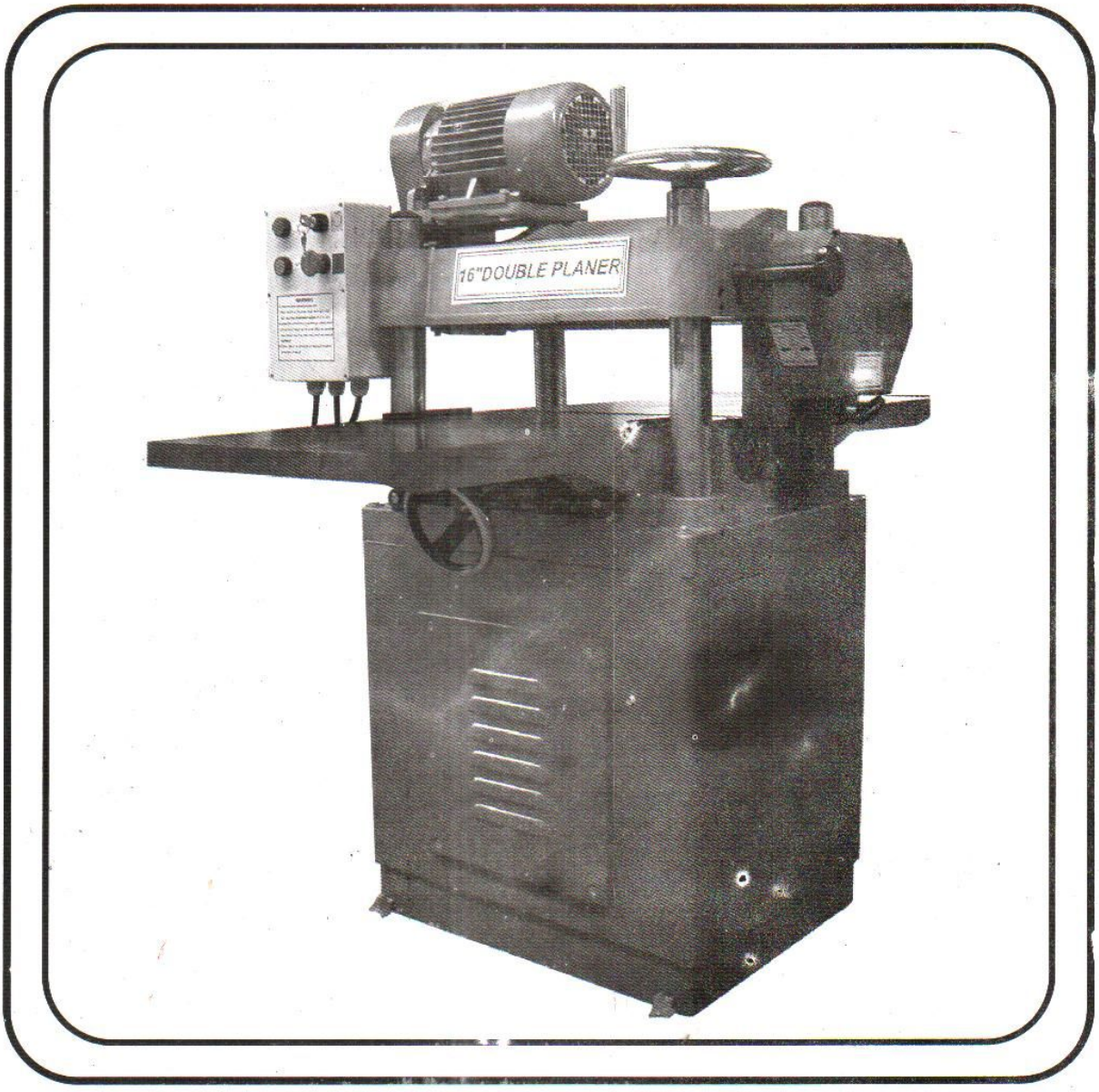
16”

DOUBLE SIDE PLANER



OPERATION MANUAL AND PARTSLIST

TABLE OF CONTENTS

PREFACE

Thank you for choosing this 16 " Double Surface Planer. We are pleased to offer you our best machinery and service, and trust that you will find our machinery economical, productive and easy to operate.

This manual covers the proper operation, safety and maintenance of the machine. It is important that this manual be read in its entirety before operating the machine. Although the machine has been checked and inspected in compliance with relevant safety regulations, the machine' s safety and best performance are dependent on proper maintenance and operation. Hazards that arise due to improper operation and maintenance are solely the responsibility of the operator.

We thank you again for you choice, and for your careful reading of this manual.

GENERAL SAFETY RULES FOR WOODWORKING MACHINERY

There is a certain amount of hazard involved with the use of woodworking machinery.
Using the machine with the respect and caution demanded as far as safety precautions are concerned will considerably lessen the possibility of personal injury. However, if normal safety precautions are overlooked or ignored, severe personal injury to the operator can occur.

1. Read the operation manual before operating this machine.

2. The machine should be disconnected from the power source before performing maintenance or adjustments to the internal mechanisms, or when making repairs.

3. Before leaving the machine, make sure the work area is clean.

4. Check timber for loose knots, nails, or other items, which may cause a hazard or affect the machine's performance.

5. Learn the cutterhead's applications and limitations, as well as the specific potential hazards peculiar to it. Keep the cutterhead sharp for best and safest performance.

6. Keep all guards in place and in working order.

7. Do not force the machine. It will do the job better and be safer working at the rate for which it was designed.

8. All children and visitors should be kept a safe distance from the working area.

9. The operator should keep proper footing and balance at all times.

10. Do not operate the machine while under the influence of drugs, alcohol, or any other medication.

11. Avoid awkward operations and hand positions where a sudden slip could cause your hand to move into the cutterhead.

12. Never leave the machine until it comes to a complete stop, and never leave the machine running unattended.

13. The employer is responsible for selecting competent and qualified employees.

14. Safety shoes should be worn to provide protection against rolling objects, falling objects, and sharp edges in the workplace.

15. Eye protection should be worn and such devices should be carefully selected, fitted and used. Compulsory wearing of glasses with impact resistant lenses and side shields is a good safety policy. All eye protection should conform to ANS187 standards.

16. Wear hearing protection when operating the machine.

17. Do not wear rings, necklaces or jewelry around moving machinery.

18. Do not wear loose fitting clothes. Clothing should be comfortable, but long sleeves, neckties, etc, should not be worn.

19. Do not wear gloves or other hand covering articles around moving machinery.

20. Cover long hair with a hair net or cap.

21. Protective guards and shields must be in place at all times unless they must be removed for specific service or maintenance. They should be immediately replaced when service or maintenance is completed.

22. Make sure that operator clearly knows how to stop the machine before starting work.

23. Never clean or remove chips while the machine is running.

24. Do not alter or remove guards and warning labels.

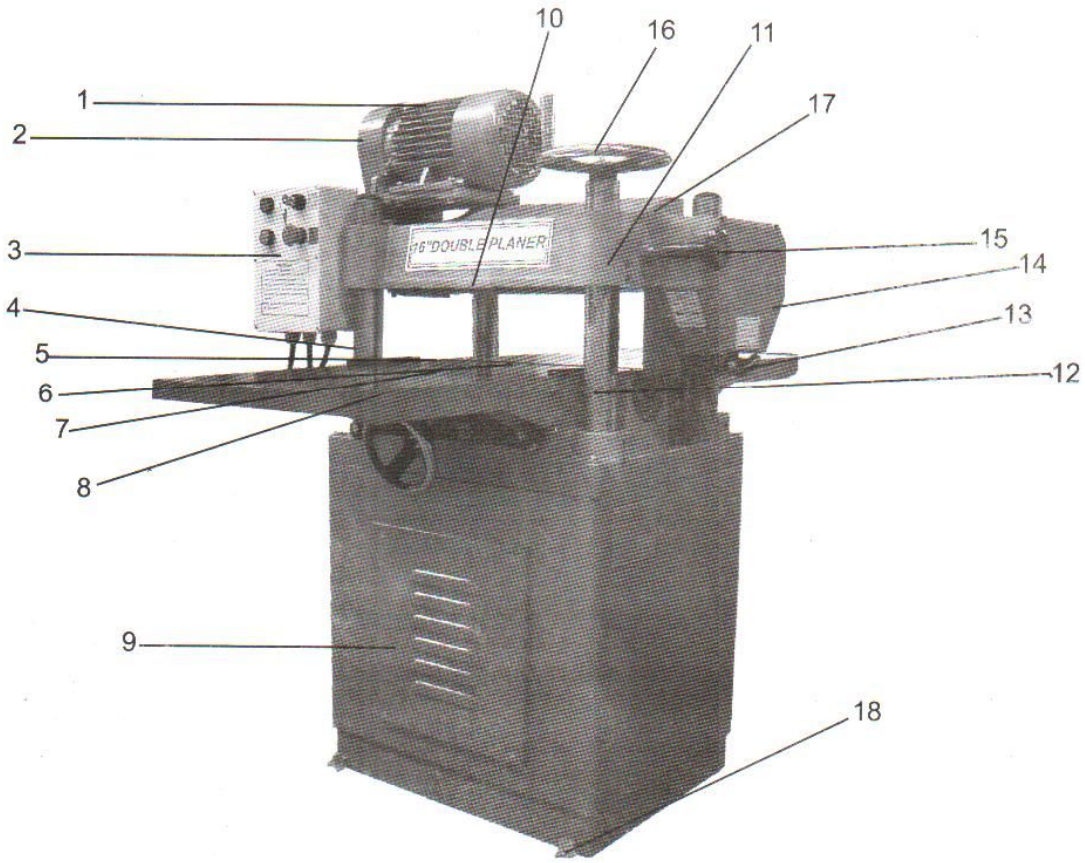
25. Keep the immediate area clean. Do not allow the floor to become slippery or covered with dust or obstacles dust that accumulates in the work area is a hazard that can cause you to fall or slip against the machine or its controls.

