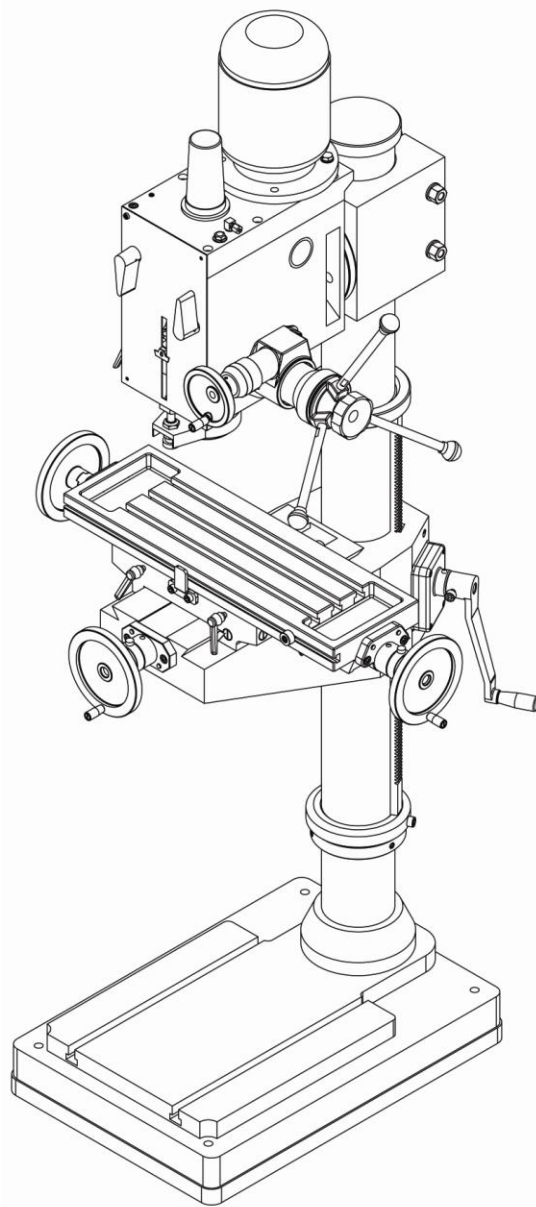

GEARED HEAD
DRILLING & MILLING MACHINE
Model **ZX50PC**



READ ALL INSTRUCTIONS CAREFULLY

**WARNING: Failure to follow instructions
MAY RESULT IN SERIOUS PERSONAL INJURY**

As with all machinery there are certain hazards involved with operation and use of the machine. Using the machine with respect and caution will considerably lessen the possibility of personal injury. However, if normal safety precautions are overlooked or ignored, personal injury to the operator may result.

This machine was designed for certain applications only. We strongly recommend that this machine NOT be modified and/or used for any application other than for which it was designed. If you have any questions relative to its application DO NOT use the machine until you have had detailed instruction from your dealer.

SAFETY RULES FOR ALL TOOLS

1. FOR YOUR OWN SAFETY, READ THIS INSTRUCTION MANUAL BEFORE OPERATING THE TOOL. Learn the tool's application and limitations as well as the specific hazards peculiar to it.

2. KEEP GUARDS IN PLACE and in working order.

3. GROUND ALL TOOLS. If tool is equipped with three-prong plug, it should be plugged into a three-hole electrical receptacle. If an adapter is used to accommodate a two-prong plug receptacle, the adapter lug must be attached to a known ground. Never remove the third prong.

4. REMOVE ADJUSTING KEYS AND WRENCHES.

Form habit of checking to see that keys and adjusting wrenches are removed from tool before turning it "on."

5. KEEP WORK AREA CLEAN. Cluttered areas and benches invite accidents.

6. DON'T USE IN DANGEROUS ENVIRONMENT. Don't use power tools in damp or wet locations, or expose them to rain. Keep work area well-lighted.

7. KEEP CHILDREN AND VISITORS AWAY. All children and visitors should be

keep a safe distance from work area.

8.MAKE WORKSHOP CHILDPROOF -with padlocks, master switches, or by removing starter keys.

9.Don't force tool. It will do the job better and be safer at the rate for which it was designed.

10.USE RIGHT TOOL .Don't force tool or attachment to do a job for which it was not designed.

11.WEAR PROPER APPAREL. No loose clothing,gloves,neckties,rings, bracelets, or other jewelry to get caught in moving parts. Nonslip foot wear is recommended. Wear protective hair covering to contain long hair.

12.ALWAYS WEAR EYE PROTECTION. Refer to ANSI Z87.1 Standard for appropriate recommendations. Also use face or dust mask if cutting operation is dusty.

13.SECURE WORK. Use clamps or a vise to hold work when practical. It's safer than using your hand and frees both hands to operate tool.

14.DON'T OVERREACH. Keep proper footing and balance at all times.

15.MAINTAIN TOOLS IN TOP CONDITION.

