

GEARED-HEAD LATHE

Operation Instruction

Max. SWING OVER BED 13" (330mm)

Max. DISTANCE BETWEEN CENTERS 40" (1016mm)

CAUTION

1. WHEN UNPACKING, LATHE ACCESSORIES SHOULD CORRESPOND TO THE ITEM OF PACKING LIST. IF NOT, PLEASE MAKE CONTACT WITH YOUR DEALER.
2. NEVER USING THE MACHINE WITHOUT FIRST READING THE OPERATING INSTRUCTION AND UNDERSTANDING IT'S REQUIREMENTS OF INSTALLING, OPERATING AND ADJUSTING ETC.
3. IF THE MACHINE OPERATING IS NOT ABLE TO BE SATISFIED IN USUAL OPERATING, MAINTENANCE AND WITHIN THE FIXED TIME, PLEASE MAKE CONTACT WITH YOUR DEALER.

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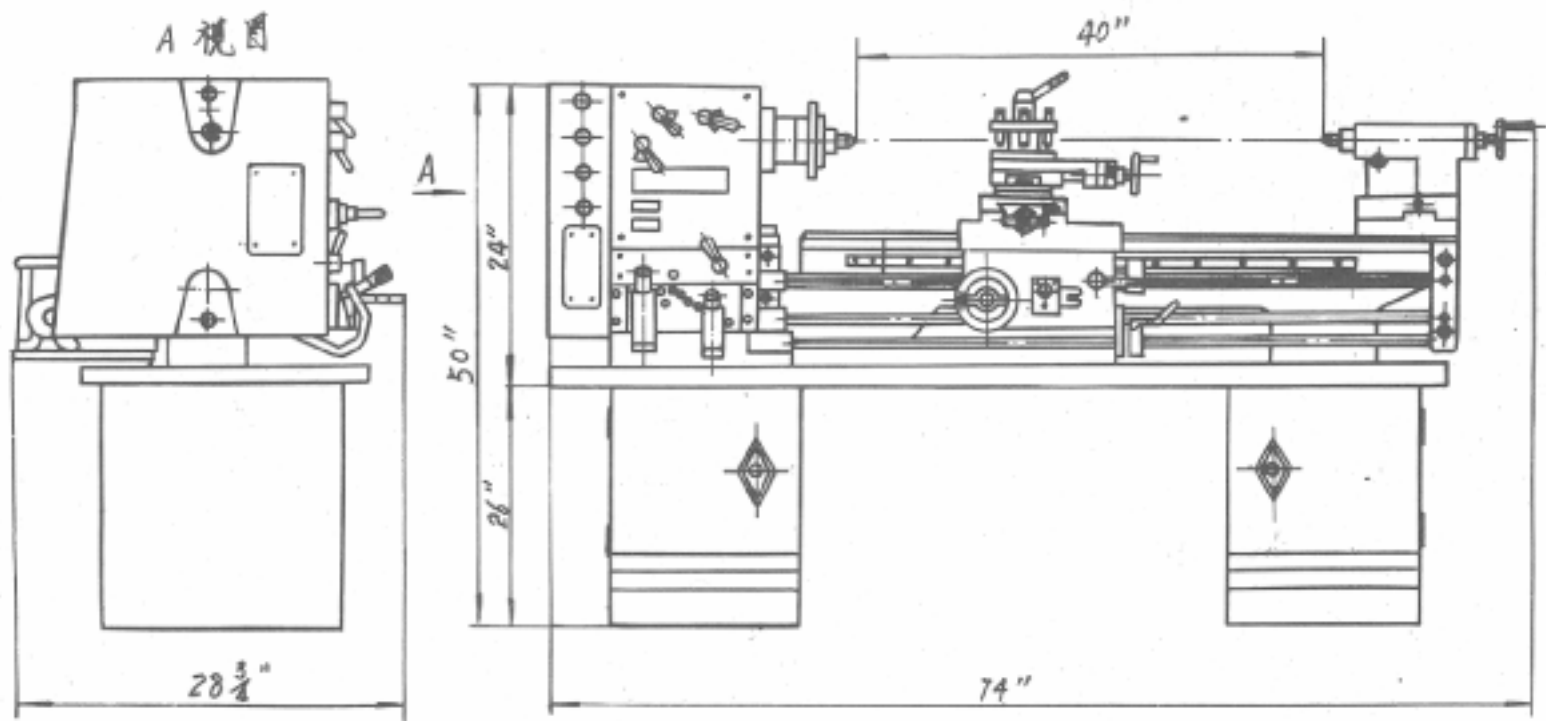


Fig. 1 Outside Diagram

APPLICATION

The machine is a small-scale universal engine lathe. It can perform various turning operation, as well as boring, drilling, grooving and other operations. It can also be used for turning metric threads and inch threads.

The machine is characterized by simple construction, easy operation, large hole in spindle and small floor space. It is used in the instrument industry and repairing workshops and is suitable for metal manufacture in single piece, small and medium batch production.

MAIN TECHNICAL SPECIFICATION

1. Main Specification

Max. swing dia. of workpiece over bed.....	13" (330mm)
Max. swing dia. of workpiece over saddle gap	18" (450mm)
Max. swing over cross slide.....	8" (200mm)
Max. length of workpiece	40" (1016mm)

2. Headstock

(dia. of) spindle bore.....	1- $\frac{1}{2}$ " (38mm)
-----------------------------	---------------------------

Taper of spindle bore.....M. T. No. 5

Range of spindle speeds (9 or 18 changes).....50-1500r. p. m.

3. Change Gears And Gear Box

Threads which can be cut Metric: 29 kinds, 0.2-4.5mm

Inch: 40 kinds, 4-11 $\frac{1}{2}$ T. P. I.

Saddle feed range per spindle revolution:

40 kinds, 0.028-0.791mm/rev.

Cross feed range per spindle revolution:

40 kinds, 0.010-0.268mm/rev.

Threads per inch lead screw

8T. P. I.

Threads per inch cross screw

8T. P. I.

Cross feed per division on its dial

0.001" (0.025mm)

Threads per inch tool post screw

8T. P. I.

Tool Post feed per division on its dial

0.001" (0.03mm)

4. Tool Post And Saddle

Max. turn angle of tool post

$\pm 90^\circ$

Tool slide travel

3" (76mm)

Cross slide travel	$5\frac{1}{8}$ "(130mm)
Saddle travel	36"(914mm)
5. Tailstock	
Dia. of tailstock quill	$1\frac{1}{4}$ "(32mm)
Taper of tailstock quill bore	M. T. No. 3
Max. travel of tailstock quill	4"(100mm)
6. Motor	
Motor frequency	60 Hz or 50 Hz
Motor horse power	1.5 HP(1.1KW)
Motor rotational speed	1720 R. P. M. or 1420R. P. M.
Motor voltage	220V/380V 3 phase or 110V/220V 1 phase
7. Lathe size and weight	
Overall dimensions(L×W×H)	
	$74" \times 28\frac{3}{4}" \times 24"$ (1880×730×610mm)
	[With Stands: $74" \times 28\frac{3}{4}" \times 50"$ (1880×730×1270mm)]
N · W/G · W	460/560 kg 1014/1235 lb.
[N · W/G · W	540/640 kg] 1190/1411 lb.

HOISTING AND INSTALLATION

1. After unpacking, count the lathe accessories according to packing list.
2. Remove the paper which covered the unpainted surfaces and using a nonvolatile solvent and brush, thoroughly clean grease which covered surfaces.
3. Sling the machine as shown in the hoisting chart Fig.2 when it is transporting.
4. The fixed dimension of this machine are shown in the Fig. 3. The machine should be firmly attached to the floor by lathe stands. If you purchases a bench lathe, place the chip tray on top of the bench; mark off the location of the bed mounting holes using a pencil. Then drill the six bolt holes.
5. To maintain accuracy, it is important to keep the bed way leveled. Please use the following procedure: Move the carriage to the headstock end of the bed-way. Place the level in a 90 degree position on top of the cross slide. Loosen the mounting bolts and jack up the base stand(or bed)with adjusting washer to center the bubble in the level. Retighten the mounting bolts. Move the carriage to tailstock end of the bed way and repeat that procedure. After doing that please recheck the headstock end and continue the procedure until both ends of the

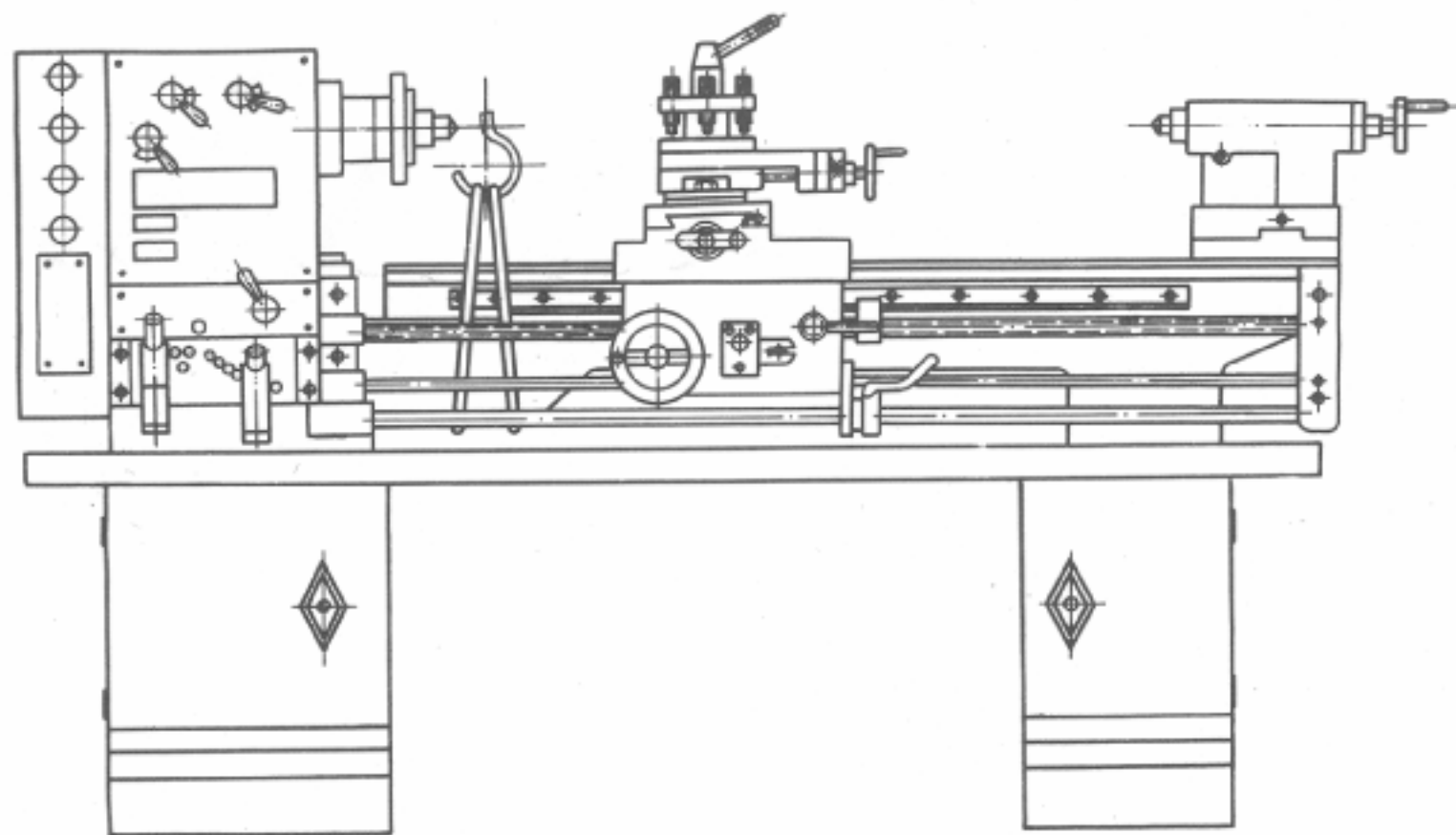
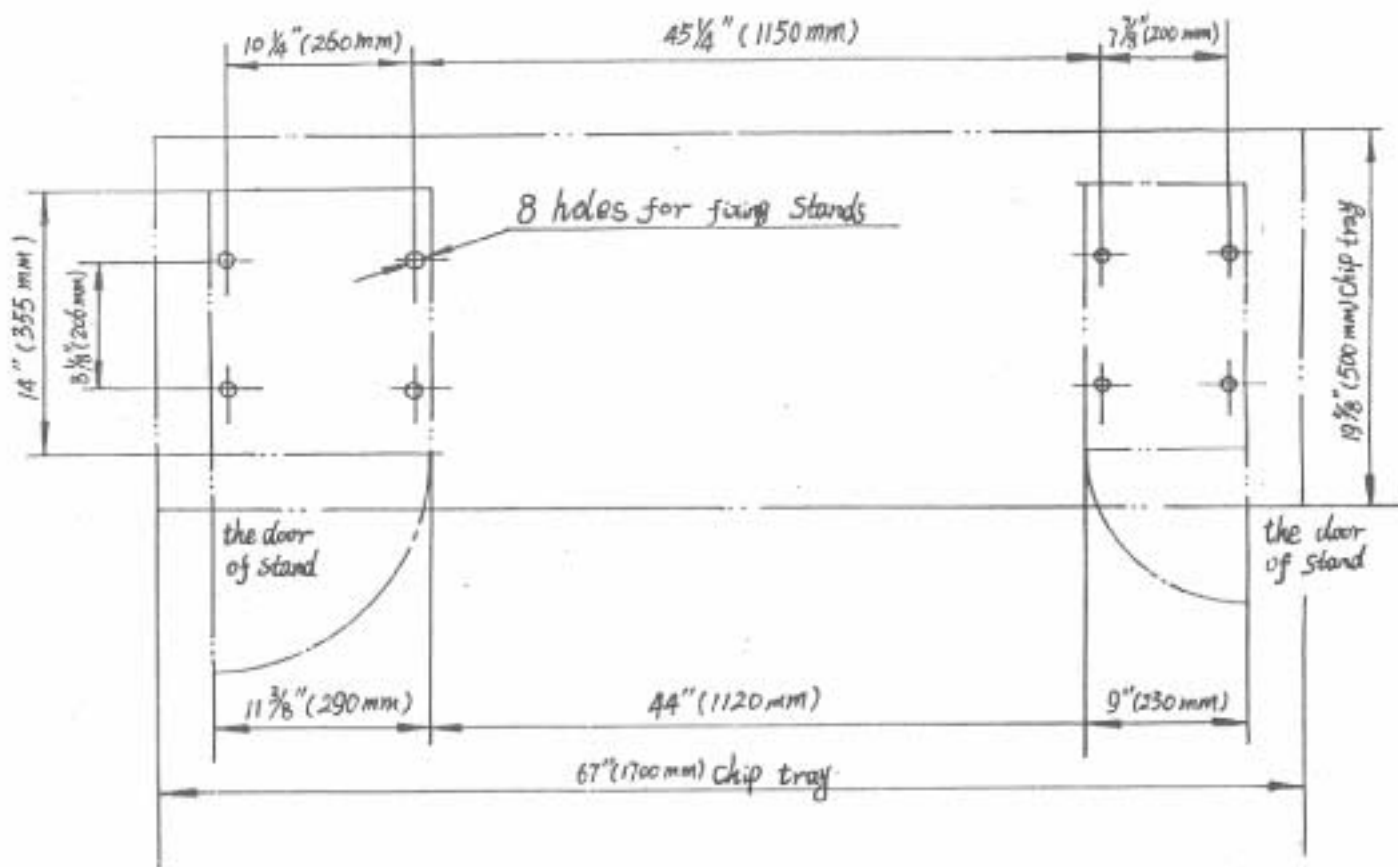


Fig. 2 Hoisting Chart



bedway are level (the longitudinal tolerance is 0.02/1000 and the cross one is 0.04/1000).

6. During transport and unpacking, it is likely that debris will be present on top of the lathe. Do not move the carriage or tailstock until the bed way has been thoroughly cleaned.

