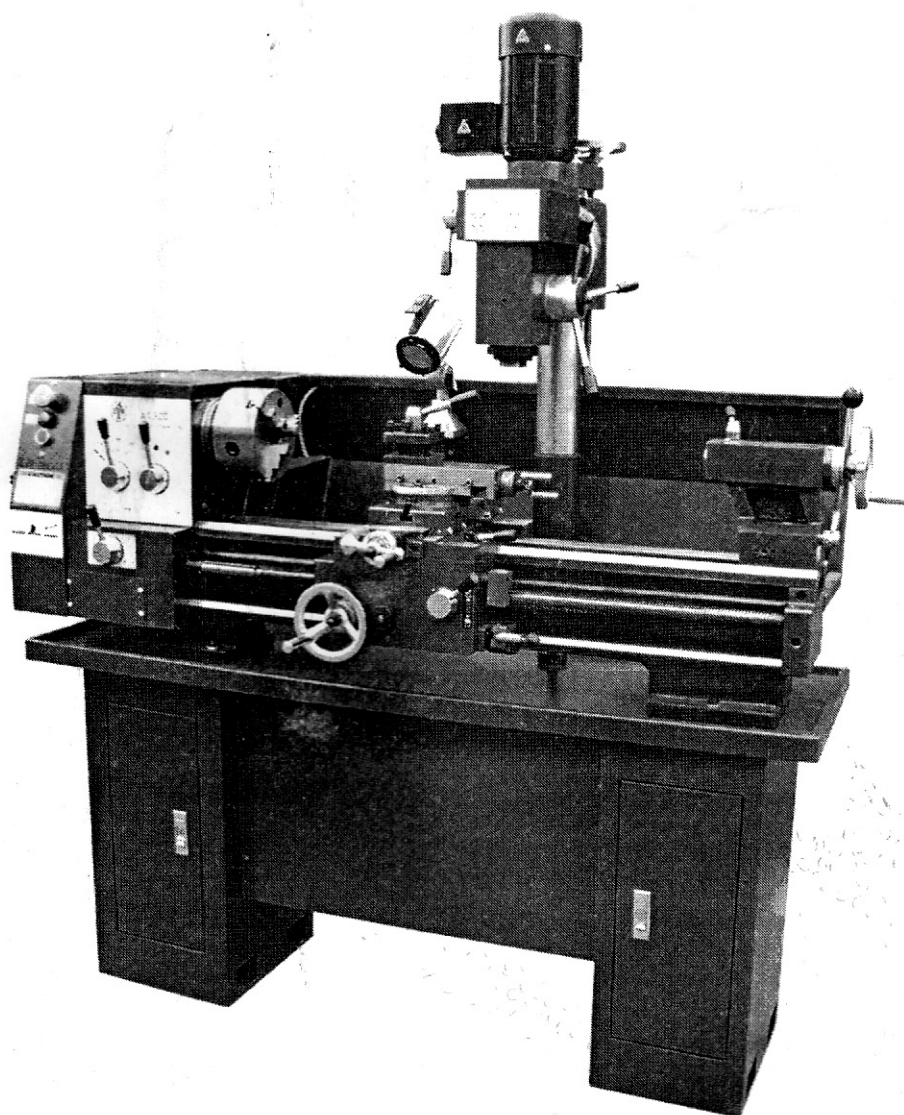




AT320

MULTI-PURPOSE MACHINE

INSTRUCTION MANUAL



1. Safety Precautions

- Keep balance of the machine when lifting in case of the danger of overturn caused by the unbalanced lifting., Only when the machine is fixed firmly, can you use it, or danger will be resulted from vibration.
- Users must check and make sure that the power source is right for the machine before operation and with reliable neutral wire, or the operator will suffer the danger from touching the electricity.
- This machine isn't equipped with illuminant apparatus. Users must mount it themselves. The mounted illuminator must not generate too strong light, flash light or shadow.
- Do not use the machine in bad surroundings, do not put the machine at damp or wet place or expose it to rain. The working place should be dry. Or the machine will be eroded or suffer from leak of circuit.
- Non-operators should keep a safety distance from the working area in case of being hurt by the flying piece.
- Operators should wear safety glasses in case of being hurt by the iron piece.
- Don't put things in the upper pocket. Don't wear things like necklace .Don't put tools and gauges ready to use in wrong place.
- Operators should wear work clothes and not with gloves on. Long hair must be bound up to avoid possible dangers of being wound by the running parts.
- Stepping-things for the operator must be able to guard against slide. Operators should keep balance of their bodies and not incline bodies or stretch arms too much.
- Do not process work pieces exceeding the designed range with the machine.
- Work pieces or cutting tools must be fixed firmly and correctly. Spanners or keys must be removed from chucks or drill chucks after the fixation. Operators should be accustomed to check and ensure that the spanners or keys have been removed already before operation.
- When operation users should adopt suitable tools, and work pieces must be fixed firmly and never be touched.
- Only when the machine is stopped, can you change cutting tools or maintain it.
- Operators can never leave the running machine. Only when the machine is stopped and chucks or drill chucks are thoroughly stopped, can they leave.
- If any abnormal noise or any other abnormal situation appears during operation, stop the machine immediately and repair it.
- Please guard against any other possible dangers.
- Caution: when the temperature is low, please run the machine for 20 minutes at low speed (160r/min).