SPECIFICATIONS OF THE 16" PLANER

Model	MB204
Cutterhead diameter	2.88″(73mm)
Cuts per minute	15,000
cutterhead speed	5,000 RPM
Knives	3
Table dimensions	16″(406mm)x50″(1270mm)
(With table extensions)	
Feed roller diameter	1.96″(50mm)
Feed speeds	16/25 FPM (4.9/7.6 m/min)
Max. depth of cut	6mm (top), 2mm(bottom)
(stock width below 6″)	
Max. depth of cut	3mm (top), 2mm(bottom)
(stock width over 6″)	
Range of stock thickness	6″(152.4mm)to 0.24″(6mm)
Minimum length of unbutted	6″(152.4mm)
Stock	
Maximum width of stock	16″(406mm)
Motor-top	3 HP
Motor-bottom	2 HP
Net weight	770 lbs (350 kgs)
Gross weight	847 lbs (385 kgs)
Packing dimensions	35.4″ x 30.7″ x 50.8″
	(900 x 780 x 1260 mm)

The above specifications are not binding. We reserves the right to amend any specifications or design characteristics without prior notice.

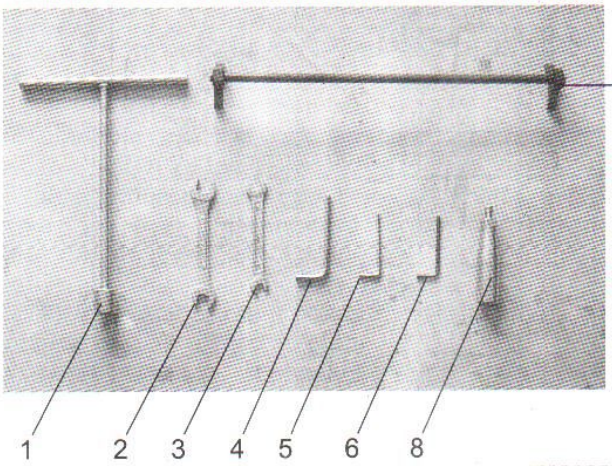
LEGEND OF THE DOUBLE SURFACE PLANER

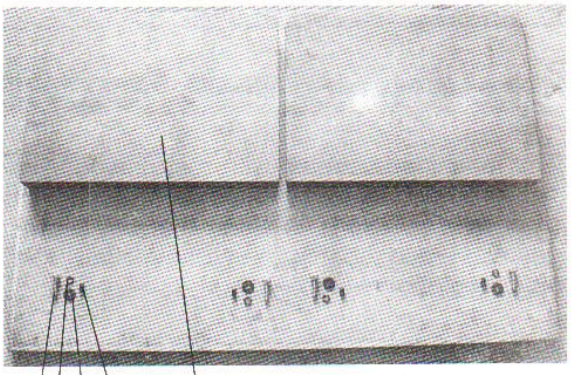


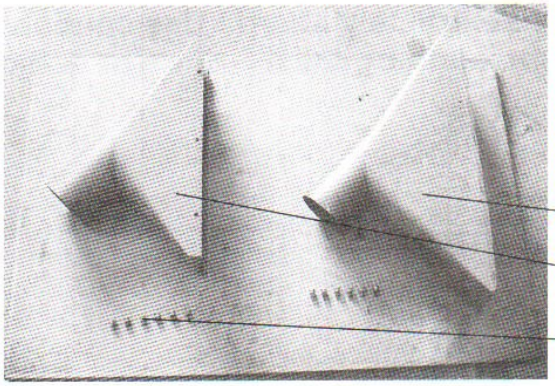
1. Upper cutterhead drive motor
2. Upper V-belt guard
3. Electrical control box
4. Column
5. Lower V-belt guard
6. Lower cutterhead
7. Main table
8. Table extension wing
9. Front cover
10. Thickness limiter
11. Upper mechanism
12. Thickness indication scale
13. Feed speed change lever
14. Gear box
15. Upper mechanism lock lever
16. Upper mechanism elevation handwheel
17. Roller lubrication oil port
18. Castor fixing knob

PACKING CONTENTS

Remove the planer and all parts from the container, and check to ensure that all parts are present as indicated in the pictures below and in the list on the following page. If any parts are damaged or missing, contact your distributor immediately. Included with these parts are all tools necessary for assembly and adjustment of the planer.







PACKING LIST

No.	Part No.	Specification	Qty.
1	T-wrench	17mm	1
2	Open end wrench	12 x 14	1
3	Open end wrench	8 x10	1
4	Allen wrench	6mm	1
5	Allen wrench	4mm	1
6	Allen wrench	3mm	1
7	Knife setting gauge		1
8	Handle		1
9	Hex head screw	M8 x 30	4
10	Lock washer	8	4
11	washer	8	4
.12	Set screw	M8 x 12	4
13	Extension table		2
14	Upper dust hood		1
15	Lower dust hood		1
16	Hexagonal head screw with washer	M6 x 12	12

CLEANING THE MACHINE

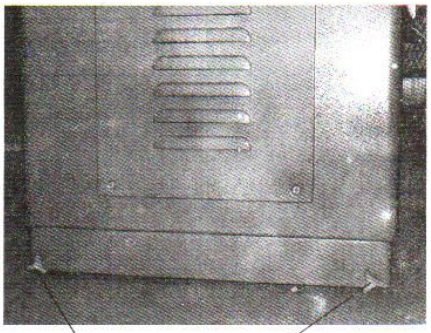
The machine is coated with rust preventative oil before shipment. When the machine has been moved to a proper work site, wipe the oil from the machine. Use a soft cloth soaked in kerosene to clean the rust preventative oil from the machine. Do not use gasoline, lacquer thinner, or any other volatile solvent, as these may damage the surface of the machine.

To prevent rust, it is recommended that the infeed and outfeed table be coated with a layer of paste wax.

WARNING! The cutterhead knives are extremely sharp ! Use caution when cleaning the cutterhead and surrounding area! Failure to do so may cause serious injury!

MOVING THE MACHINE

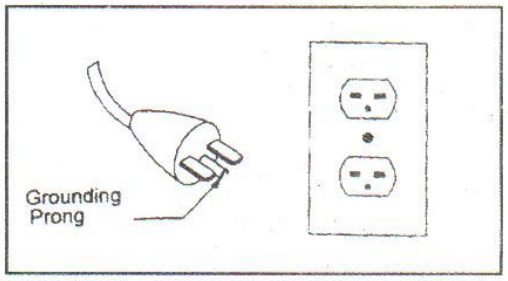
There are 2 castors provided under the cabinet for convenient movement of the machine. Before moving the machine to the desired working location, loosen the 2 lock knobs that fix the castors. Tighten them securely after the machine has been moved to ensure cutting stability.



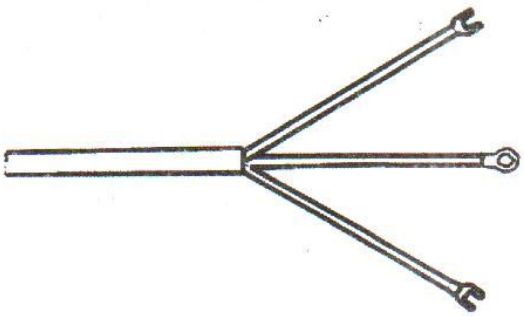
Lock knobs

ELECTRICAL CONNECTIONS

This 16″planer is rated at 230 V. Fit the power cable with a 230 volt plug, or hard wire to the electrical circuit through a disconnect box. Proper grounding is essential. Failure to properly ground the machine may result in electrical shock and injury to the operator or other personnel. If the machine is to be used with other electrical configurations, all connections must be made by qualified service personnel, and the setup must comply with local codes and ordinances. Use of an extension cord is not recommended. If an extension cord must be used, it must be of adequate size and capacity to support the amperage and distance between the machine and the power source. The power cable for the machine is configured as shown below. If not hard wired to a disconnect box, fit the cable with a plug for use with electrical socket as shown right.



WARNING: All electrical connections must be done by qualified service personnel! Failure to comply may result in serious injury and /or

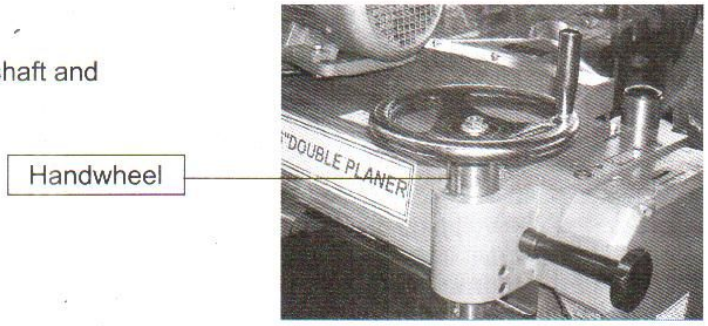


Power cable configuration

ASSEMBLING THE PLANER

Attaching the handwheel

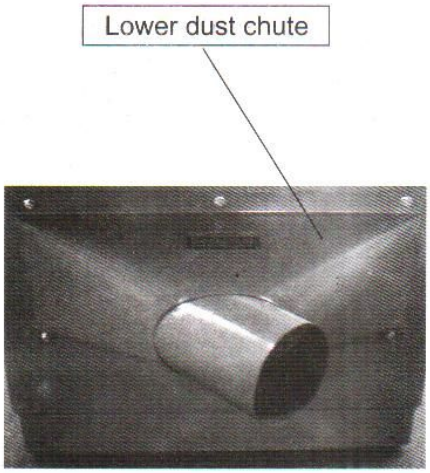
1. Mount the handwheel onto the handwheel shaft located on the front right of the machine.
2. Align the keyways on both handwheel and handwheel shaft.
3. Fit the key into the keyways.
4. Place a washer and nut on the shaft and tighten securely.