LATHE DRIVING SYSTEM AND THE LIST OF MAIN GEARS, SCREWS, NUTS

Machine driving system, see Fig. 4

The list of main gears, screws and nuts in the machine driving system

parts	part No.	description	No. of gear teeth or screw thread	modulus or pitch	pressure angle	material	notes
head-stock	1	gear	42	m2	20 deg	45	
	2	gear	23	m2	20 deg	45	
	3	gear	51(47)	m2	20 deg	45	47 teeth gear is used to change speed lathe
	4	gear	36	m2	20 deg	45	
	5	gear	55	m2	20 deg	45	
	6	gear	27(31)	m2	20 deg	45	"
	7	gear	50(45)	m2	20 deg	45	"
	8	gear	65(58)	m2	20 deg	45	
	9	gear	21	m2	20 deg	45	
	10	gear	45	m2	20 deg	45	"
	11	gear	54(59)	m2	20 deg	45	"
	12	gear	39(46)	m2	20 deg	45	
	13	gear	83	m2	20 deg	45	
	14	paired gear	45	m2	20 deg	45	
			40	m2	20 deg	45	
15	paired gear	40	m2	20 deg	45		
		45	m2	20 deg	45		

parts	part No.	description	No. of teeth or thread	modulus or pitch	pressure angle	material	notes
gear-box	16	paired gear	32	m1.75	20 deg	45	
			16	m1.75	20 deg	45	
	17	paired gear	32	m1.75	20 deg	45	
			16	m1.75	20 deg	45	
	18	gear	16	m1.75	20 deg	45	
	19	gear	32	m1.75	20 deg	45	
	20	gear	16	m1.75	20 deg	45	
	21	gear	16	m1.75	20 deg	45	
	22	gear	18	m1.75	20 deg	45	
	23	gear	19	m1.75	20 deg	45	
	24	gear	20	m1.75	20 deg	45	
	25	gear	22	m1.75	20 deg	45	
	26	gear	24	m1.75	20 deg	45	
	27	gear	26	m1.75	20 deg	45	
	28	gear	28	m1.75	20 deg	45	
	29	gear	24	m1.75	20 deg	45	
	30	gear	24	m1.75	20 deg	45	
	31	gear	15	m1.75	20 deg	45	
	32	gear	16	m1.75	20 deg	45	
	33	gear	32	m1.75	20 deg	45	
34	gear	24	m1.75	20 deg	45		
apron	35	gear	11	m2	20 deg	45	
	36	rack		m2	20 deg	45	
	37	lead screw	single thread	8 teeth per inch		45	
	38	half nuts	single thread	8 teeth per inch		ZQSn 6-6-3	

parts	part No.	description	No. of teeth or thread	modulus or pitch	pressure angle	material	notes
apron	39	worm	single thread	m2	20 deg	45	
	40	worm gear	24	m2	20 deg	ZQSn 6-6-3	
	41	gear	12	m2	20 deg	45	
	42	gear	50	m2	20 deg	45	
	43	pinoin	25	m2	20 deg	45	
	44	nut	single thread	8 teeth per inch		ZQSn 6-6-3	lefthand thread
	45	screw	single thread	8 teeth per inch		45	lefthand thread
	46	gear	14	m2	20 deg	45	
	47	gear	51	m2	20 deg	45	
	48	gear	13	m2	20 deg	45	
	49	gear	25	m2	20 deg	45	
	50	gear	48	m2	20 deg	45	
	51	screw	single thread	8 teeth per inch		45	
	52	screw nut	single thread	8 teeth per inch		ZQSn 6-6-3	
tail-stock	53	screw	single thread	10 teeth per inch		45	lefthand thread
	54	nut	single thread	10 teeth per inch		ZQSn 6-6-3	lefthand thread
change gear		gear	40	m1.5	20 deg	45	
		gear	25	m1.5	20 deg	45	
		gear	26	m1.5	20 deg	45	
		gear	43	m1.5	20 deg	45	
		gear	46	m1.5	20 deg	45	
		gear	47	m1.5	20 deg	45	
		gear	60	m1.5	20 deg	45	
		gear	80	m1.5	20 deg	HT200	

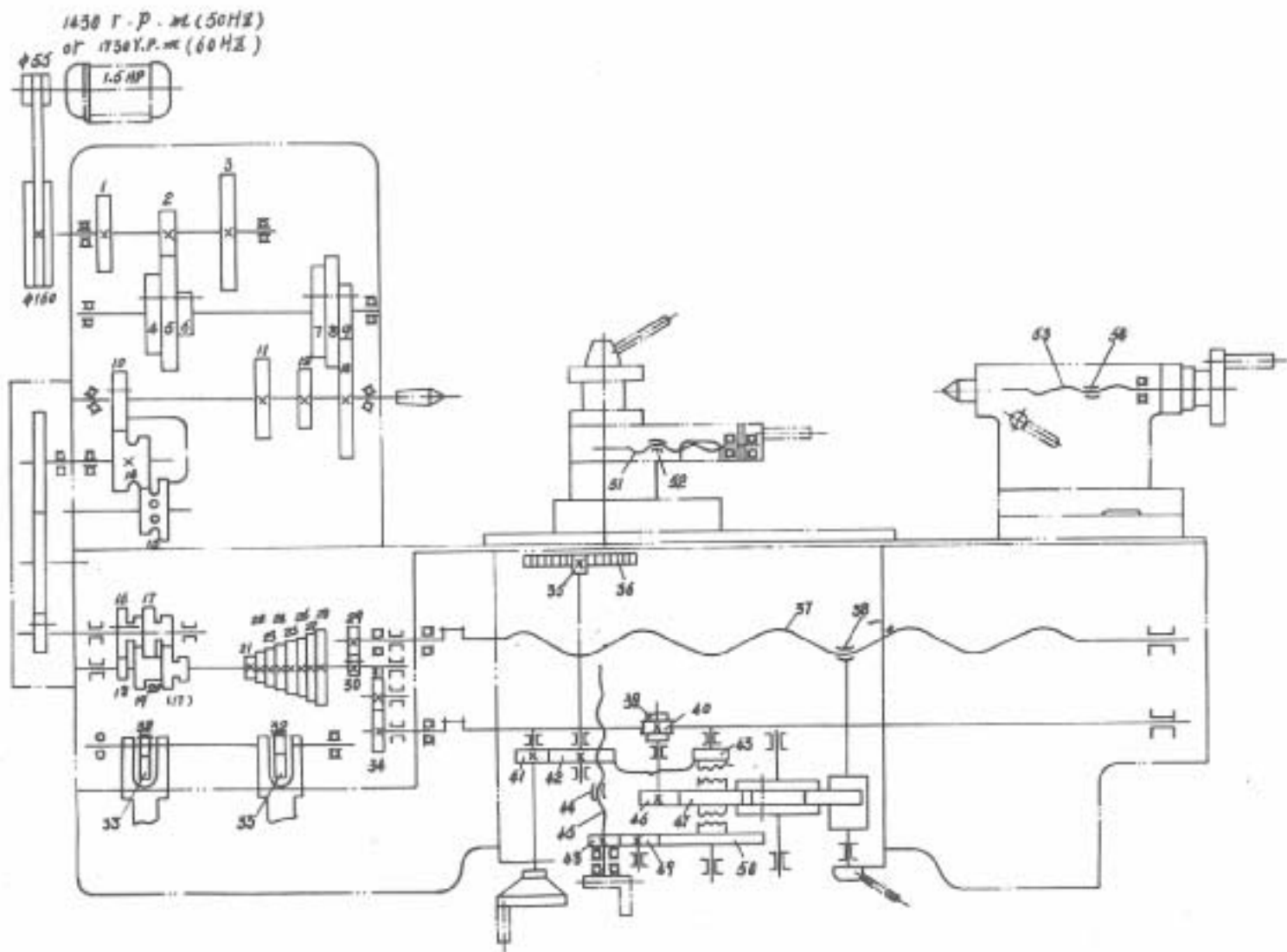


Fig. 4 Driving System

BEARING LIST(See Fig 5)

Type	Name	Specification	Q'TY	Installation
60104	single row ball bearing with shield	20 × 42 × 12	2	headstock
60304	"	20 × 52 × 15	1	
104	single row ball bearing	20 × 42 × 12	3	
204	"	20 × 47 × 14	1	
D7211	single row taper roller bearing	55 × 100 × 23	1	
D7212	"	60 × 110 × 24	1	
7000102	single row ball bearing	15 × 32 × 8	2	gear box
8103	single row ball thrust bearing	17 × 30 × 9	3	
8101	"	12 × 26 × 9	2	carriage
8102	"	15 × 28 × 9	2	
8101	"	12 × 26 × 9	1	tailstock
80202	single row ball bearing with two end shield	15 × 35 × 11	1	change gear

LUBRICATION

- All moving parts and sliding surfaces should be regularly lubricated with clean lubricating oil. Please refer to Fig. 6 for the lubrication holes.
- No.1, the cover of headstock, is for headstock lubrication point. Open the cover and fill oil until it reaches the oil-level sight gauge. Running for the first two weeks, or usually for three months, exchange the oil. While exchanging the oil, loosen the oil screw and flow all-out the oil. Then wash the headstock with kerosene etc. and pour clean oil into headstock.
- No.2 through 11 are lubrication points (see Fig. 6). They are oiled with oil gun twice a day.
- No.2 is the lubrication point for gear box. No.3 for change gear. No.4 for apron. No.5 (two slanting holes) for gear box. No.6(two points) for carriage sliding. No.7 for handwheel. No.8 (two points) for collar of bracket. No.9 for tailstock. No.10 for tool post slide. No.11 for saddle screw.
- The other sliding surfaces contain dovetail slot, half nut, worm gear, lead screw, feed rod, handle rod, quill of tailstock etc. They should be oiled before operating and after doing.
- Oil recommendations: a. For headstock and feedbox; Mobil D.T.E. light. b. For all other applications; Mobil Vactra No.2.

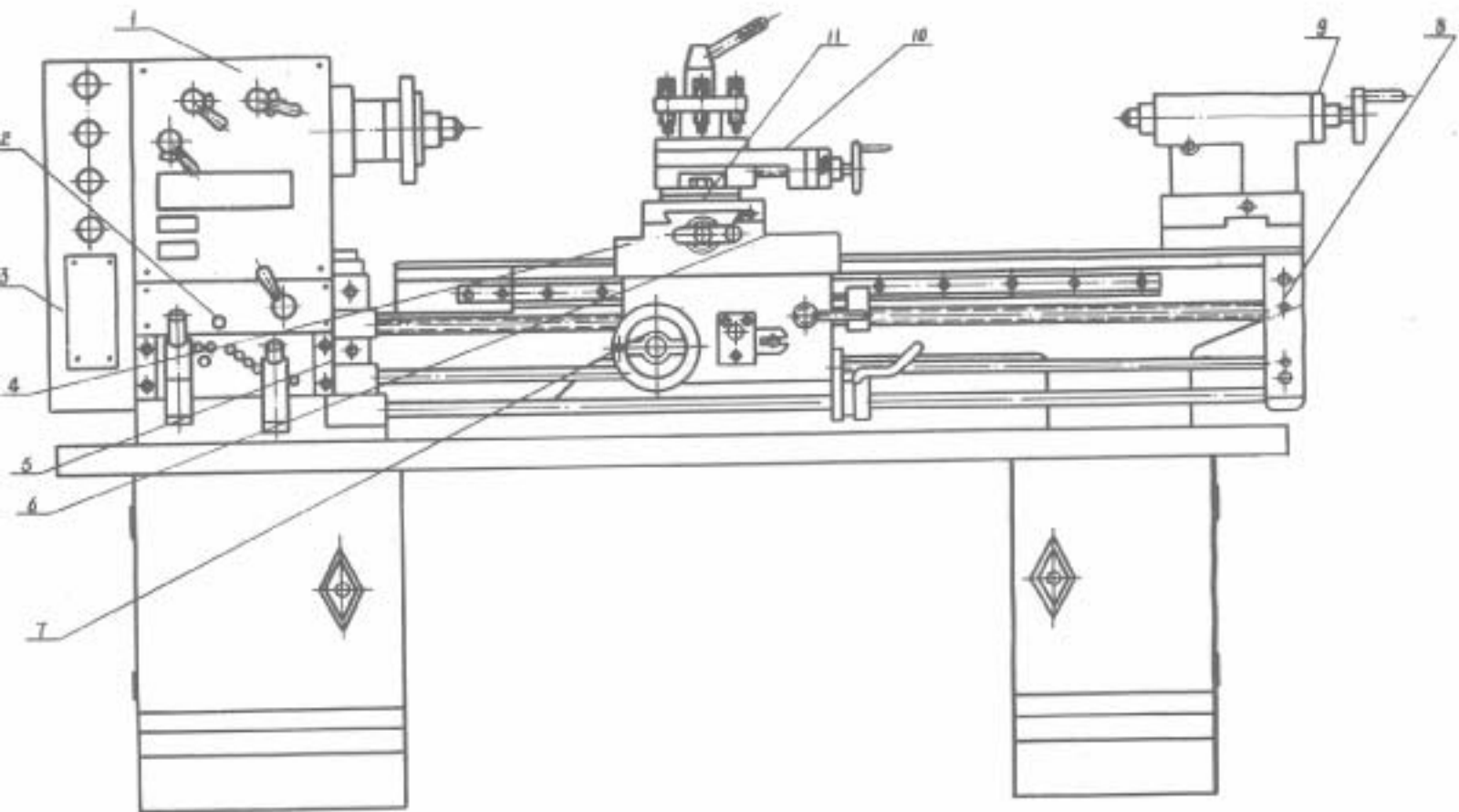


Fig. 6 Lubrication Chart

ELECTRICAL DOCUMENT CATALOGUE

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ELECTRICAL SYSTEM EXPLANATION

- The standard lathe are wired for 220v/380v 3 phase 60 & 50 Cycle [See Fig. 7] or for 110v/220v 1 phase 60 & 50 cycle (See Fig.10) according to order. For connection to motor (1 phase, 110v/220v), please see Fig.14 transferring connection diagram.

For electrical connections, merely connect your supply lines to the leads provided on the lathe. Before connecting, make sure the motor specification and the machine wiring correspond with power supply and connect 15/30A fuse into power line.

- Electrical control box is located behind the headstock.
- Put the cs handle in the middle position and push the "power start" to close the electrical circuit. The cs switch is wired for counter-clockwise spindle rotation in the forward position and clockwise spindle rotation in the reverse position. If not, turn off the power and interchange the leads according to the motor wiring diagram.
- Putting cs-handle in the middle position can stop the machine. Pushing the knob "reset" will open the circuit.
- The machine must be connected to ground or ground wire.

	Reverse run	Forward run		Signal	Emergency stop start	Forward run	Reverse run
1	2	3	4	5	6	7	8

- Suggestion
- 1) Frequency: 50Hz
Phase: 3
Power Volt: 380V
Controlling Volt: 24V
Power: 1.5HP
Wire: 1.5 mm²
 - 2) Frequency: 60 Hz
Phase: 3
Power Volt: 220V
Controlling Volt: 29V
Power: 1.5HP
Wire: 1.5 mm²

