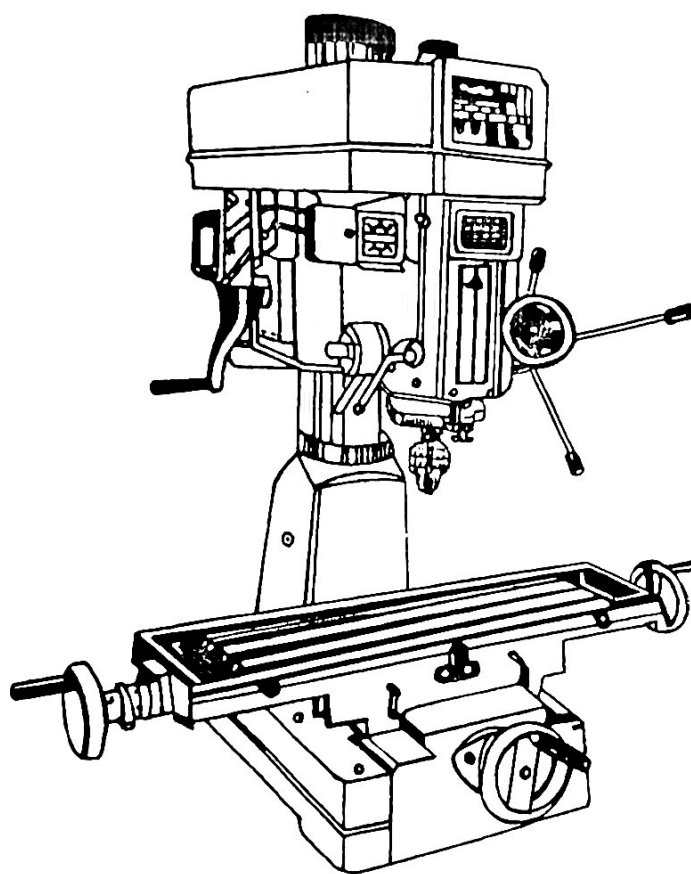


CENTRAL MACHINERY

®

MILLING/DRILLING MACHINE

ITEM33686
INSTRUCTION MANUAL



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

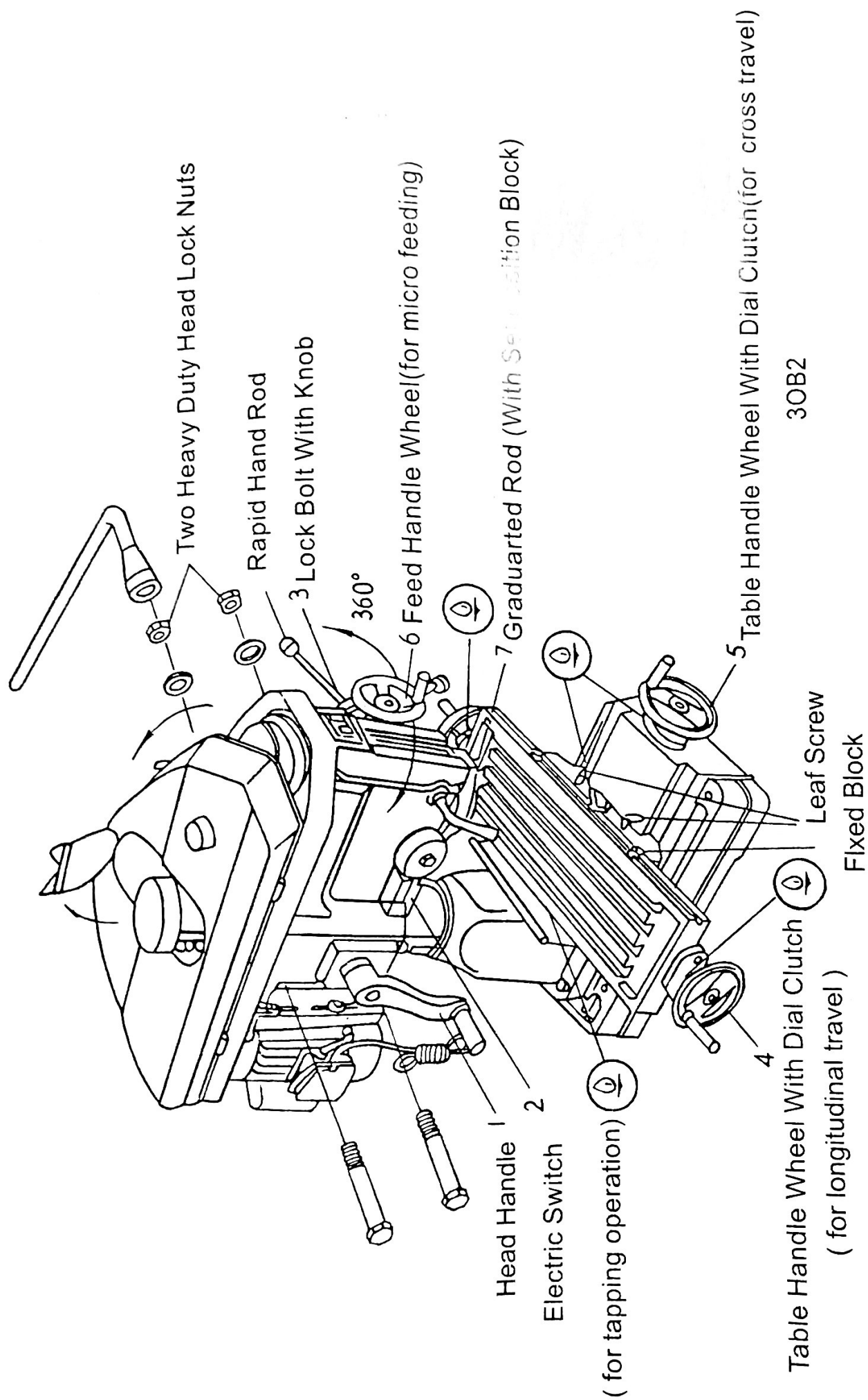


Figure 1

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			33686
Drilling capacity			33686
Face mill capacity			3#31.75mm(1 1/4") 7:24,23mm(7/8")
End mill capacity			76mm(3")
Swing			20mm(3/4")
Max. distance spindle nose to			405mm(15-7/8")
Spindle taper			457mm(18")
Spindle stroke			M.T.3R-87:24
Diameter of Spindle sleeve			130mm(5")
Head swivel			75mm(3")
Diameter of column			360°
Overall Height(w/o stand)			115mm(4 1/2")
Machine stand height			1100mm(43 1/2")
Length			760mm(30")
Width			1080mm(42 1/2")
Motor			1010mm(39 3/4")
Spindle speed (r. p. m)			1 1/2hp-2HP
12s	50HZ	100-2080(4pole)(75-1685 6pole)	
	60HZ	120-2500(4pole)(95-2020 6pole)	
Forward and backward travel of Table			175mm(7")
Right and left travel of table			178mm(7")
Working area of table			500mm(19-3/4")
Gross weight			610mm(24")
Measurement			730mmx210mm (28 1/4"x8 1/2")
			806mmx241mm (31 3/4"x9 1/2")
			340kgs(660lbs)
			345kgs
			29.3Cuft

2 FEATURES

- (1) This machine has several uses, such as surface cutting, drilling, milling, and also can be equipped with an electric switch for tapping.
- (2) This machine is of fine quality, can be operated easily, and it is not limited to skilled operators.
- (3) The drilling and milling operation can be performed by two methods:
 - 1) Hand operation, which makes quick drilling.
 - 2) Worm gear feed operation, which makes slow milling.
- (4) Bronze adjustable nuts, which adjust the thread clearance and reduce the wear. They also make screws rotated smoothly and increase the thread accuracy.
- (5) Whole column which makes this machine strong, stable, and also keep the high accuracy.
- (6) Head of tough cast ensures its accuracy lasting and enduring through the treatment of precise boring cylinder, grinding, and internal stress relief.
- (7) To adjust belt and change speed, new pulley cover is easy to open the cover.

