

M629 BM65VE 11/11/05

HARE & FORBES

MACHINERYHOUSE

Established 1930

Distributors of New & Used Workshop Equipment

**TURRET
MILLING MACHINE**

MODEL: BM-65VE

ORIGINAL

Part

TOKE

OPERATION MANUAL AND PARTS LIST

PLANT SAFETY PROGRAMME

NEW MACHINERY HAZARD IDENTIFICATION, ASSESSMENT & CONTROL

Stock Code: M629 Description: Milling Machine Model: BM65VE Brand: HAFCO

Developed in Co-operation Between A.W.I.S.A and Australia Chamber of Manufactures
This program is based upon the Australian Worksafe Standard for Plant(NOHS: 1010-1994)



Item No.	Hazard Identification	Hazard Assessment	Risk Control Strategies (Recommended for Purchase / Buyer / User)
A	ENTANGLEMENT	HIGH	Eliminate, avoid loose clothing / Long hair etc.
B	CRUSHING	LOW	Secure & support workpiece on mill table.
C	CUTTING, STABBING, PUNCTURING	MEDIUM	Isolate power to machine prior to any checks or maintenance being carried out. Do not adjust or clean machine until the machine has fully stopped.
D	SHEARING	MEDIUM	Make sure all guards are secured shut when machine is on. Isolate power to machine prior to any checks or maintenance.
F	STRIKING	MEDIUM	Ensure tooling is secure in chuck. Wear safety glasses. Stand clear of moving parts on machine. Remove all loose objects around moving parts. Ensure correct spindle direction when milling.
H	ELECTRICAL	MEDIUM	All electrical enclosures should only be opened with a tool that is not to be kept with the machine. Machine should be installed & checked by a Licensed Electrician.
M	HIGH TEMPERATURE	LOW	Wear appropriate protective clothing to prevent hot swarf.
O	OTHER HAZARDS, NOISE.	LOW	Wear hearing protection as required.

Plant Safety Program to be read in conjunction with manufactures instructions



ABN 96 000 286 957

"THE JUNCTION" 2 WINDSOR ROAD, NORTHMEAD NSW 2152
Phone (02) 9890 9111 Fax (02) 9890 3888

Authorised and signed by: 
Safety officer: 
Manager:

Date: Mar-02

INSTRUCTION MANUAL

PRELIMINARY INFORMATION

UNCRATING:

Carefully remove the protective crating and skid so that the machine and parts are not marred, scratched or otherwise damaged. In the event of any damage in transit, notify our representative at once as well as the transportation company making final delivery. The machine should be lifted from the base of the crate by placing a sling under the overarm.

SHORTAGES:

Inspect the complete shipment carefully against the itemized packing list to make sure that all items are present. In the event damage or shortages are noticed they should be reported immediately to the delivering carrier and to the representative from whom the machine was purchased with a clear indication as to which parts have not been received.

CLEANING:

Thoroughly clean the rust preventive materials from the machine with mineral spirits, or other suitable solvents. Do not move the table, saddle, knee or other moving parts until all of the sliding way surfaces have been well cleaned and lubricated. After cleaning carefully move to a limit stop in one direction the table, saddle and knee, and clean and lubricate the exposed way surfaces. Then move each of these units to the opposite limit stop and similarly clean and lubricate the exposed way surfaces. Loosen the two locks to unlock the overarm and move this forward and backward to the extreme position in order to clean and lubricate.

FOUNDATION:

For best performance it is important that the machine be placed on a solid foundation and that it be level. A solid concrete floor is desirable, but a firm wooden floor, freed from vibration, may be suitable. If the machine is to be located on an upper floor or balcony it should be placed as close as possible to a strong supporting pillar or column.

INSTRUCTION MANUAL

LEVELING:

The machine is provided with four bolt holes not at each corner of the base. Steel wedges or steel plates should be used for leveling. A good machinist's level should be used in the leveling process and the bubble should have adequate time to come to rest. The level should be placed both lengthwise and crosswise on the machine table.

VERTICAL HEAD ON OVERARM(EXPORT ONLY)

When the machine leaves the factory the vertical head is positioned on the overarm with the spindle up and the motor down. Before operating the machine it is necessary that the head be returned to its normal operating position by loosening the hexagonal units located at the head end of the overarm. It will then be possible to tilt the head into normal operating position by using a crank on the 1/2" stud located on the right side of the front end of the overarm. Because of the heavy overhung weight involved, the tilting of the head back to its normal position will be greatly facilitated if a second person can help push it into position. The head may then be trammed in as described.

VERTICAL HEAD ON OVERARM:

When the machine leaves the factory the vertical head is tilted back on the overarm. Before operating the machine it is necessary that the head be returned to its normal operating position and trammed in as described.

HANDLES:

When crating, the three ball crank handles are turned facing each other. The handles should be reversed during installation.

LUBRICATION:

Do not operate machine until properly lubricated. Follow the instructions given in fig.3, page 6, and lubrication plate, page 7.

INSPECTION:

Machine is carefully inspected and lined up before it leaves our factory. Figures=1 and 2 shows the way your machine is lined up.

INSTRUCTION MANUAL

ALIGNMENT OF HEAD

In case of precision boring or work of that nature, where it is necessary to have head perfectly square with the table, use method prescribed below. For normal milling, graduations on turret and head are accurate enough. To set head perfectly square with table see figures=1 & =2. This may be done with head and adapter on overarm, by adjusting adapter through worm gear on adapter. Loosen three binding bolts but leave drag on same for fine adjustment. Mount indicator in spindle nose as shown in figure=1 and 2, and indicate parallel.

NOTE:

When indicating as in figures 1, it should be noted that the table is fitted to be slightly high in front, usually about 0.0005.