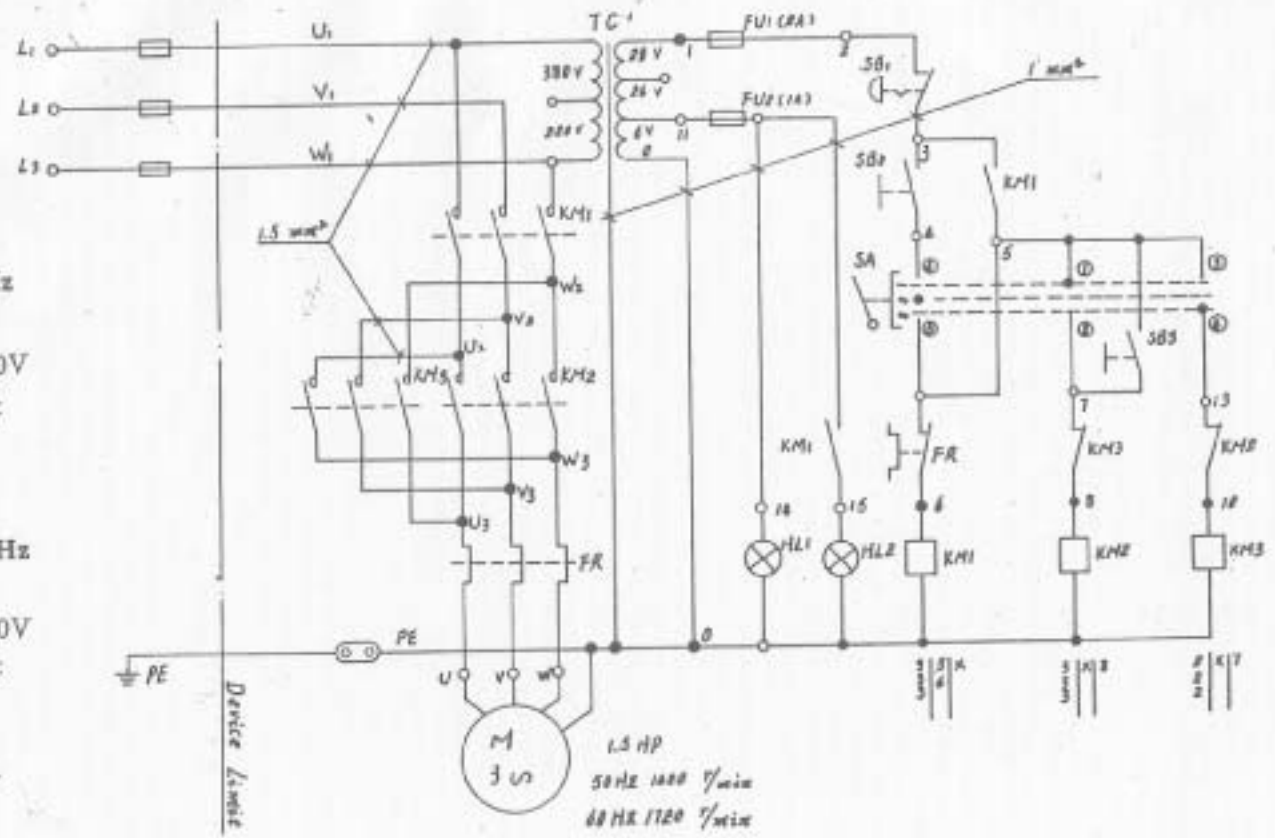


Fig. 7 Wiring Diagram For 3 Phase

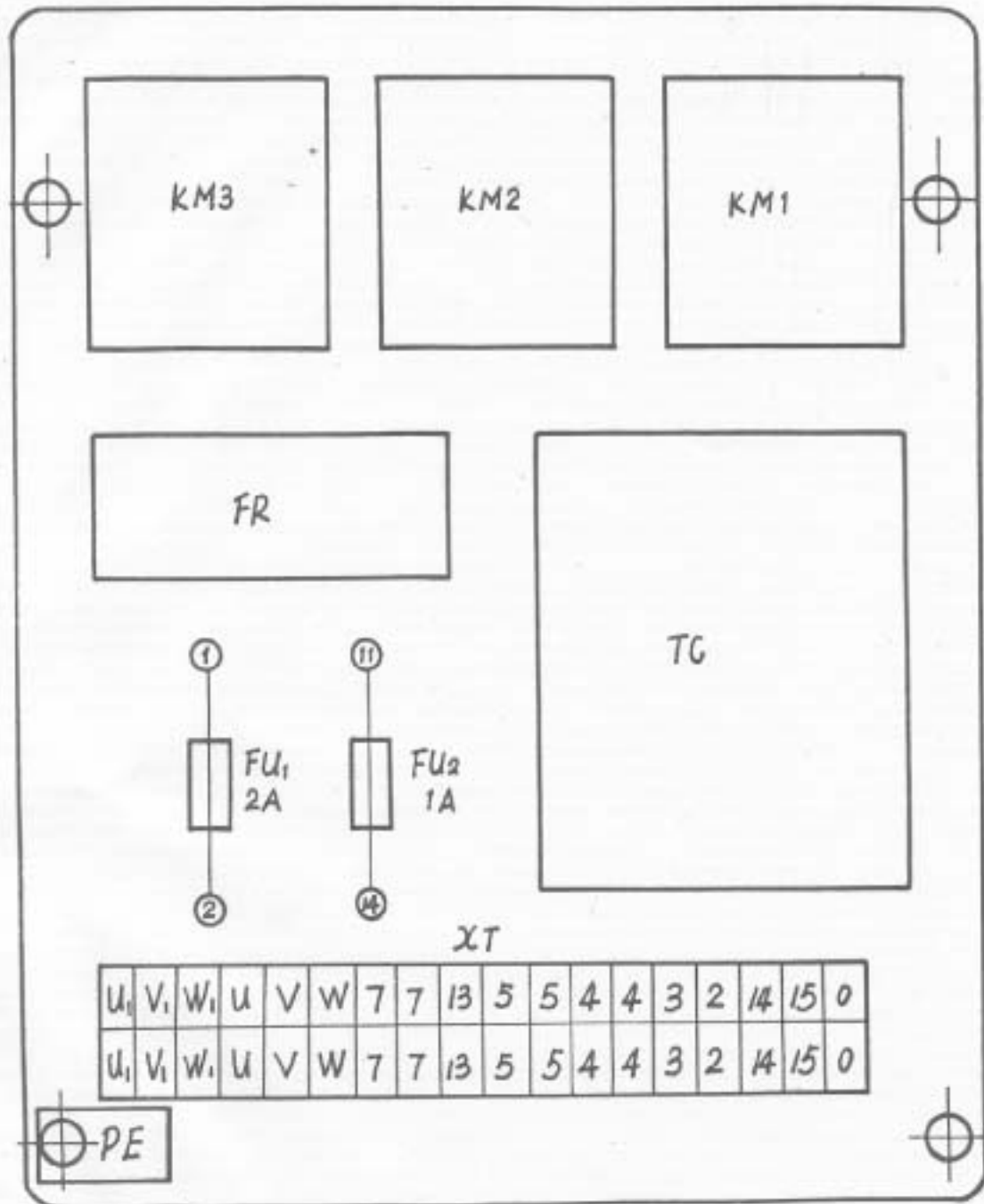


Fig. 8 Distributing Plate Arrangement For 3 Phase

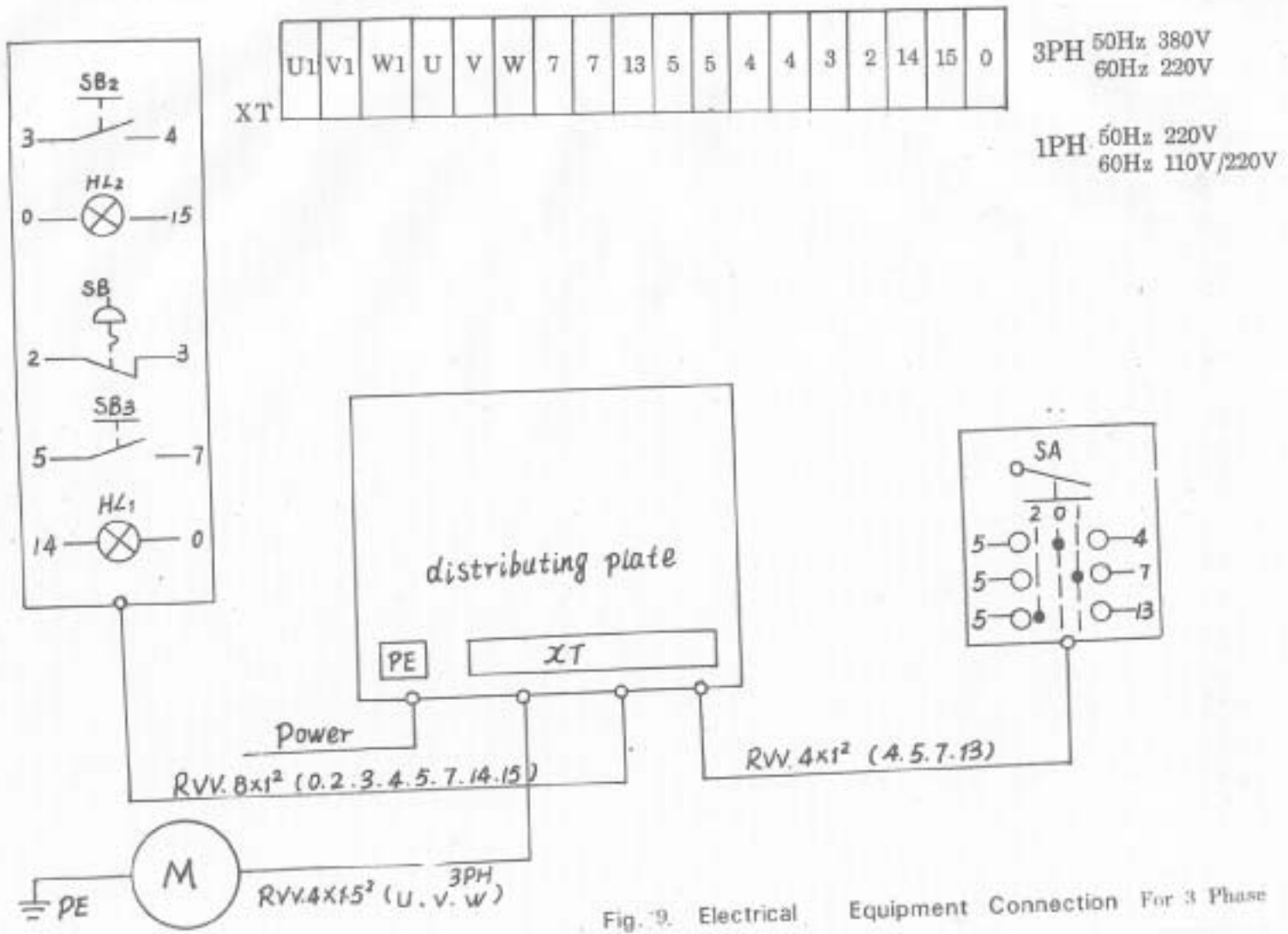
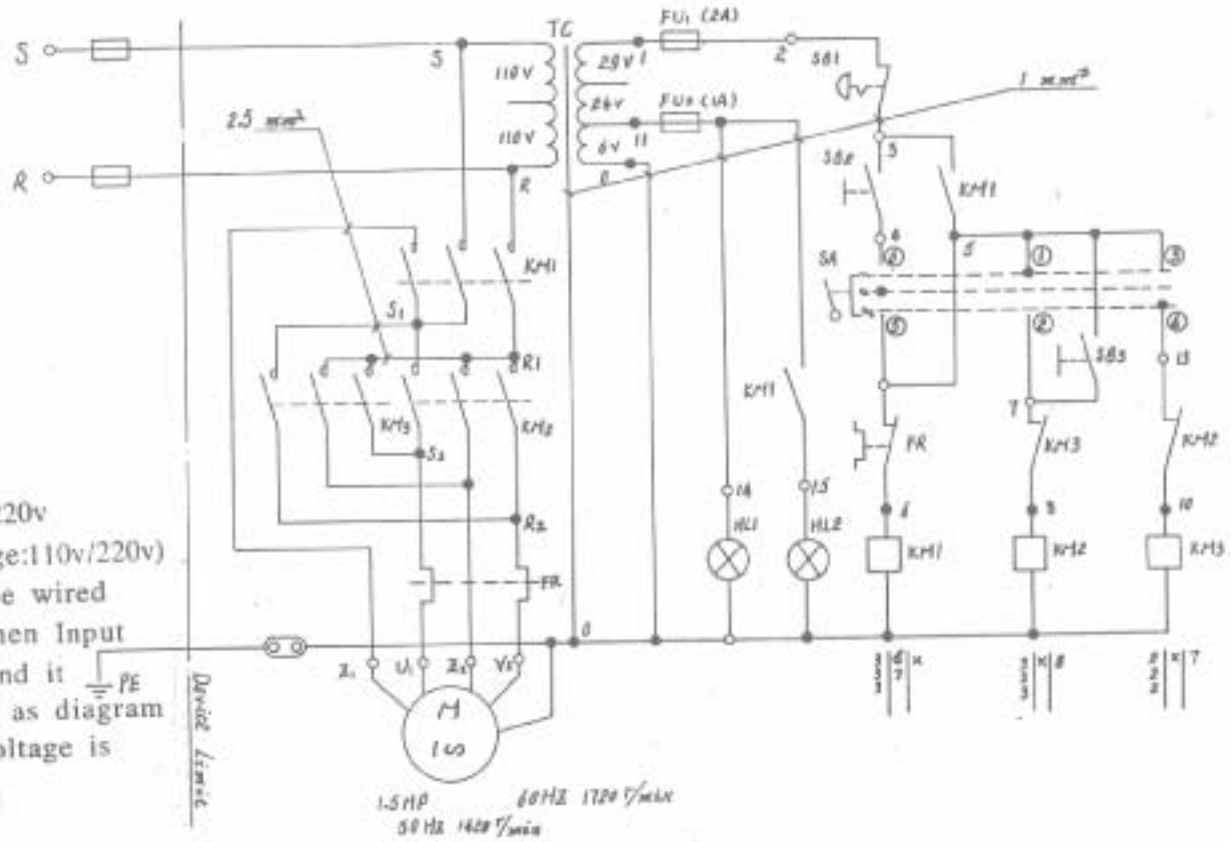


Fig. 9. Electrical Equipment Connection For 3 Phase

	Reverse run	Forward run		Signal	Emergency stop start	Forward run	Reverse run
1	2	3	4	5	6	7	8

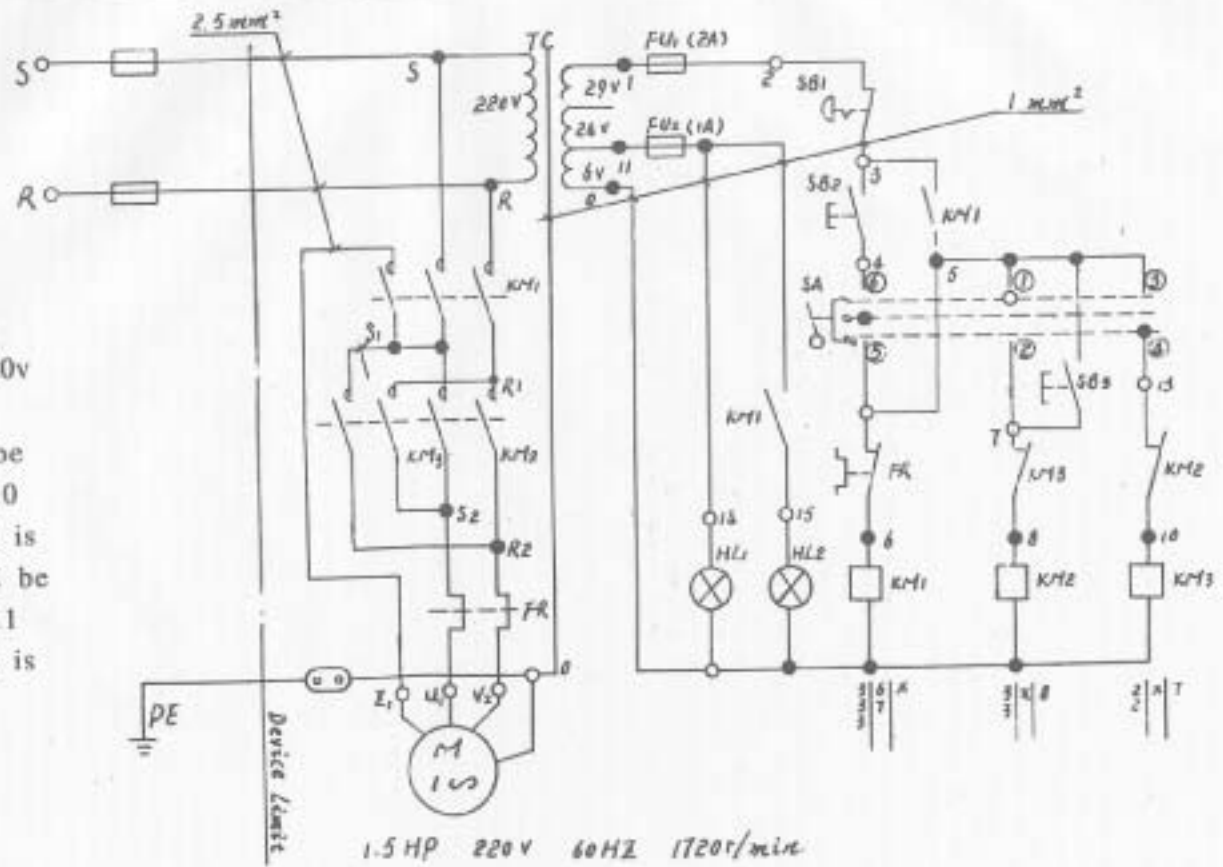


Suggestion

- 1) Frequency: 50Hz
Phase: 1
Power Volt: 220V
 - 2) Frequency: 60Hz
Phase: 1
Power Volt: 110v/220v
- Note: (Input Voltage: 110v/220v)
Machine should be wired as diagram 10 when Input voltage is 110v and it should be Wired as diagram 11 when Input voltage is 220V.

Fig.10 Wiring Diagram For 1 Phase (1)

	Reverse run	Forward run		Signal	Emergency stop start	Forward run	Reverse run
1	2	3	4	5	6	7	8



Suggestion:
 Frequency: 60Hz
 Phase: 1
 Power Volt: 110v/220v
 Note:
 Machine should be wired as diagram 10 when Input voltage is 110v, and it should be wired as diagram 11 when Input voltage is 220V.

