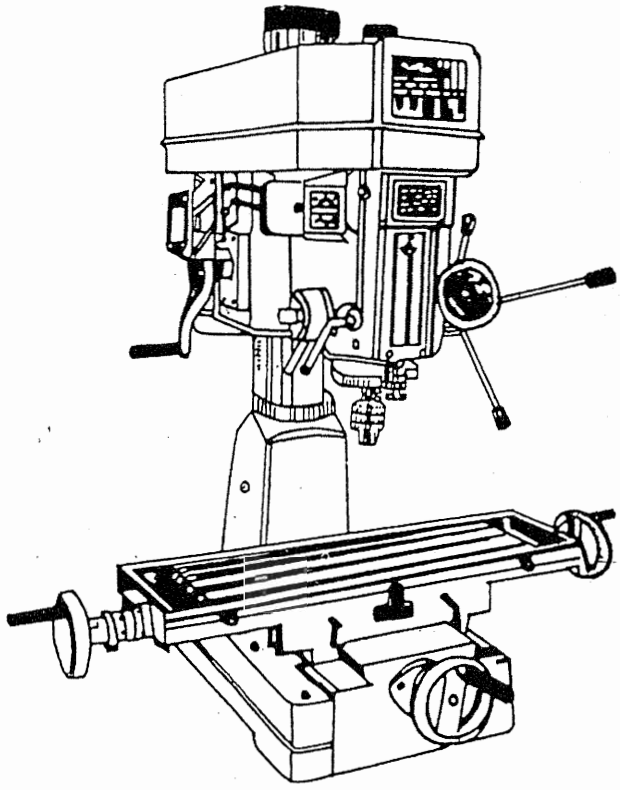
CENTRAL MACHINERY®

MILLING/DRILLING MACHINE

ITEM 33686

INSTRUCTION MANUAL



DISTRIBUTED BY: HARBOR FREIGHT TOOLS
3491 MISSION OAKS BLVD.
CAMARILLO, CA. 93011-6010

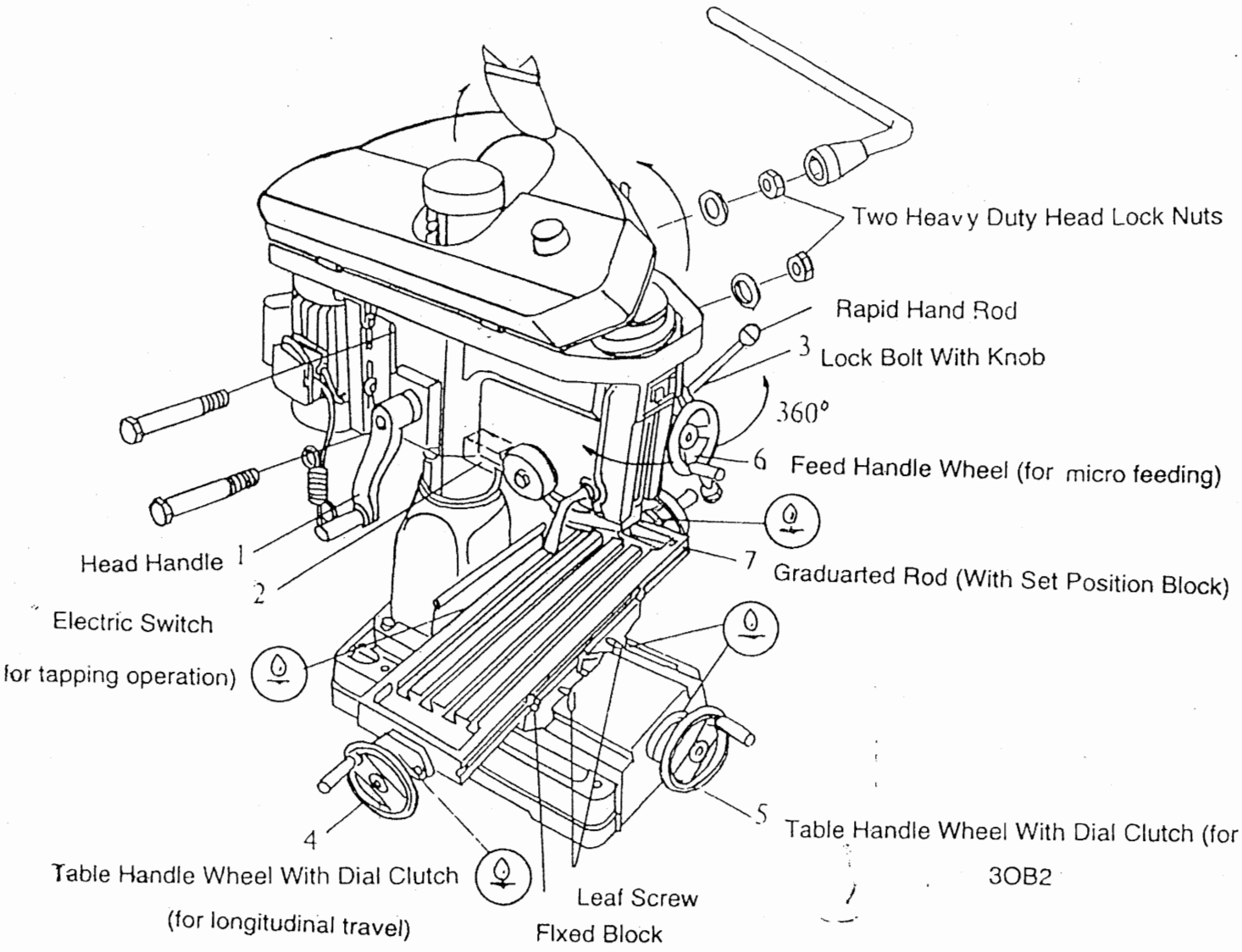

Two Heavy Duty Head Lock Nuts
Rapid Hand Rod
3
Lock Bolt With Knob
360°
6
Feed Handle Wheel (for micro feeding)
7
Graduarted Rod (With Set Position Block)
Head Handle
1
2
Electric Switch
for tapping operation)
5
Table Handle Wheel With Dial Clutch (for cross travel)
3OB2
4
Table Handle Wheel With Dial Clutch
(for longitudinal travel)
Leaf Screw
Flxed Block

Figure 1

Thank you for buying the 33686 Milling/Drilling Machine. properly cared for and operated, this machine can provide you with years of accurate service. Please read this manual carefully before using your machine.

SPECIFICATION

MODEL			ITEM 33686.	ITEM 33686
Drilling capacity			3# 31.75mm (1 1/4") 7:24,23mm(7/8")	
Face mill capacity			76mm (3")	
End mill capacity			20mm (3/4")	
Swing			405mm (15-7/8")	
Max.distance spindle nose to table			457mm (18")	
Spindle taper			M.T.3 R-8 7:24	
Spindle stroke			130mm (5")	
Diameter of Spindle sleeve			75mm (3")	
Head swivel			360	
Diameter of column			115mm (4-1/2")	
Overall height (w/o stand)			1100mm (43-1/2")	
Machine stand height			760mm (30")	
Length			1080mm (42-1/2")	1156mm (45 1/2")
Width			1010mm (39-3/4")	
Motor			1-1/2hp -- 2HP	
Spindle speed (r.p.m.)	12s	50Hz	100-2080 (4 pola) (75--1685 6pole)	
