
CNC lathe model CBT-1640



OPERATION MANUAL

(MECHANICAL PART)

Max. Swing over bed: $\Phi 15 \frac{3}{4}$ "

Max. Turning length: $39 \frac{3}{8}$ "

Serial No.:

BE SUBJECT TO ALTERATION WITHOUT NOTICE

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A. PREFACE

Thank you for choosing the MODEL **CBT-1640** CNC LATHE which is manufactured in our company. This model is a 2-Axes CNC lathe working under the microcomputer control and designed for turning inner and outer cylindrical surface, end surface, any random taper surface, arc surface, ball surface and various inch or metric thread, taper thread, esp. multi-headed thread of shafts, etc., with high efficiency, accurate processing, easy and safe operation, full functions and reliable capacities. The cutting tools carrier can be equipped with 4-station, 6-station, 8-station or gang-type turrets. The spindle speed is adjusted by frequency alternation. The spindle supporter is adopted with preloading accurate and angular contact rolling bearings and the bed ways have been finely grinded after ultra-tone quenching. It can also complete the working procedures of cutting, notch cutting, drilling, hole slashing and reaming, etc. The main drive motor on the machine works at an infinitely variable speed under the control of frequency inverter. The feeding movements are actuated by A.C. servomotor.

The model can also be widely used in the educational institutions:

- Engineering courses of colleges and universities, subject of machinery manufacturing , electro mechanization, production control automation and other relative professional teaching practice and integrative experiments of CNC technology
- The basic courses of technical secondary school, technical school, subject of basic operation training of CNC lathe.
- The batch quantity of products processing for the Scientific research organizations and enterprises.

The machine is rational in design, excellent in performance, it is an ideal machining facility in the state of arts industry.

1. GENERAL SAFETY RULES FOR POWER TOOLS

WARNING: DO NOT ATTEMPT TO OPERATE UNTIL YOU HAVE READ THOROUGHLY AND UNDERSTAND COMPLETELY ALL INSTRUCTIONS, RULES, ETC., CONTAINED IN THIS MANUAL. FAILURE TO COMPLY CAN RESULT IN ACCIDENTS INVOLVING FIRE, ELECTRIC SHOCK, OR SERIOUS PERSONAL INJURY. MAINTAIN OWNERS MANUAL AND REIEW FREQUENTLY FOR CONTINUING SAFE OPERATION, AND INSTRUCTING THE THIRD-PART USER.

1) KNOW YOUR POWER TOOLS

For your own safety, read the owner's manual carefully. Learn its application as well as the specific potential hazards peculiar to this tool.

2) GUARD AGAINST ELECTRICAL SHOCK BY PREVENTING BODY CONTACT WITH GROUNDED SURFACE.

For example: pipes, radiators, ranges refrigerator enclosures.

3) REMOVE ADJUSTMENT KEYS AND WRENCHES.

Form habit of checking to see that keys and adjusting wrenches are removed from tool before turning on it.

4) KEEP THE WORKING AREA CLEAN, DO NOT USE IT IN DANGEROUS ENVIRONMENT.

Don't use the power tools in damp or wet locations, or expose them in rain. Keep the working area well illuminated.

5) KEEP CHILDREN AND VISITORS IN A SAFE DISTANCE FROM THE WORKING AREA.

6) USE RIGHT TOOL

Don't force tool or attachment to do a job for which it was not designed.

7) WEAR PROPER APPAREL

No loose clothing, gloves, neckties, rings bracelets, or jewelry to get caught in moving parts. Non-slip foot wear is recommended. Wear protective hair covering to contain long hair.

8) ALWAYS USE SAFETY GLASSES.

9) MAINTAIN TOOLS IN TOP CONDITION

Keep tools sharp and clean for best and safest performance. Follow instructions for lubricating and changing accessories.

10) DISCONNECT TOOLS FROM POWER SOURCE.

