Catalogue

1、Scope of application of the machine
2、 Lifting of the machine
3、 Main structure of the machine
4、 Correct use and adjustment of the machine
5、 Hydraulic system of machine tool
6、 Test run and operation of machine tool
7、Electrical system
8、Machine tool maintenance

1、Scope of application of the machine

This machine has high labor productivity and high working accuracy for bending metal sheets. When bending sheets with different thicknesses, "V" shaped grooves with different opening sizes distributed on the lower die should be selected. The opening size of "V" shaped grooves should generally be greater than 8 times the thickness of the sheet. If upper and lower dies with different shapes are used, they can be bent into workpieces of various shapes. The bending force can be calculated from the sheet bending force table (see Table 1) or the bending calculation formula. The slider stroke can be used to bend the sheet metal once, and the workpiece with complex shape can be obtained after multiple bends. The machine adopts steel plate welding structure, which has sufficient strength and stiffness. The hydraulic transmission ensures that no serious overload accident will occur due to the change of the thickness of the plate or the improper selection of the "V" slot of the lower die during the operation. In addition, the machine has the characteristics of stable operation, convenient operation, safety and reliability. The connection part of the upper die is equipped with a compensation mechanism, which compensates the deflection of the workbench and the slider when bending the plate, ensuring a high working accuracy, At the same time, a mechanical stop is set in the oil cylinder to ensure the repeated positioning accuracy of the sliding block to the bottom dead point, so as to ensure the consistency of the bending angle during mass production. The machine adopts hydraulic and electrical control, the stroke of the slider can be adjusted at will, and has standard actions such as inching and semi-automatic. The inching standard is used for convenient mold testing and adjustment.

With advanced technology and reliable performance, this machine is one of the ideal sheet metal forming equipment. It is widely used in aircraft, automobile, shipbuilding, machinery, etc., with high production efficiency.

Table 1 Sheet Bending Machine

v		4	5	8	10	12	14	16	13	20	24	23	32	36	40	45	50	55	60	65	70	80	90	100	120
b		2.8	4	5.5	7	8.5	10	11	12.5	14	17	20	22	25	28	31	35	36	42	46	49	50	63	70	85
r		0.7	1	1.3	1.6	2	2.3	2.6	3	3.3	3.8	4.5	5	6	6.5	7	8	9	10	10.5	11	13	14	18	19
s	0.5	40	30																						
	0.6	60	40	30																					
	0.8		70	50	40	30																			
	1		110	80	70	50																			
	1.2			120	100	80	70	60																	
	1.5				150	120	110	90	80																
	2					220	190	170	150	130	110														
	2.5							250	220	200	170	150	130												
	3								330	290	250	210	180	160											
	3.5									400	330	290	250	220	200	180									
	4										440	370	330	290	200	230	210								
	4.5											470	410	370	330	300	270	240							
	5												510	450	400	360	330	300	270	250					
	6															520	470	430	390	360	340	300			
	8																		700	640	600	520	460	420	
	10																					810	720	550	
	12																							970	780
	14																							1200	1100

Values in the table: when L=1m, the bending is KN

Example: S=4mm

L=1m

V=32mm

According to the table, P=330KN

Calculation formula: P=650S2L/V

(KN) S - thickness of folded sheet mm L - width of folded sheet m V - opening size of lower die mm

Note: The calculation formula and the values in the table are based on σ B=450KN tensile strength of carbon steel plate.

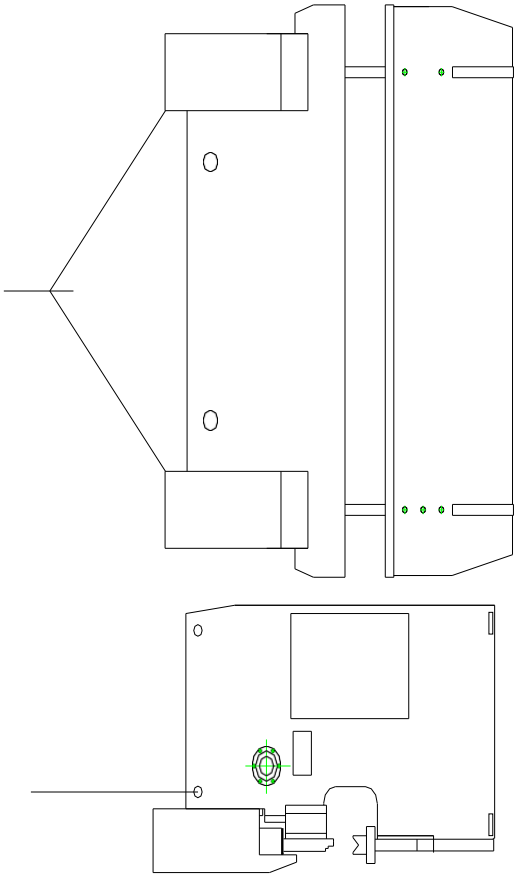
Stainless steel plate: multiply the P value found in the table by 2

