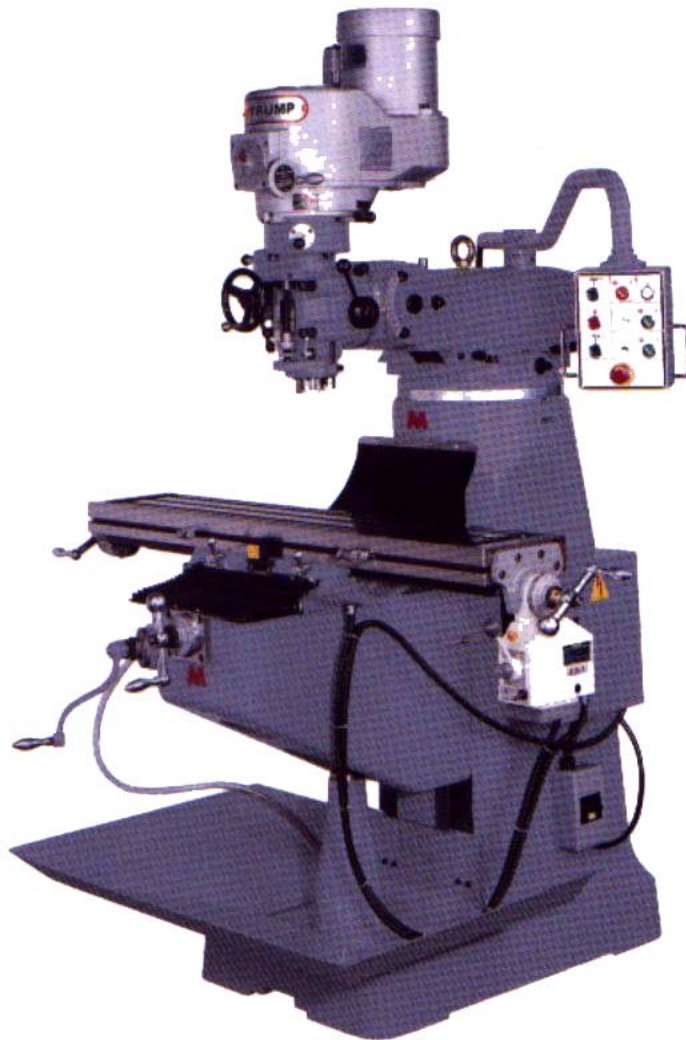


OPERATING MANUAL

HEALTH AND SAFETY
GUIDANCE NOTES
MODEL: K2S 、 K2V



DATE: 2001/05/11

VERSION: 3

1. Operating safety guidelines	1-1
1.1 Operating safety precautions	1-1
1.2 Machine operators precautions	1-1
1.3 Warning signs and marks on the machine	1-2
1.4 Safety devices and inspection	1-4
2. Machine specifications	2-1
2.1 Specification	2-1
3. Names of machine parts	3-1
3.1 Headstock of k2v	3-2
3.2 Headstock of k2s	3-3
3.3 Machine body	3-4
4. Position and noise level	4-1
4.1 Position and noise lever	4-1
4.2 Spindle noise detail	4-2
5. Lubrication	5-1
5.1 Headstock lubrication	5-1
5.2 Machine table lubrication	5-2
6. Instruction in operations	6-1
6.1 Headstock	6-1
6.1.1 Spindle switch	6-1
6.1.2 Spindle brake	6-1
6.1.3 Chucking of tooling shank and dismantling	6-1
6.1.4 Manual feed	6-1
6.1.5 Manual micro motion feed	6-2
6.1.6 Automatic feed	6-2
6.1.7 Speed change of spindle	6-3
6.1.8 Headstock tilting	6-6
6.2 Machine body operations	6-7
6.2.1 Ram movement and swiveling	6-7
6.2.2 Zero positioning of dial ring of table feed	6-8
6.2.3 Setting of sliding surfaces of work table, saddle and knee	6-8
7. Transport, unpacking and floor space	7-1
7.1 Methods of transport	7-1
7.2 Cautions for unpacking	7-2

7.3 Floor space	7-3
8. Precision alignment	8-1
9. Trouble shooting	9-1
9.1 Dismantling of motor	9-1
9.2 Replacement of speed change belt	9-2
9.3 Replacement of brake block	9-3
9.4 Replacement of timing belt	9-4
9.5 Replacement of v-belt of k2s	9-5
10. Adjustment	10-1
10.1 Adjustment of backlash of lead screw	10-1
10.1.1 Adjustment of cross lead screw	10-1
10.1.2 Adjustment of backlash of longitudinal lead screw	10-2
10.2 Adjustment of play between gibs	10-2
10.2.1 Adjustment of work table gibs	10-2
10.2.2 Adjustment of saddle gib	10-3
10.2.3 Adjustment of knee gib	10-4
10.2.4 Adjustment of ram gib	10-5
10.2.5 Replacement of collect aligning screw	10-5
11. Maintenance	11-1
11.1 Daily maintenance	11-1
11.2 Monthly maintenance	11-1
11.3 Quarterly maintenance	11-1
12.Parts list	12-1
12.1 Head stock upside of k2s (1)	12-1
12.2 Head stock upside of k2s (2)	12-3
12.3 Head stock upside of k2v (1)	12-5
12.4 Head stock upside of k2v (2)	12-7
12.5 Head stock upside of k2v (3)	12-9
12.6 Head stock infrastructure (1)	12-11
12.7 Head stock infrastructure (2)	12-13
12.8 Head stock infrastructure (3)	12-15
12.9 Head stock infrastructure (4)	12-17

12.10 Column assembly	12-19
12.11 Knee assembly	12-21
12.12 Table, saddle assembly	12-23
13. Summart of the electrical	13-1
13.1 Electrical components and layout (ce option)	13-1
13.2 Control panel, switches and symbols (ce option)	13-2
13.3 Power circuit	13-3
13.3.1 Wiring diagram for stand ard electric box three phase	13-3
13.3.2 Wiring diagram for simple electric box three phase	13-4
13.3.3 Power circuit (ce option)	13-5
13.4 Schedule of electrical equipment (ce option)	13-7


1. OPERATING SAFETY GUIDELINES

1.1 OPERATING SAFETY PRECAUTIONS

- a. The operator must be technician who is trained in the operation and familiar with the manual
- b. Never lay anything on the working surfaces of the machine, where it may foul with rotating or moving parts.
- c. Do not touch or reach over moving or rotating machine parts.
- d. Ensure you know how to stop the machine before starting it.
- e. Do not operate the machine in excess of its rated capacity.
- f. Do not wear rings, watches, ties or loose sleeved clothing.
- g. Stop machine immediately anything unexpected happens.
- h. Do not cutting Mg metal.
- i. Always select the correct tool for the job.
- j. Do not run the machine unattended.
- k. Do not place hand or body in path of moving objects.
 - l. Know the function of each and every control.
- m. Make sure power has been turned off when machine is unused for sometime.
- n. Be sure spindle is not running when using gauges on the machine.
- o. Never take depth of cuts beyond machine's capability.

1.2 MACHINE OPERATORS PRECAUTIONS

- a. The machine is to be started or operated by an authorized operator only.
- b. Immediate stop and repair are needed in case of troubles in operations.
- c. In installation, the machine shall be connected to earth.
- d. In stop motion, the feed lever shall be placed in the neutral position.
- e. The machine should be stopped during the inspection on the work pieces.
- f. In clamping, check and ensure if the work pieces are firmly vise.
- g. The spindle must be kept clean and lubricated all the time.
- h. Do not place any tools on the work table to maintain its surface preciseness and smoothness.
- i. Prior to cutting, wait until the spindle is running steadily after the motor is started.
- j. Use brush to clean off the iron fragments.

	<p>WARNING</p> <p>Shearing Hazard. Transmission parts can cause injury. Keep hand away from it. Please turn off the power before to do any maintenance work.</p>
---	--

	<p>WARNING</p> <p>Moving parts. Can cause injury. Keep hands away.</p>
---	--

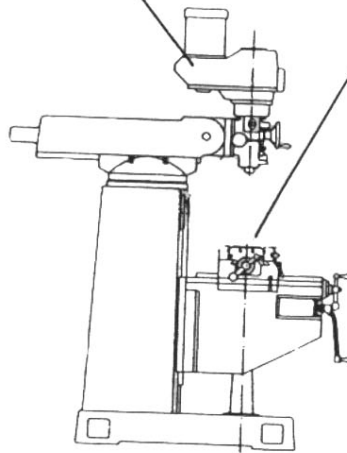


FIG1-1

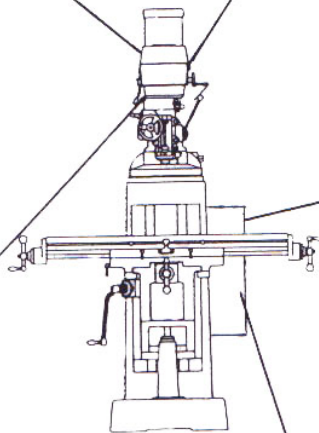


WARNING


IMPROPER INSTALLATION OR OPERATION OF THIS MOTOR MAY CAUSE INJURY TO PERSONNEL OR MOTOR FAILURE. READ OPERATION INSTRUCTION.

MOTOR MUST BE INSTALLED AND GROUNDED PER LOCAL AND NATIONAL ELECTRICAL CODES. TO REDUCE POTENTIAL OF ELECTRIC SHOCKS. DISCONNECT ALL POWER SOURCES BEFORE INITIATING AND MAINTENANCE OR REPAIRS.

KEEP FINGERS AND FOREIGN OBJECTS AWAY FROM VENTILATION AND OTHER OPENINGS. KEEP AIR PASSAGES CLEAR. EYEBOLTS OR LIFTING HOOKS WHEN SUPPLIED ARE INTENDED FOR LIFTING THE PRODUCTS ONLY. DON'T LIFT ADDITIONAL WEIGHT.

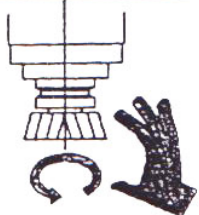


⚠ DANGER



1. High voltage inside. it may make people being killed.
2. Please turn off the power before to do any service work.
3. The cabinet can be opened only by qualified personnel.

⚠ DANGER



Entanglement Hazard
Keep your hands away from the running tooling.



FIG1-2

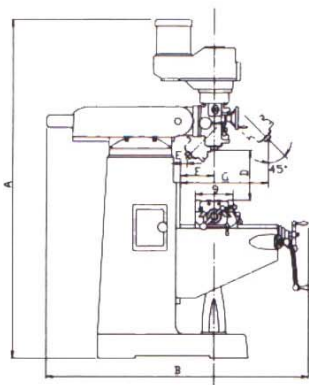
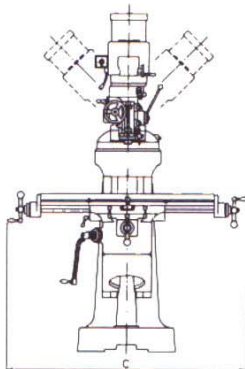


FIG1-3

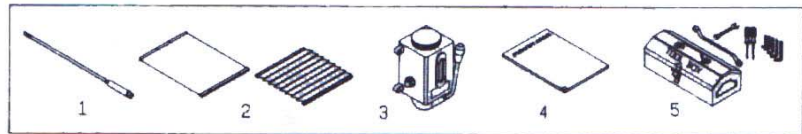
2.1 SPECIFICATION

	K2V	K2S
WORK TABLE	STD. 1066 x 228mm (42"x9") OPT. 1245 x 228mm (49"x9")	
X AXIS TRAVEL	STD. 770mm (30 - 1/4") OPT. 948mm (37 - 1/4")	
Y AXIS TRAVEL	325mm (12 - 3/4")	
Z AXIS TRAVEL	430mm (17")	
QUILL DIAMETER	Ø86mm (3 - 3/8")	
QUILL TRAVEL	125mm (4 - 7/8")	
QUILL FEED	0.0508, 0.1016, 0.1524mm (0.002", 0.004", 0.006")	
SPINDLE TAPER	R8 OR N.S.T. #30	
SPINDLE MOTOR	3HP/4P	2HP/2P/4P
SPINDLE SPEED 50Hz	58 - 3600RPM (VARIABLE) 65 - 2330RPM (4 - STEP) 2P/4P: 65 - 4660RPM	
60Hz	70 - 4200RPM (VARIABLE) 80 - 2800RPM (4 - STEP) 2P/4P: 80 - 5600RPM	
A. OVERALL HEIGHT	2120mm (83 - 1/2")	
B. OVERALL DEPTH	1706mm (67 - 1/8")	
C. OVERALL WIDTH	1466mm (57 - 3/4")	
D. MIN. - MAX. DISTANCE	60 - 490mm (2 - 3/8" - 19 - 1/4")	
E. MIN. - MAX. DISTANCE	0 - 493mm (0 - 19 - 3/8")	
F. MIN. - MAX. DISTANCE	114 - 504mm (4 - 1/2" - 19 - 3/4")	
G. MIN. - MAX. DISTANCE	127 - 517mm (5" - 20 - 3/8")	
NET WEIGHT	1010kg	
PACKED SIZE	140 x 133 x 196cm (1 SET / CRATE)	228 x 133 x 196cm (3 SET / CRATE)

OVERALL DIMENSION

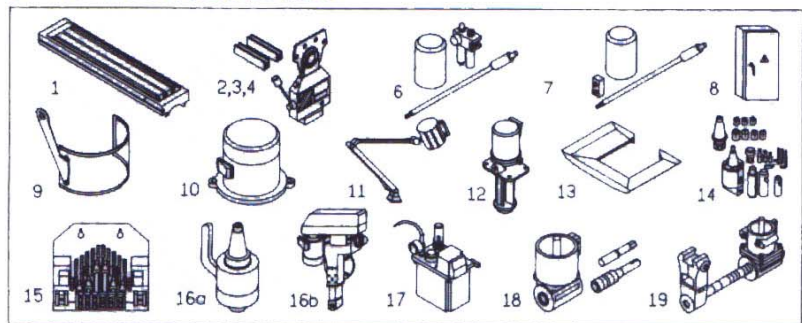


STANDARD EQUIPMENTS



1. DRAW BAR
2. SLIDWAYS COVER
3. ONE SHOT LUBRICATION
4. OPERATION MANUAL
5. TOOLS & TOOL BOX

OPTIONAL ACCESSORIES



1. LARGER WORK TABLE
2. X AXIS POWER FEED
3. Y AXIS POWER FEED
4. Z AXIS POWER FEED
6. PNEUMATIC POWER DRAW BAR
7. ELECTRIC POWER DRAW BAR
8. ELECTRIC BOX
- 8a. CE ELECTRIC BOX
9. CHIP GUARD
10. 2P/4P 2-SPEED MOTOR(K2S)
11. HALOGEN WORK LIGHT
12. COOLANT SYSTEM
13. CHIP TRAY
14. MILLING CHUCK W/ COLLETS
15. CLAMPING KITS
- 16a. QUICK CHANGE SLOTING UNIT
- 16b. SLOTING UNIT
17. AUTO LUBRICATION SYSTEM
18. RIGHT ANGLE ATTACHMENT
19. HORIZONTAL MILLING ATTACHMENT

