

CNC350 Numerical Control Machine

Operation Instruction

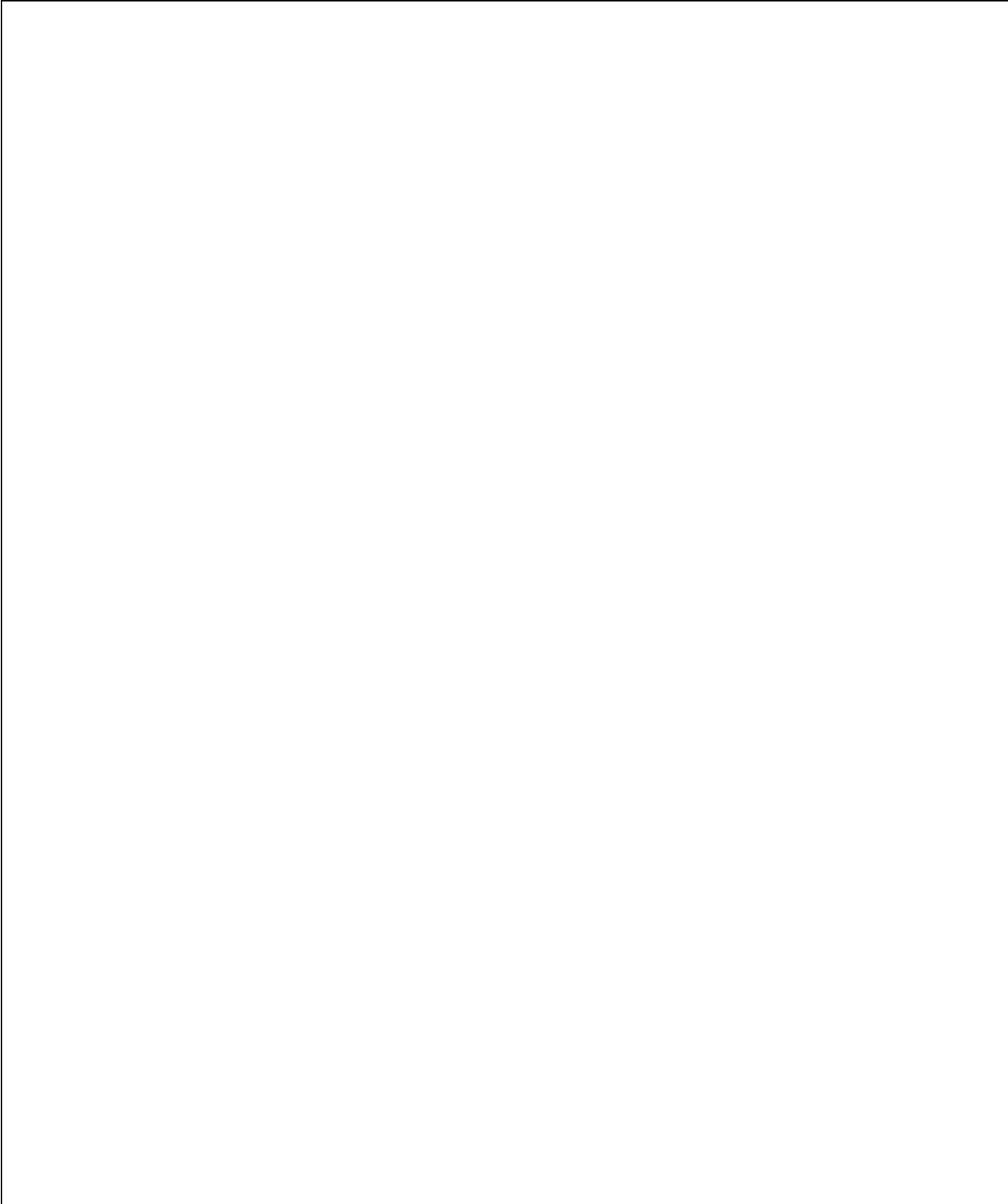
 **KANMEN MACHINE**

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YUHUAN KANMEN MACHINE TOOL FACTORY

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II Application and feature of the lathe

CNC350, horizontal CNC lathe, adopts electromechanical integration design, good external appearance and reasonable structure, which is of wide application and easy operation.

The machine has automatic control and can carry out finish turning of internal and external rounds, end surface, cutting groove, any conical surface, ball surface, and english system circular cylinder, taper screw thread etc.. It is equipped with good S.T.M function with which it can generate and receive many signals as well as conduct automatic process.

The lathe guide way adopts flame hardening or supersonic frequency induction hardening. It is of good abrasion resistance, good precision maintenance. With advanced structure, the spindle system is of high turning precision, good anti-vibration performance, and high cutting turning performance. Ball screw on the vertical and lateral direction respectively has good dynamic respond, so the machine has low noise, and the worker can get good working environment.

The lathe has good adaptability to the parts processing of large, medium and small quantity of as well as various kinds. It shows high efficiency and stable and reliable equality especially in the processing of the parts with conical surface, ball surface etc.