TABLE SQUARE WITH SPINDLE THRU
TRANSVERSE AXIS

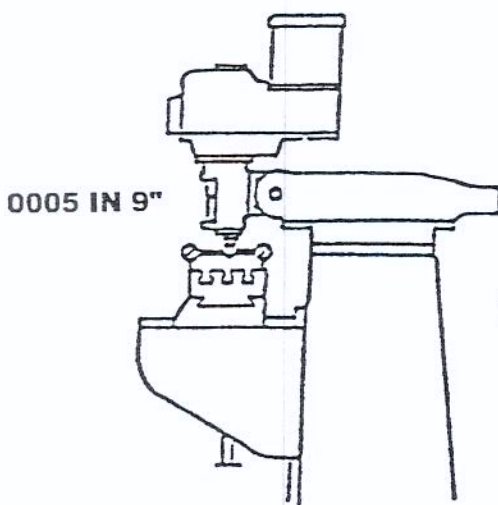


FIG. 1

TABLE SQUARE WITH SPINDLE THRU
LONGITUDINAL AXIS

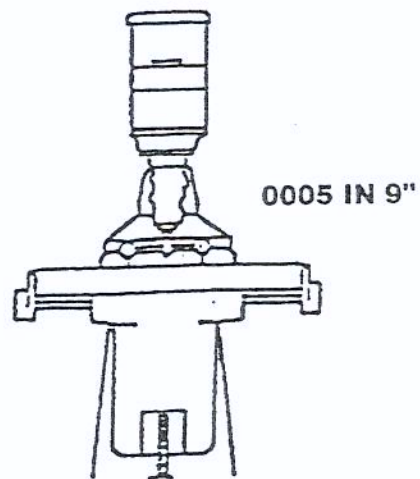


FIG. 2

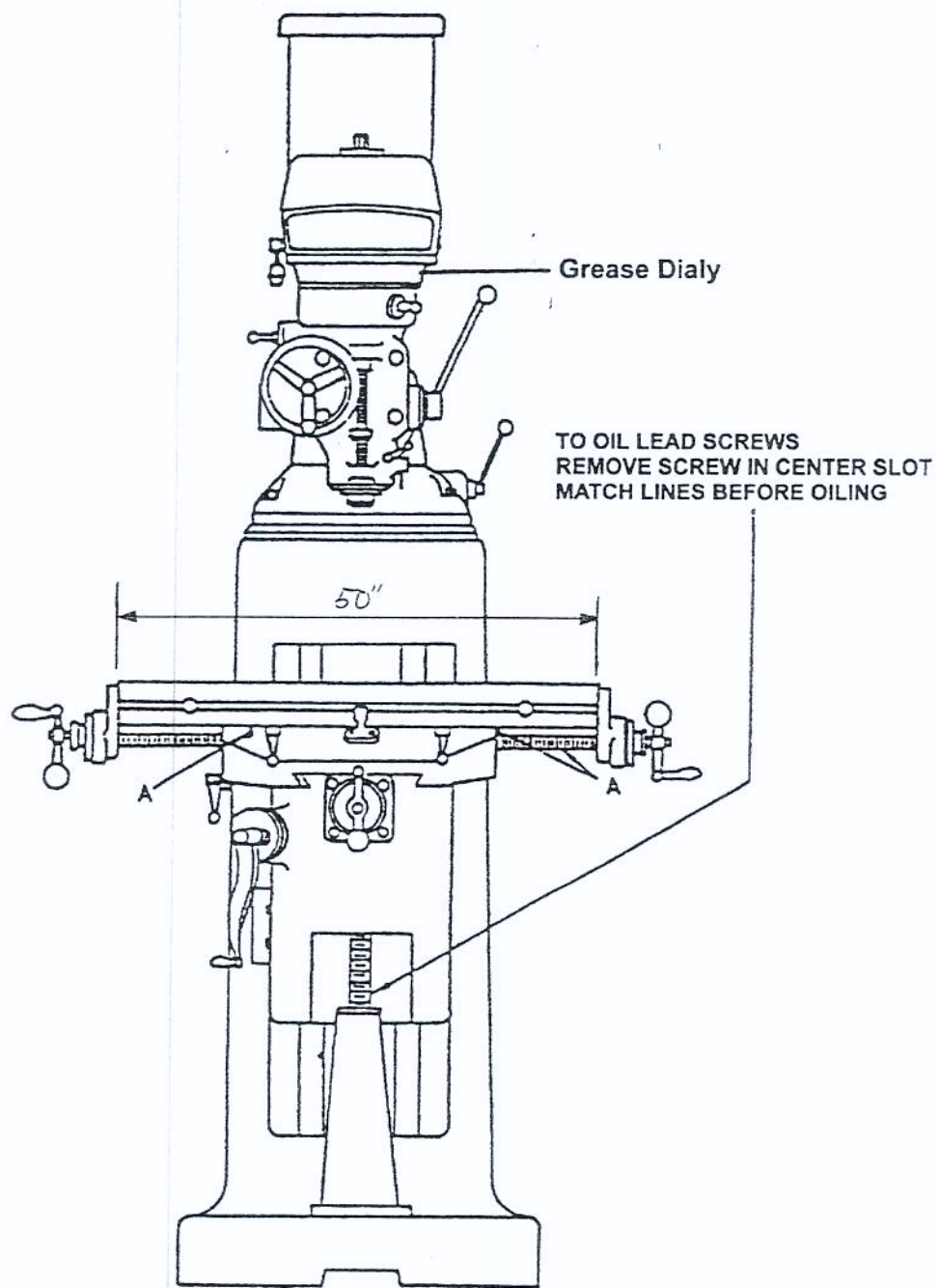


FIG.3

- A. One shot, lube system
 mobil VACTRA OIL No.2
- B. Milling head
 S.A.E. 10 or 10W Light Oil

INSTRUCTION MANUAL

HEAD

1. Tilting of the head in a front to back plane is readily accomplished by loosening the three nuts the right hand side of the head (at joint) and applying crank to forward head tilting worm stud (top center of joint).

CAUTION:

WHEN RETURNING HEAD TO VERTICAL POSITION, SWEEP THE TABLE WITH AN INDICATOR ATTACHED TO SPINDLE TO MAKE SURE HEAD IS SQUARE TO TABLE.

2. To tilt head from side to side, loosen the (4) hex nuts (front of head). Then title head the desired amount by applying crank to the side wise tilting worm stud located at the right side of joint and to the rear of the spindle head.

CAUTION:

WHEN RETURNING HEAD TO VERTICAL POSITION, SWEEP THE TABLE WITH AN INDICATOR ATTACHED TO SPINDLE TO MAKE SURE HEAD IS SQUARE TO TABLE.

OVERARM OR ARM:

The back to front position of the head and overarm is readily changed by loosing the 2 overarm locks (located left side of turret). Move the overarm by adjustment handle (located on right side of turret). To desired position.

TURRET

To index the entire turret-overarm-head assembly loosen the 4 hex nuts, 2 on either side of the overarm which clamp the turret to the top of the column. Then swing the turret to the desired position and reclamp.

NOTE: It is highly recommended that all clamping nuts bolts and locks (turret to column, overarm to turret, head side-wise tilt and head forward-back tilt) be securely tightened before any machining cuts are taken. Always check these points before starting a cut. Also, when returning overarm to normal position attach an indicator to the overarm, and slide the overarm in and out, with the indicator riding against a square which has been square to front of table to make sure overarm is square with table.

INSTRUCTION MANUAL

CHATTER OR VIBRATION WHEN CUTTING

- a. Cause-Dirt in spindle taper, causing bad fit between tool holder Shank and spindle taper. Remedy-Clean spindle taper and shank of tool holder.
- b. Cause-Faulty shank on tool holder.
Remedy-Replace shank or dress off burrs, if due to nicks or burrs.
- c. Gibs poorly adjusted on slide ways, or dirty.
Remedy-Adjust gibs.
- d. Work improperly clamped to table of machine.
Remedy-Check for rocking or movement, and correct by proper clamping.
- e. Improper grind on cutting tool.
- f. Hard spot at splice of drive belts or worm belts.
Remedy-Replace belts.
- g. Spindle quill worn in quill head lock slightly.
Remedy-Tighten quill head lock slightly.
- h. Incorrect spindle speed, table feed, or both.
Remedy-Ordinarily increase spindle speed and/or increase or decrease feed to Break up vibration period. Experiment by using hand feed to feed table.

BORING OR MILLING OUT SQUARE OR AT AN ANGLE.

- a. Cause-Head not properly aligned with table.
Remedy-Check head for alignment and correct
- b. Work improperly set up; i.e. not square and flat.
Remedy-Check and re-align work.

FAILURE TO HOLD CENTER DISTANCE WHEN LOCATING FOR BORING.

Cause-Failure to take back-off tension on lead screw after coming up to indicator Reading, causing table to "creep", or failure to lock up slide ways with same Amount of tension after moving table to new position.

SPARE PARTS RECOMMENDED

SET OF DRIVE BELTS FOR ALL DRIVES: (See Parts List)

INSTRUCTION MANUAL

INSPECTIONS:

1. Inspect taper of spindle for cleanliness and freedom from chips of foreign matter.

Frequency-Each time tool holder is inserted.

Inspection by machine operator.

No special equipment required.

2. Inspect and adjust gibs of slide ways.

Frequency-every 160 hours. Oftener if looseness is noted by operator. Inspection and adjustment by machine operator or machine maintenance man. No special equipment required other than allen wrench.

3. Inspect for general cleanliness of machine, paying particular attention to keep dirt and chips from slide ways. **DO NOT USE AIR TO REMOVE SUCH DIRT AND CHIPS-BUT WIPE OFF WAYS OR KEEP THEM COVERED.** Flood ways with light oil and work slide movements back and forth to wash out foreign matter. Then re-lubricate machine according to lubrication instructions.

Frequency-Constantly, as far as wiping off chips and dirt are concerned. Every 40 hours ways should be flooded with oil and cleaned as above. No special equipment required.

4. Inspect drive belts for wear, hard spots at splice etc.

Frequency-Every 40 hours.

Inspection by machine operator or machine maintenance man.

No special equipment required.

5. Inspect to see if vertical head is square with table, by mounting indicator on spindle and sweeping table.

Frequency-every 80-120 hours, or after head has been tilted.

Inspection by machine operator or machine maintenance man.

Special equipment required consists of (1) A short accurate arbor to insert in spindle. (2) A clamp for use in clamping a 6" bar to above arbor in horizontal position. (3) 6" bar approximately 1/2" in diameter. (4) An accurate dial indicator to clamp to above 6" bar position so when spindle is revolved by hand, nib of indicator in contact with table, sweeps table in a full circle and indicates out of squareness.

INSTRUCTION MANUAL

GENERAL SPEED RECOMMENDATIONS

Material to be Cut	Feet Per Minute		
	Rough Cut	Rough and Finish	Light and Finish Cut
Cast Iron-Soft-(Under 200 Brinnell)	70	80-90	120
Cast Iron-Med-(200-300 Brinnell)	55	60-70	90
Cast Iron-Hard-(Over 200 Brinnell)	40	50-60	70
Steel (Chrome Nickel 40-50 Shore)	30	40	50
Steel (Stainless)	60	80	90
Steel (Low Carbon)	80	90	140
Steel (High Carbon)	40	50	70
Bronze (Medium)	90	120	150
Bronze (Hard)	65	90	130
Brass (Hard)	100	150	200
Copper	150	200	300
Duraluminum	400	----	600
Aluminum	600	----	1000

TABLE OF CUTTING SPEEDS AND FEEDS

Diameter Inches	Feet Per Minute										
	15	20	25	30	40	50	60	70	80	90	100
1/16"	917	1222	1528	1833	2445	3056	3667	4278	4889	5500	6112
1/8"	458	611	764	917	1222	1528	1833	2139	2445	2750	3056
3/16"	306	407	509	611	815	1019	1222	1426	1630	1833	2037
1/4"	229	306	382	458	611	764	917	1070	1375	1375	1528
5/16"	183	244	306	367	489	611	733	856	978	1100	1222
3/8"	153	204	255	306	407	509	611	713	815	917	1019
7/16"	131	175	218	262	349	437	524	611	698	786	873
1/2"	115	153	191	229	306	382	458	535	611	688	764
5/8"	91	122	153	183	244	306	367	428	489	550	611
3/4"	76	102	127	153	204	255	306	357	407	458	509
7/8"	65	87	109	131	175	218	262	306	349	393	437
1"	57	76	95	115	153	191	229	267	306	344	382
1 1/8"	50	67	84	102	136	170	204	238	272	306	340
1 1/4"	45	61	76	91	122	153	183	214	244	275	306
1 3/8"	41	55	69	83	111	139	167	194	222	250	278
1 1/2"	38	50	63	76	102	127	153	178	204	229	255
1 5/8"	35	47	58	70	94	118	141	165	188	212	235
1 3/4"	32	43	54	65	87	109	131	153	175	196	218
1 7/8"	30	40	50	61	81	102	122	143	163	183	204
2"	28	38	47	57	76	95	115	134	153	172	191

The foregoing should be regarded as approximate, as many factors control the efficient operation of end mills. Always keep cutters sharp, and a steady flow of oil or compound directly on the working point will allow much higher cutting speed. Keep rate of feed consistent with finish required.