3. NAMES OF MACHINE PARTS

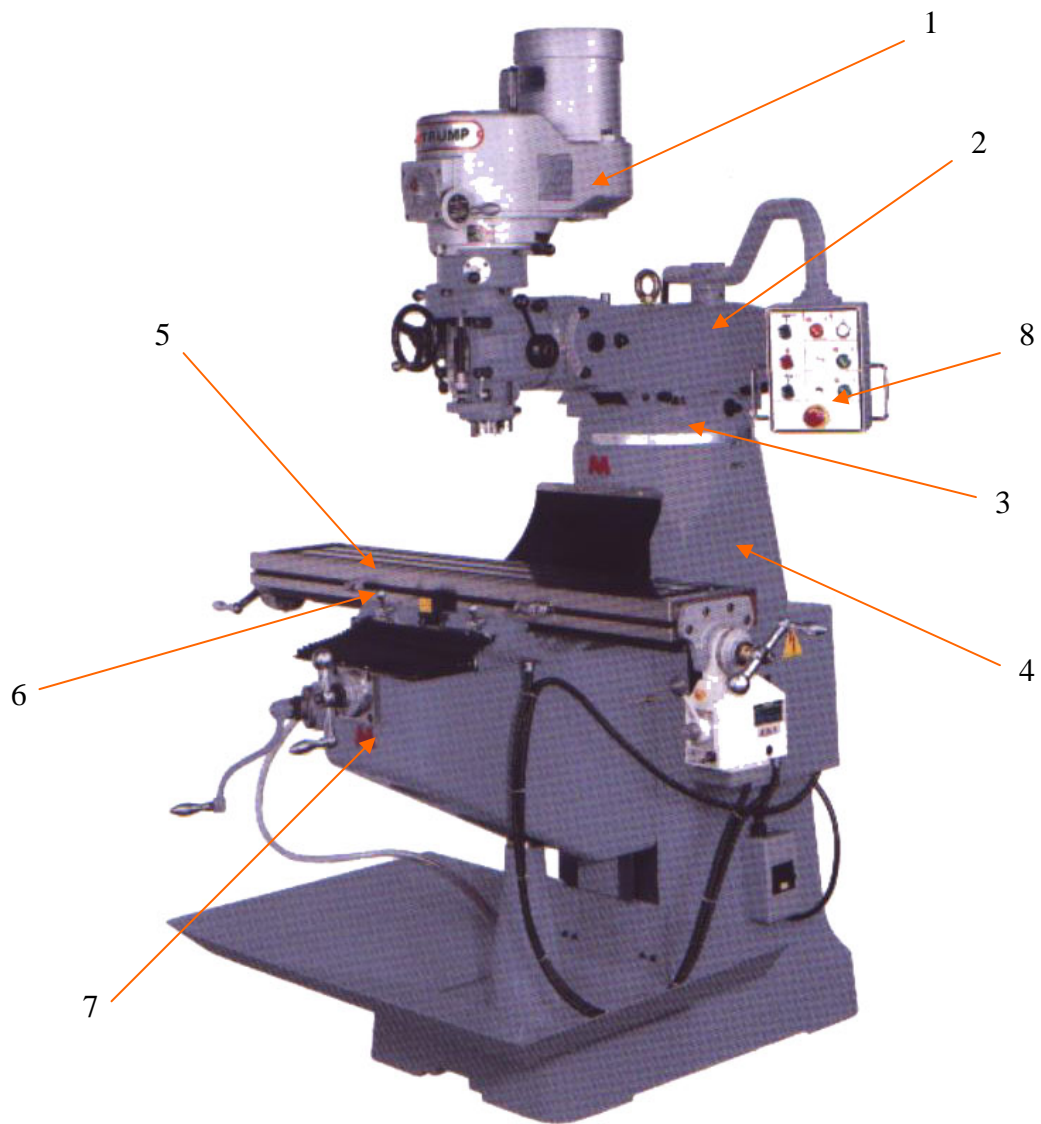


FIG3-1

1	Milling head stock
2	RAM
3	Turret
4	Column
5	Work table
6	Saddle
7	Knee
8	Operating plate

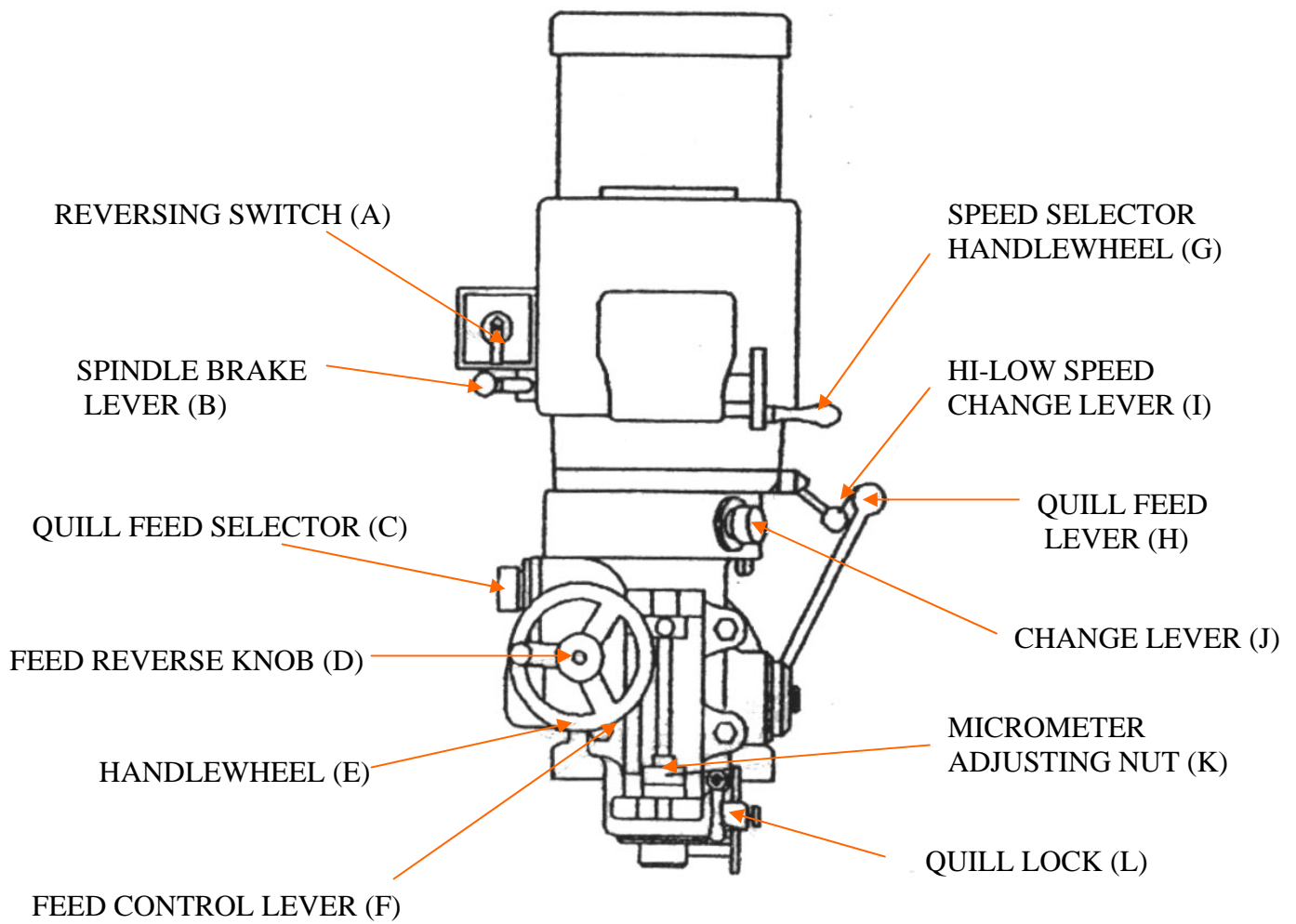


FIG3-2

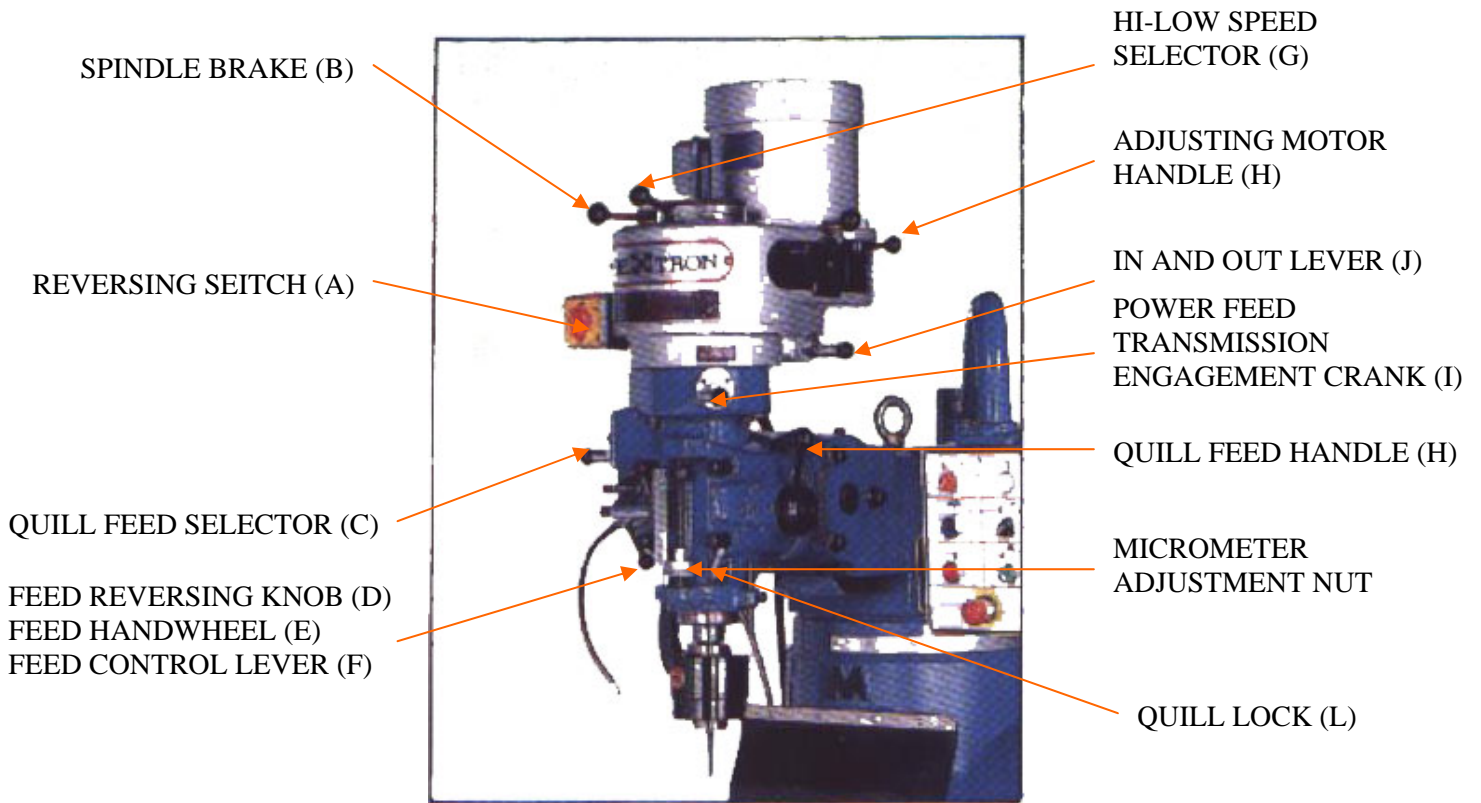
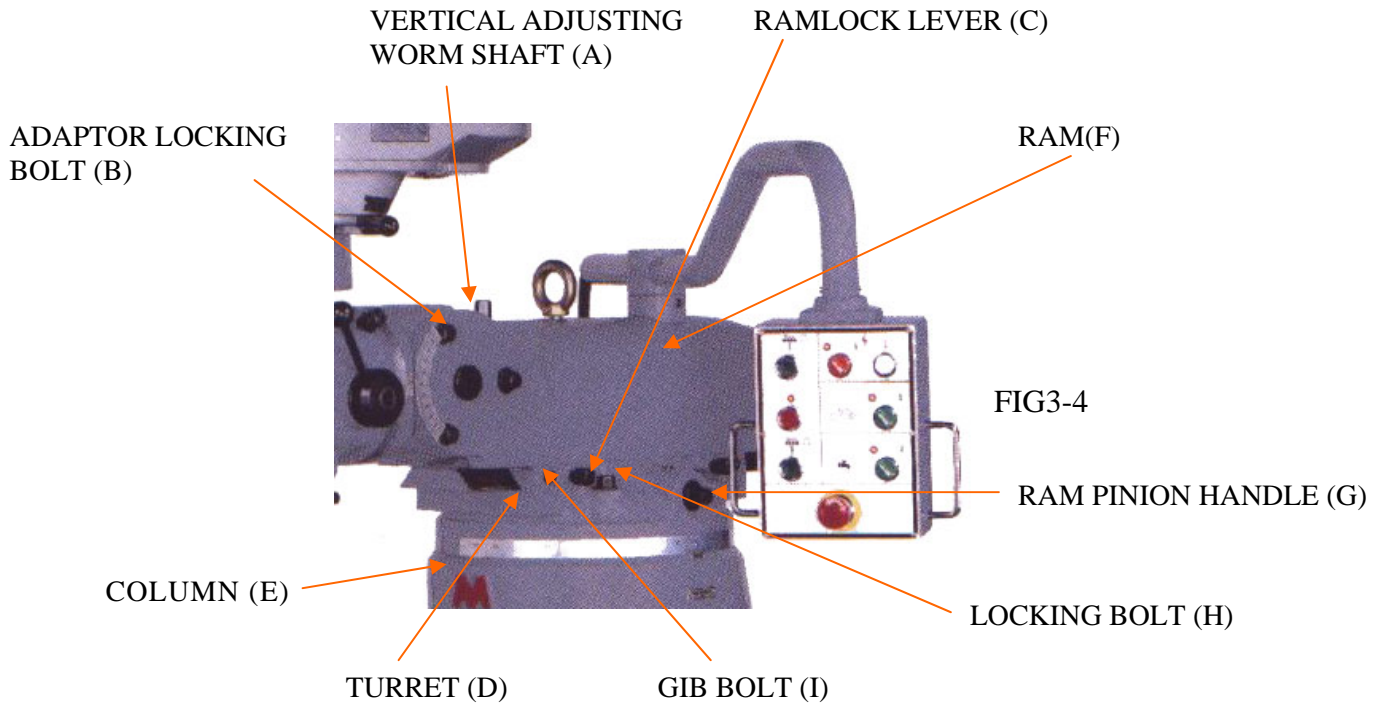
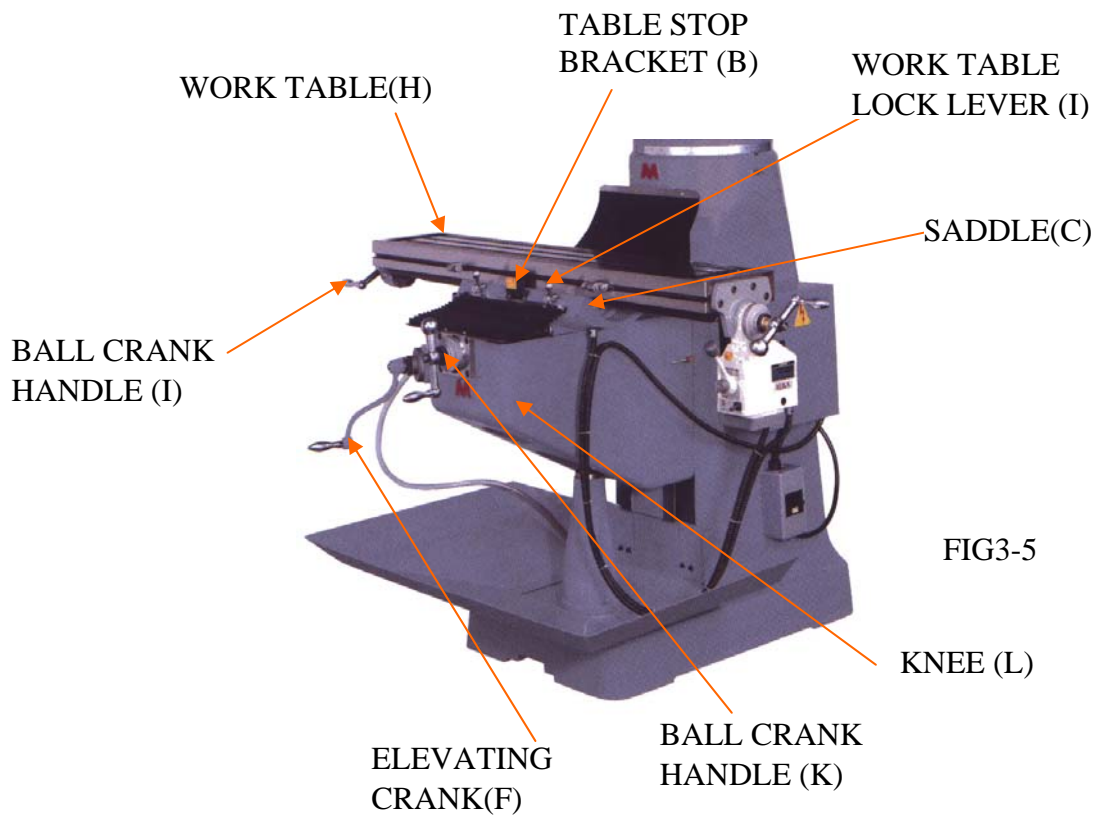


FIG3-3

(1) COLUMN, TURRET AND RAM



(2) WORK TABLE, SADDLE AND KNEE



4. POSITION AND NOISE LEVEL

4.1 OPERATOR POSITION AND NOISE LEVEL

Noise Level:
Less Than 82 dB

At a distance of 1 meter from the surface of the machinery and at a height of 1.6 meter from floor.

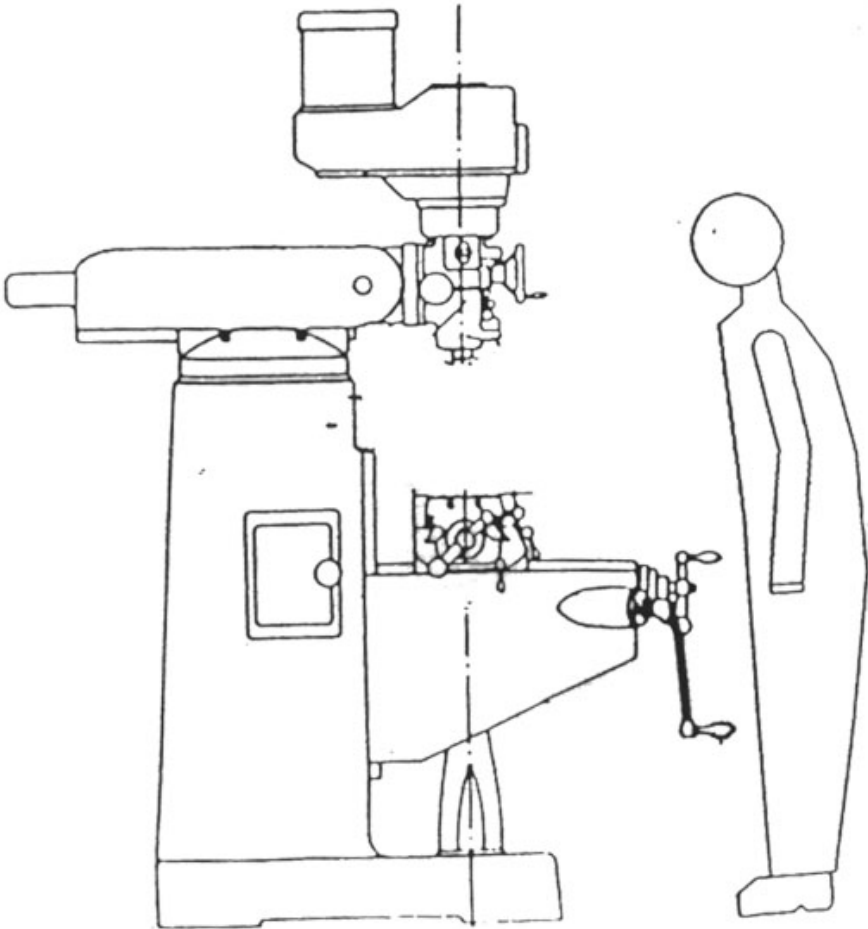


FIG4-1

4.2 SPINDLE NOISE DETAIL

Spindle Nose Detail

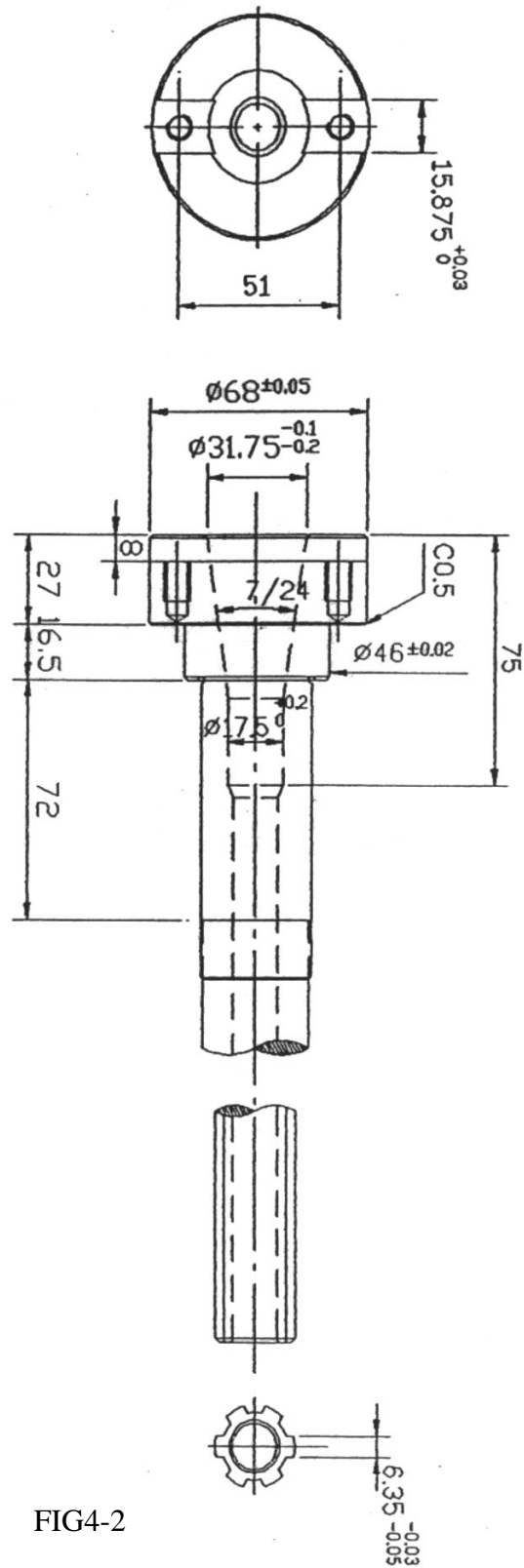
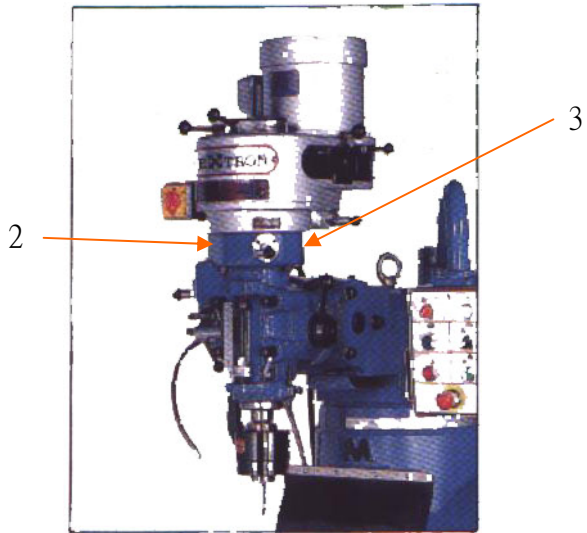


FIG4-2

5. LUBRICATION

5.1 HEADSTOCK LUBRICATION



MODEL : K2S

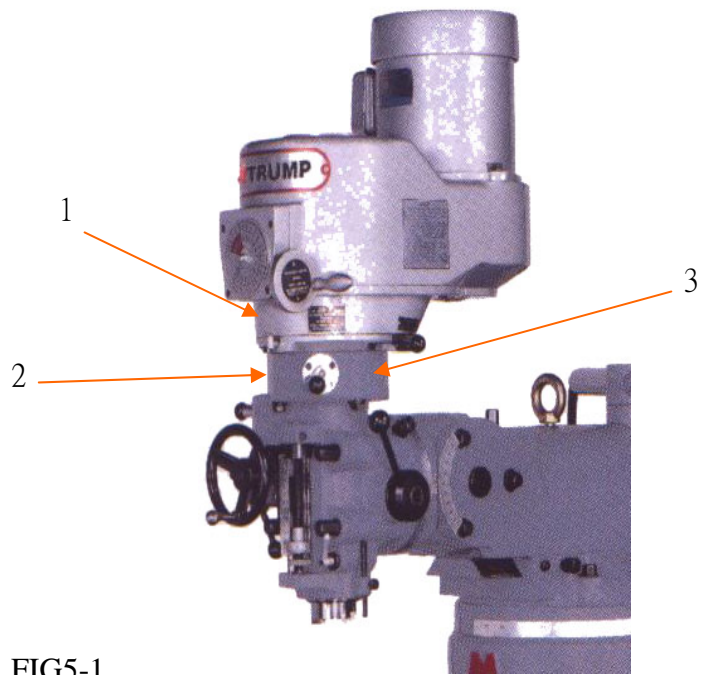


FIG5-1

MODEL : K2V

ITEM	LUBRICANTS	QTY.	TIME	POSITION
1	KUO-KUANG R68 ESSO FEBIS K53	FULL	TWICE DAILY	COUNTER SHAFT GEAR WORM GEAR CRADLE
2	COSMO CHASSIS GREASE NO. 3	FULL	ONCE WEEKLY	BULL GEAR BEARING SLEEVE
3	COSMO CHASSIS GREASE NO.3	FULL	ONCE WEEKLY	HEAD STOCK MATCHING QUILL HOLES

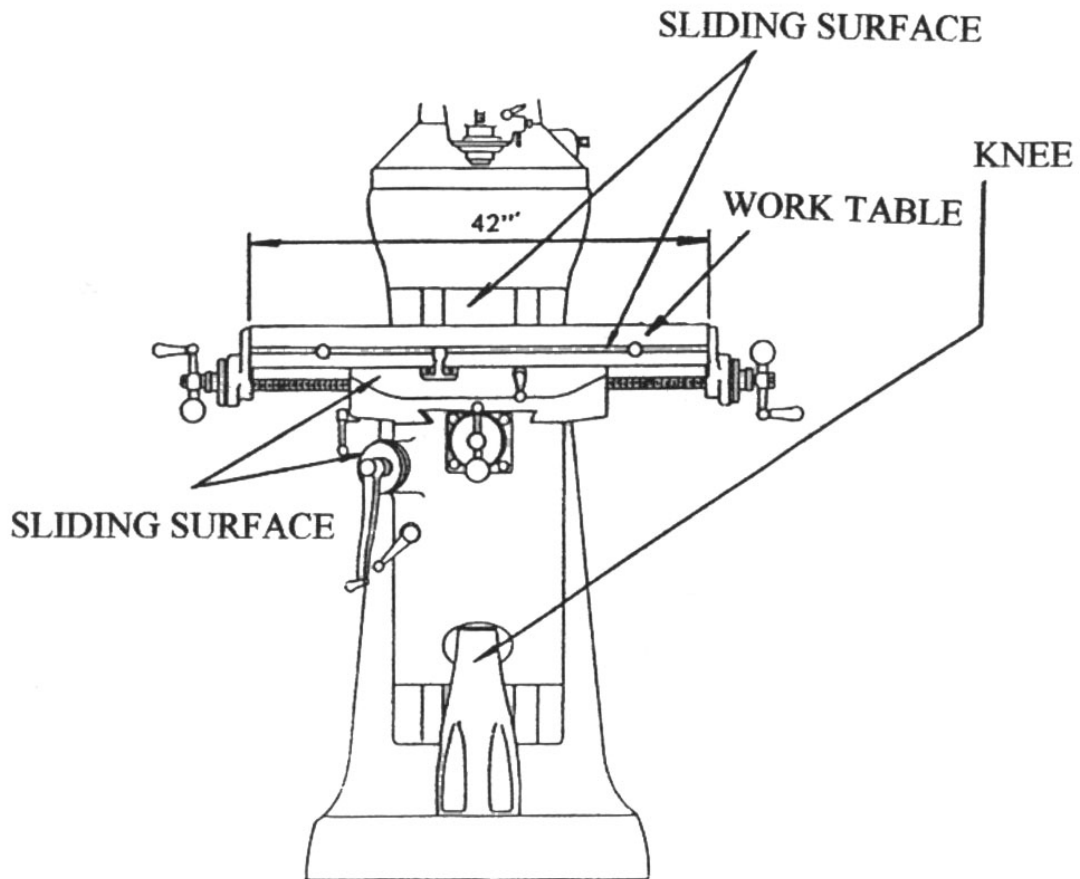


FIG5-2

POSITION:	LUBRICATION OF WORK TABLE, KNEE, SLIDING SURFACE AND LEADSCREWS MAY BE EFFECTUATED BY MEANS OF THE HAND CRANK PUMP ON THE LEFT SIDE OF KNEE.
METHOD:	3 TO 5 TIME DAILY BY PULLING TWICE EACH TIME.
LUBRICANT:	KUO KUANG R-68 GULFWAY 52 VACTRA 2 ESSO FBIS K-53 SHELL TONNA 33

6. INSTRUCTIONS IN OPERATIONS

6.1 HEADSTOCK

6.1.1 REVERSING SWITCH:

Motor turning is controlled by the reversing switch (vide the figure in the right). When the high-low speed change lever (vice FIG6-1) is placed at the high gear position and the switch is on for, the motor turns clockwise. When the switch is on rev, the motor turns counter clock wise. When the switch is on stop, then the power source is cut off.

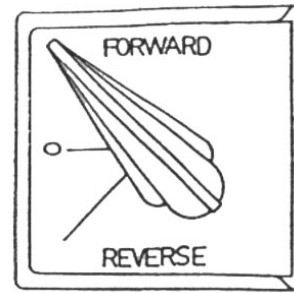


FIG6-1

NOTE : When the high speed change lever is placed at the low gear position, then, just on the opposite.

is

6.1.2 SPINDLE BRAKE:

Before braking, the power source must be switched off, and waiting until the spindle speed is lower than 200 rpm before the brake lever (as shown in the figure on the left) is pushed to the left rear or left front to stop the turning and effectuate the bracking. Push the brake lever upward and the quill is braked to a full stop for easy cutter tool change.

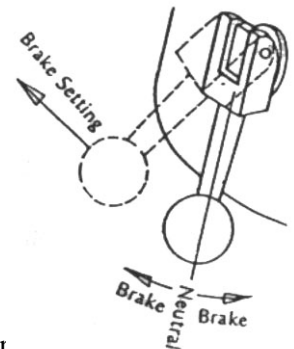


FIG6-2

NOTE : Be sure that the brake lever in neutral before starting motor

6.1.3CHUCKING OF TOOLING SHANK AND DISMANTLING

First the spindle must be raised up to its maximum height. The screw of draw bar is right turn. When the screw is turned clockwise, is for locking of tooling shank, and vice versa. To take out the tooling shank, the drawbar to allow the tooling shank to separate from the spindle. Turn the drawbar, until the tooling shank comes off totally.

NOTE : According to (b) spindle braking, brake the spindle to stop and the tooling shank may easily come off or chuck on.

6.1.4 MANUAL FEED:

The manual feed lever is installed on the right side of head stock (vide FIG6-2).

The spindle will travel vertically when the lever is turned. There are 12 positions to be closed. An operator can freely take out the lever and install it again at the position deemed proper and fit.

NOTE : In manual feed, the feed control handle (F) must be placed at position (F) as shown in (FIGURE 6-3.)

6.1.5 MANUAL MICRO MOTION FEED:

To effectuate the manual micromotion feed, the power feed transmission engagement crank(J) (figure 6-3) shall be placed at "OUT" position, and feed reverse knob (d), at the neutral position.

Feed control lever (F) must be pulled from (F1) to (F2). This is to engage the overload clutch. Turn the feed hand wheel (E) clockwise for quill downward feed,

and

vice-versa.

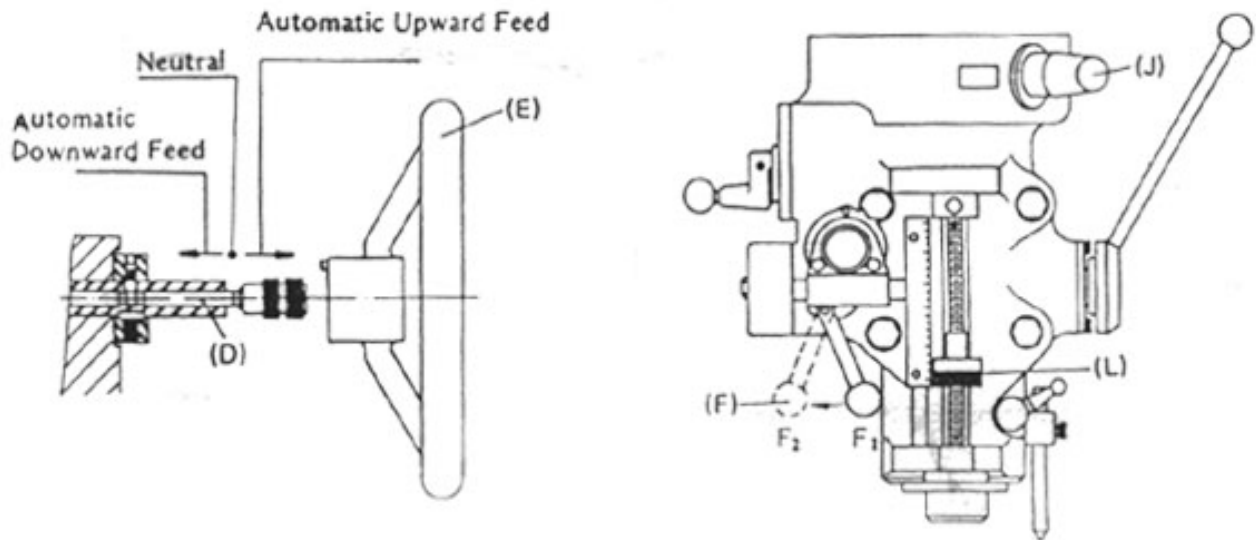


FIG6-3

6.1.6 AUTOMATIC FEED:

For automatic feeding, please take the following steps (Vide Figure 3-3):

- a. Loosen the quill lock (L).
- b. Turn the power feed transmission engagement crank
- c. Feed speed is in three stages. H, L and M. selection may be made by quill feed selector (C).
- d. Pull the feed control lever (F) from (F1) to (F2) position (FIGURE 6-4) to engage the overload clutch for automatic feed mechanism.
- e. When the feed control lever knob (D) pressed inward (figure 6-3), it is for downward feed, and vice-versa. The middle position is neutral.
- f. As shown in (FIGURE 6-4), the working depth may be set by micrometer adjustments nuts (K) (each graduation is 0.001" or 0.02 mm). When the quill stop block (I) contacts the micrometer nut (K), the feed control lever (F) may simply jump from (F2) back to (F1) position owing to the connecting motion between the feed trip lever and feed trip plunger. This will disengage the overload clutch and stop the spindle feed.

engage

NOTE : 1. Maximum drilling capacity in automatic feed is 3/8" or 10 mm.

2. The power feed transmission engagement crank (i)

(figure 3-3) shall be placed at "out" position when the automatic feed is not in operation. do not move the power feed transmission engagement

crank

when the spindle is in revolution.

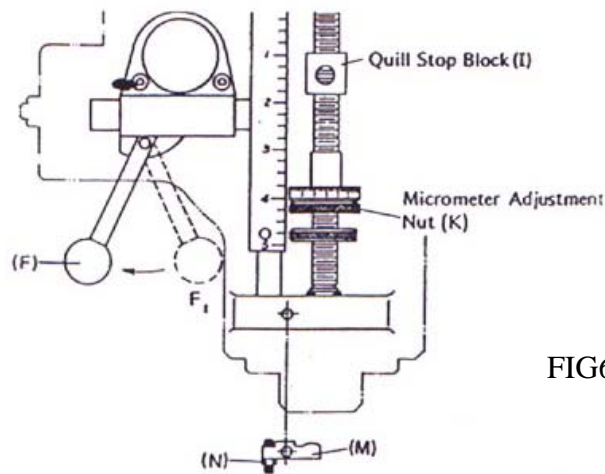


FIG6-4

6.1.7 SPEED CHANGE OF SPINDLE

(1) Speed change of K2V

By means of the variation of one set of slicking belt pulley and counter 1 shaft gear (high or low speed), the spindle revolution speed is changed accordingly.

Change of high and low speeds:

The speed change may be effectuated by the chosen high and low speed lever (figure 6-5 (J)). When (J) is engaged in the right front, it is for the high speed and the spindle rotate as high as 500 or 3,000 rpm. The neutral lever position is in the right down.

NOTE: a. The spindle must be motionless completely during the speed change.

b. To shift the high speed into the low one, the spindle must be slightly turned to make it easier for the backrow gear to engage.

c. To shift the low speed into the high one, use the brake lever so as to put a stop to the spindle clutch. Then turn the spindle slightly so that the clutch may be engaged feasibly. a "click" sound of engagement may be sensed at this moment

d. The direction of low speed rotation is opposite to that of the high speed. by the reversing switch, the direction may be changed to that high speed revolution.

Speed change hand wheel:

Step less speed variation between high and low speeds may be controlled by means of the turning hand wheel (figure 6-5(G)) when it is turned clockwise, it is for higher speed, and vice-versa.

- NOTE:**
- Do not change the speed when the spindle stands still.
 - Avoid to use it when the speed is in excess of 3,000 rpm.
 - In the process of speed change from high speed to low speed, and vice- versa, do not change the speed rapidly to safeguard the speed rapidly to safeguard the service life of the internal mechanism.
 - It takes roughly 10 to 15 minutes to change from low speed to the high one, and viceversa.

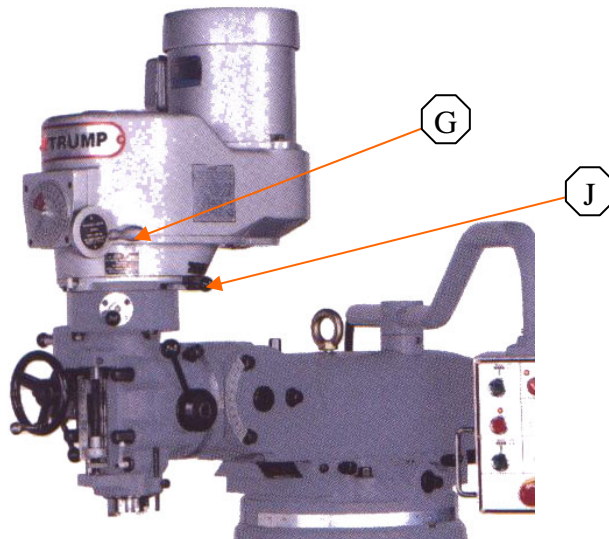


FIG6-5

(2) SPEED CHANGE OF K2S

Change speed of spindle can be shift to the desired stage by changing the belt pulley and counter shaft gear (high or low speed).

