

**CNC1315 LATHE**  
**OPERATION INSTRUCTION,**  
**CERTIFICATE OF INSPECTION**  
**AND**  
**PACKING LIST**

Manufacture No.: **1207302**

**MADE IN CHINA**

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## Operation Instruction

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## Certificate of Inspection

## Packing List

**1.1 The Signs of the Safety Message and Their Definitions**

All the safety articles described in this Operation Instruction are very important, which can ensure you to use the lathe safely, protect you and others around from any injuries, and avoid any damages to the property in the working area. First of all, please completely familiarize with the signs below as well as their meanings, and must abide by the matters described for attention. And then, read the Operation Instruction conscientiously.

**1.2 Installation Environment**

The lathe must be installed within the environment with the following conditions:

- (1). Power Voltage: The steady-state voltage value is 0.9—1.1 times of rated voltage.
- (2). Frequency: It is 0.99—1.01 times of rated frequency (in continuous operation); and 0.98—1.02 times of rated frequency (in transient time).
- (3). Ambient Temperature: within the range of 5°C-- 40°C.
- (4). Relative Air Humidity: It is not higher than 90%( at 20°C), or 50%(at 40°C).
- (5). There should not be any dangerous environments, such as with conducting dust particles, high density of dust, acid or salt substances, corrosive gases, fume and vapour, explosive gases, and so on.
- (6). At the installation place, there should be without direct sun light, or other strong radiation rays.(such as Microwave, laser light, X-ray, UV ray, etc.)
- (7). Within the installation environment, there should not be any serious vibration or shocks.

If the environment conditions at the installation place cannot meet the requirement, the customer can submit a special order.

**1.3 . Installation Safety****1.3.1. Hoisting up the Machine**

- (1). The hoisting of the machine should be operated by qualified special persons.
- (2). While hoisting up the machine, a qualified lifting apparatus with enough capacity should be used.
- (3). While hoisting up, it should be conducted by a special person.
- (4). While hoisting, any person should not stand in the dangerous area below the lathe.

**1.3.2. Connecting Wires**

(1). Only the wires stipulated in the Section of "Electrical System of the Lathe " in this Operation Instruction or those better must be used.

(2). It is forbidden to connect the power supply of this lathe together with other devices which can produce high noises, such as, the devices for high frequency quenching, arc welding, etc.

(3). Qualified special electrical technicians should be designated for wire-connecting.

**1.3.3. Grounding**

A grounding wire with a section area of 14mm<sup>2</sup>, larger than AWG No.5 or SWG No.6, should be used.

It should be ensured that the grounding for the lathe is correct and reliable before switching on the power to the lathe.

A normal CNC lathe should be connected to a separated earthing pole. If this condition is not provided with in the installation place, it can be prepared according to the follows:

(1). An individual conductor can be connected to the grounding terminal of the Lathe so that the fault to be caused by the earth current can be avoided.

(2). If a reinforced bar in the concret is to be used as the grounding point, it should be especially careful. During the connecting, it should be carried out as the following requirements:

(a). A common reinforced bar, a grounding terminal or connecting terminal should not be used together with other devices, such as the devices for high frequency quenching, arc welding, etc.

(b). The connecting terminals with enough electrical properties should be used.

(3). A separated grounding wire, with a length as short as possible, should be used.

(4). An actual measurement of the grounding resistance should be checked. If only one set of equipment is connected to the grounding pole, the resistance should be less than 100  $\Omega$ .

#### **1.3.4 Phase Sequence Checking**

When using three-phase power supply to the lathe, the phase sequence should be checked: While starting up the cutting fluid pump, if the supply of the fluid is normal, it means that the phase sequence is correct; if abnormal, please change the connecting positions for two lines among the three after switching off the power.

#### **1.3.5. Door of Electric Distributing Cabinet**

It is forbidden to open the door of the distributing cabinet after switching on the lathe.

#### **1.4. Basic Points for Attention in Safety Operation**

On this lathe, many kinds of safety devices are designed in order to protect the operator or the lathe from any harms caused by accidents. Even so, the operator should carefully read the following points for attention, and never too rely on these safety devices.

(1). While working, please wear working cloth, safety shoes, working cap and protective glasses. Please mind that it is not permitted to operate the lathe by hands with gloves, nor wearing a tie.

(2). Please mind never to move or damage the warning signs on the lathe.

(3). Please mind never to place any obstacles around the lathe, and the space for working should be large enough.

(4). Before changing the fuses, swith off the power to the lathe. Never touch the motor, transformer, control board and other conductors with high voltage with hands.

(5). If two or more people need to carry out one job together, please mind to act in unison and in coordination to each other.

(6). It is not permitted to use compressed air to clean up the electrical system or the CNC unit of the lathe.

(7). All the safety measures on the lathe, such as grounding, safety protection, warning system, limit switches, etc., should be inspected often. If there are any problems, please adjust them in time according to requirements in order to avoid any accidents.

(8). Especially Mind: While starting up this CNC Lathe, the following sequence must be abided by: a. Turn on the main power supply switch; b. Turn on the power switch of the CNC system; c. Turn on the power switch of the servo system (for driving). While switch off the machine, a reverse sequence should be followed.

(9). Any unprofessional personnel can not, at will, change any codes of the kinetic energy and the parameters which have been entered into the CNC system, Drivers and transformers when delivering out of the manufacture factory.

### **1.5. Warming-up of the Lathe**

Before warming up the lathe, first of all, check if working conditions of the lubricating system are normal. If the lathe has not be used for a long time, please let the pump, with manual mode, supply some oil to all the lubricating points, first.

The automatic operation mode should be used to make the lathe warming up.

- (1). Running Time: 10 – 20 Min (It should be prolonged properly during winter time.)
- (2). Spindle: 500r/Min – 1000r/Min.
- (3). Slide: All axes should be run at their maximum travels as possible. But the speed of 100%G00 should not be used.
- (4). Tool carriage, tailstock and all moving parts should be put into operation.

### **1.6. Preparations Before Starting up Work**

(1). Please mind that the cutters to be used to this lathe should be in conformity with the specifications permitted. If there are any seriously damaged cutters, they should be replaced in time.

(2). Any tools for adjusting the cutters should not be left inside the lathe.

(3). Please mind if the central holes of large-sized shaft work-pieces are processed proper. If the central holes are too small, it is easy to happen risks during working.

(4). After clamping a workpiece with manual chuck, its manual handle must be taken off.

(5). Mind to check if the clamping force of the power chuck is adjusted reasonable.

(6). When choosing the spindle speed, it should not be over the maximum speed permitted to the chuck.

### **1.7. Safety Points for Attention During the work**

(1). It is forbidden to touch the cutter tip or the chips with hands and the chips should be cleaned out with a brush or a hook.

(2). It is forbidden to touch the running spindle, workpiece or other moving parts with hands or other ways.

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<p>(3). While closing the protective door of the lathe, mind not to jam your hands; During the automatic processing procedure, it is not permitted to open the protective door.</p> <p>(4). It is not permitted to mount or dismount the cutter while the spindle is running.</p> <p>(5). While processing magnesium alloy workpieces, the operator should wear a protective mask.</p> <p><b>1.8. Interruption during the working operation</b></p> <p>During the processing procedure, if need to interrupt the working operation, a best suitable switch or button can be chosen among the follows:</p> <p>(1). Feed Hold Switch</p> <p>This Switch is effective during the lathe is in automatic operation mode. When pressing down this Switch, the feed motions of all slides of the lathe will stop, but the function excutions of the spindle and Motors can not be affected.</p> <p>(2). Reset Button.</p> <p>In any operation modes, this button is effective to be used to interrupt the lathe's working. While pressing down this button, all the functions of spindle and motors can be interrupted</p> <p>(3). Emergenct Stop Switch</p> <p>In any operation modes, this switch is effective. While pressing down this switch, the CNC unit will be immediately into interruption state and all the functions will be stopped.</p> <p><b>1.9. Points for Attention After Finishing Work</b></p> <p>(1). Clean away the chips and clean up the lathe, in order to keep the environment as well as the lathe in a clean state.</p> <p>(2). Mind to check or replace the worn-out oil seals on the slideways of the lathe.</p> <p>(3). Check the states of lubricating oil and cooling fluid. And add or replace them according to concrete conditions.</p> <p>(4). Before going off work, turn off the power switch on the control panel of the lathe and the main power supply switch in turn.</p> <p><b>1.10. The Safety Devices of the Lathe</b></p> <p>(1). Protective Door, which is to prevent the chips, cooling fluid or workpiece from flying off, and to protect the operator. While the lathe is in automatic operation state, never open this door.</p> <p>(2). Emergency Stop Switch, which is mounted on the control panel of the lathe and used to interrupt the operation of the lathe immedietely when an emergency accident happens.</p> <p>(3). X and Z axial Stroke Limit Switchs, which are mounted on slides to prevent the slides of X and Z axles from overtravelling.</p> <p>(4). Soft Stroke Protection of X and Z axles (CNC software), which are set in the CNC system in X and Z axial parameters to prevent the slides from overtravelling.</p> <p><b>1.11. The Safe Use of the Chuck</b></p>	

If the chuck of the lathe cannot be used correctly, it would be the main reason to cause the safety problems to the operator or the machine. The points for attention in using the chuck are described in the follows, and the operators should clearly understand them and strictly abide by them.

(1). When mounting, inspecting or replacing the chuck, the power must be switched off.

