002	Leadscrew	1
146	GB/T78	Screw M6×8	1
147	GB/T1155	Oil ball 6	2
148	GB/T117	Taper pin B5×55	2
149	GB/T70	Screw M6×50	2
150	HQ500-09-006	Spanner nut M17×1.5	2
151	GB/T301	Bearing 8103	2
152	GB/T1096	Key 5×10	1
153	HQ500-09-004	Shaft connector	1
154	GB/T879	Spring pin 4×24	1
155	GB/T879	Spring pin 5×30	2
156	HQ500-01-004	Leadscrew seat	1
157	GB/T118	Taper pin 6×55	2
158	GB/T70	Screw M6×45	2
159	HQ500-01-006	Dial	1
160	HQ500-01-007	Dial seat	1
161	HQ500-10-016	Spring piece	1
162	GB/T879	Spring pin 4×20	1
163	HQ500-01-009	Crank handle	1
164	HQ500-01-008	Washer	1
165	GB/T819	Screw M4×12	1
166	GB/T2089	Spring 14×1×15	1
167	GB/T117	Taper pin B10×35	2
168	GB/T70	Screw M10×25	4
169	HQ500-01-003(1)	Fixing block	1

## Headstock Assembly

Index No.	Part No.	Description	QTY.
201	GB/T117	Taper pin $8 \times 40$	2
202	GB/T97.2	Washer 10	4
203	GB/T5781	Bolt $M10 \times 35$	4
204	GB/T78	screw $M5 \times 12$	3
205	HQ500-02-005	Headstock	1
206	HQ500-02-027	Fork	1
207	GB/T894.1	Retain ring (external)12	1
208	GB/T879.1	Roll pin $5 \times 18$	1
209	CZ300-03-050	Fork arm	1
210	HQ400/3-02-041	Straight pin	1
211	GB/T3452.1	O-ring $8.5 \times 1.8$	1
212	HQ500-02-013	Spacer	1
213	GB/T308	Steel ball $\Phi 6.5$	1
214	GB/T2089	Spring $1 \times 6 \times 15$	1
215	GB/T879	Spring pin $4 \times 40$	1
216	CZ300A-03-016	Handle seat	1
217	GB/T73	flat point set screw $M8 \times 5$	1
218	HQ400-13-005	Handle rod	1
219	GB/T4141.12	Handle knob $M10 \times 32$	1
220	GB/T1160	Oil level indicator	1
221	HQ500-02-025	Triplex gear	1
222	GB/T879	Spring pin $3 \times 8$	1
223	GB/T894.1	Retain ring (external)14	3
224	HQ500-02-015	Brass bushing	1
225	HG4-692-67	O ring $PD15 \times 30 \times 10$	1
226	HQ400/3-02-005	Gasket	1
227	HQ400/3-02-002	O-ring seat	1
228	GB/T65	Bolt $M5 \times 20$	3
229	HQ500-02-028	Key	1
230	HQ500-02-021	Shaft D	1
231	GB/T1096	Key $4 \times 8$	1
232	GB/T848	Washer 10	1
233	GB/T6170	Nut M10	1
234	HQ500-02-020	Hole plug	1
235	HQ500-02-014	Brass bushing	1
236	GB/T1096	Key $5 \times 14$	1
237	HQ500-02-017	Shaft C	1
238	HQ400/3-02-012	Gear C	1
239	HQ500-02-026(2)	Gear C(2)	1
240	GB/T879	Spring pin $4 \times 20$	2

Index No.	Part No.	Description	QTY.
241	HQ500-02-026(1)	Gear C(1)	1
242	HQ400/3-02-038	Brass bushing	1
243	HQ400/3-02-026	Gasket	1
244	HQ500-02-022	Cover	1
245	GB/T818	Screw M5×12	3
246	HQ500-02-019	Hole plug	1
247	HQ500-02-009	Shaft B	1
248	HQ400/3-02-013	Duplex gear B	1
249	HQ400/3-02-030	Brass bushing	1
250	HQ500-02-010	Spindle	1
251	GB/T5783	Bolt M8×25	3
252	GB/T1096	Key 8×22	2
253	GB/T70	screw M5×16	13
254	DIY1619-02-036	Cover	1
255	DIY1619-02-037	Gasket	1
256	GB/T297	Taper roller bearing 2007109	1
257	HQ500-02-006	Gear A	1
258	GB/T71	screw M8×10	1
259	GB/T921	Locking ring 47	1
260	GB/T297	Taper roller bearing 2007108	1
261	HQ500-02-003	Gasket	1
262	HQ500-02-002	Flange	1
263	HQ500-02-004	Spacer	1
264	HQ500-02-024	Pulley spacer	1
265	GB/T1096	Key 10×25	1
266	GB/T894.1	Retain ring (external) 63	1
267	HQ500-02-001	Pulley	1
268	GB/T1171	V-belt O-710	1
269	GB/T812	Spanner nut M40×1.5	2
270	GB/T858	Locking washer 40	1
271	HQ500-02-012	Gasket	1
272	HQ500-02-011	Bracing plate	1
273	CM1224C-03-034	Oil plug	1



