

# **CNC lathe**

## **Model CNC210**

# **OPERATING      MANUAL**

(Mechanical part)



WMT CNC INDUSTRIALCO.,LTD

## **Contents**

|  |    |
|--|----|
| 1.General Instruction.....                         | 2  |
| 2 Safety guide for operating this machine.....     | 3  |
| 3.Lifting and Installing.....                      | 8  |
| 4.Technical data.....                              | 11 |
| 5.Machine structure.....                           | 12 |
| 6.Operating instruction and safety protection..... | 15 |
| 7.Inspection and maintenance.....                  | 16 |

**Note:Please read the operation manual carefully before using the machine.**

### ***1.General Instruction***

#### **1.1 The scope and purpose of this operation manual .**

This manual is written for the flat bed CNC lathe to guide the user to accurately use the machine which produced by our company , please read it carefully.

In the second part of the manual ,we providing the safety instructions for the operation of the machine.which the operator can use it as a check item for daily work.

In the second part of the manual,we provide the method of how to install and matters what we should pay attention to.

In the fourth and fifth part of the manual,you should understand the Technical data and the Machine tool structure before using .

The sixth part of the use of machine tools and safety protection describes the operation of the machine tools in the security situation

The seventh part of "inspection and repair" provides the operator with the knowledge and methods of operation and maintenance of the machine tool.

The eighth part of the "easy-broken parts" provides the machine parts diagram

**Please connect with our service or technical department,if any problems doesn't mention in the manual.**

#### **1.2 The main use of the machine.**

The machine is mainly used for processing various kinds of shaft, disk type parts,can be turned all kinds of thread, arc, cone and the inner and outer surface of the revolving surface, can meet the needs of high-speed cutting of ferrous and non-ferrous metal materials,Suitable for the processing of plumbing and heating equipment, valves, electrical appliances, instruments, automobiles, motorcycles, bearings and other parts of the industry.With high speed, high efficiency, high reliability, and nice work at the machining parts consistency ,and little influenced by human factors.Machining accuracy can reach IT6~IT7 level.

#### **1.3 Accuracy of the machine.**

The precision of the machine is in accordance with the standard of the JB/T8324.1-1996 simple CNC horizontal lathe

#### **1.4 The using environment of machine .**

This machine is suitable for operation under the environment and conditions as specified below.

A. Ambient temperature:5--40℃

B. Dampness:The maximum temperature of 40℃ , the relative humidity shall not exceed 50% of the range

C.Altitude:1000 meters below

D. Radiation: Avoid the change of ambient temperature caused by direct sunlight or other heat radiation

E.Installation position should be far away from the vibration source and inflammable and explosive materials, away from the electromagnetic interference area

### 1.5 Impact of machine tools on the environment

When the machine idling,the noise is not more then 83db,no harmful gas or liquid emissions, so there is any adverse impact on the environment.

## 2. Technical data

| Item                                      | Data(Metric)           | Data(Inch)                     |
|---|------------------------|--------------------------------|
| Model Name                                | CNC210                 | CNC210                         |
| Max.swing over bed                        | 210mm                  | 8 1/4"                         |
| Max.swing over carriage                   | 105mm                  | 4 1/8"                         |
| Max. Machining length of work pieces      | 250mm                  | 9 7/8"                         |
| Range of metric threads                   | 0.25~4mm               | 0.00984-0.1575"                |
| Range of imperial threads                 | 6~80T.P.I              | 6~80T.P.I                      |
| Through spindle bore.                     | 26mm                   | 1.0236"                        |
| Spindle speed (DC stepless adjustment)    | 100~3000r/min          | 100-3000r/min                  |
| X travel                                  | 105mm                  | 4 1/4"                         |
| Z travel                                  | 275mm                  | 10 13/16"                      |
| Max.moving speed of X axis (step-motor)   | 2000mm/min             | 78 3/4"/min                    |
| Max.moving speed of Z axis (step by step) | 2000mm/min             | 78 3/4"/min                    |
| Taper of tail stock                       | MT2                    | MT2                            |
| Tail stock diameter                       | 22mm                   | 7/8"                           |
| Max.travel of tail stock                  | 55mm                   | 2 3/16"                        |
| Positioning accuracy                      | 0.02mm                 | 0.0008"                        |
| Re-positioning accuracy                   | 0.02mm                 | 0.0008"                        |
| Spindle proximal bounce                   | 0.01mm                 | 0.0004"                        |
| Motor                                     | 1.2kw                  | 1.2Kw                          |
| Lubricating pump power (manual operation) |                        |                                |
| Water pump power                          | 40w                    | 40w                            |
| Tool-Post                                 | electrical 4- station  |                                |
| Size of tool arbor                        | 12mm                   | 1/2"                           |
| Overall size (L X W X H)                  | 1105 x 925 x<br>1145mm | 43 1/2" x 36 3/7" x<br>45 1/9" |
| Net weight (about)                        | 260kg                  | 573lbs                         |

## 3.Safety protection

The machine tool with some necessary safety equipment and warning signs, please read the instructions carefully before operator,in order to avoid the damage or other machine operation accident ,please fully understand all the operation method ans the signs.

### 3.1 The requirement to the operation and maintenance person.

The operation who use the machine should be well trained and should be qualified.

Before using the machine ,the operation should carefully read the manual operation ,and fully understand what mention in the manual operation.

In order to avoid accident ,the Maintenance should be assumed by the person who should have the appropriate qualifications or professional maintenance knowledge.

### 3.2 Basic operation requirement.

Dangerous :

A:Control panel, electrical cabinets, transformers, motors, junction box and other high voltage terminal parts of the untouchable, otherwise, it is easy to get a shock.

B:Don't touch the bottom with wet hands,otherwise it will cause a short circuit, machine malfunction, endanger personal safety.

Warning:

A: You should be very familiar with the emergency bottom switch .so that in any need time ,you don't need to find it.

B:Please make sure that the power of the machine should be offed ,before you replacement the electrical components.

C:When the power supply part fails, the main circuit breaker should be turned off immediately.

D:When a task needs to be completed by two or more than two people, each step in the operation should be required to provide a coordinated signal,and you should get the signal and accept it ,then you can do the next step work.

Attention:

A:Use recommended lubricants, oils or fats or oils that are recognized as equivalent to the performance of oils or fats. Before replacement, the machine must be cleaned to avoid adverse consequences of two different types of oil or fat.

B:The electrical components needed to be replaced which must be consistent with the electrical parts list or equivalent.

C:We need to prevent the NC device operation panel electrical control panel etc. impact, otherwise easily lead to failure, so that the machine can not work normally.

D:Do not change the parameters, values, or any other electrical devices . When you have to change, record the original data so that you can return to the original number when you need it.

E:Don't dirty, damaged or mobile warning signs, if the signs on the handwriting has become blurred sign or lost, please order from us new signs.

F:Needing enough space ,in order to avoid danger.

G:Water or oil can make slipping on the ground, resulting in danger, iron can cut the body, in order to prevent accidents, the ground must be kept clean. Clean iron filings do not directly with the hand

H:you should confirm in advance before you operation the switch,no mistakes,or prone to accidents. Don't touch the switch at will.

### 3.3 Requirement before power supply

Danger:

Cable, coil, wire, electrical components, if there is damage, will produce leakage, causing electric shock accident. So you should check them carefully before using.

A:you must understand them which were required in the operation and programming Manual.and you should clear about each function and operation .

B:Wear oil proof, non slip insulated shoes, and other requirements of the safety protection facilities.

C:Check all NC devices, operating panel, electrical control panel, door and lid should be closed.

Attention:

A:The cable conductor need have sufficient cross-sectional area,which from the power supply switch to the total machine power switch.so that it can meet the demand of power transmission.

B:the cable conductor which dew on the ground should be waterproof, prevent cuts, anti wear protective measures ,in order to avoid the accidents.

C:we should clean the debris and antirust oil,when we start the machine,after a long-term shutdown or unpacking machine before the first use.Each lubricating point, should be re-oiled, and in accordance with the lubrication requirements. The machine should be coated with anti rust oil neutral before the long-term stop.

D:The oil tank should be not less than the oil standard position, regular inspection and oiling.

E:For lubrication points, types of oil, please refer to the relevant lubrication instructions.