Aluminum plate: multiply the P value found in the table by 0.7

2、 Lifting of the machine

2. Hoisting of the machine:

The center of gravity of the whole plate bending machine is high, and it is heavy in the front and light in the rear. Therefore, attention must be paid to the center of gravity during lifting, handling and installation to avoid turning over the machine. When hoisting, please hoist the steel wire rope according to the position shown in the drawing. The included angle should be small to ensure the accuracy of the machine remains unchanged.



3、 Main structure of the machine

3.1 Main structure of the machine tool: the machine tool is hydraulically driven, with the sliding block above the workbench. The bending force adopts the cartridge valve hydraulic integrated control system, and the system pressure safety valve is set to prevent the machine from overload. The bending operation has the function of automatic and accurate positioning of the rear stopper (X axis) and mechanical stopper (Y axis) controlled by LCD digital control. It is stable and reliable, without electrical maintenance. The work of the solenoid valve can be displayed dynamically and in real time, which is convenient for quick inspection and analysis of the peripheral electrical wiring of the machine tool and the working condition of the hydraulic solenoid valve. A mechanical stop is set in the oil cylinder to ensure the repeated positioning accuracy of the sliding block when it moves to the bottom dead center, so as to achieve the consistency of the bending angle of the workpiece. The machine tool is equipped with a mechanical synchronous torsion shaft and a 6S high wear-resistant nano material friction plate with double guide rails to achieve synchronous and consistent movement of the cylinder piston and slider. The rear stopper adopts precision ball screw, upper and lower double flanging side guide rail frame, and 6S nano wear-resistant material paste layer (wear amount per hundred kilometers is less than 0.12mm). The ram type cubic axial force balancing lifting and adjusting mechanism is adopted for the retaining beam. Through the automatic balancing and adjusting function of torque force at all relevant parts, the assembly and adjustment of ordinary rear retaining machinery are difficult to meet the high-precision requirements and maintenance, making it simple and easy.

3.1.1 Use function of the machine tool: the machine tool is equipped with inching and single operation functions. The inching function is convenient for machine tool debugging. The single function is convenient for batch bending operation.

3.1.2 Selection of bending pressing force: the bending operation can be carried out according to the bending force calculation formula and selection table (Table 1), and the required bending can be selected according to the thickness of the bending sheet, the opening width of the lower die V slot, and the sheet width. The working pressure of the system is regulated by the remote pressure regulating valve under the pressure gauge at the distribution box.

3.2 Frame structure: the frame and the workbench are of an integral welded steel plate structure with high strength and rigidity. The parallelism between the upper die fitting surface of the slider and the workbench does not need to be adjusted by the user.

3.2.1 Working slider: the sliding block of the machine tool is an integral steel plate structure, and both sides are connected to the frame through sliding guide rails. The right guide rail is equipped with up/down collision free proximity travel switch, which can adjust the sliding block to stop at the top dead center and slow switching position. The piston rod of the oil cylinder is connected with the sliding block through bolts, and the pressure of the oil cylinder is transmitted to the sliding block through the piston rod, and the pressure of the oil cylinder is transmitted to the sliding block through the mold
Apply a pressing force to the workpiece. The synchronous torsion shaft is connected with the sliding block through the connecting rod. The torsion shaft and the side guide rails on both sides of the sliding block ensure the synchronous consistency of the two working oil cylinders in the movement process.