(2). The gyratory number of the chuck must be limited. For the maximum rotary speeds (r.p.m) of all kinds of chucks, please refer to the following table:

Model	KZ100	KZ125	KA160	KZ200	KZ250	K52-160	K52-200	K54-160	K54-200
Max. Rotary Speed	3600	3000	2500	2000	1600	3000	2500	4500	4000

(3). Reliably lock up the fixing bolts of the chuck and jaws. For their locking torques, refer to the following table.

**A Table of Locking Torques of the Fixing bolts of the Chuck**

Thread Specifications	M6	M8	M10	M12	M14	M16	M18
Locking Torques	12.7Nm (1.30 kgf.m)	38.2Nm (3.90 kgf.m)	72.6Nm (7.40 kgf.m)	107NM (10.9 kgf.m)	171Nm (17.4 kgf.m)	226Nm (23 kgf.m)	402Nm (41 kgf.m)

(4). While locking up, please mind not to squeeze your fingers.

(5). It is absolutely not permitted to modify the chuck at will.

(6). When the chuck rotates, the jaws must be in locking-up state to prevent the workpiece from throwing off.

(7). The lubricating points of the chuck should not be ignored, otherwise, its clamping force could be decreased.

(8). When using the way of inner diameter clamping, the clamping force could be reduced more than a half.

(9). It is absolutely not permitted to strike the workpiece clamped on the chuck by a hammer or a similar article, otherwise, the machining accuracy and the function of the chuck can be seriously harmed, and the service life of the chuck can be obviously reduced.

(10). When the workpiece is too long, a balancing object or the tailstock should be used as the supporter.

(11). When hoisting up the chuck, a lifting ring bolt or lifting rope should be used. While mounting and dismounting the chuck, must pay attention to safety.

## 1.12. Other Points for Attention in Operation

(1). Before operating the lathe, the operator should familiarize its driving system and the functions of its all handles, and also should check if the shifting handle is on the positioning point.

(2). While all the mechanisms of the lathe are in running state, it is not permitted to shift the handles. If to shift the handles' positions, it must be done only after stopping the lathe.

(3). In order to ensure the service life of the slideways, it should be minded to keep the surfaces of the slideways clean and lubricated. Especially in machining the workpieces of cast iron, the chip scrapers on the slideways should be cleaned, often.

(4). For all the key parts of the lathe, it is not permitted to dismount at will, in order to prevent their accuracies from disrupting.

(5). The lubricating oil in each tank should be replaced periodically. The indications of the oil levelers should be always kept in mind, and the lubricating situations should be checked, often.

(6). The elasticity of the driving belt must be inspected periodically, and should be readjusted properly, in order to reduce the vibration.

(7). Because the protective door of the lathe is easy to happen collisions during the transportation, it is fixed before the delivery. So, before using the lathe, the fixing devices should be removed, first. Then, the protective door can be pulled to and fro.

#### **1.13. The Preparations Before Maintenance**

(1). Without permission, any maintenance can not be made presumptuously.

(2). Before replacing any components, or vulnerable parts (such as, oil seal, bearing, oil or grease, etc.), the preparations must be arranged in advance.

(3). Please read the safety protection measures described in this Operation Instruction carefully, and understand them fully.

Please read this Operation Instruction in all details, and completely understand the related principles, structures as well as the points for attention involved.

#### **1.14. Maintenance Operation**

(1). For the maintenance service to the lathe equipped with frequency converter and feed driver, only 10 minutes after switching off the power, the door of its electrical cabinet may be opened.

(2). Any persons irrelative to the maintenance service should not operate the main power supply switch or the power control switch (ON) on the control panel. Therefore, the warning notes of "No Touching the Power Switch; The Machine in Maintenance State!" or similar warnings should be hanged out at the power switches or other relevant places. This kind of warning note boards should be obvious, and they are easy to take off but not easy to fall off.

(3). It is dangerous to maintain a machine in live-wire state. In principle, the main power supply switch should be always in the state of switch-off during the maintenance period.

(4). The maintenance service to the electrical system should be undertaken by skilled technicians, who should keep close contacts with the person in charge, and, for any serious problems, never make final decisions by themselves.

(5). For the interlock mechanisms, such as, travel limit devices, proximity switches, etc., they should not be dismounted or modified.

(6). For fuses and cables, only those made by qualified manufacturers should be used.

#### **1.15. Treatments after Maintenance Service**



(1). After finishing the maintenance service, the working environment should be cleaned and arranged, and the water, oil or grease on the components and parts should be wiped off, in order to provide a good working environment.

(2). All replaced old parts and the waste oil should be placed on a place far away to the machine for the purpose of safety.

(3). The maintenance technician should check if the lathe is safe in operation.

(4). For the maintenance results as well as the inspection data, a record should be made and kept for future reference.

## 1.16. Scrap Treatment of Old Lathe

(1). A scraped lathe should be treated as the industrial wastes.

(2). Some electric components ( such as capacitor) could explode while burning. So, they should be treated properly.

(3). Some plastic parts and the paints could produce poisonous gases while burning. So, they should be treated properly.

Note: The structures of the lathes are some different. If there are no some mechanisms in them, the messages concerned are invalid.

## 2. Points for Attention:

### 2.1 Opening Packing Crate for Checking and Accepting:

If it is found that the product and its accessories are not in conformity with the packing list while opening the packing crate, please contact with the dealer concerned.

### 2.2 Installation and Use:

First of all, all the items on installation, working environment, operation and adjustment of the lathe described in this Operating Instruction must be read carefully and conscientiously to understand them clearly in order to avoid any accidents. Under the conditions of normal transportation, installation, use and maintenance, if any quality problems in manufacture are found, please contact with the dealer concerned or the manufacturer within the stipulated time limit.

### 2.3 Safety Matters:

All the safety measures, such as electrical safety protections (in voltage, frequency and current), alarming system, limit switches, etc., must be inspected often. If there are any problems, they must be adjusted to their required conditions in time, in order to avoid any accidents.

### 2.4 Special Attentions:

While starting up this CNC lathe, the below-mentioned procedure sequence must be followed:

(1). Turn on the Main Power Switch;

(2). Turn on the Power Switch of CNC System;

(3). Turn on the Power Switch of Driving System.

When turning off the lathe, a reverse sequence must be followed.

2.5 After turning on the Main Power Switch, must check whether the phase sequence of the power supply is correct or not. As for the detailed methods for the checking, please see Item 13.3.

2.6 Unprofessional personnel are not permitted to modify the kinetic energy codes as well as the parameters, at will, which have been entered into the CNC System, Driver and Converter before the delivery at Manufacturer's works.

2.7 For the purpose to improve the quality of the Lathe continuously, this Lathe has always been being modified. So, some specifications and structures of it in this Operating Instruction maybe have some little differences to the practical machine delivered out, please pay attention to them when user operates the lathe.

## 3. Main Specifications and Parameters

3.1 Max. Swing Diameter over Bed:	Φ320 mm
3.2 Max. Length of work piece (Distance between centers):	300 mm
3.3 Max. Swing Diameter over Tool Slide (with tool carriage):	Φ100mm
(with power-driven tool carriage):	Φ120mm
3.4 Diameter of Spindle Through Hole:	Φ32mm
3.5 Taper of Spindle tapered hole:	Morse 5#
3.6 Range of Spindle Speed:	280 – 3000rpm
3.7 Max. Lateral Travel (X-Axis):	125mm
3.8 Max. Longitudinal Travel (Z-Axis):	250mm
3.9 Pulse Equivalences of Longitudinal and Lateral movements:	0.001mm
3.10 Max. Quick Travel Speeds in Longitudinal and Lateral Directions:	X: 4000mm/Min.; Z: 8000mm/Min.
3.11 Feed Speeds in Longitudinal and Lateral Directions:	X: 4—300 mm/Min.; Z: 8—600 mm/Min.
3.12 Pitch Range of Thread Cutting:	0.2—5 mm
3.13 Taper of the Tapered Hole of Tailstock Quill:	Morse 2#
3.14 Max. Travel of Tailstock Quill:	60mm
3.15 Main Motor:	Y100L-4/380V/50Hz/2.2Kw
3.16 Power of Cooling Pump:	YSB-12 110V/220V
3.17 External Dimensions of Lathe:	1470 x 880 x 1440mm
3.18 Net Weight of Lathe:	about 920Kg

## 4. Main Usages and Features:

For this Lathe, it is reasonable in structure with a mechantronics design, beautiful in overall shape, convenient in operating and maintenance, and wide in processing capacity. And it is suitable to process the work pieces of non-ferrous metal, ferrous metal and non-metal.

This Lathe can carry out the turning jobs of cylinder, cone, multidiameter, end face, boring, grooving, thread cutting, arc surface, and etc. so that it can be comprehensively used in the industries of mechanical instrument, motorcycle, burning devices, light industry and electrical appliance for single part processing, small batch process and mass production.

\* Additionally, this Lathe has a famous characteristic. Especially in processing non-ferrous metal parts, it can achieve the effect of using turning instead of grinding under the conditions that better cutting amounts and high-quality tools are selected.

This lathe is of open-loop control. Its converter, driver and motor are controlled by CNC system to achieve the functions of stepless change of speed, the forward and reverse rotations of the spindle, the two-axis linkage in longitudinal and lateral feeds, and tool changes. So, all kinds of turning processes can be carried out. Before processing the parts, a program should be firstly worked out according to a selected suitable processing technology and entered into the CNC system. Then, after checking the cutting tools, the turning process can be started.