F:Each switch and handle should be flexible and smooth.

G:When the power supply to the machine, in turn connected to the factory power supply switch, the total machine power switch, the operating board of the system power switch.

H:Check coolant and add coolant if necessary.

### 3.4 The demand after power supply

When the machine power supply, the NC system of the screen should be lit, display status in accordance with the state of the NC system specification.

### 3.5 Routine checking

Warning:

When checking the tightness of the belt, do not extend the finger to the belt and the belt pulley, easy to press the finger.

Attention:

A:Please check the electrical mechanical system, etc., to ensure that no abnormal noise.

B:Please check all parts of lubrication of machine tools.

C:Please check the protective cover and door and other safety devices are safe, normal work.

D:Please check the belt, if not meet the requirements of the specification, please adjust or replace. The belt should be intact without damage.

E:The chuck should be locked,before the main chuck running,in order to prevent the chuck out.

### 3.6 Temperature rise

Attention:

A:To heat up the machine should be in the state of automatic operation of the machine without load, the maximum speed of the machine tool movement of half or 1/3 to make the machine running 10~20 minutes, so that the machine to achieve stable temperature

B:In automatic operation, the machine tool on each moving parts should be in accordance with the program automatic action, at the same time to check the movement of the various parts of the movement, should be smooth without abnormal noise.

C:If the machine idle for a period of time, we must carry out the temperature rise of the machine In order to make the machine tool life lasting, stable and reliable accuracy.

### 3.7 Preparation before starting

Warning:

A:The tooling should accord with the technical parameters ,no over loading ,or affect the balance of the machine.

B:Tool wear transition or damage, not only affect the machining accuracy of parts, and will damage the machine tool, it must always check the tool condition, timely replacement or repair.

C:Processing areas should have good lighting, in order to facilitate the safety detection.

D:Tools and other items around the machine tool should be kept in an orderly, reliable, clean and orderly environment.

E:tools,work piece and any other items should not put on the spindle box cutter, spindle, carriage and other similar parts, in order to avoid the accident.

F: the center hole of the work piece should match its weight,so can we prevent the work piece from sliding out of the center.

Attention:

A:The length should be in the limited range ,so that we can avoid interference.

B:After the tool is installed, try to run, and pay attention to the adjustment of tool parameters.

### 3.8 Matters needing attention in works

Danger:

A:The operator with long hair ,should wear hat ,and plate the hair in the hat,and avoid the hat blown off by the exhaust fan .shall not wear gloves,and operator not allow to romp and play.

B:The work piece should be clipped,the wrenches on the spindle and chuck should be taken down.

C:adjusting the nozzle of the coolant should under the machine shutdown state.

D: Don't use hands or clothes in contact with rotating work piece and the main spindle.

E: In the process of automatic ,please don't open the guard door of the machine.

F:In heavy duty processing, should avoid chip accumulation, because hot chips may cause fire, heat accumulation will cause the thermal deformation of the machine, affect the processing precision.

Warning :

A:The operation of the switch is not allowed to wear gloves, may cause malfunction of the machine.

B: Only after the Tool carrier ,spindle and other parts of the machine is stopped ,can be allow replace the work piece and tools.

C: Don't clean up the chip when the machine work.

D:Not allow to open the door or guard cover ,when operation the machine.

Attention :

A:when heavy work piece need to be moved ,you should work with two or more than two people ,in order to avoid danger.

B:If the work piece need to be moved by elevator or forklift, crane and other similar equipment,the operator should be trained and approved by the enterprise.

C:Should use the brush to clean the knife cutting head, not directly to clean with hands.

D:Processing of magnesium alloy, the operator should wear gas masks; processing of large dust materials, should wear masks and other protective equipment

### 3.9Interrupt processing

Attention:

After the completion of the processing,the operating panel should be on the power switch off, and disconnect the main circuit switch,when you need leave the machine for a while.

### 3.10 Finish machining

Attention:

A:don't clean up the machine before the machine stopped

B:the machine should be clean up after stop working,remove iron, wipe the door, window cover, etc.

C:Return each component of the machine to the initial position.

D:To check the shaving device whether is not damaged or not, if there is any damage please replace it immediately.

E:Check the contamination of the coolant and lubricating ,and replace it if necessary.

F:Check the amount and coolant and lubricating oil,please add if necessary.

G:Clean the iron box position filter to prevent clogging

H: please power off the switches,Power switch on the operation panel, the main circuit switch of the machine tool, and the electric switch of the workshop,when you knock off.

### 3.11 Safety protection device



A:Front and behind protection and cooling protection.

B:exceed range limited device(According to the specific configuration)

C:Storage stroke limiting device(NC software)

### 3.12 The work before repair

Warning:

A: Without permission to do any maintenance work.

B:Replacement parts, vulnerable parts should be arranged advanced.

C:Use right maintenance methods.

Attention:

A:Read carefully and fully understand the safety precautions specified in the manual.

B:Read this manual carefully and understand the relevant principle and contains notes

### 3.13 Maintenance operation.

Danger :

A:The control power switch on the main circuit breaker or the operation panel shall not be operated by the personnel who are not related to the maintenance work.In such a switch or other appropriate places should be hung "no flipping a switch, maintenance!" the warning signs. And such signs hung on the obvious and not easy to pick the location

B:When maintenance of machine tools, live operation is dangerous, please be careful. Try to close the main circuit power supply operation

Danger:

A:Electrical maintenance personnel should be familiar with the corresponding business personnel to play

B:The protective device and the interlock function of the machine can not be removed at will.

C:Replacement of the electrical components should be strictly in accordance with the list which provide by the manufacturers.

### 3.14 The works after maintenance.

Warning:

A: We should clean up and arrange the working environment ,in order to provide a good working environment ,when we finish maintenance.

B:Remove the parts and clean out the waste oil, waste water should be placed away from the machine according to the relevant regulations for processing

C:Maintenance personnel should check whether there is a security risk in the operation of the machine after the completion of the maintenance

D:Record of maintenance and inspection data for future reference.

## ***4 Lifting and Installing***

### 4.1 transport and storage of machine

The machine adopts waterproof package, and the key parts coated with antirust oil, packaging box using the anti vibration and impact measures, can guarantee in  $^{\circ}\text{C}$  to  $55^{\circ}\text{C}$  temperature range safety transportation and storage. But the packaging box absolutely not allow upside down or tilt more than  $50^{\circ}$ , does not allow violent impact and vibration, so as to avoid damage to the internal device.

## 4.2 Preparation before installation

### 4.2.1 Environments for the machine

Machine tools should not be placed in the following position:

A: Temperature has a significant change in the environment, such as direct light or near a large heat source

B: high humidity place.

C: dust is too big, too dirty place.

D: the machine around have punch and other types of source place, If the machine installation near the location of the source, must dug anti vibration ditch or a similar measure of anti vibration.

### 4.2.2 Environment demands of NC system.

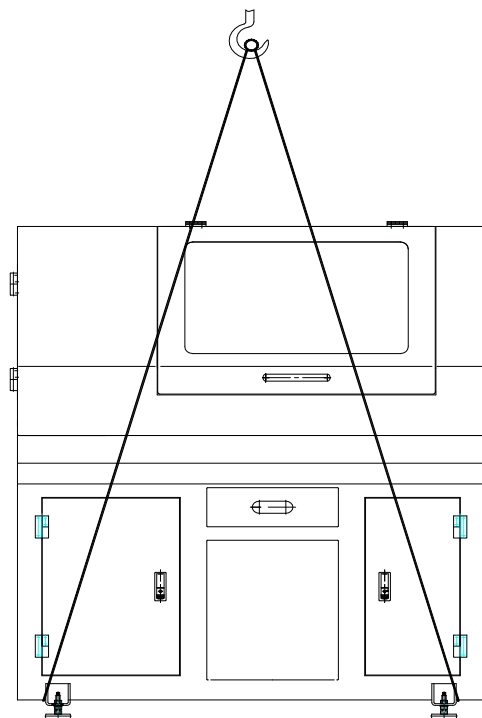
temperature  $5^{\circ}\text{C}$  ~  $40^{\circ}\text{C}$ ; relative humidity below 50%.

### 4.2.3 power interface

The power line connecting terminal is located on the outside of the machine tool electric cabinet.