Keep tools sharp and clean for best and safest performance. Follow instructions for lubricating and changing accessories.

16.DISCONNECT TOOLS before servicing and when changing accessories such as blades,bits,cutters,ect.

17.USE RECOMMENDED ACCESSORIES.

Consult the owner's manual for recommended accessories .The use of improper accessories may cause hazards.

18.AVOID ACCIDENTAL STARTING. Make sure switch is in "OFF" position before plugging in power cord.

19.NEVER STAND ON TOOL. Serious injury could occur if the tool is tipped or if the cutting tool is accidentally contacted

20.CHECK DAMAGED PARTS. Before further use of the tool, a guard or other part that is damaged should be carefully checked to ensure that it will operate properly and perform its intended function check for alignment of moving parts binding of moving parts, breakage of parts mounting, and any other conditions that may affect its operation. A guard or other part that is damaged should be properly repaired or replaced.

21.DIRECTION OF FEED. Feed work into a blade or cutter against the direction of rotation of the blade or cutter only.

22.NEVER LEAVE TOOL RUNNING UNATTENDED.TURN POWER OFF.

Don't leave tool until it comes to a complete stop.

23.DRUGS,ALCOHOL ,MEDICATION. Do not operate tool while under the influence of drug, alcohol or any medication.

24.MAKE SURE TOOL IS DISCONNECTED FROM POWER SUPPLY while motor is being mounted, connected or reconnected.

ADDITIONAL SAFETY RULES FOR MILL DRILL

- 1.BE SURE drill bit or cutting tool is securely locked in the chuck.
- 2.BE SURE chuck key is removed from the chuck before turning on power.
- 3.Adjust the table or depth stop to avoid drilling into the table.
- 4.SHUT OFF the power ,remove the drill bit or cutting tool, and clean the table before leaving the machine.
- 5.CAUTION. When practical , use clamps or a vise to secure workpiece to keep the workpiece from rotating while the drill bit or cutting tool.
- 6.WARNING: FOR Your Own Safety Don't wear gloves when operating a mill/drill.

SPECIFICATION

Drilling capacity		31.5mm(MT3) 40mm(MT4)	
Vertical milling capacity		32mm	
Spindle taper (option)		MT3 , MT4 , R8 or ISO30	
Max.distance from spindle axial to column surface		272.5mm	
Working table size		600mm×190mm	
Base size		650mm×450mm	
Diameter of column		φ115mm	
T-slot size		12mm	
Max distance spindle nose to worktable		610mm	
Max distance spindle nose to base		1180mm	
Spindle stroke		120mm	
Spindle speed(rpm) (option)	Motor 0.85KW/1.1KW	I	75 180 280 600 1000 1600
		II	150 360 560 1200 2000 3200
	Motor 1.1KW	50HZ	75 170 280 540 960 1600
		60HZ	90 210 345 670 1180 1970
Packing dimension		820mm×720mm×1830mm	
NW/GW Weight		340/390Kg	

WARNING:CHANGE SPEED ONLY WHEN MACHINE IS STOPPED

CHANGING THE GEAR BOX OIL

Tilt the head stock over as shown in Fig 1. Open the drain plug to allow the oil to drain from the opening completely. Then lock the oil drain plug and turn the head to be upright position. Remove the oil filler plug fill the oil to the gear box until the oil level reach the middle of oil fluid level indicator. Then lock the plug.

CLEANING

- (1) Your machine has been coated with a heavy grease to protect it in shipping. This coating should be completely removed before operating the machine. Commercial degreaser, kerosene or similar solvent may be used to remove the grease from the machine, but avoid getting solvent on belts or other rubber parts.
- (2) After cleaning, coat all bright work with a light lubrication. Lubricate all points with a medium consistency machine oil.

LUBRICATION:

All ball bearings in your mill/drill are sealed for life , requiring no lubrication. Points requiring lubrication are:

- (1) Internal spline drive assembly. Keep this area well lubricated with a good grade grease , insert grease in the hole at the top of spindle pulley spline driver, lube twice yearly.
- (2) A light film of oil applied to the quill and column will reduce wear, prevent rust, and assure ease of operation.
- (3) Quill return spring should receive oil once yearly. Remove cover plate and apply oil with squirt can or small brush.
- (4) **IMPORTANT:** The gear box should be oiled with a lubricant such as sae 68 oil in level. **CHANGE OIL EVERY ONE YEAR.**
- (5) Apply lubricate to quill pinion every 90 days.

NOTE: use extreme care when performing this operation and keep hands clear of pinch points. When using paraffin bar, do this only by turning the

sheaves by hand. Do not apply with motor running.

USE OF MAIN MACHINE PARTS

- (1) To raise and lower the head by head handle.
- (2) Equipped with an electric switch for tapping operation clockwise or counterclockwise.
- (3) To adjust the quick or slow feeding by feed handle.
- (4) To adjust the table left and right travel by table handle wheel.
- (5) To adjust the table fore and after travel by table handle wheel.
- (6) To operate the spindle handle wheel for micro feed.
- (7) To adjust the scale size according to working need.