Adjustment and change of belt pulley (figure 6-5):

- Take off the side cover (A) of front belt pulley.
- Loosen the adjusting motor handle (B) as arrowed in the figure and move the forward to loosen the belt.
- Adjust the V-belt to the pulley groove of the needed rotation speed.
- Move the motor backward to regain the proper belt tension before the lever (b) is locked up tightly again.

Adjustment and change of high and low speeds:

POSITION SPEED	HISPEED GEAR CLUTCH LEVER (C)	LOW-SPEED GEAR CLUTCH LEVER (D)		REMARKS
		IN	OUT	
HIGH	HEADSTOCK'S FRONT	OUT		DIRECT DRIVE BY CLUTCH 60Hz : 650-2760 RPM 50Hz : 540-2280 RPM
LOW	HEADSTOCK RIGHT SIDE	IN		COUNTER SHAFT GEAR DRIVE 60Hz : 80-3500 RPM 50Hz : 68-285 RPM
NEUTRAL				
DEAD STOP	HEADSTOCK'S FRONT	IN		DO NOT USE IT

NOTE : Low speed turning is in the reverse direction of the high speed. For the same direction of turning, use the reversing switch.

- a. Make certain the spindle is completely motionless for gear shifting.
- b. To change from high to low speed, the spindle must be highly turned the engagement of counter shaft gear.
- c. To change from low to high gear, the spindle must be also slightly turned for clutch engagement. A "click" sound will be sensed at the of engagement.

for

time

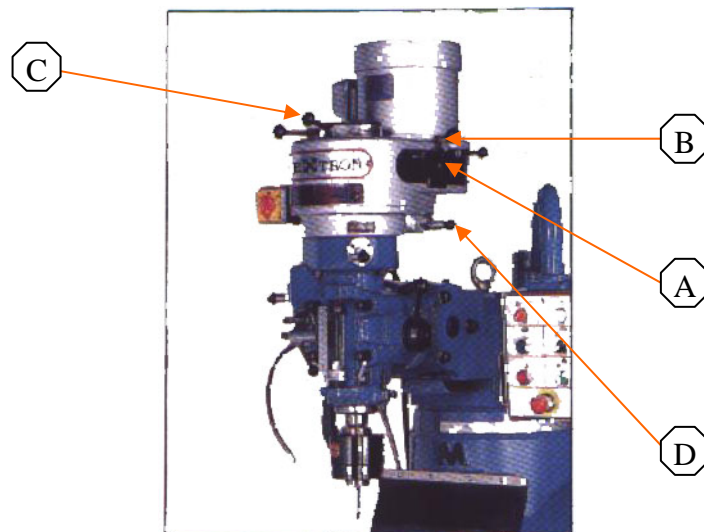


FIG6-6

6.1.8 HEADSTOCK TILTING

In and out tilting (figure 6-7):

Turn loose evenly the three adapter locking bolt (P) and turn the vertical adjusting worm shaft (Q) until the angle desired is obtained. Lock up the bolts (P) tightly.

NOTE: Do not loosen all the headstock bolts totally.

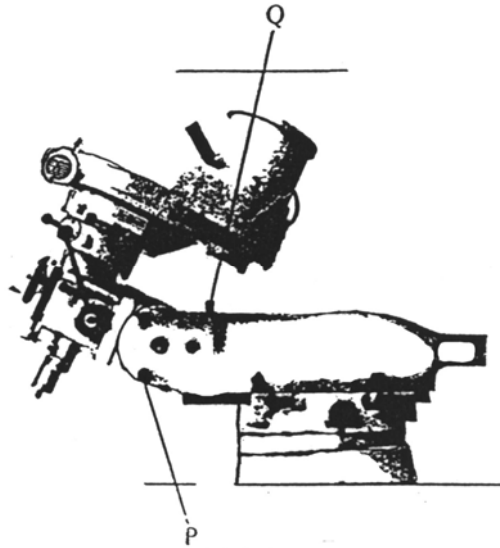


FIG6-7

Cross tilting (figure 6-8:)

Loosen evenly the four lock nuts (R) and turn the worm shaft (S) until the desired angle is secured. Then lock up the lock nuts (R) evenly.

NOTE: a. If the adjustment angle is larger than 30 degrees, the safety pin (t) must be drawn out. there is no need to pull the pin out for any angle less than that (figure 6-9).

b. Do not loosen the lock nuts (r) totally during the adjustment.

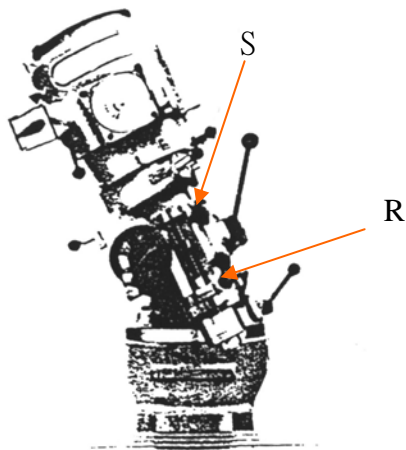


FIG6-8

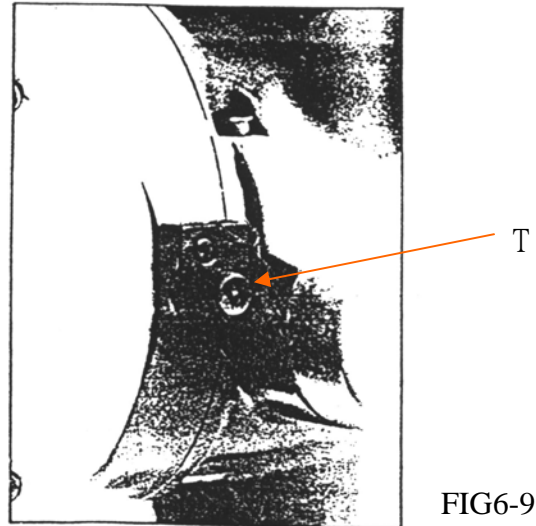


FIG6-9

6-6

6.2 MACHINE BODY OPERATIONS:

6.2.1 Ram movement and swiveling (see figure 6-10):

(1). Ram movement:

- a. Loosen the two ram lock levers (A).
- b. Swivel the ram pinion handle (B), and the ram can be moved.
- c. When it moves to the desired position, lock up (A).

(2). Ram swiveling:

Loosen the four locking bolts (C). And force the cross srm to turn until the desired angle is obtained. lock up (C).

A

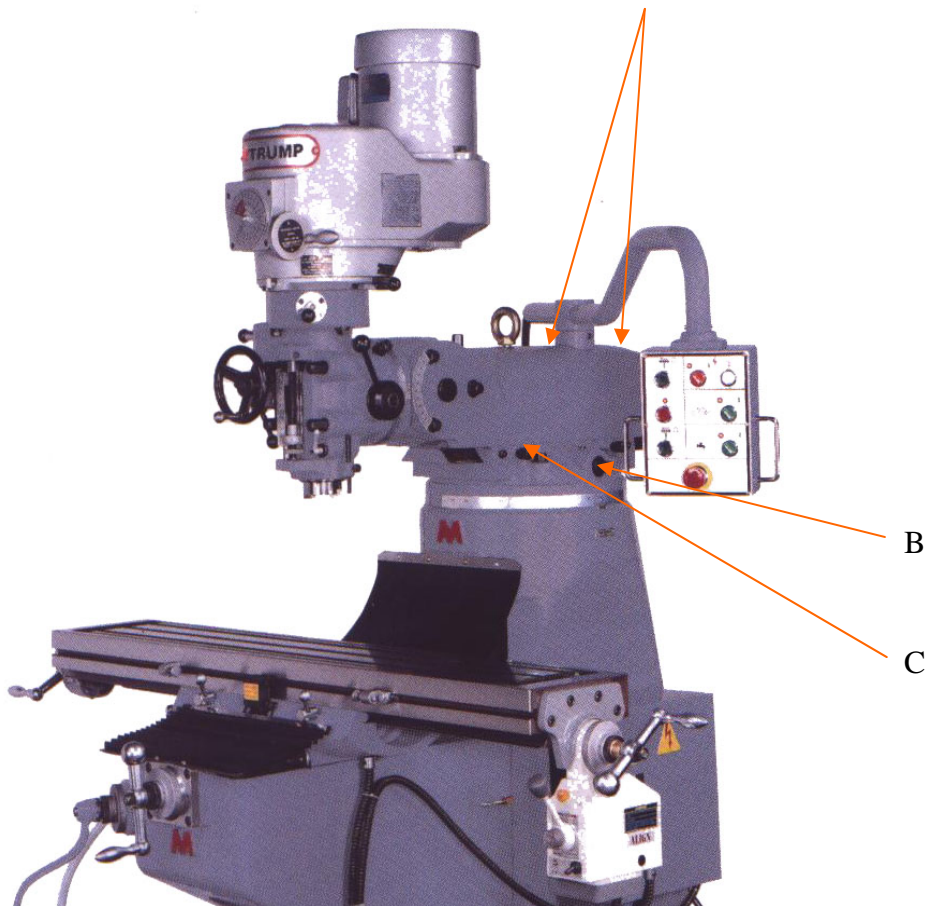


FIG6-10

6-7

6.2.2 Zero positioning (as shown in figure 6-11) of dial ring of table feed.

- (1) Loosen the nut (D) of dial ring.
- (2) Turn the dial right (E) to zero position.
- (3) Lock the nut (D) of dial ring.

6.2.3 Setting of sliding surfaces of work table, saddle and knee:

All non-feed sliding surfaces shall be secured and set to prevent slipping and increase machine body's rigidity. The sliding surface setting levers (as shown in figure 6-12) are clockwise for setting and counterclockwise for release.

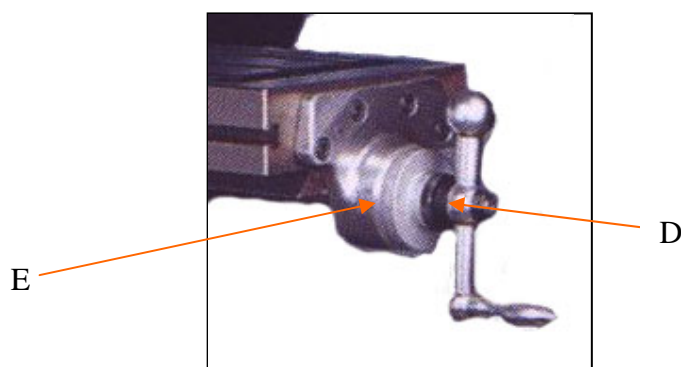


FIG6-11

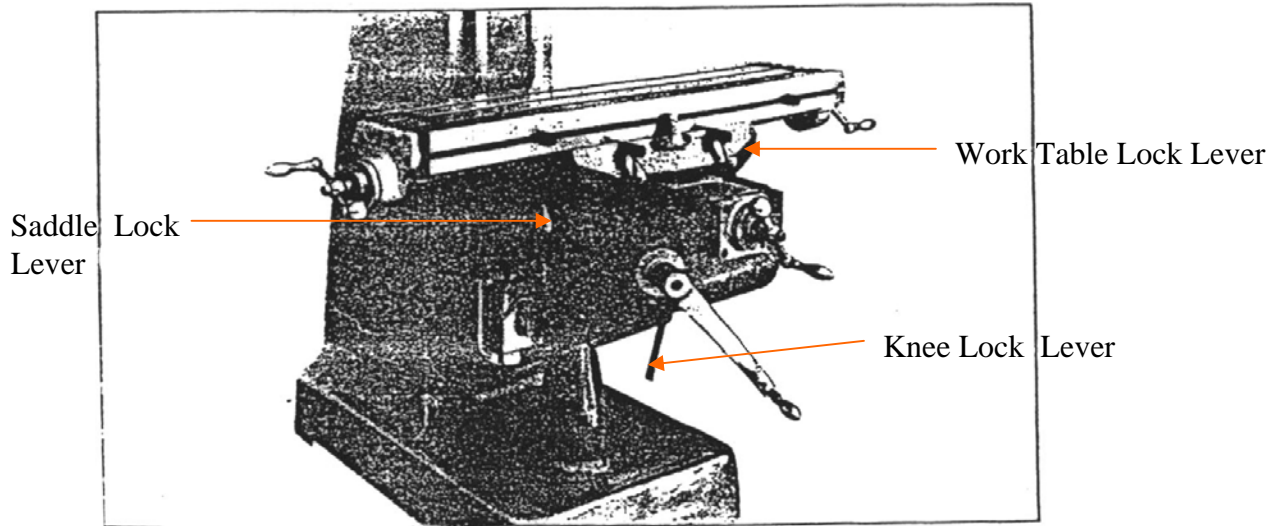


FIG6-12

6-8

7. TRANSPORT, UNPACKING AND FLOOR SPACE

7.1 METHODS OF TRANSPORT:

- (1) Machine net weight: approx. 1010KGS
- (2) Prior to unpacking, transport may be using a forklift (fig. 7-1) and a reinforced cable (fig. 7-2).
- (3) After packing, transport may be made by hoisting with a reinforced cable (fig. 7-3) and the eye bolt (fig. 7-4).

REMARKS:

- (1) Always ensure capacity of equipment is adequate before attempting to lift.
- (2) When the machine is being hoisted, keep the personnel afar.
- (3) Hoisting by eye bolt should be used as less as possible.
- (4) To hoist the unpacked case by reinforced cable, the motion shall observe strictly the instruction appeared on the side of the wooden case.

- (5) Keep the work table and saddle in the proper positions so as to keep the machine balance.
- (6) Do not hoist the machine too high. the best position is to keep the machine base approximately 10 cm from the ground.
- (7) Do not allow the machine to wobble in hoisting.
- (8) Only an authorized forklift or crane operator is allowed to transport the machine.

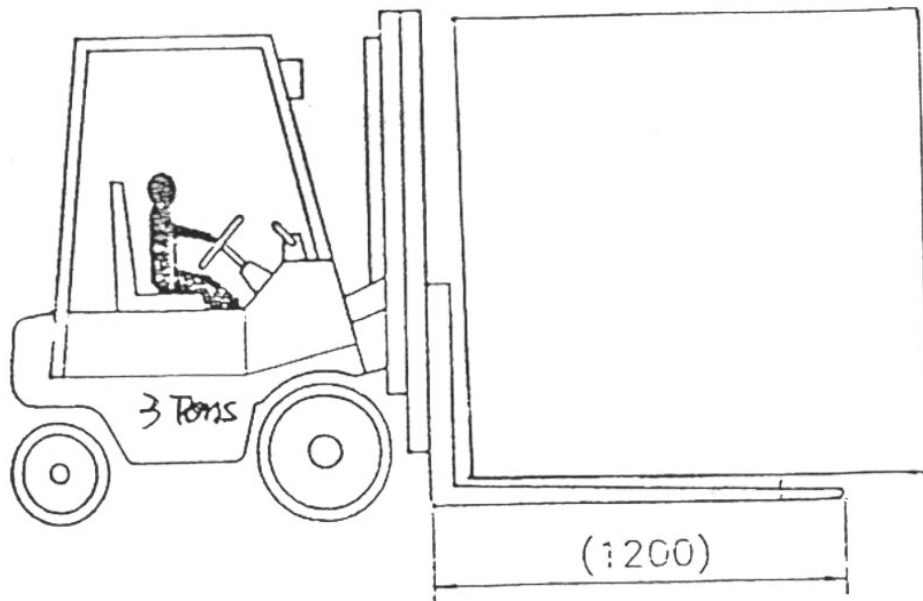


FIG7-1

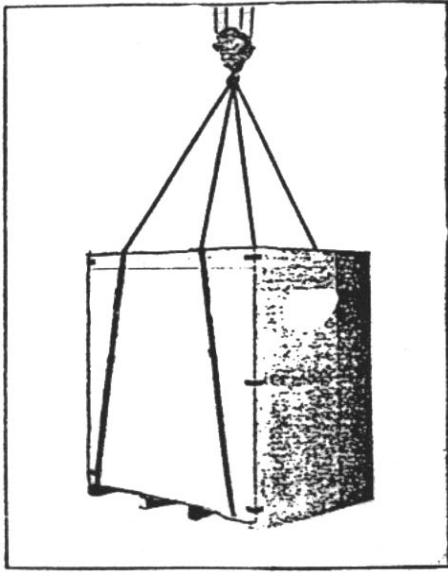


FIG7-2

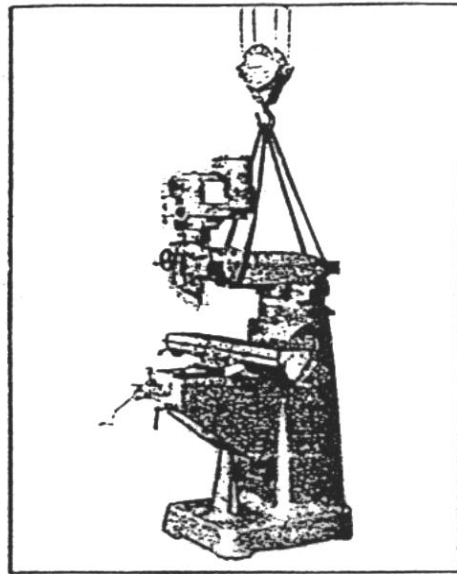


FIG7-3

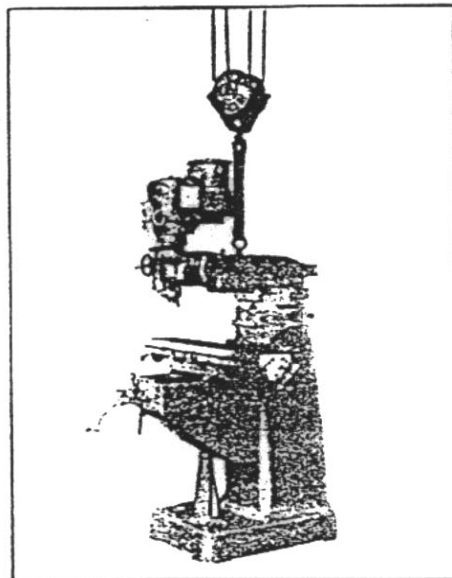


FIG7-4

7.2 CAUTIONS FOR UNPACKING:

- a. To transport the machine, it is necessary to support the machine with the rated case or pallet to avoid moisture. In case of damage by moistening, please contact our agent or the transporter.
- b. After unpacking, check and see if all tools and accessories are intact, otherwise, please contact our agent.
- c. Restore the head stock to its normal position after unpacking.
- d. After unpacking, do not move the sliding surfaces and work table as long as the rustproof oil on them are not cleaned off and followed with the lubrication.

e. Before the cleaning starts, the sliding protective pieces must be dismantled, and all sliding surface setting levers, loosened. When the rustproof oil is removed, proper amount of lubricant should be injected onto various sliding surfaces. Then move the sliding surfaces for final cleansing and lubrication.

f. Do not remove the oil brushes in the process of cleaning.

g. Do not use gasoline or any other inflammable oil cleaner.

7.3 FLOOR SPACE:

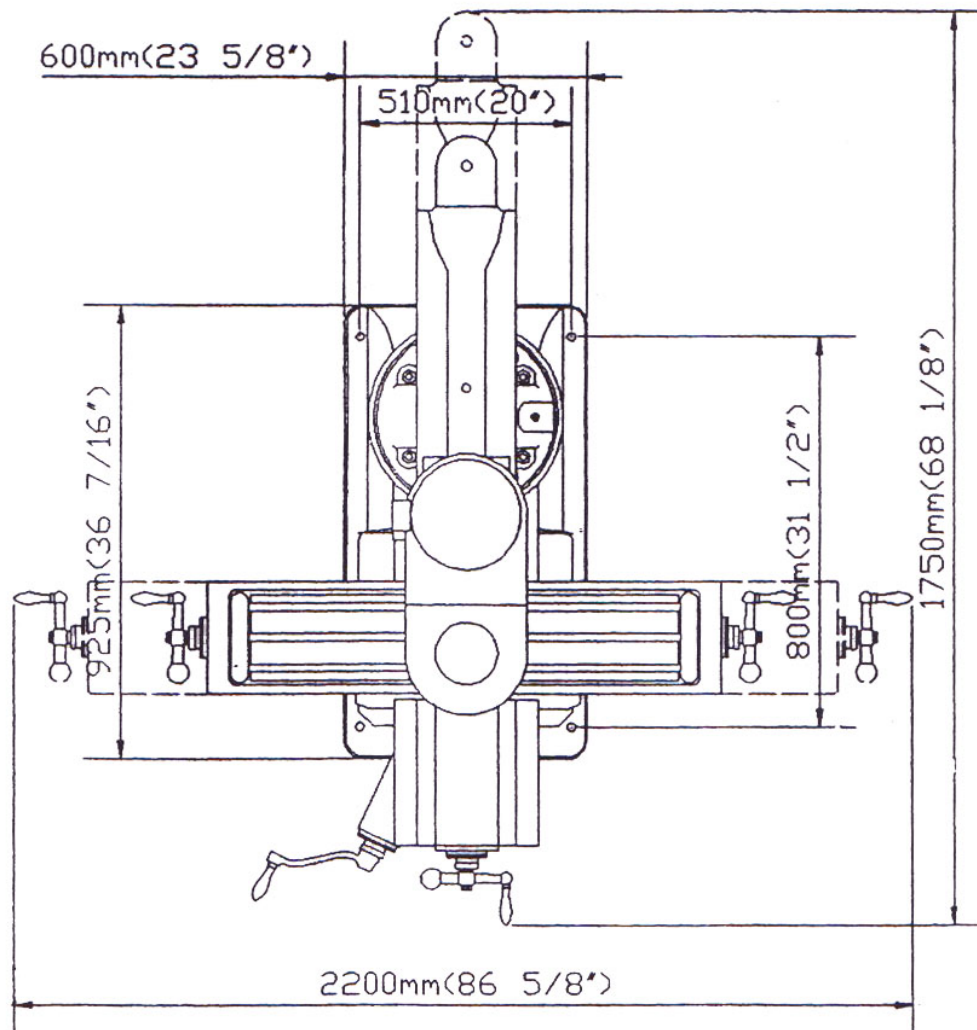


FIG7-5

8. PRECISION ALIGNMENT

Precision of a machine dominates the processing quality. To produce the quality work piece, precision of each and every components is a top priority.

In order to maintain the primary machine precision following a long-term operation, regular precision alignment is indispensable to the upgrading of work quality. Beside, it may extend the machine service life. For details of components to be aligned and precision requirements, please vide the table of precision inspection.

NOTE: To align the vertically of spindle to the table surface, is necessary to loosen the three machine head bolts (vide figure 6-7(p)) and the four machine head nuts (vide figure 6-8(r)). however, the bolts and nuts can not be loosened totally to prevent the components from a sudden tilting. lock up (p) and (r) as soon as the alignment is performed.

9. TROUBLE SHOOTING:

9.1 DISMANTLING OF MOTOR (AS SHOWN IN FIGURE 9-1):MODEL: K2V

- a. Start the motor and turn the speed change hand wheel (A) to the position of 60 rpm appeared on the indicator to lower down the stationary motor vari-disc to the lowest position.
- b. Cut off the motor power source and take off wire press board and reversing switch.
- c. Remove motor pulley cover (B) under the motor shaft. Then, use the two hexagonal concave bolts (C) that locked the bearing housing, to insert into the two holes of the speed change spring pieces (D). Lock into the motor vari-disc (E) and evenly lock up the two bolts (C). Push down the speed change spring (F) so as to separate it from the retainer ring (G).
- d. Take out the retainer ring (G).
- e. Take off the two hexagonal bolts (H) that locked the motor. The motor may be lifted up. Motor vari-disc (E) and speed change belt are still kept inside the belt housing.
- f. Once the motor is replaced, just reverse the order of dismantling.

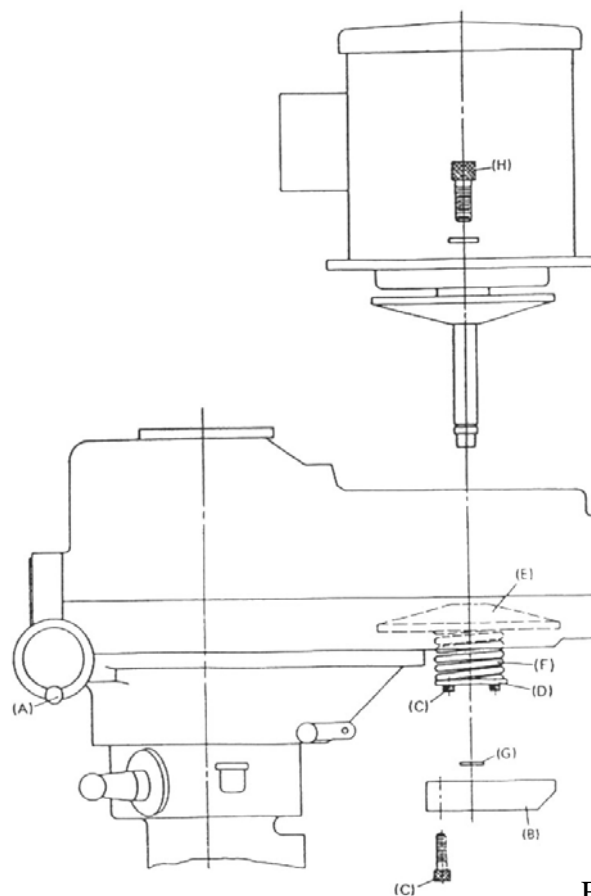


FIG9-1

9.2 REPLACEMENT OF SPEED CHANGE BELT : MODEL: K2V

- a. Refer to step A to E of motor dismantling.
- b. Take off draw bar (I).
- c. Dismantle the three hexagonal concave bolts (J) and use two of them (J) to lift the bearing housing (K).
- d. Remove from atop the two hexagonal concave bolts (L), fixing the speed change plate, and take off the bolt sleeves (M).
- e. Dismantle four hexagonal concave bolts (N) (O) and the two at the bottom (P).
- f. Take off the two hexagonal concave bolts (S) speed change housing (Q) and gear housing (R).
- g. Use a mallet and hit the upper belt housing (T) lightly so that it will break away from the fix pin (U) for dismantling of the upper belt housing.
- h. When the speed change belt is replaced accordingly, restore the machine by reversing the orders.

NOTE: The replaced speed change belt shall conform to that of our company specifications.