2. Main Structure And Features

- This machine consists of 2 parts, the bench lathe and milling and drilling parts.
- This machine is capable of cutting internal and external circular surfaces cone plane and threads both in metric system and inch system, and able to drill and bore holes, mill plane or grooves and do other machining work.
- It possesses strong practical value and can be widely used in small -scale enterprises, repairing shops, schools and individual processing industries.

3. Main Specifications And Technical Data

3.1 Cutting

Max. swing diameter over bed	320 mm
Max. length of work piece	750 mm
Max. swing diameter over gap	210 mm
Spindle bore	38mm
Taper of hole in spindle Morse	MT.5 [#]
Transverse travel of tool post	160mm
Longitudinal travel of small tool post	100 mm
Metric thread kinds on processing	17
Metric thread pitch on processing	0.5~4 mm
Inch thread kinds on processing	20
Inch thread pitch on processing	9~40 1/n"
Longitudinal feed on spindle tool post	0.135~1.80 mm/r
Cross feed on spindle tool post	0.025~0.34 mm/r
Max. travel of tail stock sleeve	70 mm
Taper hole of tail stock sleeve Morse	MT.3 [#]
Spindle speed grade	12
Spindle speed scope	60~1600 r/min
Motor	1100w ,220V/380V, 50 Hz

3.2 Drilling and milling

Spindle bore	R8
Spindle speed grade	4
Spindle speed range	240~2700r/min
Max. drilling capacity	16 mm
Swivel angle around the column	360 °
Motor for drill-mill head stock	370W, 220V/380V, 50 Hz

3.3 Others

Net weight	390kg.
Overall dimension (base not involved) (L×W×H)	1580×770×1150mm 62.2×30.3×45.3"
Packing dimension (L×W×H)	1580×770×1840mm 62.2×30.3×72.4"