## 5. Working Environmental Conditions

- 5.1. Ambient Environmental Temperature: within the range from -10℃ to 40℃;
- 5.2. Relative Air Humidity: not more than 90%;
- 5.3. The lathe should not be installed in a dangerous environment full of conducting dusts, and explosive gases;
- 5.4. The lathe should be installed in an environment without corrosive gases;
- 5.5. The lathe should be installed in a place without serious vibrations and shocks.

## 6. The Coordinate System of the Lathe

(Taking the front tool carriage close to the operator as the sample)

X – Axis: The direction to the center line is negative; and the direction off the center line is positive;

Z – Axis: The direction to the chuck is negative; and the direction off the chuck is positive;

## 7. The Transmission System of the Lathe

### 7.1. Description to the Transmission System (See Fig.1)

7.1.1. The main transmission force of the lathe is provided by the Motor, through the band pulley to the spindle; and the NC system, according the program and through the converter, controls and achieves the preset spindle speed. And the spindle speed is variable.

### 7.1.2. Feed Drive System

The driving force is provided by the driving motor located at the left side of the bed, through Synchronous Band Pulley to Ball Screws, to drive the Slide Carriage for making longitudinal movement (of Z-Axis);

The driving force is provided by the motor located behind the Carriage, through Synchronous Band Pulley to Lateral Ball Screws, to drive the Slide Carriage for making lateral movement (of X-Axis);

### 7.2. Relation Between Instruction S and Spindle Rotating Speed

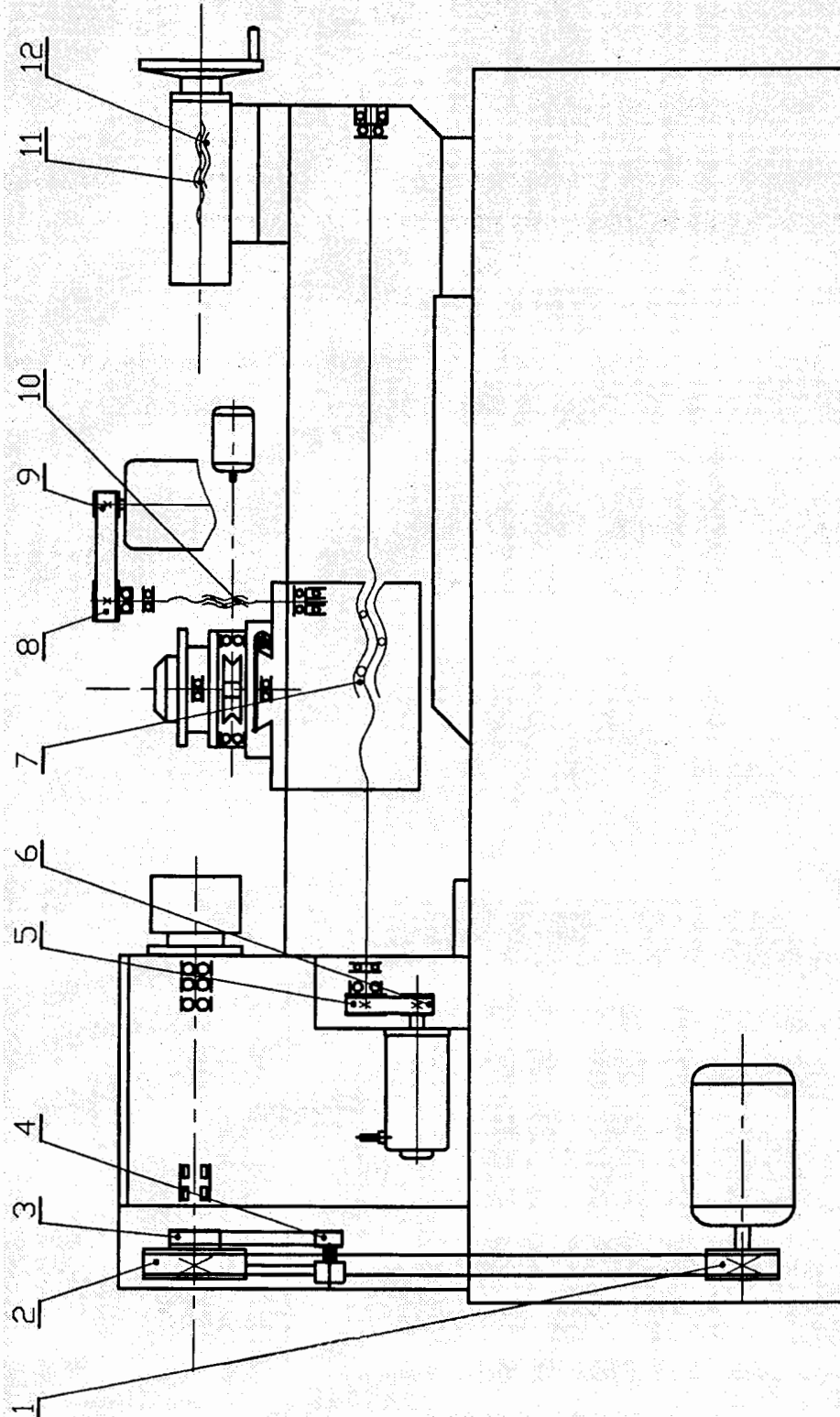


Fig.1 Diagram of the Transmission System of the Lathe

The Instruction S value directly indicates the speed value of spindle. After the letter of S, maximally, a 4-digital number can be entered for the practical spindle speed. It is simple and visual in operating.

**For instance: When selecting 500rpm as the spindle rotating speed, entering S500.**

### 7.3. The Detailed List of Transmission Parts of the Lathe (See Table 1)

### Table 1. Detail List of Transmission Parts

Number on Drawings	Descriptions	Tooth No.	Module or Pitch	Rotating Direction	Material	Type of Band
1	Band Pulley of Motor				HT200	V-Ribbed Belt, 6L--1600
2	Band Pulley of Spindle				HT200	
3	Synchronous Band Pulley of Spindle				35	Circular Arc-Typed Synchronous Band, 615-5M-9
4	Synchronous Band Pulley of coder				35	
5	Synchronous Band Pulley of Longitudinal Leading Screw	35	5M		45	Circular Arc-Typed Synchronous Band, 350-5M-20
6	Synchronous Band Pulley of Longitudinal Motor	21	5M		45	
7	Pair of longitudinal Ball Screws		5	Right	GCr15	
8	Synchronous Band Pulley of Lateral Leading Screw	36	5M		45	Synchronous Band, 285-5M-20
9	Synchronous Band Pulley of Lateral Motor	27	5M		45	
10	Pair of Lateral Ball Screws		4	Right	GCr15	
11	Leading Screw of Tailstock		3	Left	45	
12	Leading Screw Nut of Tailstock		3	Left	ZQSn6-6-3	

#### 7.4. The Positions of Rolling Bearings (See Table 2.)

### 7.5. The Detailed List of Rolling Bearings (See Table 2.)

## 8. Main Structure and Functions

### 8.1. Bed Body and Bottom Case

The bed body of the lathe is made of HT250 cast iron, which is treated with artificial aging for removing the residual stress and stabilizing the precision of the bed. Its guide rail is treated with supersonic quenching for enhancing its wear resistance. After the large carriage and working table are