## 4.3 Install

### 4.3.1 lifting schematic diagram shown below



Attention: The best way to adjust the install position is the forklift.

**Note:    using the circular vibration pad iron (Random)**

#### 4.3.2 lifting requirements

The machine and the packing box is not recommended for lifting and adjusting the installation position, it is best to use a forklift truck, if not to have to be suspended, please pay attention to the following requirements.

A:Hoisting machine should be especially careful, avoid shock and impact especially the NC system of the machine tool, control circuit plate, electrical components. Before lifting should inspect each part of the machine is fixed, the machine tool tail stock should lock, the door to appropriate fixed, no freely objects on the machine , some accessories and do not belong to the objects of the machine itself should be removed.

B:Lifting boxes must be in accordance with the outer container lifting sign,steel wire shall not serious squeeze packing box, not to have access to the machine, and minimize the packing box subject to impact and vibration. Packing crates tilt shall not exceed 15 degrees. You are not allowed to take the machine box on the objects with edges and corners or upside down, so as not to affect the machine's accuracy. Using roller moving boxes on the slope, roll bar diameter shall not be more than 70mm.

C:the first thing you should do is checking the external conditions of the machine tool, according to the packing list and the tool is complete.

D:To keep up the machine or the packing box to keep balance in all directions,and should do adjust when the machine hanging from the ground.

E:The included angle of the hoisting wire rope shall not be more than 60 degrees.

F:When the machine is operated, the operator should be coordinated.

G:when using the forklift ,we also need to follow the above considerations.Forklift should try to slow down the speed, avoid fast start, stop the inertia in the runaway phenomenon. Driving forklift personnel must be after the training of qualified drivers, driving the process should be cautious, careful not to hurt the cooperative work, don't bump machine, so that the machine excessive tilt.

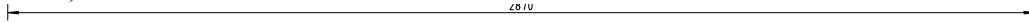
#### 4.4 Install of the machine

The method of install the machine will have a great effect to the function and performance,improper installation will make the machine can not meet the requirements of the processing accuracy, or can not maintain a long-term accuracy requirements.Must carefully read the installation steps, and refer to the requirements of the installation of the machine in order to make high precision machining.

##### 4.4.1 Foundation

The position of the machine should be level, and then determine the installation space according to the specified environment and the shape of the machine tool, and finish the job of the foundation.

Covers an area including the machine tool itself covers an area of operation (see figure below).



#### 4.4.2 Temporary level adjustment

A:Lift or fork the machine, adjusting the pad iron bolts penetrated into the base of the anchor bolt hole. Then the machine slowly down, and ensure uniform contact.

B:adjusting bolt,for coarse level of the machine.

#### 4.5 Inspection of internal device connection

After finish adjust the temporary level of the machine, the mechanical and electrical system of the machine shall be checked in accordance with the following provisions.

A:Cleaning. To rust, machine sliding surface and some pieces of metal surface has been coated on the a layer of anti rust oil,they may pollution by the transport process. anti rust oil must be clean before use, otherwise there is the danger of damage to the sliding surface. Clean cloth dipped in oil cleaning, after cleaning we should lubricating the machine in accordance with the requirements of lubrication.

B:Machine check.Check the machine parts if there have damaged, missing parts or accessories, whether lubrication is good, hydraulic pipeline whether reliable connection.

C:Electrical system inspection should be carried out before the electrical connection is switched on

D:After the machine is shut down for a long time, the lubricating system must be started to make full lubrication.

#### 4.7 The final adjust of the machine.

Re-adjusting the machine in the longitudinal and transverse,the adjust step and allow poor, please refer to the attached to each machine *accuracy test*. With the scale of the level meter is 0.02mm.

#### 4.8 Maintenance of initial installation

After the installation of the initial stage, due to the change of base and foundation of the unstable because of factors, the level of machine will have obvious change, may greatly influence the machine precision. On the other hand machine initial wear, as well as by the machine pollution .Extremely easily cause changes in the performance of the machine . So, please according to the following method for initial and maintenance:

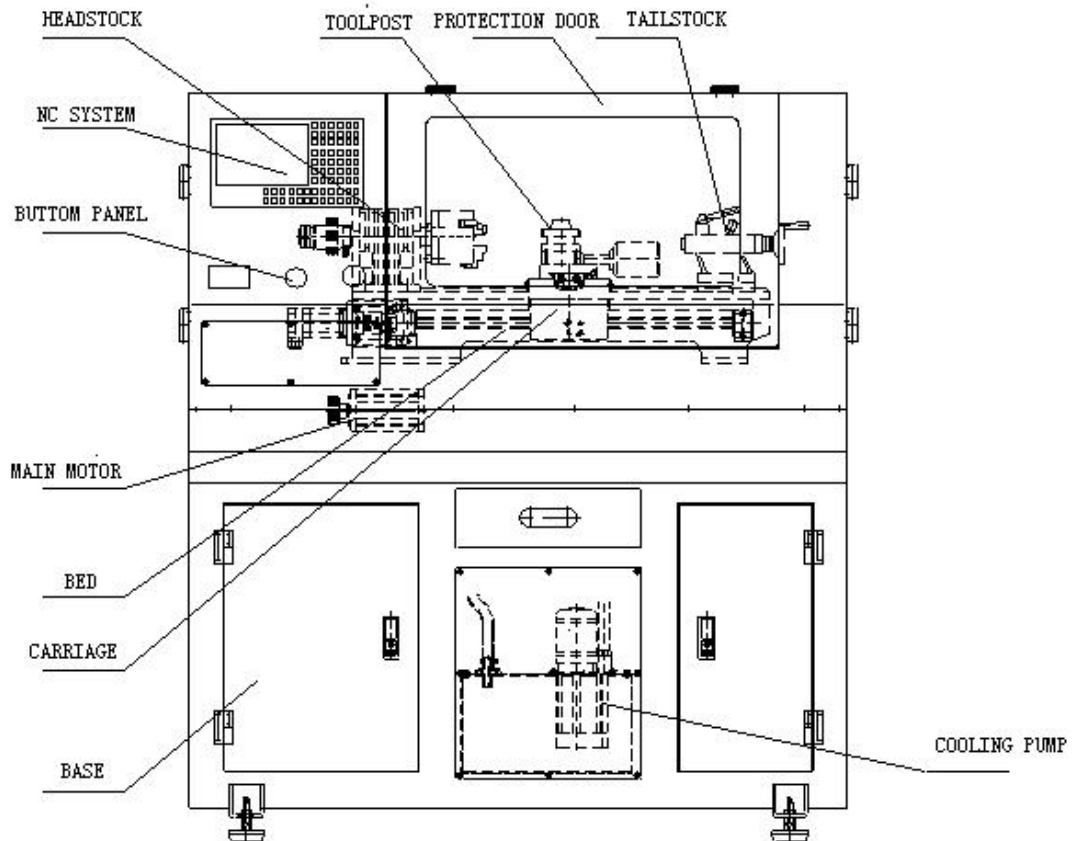
A:Test: after the installation of machine ,the initial test should be very cautious. Test time is about 1 hours, during the whole test period shall not be heavy load cutting and machining parts.

B:Check at the initial stage of the bed level: from machine installation date six months should check the bed level, if found any abnormal phenomenon, should be promptly corrected, to ensure that the requirements of the bed level accuracy is achieved.

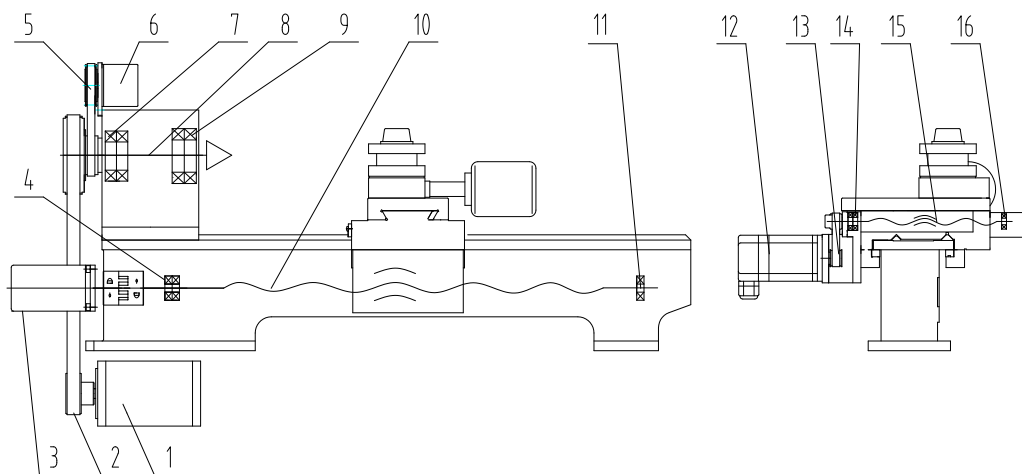
C:6 months later, we can change the appropriate extension of the inspection period, according to the machine ,until the change is stable to a certain extent, a year can be one to two times the inspection.