Before serving and when changing accessories such as blades, bit cutters or when mounting and remounting motor.

11) AVOID ACCIDENT ATARTING.

Make sure switch is in “OFF” position before plugging in cord.

12) USE RECOMMENDED ACCESSORIES.

Consult the owner’s manual for recommended accessories. Use of improper accessories may be hazardous.

13) NEVER STAND ON THE TOOL.

Serious injury could occur if the tool is tipped or if the cutting tool is unintentionally contacted.

14) CHECK DAMAGED PARTS.

Before further use of the tool, a guard or other part that is damaged should be carefully checked to ensure that it will operate properly and perform its intended function. Check for alignment of moving parts, binding of moving parts, breakage of parts, mounting, and any other conditions that may affect its operation. A guard or other part is damaged should be properly repaired or replaced.

15) NEVER LEAVE TOOL RUNNING UNATTENDED

Don’t leave tool until it comes to a full stop. The operation of any power tool may result in some objects being thrown into the eyes, which can result in severe eyes damage. Always wear safety glasses or eye shields before using your lathe. We recommended wide vision safety mask or

standard safety glasses.

2. SAFETY RULES FOR THE LATHE

Safety is a combination of operator's common sense and alertness at all times when lathe is being used. Study these safety rules and general safety rules before operating and retain for further use.

1. wear eye protection.
2. never attempt any operation or adjustment if procedure is not understood.
3. keep fingers away from revolving parts and cutting tools while in operation.
4. never force cutting action.
5. never perform an abnormal or little used operation without study and use of adequate slipper blocks, jigs stops and fixtures etc.
6. use of shop manual such as "machinery's Handbook" or similar is recommended for cutting speeds, feeds and operation details.
7. do not remove drive cover while machine is in operation. Make sure it is always closed.
8. always remove chuck key, even when machine is not in operation.
9. do not attempt to adjust or remove tools when in operation.
10. always keep cutters sharp.
11. never use in an explosive atmosphere or where a spark could ignite a fire.
12. always use identical replacement parts when serving.