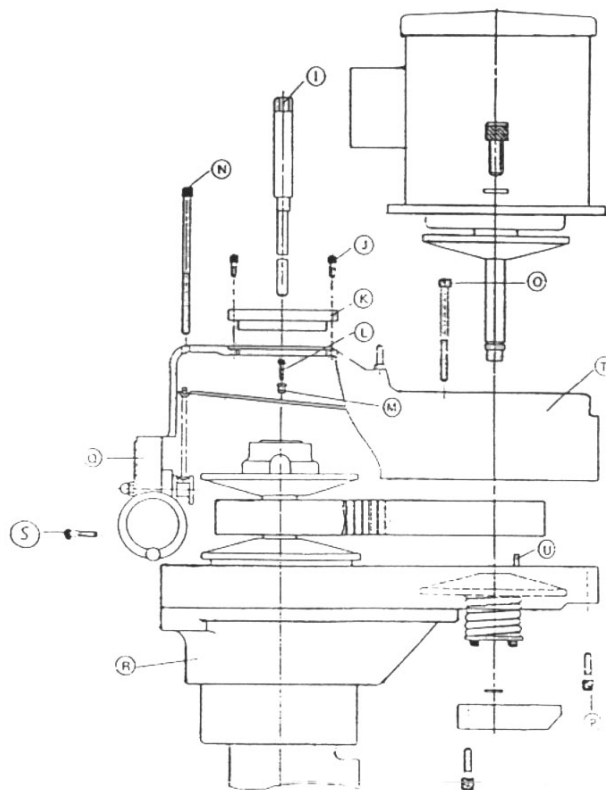


FIG9-2

- a. Refer to step a to e on motor dismantling.
- b. Refer to step B to G on replacement of speed change belt to dismantle the upper belt housing.
- c. As shown in figure 9-4, take off the connected gear housing (R) and the four hexagonal concave bolts (V) bottom belt housing (T1).
- d. Use a soft mallet and hit the bottom belt housing lightly to disengage it with the fix pin (W) to dismantle the bottom belt housing (T1) as shown in figure 9-4.
- e. Take off the hexagonal concave bolt (X) of the two setting bearing housing and remove the front vari-disc assembly set (E1). Brake block (Y) can be replaced then.
- f. Reverse the order to restore the machine assembly after the brake block is replaced.

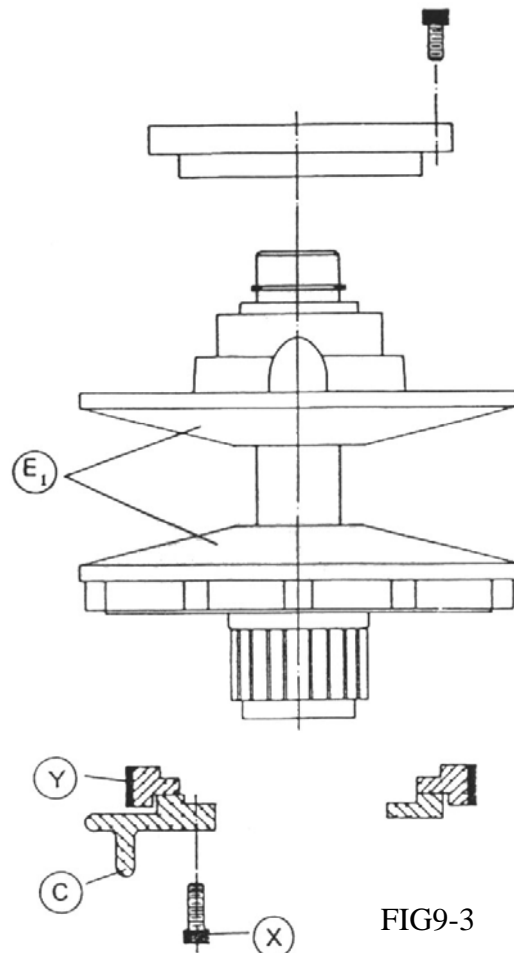


FIG9-3

- a. Refer to step A to E of motor dismantling
- b. Refer to step B to G speed change belt replacement to take off the dismantling of bottom belt housing and change the timing belt as shown in figure 9-4.
- c. Refer to step C to D on p.28 replacement of brake block for the dismantling of bottom belt housing and change the timing belt as shown in figure 9-4.
- d. Restore the machine structure by reversing the steps once the timing belt is replaced.

NOTE: Belt to be replaced shall conform to the manufacture's specs.

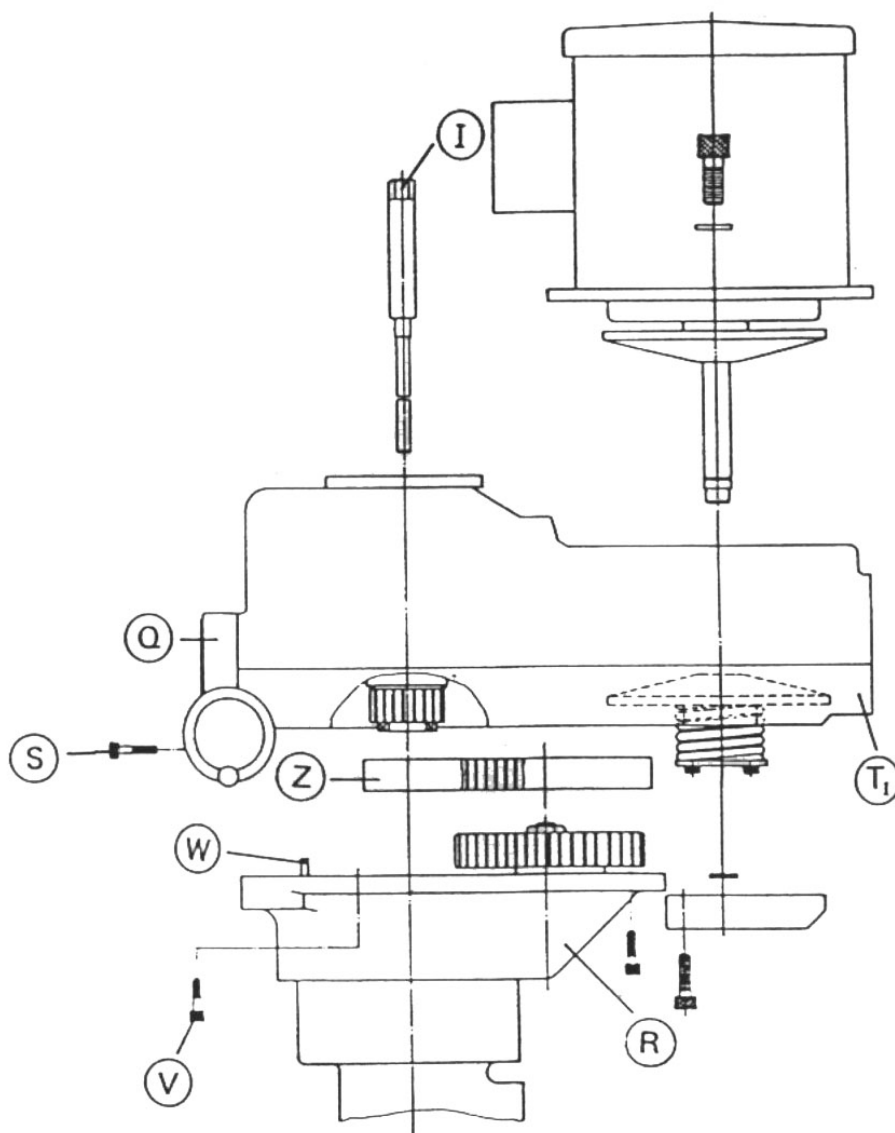


FIG9-4

9.5 REPLACEMENT OF V-BELT OF K2S

- a. Take up the wire grip and reversing switch.
- b. Take off the side cover of belt wheel housing (vide figure)
- c. As illustrated in, loosen adjusting motor handle (B) and move the motor forward to loosen the belt. Turn the V-belt and let it slip off the belt wheel.
- d. Take off the two hexagonal nuts (C) for motor dismounting.
- e. Take out the drawbar (D) and drop the quill down to the lowest position.
- f. Push the hi-low speed selector (E) to the right front position.
- g. Dismantle the six concave bolts (H) connecting the belt housing (F) and gear housing (G) strick upward the belt housing lightly and disengage it from the setting pin (I). Then, take out the belt housing. V-belt and timing belt ate therefore replaced.
- h. Reverse the aforesaid steps and restore the mechanism once both belts are replaced.

NOTE : Replacement of v-belt and timing belt shall conform to the manufacturer's specs.

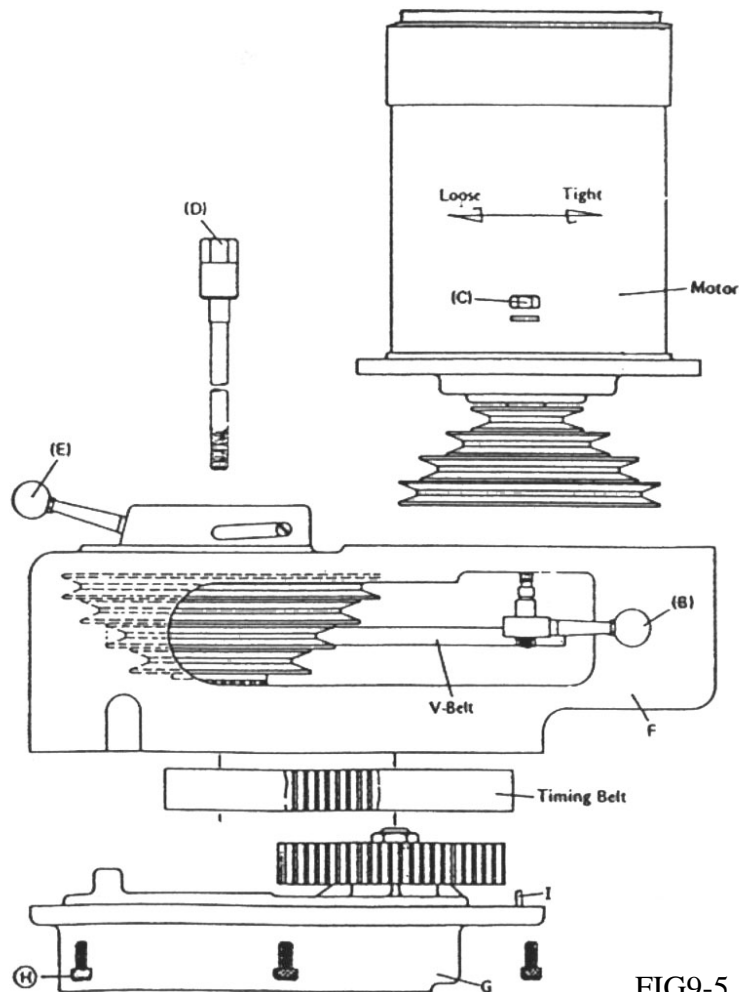


FIG9-5

10.1 ADJUSTMENT OF BACKLASH OF LEADSCREW

After a certain period of time, a clearance is developed between the lead screw and its nut due to frictions. Positioning accuracy will become impossible. Therefore, the nut must be adjusted so as to keep a proper tension between itself and the lead screw.

10.1.1 Adjustment of cross lead screw

- a. Turn counterclockwise the crank (F) and move the saddle seat to the foremost position of knee.
- b. Remove the two setting pins (H) of the front bearing bracket (G) and take off the four socket head cap screw (I).
- c. Support the cross feed bearing bracket (G) and turn clockwise the crank (F) so that the bracket will be separated from the knee with a certain distance between them (as shown in figure 30, the distance must be longer than the length of the adjusting tool).
- d. Insert the larger end of clearance adjusting tool into the knee and turn the locking nut (J) one round anticlockwise reverse the adjusting tool and insert the smaller end into the knee. turn the nut (K) clockwise and lock it up.
- e. Turn clockwise and anticlockwise the crank (F) and measure a clearance of approximately 3-4 graduations (0.06mm-0.08mm or 0.003"-0.004") on the dial. lock (J) consequently.
- f. Turning counterclockwise the lead screw into the knee until front bearing bracket seat gets in contact with the knee. Insert the two setting pins (H) and lock up tightly the four cap screw (I) of the bearing bracket.

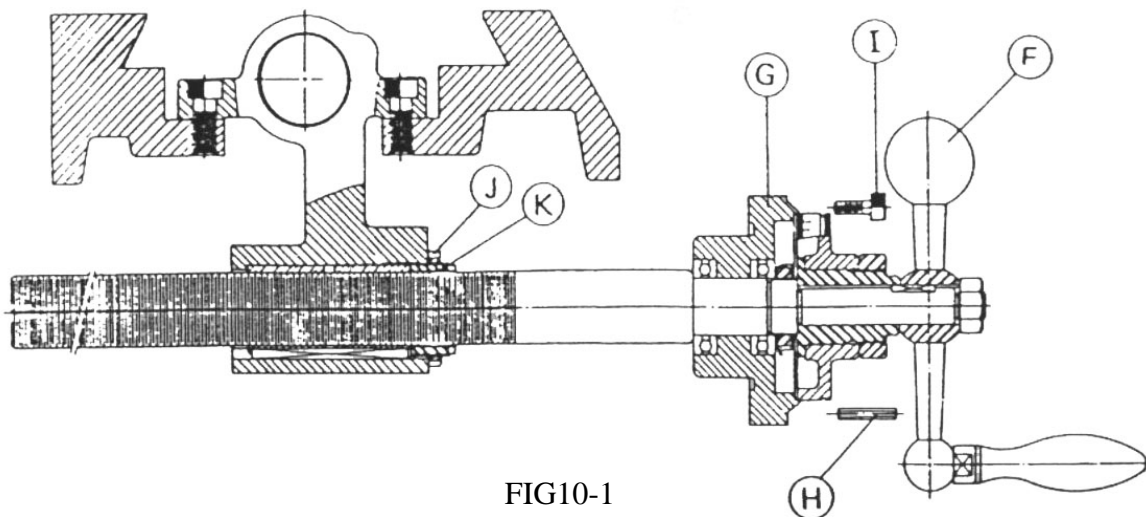


FIG10-1

10-1

10.1.2 Adjustment of backlash of longitudinal lead screw:

- a. Move the work table to the center of saddle.

- b. Insert the large end of backlash adjustment tool into the left side of saddle. Turn the locking nut (J) Counterclockwise one round. Reverse the end of adjustment tool and insert the small end into same position and turn the lead screw adjusting nut (K) clockwise.
- c. turn the crank (F) slightly clockwise and counterclockwise and measure a clearance of approximately 3 to 4 graduations on the dial (0.6 - 0.8mm or 0.003"-0.004"), before the nut is locked up tightly again.

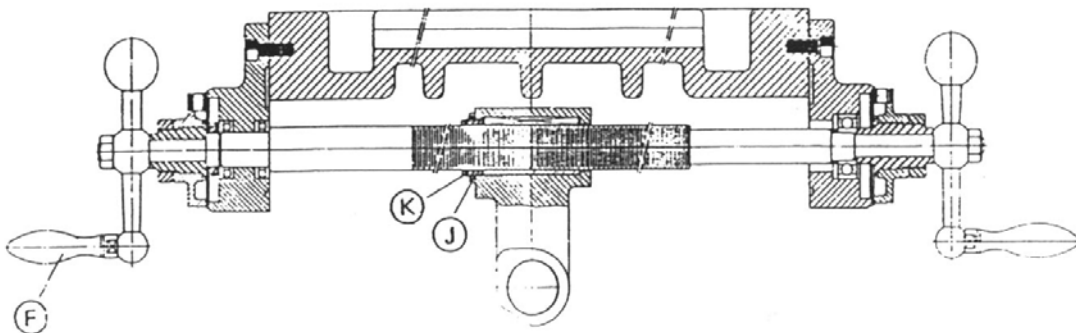


FIG10-2

10.2 ADJUSTMENT OF PLAY BETWEEN GIBS

As a result of long-term operation between the sliding surface and gibs, the worn-out gibs will create a clearance. Therefore the gibs must be adjusted to upkeep the precision of sliding surfaces.

10.2.1 Adjustment of work table gibs (vide figure 10-3):

The gibs are attached onto between the saddle seat and work table dovetail.

- a. Loosen the lock lever (L).
- b. Clean the slide way and add the lubricant.
- c. Use a screwdriver and adjust the gib screw (M) on both sides of saddle seat.

- d. Adjusting skill: if the turning of crank (F) (vide figure 10-3) is sensed too loose, loosen slightly the adjusting gib screw on the left side. Turn the crank again to see if it is in good tightness. otherwise, loosen the left adjusting gib screw and lock the

right one tightly. Repeat the same motion until the work table sliding is satisfactory.

e. Replace the excessive worn-out gib whenever necessary.

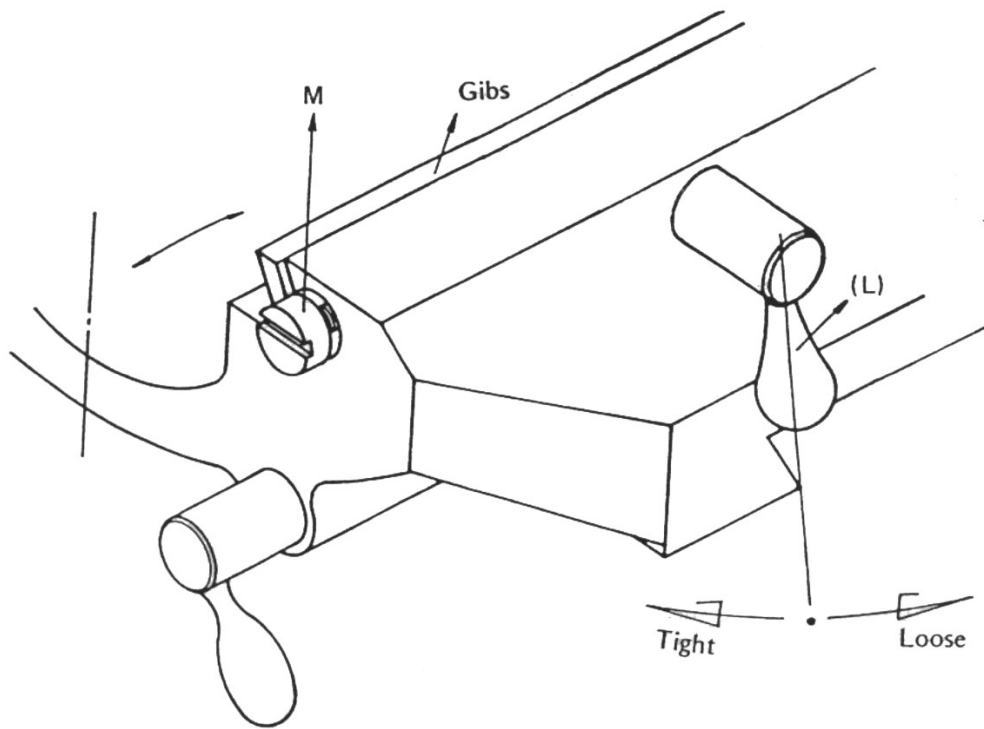


FIG10-3

10.2.2 Adjustment of saddle gib (vide figure 10-4):

Saddle gib is attached to the position between the left side of saddle and knee dovetail.

- a. Loosen the saddle lock bolt (A)
- b. Move the saddle to the front part of knee.
- c. Take off the wiper holder (B) of saddle.
- d. Clean the slideway and add the lubricant.
- e. Use a screw driver to adjust the gib screw (D) of the saddle.
- f. Employ the same methods to adjust the work table gib.
- g. lock up the wiper holder (B) on the saddle.

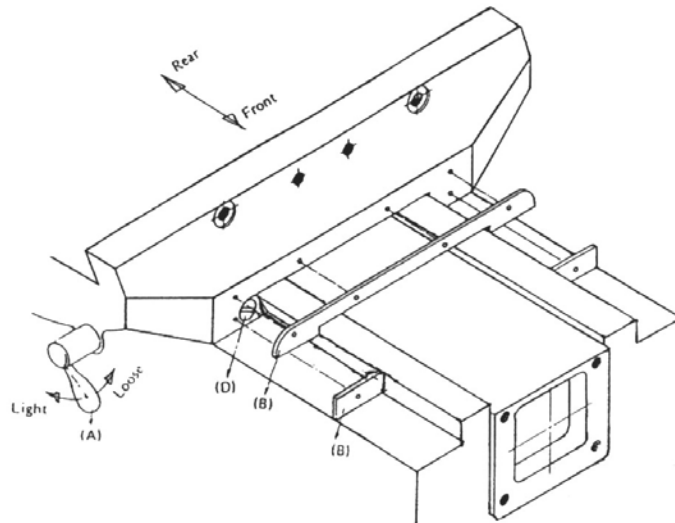


FIG10-4

10.2.3 Adjustment of knee gib (vide figure 10-5):

The knee gib is attached to the position the left side of knee and column dovetail. The adjustment can be performed as follows:

- a. Loosen the knee clamp lever (G) (vide figure 3-5).
- b. Take off the wiper holder (Q).
- c. Clean the slide way and add the lubricant.
- d. Raise the knee to its up most position.
- e. Use a screw driver to adjust the gib screw (R) of the knee.
- f. Employ the same methods to adjust the work table gib.
- g. Restore and lock up the wiper holder (Q).

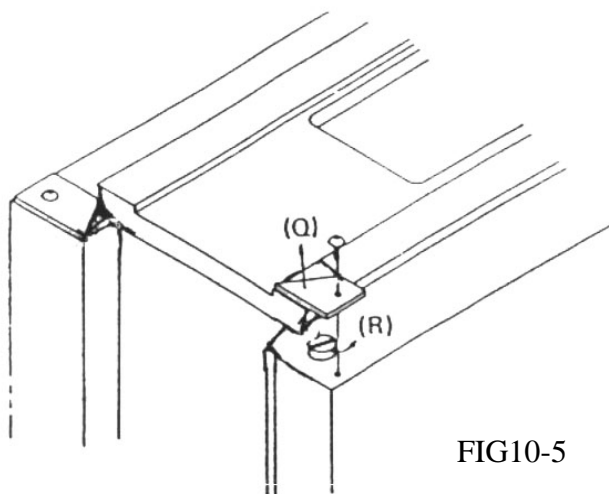


FIG10-5

10.2.4 ADJUSTMENT OF RAM GIB:

The ram gib is attached between the ram and turret dovetail. when the ram sliding is too tight or loose, adjustment may be effectuated by means of the bolt as follows:

- a. Loosen ram lock lever (C).
- b. Clean the slide way and add the lubricant.
- c. Turn the nut on the bolts of gib (I) .
- d. Use a screw driver to set or loosen gib bolt (I) until the ram moves smoothly.
- e. Lock up the nut tightly.

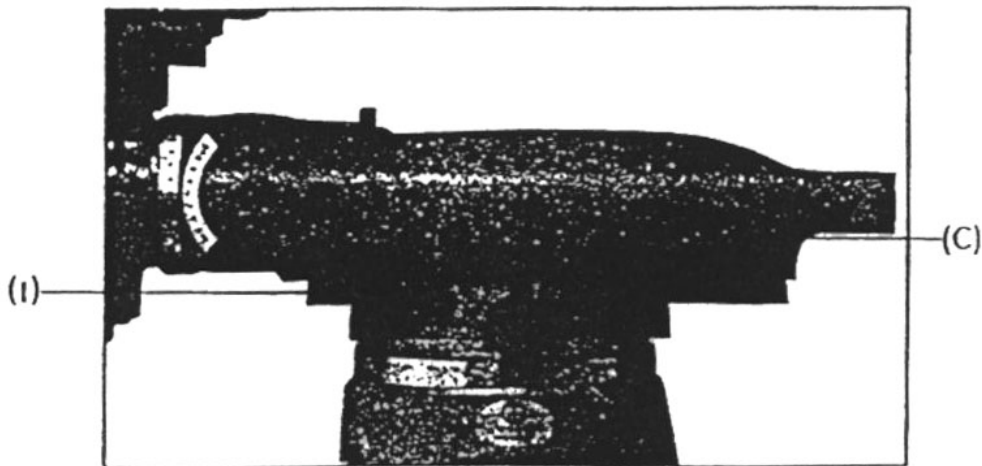


FIG10-6

10.2.5 Replacement of collect aligning screw (vide figure 10-7):(available for R8 spindle only)

- a. Prior to replacement, use a marking pencil to draw a line on quill (A) and its nose piece (B).
- b. Loosen the setting screw (C) nose piece. Use a hook spanner to take off the nose piece (B).
- (D) c. Use a hexagonal spanner of appropriate length to take off the collect aligning screw for replacement.
- d. When the collet aligning screw is replaced, set the nose piece (B) tightly until it is positioned on the marked line.
- e. Set the set screw (C) of nose piece tightly.

NOTE: To replace the collect aligning screw, the collet must be placed inside the quill. set the collet aligning screw (d) tightly so that it will contact the bottom of screw keyway. then turn it backward by approximately 1/4 round to keep a 0.25mm (0.01") play for easy installation and removal of the shank.

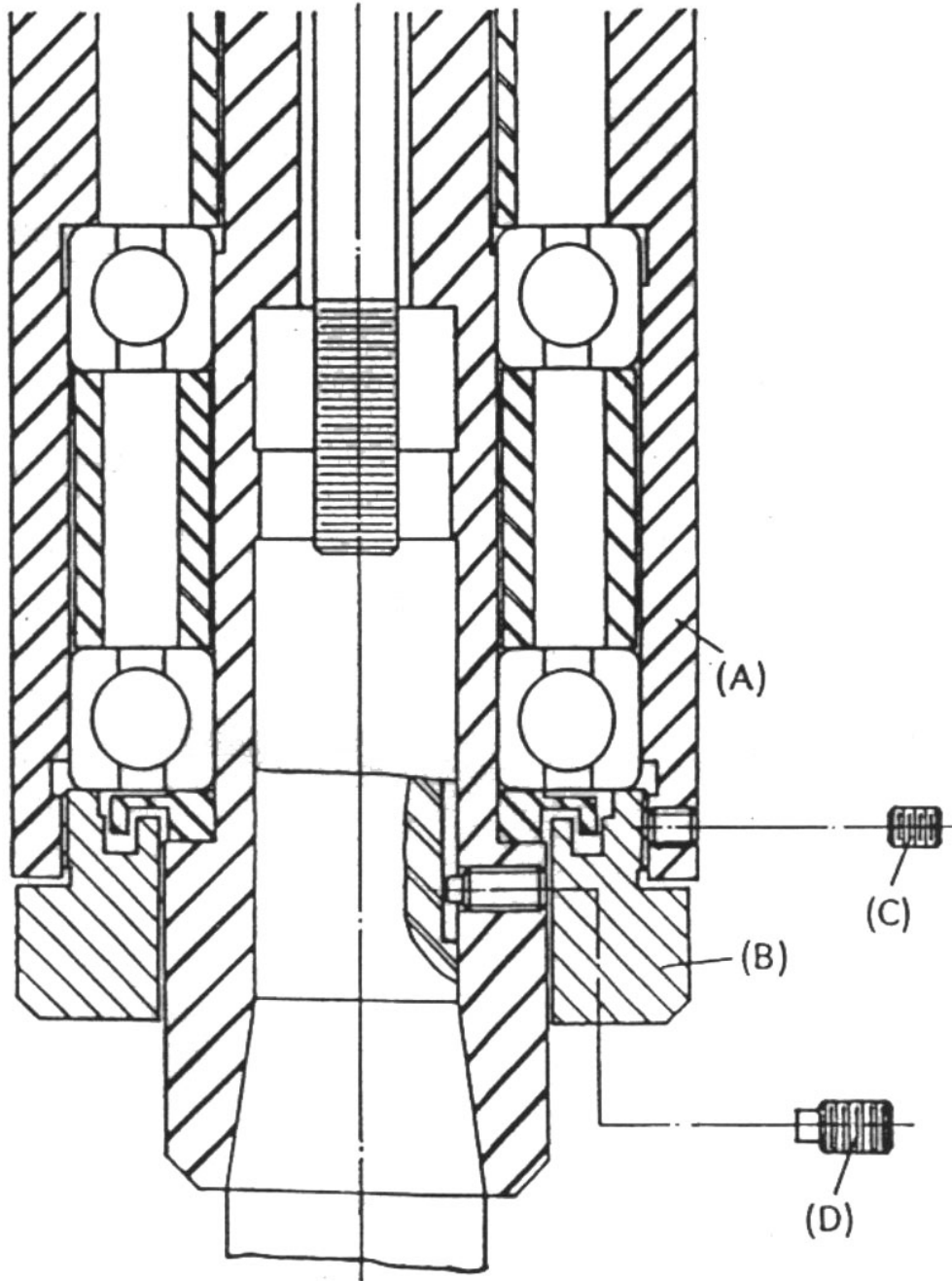


FIG10-7

11. MAINTENANCE:

"Maintenance is more important than repair; and repair is better than purchase".