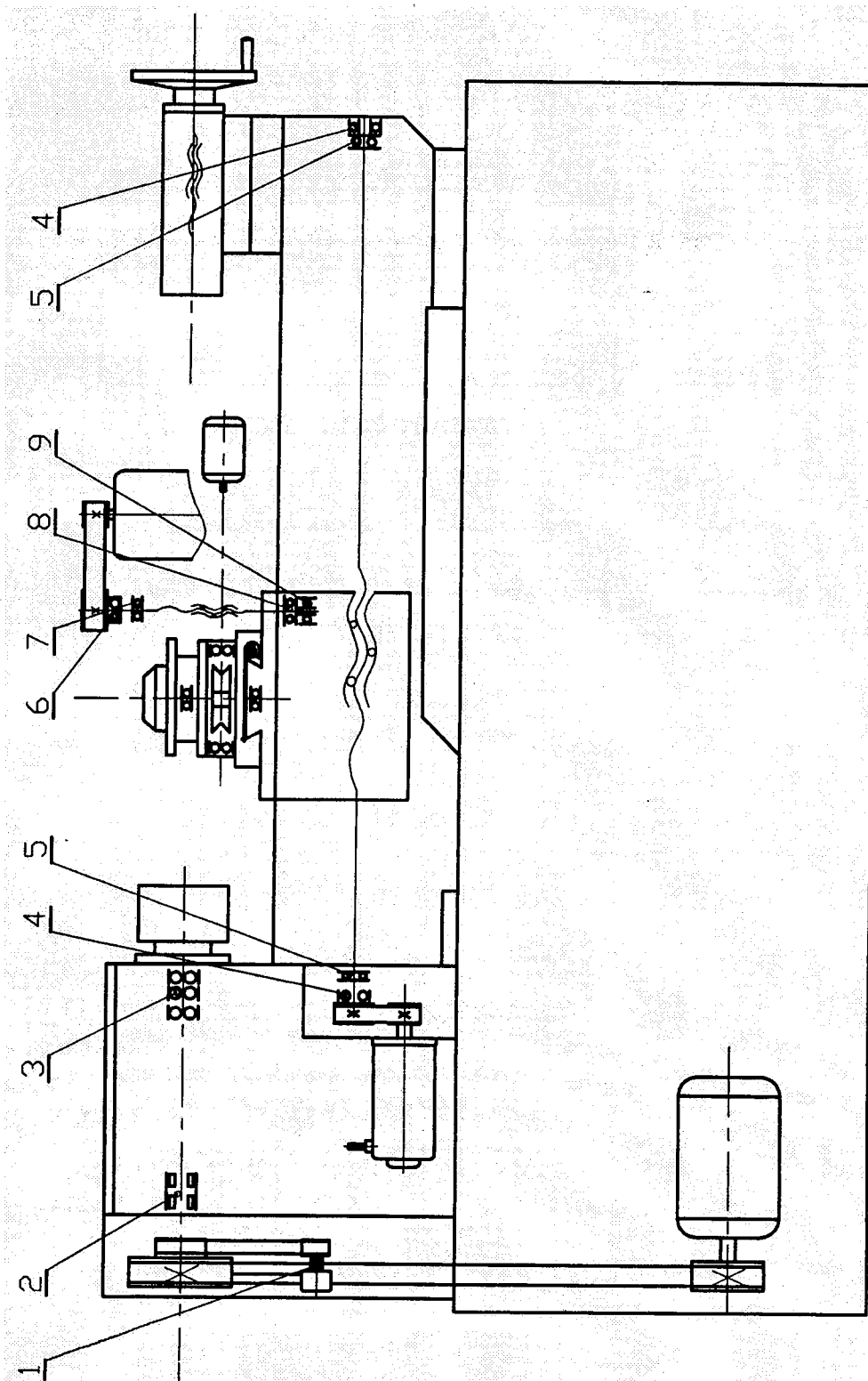


Fig.2 Diagram of Bearings' Positions of the Lathe

**Table 2, Detail List of Rolling Bearings**

Bearing Code	Bearing Name	Quantity	Precision Class	Number on Drawings
7000103	Deep Groove Ball Bearing	2	P0	1
NN3010K	Double-Row Cylindrical Roller Bearing	1	P5	2
7012AC	Double Direction Angular Contact Thrust Ball Bearing	3	P5	3
6203-Z	Deep Groove Ball Bearing	2	P5	4
51203	Single Direction Thrust Ball Bearing	2	P6	5
6201-Z	Deep Groove Ball Bearing	1	P5	6
51201	Single Direction Thrust Ball BearingF	1	P6	7
6202-Z	Deep Groove Ball Bearing	1	P6	8
51102	Single Direction Thrust Ball Bearing		P6	9

attached on the wear-resisting guide rail, a scraping and grinding installation is given to ensure the precision class of longitudinal and lateral feeds, and to guarantee the wear resistance.

The bottom case is made of cast iron by completely casting, which is treated with aging. So, it is strong in rigidity and good in stability. The bottom case is divided into three sections, left, middle and right. Inside the left section is located the main motor, which is installed on an adjusting plate. While adjusting the height of motor, the tension of the band can be adjusted. And the cooling pump and the cutting coolant tank are located inside the right section.

The front protection cover of this lathe is movable (push- pull door) for achieving safety production in CNC turning. On the left side of rear protection cover, strong power supply section are mounted, including driver and converter.

## 8.2. The Longitudinal Feed Mechanism (See Fig.3)

The Longitudinal Feed Mechanism is mounted at the front of the bed body. The motor (1 ), through a pair of Circular Tooth Synchronous Band Pulleys (2), drives ball screws (3) , and through the screw nut bracket (4) fixed on big carriage, makes the big carriage longitudinal moving. The ball screw is supported by both end bearings; and the pre-fixing of the ball screw is achieved by the tensioning nuts (5), so as to enhance the rigidity of the ball screw. Zero-clearance mating between the ball screw and its nuts is adopted. During the operation period, if there are any axial floats on the ball screw, the tensioning nuts(5) can be adjusted to eliminate the clearance. The clearance between big carriage and bed guide rail is achieved by adjusting the clamp plate under the big carriage. Attention! While adjusting the clamp plate's position, it must be adjusted to the extent that the big carriage can move but there are neither clearance nor too tight. If the clearance were large or too tight, the process precision of workpieces would be

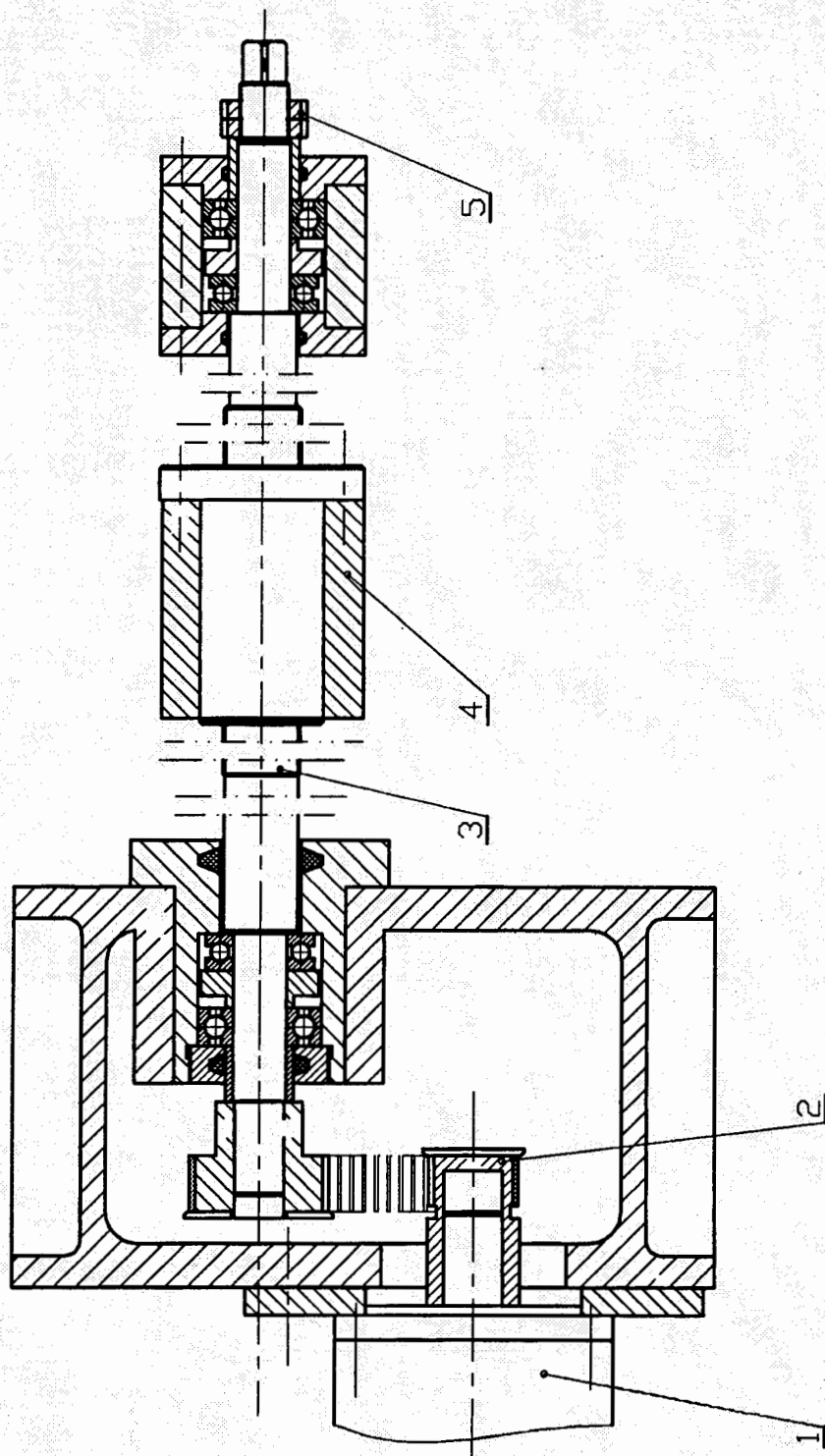


Fig.3 Diagram of Longitudinal Feed Gear



affected.

For the bearings on both end bearing brackets of the ball screw, while assembling them, a white special 3# lubricating grease has be applied to ensure the good lubricating capacity during the operating period. So, there is no need to add any more grease during operating period.

### 8.3. The Lateral Feed Mechanism (See Fig. 4)

The lateral movement of middle carriage is driven by Motor (1), which drives ball screws(3) through a pair of Circular Tooth Synchronous Band Pulleys(2), and makes the middle carriage moving through ball Screw Nut (4) fixed on the middle carriage.

The clearance of dovetail guide of the middle carriage can be achieved by adjusting the oblique iron through its adjusting screw. Attention! While adjusting the position of the oblique iron, it must be adjusted to the extent that the middle carriage can move but there are neither clearance nor too tight. If the clearance were large or too tight, the process precision of workpieces would be affected.

The lateral ball screw is supported by both end bearings. The pre-fastening of this ball screw is achieved by means of the fastening nut (5). so as to enhance the rigidity of the ball screw. Zero-clearance mating between the ball screw and its nuts is adopted. During operating, if the ball screw shaft has any axial floating phenomena, it can be eliminated by adjusting the fastening nut (5) to remove the clearance.

For the bearings on both end bearing brackets of the ball screw, while assembling them, a white special 3# lubricating grease has be applied to ensure the good lubricating capacity during the operating period.

If a power tool carrier is equipped on the middle carriage, please read the Operating Instruction of Power-Driven Turret for its adjustment.