## HEADSTOCK GUARD ASSEMBLY

Index No.	Part No.	Description	QTY
301	GB4141.29	Knob $A8 \times 32$	1
302	GB879	Pin $3 \times 14$	2
303	CZ300A-08-005	Clamping block	1
304	CZ300A-08-008	Rod	1
305	GB/T65-85	Screw $M5 \times 35$	1
306	GB/T41-86	Nut M5	2
307	HQ500-03-009	Adjustive pin	1
308	D97-4-20	Wire connector	4
309	HQ500-03-003	Electrical box	1
310	B16	AC connector	1
311	GB/T818-85	Screw $M4 \times 8$	7
312	HQ500-03-002	Guard	1
313	GB/T819-85	Screw $M4 \times 12$	2
314	GB/T67-85	Screw $M4 \times 25$	2
315	HQ500-03-006	Switch box	1
316	LX5-11N	Limit switch	1
317	GB/T70-85	Screw $M5 \times 10$	5
318	GB/T96	Washer 5	5
319	HQ500-03-001	Guard door	1
320	GB/T819	Screw $M4 \times 10$	2
321	AD11	Indicator light	1
322	LA19	Button	1
323	LAY3	Emergency stop button	1
324	HZ5	Compose switch	1
325		Drill / lathe switch	1

## MIDDLE PULLEY ASSEMBLY

Index No.	Part No.	Description	QTY.
401	GB/T4141.8	Handle	1
402	GB/T97.1	Washer 12	1
403	HQ400/4-04-001	Pulley arbor	1
404	HQ400/3-02-034	Middle pulley	1
405	GB/T276	Bearing 104	2
406	HQ400/3-02-035	Spacer	1
407	HQ400/3-02-036	Cover	1
408	GB/T68	Screw M5×10	4
409	HQ400/3-02-037	Cover	1

# MILLING & DRILLING ASSEMBLY

Index No.	Part No.	Description	QTY
501	GB/T1154-89	V-belt Z800	1
502	GB/T70	Screw M10×40	4
503	HQ500-05-002	Milling-drilling headstock	1
504	HQ500-05-001	Support column	1
505	HQ500-05-003	Locking block (pair)	3
506	HQ500-05-004	Spacer	3
507	HQ500-05-022	Screw	2
508	CX16-03-006	Handle	2
509	GB/T4141.15-84	Handle M10×50	2
510	GB/T4141.12-84	Handle knob BM10×32	2
511	HZ5-10	On/off switch	1
512	HQ500-05-020	Switch plate	1
513	GB/T818	Screw M5×8	4
514	HQ500-05-018	Frame cover	1
515	HQ500-05-014	Eccentric flange	1
516	GB/T 70	Screw 6×20	4
517	GB/T 73	Screw M8×12	1
518	HQ500-05-015	Motor pulley	1
519	GB/T 818	Screw M4×6	4
520	HQ500-05-011	See-through window	1
521	HQ500-05-016	Upper cover	1
522	HQ500-05-009	Pulley seat flange	1
523	GB/T 70	Screw M6×40	4
524	BG/T 117-86	Taper pin A5×45	2
525	GB/T 276	Ball bearing 108Z	1
526	GB/T 894.1	Retain ring (External) 40	1
527	GB1154-89	V-belt Z860	1
528	HQ500-05-010	Milling-drilling pulley	1
529	GB4141.26-84	Knob CM8×25	2
530	HQ400-24-021	Cap	1
531	HQ500-05-019	Upper cover post	1
532	HQ500-05-004	Spacer	2
533	GB/T899	Stud AM10×80	2
534	GB/T4141.16-84	Handle seat BM10×20	1
535	GB/T75	Screw M10×14	1
536	GB/T73	Screw M10×12	1
537	HQ500-05-005	Hole plug	3
538	GB/T79	Screw M8×12	1
539	HQ500-05-008	Lower cover	1
540	GB/T97.1	Washer 6	1