3.3 Sliding block positioning transmission structure: the sliding block is positioned at the bottom dead center of the movement. The sliding block is rotated by the worm gear reducer motor and rotated by the synchronous belt/wheel drive connecting rod to make the two worm gear pairs and lifting screws in the left and right oil cylinders rotate synchronously. The rotation of the lifting screw drives the mechanical stopper in the plunger to move up or down. The stopping position of the mechanical stopper is limited
The end stroke of the piston rod can be adjusted, thus the accurate position of the bending angle of the slider bottom dead center can be adjusted.

3.4 Sliding block positioning and bottom dead center adjustment: When adjusting the sliding block's bottom dead center position, the sliding block must stay at the upper limit travel switch position. Otherwise, the regulating motor cannot be started due to the electrical interlock. By setting the digital display value and operating the up or down button, the up and down travel displacement of the stop can be accurately and automatically positioned
Enables size control of different bend angles.

4、 Correct use and adjustment of machine tools

4.1 Factors affecting bending accuracy:

4.1.1 Influence of sheet metal characteristics on bending accuracy: in the actual bending process, after adjusting the bending angle for one time in the same V-shaped groove, poor angle consistency often occurs. In addition to the installation and adjustment accuracy of the upper and lower dies of the machine tool, this phenomenon is also different from the use of different plate widths, neutral layer tensile coefficients of different materials, and elastic dies

It is related to the quantity, the flatness error of the plate surface, and different cutting or gas cutting blanking methods, which will directly cause the inaccurate accuracy change in the bending process. Usually, the theoretical value of the sheet metal in the ideal state is used as the reference for the bending process. In actual operation, normal operation and processing can only be carried out after trial bending and correction.

4.2 Non negligible position for placing the sheet metal: in the actual bending process, the operator often habitually presses the sheet metal close to one side for eccentric load. Because the anti-eccentric load torque of the ordinary mechanical torsion shaft synchronous bending machine is very limited, especially for the large machine type with bending force of more than 250T, its dynamic synchronization performance is objectively restricted by the comprehensive technical conditions, and can no longer meet the synchronization performance and requirements of large tonnage models, If we do not pay attention to the correct pressing position of bending sheet metal, which is "symmetrical at the center of both ends of the mold", fatigue stress and deformation of different degrees will occur because the synchronous shaft is under the action of eccentric torque. This will cause harm and adverse effects on important parts of the machine tool to varying degrees. Only correct and good machine tool operation habits can avoid the probability of machine tool failure and give full play to the performance and use of the machine tool.

4.2.1 Factors affecting the bending accuracy: with the folding plate material of 2mm (Q235) and the width of the lower mold V groove of 20mm as reference, when the slider positioning accuracy, upper mold adjustment accuracy, and the error accuracy of the plate thickness, each difference of about 0.05mm will cause an error change of about 1 degree in the bending angle. When the slider depth value is used to correct the angle, or when the upper mold and mechanical stop

benchmark accuracy are adjusted separately, It can be used as a rough reference for numerical values.

4.3 Correct adjustment of the mechanical stop: In order to ensure good bending accuracy, the height of the stop at any position of the mechanical stop in the two oil cylinders must be parallel to the reference plane of the machine tool workbench. When the machine tool is in production, the equal height of its position has been adjusted. In case of user use or improper debugging
The two ends of the angle are consistent, and a certain V slot of the lower die is taken as the reference datum, while the mechanical stop at one end is adjusted improperly). This will make the original parallel datum accuracy of the machine tool have a certain deviation change. When the upper die and a single stopper are repeatedly adjusted for several times, the force balance effect deviation of the synchronous shaft relative to the bench datum will increase, which will lead to a certain force bias on the moving track when the upper die slider is pressurized. If the machine tool continues to be used for a period of time, It may cause a certain degree of potential cumulative damage to the structural accuracy of the machine tool. In this case, the machine tool should be stopped and readjusted.

4.3.1 Precautions for block adjustment: When the consistency change of bending angle is too large, the connecting rod and the connecting sleeve should not be easily detached to adjust the mechanical block individually. Generally, the uniformity of the common bending angle is mainly ensured by the clamping and debugging of the upper mold and the parallel control accuracy based on the workbench. Within the tolerance range of 0.1mm, the accuracy should meet the normal use and requirements of most bending parts. When it is really necessary to disconnect the connecting sleeve for single block adjustment, the specific requirements, commissioning sequence, and the correct positive and negative direction of the adjustment position should be specified first, and attention should be paid! It is necessary to completely avoid the method of trial and groping when the debugging process is not exact, otherwise it may cause excessive deviation of the reference position of the stop. If the direction is adjusted reversely by mistake, after several repetitions, the stop position will exceed the maximum allowable error (0.5mm) range of the balance reference of the machine tool synchronous shaft. When it reaches a few millimeters, it will cause some end of the slider to tilt and sink or rebound when it is pressurized, which not only makes positioning adjustment difficult, but also may cause the machine tool synchronous shaft to deform and other undesirable phenomena. Only the correct use and maintenance

of the machine tool can make the performance of the machine tool better.