3 MOUNTING MACHINE

- (1) Be sure to fix the head on the column and put the hanger on the head before moving machine. While moving machine, please keep its balance and safety.
- (2) Do not mount the machine at the sunshine place to avoid the deformity of machine and the loss of accuracy.
- (3) Check to see if the motor turning in clockwise direction before connecting the electric distribution line.
- (4) Mount machine to a sturdy table or base, it is advisable that the table you choose be well constructed to avoid any vibration during operation.
- (5) Four holes are provided on the machine base for mounting. Before tightening bolts make sure the work table on the machine is level lengthwise and crosswise. Use shims if necessary.

4 CLEANING & LUBRICATING

- (1) Your machine has been coated with a heavy grease to protect it in shipping. This coating should be completely removed before operating the machine. Commercial degreaser, kerosene or similar solvent may be used to remove the grease from the machine, but avoid getting solvent on belts or other rubber parts.
- (2) After cleaning, coat all bright work with a light lubricant. Lubricate all points in Fig.1 with a medium consistency machine oil.
- (3) Lubricating points as shown in arrows.

5 USE OF MAIN MACHINE PARTS(See fig 1)

- (1) To raise and lower the head by head handle.
- (2) Equipped with an electric switch for tapping operation clockwise or counterclockwise.
- (3) To adjust the quick or slow feeding by feed handle.
- (4) To adjust the table left and right travel by table handle wheel.
- (5) To adjust the table fore and aft travel by table handle wheel.
- (6) To operate the spindle handle wheel for micro feed.
- (7) To adjust the scale size according to working need.

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 high.
- (e) Be sure everything is ready for operation.

(2) After Operation

- (a) Turn off the electric switch.
- (b) Turn down the tools.
- (c) Clean the machine and coat with oil to prevent rust.
- (d) Cover the machine with cloth to prevent 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 retighten lock nut if the machine is used on a continual basis.
- (4) Preparing for Drilling (see fig. 2) (Except addition power feed system)