541	GB/T70	Screw M6×12	2
542	HQ500-05-013	Motor mount	1
543	GB/T 97.1-85	Washer 10	1
544	GB/T5781	Hex head screw M10×30	2
545	HQ500-05-012	Mill-drill cover post	1
546	D97-4-18(20)	Connection tube M18(20)×1.5	3
547	YL7144	Motor	1
548	GB/T1096-79	Key A5×16	1
549	HQ500-05-017	Tension handle	1
550	GB/T68	Screw M5×8	4
551	HQ500-06-004	Eccentric shaft	1
552	HQ500-06-003	Middle pulley	1
553	GB/T276	Ball bearing 104Z	2
554	HQ500-06-002	Spacer	1
555	GB/T893.1	Retain ring (external) 42	1
556	HQ500-06-001	Bearing cover	1
557	GB/T68	Screw M5×10	1
558	HQ500-08-001	Quill	1
559	GB/T297	Ball bearing 2007107	1
560	HQ500-08-002	Spindle	1
561	HQ400-22-002	Cover	1
562	GB/T71	Screw M5×8	1
563	GB/T297	Bearing 2007106	1
564	GB/T812	Spanner nut M30×1.5	1
565	GB/T858	Washer 30	1
566	HQ400-22-001	Gasket	1

## MILLING&DRILLING FEED ASSEMBLY

Index No.	Part No.	Description	QTY
601	HQ400-24-019	Spring box cover	1
602	HQ500-05-006	Spring	1
603	GB/T73-1985	Screw	1
604	HQ500-05-007	Spring box	1
605	HQ500-07-001	Gear shaft	1
606	GB/T1096-1979	Key 6×14	1
607	HQ400-23-010	Collar	2
608	HQ500-07-002	Feed box	1
609	HQ400-23-004	Worm	1
610	HQ500-07-003	Handle shaft	1
611	GB/T879-1986	Spring pin 4×20	1
612	GB/T879-1986	Spring pin 4×14	1
613	HQ500-07-004	Arm	1
614	GB/T4141.4	Handle M8×40	1
615	HQ400-23-005	Worm gear	1
616	HQ400-23-006	Clutch tooth	1
617	GB/T119-1979	Pin D5×28	1
618	HQ400-23-009	Shaft	1
619	HQ400-23-007	Dial ring	1
620	HQ400-23-008	Spring piece	1
621	HQ400-23-013	Dial seat	1
622	HQ400-23-001	Handle	2
623	GB/T4141.14	Handle knob BM8×40	2
624	GB/T71-1979	Screw M6×18	1
625	GB/T4141.27	Knurled knob BM10×40	1

## SPINDLE FEEDING ASSEMBLY

Index No.	Part No.	Description	QTY.
701	HQ400-24-019	Cover	1
702	HQ500-05-006	Volute spring	1
703	GB/T71	Screw M5×25	1
704	HQ400/4-05-007	Volute spring box	1
705	GB/T78	Screw M8×20	2
706	GB/T73	Screw M8×12	3
707	HQ400/4-07-001	Gear shaft	1
708	GB/T1096	Key A6×14	1
709	HQ400/4-07-002	Feeding box	1
710	GB/T71	Screw M6×8	2
711	Hq400-23-010	Bushing	2
712	HQ400-23-004	Worm	1
713	HQ500-05-005	Dial	1
714	HQ500-10-016	Spring piece	1
715	GB/T879	Spring pin 4×20	1
716	HQ400/4-07-003	Handle	1
717	GB/T879	Spring pin 4×14	1
718	HQ400/4-07-004	Handle	1
719	GB/T4141.4	Rotational handle	1
720	GB/T879	Spring pin 5×35	1
721	GB/T1155	Oil ball 6	1
722	HQ400-23-005	Worm wheel	1
723	HQ400-23-006	Clutch	1
724	GB/T119	Pin D5×28	1
725	Hq400-23-009	Shaft	1
726	GB/T4141.14	Handle knob BM8×40 2	2
727	HQ400-23-001	Handle	2
728	HQ400-23-007	Dial	1
729	HQ400-23-013	Dial seat	1
730	HQ400-23-008	Spring piece	1
731	GB/T71	Screw M6×18	1
732	GB/T4141.27	Handle BM10×40	1