B. INSTRUCTIONS OF OPERATION

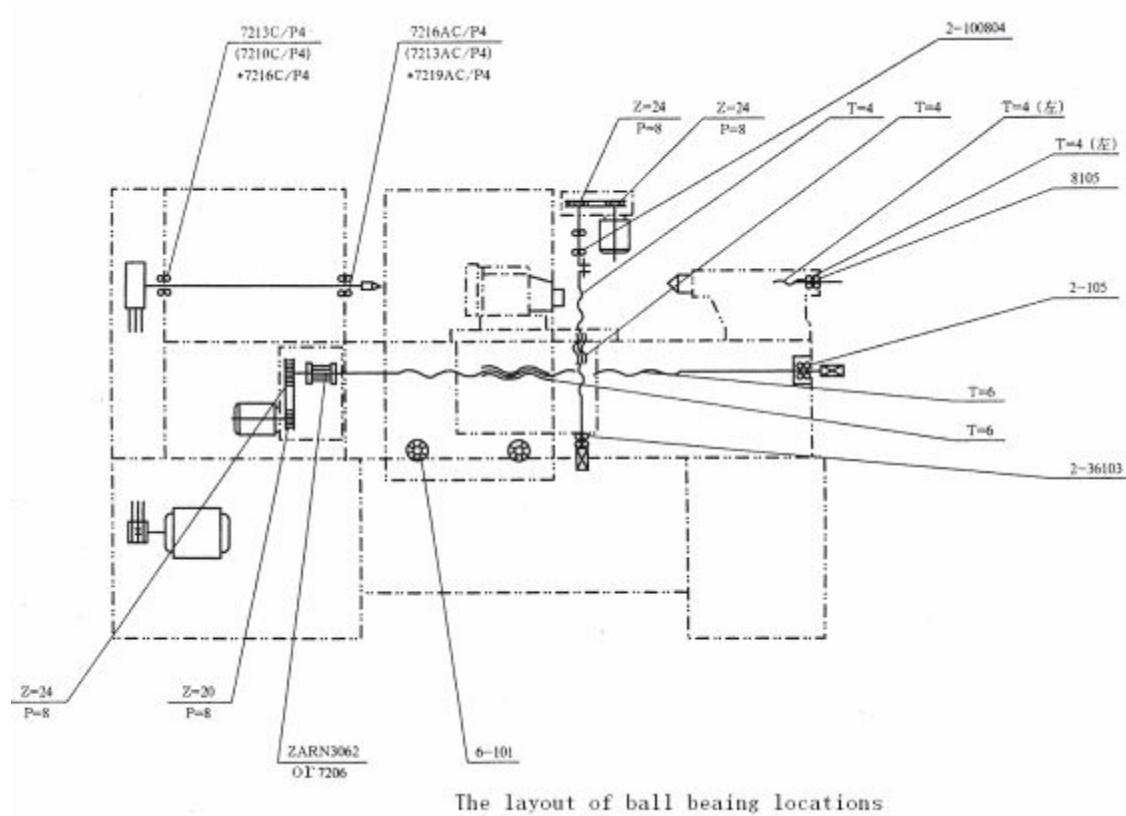
THE MECHANICAL PART

1. THE MACHINERY SPECIFICATION

Items	Specifications	
Max. swing over bed	Φ 15 3/4"	
Max. swing over carriage	Φ 8 1/4"	
Max. length of work piece	39 3/8"	
Range of spindle speed	200-2000 rpm	
Spindle bore	Φ 2 3/8"	
Taper of spindle bore	MT6	
Stations of tool carrier	4, 6 or 8 (optional)	
Max. size of tool post	25X25 (for 4-station) ,20x20 (for 6-station)	
Min. setting unit : Servo / stepper	(Z) cross	0.000039"
	(X) long.	0.000039"
Moving speed of post Server	(Z) cross	393.7" / min.
	(X) long.	314.96" / min.
Taper of tailstock quill	MT4	
Max. range of tailstock quill	4.72"	
MAIN Motor power	7.37HP	
(Z) sever motor (feeding power)	2.01HP	
(X) sever motor (feeding power)	2.01HP	
Packing size (mm)	103 15/16" x59 1/16" x69 1/2"	
Net weight	3969LBS.	

Optional accessories: 1. pneumatic chuck 2. hydraulic chuck 3. pneumatic tailstock 4.spring fastener

2. THE FIGURE OF THE LATHE LAYOUT



3. THE MAIN PARTS TABLE

NO	PART NAME	QUANTITY
1	BED	1
2	FOOT STAND	1
3	LATHE ENCLOSER	1
4	HEAD STOCK	1
5	TAIL STOCK	1
6	APRON	1
7	ELECTRIC TOOL POST	1

8	COOLANT SYSTEM	1
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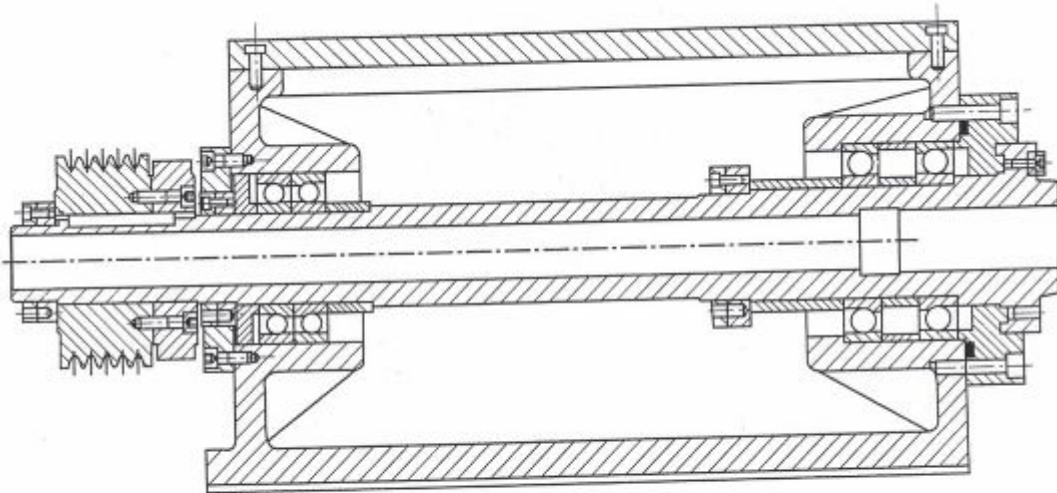
4. THE MAIN STRUCTURE