## 5 Structure of machine

### 5.1 Machine layout



### 5.2 Machine transmission system and bearing distribution



1.main motor 2.Multi wedge belt 3.Z axis feed motor 4.Angular contact bearing 5.Deep groove ball bearing 6. Spindle 7. Angular contact bearing 8.Longitudinal lead screw 9.Deep groove ball bearing, 10, X axis feed motor 11.Synchronous belt 12.Angular contact bearing 2.13. Transverse lead screw 14.Deep groove ball bearing

**Note: this drive system diagram, just roughly indicates the installation position of the components. In the bearing distribution table, will be "close to the motor side", "far away from the motor side" to explain the text.**

Table 5-1 important bearing distribution table

| 4 one pairs of Angular contact bearing<br>(Near the motor) | 7200C/DB  | 1 pairs | P5 |
|--|-----------|---------|----|
| 7 Deep groove ball bearing                                 | 6007-Z    | 2       | P5 |
| 9 one pairs of Angular contact bearing                     | 7008C/DB  | 1 pairs | P4 |
| 11 Deep groove ball bearing(Far from the<br>motor)         | 6200-2Z   | 1       | P5 |
| 14Angular contact bearing(Near the motor)                  | 71900C/DB | 1 pairs | P5 |
| 14 Deep groove ball bearing(Far from the<br>motor)         | 619/8-2Z  | 1       | P5 |

**Note: bearing models refer to the country's latest standards.**

#### 5.2.1 Main drive system

The machine main motor direct drive spindle motor, spindle box has cancelled the gear transmission mechanism, simple structure, easy maintenance, high reliability. Transmission through the main motor by DC brushless motor, DC stepless speed regulation. Spindle positive inversion through the electrical system control, positive inversion has the same speed.

#### 5.2.2 Work piece clamping mechanism

The configuration of the machine tool work piece clamping mechanism is three jaw chuck and the power source is manual .

#### Warning :

All tooling and work piece clamping mechanism installed on the spindle must consider its dynamic balance, otherwise it will greatly damage the spindle bearings, severely punish will cause the body to scrap or damage the safety of the operator.

#### 5.2.3 Feed drive system

X axis, Z axis feed motion is by two step through the coupling (synchronous belt and synchronous belt wheel) connected with the ball screw nut pair then by the ball screw nut transfer to the carriage or in a small trailer to achieve. Ball screw nut pair has been pre- tight, can achieve high precision gap less transmission

#### 5.2.4 photoelectric encoder drive system

The main spindle photoelectric encoder is driven by the synchronous belt wheel on the main spindle to drive the synchronous belt wheel on the encoder seat.

#### 5.2.5 tool post

The machine can be used in two rows tool carriers, and can be equipped with four electric station. The electric post's transposition locking directly from the electric post built-in motor drive, direct control by the NC system.

#### 5.2.6 tail seat

Tail stock is manual tail stock. Tail stock manually according to the eccentric principle locking on the bed, with the hand cranking wheel moving screw the tail stock sleeve forward backward; loosen eccentric locking mechanism, manual movement of the tail stock body sliding back and forth.

When the work is carried out by using the tail seat, the locking sleeve is needed to be locked.

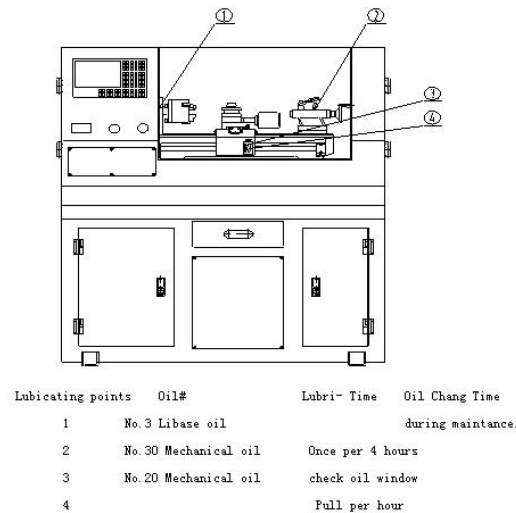
#### 5.2.7 Lubricating System

##### 5.2.7.1 the bearing of the spindle

The machine spindle bearings using 3 lithium grease lubrication, filling the number of 1/3 to 2/3, the machine tool factory has filled with grease. The bearings should be clean up every time and add the same type of grease, when overhaul the machine.

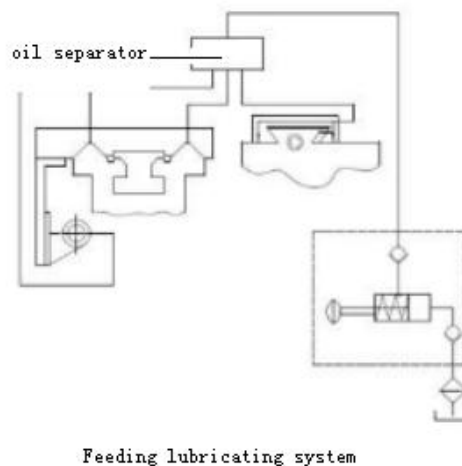
##### 5.2.7.2 The lubricating of the feeding system.

Feed system of the sliding interface using lubricating oil, consisting of a manual centralized lubrication system and pipeline. And Z axis screw support bearing adopts 3 lithium grease lubrication, we have add in the assembly. We can replacement according to the situation, but the first thing you should do is cleaning. The concentration oil lubricating tank should keep sufficient oil, liquid level shall not be lower than the half of the calibration standard oil. Each shift before starting machine, the first thing is to pull up hand pull the pump handle more than 3 times and wait for after a few minutes before operating the machine. In order to ensure the lubrication points to obtain the full lubrication.



Lubrication diagram

**Note:** before processing should clean up the rail surface, especially machining of cast iron or to produce debris non-ferrous metal pieces should be often wipe the surface of the guide rail, and to ensure adequate lubrication.



## 6 The operation and the safety of the machine.

### 6.1 The operation of the machine.

Starting the machine ,Operating procedures during the process, shutdown procedures,operating methods and precautions, and the occurrence of errors in the operation process of the machine, as well as the wrong operation and preventive measures, please see the machine's *NC system specification*.

### 6.2 Safety protection

#### A:Sheet metal protection

This machine use closed shield door. Closed door machine has the advantages of beautiful appearance,when processing the iron ,cutting fluid does not fly out of guard,well protect the



operator and the environment ,the protective doors with transparent material, we can clearly see the machine's running situation when in processing.

B: The protection of X and Z axis.

X, Z axis adopts metal protection, can effectively block cutting fluid and scrap iron .

C:Z, X axis has a dead limit, it can avoid errors in the operation and programming data errors caused by failure, etc.

D:Cooling liquid flows back to the water tank,filtered through the mesh filter cover, you can filter out most of the iron filings. Inside the water tank is provided with separating strips, the clastic which didn't filtered will deposit at one end of the water tank, does not enter the pump.and please clean the tank regularly.

E: fully closed design electrical cabinet,and it is easy to expansion for the reserved in the electrical cabinet.

F: The protection of power failure or breakdown.

When machine encounter outside a sudden power failure or failure, the parts which in the start state will automatically to the stop state, in the stop state will not automatically start.NC system built in the battery, when the system fault always, storage processing program will not lost.

H:Machine equip with alarm function and emergency stop button, can prevent all kinds of sudden failure of the machine caused damage to the machine .NC system will give alarm signal,we can find the fault location according to the system specification.