4. Driving System

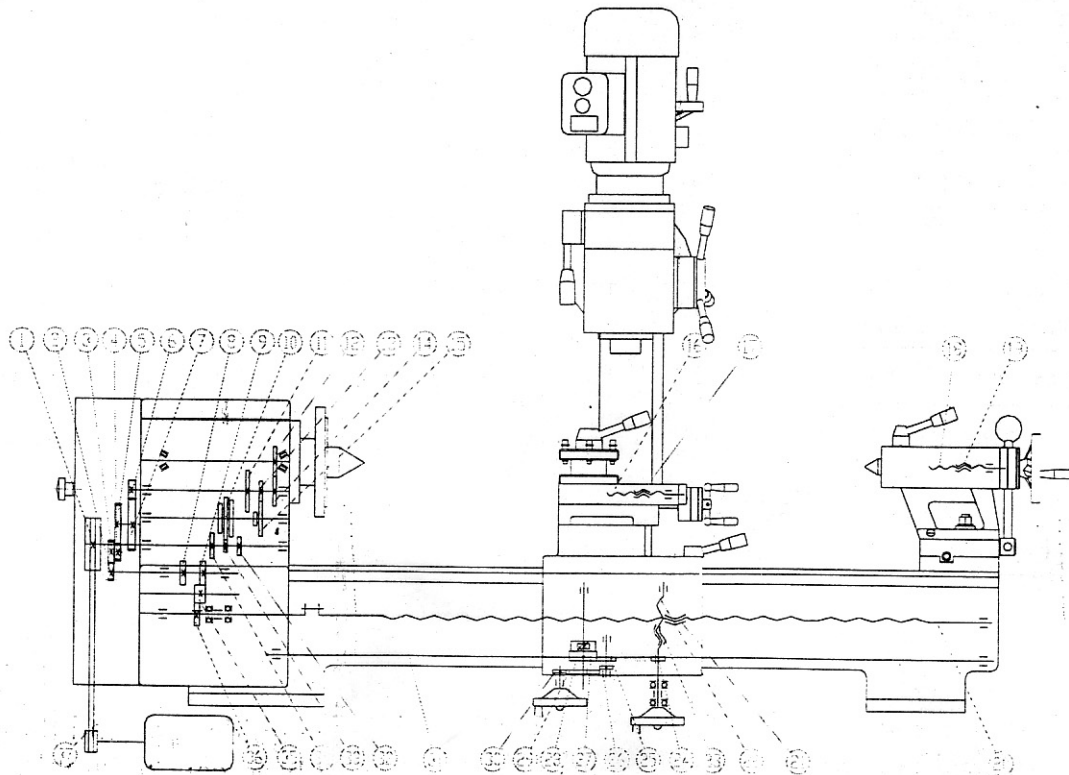


Fig.1 Driving System Fig

The driving parts in Fig.1 are showed below:

- | | | | |
|-----------------|---------------------------|----------------------|------------------|
| 1. Input pulley | 10. Triple slip gear | 19. Tail stock nut | 28. Worm screw |
| 2. Change gear | 11. Tooth gear | 20. Long, feed screw | 29. Tooth gear |
| 3. Change gear | 12. Shaft gear | 21. Long. Half nut | 30. Tooth gear |
| 4. Change gear | 13. Shaft gear | 22. Cross lead screw | 31. Tooth gear |
| 5. Change gear | 14. Tooth gear | 23. Cross nut | 32. Tooth gear |
| 6. Output gear | 15. Duplicate slip gear | 24. Tooth gear | 33. Tooth gear |
| 7. Tooth Gear | 16. Tool post lead screw | 25. Tooth gear | 34. slip gear |
| 8. Tooth Gear | 17. Tool post nut | 26. Tooth gear | 35. Tooth gear |
| 9. Tooth gear | 18. Tail stock lead screw | 27. Warm gear | 36. Motor pulley |

5. Lifting And Installation

It is recommended to use the lifting method in figure 2. If a forklift is available, it can also be used to lift the machine. When the machine is lifted and installed, you should make it level in case of turnover causing possible danger. The drilling and milling head can't be turned at 180° in case of losing balance.

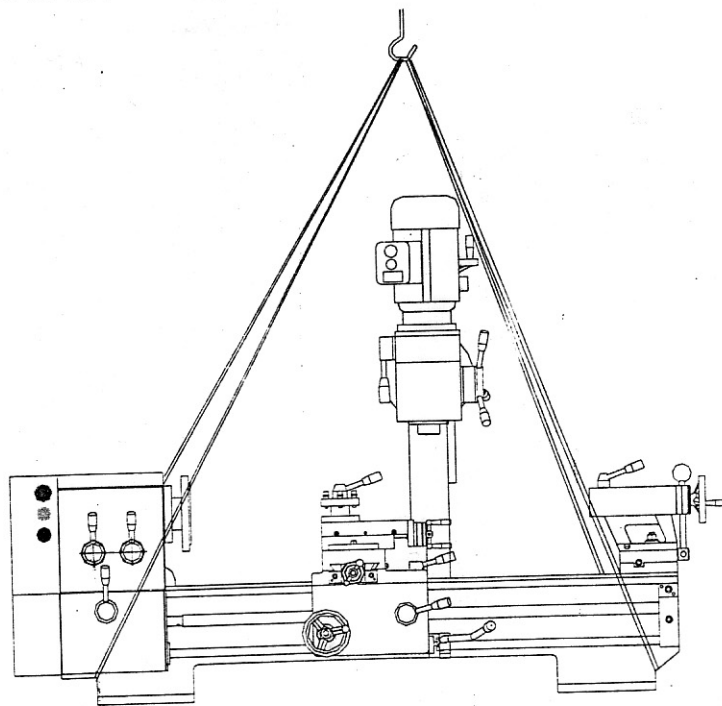


Fig.2 Machine Lifting Fig.

Please assembly referring to figure 3. Use to level the guide way and the small slide. Fix the machine in the base with bolts. The machine base can be supplied as special accessory supplied according to customer's requirements.