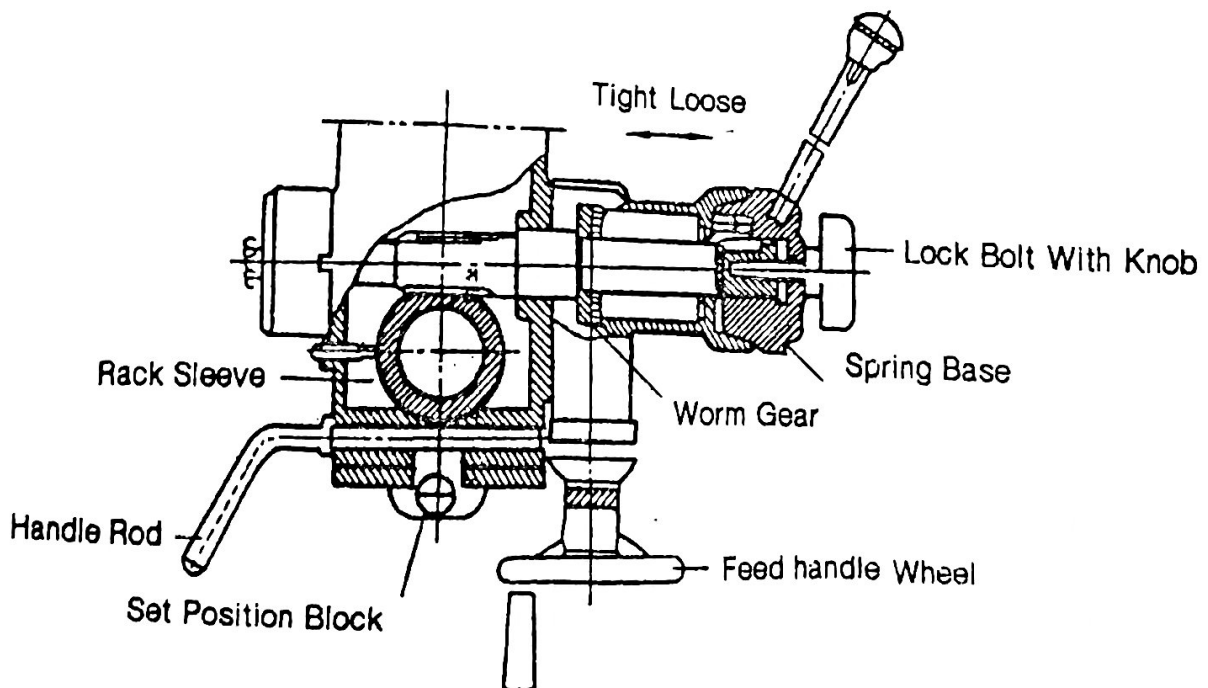


Figure 2

Turn of the knob make loose the taper body of worm gear and spindle stroke setting the positive depth stop gauge for desired pass hole.

Then we decide
or Free state for

(5) Preparing for Milling (see fig 2) (Except addition power)

(a) Adjust the positive depth stop gauge to highest position

(b) Turn tight of the knob be use to taper friction for locking the worm gear and brake

Then turning the handle wheel by micro set the surface of work piece machining 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) Adjust the jib strip bolt until feel a slight drag when shifting the table.

8. CLAMPING TABLE BASE, AND MACHING 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 milling, 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.

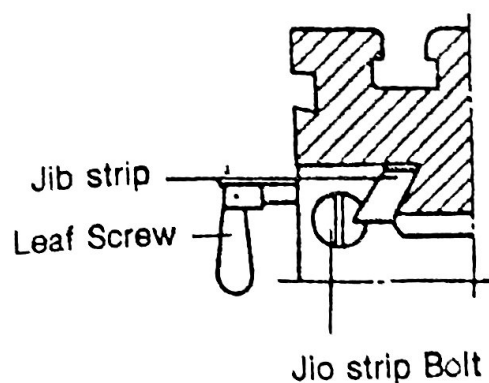
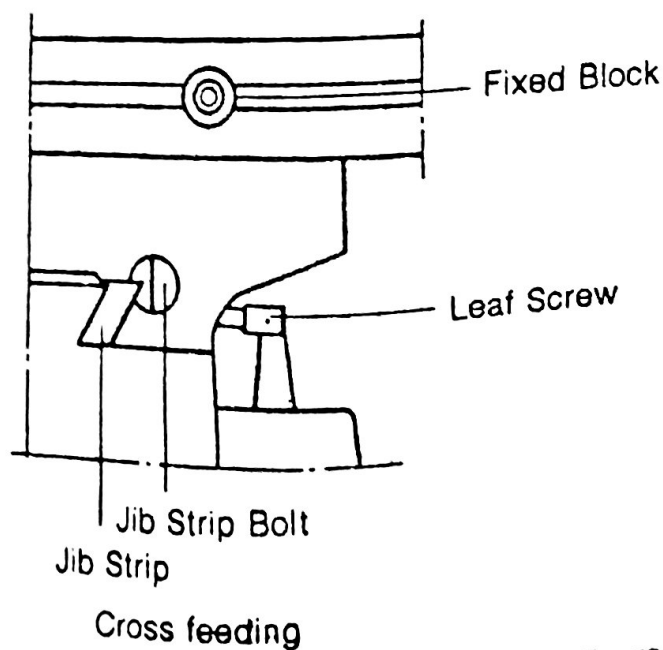


Figure 3

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 to motor 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 position of base for speed change inter pulley.
- (6)Select the suitable R P M from speed charts of fig 5. Then place the belts on 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 cover step(2) after turn power on;

