

VERTICAL MILLING MACHINE

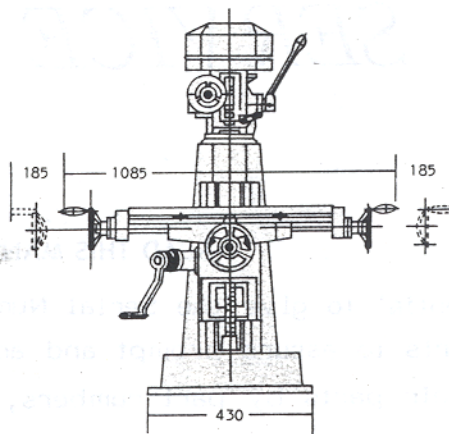
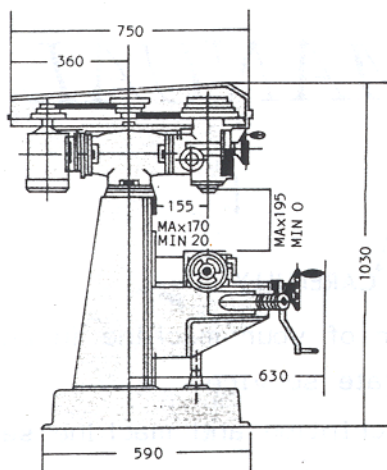
MODEL: 100-5100

SERVICE MANUAL

VERTICAL MILLING MACHINE

Vertical spindle nose taper.....	R-8
Vertical spindle tapel.....	3-1/8" (80mm)
Vertical spindle speed (9 speeds).....	230-2500R.P.M.
Vertical spindle to table surface.....	1/4"(6mm)-7 3/4"(195mm)
Working table surface.....	6"(152mm)×26"(600mm)
T-slots size (Number).....	1/2" (3)
Maximum longitudinal travel.....	14 1/2"(370mm)
Maximum cross travel.....	6"(150mm)
Vertical travel.....	7 3/4"(195mm)
Lead screw.....	1" × 8TPI
Vertical head tilting angle (R & L).....	90°
Ram swivelling angle.....	360°
Motor.....	1HP, 1PH
Net weight (approx).....	245kgs
Ship weight (approx).....	345kgs
Packing	40 1/2" × 45" × 50" (two set) 60 1/2" × 38 1/2" × 50" (one set)

REFERENCE DIMENSIONS:



FEATURES

1. **Model** is a compact vertical milling machine. It is easy to set up. The controls are designed for operator convenience with dual table hand wheels.
2. It is very practical for technical schools, small parts production, toolrooms, R&D work, maintenance shops and even hobby use.
3. The machine is ideally suited for many operations, including: conventional milling, compound angle milling, engraving, drilling and jig boring.
4. All "ways" are hand scraped for perfect bearing and alignment. The table is ground for perfect squareness.
5. Castings are high strength material. They are aged for several months, before normalizing and tempering, to minimize deformation.
6. Anti friction bearings are procured from famous manufacturers such as **SKF**, **FAC**, **NSK**, etc... completely interchangeable world wide.

1. Remove protective crating and skids carefully, in the event of damage in transit, contact our representative and the transportation company making delivery.
2. The machine is carefully inspected and tested in operation by Q.C. personnel before it leaves our factory. If any defects are found on delivery write us directly.
3. Read the catalogue and become familiar with the parts locations on the drawings as it will be easier to understand this operator's manual.

I INSTALLATION:

To set the machine on a solid concrete foundation, it's advisable to apply a little grout to touch up any unevenness in the concrete in order to get a solid foundation at all points.

When setting machine on a floor that has any surface irregularities, shims should be used to correct this condition to the greatest extent possible.

II PRE-LUBRICATION:

Thoroughly clean the machine with gasoline or kerosene, then lubricate all the slide ways with S.A.E. #10 and gears with S.A.E. #30 lubricant. Be sure the machine is lubricated properly before starting.