### 6.3 set the necessary safety warning signs

Despite adopting many safety measures, but there will still some potential, not obvious danger, in order to prompt the operator, we set necessary safety warning signs, please don't violate the above tips.

## 7 Inspection and maintenance

### 7.1 Routine check

| Order NO. | Check position                         | Check items   | Remarks   |
|-----------|--|---|---|
| 1         | The oil level of the lubrication parts | 1. Whether there is enough oil<br>2. Whether the oil is polluted obviously  | Please add,if the oil is not enough, replace the oil when polluted                                  |
| 2         | Coolant level                          | 1. Whether the coolant level is suitable<br>2. Whether the coolant is polluted<br>Whether Sediment has exceeded the height of the bottom of the water tank. | Please add if necessary<br>Please replace if necessary<br>Please replace and clean up if necessary. |
| 3         | Guideway                               | 1. Whether the lubricating oil is enough<br>2. Whether the scraping board is damaged  |   |
| 4         | ribbed belt                            | 1.Whether the tension is appropriate<br>2.Is there a crack or scratch on the surface  |   |
| 5         | The surface of the bed and pipeline    | 1.Whether there is oil, water leakage<br>2.Whether they are unimpeded.  |   |

|    |                                |   |               |
|----|--------------------------------|---|---------------|
| 6  | Moving parts                   | 1. Whether there is noise and shake<br>2. Whether the shift is smooth and normal.                     |               |
| 7  | Operation panel                | 1. Whether the switch and the hand shank is normal<br>2. Whether can display the alarm.               |               |
| 8  | Safety device                  | Function is normal.   |               |
| 9  | The external wire cable        | 1. Whether there is break<br>2. there is no short circuit, whether the insulation of wire is damaged. |               |
| 10 | Motor and other rotating parts | 1. Whether there have unusual noise and shake.<br>2. Whether there have abnormal fever.               |               |
| 11 | Clean up                       | Clean the surface of the chuck, X, Z axis guard surface   | After working |
| 12 | Chuck lubrication              | Lubricating around the chuck  | Every weeks   |
| 13 | accuracy of machine            | Whether the accuracy of the machine in a permit range.  |               |

## 7.2 Regular check

| Order NO. | Checking parts            |   | Maintain items  | time interval |
|-----------|---------------------------|---|---|---------------|
| 1         | Lubrication system        | Lubricating device pipeline                               | Clean up the Version filter<br>Check for oil leakage, blockage and rupture.   | Six months    |
| 2         | Lubricating system.       | filter  | Clean up the drain opening filter   | Timely        |
| 3         | Ribbed belt               | Belt<br>Belt pulley                                       | Check appearance and tightness<br>Clean up the pulley   | Six months    |
| 4         | Spindle motor             | Sound, vibration, temperature rise, insulation resistance | Check the abnormal noise on the bearing and any other parts.<br>Clean up the Belt pulley  | Six months    |
| 5         | the motor of X&Z axis     | Sound and temperature rise                                | Check the abnormal noise and temperature rise on the bearing.   | 1 month       |
| 6         | chuck                     | chuck   | Removing chuck and clean up the cutting chips in the chuck  | Three months  |
| 7         | Control panel             | Electrical device and connection screw                    | Check whether the electrical device has peculiar smell, color change, whether the contact surface have wear and screw loose<br>Dust and so on | Three months  |
| 8         | The clearance of X&Z axis | Check the clearance                                       | Check it with dial gauge  | Six months    |
| 9         | foundation                | The level of the bed                                      | Check with gradienter and adjust the level of the bed   | Twelve months |

## 7.3 lubrication and coolant

### 7.3.1 lubricating device

The items of check the lubricating device as below:

A: timely add the oil according to the provisions.

B: The lubricating parts' check. To ensure that each of the lubricating parts can be well lubricated, if the lubrication is not good somewhere, may be the lubrication pipeline blockage, please remove the joint, clean or replace.

### 7.3.2 coolant device

The check items as below:

A:whether the cooling pump is working properly ,no noise, flow and rated value.

B:whether the cooling liquid need to be replaced:when the nozzle out of the water reduction, should check the level of the tank, timely replenishment. If it is too dirty, please timely replacement.

Clean the sediment in the cooling water tank in time.

#### 7.4 Adjust and maintain of the machine.

##### 7.4.1 Headstock

Factory has adjusted the spindle bearing preload, within a short period of time it do not need to be adjusted.After been used a period of time , the bearing clearance will increases, leading to reduce the precision of rotary spindle, influences the machining accuracy of the products.In normal use, spindle bearing temperature rise shall not exceed 40 degrees centigrade, temperature shall not exceed 70 DEG.Otherwise, the bearing preload should be re adjust.if the accuracy of the spindle can not achieve the accuracy requirement, also need to adjust bearing preload.For paired angular contact ball bearings, they need to be removed and in accordance with the standard method ,and determination under the predetermined pressure inside and outside the ring height difference, and cooperate with each other, re installed onto the spindle box, preloaded with radial locking screws, locking nut, and check the spindle of the precision, adjust bearing installation and meets the requirement of accuracy, running 1 hour, meet the highest temperature and temperature rise requirements.

Attention: The personal who adjust of spindle bearing shall have the professional and technical qualifications .Adjustment should avoid pollution bearing. Very fine dust and impurities will cause bearing excessive wear. The series of machine spindle bearing box have two kinds of position, front and rear ,please pay attention while adjusting.

##### 7.4.2 Adjustment of multi wedge belt

If the tension of the belt is greater than the allowable value, it may shorten the belt and the main shaft bearing life. Instead, the tension is too small, there is not enough friction force to transfer the amount of power.

The first belt tightness inspection should be in 3 months and then every 6 months.

Please see the below chart, Pressing belt by hand in the direction perpendicular to the belt, the force must be in the middle position of belt wheel.

PK between 15-22N, H in 16 mm or so, if it is too large or too small, it will need to be adjusted.

Release motor mounting plate and mounting screws, adjust the motor mounting plate, you can adjust the tightness of the belt, while please attention that the belt and any other parts can not be touched.

##### 7.4.3 The adjust of lead screw.

The ball screw and drive motor Z axis of the machine using direct coupling, screw positioning using near the end of the motor positioning, only need to adjust the positioning end bearing elastic.

##### 7.4.4 the adjust of the clearance for the different planker (adjust the clearance of guide way)

Between small carriage and the carriage, carriage and bed ,the sliding surface are used angle plug iron, the plug iron inclination to 1:100. Inclined plane with the surface after distribution scraping, and ensure good contact, when the gap is bigger, you can use the screws at the ends of the gradual adjustment of the position of the plug iron to adjust the size of the gap. After adjustment the ends of the two screws should contact with the plug iron, in order to ensure the plug iron rigid.Adjustment should be in a moderate gap, not only to meet the accuracy requirements of the machine tool, see *precision test list* , but also flexible sliding. Friction is too large, although the detection accuracy is good, but it will lead to wear too fast.

## 7.5 Common failure and cause

### 7.5.1 coolant can not flow out

A:whether operating panel on the coolant switch is set to normal; M instructions are wrong.

B:whether the cooling pump suction entrance is fully inserted into the coolant

C:whether the chip tray filter and pump suction filter is blocked.

D: whether the coolant pump motor is working.

E:whether the cooling pump motor protection device is disengaged in the control circuit board.

### 7.5.2 spindle didn't work.

A:M instructions are correct.

B:Electrical components - main motor and control circuit board is normal

C:If there is urgent stop alarm.

### 7.5.3 Spindle box abnormal temperature rise.

The main chuck bearing preload setting is not appropriate.

### 7.5.4 the zero point of X&Z disappear (this function needs to be ordered)

The zero point switch loosen.

### 7.5.5 Repeated positioning accuracy is not good.

A:Iron adjustment is not appropriate.

B:The rail lubrication is not suitable.

C:The coupling loose

### 7.5.6 machine notwork

A:NC device display alarm signal.

B:part of the machine may injured.

### 7.5.7 The work piece can not be clamped

A: three jaws didn't work at the same time.

B:the jaws seized by other things.

C:the lubricating of the jaws are not good.

D:the three jaw chuck may damaged.

### 7.5.8 Appear tamper in fine machining.

Processing disc type :spindle disc centering is not suitable.

Processing axle type:tail stock centering is not suitable

The guide way gap is too large.