INSTRUCTION MANUAL

ADJUSTMENT OF TABLE GIB

The table is provided with a full length tapered gib in the saddle, with an adjusting screw on the left side. To take up gib, tighten large screw slightly and repeat until a slight drag is felt when moving the table by hand. (Fig.4)

Fig.4

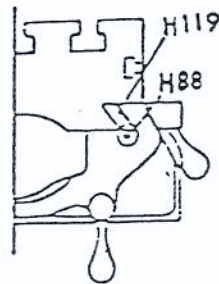
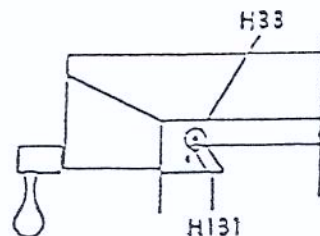


Table-saddle gib

ADJUSTMENT OF SADDLE AND KNEE GIBS

A tapered gib is used for adjusting the saddle bearing on the knee. This forms a guide for the saddle. To tighten gib, same principal as described above is used, however, chip wiper must be removed first. (Fig.5)

Fig.5

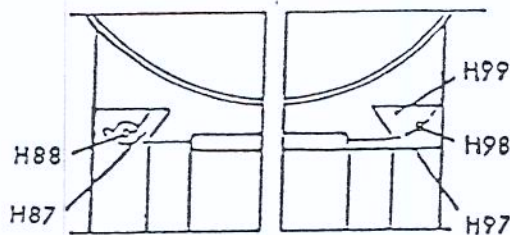


Saddle-knee gib

ADJUSTMENT OF KNEE GIB

Remove chip wiper and adjust screw until smooth movement is attained. (Fig.6)

Fig.6



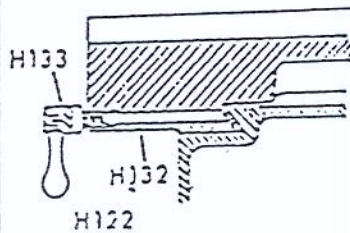
Knee-Column gib

INSTRUCTION MANUAL

CLAMPING TABLE SADDLE

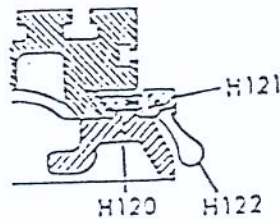
When milling with longitudinal table feed only, it is advisable to clamp the knee to the column and the saddle to the knee to add rigidity to these members and provide for heavier cuts with a minimum of vibration. The saddle locking lever is located on the left-hand side of saddle. (Fig.7) Excessive Pressure can cause slight table bind. Use moderate clamping pressure, as this will hold saddle sufficiently.

Fig.7



The table clamping levers are located on front of saddle and should always be clamped when longitudinal movements is not required. (Fig.8)

Fig.8



REMOVING OF TABLE

Remove as follows: Ball crank handles, dial holders, bearing brackets. Screw will then turn all the way so that it can be removed. When this is accomplished, the table can easily be taken off merely by sliding from saddle.

REMOVING OF SADDLE

Follows along the same lines as removing table; however, it is necessary to remove entire front bracket assembly completely. Then remove nut bracket which has become accessible after table has been removed.

INSTRUCTION MANUAL

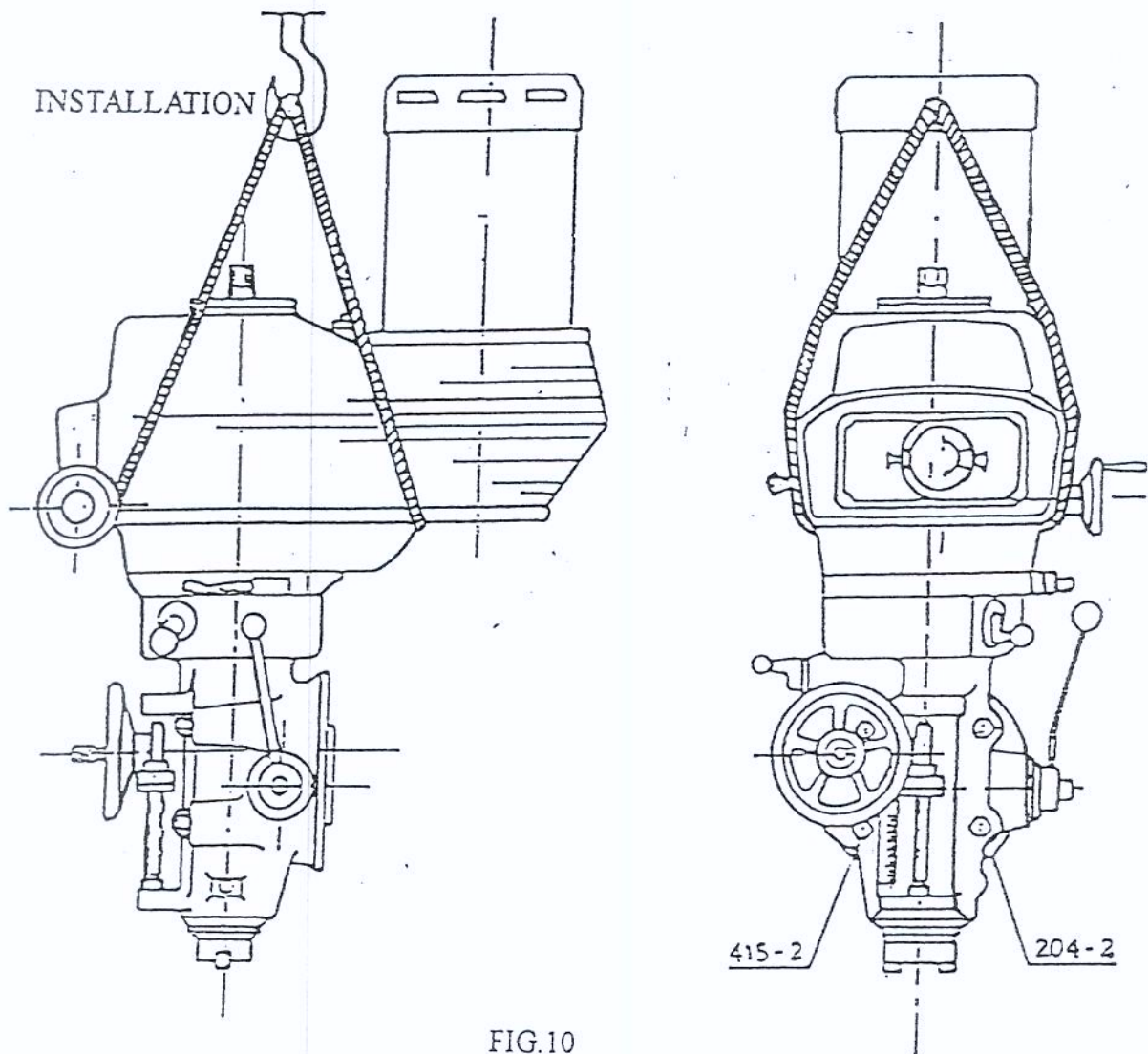


FIG.10

HEAD REMOVAL/INSTALLATION

We recommend use of a nylon strap for transporting variable speed head, as shown above.

INSTALLATION

Place screws Nos. 204-2 and 415-2 into the four holes of head. Then, tighten by means of four nuts corresponding to screws mentioned above.

CAUTION:OVER TIGHTENING THE NUTS COULD CAUSE DAMAGE TO THE HEAD OR STRIP THE BOLTS.

INSTRUCTION MANUAL

FINAL RECOMMENDATIONS

LUBRICATION

Long life, accuracy and warranty of this variable speed head are conditioned by an adequate use and lubrication. Therefore, please follow strictly the greasing indications shown on lubrication plate and avoiding the use of different lubricants.

Bearings in this assembly are watertight and are greased for life.

WORK

The feeds can be used to drill holes up to a 3/8" dia. Use manual feeds for holes that are large than the mentioned one.

The clutch is adjusted to approx. 200 Lbs. Of downwards pressure on the quill which allows drilling 3/8" dia. In mild steel.

CAUTION: THIS CLUTCH IS TO BE USED ONLY WHEN IT IS ABSOLUTELY NECESSARY.