		60Hz	120-2500 (4 pole)(95--2020 6pole)	
Forward and backward travel of Table			175mm (7")	178mm (7")
Right and left travel of table			500mm (19-3/4")	610mm (24")
Working area of table			730mm×210mm (281/4"×81/2")	806mm×241 (31 3/4"×9 1/2")
Gross weight			340 kgs (660 lbs)	345kgs
Measurament			29.3 Cuft	

6. PRECAUTION FOR OPERATION

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

(1) Before Operation

(a) Fill the lubricant.

(b) In order to keep the accurate precision, the table must be free from dust and oil deposits.

(c) Check to see that the tools are correctly set and the workpiece is set firmly.

(d) Be sure the speed is not set too fast.

(e) Be sure everything is ready before use.

(2) After Operation

(a) Turn off the electric switch.

(b) Turn down the tools.

(c) Clean the machine and coat it with lubricant.

(d) Cover the machine with cloth to keep out the dust.

(3) Adjustment of Head

(a) To raise and lower the head, loosen the two heavy duty head lock nuts shown in Fig. 1. Use the left side head handle to raise and lower the head on its rack and pinion mechanism. When the desired height is reached, tighten the bolts to avoid vibration.

(b) Head may be rotated 360° by loosening the same bolts mentioned above. Adjust the head to the desired angle, then fix the heavy duty head locknuts. You may have to re-tignten lock nuts if the machine is used on a continual basis.