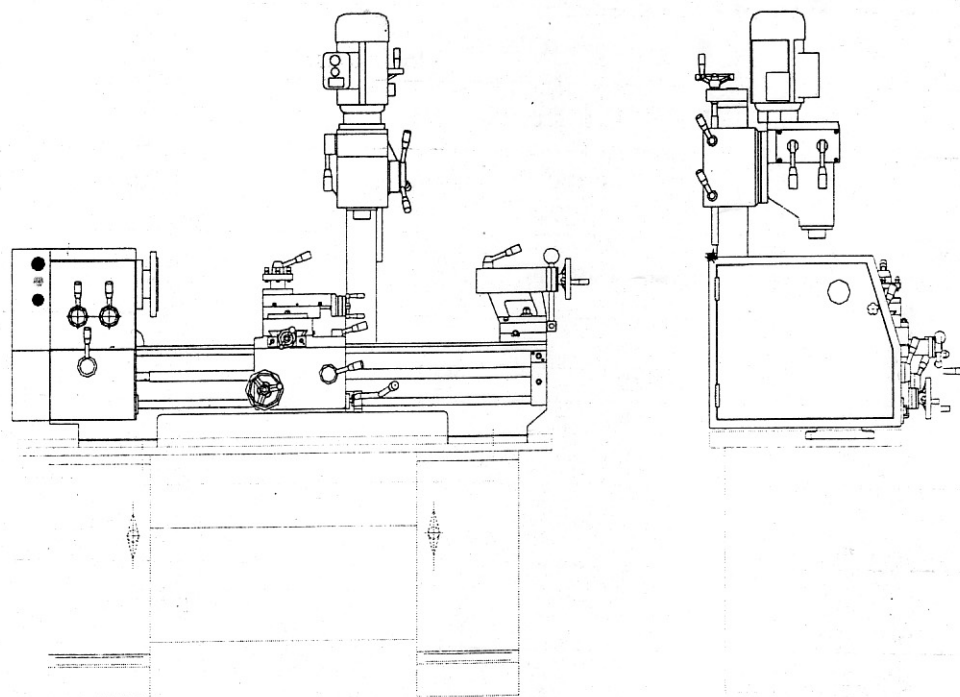


Fig 3 assembly fig.