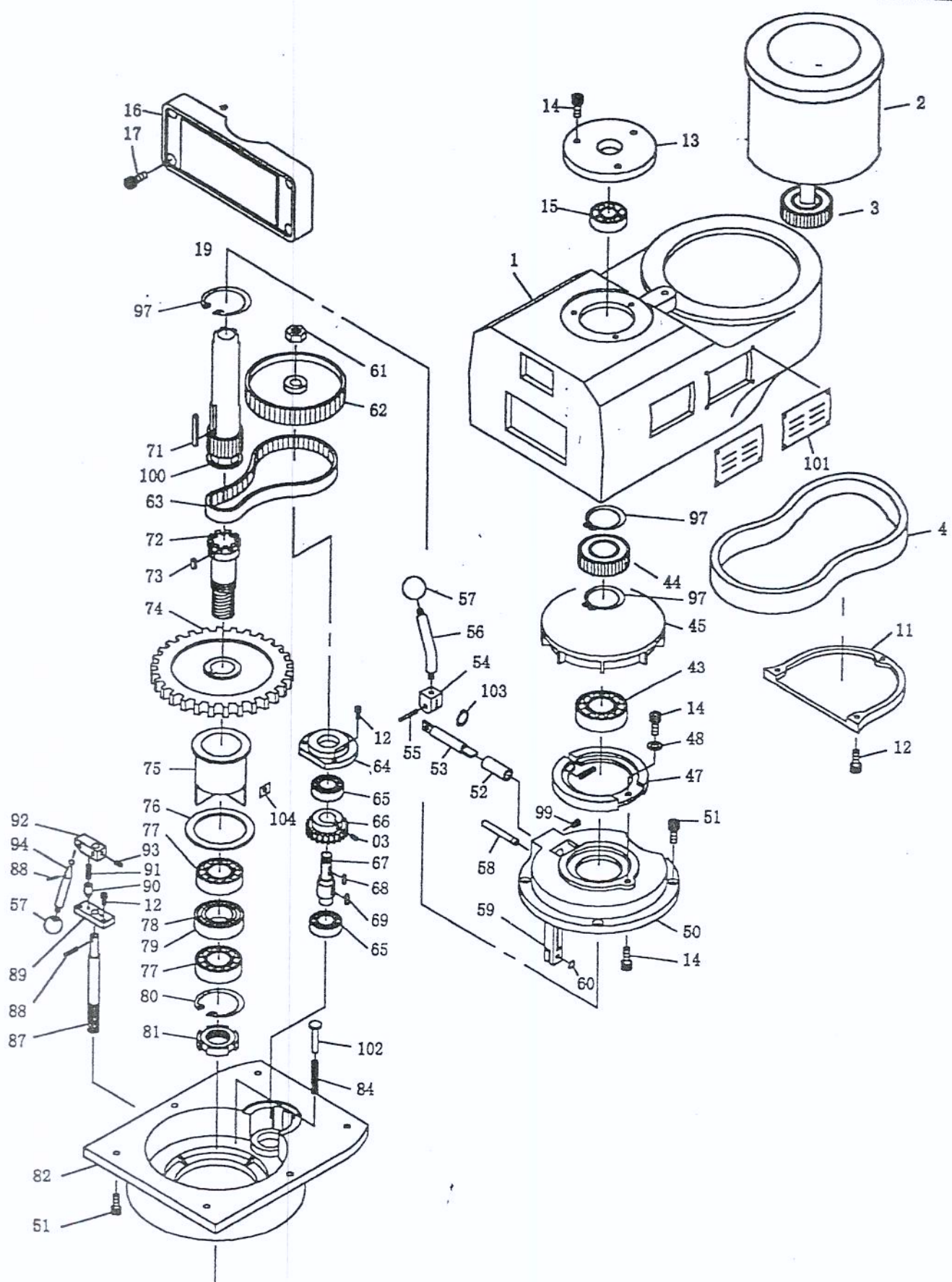
WARNING: IN HEAVY DUTY MILLING OPERATIOND, HOLD THE HEAD AS CLOSE TO THE COLUMN FACE AS POSSIBLE, IN ORDER TO OBTAIN A MAXIMUM RIGIDITY.

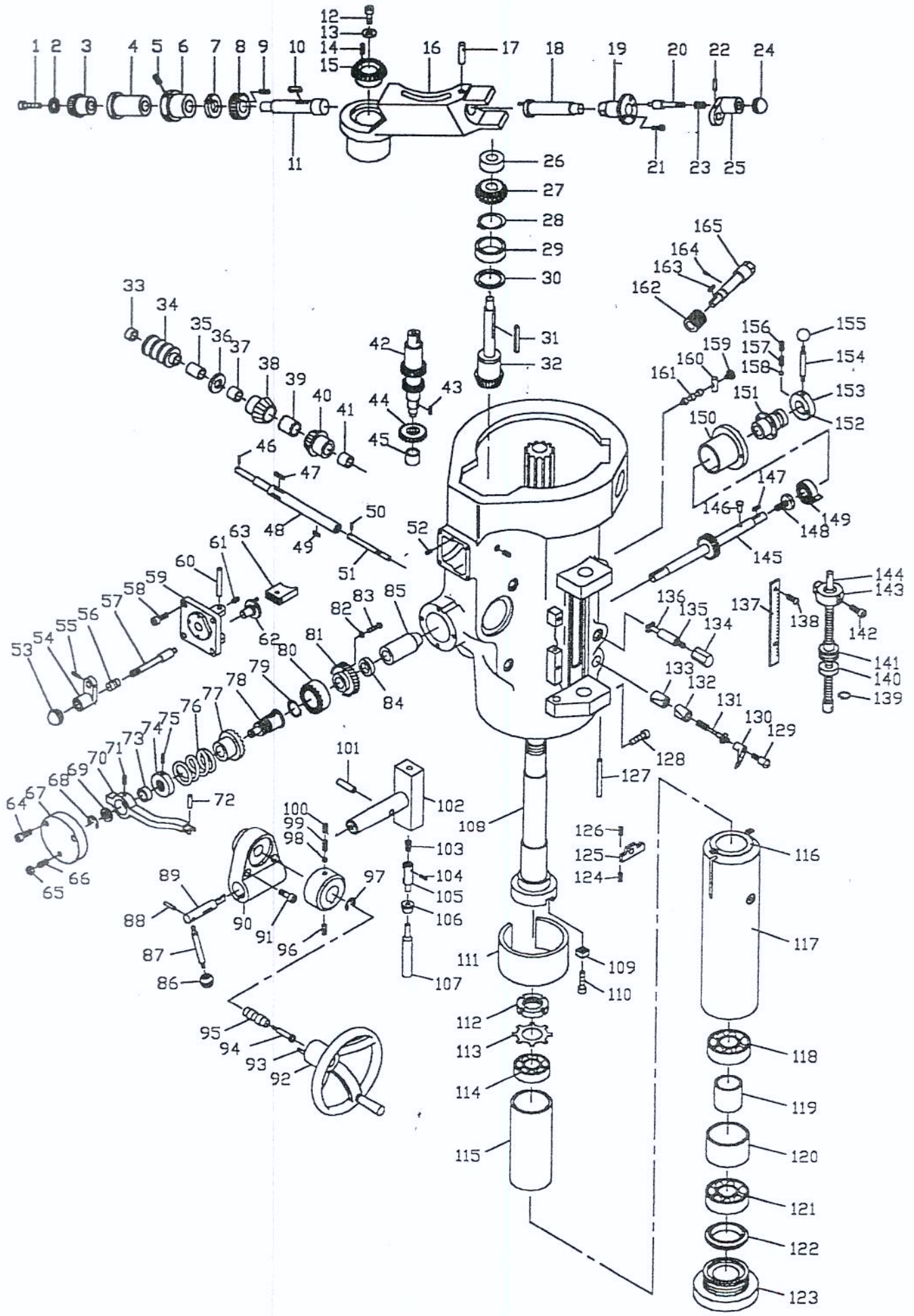
HIGHT SPEED

In high speed position, spindle is directly driven by means of a tapered tooth drive. If this clutch is not tightened enough, a light noise may be produced: this can be corrected by changing position plate No.718 upwards, until noise disappears. When positioning plate has a long displacement, this operation needs to reverse this plate.

CAUTION: Do not change high and low speeds direct drive/ BACKAGEAR WHEN MOTOR IS RUNNING.

Parts List & Drawing





HEAD TOP HOUSING (INVERTOR VARIABLE SPEED) - Bottom

Item	Description	Q'ty	Remark	Item	Description	Q'ty	Remark
1	Screw	1		43	Key	1	
2	Washer	1		44	Gear	1	
3	Bevel gear	1		45	Bearing	1	
4	Sleeve	1		46	Pin	1	
5	Set screw	1		47	Key	1	
6	Bushing	1		48	Worm shaft	1	
7	Spacer	1		49	Key	1	
8	Gear	1		50	Pin	1	
9	Key	1		51	Rod	1	
10	Key	1		52	Screw	5	
11	Shaft	1		53	Knob	1	
12	Screw	1		54	Crank	1	
13	Washer	1		55	Pin	1	
14	Key	1		56	Set screw	1	
15	Bevel gear	1		57	Shaft	1	
16	Worm gear cradle	1		58	Screw	4	
17	Pin	1		59	Cover	1	
18	Shaft	1		60	Rod	1	
19	Shift sleeve	1		61	Set screw	1	
20	Shaft	1		62	Shifter	1	
21	Set screw	1		63	Shift fork	1	
22	Pin	1		64	Screw	2	
23	Set screw	1		65	Nut	1	
24	Knob	1		66	Set screw	1	
25	Crank	1		67	Cover	1	
26	Bushing	1		68	C-snap	1	
27	Gear	1		69	Ring	1	
28	C-snap	1		70	Trip lever	1	
29	Bushing	1		71	Set screw	1	
30	Spacer	1		72	Pin	1	
31	Key	1		73	Ring	1	
32	Bevel gear	1		74	Nut	1	
33	Bushing	1		75	Set screw	1	
34	Worm gear cradle	1		76	Spring	1	
35	Bushing	1		77	Overload clutch	1	
36	Washer	1		78	Clutch sleeve	1	
37	Bushing	1		79	C-snap	1	
38	Bevel gear	1		80	Overload clutch	1	
39	Feed reverse clutch	1		81	Worm gear	1	
40	Bevel gear	1		82	Washer	1	
41	Bushing	1		83	Screw	1	
42	Feed driving gear	1		84	Spacer	1	