- LATHE BED

The lathe bed has been cast into firm cross form by the iron material numbered HT200 with little vibration. Two 90 degree V-type level guide rails are hardened by hyper acoustic quenching and well grinded. Both apron and tail stock have one 90 degree V-type level guide rail. The longitudinal feeding (Z) is transmitted by ball lead screws which is fixed before the lathe bed. The main motor is built in the foot stand.

- HEAD STOCK

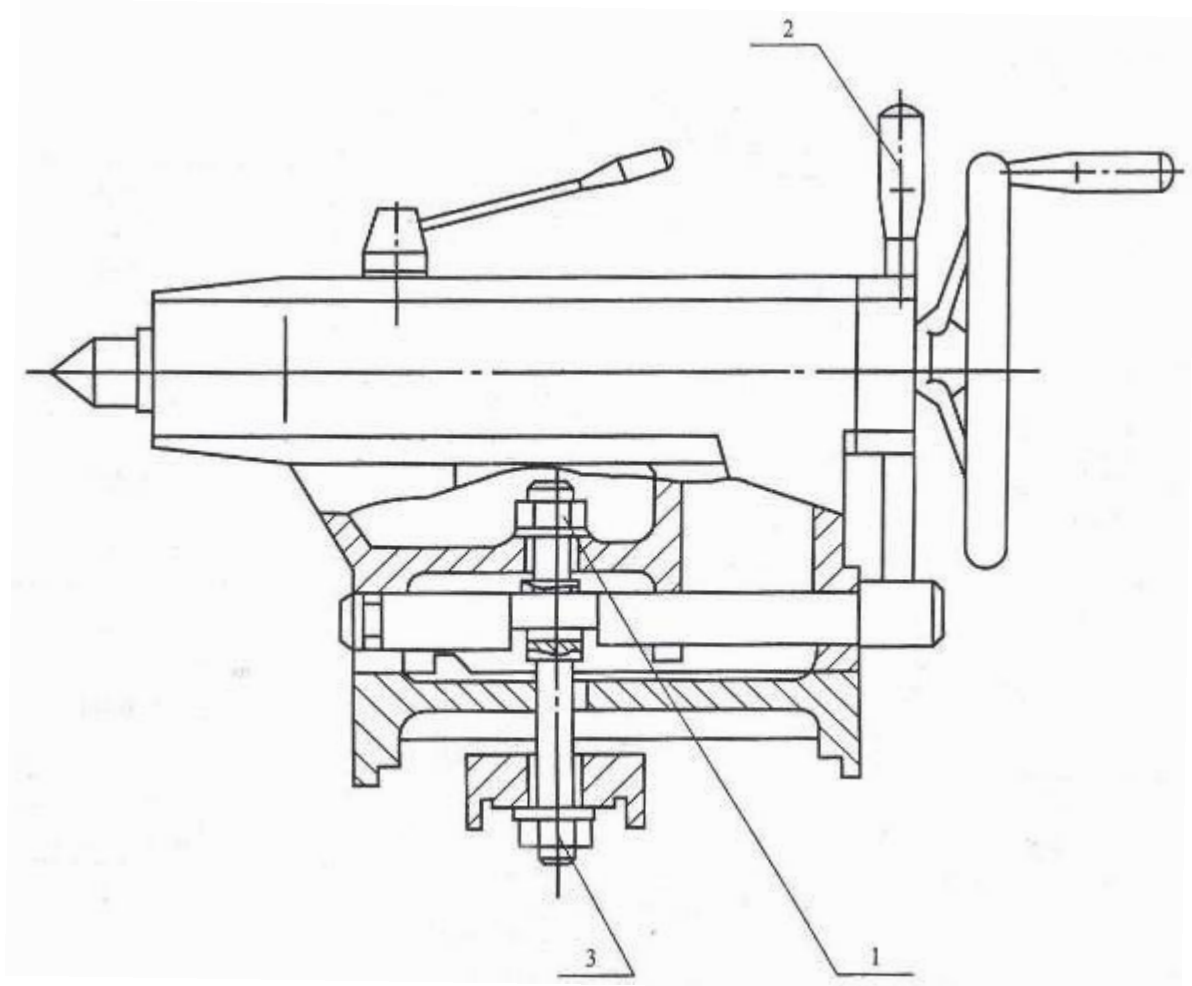
The lathe bed has been cast by the iron material numbered HT200, it is fixed firmly on the lathe bed by eight screws. In the headstock, the spindle is fixed on pairs of precise ball roller bearings (7018AC/P5/DB, 7219AC/P5/DB), the spindle bore is $\Phi 2.36''$, the taper of the spindle bore is MT 6. The triangular belt is used on the lathe, the advantage is non-noise when the lathe is running at any speed.