III LEVELLING MACHINES:

Set machines by levelling the work table lengthwise and crosswise with a precision levelling instrument (refer to the test readings in the attached test records).

IV INSPECTION:

Inspect the machine with the attached original testing records for reference.

V SWITCH BOX:

Switch box is located on the left side of the column, on-off only.

VI ADJUSTMENT OF TABLE FEED TRAVEL:

Table longitudinal and cross feed can be set for any travel distance by adjusting stop set screws that are located in front of table and at the right side of knee.

VII ADJUSTMENT OF TABLE GIB:

The table is provided with a full length tapered gib in the saddle with an adjusting screw on each end. To take up gib tighten the two screws until a slight drag is felt when moving the table by hand. If the table is not tight enough, loosen the adjusting screw on small end, and tighten up adjusting screw on big end. If feel is too tight, reverse the adjusting procedures.

VIII ADJUSTMENT OF SADDLE AND KNEE GIBS:

To tighten gibs the same method as described above is used.

IX CLAMPING TABLE, SADDLE AND KNEE:

When milling with longitudinal table feed only, it is advisable to clamp the knee with the column and the saddle with the knee

to add rigidity to these members and provide for heavier cuts with a minimum of vibration. The saddle locking lever is located on the left side of saddle to the operator, apply clamping pressure properly, as this will hold saddle sufficiently rigid.

The table clamping levers are located in front of saddle and should always be clamped when longitudinal movement is not required.

The knee clamping lever is at the left side of knee, leave clamped at all times unless the knee is in operation.

X REMOVING TABLE:

Remove the table as follows : hand wheel, dial holder, bearing bracket, turn the lead screw all the way, so that it can be removed. Complete all the steps then the table can be disassembled easily.

XI REMOVING SADDLE:

Remove as follows : hand wheel, dial holder, bearing bracket, turn the leadscrew all the way, loosen set screw on the middle of saddle, take off the lead screw nut, and draw saddle gib out. The saddle can then be removed.

XII MOUNTING MOTOR AND SHIFTING BELTS FOR SPEEDS:

Motor is mounted on a plate hinged to the pulley housing. Release the belt set unit by turning the handle at the side of motor, then shift belts to proper speed as desired, then tighten the belt set unit. A speed change chart is attached inside the pulley cover.

XIII QUILL LOCK AND VERTICAL FEED:

The handle at the right lower corner of the head is the quill lock. When vertical feed is not in use, set the handle to lock the quill and make the head more stable.

Open the pulley cover to locate a vertical oil cup in front of pulley. Open the cup and drip oil in a couple times a day. This will lubricate all the vertical spindle system from top to bottom.

The micrometer depth stop is graduated in inches. By utilizing these simple graduations, it is possible to work very accurately to different depths. A lock nut under the micrometer nut assures that the micrometer nut is secured properly.

XVI QUILL CLUTCH OF VERTICAL MILLING HEAD:

The vertical feed is controlled by a hand wheel at the front of the head and a handle at the right hand of the head. When hand wheel is in use tighten the clutch lock nut by hand, or loosen it for handle operation. Use hand wheel for fine feeds, handle for fast feeds.

XV VERTICAL HEAD AND TEE ADAPTER:

Vertical milling head can be tilted 90° on each side by loosening the four locking bolts on tee adapter.


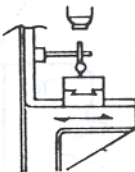
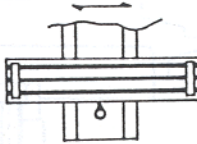
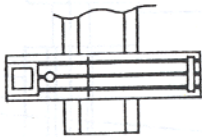
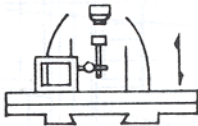
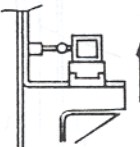
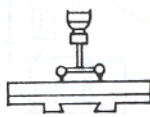
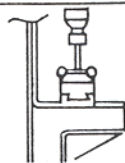
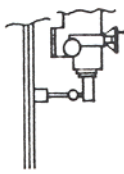
Loosen two set bolts on the adapter, the vertical milling head can then be swivelled 120°; tighten the set bolts after swiveling. The motor and milling head must tilt together for the motor and head are suspended on the same pulley housing.