HEAD TOP HOUSING (INVERTOR VARIABLE SPEED) - Bottom

Item	Description	Q'ty	Remark
85	Bushing	1	
86	Knob	1	
87	Lever	1	
88	Pin	1	
89	Link	1	
90	Trip bracket	1	
91	Screw	2	
92	Handwheel	1	
93	Pin	1	
94	Screw	1	
95	Shaft	1	
96	Set screw	1	
97	C-snap	1	
98	Block-gear box	1	
99	Set screw	1	
100	Set screw	1	
101	Pin	1	
102	Cam rod sleeve	1	
103	Spring	1	
104	Pin	1	
105	Trip plug	1	
106	Bushing	1	
107	Rod	1	
108	Spindle	1	
109	Driver key	2	
110	Screw	2	
111	Sleeve	1	
112	Nut	1	
113	Washer	1	
114	Bearing	1	
115	Sleeve	1	
116	Cover	1	
117	Quill	1	
118	Bearing	1	
119	Spacer	1	
120	Spacer	1	
121	Bearing	1	
122	Spacer	1	
123	Bearing cap	1	
124	Screw	1	
125	Plate	1	
126	Screw	1	

Item	Description	Q'ty	Remark
127	Rod	1	
128	Screw	1	
129	Screw	1	
130	Handle	1	
131	Bolt	1	
132	Clamp block	1	
133	Clamp block	1	
134	Nut	4	
135	Bolt	4	
136	Nut	1	
137	Scale	1	
138	Screw	2	
139	C-snap	1	
140	Micro-stop nut	1	
141	Micrometer nut	1	
142	Screw	1	
143	Quill stop knob	1	
144	Leadscrew	1	
145	Pinion shaft	1	
146	Pin	1	
147	Key	1	
148	Screw	1	
149	Clock spring	1	
150	Spring cap	1	
151	Pinion shaft hub	1	
152	Pin	1	
153	Block	1	
154	Lever	1	
155	Knob	1	
156	Set screw	1	
157	Set screw	1	
158	Steel ball	1	
159	Screw	1	
160	Stud	1	
161	Shaft	1	
162	Worm gear	1	
163	Key	1	
164	Set screw	1	
165	Shaft	1	

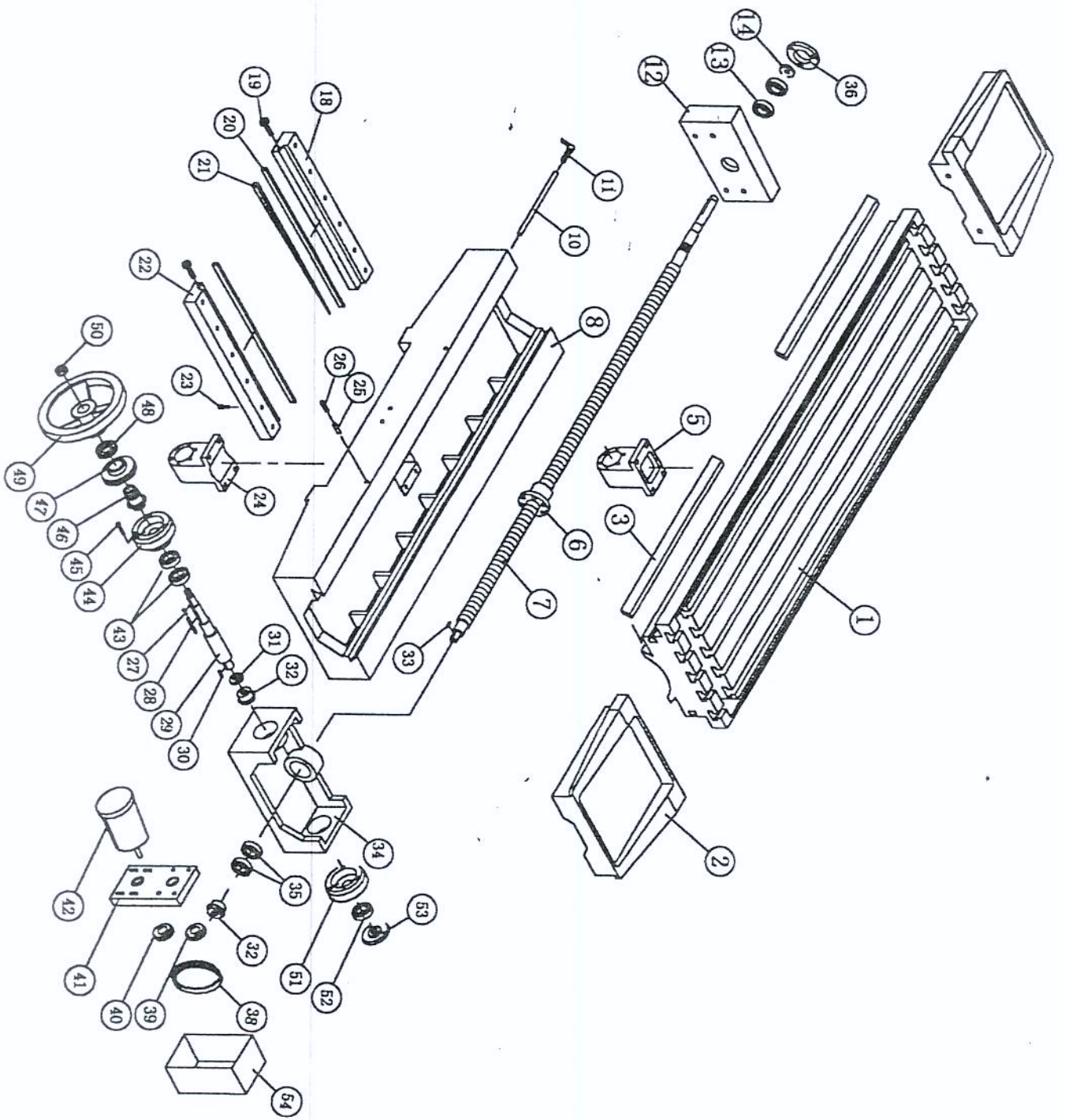
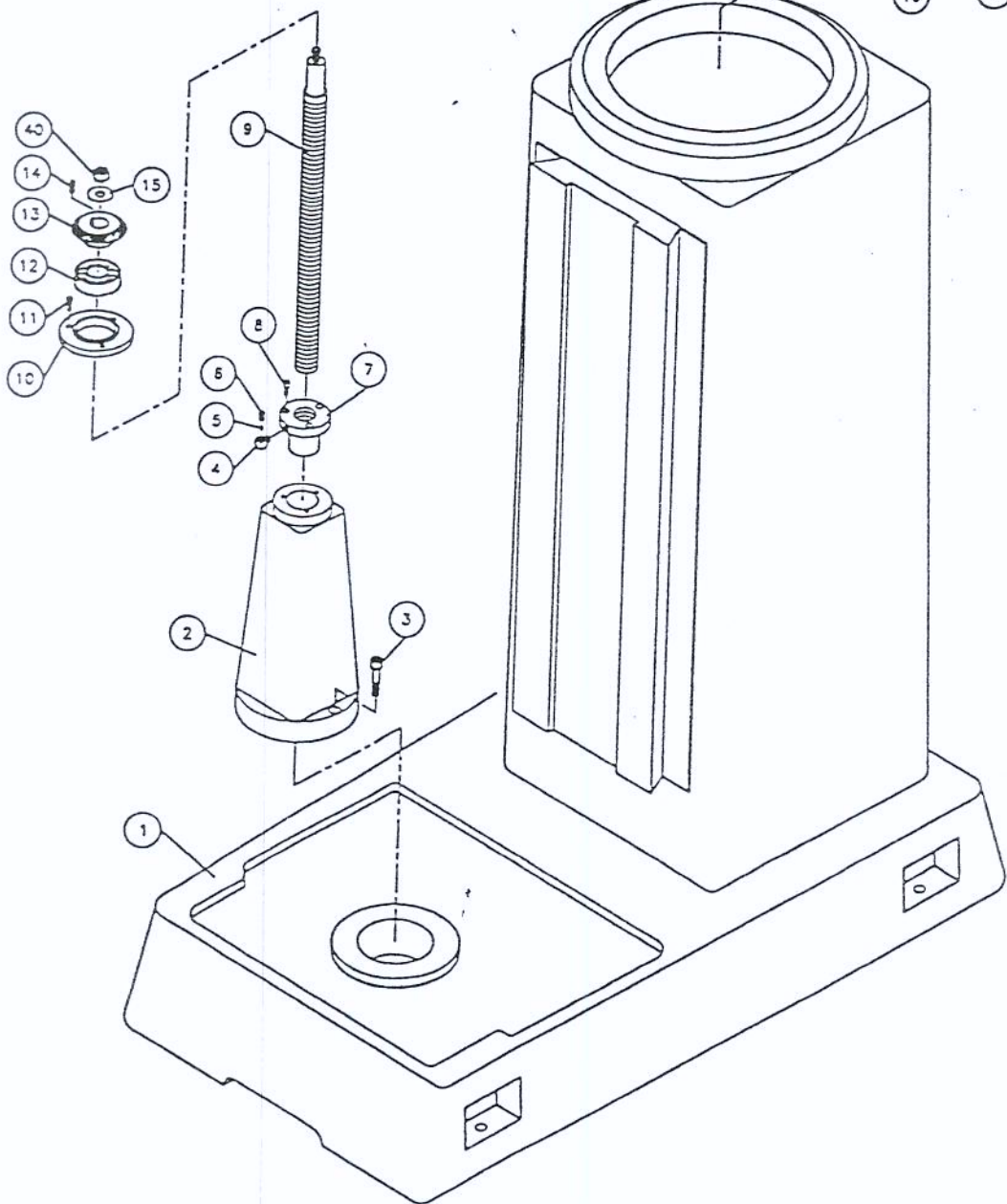
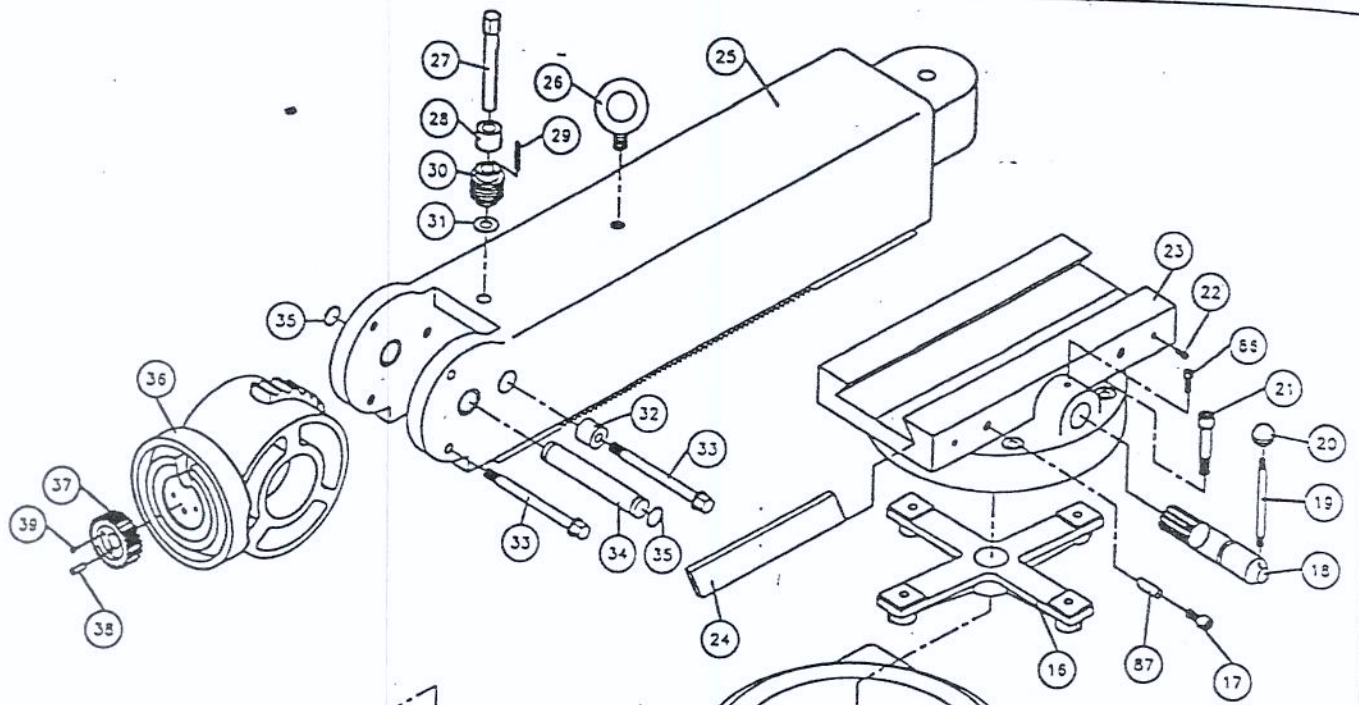
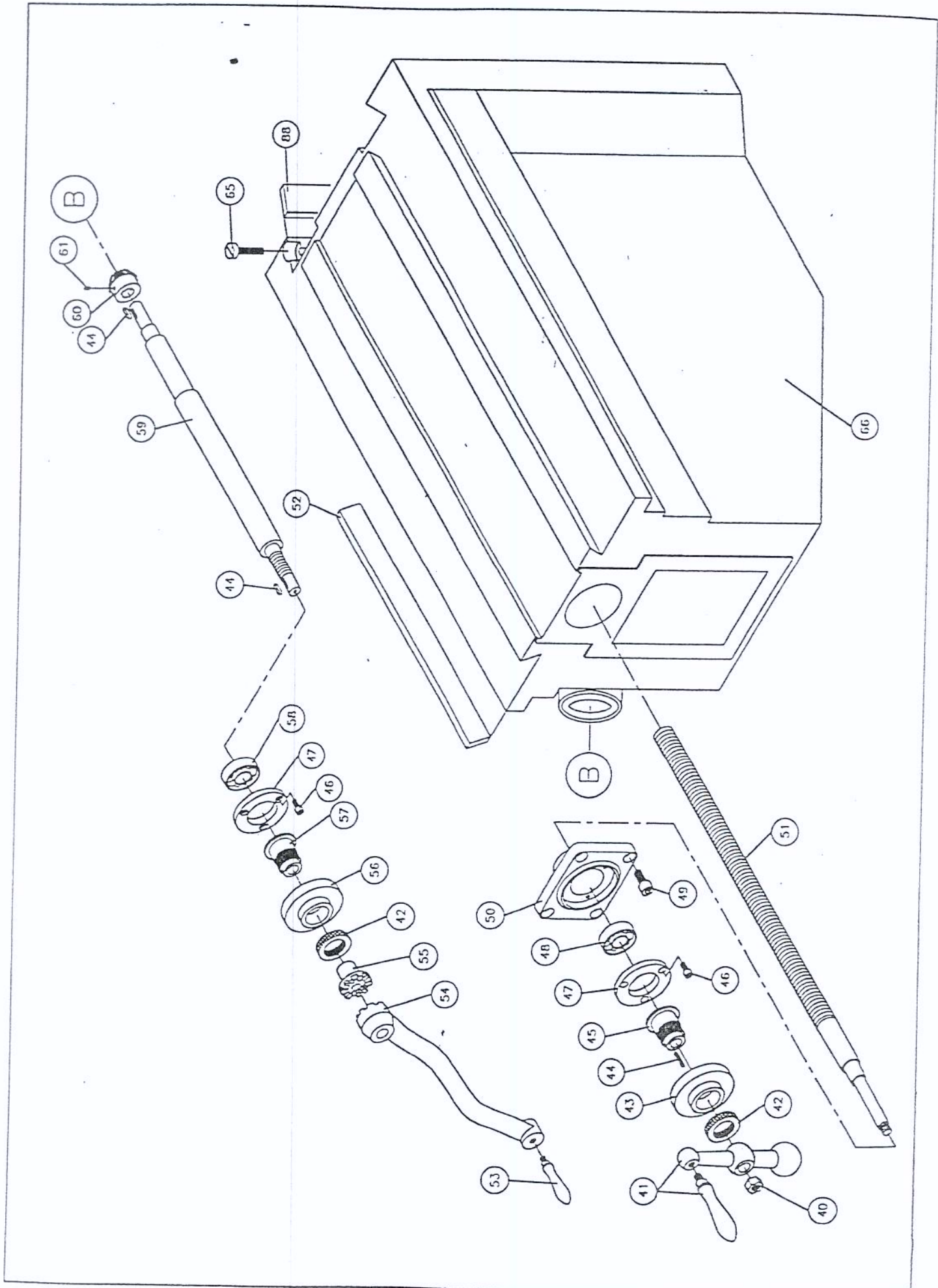