The adjustment figure of spindle bearings

- APRON

The apron has been cast by the iron material numbered HT200, its surface of sliding rails are well grinded, there is no clearance between apron rails and the level rails of the lathe bed, its lower sliding parts can be conveniently adjusted. The top slide is fixed on the apron, its sliding on the apron is transmitted through the ball screws, the apron slide clearance of the dove tail slot can be adjusted by moving the fit strip.



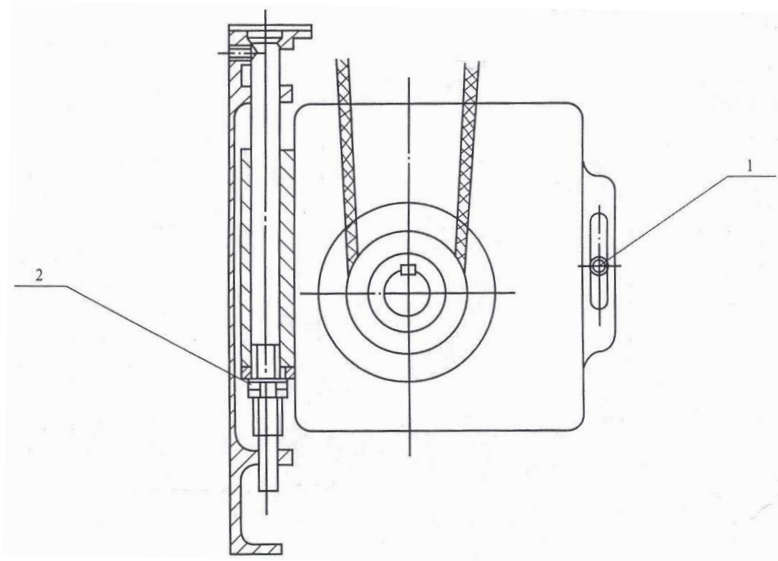
- TAIL STOCK

The tail stock can be fastened on the lathe bed by tightening the locking block through one locking handle, there is a sleeve in the tail stock, the taper of it is MT 4, there is another locking handle which can tight the sleeve at any position, when you rotate the hand wheel of the tailstock, the sleeve can be moving.