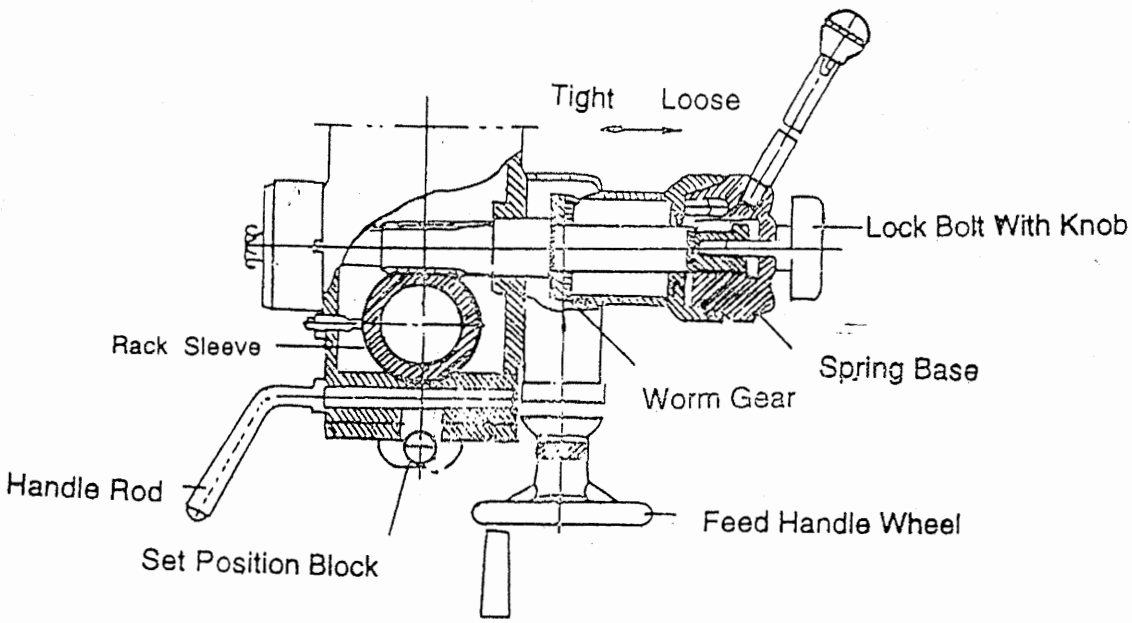


Figure 2

(4) Preparing for Drilling (see fig. 2) (Except addition power feed system).
Turn of the knob make loose the taper body of worm gear and spring base. Then we decide spindle stroke setting the positive depth stop gauge for drilling blind hole or Free state for pass hole.

(5) Preparing for Milling (see fig. 2) (Except addition power feed system).
(a) Adjust the positive depth stop gauge to highest point position.
(b) Turn tight of the knob be use to taper friction force coupling the worm gear ane base. Then turning the handle wheel by micro set the sprindle of work piece machming height.
(c) Lock the rack sleeve at the desired height with fixed bolt.

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

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

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

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

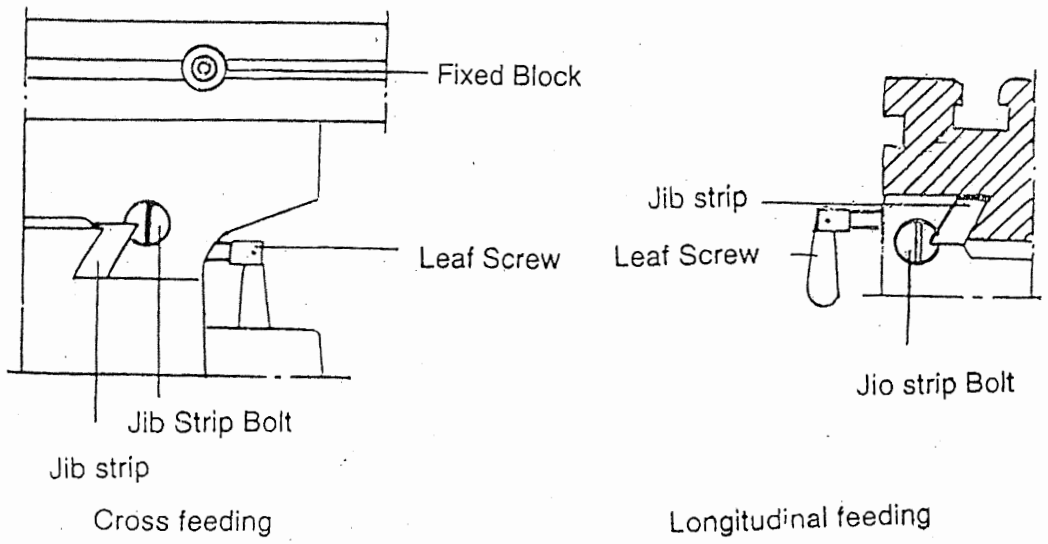


Figure 3

9 SPEED CHANGING AND ADJUST BELT (Step See Fig. 4)

(1) Turn power off.

(2) Open belt cover by releasing side latches step see (a) (b) (c)

(3) Loosen motor mount leaf screw.

(4) Push motor in order to loosen belts (head side of motor mount is set fixed, two motors ear side with motor screw to tighten of loosen of belts.)

(5) Loosen two screws of base for speed change inter pulley that also adjust the location of base for speed change inter pulley.

(6) Selecf the suitable R.P.M. from speed charts of Fig. 5 Then place the belts on the desired pulley steps.

(7) Tighten two screws of base for speed change pulley and the bolt of motor mount lock.