### 7.5.9Tail sleeve does not move

Tail sleeve lubricating is not in a good condition.

7.5.10 The runout of the tail sleeve center is too large.

A:The tailstock bear a large thrust .

B: The gap between tail stock and tail stock sleeve is to large.

C:The locking handle without locking

7.5.11 The tail stock body can not move.

A:The eccentric lock not loosened.

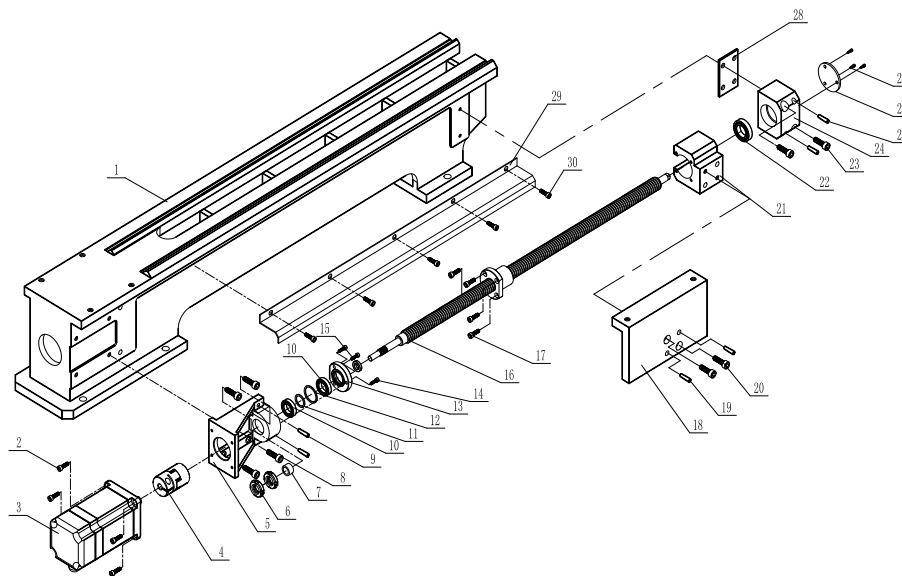
B:The lubrication of the moving parts is not good.

C:The eccentric locking after released, following plate hit the bed or get stuck.

7.5.12 electrical system and NC system fault

Please see the Electrical manual and NC system manual, driver manual and other accessories.

**Drawing of bed assembly**

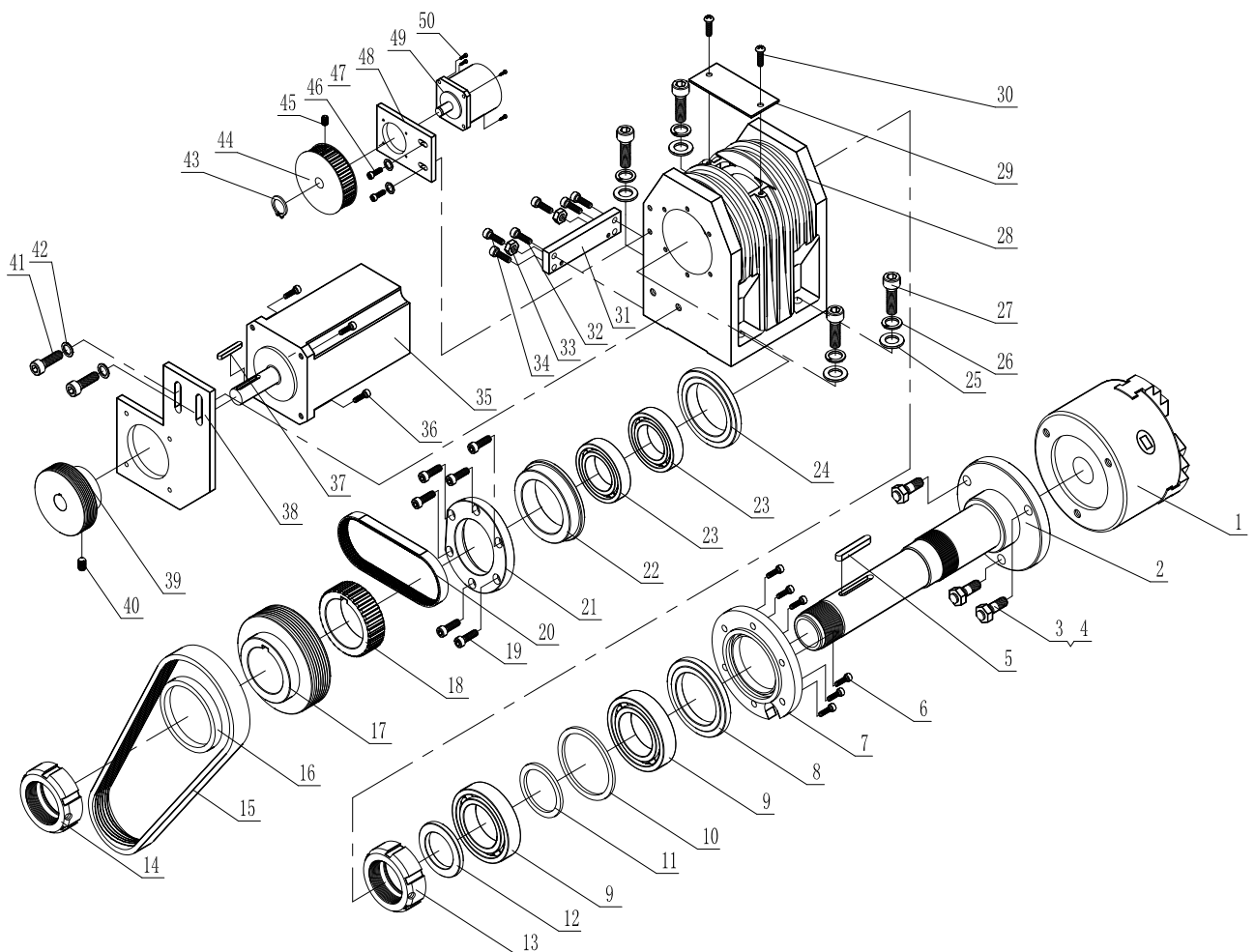


**Parts list**

| No. | Parts No.      | description  | Q'ty  |
|-----|----------------|--|-------|
| 1   | CNC210-01-001  | bed  | 1     |
| 2   | GB70-85        | Screw M5×20  | 4     |
| 3   |                | Feed motor   | 1     |
| 4   | EKL/20/B/8/8   | Elastic coupling                                     | 1     |
| 5   | CNC210-04A-001 | Motor seat   | 1     |
| 6   |                | Dental cover nut M10×1                               | 1     |
| 7   | CNC210-04-003  | Spacer   | 1     |
| 8   | GB70-85        | Screw M6×20  | 4     |
| 9   | GB118-2000     | Taper pin 6×18                                       | 2     |
| 10  | GB/T292-94     | Duplex angular contact bearings in pairs 7200C/DB P5 | 1 set |
| 11  | CNC210-04A-007 | Spacer   | 1     |

|    |                |                           |      |
|----|----------------|---------------------------|------|
| 12 | CNC210-04A-008 | spacer                    | 1    |
| 13 | CNC210-04-004  | Bearing gland             | 1    |
| 14 | GB70-85        | Screw M4×14               | 3    |
| 15 | GB1387-92      | Skeleton oil seal 16×28×7 | 1    |
| 16 | CNC219094A-002 | Z axis ball screw         | 1set |
| 17 | GB70-85        | Screw M4×14               | 4    |
| 18 | CNC210-05A-001 | Connection seat           | 1    |
| 19 | GB118-2000     | Taper pin 6×20            | 2    |
| 20 | GB70-85        | Screw M6×18               | 2    |
| 21 | CNC210-05-002  | Nut seat                  | 1    |
| 22 | GB/T276-94     | Bearing 6200-2Z P5        | 1    |
| 23 | GB70-85        | Screw M6×30               | 2    |
| 24 | CNC210-04A-005 | Screw seat                | 1    |
| 25 | GB118-2000     | Taper pin 6×40            | 2    |
| 26 | CNC210-04-006  | Cover                     | 1    |
| 27 | GB/T818-2000   | Screw M4×8                | 3    |
| 28 | CNC210-04A-006 | Adjust pat                | 1    |
| 29 | CNC210-00A-001 | Lead screw cover          | 1    |
| 30 | GB70-85        | Screw M4×8                | 5    |

