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1. Characteristics and Use of Machine.

GFLR6 CNC lathes are double - axis linkage and semi-closed loop control lathe. Host USES the whole bed, high rigidity rolling guide, good dynamic characteristics, strong rigidity, good chip removal performance, waterproof, easy to operate, manifests the modular design, high performance and high stability. The machine tool shape is beautiful and pleasant, the man-machine function is fully reflected.

The machine tool control system adopts GSK 928TEa system and GSK 928TEa crosswise servo system. It can also be equipped with Taiwan famous control system and AC (AC) crossbar servo system.

1.1 Features of Machine

1. The whole high rigid bed, X and Z all adopt the German Rexroth high rigid rolling guide, the dynamic characteristics are good, no crawling;
2. Module integration and full protection design, compact structure, convenient cuttings and elegant appearance;
3. Reasonable layout and convenient maintenance;
4. The main drive adopts the frequency conversion motor of Ningbo, and the spindle speed is 60-4500r/min; The headstock adopts gearless transmission, low noise, low heat and stable operation.
5. The vertical and horizontal drive adopts the high-performance ac servo motor, with high positioning accuracy and reliable performance.
6. Automatic centralized lubrication device is adopted for each sliding surface of the machine, and the lubrication is fully reliable;
7. Pneumatic power spring clamps are adopted to make the upper and lower materials convenient (also available for manual clamping or oil pressure clamping);
8. Carefully designed iron chip box and water tank separation structure to facilitate the cleaning of the tank; The cooling system USES high lift water pump to make the parts processing strong cooling effect.

1.2 Processing Objects and Applications of Machine.

- Best suited for the processing diameter ϕ 100mm or lower parts;
- The machining geometry is complex, the size is various, the precision requires the high axle type (or dish) parts;
- Machining cylinder, conical surface, step surface, spherical surface and various other rotating surfaces;
- Processing all kinds of public and English internal and external threads;
- It can also carry out drilling, expansion, reaming, rolling and boring processing, which can be used for turning, cutting and chamfering.
- It is suitable for medium, small batch and single production, and can also be used for mass production of complex parts.

1.3 Overall Layout of Machine.

Machine, electricity and liquid integrated design. Lathe bed for the whole structure rigidity, high protection adopts the fully closed structure, both inside and outside sliding door left open, swing console installed on the left cover, easy to operate, iron tank (tank) placed between two bed legs. The machine tool shape is beautiful, the layout is compact and coordinated.

2. General Description of Machine.

2.1 Machine Control and Adjustment

When the machine loading and drawing the parts, it needs to open the access door, and then the spindle should be started when the door is closed. Do not open the door when the spindle is running. Pneumatic, manual or hydraulic clamping release except for the control panel button control, also the front of the machine is equipped with clamping release switch. When using a tap or a reamer, the corresponding special accessories should be configured on the boring tool post. The horizontal and vertical stroke of the machine tool has been adjusted before delivery, and the user cannot

adjust it when used. Before starting the machine, it is necessary to lubricate the linear guide way and ball screw, and observe whether the fuel tank, lubricating oil pump tank and tank level are suitable, check whether the adjustment is appropriate, and make a comprehensive observation on the whole machine. If the machine is in a normal state, it can start the machine.

2.2 Machine Parts

The distribution of machine parts is shown in figure 2. and table 1 is a list of machine parts.

This configuration is for reference only. The specific configuration of machine tools may vary depending on the production batch or user requirements.

| No. | Name | Note |
|-----|-------------------------|------|
| 1 | General machine diagram | |
| 2 | Main drive | |
| 3 | Lathe bed | |
| 4 | Headstock | |
| 5 | Encoder | |
| 6 | Carriage | |
| 7 | Post | |
| 8 | Cooling chip removal | |
| 9 | Pneumatic clamping | |
| 10 | Protection | |
| 11 | lubrication | |
| 12 | hydraulic | |
| 13 | electrical | |
| | | |
| | | |

2.3 Main Technical Specifications and Drive (Control) Parts.

Table 2 main technical specifications of machine list.