(8) Cover the belt cover with counter step (2) after turn power on;

Motor 12s 30MM Spindle shaft

12SPEEDS		BELT	12SPEEDS		BELT
50~	60 ~		50 ~	60 ~	
100	120	4—5	640	820	1—6
160	200	3—5	865	1090	2—7
190	250	4—6	1010	1245	3—8
235	295	2—5	1205	1520	1—7
305	400	3—6	1500	1820	2—8
365	465	4—7	2080	2500	1—8

Figure 5

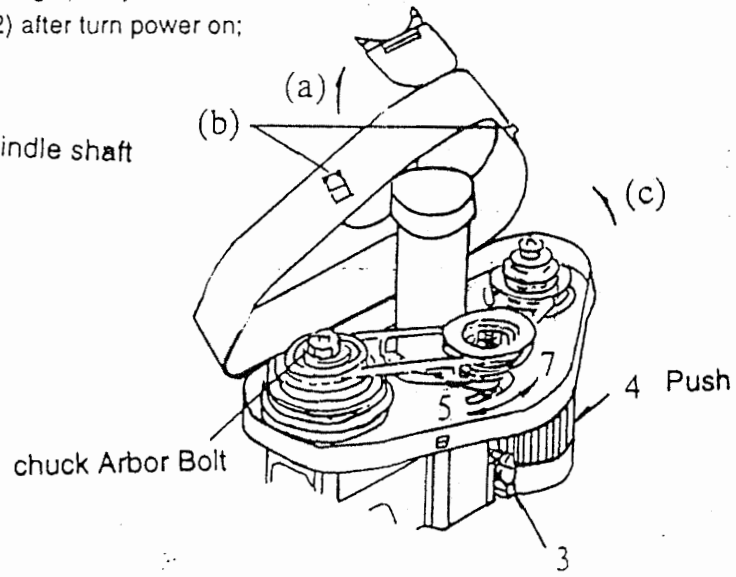


Figure 4

10. TO CHANGE TOOLS

(1) Removing Face Mill or Drill Chuck Arbor

Loosen the arbor bolt (see fig. 4) at the top of the spindle shaft approximately 2 turns with a wrencn. Rap the top of the arbor bolt with a mallet.

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

(2) To Install Face Mill or Cutter Arbor

Insert cutter and cutter arbor into the taper of spindle. Tighten arbor bolt detach securely, but do not ove.tighten.

(3) Removing Taper Drills

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

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

11. ORDERING REPLACEMENT PARTS

Complete parts list is attached. If parts are needed, contact your local distributor or our factory.

In order to use mill cutters you will need a R-8 collet holder. You can order this from Harbor Freight Tools (item# 46004). We also sell a 4 PC. collet set (item# 46002)

12. EXTRA TOOLING AND ACCESSORIES

Each of machine is equipped with a MT = 3 spindle taper or a R-8 spindle taper (examples below). Contact your local distributor or a major cutting tool distributor to obtain any of these accessories.

Taper Drills
Reamers
End Mills
Cutter Arbor
Taps
Collets
Adapters and Sleeves

13. TAPPING EQUIPMENT

This machine can be equipped with an electric switch for tapping operation clockwise or counterclockwise, and the working depth also can be adjusted by the limit switch. (Electric switch will be installed according to your requirement, and you must pay the cost only.)

14. SPECIFICATION OF T-SOLT

The size of T-Solt on table as Fig 6

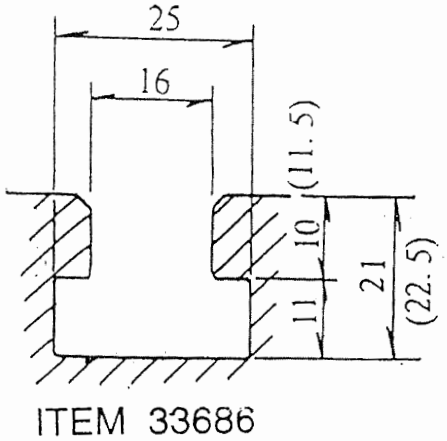


Figure 6

15. TROUBLE SHOOTING

(1) No running after switch on:

(a) Main switch interruption while volts irregular - Adjust input voltage and draw back the main switch

(b) Break down of fuse in switch box - Replace with new one.

(c) In case of too much current, the overload relay jumps away automatically - Press the overload relay, and it will return to the correct position.

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(2) Motor Overheat and No Power:

(a) Overload - Decrease the load of feed.

(b) Lower voltage - Adjust to accurate voltage.

(c) Spoiled contact point of magnetic switch - Replace with new one.

(d) Breakdown of overload relay - Connect it or replace with new one.

(e) Motor is poor - Replace with new one.

(f) Break down of fuse or poor contact with wire (it is easily to spoil motor while short circuited) Switch off power source at once and replace fuse with new one.

(g) The tension of pulley V-belt too tight - Adjust for proper tension of V-Belt.

(h) If this machine with the tapping attachment, there is an aid plum screw fix on the motor mount in order to avoid the motor pulleys shake while turning.

(3) The temperature of spindle bearing is too hot:

(a) Grease is insufficient - Fill the grease.

(b) The spindle bearing is fixed too tight - Turning with no speed and feel the tightness with hand.

(c) Turning with high speed for a long time - Turn it to lightly cutting.

(4) Lack of power with main spindle revolving:

(a) The tension of V-belt too loose - Adjust for proper tension of V-belt.

(b) Motor has burned out - Change a new motor.