4.3.2 "Adjustment criteria" for mechanical stop: the positioning of mechanical stop in the two oil cylinders of the bending machine and the force balance of the synchronous shaft are based on the workbench plane, so that the full length parallelism of the bottom plane of the slider is consistent for debugging. It is an important guarantee to maintain the normal operation of the machine tool. As the force balance of the step shaft, the vertical movement of the slider
The bearing torque and compliance of the left and right guide rails. The slider works and is correctly maintained under the ideal condition that the benchmark is parallel, which is very conducive to the normal performance and use of the machine tool.

4.3.3 Adjustment of upper/lower molds:
1. Since the parallel accuracy of each V-slot opening of the lower die with ordinary accuracy has a certain degree of unequal error, it cannot fully meet the consistency of the bending process that requires higher accuracy. Users often adjust the position of mechanical stop in a certain oil cylinder to solve the problem. The machine tool should be used with care, and this "non-standard" adjustment method should not be used! Otherwise, it will bring certain hidden dangers to the normal use and maintenance of the machine tool, which will affect the normal operation of the machine tool.
2. Under normal working conditions, it is only necessary to maintain the full length parallel accuracy of the upper die tip (C) and the lower die plane (T), which can meet the accuracy requirements of most ordinary bending. The sequence of maintenance and debugging is: @ 1>. First check whether the connection between the cylinder plunger and the slider shoulder is loose. If it is loose, tighten the connecting bolts and nuts (Fig. 3). Set the change-over switch to the "inching" operation to make the slider return to the upper limit, @ 2>. When the mechanical stop is lifted to the position of the slider, a gap of about 0.5mm can be left between the upper plane of the lower mold and the full length upper mold tip@ 3> Press the sliding block on the lower dead center of the mechanical stop in a free state, moderately loosen the screws of the upper die clamping plate and the inclined iron screws of the adjusting cushion block to the extent that it can be pressed gently, @ 4>, and gently press down to release the button to eliminate the gap between the stop screw rod@ 5> By adjusting the position of the inclined iron of each upper mold, the upper mold and the lower mold plane can be contacted evenly without gaps. When adjusting the inclined iron, pay attention

not to use too much force, so that it is appropriate to pad@ 6> Pre tighten the loosened screws of each clamping plate properly, do not return the slider, and gently press it down again to make the contact of each adjustment uniform. After checking, all the pre tightened screws can be fully tightened. **Note: Note! Operation shall be carried out when the oil pump motor is stopped to ensure personal safety.**

4.4 Working condition and maintenance of sliding block: due to poor dynamic working condition characteristics of conventional hydraulic bending machine, it cannot be pressed by bias load, but it is difficult to accurately control in actual work. Due to the influence of variable bias load, it will cause the connection between sliding block and working oil cylinder, and the looseness of the adjusting jackscrews of friction plates in the guide rails on both sides of the sliding block. During normal use of the machine tool, the two relevant nuts and screws should be checked and maintained frequently. When adjusting the top screw of the guide rail friction plate, it should be coordinated with the smooth up and down movement of the slider. The friction surface of the two guide rails should always be fully lubricated.

4.4.1 Back stop function of the machine tool: the machine tool is equipped with a front support frame and a back stop frame, and the back stop can be set according to the work
The required stop size of the part is precisely positioned through the control system operation.

4.4.2 Upper and lower molds of the machine tool: the upper mold is segmented, and the lower mold is integral. When the V-shaped groove on the bottom surface of the lower formwork is selected and the lower formwork needs to be turned over, the lower formwork can be lifted by the lifting ring with the help of the inching of the slider to complete the turning over.