| Name | | Units | Size | Note | |
|----------------------|-------------------------------|--------|-----------|----------|--|
| Capacity | Swing over the bed | mm | φ320 | | |
| | Swing over the carriage | | φ110 | | |
| | Maximum cutting diameter | | Planeφ300 | | |
| | Maximum cutting length | | 150 | | |
| Maximum travel range | | mm | 300 (X) | | |
| | | mm | 280 (Z) | | |
| Spindle | Speed range | r/min | 60-4500 | | |
| | Spindle nose | | A2-5 | | |
| | Taper | Degree | 34° | | |
| | Spindle through hole diameter | mm | Φ44 | | |
| Tool post | Form of tool post | | Gang type | | |
| | O.D tool size | mm | 20×20 | | |
| | Boring tool size | | Φ20 | | |
| Clampin | Collet | mm | Φ56x34° | | |
| Feed shaft | Feeding rate | X | mm/r | 0.001-10 | |
| | | Z | mm/r | 0.001-10 | |
| | Rapid speed | X | m/min | 18 | |
| | | Z | | 18 | |
| | Screw lead | | mm/r | Z=8, X=8 | |

| | | | | |
|---------------------|-------|----|----------------|--|
| Layout size (L*W*H) | | mm | 1670×1330×1660 | |
| Weight | Net | kg | 1300 | |
| | Gross | | 1500 | |

Table3 machine drive(control) consonances list

| Name | Model | Size | | Brand |
|--------------------|--|---------------|------------|--------------|
| Controller | GSK928TEa | | | GSK |
| Spindle motor | YVF2-112M-4-50-4.0-B3(left wiring, optic axis) | Power | 4.0kW | Ningbo Gexin |
| | | Normal speed | 1500 r/min | |
| | | Maximum speed | 5000 r/min | |
| X axis servo motor | 130SJT-M060D | Speed | 2500 r/min | GSK |
| | | Torque | 6.0Nm | |
| | | Power | 1.5kW | |
| X axis servo motor | 130SJT-M060D | Speed | 2500 r/min | GSK |
| | | Torque | 6.0Nm | |
| | | Power | 1.5kW | |
| Lubrication pump | AP722 | Volume | 0.2L | Shanghai |
| | | Power | 60W | |
| Cooling pump | LDPB2-15 | Flow rate | 65L/min | Jiangsu |
| | | Lift | 8m | |

2.4 Mechanical Transmission System and Rolling Bearing Distribution (figure3)

Table 4 Table of rolling bearings for machine tools.

| Competence of machine | Code | Model | Size | Accuracy level | Note | Quantity |
|-----------------------|------|-------|------|----------------|------|----------|
| | | | | | | |

| | | | | | | |
|------------|-----|----------------------|---------------|----|--|-------|
| e | | | | | | |
| Spindle | 101 | 7015AC-P5TBTC | 75X115X(20X3) | P5 | | 1set |
| unit | 102 | 7013AC-P5DBB | 65X100X(18X2) | P5 | | 1set |
| Encoder | 103 | 6001P5 | 12×28×7 | P5 | | 2 |
| Z-axis | 104 | 25TAC 62B-DDG DBB P5 | 25×62(15×2) | P5 | | 1 set |
| drive | 105 | 25TAC 62B-DDG DBB P5 | 25×62(15×2) | P5 | | 1set |
| X-axis | 106 | 20TAC 47B-DDG DBB P5 | 20×47(15×2) | P5 | | 2set |
| drive | | | | | | |
| Protection | 107 | 626 | 6×19×6 | D | | 2 |
| | 108 | SBR16S-1150-2R | | | | 2 |
| Chips | | | | | | 4 |
| container | 109 | 6205 2RZ | 25x52x15 | | | |

Table 5, Machine belt pulley and ball screw list.

| Code | Name | Model | Note |
|------|-------------------------|--|-------------------------------|
| 1 | Main motor pulley. | CKG0635Z-12102 | Reference diameter ϕ 145 |
| 2 | Main motor belt | XPZ 1050La(Reference length 1000mm) | shanglishi |
| 3 | Spindle pulley | CKG0635Z-31102 | Reference diameter ϕ 145 |
| 4 | Toothed pulley. | CK0635/G-31311 | |
| 5 | Toothed belt | 200XL037 | |
| 6 | Encoder toothed pulley. | CK0620II-32303 | |
| 7 | Z-axis ball screw. | CKG0635Z-21301 | HIWIN |
| 8 | X axis ball screw. | CKG0635Z-61301 | HIWIN |

2.5. Machine Ability Range and Travel Limit.

See figure 4. Figure 5 and table 2(main technical specifications of machine tools).