### 8.4. The Head-stock (See Fig.5)

The internal design of the head-stock of this lathe is of single-spindle structure. For the front supporting of the spindle, the combination of three D7012AC Angular Contact Thrust Ball Bearings is adopted; For its back supporting, a DNN3010K/P5 Double-Row Cylindrical Roller Bearing is adopted; Additionally, a reasonable supporting distance is used. So, a typical, precise spindle system with high rigidity and reliability is formed. And these are the key points why the lathe can provide the performance with turning instead of grinding in processing workpieces if reasonable cutting amounts and high-function tools are selected.

The radial clearance of its front bearing can be adjusted by nut (1), and the adjustment of back bearing can be achieved by nut (2). While assembling these bearings, a white special 3# lubricating grease has be applied to ensure the good lubricating capacity during the operating period. So, there is no need to add any more grease during operating period.

### 8.5. The Tailstock

The tailstock is made of HT200 cast iron, which has been treated with aging. The tailstock can move

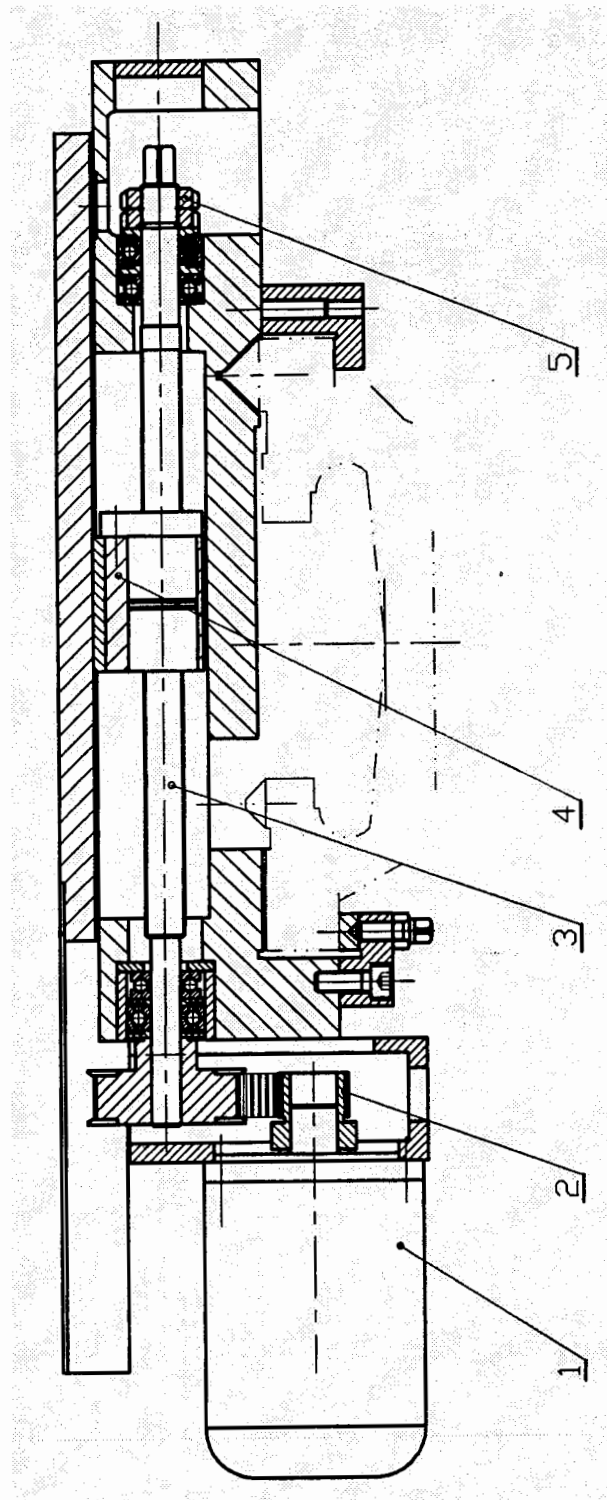


Fig.4 Diagram of Cross-Feed Gear

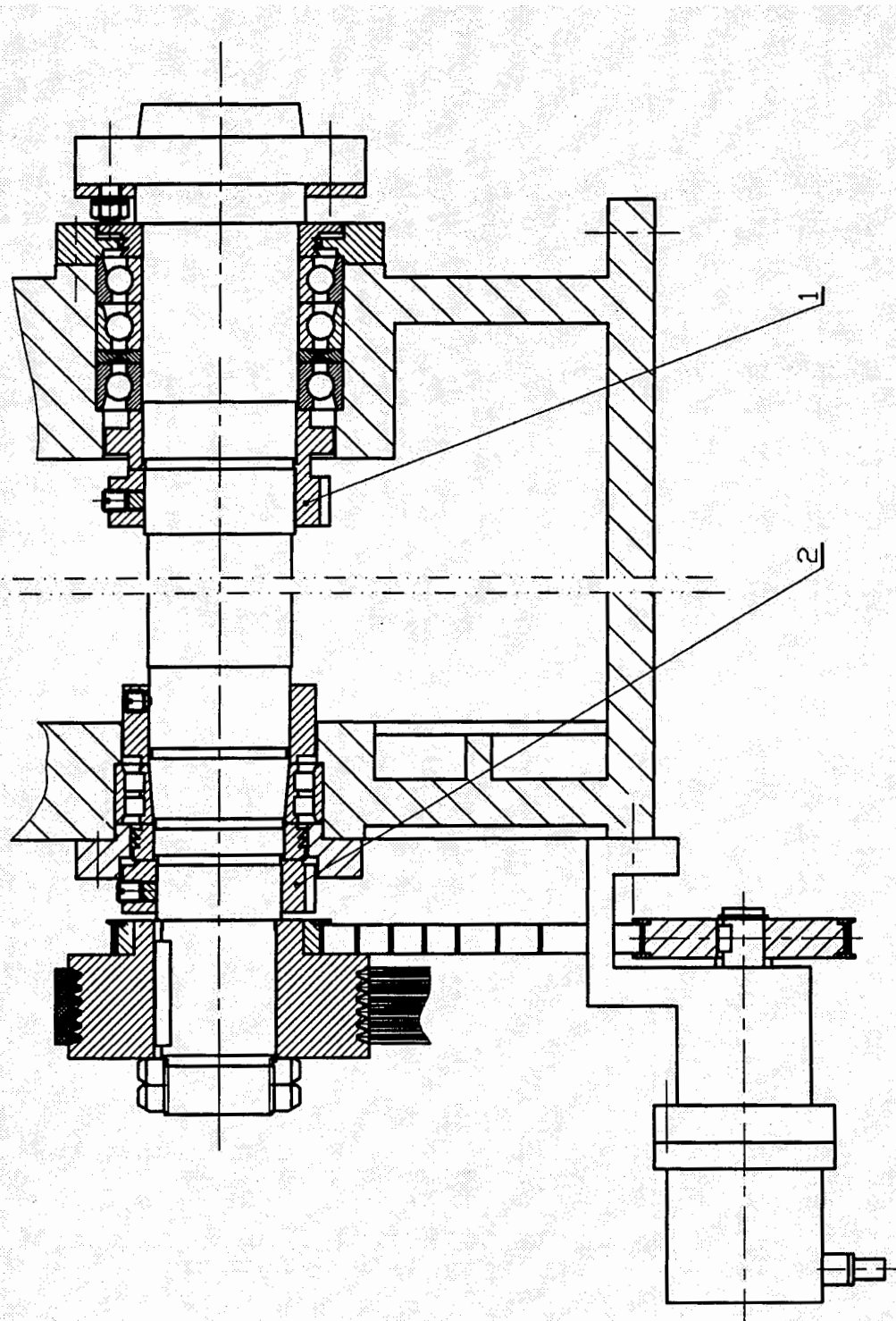


Fig.5 Diagram of Head Stock Structure

Operation Instruction	Total 38 Pages
	Page 18
<p>along the bed guide rail. Meanwhile, the tailstock can be fixed on any required position by means of an eccentric mechanism. The offset of tailstock on horizontal surface can be adjusted by means of lateral adjusting screw.</p>	
<p><b>9. The Cooling System of the Lathe</b></p>	
<p>The Cooling Pump and coolant of this lathe are both inside a independent coolant tank. The spray nozzle for coolant can be moved to the positions for cooling. The spray nozzle itself can be adjusted for flow control. After a cooling circulation, the coolant will flow into the chip-receiving tray, and then, after filtering by means of gauze strainer, it will flow back into the coolant tank for recycling.</p>	
<p><b>10. Lubrication of this Lathe</b></p>	
<p>The librication of lathe is a very important matter, because it has very large influence on the accuracy and the service life of the lathe. So, the performance of the lubricating parts, the constitution of the lubrication system, the distribution of the lubricationg points, making correct lubrication and periodical inspections, cleaning the lubricant tank, checking the lubricating pipe lines, etc., are very important jobs. For any losses on the lathe, caused by improper lubrication, the responsibilities will be taken by the user itself..</p>	
<p>10.1 For the lubrication of this lathe, it is divided into two sections, manual pump-lubricating, and pressure-oil-gun lubricating.</p>	
<p>10.2 In order to ensure the normal operation of the lathe, the operator should pull the manual pump 2 or 3 times in each shift of work (generally, to keep the lathe under normal working conditions). The oil level should be checked, often, which should not be lower than normal position. For the detailed distribution of the automatic lubricating points of this lathe, please refer to Fig. 5 The Diagram of Lubrication by Oil Pum.</p>	
<p>10.3 As for the sections to be lubricated by pressure-oil-gun, they are the two oil cup holes on the tailstock, and the section contacting with sliding plate under the tailstock. In order to ensure the normal operation of the lathe, the operator should lubricate them 3 – 5 times with the pressure-oil-gun in each shift of work (generally, to keep the lathe under normal working conditions).</p>	
<p>10.4 Before putting the lathe into normal operation after unpacking its crate, the lathe should be kept in idle running for several hours and all the sliding parts should be lubricated with new oil. The manual-control pump should be pulled many times until the lubricating oil coming out from the chips-scraper. And then, using the pressure-oil-gun to lubricate the oil cup on the tailstock and the section contacting with sliding plate under the tailstock.</p>	
<p>10.5 Maintenance Inspections:</p>	
<p>(a) Ordinary Inspection: After starting up the lathe in each shift of work, inspect if there are any leaks and looses on the lubricating pipeline, any loose-fit on the joints or any damages of the oil cups.</p>	
<p>(b) Periodical Inspection: Check the oil level of the lubricating pump.</p>	
<p><b>11. The Electrical System of the Lathe</b></p>	