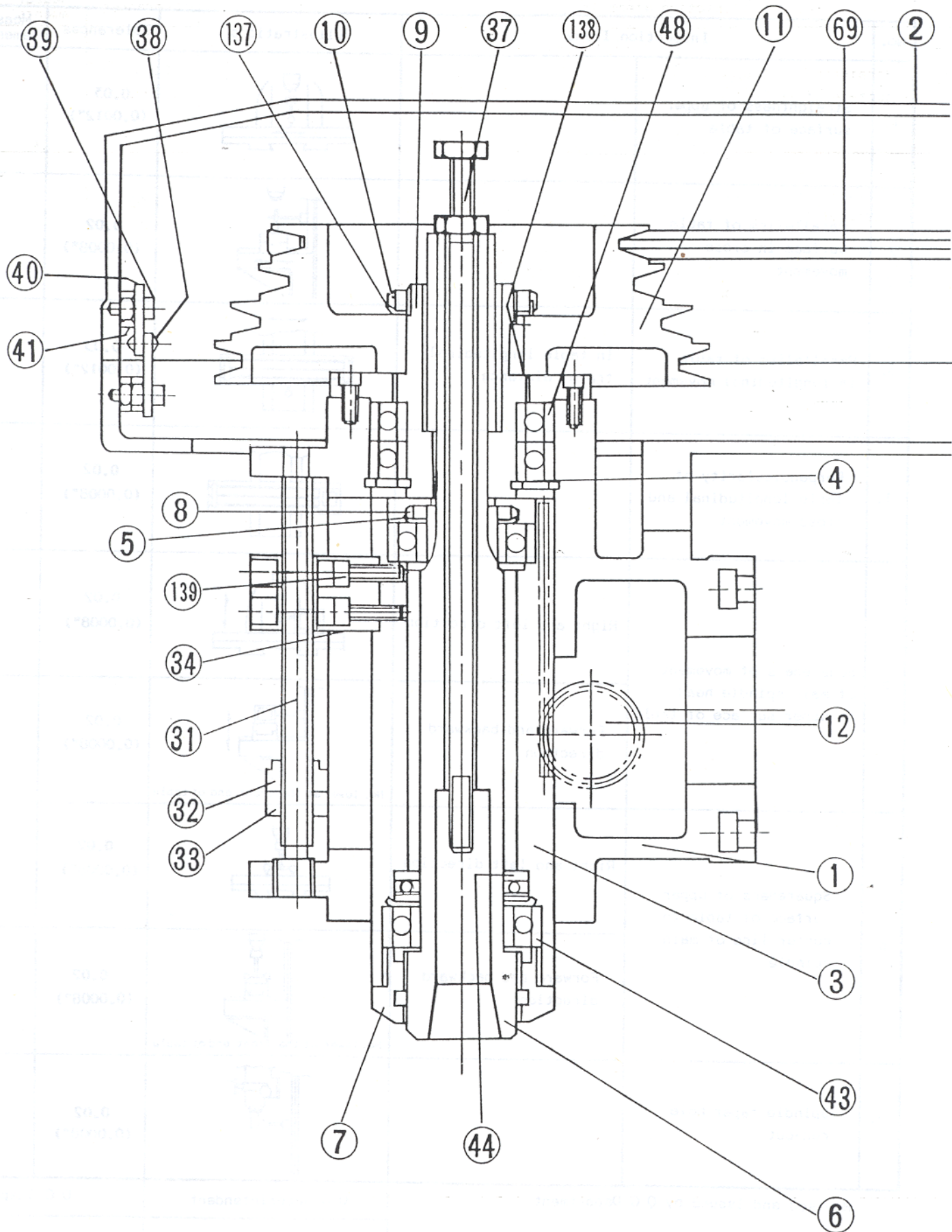
FINAL INSPECTION RECORD

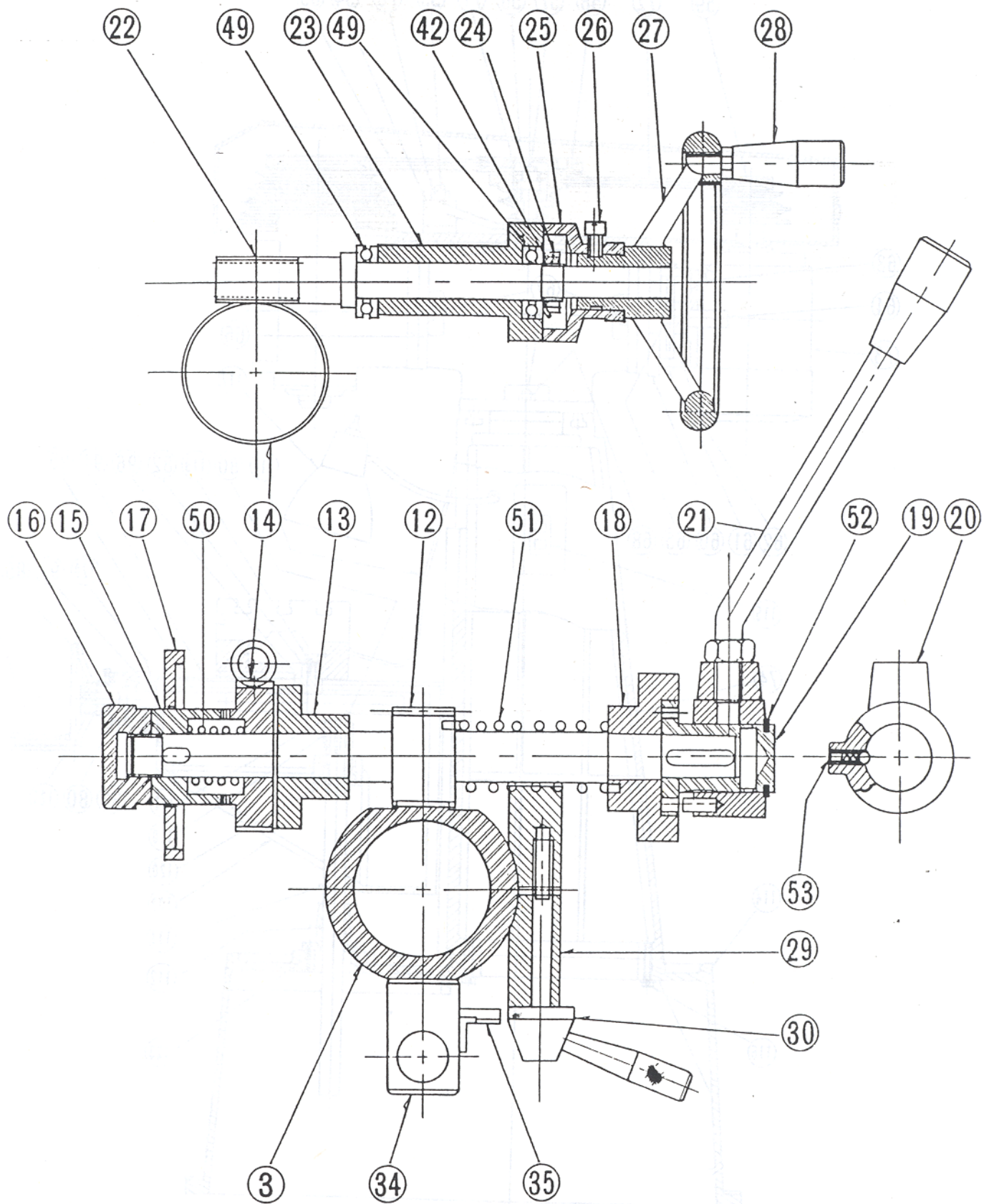
MODEL: _____

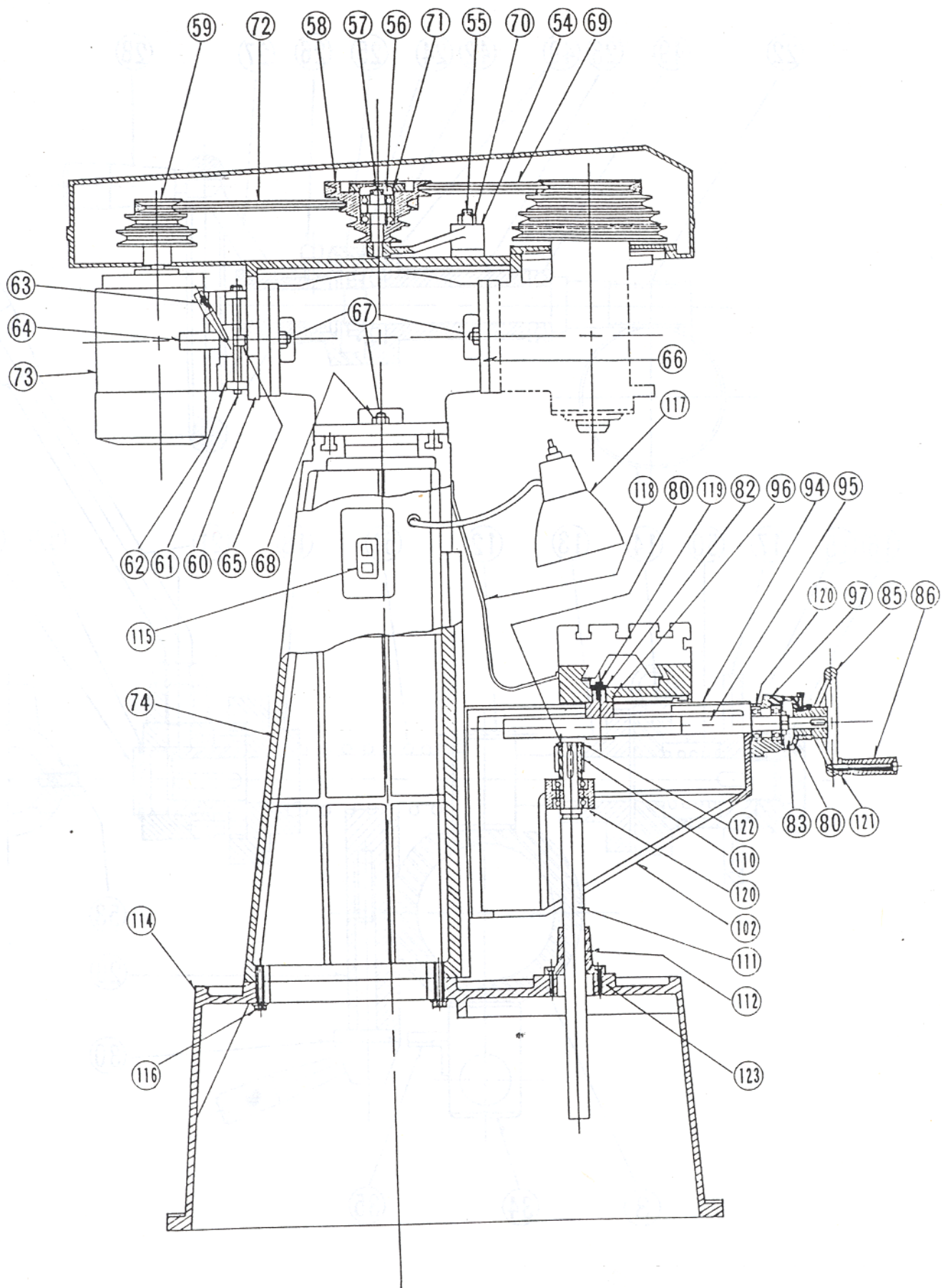
MFG. NO. _____

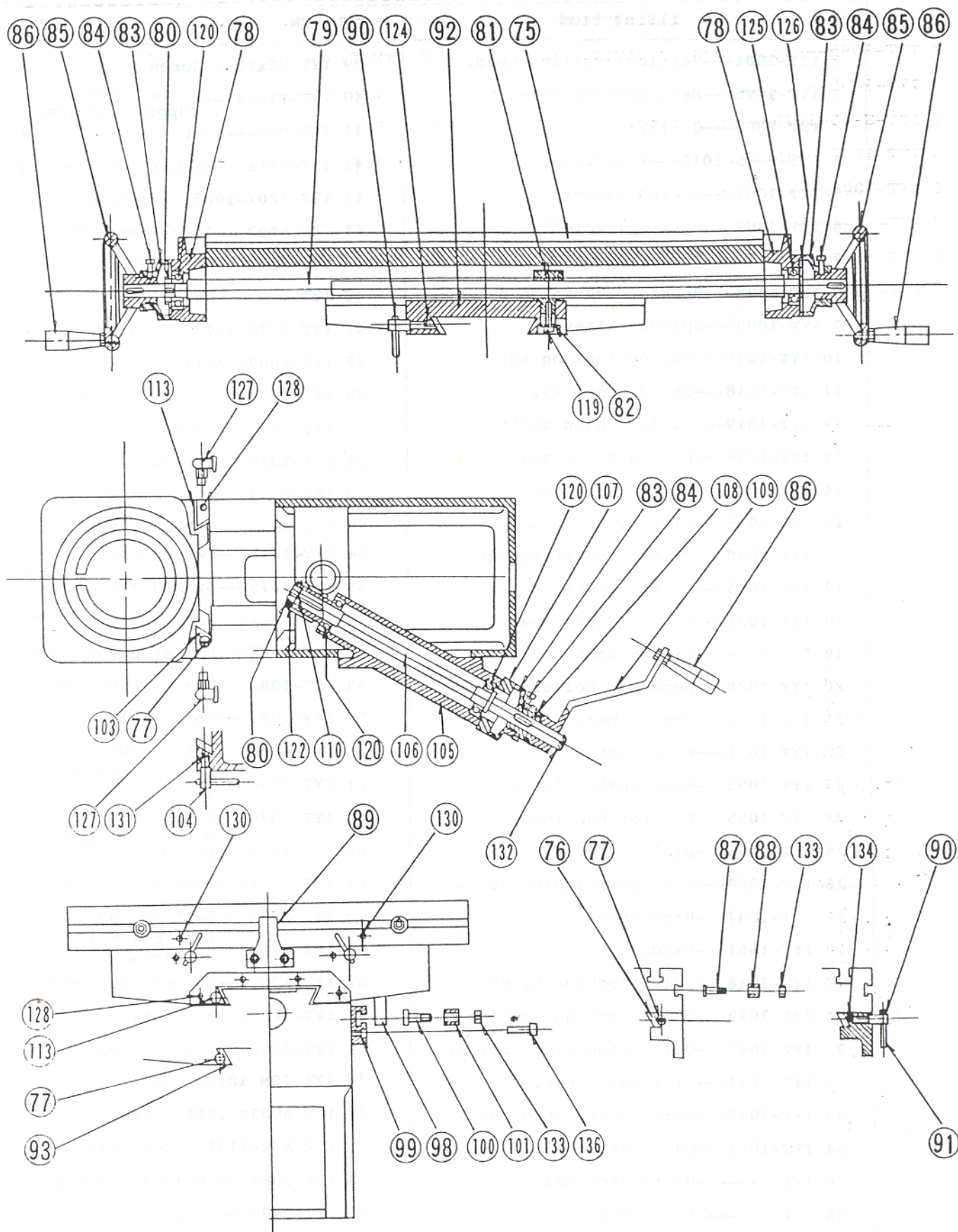
DATE: _____

No.	Inspection Items		Illustrations	Tolerances	Measurements
1.	Straightness of upper surface of table			0.03 (0.0012")	
2.	Parallelism of table surface in cross movement			0.02 (0.0008")	
3.	Parallelism of table in longitudinal movement	In table longitudinal travel distance		0.03 (0.0012")	
4.	Perpendicularity of table longitudinal and cross movement			0.02 (0.0008")	
5.	Squareness of movement of main spindle head to upper surface of table	Right and left direction		0.02 (0.0008")	