MOTOR 12S



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

Chuck Arbor Bolt

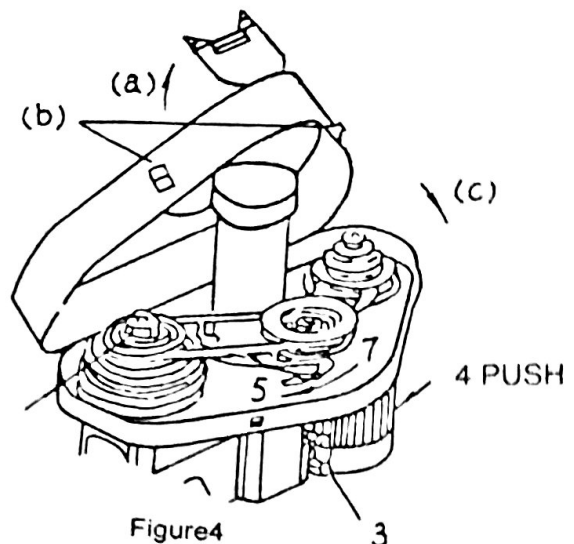


Figure4

10.TO CHANGE TOOLS

(1)Removing Face Mill of Drill Chuck Arbor

Loosen the arbor bolt(see fig 4) at the top of the spindle shaft approximately 2 turns with a wrench. 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 of Cutter Arbor

Insert cutter and cutter arbor into the taper of spindle.

Tighten arbor bolt detach securely, but do not over tighten.

(3)Removing Taper Drills

Note: You will need an adapter(R8 to MT[Morse to Taper]) use taper drills. This adapter is not included.

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-SLOT

The size of T-slot on table as Fig 6

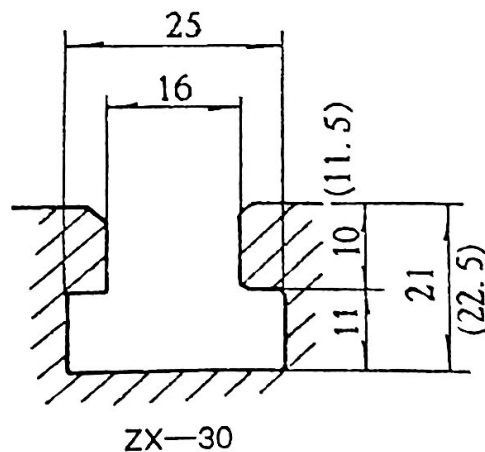


Figure 6

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) Bread 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.

- (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 OK as long as no gap between them.
 - (c) Loosening of chuck-Fasten chuck.
 - (d) Cutter is dull-Resharpen it.
 - (e) 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 balance while 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. MAINTAINING

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 lubricating or coating rust-proof oil before leaving.

(2) Weekly Maintenance

- (a) Clean and coat the cross leading screw with oil.
- (b) Check to see if sliding surface and turning parts lack of lubricant. If the lubricant is insufficient 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	43 Angular Gear	1
2 ELT Pulley lock Nut	1	44 Shaft	1
3 Spindle Pulley	1	45 Compression Spring	1
4 Belt Bottom Cover	1	46 Vibration-Proof Pole	1
5 Dust Cover	1	47 Motor Mount	1
6 Spindle Taper Sleeve	1	48 Motor	1
7 Ball Bearing(#6009 ZZ)	2	49 Punch Key	1
8 Bearing Spacer	1	50 Belt Cover	1
9 C-Retainer Ring	1	51 Motor Pulley	1
10 C-Retainer Ring	1	52 V-Belt(B813)	1
11 Head Body	1	53 Ball Bearing(62042)	2
12 Feed Base	1	54 Inter Pulley	1
13 Rubber Flange	2	55 V-Belt(B1016-1041)	1
14 Lock Nuts	2	56 Inter Pulley Shaft	1
15 Taper Roller Bearing(302061)	1	57 Speed Change Inter Pulley Base	1
16 Rack Sleeve	1	58 Clip Plate	1
17 Spindle Shaft	1	59 Rubber Collar	1
18 Taper Roller Bearing(E302071)	1	60 Screw With Plumb Knob	1
19 Bearing Cap	1	61 Cutter	1
20 Cutter Arbor	1	62 Set Distance Nut	
21 Chuck Arbor	1	63 Set Position Block	1
22 Grip	4	64 Lock Nut	1
23 Retainer Ring	1	65 Support Base	1
24 Handle Rod	1	66 Handle	1
25 Fixed Tight Collar	1	67 Front Cover Plate	1
26 Fixed Tight Collar(Thread)	1	68 Push Switch Protection Piece	1
27 Screw Key	1	69 UP-Down with stand	1
28 Lift Knob	1	70 Limit Plate	4
29 handle Rod	3	71 Spring Cover	1
30 Knob	3	72 Spring	1
31 Micro Adjusting indicator	1	73 Spring Base	1
32 Worm Cover	1	74 Pinion Shaft	1
33 Ball Bearing(6202Z)		75 Worm Gear	1
34 Worm Shaft	1	76 Feed Box	1
35 Lock Handle	1	77 Terminal	2
36 Leaf Screw	1	78 Spring Base	1
37 Head Body Fix Bolt	2	79 Buffer Spring	1
38 Graduated Rod	1	80 Hexagon Head Bolt	5
39 Graduated Dial	1	81 Washer	12
40 Switch	1	82 Cross-Recess Round Head Screw	4
41 Name Plate	1	83 Hexagon Head Bolt	1
42 Worm Shaft	1	84 Hexagon Nut	1