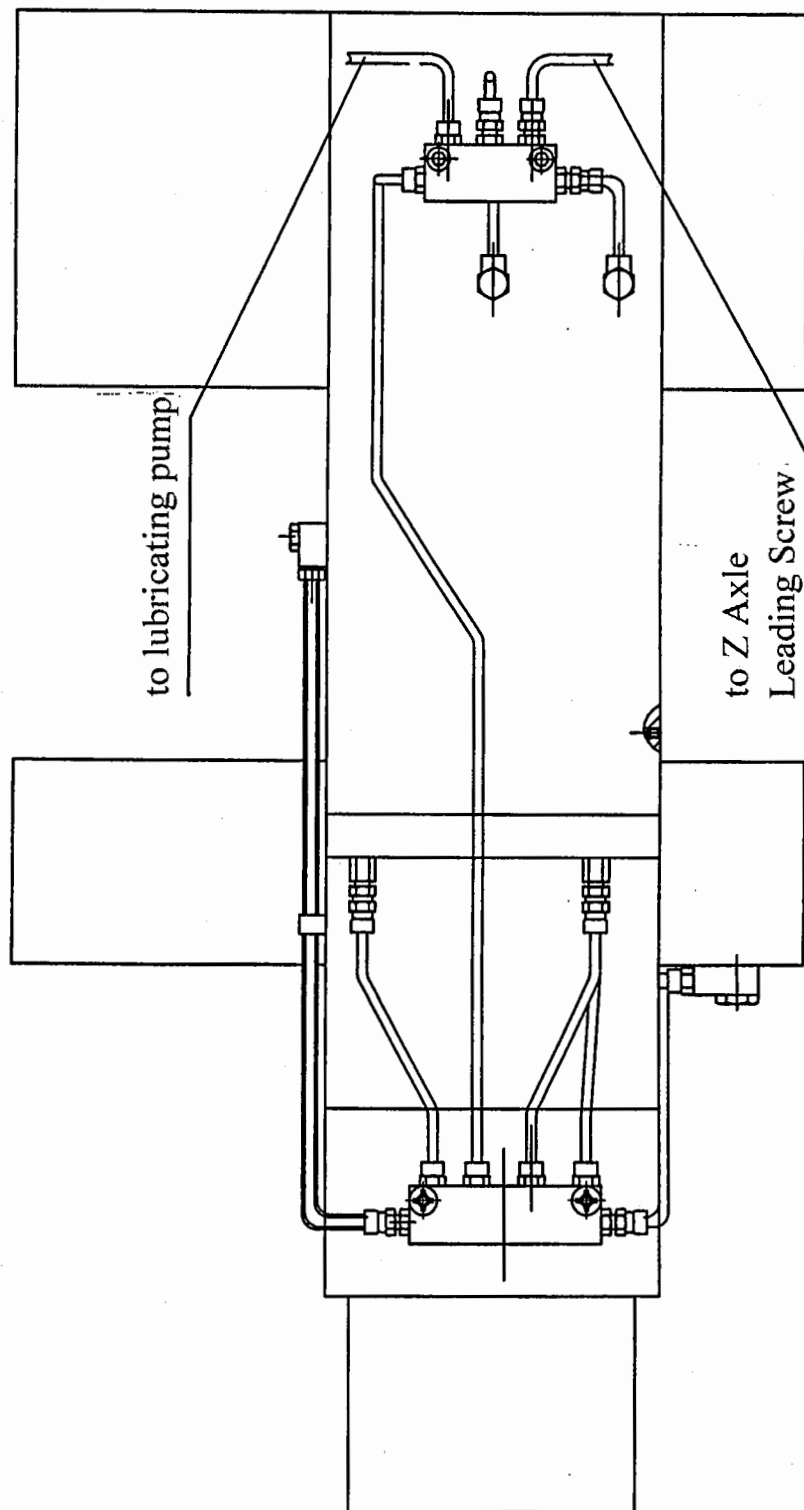


Fig.6 Schematic Diagram of Locations by Lubricating Pump

11.1 For the power supply of the lathe, AC two-phase four-wire system is adopted. The main parameters of the lathe are as follows:

- (1). The Rated Voltage: 220V
- (2). Phase Number: two-Phase
- (3). Frequency: 50/60Hz
- (4). The Rated Capacity: 5Kw
- (5). The Rated Input Current Value: 15A
- (5). Steady-state Voltage Value: +/-10% of rated voltage
- (6). Protection Class: IP54

\* This lathe has a reliable grounding system. So, the ground wire of the local power networks must be directly connected onto the earth terminal inside the power control cabinet for the lathe, to ensure the safety in personnel and equipment.

#### 11.2 Operating Instruction on the Electrical Circuit of the Lathe (See Fig. 7)

##### (1). Main Power Supply Switch (QF)

While turning the Switch QF, counter-clockwise, to the position of "O", the power supply to the lathe is completely off; While turning the Switch QF, clockwise, to the position of "I", the power to the lathe is on. When the power indicator HL1 lights on, it means that the electrical system of the lathe is in ready state. If any troubles happen on the lathe, the power supply should be switched off immediately. And only after eliminating the troubles, the power supply can be re-switched on.

##### (2). How to operate the electrical system of the lathe

a. First, while pressing down the power button of SA1 system, the CNC system will be into work-ready state; Then, while pressing down the power button of SB1 Servo Driving System, the driving system and the Spindle Speed Adjusting System will be into working state.

b. When operating the CNC tool carriage (For details, refer to the Instruction of the CNC System), the power-driven tool carriage will make motions accordingly, such as automatically carrying out the motor running, tool position changing, locking-in, etc., and then, will keep into the tool position preset by the program.

\* This is only effective to the lathe equipped with power-driven tool carriage.

c. When putting the switch SA2 at the position "I", the working light will be on; While setting the switch at the position "O", the working light is OFF.

d. Operation of the key-board of the CNC system (for details, refer to the Instruction of the CNC System). Manually operating the keys of " $\leftarrow$ ", " $\uparrow$ ", " $\rightarrow$ ", or " $\downarrow$ ", the longitudinal and transversal motion motors MZ and MX can run to and fro from low speeds to high ones, accordingly.

#### 11.3 Explanation of Electrical Adjustment

a. The fuses FU1 are worked as the terminal short-circuit protection of the electrical system of the lathe. The breaking current value of short-circuit is 16A.