		Forward and backward direction	 No. lower at the front end of table	0.02 (0.0008")	
6.	Squareness of upper surface of table to center line of main spindle	Right and left direction		0.02 (0.0008")	
		Forward and backward direction	 No. lower at the front end of table	0.02 (0.0008")	
7.	Spindle taper hole run-out			0.02 (0.0008")	
Revised and issued by Q C Department			Q C Superintendent	Q C Inspector	









PART LIST

S/N P/N	DESCRIPTION	S/N P/N	DESCRIPTION
1 IYT-1001---	Vertical milling head.	39 IYT-M5x10---	Screw.
2 IYT-1095---	Belt housing cover.	40 IYT-T1089---	Rulley cover supporting arm.
3 IYT-1005---	Quill.	41 IYT-M5-----	Nut.
4 IYT-S-45-1010---	Snap ring.	42 IYT-1016---	Washer for bearing.
5 IYT-1007---	Spring washer.	43 IYT-7207-1003---	Bearing.
6 IYT-1002---	Vertical spindle.	44 IYT-6007ZZ-1003---	Bearing.
7 IYT-----	Cover.	45 IYT-6206Z-1006---	Bearing.
8 IYT-1008---	Bearing adjusting nut.	46 IYT-----	Snap ring.
9 IYT-1009---	Spindle sleeve.	47 IYT-R-75-1012---	Snap ring.
10 IYT-1016---	Pulley locking nut.	48 IYT-6009Z-1011---	Bearing.
11 IYT-1018---	Spindle pulley.	49 IYT-1052---	Thrust bearing.
12 IYT-1019---	Quill pinion shaft.	50 IYT-1037---	Spring.
13 IYT-1034---	Pinion shaft seat.	51 IYT-1020---	Spring.
14 IYT-1036---	Clutch worm gear.	52 IYT-E-19---	Snap ring.
15 IYT-1039---	Clutch.	53 IYT-M6x15-1038---	Bolt.