PRECAUTION FOR OPERATION

Check all parts for proper condition before operation; if normal safety precautions are noticed carefully, this machine can provide you withstanding of accurate service.

(1) Before Operation

- (a) Fill the lubricant
- (b) In order to keep the accurate precision, the table must be free from dust and oil deposits.
- (c) Check to see that the tools are correctly set and the workpiece is set firmly.
- (d) Be sure the speed is not set too fast.
- (e) Be sure everything is ready before use

(2) After Operation

- (a) Turn off the electric switch.
- (b) Turn down the tools.
- (c) Clean the machine and coat it with lubricant.
- (d) Cover the machine with cloth to keep out the dust.

(3) Adjustment of head

- (a) To raise and lower the head, loosen the leaf screw located on the right side of the raise and lower base. When the desired height is reached tighten leaf screw to avoid vibration.
- (b) Head may be rotated 360° by loosening the same bolts mentioned above. Adjust the head to the desired angle, then fix the heavy duty head locknuts, It is tighten the same to fix the head if drilling & milling too much.
- (c) Unscrew 3 nuts while the workpiece needs to be drilled. Turn to the

degrees you wish on the scale, then screw the 3 nuts.

(4) Adjustment of the lifting table

- (a) Loosening the locking handles, rocking the crank to move the lifting table up and down along the column, when arrived the height of your request, tighten the handles to prevent loose.

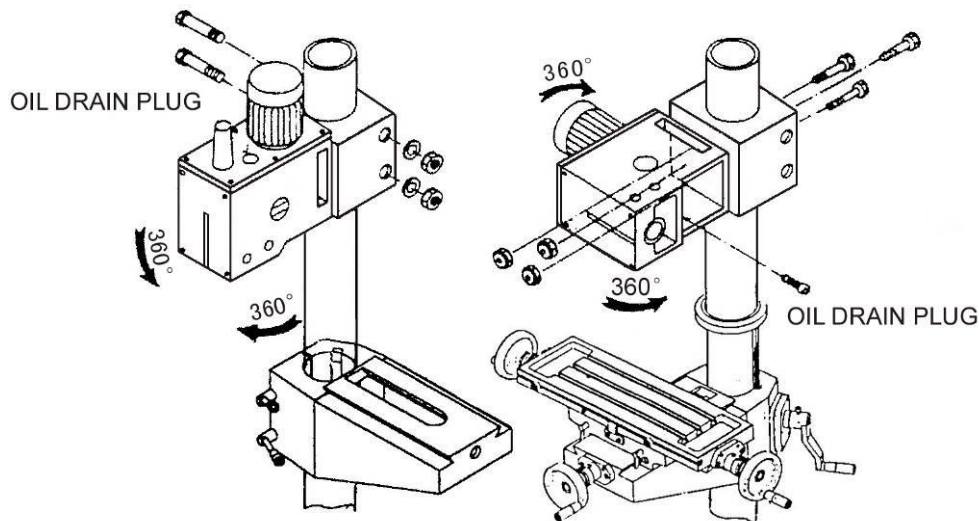


Fig.1

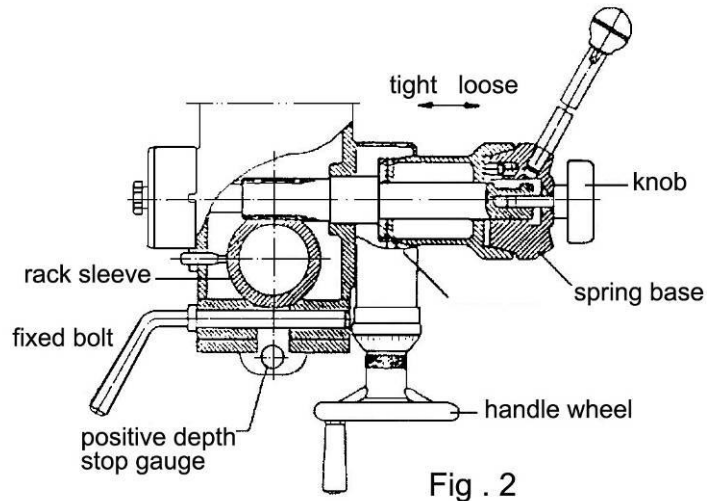
- (b) When need to working large parts, loosening the locking handles, rotating the lifting table of 180°, then tighten the handles, and place the part on the base to work on it.

QUILL RETURN SPRING ADJUSTMENT:

Spring tension for return of spindle, after hole drilling, has been pre-set at the factory .No further adjustment should be attempted unless absolutely necessary. Adjustment will probably be required if a multiple spindle drilling or tapping head is used .If adjustment is necessary ,loosen lock screw while holding quill spring housing .Do not allow the housing to turn in your hand,or spring will unwind. Turn entire housing assembly clockwise the number of turns necessary to cause the quill to return to its up position.(NOTE: The flat of the spring housing pilot is lined up with the spring loading hole on the body of the spring housing.)Reset lockscrew make sure point of screw mates the flat on the housing journal.