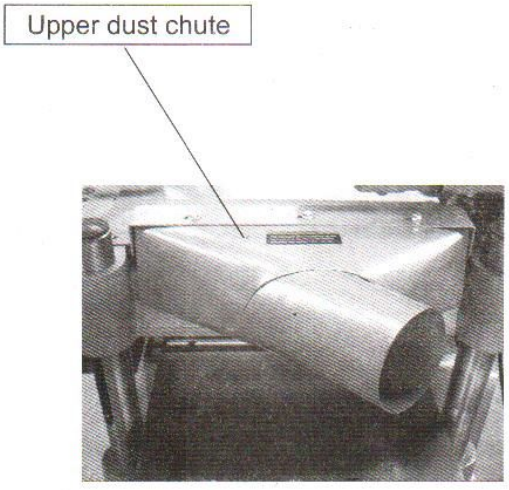


Attaching the dust chute

1. Attach the upper dust chute to the upper assembly with washers and screws. Attach the lower dust chute to the base using 6 washers and screws. The dust chute outlets are 4″ in diameter.

CAUTION: Always use a dust collector when operating this planer!

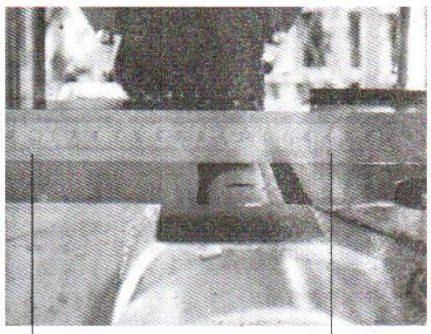


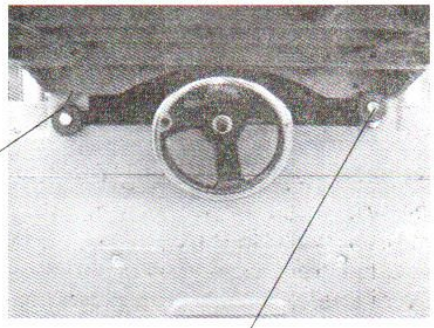


ADJUSTING THE PLANER
(For single face planing)

Adjust infeed table to lower cutterhead

1. Disconnect the machine from the power source.
2. Raise the upper mechanism to the extreme top end to have enough space for adjustment.
3. Place a straight edge on the outfeed table and across the lower cutterhead.
4. Raise or lower the infeed table by turning the handwheel until the infeed and outfeed table are level.
5. If lowering the infeed table is limited and further adjustment is needed, loosen the lower set screws on the front on either side of the handwheel to increase the allowed adjustment of the infeed table.

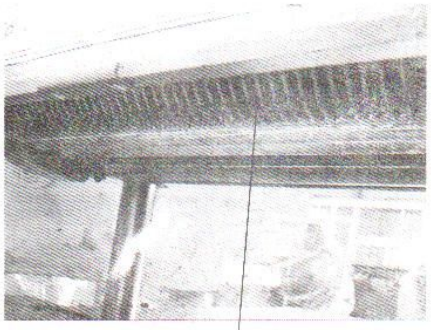




Checking the Anti-kickback fingers

Located in front of the infeed roller, anti-kickback fingers are provided to prevent the workpiece from kicking back during planing. These fingers are gravity implemented and should be inspected daily for buildup of gum or pitch that could interfere with their operation. The fingers should fall freely after being lifted. If the fingers do not fall freely, clean them with compressed air.

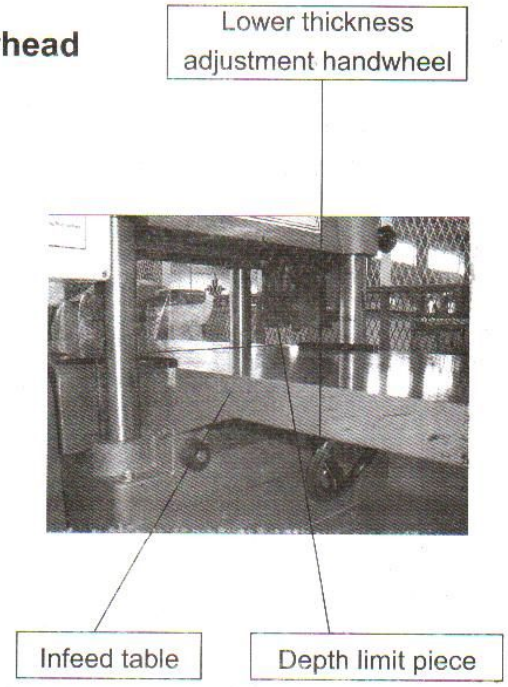
WARNING: Do not assume that the workpiece will never kick back! Do not stand directly in front of or behind the planer during planing! Failure to comply may cause serious injury!

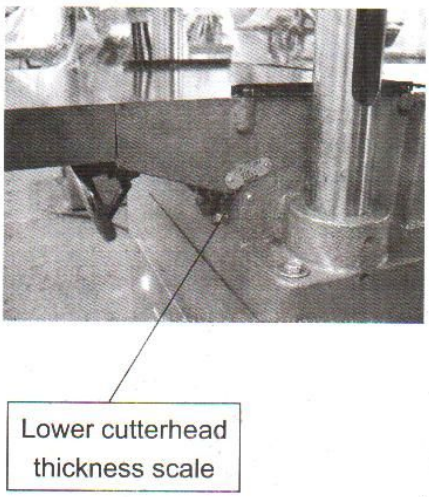


ADJUSTING THE PLANER

Adjusting the depth of cut on lower cutterhead

1. Change the lower depth of cut by raising or lowering the infeed table.
2. Turn the handwheel located under the infeed table to raise or lower the infeed table to the desired position.
3. Positive stops are provided at the 0 and 2mm positions. The 0 position can be used for leveling.
4. A thickness scale attached on the right side of the infeed table indicates the thickness adjustment amount.
5. Maximum depth of cut for the lower cutterhead is 2 mm.



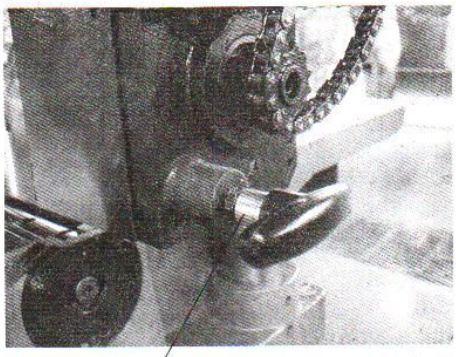


ADJUSTING THE PLANER

Feed rate adjustment

The planer is equipped with feed rollers that feed stock at 16 or 25 feet per minute. Always change feed speed while the machine is running. Change the feed speed as follows:

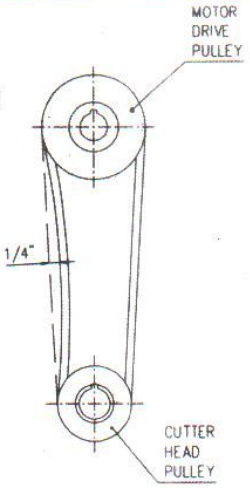
1. Push the speed control lever (shown right) all the way in for 25 feet per minute.
2. Pull the speed control lever out halfway to disengage the feed rollers.
3. Pull out the speed control lever all the way for 16 feet per minute.

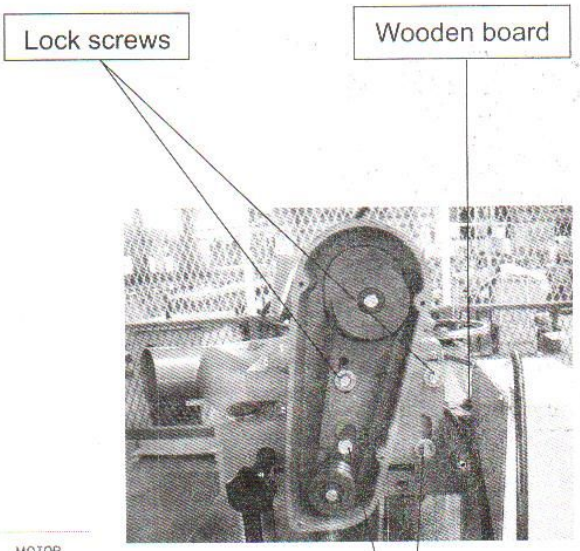


Speed control lever
(Cover removed)

Adjusting the V-belt tension for upper cutterhead

1. Disconnect the machine from the power source.
2. Remove the upper belt cover from the left side of the machine.
3. Loosen the two lock screws as shown in right figure.
4. Use a piece of wood to raise the motor base from the outfeed side to tighten the belt tension.
5. If only a small adjustment of belt tension is required, loosen the micrometric adjustment screws and move the motor cover by hand to adjust tension. Retighten the micrometric adjustment screws.
6. Correct pressure can be identified by pressing the center of the belt with normal finger pressure. The belt should yield_.
7. Tighten the two lock screws after adjustment.
3. Replace the belt cover.



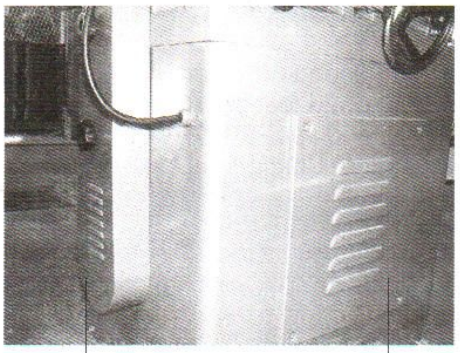


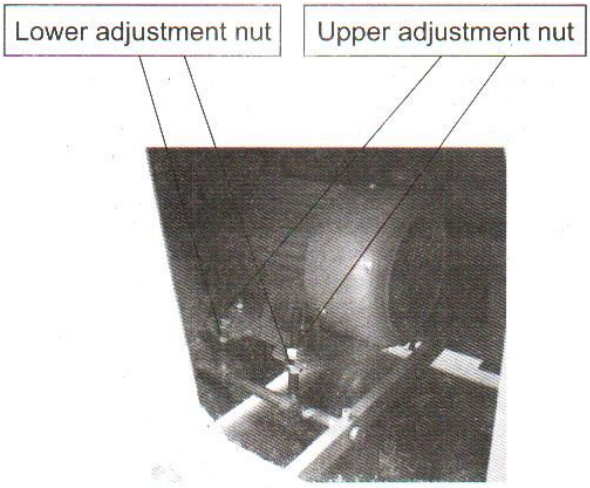
ADJUSTING THE PLANER

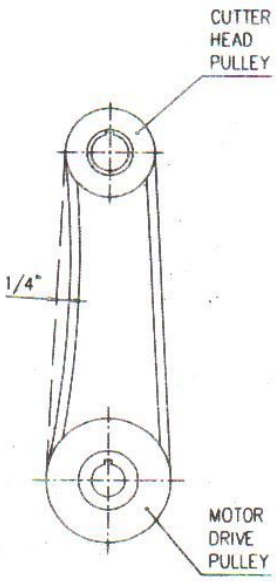
Adjusting the V-belt tension for lower cutterhead.