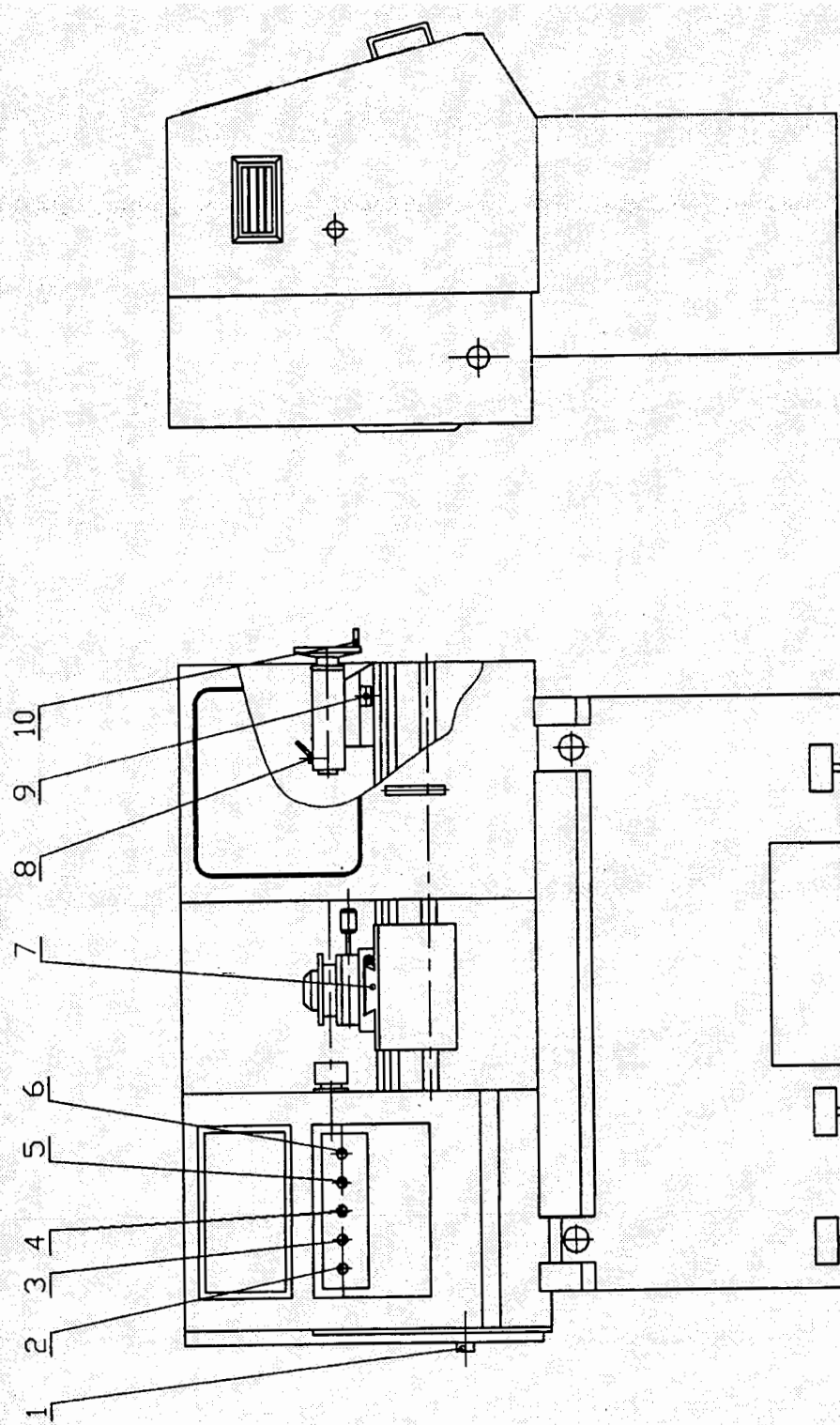


Fig. 7 Diagram of Operating Positions of the Lathe

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<p>b. The main driving motor M1 of the lathe is a Three-phase asynchronous motor of Y100L-4.  Rated Power: 2.2 Kw  Rated Current: 5A  Rated Rotation Speed: 1400 rpm.</p> <p>For the speed regulation of the main driving motor, the frequency conversion is used (refer to the instruction of Converter). During the normal operation, the frequency should be controlled within 150HZ in order to prolonge the service life of spindle motor.</p> <p>c. For the Motor M2 of power-driven tool carriage, a minitype 3-phase AC motor is used (for details, refer to the Instruction of Power-driven Tool Carriage). The working operation of the power-driven tool carriage is controlled by the signals issued by the CNC control box.</p> <p>* This is only effective to the lathe equipped with power-driven tool carriage.</p> <p>d. The longitudianl and transversal travel motors M4 and M5 of the carriage are controlled by AC drivers; and their feed motions are controlled by the CNC program. KX and KZ are the longitudianl and transversal stroke limit swtchs.</p>	
<h4>11.4 Maintenance of the Electrical System</h4>	
<p>The electrical system should be periodically maintained by professional technicians. For the detailed maintenance procedures, please refer to the following Diagrams and Instructions concerned:</p>	
<ul style="list-style-type: none"> <li>● The Electrical Pinciple Diagram (refer to Table 3, Fig.8 – 17);</li> <li>● The Operation Manual of the Converter;</li> <li>● The Operation Instruction of Driver;</li> <li>● The Operation Instruction of the NC System;</li> <li>● The Operation Instruction of Power-Driven Tool Carriage</li> </ul>	
<h2>12. How to Hoist up and Install the Lathe</h2>	
<h3>12.1 Hoist up the lathe (refer to Fig. 18)</h3>	
<p>For hoisting up the unpacked lathe, two pieces of steel tubes should be prepared. Both of them should be inserted and passed through the hoisting holes of the lathe, and then tie the hoisting ropes on them for hoisting. While hoisting up the lathe, take mind not to let the steel cable or the hoist chain fixture touch with the guid rail of the bed, leading screws, spindle and other smooth parts. The paint surface,should be covere with soft articles in order to avoid to be scratched.</p>	
<p>During the procedures of loading and unloading the lathe before and after the transportation, severe shocks and vibrations should be avoid. While using rolling rods for moving the lathe, the lathe should be kept balanced, in order to prevent it from overturning for slanting too much.</p>	
<h3>12.2 the lathe must be installed on a sturdy concrete foundation. The depth of the foundation normally should be 400 – 500mm. Otherwise, the processing accuracy of the lathe could be affected. Four pieces of cushion irons should be used under the lathe for supporting the lathe and adjusting its level.</h3>	



Pages 23 through 38 have been removed from this manual due to necessary updates.

This section is unavailable at this time.

Please check our website for future updates – they will be posted when they are available.

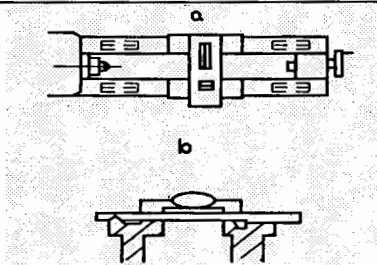
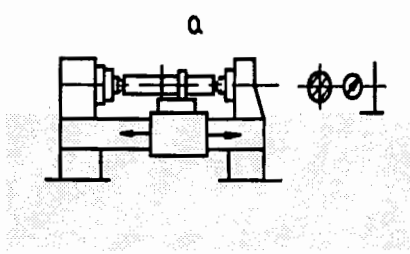
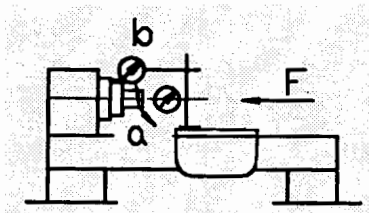
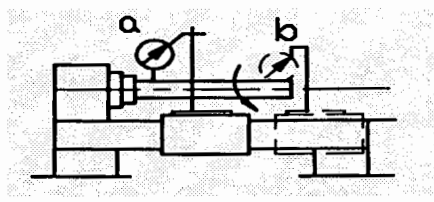
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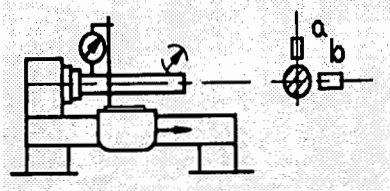
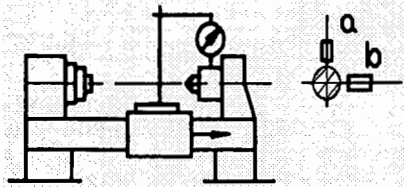
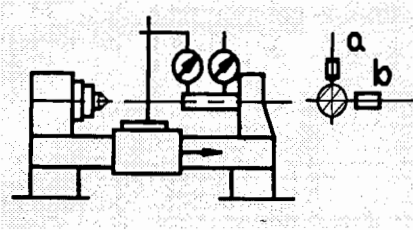
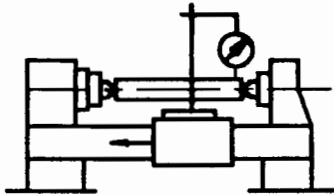
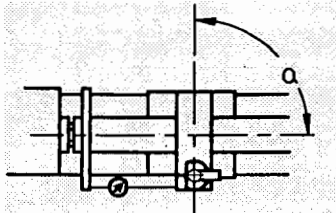
This is to certify that the lathe is inspected according to the Standards concerned, and qualified in precision. It is, hereby, permitted for delivery.

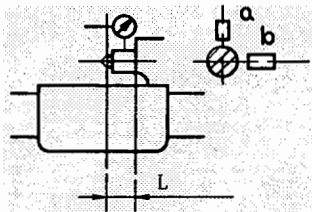
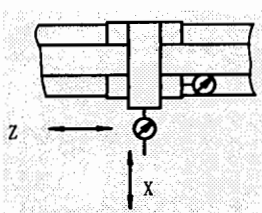
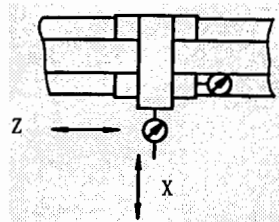
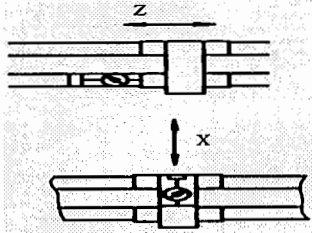
(attached with precision inspection forms)

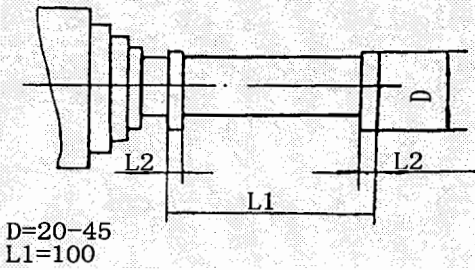
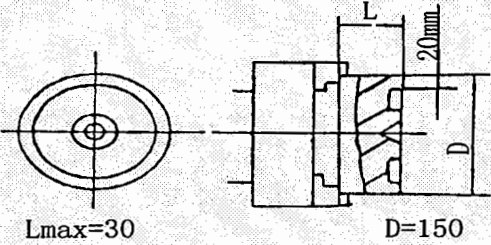
Inspection Director: Ye Hui

