VERTICAL TURRET MILLING MACHINE

OPERATION MANUAL

TEST CERTIFICATE

VERTICAL TURRET MILLING MACHINE

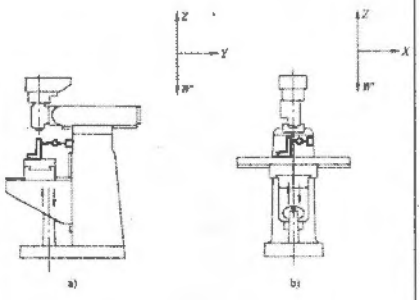
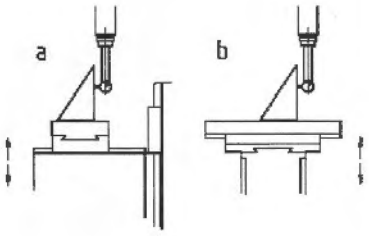
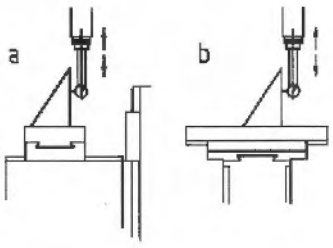
Serial No.: 152369

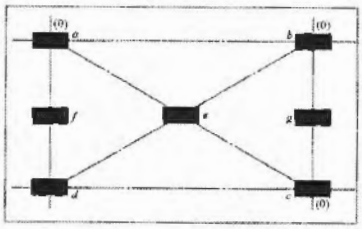
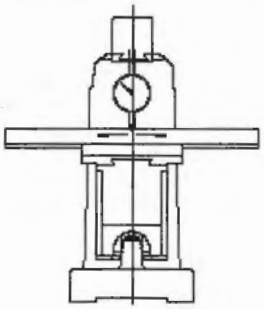
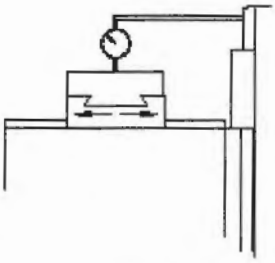
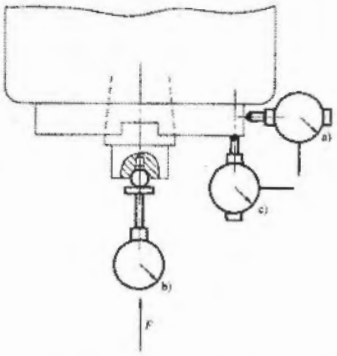
Model: 4VS Turret Mill

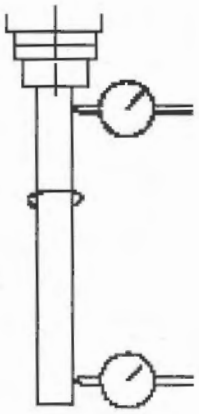
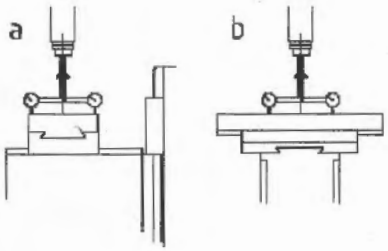
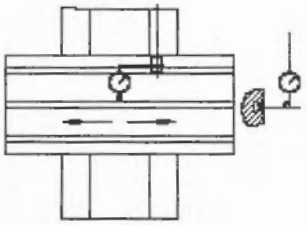
The machine has been inspected and found to be up to the standard, then approved for ex-factory.

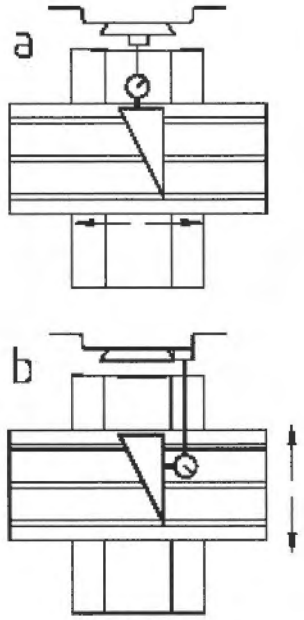
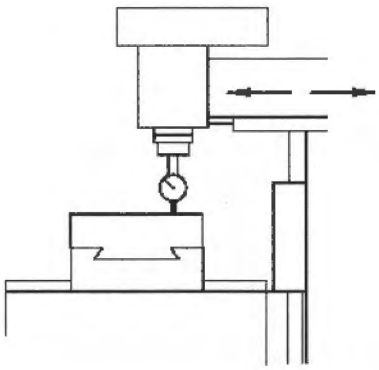
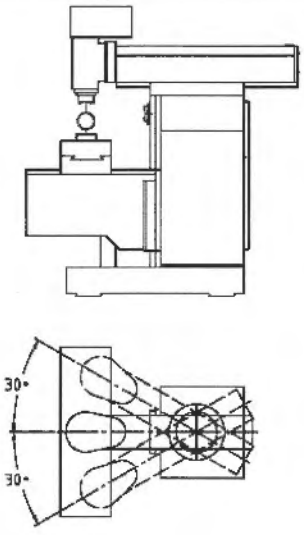
Inspector : [illegible]

Date of inspect : 2016.03

NO.	Inspection item		Figure	Tolerance	Measured
G1	Straightness of knee vertical movement (W axis)	a) in the cross and vertical surface (YZ)		Within 0.025 at 300 arbitrary length measurement	a) 0.02/300
		b) in a longitudinal and vertical surface (ZX)			b) 0.02/300
G2	Squareness of upper surface of table to knee movement	Right and left direction		Per 0.025/300	0.02/300
		Forward and backward direction		0.025/300	0.02/300
G3	Squareness of vertical movement of the spindle head with table surface	Right and left direction		Per 0.020/125	0.02/125
		Forward and backward direction		0.020/125	0.02/125

NO.	Inspection item	Figure	Tolerance	Measured
G4	Flatness of work table		0.040 in 1000 length, for each additional 1000 length of working table, tolerance values increased by 0.005, Local tolerance: 0.020 at 300 arbitrary length measurement	0.02/300
G5	Parallelism of right and left movement of table tO its upper surface		0.02/300 max. 0.04	0.02/300
	Parallelism of forward and backward movement of table to its upper surface			0.01/300
G6	Run out of spindle		a) 0.01 b) 0.01	a) 0.005 b) 0.005

NO.	Inspection item		Figure	Tolerance	Measured
G7	Main spindle taper hole run-out	At fixed end of test bar		0.01	0.005
		At point 300		0.02	0.018
G8	Squareness of upper surface of table to centre line of spindle	Right and left direction		Per 0.025/300	0.015/300
		Forward and hackward direction		0.025/300	0.015/300
G9	Straightness of table central or benchmark T slot			In any 500 measuring length is 0.010, the maximum tolerance 0.030	0.01/500
G10	Parallelism of right and left movement of table to side of middle T slot of table			0.015/300 Max. 0.04	0.015/300

NO.	Inspection item	Figure	Tolerance	Measured
G11	Squareness of forward and backward movement of table to side of middle T slot of table		Per 300 0.02	0.02/300
G12	Parallelism of forward and backward movement of overarm with table surface		0.035/300	0.03/300
G13	parallelism of left and right movement of swivel turret with table surface		0.035	0.03

CONTENTS

CHAPTER 4. MAINTENANCE

INTRODUCTION

THIS MANUAL HAS BEEN CAREFULLY PREPARED, PLEASE STUDY IT THOROUGHLY BEFORE TRYING TO OPERATE THE MACHINE.

**A FEW MINUTES GIVEN TO READING THIS MANUAL CAREFULLY, COULD ENSURE YOU ACHIEVE MAXIMUM PERFORMANCE FROM THE MACHINE & REDUCE THE RISK OF INJURY TO THE OPERATOR OR DAMAGE TO THE MACHINE OR WORKPIECE.

EVERY EFFORT HAS BEEN MADE DURING CONSTRUCTION & TESTING TO ENSURE THIS MACHINE MEETS INTERNATIONAL QUALITY & PERFORMANCE REQUIREMENTS. WE WISH IT SERVES YOU WELL.

CHAPTER 1. SAFETY INFORMATION

1-1 IMPORTANT SAFETY INFORMATION:

A. Application of the milling machine

The milling machine is designed and constructed for the cutting of metal and similar materials.

The machine is along with all the necessary safety requirements. Only fully trained & fully qualified operators should be allowed to operate this machine.

B. Prohibitation:

-Untrainned operators are prohibited from using this machine.

-Modifications that change the function or specification of this machine is prohibited.

-Operation of this machine before reading through this instruction manual, is prohibited.

C. Airborne noise level:

-The airborne noise level during operation is about 70~75 Db (A).

D. Lighting:

-Appropriate lighting must be provided, according to local regulation.

-Minimum lighting for this machine is 300 LUX, if there are no any local other local regulations.

E. Environment:

1. Ambient air temperature: +5℃~+55℃ in free air, and the average ambient air temperature over a period of 24 hours shall not exceed +50℃.
2. Humidity: 30%~95%.
3. Altitude: up to 1000m above mean see level.
4. Transportation & storage condition: -25℃~+55℃, and for short periods not exceeding 24 hours up to +70℃.

1-2 SAFETY RULES DURING AND/OR BEFORE OPERATION

A. Be sure the instruction manual are fully understood.

B. Use safety protective equipment such as safety shoes, goggles, clothes, etc.

C. Work table near the machine must be strong enough to prevent accidents and be sure articles will never slip off the table surface to interfere with the act of machining.

D. Tools and any unnecessary items are not allowed to be placed on the machine table, moving parts, or similar locations.

E. Before operating switches, always check if the switches are the right ones and never touch a switch accidentally or it may cause malfunctions or danger.

F. Do not operate switches with gloves on. This could cause malfunctions or even danger.

G. Do not touch switches with wet hands, an electric shock could occur.

H. Warm up the machine before use, especially the spindle and feeding axes by running them for 10 to 20 minutes. It is very important for maintaining machine accuracy.

I. If job is to be done by two or more operators, the function of each must be well known, what action will be done and what danger may occur, before the next step is taken.

J. Tools should conform to the machine's specifications, such as dimensions, weight and types.

K. Grip workpieces securely to minimise movement or vibration between workpiece and cutting tool or it may injure personnel, or damage the machine or workpiece.

L. Never touch tool nose and cutting chips with bare hands.

M. Never try to touch a turning workpiece or spindle in any way.

N. Stop the machine before replacing a workpiece and provide plenty of distance between workpiece and tool to avoid impact between workpiece and tool during the changeover.

O. In the event of power failure, turn off the main circuit breaker immediately.

P. After power failure or an emergency stop, it is necessary to return to referrence point of the three axes.

Q. Do not change electrical settings unless necessary. If such changes are unavoidable, record the original values so that they can be returned to their original settings if needed.

R. Before replacing a fuse or electric part, turn off the machine and keep a record of them, for future reference.

S. If unspecified lubricant is used, it may result in malfunctions or damage to the machine.

T. Limit switches, proximity switches, interlock mechanisms including functional parts and other safety devices should not be removed or modified.

U. Dispose of filter material and possible working fluid according to the local regulation.

V. Please keep the instruction manual near the machine or in a position easy to be reached by the operator, and keep them for available & in good condition for use.

W. Please always quote the machine model and serial number in order for us to deal with any request, as quickly as possible.

X. The machine surface is smeared with anti-rust protection when delivered. It should be carefully cleaned & then smeared with protect5ion oil.

1-3 SAFETY DURING ELECTRICAL CONNECTION OR DISCONNECTION

A. Electrical connection:

1. A cable with three wires is supplied to connect your machine into the 3 phase power supply.
2. The exact power source voltage, frequency, and number of phase shall be checked according to the installation diagram and circuit diagram.
3. The correct direction of spindle should be checked after connecting.

B. Electrical disconnection:

1. The disconnection is carried out by hand-operated disconnecting device, which is on the door of control box as an option or connected before the power source.
2. Be sure to disconnect this machine from power source, when you want to stop the job for maintenance or adjustment.

C. Grounding:

The grounding of this model is carried out by connecting the yellow/green terminal of supply cable to the grounding terminal of power source. Be sure to ground your machine before connecting machine to power source in any situation.

WARNING!

DO NOT DISCONNECT GROUNDING TERMINAL BEFORE DISCONNECTING POWER SOURCE.

D. Where a portion of the machine and its associated equipment is changed or modified, must be approved by the manufacturer first, and following retest shall be carried out in accordance with the clauses of en60204-1,1992 edition:

—Continuity of the protective bonding circuit. (SUBCLAUSE 20.2)

—Insulation resistance tests. (SUBCLAUSE 20.3)

—Voltage tests. (SUBCLAUSE 20.4)

—Functional tests.

1-4 DESCRIPTION FOR THE SAFETY FUNCTION OF THIS MACHINE

The following safety functions are equipped with this machine be sure to check and ensure the correct function before you start to operate your machine:

A. The hand-operated power disconnection device:

It is constructed to disconnect machine from power source when the operator intend to stop operation for maintenance, repair, and/or while the end of work. The correction is that the door of control cabinet could be open only when this switch of this device is switched off, and after this device is switched off, it is possible to be locked with some appropriate locking. As soon as this device is switched off, no any operation is possible and there would be no any electricity on the control circuit except the wiring before this device.

B. The emergency stop device:

It is constructed to stop machine as fast as possible while in emergency situation. As soon as this device is actuated, any movement will be stopped in a short time. After the actuation of emergency button, The further operation is possible only when this button is disengaged and the restart key is actuated. Be sure to check that machine action will stop immediately after this button is pushed and will not cause any action when this button is disengaged.

1-5 SAFETY INSPECTION

To ensure safety, it is necessary to do the following inspections for this machine after installation.

A. Check if the transporation procedure has influenced the accuracy and functions of the machine.

B. Check if the foundation of the machine is appropriate.

C. Check if the factory has the correct thunder-preventing system under 25. The machine's power switch should also have earth wiring connected.

D. Use the multitester to check if the three-phase voltage is stable and phases are in order.

E. Check if spindle rotation is normal.

F. Check if the control panel function and push button are functioning (including indicator lamp, load and rpm meter).

G. Check emergency stop function.

H. Check if safety protection accessories are functioning well.

I. Check if other accessories, including hydraulic and pneumatic ones, are connected well (including transformer etc.).

J. Check if the oil amount indicator and air pressure indicator are normal.

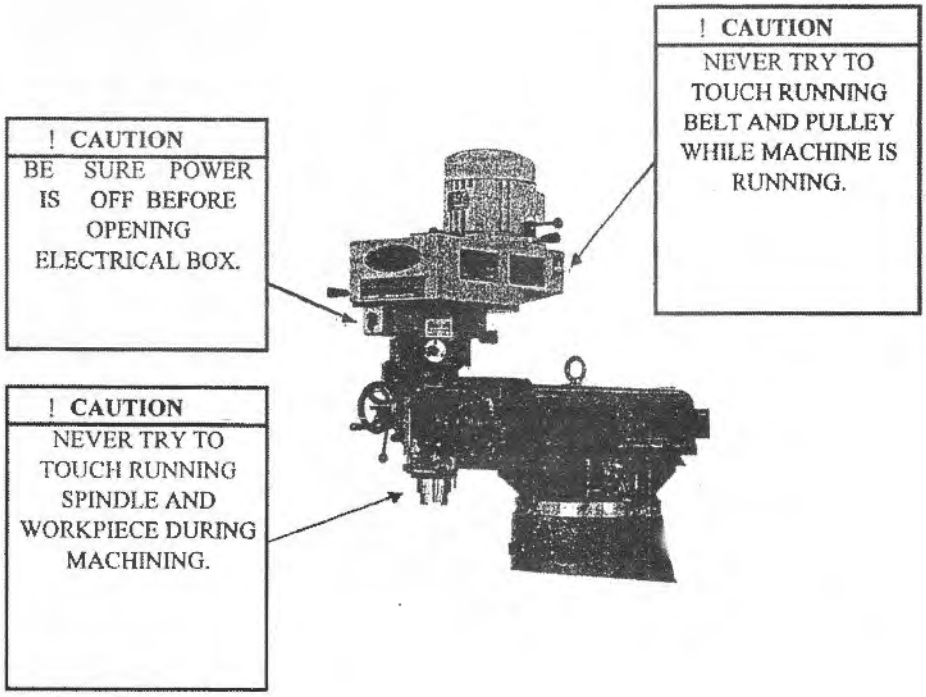
K. Make sure no obstacle is around machine and control system.

L. Make sure no personnel is in dangerous area.

CHAPTER 2.INSTALLATION

2-1 SAFETY PRECAUTIONS

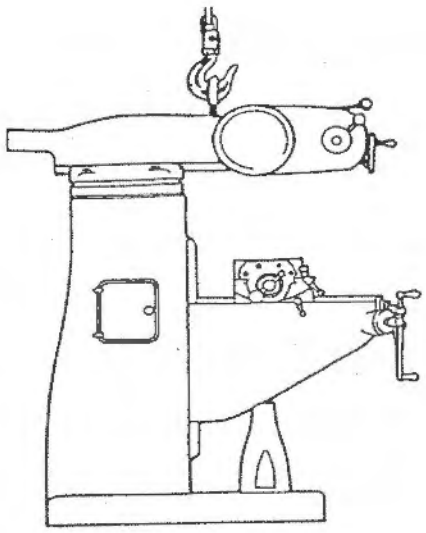
1. Be sure the instruction manual is fully understood. Must follow instruction manual to operate machine carefully.
2. The operator without training or being authorised is prohibited to operate this machine.
3. Set all covers in position before operation.
4. Use safety protective equipment such as safety shoes, goggles, clothes, etc. And do not wear gloves or ornaments.
5. Must not touch running cutters.
6. Never try to touch workpieces or clean chips while cutters is running.
7. Keep head & hands clear from running machine parts.
8. Turn power off before maintenance.



2-2 INSTALLATION

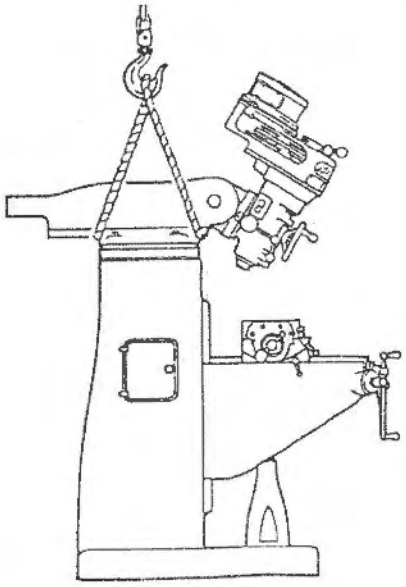
METHOD 1

Insert 3/4 " （whitworth） eye bolt into hole. Ensure bolt is fully secured before lifting. It is advisable to swivel head before lifting machine.



METHOD 2

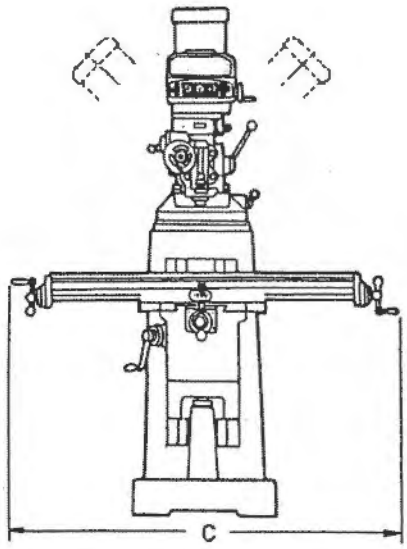
Use rope sling as illustrated. Insert pads of soft cloth between rope and machine. It is advisable to lift the head before lifting the machine.

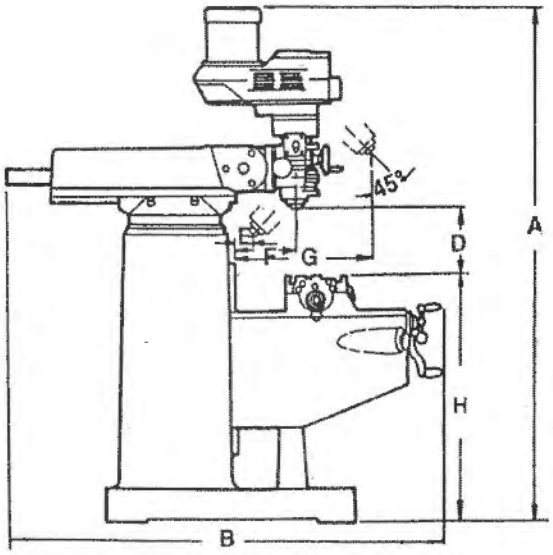


CLEANING

1. Remove rust preventative before moving any slide ways.
2. The coating is best removed by using paraffin applied with clean rags.
3. When the coating has become soft, remove with clean rags.
4. Oil or grease all lubrication points.