Under long-term operations, if the machine has not been properly maintained and operated, its service life shall be greatly reduced. The work piece quality is therefore affected, and the efficiency, decreased. it is essential for an operator to know how to handle the machine and the concept of its maintenance and keep correctly.

11.1 DAILY MAINTENANCE:

- (1) Check and see if the oil level of hand crank pump is on the designated line.
- (2) The designated positions must be lubricated prior to operations .
- (3) Keep the machine idling for three to five minutes daily prior to operations.
- (4) At the close of each day, work table shall be cleaned and the unfinished work piece must be removed. a little bit of lubricant is recommended.
- (5) At the close of each day, all setting levers shall be loosened, and all sliding parts shall be move to the proper position. The cutter must be dismantled.
- (6) At the close of each day, the head stock must be restored to its normal position if it is tilted.

11.2 MONTHLY MAINTENANCE

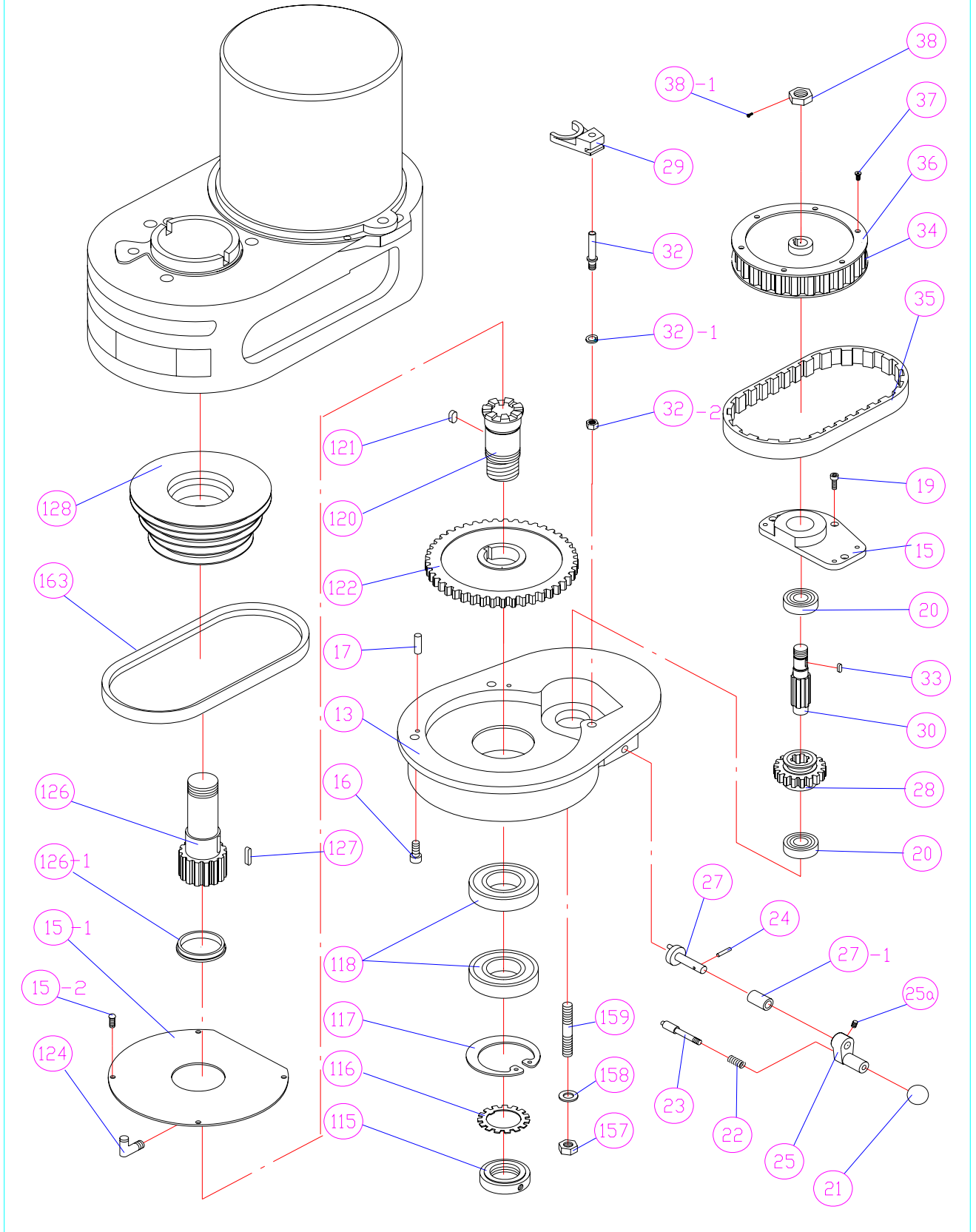
- (1) Check and see if all clamping rails of various sliding surfaces are normal.
- (2) Check and see if the backlash between lead screw and its nut is normal.
- (3) Check and see if the quill lock and that of each and every sliding surface is normal.

11.3 QUARTERLY MAINTENANCE:

- (1) Check and see if the brake functions and belt are normal.
- (2) Inspect the level of work table and erection status of head stock.
- (3) Test the machine again by the chart of test specs.
- (4) Replace whatever parts worn-out.

12. PARTS LIST:

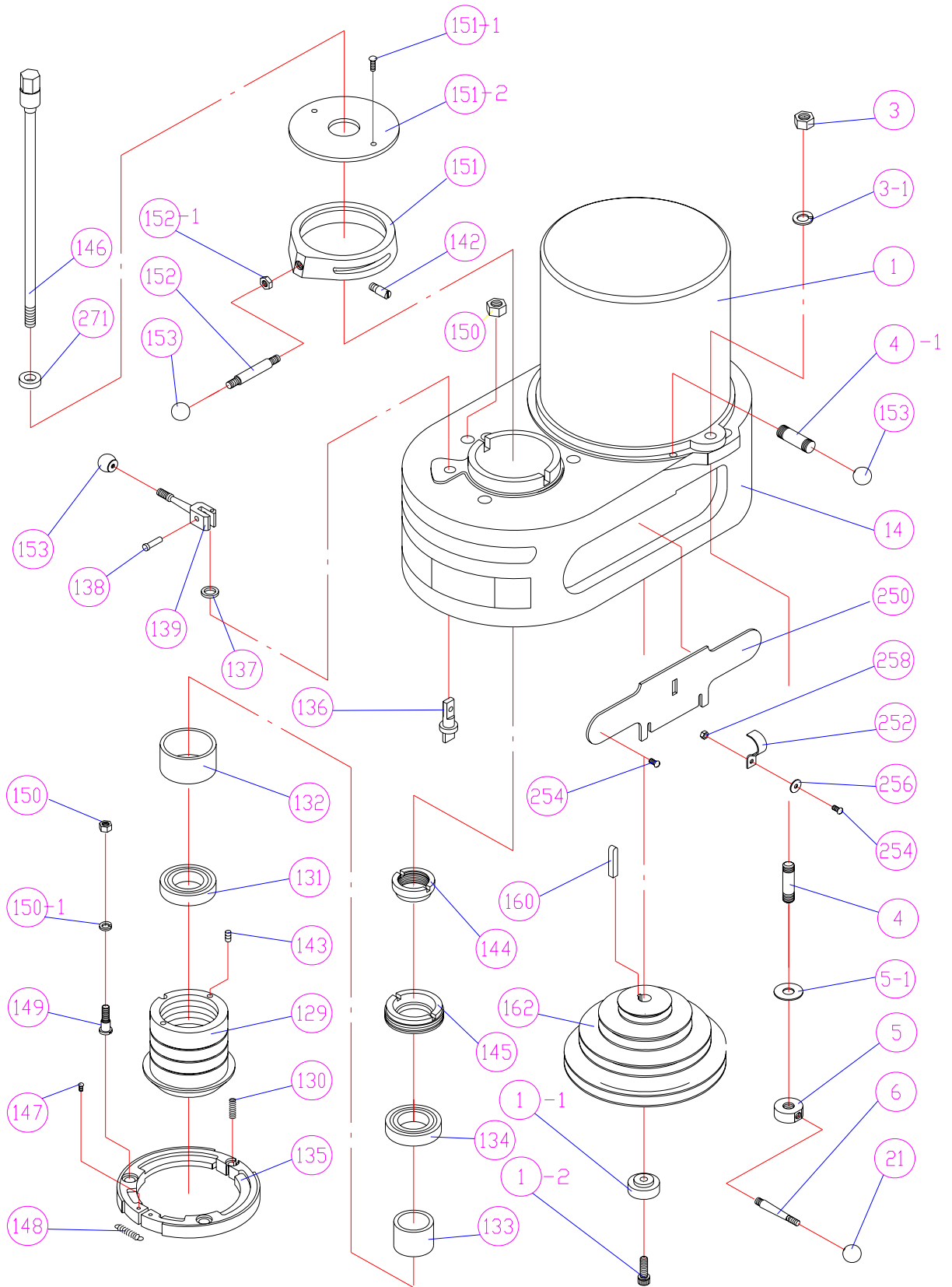
12.1 HEAD STOCK UPSIDE OF K2S (1)



HEAD STOCK UPSIDE OF K2S (1) PARTS LIST

NO.	PART NO.	DESCRIPTION	QTY
13.	K2-S013-00	GEAR HOUSING	1
15.	K2-S015-00	GEAR HOUSING COVER	1
15-1.	K2-S015-10	GEAR HOUSING COVER	1
15-2.	M5x6	CROSS SCREW	4
16.	M8x20	SOCKET CAP SCREW	6
17.	5x20	DOWEL PIN	2
19.	M5x16	OVAL HAND SCREW	5
20.	3203ZZ	DOUBLE SEAL BEARING	1
21.	1/4"	BLACK PLASTIC BALL HANDLE	1
22.	K2-S022-00	COMPRESSION SPRING	1
23.	K2-S023-00	GEAR SHAFT PLUNGER	1
24.	Øx20	ROLLING PIN	1
25.	K2-S025-00	SHIFT CRANK	1
25a.	M5x6	SET SCEW	1
27.	K2-S027-00	BACKGEAR SHIFT CRANK	1
27-1.	K2-S027-A0	BACKGEAR SHIFT BUSHING	1
28.	K2-S028-00	COUNTER SHAFT GEAR	1
29.	K2-S029-00	BACKGEAR SHIFTER FORK	1
30.	K2-S030-00	COUNTER SHAFT	1
32.	K2-S032-00	ALIGNING PLUNGER	1
32-1.	5/16"	SPRING WASHER	1
32-2.	5/16" NC	NUT	1
33.	5x5x16	KEY	1
34.	K2-S034-00	TIMING BELT PULLEY	1
35.	K2-S035-00	PULLEY	1
36.	K2-S036-00	TIMING BELT PULLEY FLANGE	2
37.	M4x10	OVAL HEAD SCREW	8
38.	K2-S038-00	HEX NUT	1
38-1.		NUT	1 115.
K2-S115-00	LOCK NUT	1	
116.	Ø40	LOCK WASHER	1
117.	R-78	SNAP RING	1
118.	6208ZZ	BEARING	2
120.	K2-S120-00	SPINDLE GEAR HUB	1
121.	8x8x20	KEY	1
122.	K2-S122-00	SPINDLE BULL GEAR	1
124.	PT 1/8"	OIL CUP	1
126.	K2-S126-00	SPINDLE PULLEY HUB	1
126-1.	K2-S126-A0	BELT POSITION WASHER	1
127.	5x5x18	SPINDLE PULLEY KEY	1
128.	K2-S128-00	SPINDLE PULLEY	1
157.	7/16"	HEX. NUT	3
158.	K2-S158-00	VERTICAL T-BOLT WASHER	3
159.	K2-S159-00	VERTICAL T-BOLT	3
163.	A-33	V-BELT	1

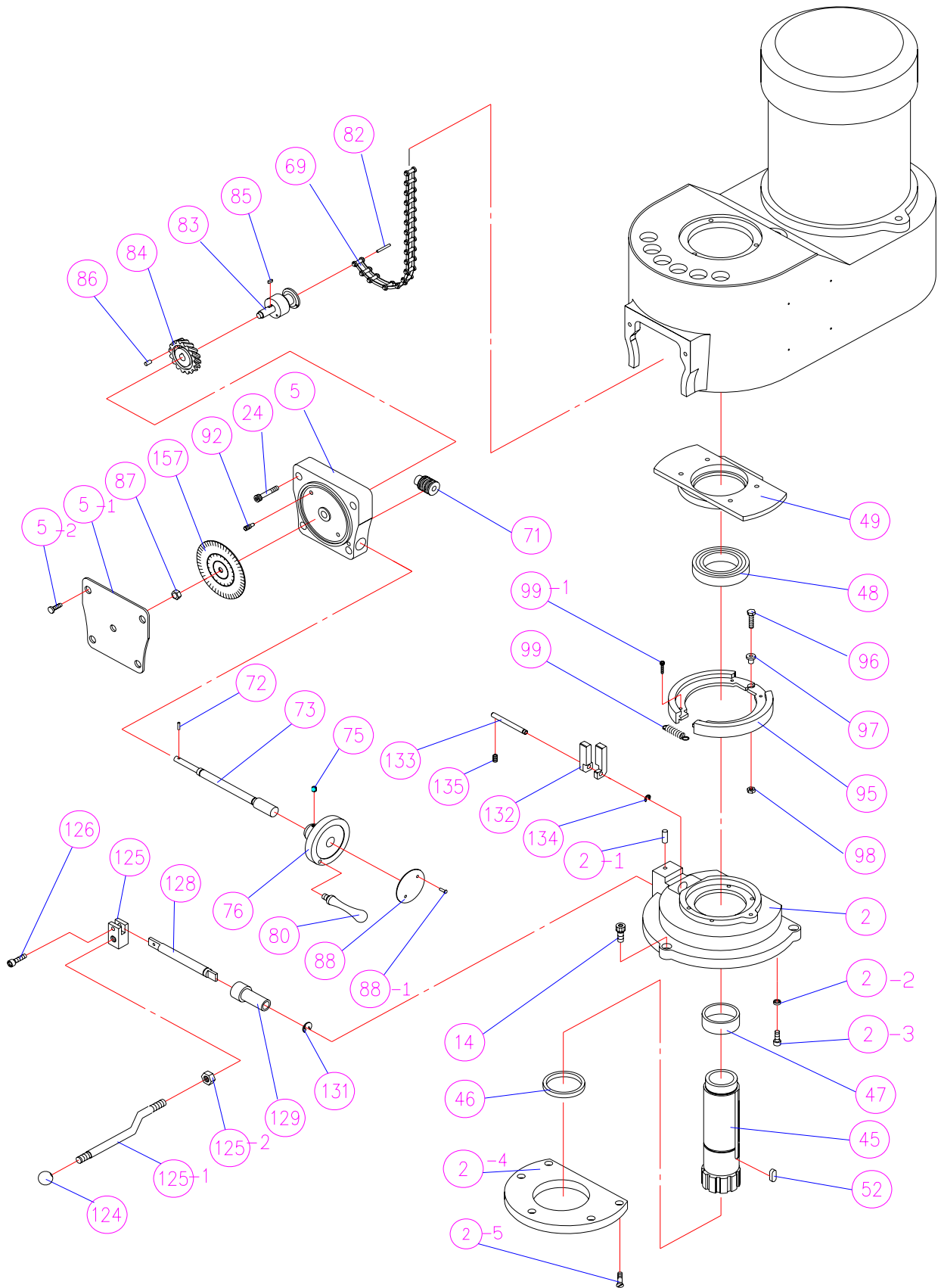
12.2 HEAD STOCK UPSIDE OF K2S (2)



HEAD STOCK UPSIDE OF K2S (2) PARTS LIST

NO.	PART NO.	DESCRIPTION	QTY
1.	K2-S001-00	MOTOR	1
1-1.	K2-S001-A0	BUSHING	1
1-2.	M8x30	SOCKET CAP SCREW	1
3.	3/8"	HEX. JAM NUT	2
3-1.	3/8"	SPRING WASHER	2
4.	K2-S004-00	MOTOR MOUNTING STUD	1
4-1.	K2-S004-10	STUD	1
5.	K2-S005-00	MOTOR LOCK NUT	1
5-1.		WASHER	2
6.	K2-S006-00	MOTOR LOCK NUT HANDLE	2
14.	K2-S014-00	BELT HOUSING	1
21.	1/4"	BLACK PLASTIC BALL HANDLE	1
129.	K2-S129-00	SPINDLE PULLEY BEARING SLEEVE	1
130.	K2-S130-00	COMPRESSION SPRING	1
131.	6007ZZ	BEARING	1
132.	K2-S132-00	UPPER BEARING SPACER	1
133.	K2-S133-00	UPPER BEARING SPACER	1
134.	6007ZZ	BEARING	1
135.	K2-S135-00	BRAKE BLOCK	1
136.	K2-S136-00	BRAKE LOCK STUD	1
137.	K2-S137-00	BRAKE LOCK WASHER	1
138.	K2-S138-00	BRAKE LOCK PIN	1
139.	K2-S139-00	PRAKE LOCK & HANDLE	1
142.	K2-S142-00	SPINDLE CLUTCH CAM RING PIN	2
143.	K2-S143-00	SOCKET SET SCREW	2
144.	K2-S144-00		1
145.	K2-S145-00		1
146.	K2-S146-00	DRAW BAR	1
147.	M3x6	OVAL HAND SCREW	4
148.	K2-S148-00	SPRING	2
149.	K2-S149-00	BRAKE PING SCREW	3
150.	5/16"	HEX. JAM NUT	3
150-1.	5/16"	SPRING WASHER	3
151.	K2-S151-00	CAM RING	1
151-1.	M3x16	CROSS SCREW	1
151-2.		PLASTIC COVER	1
152.	K2-S152-00	SPINDLE CLUTCH LEVER	1
152-1.	5/16"	NUT	1
153.	K2-S153-00	BLACK PLASTIC BALL HANDLE	1
160.	K2-S160-00	KEY	1
162.	K2-S162-00	PULLEY	1
250.	K2-S250-00	BELT GUARD ASSEMBLY	2
252.	K2-S252-00	SPRING PLATE	2
254.	M5x10	ROUND HEAD SCREW	2
256.	Ø5xØ13	WASHER	2
258.	M5	HEX. NUT	2
271.		DRAWBAR WASEHR	2

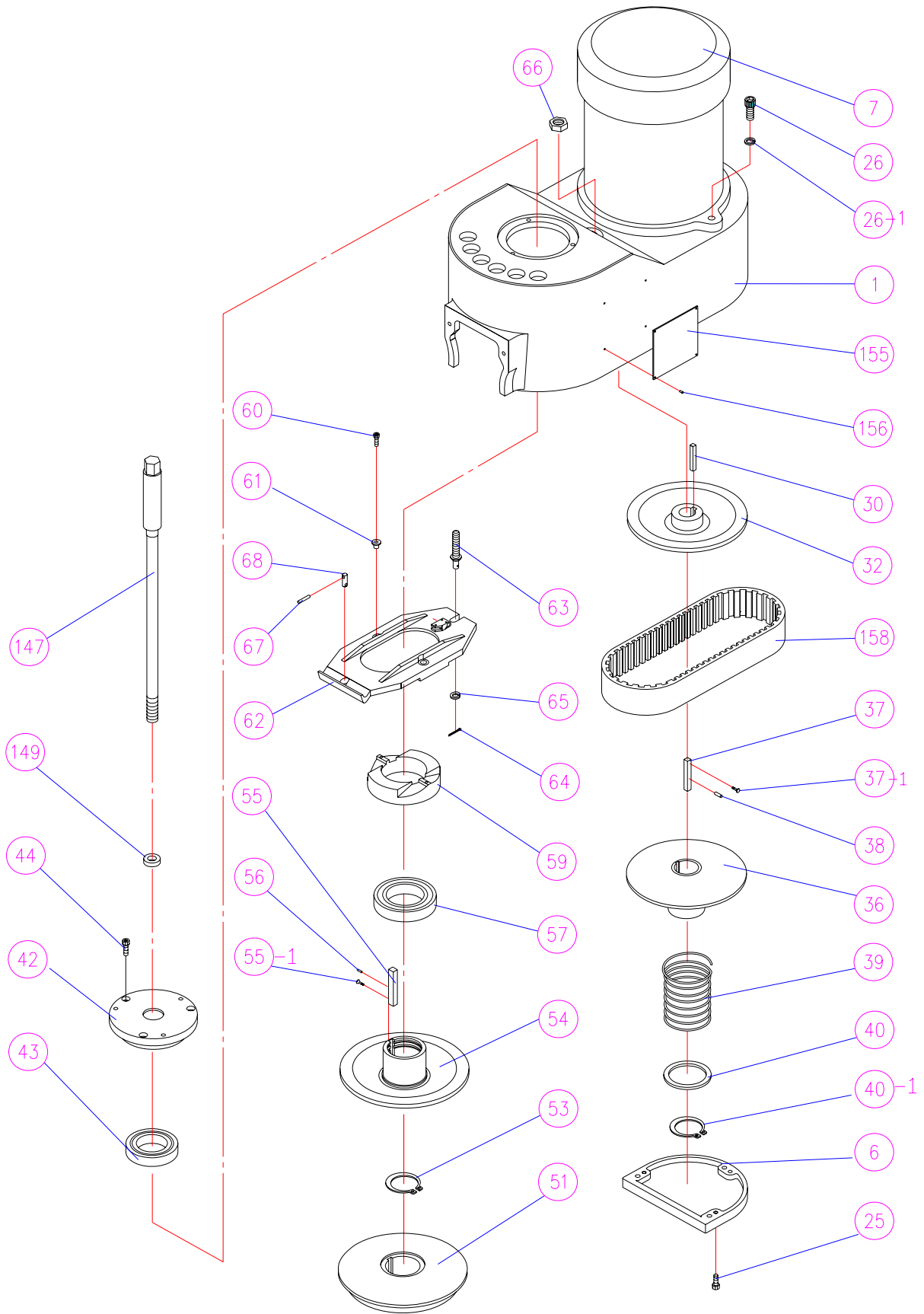
12.3 HEAD STOCK UPSIDE OF K2V (1)



HEAD STOCK UPSIDE OF K2V (1) PARTS LIST

NO.	PART NO.	DESCRIPTION	QTY
2.	K2-V002-00	BELT HOUSING BASE	1
2-1.	M6x8	SET SCREW	2
2-2.	Ø5xØ13	WASHER	4
2-3.	M5x30	SCREW	2
	M5x35	SCREW	2
2-4.		COVER	1
2-5.	M4x16	SCREW	5
5.	K2-V005-00	SPEED CHANGE HOUSING	1
5-1.		PLATE	1
5-2.	M3x16	SCREW	3
14.	M8x20	SOCKET CAP SCREW	6
24.	M6x30	SOCKET CAP SCREW	1
45.	K2-V045-00	SPINDLE PULLEY HUB	1
46.	K2-V046-00	SPINDLE PULLEY SPACE	1
47.	Ø1/12" x Ø1/4" x 4		1
48.	3010ZZ	BALL BEARING	1
49.	K2-V049-00	BRAKE BEARING CAP	1
52.	8x8x20	KEY	1
57.	3011ZZ	BALL BEARING	1
69.	K2-V069-00	SPEED CHANGE STUD	1
71.	K2-V071-00	WORM GEAR	1
72.	3x12	SPRING PIN	1
73.	K2-V073-00	SPEED CHANGE SHAFT	1
75.	M6x6	SET SCREW	1
76.	K2-V076-00	SPEED CHANGE HANDLE WHEEL	1
80.	K2-V080-00	HANDLE	1
82.	Ø3x25	SPRING PIN	2
83.	K2-V083-00	SPEED CHANGE CHAIN DRUM	1
84.	K2-V084-00	SPEED CHANGE SPUR GEAR	1
85.	3x3x18	KEY	1
86.	5x10	SPRING PIN	1
88.	K2-V088-00	CAUTION PLATE	1
88-1.		RIVET	2
92.	K2-V092-00	STOP SCREW	1
95.	K2-V095-00	BRAKE SHOE ASSEMBLY	1
96.	M6x20	HEX. HEAD SCREW	1
97.	K2-V097-00	BRAKE SHOE PIVOT SLEEVE	1
98.	M10	NUT	1
99.	K2-V099-00	SPRING	2
99-1.	M3x6	ROUND HEAD SCREW	4
124.	3/8"	CYLINDRICAL KNOB	1
125.	K2-V125-00	BRAKE HANDLE	1
125-1.	K2-V125-10	SOCKET CAP SCREW	1
125-2.	M10	NUT	1
126.	K2-V126-00	BRAKE KNOB	1
128.	K2-V128-00	BRAKE LOCK SHAFT	1
129.	K2-V129-00	SLEEVE FOR BRAKE LOCK SHAFT	1
131.	E-10	SNAP RING	1
132.	K2-V132-00	BRAKE FINGER PIVOT STUD	2
133.	K2-V133-00	BRAKE OPERATING FINGER	1
134.	E-5	SNAP RING	1
135.	M6x6	SOCKET SET SCREW	2
157.	K2-V157-00	VARI-SPEED DIAL 60HZ	1