Parts List(continued)

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

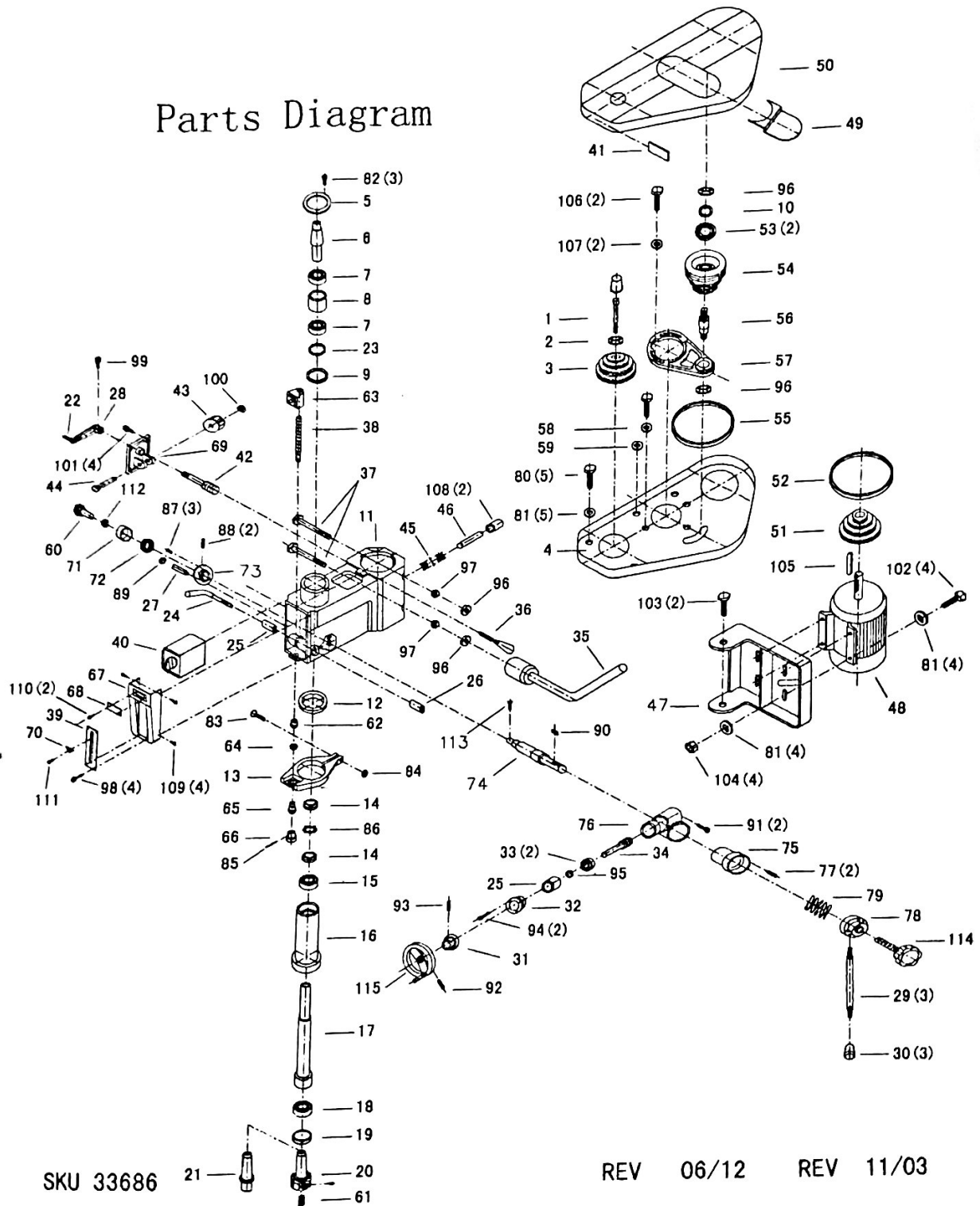
144 Hexagon Head Bolt(Same3-131)	4
145 Hexagon Socket Head Screw	10
146 Hexagon(Same3-145)	2
147 Cone Pin	3
148 Indicated Zero With Screw	
149 Oil Ball	5
150 Hexagon Head Bolt	4
151 Spring Washer	4
152 Hexagon Socket Head Screw	2
153 Hexagon Socket Head Screw	1
154 Hexagon Socket Head Screw	2
155 Hexagon Socket Head Screw	2
156 Adjusting plate	2
157 Dial Ring	3
158 Headless Screw	3