2-3 MACHINE DIMENSION

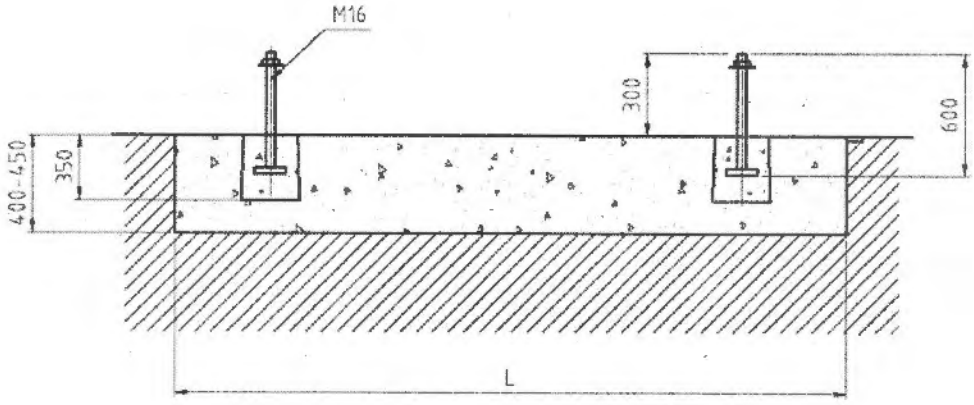


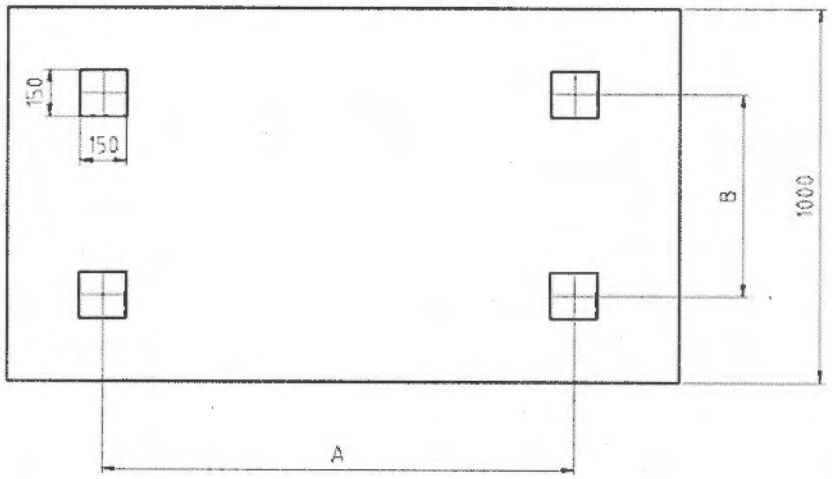


Unit: mm

ITEM / MODEL		X6323 X6323A	X6325、X6325A X6325B、X6325C X6325D	X6330	X6333
A	H	2006（79 " ）	2235（88 " ）	2130（84 " ）	2180（86 " ）
B	L	1600（63 " ）	2156（85 " ）	2057（81 " ）	
C	W	2156（85 " ）	2540（100 " ）	2235（88 " ）	2970（117 " ）
D	MIN	42	20	20	
	MAX	405（16 " ）	405（16 " ）	400（15-3/4 " ）	
E	MIN	0			
	MAX	305（12 " ）	456（18 " ）	560（22 " ）	
F	MIN	170（6-3/4 " ）	140（5-1/2 " ）	108（4-1/4 " ）	
	MAX	482（19 " ）	609（24 " ）	760（29-7/8 " ）	
G	MIN	228（9 " ）	254（10 " ）	285（11-1/4 " ）	
	MAX	532（21 " ）	710（28 " ）	895（35-1/4 " ）	
H	MIN	863（34 " ）	965（38 " ）	965（38 " ）	
	MAX	1270（50 " ）	1370（54 " ）	1370（54 " ）	

2-4 FOUNDATION PLAN





Unit: mm

DIMENSION / MODEL	L	A	B
X6323 series	1500	740	520
X6325 series	1500	889	540
X6330 series	1570	960	540

2-5 POWER SUPPLY

A). Machine supplied with electrical box

1. Check and confirm correct voltage from factory power source.
2. Turn machine main power switch "OFF", connect machine main power cable and ground wire to factory power source.
3. Power "ON" machine and check motor rotation direction, if it rotates reverse, switch main power 2 cables connection to correct it.

B). Machine supplied without control panel

1. Check the motor voltages against supply.
2. Turn power "OFF", connect main power and ground wire, then machine is ready.
3. Power "ON" machine and check motor rotation direction, if it rotates reverse, switch main power 2 cables connection to correct it.

2-6 INITIAL SETTING

1. If the machine was delivered in a crate, the slide way handles have been taken off. These should be re-fitted.
2. The machine head was turned down for shipping purpose, machine head must be turned up before positioning.

   How to turn machine head up:

   1) Loosen Ⓔ hexagon nut a little bit, and turn machine head.

   2) One person hold machine head, and the other person turn Ⓕ hexagon screw to turn machine head up.

3. To set milling head square to table (for horizontal plane):

   1) An indicator mounted in a spindle nose travelling in a 115MM(4.5") 90° radius, then tighten Ⓖ lock handle.

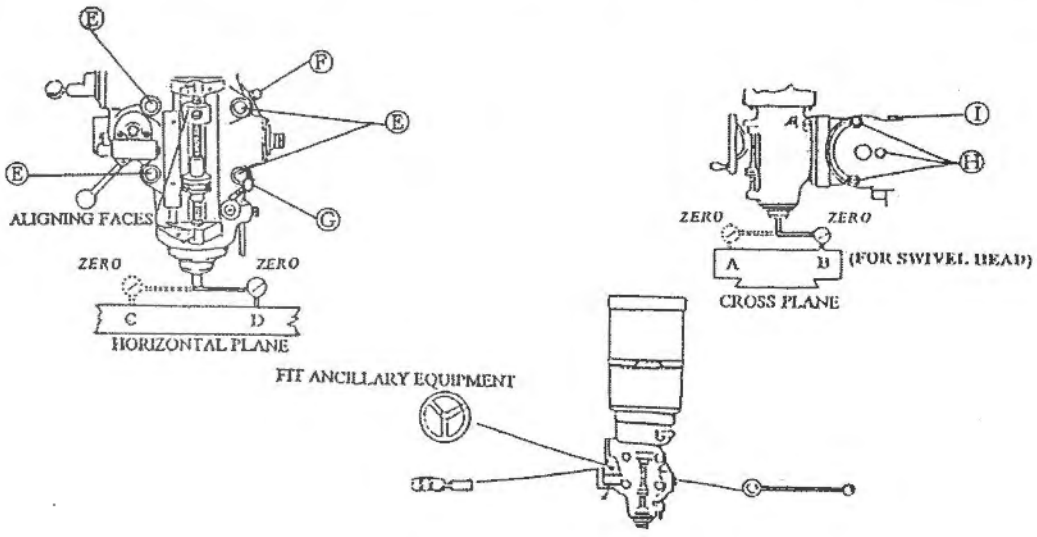
   2) Loosen Ⓔ hexagon nut (4 PCS.), turn Ⓕ hexagon screw, then adjust the point c & d.

4. To set milling head square to the table (for cross plane):

   1) An indicator mounted in a spindle nose travelling in a 115MM(4.5") 90° radius, then tighten Ⓖ lock handle.

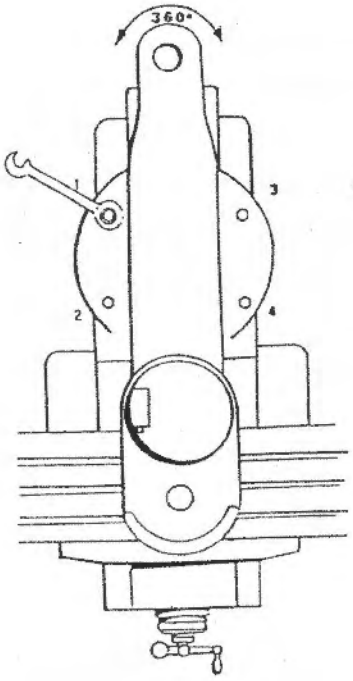
   2) Loosen Ⓗ adaptor locking bolts (3 PCS.), turn Ⓘ vertical adjusting worm shaft, then adjust the point A & B.

NOTICE: X/Y/Z AXIS ARE LOCKED SEPARATELY, PLEASE LOOSEN RESPECTIVE LOCKING LEVER.



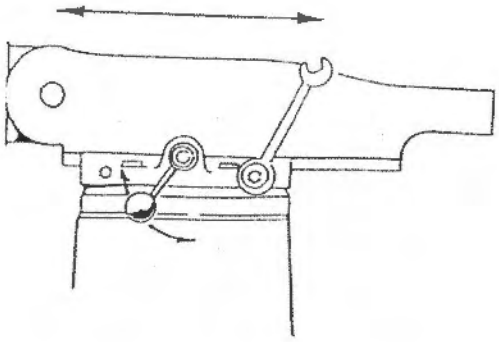
CHAPTER 3. OPERATION

3-1 SWIVEL TURRET



1. Use spanner to loosen the 4 bolts.
2. Index to the required setting.
3. Tighten the 4 bolts.

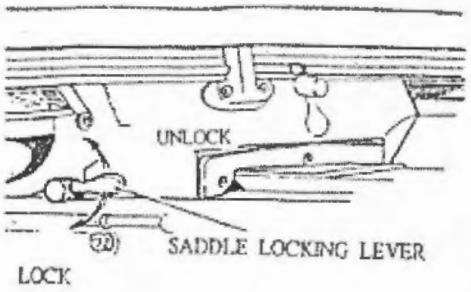
3-2 MOVE RAM SLIDE



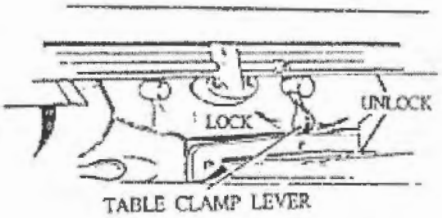
1. Use spanner to loosen the 2 bolts.
2. Turn the handle to move the slide to the desired position.
3. Lock and tighten the 2 bolts.

3-3 CLAMPING TABLE, SADDLE AND KNEE

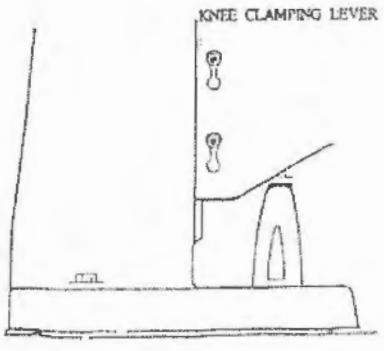
1. When milling with longitudinal table feed only, it is advisable to clamp the knee to the column and the saddle to the knee to add rigidity to these members and provide for heavier cuts with a minimum of vibration. The saddle locking lever is located on the left-hand side of saddle.



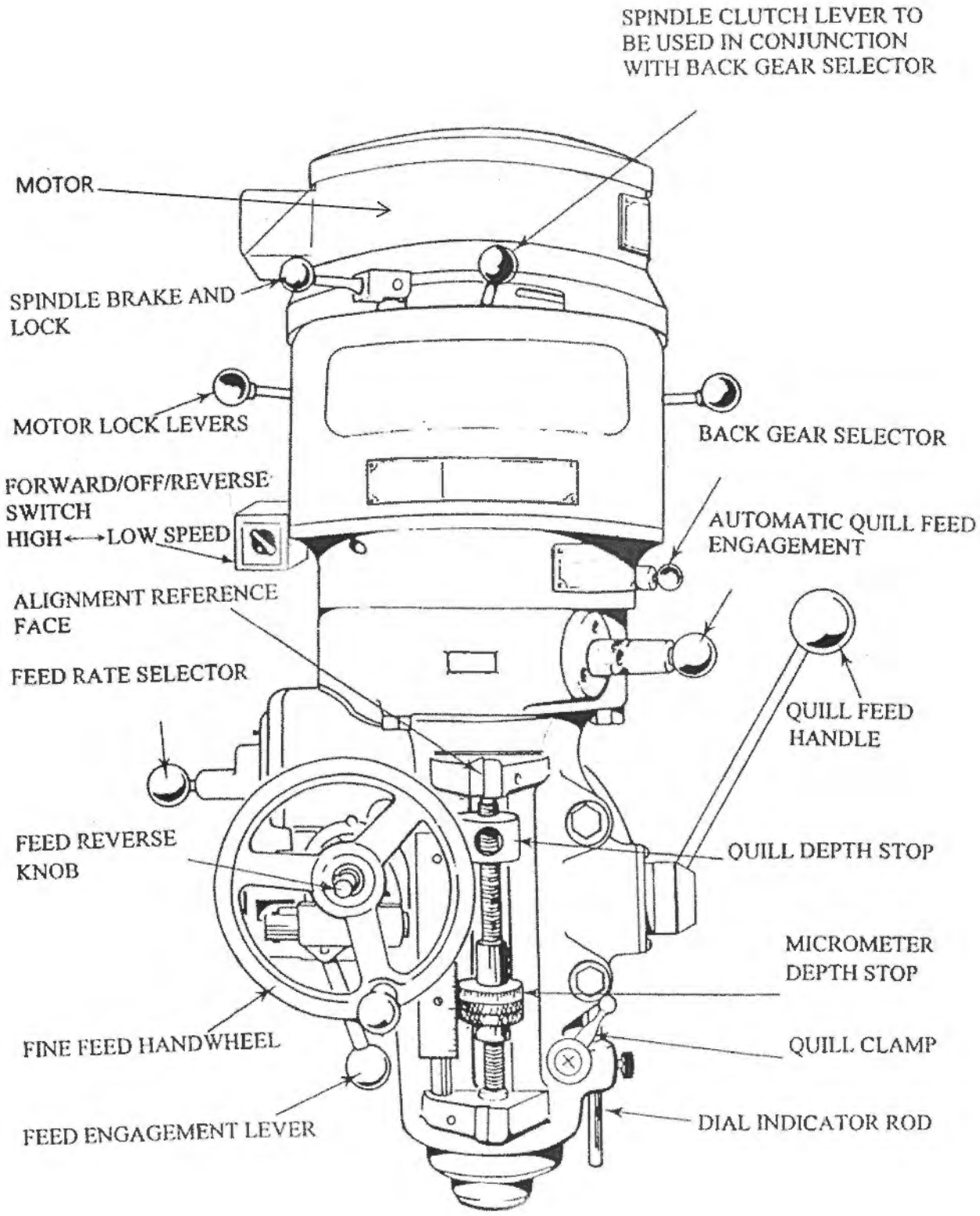
2. The table clamp lever is located on front of saddle and should always be clamped when longitudinal movement is not required.



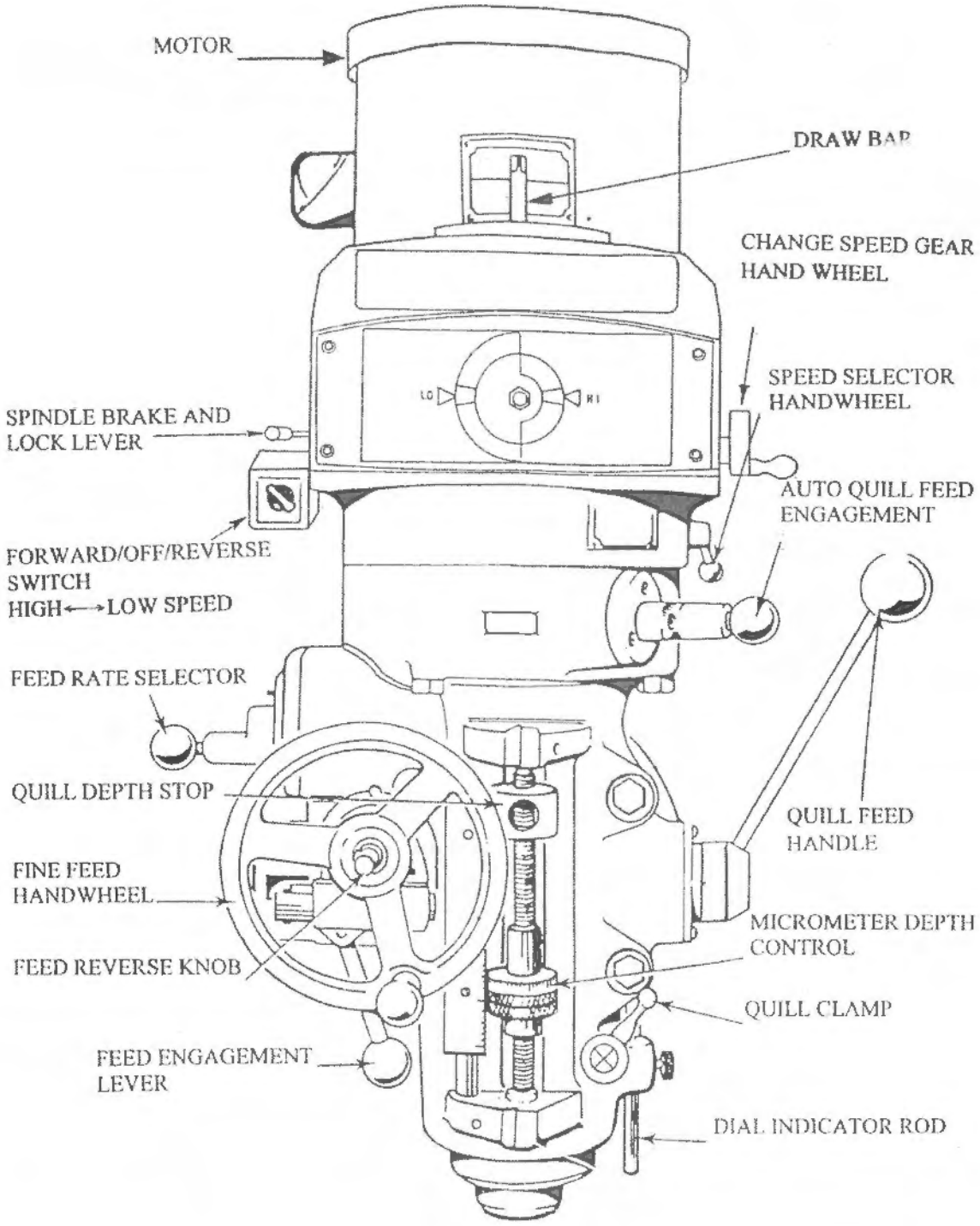
3. The knee clamping lever is at the left side of the knee and should be drawn upward to clamp the knee. This is only a tension brake and will not lock the knee completely. Leave clamped at all times unless using knee in operation.