2.6 Lubrication of Machine.

The lubrication of machine is mainly lubrication and ball screw lubrication. It is composed of automatic lubricating pump, oil dividing block, quantitative oiler, pipeline and joint. Each lubrication point is controlled by an oil distribution element (quantitative oiler) to control the amount of oil. The lubricating pump should pay attention to timely refueling, always check the oil level of the lubricating pump.

2.7 Cooling System of Machine.

The cooling system of machine is composed of water tank, pump and water pipe. The water tank should be washed regularly so as not to damage the water pump. Never start the pump without water.

3. Structure Description of Main Parts

3.1 Lathe Bed

The machine tool bed body is high rigid integral structure, large bracket guide rail is high rigid rolling guide.

3.2 Main Transmission System.

The main drive system of this machine is driven by ningbo innovation motor, and the spindle speed range is 60-4500r/min with a pair of pulley speed ratio of 1:1 transmission.

3.3 Transverse Drive and Longitudinal Direction Drive.

The horizontal and vertical drive of the support plate is driven by the ac servo motor through the coupler to drive the horizontal direction of the saddle and the sliding body in the vertical direction of the ball screw.

Note: when removing the pallet, screw and other parts, the other moving parts must be fixed.

3.4 The Tool Post

Equipped with specially designed cutting tool holder and boring tool holder, T type tool holder, the knife square dimension is 20 x 20mm standard knife square. A boring tool with 20mm diameter.

Be sure to check whether the tool and workpiece, cutting tool and fixture are interfered or cause an accident.

3.5 Fixture (Chuck) Cylinder Device.

The rear end of the machine adopts the clutch structure, the front end is connected with the spring clamp by the pull pipe, and the left and right movement of the sliding sleeve in the clutch is used to pull the spring clamping head.

4. Adjustment of Machine Tool.

4.1 The First Start of Machine Tool.

Before the machine is first started, it is fully familiar with the transmission system of the machine, the structure and working performance of the electrical system and the parts, the position and function of each operating part and the button, and the cleaning of anti-rust oil, filling the lubricating oil, hydraulic oil and cooling fluid, and then the test run can be carried out after the power supply is connected. Start the main motor, spindle speed from low to high, running after the idle running test, check

each part of the machine tool movement, and monitor the performance of the electric and lubrication and cooling system is normal, and then can begin to work.

4.2 Adjustment of Machine Tool.

According to the specific conditions of the machining parts, the relative positions of the vertical (z-axis), the horizontal (X-axis) limit and the backstop iron are determined. Other aspects of adjustment work refer to the instructions of the electrical specification. All preparations are ready, the parts can be tested, the test results are in accordance with the requirements, and the parts can be processed.

5. Precautions for Safe Operation Of Machine Tools.

The safety problem is becoming more and more important in machine tool operation. According to the structure and nature of the machine, the following safety problems should be paid attention to.

5.1 Personal Safety Issues.

Because of CNC machine tools has realized automatic control automatic cycle, to make sure the programming is correct in the operation, the action is in place, workpiece clamping reliable, must close when start the machine tool machine tool protection sliding door and shield, confirm again after all preparations were made to start the machine start to work.

According to the characteristics of this machine, the following items should be noted:

5.1.1 Keep Your Body and Clothes Away from The Rotating and Moving Parts When the Spindle Is Rotated Manually.

Avoid involving clothes in accidents.

5.1.2 Hold the Workpiece in Place When Clamping Workpiece, So as Not to Cause Accident. After Finishing the Clip, Pay Attention to The Chuck.

Remove and remove the hand and other adjusting tools so as not to cause an accident when the spindle rotates.

5.1.3 When the Belt Is Adjusted (The Main Motor Belt, The Main Shaft Belt) Must Be Carried Out in The State of Motor Power Off. In Case of Intention

The accident.