(c) Fuse has burned out - Replace with new one.

(5) Table travel has not balanced:

(a) The gap of spindle taper too wide - Adjust bolt in proper.

(b) Loosening of leaf bolt - Turn and fasten in place.

(c) Feed too deep - Decrease depth of feed.

(6) Shake of spindle and roughness of working surface has taken place during performance:

(a) The gap of spindle bearing too wide - Adjust the gap in proper or replace bearing with new one.

(b) Spindle loosening up and down - Make two of inner bearing covers on the top tight each other. Do not overtighten two inner bearing covers with the taper bearing; it is OKas long as no gap between them.

(c) The gap of taper sliding plate too Wide - Adjust the tension of bolt in proper

(d) Loosening of chuck - Fasten chuck.

(e) Cutter is dull - Resharpen it.

(f) Workpiece has not hold firmly - Be sure to tighten workpiece.

(7) Micro feed does not work smoothly:

(a) Loosening of clutch - Be sure to tighten it.

(b) Worm and worm shaft has worn out - Replace with new one.

(c) Loosening of handwheel fixed screw - Be sure to tighten it.

(8) Without accuracy in performance:

(a) Imbalance of heavy workpiece - Must be considerate of the principle of balancewhile holding workpiece.

(b) Often use of hammer to strike workpiece - Forbidden to use hammer to strike workpiece.

(c) Unaccurate horizontal table - Check and maintain table for keeping accurate horizontal after a period of use.

16. MAINTAINIING

That's easier to keep machine in good condition or best performance by means of maintaining if at any time than remedy if after it is out of order

(1) Daily Maintenance (by operator)

(a) Fill the lubricant before starting machine everyday.

(b) If the temperature of spindle caused overheating or strange noise, stop machine immediately to check it for keeping accurate performance.

(c) Keep work area clean; release vise, cutter, workpiece from table; switch off power source; take chip or dust away from machine and follow instructions lubricanting or coating rust-proof oil before leaving.

(2) Weekly Maintenance

(a) Clean and coat the cross leading sorew with oil.

(b) Check to see if sliding surface and turning parts lack of lubricant. If the libricant is insufficant, fill it.

(3) Monthly Maintenance

(a) Adjust the accurate gap of slide both on cross and longitudinal feed.

(b) Lubricate bearing, worm, and worm shaft to avoid wear.

(4) Yearly Maintenance

(a) Adjust table to horizontal position for maintenance of accuracy.

(b) Check electric cord, plugs, switches at least once a year to avoid loosening or wearing.