5. THE TRANSMISSION SYSTEM

- THE MAIN SPINDLE SPEED ROTATION

The speed of spindle is transmitted by triangular belt, the motor (VF50-5.5-4) will get the different speeds through the frequency converter, so the main spindle speed will be changed with it.



The belt transmission principle figure to adjust the tensile force

- THE MOVEMENT OF LONGITUDINAL FEEDING (Z-AXIS)
The longitudinal feeding of the cross slide is supported by the servo motor fixed on the lathe bed, the longitudinal feeding speed will be changed by controlling the lead screw speed.
- THE MOVEMENT OF CROSS FEEDING (X-AXIS)
The longitudinal feeding of the cross slide is supported by the servo motor fixed on the cross slide, the cross feeding speed will also be changed by controlling the lead screw speed.
- THREAD CUTTING
To ensure for the spindle to run a circle while the tool post to move a lead, so we fix a photoelectric encoder on the left side of the headstock, the speed proportion from the spindle to photoelectric encoder is 1:1, the photoelectric encoder will coordinate with the step motor or serve motor to ensure for the spindle to run a circle while the tool post to move a lead (that is, the thread pitch to be

processed), it saves trouble to change gears and the thread processing ranges are also widened.

- **TRIAL RUNNING**

To ensure the long life the characteristic of the bearings, you are suggested to avoid from running at high speed during the beginning period, please alternatively use the speed for the trial running:

- 400 rpm running for 3 hours
- 700 rpm running for 2 hours
- 1200 rpm running for 3 hours

TRANSMISSION TABLE

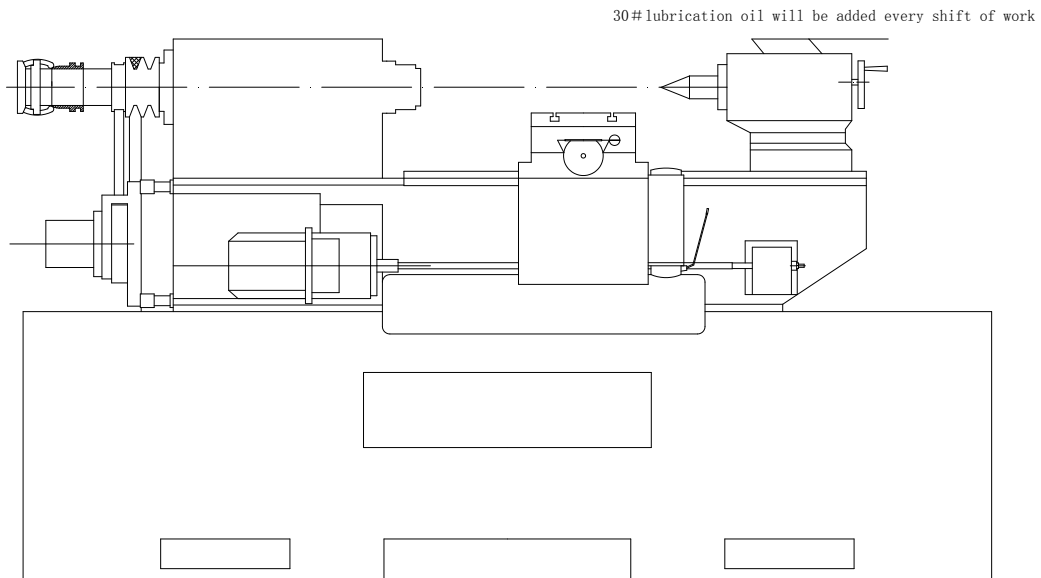
- **Table of ball bearing**

Mode 1	Name	Q'ty
1	Angular contact ball bearing 7018AC/P5D4	2
2	Angular contact ball bearing 7219AC/95/DB	2
3	Angular contact ball bearing 7003AC	2
4	Angular contact ball bearing 7206AC	2
5	Deep groove ball bearing 6203	2
6	Deep groove ball bearing 6005	2
7	Deep groove ball bearing 6104	1

6. THE LUBRICATION SYSTEM

The lubrication of the spindle and the ball bearings are safety-guarded by the hyperthermia grease lubricant.