5.1.4 In the Operation of Wiring, Adjustment and Maintenance of The Electrical Part, It Must Be Operated by The Professional to Avoid Making It.

Electric shock and other accidents.

5.2 Avoid Safety Issues That May Cause Damage to Machine Parts and Functions.

Although the CNC machine tool which can realize the automatic control to complete many complex movements, but the former title must be in a reasonable and orderly, the correct programming, and action, and through strict confirmation to complete. Therefore, according to the characteristics of the CNC machine tool and the parts structure of the machine tool, the following safety issues should be paid attention to:

5.2.1 Read the Instruction Manual Carefully, Master the Operation and Maintenance Skills of CNC Lathes, And Be Familiar with The Structure and Performance of Each Part of The Machine Tool, So As To Prepare For The Formal Operation.

5.2.2 According to Relevant Data in The Manual Configuration Suitable and Stable Power Grid, Such as Power Grid Voltage Fluctuation Beyond the Specified Value Must Be Increased Accordingly Regulated Power Supply to Ensure the Normal Operation of The Machine Tool Electrical Components, Fault Component Damage Can Be Avoided.

5.2.3 Requires Careful Inspection Programming, Parameter Setting, Interference Action Sorting, Cutting Tool, Workpiece Clamping, Switch Protection Link Is Completely Correct, Lest Cause Accidents, Circulation Processing When Damage Tools and Related Parts.

5.2.4 It Is Strictly Prohibited to Work During Operation, So as Not to Damage the Ball Screw and The Servo Motor.

5.2.5 When the Electrical and Control Parts Are Repaired, Adjusted and Replaced, The Professional Personnel Must Be Carried Out to Avoid Accidents.

5.2.6 Try to Avoid Accidents. During the Operation of The Machine Tool, It Is Difficult to Find the Problem. Please Do Not Dispose It at Will, Contact the Manufacturer in Time, And Then Deal with The Problem. In A Word, In the Operation of Machine Tool Should Be Careful and Careful, Should Avoid Accident Occurrence as Far as Possible.