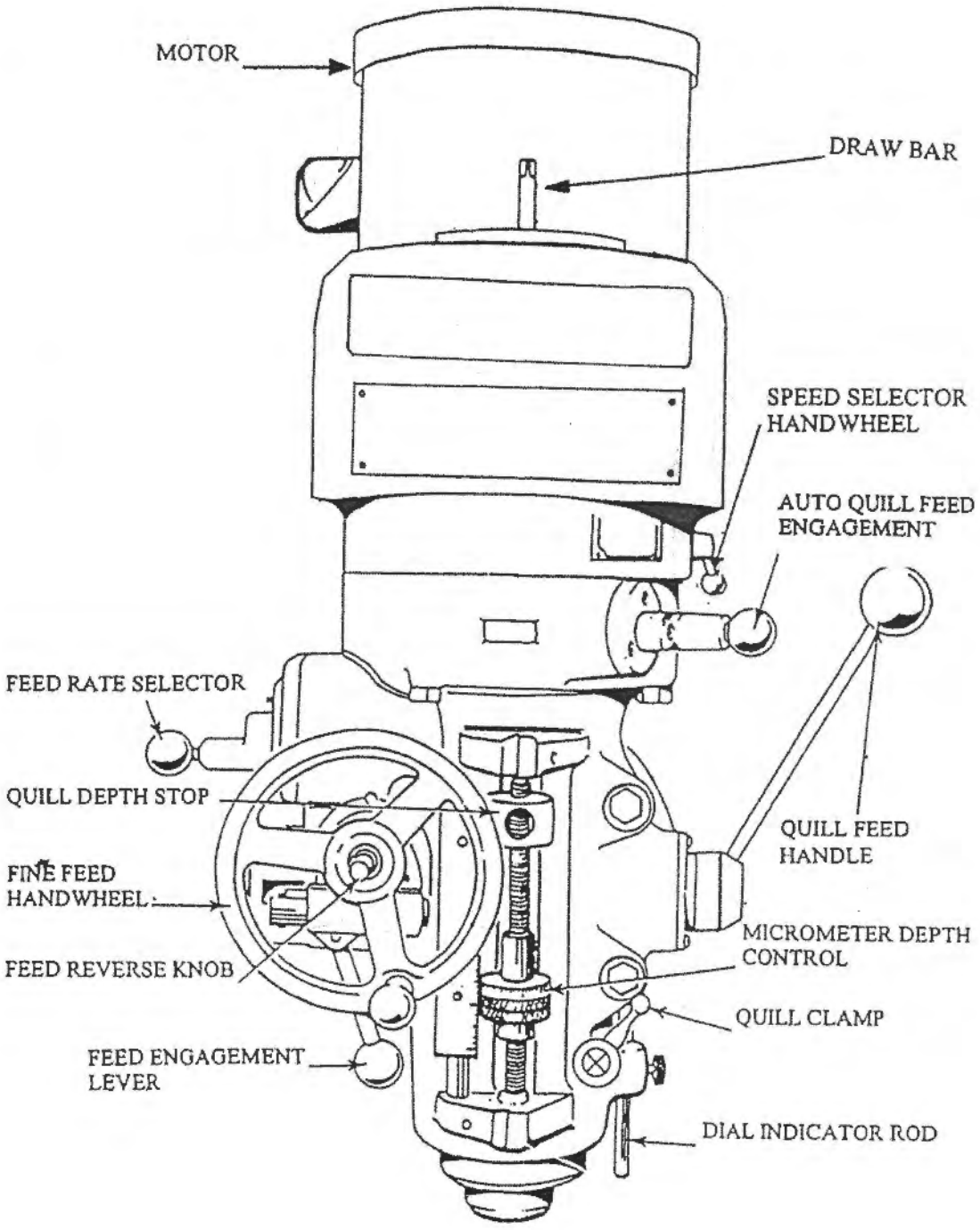
3-4 MAIN PART OF MILLING HEAD (WITH STEP PULLEY CONTROLLED)



3-5 MAIN PART OF MILLING HEAD (WITH VARIABLE SPEED MOTOR)



3-6 MAIN PART OF MILLING HEAD (WITH INVERTER CONTROLLED VARIABLE SPEED)



3-7 SPINDLE SPEED (WITH STEP PULLEY CONTROLLED)

■STEP PULLEY CONTROLLED（8 SPEEDS) 8

HIGH	50HZ	60HZ	LOW	50HZ	60HZ
1	2330	540	1	270	325
2	1550	360	2	180	215
3	975	220	3	110	135
4	590	130	4	65	80

■STEP PULLEY CONTROLLED（16 SPEEDS) 16

50HZ	MOTOR HIGH 2P		MOTOR LOW 4P	
	HIGH SPEED	LOW SPEED	HIGH SPEED	LOW SPEED
1	4660	540	2330	270
2	3100	360	1550	180
3	1950	220	975	110
4	1180	130	590	65

60HZ	MOTOR HIGH 2P		MOTOR LOW 4P	
	HIGH 5PEED	LOW 5PEED	HIGH 5PEED	LOW SPEED
1	5600	650	2800	325
2	3720	430	1860	215
3	2340	270	1170	135
4	1420	160	710	80

***STOP MOTOR BEFORE CHANGING SPEED

3-8 SPINDLE SPEED(WITH VARIABLE SPEED MOTOR & INTERTER CONTROLLED VARIABLE)

■VARIABLE SPEED MOTOR

HZ	HIGH SPEED	LOW SPEED
50HZ	470～3550	50～410
60HZ	550～4300	60～500

***CHANGING SPEED WHILE MOTOR IS RUNNING

■INTERTER CONTROLLED VARIABLE

HZ	HIGH SPINDLE RANGE r.p.m	LOW SPINDLE RANGE r.p.m	HZ	HIGH SPINDLE RANGE r.p.m	LOW SPINDLE RANGE r.p.m
20	575	65	70	2005	230
25	715	82	80	2290	260
30	860	98	100	2865	330
35	1000	115	120	3440	392
40	1145	130	140	4010	460
50	1430	165	160	4580	520
60	1720	196	175	5000	575

3-9 FINE HEAD FEED

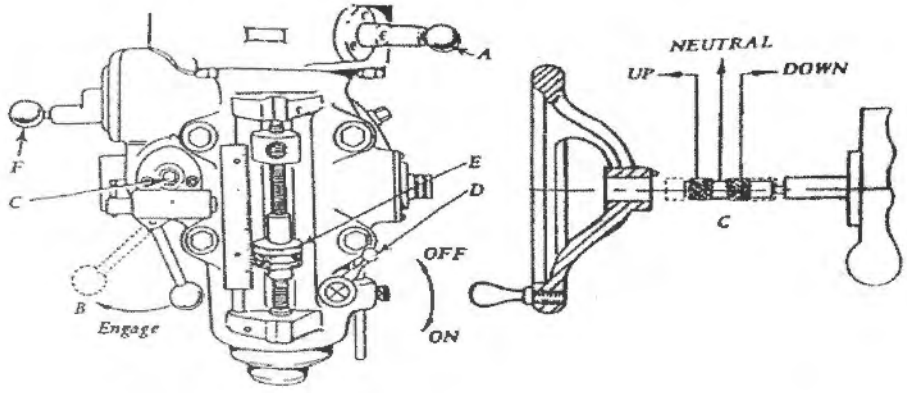
1. Disengage auto quill feed 'A'.
2. Locate 'C' in mid (neutral) position.
3. Engage feed trip lever 'B'.
4. The quill is now under hand wheel control.

3-10 AUTOMATIC FEED

Maximum loading 9.5 mm (3/8") diameter drill in steel.

1. Ensure quill lock 'D' is off.
2. Set micrometer dial 'E', to required depth.
3. When motor has stopped, engage auto quill feed 'A'.
4. Select feed rate 'F' & feed direction 'C'.
5. Engage feed trip lever 'B'.
6. Feed will automatically trip out within +/-0.25 MM (0.005") of required depth.
7. Press hand feed to dead stop for repeating accuracy of +/-0.025 MM (0.001").

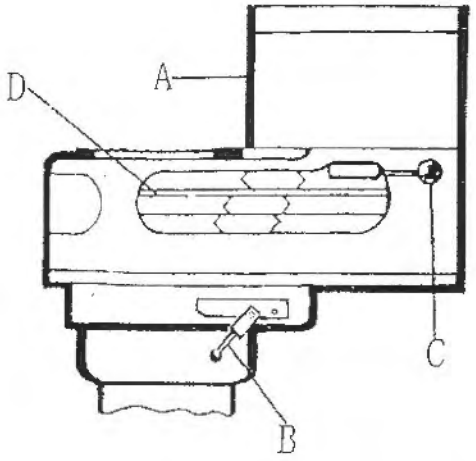
***NOTE: DO NOT ENGAGE QUILL FEED 'A' OVER 3000 R.P.M.

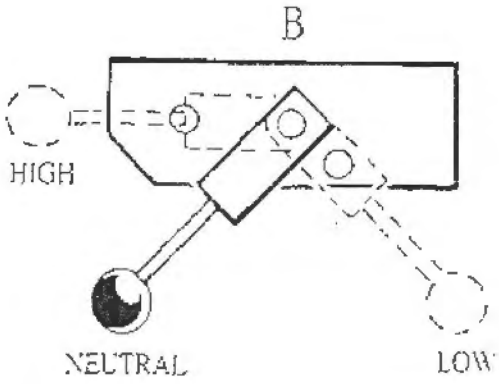


3-11 SPINDLE SPEED SELECTION (WITH STEP PULLEY CONTROLLED)

CHANGE SPEED

1. Isolate machine 'A'.
2. Select high/low speed 'B' as required.
3. Release the handle 'C'.
4. Position belt 'D' on appropriate pulleys.
5. Slide motor to the rear to tension vee belt, then tighten the handle 'C'.

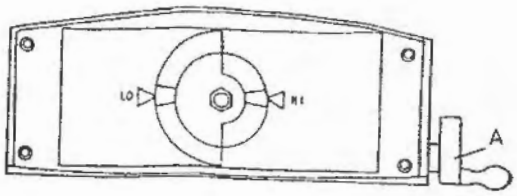




3-12 SPINDLE SPEED SELECTION (WITH VARIABLE SPEED MOTOR)

A. CHANGE SPEED WHEEL

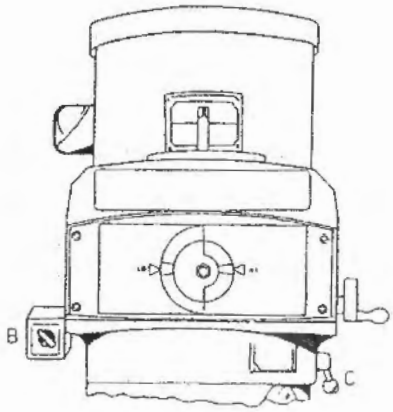
1. Do not turn 'A' when spindle stopped.
2. Turn wheel 'A' to choose speed.



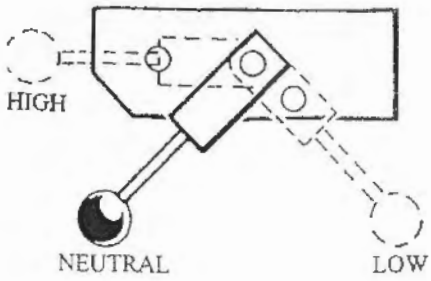
NO TURNING 'A' WHEN SPINDLE STOPPED

B. CHANGE HANDLE

1) CHANGE SPEED FROM HIGH SPEED TO LOW SPEED
   1. Turn off motor.
   2. Moving handle 'C' through neutral to low speed.
   3. Turn on the motor.
2) CHANGE SPEED FROM LOW SPEED TO HIGH SPEED
   1. Turn off motor.
   2. Moving handle 'C' through neutral to high speed.
   3. Turning spindle to match clutch.
   4. Turn on the motor.

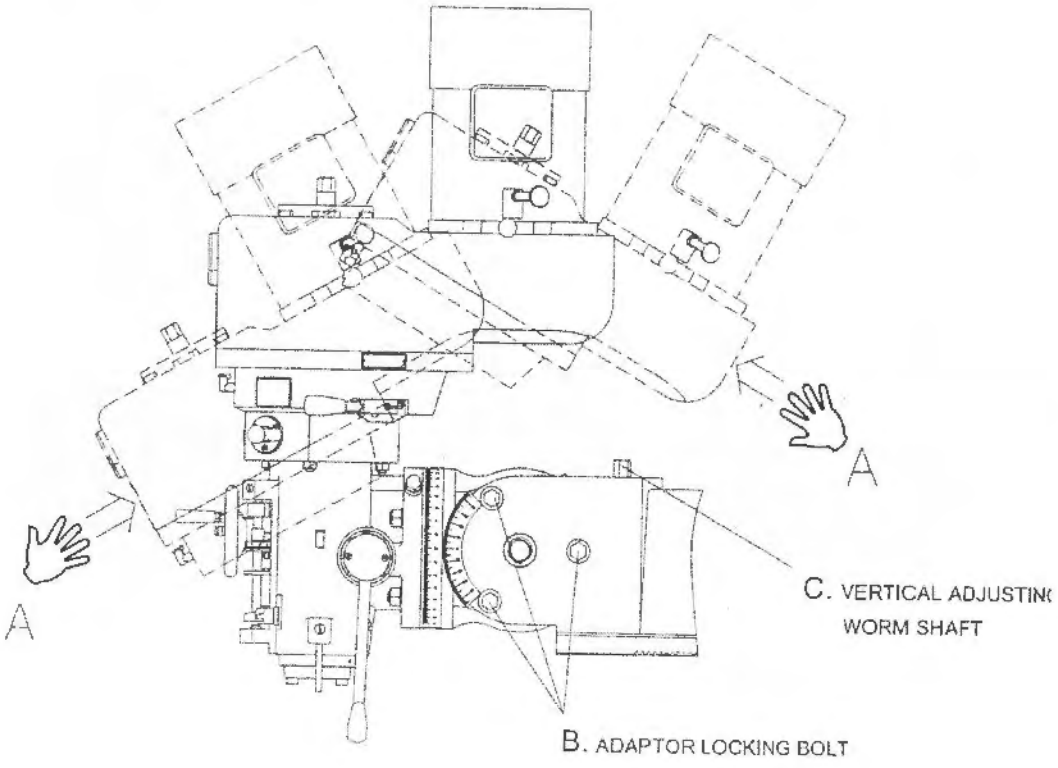


NO CHANGE 'C' WHEN SPINDLE MOVING



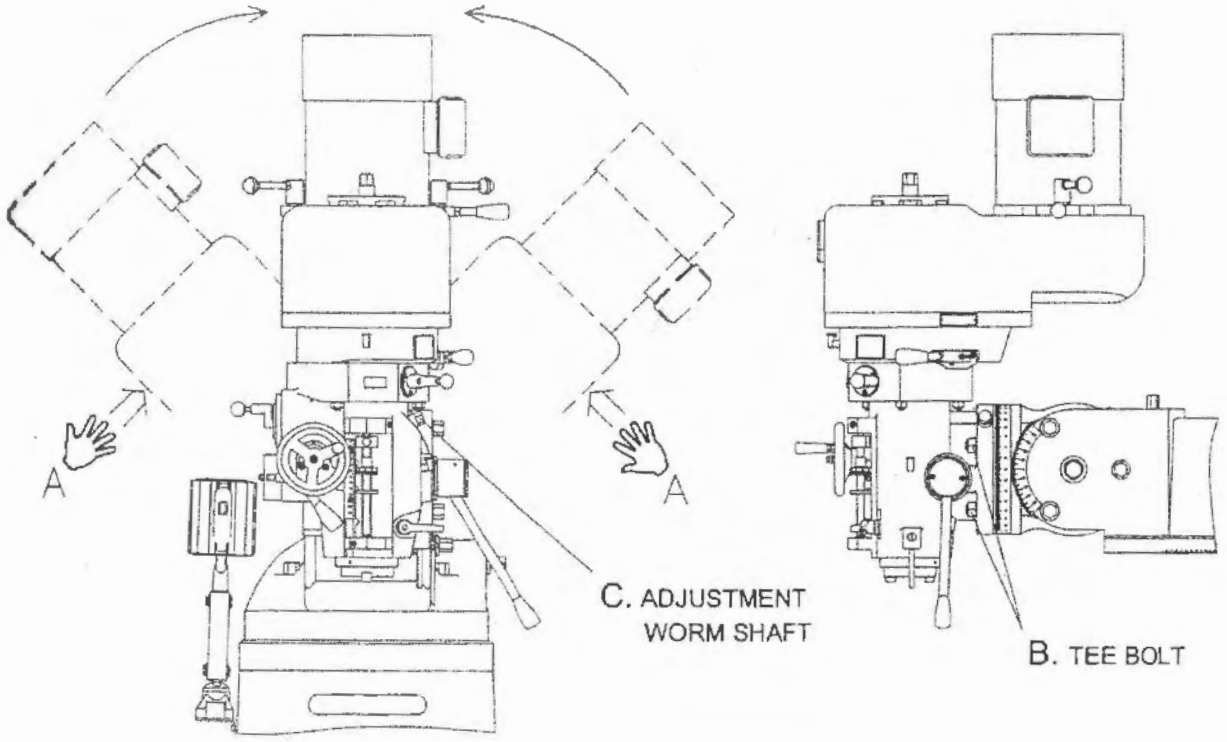
3-13 SWING MILLING HEAD FORWARD & BACKWARD

1. Loosen 'B' adaptor locking bolt (3 pieces), but do not loosen them too much or remove them away from machine.
2. Turn slowly 'C' vertical adjusting worm shaft to swing milling head to your required angle. While swinging milling head, use your hand(s) to support it from falling. after milling head at position, lock 'B' adaptor locking bolt(3 pieces) tightly.
3. Loosen 'B' adaptor locking bolt (3 pieces), then turn 'C' vertical adjusting worm shaft to return milling head back to original position. While turning milling head, use your hand(s) to push it upwards.



3-14 SWING MILLING HEAD LEFT-SIDE & RIGHT-SIDE

1. Loosen 'B' tee bolt (4 pieces), but do not loosen them too much or remove them away from machine.
2. Turn slowly 'C' adjusting worm shaft to swing milling head to your required angle. While swinging milling head, use your hand(s) to support it from falling. After milling head at position, lock 'B' tee bolt(4 pieces) tightly.
3. Loosen 'B' tee bolt (4 pieces), then turn 'C' adjusting worm shaft to return milling head back to original position. While turning milling head, use your hand(s) to push it upwards.



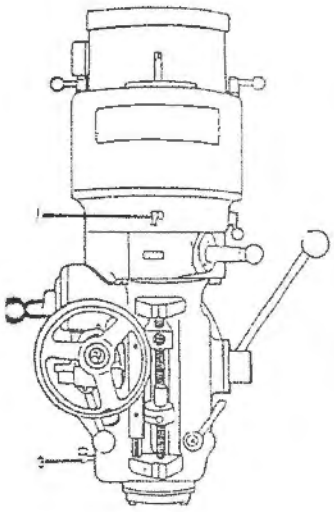
CHAPTER 4. MAINTENANCE

4-1 MILLING HEAD LUBRICATION SYSTEM

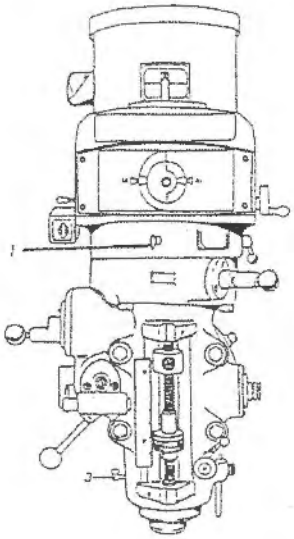
FREQUENCY	LUBRICATE	LUBRICANT	QUANTITY	LUB. AT
TWICE WEEKLY	CAP RING	VACTRA HEAVY MEDIUM	5 DROPS	1
TWICE DAILY	SPINDLE GEAR	GREASE	TOP-UP	2
TWICE DAILY	QUILL	VACTRA HEAVY MEDIUM	5 DROPS	3