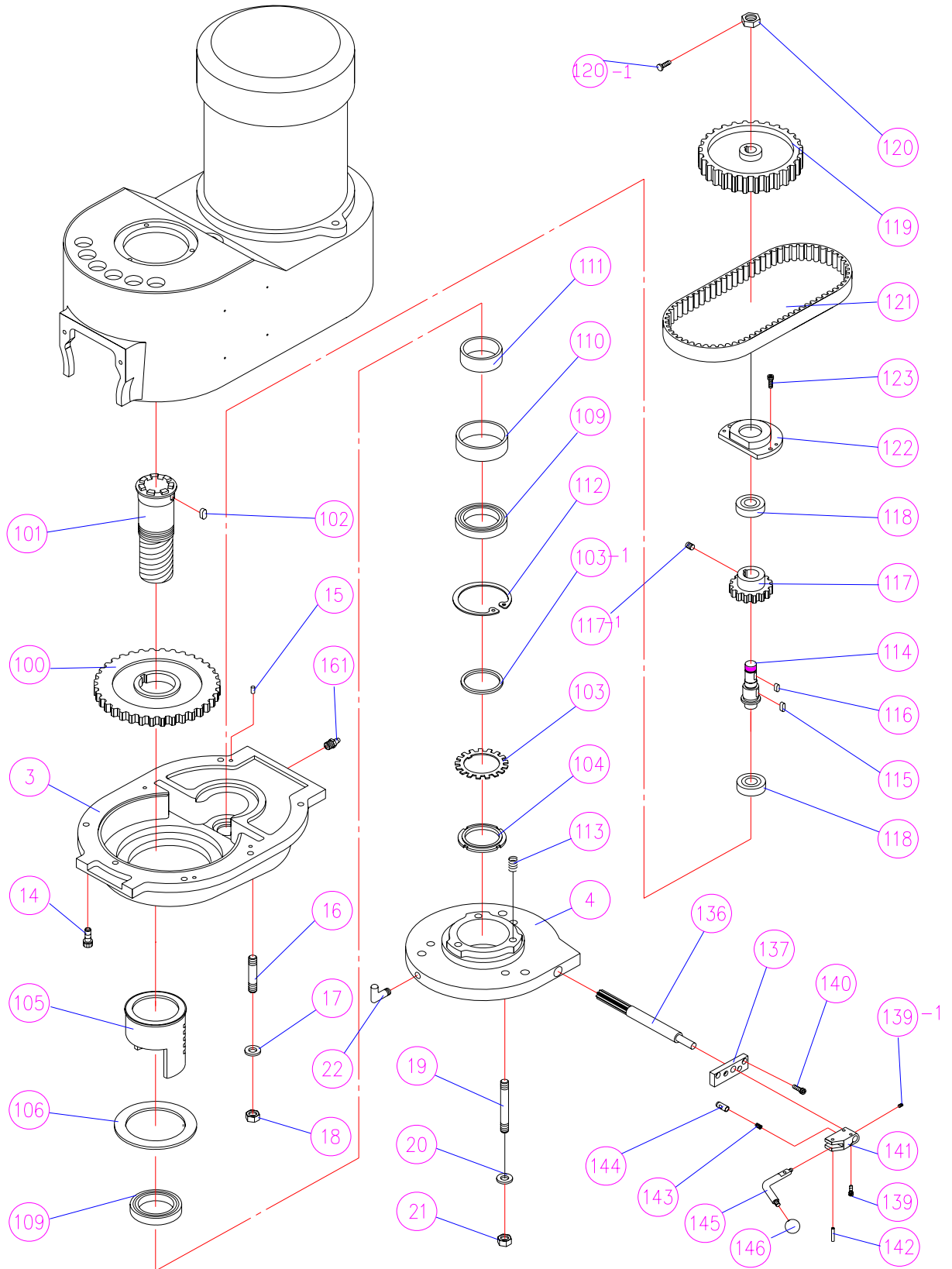
12.4 HEAD STOCK UPSIDE OF K2V (2)



HEAD STOCK UPSIDE OF K2V (2) PARTS LIST

NO.	PART NO.	DESCRIPTION	QTY
1.	K2-V001-00	BELT HOUSING	1
6.	K2-V006-00	MOTOR SHAFT BEARING COVER	1
7.	K2-V007-00	MOTOR (2HP) COMPLETE UNIT	1
25.	M5x12	SOCKET CAP SCREW	3
26.	3/8" x 1-1/4"	SOCKET CAP SCREW	1
26-1.	3/8"	WASHER	1
30.	6x6x30	KEY	1
32.	K2-V032-00	STATIONARY MOTOR VARI. DISC	1
36.	K2-V036-00	ADJUSTABLE MOTOR VARI. DISC ASSEMBLY	1
37.	6x6x55	KEY	1
37-1.	M4x10	ROVND HEAD SCREW	1
38.	4x10	SCREW	1
39.	K2-V039-00	SPRING	1
40.	K2-V040-00	ADJUSTABLE VARI. DISC SPRING COLLAR	1
40-1.	S-40	SNAP RING	1
42.	K2-V042-00	TOP BEARING CAP	1
43.	6007ZZ	BALL BEARING	1
44.	M6x20	SOCKET CAP SCREW	1
51.	K2-V051-00	STATIONARY DRIVEN VARI. DISC	1
53.	S-40	SNAP RING	1
54.	K2-V054-00	ADJUSTABLE DRIVEN VARI. DISC	1
55.	8x7x63	KEY	1
55-1.	M4x8	SCREW	1
56.	Ø3x8	SPRING PIN	1
57.	6011ZZ	BALL BEARING	1
59.	K2-V059-00	SPINDLE PULLEY BEARING SLIDING	1
60.	M5x20	SOCKET HEAD CAP SCREW	2
61.	K2-V061-00	PIVOT SLEEVE	2
62.	K2-V062-00	SPEED CHANGE PLATE	1
63.	K2-V063-00	SPEED CHANGE PLATE PIVOT STUD	1
64.	K2-V064-00	COTTON PIN	1
65.	5/16"	WASHER	1
66.	K2-V066-00	HEX. JAM NUT	1
67.	4x30	SPRING PIN	1
68.	K2-V068-00	SPEED CHANGE STUD	1
147.	K2-V147-00	DRAWBAR	1
149.	K2-V149-00	DRAWBAR WASHER	1
155.	K2-V155-00	CAUTION PLATE	1
156.		RIVAL	16
158.	K2-V158-00	BELT	1

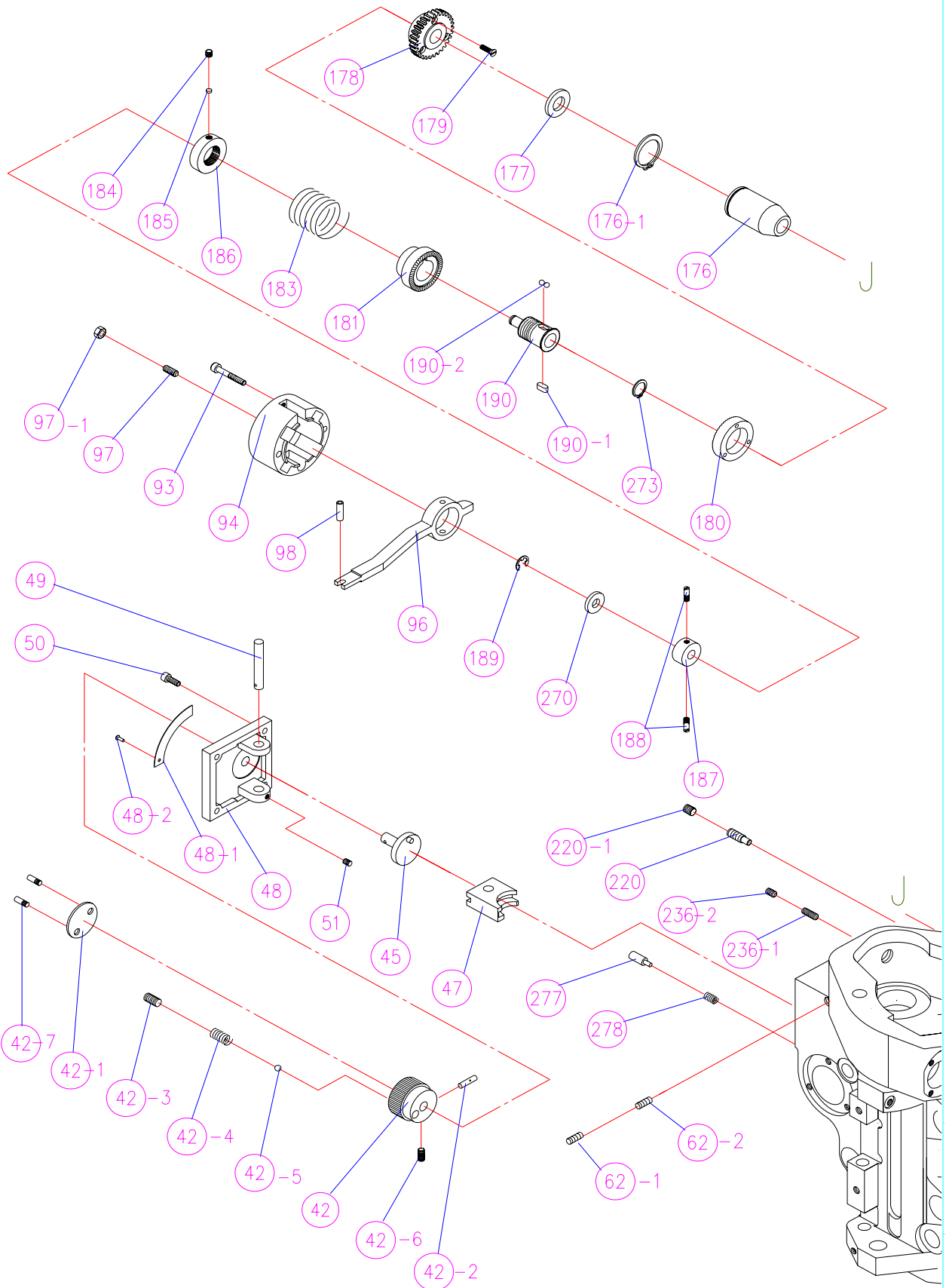
12.5 HEAD STOCK UPSIDE OF K2V (3)



HEAD STOCK UPSIDE OF K2V (3) PARTS LIST

NO.	PART NO.	DESCRIPTION	QTY
3.	K2-V003-00	GEAR HOUSING	1
4.	K2-V004-00	FIXED CLUTCH BRACKET	1
15.	K2-V015-00	PIN	2
16.	K2-V016-00	VERT. TEE BOLTS	1
17.	K2-V017-00	STEEL WASHER	1
18.	7/16" NC	HEX. NUT	1
19.	K2-V019-00	VERTICAL T-BOLT	1
20.	K2-V020-00	VERTICAL BOLT WASHER	1
21.	7/16" NC	HEX. NUT	1
22.	1/8" PT	LTYPE, OIL CUP	1
100.	K2-V100-00	SPINDLE BULL GEAR ASSEMBLY	1
101.	K2-V101-00	SPLICED GEAR HUB	1
102.	8x8x12	KEY	1
103.	Ø40	WASHER	1
103-1.	K2-V103-00	WASHER	1
104.	K2-V104-00	BEARING NUT	1
105.	K2-V105-00	BEARING SLEEVE	1
106.	K2-V106-00	BALL BEARING GEAR SLEEVE WASHER	1
109.	6908ZZ	BALL BEARING	2
110.	K2-V110-00	BEARING SPACER	1
111.	K2-V111-00	BEARING SPACER	1
112.	R-62	SNAP RING	1
113.	K2-V113-00	SPRING	3
114.	K2-V114-00	BULL GEAR PINION COUNTER SHAFT	1
115.	5x5x18	KEY	1
116.	5x5x12	KEY	1
117.	K2-V117-00	BULL GEAR PINION	1
118.	6203ZZ	BALL BEARING	2
119.	K2-V119-00	PULLEY	1
120.	5/8" NC	HEX NUT	1
120-1.	M5x6		1
121.	K2-V121-00	BELT	1
122.	K2-V122-00	BULL GEAR PINION BEARING CAP	1
123.	M5x16	SOCKET CAP SCREW	1
136.	K2-V136-00	BULL GEAR SHIFT PINION	1
137.	K2-V137-00	HI-LOW DETENT PLATE	1
139.	M4x16	SOCKET CAP SCREW	2
139-1.	M5x6	SOCKET SET SCREW	1
140.	M5x15	SOCKET CAP SCREW	2
141.	K2-V141-00	HI-LOW PINION BLOCK	1
142.	4x16	SPRING PIN	1
143.		SPRING	1
144.	K2-V144-00	HI-LOW DETENT PLUNGER	1
145.	K2-V145-00	HI-LOW SHIFT CRANK	1
146.	1/4"	BRACELET BALL HANDLE	1
161.	1/8" PT	OIL CAP	1

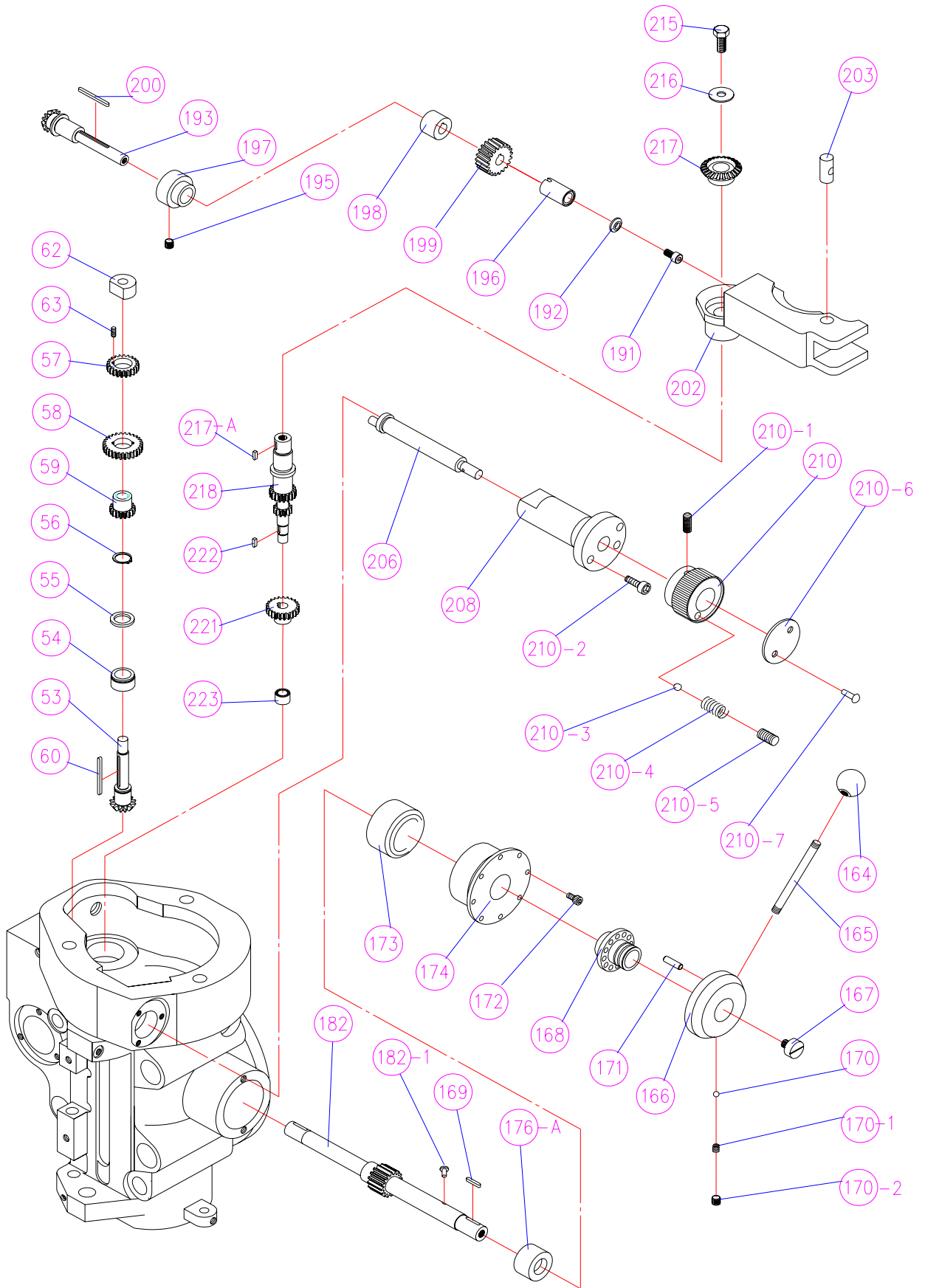
12.6 HEAD STOCK INFRASTRUCTURE (1)



HEAD STOCK INFRASTRUCTURE (1) PARTS LIST

NO	PART NO.	DESCRIPTION	QTY
42.	K5-A042-00	SHIFT CRANK	1
42-1.	K5-A042-10	NAME PLATE	1
42-2.	Ø3x30	SPRING PIN	1
42-3.	K5-A042-40	COMPRESSION SPRING	1
42-4.		SPRING	1
42-5.	K5-A042-60	STELL BALL	1
42-6.	M6x10	SET SCREW	1
42-7.		RIVEL	2
45.	K2-A045-00	CLUSTER GEAR SHIFT CRANK	1
47.	K2-A047-00	FEED GEAR SHIFTER FORK	1
48.	K2-A048-00	CLUSTER GEAR COVER	1
48-1.		FEED PLADE	1
48-2.		RIVEL	2
49.	K2-A049-00	FEED SHAFT ROD	1
50.	M5x15	SCOKET CAP SCREW	4
51.	M5x5	SOCKET SET SCREW	1
62-1.	K2-A062-B0	SOCKET SET SCREW M6X10	1
62-2.	M6x16	SOCKET SET SCREW	1
93.	M5x35	SOCKET SET SCREW	2
94.	K2-A094-00	CLUTCH ARM COVER	1
96.	K2-A096-00	OVERLOAD CLUTCH TRIP	1
97.	1/4"x3/4"	SOCKET SET SCREW	1
97-1.	1/4"	NUT	1
98.	5x16	SPRING PIN	1
176.	K2-A176-00	QUILL PINION SHAFT BUSHING	1
176-1.	S-32	SNAP RING	1
177.	K2-A177-00	PINION SHAFT WORM GEAR SPACER	1
178.	K2-A178-00	OVERLOAD CLUTCH WORM GEAR	1
179.	M4x16	SOCKET CAP SCREW	3
180.	K2-A180-00	OVERLOAD CLUTCH RING	1
181.	K2-A181-00	OVERLOAD CLUTCH	1
183.	K2-A183-00	SAFETY CLUTCH SPRING	1
184.	M6x6	SOCKET SET SCREW	1
185.	K2-A185-00	SPACER	1
186.	K2-A186-00	OVERLOAD CLUTCH ADJUSTABLE NUT	1
187.	K2-A187-00	OVERLOAD CLUTCH RING	1
188.	K2-A188-00	OVERLOAD CLUTCH RING PIN	2
189.	E-8	SNAP RING	1
190.	K2-A190-00	OVERLOAD CLUTCH SLEEVE	1
190-1.	4.5x5X12	KEY	1
190-2.		STEEL BALL	2
220.	K2-A220-00	SOCKET SET SCREW	1
220-1.	K2-A220-A0	SOCKET SET SCREW	1
236-1.	M6x10	SOCKET SET SCREW	1
236-2.	K2-A236-B0	SOCKET SET SCREW	1
270.	K2-A270-00	WASHER	1
273.	S-15	SNAP RING	1
277.	K2-A277-00	PIN	1
278.	K2-A278-00	COMPRESSION SPRING	1

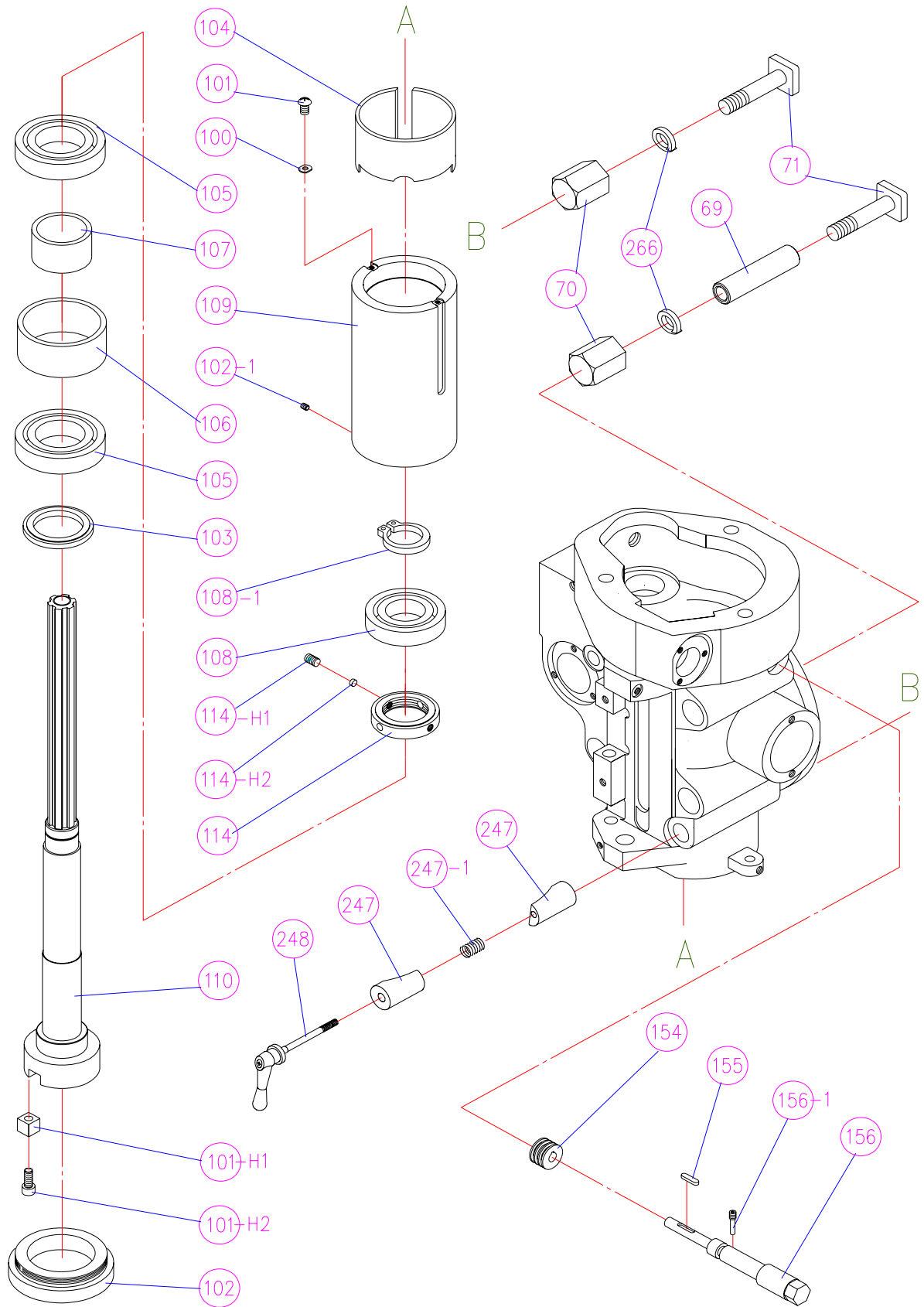
12.7 HEAD STOCK INFRASTRUCTURE (2)



HEAD STOCK INFRASTRUCTURE (2) PARTS LIST

NO	PART NO.	DESCRIPTION	QTY
53.	K2-A053-00	FEED REVERSE BEVEL PINION	1
54.	K2-A054-00	BEVEL GEAR BEARING	1
55.	K2-A055-00	BEVEL GEAR THRUST WASHER	1
56.	S-16	SNAP RING	1
57.	K2-A057-00	FEED DRIVE CLUSTER GEAR (UPPER)	1
58.	K2-A058-00	FEED DRIVE CLUSTER GEAR (ENTER)	1
59.	K2-A059-00	FEED DRIVE CLUSTER GEAR	1
60.	3x3x45	KEY	1
62.	K2-A062-00	TRIP SHAFT BUSHING	1
63.	M4x10	CLUSTER GEAR PIN	1
164.		BLACK PLASTIC BALL HANDLE	1
165.	K2-A165-00	PINION SHAFT HUB HANDLE	1
166.	K2-A166-00	PINION SHAFT HUB	1
167.	K2-A167-00	PINION SHAFT HUB SCREW	1
168.	K2-A168-00	PINION SHAFT HUB SLEEVE	1
169.	3x3x18	KEY	1
170.		STEEL BALL	1
170-1.	K2-A170-A0	COMPRESSION SPRING	1
170-2.	5/16"x5/16"	SOCKET SET SCREW	1
171.	5x20	ROLLING PIN	1
172.	M5x10	SOCKET SET SCREW	2
173.	K2-A173-00	CLOCK SPRING	1
174.	K2-A174-00	SPRING COVER	1
176-A.	K4-A176-10	SHAFT BUSHING	1
182.	K2-A182-00	QUILL PINION SHAFT	1
182-1.	K2-A182-A0	PIN	1
191.	M6x12	ROUND HEAD SCREW	1
192.	K2-A192-00	BEVEL PINION WASHER	1
193.	K2-A193-00	FEED BEVEL PINION	1
195.	M6x6	SOCKET SET SCREW	1
196.	K2-A196-00	FEED WORM GEAR SHAFT SLEEVE	1
197.	K2-A197-00	WORM CRADLE BUSHING	1
198.	K2-A198-00	WORM GEAR SPACER	1
199.	K2-A199-00	FEED DRIVE WORM GEAR	1
200.	3x3x25	KEY	1
202.	K2-A202-00	WORM GEAR CRADLE	1
203.	K2-A203-00	FEED ENGAGE PIN	1
206.	K2-A206-00	WORM GEAR CRADLE THROW-OUT	1
208.	K2-A208-00	SHIFT SLEEVE	1
210.	K2-A210-00	SHIFTER CRANK	1
210-1.	M6x10	SOCKET SET SCREW	1
210-2.	M5x12	SOCKET CAP SCREW	1
210-3.		STEEL BALL	1
210-4.	K2-A210-40	COMPRESSION SPRING	1
210-5.	M6x6	SOCKET SET SCREW	1
210-6.	K2-A210-60	NAME PLATE	1
210-7.		RIVEL	2
215.	M8	HEX. NUT	1
216.	5/16"	WASHER	1
217.	K2-A217-00	FEED REVERSE BEVEL GEAR	1
217-1.	3x3x9.5	KEY	1
218.	K2-A218-00	FEED DRIVING GEAR	1
221.	K2-A221-00	FEED DRIVE GEAR	1
222.	3x3x8	KEY	1
223.	B-66	TORRINGTON NEEDLE BEARING	1