1. Disconnect the machine from the power source.
2. Remove the lower cover and lower cutterhead belt cover located at the left side of the machine.
3. Loosen the belt tension upper adjustment nut.
4. Turn the belt tension lower adjustment nut until the correct tension has been achieved. Turn this nut clockwise to tighten belt tension. Turn counterclockwise to loosen belt tension.
5. Correct pressure can be identified by pressing the center of the belt with normal finger pressure. The belt should yield_".
6. Tighten the belt tension upper adjustment nut after adjustment.
7. Remount the lower cover and lower belt cover.

Upper and lower belts should yield _" when pressed by finger using normal pressure.



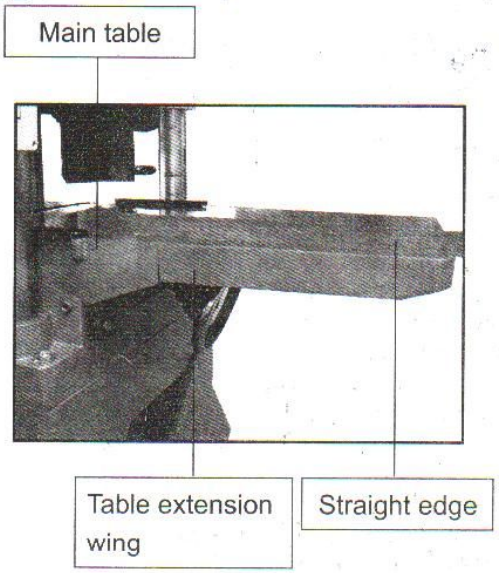


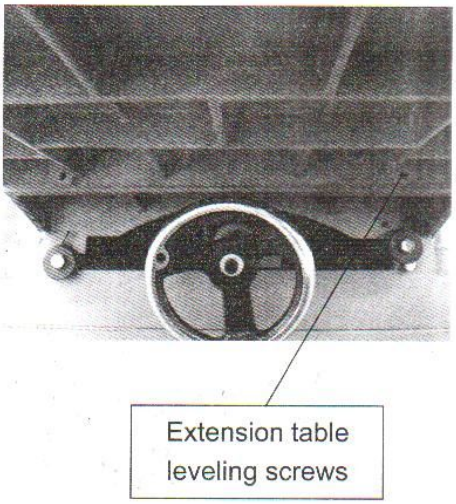


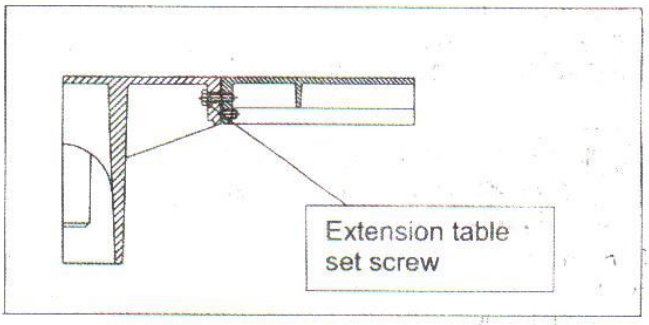
ADJUSTING THE PLANER

Leveling adjustment for table extension.

1. Place a straight edge on the table extension wing and across the main table surface to check leveling.
2. Loosen the two set screws that tighten the table extension wing, located under the extension wing.
3. Turn the leveling adjustment screws until proper leveling is obtained. (See diagram below)
4. Make leveling adjustment at the right and left side of the table.
5. Tighten the two table extension wing set screws securely after leveling has been completed.



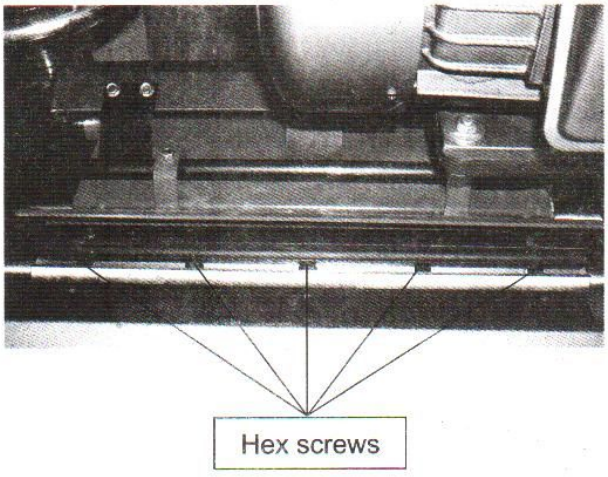


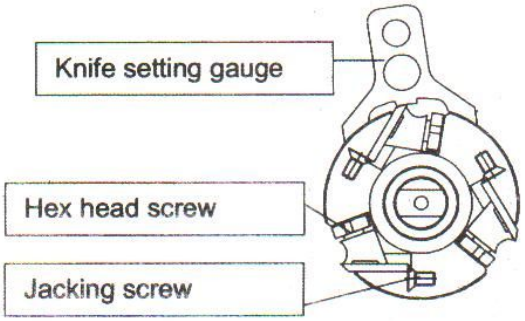


ADJUSTING THE PLANER

Adjusting the knives

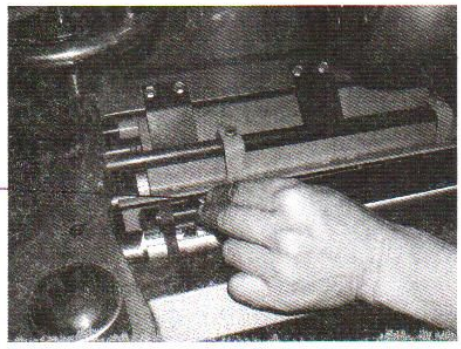
1. Disconnect the machine from the power source.
2. Loosen the five hex head screws as shown in right figure.
3. Place the knife setting gauge on the cutterhead as shown. When properly adjusted, the knife edges should just barely come into contact with the bottom of the center protrusion.
4. To raise the knife, insert the hex wrench into the jacking screw on either end of the cutterhead and turn counter-clockwise.
5. To lower the knife, turn the jacking screws clockwise. With a block of scrap wood, push the knife farther into the cutterhead than desired. The final adjustment should always be made by raising the knife.
6. Tighten the five hex head screws firmly.
7. Repeat these steps for the other knives.





Removing and installing knives

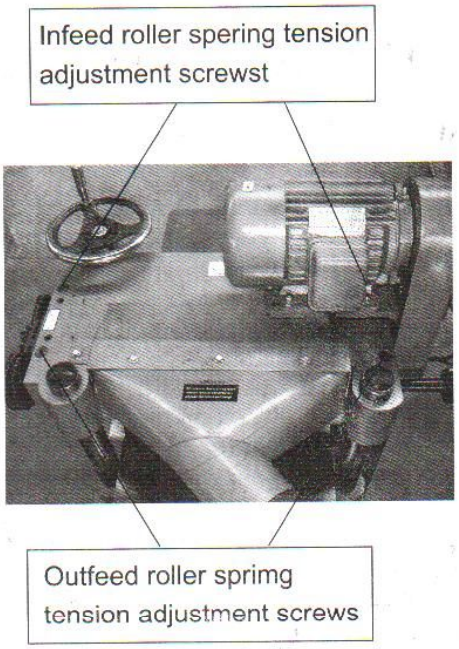
1. Disconnect the machine from the power source.
2. Loosen the five hex head screws as described above.
3. Remove the knife by lifting it straight out. A piece of scrap wood will aid removal.
4. Insert the new knife into the cutterhead.
5. Check that the knife height is set correctly according to the procedures for adjusting knives.
6. Tighten the five hex head screws.



WARNING! Use extreme caution when working on or near the cutting knives!the knives are very sharp and extremely dangerous! Any adjustment or maintenance of knives should be performed on all three knives at the same time. Failure to do this may result in an unbalanced cutterhead, which will lead to bearing failure!

ADJUSTING THE PLANER

Adjusting feed roll spring tension

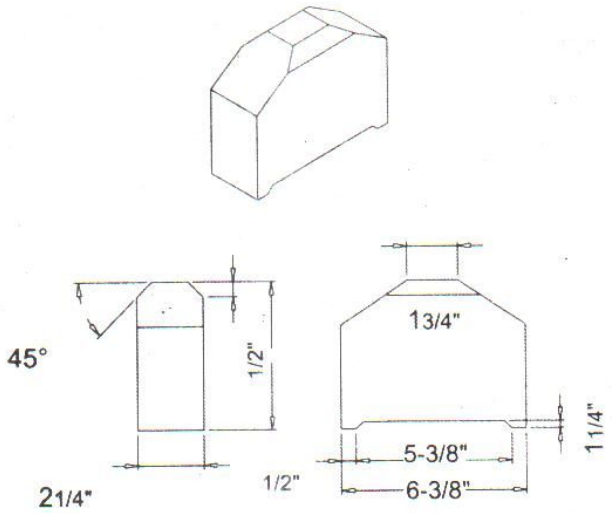


The infeed and outfeed rollers are under spring tension sufficient to feed the stock uniformly through the planer without slippage. If spring tension is too loose, the stock will not feed correctly. If tension is too tight, damage to the stock will occur. Tension should be adjusted equally at both ends of the roller.