(1)Preparing for Drilling(see fig.2)(Except addition power feed system).

Turn of the knob make loose the taper body of worm gear and spring base.
Then we decide spindle stroke setting the positive depth stop gauge for
drilling blind hole or free state for pass hole.



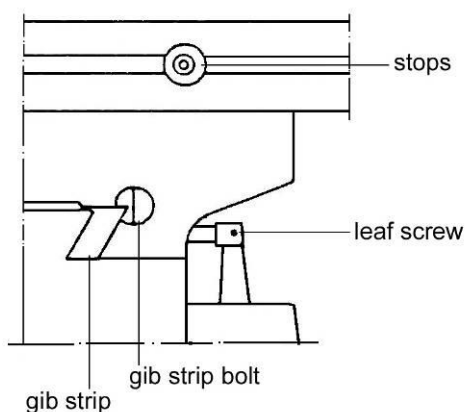
(2) Preparing for milling(see fig.2)(Except addition power feed system)

- (a)Adjust the positive depth stop gauge to highest point position.
- (b)Turn tight of the knob be use to taper friction force coupling the worm gear and spring base. Then turning the handle wheel by micro set the spindle of work piece machining height.

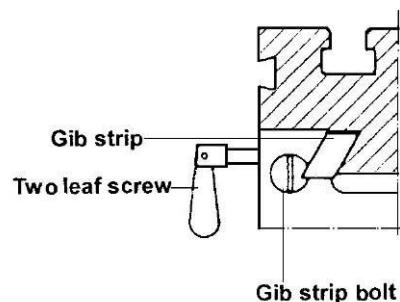
ADJUSTING TABLE SLACK AND COMPENSATE FOR WEAR(see fig.3)

- (1) Your machine is equipped with jib strip adjustment to compensate for wear and excess slack on cross and longitudinal travel.
- (2) Clockwise rotation the job strip bolt with a big screw for excess slack otherwise a little counter clockwise if too tight.
- (3) Adjust the jib strip bolt until feel a slight drag when shifting the table.

CLAMPING TABLE BASE AND MACHINE BASE(See Fig.3)



Cross feed view



Longitudinal feed view

Fig.3

- (1) When milling longitudinal feed. It is advisable to lock the cross feed table travel to insure the accuracy of your work. To do this, tighten the small leaf screw located on the right side of the table base.
- (2) To tighten the longitudinal feed travel of the table for cross feed milling, tighten the two small leaf screw on the front of the table base.
- (3) Adjustable travel stops are provided on the front of the table for control of cross travel and the desired milling length.

TO CHANGE TOOLS

(1) Removing Face Mill or Drill Chuck Arbor

Loosen the arbor bolt at the top of the spindle shaft approximately 2 turns with a wrench. Rpa the top of the arbor bolt with a mallet.

After taper has been broken loose, holding chuck arbor on hand and turn detach the arbor bolt with the other hand.

(2)To install Face Mill or Cutter Arbor

Insert cutter and cutter arbor bolt detach securely, but do not over-tighten.

(3)Removing Taper Drills

(a) Turn down the arbor bolt and insert the taper drill into the spindle shaft.

(b) Turn the rapid down handle rod down until the oblong hole in the rack sleeve appears. Line up this hole with the hole in the spindle. Insert key punch key through holes and strike lightly with a mallet. This will force the taper drill out.

SPECIFICATION OF T-SLOT

The size of T-Solt on table as Fig.4.