6. Lubrication

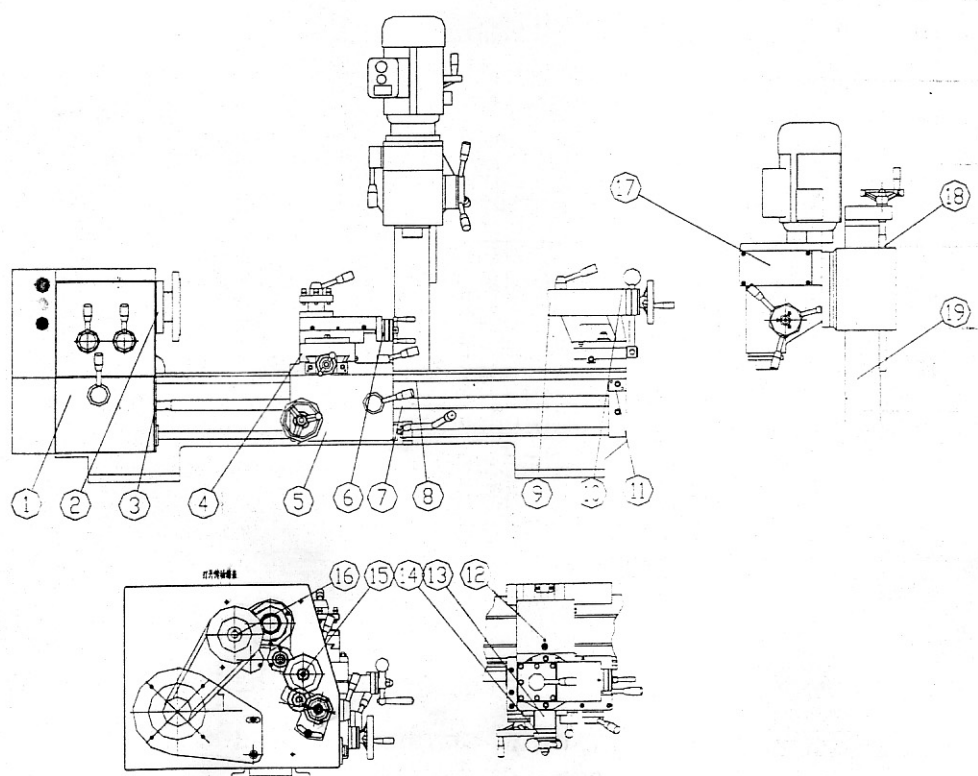


Fig.4 Lubrication Positions

List 1. Lubrication Positions List

Item in figure 6.	Lubrication Positions	Located Parts	Lubrication Methods	Types Of Lubrication Oil	Lubrication Period
1	Change gear, Shaft Sleeve	Left Trestle	Gun Oiling	Machine Oil	One year
2	Lathe head shaft Bearing	Lathe Head Stock	Greasing	Grease	One Year
3	Driving bearing	Left trestle	Greasing	Grease	One Year
4	Dovetail guide way, screw	carriage	Gun Oiling	Machine oil	Twice a day
5	Gear, Rack	Drill-mill Head Stock	Greasing	Grease	One month
6	Tool post lead screw, surface of guide way.	Tool post	Gun oiling	Machine oil	Twice a day
7	Long. feed screw	Feed screw	Gun Oiling	Machine Oil	Twice a Day
8	Bed guide way	Bed	Gun Oiling	Machine Oil	Twice a Day
9	Tail Stock Sleeve	Tail Stock	Gun Oiling	Machine Oil	Twice a Day
10	Bearing sleeve	Tailstock	Gun Oiling	Machine Oil	Twice a Day
11	Bearing seat	Bed	Gun Oiling	Machine Oil	Twice a Day
12	Cross nut, lead screw	Small carriage	Gun Oiling	Machine Oil	Twice a Day
13	Bearing sleeve	Small carriage	Gun Oiling	Machine Oil	Twice a Day
14	Driving bearing	Lead screw seat	Greasing	Grease	6 a Year
15	Gear shaft	Driving box	Gun Oiling	Machine Oil	Twice a day
16	Bearing	Input pulley	Greasing	Grease	One Day
17	gear	Drill-mill Head Stock	Greasing	Grease	One Year
18	Elevator lead screw, nut	Drill-mill Head Stock	Gun Oiling	Machine Oil	Twice a Day
19	Column	Drill-mill Head Stock	Gun Oiling	Machine Oil	One Day

Note:

- 1) It is recommended to use 3#CA Grease for the "grease" in the table.
- 2) Use 20# machine oil for the "machine oil" in the table.
- 3) The parts lubricated should be cleaned in due .The oil in the carriage should be changed in due. Oil again to the oil sign.

7. Electrical system,

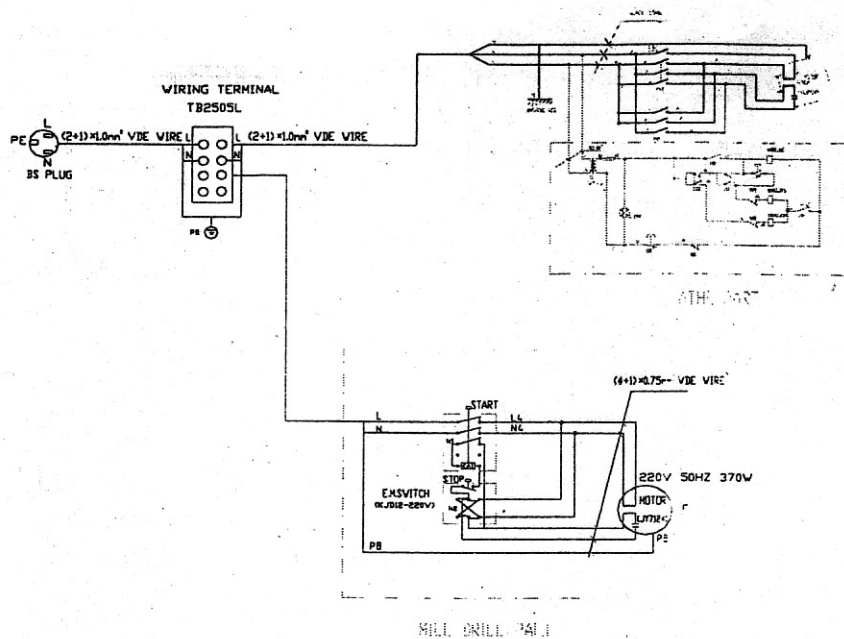


Fig 5, Electrical system

8. Operation And Usage

After installation, users should clear the antiseptic coat on the guide way, column, carriage, tailstock, change gears and pulleys e with non-corrosive kerosene and clean yarn, finally oil the machine as per lubrication requirements.

The descriptions and uses of the parts marked with nos. in Fig.6 are as following:

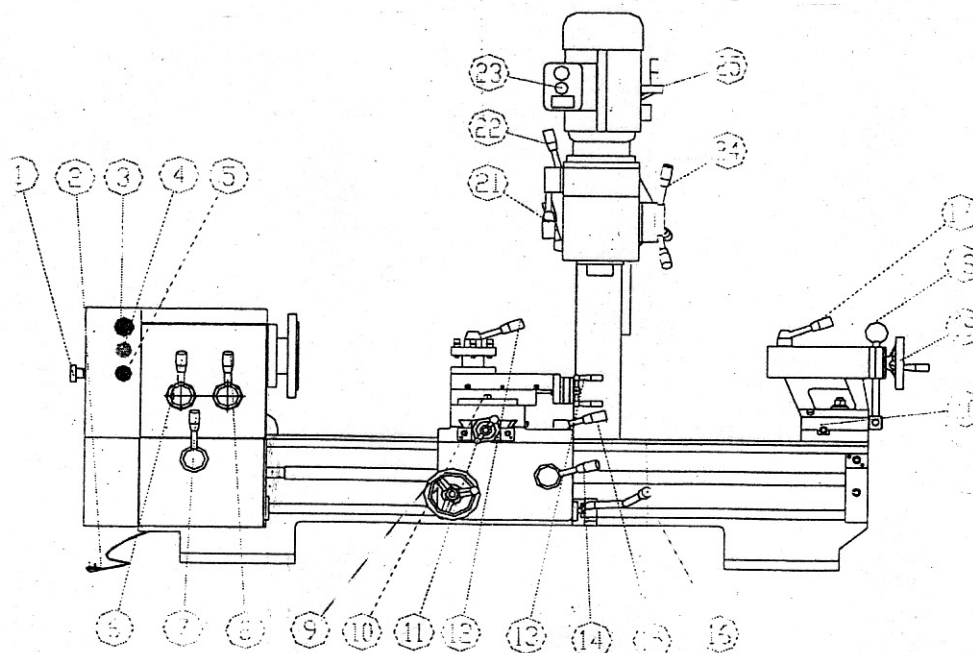
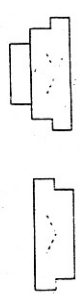







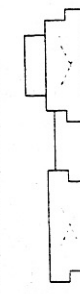

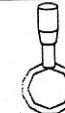



Fig.6 Operating Parts Fig.

1. Star shaped knob, to open or close the gear box.;
2. Triple pin plug, The power plug of the machine;
- 3.5. Gear shifting knob. The former has three gear shifting; the later has two. Refer to the label of spindle gear shifting .
4. Knob, to shift between forward and reverse feed. Three gears. The middle is powerless.
6. Switch, to control the turning diameter of the motor. When the motor stopped ,you can use it.
7. Start button; to start the motor.
8. Stop button; stop the machine; when emergency occurs, press this button.
9. longitudinal hand wheel; make the carriage move along the bed.
10. cross hand wheel; make the small slide and tool post move crossly.
11. Tool post handle, loose or lock the tool post. Use it to change tools.
12. Nut. To fix the small tool post. Loose it to move the post on the seat. Often use it to cut cone.
13. mutual lock handle; To make the longitudinal and cross feed lock alternatively and automatically.
14. Tool post hand wheel; To make the small tool post forward or back.
15. Handle, to control the split nut to be connected or disconnected;
16. handle , to control the longitudinal and cross power feed .
17. Handle, to lock tail stock sleeve;
18. Handle, to lock the tail stock;
19. Handle, to lock or loosen the tool post;
20. Set screw, to set the center of the live center to make it centric with the spindle.
21. Gear shifting handle for drilling and milling.
22. Lock handle, to lock the seat for locking the drill and mill.
- 23.24. Switch button.
25. Drill and mill feed handle.
26. Handle wheel, To elevate the drilling and milling head;

- Lathe spindle gearshift
Alter the position of the 2 handles(A,B) to realize gear shifting..

List. 2 Lathe gear shift list.

	A	B		
				60 350
				120 600
				200 050

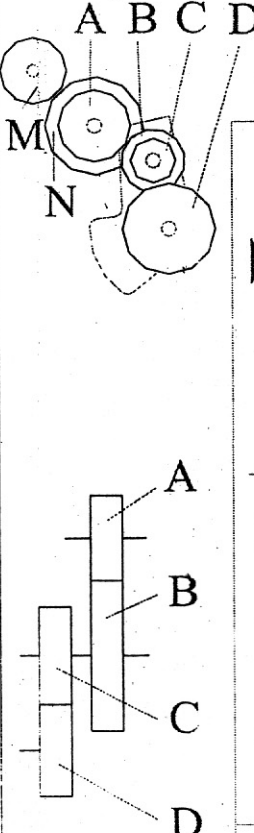






	A	B		
				30 500
				160 850
				300 1600

● Cut thread:

When cut a certain kind of thread, the right gears should match with the gear handle 3, 5 (in fig 6) to get the right thread pitch.

The matching relationship is showed in fig 3 clearly. When operation, please refer to the label in the gear box or showed in fig 3 below.