General Manager: YU DANING

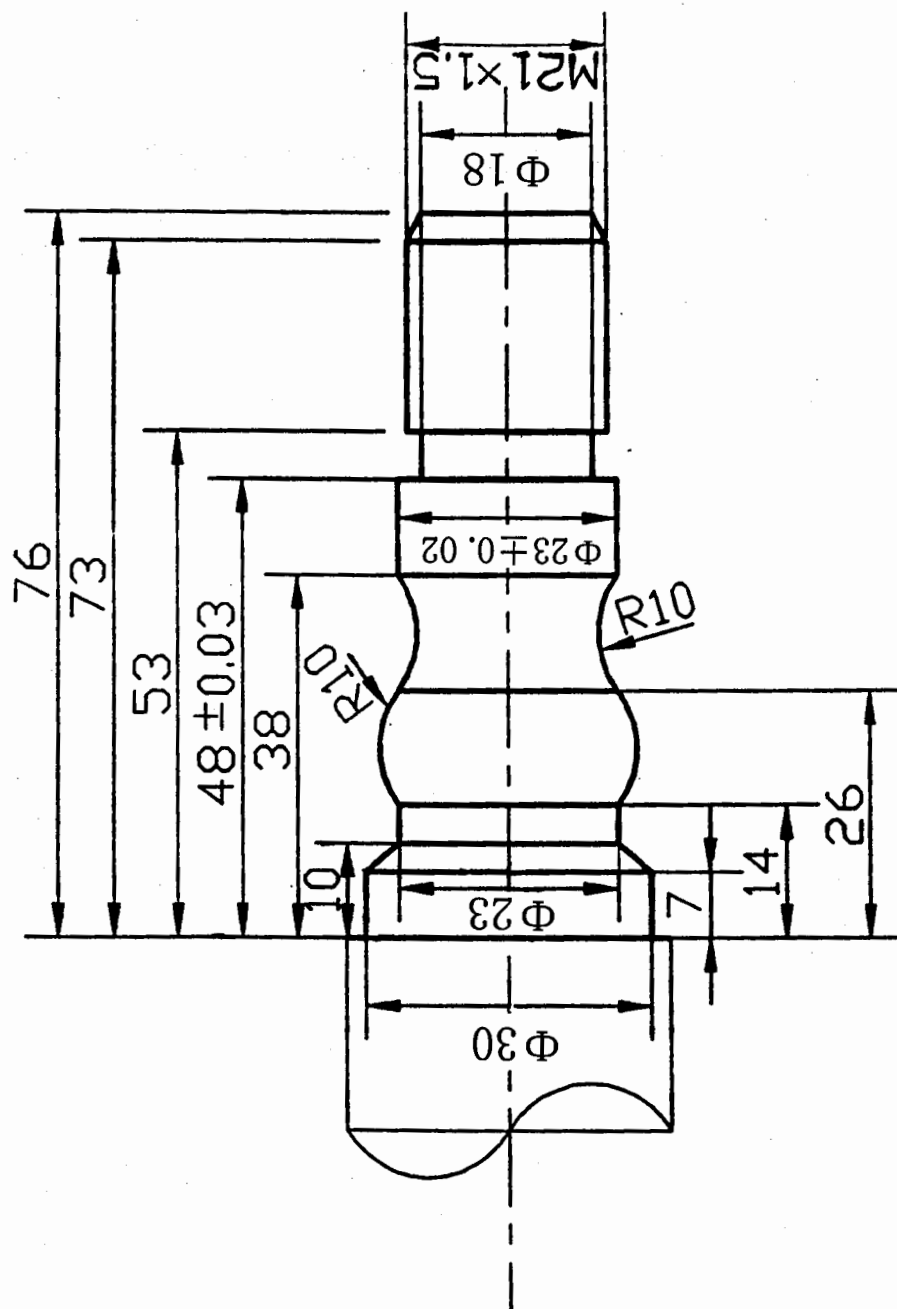
Precision Inspection			Total 4 Pages
			Page 1
No.	Inspection Items	Inspection Sketch	Allowable error (mm)
G <sub>0</sub>	a: Levelling the Lathe b: The straightness of Slideway within the vertical plane.		a: 0.04 / 1000 b: 0.02
G <sub>1</sub>	The straightness of Slide Carriage moving within the horizontal plane.		0.015 within the total length
G <sub>2</sub>	Run-out at Spindle end a: Axial float of the Spindle. b: Run-out of the supporting surface of the spindle shoulder. c: The radial run-out of centering shaft neck of spindle.		a: 0.01 b: 0.015 c: 0.01
G <sub>3</sub>	The radial run-out of the axis of Spindle Taper Hole		a: 0.01 (near the spindle end) b: (at the place 300mm to the spindle end) 0.02 (for 3-bearing spindle) 0.025 (for 2-bearing Spindle)

Precision Inspection			Total 4 Pages
			Page 2
No.	Inspection Items	Inspection Sketch	Allowable error (mm)
G <sub>4</sub>	The parallelism of the spindle axis to the motion of the slide carriage.		a: 0.02/300 (only upward deviation permitted) b: 0.02/300 (only forward deviation permitted)
G <sub>5</sub>	The parallelism of the axis of the tailstock sleeve to the motion of slide carriage.		a: 0.015/100 (only upward deviation permitted) b: 0.01/100 (only forward deviation permitted)
G <sub>6</sub>	The parallelism of the axis of the taper hole of the tailstock sleeve to the motion of slide carriage.		At a measuring length of 300: a: 0.03 (only upward deviation permitted) b: 0.03 (only forward deviation permitted)
G <sub>7</sub>	The contour (equal-height) between the two centers of spindle and tailstock.		0.04 (only permit the tailstock higher)
G <sub>8</sub>	Perpendicularity of cross motion of tool carriage to spindle axis.		0.015/100 (deviation direction $\alpha \geq 90^\circ$ )

Precision Inspection			Total 4 Pages
			Page 3
No.	Inspection Items	Inspection Sketch	Allowable error (mm)
G <sub>9</sub>	Parallelism of the movement of tailstock to that of slider. a. within vertical plane; b. within horizontal plane;		a: 0.015 b: 0.02
G <sub>10</sub>	Forward/reverse backlash of working table		Longitudinal : 0.04 ( sliding guideway); 0.02 ( ball guideway) Cross: 0.03
G <sub>11</sub>	The error of returning the reference point		Half-closed loop Z Axle: 0.01 X Axle: 0.008 Open Loop Z Axle: 0.01 X Axle: 0.015
G <sub>12</sub>	The minimum error in the given unit		Minimum Given unit x 5
G <sub>13</sub>	The positioning accuracy of Z axle and X axle a: Repositioning Accuracy R; b: Reverse Deviation B c: Positioning Accuracy A		X Axle: a. 0.012 b. 0.013 c. 0.03 Z Axle: a. 0.013 b. 0.015 c. 0.032

Precision Inspection			Total 4 Pages
			Page 4
No.	Inspection Items	Inspection Sketch	Allowable error (mm)
P <sub>1</sub>	<p>The accuracy of finishing outside circle:</p> <p>a: Cylindricity</p> <p>b: Roundness</p>	 <p>D=20-45 L1=100</p>	<p>a: At a measuring length of 100: 0.01</p> <p>b: 0.005</p>
P <sub>2</sub>	Planeness of finishing end face	 <p>Lmax=30 D=150</p>	0.02 / 150
P <sub>3</sub>	<p>a: the accuracy of the diameters in finishing shaft workpieces;</p> <p>b: Accuracy in length</p> <p>c: Accuracy in thread pitch</p>	<p>As for the sketch and the sizes of the test workpiece, see the attached drawings 1.</p> <p>The sizes of the test workpiece can be appropriately enlarged or reduced.</p> <p>Materials: Brass H62</p> <p>(Allowable diameter can be enlarged or reduced in propotions; the test sample can be used several times.)</p> <p>Explanation:</p> <p>a: <math>\Phi 23</math>, the difference of the actual measuring.(the size of <math>\Phi 23</math> can be enlarged or reduced in proportions)</p> <p>b: Measuring the sizes of the multidiameters</p> <p>c: Without obvious light slit;</p> <p>D: Without obvious light slit.</p>	<p>a: <math>23 \pm 0.02</math></p> <p>b: <math>\pm 0.03</math> (sliding the guide rail)</p> <p><math>\pm 0.015</math> (rolling the guide rail)</p>

# Attachment 1. Test Workpiece Drawing



Material: Brass

**CNC1315 LATHE**

**PACKING LIST**

Manufacture No.:

MADE IN CHINA



# Packing List

Total 1 Page

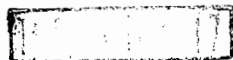
**Packing Dimensions: 170 × 105 × 155 cm (L × W × H)**

**G.W.: 1020 Kg**

**N.W.: 920 Kg**

No.	Descriptions	Model and Specifications	Qty	Remarks
1	Main Machine		1 set	With its base seat
2	Three-jaw Chuck	KZ125	1 set	Mounted on machine
3	Tool Carriage		1 set	Mounted on the Main Machine ( five tool rests)
4	Alloy Center	Morse No.3	1	
5	Chuck Spanner		1	
6	Reducing Sleeve	JB3477-83 (Outside #3; Inside #2)	1	Special Order
7	Double-Head Wrench	13 x 16; 16 x 18; 17 x 19	1	
8	Inner-hexagon Spanner		1 set	8 pieces
9	Pressure Oil Gun	180 cm <sup>3</sup>	1	
10	Rocker	Z7030.2F-05-00	1	
11	Attached Documents	CNC1315 Lathe Operation Instruction; Certificate of Inspection; Packing List; Operation Manual of Converter and Operation Manual of Driver	1 set	
		User's Manual of CNC System	1	
		Operation Instruction of Power-Driven Tool Carriage	1	
12	Taper-Shank of Drill Chuck	ZQ4124-61	1	
13	Drill Chuck	JS13	1	
14	Wedge	ZQ4124-67	1	
15	Press Tool Wrench	10MM	1	
16	Alloy Center	Morse No.4	1	

Packing Inspector:



Packing Date: 07 2012