III Main specification & parameter of the lathe

1. Main specification

Max diameter swing over the bed	Φ350mm
Maximum turning length	350mm

2. Processing scope:

1) Max. Diameter of work-piece

On lathe bed	Φ320mm
On tool holder	Φ180mm
Bar diameter	Φ40mm

2) Max. Length of work-piece in process	350mm
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CNC350

Instruction

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3) Screw thread

Metric thread pitch 0.25-12mm

English system thread 28-3 1/2teeth/inch

3. The distance between centerline of the spindle and the surface of the guide way 210mm

4. Spindle

1) Type of the spindle head A₁-5

2) Spindle bore Φ 50mm

3) Max spindle speed 300-3000r/min

5. Tool holder

1) Max. Stroke

Longitudinal (Z axis) 350mm

Transverse (X axis) 250mm

2) Feed rate

Longitudinal (in Z axis direction) (stepless) 10mm/min-2000mm/min

Transverse (in X axis direction) (stepless) 5mm/min-1000mm/min

3) Rapid traverse speed

Longitudinal (in Z axis direction) (stepless) 8000mm/min

Transverse (in X axis direction) (stepless) 8000mm/min

4) Electric tool holder (for customer choose) LD4B-CK6132

5) Sectional area 25mm × 25mm

6. Tailstock

1) Sleeve inner taper Morse 4#

2) Sleeve max movement 90mm

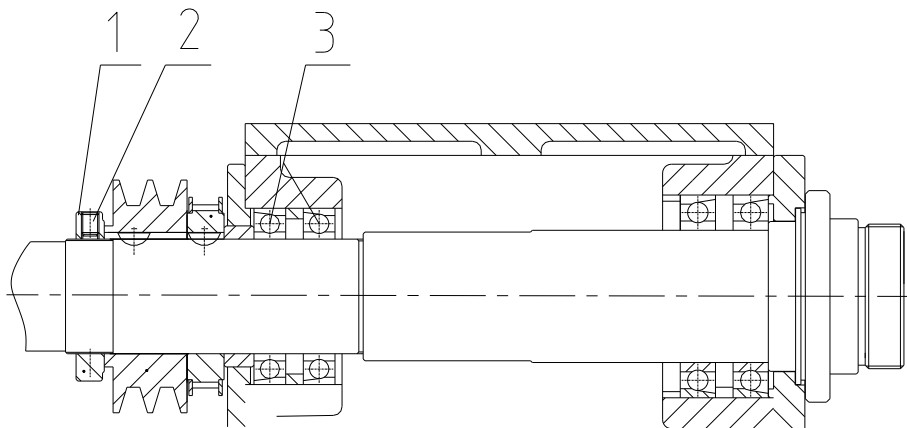
3) Max movement in transverse \pm 5mm

V Structure and adjustment of the lathe bed

1. Adjustment of the spindle bearing

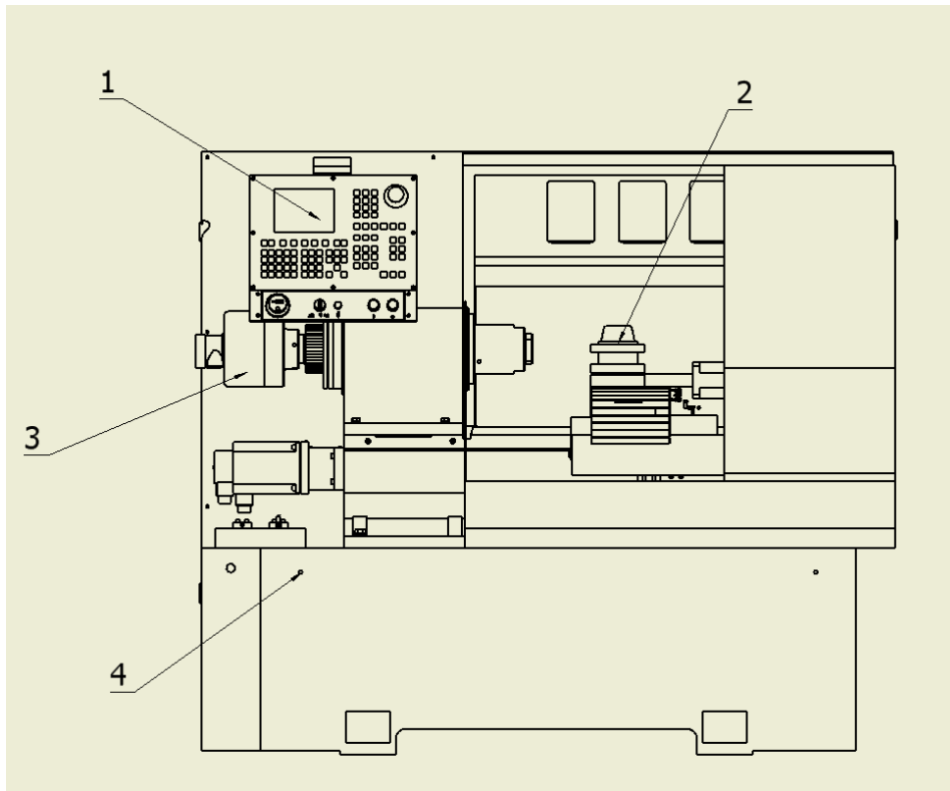
The turning precision of the lathe spindle is guaranteed through control of its longitudinal and axial movement (please refer to G4, G5 etc.). After long time operation of the lathe, the clearance between the bearings becomes large and can not guarantee the above mentioned precisions. In this case, adjustment has to be carried out according to the front and back bearings to reduce the clearance between the bearings. Please do not adjust the clearance between bearings too much to avoid abnormal phenomenon such as too high temperature of the spindle operation. Therefore, after the adjustment, high speed unloaded trial operation of the spindle should be carried out. After one hour, the measured temperature of the spindle bearing should be no more than 70°C and the temperature rise should be no more than 40°C . Otherwise, readjustment must be carried out in following way:

Please refer to the drawing2 for the assembly structure of the spindle and bearing. When the spindle needs adjustment, loose the bolt 1 first and then nut 2. Tighten bolt 1 when the clearance is proper after examination.