16 IYT-1040---	Clutch adjusting nut.	54 IYT-1076---	Swivel arm
17 IYT-1046---	Clutch cover.	55 IYT-1075---	Swivel stud.
18 IYT-1021---	Pinion shaft seat.	56 IYT-----	Pulley shaft cover.
19 IYT-----	Pinion shaft sleeve.	57 IYT-1079---	Pulley pivot stud.
20 IYT-1028---	Hand bar holder seat.	58 IYT-1080---	Vee belt pulley.
21 IYT-1030---	Handle bar.	59 IYT-1084---	Motor pulley.
22 IYT-1051---	Worm shaft.	60 IYT-1067---	Motor mounting.
23 IYT-1053---	Worm shaft sleeve.	61 IYT-1068---	Motor suspending pivot.
24 IYT-1055---	Nut for bearing.	62 IYT-1070---	Motor mounting.
25 IYT-1056---	Dial.	63 IYT-1072---	Motor set unit handle.
26 IYT-1060---	Dial positioning screw.	64 IYT-1071---	Belt set unit.
27 IYT-1057---	Hand wheel.	65 IYT-1071---	Belt set unit.
28 IYT-1061---	Handle.	66 IYT-1064---	Vertical head adapter.
29 IYT-1048---	Quill locking block.	67 IYT-1065---	Adapter set bolt.
30 IYT-1049---	Quill locking bolt.	68 IYT-10M-1066---	Nut.
31 IYT-1042---	Quill stop micro screw.	69 IYT-A35-1102---	Vee belt.
32 IYT-1044---	Micrometer nut.	70 IYT-10M-1078---	Nut.
33 IYT-1045---	Quill micro stop nut.	71 IYT-6003Z-1081---	Bearing.
34 IYT-1041---	Quill stopper.	72 IYT-A32-1101---	Vee belt.
35 IYT-----	Micrometer scale.	73 IYT-1HP4 POLE-1073---	Motor.
36 IYT-----	Felt ring.	74 IYT-2006---	Column.
37 IYT-1014---	Draw bar.	75 IYT-2073---	Table.
38 IYT-c5x15---	Rivet.	76 IYT-2062---	Table gib.