1. To adjust spring tension of the infeed roller, turn the tension adjustment screw shown in right figure. Turn the screw clockwise to increase tension and counter-clockwise to decrease tension. Adjust the tension equally on both ends of the roller.
2. To adjust spring tension of the outfeed roller, turn the tension adjustment screw shown in right figure. Turn the screw clockwise to increase tension and counter-clockwise to decrease tension. Adjust the tension equally on both ends of the roller.

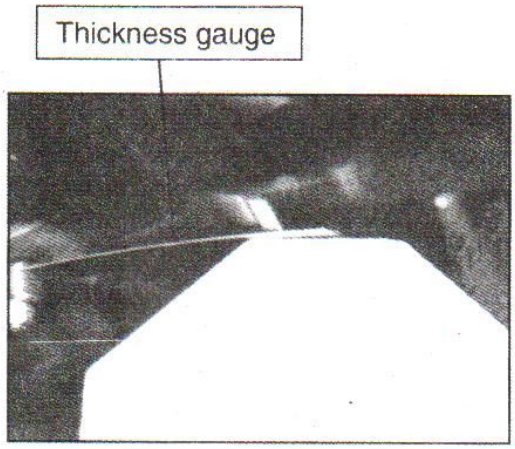
Making a gauge block

Some adjustments, such as those for the cutterhead, chipbreaker, and infeed & outfeed rollers require a gauge block for adjustment. Use a hardwood to fashion a gauge block of the dimensions shown below.



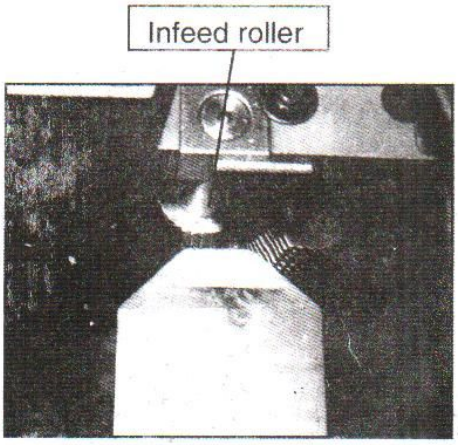
ADJUSTING THE PLANER

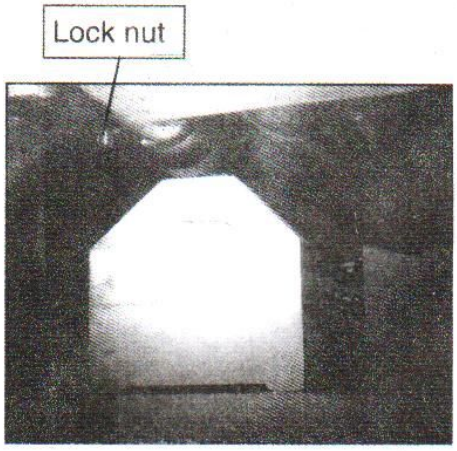
Adjusting infeed and outfeed rollers



NOTICE: Make sure that the infeed and outffed table have been leveled before adjusting the infeed and outfeed rollers.

1. Disconnect the machine from the power source.
2. Make sure the knives are adjusted properly. Refer to instructions for knife adjustment.
3. Place the gauge block on the table directly underneath the cutterhead.
4. The infeed roller position is 1.5 mm below the knife edge. To make this adjustment, place a 1.5mm thickness gauge on the top of the hardwood block, and lower the upper mechanism until the knife just touches the thickness gauge when the knife is at its lowest point.
5. Remove the thickness gauge from the hardwood block.
6. Place the hardwood block just under the infeed roller. The infeed roller should just touch the top of the hardwood block. Otherwise, the infeed roller needs to be adjusted.
7. Loosen the lock nut as shown in figure, then turn the infeed roller adjustment screw until the infeed roller just touches the top of the hardwood block.
8. Tighten the lock nut after the infeed roller has been properly adjusted.
9. Check and adjust both sides of the infeed roller by the above procedures.

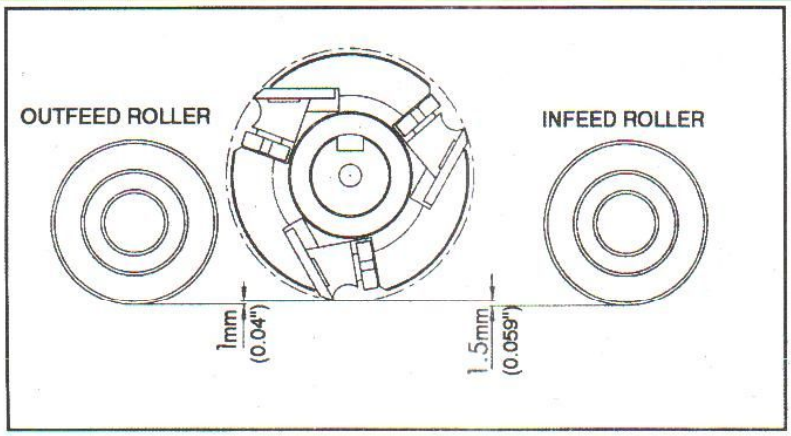




ADJUSTING THE PLANER

Adjusting the infeed and outfeed rollers

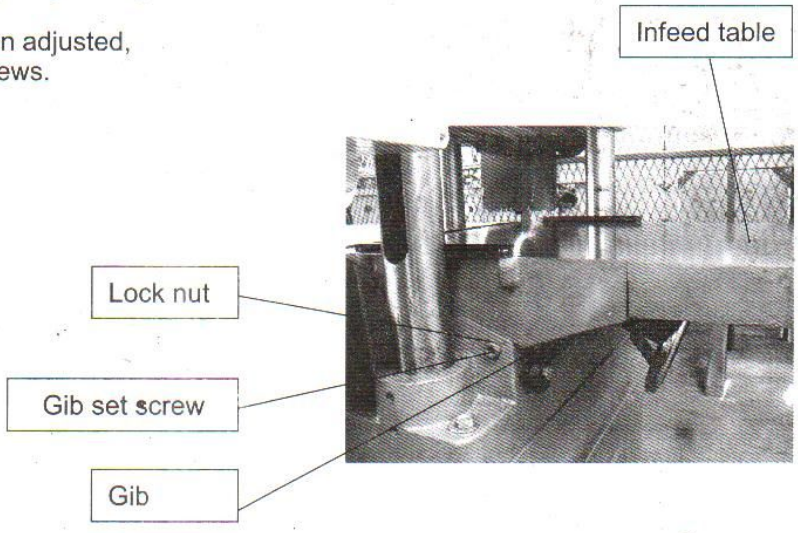
The infeed roller is adjusted to 1.5mm below the knife edge when it is at the lowest point. The adjustment procedures for the infeed roller are the same as the outfeed roller.



Gib adjustment

After the machine has been operated for a long period, the gibs located at the right side of the infeed table may become loose, affecting cutting stability. If this occurs, adjust the gibs as follows:

1. Loosen the 3 lock nuts.
2. Tighten the 3 gib set screws with a 5mm hexagonal wrench. Slight tightening is enough.
3. After the gibs have been adjusted, retighten the 3 lock screws.

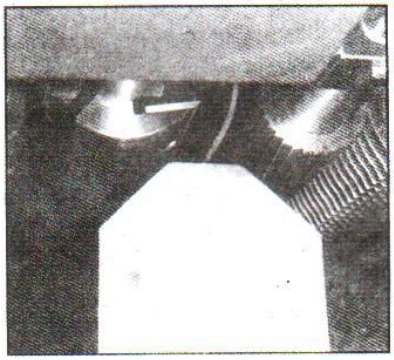


ADJUSTING THE PLANER

Adjusting the chipbreaker

The chipbreaker is located on the upper assembly of the planer and extends down in front of the cutterhead. The chipbreaker raises as stock is fed through and breaks the trajectory of the flying chips. The bottom of the chipbreaker must be parallel to the knives and shuld be set 0.5mm below the cutting height. To adjust the chipbreaker perform the following steps:

1. Disconnect the machine from the power source.
2. Make sure the knives are adjusted properly. Refer to instructions for knife adjustment
3. Place the gauge block on the table directly underneath the cutterhead. Place a 0.5mm thickness gauge on top of the gauge block and raise or lower the upper mechanism until the knife just touches the thickness gauge when the knife is at its lowest point. Do not move the table until the chipbreaker has been adjusted.
4. Move the gauge block underneath the chipbreaker as shown. The bottom of the chipbreaker should just touch the gauge block. If adjustment is reguired loosen the lock nuts and turn the adjustment screws until the bottom of the chipbreaker just touches the gauge block. Retighten the lock nuts.