Drawing 2 spindle bearing adjustment

VI Operation of the machine
Refer to the drawing 3



- (1) Controller
- (2) Electric tool holder
- (3) Hydraulic cylinder
- (4) Ring for transportation

Drawing3 Operation system

VII Maintenance and lubrication of the machine

1. For the normal operation of the lathe please pay attention to the following matters:

1) Lubrication grease (oil) should be added periodically to the lathe.

2) All lubrication points are poured into by auto-lubricating pump. Make sure that whether the lubrication pump-box has oil or not.

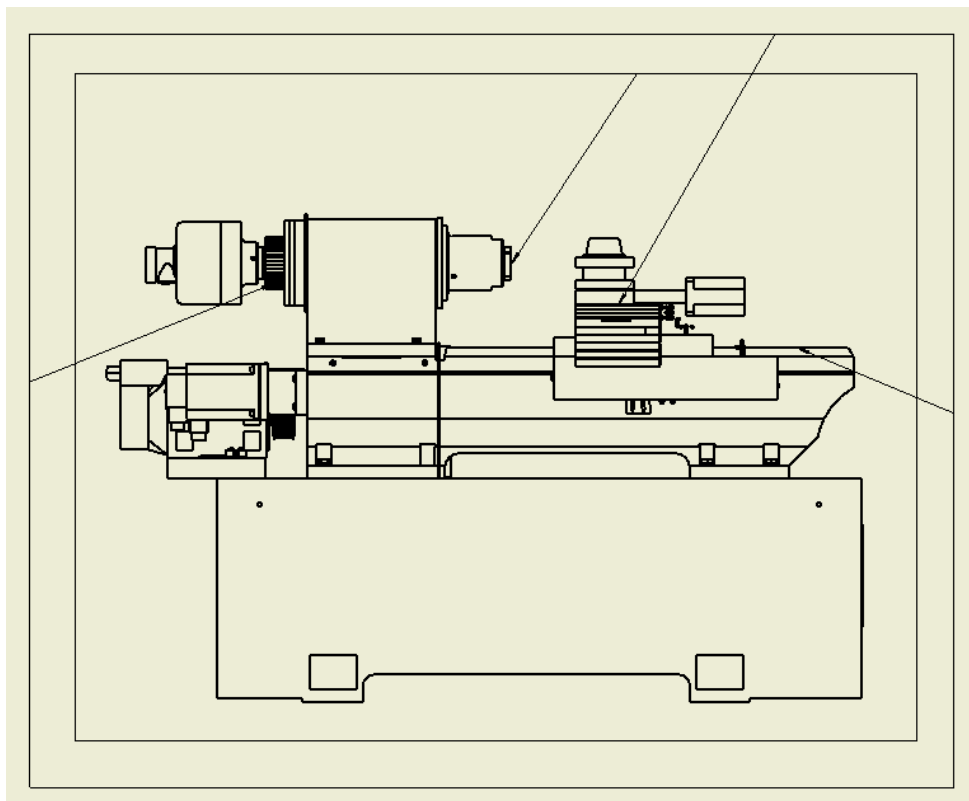
3) Keep the guide way of the lathe clean. Clean the iron scrap and cooling refrigerant, and add new lubricant oil after every work.

4) Before processing cast iron piece, clean the cooling refrigerant on the lathe bed. While after finish, it must clean the iron scrap.

2. Carry out lubrication periodically (please refer drawing 7) to ensure normal operation of the lathe. The lubrication of the lathe should follow the stipulation below:

1) No.30 machine lubrication oil is adopted for the lubrication of the lathe bed. The viscosity of which is 3.81-4.95 centipoises. The lubricant oil must be filtered before use.

2) Every lubricating point must be added with lubricant oil periodically.