5、 Hydraulic system of machine tool

5.1 Hydraulic working principle of machine tool

5.1.1 Idle running of the system: #>1, the gear pump motor starts to drive the gear pump to run, and the hydraulic oil flows into the oil tank through the oil filter and pressure oil pipeline at the suction port of the gear pump, the plug-in overflow valve, and the (middle T-port) of the three position four-way reversing valve. There is no pressure in the system at this time. #> 2. A safety valve for the lower chamber of the oil cylinder is installed on the left vertical side (rear view) of the hydraulic manifold block to prevent sudden pressure doubling in the lower chamber. The overflow pressure of the valve is set at 25Mpa. **Be careful! Do not adjust the valve easily to avoid out of control protection.**

5.2 System pressure and adjustment: the hydraulic system of the machine tool has been adjusted before delivery, so it is not allowed to adjust it easily. When it is really necessary to adjust, first screw the remote pressure regulating valve at the side of the distribution box, drop the slider onto the mechanical block in the oil cylinder, cooperate with inching, and slowly adjust the adjusting knob near the solenoid valve YV1 to the system pressure of 25Mp.

5.2.1 Sliding block fast and slow speed control: #>1, the solenoid valve (YV1/pressure, YV2/downward, YV4/fast YV6/oil return from the lower chamber) is energized, the hydraulic oil enters the upper chamber of the oil cylinder through the three position four-way electromagnetic reversing valve and the check valve, and the weight of the sliding block of the machine tool causes the upper chamber of the two oil cylinders to produce vacuum and self suction. Open the hydraulic control check valves that are directly connected to the oil tank, and the upper chamber is rapidly filled with liquid to make the sliding block fast downward. The return oil from the lower chamber of the two oil cylinders returns to the oil tank through the cartridge valve. #> 2. By adjusting the hexagonal adjusting screw rod located at the bottom of the middle of the solenoid valves (YV4, YV5), the oil flow rate of the fast down speed of the slider can be changed. The fast down speed of the slider should be adjusted appropriately. If too fast will affect the position of the upper chamber of the oil cylinder, the solenoid valve (YV4) will be powered off, (YV5) will be powered on, and it will be controlled by fast switching to slow throttling. By adjusting the round metal knob below the solenoid valve (YV5), the pilot overflow pressure of the cartridge valve can be changed, To generate a force

comparison with the change of the opening flow of the main valve core, so as to achieve slow throttling control. The adjustment screw is slow clockwise and fast reverse. The slow adjustment shall be adjusted slowly. If the speed is too slow, the slider is prone to jitter. After adjustment, tighten the locking screw of the knob.

5.2.2 Pressure maintaining, unloading and return of the sliding block: after the sliding block downward pressure maintaining time is over, all relevant solenoid valves are powered off, and the upper chamber of the oil cylinder is in the pressure maintaining state. When the slider returns, the solenoid valves (YV5, YV7, YV8) are energized. (YV7 depressurizes the oil cylinder first to reduce the transient impact. The lower adjusting knob of (YV7) is loosened to the maximum and then tightened 2 turns to lock. At the same time, the valve control oil opens the hydraulic control valve to release the oil pressure in the upper chamber through the oil tank. After the unloading is delayed for 1 second, (YV7 is powered off, YV1, YV3 are powered on), the pressure oil flows through the three position four-way reversing valve, one-way valve, The cartridge valve enters the lower chamber of the oil cylinder and pushes the piston to move the sliding block upward. The hydraulic oil in the upper chamber directly returns to the oil tank through the hydraulic control valve. The adjusting knob below the solenoid valve (YV4) can adjust the return pressure of the slider, which increases clockwise and decreases on the contrary. After adjustment, lock the knob screws.

5.3 Hydraulic system maintenance and precautions

1. When hydraulic oil is added to the oil tank, 80-150 mesh filter screen shall be used to filter it before adding it to the oil tank. The surrounding area of the oil tank shall be clean to avoid mixing pollutants, cotton yarn heads, etc. into the tank. After the new machine tool is used for a period of time for the first time, clean the oil filter in the oil tank and at the oil pump port, and regularly check to keep the physical properties of the oil tank and oil fluid stable and pure. If the oil is found to be emulsified and the viscosity drops, replace it with a new oil in a timely manner, which can eliminate and avoid the probability of hydraulic system failure and potential adverse factors, and has a better positive preventive effect. During system maintenance, pay attention not to use cotton cloth, cotton yarn and fiber to clean the oil tank and hydraulic components. Silk cloth, vinyl sponge or dough can be used in the oil tank to stick dirt. The machine tool should be replaced with new hydraulic oil at least once a year. Generally, about 80% of the hydraulic failures are caused by the pollution of hydraulic oil.