TABLE AND SADDLE -

Item	Description	Q'ty	Remark	Item	Description	Q'ty	Remark
1	Working Table	1		49	Hand Wheel	1	
2	Bracket	2		50	Nut	1	
3	Gib (Right)	1		51	Bearing Housing	1	
4	Gib (Left)	1		52	Bearing	1	
5	Nut Housing	1		53	Bearing Cap	1	
6	Nut	1		54	Pulley Cover	1	
7	Lead Screw	1					
8	Saddle	1					
10	Bushing	2					
11	Clamper	1					
12	Bracket	1					
13	Ball Bearing	2	# 6205Z				
14	Bearing Nut	2	AN05				
18	Bracket	1					
19	Adjusting Bolt	8					
20	Gib	1					
21	Gib	1					
22	Bracket	1					
23	Screw	12					
24	Nut Housing	1					
25	Bush	2					
27	Key	1	4x4x20L				
28	Key	1	4x4x45L				
29	Shaft	1					
30	Key	1	4x4x15L				
31	Washer	1					
32	Bevel Gear	2					
33	Key	1	4x4x15L				
34	Bracket	1					
35	Ball Bearing	2	#6205Z				
36	Bearing Cap	1					
38	Belt	1					
39	Pulley	1					
40	Pulley	1					
41	Bracket	1					
42	Motor	1					
43	Ball Bearing	2					
44	Retainer Ring	1					
45	Screw	3					
46	Bush	1					
47	Dial	1					
48	Nut	1					