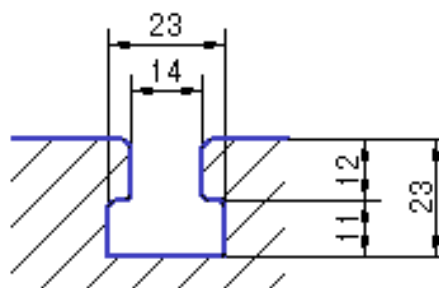
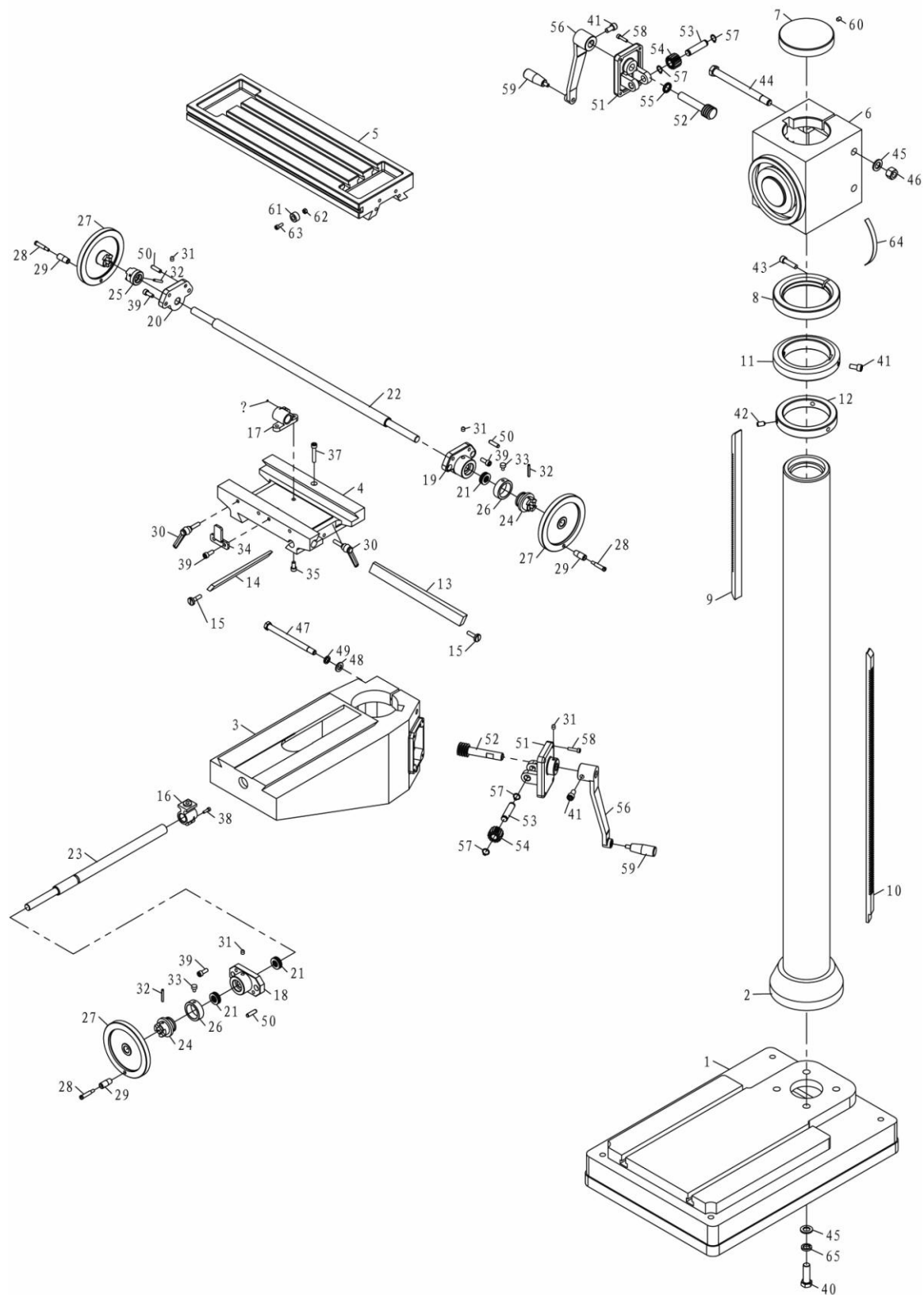


Fig.4

TROUBLE	PROBABLE CAUSE	REMEDY
Excessive Vibration	1.Motor out of balance 2.Bad motor	1.Balance or replace problem motor. 2.Replace motor
Motor stalls	1.Over feeding. 2.Dull drill. 3.Motor not building up to running speed 4.Bad motor	1.Reduce feed rate. 2.Sharpen drill and keep sharp. 3.Replace or repair motor. Check fuses in all three legs on three phase motors and replace if necessary. 4.Replace motor.
Noisy Operation	1.Excessive vibration. 2.Improper quill adjustment. 3.Nosiy spline 4.Noisy motor	1.Check remedy under excessive vibration. 2.Adjust quill. 3.Lubricate spline. 4.Check motor bearings or for loose motor fan.
Drill or Tool heats up or burns work.	1.Excessive speed. 2.Chips not clearing. 3.Dull tool. 4.Feed reate too slow. 5.Rotation of drill incorrect. 6.Failure to use cutting oil or coolant(on steel)	1.Reduce speed. 2.Use pecking operation to clear chips. 3.Sharpen tool or replace. 4.Incresase feed enough to clear chips. 5.Reverse motor rotation. 6.Use cutting oil or coolant on steel
Drill leads off	1.No drill spot. 2.Cutting lips on drill off center. 3.Quill loose in head. 4.Bearing play.	1.Center punch or center drill workpiece. 2.Regrind drill. 3.Tighten quill. 4.Check bearings and reseal or replace if necessary.
Excessive drill runout or wobble	1.Bent drill. 2.Bearing play. 3.Drill not seated properly in chucks.	1.Replace drill. Do not attempt to straighten 2.Replace or reseal bearings. 3.Loosen, reseal and tighten chuck.