2. The motor can only be started when the oil tank is filled to the oil level. N32 or N46 hydraulic oil should be added. The machine tool should be filled with 200Kg oil at a time.
3. After the installation of the new machine tool that has been transported for a long distance, each hydraulic pipe joint should be checked once. If it is loose, it should be tightened in time, and regular inspection and maintenance should be carried out and aging seals should be replaced in time. To fully improve the dynamic performance of the machine tool.

5.4 Fault analysis and troubleshooting of machine tool hydraulic system

5.4.1 Bending, pressing and return without pressure
1. When confirming that the motor steering and oil pump work normally, first check whether the remote pressure regulating valve at the electric box side is loose or misadjusted by others, and temporarily tighten it. Check whether the pipe connector of the pressure gauge and the relevant oil pipe connector of the remote pressure regulating valve have oil leakage. If there is no problem, cooperate with the inching slider up or down to check whether the power on indicator of the three position four-way solenoid valve (YV1, YV2, YV3) plug is on, if it is on, In most cases, this fault is caused by the jamming of one of the valve cores of solenoid valves (YVI, 2, 3). First, use a small screwdriver with appropriate diameter to push the valve core push rods in the end holes of these electromagnets with force, and cooperate with inching operation to see whether the valve core can move. If one of the valve cores cannot move, remove the valve body. Remember the correct disassembly and assembly sequence to avoid missing parts after assembly, Or the direction is reversed (in case of difficulties or miscalculation for subsequent reasons). Take out the valve element, clean it with clean kerosene and reinstall it. Pay full attention to the assembly cleaning of the valve core after washing, and do not wipe the valve core parts with cotton yarn, cotton cloth, etc. As a hydraulic fault often has a certain degree of multi correlation and concealment, it should be checked one by one from easy to difficult.

2. If there is no valve jam through the above inspection, try to tighten the system pressure regulating knob near YV1 clockwise, and then jog to see if there is any pressure change. If there is pressure, drop the slider onto the mechanical stop at the bottom dead center, and adjust the knob slowly to 25Mpa system pressure in coordination with jog operation.

3. When the above troubleshooting is invalid, there are a few phenomena: although the remote pressure regulating valve knob has been adjusted to a non-tightening degree, the thread fitting of the adjusting screw rod near the root is too tight and the plug is not in place, which will cause the valve to directly overflow and relieve pressure. Press the button to check the oil return condition of the valve oil return pipe. If there is a large oil return phenomenon, take out the adjusting screw rod and use the die to pass the thread at the root of the screw rod again.
#4. If the above cannot be ruled out, it may be that the sealing combination gasket of the pressure oil outlet pipe joint of the hydraulic oil pump is damaged. It is necessary to drain the hydraulic oil from the oil tank and search for and deal with it. During maintenance, pay attention to the cleaning and protection of the oil tank. After maintenance, clean the filter in the oil tank and at the oil pump suction port.

5.4.2 Only bending and pressing without pressure
The lower and return stroke of the slider block are normal. After contacting the sheet metal (without pressure), the slider cannot continue to move down. This fault is mostly caused by the hydraulic control check valve in the upper chamber of the oil cylinder not being closed. There are two possible reasons for this. One is that a certain valve element is stuck by dirt, so that the pressure oil overflows into the oil tank through the valve port, or the valve spring is too soft. The other is that the two hydraulic control valves return oil at the same time, which is mainly caused by the jamming of the solenoid valve core, which causes the control oil of the two hydraulic control valves to be unable to be turned off, thus making the two valves in the normally open state. For the above inspection, reach out at the two oil ports of the oil tank to check whether there is oil return during pressurization.

5.4.3 Sliding block operation does not move up and down
When it is displayed that the power on LED of the relevant slider is correct or the return solenoid valve is correct, the fault is mostly caused by the three position four-way solenoid valve element being stuck. The inspection and cleaning method is the same as the pressure fault part described previously.