### Drawing spindle box assembly



### Parts list

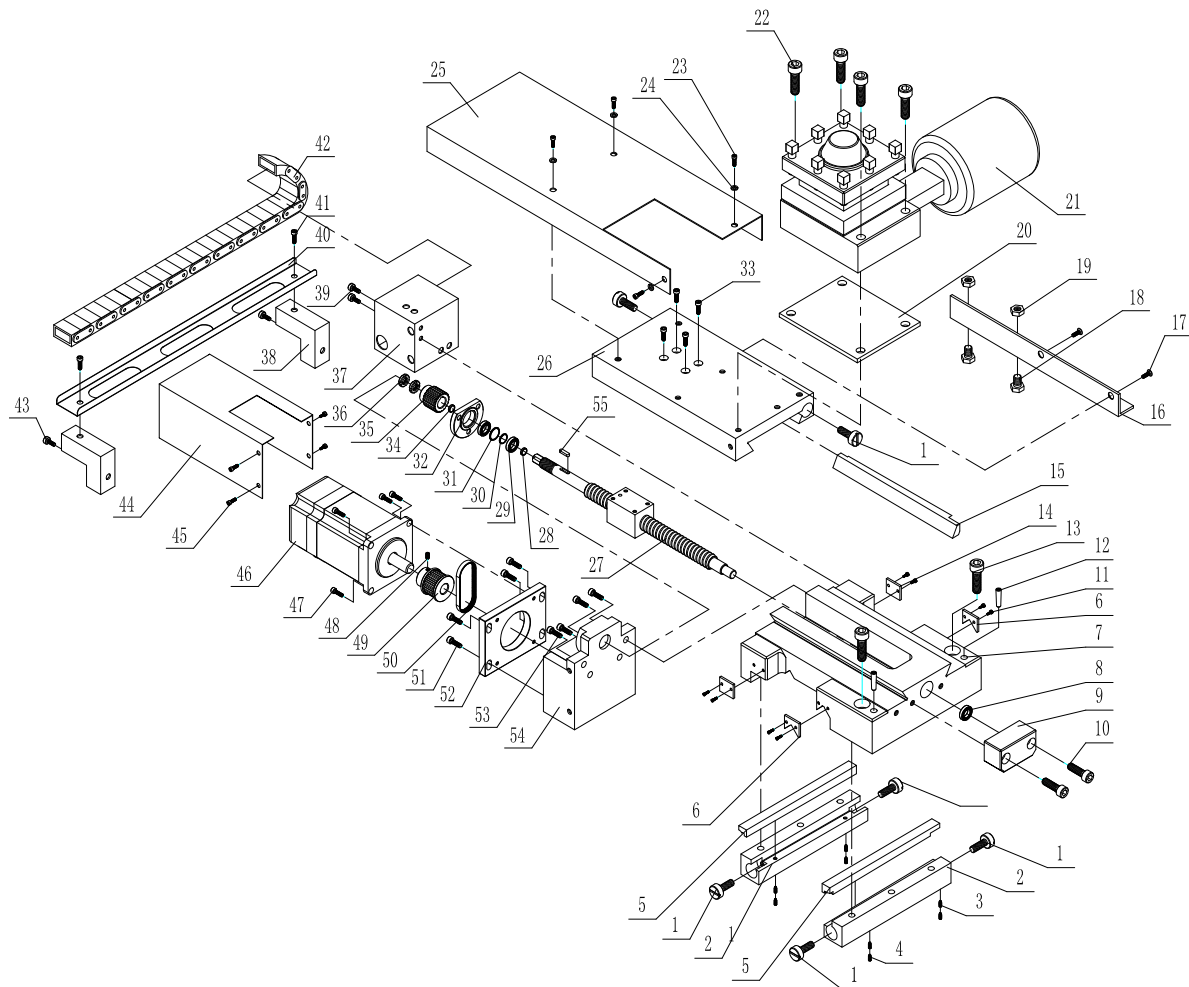
| No. | Parts No. | Description | Q'ty |
|-----|-----------|-------------|------|
|-----|-----------|-------------|------|

CNC210      Operating Manual

|    |                |  |      |
|----|----------------|--|------|
| 1  |                | Three jaw chuck $\Phi 100$                           | 1    |
| 2  | CNC210-02B-001 | Spindle  | 1    |
| 3  | GB897-88       | Double end studs $M8 \times 30$                      | 4    |
| 4  | GB41-2000      | Nut M8   | 4    |
| 5  | GB1096-79      | Key $6 \times 40$                                    | 1    |
| 6  | GB70-85        | Screw $M6 \times 14$                                 | 6    |
| 7  | CNC210-02B-002 | The spindle end cover                                | 1    |
| 8  | CNC210-02B-003 | Shield ring  | 1    |
| 9  | GB/T292-94     | Duplex angular contact bearings in pairs 7008C-DB P4 | 1set |
| 10 | CNC210-02B-018 | Spacer   | 1    |
| 11 | CNC210-02B-019 | Spacer   | 1    |
| 12 | CNC210-02B-005 | Clamping ring  | 1    |
| 13 |                | Dental cover nut   YSF $M40 \times 1.5$              | 1set |
| 14 |                | Dental cover nut   YSF $M35 \times 1.5$              | 1set |
| 15 |                | Wedge belt   7-PJ594                                 | 1    |
| 16 | CNC210-02B-011 | Spacer   | 1    |
| 17 | CNC210-02B-010 | Spindle pulley                                       | 1    |
| 18 | CNC210-02B-009 | synchronous pulley   A                               | 1    |
| 19 | GB70-85        | Screw $M5 \times 14$                                 | 6    |
| 20 |                | Synchronous belt   130XL037                          | 1    |
| 21 | CNC210-02B-008 | End cover  | 1    |
| 22 | CNC210-02B-007 | Bearing gland  | 1    |
| 23 | GB/T276-94     | Bearing   6007-Z P5                                  | 2    |
| 24 | CNC210-02B-006 | Bearing retainer                                     | 1    |
| 25 | GB95-85        | Flat washer $\Phi 8$                                 | 4    |
| 26 | GB97-86        | Spring washer $\Phi 8$                               | 4    |
| 27 | GB70-85        | Screw $M8 \times 30$                                 | 4    |
| 28 | CNC210-02B-004 | Spindle box  | 1    |
| 29 | CNC210-02B-017 | Cover  | 1    |
| 30 | GB70-85        | Screw $M5 \times 8$                                  | 2    |
| 31 | CNC210-02B-015 | Adjust seat  | 1    |
| 32 | GB70-85        | Screw $M6 \times 16$                                 | 4    |
| 33 | GB41-2000      | Nut M6   | 2    |
| 34 | GB70-85        | Screw $M6 \times 30$                                 | 2    |
| 35 |                | Main motor 1.1KW                                     | 1    |
| 36 | GB70-85        | Screw $M5 \times 20$                                 | 4    |
| 37 | GB1096-79      | Key $4 \times 20$                                    | 1    |
| 38 | CNC210-02A-006 | Motor seat   | 1    |
| 39 | CNC210-02B-012 | Motor pulley   | 1    |
| 40 | GB/T78-2000    | Six pyramid end screw $M5 \times 8$                  | 1    |
| 41 | GB70-85        | Screw $M8 \times 25$                                 | 2    |
| 42 | GB96-85        | Flat washer   8                                      | 2    |
| 43 | GB894.1-86     | Shaft with elastic ring 15                           | 1    |

|    |                |                                |   |
|----|----------------|--------------------------------|---|
| 44 | CNC210-02B-013 | synchronous pulley B           | 1 |
| 45 | GB/T88-2000    | Allen flat end set screws M5×8 | 2 |
| 46 | GB70-85        | Screw M6×16                    | 2 |
| 47 | GB95-85        | Flat washer 6                  | 2 |
| 48 | CNC210-02B-014 | The encoder seat               | 1 |
| 49 |                | The encoder ZSP5208            | 1 |
| 50 | GB70-85        | Screw M5×12                    | 4 |