## TAILSTOCK ASSEMBLY

Index No.	Part No.	Description	QTY
801	JB/T7270.5-94	Handle M6×50	1
802	GB/T923-88	Acorn Nut M10	1
803	GB/T97-85	Flat Washer 10	1
804	JB/T7273.3-94	Hand Wheel B12×100	1
805	HQ400/4-10-015	Scale ring base	1
806	HQ500-10-016	Spring piece	1
807	HQ400-13-010	Scale ring	1
808	GB/T70-85	Screw M5×20	4
809	HQ400-13-009	Feed Screw Socket	1
810	JB/T7940.4-95	Oiler	3
811	HQ400-13-008	Bracket	1
812	GB/T119-86	Pin D5×24	1
813	GB/T1096-79	Key C4×18	1
814	HQ400-13-006	Feed Screw	1
815	HQ400-13-001	Tail Stock Body	1
816	GB/T819-85	Screw M5×14	2
817	HQ400-13-004	Key	2
818	GB/T73-85	Screw M10×50	2
819	GB/T97.2-85	Washer 10	4
820	GB/T5780-86	Screw M10×40	4
821	HQ400-13-011	Locking block (Bottom)	1
822	HQ400-13-012	Locking block (Top)	1
823	GB/T899-85	Double-Screw Bolt AM10×40	1
824	HQ400-13-013	Washer	1
825	HQ400-13-004	Locking Nut	1
826	HQ400-13-005	Locking Lever	1
827	JB/T7271.3-94	Knob M10×32	1
828	GB/T71-85	Set Screw M4×8	1
829	HQ400-13-007	Feed Nut	1
830	HQ400-13-003	T-Key	1
831	HQ400-13-002	Tail Stock Barrel	1

## TOOL POST ASSEMBLY

Index No.	Part No.	Description	QTY.
901	HQ400-14T02-002(1)	Angle ruler	1
902	GB/T827-1985	Rivet 2.5×5	2
903	GB/T68-1985	Screw M4×12	2
904	HQ400-14T02-010	Key	2
905	HQ400-14T02-001	"T"-Bolt	2
906	HQ400-14T02-002	Base	1
907	GB/T97.1-1985	Washer 10	2
908	GB/T6170-2000	Nut M10	2
909	HQ400-14T02-003	Bolt	2
910	HQ400-14T02-005	Vice base	1
911	HQ400-14T02-006	Vice block	2
912	GB/T70.1-2000	Screw M5×14	4
913	GB/T97.1-1985	Washer 8	2
914	GB/T6170-2000	Nut M8	2
915	GB/T77-2000	Screw M5×6	1
916	HQ400-14T02-014	Gib	1
917	HQ400-14T02-004	Moving vice	1
918	GB/T71-1985	Screw M5×14	2
919	GB/T6170-2000	Nut M5	2
920	HQ400-14T02-007	Locking block	1
921	GB/T70.1-2000	Screw M5×8	1
922	JB/T7940.4-1995	Oiler Ø6	2
923	HQ400-14T02-011	Nut Tr12	1
924	HQ400-14T02-012	Lead screw Tr12	1
925	HQ400-14T02-013	Lead screw bracket	1
926	GB/T70	Screw M6×16	2
927	GB/T117-2000	Pin 3×16	1
928	HQ400-14T02-009	Bolt M10×100	1
929	HQ400-14T02-008	Tool post base	1
930	GB/T1358-1993	Spring 5×0.6×30	1
931	HQ400-14-007	Set pin	1
932	HQ400-14-003	Tool post	
933	GB/T85-1988	Screw M8×25	8
934	HQ400-14-005	Compensating washer	1
935	HQ400-13-010	Nut M10	1
936	HQ400-14-006	Handle	1
937	JB/T7271.3-1994	Knob M10×32	1
938	DJ136/2-012	Dial	1
939	DJ136/2-010	Dial seat	1
940	DJ136/2-011	Spring piece	1
941	GB/T810	Slotted round nut M10×1	2
942	GB/T4141.10	Bi-lever balance handle 8×25	1