5.4.4 Normal slider cannot return
There is bending pressing force and return pressure, but the slider cannot return. This fault is mainly caused by the solenoid valve having no output oil and cannot control the on-off of the two hydraulic control check valves. If the power on is

normal, the valve can be cleaned.

5.5 The fast lower slider is slow with pressure

1. There are two cases of this fault. One is to check that the solenoid valve works normally when the operation is fast. The solenoid valve may be stuck.
2. In other cases, the sliding block moves slowly with high system pressure when it moves down quickly. This is because the solenoid valve element is stuck or not energized, which blocks the oil return in the lower chamber of the oil cylinder and returns oil only through the lower chamber overflow valve.

5.5.1 The sliding block has no slow speed or unstable slow speed

When the slider moves against the speed switching travel switch without slow speed, or the speed is unstable and jitters, or the speed is too slow. It is caused by improper adjustment of the working speed and flow rate. The adjustment knob below the solenoid valve can be adjusted. To eliminate jitter, sometimes it is necessary to adjust the friction tightness of the slider guide rail at the same time.

5.5.2 There is a large impact vibration when the slider returns

1.It is mainly because one of the solenoid valves is not energized or the valve element is stuck. The two valves can be checked and eliminated one by one. Check whether the adjustment of the lower round metal knob is too tight, which can be adjusted to the most loose and then tightened for 2 turns.
2. The other case of this phenomenon is that the metal knob at the bottom is adjusted too tightly, which is caused by too high return pressure. The knob can be adjusted to the degree that the slider can return smoothly.

5.5.3 Bending pressure abnormal sound increases, bending force decreases

The other case is that the motor noise suddenly increases and the bending force decreases when bending and pressurizing. This fault is caused by the unstable contact of an AC contactor after the star delta switching start of the oil pump motor (star angle starting mode). It is possible that there are foreign matters stuck in the armature closing gap, or the contact is poor, which rarely happens.

5.5.4 Sliding block stops slowly

The fault is caused by the internal leakage of the safety valve. The sealing ring can be replaced. When replacing the sealing ring, the current position of the adjusting rod should be carefully marked. After replacing the sealing ring, the adjusting screw rod should be restored to its original position. If it still cannot be eliminated

after replacement, a new valve should be replaced

5.5.5 Abnormal sound of pump during bending and pressurization
#1. After the slider enters the bending and pressurization, there is a similar metal knocking sound at the pump motor, which may cause this fault. One phase of the three-phase power supply may have a poor contact. Carefully check and fasten the power incoming line to the relevant connector of the motor. If there is no problem with the power supply wiring, check whether the oil pump fails.

6、 Test run and operation of machine tool

6.1 Bending pressure adjustment: #>1, according to the thickness and width of the bending workpiece sheet, select the appropriate V-slot opening of the lower die, check the working pressure required for bending according to the bending parameter selection table and bending pressure curve, and adjust the pressure to the required bending working pressure through the remote pressure regulating valve knob below the pressure gauge. build
It is convenient to adopt the bending force calculation formula: 65 × (Plate thickness) ² ÷ (V-slot width) × (Plate width) = (Bending force) tons. The width of the V-shaped groove is selected according to the thickness of the sheet (8-10 times), and the inner fillet of the folded sheet is approximately 0.156 × V-groove width. Bending force corresponding to pressure 1/MPa=(300T ÷ 28)=about 10.7T 400T model/bending force corresponding to pressure 1/MPa=(400T ÷ 28)=about 14.3T.

6.2 Jog and single operation: The machine tool is equipped with the functions of inching, single operation and single operation, which are realized by hanging the "transfer switch" on the panel of the operation station. When the "transfer switch" is turned to the "inching, single operation" position respectively, the working slider is jogged and operated in a single operation. The foot switch is a double pedal switch. When jogging, step on the left pedal slider to move upward, release the pedal, and the slider stops; Step on the foot downward, the slider moves downward. Release the foot, and the slider stops. In a single time, step on the right pedal slider to move downward, and release the pedal slider to automatically move upward until the upper limit stops. If the pedal switch is pressed and held, the slider "will automatically return to the upper limit after the pressure holding

time is over. If the pedal switch is pressed and held continuously, the slider cannot move downward. After the pedal switch is released, step on the switch slider to move downward.