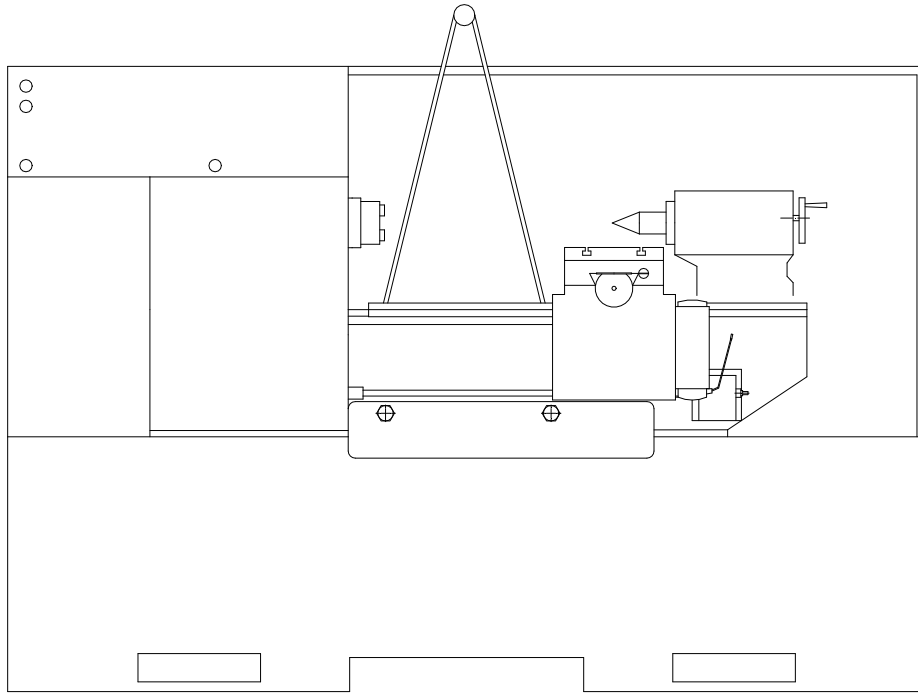
For the bed track and the surface of the tailstock sleeve, they must be oiled by the oil gun during every work shift. The surfaces of the cross slide and the feeding ball screw must also be oiled by grease hand pump during every work shift.



Lathe lubrication figure

7. THE TRANSPORTATION

During transportation, some items should be noticed that when the machine is lifted into or out of the packing wooden case, using two pieces of steel pipes ($\Phi 1.57''$) to insert the lifting holes on the left and the right sides of the machine tool (see figure 4), it must be kept balance when it is lifted or set down, never to be impacted, strenuously vibrated and exceedingly tilted.



Lathe transportation figure

8. THE INSTALLATION

When you set the machine tool on the ground, you'll use the supplied four shockproof sizing block to adjust the level, it is in the perfect condition that the installation precise of the two-way leveling will not exceed $0.0016'' / 39.37''$.

9. THE MAINTENANCE

- Before operating the lathe, all the parts must be lubricated.
- When the lathe is used for the first time, or it is not used for a long time, keep the machine running for a few minutes.
- Never use the lathe in the moist position, keep the lathe clean and also keep the working site well illuminated.
- Forbidden to use the air compressor to clean the machine.