**NOTE: FAILURE TO LUBRICATE "QUILL" AT 3 CAN RESULT IN TIGHT QUILLS.

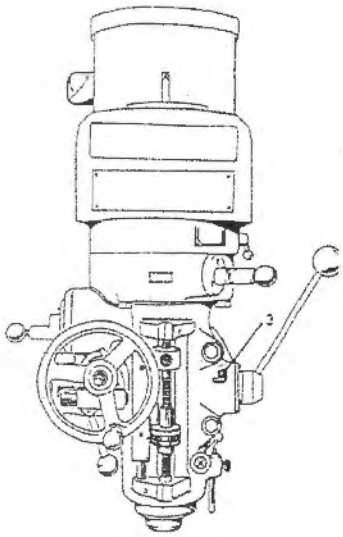
STEP PULLEY CONTROLLED HEAD

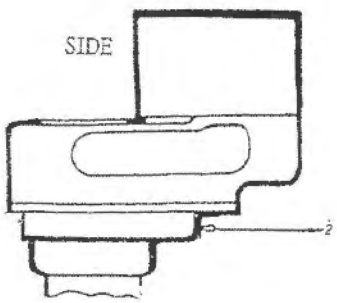


VARIABLE SPEED HEAD



VARIABLE SPEED MOTOR HEAD

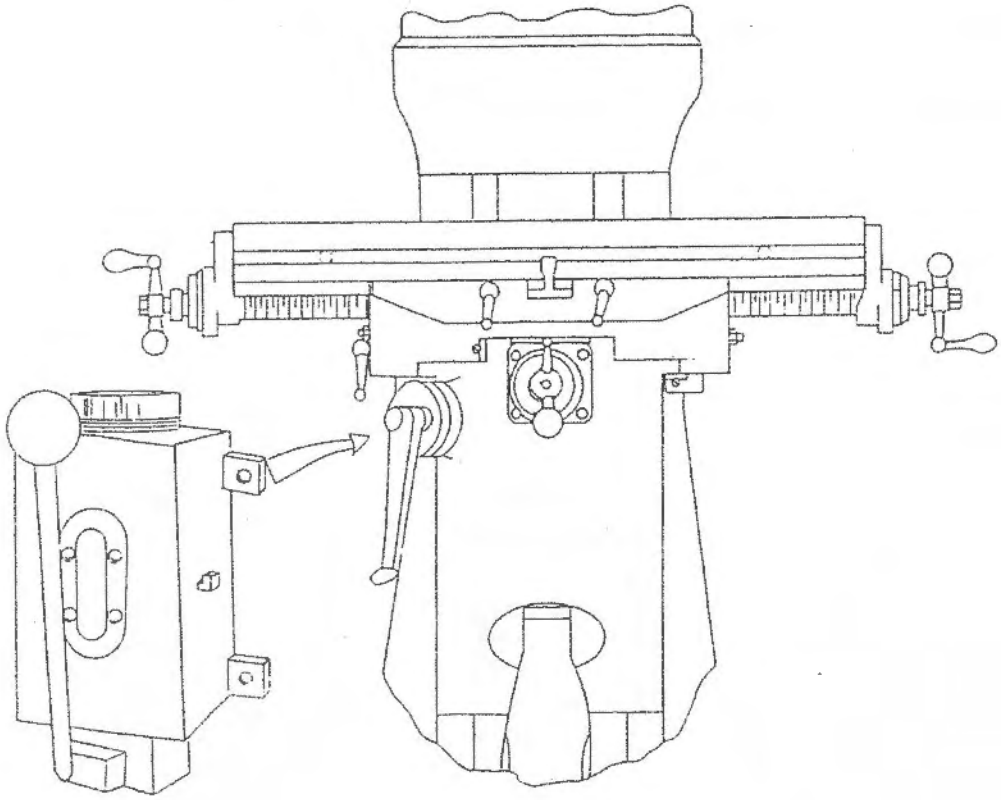




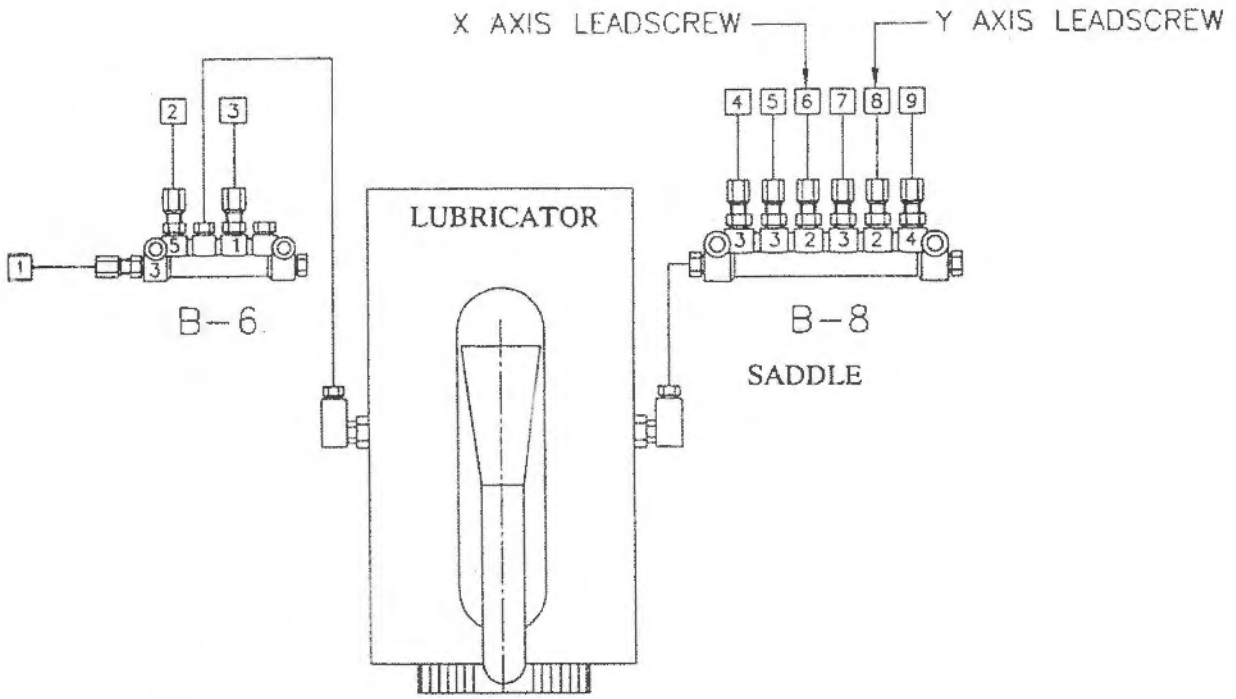
4-2 AXIAL LUBRICTION SYSTEM

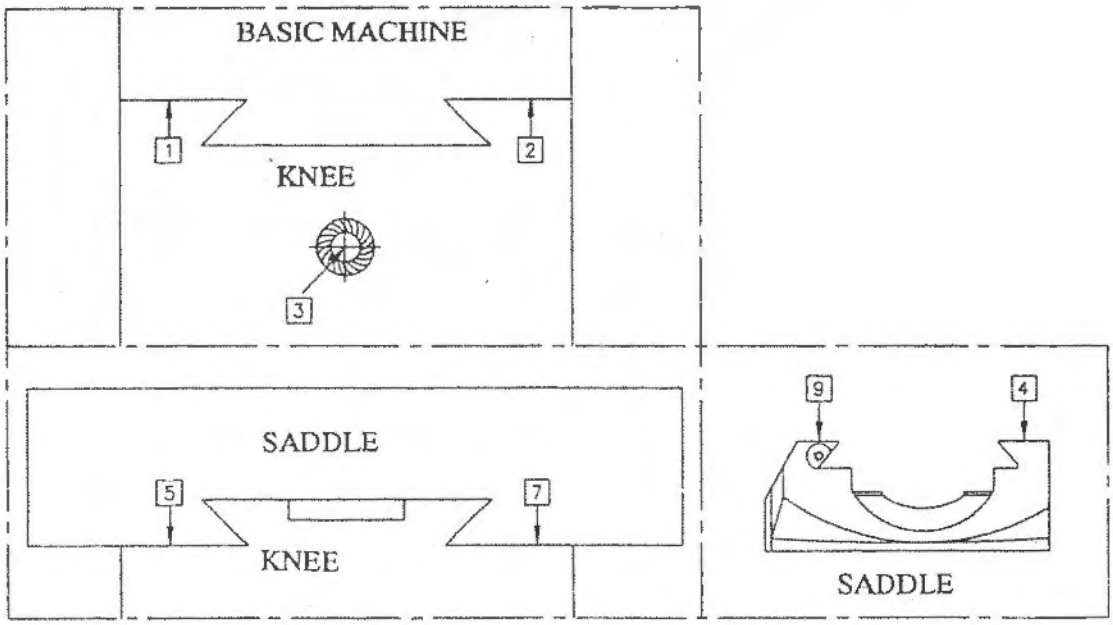
REGULAR LUBRICATION

1. Please use lubrication slide way oil NO. 68(for example: oil Mobil NO. 2).
2. Please push lube system at least one time every day.



4-3 LUBRICATION SYSTEM

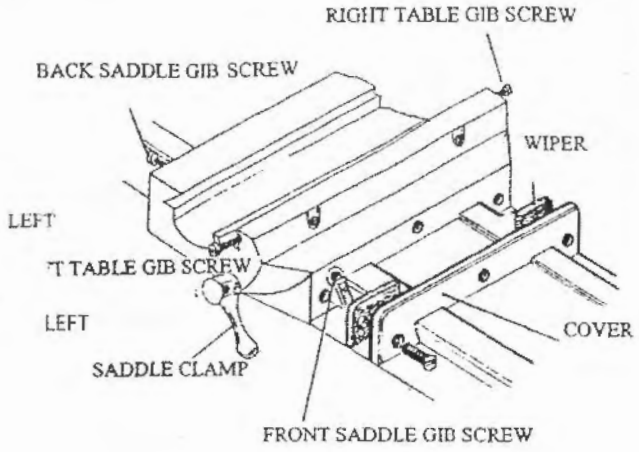




4-4 GIB ADJUSTMENT

A. TABLE SADDLE WAYS

1. Remove all swarf from area.
2. Loosen right table gib screwand turn left table gib screwclock wise until slight drag is felt.

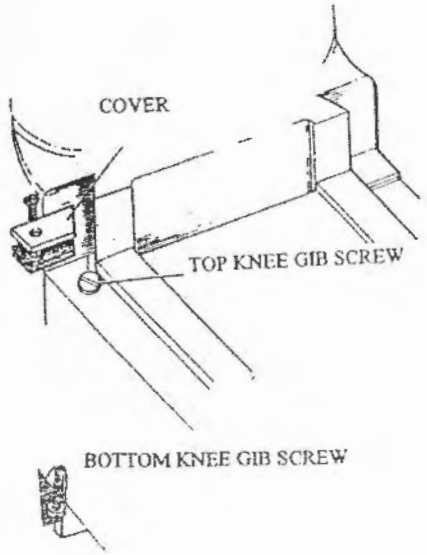


B. SADDLE KNEE WAYS

1. Remove all swarf from area.
2. Remove cover.
3. Loosen back saddle gib screw and turn front saddle gib screw clock wise until slight drag is felt.
4. Replace the wiper.

C. KNEE COLUMN WAYS

1. Remove all swarf from area.
2. Remove cover.
3. Loosen bottom knee gib screw and turn top knee gib screwclock wise until slight drag is felt.
4. Replace the wiper.

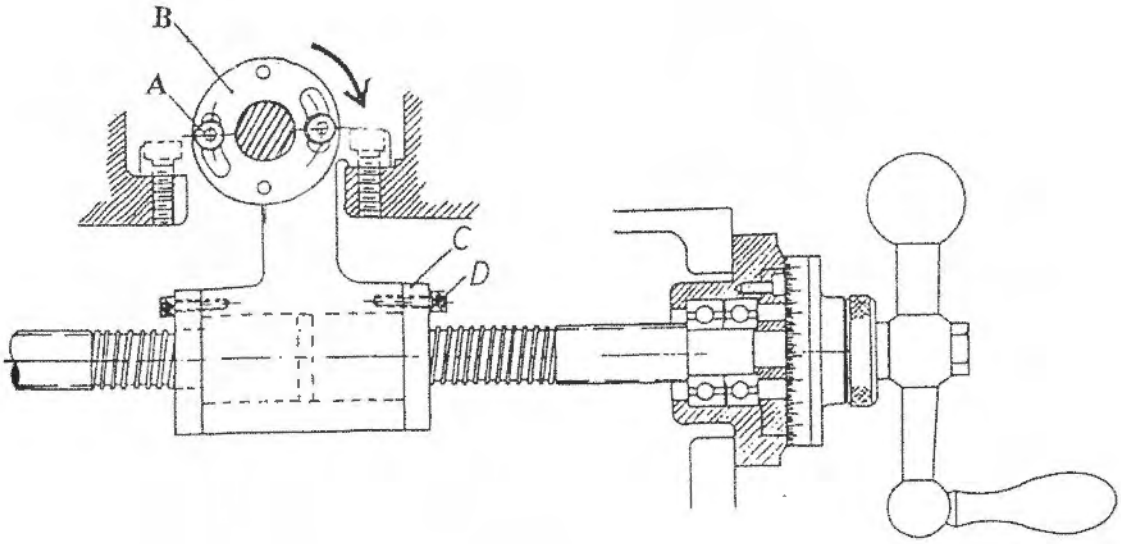


4-5 BACKLASH ADJUSTMENT (X AXIS)

TABLE SCREW ASSEMBLY

1. Move the table to the left.
2. Loosen 2 PCS lock screw 'A'.
3. Tighten nut 'B' (clockwise).
4. Then tighten 2 PCS lock screw 'A'.

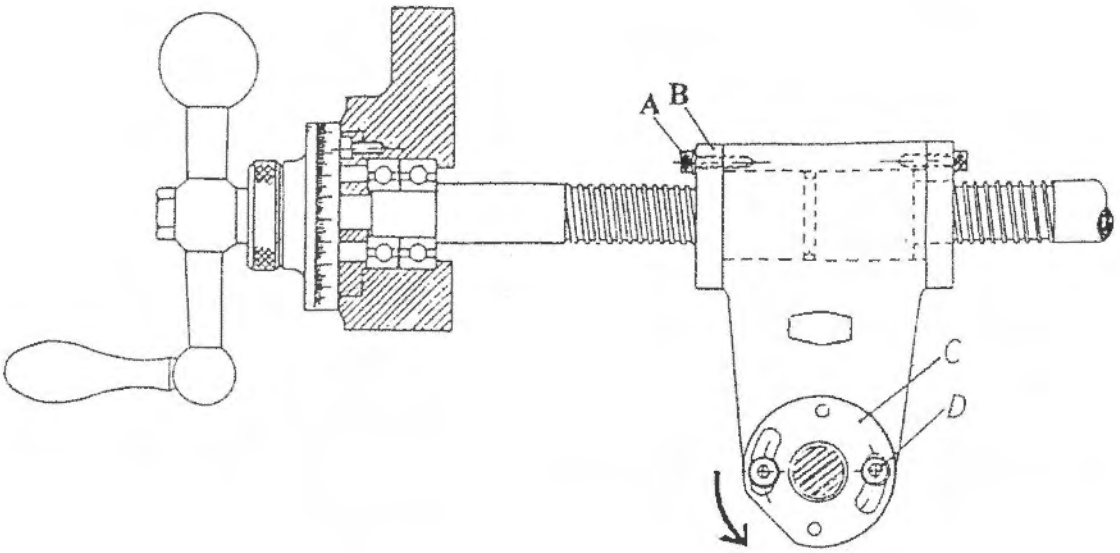
**NOTE: THIS BACKLASH ADJUSTMENT DOES NOT APPLY, IF MACHINE IS EQUIPPED WITH X AXIS BALL SCREW.



4-6 BACKLASH ADJUSTMENT (Y AXIS)

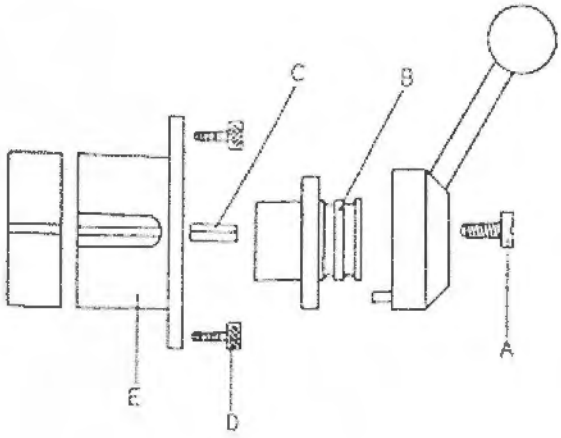
CROSS SCREW ASSEMBLY

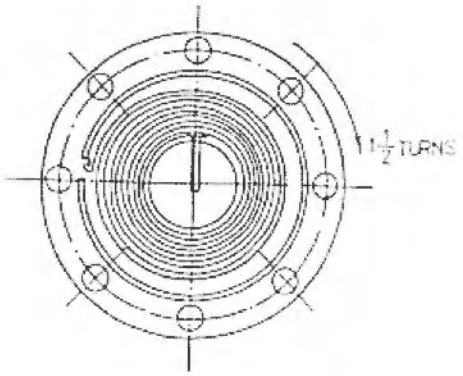
1. Move the saddle to the middle position.
2. Loosen 2 PCS lock screw 'D'.
3. Tighten nut 'C' (counter-clockwise).
4. Then tighten 2 PCS lock screw 'D'.



4-7 CLOCK SPRING REPLACEMENT

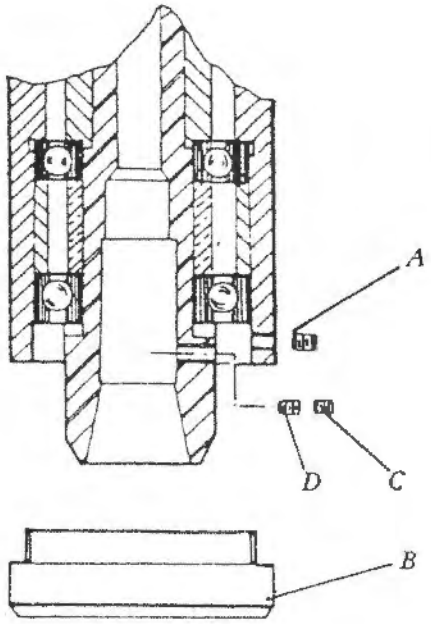
1. With quill at top of movement, apply quill lock 'G' lock handle.
2. Remove 'A' set screw, hub 'B' pinion shaft hub sleeve.
3. Remove 'D' round head Allen screw (2 PCS), rotate 'E' spring cover counter clockwise, to release spring tension, be sure to turn the cover slowly and gently.
4. Remove end of 'H' clock spring from the peg on 'F' spring pin.
5. Remove 'H' clock spring (beware of the spring tension, so you can avoid being hurt), and refit a new good 'H' clockspring.
6. Refit spring in reverse order, test spring reverse tension, adjust 'H' clock spring tension as required, as follows:
   Remove the first screw 'D' round head Allen screw, insert a pin, then remove the second 'D' round head Allen screw, adjust angle of 'E' spring cover as required, tighten the tension clockwise, realease the tension counter-clockwise.

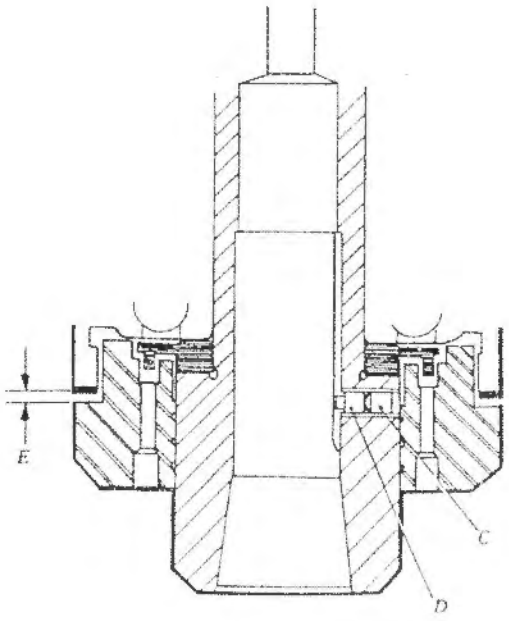




4-8 COLLET ALIGNING SCREW REPLACEMENT(R8)

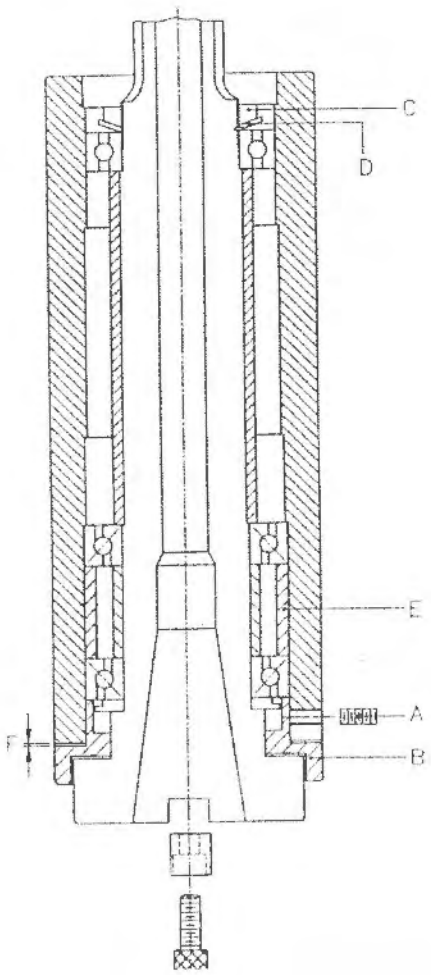
1. Remove set screw 'A'.
2. Unscrew nose cap 'B' (left hand thread & beware that the spindle goes down).
3. Remove lock screw 'C' & collet aligning screw 'D'.
4. Aim the slot of r8 collet at screw 'D' adjust screw 'D' to the proper position (do not overtighten grip on the collet).
5. Replace lock screw 'C'.
6. Replace and lock nose cap 'B' properly (do not lock tight, or this will cause quill distortion).
7. Replace and lock set screw 'A' properly (do not lock tight, or this will cause quill distortion).
8. Check if there is a gap between nose cap 'B' and quill, if there is no gap, remove nose cap 'B', machining it until there is a gap.





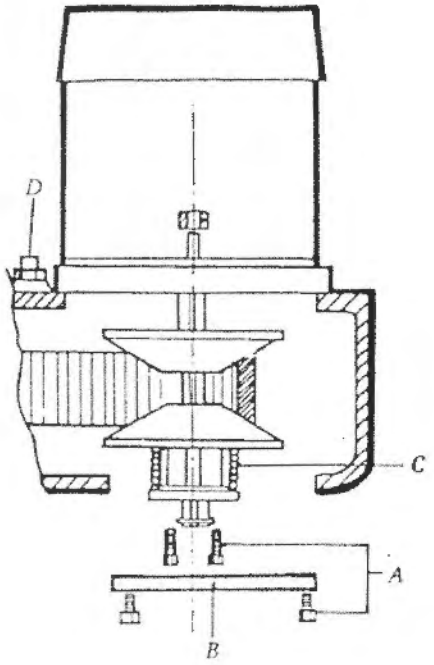
4-9 ADJUSTING SPINDLE BEARING AND REPLACE BEARING(NT30#)

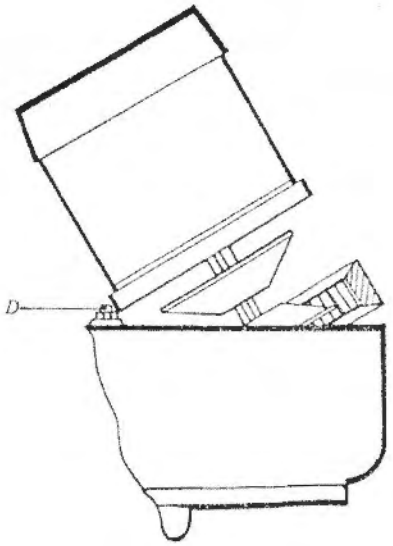
1. Remove milling chuck and draw bar.
2. Take off set screw 'A'.
3. Loosen adjusting nut 'B' (left-hand thread) until disengaged from quill, and hold spindle which will not falls off.
4. Remove whole set spindle, then pull open circlip 'D' and adjusting nut 'C' until bushing 'E' to tighten to death.
5. Replace spindle, tighten adjusting nut 'B' to death. check there is a gap 'F' about 0.5~1MM between nut and quill, if there is not, take off nut and machining it use a scale to measure dimension before assembly).
6. Fit set screw 'A' re-drill a hole and tighten it properly (not too tight).



4-10 REMOVE MOTOR

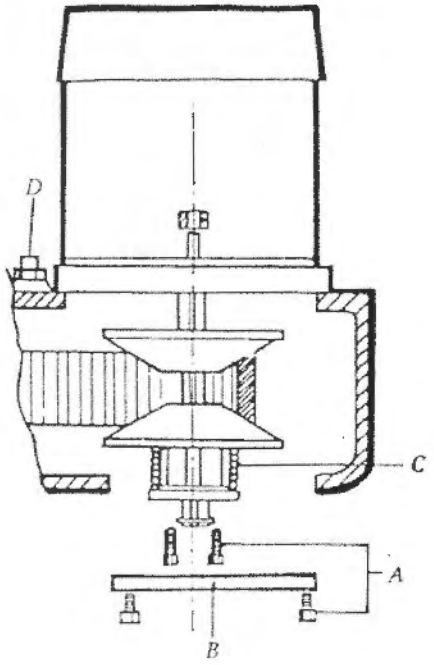
1. Adjust spindle speed to highest speed.
2. Turn off main power.
3. Remove 3 Screw 'A' & cover 'B'.
4. Separate the connecting wire between forward/reverse switch and motor.
5. Remove the 4 locking nuts 'D'.
6. Remove the motor.