SKU 33686

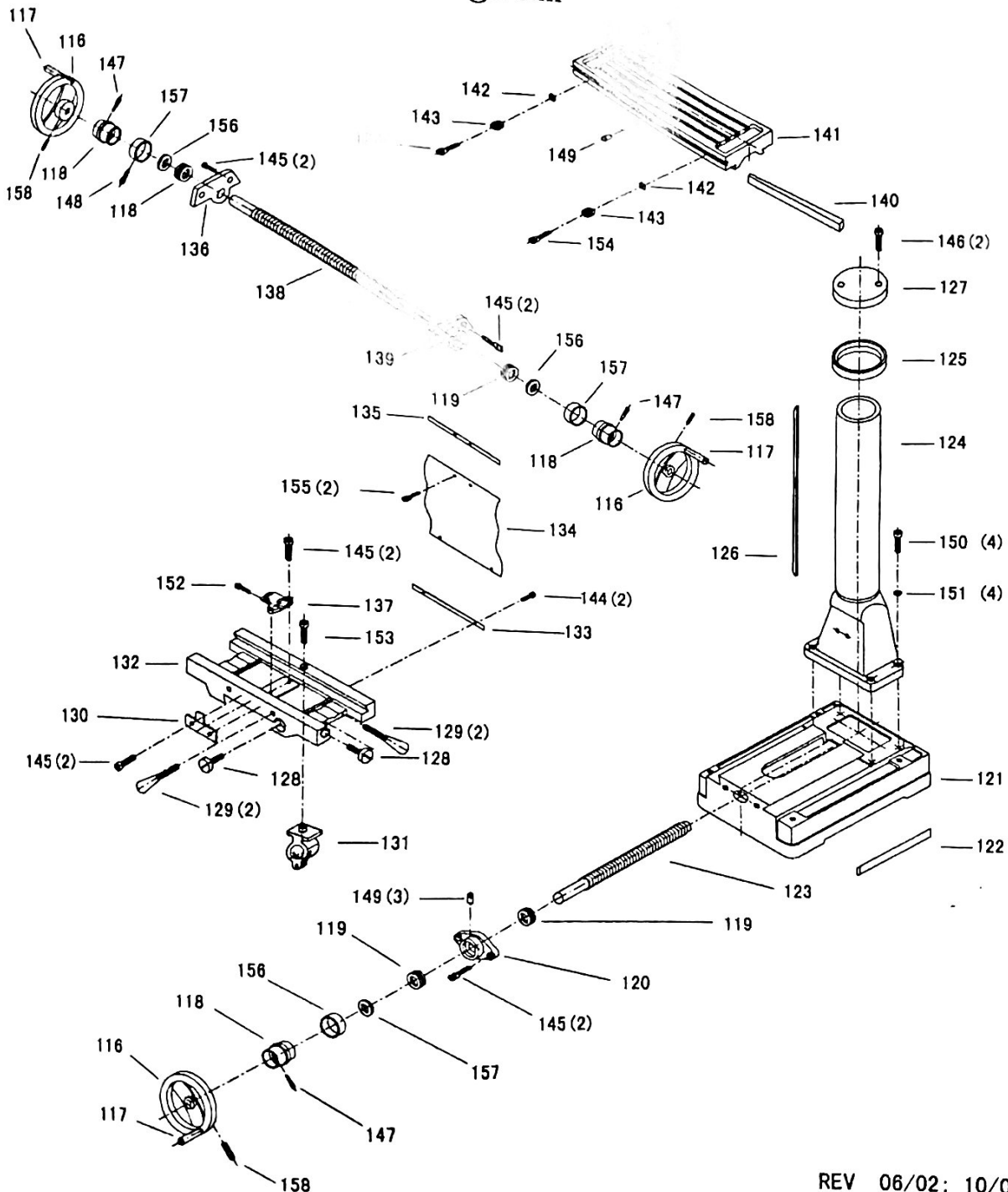
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Parts Diagram