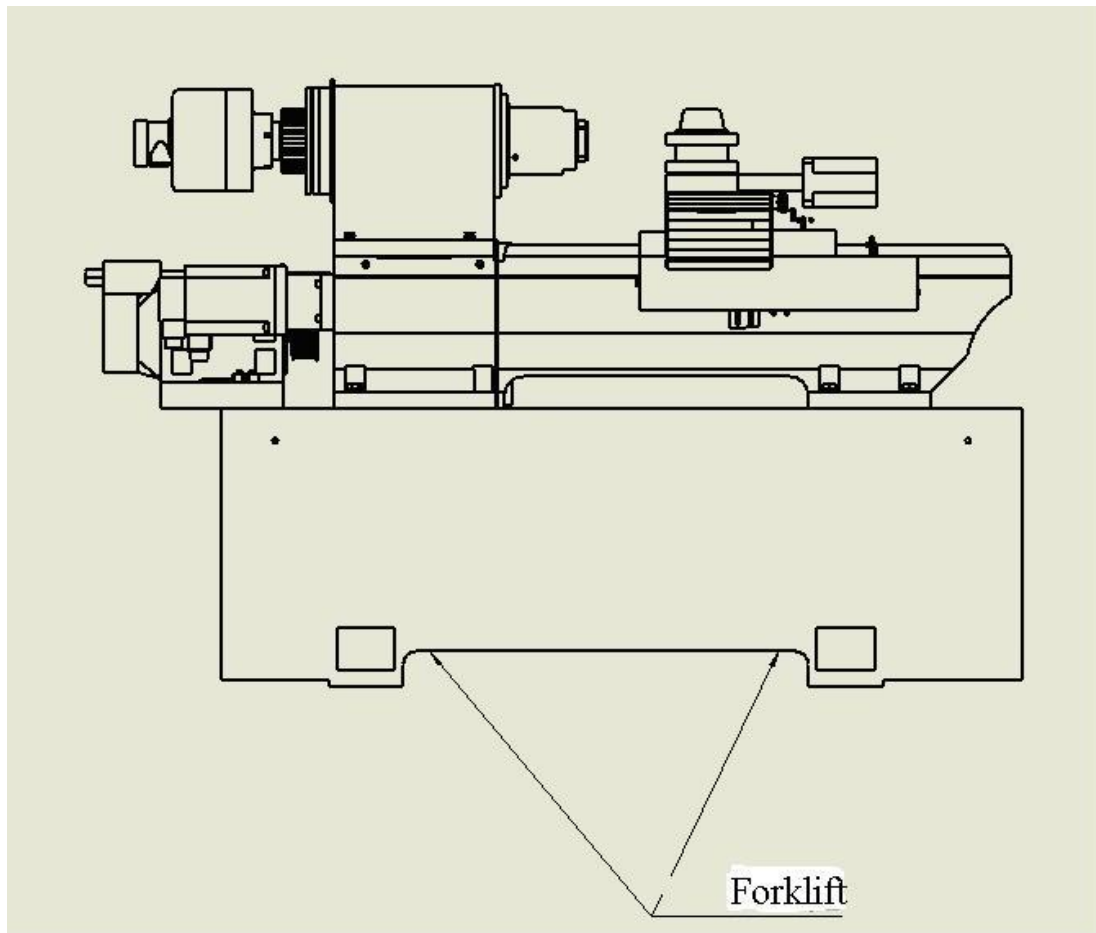


Drawing 4 Lubrication

VIII Transportation, installation and trial operation of the machine

1 Transportation

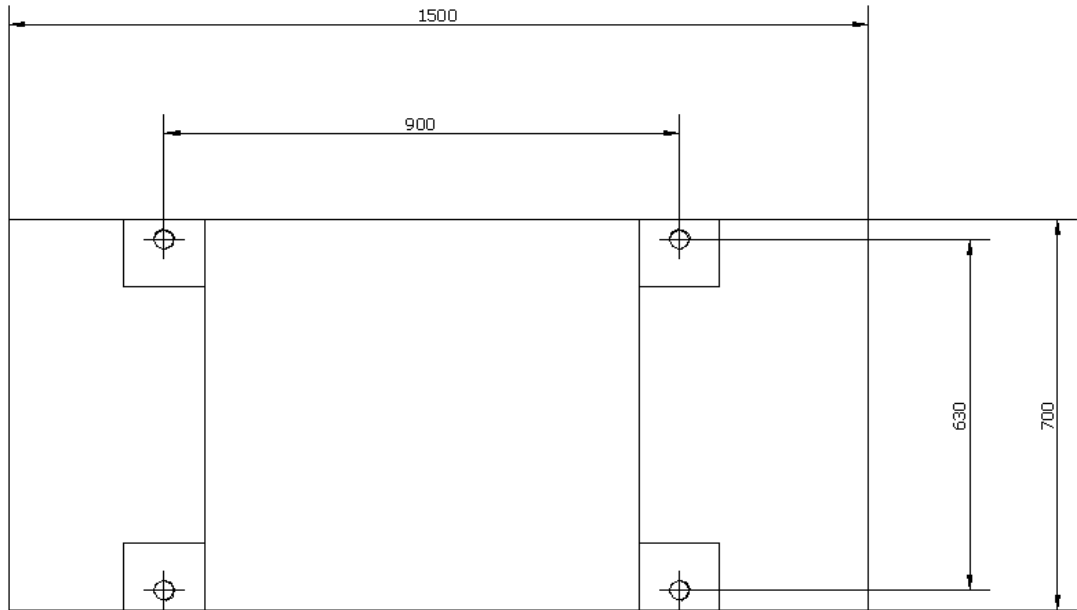
When lifting and moving the lathe in case, we should arrange the steel wire as per the lifting mark on the case referring to the drawing 5. In any case, in order to avoid the impaction and shaking during the lifting and moving, it's better not to keep the case slope and upside down.



Drawing 8 Transportation

2. Erection of the lathe

The lathes are adjusted comprehensively and given the cutting test before they are sent out the plant. Otherwise, improper erection of the lathe will influence the function and degree of accuracy. Make sure that the lathe is erected and fixed on the form base by anchor bolt to ensure stable operation. Please refer to drawing 9 for the foundation dimension. The depth is determined according to the local geography condition, which is usually about 400 mm.



Drawing 6 Foundation

There are four pads for supporting the machine for the balance. Put the level instrument on two ends of the guide way, which should not exceed 0.06/1000.

3. Clean and trial operation:

Before the operation of the machine, use kerosene to clean the anti-corrosion material, the lead screws and guide way. And paint them with anti-corrosion machine oil. Then add lubricating oil to all lubricating points according to the lubrication system drawing in page 12(drawing 4).

Study the structure before starting the lathe and understand the operation instruction of the lathe and that of the CNC system. Check out whether the electric systems of the CNC system and the lathe are in good condition and if there is any loose of any part. Only when there is no problem after the examination of electric principle diagram can it be switched on.

Before the machine is on, please know the machine structure, read the instruction of the machine, controller and electric tool holder.

When the power is on, check whether the rotary direction of main motor is right. Then turn on the controller power for check of fan. It is not allowed to work when the fan stops.

Check the servo drive unit by manual mode in the controller. Make sure that the components of the controller work well. Making the program for check the function before turning.

X V Instruction of CNC controller and electric part

1. General

The lathe adopts NC system, 928TEa controller, which could be chosen by customers. The spindle adopts the inverter for speed. The tool holder can be installed with 4-station electric tool holder or gang tool for processing all kind work pieces automatically.