Fig. 11 Wiring Diagram For 1 Phase (2)

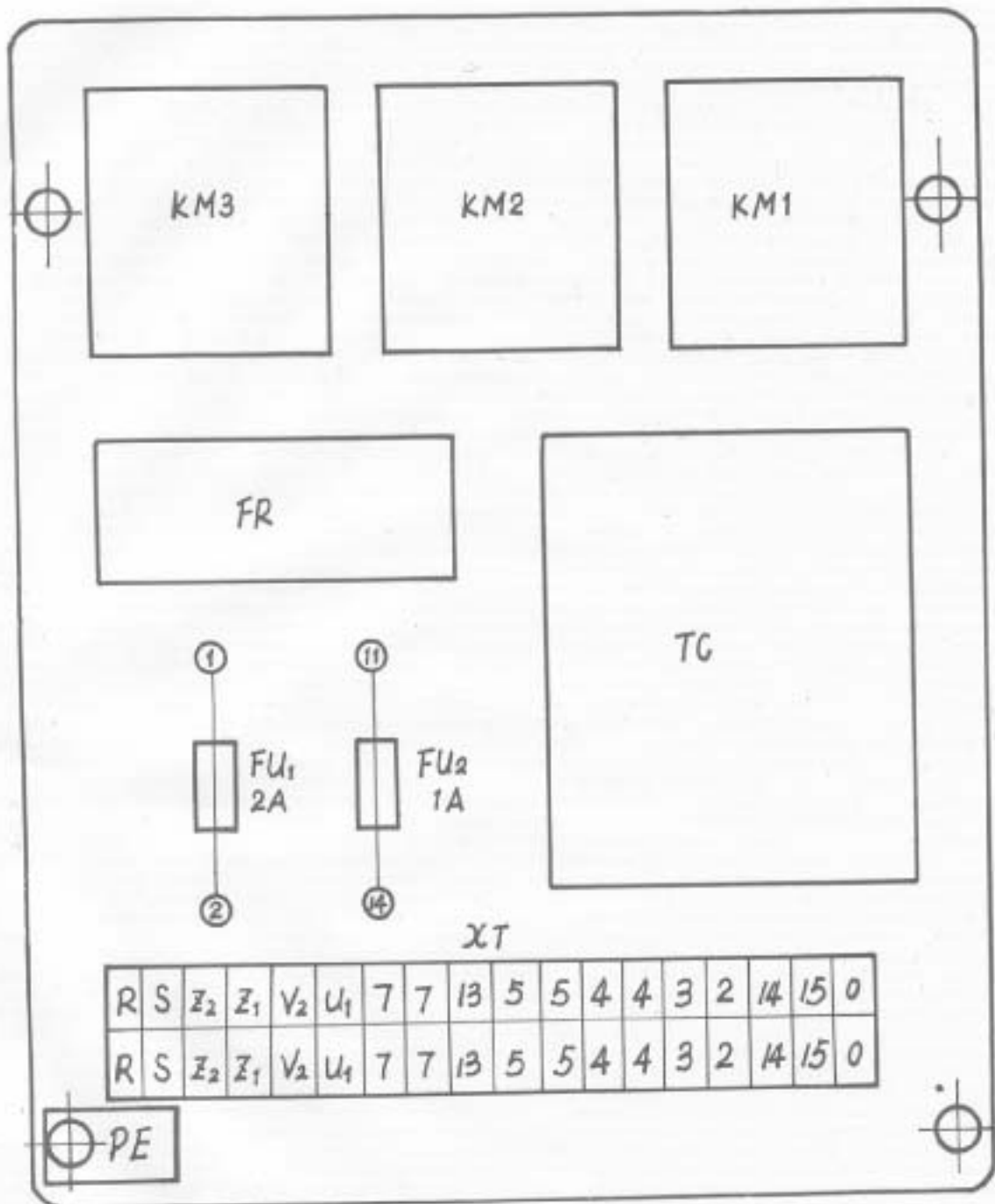


Fig. 12 Distributing Plate Arrangement For 1 Phase

IPH 50Hz 220V
60Hz 110v/220v

Note:(Input voltage:
110v/220v)

Do not pulg in the
wire Z2 when input
voltage is 220V and
connect it when input
voltage is 110V .

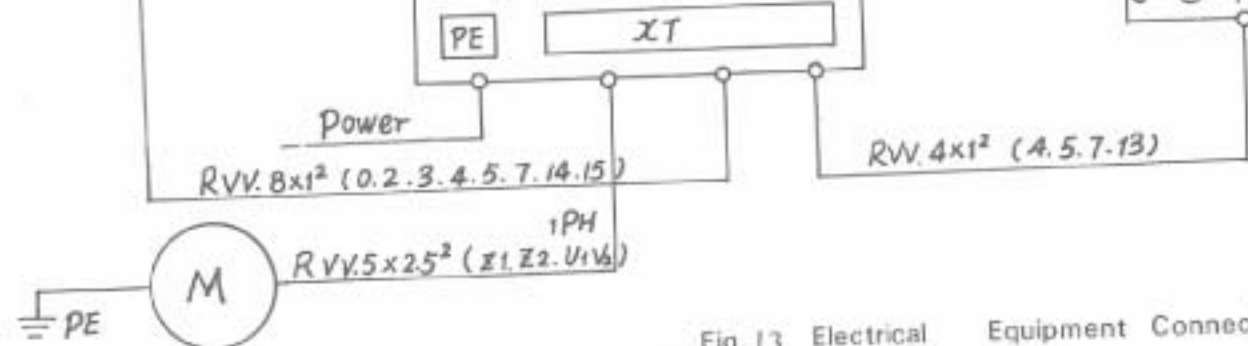
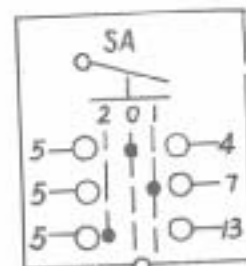
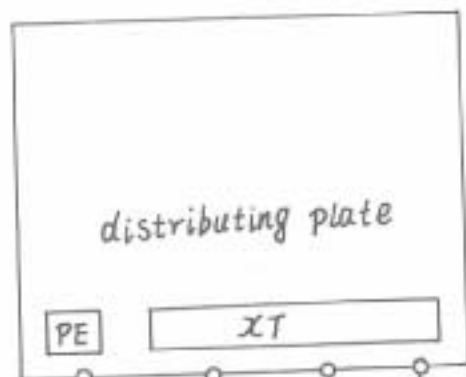
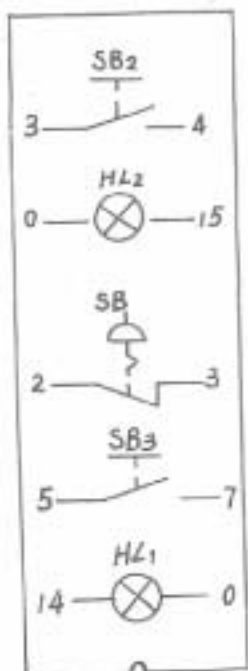
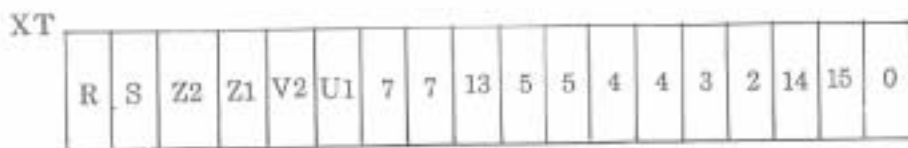
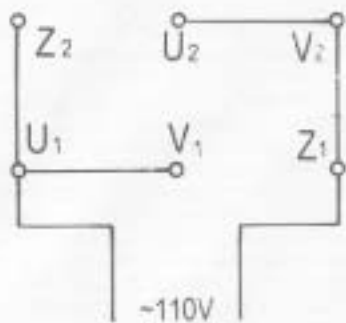
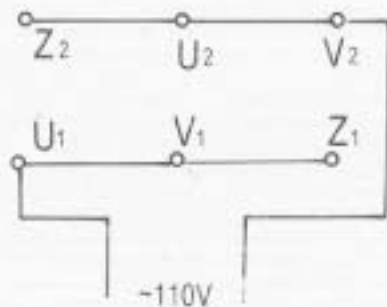


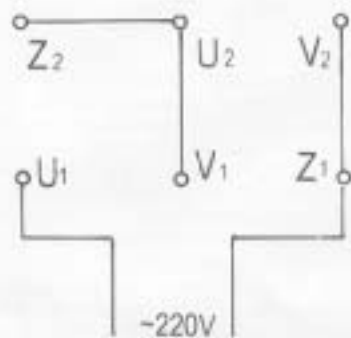
Fig.13 Electrical Equipment Connection For 1 Phase



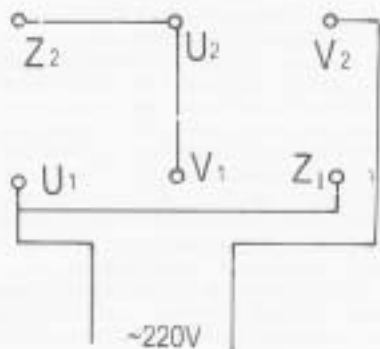
Forward run



Reverse run



Forward run



Reverse run

Caution: When 110v transfer to 220v, only

3 wires were connected, Z_1 , U_1 , V_2

not Z_2 ,

Fig.14 The motor 110v/220v Transferring Connection Diagram For 1 Phase

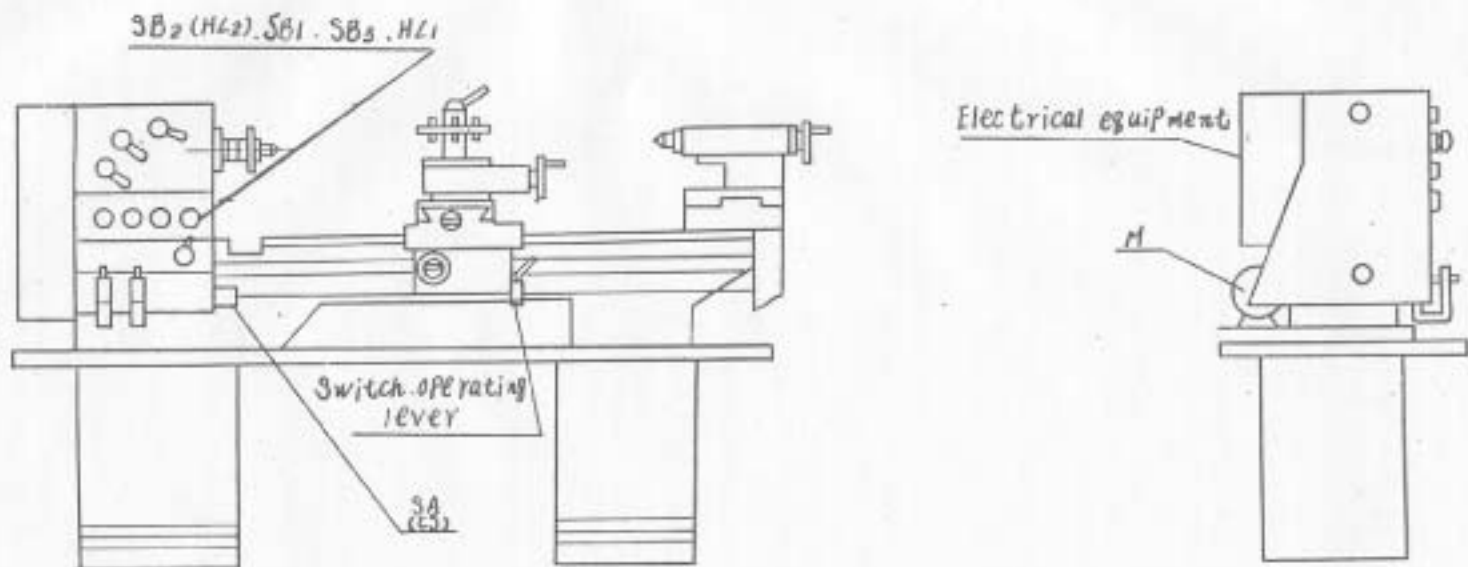


Fig. 15 Electrical Equipment Arrangement

Symbol	Name	Type				Quantity	Note
		Phase 3, 50Hz, 380V	Phase 1, 50Hz, 220V	Phase 3, 60Hz, 220V	Phase 1, 60Hz, 110V/220V		
M	Induction Motor	Y90S-4 1.1 KW 1420r/min	YL90S-4 1.1KW 1420r/min	Y90S-4 1.1KW 1720r/min	YC90L-4 1.1KW 1720r/min	1	
KM1	AC Contactor	3TB41 Control volta 24V	3TB41 Control volta 24V	3TB43 Control volta 29V	3TB43 Control volta 29V	1	
KM2	"	"	"	"	"	1	
KM3	"	"	"	"	"	1	
FR	Heating device relay	JR16B-20/3 3.5A	JR16B-20/3 11A	JR16B-20/3 5A	YJR16B-20/3 22A	1	
TC	Transformer for Contol circuit Supply	BKC-50 Primary: 0-380V Secondary: 0-6V, 0-24V	BKC-50 Primary: 0-220V Secondary: 0-6V, 0-24V	BKC-50 Primary: 0-230V Secondary: 0-6V, 0-29V	BKC-50 Primary: 0-110V-220V Secondary: 0-6V, 0-29V	1	
FU1	Fuse	BLF-1 2A	BLF-1 2A	BLF-1 2A	BLF-1 2A	1	
FU2	"	BLF-1 1A	BLF-1 1A	BLF-1 1A	BLF-1 1A	1	
SA (CS)	Selector Switch	HZ5B-10/2 D009	HZ5B-10/2 D009	HZ5B-10/2 D009	HZ5B-10/2 D009	1	
SB1	Reset	LAY3-01 ZS/1	LAY3-01 ZS/1	LAY3-01 ZS/1	LAY3-01 ZS/1	1	
SB2	Power start	LA19-11D Green	LA19-11D Green	LA19-11D Green	LA19-11D Green	1	Voltage for Lamp 6.3 V
SB3	Inching	LA19-11 Black	LA19-11 Black	LA19-11 Black	LA19-11 Black	1	
HL	Indicator lamp	XD-1 White	XD-1 White	XD-1 White	XD-1 White	1	Voltage for Lamp 6.3 V

Electrical Element List

TRIAL DRIVE, ADJUSTING AND OPERATING INSTRUCTION

1. Before operating the machine, read this operating instruction and understand it's requirement of adjusting, operating, maintenance and lubrication etc.
2. The machine is equipped with 1 or 2 V-belts from the motor to the low rear pulley. It is advisable to check the tension before starting the machine. The belts should be depressed about 1/2 inch by normal finger pressure. Tight belt will ruin the bearing. Adjust the tension, if necessary.
3. When trial driving, set changing lever on the Lowest speed and let the machine operate for 20 minutes. If functioning normally, increase the spindle speed step by step until the highest speed (then the feed lever in the middle rate) each step operating for over 5 minutes.

Caution: Speed changing can be made when motor is completely stopped.

4. Machine Operating Lever. See Fig. 16

Headstock

- With the help of lever (1), (2) and v-belts the headstock can provide 18 or 9 step speeds from 50 to 1500 r.p.m as shown in "spindle speed chart" located on the front side of headstock (see Fig. 17)
- Starting & stopping of spindle can be made merely by the starting lever(11). Moving the lever (11) up, the spindle will be counter - clockwise rotation; starting lever(11) down, the spindle will be reverse rotation.

Quick Change Gear Box

- Lever (4) is a selecting lever of threading or feed. Left position is for feed shaft. Center position is neutral. Right position is for lead screw.
- Lever (5) & (6) can control the feed gear box. Lever (5) has five positions. Lever (6) has eight positions. Moving the two tumbler levers can provide all kinds of feed rates positioned on left side of headstock (See Fig. 18) and inch thread pitches positioned on the front of gear box (See Fig.19) with the help of metric change gears, the two tumbler lever can also provide metric threads in the "change gear chart for m/m size" located on the front side of headstock. (See Fig.20)

Caution. Always stop the spindle before engaging any of above 3 levers.

Carriage Assembly

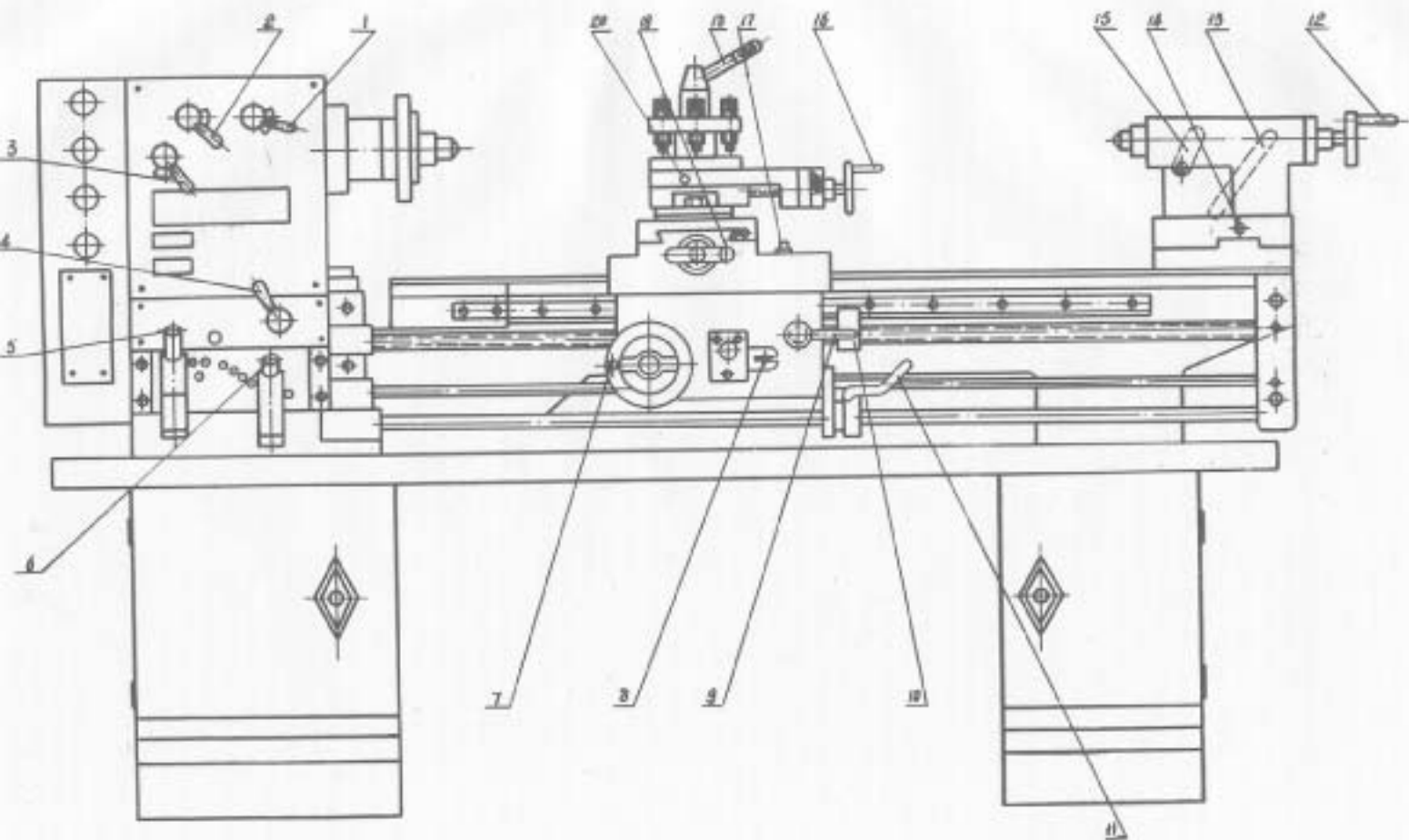
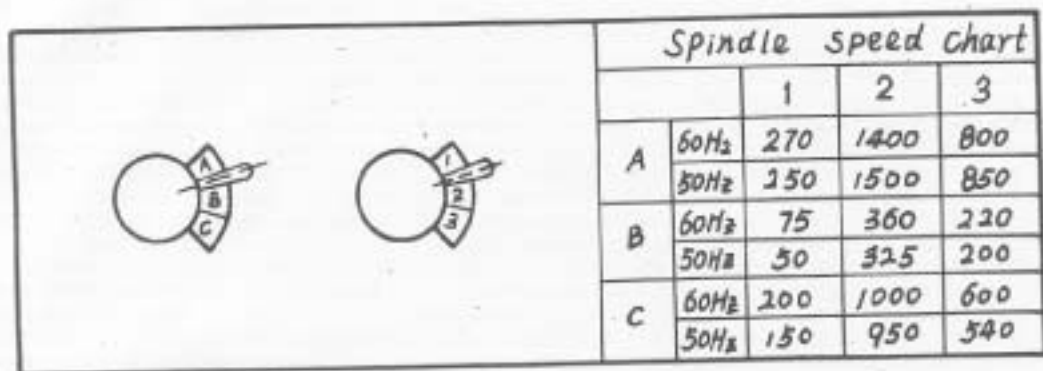