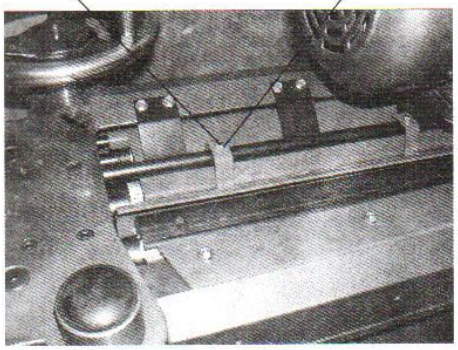


Gauge block

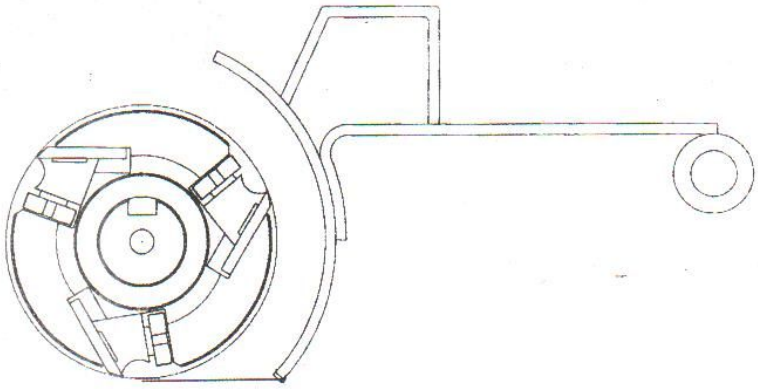
Chipbreak

Set screw

Lock nut



Chipbreaker should be 0.5mm(0.02″) lower than the

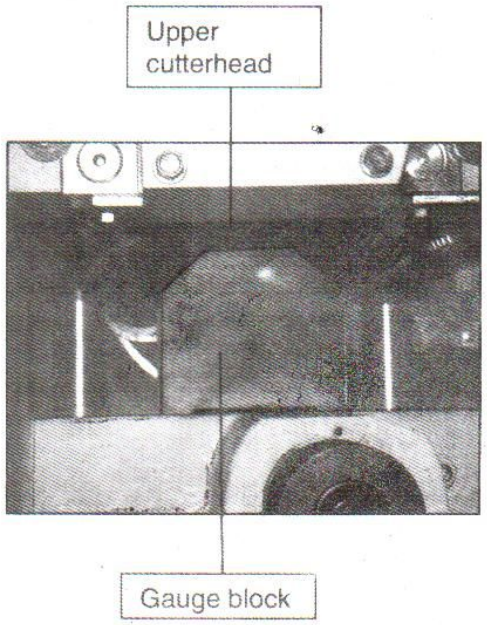


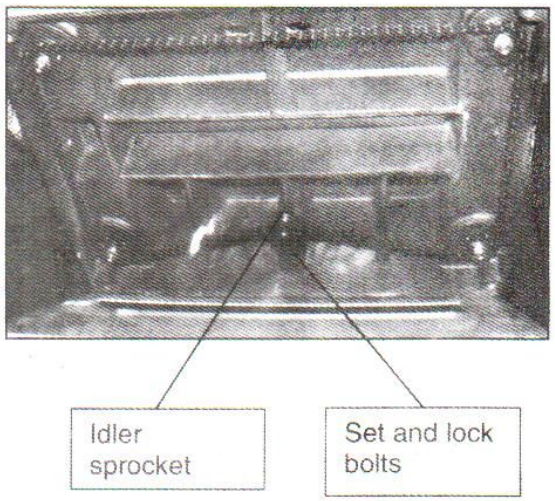
ADJUSTING THE PLANER

Setting the cutterhead parallel to the table

The table is set parallel to the cutterhead at the factory, and no further adjustment should be necessary. If the machine is planing a taper, first set to see that the knives are set properly in the cutterhead. Then check to see that the table is set parallel to the cutterhead as follows:

1. Disconnect the machine from the power source.
2. Place a gauge block directly under the upper cutterhead as shown in right figure. Lower the upper mechanism until the knife on the upper cutterhead just touches the gauge block.
3. Move the gauge block to the opposite end of the table and repeat the process.
4. The distance from the table to the edge of the cutterhead should be the same.
5. If the cutterhead is not parallel to the table, adjustment should be made on the bottom of the machine.
6. Remove the set bolt and loosen the lock bolt, to allow movement of the idler sprocket assembly for engough to release tension on the chain.
7. Remove chain from the sprocket on the end of the table that needs to be adjusted.
8. Turn the sprocket by hand to bring the corner into adjustment with the other three corners. Note that this adjustment is very sensitive and it should not be necessary to turn the sprocket more than one or two teeth.
9. Turning the sprocket clockwise will decrease the distance between the table and the head casting. Counter-clockwise movement will increase the distance.
10. After checking with a gauge block to make sure the adjustments are correct, place the chain back on the sprocket and the retention idler sprocket, the replace set and lock bolts.

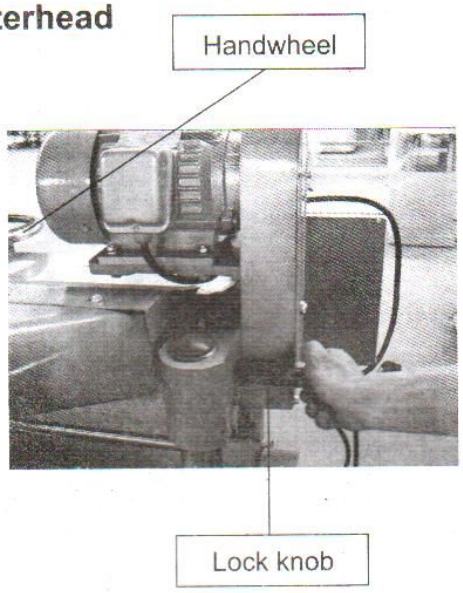




ADJUSTING THE PLANER

Adjusting the depth of cut on upper cutterhead

1. Change the depth of cut by raising and lowering the upper mechanism.
2. Loosen the lock knobs as shown in right figure.
3. Turn the handwheel to raise or lower the table to the desired position.
4. The thickness scale attached on the right column indicates the thickness adjustment amount.
5. Maximum depth of cut for narrow workpieces on the upper cutterhead is 6 mm.
6. Maximum depth of cut for full width planing on the upper cutterhead is 3 mm only. A depth limit piece is provided to limit the depth of cut for full width planing.
7. Tighten the lock knobs before operating the machine.



WARNING! All adjustments must be made with the power off and the machine disconnected from the power source.

PERFORM UPPER PLANING

This machine can be used to perform upper single surface planing, but not lower single surface planing. Before performing upper single surface planing, adjust the infeed table until the infeed and outfeed tables are level. See instructions for "Infeed table leveling adjustment". Start the upper cutterhead running only by pressing the upper cutterhead button located on the electrical control panel.

Upper cutterhead start button

Lower cutterhuad start button

Electrical control panel

PERFORM UPPER AND LOWER PLANING

Follow these procedures to perform upper and lower planing:

1. Start the upper cutterhead running first by pressing the upper cutterhead start button on the control panel.
2. Start the lower cutterhead running by pressing the lower cutterhead start switch on the control panel.
3. When the emergency stop switch on the control panel is pressed, both upper and lower cutterheads stop immediately.

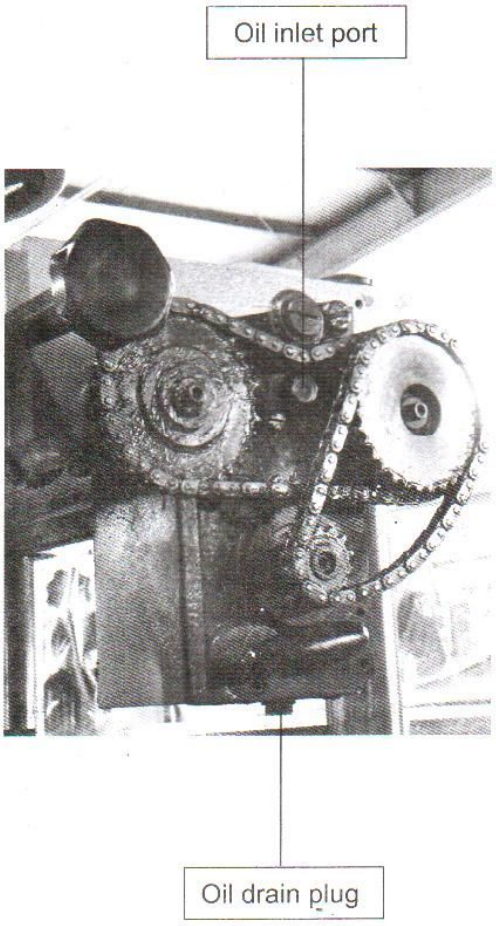
LUBRICATION AND MAINTENANCE

The gearbox oil should be changed after 30 hours of operation. Drain oil by removing the drain plug (see figure). Refill the gear box with 50W oil through the oil fill.

The table and four columns should be lubricated as needed with a thin film of oil.

The 4 elevation screws should be lubricated as needed using common grease.

Lubricate the feed rollers after 30 hours of operation. Fill oil through the 4 oil inlet ports, which are located at the four corners on the top of the upper mechanism.



DIAGRAMS AND PARTS LIST

No.	Part Name	Specification	Quantity
1	Hexagonal head screw	M10*80	1
2	Long bushing		1
3	Hexagonal head screw with washer	M6*12	33
4	Cover		1
5	V-belt	0 670	3
6	Hexagonal head screw	M8*20	1
7	Plain washer	8*28*3	4
8	Motor pulley		2
9	V-belt guard		1
10	Plain washer	10*25*3	7
11	Hexagonal head screw	M10*30	5
12	Single round end key	8*30	2
13	Upper cutterhead motor		1
14	Motor base		1
15	Hexagonal head screw	M8*40	8
16	Plain washer	8.5*23*2	11
17	Plain washer	8.5*16*1.5	8
18	Lock washer	8	8
19	Nut	M8	13
20	Hexagonal socket head screw	M6*12	10
21	Handle		1
22	Nut	M10	9
23	Direction indication label		1
24	Handwheel		1
25	R circlip	38	1
26	Support collar		1
27	Hexagonal socket head screw	M6*1C	2
28	Fix block		1
29	Spring		1
30	Bracket		1
31	Wheel shaft		1
33	Plain washer	6.5*20*2	6
34	Tension wheel		1
35	Tension wheel shaft		1
36	Screw		4
37	Spring		4