PART LIST

S/N P/N	DESCRIPTION	S/N P/N	DESCRIPTION
77 IYT-2059---	Adjusting screw.	115 IYT-2089---	Switch.
78 IYT-2082---	Longitudinal bearing bracket.	116 IYT- $\frac{1}{2}$ "x2"-2002---	Bolt.
79 IYT-2079---	Longitudinal lead screw.	117 IYT-2097---	Light.
80 IYT-2084---	Nut for bearing.	118 IYT-2069---	Rubber sheet.
81 IYT-2080---	Longitudinal feed nut.	119 IYT-6Mx $\frac{3}{4}$ "-2039---	Bolt.
82 IYT-2081---	Washer.	120 IYT-6004Z-2010---	Bearing.
83 IYT-2087---	Dial.	121 IYT- $\frac{3}{8}$ "---	Nut.
84 IYT-1060---	Dial positioning screw.	122 IYT-2024---	Washer.
85 IYT-2089---	Hand wheel.	123 IYT-6Mx $\frac{3}{4}$ "-2008---	Bolt.
86 IYT-2091---	Handle bar.	124 $\frac{1}{4}$ "DIA-----	Copper block.
87 IYT-2103---	Long, travel adjusting screw.	125 IYT-6004Z-2084---	Bearing.
88 IYT-2104---	Adjusting screw sleeve.	126 IYT-S-18---	Snap ring.
89 IYT-2068---	Table stopper.	127 IYT-2018---	Oil cup.
90 IYT-2060---	Table locking screw.	128 IYT-M5x8-2065---	Bolt.
91 IYT-2060---	Handle bar.	129 M5x10---	Bolt.
92 IYT-2066---	Saddle.	130 STD-----	Grease nipple.
93 IYT-2058---	Saddle gib.	131 $\frac{3}{8}$ "DIA-----	Copper block.
94 IYT-----	Chip guard.	132 S-18-----	Snap ring.
95 IYT-2401---	Cross lead screw.	133 10M-----	Bolt.
96 IYT-2037---	Cross feed nut.	134 STD-----	Copper block.
97 IYT-2042---	Cross feed bearing bracket.	135 6Mx25-----	Nut.
98 IYT-2068---	Stop block.	136 8Mx25-----	Bolt.
99 IYT-2102---	Stop block fixture.	137 AW09	Washer
100 IYT-2103---	Cross travel adjusting screw.	138 7x7x20	Key
101 IYT-2104---	Adjusting screw sleeve.	139 M5x14	Bolt
102 IYT-2105---	Knee.		
103 IYT-2016---	Knee gib.		
104 IYT-2017---	Knee locking screw.		
105 IYT-2019---	Gear shaft sleeve.		
106 IYT-2020---	Gear shaft.		
108 IYT-2029---	Elevating handle clutch.		
109 IYT-2030---	Handle arm.		
110 IYT-2022---	Elevating gear.		
111 IYT-2009---	Elevating lead screw.		
112 IYT-2007---	Elevating lead screw set nut.		
113 IYT-2059---	Chip guard.		
114 IYT-2001---	Base.		

CAUTION:

Find the serial number from the drawing, then use it to obtain the part number from this list.