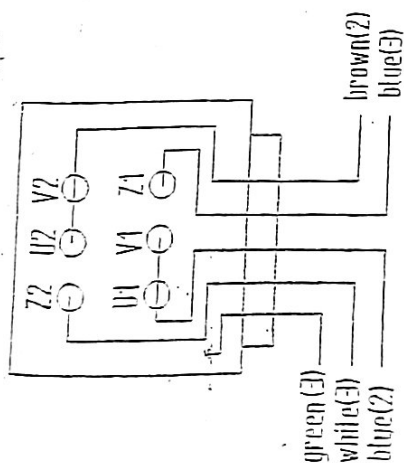
Parts Diagram



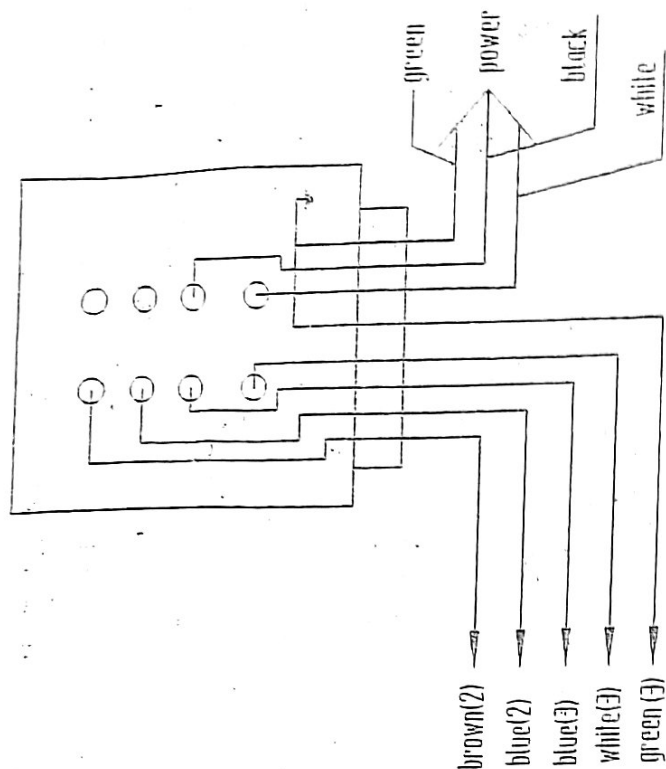
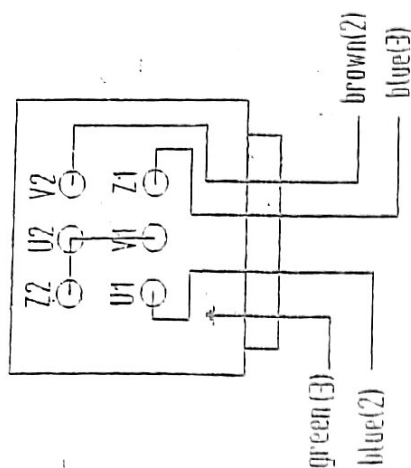
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SKU 33686 For technical questions, please call 1-800-444-3353

110V/60HZ motor



220V/60HZ motor



- 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 220, don't connect with white wire of tri-core wire, it should be insulated.