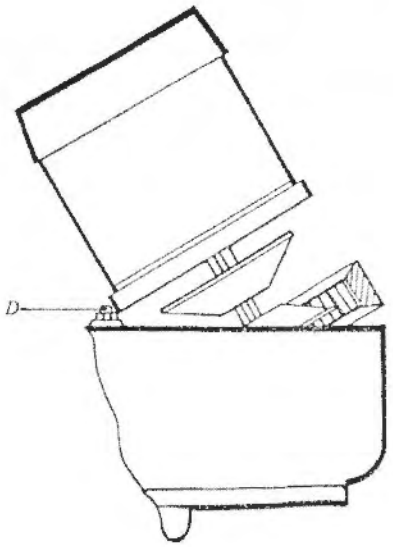




4-10 REMOVE MOTOR

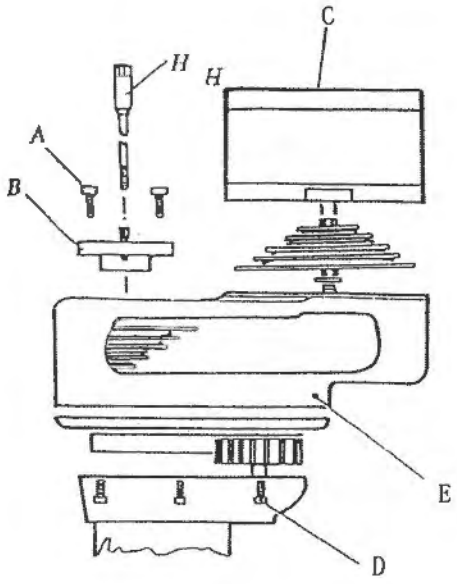
1. Adjust spindle speed to highest speed.
2. Turn off main power.
3. Remove 3 Screw 'A' & cover 'B'.
4. Separate the connecting wire between forward/reverse switch and motor.
5. Remove the 4 locking nuts 'D'.
6. Remove the motor.





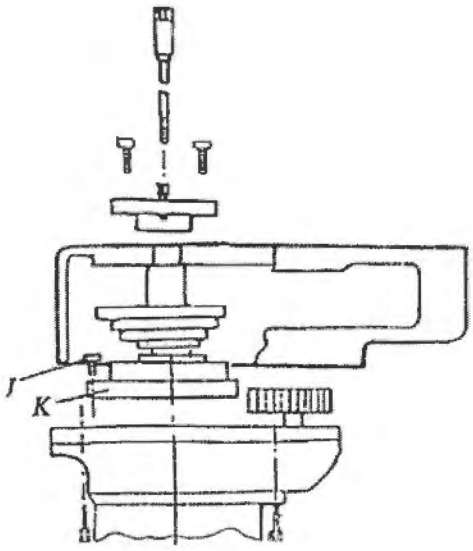
4-11DRIVING BELT REPLACEMENT (WITH STEP PULLEY CONTROLLED)

1. Isolate machine.
2. Remove draw bar 'H'.
3. Remove motor 'C'.
4. Lower quill to full extension.
5. Remove screws 'A' 3 PCS.
6. Remove bearing retainer 'B'.
7. Remove screws 'D' 6 PCS.
8. Remove belt housing 'E'.
9. Replace new driving belt.



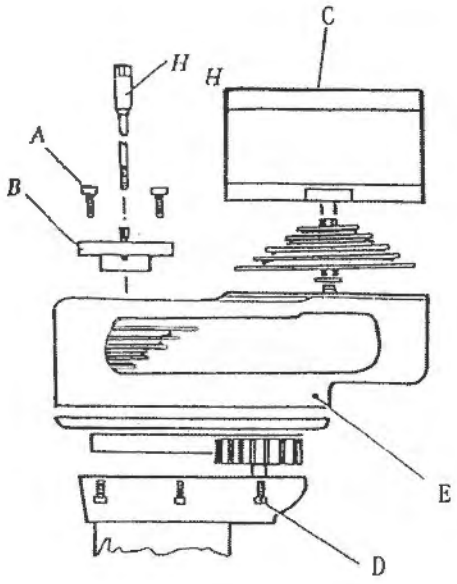
4-12 BRAKE DRUM & TIMING BELTREPLACEMENT(WITH STEP PULLEY CONTROLLED)

1. Repeat sequence item 1 to 9 (same as above).
2. Remove screws 'J' 4 PC5.
3. Remove brake base 'K'.
4. Replace brake drum or timing belt.



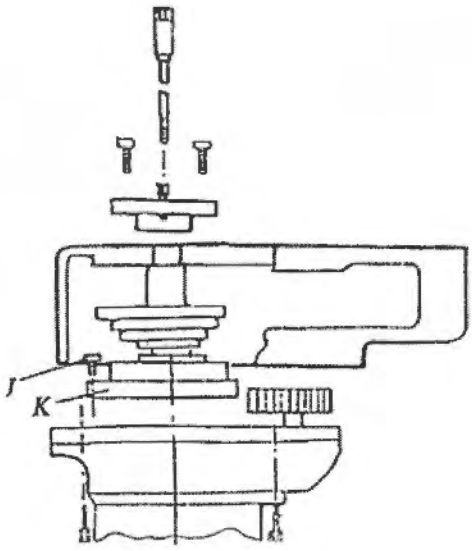
4-11DRIVING BELT REPLACEMENT (WITH STEP PULLEY CONTROLLED)

1. Isolate machine.
2. Remove draw bar 'H'.
3. Remove motor 'C'.
4. Lower quill to full extension.
5. Remove screws 'A' 3 PCS.
6. Remove bearing retainer 'B'.
7. Remove screws 'D' 6 PCS.
8. Remove belt housing 'E'.
9. Replace new driving belt.



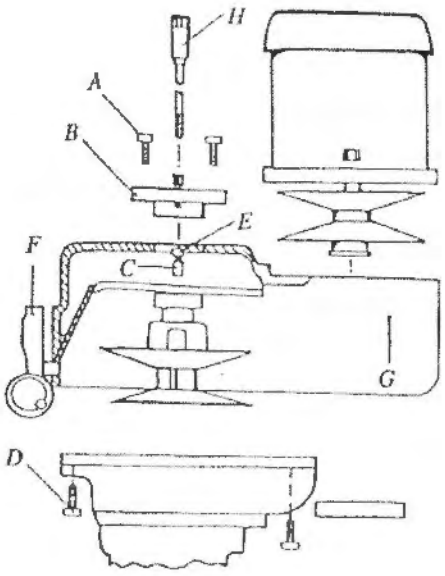
4-12 BRAKE DRUM & TIMING BELTREPLACEMENT(WITH STEP PULLEY CONTROLLED)

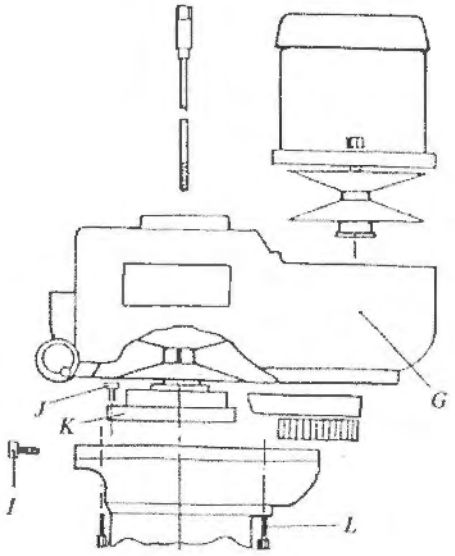
1. Repeat sequence item 1 to 9 (same as above).
2. Remove screws 'J' 4 PCS.
3. Remove brake base 'K'.
4. Replace brake drum or timing belt.



4-13 TIMING BELT REPLACEMENT (WITH VARIABLE SPEED MOTOR)

1. Remove the motor.
2. Remove draw bar 'H' and milling cutter.
3. Remove screws 'A' 3 PCS and bearing housing 'B'.
4. Remove screws 'E' 2 PCS and the bushing 'C'.
5. Remove screws 'D' 6 PCS.
6. Remove the 2 screws which are at the bottom of the 4 screws of the speed change 'F'.
7. Remove top housing 'G' and the speed change 'F'.
8. Remove the 4 Allen head screw 'J'.
9. Remove brake base 'K'.
10. Refit a new, good belt.



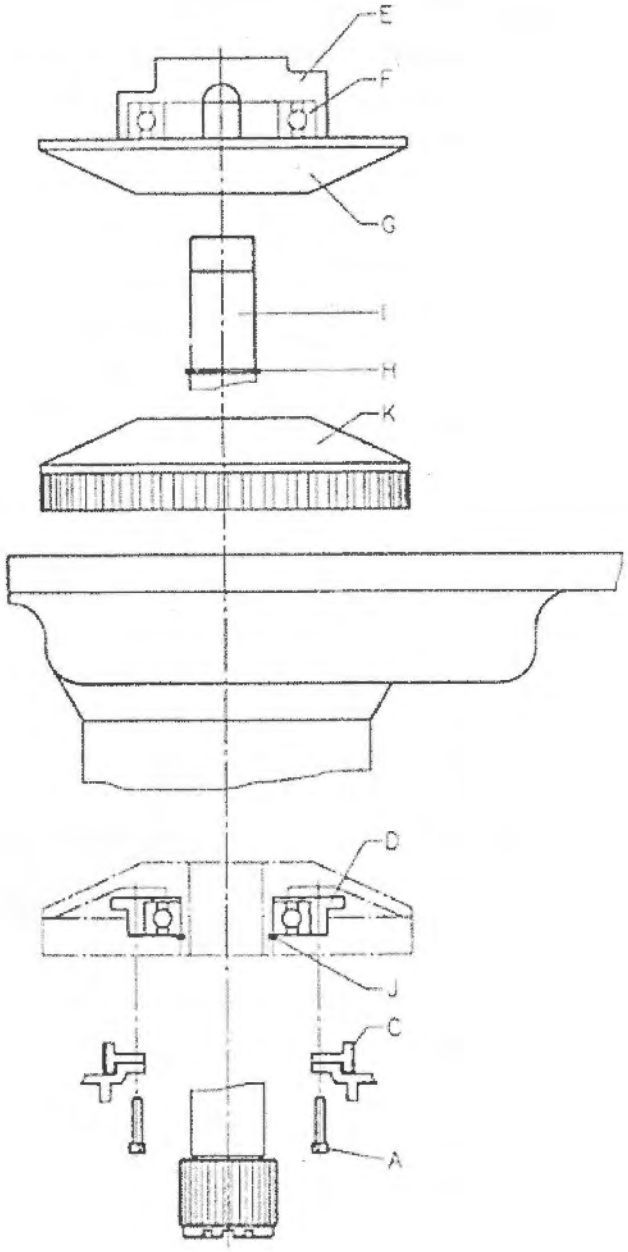


4-14 DRIVING BELT REPLACEMENT (WITH VARIABLE SPEED MOTOR)

1. Item 1 to 7 same as above.
2. Replace a new/good belt.

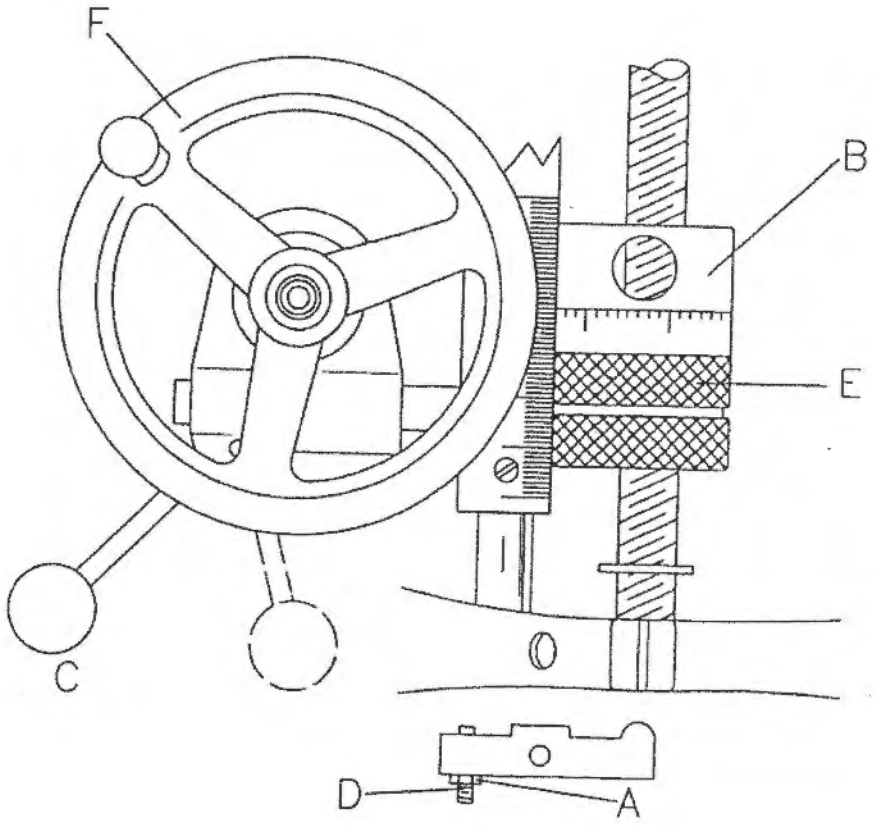
4-15 BRAKE DRUM REPLACEMENT (WITH VARIABLE SPEED MOTOR)

1. Remove the motor.
2. Same as timing belt replacement item 1 to 9.
3. Remove 'E','F','G' (Aim at the slot and re-mark first).
4. Remove 'H' circuit.
5. Remove clutch gear shaft 'I' from lower side.
6. Remove 'J' circlip.
7. Remove 'K' variable speed pulley from upper side.
8. Remove 'A' Allen head screw.
9. Remove 'D' brake bearing base.
10. Refit a new/good brake shoe.



4-16 FEED TRIP ADJUSTMENT

1. Release locknut 'A'.
2. Engage trip handle 'C'.
3. Adjust micrometer nut 'E' against quill stop knob 'B'.
4. Slowly turn adjusting screw 'D' until cam rod 'C' trips.
5. Then tighten hexagon nut 'A'.
6. Engage cam rod 'C'.
7. Fit hand wheel 'F', adjust quill stop knob 'B' against micrometer nut 'E', check that smart trip action is obtained.



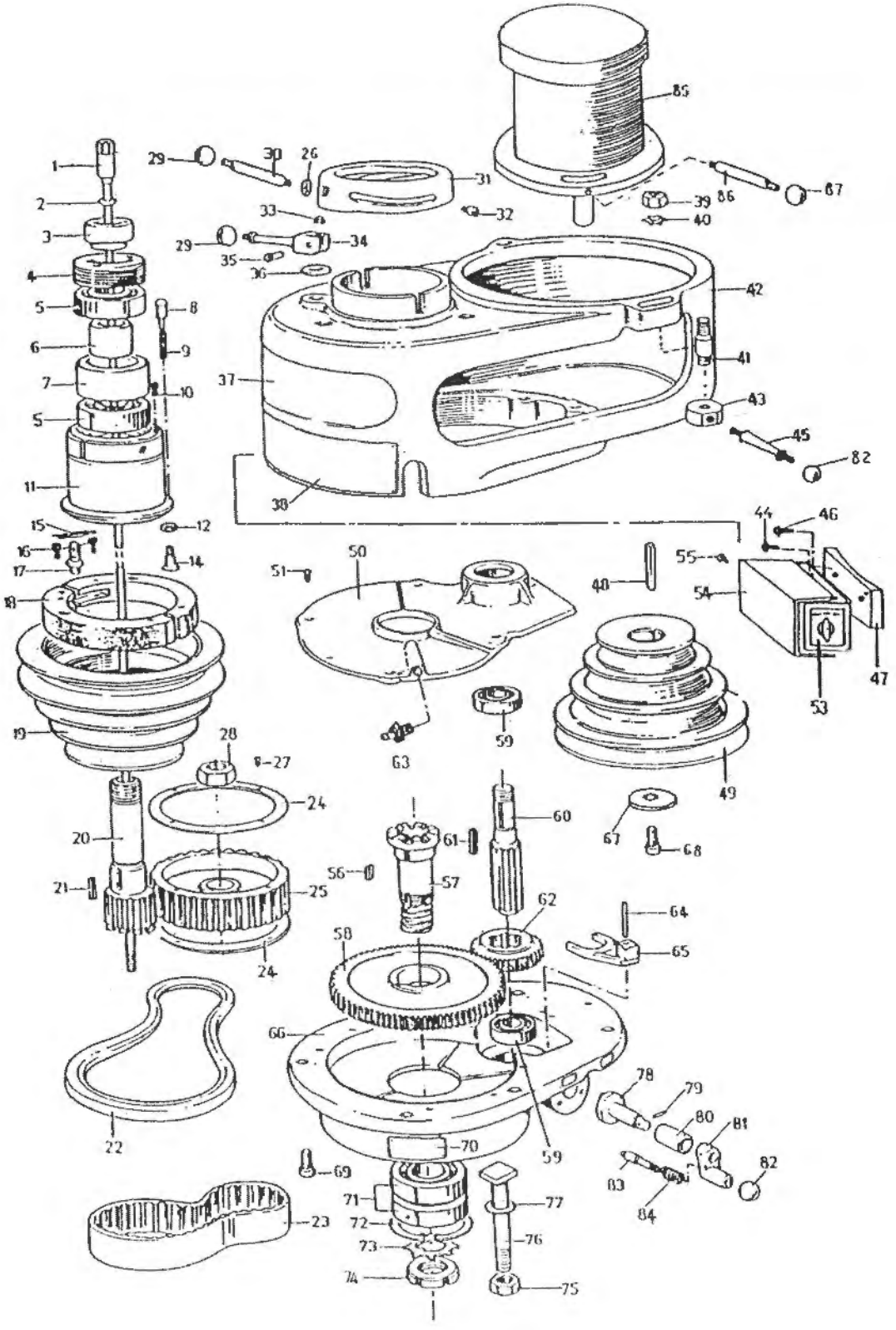
CHAPTER 5. PARTS LIST

WHEN ORDERING REPLACEMENT PARTS, PLEASE QUOTE:

- THE MACHINE MODEL NUMBER
- THE MACHINE SERIAL NUMBER
- PARTS NUMBER
- DESCRIPTION
- QUANTITY

***PARTS OBTAINABLE IN INCH OR METRIC

5-1 HEAD TOP HOUSING ASSEMBLY STEP PULLEY /A001~A087

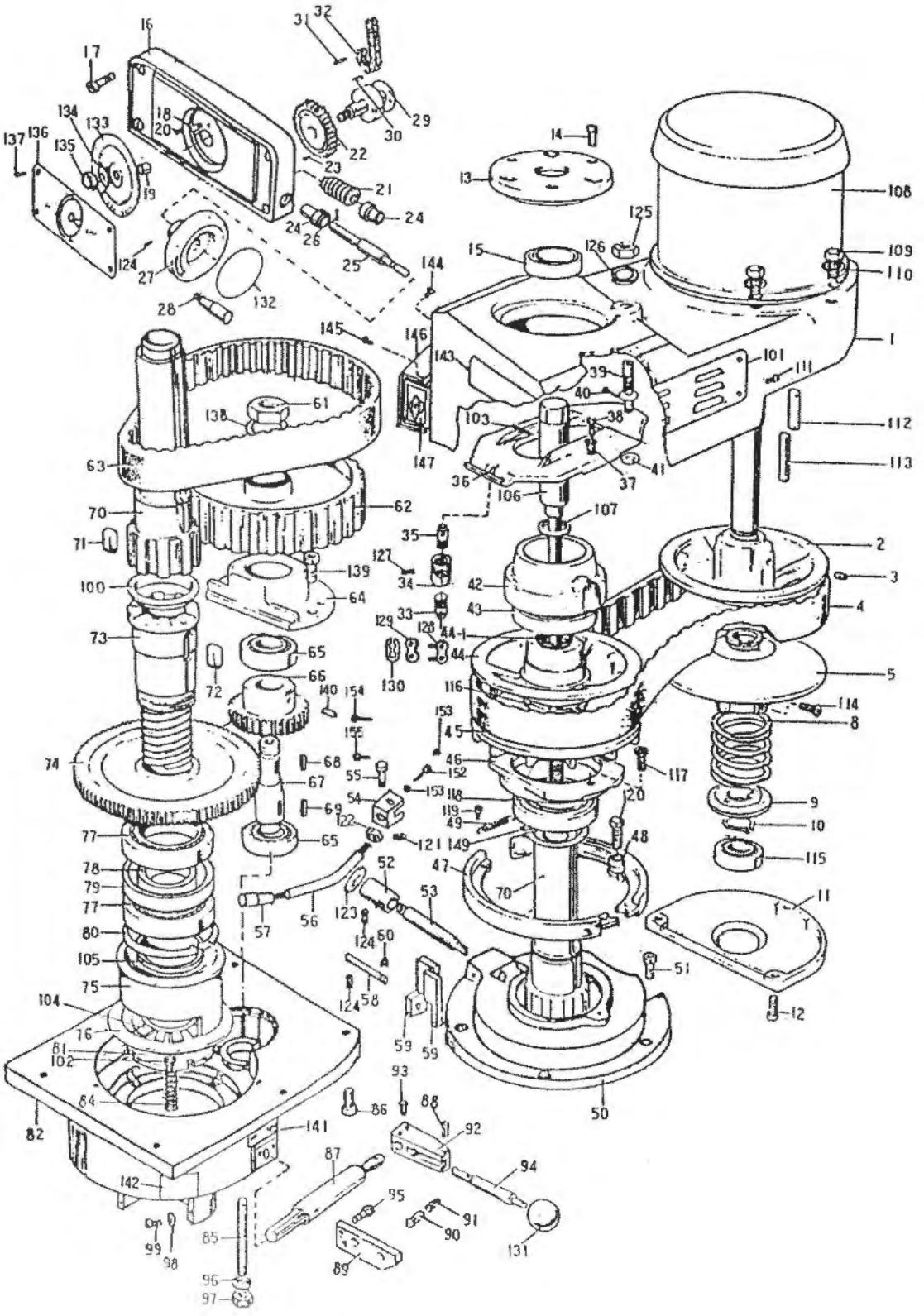


PARTS NO.	DESCRIPTION	SPEC.	Q' TY
A-001	DRAW BAR	R8/NT30/NT40	1
A-002	WASHER		1
A-003	UPPER BEARING LOCKNUT		1
A-004	BEARING SLEEVE LOCKNUT		1
A-005	BEARING	6207 ZZ	2
A-006	INNER BEARING BUSHING		1
A-007	OUTER BEARING BUSHING		1
A-008	SPRING PLUNGER		4
A-009	SPRING		4
A-010	ALLEN HEAD SCREW	M3*8	2
A-011	SPINDLE PULLEY BEARING SLEEVE		1
A-012	HEXAGON NUT	5/16 "	1
A-014	SET SCREW		1
A-015	SPRING		2
A-016	ALLEN HEAD SCREW	M3*10	4
A-017	BRAKE LOCK STUD		1
A-018	BRAKE LOCK		1
A-019	SPINDLE PULLEY		1
A-020	SPINDLE PULLEY HUB		1
A-021	KEY	6*6*25	1
A-022	V'BELT	A-34	1
A-023	TIMING BELT	225L	1
A-024	TIMING BELT PULLEY FLANGE		2
A-025	TIMING BELT PULLEY		1
A-026	HEXAGON NUT	5/16 "	1
A-027	FLAT HEAD SCREW	3/16 " *3/8 "	8
A-028	HEXAGON NUT	5/18 " -18NF	1
A-029	BLACK PLASTIC BALL	5/16 "	2
A-030	SPINDLE CLUTCH LEVER		1
A-031	CAP RING		1
A-032	SPINDLE CLUTCH CAM RING PIN		2

A-033	SNAP RING	E5	1
A-034	BRAKE LOCK HANDLE		1
A-035	BRAKE LOCK PIN		1
A-036	WASHER		1
A-037	OPERATION INSTRACTION PLATE		1
A-038	SPEED PLATE		1
A-039	HEXAGON NUT	3/8 " -24NF	2
A-040	SPRING WASHER	3/8 "	2
A-041	MOTOR MOUNTING STUDS		2
A-042	BELT HOUSING		1
A-043	MOTOR LOCK NUT		2
A-044	ROUND HEAD SET SCREW	M8*8	2
A-045	MOTOR LOCK NUT HANDLE		2
A-046	ROUND HEAD SET SCREW	M6*16	2
A-047	SWITCH BASE		1
A-048	KEY	7*7*30	1
A-049	MOTOR PULLEY		1
A-050	GEAR HOUSING COVER		1
A-051	ALLEN HEAD SCREW	M5*12	5
A-053	FORWORD/REVERSE SWITCH		1
A-054	OUTER SWTICH BOX		1
A-055	ROUND HEAD SET SCREW	5/32 " *1/4 "	1
A-056	KEY	8*8*16	1
A-057	GEAR HUB		1
A-058	SPINDLE GEAR		1
A-059	BEARING	6203 ZZ	2
A-060	COUNTER SHAFT		1
A-061	KEY	5*5*15	1
A-062	COUNTER SHAFT GEAR		1
A-063	GREASE NIPPLE	1/8 " PT	1
A-064	LONG DOWEL PIN		1
A-065	BACK GEAR SHIFTER FORK		1

A-066	GEAR HOUSING		1
A-067	WASHER	M8	1
A-068	ALLEN HEAD SCREW	M8*25	1
A-069	ALLEN HEAD SCREW	M6*20	6
A-070	DISENGATE FEED INSTRUCTION PLATE		1
A-071	BEARING	6208 2Z	2
A-072	CIRCLIP	R80	1
A-073	CIRCLIP	AW08	1
A-074	BEARING LOCKNUT		1
A-075	HEXAGON NUT	7/16 "	3
A-076	VERTICAL TEE BOLT		3
A-077	COMPRESSION WASHER	7/16 "	3
A-078	ECCENTRIC SHAFT		1
A-079	LONG ROLL PIN	3*20	1
A-080	BACK GEAR SHIFTER BUSHING		1
A-081	SHIFT CRANK		1
A-082	BLACK PLASTIC BALL	1/4 "	3
A-083	GEAR SHIFT PLUNGER		1
A-084	SPRING		1
A-085	MOTOR		1
A-086	HANDLE		2
A-087	BLACK PLASTIC BALL	3/8 "	2

5-2 HEAD TOP HOUSING ASSEMBLY FOR VARIABLE SPEED /VS001~VS155



PARTS NO.	DESCRIPTION/	SPEC.	Q' TY
VS-001	BELT HOUSING ASSEMBLY		1
VS-002	MOTOR MOUNTING PULLEY		1
VS-003	SET SCREW	M8*8	1
VS-004	VARI SPEED BELT	900VC-3830	1
VS-005	LIVE MOTOR PULLEY		1
VS-005-1	BRONZE SLEEVE		1
VS-008	SPEED CHANGE SPRING		1
VS-009	SPRING BASE		1
VS-010	CIRCLIP	S28	1
VS-011	MOTOR BASE		1
VS-012	ALLEN HEAD SCREW	M6*16	3
VS-013	BEARING BLOCK		1
VS-014	ALLEN HEAD SCREW	M6*25	3
VS-015	BEARING	6007 2Z	1
VS-016	SPEED CHANGE BOX		1
VS-017	ALLEN HEAD SCREW	M6*30	4
VS-018	SET SCREW	3/16 " *3/4 "	1
VS-019	BUSHING		1
VS-020	SET SCREW	M6*6	1
VS-021	WORM		1
VS-022	WORM GEAR		1
VS-023	SPRING PIN	5*10	2
VS-024	BRASS BUSHING		2
VS-025	VARIABLE SPEED SHAFT		1
VS-026	SPRING PIN	3*12	1
VS-027	CHANGE SPEED GEAR HAND WHEEL		1
VS-028	CHANGE SPEED GEAR HANDLE		1
VS-029	WORM GEAR HOLDER		1
VS-030	SPRING PIN	3*18	1
VS-031	SPRING PIN	3*24	1
VS-032	CHAIN	35#	1
VS-033	BOLT		1
VS-034	BOLT BASE		1

VS-035	SPEED CHANGE PLATE		1
VS-036	SPEED CHANGE PLATE		1
VS-037	PLATE COVER		2
VS-038	ALLEN HEAD SCREW	M5*20	2
VS-039	CHANGE SPEED SCREW		1
VS-040	PIN	3/32 " *1 "	1
VS-041	WASHER	8	1
VS-042	VARIABLE SPEED SHAFT BASE		1
VS-043	BEARING	6012 2Z	1
VS-044	LIVE VARIABLE SPEED PULLEY		1
VS-044-1	HOUSING		1
VS-045	VARIABLE SPEED PULLEY		1
VS-046	BRAKE BEARING BASE		1
VS-047	BRAKE DRUM		1
VS-048	BRAKE DRUM LOCKNUT		1
VS-049	SPRING		2
VS-050	BRAKE BASE		1
VS-051	ALLEN HEAD SCREW	M6*16	4
VS-052	BRAKE BUSHING		1
VS-053	BRAKE SHAFT		1
VS-054	BRAKE HANDLE BASE		1
VS-055	BRAKE LOCK PIN		1
VS-056	BRAKE HANDLE		1
VS-057	BLACK PLASTIC BALL	3/8 "	1
VS-058	BRAKE OPERATION AXLE		1
VS-059	BRAKE BLOCK		2
VS-060	CIRCLIP	E5	1
VS-061	HEXAGON NUT	5/8 " -18NF*5/16 "	1
VS-062	TOOTHED PULLEY		1
VS-063	TIMING BELT	225L	1
VS-064	BEARING HOUSING		1
VS-065	BEARING	6203 2Z	2
VS-066	GEAR		1
VS-067	GEAR SHAFT		1

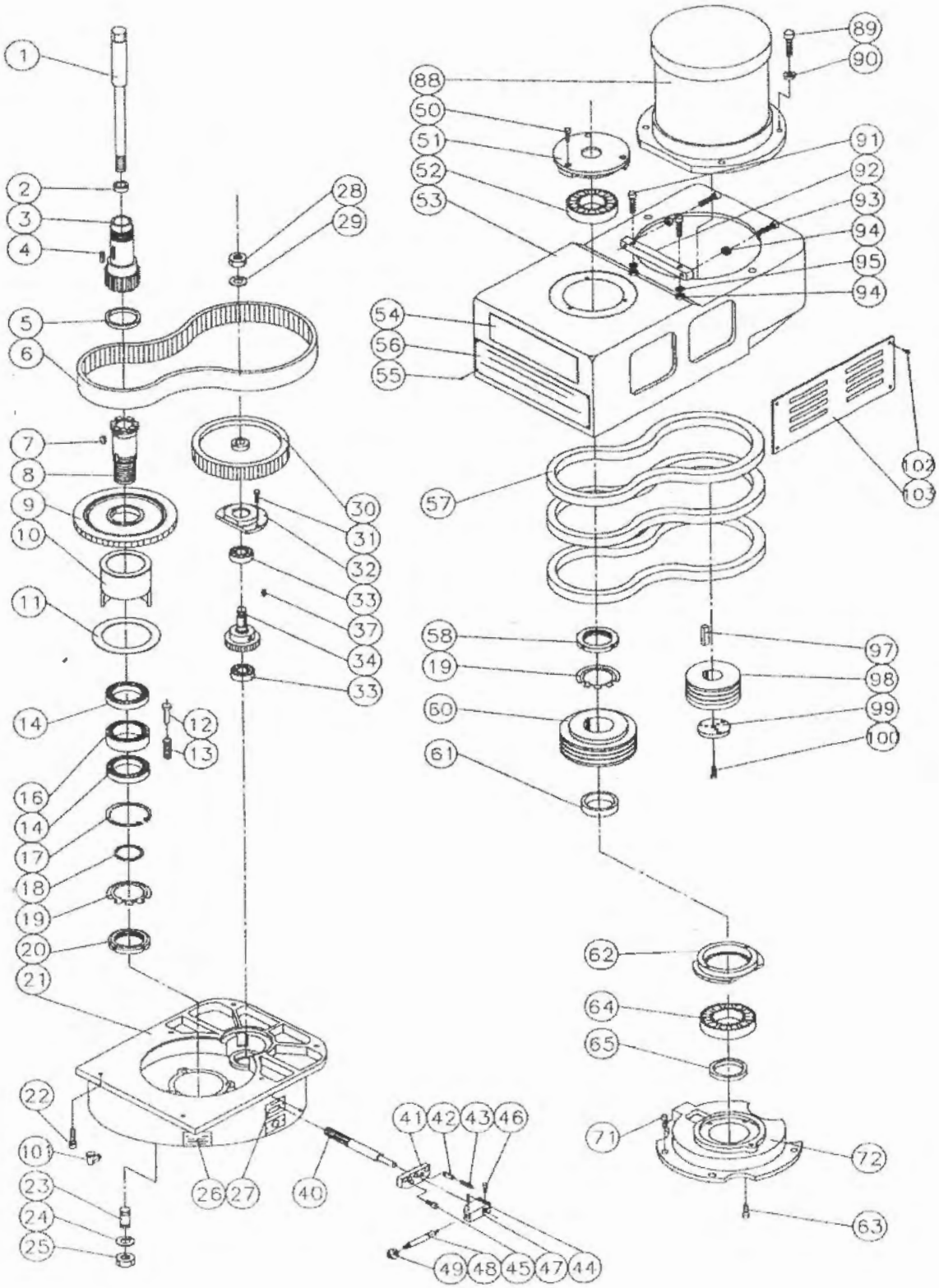
VS-068	KEY	5*5*15	1
VS-069	KEY	5*5*18	1
VS-070	CLUTCH GEAR SHAFT		1
VS-071	KEY	8*8*16	1
VS-072	KEY	8*8*12	1
VS-073	CLUTCH GEAR SHAFT		1
VS-074	GEAR WHEEL		1
VS-075	QUILL		1
VS-076	LOCK WASHER		1
VS-077	BEARING	6908 2Z	2
VS-078	SPACER		1
VS-079	OUTER BEARING SPACER HOUSING		1
VS-080	CIRCLIP	R62	1
VS-081	CLUTCH GEAR SHAFT LOCKNUT	R40*P1.0	1
VS-082	GEAR BOX BASE		1
VS-084	SPRING		3
VS-085	BOLT		3
VS-086	ALLEN HEAD SCREW	M8*25	6
VS-087	CLUTCH RING CONTROL SHAFT		1
VS-088	PIN	3*18	1
VS-089	HIGH/LOW SPEED PLATE		1
VS-090	LOCATING PIN		1
VS-091	SPRING		1
VS-092	HANDLE BASE		1
VS-093	ALLEN HEAD SCREW	M5*12	2
VS-094	CLUTCH HANDLE		1
VS-095	ALLEN HEAD SCREW	M6*16	2
VS-096	SPRING WASHER	7/16"	3
VS-097	HEXAGON NUT	7/16"	3
VS-098	WASHER	3/16"	1
VS-099	ROUND HEAD PHILIPS SCREW	3/16"*3/8"	1
VS-100	SHAFT FERRULE		1
VS-101	COVER		2
VS-102	PIN		3

VS-103	SPRING PIN	4*30	1
VS-104	LOCK NUT	AW08	1
VS-105	SPACER WASHER		1
VS-106	DRAW BAR	R8/NT30/NT40	1
VS-107	WASHER	R8/NT30/NT40	1
VS-108	MOTOR		1
VS-109	HEXAGON SCREW	3/8 " *1 "	4
VS-110	SPRING WASHER	3/8 "	4
VS-111	ROUND HEAD PHILIPS SCREW	3/16 " *3/8 "	8
VS-112	KEY	7*7*25	1
VS-113	BRASS KEY	7*7*30	1
VS-114	SET SCREW	M4*10	1
VS-115	BEARING	6204 2Z	1
VS-116	CIRCLIP	S40	1
VS-117	ALLEN HEAD SCREW	M6*12, M6*16	2, 1
VS-118	BEARING	6010 2Z	1
VS-119	CAP SCREW	1/8 " *1/4 "	4
VS-120	HEXAGON SCREW	M6*25	1
VS-121	CIRCLIP	E5	1
VS-122	HEXAGON NUT	3/8 "	1
VS-123	WASHER		1
VS-124	SET SCREW	M6*36	3
VS-125	HEXAGON NUT	3/8 "	1
VS-126	SPRING WASHER	3/8 "	1
VS-127	SET SCREW	M4*6	1
VS-128	CHAIN CIRCLIP		1
VS-129	CIRCLIP COVER		1
VS-130	CIRCLIP		1
VS-131	PLASTIC HANDLE	1/4 "	1
VS-132	NAME PLATE		1
VS-133	SPEED PLATE	50~3550, 60~4300	1
VS-134	WASHER	5/16 "	1
VS-135	NUT	5/16 "	1
VS-136	SPEED PLATE		1
VS-137	ROUND HEAD PHILIPS SCREW	M4*6	4

VS-138	SPRING WASHER	5/8 "	1
VS-139	ALLEN HEAD SCREW	M5*20	3
VS-140	SET SCREW	1/4 "	1
VS-141	HIGH/LOW SPEED PLATE		1
VS-142	QUILL FEED PLATE		1
VS-143	NAME PLATE		1
VS-144	ROUND HEAD PHILIPS SCREW	5/32 " *1/4 "	1
VS-145	ROUND HEAD PHILIPS SCREW	M6*1	2
VS-146	SWITCH COVER		1
VS-147	FORWARD/REVERSE SWITCH		1
VS-149	CIRCLIP	S50	1
VS-152	ALLEN HEAD SCREW	M4*16	1
VS-153	HEXAGON NUT	M4	2
VS-154	ROUND HEAD PHILIPS SCREW	M4*25	2
VS-155	ALLEN HEAD SCREW	M6*12	2

5-3 HEAD TOP HOUSING ASSEMBLY FOR INVERTER CONTROLLED VARIABLE SPEED

EVS001～EVS103

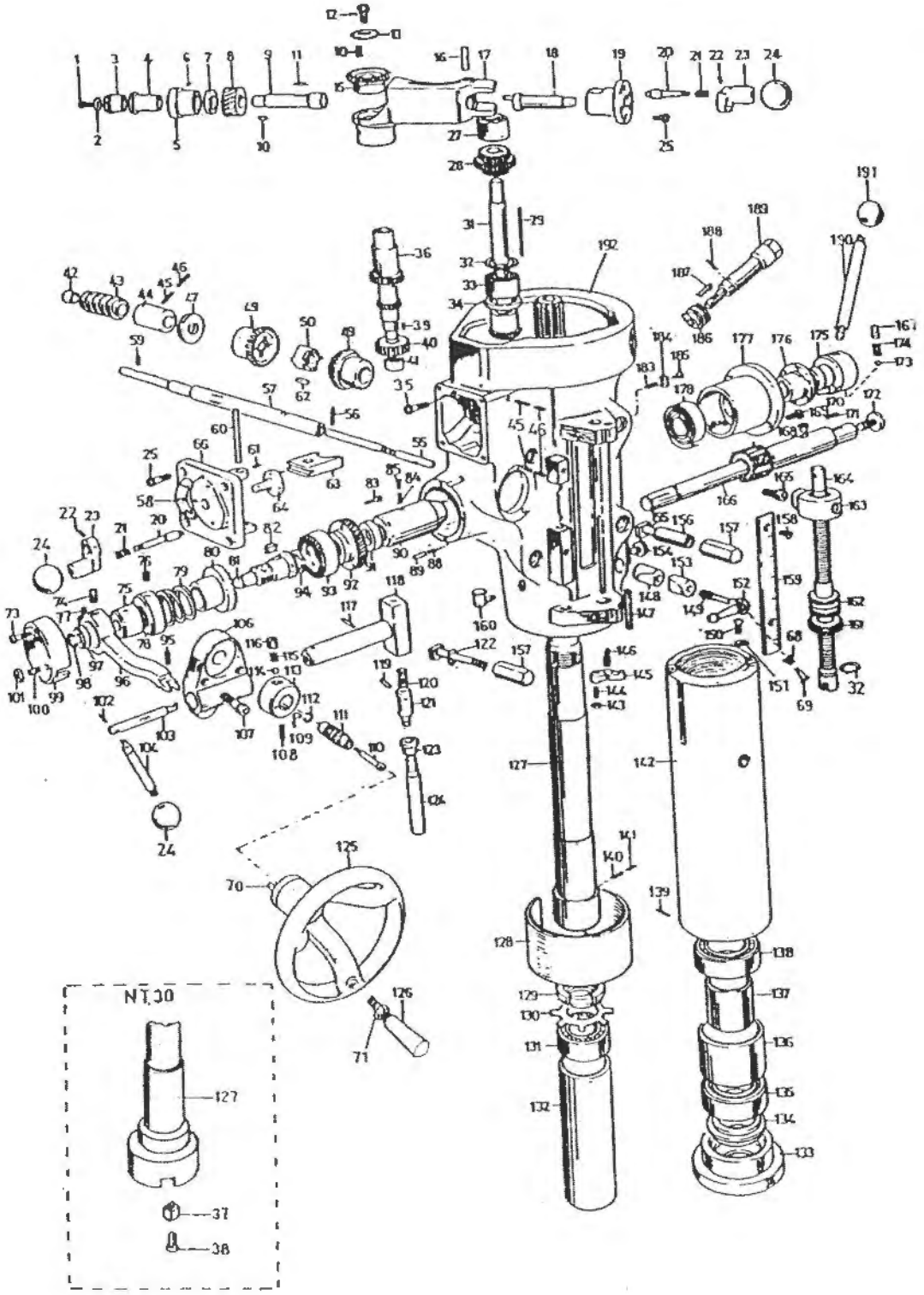


PARTS NO.	DESCRIPTION	SPEC.	Q' TY
EVS-001	DRAWBAR		1
EVS-002	WASHER		1
EVS-003	PULLEY SHAFT		1
EVS-004	KEY	6*25L	1
EVS-005	COLLAR	Φ54*Φ48*6.5t	1
EVS-006	TIMING BELT	225L-25W	1
EVS-007	KEY	8*12L	1
EVS-008	CLUTCH GEAR SHAFT		1
EVS-009	LARGE DRIVE GEAR		1
EVS-010	BEARING BUSHING		1
EVS-011	COLLAR		1
EVS-012	SPRING PLUNGER		3
EVS-013	SPRING		3
EVS-014	BEARING	6908 ZZ	2
EVS-016	BEARING SPACER HOUSING		1
EVS-017	CIRCLIP	R62	1
EVS-018	SPACER WASHER		1
EVS-019	SPRING WASHER	M40	2
EVS-020	LOCK NUT		1
EVS-021	GEAR HOUSING		1
EVS-022	ROUND HEAD ALLEN SCREW	M8*20L	6
EVS-023	BOLT		3
EVS-024	SPRING WASHER	7/16 "	?
EVS-025	HEXAGON NUT	7/16 "	3
EVS-026	QUILL FEED PLATE	A-12	1
EVS-027	HIGH/LOW SPEED PLATE	S-5	1
EVS-028	HEXAGON NUT	5/8 " *18NF*23	1
EVS-029	SPRING WASHER	5/8 "	1
EVS-030	TOOTTHED PULLEY		1
EVS-031	ROUND HEAD ALLEN SCREW	M5*16L	3
EVS-032	BEARING HOUSING		1
EVS-033	BEARING	6203 ZZ	2