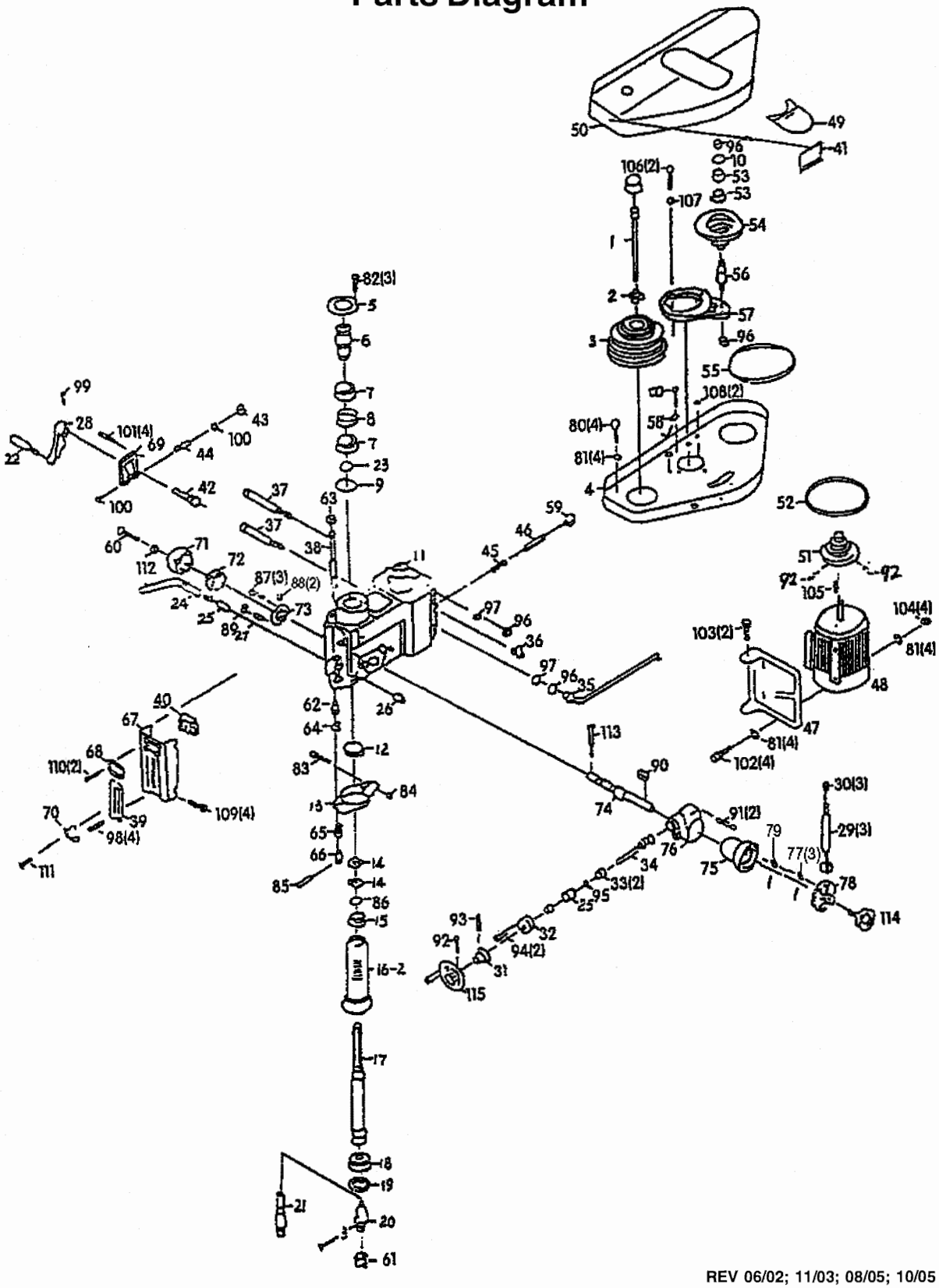
Parts List

1 Chuck Arbor Bolt	1
2 ELT Pulley Lock Nut	1
3 Spindle Pulley	1
4 Belt bottom Cover	1
5 Dust Cover	1
6 Spindle Taper Sleeve	1
7 Ball Bearing(#6009 ZZ)	2
8 Bearing Spacer	1
9 C – Retainer Ring	1
10 C – Retainer Ring	1
11 Head Body	1
12 Rubber Flange	2
13 Feed Base	1
14 Lock Nuts	2
15 Taper Roller Bearing(302061)	1
16 Rack Sleeve	1
17 Spindle Shaft	1
18 Taper Roller Bearing(E3020671)	1
19 Bearing Cap	1
20 Cutter Arbor	1
21 Chuck Arbor	1
22 Grip	4
23 Retainer Ring	1
24 Handle Rod	1
25 Fixed Tight Collar	1
26 Fixed Tight Collar(Thread)	1
27 Screw Key	1
28 Lift Knob	1
29 Handle Rod	3
30 Knob	3
31 Micro Adjusting indicator	1
32 Worm Cover	1
33 Ball Bearing(6202Z)	
34 Worm Shaft	1
35 Lock Handle	1
36 Leaf Screw	1
37 Head Body Fix Bolt	2
38 Graduated Rod	1
39 Graduated Dial	1
40 Switch	1
41 Name Plate	1
42 Worm Shaft	1
43 Angular Gear	1
44 Shaft	1
45 Compression Spring	1
46 vibration – Proof Pole	1
47 Motor Mount	1
48 Motor	1
49 Punch Key	1
50 Belt Cover	1
51 Motor Pulley	1
52 V – Belt(B813)	1
53 Ball Bearing(62042)	2
54 Inter Pulley	1
55 V – Belt(B1016 – 1041)	1
56 Inter Pulley Shaft	1
57 Speed Change Inter Pulley Base	1
58 Clip Plate	1
59 Rubber Collar	1
60 Screw With Plumb Knob	1
61 Cutter	1
62 Set Distance Nut	
63 Set Position Block	1
64 Lock Nut	1
65 Support Base	1
66 Handle	1
67 Front Cover Plate	1
68 Push Switch Protection Piece	1
69 PU – Down with stand	1
70 Limit Plate	4
71 Spring Cover	1
72 Spring	1
73 Spring Base	1
74 Pinion Shaft	1
75 Worm Gear	1
76 Feed Box	1
77 Buffer Spring	3
78 Spring base	1
79 Terminal	3
80 Hexagon Head Bolt	
81 Washer	12
82 Cross – Recess Round Head Screw	4
83 Hexagon Head Bolt	1
84 Hexagon Nut	1
85 Capacitor Housing	1

Parts List (continued)