## SADDLE AND APRON ASSEMBLY

Index No.	Part No.	Description	QTY.
1001	HQ500-10-003	Table	1
1002	JB/T 7940.4-4	Oil ball 6	6
1003	HQ500-10-010	Lead screw seat (B)	1
1004	GB/T 70-85	Screw M5 × 16	4
1005	GB/T 879-5	Spring pin 5 × 20	2
1006	GB/T 810-13	Spanner nut M14 × 1.5	2
1007	GB/T 301-11	Thrust ball bearing 8102	2
1008	HQ500-10-011	Spacer A	2
1009	HQ500-10-048	Spring B	1
1010	GB/T 894.1-9	Retain ring (external) 26	1
1011	HQ500-10-046	Washer	1
1012	GB/T 879-7	Spring pin 2 × 10	2
1013	HQ500-10-045	Spacer G	1
1014	HQ500-10-010	Gear A	1
1015	HQ500-10-006	Locking screw	2
1016	CM1224C-05-022B	Locking lever	2
1017	GB/T 1096-14	Key 4 × 18	2
1018	HQ500-10-030	T-Key	2
1019	HQ500-10-008	Cross feeding lead screw	1
1020	HQ500-10-050	Washer	1
1021	HQ500-10-007	Lead screw (A)	1
1022	GB/T 70-85	Screw M6X16	2
1023	HQ500-10-009	Cross feeding lead nut	1
1024	HQ500-10-051	Spacer	1
1025	HQ500-10-049	Spacer	2
1026	HQ500-10-047	Spring A	1
1027	HQ500-10-002	Saddle	1
1028	GB/T 71-85	Screw M6 × 8	10
1029	GB/T 70-85	Screw M6 × 35	4
1030	GB/T 117-6	Tap pin A5 × 25	2
1031	GB/T 75-85	Screw M8 × 16	2
1032	HQ400-11-014	Locking washer	1
1033	GB/T 73-85	Screw M8 × 8	5
1034	HQ500-10-025	Locking screw	1
1035	HQ400-00-016	Handle rod	2
1036	JB/T 7271.3-23	Handle knob M6 × 20	2
1037	HQ500-10-013	Fixing sleeve (A)	1
1038	GB/T 70-85	Screw M5 × 16	4
1039	HQ500-10-014	Dial	1
1040	HQ500-10-015	Dial seat (A)	1
1041	JB/T 7273.3-16	Hand wheel B12 × 100	2
1042	HQ500-10-018	Washer	2
1043	GB/T 70-15	Screw M4 × 12	2
1044	JB/T 7270.4-17	Handle M6 × 50	2

Index No.	Part No.	Description	QTY.
1045	HQ500-10-016	Spring piece	2
1046	CM1224C-06-007	Spring	2
1047	GB/T 308-2	Steel ball 6.5	2
1048	HQ500-10-036	Handle seat	1
1049	GB/T 879-26	Pin 4 × 40	1
1050	HQ500-10-035	Spacer (E)	1
1051	HQ500-10-034	Eccentric wheel	1
1052	HQ400/3-06-003	Arm	1
1053	GB/T 71-85	Screw M6 × 8	10
104	HQ500-10-001	Screw	1
1055	HQ500-10-033	Half nut seat	1
1056	GB/T 879-25	Spring pin 4 × 30	1
1057	HQ500-10-043	Shaft	1
1058	HQ500-10-037	Spacer (F)	1
1059	HQ500-10-042	Gear T32	1
1060	GB/T 894.1-27	Retain ring (external) 12	1
1061	HQ500-10-004	Screw	2
1062	HQ500-10-005	Table gib	1
1063	HQ500-10-026	Saddle gib	1
1064	HQ400/3-06-002B	Half nut	1
1065	HQ500-10-032	Stop pin	1
1066	HQ500-10-031	Spacer (D)	2
1067	HQ500-10-029A	Bevel gear	1
1068	HQ500-10-017	Shaft	1
1069	GB/T 1096-29	Key A5 × 8	1
1070	HQ500-10-029	Gear	1
1071	HQ500-10-027	Gear T48	1
1072	GB/T 894.1-27	Retain ring (external) 14	1
1073	HQ500-10-038	Pull-push knob	1
1074	GB/T 96-85	Washer 6	1
1075	GB/T 818-19	Screw M6 × 8	1
1076	HQ500-10-041	Dial	1
1077	HQ500-10-019	Dial seat (B)	1
1078	HQ500-10-028	Apron	1
1079	HQ500-10-024	Spacer (C)	2
1080	HQ500-10-023	Gear T25	1
1081	GB/T 879-21	Spring pin 4 × 20	2
1082	HQ500-10-022	Spacer (B)	2
1083	HQ500-10-020	Shaft	1
1084	HQ500-10-021	Fixing sleeve B)	1
1085	HQ500-10-040	Shaft gear T21	1
1086	HQ500-10-039	Gear T65	1
1087	GB/T 70-85	Screw M4 × 12	4
1088	GB894.1-86	Retain ring (external) 28	1
1089	HQ500-10-029B	Washer	1