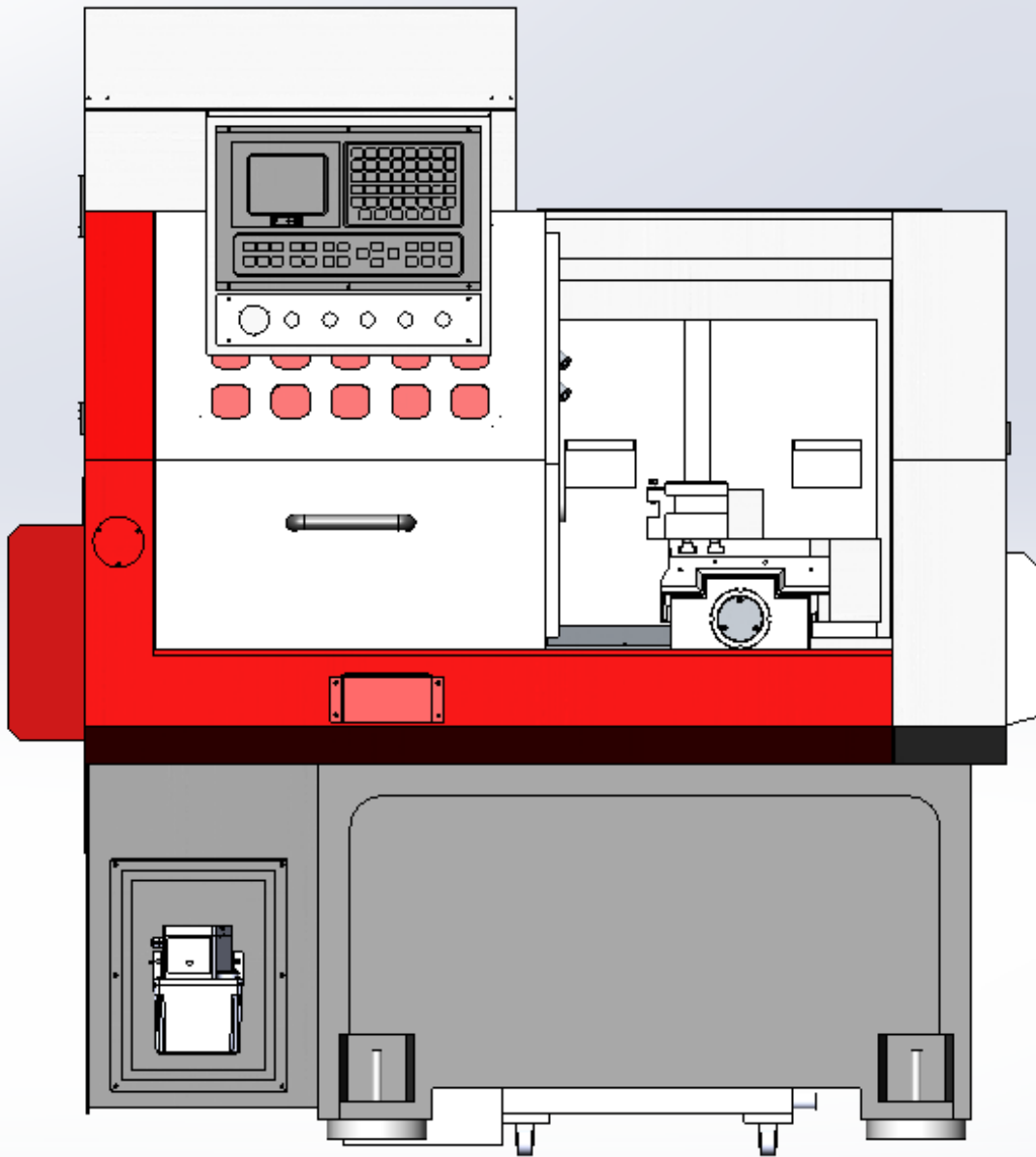


Figure 1, machine layout

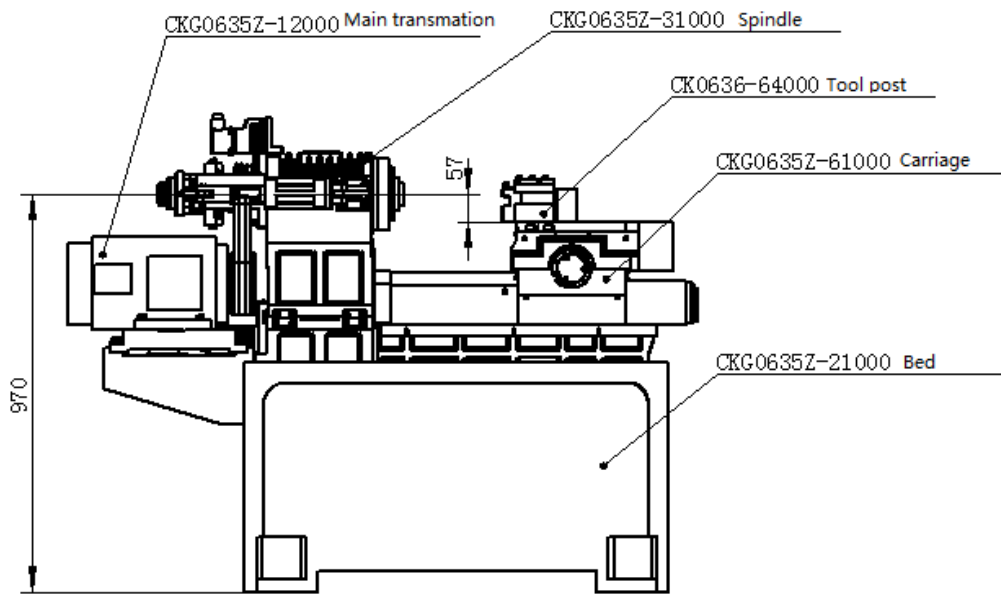
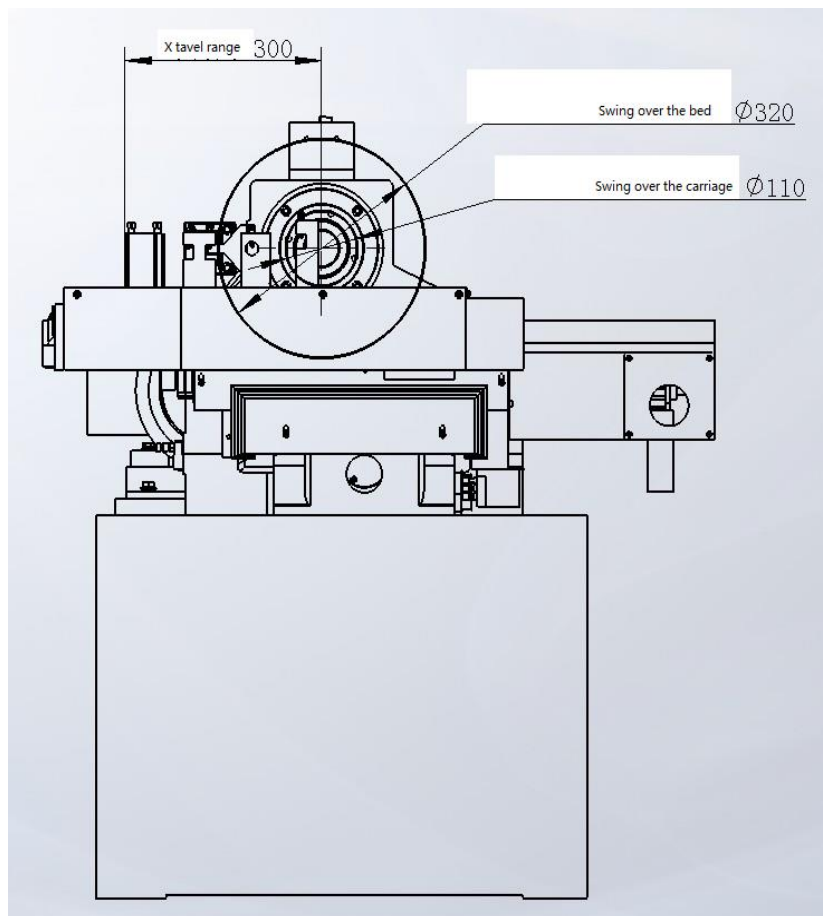