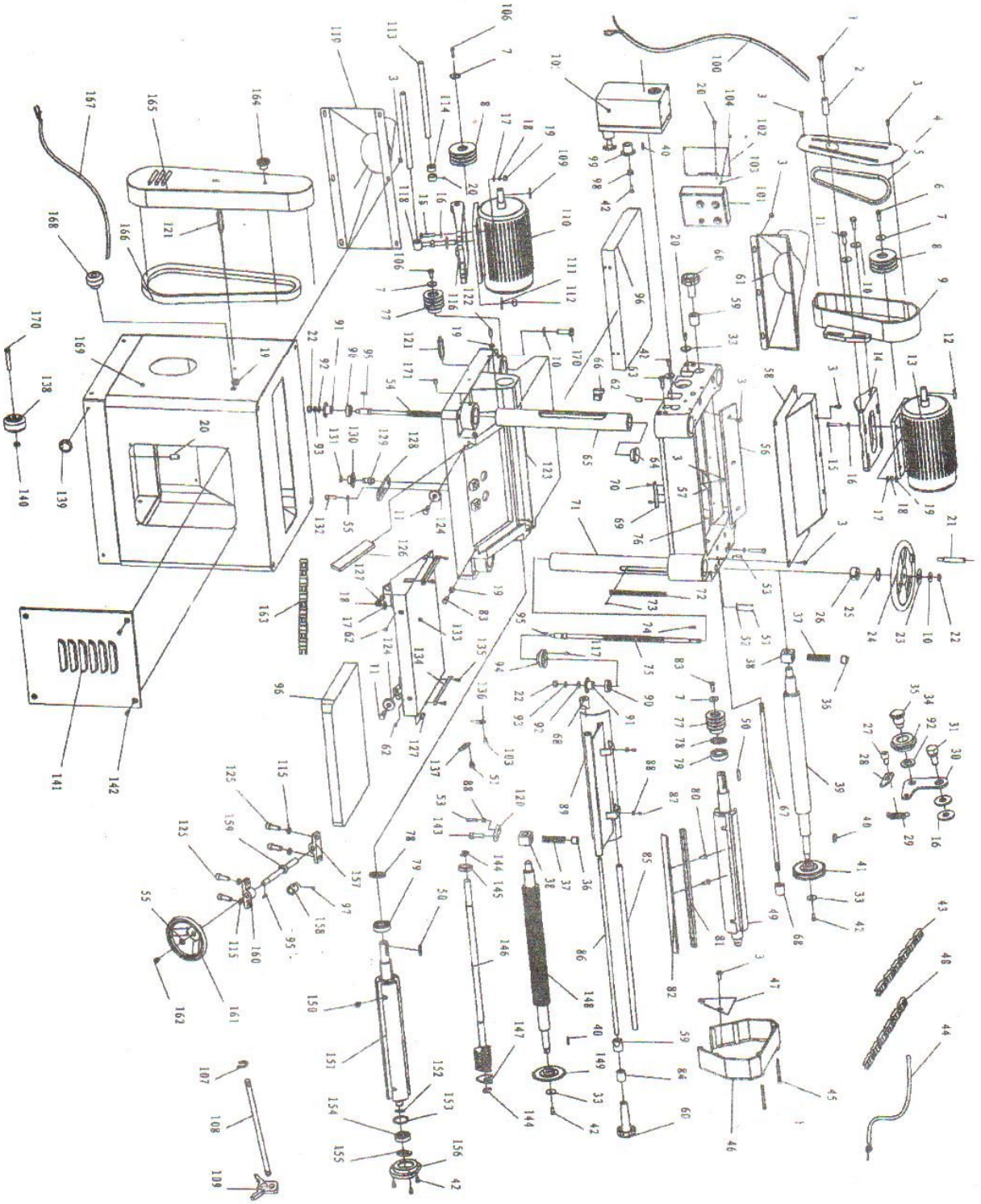
38	Roller bracket		4
39	Outfeed roller		1
40	Single round end key	5*12	3
41	Chain wheel		1
42	Hexagonal socket head screw	M6*16	6
43	Chain	#06B*64P	1
44	Upper cutterhead motor wires		1
45	Hexagonal socket head screw	M6*50	2
46	Side cover		1
47	Safety hatch		2
48	Chain	#06B*48P	1
49	Upper cutterhead		1
50	Single round end key	8*35	2
51	Rivet	2*5	4
52	Pointer		1
53	Set screw	M6*16	5
54	Short screw shaft		3
55	Plain washer	8.5*22*3	3
56	Chip guard		1
57	Elastic plate		3
58	Upper cover		1
59	Clamping piece		2
60	Lock knob		2
61	Upper dust hood		1
62	Set screw	M8*12	5
63	Hexagonal socket head screw	M6*20	8
64	Plug		3
65	Column		3
66	Nut		4
67	Screw shaft		1
68	Nut		2
69	Thickness limiter		1
70	Flat cross head screw	M5*10	2
71	Column		1
72	Thickness scale		1
73	Round cross head screw	M3*6	2
74	Double round end key	4*16	1
75	Long screw shaft		1
76	Upper mechanism		1

77	Cutterhead pulley		2
78	Pulley retainer		2
79	Bearing	6205ZE	2
80	Gib set screw	M8*10	30
81	Knife gib		6
82	Knife		6
83	Hexagonal head screw	M8*25	2
84	Round block		1
85	Adjustment shaft		1
86	Long screw shaft		1
87	Set screw	M6*12	2
88	Nut	M6	9
89	Chip breaker		1
90	Bearing	6202Z	4
91	Chain wheel		4
92	Plain washer	10*20*1.5	8
93	Lock washer	10	4
94	Press cover		4
95	Single round end key	5*20	5
96	Extension ring		2
97	Set screw	M6*8	2
98	Washer		1
99	Chain wheel		1
100	Lower motor wires		1
101	Electric control box		1
102	Switch lamella		1
103	Screw	M4*10	6
104	Nut	M4	4
105	Gear box		1
106	Hexagonal head screw (left)	M6*25	2
107	E circlip	9	2
108	Knife gauge		1
109	Knife setting gauge		2
110	Lower cutterhead motor		1
111	Plain washer	12*26*2	4
112	Nut	M12	4
113	Motor base shaft		2
114	Spacing collar		2
115	Lock washer	12	4

116	Motor base		1
117	Screw	M4*12	12
118	Adjustment shaft set		2
119	Lower dust hood		1
120	Support plate		4
121	Bolt		2
122	Set screw	M8*30	3
123	Base		1
124	Spring washer		2
125	Hexagonal socket head screw	M12*35	4
126	Gib		1
127	Hexagonal head screw	M8*30	4
128	Idle wheel bracket		1
129	Idle wheel shaft		1
130	Gear		1
131	"S" circlip	15	1
132	Hexagonal socket head screw	M8*25	2
133	Infeed table		1
134	Fence		2
135	Round cross head screw	M5*10	4
136	Infeed table depth indicator		1
137	Scale		1
138	Castor		4
139	Knob	M8*20	2
140	Set nut	M10	4
141	Cover		1
142	Flat cross head screw	M6*20	4
143	Hexagonal socket head screw	M8*20	4
144	E circlip	15	2
145	Spacing collar		46
146	Shaft		1
147	Anti-kickback finger		45
148	Infeed roller		1
149	Chain wheel		1
150	Flat socket head screw	M5*10	12
151	Lower cutterhead		1
152	"S" circlip	20	1
153	"R" circlip	47	1
154	Ball bearing	6204ZE	1

155	Elastic washer	¢46*¢39	1
156	Bearing cap		1
157	Bracket		1
158	Collar		1
159	Screw		1
160	Bracket		1
161	Handwheel		1
162	Hexagonal socket head screw	M8*12	1
163	Chain	#081*142P	1
164	Nut	M8	2
165	Belt guard		1
166	V-belt	0 1120	3
167	Power wires		1
168	Strain relief	M20	1
169	Machine cabinet		1
170	Hexagonal head screw	M10*70	8
171	Set screw	M10*12	8