Cooling pump M1	AB-25	0.09kW
Hydraulic station motor M2	Y802-4	0.75kW
Spindle motor M3	Y100L2-4	3kW
Servo motor M4	1	10SM0602D 6Nm
Servo motor M5		130SM075D 7.5Nm
Lubricating pump M6	YESB	AC220V
Electric tool holder M7-BQ	LD4B-CK6132	
Power	Three phase four wire system	AC380V 3N-50HZ
Controller power		AC220V (TC2 controls transformer supply)

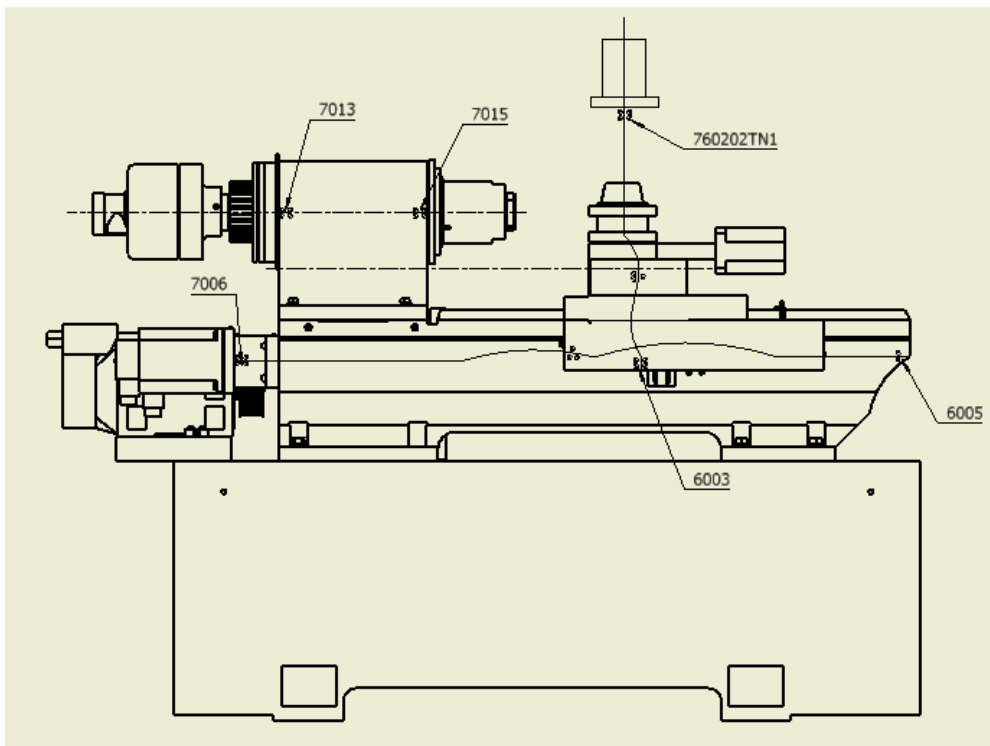
2. Electric protection and interlocking

- 1) The machine QF1-QF13 adopts GV2 and OSMC32N, main protection of overload and short circuit.
- 2) The electric cabinet is installed with gate lock electric switch for cut off electricity when open the door.
- 3) X axis and Z axis are equipped with stroke limited switches SQ1, SQ2, SQ4, and SQ5, also installed with mechanical origin switches SQ3 and SQ6 (customers choose).
- 4) The positive and negative interlock of spindle owing to close point of relay KD3 and KD4 to interlocking. At the same time the digital control system is interlocking.
- 5) Transducer of spindle and system can be interlocking owing to touch spot of transducer KD3 and KD4. When the transducer alarms, the lathe will stop.

X IV The rolling bearing arrangement drawing and list

Detail list of rolling bearing

Type	Specification	Item	Erection position	Quantity	Precision class	remarks
7013	65×100×18	Angular contact ball bearing	spindle box	2	P5	
7015	75×115×20	Angular contact ball bearing	spindle box	2	P5	
760202 TN1	17×35×10	Angular contact ball bearing	Carriage	1	P5	
6003	17×35×10	Deep groove ball bearing	Carriage	1	P5	
7006	30×55×13	Angular contact ball bearing	Bed	1	P5	
6003	25×47×12	Deep groove ball bearing	Bed	1	P5	



Rolling bearing layout

4. Matters and attention of operation

1) The operation of electrical equipment and the connection of exterior power supply should be done by the electrical technician. After the power is on, the people must pay attention to the power phrase and the spindle rotation. If it need change the direction, the technician only to change the power phrase outside.

2) The machine must have good earth device for the safety and performance of the machine.

3) Before the automatic processing, make sure that there is no lubricating oil on the guide way.

4) Before the automatic processing, adjust every coordinate axes and reference point for which the machine need.

5) When the power is on, do not insert or draw out connectors for not damaging controller components.

6) When the machine is on the process of working, it is not allowed to put the hand into cutting area.

7) It needs closing the protecting door while the machine is on. If it needs opening, change P511 of controller parameter to 0, which should become what it was after finish.

8) When the chuck clamps the workpeice from internal or outside, please change the controller parameter P409-d6 from 0 to 1, or 1 to 0. If you do not want to change the parameter, you also can exchange the oil tube of the cylinder.

9) Before the part is processed, please check the hydraulic station pressure.

10) Before the auto process, please make sure that the hydraulic pressure is 3MPa for machine normal operation.

11) Before use the machine, please read the technique document.

5. Maintenance of electric system

Every working day, maintain the electric system of the machine. Checking whether the plug-in, the wire terminals loose or broke. At the same time, check the transmission screw of servo-motor for the loose or block of the transmission chain.