List 3. change gear list

		M=24 N=60	M=28 N=35	$\frac{A}{B} \times \frac{C}{D}$	 M=24 N=60	 M=28 N=35	 M=24 N=60	 M=28 N=35
		18	9	$\frac{24}{50} \times \frac{25}{48}$	0.100	0.200	0.022	0.045
		20	10	$\frac{32}{28} \times \frac{35}{34}$	0.493	0.986	0.105	0.210
		22	11	$\frac{30}{27} \times \frac{40}{42}$	0.443	0.886	0.095	0.190
		23	11.5	$\frac{32}{30} \times \frac{36}{40}$	0.400	0.800	0.085	0.170
		24	12	$\frac{27}{42} \times \frac{40}{28}$	0.385	0.770	0.082	0.164
		26	13	$\frac{30}{34} \times \frac{32}{32}$	0.370	0.740	0.078	0.156
		28	14	$\frac{32}{35} \times \frac{32}{36}$	0.340	0.680	0.072	0.144
		30	15	$\frac{30}{27} \times \frac{34}{50}$	0.316	0.632	0.068	0.136
		32	16	$\frac{35}{32} \times \frac{27}{42}$	0.295	0.590	0.062	0.124
		34	17	$\frac{35}{34} \times \frac{27}{42}$	0.277	0.554	0.059	0.118
		36	18	$\frac{32}{36} \times \frac{28}{40}$	0.260	0.520	0.055	0.110
		40	20	$\frac{30}{34} \times \frac{28}{42}$	0.246	0.592	0.052	0.104
		48	24	$\frac{30}{32} \times \frac{27}{48}$	0.221	0.442	0.047	0.094
		0.5	1	$\frac{25}{32} \times \frac{27}{48}$	0.185	0.370	0.039	0.078
		0.6		$\frac{28}{35} \times \frac{25}{48}$	0.175	0.350	0.037	0.074
		0.7		$\frac{24}{36} \times \frac{30}{40}$	0.210	0.420	0.044	0.088
		0.75	1.5	$\frac{28}{36} \times \frac{30}{40}$	0.244	0.488	0.052	0.104
		0.8		$\frac{25}{40} \times \frac{32}{32}$	0.262	0.532	0.056	0.112
		1	2	$\frac{28}{32} \times \frac{32}{42}$	0.280	0.560	0.060	0.120
		1.25	2.5	$\frac{30}{32} \times \frac{32}{36}$	0.350	0.700	0.074	0.148
		1.5	3	$\frac{30}{32} \times \frac{40}{36}$	0.436	0.872	0.093	0.186
		1.75	3.5	$\frac{30}{36} \times \frac{42}{28}$	0.524	1.048	0.111	0.222
		2	4	$\frac{35}{30} \times \frac{40}{32}$	0.612	1.224	0.130	0.260
				$\frac{35}{30} \times \frac{40}{28}$	0.700	1.400	0.150	0.300

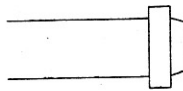





Cut right spiral thread, The handle 4 in Fig 6 can change the direction of feeding.

Reverse feeding will be realized with this handle when cut right spiral thread.

Power feed: Besides cutting thread, Turn handle 16 to cross or longitudinal feed position according to direction in Fig 6 when cut outside cylinder. The recommended position is :A=24,B=50,C=25,D=48. When out of factory, the matching is just like this.

- Gear shifting of drill and mill.

List. 4

			
	240		1100
	600		2700

9. Maintenance

- The machining range must not exceed the designed range mentioned above.
- If the motor cannot start with the source power is normal, please check the Switch system is normal. Eg, The switch in the gear box is good or not. The Fuse in the plug should also be given priority to check. Sometimes the machine problem also can cause the motor stopping turning such as bad lubrication, too much load, or the clearance is too small etc..
- After repair is made to the electrical elements, please go with following instructions.

- | | |
|-----------------------|--------------|
| 1 Yellow & green wire | Earth wire |
| 2 Blue wire | Neutral wire |
| 3 Brown wire | Live wire |

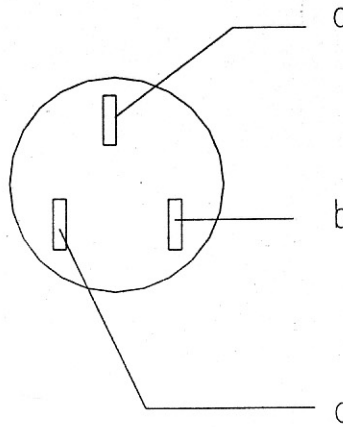


图 7. Plug wiring

Accordingly, please connect the wires with the source plug as below:

- a. The higher terminal of the source plug (marked with "E", "PE" or \oplus " coloured green or yellow & green) must be connected with yellow & green wire.
 - b. The terminal marked with "N" or coloured black must be connected with blue wire.
 - c. The terminal marked with "L" or coloured red must be connected with brown wire.
- In the carriage ,small slide and the dovetail guide way, There are iron piece to eliminate friction. They are properly set. After using a period of time, the gap will be bigger or smaller. According to the actual fact,reset them.Refer to fig 9 or fig 10.