Work or fixture comes loose or spins	1.Failure to clamp workpiece or work holding device to table.	1.Clamp workpiece or work holding device to table surface.
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TROUBLE SHOOTING HINTS



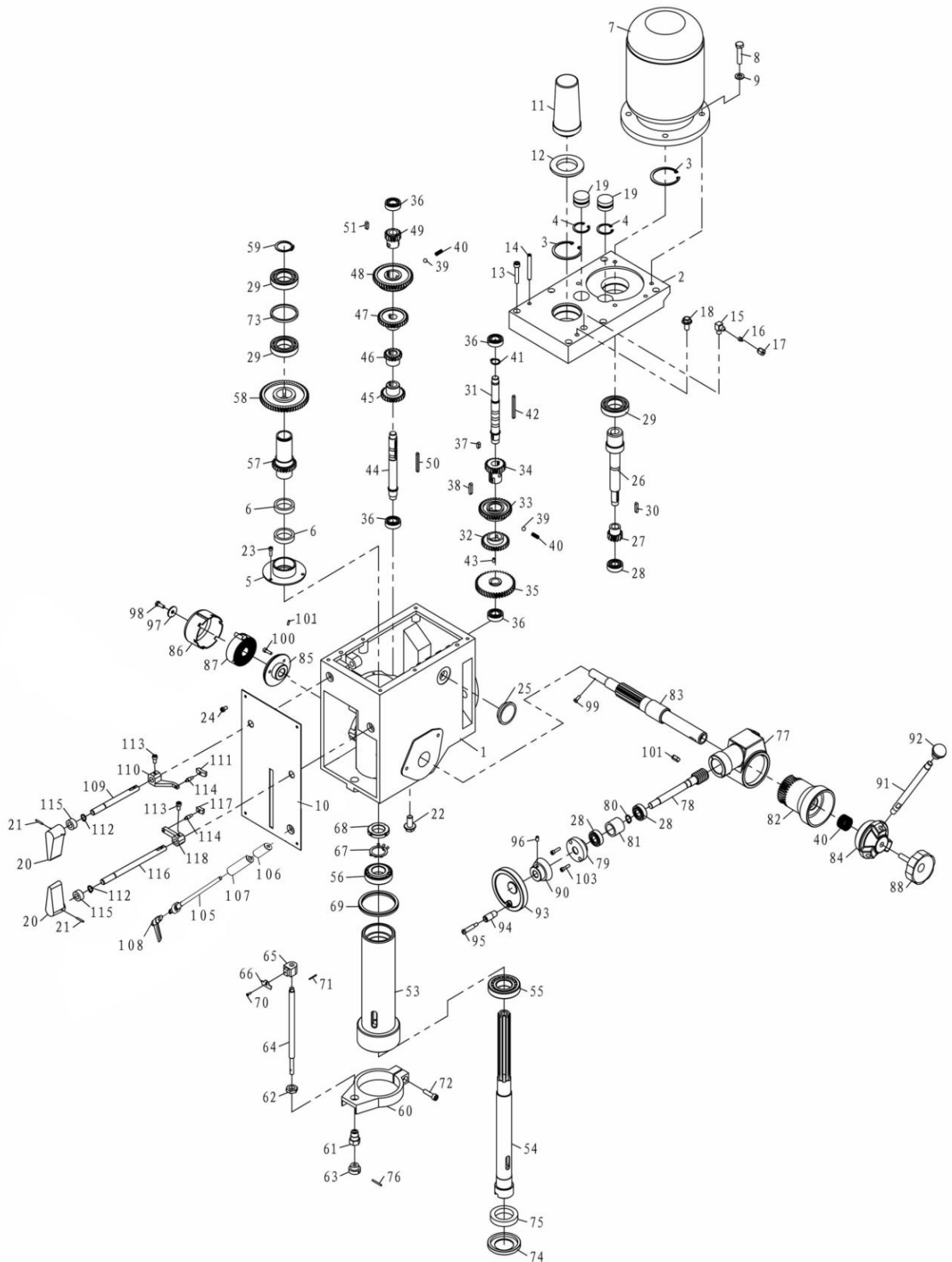
BASE

BASE PARTS

BASE PARTS

No.	Qty.	Code	Name	No.	Qty.	Code	Name
1	1	10002/40H	base	38	1		screw M5X16
2	1	10001/40H	column	39	8		screw M8X20
3	1	10003/40H	lifting table	40	4		bolt M16X50
4	1	10005/40H	slip saddle	41	3		screw M10X20
5	1	10004/40H	work table	42	3		screw M10X20
6	1	10016/40H	elevating body	43	1		screw M10X40
7	1	10014/40	column lid	44	2		bolt M16X190
8	1	10012/40H	locked guide ring	45	3		washer 16
9	1	10014/40H	up rack	46	2		nut M16
10	1	10015/40H	low rack	47	2		bolt M12X16
11	1	10011/40H	guide ring	48	2		washer 12
12	1	10013/40H	fixed ring	49	2		washer 12
13	1	10006/40H	gib strip	50	6		pin 8X30
14	1	10007/40H	gib strip	51	2	10017/40	bracket
15	2	10106/40	adjust screw	52	2	10112/40	worm shaft
16	1	10203/40	guide screw nut	53	2	10113/40	small shaft
17	1	10202/40	guide screw	54	2		helical gear
18	1	10021/40	guide screw support	55	2	10201/40	washer
19	1	10020/40	right support	56	2	10018/40	rock handle
20	1	10019/40	left support	57	4		retaining ring
21	4		bearing 51103	58	8		screw M6X25
22	1	10008/40H	table screw	59	2		turn handle
23	1	10009/40H	base screw	60	1		screw M8X12
24	2	10102/40H	dial clutch	61	2	10109/40	fixed block support
25	1	10110/40	left clutch	62	2		nut M6
26	2	10111/40	graduation plate	63	2		screw M6X16
27	3	10301/40	handwheel	64	1		degree meter
28	3	20305-2B/40	screw	65	1		washer 16
29	3	20305-1B/40	turn handle				
30	3		adjust handle				