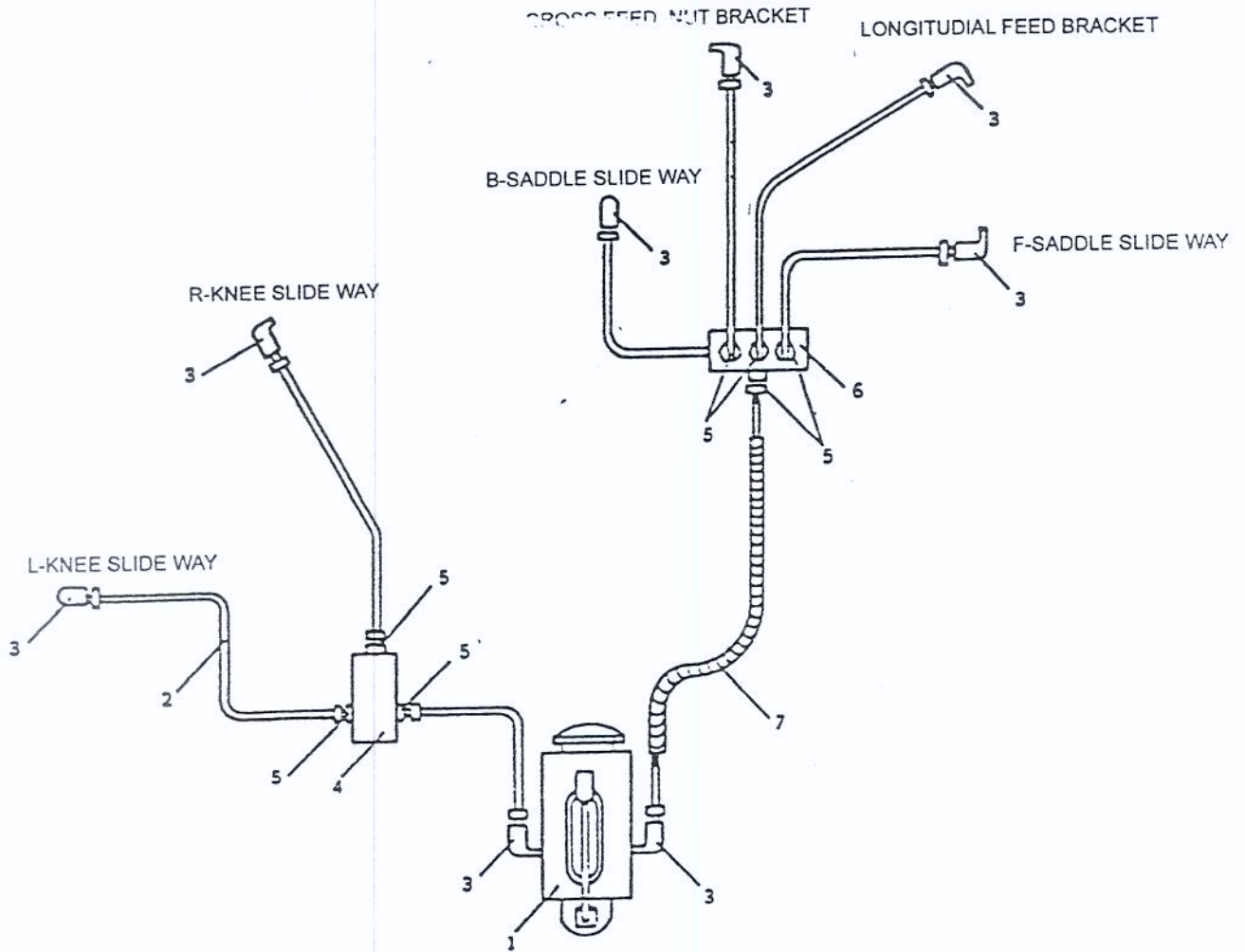


COLUMN AND KNEE

Item	Description	Q'ty	Remark
1	Column	1	
2	Elevating screw housing	1	
3	Hollow herd cap screw	2	M8x1.25P
4	Nozzle	1	
5	Nozzle plug	1	
6	Nozzle cap nut	1	
7	Elevating screw nut	1	
8	Hollow herd cap screw	3	M6x1.0P
9	Elevating screw	1	
10	Bearing retainer ring	1	
11	Hollow herd cap screw	3	M6x1.0P
12	Grease sealed ball bearing	1	URB 3305
13	Bevel gear	1	
14	Key	1	5x5x20L
15	Washer	1	
16	Spider	1	
17	Table lock bolt	2	3/4" 10 THD
18	Ram pinion	1	
19	Ram pinion handle	1	
20	Ball	1	
21	Turret clamp bolts	4	1/2" 13 THD
22	Screw	2	3/8" 16 THD
23	Turret	1	
24	Overarm gib	1	
25	Ram	1	
26	Hoisting Ring	1	3/4" 10 THD
27	Pin	1	
28	Adapter pivot stud locknut	1	
29	Worm key	1	5x5x45L
30	Vertical adjusting worm	1	
31	Washer	1	
32	Adapter pivot stud locknut	1	
33	Adapter locking bolt	3	1/2" 13 THD
34	Adapter pivot stud	1	Dia. 28
35	Ring	1	Dia. 28
36	Ram adapter	1	
37	Gear	1	
38	Pin	2	#10
39	Screw	1	M6x1.0P
40	Jam nut	4	1/2" 20 THD
41	Ball crank handle	3	
42	Dial lock nut	4	

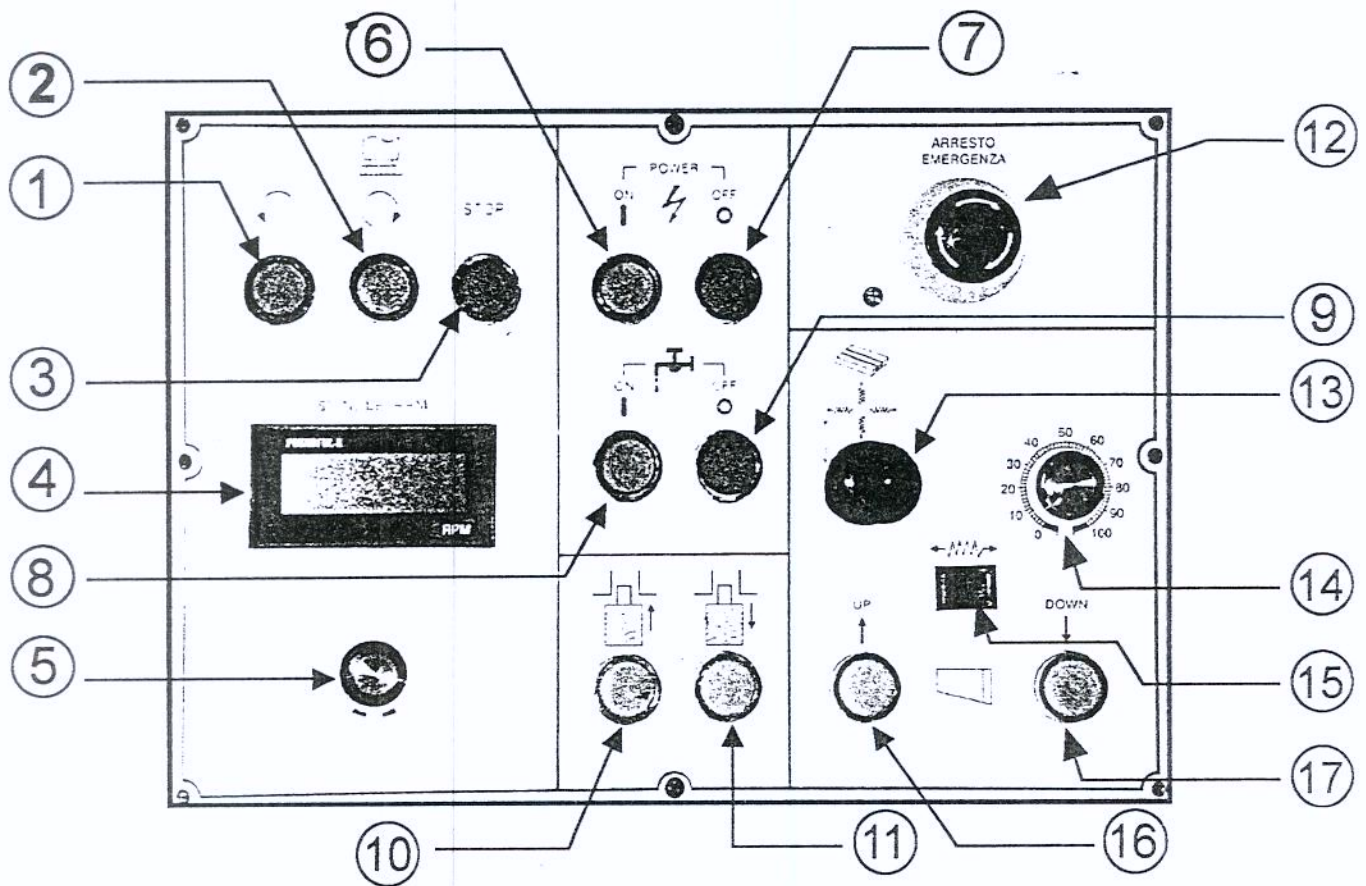
Item	Description	Q'ty	Remark
43	Dial with 200 graduations	3	
44	Woodruff key	5	3x3x25L(4x4x25L)
45	Dial holder	3	
46	Hollow head cap screw	12	M6x1.0P
47	Bearing retainer ring	4	
48	Grease sealed ball bearing	3	6204ZZCM
49	Hollow head cap screw	12	M8x1.25P
50	Cross feed bearing bracket	1	
51	Cross feed screw	1	
52	Saddle knee gib	1	
53	Handle	1	
54	Elevating crank	1	
55	Gearshaft clutch insert	1	
56	Dial with 100 graduations	1	
57	Dial holder	1	
58	Grease sealed ball bearing	2	6204ZZCM
59	Gear shaft	1	
60	Bevel pinion	1	
61	Set screw	1	M6x1.0P
62	Gib	2	
63	Gib	1	
64	Belt wirer	2	
65	Gib screw	7	3/8" 24 THD
66	Knee	1	
67	Left bearing bracket	1	
68	Saddle	1	
69	Pin	4	
70	Right bearing bracket	1	
71	Screw	1	M6x1.0P
72	Long. Nut	1	
73	Cross feed nut	1	
74	Cross feed nut	1	
75	Longitudinal feed unit	1	
76	Hollow head cap screw	4	3/8" 16 THD
77	Feed nut bracket	1	
78	Saddle table gib	1	
79	Longitudinal feed screw	1	
80	Table	1	
81	Degree plate	1	
82	Spring	6	
83	Handle	6	
84	Clamp screw	6	