Figure 2, distribution of machine parts



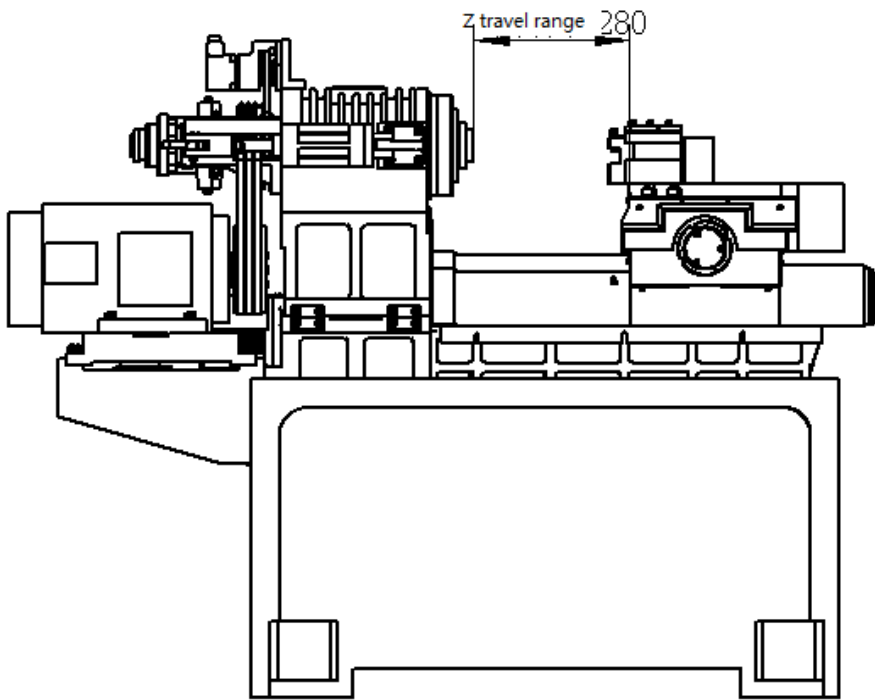


Figure 3, Mechanical Transmission System and Rolling Bearing Distribution