85	Cone Pin	1
86	Lock Washer	1
87	Cross - Recess Round Head Screw	3
88	Spring Pin	2
89	Hexagon Nut	1
90	Key	1
91	Hexagon Socket Head Screw	2
92	Hexagon Socket Headless Screw	3
93	Hexagon Socket Headless Screw	1
94	Hexagon Socket Head Screw	2
95	C - Retainer Ring	1
96	Hexagon Nut	4
97	Washer	2
98	Cross - Recess Round Head Screw	4
99	Hexagon Socket Headless Screw	1
100	O - Retainer Ring	2
101	Hexagon Socket Head Screw	4
102	Hexagon Head Screw	4
103	Hexagon Head Screw	2
104	Hexagon Nut	4
105	Key	1
106	Hexagon Head Bolt	2
107	Washer	2
108	Outline Bush	2
109	Cross - Recess Round Head Screw	4
110	Cross - Recess Round Head Screw	2
111	Cross - Recess Round Head Screw	4
112	Washer	1
113	Cross - Recess Round Head Screw	1
114	Lock Bolt with Knob	1
115	Feed Handle Wheel	1
116	Table Handle Wheel	3
117	Dial Handle	3
118	Thrust Bearing (S1103)	4
119	Square Flange	1
120	Feeding Plate Screw	1
121	Body	1
122	Gib Strip	1
123	Vertical Shaft	1
124	Shaft Bottom	1
125	Rack	1
126	Shaft Cover	1
127	Jib Strip Bolt	2
128	Leaf Screw	4
129	Movable Fixed Block	1
130	Table Down Nut	1
131	Center Base	1
132	Anti-dust Press Plate	1
133	Anti-dust Plate	1
134	Anti-dust Press Plate	1
135	Left Flange	1
136	Table Upper Nut	1
137	Table Screw	1
138	Right Flange	1
139	Table Gib Strip	1
140	Table	1
141	Fixed Block	1
142	Movable Fixed Ring	1
143	Hexagon Head Bolt (Same3-131)	4
144	Hexagon Socket Head Screw	10
145	Hexagon (Same3-145)	2
146	Cone Pin	3
147	Indicated Zero With Screw	
148	Locking Screw	5
149	Hexagon Head Bolt	4
150	Spring Washer	4
151	Hexagon Socket Head Screw	2
152	Hexagon Socket Head Screw	1
153	Hexagon Socket Head Screw	2
154	Hexagon Socket Head Screw	2
155	Adjusting Plate	2

Parts Diagram



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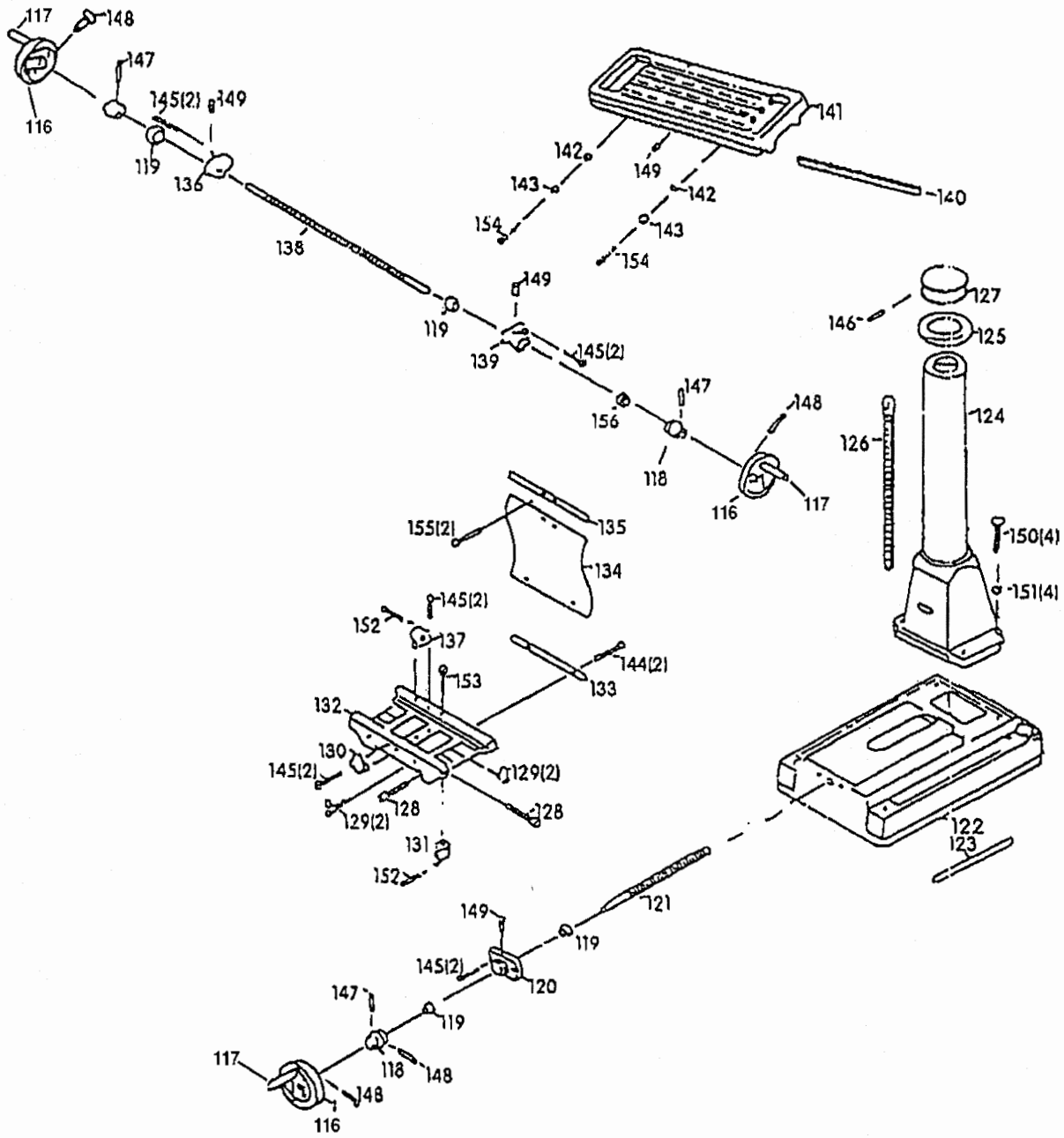
Parts Diagram