Fig.16 Machine Operating Levers

List 1: 9 step spindle speed



List 2: 18 step spindle speed

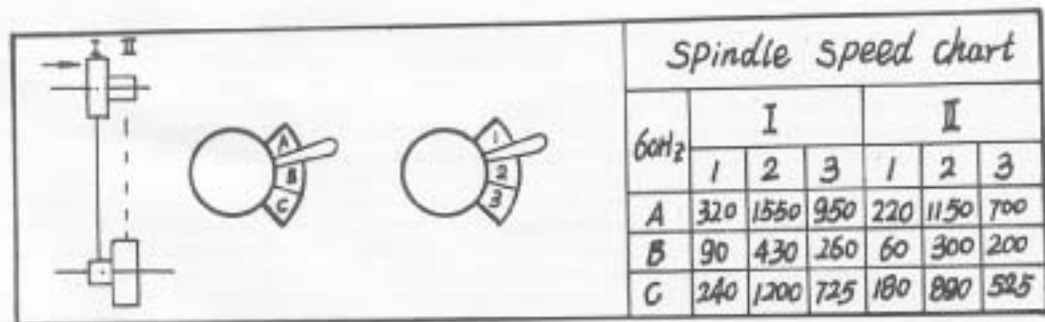

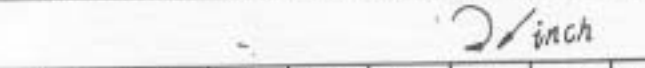


Fig.17 Spindle Speed Chart

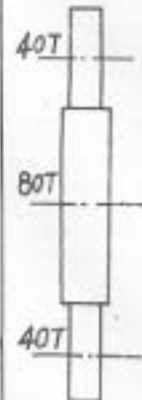


Position		1	2	3	4	5	6	7	8
A		0.791	0.703	0.666	0.632	0.575	0.527	0.486	0.452
		0.268	0.238	0.226	0.214	0.196	0.178	0.166	0.154
B		0.395	0.351	0.333	0.316	0.287	0.264	0.243	0.226
		0.134	0.119	0.113	0.107	0.098	0.089	0.083	0.077
C		0.198	0.175	0.167	0.158	0.144	0.132	0.122	0.113
		0.067	0.060	0.057	0.054	0.049	0.045	0.042	0.038
D		0.099	0.088	0.085	0.079	0.072	0.066	0.061	0.057
		0.033	0.030	0.028	0.027	0.025	0.022	0.021	0.019
E		0.050	0.044	0.042	0.040	0.036	0.033	0.031	0.028
		0.017	0.015	0.014	0.014	0.012	0.011	0.011	0.010



Position		1	2	3	4	5	6	7	8
A		0.0311	0.0277	0.0262	0.0249	0.0226	0.0207	0.0191	0.0178
		0.0105	0.0094	0.0089	0.0084	0.0077	0.0070	0.0065	0.0061
B		0.0136	0.0138	0.0131	0.0124	0.0113	0.0104	0.0096	0.0089
		0.0053	0.0047	0.0044	0.0042	0.0039	0.0035	0.0032	0.0030
C		0.0078	0.0069	0.0066	0.0062	0.0057	0.0052	0.0048	0.0044
		0.0026	0.0024	0.0022	0.0021	0.0019	0.0018	0.0017	0.0015
D		0.0039	0.0035	0.0033	0.0031	0.0028	0.0026	0.0024	0.0022
		0.0013	0.0012	0.0011	0.0011	0.0010	0.0009	0.0008	0.0007
E		0.0020	0.0017	0.0017	0.0016	0.0014	0.0013	0.0012	0.0011
		0.0007	0.0006	0.0006	0.0006	0.0005	0.0004	0.0004	0.0004

Fig. 18 Feed Rate list



POSITION	THREADS PER INCH							
	1	2	3	4	5	6	7	8
A	4	4½	4¾	5	5½	6	6½	7
B	8	9	9½	10	11	12	13	14
C	16	18	19	20	22	24	26	28
D	32	36	38	40	44	48	52	56
E	64	72	76	80	88	96	104	112

Fig. 19 Inch Thread Pitch list

CHANGE GEAR CHART FOR ^{mm} SIZE


F	COMBINATION OF GEARS		POSITION	PITCH mm					
	F	G		1	2	3	4	5	6
				60	A				
B					1.2				
C					0.6				
D					0.3				
E									
26		60	A					2.0	
			B					1.0	0.9
			C	0.7				0.5	0.45
			D	0.35				0.25	
			E						
43		60	A	4.5	4				3.0
			B	2.25					1.5
			C	1.125					0.75
			D						
			E						
46		60	A					3.5	
			B					1.75	
			C					0.875	0.8
			D						0.4
			E						0.2
47		60	A						
			B	2.5	2.2				
			C	1.25	1.1				
			D		0.55				
			E						

Fig. 20 Metric Thread Pitch list

- * Handwheel (7) is used for manually moving the carriage along the bedway.
- * crossfeed crank (19) is used to manually move the cross slide in or out.
- * Compound slide crank (16) is used to manually move the tool post. The compound is fully adjustable to any angle and is also used for threading or machining an angle on the workpiece.
- * Starting/stopping lever (11) is used to control the spindle direction of rotating, either forward or reverse.
- * Thread lever (9) is used to engage the half nuts when threading.
- * Feed lever (8) is used to engage either the longitudinal or cross feed. This lever has a safety interlock to prevent accidental engagement of the half nuts when the lathe is in feed mode. There are three positions: Center or disengaged position. Upper position engages the power longitudinal feed. Lower position engages the power cross feed.
- * The lead/feed lever (3) is used to change the direction of either longitudinal or cross feed in remaining the same spindle rotation.
- * Thread cutting dial (10) is used to engage the half nuts with the leadscrew, in the same thread that has been previously cut. Please note, Use any line of the dial for even pitches of threads; but you must use the same starting line for odd pitches of threads. i.e. when cutting a shaft with 10 T.P.I., engage the half nuts at any number on the thread dial; when cutting an odd pitches, if you start the cut using a 1 or a 3, continue to use the 1 or the 3 until the thread is finished.
- * The clamp lever (18) is used to secured tool post against loosening. Loosening the Lever, the tool post can rotate counter-clockwise to change cutting tools.
- * Saddle lock screw (17) is used to firmly clamp saddle to bed way.
- * Compound slide screw (20) is used to clamp compound slide to saddle.

Tailstock

- * The handwheel (12) is used to feed or retreat the quill. Turning the handwheel in counter-clockwise until a full stop is reached will automatically eject the tool being used.
 - * The tailstock clamp lever (13) locks the tailstock to the bedway. To lock, put the lever up. To release, put it down.
 - * The quill lock lever (15) prevent the quill from moving. Before operating the handwheel (12), release the lever. Feeding the quill to desired position, lock it.
 - * Two set screws (14) on either side of the base is used to offset the tailstock. After taper adjustment is made, retighten both screws
5. See the Fig. 21 Adjust the clearance of cross feed nuts on the saddle as following.

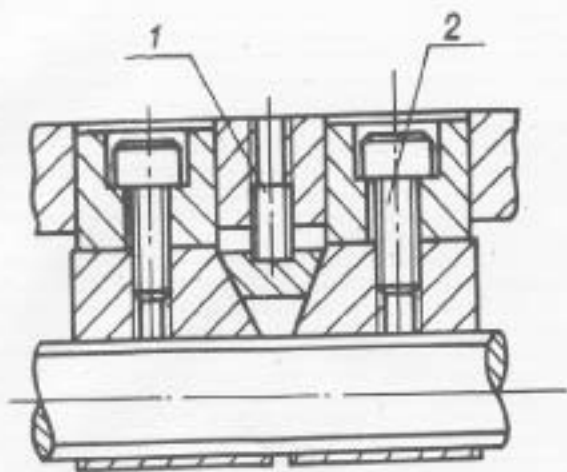


Fig.21 Adjust the clearance of cross feed nuts

Loose 2-M6 screw (2) then rotate the screw (1) down until the slide moves with a slight drag. Last, retighten the 2-M6 screws.

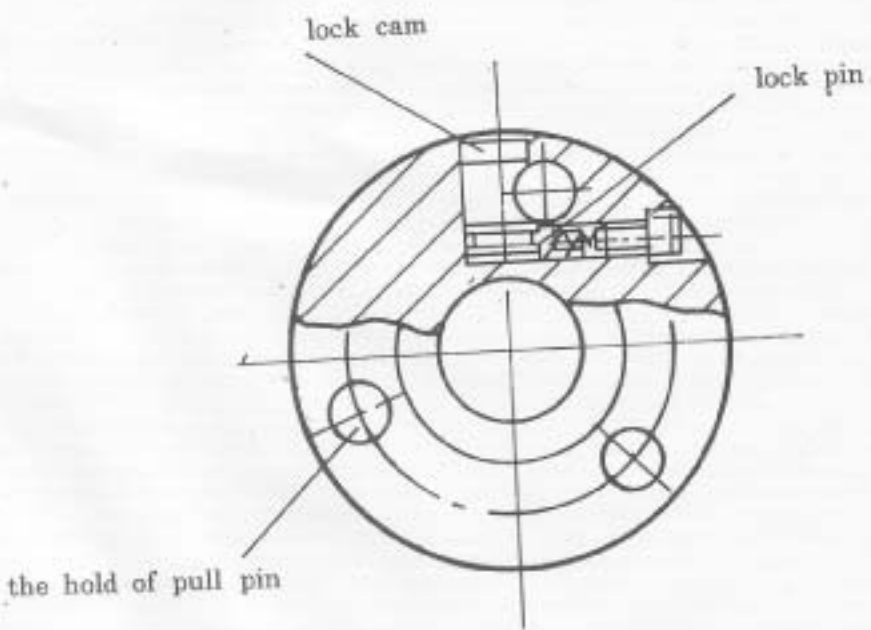


Fig.22 chuck or face plate lock structure

6. See the Fig. 22, the Mounting and detaching of chuck or face plate. The connection between spindle and chuck or face plate is made by type D cam lock structure according to china national Standard GB5900.3-86(similar to

When mounting, put the three pull pin of chuck or face plate into the three holes (See Fig. 22) on the spindle face end. Then turn the three cams (See, Fig. 22) with the help of square head wrench when turning the cams clockwise the chuck or face plate will be locked. When turning the cams counter-clockwise to certain point, the chuck or face plate can be detached.

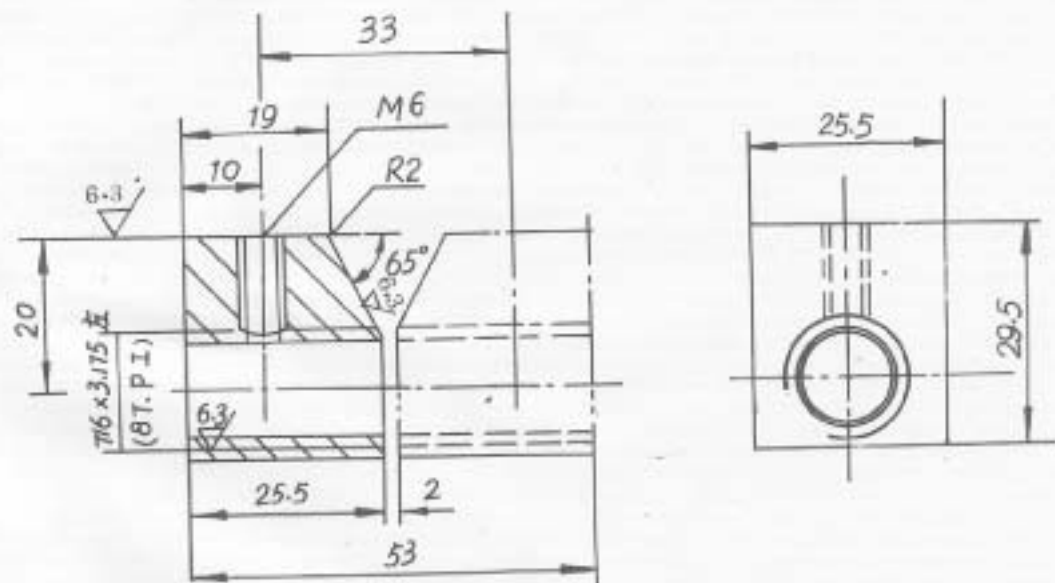
LATHE MAINTENANCE

1. Before operating the machine, check the oil level and lubricate all sliding and rotating parts according to "Lubricate Chart" (Fig. 6)
2. Always clean every sliding surfaces to prevent the chips. Often check the felt element on each end of the saddle. If being damaged, wash or change it. After operating, clean every parts of the machine and oil each slide surfaces, leadcrew, feed rod etc. to avoid rusting.
3. Periodically wash headstock, gear box, apron and change oil.
4. Keep oil from falling on the motor and v-belt. Periodically check and adjust v-belt.
5. Don't change every gear levers when the spindle is running to prevent damaging gears. If unable to change, you can turn the spindle with hand.
6. When changing spindle rotating direction, it can be accomplished with the help of forward and reverse rotation of motor. It is necessary first to stop spindle. Don't directly change the motor rotating direction before spindle stopped.
7. When using steady rest or follower rest, frequently oil the touching positions between slide pieces and workpiece.
8. Protect the spindle nose, short taper, taper bore of spindle from roughing and impacting on the working accuracy.
9. Finding the machine damaged, repair it immediately.