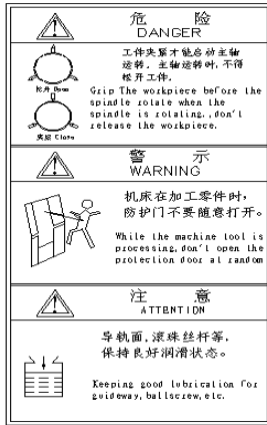
If electric having errors, firstly judge which part was error, weak current, heavy current, main circuit or control circuit on the purpose of further examination. For example:

XVI List of accessories of the machine

No	Item	Type & size	Quantify	Chart No.	Note
1	Double-ended spanner	10-12	1		
2	Double-ended spanner	14-17	1		
3	Double-ended spanner	24-27	1		
4	Double-ended spanner	16-18	1		
5	Inner hexagon spanner	4mm	1		
6	Inner hexagon spanner	5mm	1		
7	Inner hexagon spanner	6mm	1		
8	Inner hexagon spanner	8mm	1		
9	Inner hexagon spanner	10mm	1		
10	Screwdriver	4 inch cross head	1		
11	Screwdriver	4 inch “—” head	1		
12	Grease gun		1		
13	Machine oil gun		1		

NO	Appearance	Reason	Examination	Solution
1	The controller power is on, but there is no signal in the controller.	1: the breaker have no close 2: contactor of electric system has no close 3: controller has some error	1: check whether the breaker is close and the voltage of three phrase power. 2: check whether the inverter alarms 3: examine the DC voltage for controller	1: close the breaker 2: look for the reason of inverter alarm or the controller circuit. 3: make professional check or maintenance about this.
2	Controller alarm	1:limit alarm 2:driver alarm 3:controller alarm	1: check limit switch and connecting lines 2: check the driver and servo motor depending on the content of controller alarm 3. check for the content of alarm	1: change the travel switch or connecting lines 2: change the driver, servo motor 3: make professional check or maintenance about this.
3	Cannot find reference point of axis	1: travel switch does not close 2: travel switch has no input signal 3: controller has some error	1: check whether the travel switch is closed 2: there is no signal in the I/O connector 3: there is some signal in the I/O connector	1: adjust the block 2: change the travel switch or connecting lines 3: make professional check or maintenance about this.

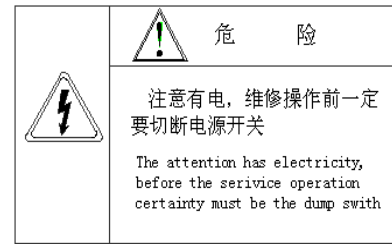
5. Warning symbols and instruction



Caution sign of operation



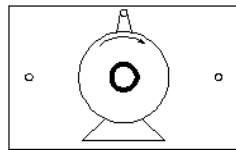
Caution index tag



Warning index tag



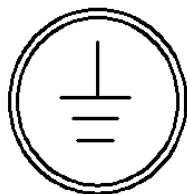
Warning



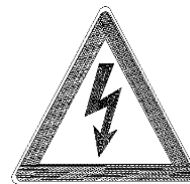
Electric-motor index tag



Operation tag



Earth index tag



Electric index tag

CNC350	Instruction	8(1)
7. Motor capacity		
1) Main motor model		Y100L2-4 6kW
Power		4kW
Speed		1430r/min
2) Servo or stepping motor		
Servo motor		130SM075D 7.5Nm
Stepping motor		110SM060D 6Nm
3) Cooling pump		AB-25 90W
8. V-belt, model B, in the main transmission		B1092
9. Dimension of the machine (L×W×H)		1980mm×1250mm×1550mm
10. Net weight(about)		1550kgs

CNC350	Instruction	8(2)				
<p>IV Transmission system (drawing1)</p> <p>1. Transmission system</p> <p>The spindle is rotated by main motor through the belt pulleys named (1) and (2) in the drawing1. The positive or negative rotation of the spindle is the same as that of spindle motor controlled by electric. And no matter which rotation the machine has, the speed and the grade are the same.</p> <p>2. Feed rate</p> <p>The gang tool moves in longitudinal direction through stepping or servo motor, named 3 in the drawing1, which drives lead screw under the name of 5, furthermore, the nut 6 will drive the carriage.</p> <p>The gang tool moves in transverse direction through stepping motor (or servo motor), named 4 in the drawing1, which drives lead screw under the name of 7, furthermore, the nut pair 8 will drive the carriage.</p> <p>The gang tool is for the motor driving worm 10 which has the function in worm gear 11.</p> <p>(1) Metric screw thread screw pitch 0.25-12mm</p> <p>(2) English system screw thread 28-3 1/2teeth/inch</p> <p>The longitudinal or transverse direction of gang tool, distances and feed rate are dealt with by computer according to the program, sending the required impulse signals 0. After enlargement of power by driver, the stepping or servo motor, 3 and 4, for mechanical loads, drive the machine to realizing automatic control.</p> <table style="margin-left: 40px;"> <tr> <td>X axis</td> <td>10-2000mm/min</td> </tr> <tr> <td>Z axis</td> <td>5-1000mm/min</td> </tr> </table>			X axis	10-2000mm/min	Z axis	5-1000mm/min
X axis	10-2000mm/min					
Z axis	5-1000mm/min					