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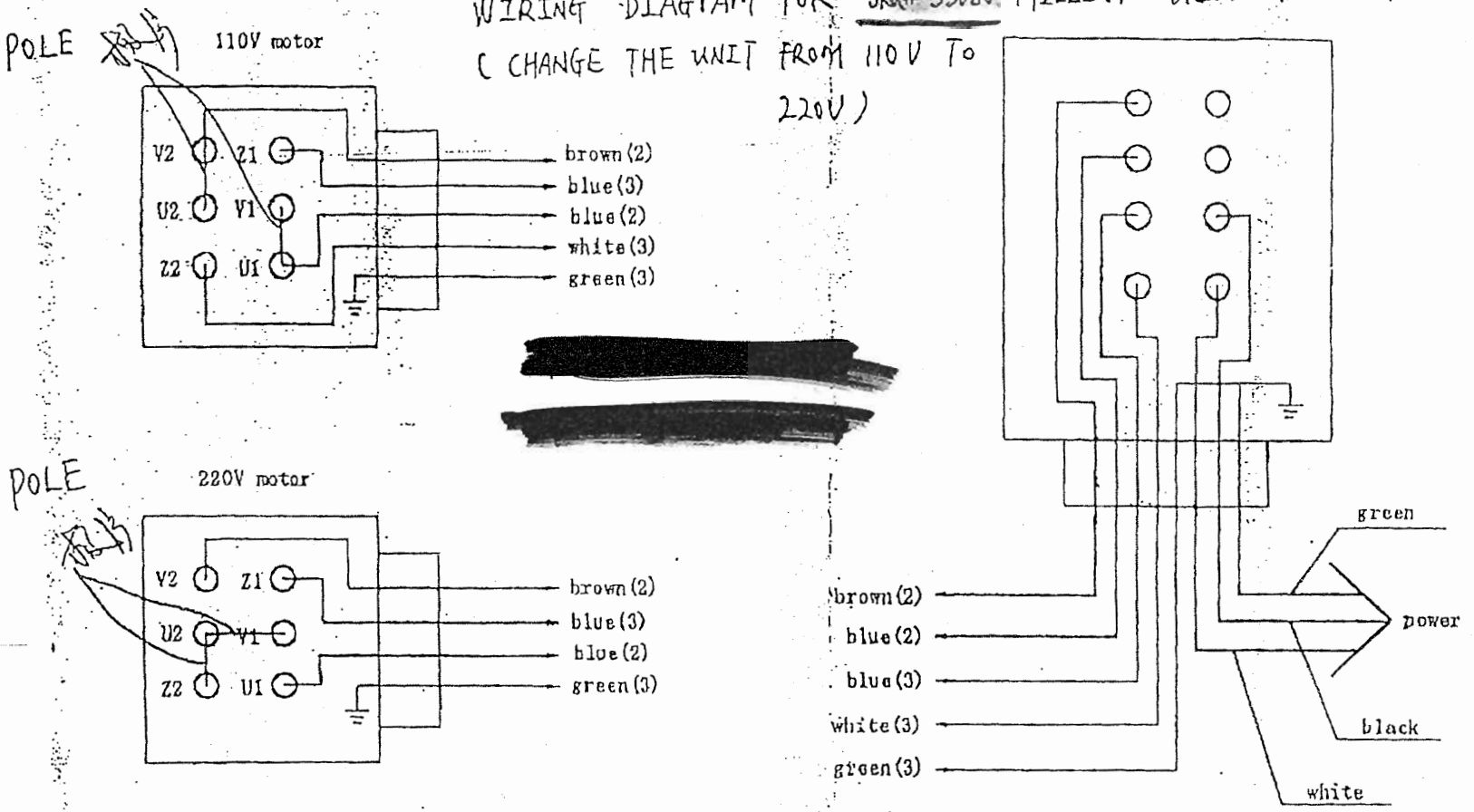
WIRING DIAGRAM FOR Sku# 33686 MILLING & DRILLING MACHINE

(CHANGE THE UNIT FROM 110V TO 220V)



note: 1. (2) is cover wire of double-core, (3) is cover wire of tri-core;

2. changing white (3) and blue (3) or brown (2) and blue (2) can change the direction of motor;

✱ 3. while turning 220v, don't connect with white wire of tri-core wire, it should be insulated.