C. THE ELECTRICAL PART

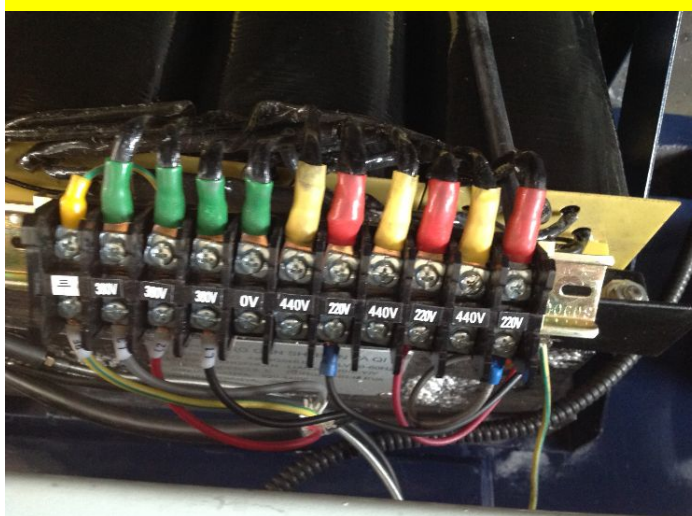
1. GENERAL SPECIFICATIONS

- General power: 380 VAC + 10% -- 15% 60(50)Hz 3-phases
- Spindle motor: 380 VAC 50 Hz 7.37HP
- Motor of coolant system: 220 VAC 50Hz 0.1206HP
- Motor of tool post: 220 VAC 50Hz 0.0804HP
- Work light: 24 VAC 0.0536HP

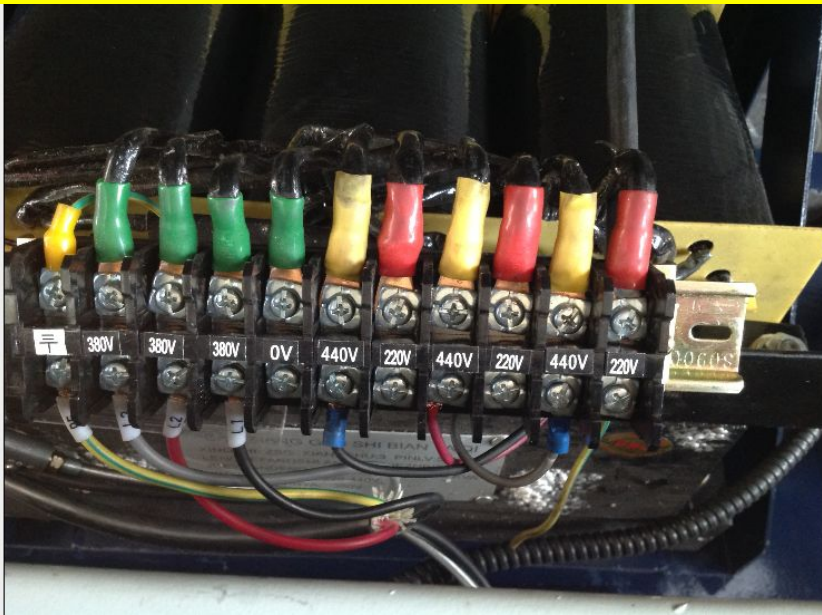
2. CONDITIONS TO USE THE ELECTRIC PARTS.

- Condition of power: alternating current (AC) 380AVC + 10% -- 15% 50Hz 3-phases
- Aggregate capacity: 10.72HP
- Condition of circumstance: A. without caustic chemical gas. B. temperature from 0-40 centigrade. C. relative humidity (RH) will not be more than 80%. D. height above sea level will not be higher than 6.561.68' .

220V Connecting



440V Connecting



3. CHECK BEFORE CONNECTION WITH POWER

- To ensure safety of the personnel and the equipment, the careful checking on all the electric parts is needed before connection with the power.
- To check whether it is right or not for the connection of all the electric parts.
- To check whether all the fastening pieces get loose or not.
- To check whether the insulation is good or not, whether the cables or line conductor with breakage, and whether it will do harm to person.
- To check whether all the electric components in good condition or not.

4. THE STRUCTURES OF SOFT WARE AND HARD WARE OF THE CNC CONTROLLING SYSTEM (refer to the manual for the debugging and programming of the CNC controlling system)