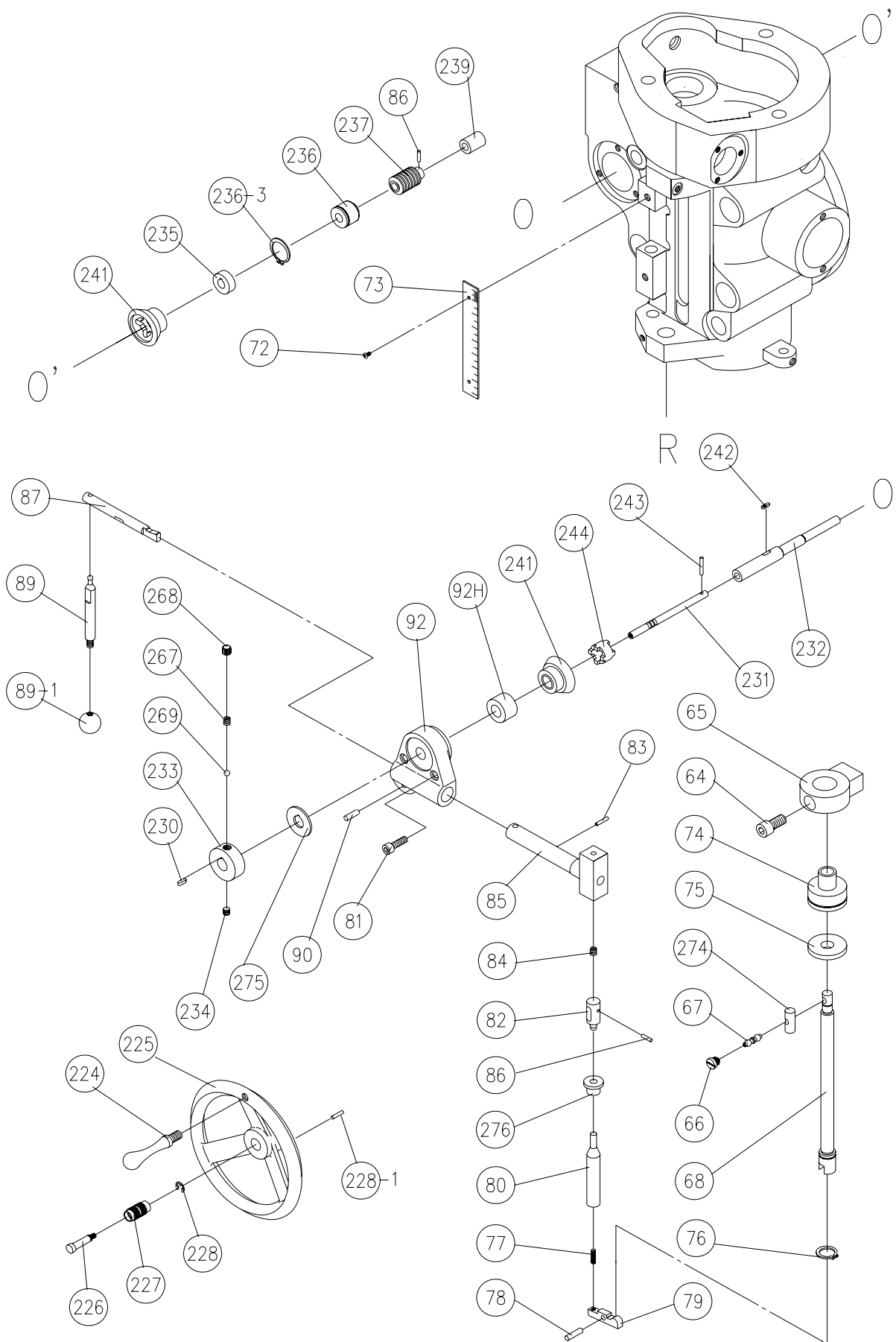
12.8 HEAD STOCK INFRASTRUCTURE (3)



HEAD STOCK INFRASTRUCTURE (3) PARTS LIST

NO	PART NO.	DESCRIPTION	QTY
12.	K2-A012-00	QUILL HOUSING	1
69.	K2-A069-00	BUSH	4
70.	K2-A070-00	HEX. NUT	4
71.	K2-A071-00	1/2" T-BOLT	4
100.	K2-A100-00	WASHER	2
101.	M5x8	OVAL HEAD SCREW	2
102.	K2-A102-00	#7207 NOSE CAP R8	1
102-1.	M5x6L	SOCKET SET SCREW	1
103.	K2-A103-00	#7207 SPINDLE DIRT SHIELD	1
104.	K2-A104-00	OIL BAFFLE	1
105.	7207B	BEARING	2
106.	K2-A106-00	BEARING SPACER	1
107.	K2-A107-00	GEARING SPACER	1
108.	6206	BEARING	1
108-1.	S-30	SNAP RING	1
109.	K2-A109-00	SLEEVE	1
101-H1.	K2-A101-H1	LOCK BLOCK	2
101-H2.	M6x16	SOCKET SET SCREW	2
110.	K2-110-00	BEARING SLEEVE R8	1
110-H1.	K2-A110-H1	BEARING SLEEVE 30#	1
110-H2.	K2-A110-H2	KEY (30#)	2
114.	K2-A114-00	LOCK NUT	1
114-H1.	8x8	SET SCREW	2
114-H2.	K2-A114-H2	PRESSUSE WASHER	2
154.	K2-A154-00	WORM GEAR	1
155.	3X3X15	KEY	1
156.	K2-A156-00	WORM SHAFT	1
156-1.	K2-A156-A0	WORM SHAFT	1
247.	K2-A247-00	QUILL LOCK SLEEVE	1
247-1.	K2-A247-10	COMPRESSION SPRING	1
248.	K2-A248-00	QUILL LOCK BOLT	1
266.	K2-A266-00	WASHER	2

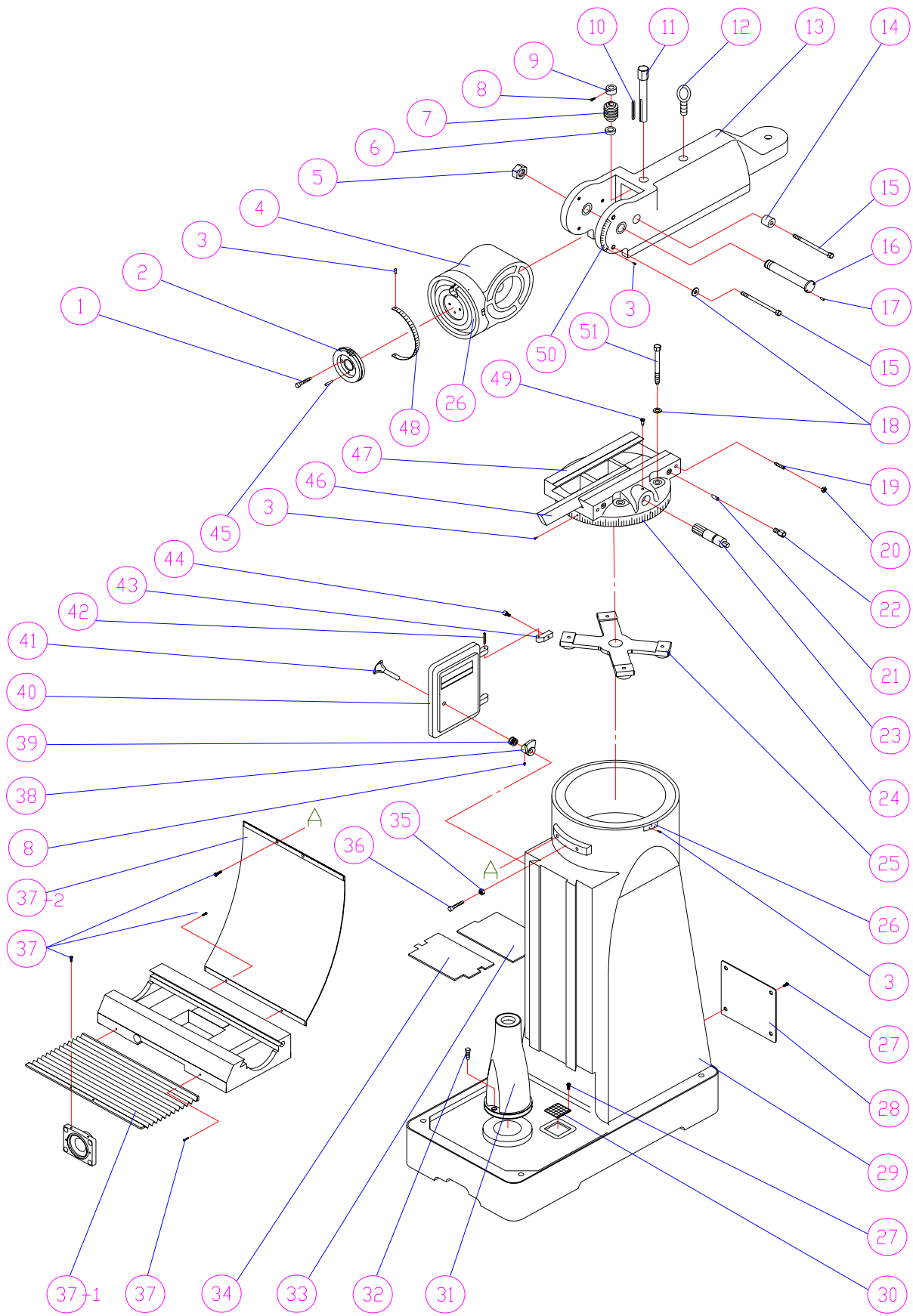
12.9 HEAD STOCK INFRASTRUCTURE (4)



HEAD STOCK INFRASTRUCTURE OF K2S (4) PARTS LIST

NO	PART NO.	DESCRIPTION	QTY
64.	3/8"x3/4"	SOCKET SET SCREW	1
65.	K2-A065-00	QUILL STOP KNOB	1
66.	K2-A066-00	REVERSE TRIP BALL LEVER SCREW	1
67.	K2-A067-00	REVERSE TRIP BALL LEVER	1
68.	K2-A068-I 0	QUILL STOP MICRO SCREW (INCH)	1
	K2-A068-M0	QUILL STOP MICRO SCREW (METRIC)	1
72.	M3x4	M3 ROUND HEAD SCREW	2
73.	K2-A073-I0	MICROMETER SCALE (IMPERIAL)	1
	K2-A073-M0	MICROMETER SCALE (METRIC)	1
74.	K2-A074-I0	DIAL WITH 50 GRADUATIONS (INCH)	1
	K2-A074-M0	DIAL WITH 50 GRADUATIONS (METRIC)	1
75.	K2-A075-I0	QUILL DIAL STOP NUT (INCH)	1
	K2-A075-M0	QUILL DIAL STOP NUT (METRIC)	1
76.	S-16	SNAP RING	1
77.	M4x16	SOCKET SET SCREW	1
78.	K2-A078-00	PIN	1
79.	K2-A079-00	FEED TRIP LEVER	1
80.	K2-A080-00	FEED TRIP PLUNGER	1
81.	M6x20	SOCKET CAP SCREW	2
82.	K2-A082-00	GEARSHAFT PLUNGER	1
83.	3x15	ROLL PIN	1
84.	K2-A084-00	COMPRESSION SPRING	1
85.	K2-A085-00	FEED TRIP PLUNGER BUSHING	1
86.	3x12	ROLLING PIN	1
87.	K2-A087-00	CAM ROD	1
89.	K2-A089-00	TRIP HANDLE	1
89-1.	1/4"	BLACK PLASTIC BALL HANDLE	1
90.	5x16	SPRING PIN	1
92.	K2-A092-00	FEED TRIP BRACKET	1
92H.	K2-A092-H0	BUSHING	1
224.	K2-A224-00	HANDLEWHEEL HANDLE	1
225.	K2-A225-00	HANDLEWHEEL	1
226.	K2-A226-00	FEED REVERSE KNOB STUD	1
227.	K2-A227-00	REVERSE KNOB	1
228.	E-5	SNAP RING	1
230.	3x3x10	KEY	1
231.	K2-A231-00	REVERSE CLUTCH ROD	1
232.	K2-A232-00	FEED WORM SHAFT	1
233.	K2-A233-00	HANDWHEEL CLUTCH	1
234.	M6x6	SOCKET SET SCREW	1
235.	K2-A235-00	WASHER	1
236.	K2-A236-00	WORM SHAFT BUSHING	1
236-3.	S-22	SNAP RING	1
237.	K2-A237-00	WORM	1
239.	K2-A239-00	BUSHING	1
241.	K2-A241-00	FEED REVERSE BEVEL GEAR	2
242.	3x3x15	KEY	1
243.	3x20	SPRING PIN	1
244.	K2-A244-00	FEED REVERSE CLUTCH	1
267.	K2-A267-00	COMPRESSION SPRING	1
268.	M8x6	SOCKET SET SCREW	1
269.	3/16"	STEEL BALL	1
274.	K2-A274-00	PIN	1
275.	K2-A275-00	WASHER	1
276.	K2-A276-00	TRIP PLUNGER BUSHING	1

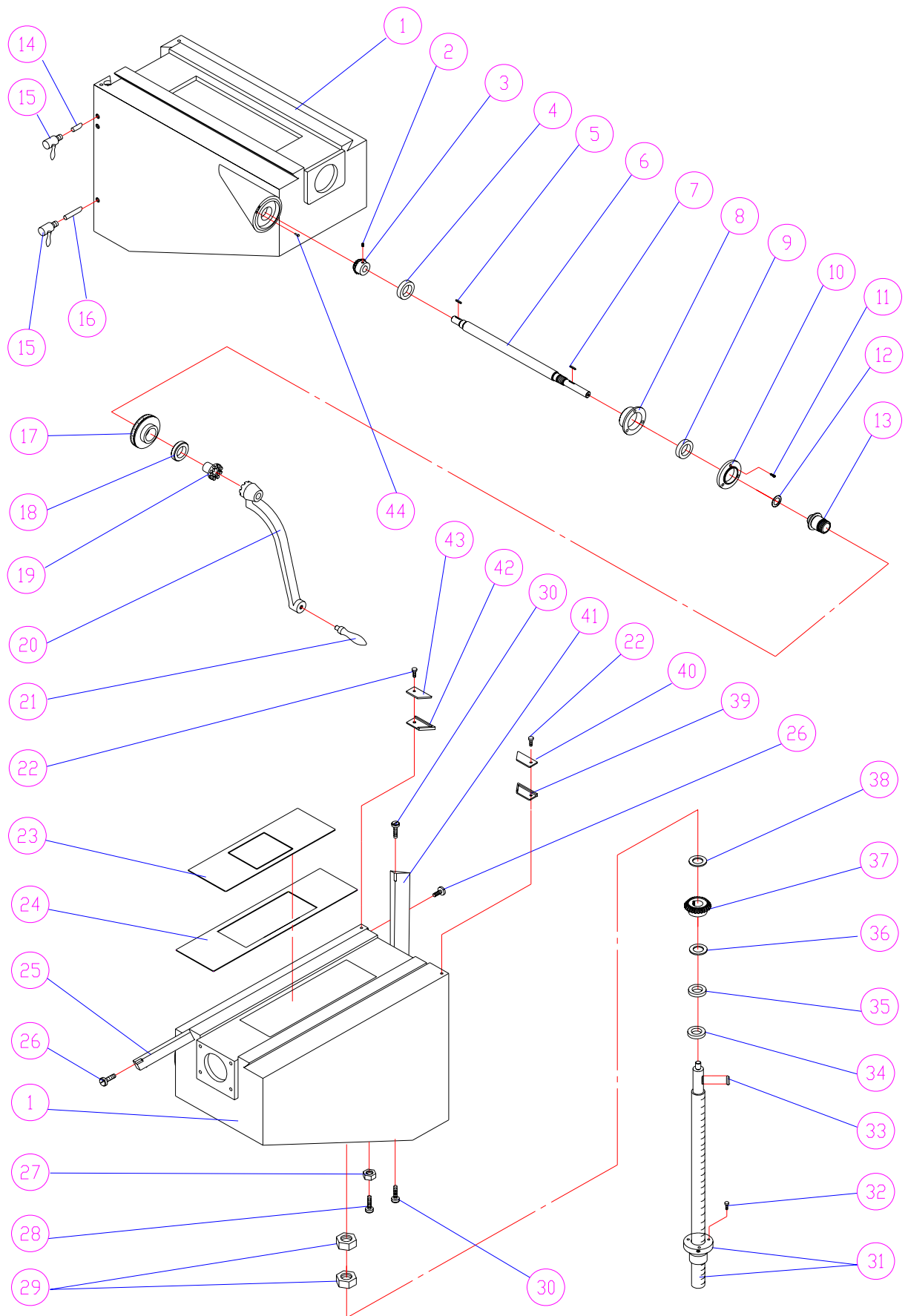
12.10 COLUMN ASSEMBLY



COLUMN ASSEMBLY

NO	PART NO.	DESCRIPTION	QTY
01.	M8x25	SOCKET CAP SCREW	2
02.	K2-C001-00	QUILL HOUSING ADJUSTING GEAR	1
03.		RIVAT	13
04.	K2-C002-00	RAM ADAPTER	1
05.	K2-C004-10	ADAPTER PIVOT STUD LOCK NUT	1
06.	K2-C012-00	WORM WASHER	1
07.	K2-C006-00	VERTICAL ADJUSTING WORM	1
08.	M6x8	SET SCREW	2
09.	K2-C007-00	SAPCING RING	1
10.	5x5x50	KEY	1
11.	K3-C008-00	VERTICAL ADJUSTING WORM SHAFT	1
12.	K2-C011-00	1/4" NC HOOK BOLT	1
13.	K2-C010-00	RAM	1
14.	K3-C010-10	SPACING RING	1
15.	K2-C019-00	ADAPTER LOCK BOLT	3
16.	K2-C017-10	ADAPTER PIVOT STUD	1
17.	Ø5x14	ROLL PIN	2
18.	K2-C018-00	WASHER	6
19.	K2-C110-00	GIB LOCK SCREW	2
20.	3/8" NC	NUT	2
21.	K2-C046-60	LOCK PLUNGER	2
22.	K2-C107-00	RAM LOCKING BOLT	2
23.	K2-C120-00	RAM PINION	1
24.	PM-DE06-00	TURRET SCALE	1
25.	K2-C118-00	SLIDER	1
26.	PM-DE02-00	ZERO PLATE	2
27.	M5x6	OVAL HEAD SCREW	8
28.	K5-C135-00	COOLANT PUMP COVER	1
29.	K2-C098-00	COLUMN	1
30.	K2-C130-00	STRAINER NET	2
31.	K2-C103-00	PEDESTAL	1
32.	M10x25	SOCKET CAP SCREW	2
33.	K2-C129-1B	TOOL BOARD	1
34.	K2-C129-0B	TOOL BOARD	1
35.	M8	NUT	1
36.	M8x50	SOCKET CAP SCREW	1
37.	M5x12	OVAL HEAD SCREW	2
37-1.	K2-C100-00	WAVE WAY COVER	1
37-2.	K2-C101-00	FLAT WAY COVER	1
38.	K2-C113-00	DOOR LOCKING CAM	1
39.	K2-C116-00	COMPRESSION SPRIING	1
40.	K2-C115-00	DOOR	1
41.	K2-C119-00	DOOR LOCK HANDLE	1
42.	Ø5x24	SPRING PN	2
43.	K2-C112-00	DOOR BRACKET	2
44.	M6x20	SOCKET CAP SCREW	2
45.	Ø6x24	SPRING PIN	1
46.	K2-C111-00	RAM / TURRET GIB	1
47.	K2-C124-00	TURRET	1
48.	PM-DE08-00	ANGLE PLATE	1
49.	K2-C128-00	RAM PINION SET SCREW	1
50.	PM-DE15-00	ADAPTER SCALE	1
51.	K2-C127-00	LOCK BOLT	4

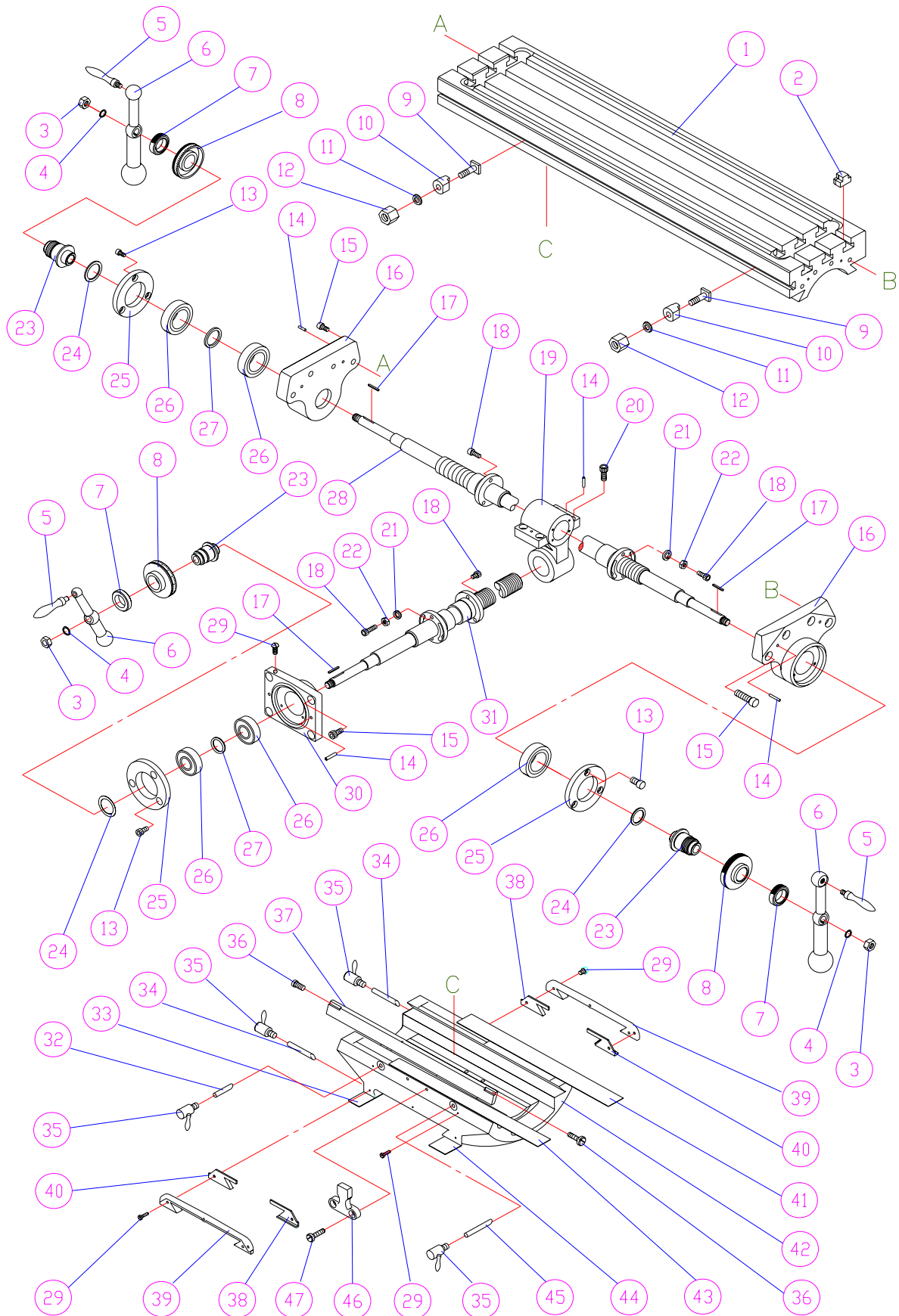
12.11 KNEE ASSEMBLY



KNEE ASSEMBLY PARTS LIST

NO	PART NO.	DESCRIPTION	QTY
01.	K2-C062-00	KNEE	1
02.	M6x8	SET SCREW	2
03.	K2-C096-00	BEVEL PINION	1
04.	6204ZZ	BALL BEARING	1
05.	4x4x18	KEY	1
06.	K2-C094-00	ELEVATING SHAFT	1
07.	3x3x18	KEY	1
08.	K2-C092-00	BEARING RETAINER RING	1
09.	6204Z	BALL BEARING	1
10.	K2-C090-00	BEARING CAP	1
11.	M6x12	SOCKET CAP SCREW	3
12.	K2-C089-00	WASHER	1
13.	K2-C086-00	DIAL NUT	1
14.	K2-C046-60	LOCK PLUNGER	1
15.	K2-C037-00	LOCK BOLT	2
16.	K3-C046-90	LOCK PLUNGER	1
17.	K2-C087-I0	DIAL (INCH)	1
	K2-C087-M0	DIAL (METRIC)	1
18.	K2-C088-00	DIAL HOLDER	1
19.	K2-C085-00	GEAR SHAFT CLUTCH INSERT	1
20.	K2-C084-00	ELEVATING CRANK	1
21.	K2-C083-00	HANDLE	1
22.	M6x12	OVAL HEAD SCREW	2
23.	K2-C060-00	CHIP GUARD - UP	1
24.	K2-C061-00	CHIP GUARD - LOWER	1
25.	K2-C049-00	SADDLE KNEE GIB	1
26.	K2-C041-00	GIB ADJUSTING SCREW	2
27.	M8	NUT	1
28.	M8x16	SOCKET CAP SCREW	1
29.	1/2" NF	NUT	2
30.	K2-C041-A0	GIB ADJUSTING SCREW	2
31.	K2-C106-I0	ELEVATING SCREW ASSEMBLY (INCH)	1
	K2-C106-M0	ELEVATING SCREW ASSEMBLY (METRIC)	1
32.	M6x16	SOCKET CAP SCREW	3
33.	5x5x22	KEY	1
34.	51205	THRUST BALL BEARING	1
35.	6005Z	BALL BEARING	1
36.	K2-C079-00	SPACING WASHER	1
37.	K2-C077-00	BEVEL GEAR	1
38.	K2-C076-00	WASHER	1
39.	K2-C058-00	FELT WIPERS	1
40.	K2-C057-00	FELT WIPERS	1
41.	K2-C055-00	KNEE COLUMN GIB	1
42.	K2-C054-00	FELT WIPERS	1
43.	K2-C053-00	FELT WIPERS	1
44.		RIVET	2