### FOLLOW REST ASSEMBLY

Index No.	Part No.	Description	QTY.
T101	HQ500-10T04-005	Follow rest frame	1
T102	JB/T72714.40	Handle 8×32	2
T103	GB/T879	Spring pin 3×16	2
T104	HQ500-10T04-001	Adjusting bolt	2
T105	HQ500-10T04-003	Sleeve	1
T106	HQ500-10T04-004	Brass head	2
T107	GB/T41	Hex nut M6	2
T108	GB/T75	Set screw M6×16	2
T109	HQ500-10T04-002	Knurled screw	2

### STEADY REST ASSEMBLY

Index No.	Part No.	Description	QTY.
T201	HQ500-10T05-005	Locking block	1
T202	HQ500-10T05-001	Steady rest base	1
T203	JB/T7274.4	Handle 8×32	1
T204	GB/T879	Spring pin 3×16	3
T205	HQ500-10T04-001	Adjusting bolt	3
T206	HQ500-10T04-003	Sleeve	3
T207	HQ500-10T04-004	Brass head	3
T208	GB/T91	Cotter pin 1.6×20	2
T209	GB/T882	Pin A6×26	2
T210	GB/T848	Washer 8	2
T211	HQ500-10T04-002	Knurled screw	3
T212	GB/T41	Hex nut M6	3
T213	GB/T75	Set screw M6×16	3
T214	HQ500-10T05-004	Steady rest head	1
T215	GB/T70	Screw M10×35	1
T216	GB/T848	Washer 10	1
T217	HQ500-10T05-002	Locking bolt	1
T218	HQ500-10T05-003	Knob	1

## THREADING DIAL

Index No.	Part No.	Description	QTY.
T301	GB/T818	Screw M4×12	1
T302	HQ500-10T01-004	Indicator plate	1
T303	HQ500-10T01-002	Arbor	1
T304	GB/T827	Rivet 2×4	1
T305	HQ500-10T01-001	Threading dial seat	1
T306	GB/T70	Screw M6×50	1
T307	HQ500-00-017	Threading plate	1
T308	GB/T827	Rivet 2×4	4
T309	GB/T71	Screw M5×8	1
T310	HQ500-10T01-003	Gear T24	1

## PROTECTION FOR CHUCK

T401	GB6170	hex nut M3	2
T402		micro switch	1
T403	GB818	pan head screw M3×14	2
T404	HQ500-02T01-003	cover support	1
T405	GB70	screw M5×55	4
T406	HQ500-02T01-002	support arbor	1
T407	GB818	pan head screw M5×8	4
T408	GB/T308	stell ball φ6.5	1
T409	GB/T2089	spring 0.8×5×14	1
T410	GB/T73	flat set screw M8×6	1
T411	GB6170	hex nut M5	1
T412	GB75	set screw M5×20	1
T413		connection	1
T414	HQ500-02T01-001	cover	1
T415	HQ500-02T01-004	switch bracket	1

## PROTECTION FOR LEADSCREW

Index No.	Part No.	Description	QTY.
T501	HQ500-01T01-001	cover mount (left)	1
T502	GB/T68	flat slotted screw $M4 \times 10$	4
T503	HQ500-01T01-002	Leadscrew cover	2
T504	HQ500-01T01-003	Cover seat (left)	1
T505	GB70	Hex socket head screw $M6 \times 12$	4
T506	HQ500-01T01-004	Cover seat (right)	1
T507	HQ500-01T01-005	Cover mount (right)	1

## PROTECTION FOR MILLING & DRILLING

T601	HQ500-05T02-001	box	1
T602	HQ500-05T02-005	cover arbor	1
T603	GB/T67	pan slotted screw $M4 \times 8$	4
T604	HQ500-05T02-002	sleeve	1
T605	GB/T75	set screw $M6 \times 8$	2
T606		switch	1
T607	GB/T67	pan slotted screw $M3 \times 15$	2
T608	CM-1224C-04-034	spring	1
T609	HQ500-05T02-004	screw	1
T610	HQ500-05T02-003	cover	1
T611	GB/T70	hex socket cap screw $M6 \times 30$	2