6.2.1 Commissioning preparation
6.2.1 Before commissioning, carefully read the operation manual and get familiar with the main structure, performance and operation method of the machine tool.
6.2.2 Check all moving parts for failure and looseness, and clean the sundries on the workbench.
6.2.3 Fill the oil tank with hydraulic oil to reach the oil pointer.
6.2.4 After connecting the power supply, start and stop the oil pump motor alternately by means of temporary inching stop. First check whether the rotation direction of the oil pump motor is correct. If the rotation direction is opposite, change the incoming line phase sequence of the wiring power supply.
6.2.5 Start the oil pump motor to work and run for ten minutes without load.

7、 Electrical system

1.Installation
Three phase AC 400 V, 50 HZ power supply can be connected into the electrical box.
2. Commissioning and operation
1). Connect the three-phase power line to the incoming terminal in the electrical box. There is a foot switch socket under the box. You can use the foot switch by turning the foot switch socket, then close the power switch QF, and then close the electrical box door to indicate that the HL 1 light machine has been powered on
2). Start the oil pump motor on the operation panel for a short time, and observe whether the rotation direction of the motor is correct. If correction is required, change the phase of the incoming line of the power supply, and do not change the internal cable of the machine tool Then start the oil pump motor indicator lamp HL 2
3). Jog: After the pump runs normally for a few minutes, turn SA 2 to position SA 2 and turn it to the foot position. Step on the foot switch: the "upper" slider rises and stops when it is released. When it rises to the limit switch SQ 1 position, it does not rise anymore. Step on the lower slider of the foot switch to move down quickly. Because of the action of the travel switch SQ 2, the slider moves down quickly to move down slowly and stops when it is released.

4). Single time: turn SA 2 to "single time", step on the "down" slider of the foot

switch to make fast to slow down pressurization, and the pressure maintaining time is over. The slider automatically returns to the upper limit switch SQ 1 to stop, and stops for a single time. Adjust the stop position of the travel switch SQ 2 in advance to make the fast down turn to slow down pressurization. Adjust the working time of the time relay KT 1 so that the working time can meet the bending pressure of the pressed workpiece. Adjust the time to continue the pressure holding time of the electrical appliance KT 2.
5). Continuous: When SA 2 is turned to "continuous", step on the foot switch "the lower slider makes fast downward, slowly downward pressurization, pressure maintaining, rising, waiting, fast downward... To stop stepping on the foot switch, the upper slider rises to the SQ 1 position to stop, and the continuous running channel stops. The time relay KT 1 can adjust the waiting time of the cycle.
6). To ensure safety, in the process of pressing down, you can step on the rising foot switch in any way at any time, and the slider will rise.

3.In normal use, if the angle at both ends is inconsistent, it can be adjusted through the connecting rod of the oil cylinder to increase or decrease the angle.

4. In the process of use, because the plate thickness is inconsistent, the angles at both ends will be inconsistent, or because the mold is worn due to long-term use in the same location, check the mold first, replace the mold if it is damaged, after replacing the mold, gently press the upper mold edge on any plane of the lower mold, loosen the mold pressing plate to adjust the inclined iron to be parallel up and down, and then clamp the mold pressing plate.

8、 Machine tool maintenance

All operators and maintenance personnel of this machine must carefully read and understand the contents of this manual. Only by strictly following the rules, will they get satisfactory results.

1. The machine must be in the charge of a specially assigned person, and the operator must be familiar with the use of the machine and the knowledge of safe production.
2.The bending force of the workpiece shall not be greater than the nominal force.
3. In order to make the die durable and not be damaged due to improper bending width, the working pressure of the machine should be appropriately reduced when bending narrow plates. The folded plate load shall not exceed 400 KN for every 630 mm of length.

4. The bending plate shall be placed in the middle of the machine, and it is generally not suitable for eccentric loading. At the same time, the machine shall not be loaded unilaterally, so as not to affect the accuracy of the workpiece and the machine. If the workpiece must be operated unilaterally, its load shall not be greater than one fourth of the nominal force. Both sides must be bent at the same time.
5. The hydraulic oil in the oil tank must be replaced within one month after the first use, and no more than once a year thereafter. The normal working oil tank temperature is 15 - 60 ℃. (If the temperature is too high, a cooler must be added)
6. The machine adopts decentralized lubrication, and oil shall be added according to the working conditions.
7. The user must always prepare the attached accessories specified by the machine for maintenance.