EVS-034	GEAR SHAFT		1
EVS-037	KEY	5*15L	1
EVS-040	CLUTCH RING CONTROL SHAFT		1
EVS-041	HIGH/LOW SPEED PLATE		1
EVS-042	POSITIONING PIN		1
EVS-043	SPRING		1
EVS-044	SPRING PIN	Φ3*18L	1
EVS-045	ROUND HEAD ALLEN SCREW	M6*12L	2
EVS-046	ROUND HEAD ALLEN SCREW	M5*12L	2
EVS-047	CHANGE GEAR HANDLE BLOCK		1
EVS-048	CLUTCH HANDLE		1
EVS-049	PLASTIC KNOB	1/4 "	1
EVS-050	ROUND HEAD ALLEN SCREW	M6*20L	3
EVS-051	TOP BEARING COVER		1
EVS-052	BEARING	6007 ZZ	1
EVS-053	BELT HOUSING		1
EVS-054	NAME PLATE		1
EVS-055	RIVET	Φ2*6L	10
EVS-056	SPINDLE SPEED PLATE		1
EVS-057	V' BELT	3V-300	3
EVS-058	LOCK NUT		1
EVS-060	FRONT PULLEY	三槽	1
EVS-061	BEARING RETAINER		1
EVS-062	BRAKE BEARING HOUSING		1
EVS-063	ROUND HEAD ALLEN SCREW	M6*12L	2
EVS-064	BEARING	6010 ZZ	1
EVS-065	BEARING RETAINER		1
EVS-071	ROUND HEAD ALLEN SCREW	M6*16L	4
EVS-072	BRAKE BASE		1
EVS-088	SPINDLE MOTOR		1
EVS-089	ALLEN HEAD SCREW	M10*40L	4
EVS-090	WASHER	Φ10*Φ30*2t	4
EVS-091	ROUND HEAD ALLEN SCREW	M8*40L	2

EVS-092	ADJUSTING BLOCK		1
EVS-093	ALLEN HEAD SCREW	M8*35L	2
EVS-094	HEXAGON NUT	M8	4
EVS-095	SPRING WASHER	M8	2
EVS-097	KEY	10*8*40L	1
EVS-098	MOTOR PULLEY		1
EVS-099	SET RING		1
EVS-100	ROUND HEAD ALLEN SCREW	M5*20L	3
EVS-101	OIL CUP	1/8 "	1
EVS-102	ROUND HEAD ALLEN SCREW	3/16 " *3/8 "	8
EVS-103	COVER		2

5-4 MACHINE HEAD ASSEMBLY /B001~B192



PARTS NO.	DESCRIPTION	SPEC.	Q' TY
B-001	ALLEN HEAD SCREW	M5*10	1
B-002	PINION WASHER	M5	1
B-003	FEED BEVEL PINION		1
B-004	FEED WORM GEAR SHAFT SLEEVE		1
B-005	WORM CRADLE BUSHING		1
B-006	SET SCREW	1/4 " *1/4 "	2
B-007	WORM GEAR SPACER		1
B-008	FEED DRIVE WORM GEAR		1
B-009	FEED DRIVE WORM GEAR SHAFT		1
B-010	KEY	3*3*8	2
B-011	KEY	3*3*20	1
B-012	ALLEN HEAD SCREW	M8*12	1
B-013	WASHER	M8	1
B-015	FEED REVERSE BEVEL GEAR		1
B-016	FEED ENGAGE PIN		1
B-017	WORM GEAR CRADLE		1
B-018	ECCENTRIC SHAFT		1
B-019	SHAFT SLEEVE		1
B-020	GEAR SHAFT PLUNGER		2
B-021	COMPRESSION SPRING		2
B-022	ROLL PIN	3*20	2
B-023	SHAFT CRANK		2
B-024	BLACK PLASTIC BALL	1/4 "	3
B-025	ALLEN HEAD SCREW	M5*12	7
B-027	CLUSTER GEAR SHAFT UPPER BEARING		1
B-028	CLUSTER GEAR ASSEMBLY		1
B-029	KEY	3*3*45	1
B-031	CLUSTER GEAR SHAFT		1
B-032	CIRCLIP	S16	2
B-033	BEVEL GEAR BEARING		1
B-034	BEVEL GEAR THRUST SPACER		1
B-035	ALLEN HEAD SCREW	M6*25	1

B-036	FEED DRIVING GEAR		1
B-037	STOP BLOCK		2
B-038	ALLEN HEAD SCREW		2
B-039	KEY	3*3*8	1
B-040	FEED DRIVE GEAR		1
B-041	BEARING	BA66	1
B-042	BUSHING		1
B-043	BOSTON WORM		1
B-044	FEED WORM SHAFT BUSHING		1
B-045	LONG SOCKET SET SCREW	M8*8	3
B-046	SET SCREW	M6*8	3
B-047	FEED WORM SHAFT THRUST WASHER		1
B-049	FEED REVERSE BEVEL GEAR		2
B-050	FEED REVERSE CLUTCH		1
B-055	REVERSE CLUTCH ROD		1
B-056	LONG ROLL PIN	3*20	1
B-057	FEED WORM SHAFT		1
B-058	FEED PLATE		1
B-059	LONG PIN	3*12	1
B-060	LONG PIN		1
B-061	SET SCREW	M5*5	1
B-062	KEY	3*3*15	1
B-063	BACK GEAR SHAFT FORK		1
B-064	CLUSTER GEAR SHAFT FORK		1
B-066	CLUSTER GEAR COVER		1
B-068	SPRING		1
B-069	SCREW		1
B-070	SPRING PIN	3*15	1
B-071	HEXAGON NUT	5/16 "	1
B-073	ALLEN HEAD SCREW	M5*35	2
B-074	CLUTCH RING PIN		2
B-075	CLUTCH RING		1
B-076	SET SCREW	M6*6	1

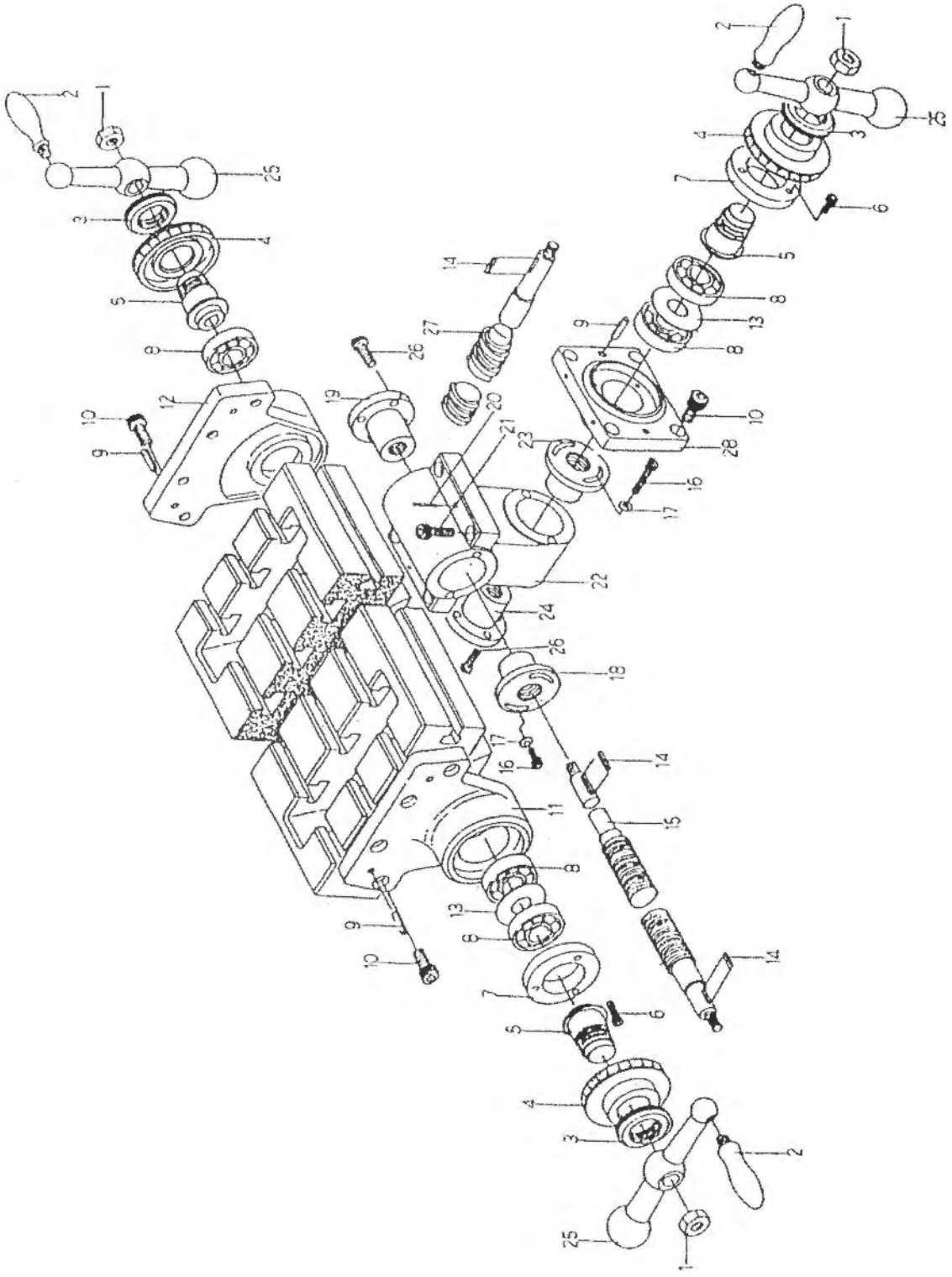
B-077	PIN	5*20	1
B-078	OVERLOAD CLUTCH LOCKNUT		1
B-079	SAFETY CLUTCH SPRING		1
B-080	OVERLOAD CLUTCH		1
B-081	OVERLOAD CLUTCH SLEEVE		1
B-082	KEY	5*8*13	1
B-083	ROUND HEAD SCREW	4*16	1
B-084	SET SCREW	M6*8	1
B-085	SET SCREW	M6*8	1
B-088	COMPRESSION SPRING		1
B-089	OVERLOAD CLUTCH LEVER SPRING PLUNGER		1
B-090	QUILL PINION SHAFT BUSHING		1
B-091	WORM GEAR SPACER		1
B-092	OVERLOAD CLUTCH WORM GEAR		1
B-093	OVERLOAD CLUTCH RING		1
B-094	KOHINOOR CIRCLIP	S15	1
B-095	DOWEL PIN	5*14	1
B-096	OVERLOAD CLUTCH TRIP LEVER		1
B-097	OVERLOAD CLUTCH WASHER		1
B-098	SNAP RING	E9, S10	1
B-099	CLUTCH ARM COVER		1
B-100	SET SCREW	M6*16	1
B-101	HEXAGON NUT	M6	1
B-102	DOWEL PIN		1
B-103	CAM ROD		1
B-104	CAM ROD		1
B-106	FEED TRIP BRACKET		1
B-107	ALLEN HEAD SCREW	M6*20	2
B-108	SET SCREW	M6*20	1
B-109	KEY	3*3*10	1
B-110	FEED REVERSE KNOB STUD		1
B-111	REVERSE KNOB		1
B-112	SNAP RING	E5	1

B-113	HANDWHEEL CLUTCH		1
B-114	STEEL BALL	3/16 "	1
B-115	COMPRESSION SPRING		1
B-116	SET SCREW	M8*8	1
B-117	LONG ROLL PIN	3*14	1
B-118	CAM ROD SLEEVE ASSEMBLY		1
B-119	LONG ROLL PIN	3*12	1
B-120	COMPRESSION SPRING		1
B-121	TRIP PLUNGER		1
B-122	SPRING WASHER	1/2 "	2
B-123	TRIP PLUNGER BUSHING		1
B-124	FEED TRIP PLUNGER		1
B-125	HANDWHEEL		1
B-126	HANDWHEEL HANDLE		1
B-127	SPINDLE	R8/NT30/NT40	1
B-128	QUILL SKIRT		1
B-129	LOCKNUT	AN06	1
B-130	CIRCLIP	AN06	1
B-131	BEARING	6206 2Z	1
B-132	SLEEVE		1
B-133	NOSE PIECE		1
B-134	SPINDLE DIRT SHIELD		1
B-135	BEARING	7207	1
B-136	BEARING SPACER		1
B-137	BEARING SPACER		1
B-138	BEARING	7207	1
B-139	SET SCREW	M5*5	1
B-140	SET SCREW	M6*6	1
B-141	SET SCREW		1
B-142	QUILL		1
B-143	HEXAGON NUT	M4	1
B-144	SET SCREW	M4*16	1
B-145	FEED TRIP LEVER		1

B-146	ADJUSTING SCREW		1
B-147	INDICATOR ROD		1
B-148	DRILLED LOCK SLEEVE		1
B-149	QUILL LOCK BOLT		1
B-150	ROUND HEAD PHILIPS SCREW	M5*10	1
B-151	WASHER	M5	2
B-152	LOCK HANDLE		2
B-153	QUILL LOCK SLEEVE TAPPED		1
B-154	INDICATOR ROD SCREW		1
B-155	TEE BOLT		1
B-156	LOWER CLAMPING BOLT SPACER		4
B-157	ADAPTOR NUT		2
B-158	ROUND HEAD PHILIPS SCREW	M4*6	4
B-159	MICROMETER SCALE		2
B-160	OIL CUP	1/8PT	1
B-161	QUILL MICRO-STOP NUT		1
B-162	MICROMETER NUT		1
B-163	QUILL STOP KNOB		1
B-164	QUILL MICRO STOP SCREW		1
B-165	ALLEN HEAD SCREW	3/8 " *5/8 "	1
B-166	QUILL PINION SHAFT		1
B-167	SET SCREW	M6*6	1
B-168	SPRING PIN		1
B-169	ALLEN HEAD SCREW	M5*12	2
B-170	LONG DOWEL PIN		1
B-171	KEY	3*3*20	1
B-172	PINION SHAFT HUB SLEEVE		1
B-173	STEEL BALL	3/16 "	1
B-174	COMPRESSION SPRING		1
B-175	RACK FEED HANDLE HUB		1
B-176	PINION SHAFT HUB SLEEVE		1
B-177	SPRING COVER		1
B-178	CLOCK SPRING		1
B-183	REVERSE TRIP BALL LEVER		1

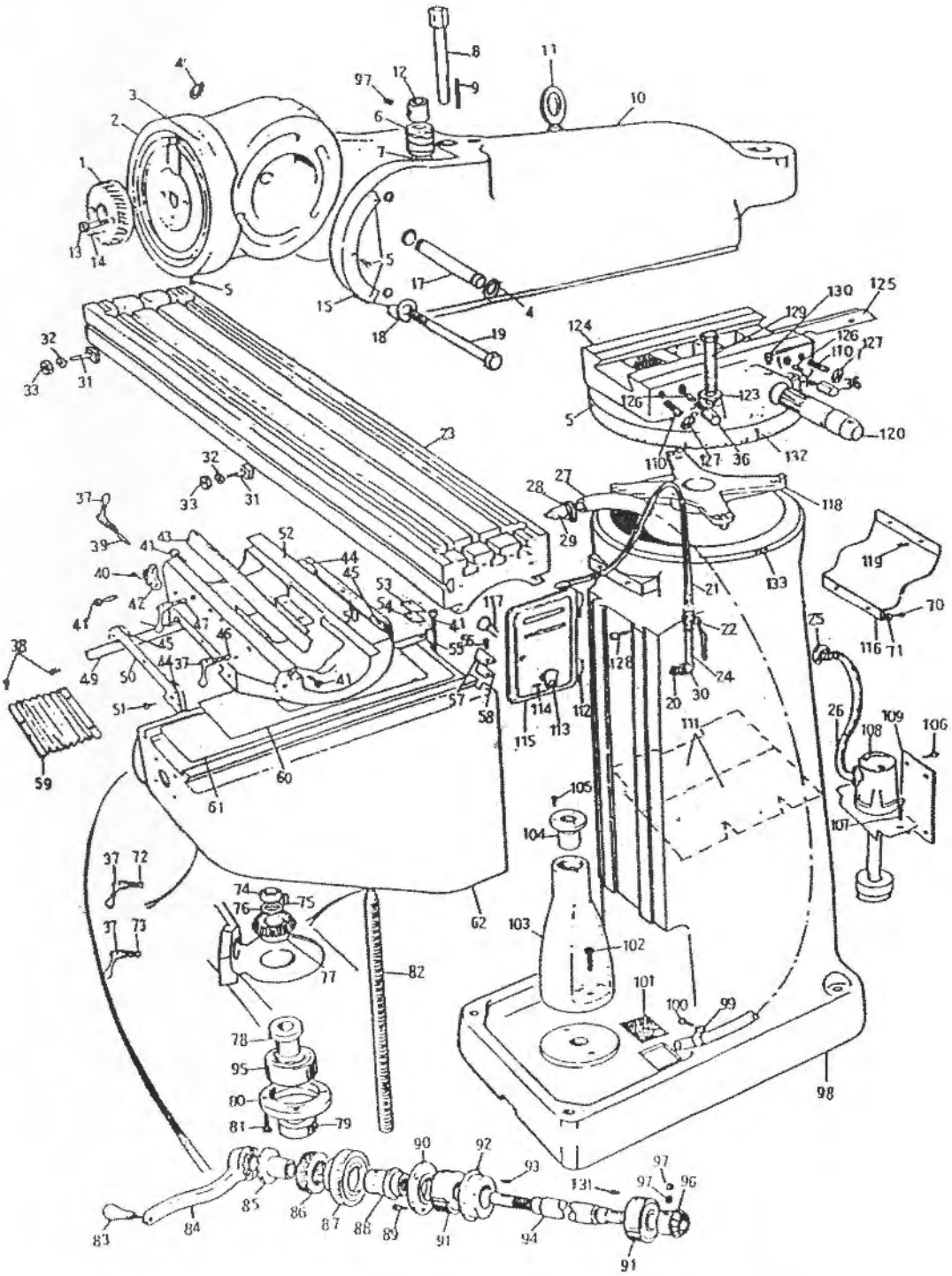
B-184	FEED REVERSE TRIP PLUNGER		1
B-185	REVERSE TRIP BALL LEVER SCREW		1
B-186	WORM GEAR		1
B-187	KEY	4*4*18	1
B-189	ADJUSTING WORM SHAFT		1
B-190	PINION SHAFT HUB HANDLE		1
B-191	BLACK PLASTIC KNOB HANDLE	3/8 "	1
B-192	QUILL HOUSING		1

5-5 X.Y AXIS LEADSCREW ASSEMBLY /D001~D028



PARTS NO.	DESCRIPTION/	SPEC.	Q' TY
D-001	HEXAGON NUT	1/2 " *20NF	3
D-002	HANDLE		3
D-003	DIAL LOCK NUT		3
D-004	DIAL	5mm(0.2inch)	3
D-005	DIAL HOLDER		3
D-006	ALLEN HEAD SCREW	M6*12	6
D-007	BEARING RETAINER RING		2
D-008	BEARING	6204 ZZ	5
D-009	SPRING PIN	Φ5*30	6
D-010	ALLEN HEAD SCREW	M10*25	12
D-011	LEFT BEARING BRACKET		1
D-012	RIGHT BEARING BRACKET		1
D-013	BEARING SPACER		4
D-014	KEY	3*3*25	3
D-015	LONGITUDINAL SCREW		1
D-016	ALLEN HEAD SCREW	M6*20	4
D-017	WASHER	M6	4
D-018	LONGITUDINAL ADJUSTING NUT		1
D-019	LONGITUDINAL NUT		1
D-020	SPRING PIN	Φ5*30	2
D-021	ALLEN HEAD SCREW	M10*25	4
D-022	FEED NUT BRACKET		1
D-023	CROSS ADJUSTING NUT		1
D-024	CROSS NUT		1
D-025	HAND WHEEL		3
D-026	ALLEN HEAD SCREW	M6*20	6
D-027	CROSS FEED SCREW		1
D-028	CROSS FEED BEARING BRACKET		1