31	5		oil cup 8				

32	3		pin 5X35
33	2	10107/40	screw
34	1	10105/40	fixed block
35	2		screw M8X16
36	1		screw M5X12
37	1		screw M8X45



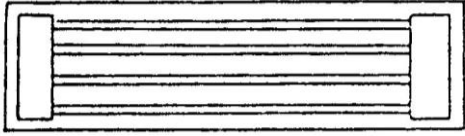
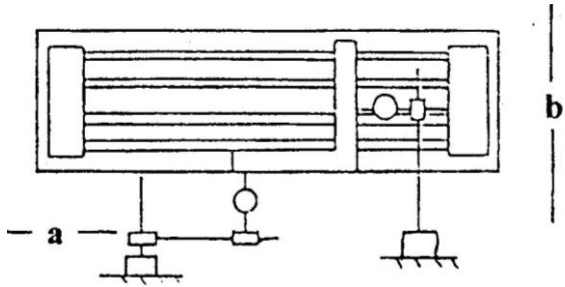
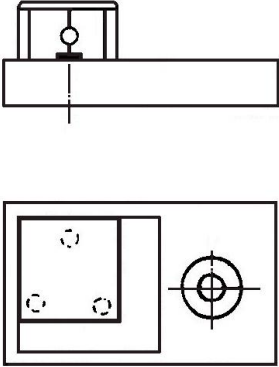
HEAD PARTS

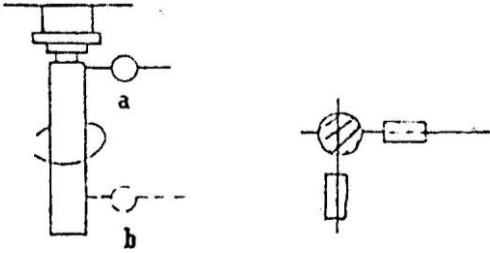
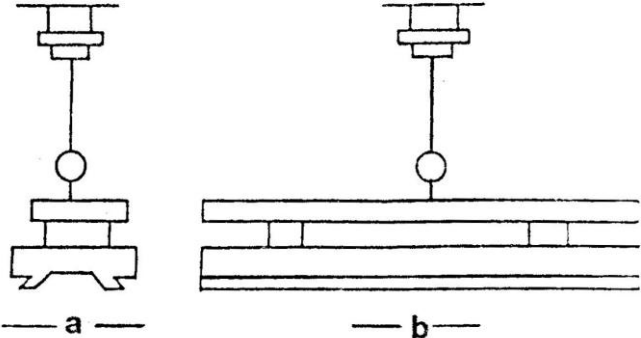
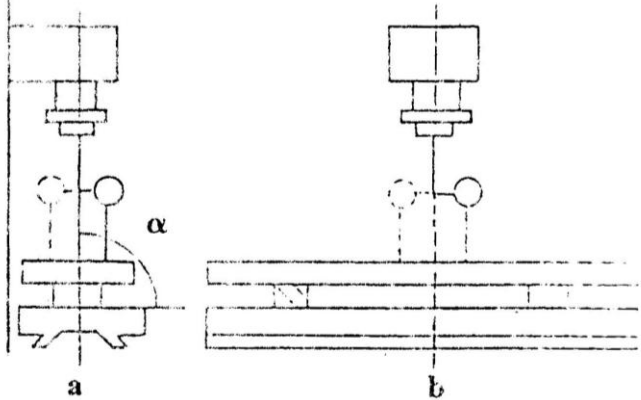
No.	Qty.	Code	Name	No.	Qty.	Code	Name
1	1	20010B	head body	37	1		key
2	1	20011B	head body cover	38	1		key
3	2		retaining ring	39	2		ball
4	2		retaining ring	40	1		spring
5	1	20018B	airtight base	40/1	1		spring
6	2		airtight ring	41	2		retaining ring
7	1		motor	42	1		key
8	1		screw	43	4		screw
9	1		washer	44	1	20107B	III shaft
10	1	20201	plate	45	1	20109-B	gear
11	1	20304-1B	arbor bolt cover	46	1	20110-2-B	gear
12	1	20304-2B	arbor bolt cover base	47	1	20112-B	gear
13	1		screw	48	1	20113-B	gear
14	1		pin	49	1		gear
15	1	20025B	joint	50	1		key
16	1	20026B	sleeve	52	1		key
17	1	20027B	nut	53	1	20019	spindle sleeve
18	1		bolt	54	1	20104B	spindle
19	2	20020B	cap	55	1		bearing
20	2	20307B	speed lever	56	1		bearing
21	2		pin	57	1	20114-B	splined sleeve
22	1		oil plug	58	1	20116-B	gear
23	1		screw	59	1		retaining ring
24	1		screw	60	1	20012	feed base
25	1		oil pointer	61	1	20128	support base
26	1	20105B	Ishaft	62	1	20129	nut
27	1	20105-1-B	gear	63	1	20130	knob
28	3		bearing	64	1	20131	graduated rod
29	3		bearing	65	1	20021	fixed bolt
30	1		key	66	1	20132	scale board
31	1	20106B	IIshaft	67	1		lock washer
32	1	20108-B	gear	68	1		lock nut
33	1	20110-1-B	gear	69	1	20308	rubber washer
34	1	20111-B	gear	70	1		screw
35	1	20106-1-B	gear	71	1		split pin