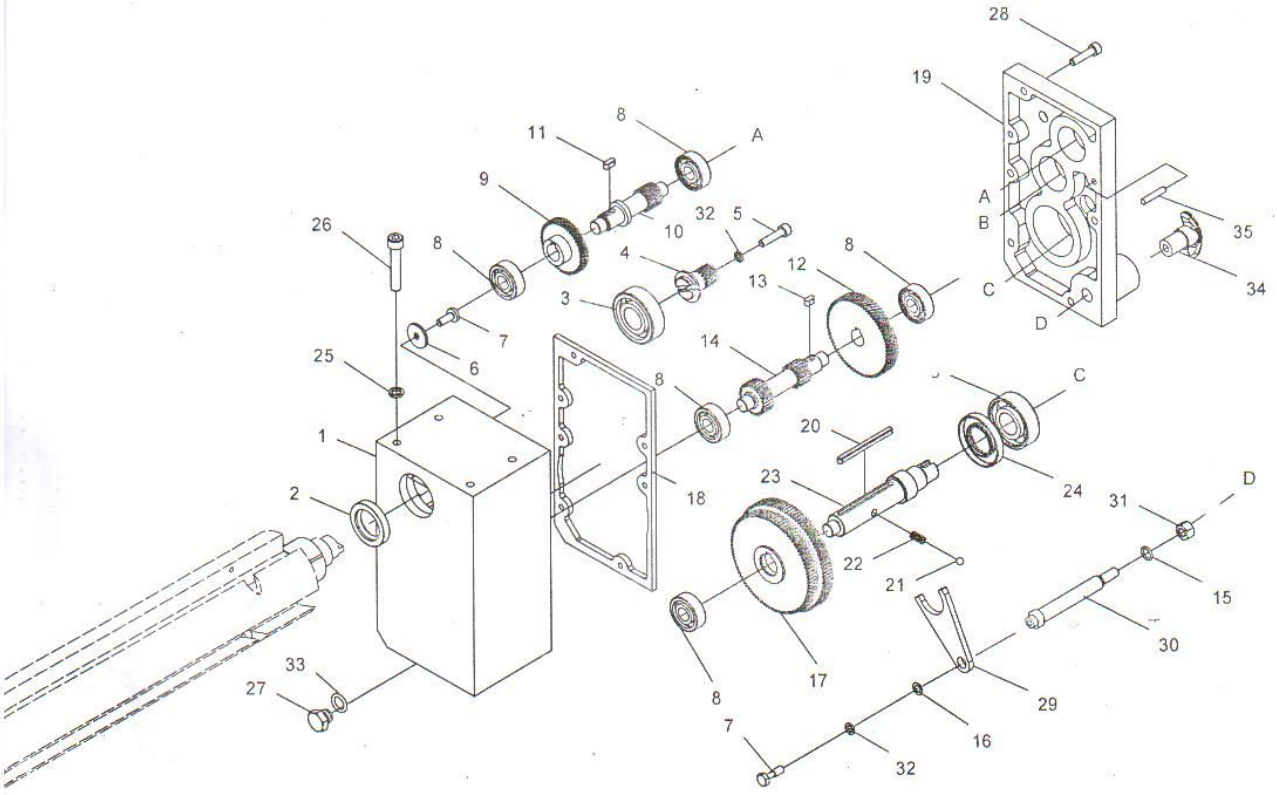
DIAGRAM AND PART LIST



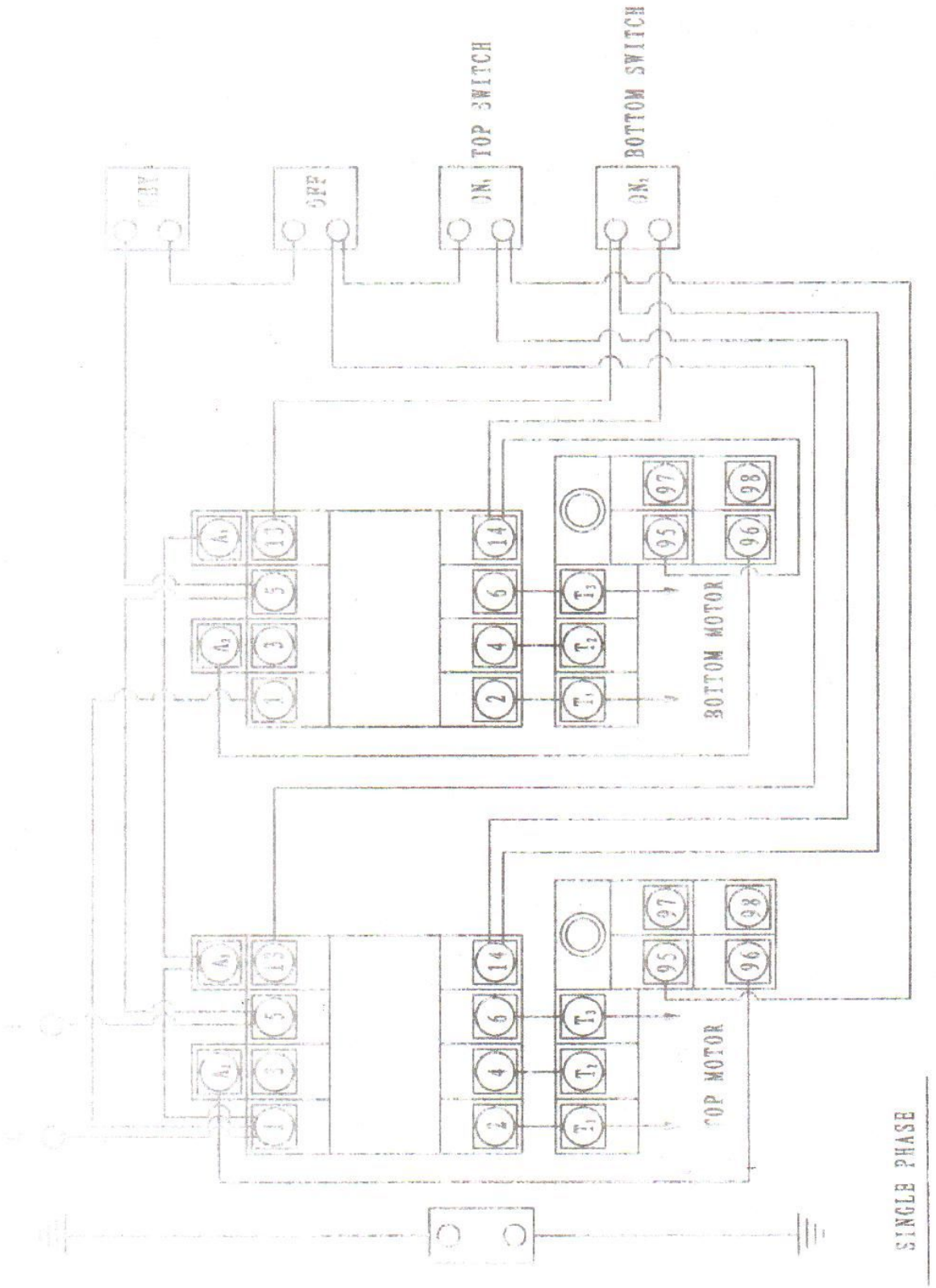
BOX

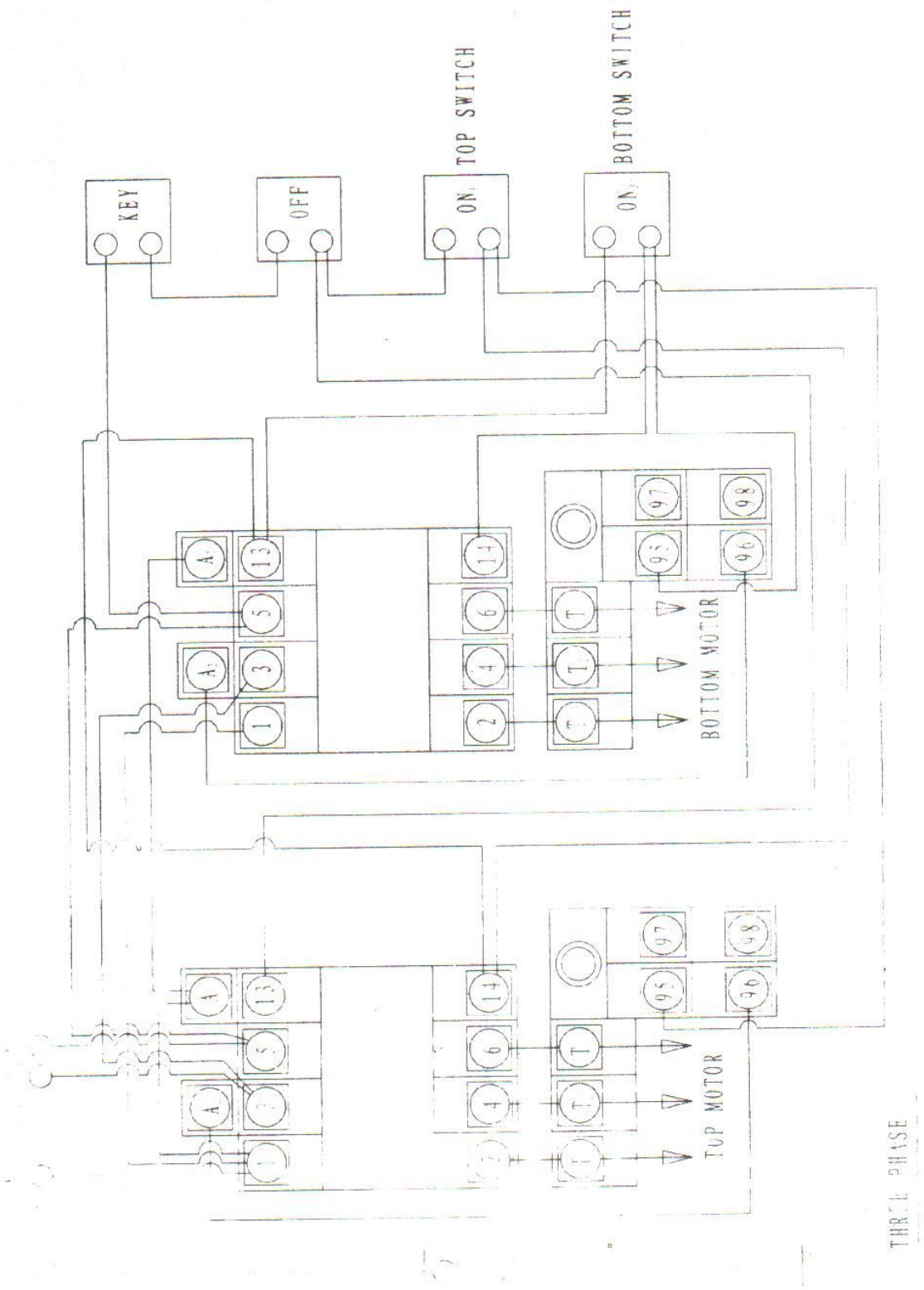
ITEM	NAME	QTY
1	GEAR BOX	1
2	OIL SEAL 25X40X7	1
3	BALL BEARING 6204	2
4	GEAR	1
5	CAP SCREW M6X25(LEFT)	1
6	FLAT WASHER ¢6X¢22	1
7	PHILLIPS HEAD BOLT M6X12	2
8	BEARING 6201	5
9	GEAR	1
10	GEAR AND SHAFT	1
11	KEY 5X12	1
12	GEAR	1
13	KEY 5X10	1
14	GEAR 2-SPEED	1
15	OIL SEAL 11.8X2.65	1
16	WASHER 6	1
17	DOUBLE GEAR	1
18	GASKET	1

ITEM	NAME	QTY
19	GEAR CASE	1
20	KEY 5X40	1
21	STEEL BALL ¢6	1
22	TENSION SPRING	1
23	SHAFT	1
24	OIL SEAL 25X47X7	1
25	LOCK WASHER ¢8	4
26	HEX HEAD BOLT M8X45	4
27	SCREW M12X1.25X16	2
28	HEX HEAD BOLT M6X25	5
29	SHIFTER	1
30	SHIFTING SHAFT HADNLE	1
31	NUT M8	1
32	LOCK WASHER ¢6	2
33	OIL SEAL 9X1.8	2
34	KNOB	1
35	ROLL PIN 5X25	2



ELECTRICAL DIAGRAM




KEY
OFF
ON
TOP SWITCH
ON
BOTTOM SWITCH
BOTTOM MOTOR
TOP MOTOR
THREE PHASE