Drawing of carriage assembly



Part

s list

| No. | Parts No. | description | Q'ty |
|-----|-----------|-------------|------|
|-----|-----------|-------------|------|

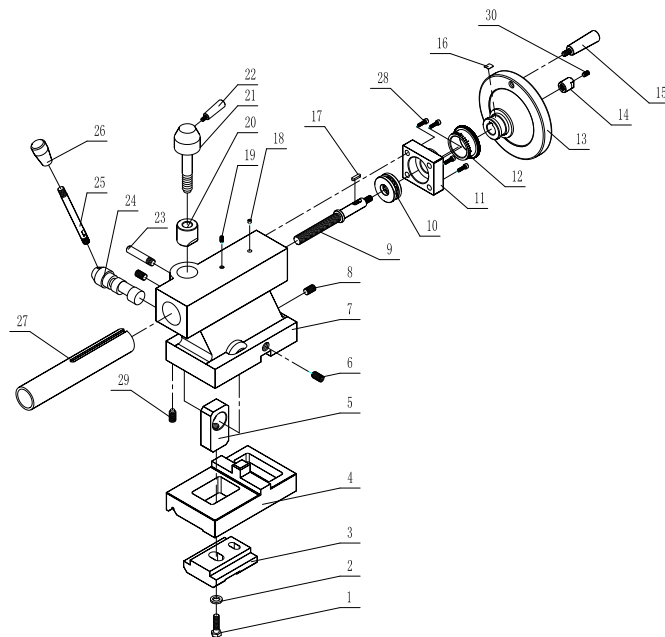


CNC210      Operating Manual

|    |                 |  |      |
|----|-----------------|--|------|
| 1  | CNC210-03A-007  | The adjusting screw                                | 6    |
| 2  | CNC210-03A-005  | Briquetting  | 2    |
| 3  | GB97-2000       | Six pyramid end screw M4×8                         | 4    |
| 4  | GB/T77-2000     | Allen flat end set screws M4×6                     | 4    |
| 5  | CNC210-03A-006  | Carriage gib                                       | 2    |
| 6  | WM180V-02-031   | Scraping the crumbs board A                        | 2    |
| 7  | CNC210-03A-001  | Carriage   | 1    |
| 8  | GB/T276-94      | Bearing 619/8-2Z                                   | 1    |
| 9  | CNC210-03A-003  | X axis ball screw seat                             | 1    |
| 10 | GB70-85         | Screw M6×25  | 2    |
| 11 | GB/T818-2000    | Screw M3×8   | 8    |
| 12 | GB118-2000      | Taper pin 6×40                                     | 2    |
| 13 | GB70-85         | Screw M8×35  | 2    |
| 14 | WM180V-02-032   | Scraping the crumbs board B                        | 2    |
| 15 | CNC210-03A-008  | Gib  | 1    |
| 16 | CNC210-03A-016  | Stand  | 1    |
| 17 | GB/T68-2000     | Screw M5×10  | 2    |
| 18 | CNC210-03A-017  | Induction block A                                  | 2    |
| 19 | GB41-2000       | Screw M6   | 4    |
| 20 | CNC210-03A-015  | Rest adjust pad                                    | 1    |
| 21 |                 | Electric tool post LD4-CK0610                      | 1    |
| 22 | GB70-85         | Screw M6×30  | 4    |
| 23 | GB/T818-2000    | Screw M5×10  | 4    |
| 24 | GB95-85         | Flat washer 5                                      | 4    |
| 25 | CNC210-03A-014A | Apron cover  | 1    |
| 26 | CNC210-03A-002  | apron  | 1    |
| 27 | CNC210-03A-012  | X axis ball screw                                  | 1    |
| 28 | CNC210-03-013   | Bushing  | 1    |
| 29 | GB/T292-94      | Duplex angular contact bearings in pairs 71900C/DB | 1set |
| 30 | CNC210-03A-011  | Bearing spacer                                     | 1    |
| 31 | CNC210-03A-013  | Bearing spacer                                     | 1    |
| 32 | CNC210-03-011   | Bearing gland                                      | 1    |
| 33 | GB70-85         | Screw M4×16  | 4    |
| 34 | CNC210-03-014   | Spacer   | 1    |
| 35 | CNC210-03-005   | Scraping the crumbs board B                        | 1    |
| 36 | GB810-88        | Dental cover nut M10×1                             | 2    |
| 37 | CNC210-03A-009  | Junction box                                       | 1    |
| 38 | CNC210-07-020   | Drag chain bracket                                 | 2    |
| 39 | GB70-85         | Screw M5×10  | 2    |
| 40 | CNC210-07-019   | Drag chain slot                                    | 1    |
| 41 | GB/T818-2000    | Screw M5×8   | 2    |
| 42 |                 | Drag chain   | 1    |
| 43 | GB70-85         | Screw M5×10  | 2    |

|    |                |                             |   |
|----|----------------|-----------------------------|---|
| 44 | CNC210-03A-008 | X axis motor cover          | 1 |
| 45 | GB70-85        | Screw M5×10                 | 4 |
| 46 |                | Feed motor                  | 1 |
| 47 | GB70-85        | Screw M4×14                 | 4 |
| 48 | GB/T78-2000    | Six pyramid end screw M5×5  | 1 |
| 49 | CNC210-03-004  | Scraping the crumbs board A | 1 |
| 50 |                | Synchronous belt 60XL037    | 1 |
| 51 | GB70-85        | Screw M5×16                 | 4 |
| 52 | CNC210-03-008  | The motor mounting plate    | 1 |
| 53 | GB70-85        | Screw M5×20                 | 4 |
| 54 | CNC210-03A-004 | X axis motor seat           | 1 |
| 55 | GB1096-79      | Key 3×10                    | 1 |

Drawing of tailstock assembly



Parts list

| No. | Parts No.      | description                     | Q'ty |
|-----|----------------|---------------------------------|------|
| 1   | GB5782-86      | Hex bolt M8×30                  | 1    |
| 2   | GB97.1-85      | Flat washer 8                   | 1    |
| 3   | WM180V-05A-003 | Clamp                           | 1    |
| 4   | WM180V-05A-002 | The tail frame backplane        | 1    |
| 5   | WM180V-05A-022 | Lock hanging piece              | 1    |
| 6   | GB/T77-2000    | Allen flat end set screws M8×20 | 2    |
| 7   | WM180V-05A-001 | Tailstock body                  | 1    |
| 8   | GB/T77-2000    | Allen flat end set screws M8×30 | 1    |
| 9   | WM180V-05A-008 | Lead screw                      | 1    |
| 10  | GB301-85       | thrust ball bearing 51100       | 1    |

CNC210      Operating Manual

|    |                 |  |   |
|----|-----------------|--|---|
| 11 | WM180V-05A-005  | Tailstock end cover                        | 1 |
| 12 | WM180V-05A-009  | Calibration loop                           | 1 |
| 13 | WM180V-05A-004  | Hand wheel                                 | 1 |
| 14 | WM180V-05A-019  | Nut  | 1 |
| 15 | JB/T7270.1-94   | Handle B-M5×40                             | 1 |
| 16 | WM180V-05A-010  | Leaf spring                                | 1 |
| 17 | GB1096-79       | Key 4×12                                   | 1 |
| 18 | GB1155-79       | Oil cup 6                                  | 1 |
| 19 | GB/T79-2000     | Screw M5×6                                 | 1 |
| 20 | WM180V-05A-006  | Lock pressing sleeve                       | 1 |
| 21 | WM180V-05A-015  | Lock screw                                 | 1 |
| 22 | JB/T7270.1-94   | Handle HY8310.1 B-M6×50                    | 1 |
| 23 | WM180V-05A-018  | Limit screw                                | 1 |
| 24 | WM180V-05A-014  | The eccentric lock shaft                   | 1 |
| 25 | WM180V-05A-013  | The long handle bar                        | 1 |
| 26 | JB/T7271.3-1994 | The handle set                             | 1 |
| 27 | WM180V-05A-007  | Sleeve                                     | 1 |
| 28 | GB.T70.1-2000   | Hexagonal cylindrical side screw set M4×12 | 4 |
| 29 | GB/T79-2000     | Hexagonal cylindrical side screw set M5×6  | 1 |
| 30 | GB/T77-2000     | Hexagonal cylindrical side screw set M6×6  | 1 |