DAMAGEABLE PARTS

No.	Name	Material	Q'ty	Notes
1	Cross feed nuts	ZQ Sn6-6-3	2	5008
2	Half nut	ZQ Sn6-6-3	1	4024

the rest 12.5/▽

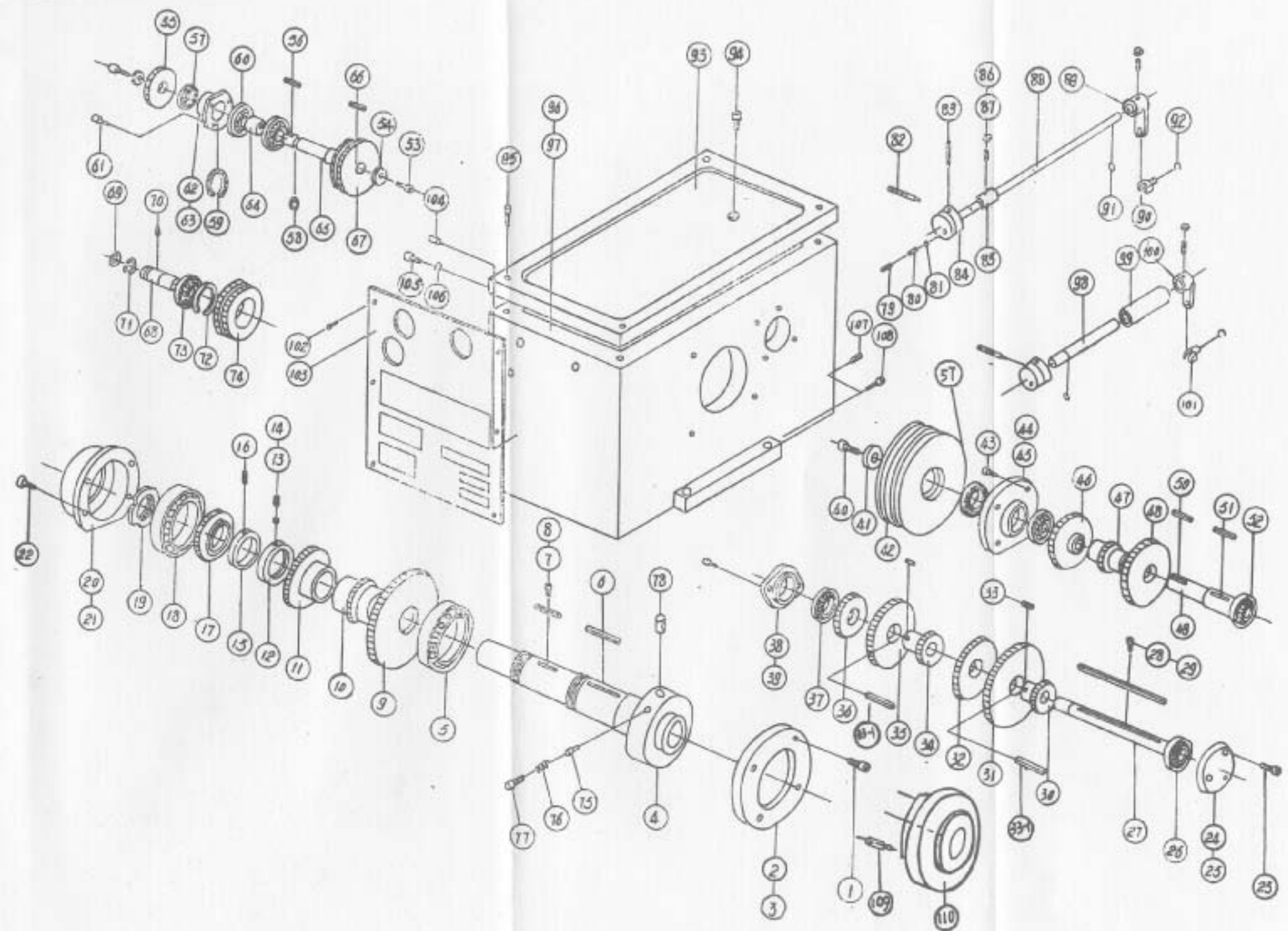


Appendix Fig. 1 Cross feed nuts
Material ZQSn 6-6-3

PARTS LIST

HEAD STOCK	
CHANGE GEAR	
GEAR BOX.....	
APRON	
SADDLE	
TOOL POST	
TAIL STOCK.....	
BED AND DRIVE ASSEMBLY	
CONTROL SWITCH ASSEMBLY.....	
BED ASSEMBLY	

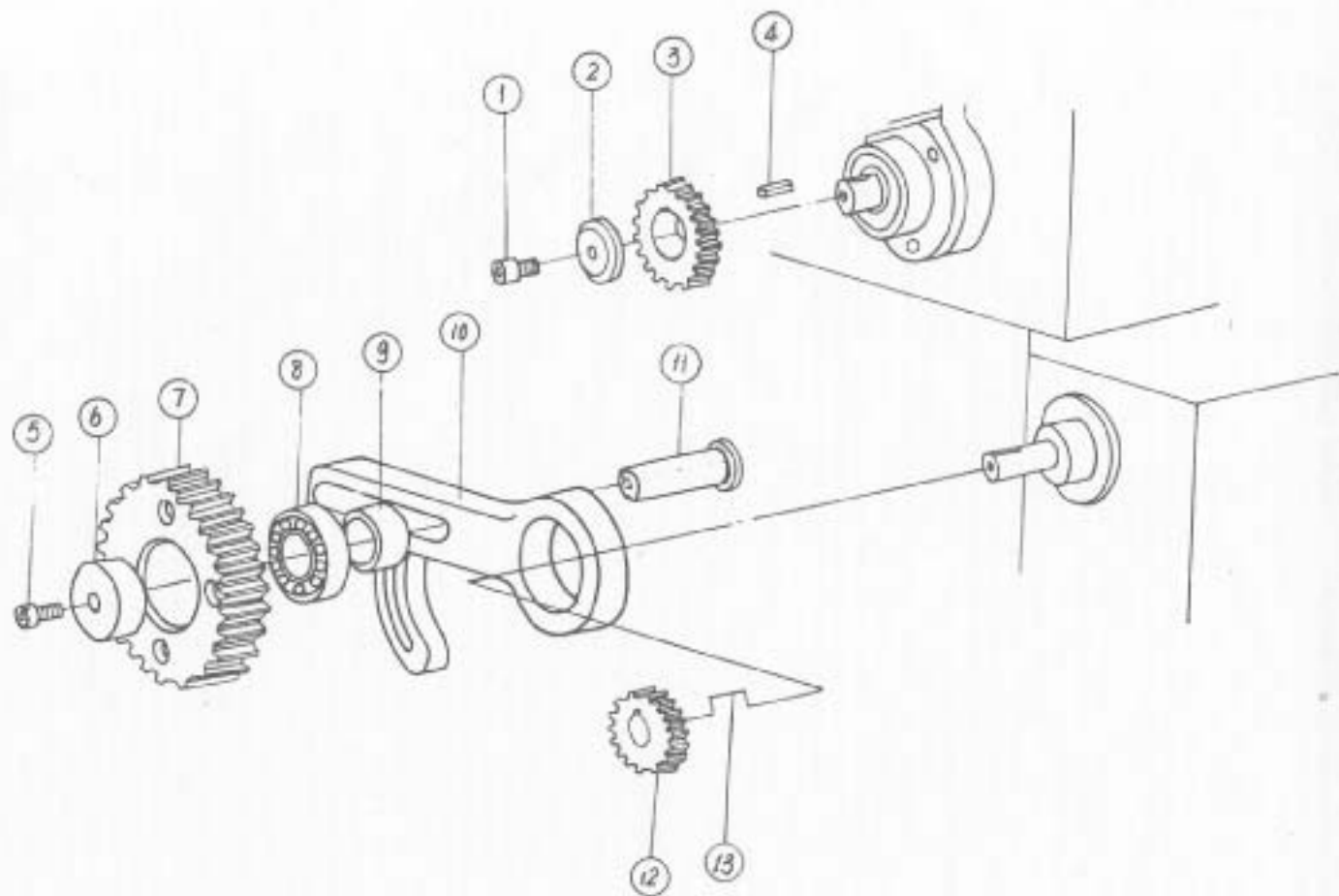
HEAD STOCK



No.	DESCRIPTION	Q'TY	PART NO.	Specification	No.	DESCRIPTION	Q'TY	PART NO.	Specification
1	Screw	4		M8 × 25	36	Gear	1	1019	
2	Cover	1	1037		37	Bearing	1		60104
3	Oil Seal	1		$\delta=0.5\text{mm}$	38	Oil Seal	1		$\delta=0.5\text{mm}$
4	Spindle	1	1036		39	Cover	1	1007	
5	Bearing	1		7212	40	Screw	1		M8 × 20
6	Key	1		8 × 82	41	Washer	1	1009	
7	Key	1		8 × 45	42	Pulley	1	1012	
8	Screw	2		M3 × 8	43	Screw	4		M6 × 12
9	Gear	1	1030		44	Cover	1	1010	
10	Gear	1	1029		45	Oil Seal	1		$\delta=0.5\text{mm}$
11	Gear	1	1028		46	Gear	1	1011	
12	Nut	1	1022		47	Gear	1	1016	
13	Washer	2	1023		48	Gear	1	1017	
14	Screw	2		M8 × 8	49	Shaft	1	1008	
15	Collar	1	1021		50	Key	1		5 × 30
16	Screw	1		M8 × 8	51	Key	1		5 × 80
17	Gear	1	1006		52	Bearing	1		104
18	Bearing	1		7211	53	Screw	2		M6 × 12
19	Nut	2	1005		54	Washer	2	1024	
20	Oil Seal	1		$\delta=0.5\text{mm}$	55	Gear	2	1002	
21	Cover	1	1004		56	Key	1		5 × 8
22	Screw	4		M8 × 16	57	Oil Seal	1		PD20 × 45
23	Screw	5		M6 × 16			2		× 10
24	Cover	1	1039		58	Circlip			20
25	Oil Seal	1		$\delta=0.5\text{mm}$	59	Circlip	1		42
26	Bearing	1		60304	60	Bearing	1		104
27	Shaft	1	1038		61	Screw	2		M6 × 16
28	Key	1		8 × 180	62	Oil Seal	3		$\delta=0.5\text{mm}$
29	Screw	2		M3 × 8	63	Cover	1	1003	
30	Gear	1	1015		64	Collar	1	1027	
31	Gear	1	1013		65	Shaft	1	1026	
32	Gear	1	1014		66	Key	1		5 × 20
33	Screw	4		M5 × 6	67	Gear	1	1025	
33-1	Key	2		5 × 20	68	Shaft	1	1001	
34	Gear	1	1020		69	Oil Seal	1		22 × 2.4
35	Gear	1	1018		70	Screw	1		M8 × 6

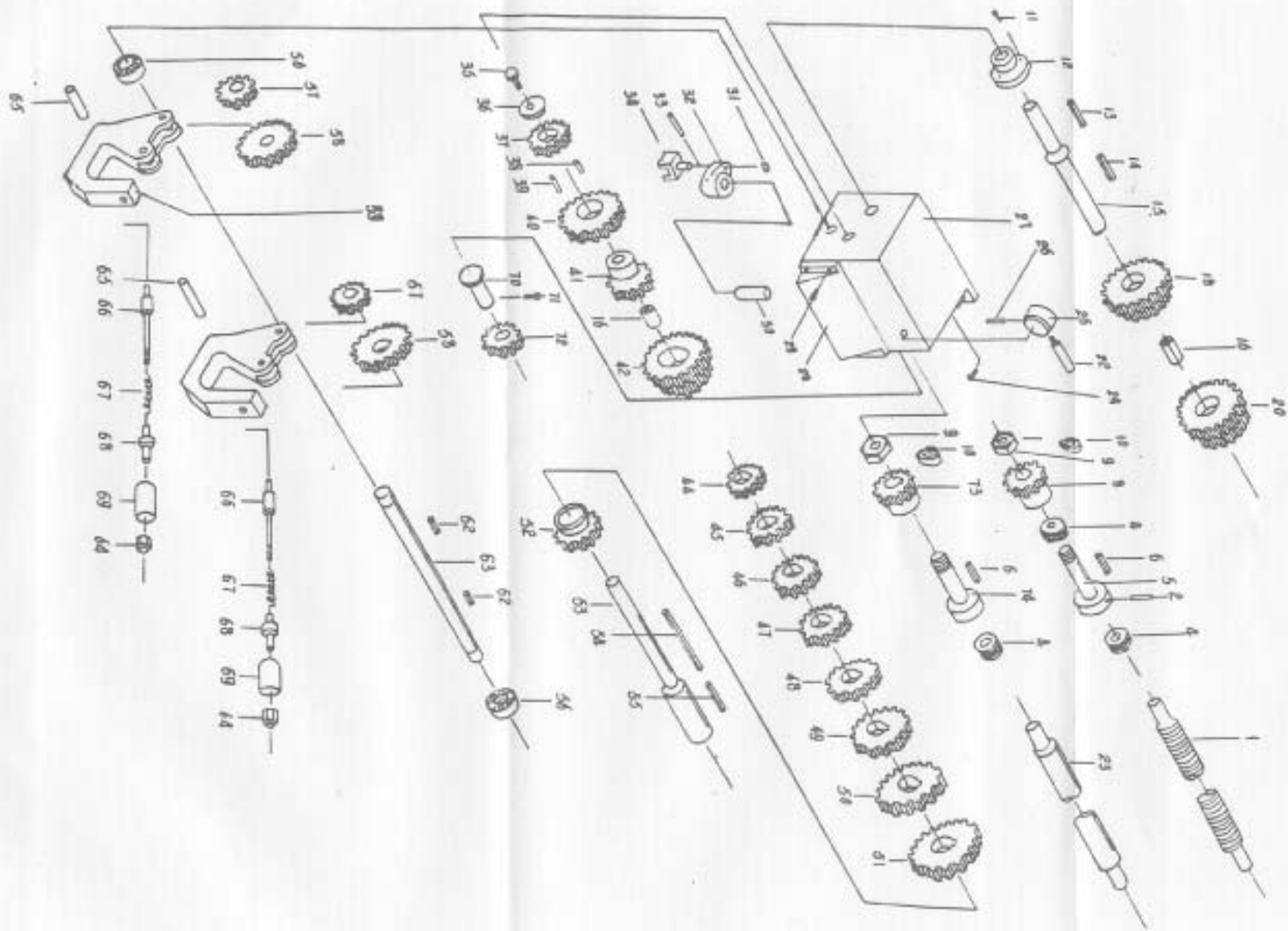
No.	DESCRIP- TION	Q'TY	PART NO.	Specific- ation	No.	DESCRIP- TION	Q'TY	PART NO.	Specific- ation
71	Circlip	1		20	93	Cover	1	1042	
72	Circlip	2		47	94	Screw	1	1043	
73	Bearing	1		204	95	Screw	6		M6 × 25
74	Gear	1	1031		96	Oil Seal	1		$\delta = 0.5\text{mm}$
75	Lock Pin	3	1033		97	Headstock	1	1032	
76	Spring	3	1034		98	Shaft	1	1049	
77	Screw	3		M8 × 16	99	Collar	1	1050	
78	Eccentric Shaft	3	1035		100	Shifter Arm	1	1051	
79	Screw	6		M8 × 8	101	Shifter	1	1052	
80	Spring	6	1048		102	Rivet	6		2 × 6
81	Ball	6		Φ6	103	Signboard	1	1054	
82	Handle	3	1046		104	Oil Window	1		12A
83	Pin	3		5 × 40	105	Screw	1	1053	
84	Boss	3	1047		106	Oil Seal	1		14 × 2.4
85	Collar	1	1045		107	Screw	2		M8 × 30
86	Nut	6		M8	108	Screw	2		M8 × 35
87	Screw	6		M8 × 12	109	Rod	9	F3004	
88	Shaft	2	1044		110-1	Face Plate	1	F3001	
89	Shifter Arm	2	1041		110-2	Flange For 3-jaw Chuck	1	F3002	
90	Shifter	2	1040		110-3	Flange For 4-jaw Chuck	1	F3003	
91	Oil Seal	5		16 × 2.4					
92	Circlip	3		12					

CHANGE GEAR



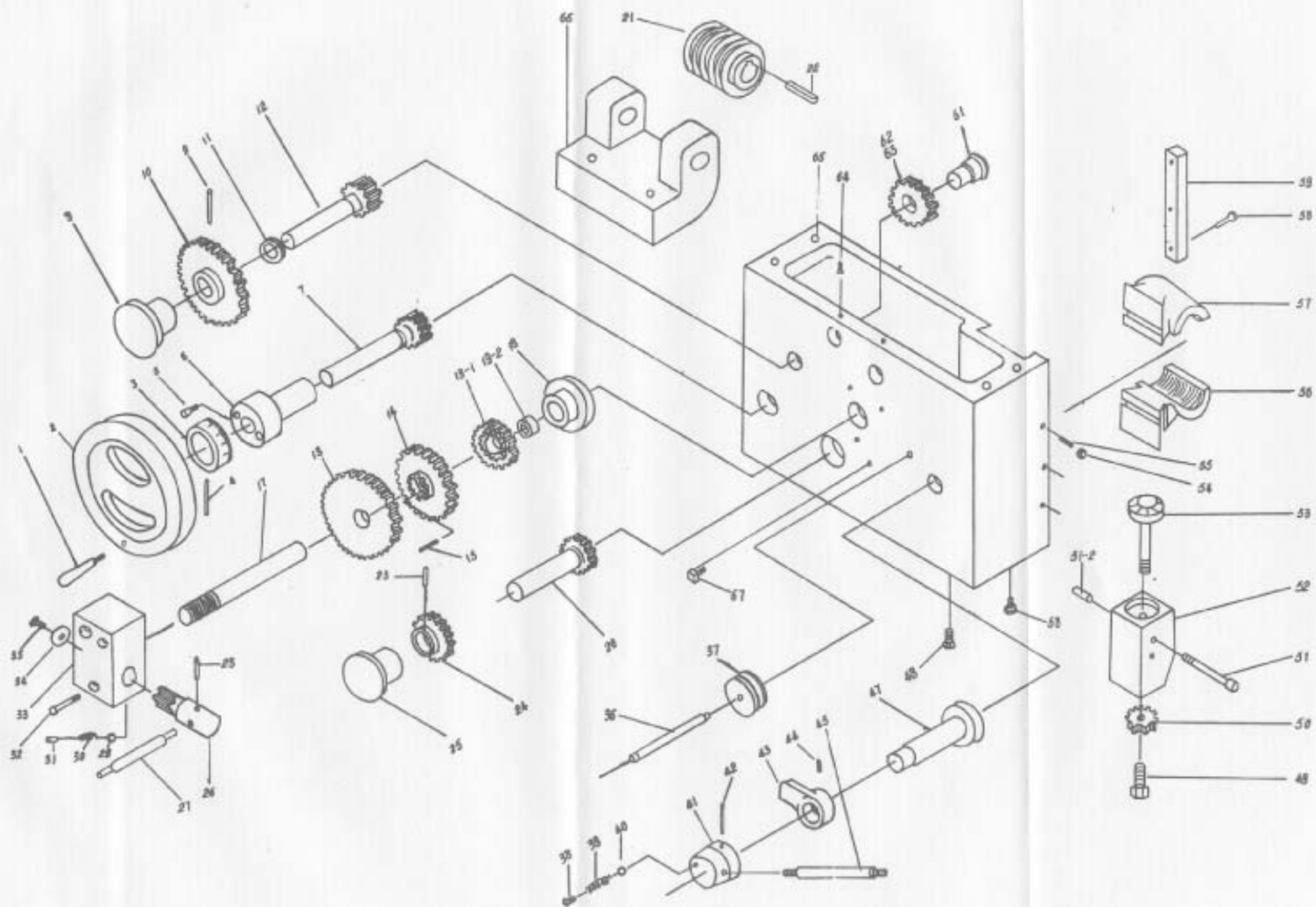
No.	DESCRIPTION	Q'TY	PART No.	Specification
1	Screw	1		M6 × 12
2	Washer	1	2007	
3	Gear	1	1002	
4	Key	1		5 × 8
5	Screw	1		M6 × 12
6	Washer	1	2004	
7	Gear	1	2013	
8	Bearing	1		80202
9	Collar	1	2005	
10	Quadrant	1	2016	
11	Shaft	1	2006	
12	Gear	1	2015	
13	Key	1		A5 × 23