CNC350	Instruction	21
<p>6) When there is no oil in the lubricating pump, it will alarm, and input the signal (COM,TCP). At the same time, the controller will also alarm. Then the machine will stop.</p> <p>7) SQ is the switch on the protective door. The lathe should not be on without closing that door (for customers choose).</p> <p>8) The loose or clamp of the chuck and spindle can be interlocking. The loose of chuck is for the pressure replay SP1, SP2, which avoids for the accident when the chuck does not clamp and no pressure of the hydraulic system.</p> <p>9) There is a thermorelay, FR, in the main circuit of the hydraulic station motor for overload.</p> <p>10) Board of controller is equipped with jerk button, so the lathe can stop while meeting accident.</p> <p>3. Erection and trial operation</p> <p>1) Lead line of electric power source must be three phase four wire system. A, B, C and N must be on the L1, L2, L3 and N respectively.</p> <p>2) The machine must have earth protection. The earth lead should follow to the standard of GB5226.1-2002/IEC60204-1:200 (be greater or equal with the sectional area of power wire). The earth lead should be joined with the ground copper bars of the machine.</p> <p>3) Before operation, please check each connecting line. It must be no problem before trial.</p> <p>4. Trail operation:</p> <p>Firstly, check the electric cabinet QF1-QF13 air switch which is closed before leaving factory. Then close electric power source switch QF1. When HL1 is on, the lathe has electricity. Press SB2 and KM1 before trial.</p> <p>1) Choose manual mode from menu, and uses corresponding key with X and Z axis, spindle, tool holder and cooling pump.</p> <p>2) Check the loose or clamp of the chuck. Check the foot switch SQ7 for chuck loose or clamp.</p> <p>3) SB5 is for the tailstock movement.</p> <p>4) Choose the editing mode within the main menu of controller. Then input the program, choosing automatic mode. After pressing the reset key, the machine will operate as the program. You can check the controller instruction about it.</p>		

The machine follows the standard: GB/T9969-2008

GB15760-2004, GB5226.1-2008

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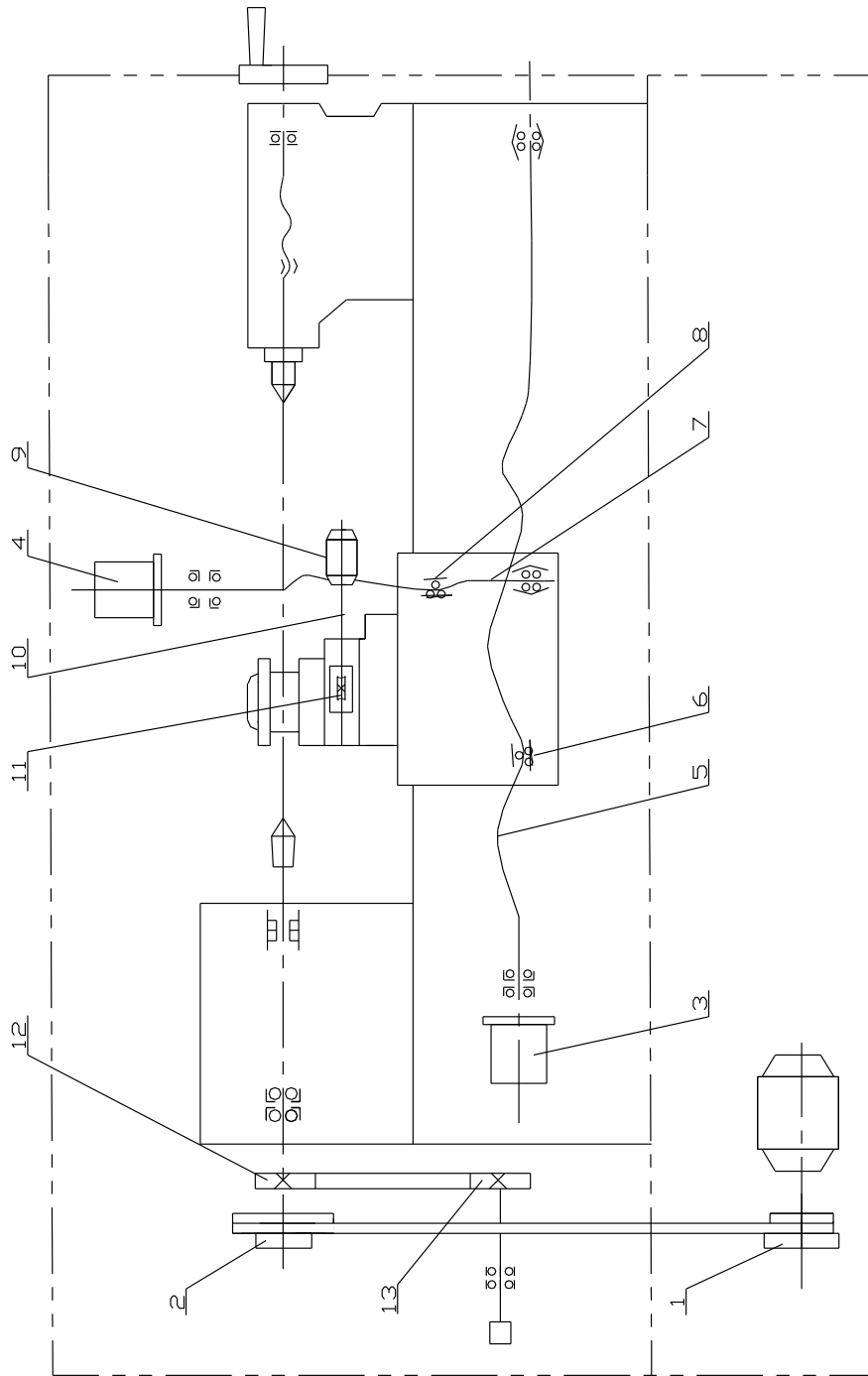
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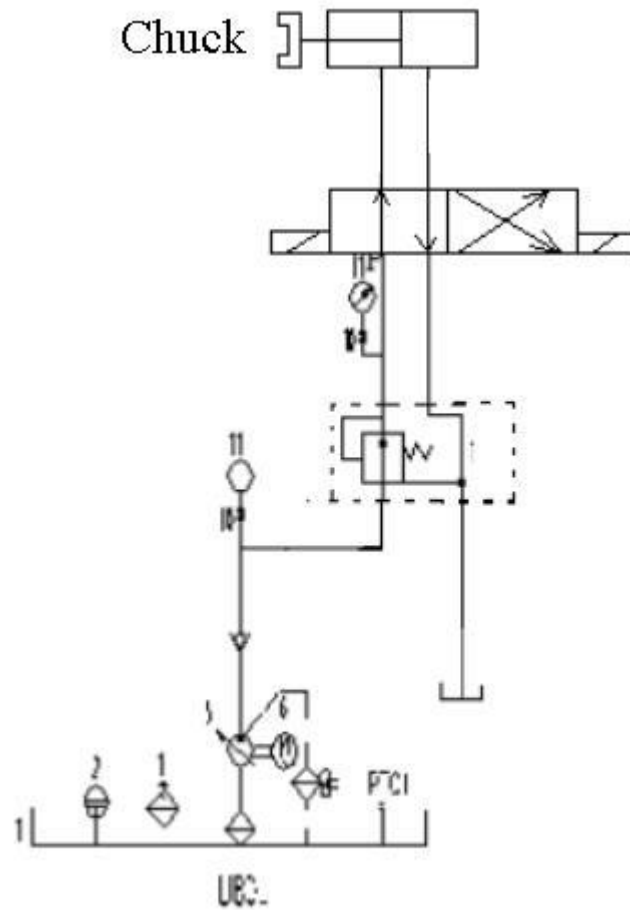
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Drawing 1 Transmission system