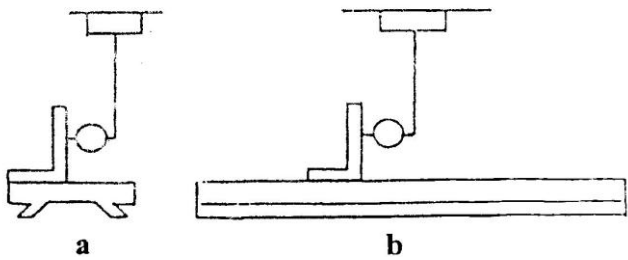
36	4	bearing	72	1	bolt
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No.	Qty.	Code	Name	No.	Qty.	Code	Name
73	1	20024B	separating ring	111	1	20204-2B	lever bracket
74	1	20133B	oil tight cover	112	2		retaining ring
75	1	62*42*12	air tight	113	2		screw
76	1		pin	114	2	20204-3B	lever rod
77	1	20015	worm wheel box	115	2		oil seal
78	1	20119	worm shaft	116	1	20126B	long lever shaft
79	1	20302	worm cover	117	1	20204-1B	lever bracket
80	1		retaining ring	118	1	20022-2B	lever
81	1	20120	separating ring				
82	1	20016	worm wheel				
83	1	20117	pinion shaft				
84	1	20013	handle body				
85	1	20118	spring base				
86	1	20123	spring cap				
87	1	20122	spring plate				
88	1	20303	big ripple handle				
90	1	20017	graduated plate				
91	1	20121B	handle rod				
92	1	20301B	handle ball				
93	1	20306B	handle wheel				
94	1	20305-1B	turn handle				
95	1	20305-2B	screw				
96	1		screw				
97	1	20102	washer				
98	1		bolt				
99	1		screw				
100	1		screw				
101	2		pin				
102	1		key				
104	2		screw				
105	1	20124B	fixed bolt				
106	1	20203B	fixed tight block				
107	1	20202B	fixed tight block				
108	1		adjust handle				

109	1	20125B	lever shaft
110	1	20022-1B	lever

ACCURACY TEST FOR MILLING & DRILLING MACHINE			Total 2
			P1
No.	Checking items	Tolerance	Error tested
G1	<p>The flatness of worktable surface</p> 	0.04/300	
G2	<p>Squareness of worktable longitudinal movement to cross movement</p> 	0.08/300	
G3	<p>The flatness of base surface</p> 	0.03/300	

G4	<p>Ran-out of spindle hole center line</p> 	<p>a) Near spindle nose 0.02 b) At a distance of 100 from spindle nose 0.04</p>	
<p>ACCURACY TEST FOR MILLING & DRILLING MACHINE</p>		Total 2	
		P2	
No.	Checking items	Tolerance	Error tested
G5	<p>Parallelism of worktable movement to worktable surface</p> 	<p>a 0.02 for any 100 testing length b 0.03 for any 300 testing Max 0.06</p>	
G6	<p>Squareness of spindle rotating line to worktable surface</p> 	<p>a 0.05/300 $\alpha \leq 90^\circ$ b 0.05/300</p>	

G7	<p>Squareness of spindle sleeve vertical movement to worktable surface</p>  <p>The diagrams show mechanical components of a machine tool. Diagram 'a' depicts a spindle sleeve assembly with a vertical guide and a worktable. Diagram 'b' shows a similar assembly but with a different base or support structure, likely used for different measurement conditions.</p>	<p>a 0.05/100 b 0.05/100</p>	
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