5-6 BASIC MACHINE ASSEMBLY /2C001~2C133



PARTS NO.	DESCRIPTION	SPEC.	Q' TY
2C-001	QUILL HOUSING ADJUSTMENT GEAR		1
2C-002	RAM ADAPTOR		1
2C-003	ADAPTOR SCALE		1
2C-004	ADAPTOR PIVOT STUD CIRCLIP	S28	2
2C-005	RIVET		11
2C-006	VERTICAL ADJUSTING WORM SHAFT		1
2C-007	WORM THRUST WASHER		1
2C-008	VERTICAL ADJUSTING WORM SHAFT		1
2C-009	KEY	5*5*50	1
2C-010	RAM		1
2C-011	LIFTING HOOK	3/4 "	1
2C-012	SLEEVE		1
2C-013	ALLEN HEAD SCREW	M6*25	2
2C-014	SPRING PIN	8*30	1
2C-015	ANGLE PLATE		1
2C-017	ADAPTOR PIVOT STUD		1
2C-018	SPRING WASHER	1/2 "	3
2C-019	ADAPTOR LOCKING BOLT		3
2C-020	NIPPLE CONNECTOR	3/8 " *1/2 "	1
2C-021	COOLANT OIL HOSE		1
2C-022	BALL VALVE	3/8 " PT	1
2C-023	TABLE		1
2C-024	PIPE		1
2C-025	HOSE CLIP		2
2C-026	PLASTIC HOSE		1
2C-027	PLASTIC HOSE		2
2C-028	HOSE CLIP		2
2C-029	CONNECTOR		2
2C-030	ELBOW CONNECTOR		1
2C-031	STOP PIECE T-BOLT		2
2C-032	TABLE STOP PIECE		2

2C-033	HEXAGON NUT	3/8 "	2
2C-037	TABLE LOCK BOLT HANDLE		5
2C-039	SADDLE LOCK PLUNGER		1
2C-040	ALLEN HEAD SCREW	3/8 " *3/4 "	2
2C-041	STRIP ADJUSTING SCREW		6
2C-042	TABLE STOP BRACKET		1
2C-043	GIB		1
2C-044	WIPER		2
2C-045	WIPER		2
2C-046	TABLE LOCK PLUNGER		1
2C-047	TABLE LOCK PLUNGER		1
2C-049	SIDE RAKED GIB		1
2C-050	WIPER		2
2C-051	ROUND HEAD PHILIPS SCREW	3/16 " *1/2 "	6
2C-052	SADDLE		1
2C-053	WIPER		1
2C-054	WIPER		1
2C-055	GIB		1
2C-056	ROUND HEAD PHILIPS SCREW	M6*12	2
2C-057	WIPER		1
2C-058	WIPER		1
2C-059	FRONT CHIP GUARD		1
2C-060	Y AXIS SCREW COVER SET		1
2C-061	CHIP GUARD		1
2C-062	KNEE		1
2C-070	ROUND HEAD PHILIPS SCREW	3/16 " *1/2 "	2
2C-071	WASHER	3/16 "	2
2C-072	KNEE LOCK PLUNGER		1
2C-073	KNEE LOCK PLUNGER		1
2C-074	HEXAGON NUT	1/2 " -20NF	1
2C-075	KEY	5*5*20	1
2C-076	WASHER	1/2 "	1
2C-077	BEVEL GEAR		1

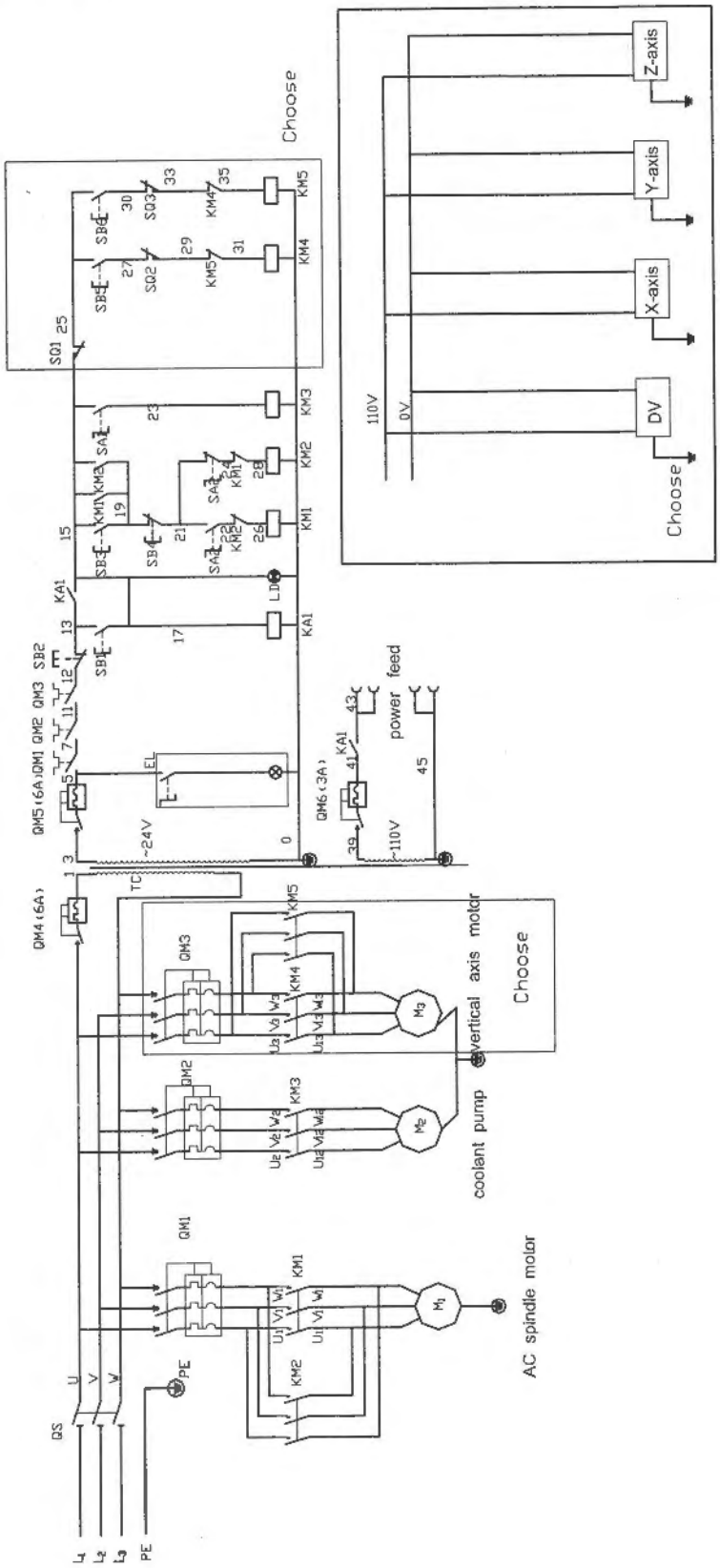
2C-078	BEARING BUSH		1
2C-079	DISTANCE BUSH		1
2C-080	BEARING RETAINER RING		1
2C-081	ALLEN HEAD SCREW	M6*20	3
2C-082	ELEVATING CRANK		1
2C-083	HANDLE		1
2C-084	ELEVATING CRANK		1
2C-085	GEAR SHAFT CLUTCH INSERT		1
2C-086	DIAL LOCK NUT		1
2C-087	DIAL		1
2C-088	DIAL HOLDER		1
2C-089	ALLEN HEAD SCREW	M6*20	3
2C-090	BEARING RETAINER RING		1
2C-091	BEARING	6204 2Z	2
2C-092	BEARING BASE		1
2C-093	KEY	3*3*18	2
2C-094	ELEVATING SHAFT		1
2C-095	BEARING	6207 2Z	1
2C-096	BEVEL DRIVE GEAR		1
2C-097	SET SCREW	M6*6	3
2C-098	COLUMN		1
2C-099	WATER HOSE SOLID COLLET	3/4 "	2
2C-100	ROUND HEAD PHILIPS SCREW	3/16 " *1/2 "	2
2C-101	FILERATION COVER		2
2C-102	ALLEN HEAD SCREW	M10*25	2
2C-103	ELEVATING SCREW HOUSING		1
2C-104	NUT		1
2C-105	ALLEN HEAD SCREW	M6*20	3
2C-106	ROUND HEAD PHILIPS SCREW	3/16 " *3/8 "	4
2C-107	ALLEN HEAD SCREW	M6*20	2
2C-108	COOLANT PUMP	1/8HP	1
2C-109	PUMP COVER PLATE		1
2C-110	SET SCREW		2

2C-111	COLUMN CABINET BASE		1
2C-112	HINGE PIN	5*30	2
2C-113	DOOR LOCKING CAM		1
2C-114	SET SCREW	M6*6	1
2C-115	DOOR		1
2C-116	REAR CHIP GUARD		1
2C-117	DOOR KNOB		1
2C-118	COLUMN COLLAR SPIDER		1
2C-119	ROUND HEAD PHILIPS SCREW	M6*12	2
2C-120	RAM PINION		1
2C-123	SPRING WASHER	1/2 "	4
2C-124	SWIVEL		1
2C-125	GIB		1
2C-126	LOCK PLUNGER		2
2C-127	HEXAGON NUT	3/8 "	2
2C-128	ALLEN HEAD SCREW	M10*20	1
2C-129	FIXING BOLT		4
2C-130	SET SCREW		1
2C-131	KEY	4*4*18	1
2C-132	SCALE		1
2C-133	SCALE POINTER		1

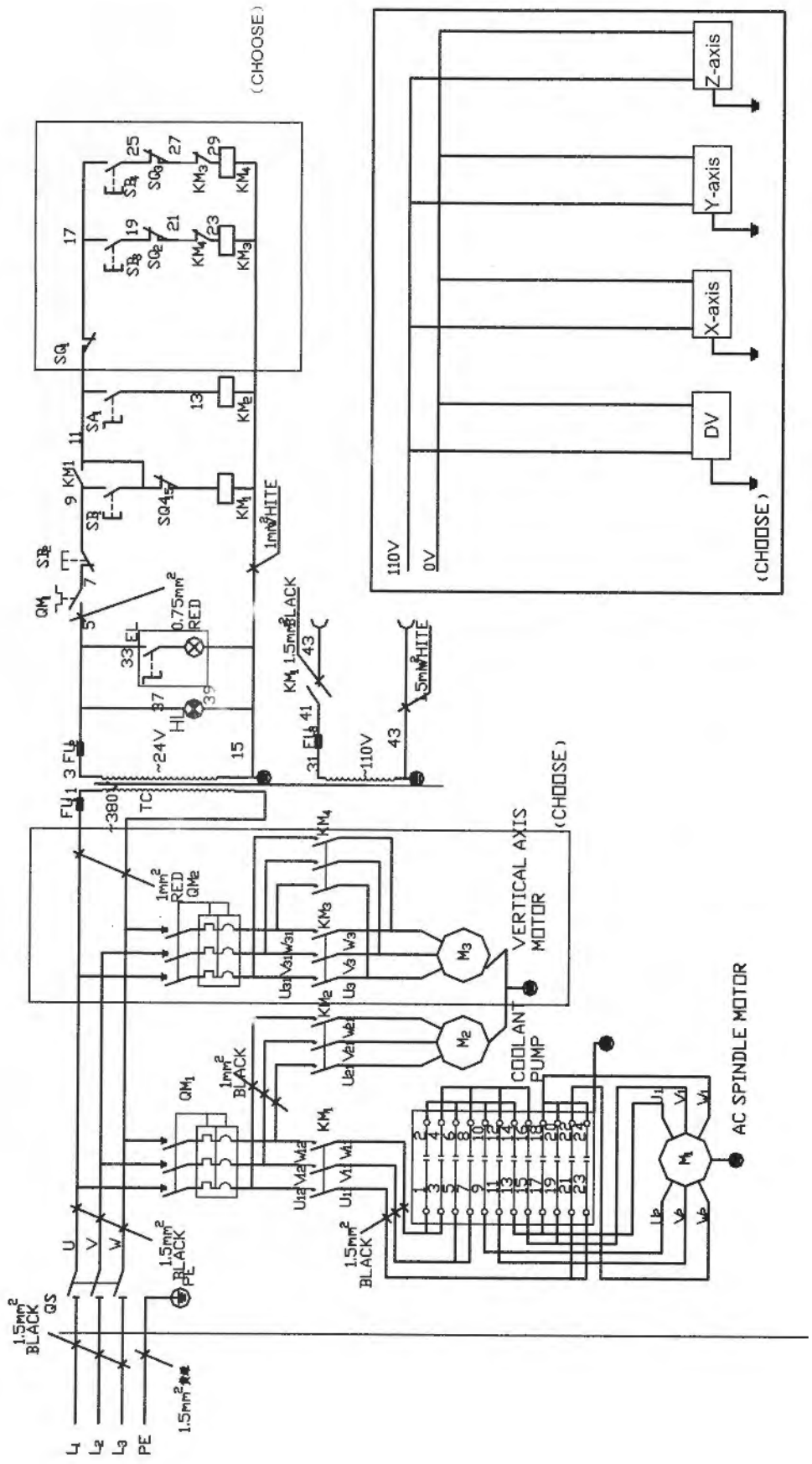
CHAPTER 6. ELECTRICAL CIRCUIT DIAGRAM

Select electrical diagrams according to actual configuration of machine.

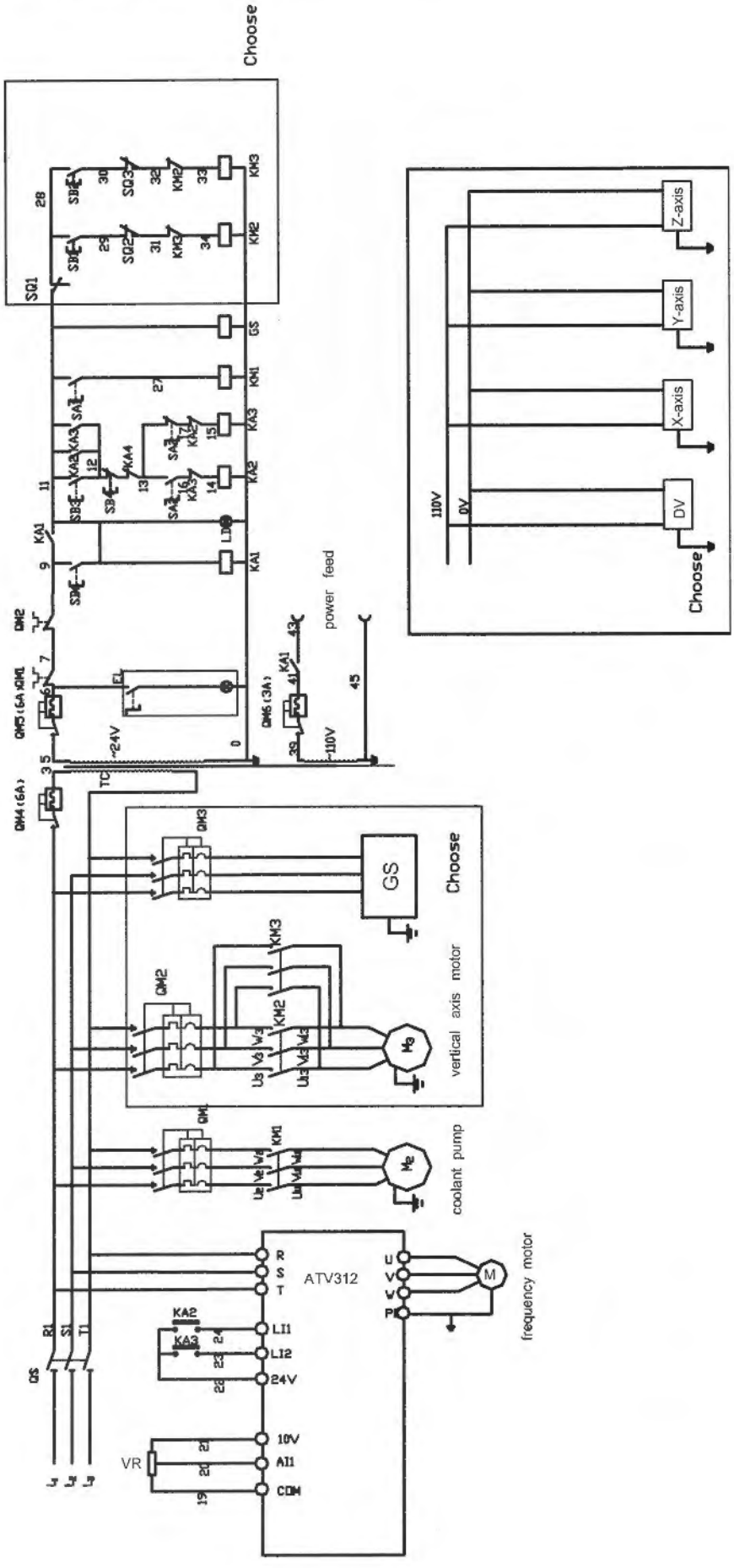
1) Ordinary spindle drive motor

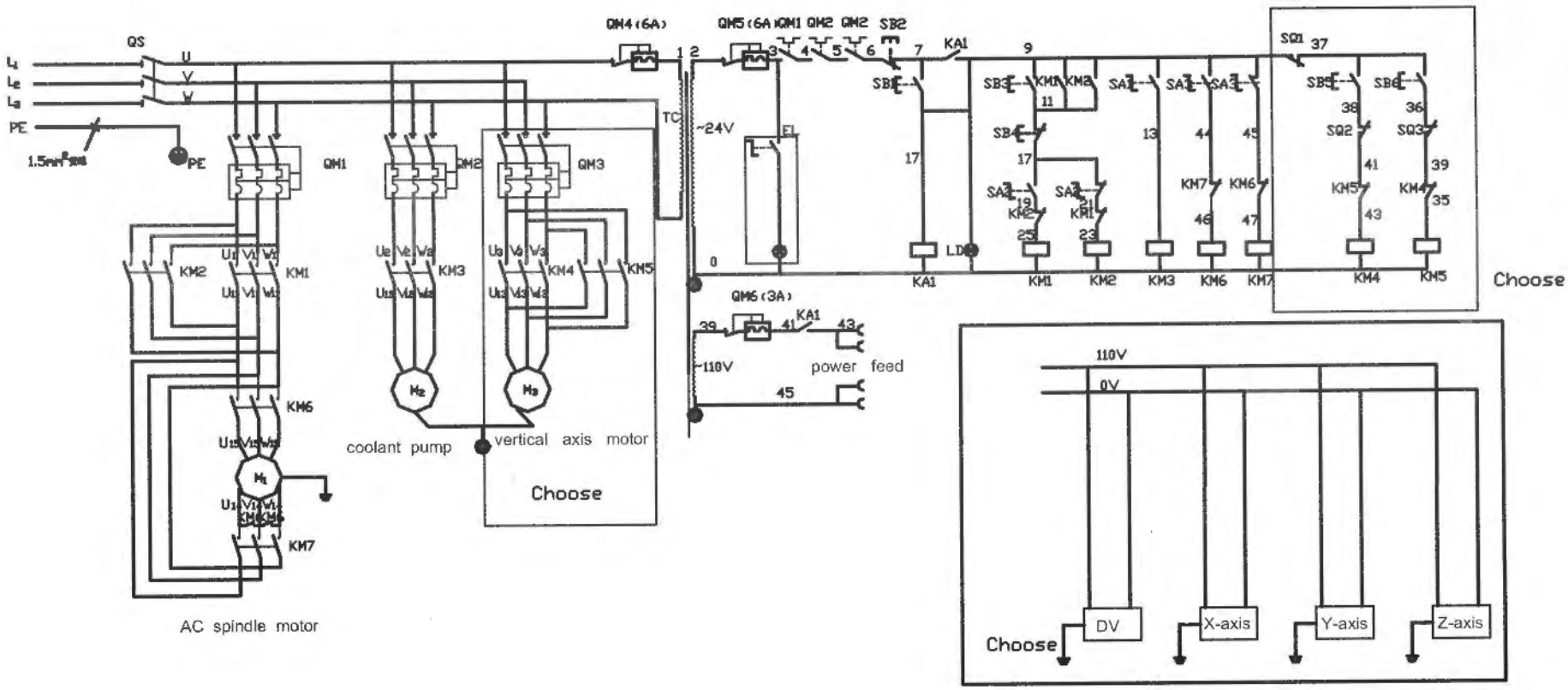


2) Small power box ordinary spindle drive motor



3) Frequency spindle drive motor




QS
U
V
W
PE
1.5mm²
PE
QM1
QM2
QM3
QM4(6A)
QM5(6A)
KM1
KM2
KM3
KM4
KM5
KM6
KM7
SB2
SB1
KA1
TC
~24V
EL
LD
QM6(3A)
~110V
power feed
coolant pump
vertical axis motor
Choose
AC spindle motor
SQ1
SQ2
SQ3
SB3
SB4
SB5
SB6
SA1
SA2
110V
0V
DV
X-axis
Y-axis
Z-axis
Choose