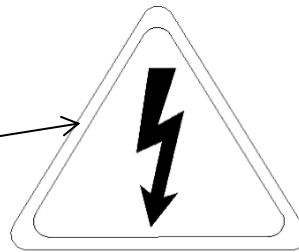
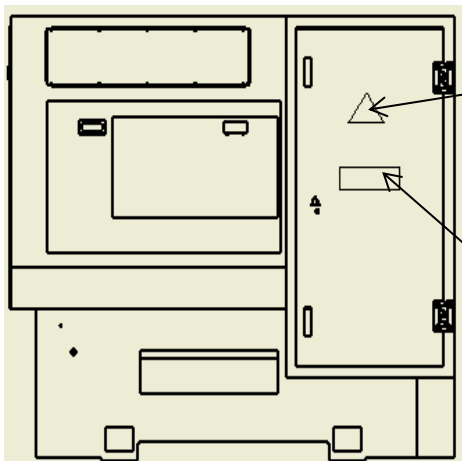
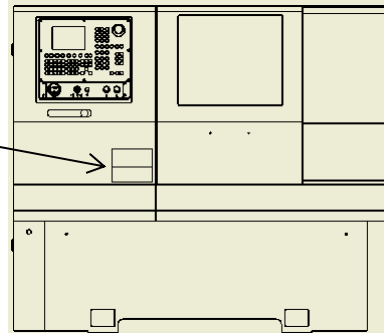
IX Hydraulic station


Hydraulic system drawing. Refers to the drawing 7 (the chuck)

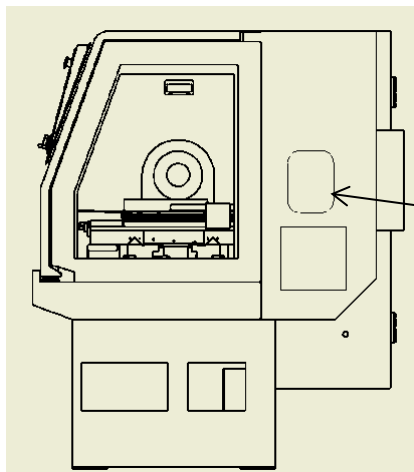


Drawing7 Hydraulic system

 <p>危 险 DANGER</p>	<p>工件夹紧才能启动主轴运转。主轴运转时,不得扳动手柄松开工件。</p> <p>The workpiece was closed then can start the main spindle. When the spindle is revolving, can't pull the handle to open the workpiece.</p>
 <p>警 示 WARNING</p>	<p>机床在加工零件时,防护门禁止打开。</p> <p>The machine tool is while processing, the protection door do not open.</p>



	<p>危 险</p> <p>注意有电, 维修操作前一定要切断电源开关</p> <p>The attention has electricity, before the service operation certainty must be the dump switch</p>
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注意事项
Attention

1. 润滑系统必须使用指定的(32#)润滑油。
Lubrication system must use specified lubricating oil (32#)
2. 应通过加油滤网向润滑泵加油。
Trough to the lubricant pump on oil cleaned screen
3. 加入量应在润滑泵液线所示范围。
Should join that line of lubricant pump.
4. 每隔半年左右清洗一次润滑系统部件(润滑泵体、加油滤网、吸油滤网、分油器输出接头滤网)。
Once every half a year cleaning the lubrication system components (lubrication pump, oil cleaner screen, output interface cleaner screen of grease separator)
5. 主机正式工作前, 润滑系统各条管路均应充满润滑油。
Before the formal work of the main frame, every pipeline of lubrication system, should be filled with lubrication oil.
6. 定期检查润滑系统各管路的供油情况。
Check the pipeline of lubrication system regularly.