12.12 TABLE, SADDLE ASSEMBLY

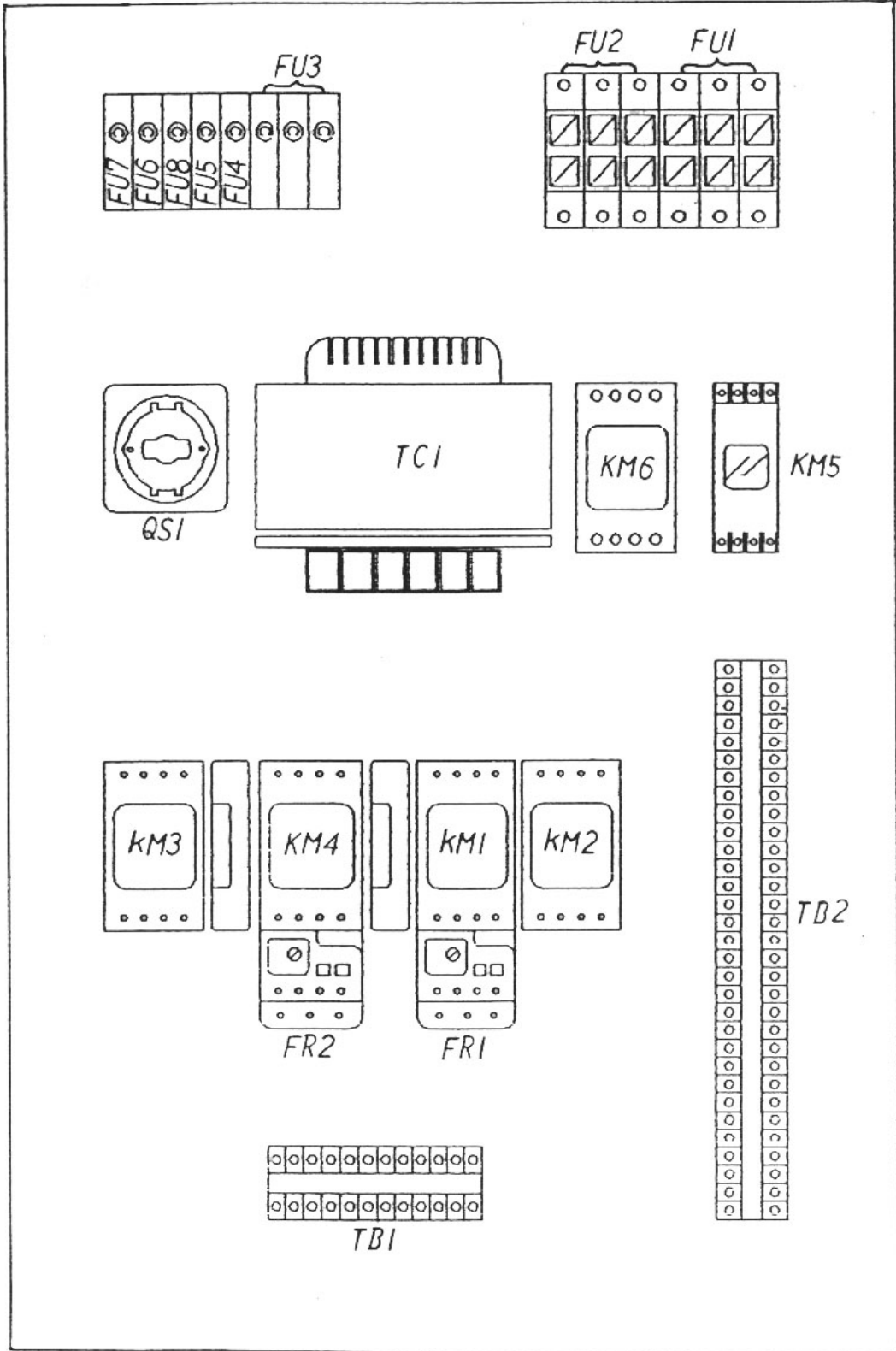


TABLE, SADDLE ASSEMBLY PARTS LIST

NO.	PART NO.	DESCRIPTION	QTY
01.	K2-C023-20	9"x42" TABLE	1
	K2-C023-90	9"x49" TABLE	1
02.	K2-D029-00	CHOCK PLUG	6
03.	1/2"-20NF	NUT	3
04.	Ø1/2"	SPRING WASHER	3
05.	K2-C083-00	HANDLE	3
06.	K2-D026-00	BALL CRANK HANDLE	3
07.	K2-D003-00	DIAL LOCK NUT	3
08.	K2-D004-I0	DIAL (INCH)	3
	K2-D004-M0	DIAL (METRIC)	3
09.	K2-C031-00	STOP PIECE T-BOLT	2
10.	K2-C032-00	TABLE STOP PIECE	2
11.	K2-C033-00	WASHER	2
12.	3/8" NC	NUT	2
13.	M6x12	SOCKET CAP SCREW	9
14.	Ø5x24	SPRING PIN	8
15.	M10x20	SOCKET CAP SCREW	12
16.	K2-D011-00	BEARING BRACKET	2
17.	3x3x25	KEY	3
18.	M6x16	SOCKET CAP SCREW	10
19.	K2-D022-00	FEED NUT BRACKET	1
20.	M10x25	SOCKET CAP SCREW	4
21.	1/4"xØ16	WASHER	4
22.	Ø6	SPRING WASHER	4
23.	K2-D005-00	DIAL HOLDER	3
24.	EK-1112-A0	WASHER	3
25.	K2-C090-00	BEARING CAP	3
26.	6204Z	BALL BEARING	5
27.	K2-D018-00	ADJUSTING WASHER	3
28.	K2-D017-I2	LONGITUDINAL FEED SCREW (INCH, TABLE 42")	1
	K2-D017-M2	LONGITUDINAL FEED SCREW (METRIC, TABLE 42")	1
	K2-D017-I9	LONGITUDINAL FEED SCREW (INCH, TABLE 49")	1
	K2-D017-M9	LONGITUDINAL FEED SCREW (METRIC, TABLE 49")	1
29.	M5x12	ROUND HEAD SCREW	12
30.	K2-D028-00	CROSS FEED BEARING BRACKET	1
31.	K2-D030-I0	CROSS FEED SCREW ASSEMBLY (INCH)	1
	K2-D030-M0	CROSS FEED SCREW ASSEMBLY (METRIC)	1
32.	K2-C046-10	TABLE LOCK PLUNGER - LEFT	1
33.	K2-C138-00	TURCITE LINING	1
34.	K2-C039-00	LOCK PLUNGER	2
35.	K2-C037-00	LOCK BOLT	4
36.	K2-C041-00	GIB ADJUSTING SCREW	2
37.	K2-C043-00	SADDLE/TABLE GIB	1
38.	K2-C044-00	FELT WIPERS	2
39.	K2-C050-00	SADDLE WIPER PLATE	2
40.	K2-C044-10	FELT WIPERS	2
41.	K2-C137-00	TURCITE LINING	1
42.	K2-C052-00	SADDLE	1
43.	K2-C136-00	TURCITE LINING	1
44.	K2-C139-00	TURCITE LINING	1
45.	K2-C046-30	TABLE LOCK PLUNGER-RIGHT	1
46.	K5-C042-00	TABLE STOP BRACKET	1
47.	M8x12	SOCKET CAP SCREW	2

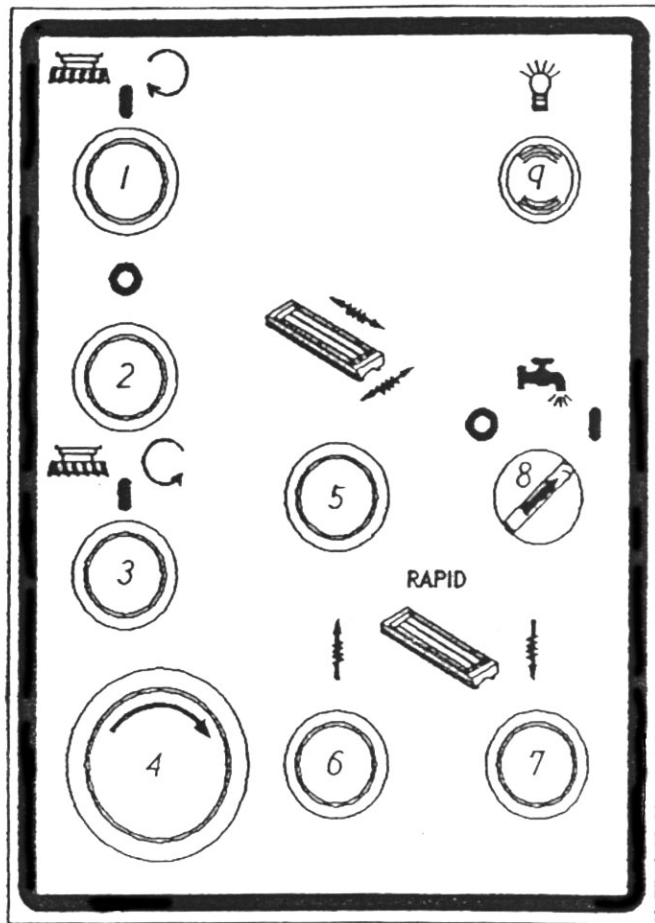
13. POWER CIRCUIT

13.1 ELECTRICAL COMPONENTS AND LAYOUT(CE OPTION)



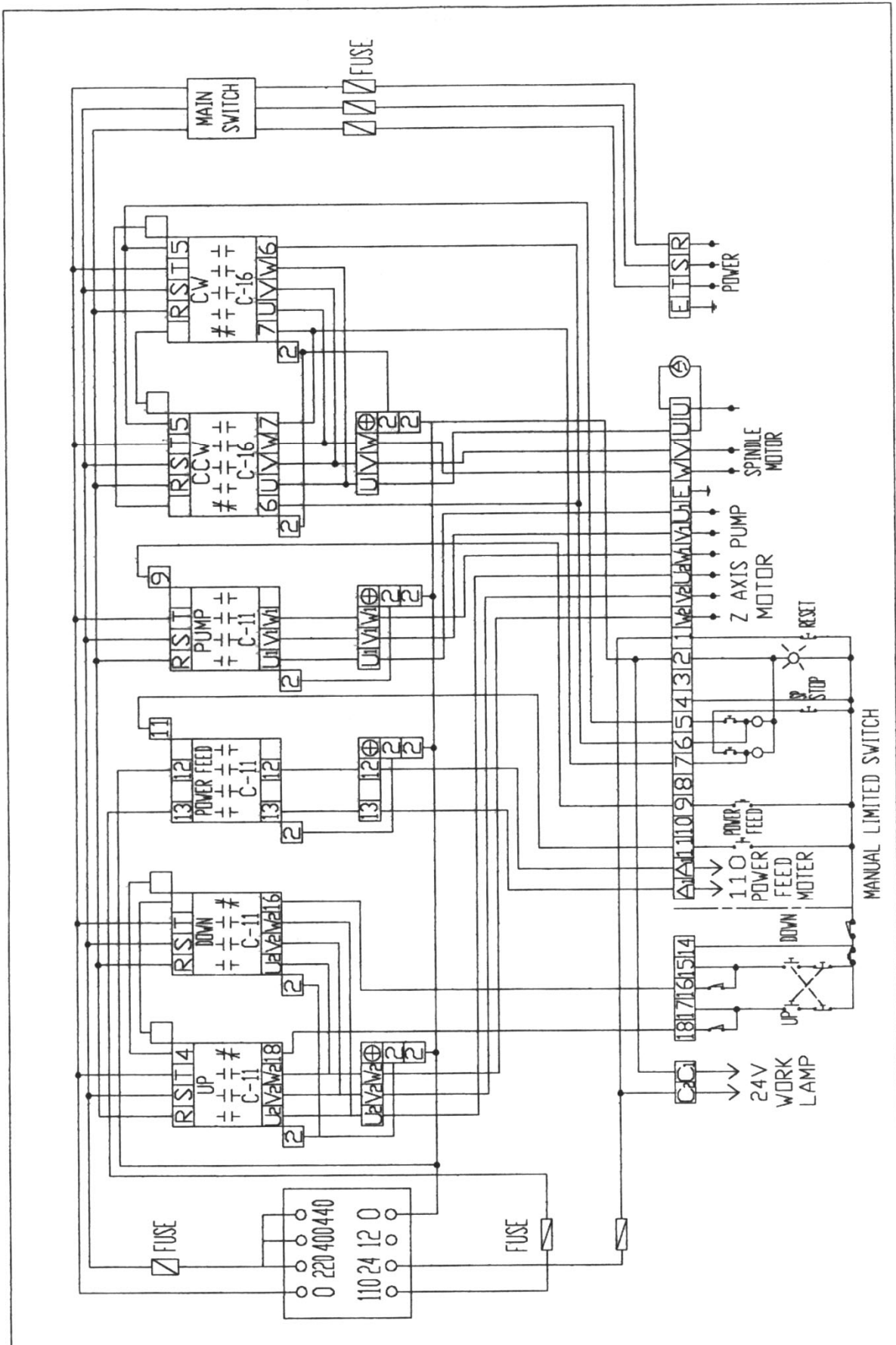
13.2 CONTROL PANEL, SWITCHES AND SYMBOLS(CE OPTION)

1. Spindle forward
2. Spindle stop
3. Spindle reverse
4. Emergency stop
5. X,Y axis auto feed
6. Z axis rapid to up
7. Z axis rapid to down
8. Coolant pump switch
9. Pilot lamp

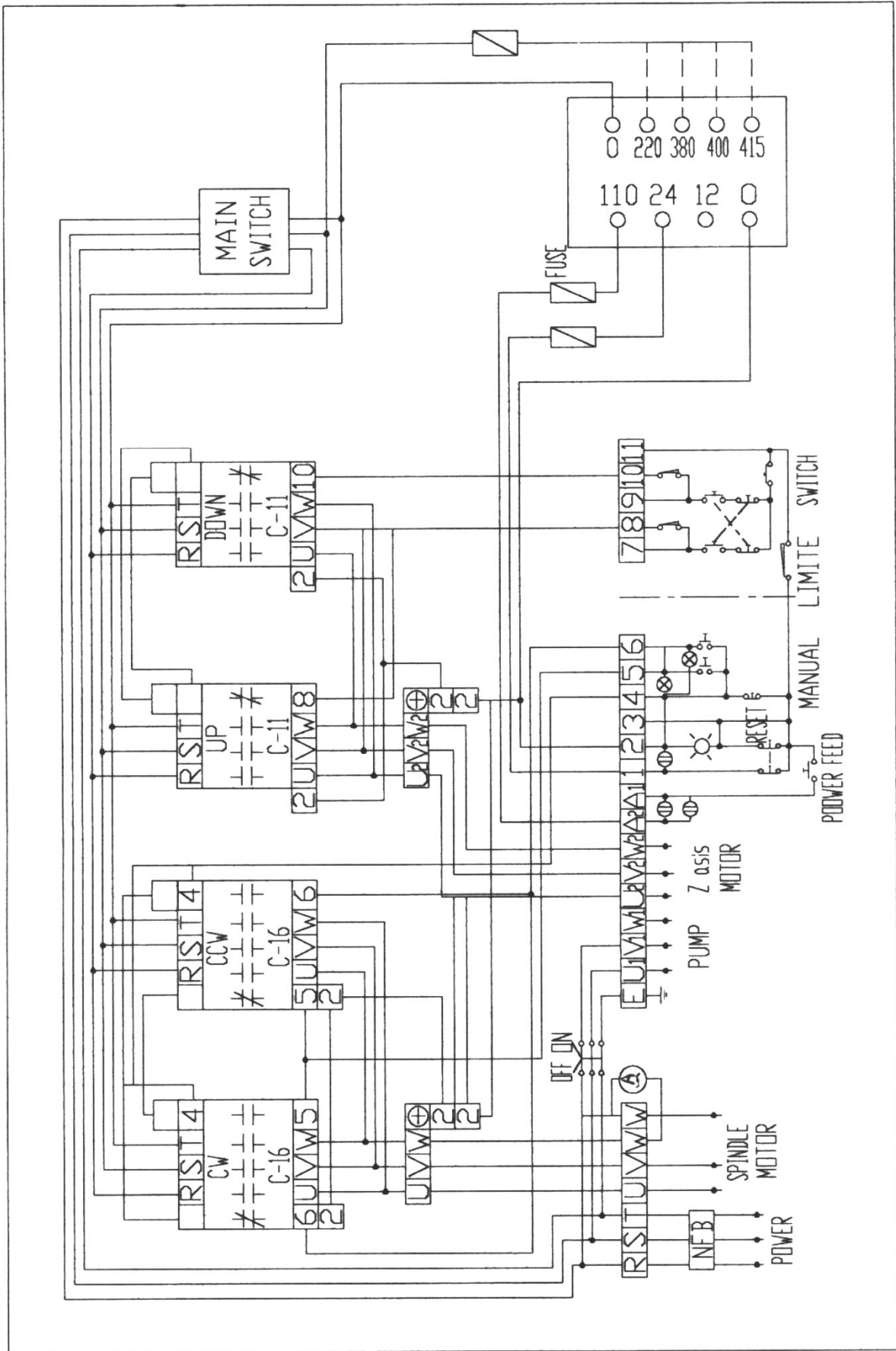


13.3 POWER CIRCUIT

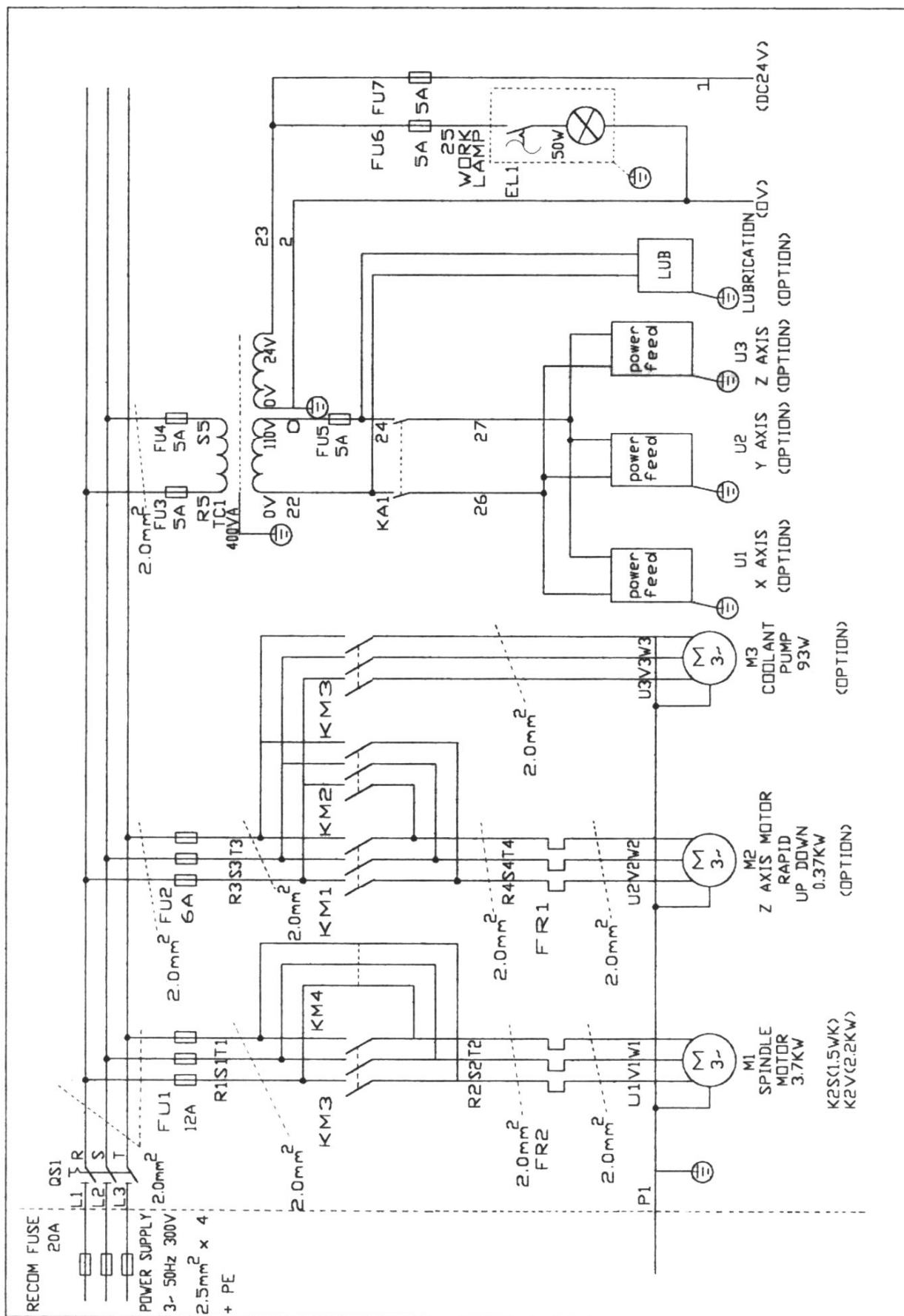
13.3.1 WIRING DIAGRAM FOR STANDARD ELECTRIC BOX THREE PHASE

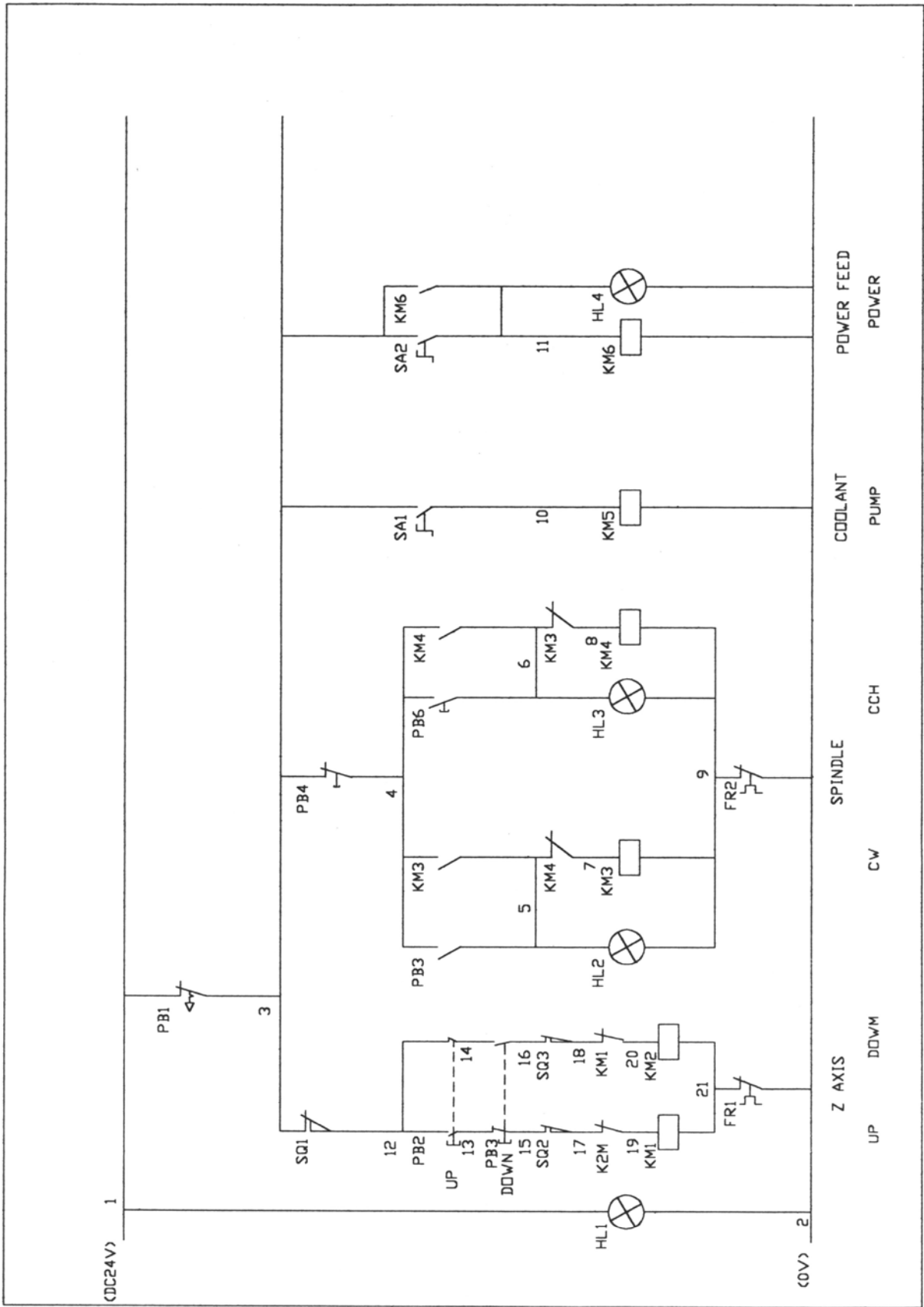


13.3.2 WIRING DIAGRAM FOR SIMPLE ELECTRIC BOX THREE PHASE



13.3.3 POWER CIRCUIT (CE OPTION)





13.4 SCHEDULE OF ELECTRICAL EQUIPMENT (CE OPTIION)

MANUFACTURER EXTRON	SCHEDULE OF ELECTRICAL EQUIPMENT				SHEET	
ORDER						
TYPE	SEE ALSO LIST				DRAWN	
ITEM DESIGNATION	DESCRIPTION AND FUNCTION	TECHNICAL DATA	QTY	SUPPLIER	SUPPLIERS REFERENCE	REMARKS
QS	MAIN POWER SWITCH	600V 20A	1	AB	194L-A20	IEC-947-3 VDE 0660
TC1		AC 600V	1	JD	T-400VA	EN-60247
FU1	Z AXIS MOTOR AC FUSE	10x36 6A 660V 32A	1	gG	FMC 101	CSA C22
FU2	SPINDLE MOTOR AC FUSE	10x36 6A 660V 32A				
FU3	COOLANT MOTOR AC FUSE	AC 600V 30m/m 5A	1	GIN SING	FS-001	CSA C222
FU4	AC FUSE TO TRANSFORMER	AC 600V 30m/m 5A	1	GIN SING	FS-001	
FU5			1			
FU6	POWER FEED AC FUSE		1			
FU7	WORK LAMP AC FUSE		1			
FU8	CONTROL LOOP FUSA		1			
FR1	OVER-LOAD	3~5A 8.5~12.5S	1			
FR2		U1-AC600V 1TH-10A	1	TAIAN	RHN-10	IEC 947-4-1 EN-60947-4-1
KM1 KM4 KM2 KM6 KM3	CONTACTOR	AC1 1th=10A UI 600V	1 1 1	TAIAN	CN-11	1RV 337-1 BS 4794 VDE 0660
KM5	CONTACTOR (RELAY)	RES 5A 240VAC 5A 30CDC GEN GA 240VAC USE 0.2A 100VDC 1.5A 30VDC	1	IDEC	RY4S-U AC-240	EN-60947-5-1
TB1 TB2	CASSETTE TERMINAL BLOCK	AC 600V MAX 15A	12 30	SHINING	TD-15H	ULE121562
HL1	WORK LAMP	AC 24V 70W	1	JARREF	TW-55L	IP65
HL2	SPINDLE FOR PILOT-LAMP	AC 24V 2W	1	YIAN	YK	IEC 144
HL3	SPINDLE REV PILOT-LAMP			KUANG		ZP65
HL4	POWER FEED PILOT-LAMP					
SQ1	MANU LIMIT SWITCH	AC 250V 10A	1	TEND	TZZ5109	IP65
SQ2	RAPID UP LIMIT SWIECH	AC 125V 10A	1	ALIGN	F-1101	IP65
SQ3	PRPID DOWN LIMIT SWIECH	AC 125V 10A	1	ALIGN	F-1101	IP65
PB1	EMERGENCY STOP	AC 250V 10A 7.5A 380VAC	1	YIAN KUANG	YK	IEC 144 IP 65
PB2	RAPID UP BUTTON	AC 250V 10A	1	YIAN	YK	IEC 144
PB3	RAPID DOWN BUTTON	7.5A 380VAC	1	KUANG	YK	IP 65
PB4	SPINDLE STOP BUTTON		1		YK	
PB5	SPINDLE FORWARD BUTTON		1		YK	
PB6	SPINDLE REVERSE BUTTON		1		YK	
PB7	POWER FEED BUTTON		1		YK	
SA2	PUMP SELECTOR	AC 250V 10A 7.5A 380VAC	1	TIAN KUANG	YK	IEC 144 IP 65
LINE	CONTROL-LINE	0.75 MAX 300V 0.76 (30/0.18)-7A AMBIENT TEMP (35°C~60°C)	1	TONG-WU		CNS 679 JIS C3307

CABLE	PVC CABLE-WIRE	2.0x4C(37/0.26)16A 3.25x4C(50/0.18)11A AMBIENT TEMP (35°C~60°C) MAX 600V	1	TONG-WU		CNS 3301 4398 JIS C3342、3401
M1	SPINDLE MOTOR					
M2	Z AXIS MOTOR					
M3	PUMP MOTOR					
U1	X AXIS POWER FEED	AC 110V 50/60HZ	1	ALIGN	CE-235	
U2	Y AXIS POWER FEED		1	ALIGN	CE-250	
U3	Z AXIS POWER FEED		1	ALIGN		
U4	LUBRICATION	AC 110/220V 50/60HZ	1	CHEN YING	CES-A	