GEAR BOX



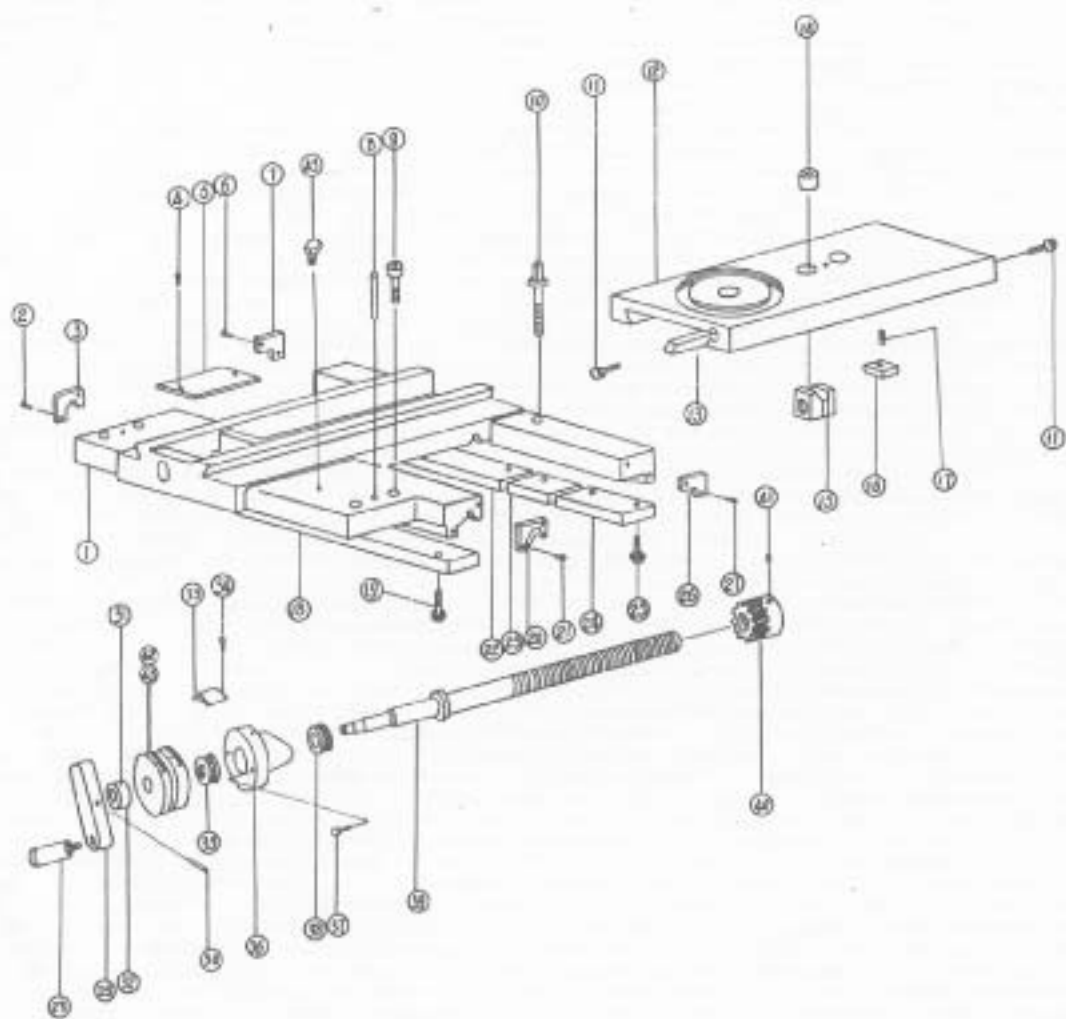
No.	DESCRIPTION	Q'TY	PART NO.	Specification	No.	DESCRIPTION	Q'TY	PART NO.	Specification
1	Lead Screw	1	7008		38	Pin	1		3 × 3
2	Pin	2		5 × 35	39	Pin	1		3 × 3
4	Bearing	3		8103	40	Gear	1	3021	
5	Shaft	1	3037		41	Gear	1	3022	
6	Key	2		A5 × 15	42	Gear	2	3020-1	
8	Gear	1	3044-1		44	Gear	1	3029	
9	Nut	4		M12	45	Gear	1	3030	
10	Washer	2	3046		46	Gear	1	3031	
11	Screw	3		M6 × 16	47	Gear	1	3032	
12	Cover	1	3025		48	Gear	1	3033	
13	Key	1		A5 × 23	49	Gear	1	3034	
14	Key	1		C5 × 9	50	Gear	1	3035	
15	Shaft	1	3027		51	Gear	1	3036	
16	Bushing	2	3020-2		52	Gear	1	3040	
18	Gear	1	3026		53	Shaft	1	3028	
20	Gear	1	3020-1		54	Key	1		A5 × 75
22	Lever	1	1046		55	Key	1	3038	
23	Feed Rod	1	7009		56	Bearing	2		7000102
24	Screw	2		M10 × 30	57	Gear	2	3016	
25	Boss	1	1047		58	Gear	2	3047	
26	Pin			5 × 40	59	Shift Lever	2	3003	
27	Gear Box	1	3001		62	Key	2	3018	
	Housing	1			63	Shaft	1	3017	
28	Plate	1	3002		64	Nut	2	3049	
29	Screw	4		M6 × 16	65	Shaft	2	3048	
30	Shaft	1	3012		66	Shaft	2	3006	
31	Circlip	1		12	67	Spring	2	3005	
32	Shift Pivot	1	3013		68	Sleeve	2	3007	
33	Pin	1		4 × 30	69	Housing	2	3004	
34	Shift Yoke	1	3014		70	Shaft	1	3041	
35	Screw	1		M6 × 12	71	Screw	2		M8 × 8
36	Washer	1	3024		71-1	Pin	1	3015	
37	Gear(sleeve)	1	3023-1 3023-2		72	Gear	1	3042	
					73	Gear	1	3044	
					74	Shaft	1	3045	

APRON



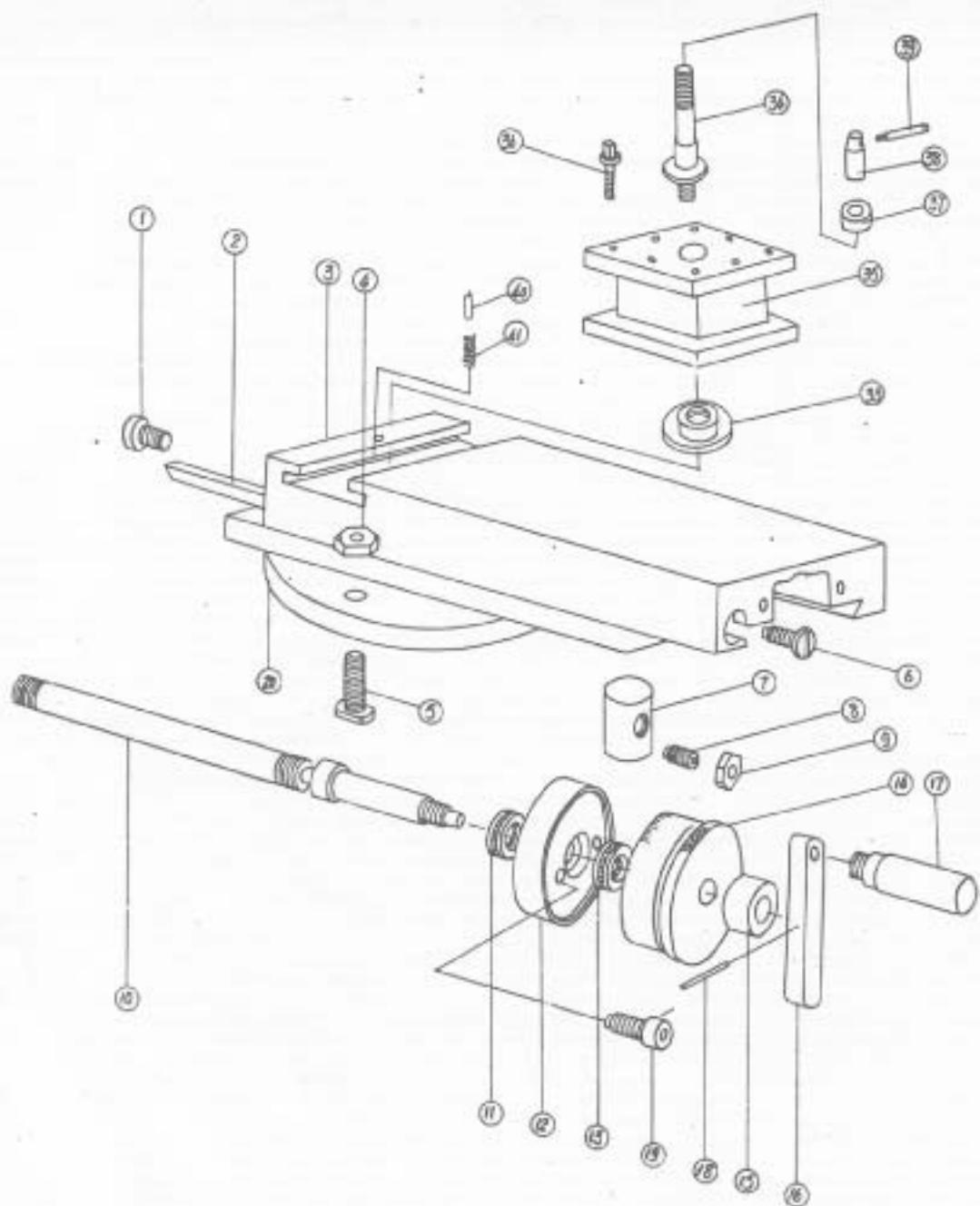
No.	DESCRIP-TION	Q'TY	PART NO.	Specific-ation	No.	DESCRIP-TION	Q'TY	PART NO.	Specific-ation
1	Handle	1	4001		35	Screw	1		M6 × 12
2	Hand Wheel	1	4002		36	Shaft	1	4023	
3	Index Ring	1	4003		37	Safety Shifter	1	4027	
4	Pin	1		5 × 50	38	Screw	1		M8 × 8
5	Screw	2		M6 × 20	39	Spring	1	(4045)	Φ6 × 1 × 16
6	Bracket	1	4004		40	Ball	1		Φ6
7	Gear Shaft	1	4006		41	Boss	1	4030	
8	Bushing	1	4007		42	Pin	1		5 × 40
9	Pin	1		5 × 30	43	Dog	1	4028	
10	Gear	1	4010		44	Screw	1		M5 × 8
11	Washer	2	4011		45	Lever	1	4031	
12	Gear Shaft	1	4009		47	Shaft	1	4029	
13	Gear	1	4034		47-1	Pin	1		5 × 10
14	Gear	1	4033		47-2	Pin	1		4 × 30
15	Pin	3		5 × 33	47-3	Screw	2		M5 × 6
17	Shaft	1	4039		48	Screw	2		M8 × 35
18	Bushing	1	4017		49	Screw	1		M6 × 16
18-1	Screw	2		M5 × 8	50	Gear	1	4022	
19-1	Gear	1	4032		51-1	Screw	1		M6 × 65
19-2	Sleeve	2	4038		52	Housing	1	4021	
20	Shaft	1	4015		51-2	Sleeve	1	4020	
20-1	Worm Gear	1	4013		53	Thread Dial	1	4019	
20-2	Screw	1		M6 × 6	54	Nut	3		M6
21	Worm	1	4014		55	Screw	3		M6 × 12
22	Flat Key	1		5 × 38	56	Half Nut	1	4024	
23	Pin	1		5 × 25	57	Half Nut	1	4025	
24	Gear	1	4008			Housing	1		
25	Bushing	1	4016		58	Screw	1		M6 × 25
26	Gear Shaft	1	4036		59	Gib	1	4026	
27	Lever	1	4037		61	Shaft	1	4042	
28	Pin	1		5 × 25	62	Gear	1	4044	
29	Ball	1		Φ6	63	Bushing	1	4043	
30	Spring	1	(4045)	Φ6 × 1 × 16	64	Screw	1		M6 × 6
31	Screw	1		M8 × 12	65	Apron Case	1	4005	
32	Screw	3		M6 × 45	66	Worm Frame	1	4012	
33	Boss	1	4040		67	Limit Block	1	4035	
34	Washer	1	4041		68	Screw	2	4018	

SADDLE



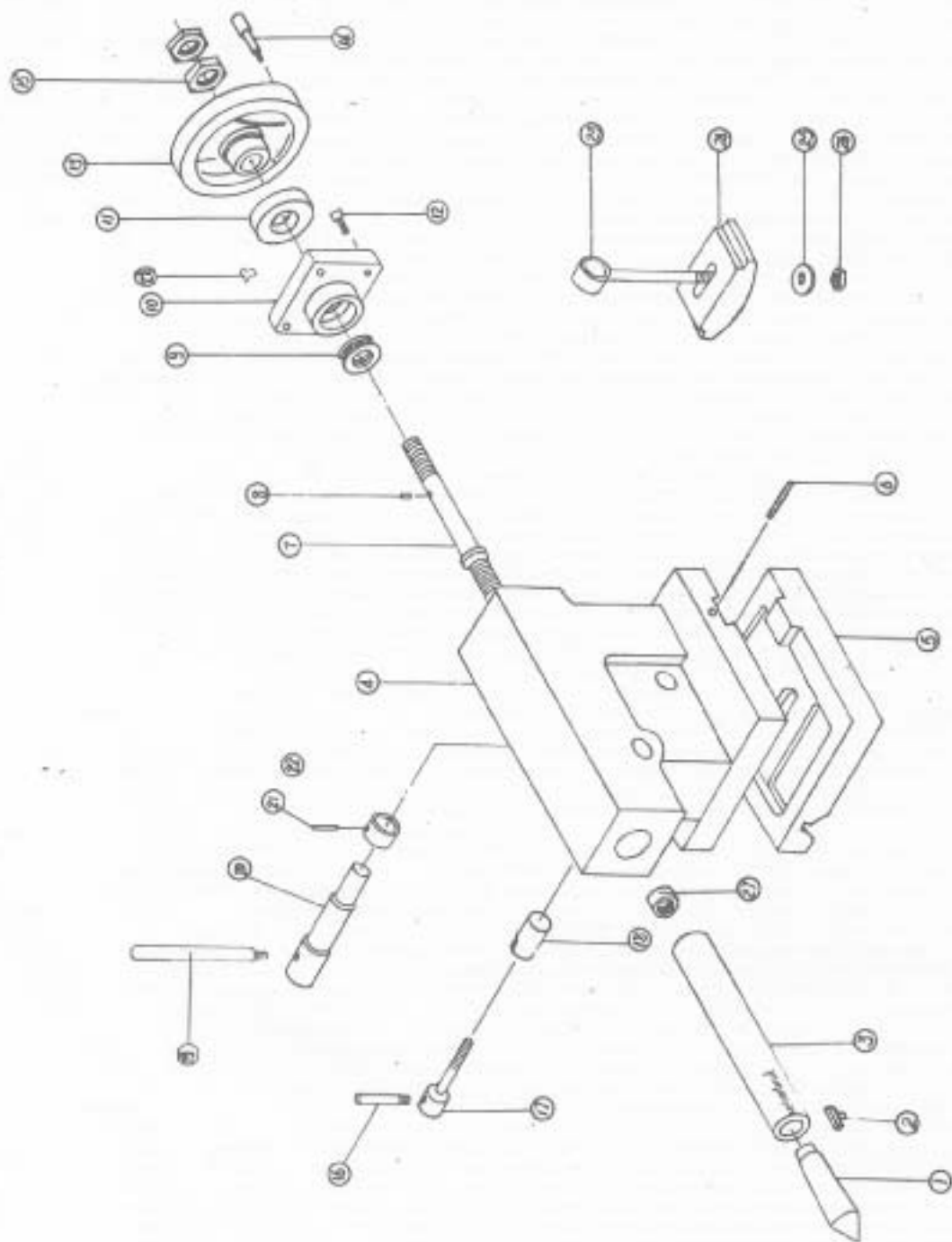
No.	DESCRIP- TION	Q'TY	PART NO.	Specific- ation	No.	DESCRIP- TION	Q'TY	PART NO.	Specific- ation
1	Saddle	1	5005		22	Slide Plate	1	5002	
2	Screw	2		M5 × 10	23	Slide Plate	1	5003	
3	Wiper	1	5010		24	Slide Plate	1	5004	
4	Screw	2		M5 × 5	25	Screw	4		M8 × 25
5	Cover	1	5012		27	Screw	2		M5 × 10
6	Screw	2		M5 × 5	28	Handle	1	5020,	
7	Wiper	2	5001					5021,	
8	Pin	2		5 × 45				5022, 5023	
9	Screw	4		M10 × 30	29	Bracket	1	5019	
10	Screw	1	5050		30	Pin	1		4 × 20
11	Screw	2	5041		31	Screw	1		M6 × 6
12	Tool Post	1	5024		31-1	Washer	1	5017	
	Slide				32	Nut	1	5018	
13	Gib	1	5040		33	Signboard	1	5052	
14	Bushing	2	5007		34	Rivet	2		2 × 6
14-1	Screw	2		M6 × 16	35	Bearing	1		8102
15	Nut	2	5008		36	Bracket	1	5015	
16	Wedge	1	5009		37	Screw	1		M6 × 30
	aduster				38	Bearing	2		8102
17	Screw	1		M6 × 16	39	Screw	1	5006	
18	Slide Plate	1	5011		40	Gear	1	5013	
19	Screw	2		M8 × 25	41	Screw	1		M6 × 6
20	Wiper	1	5051		42	Dial	1	5016	
21	Screw	2		M5 × 10	43	Screw	1	5053	