CENTRAL LUBRICATING OIL-FEEDING EQUIPMENT



ITEM NO.	PARTS NO.	DESCRIPTION
1	9001	Hand Oiler
2	9002	Aluminum Pipe
3	9003	Elbow Joint(8 Req.)
4	9004	T-Joint
5	9005	Straight Joint(7 Req.)
6	9006	Oil Regulating Distributor
7	9007	Outside Steel Flexible Tube

CONTROL PANEL



- 1.SPINDLE REVERSE SWITCH
- 2.SPINDLE FORWARD SWITCH
- 3.SPINDLE STOP SWITCH
- 4.SPINDLE SPEED METER
- 5.SPINDLE SPEED ADJUST SWITCH
- 6.POWER ON SWITCH
- 7.POWER OFF SWITCH
- 8.COOLANT PUMP ON SWITCH
- 9.COOLANT PUMP OFF SWITCH
- 10.TOOL CLAMP SWITCH
- 11.TOOL UNCLAMP SWITCH
- 12.EMERGENCY STOP
- 13.TABLE DIRECTION SELECT SWITCH
- 14.TABLE FEED RATE ADJUST SWITCH
- 15.JOG
- 16.TABLE UP SWITCH
- 17.TABLE DOWN SWITCH

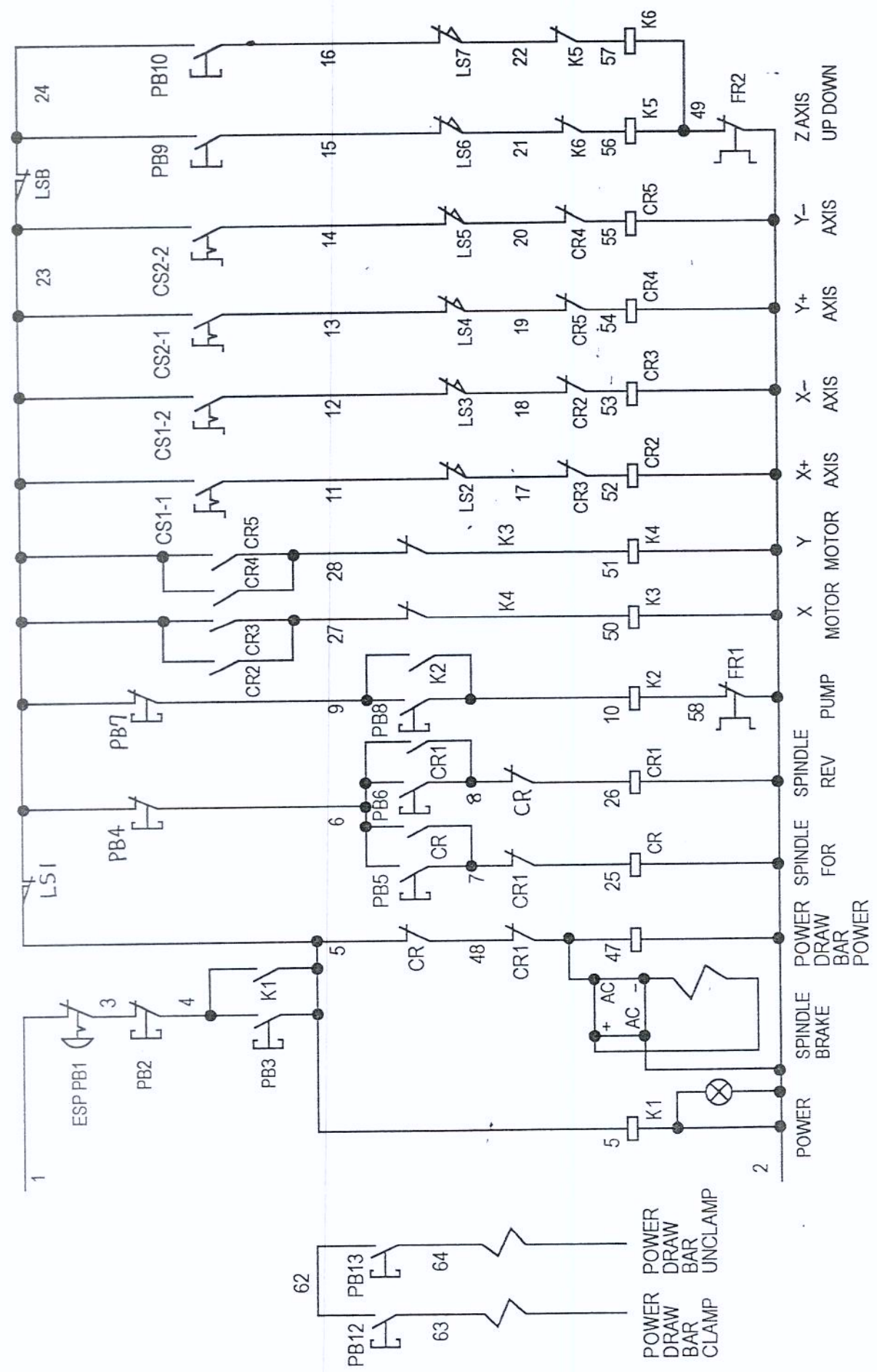
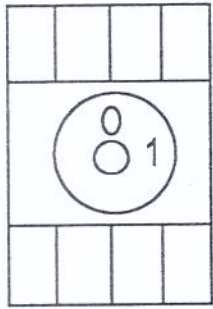
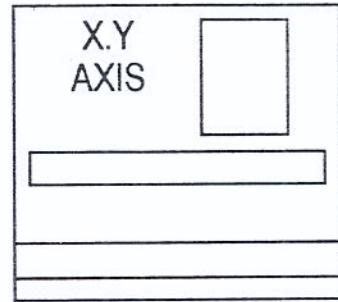
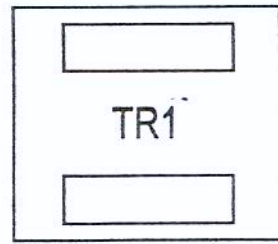
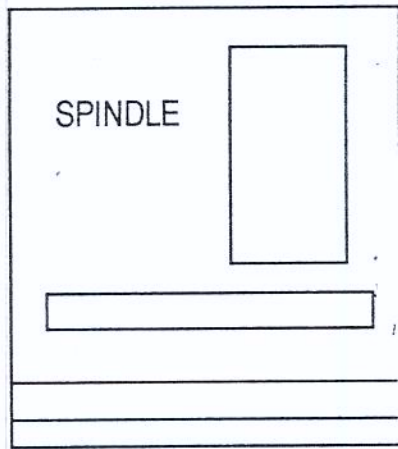
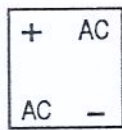


Figure 10-12 10-12

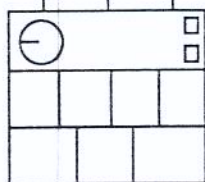
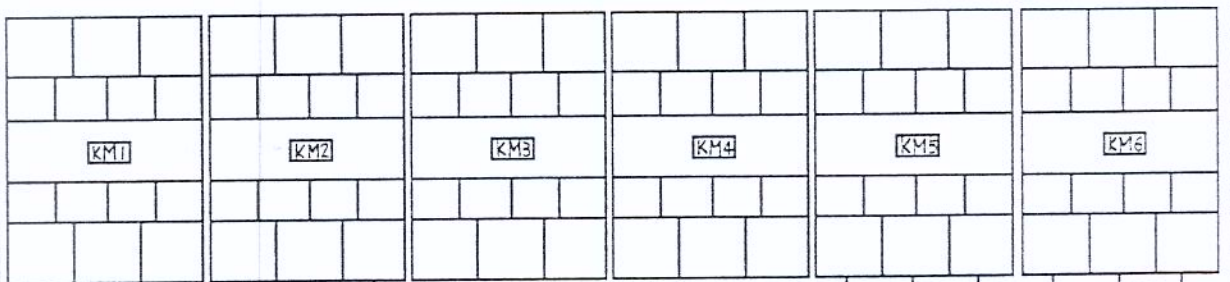
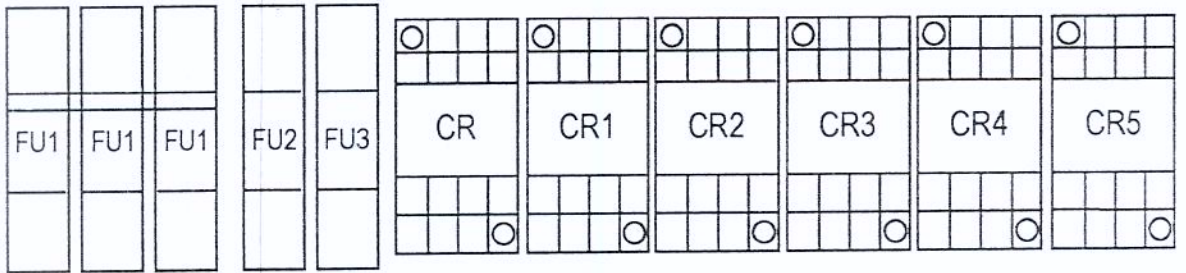
Figure 10-13 10-13



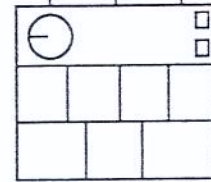
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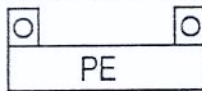
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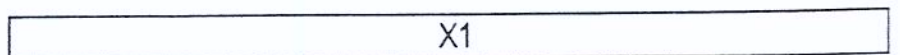
FR1



FR2



PE



X1