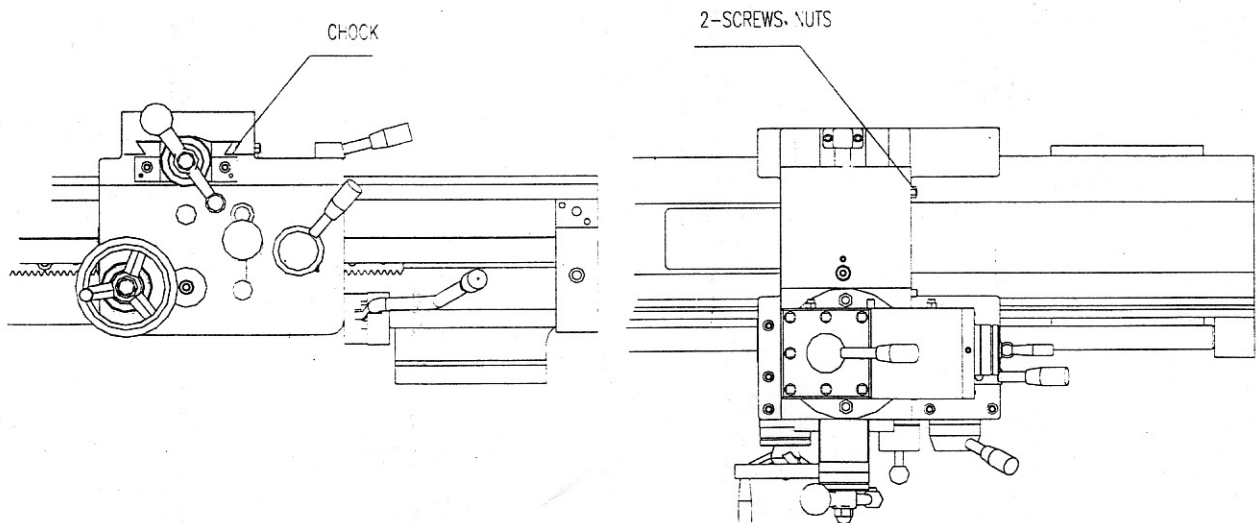


Fig.8. RESETING CHOCK I

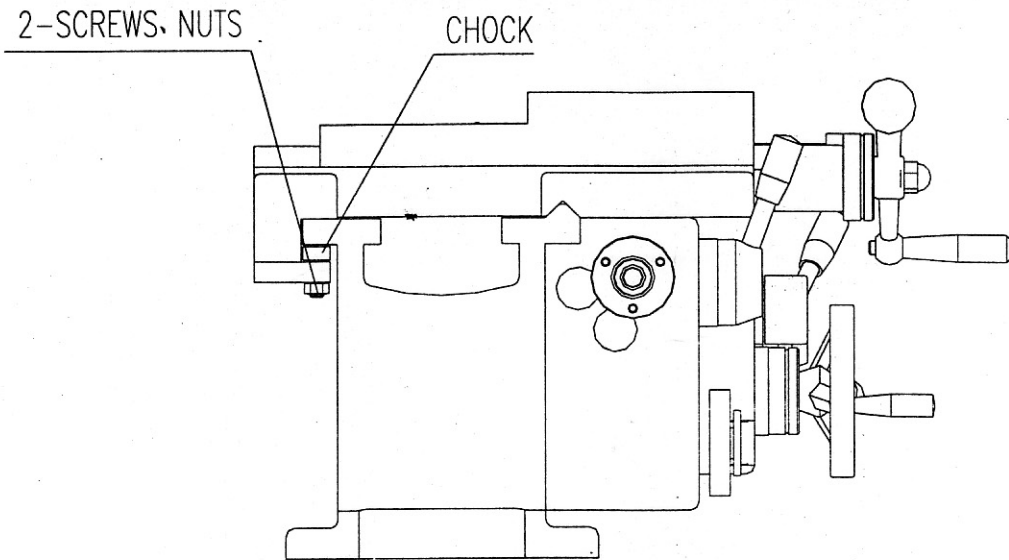


Fig9. RESETING CHOCK II

- When in use ,lubricate the machine fully. Esp.the surface of the guide ways. Shortage of oil in the surface of column will cause great damage.
- Suggestion: to check the machine periodically. Repair is made timely to ensure steady work.
- The vertical travel of the drilling and milling cannot exceed the regulation. 90 degrees in level is the best.

※ **Note:** All contents of this Instruction Manual are subject to change without notice.