TOOL POST



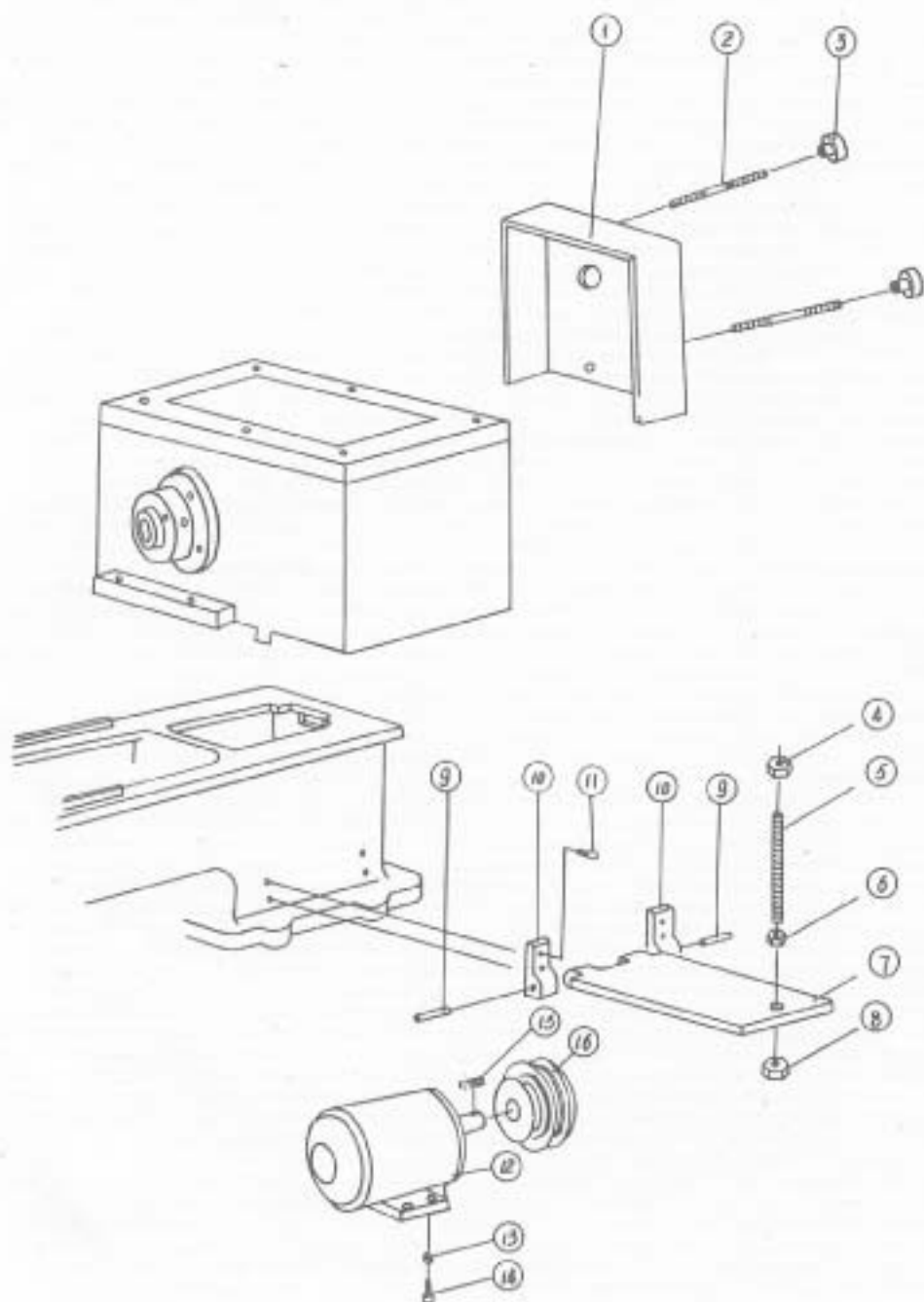
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1	Screw	1	5029	
2	Gib	1	5028	
3	Compound Slide	1	5030	
4	Nut	2		M10
5	Screw	2	5025	
6	Screw	1	5029	
7	Nut	1	5042	
8	Screw	1		M6 × 12
9	Nut	1		M6
10	Screw	1	5043	
11	Bearing	1		8101
12	Bracket	1	5044	
13	Bearing	1		8101
14	Index Ring	1	5045	
15	Nut	1	5046	
16	Bracket	1	5047	
17	Handle	1	5048, 5049	
18	Pin	1		3 × 16
19	Screw	1		M6 × 25
20	Compound Rest	1	5026	
33	Nut	1	5031	
34	Shaft	1	5032	
35	Tool Post	1	5033	
36	Screw	8	5034	
37	Collar	1	5035	
38	Boss	1	5036	
39	Handle	1	5037	
40	Pin	1	5038	
41	Spring	1	5039	

TAIL STOCK



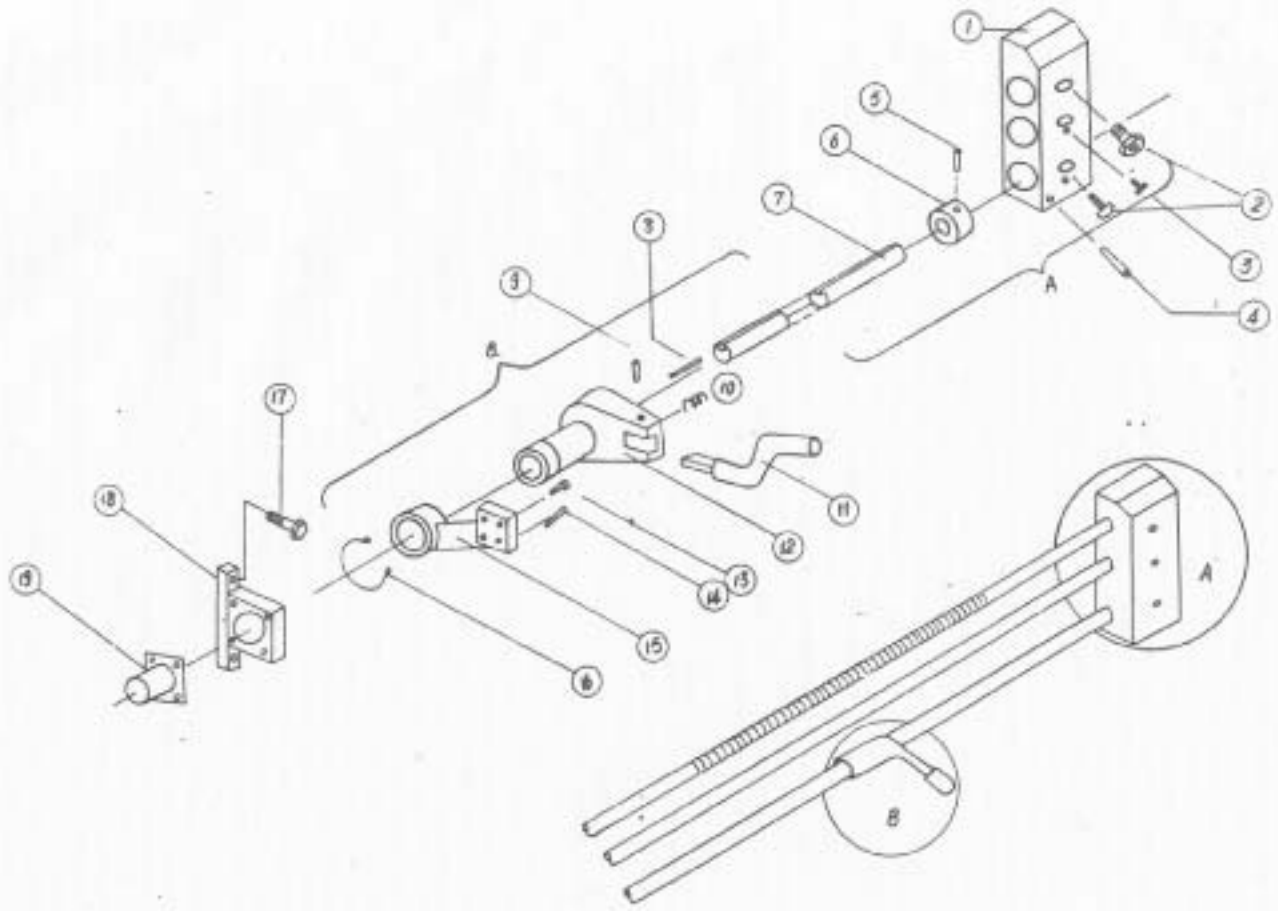
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1	Center	1	8019	
2	Key	1	8012	
3	Quill	1	8010	
4	Tail Stock	1	8001	
5	Base	1	8002	
6	Screw	2	8018	
7	Screw	1	8009	
8	Pin	1		4 x 8
9	Bearing	1		8101
10	Bracket	1	8006	
11	Index Ring	1	8007	
12	Screw	4		M6 x 20
13	Hand Wheel	1	8005	
14	Handle	1	5020	
			5021	
			5022	
15	Nut	2		M10
16	Handle	1	8014	
17	Lock Screw	1	8013	
18	Lock Shaft	1	8011	
19	Handle	1	8004	
20	Shaft	1	8017	
21	Pin	1		5 x 30
22	Collar	1	8016	
23	Shaft	1	8015	
24	Bass Shoe Block	1	8020	
25	Washer	1	8022	12
26	Nut	1		M12
27	Nut	1	8008	
28	Index Piece	1	8021	

BED AND DRIVE ASSEMBLY



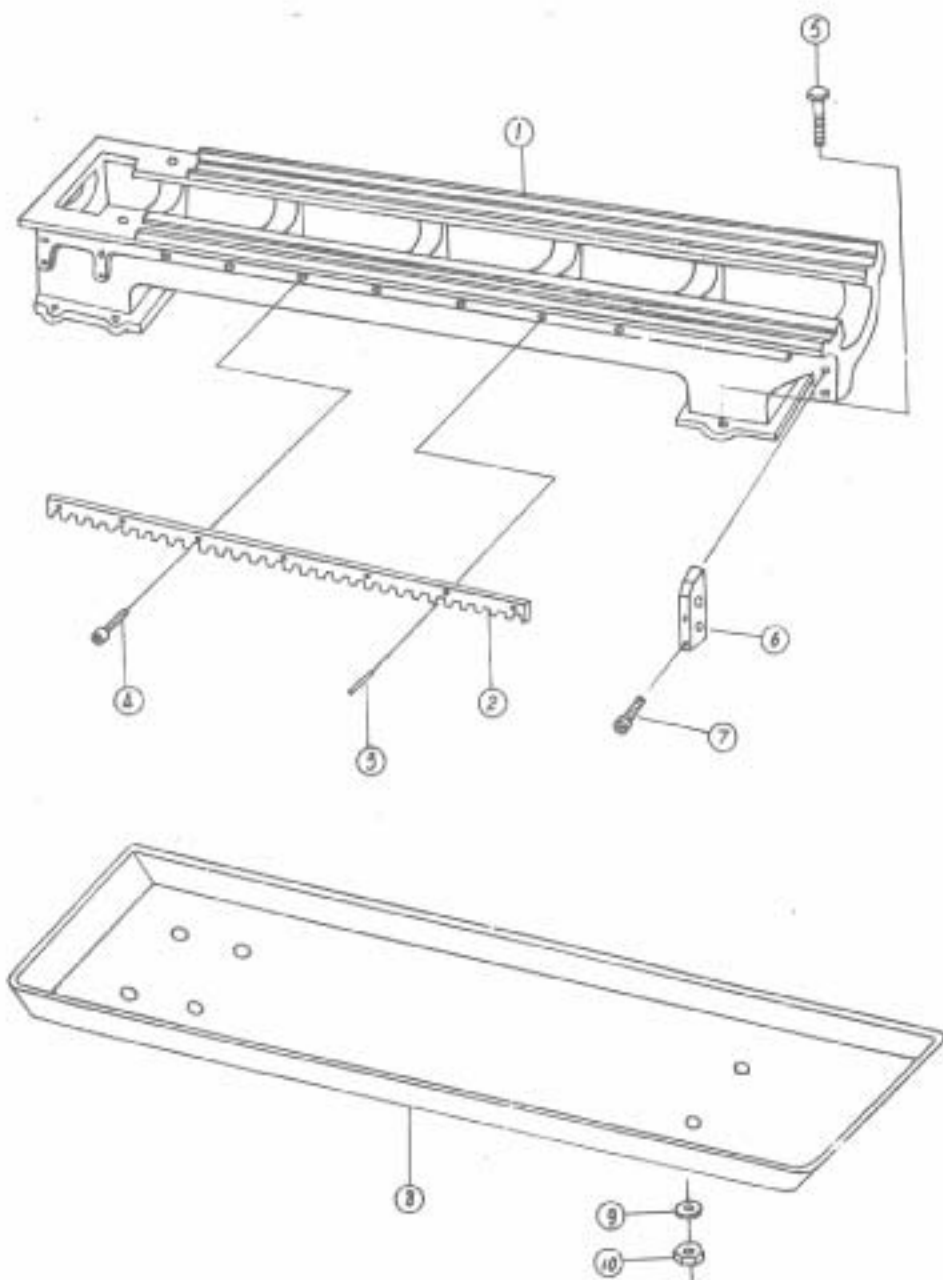
No.	DESCRIPTION	Q'TY	PART No.	Specification
1	Cover	1	2003	
2	Screw	2	2002	
3	Nut	2	2001	
4	Nut	1		M10
5	Screw	1	7013	
6	Nut	2		M12
7	Plate	1	7018	
8	Washer	2		12
9	Shaft	2	7017	
10	Bracket	2	7016	
11	Screw	4		M8 x 25
12	Motor	1		1.1KW
13	Nut	4		M10
13-1	Washer	1		10
14	Screw	4		M10 x 40
15	Key	1		8 x 40
16	Pulley	1	7001	

CONTROL SWITCH ASSEMBLY



No.	DESCRIPTION	Q'TY	PART No.	Specification
1	Bracket	1	7011	
2	Screw	2		M10 × 60
3	Oil Cup	2		Φ 6
4	Pin	2		6 × 55
5	Pin	1		4 × 30
6	Collar	1	7026	
7	Rod	1	7010	
8	Key	1		5 × 38
9	Pin	1		4 × 20
10	Spring	1	7020	
11	Handle	1	7015	
12	Bracket	1	7019	
13	Screw	2		M6 × 20
14	Pin	2		5 × 20
15	Bracket	1	7014	
16	Circlip	1		32
17	Screw	1		M8 × 25
18	Bracket	1	7021	
19	Switch	1		Hx5B - 10/2D009

BED ASSEMBLY



No.	DESCRIPTION	Q'TY	PART No.	Specification
1	Lathe Bed	1	7004	
2	Rack Gear	1	7005, 7007	
3	Pin	6		5 × 18
4	Screw	6		M6 × 16
5	Screw	6		M10 × 35
6	Bracket	1	7011	
7	Screw	2		M10 × 60
8	Chip Pan	1	7023	
9	Washer	6		10
10	Nut	6		M10