W62 Series Hydraulic Folding Machine

Operation Manual

(Mechanical Part)

Product Modle:

Manufacturing No:

Version: v2.1

Date: 2016.08

Content

Please preserve the operation manual carefully, which is the important material for users to operate and maintain the machine tool.

No notice if any minor changes of the machine and the operation manual made.

Outline Drawing of the machine tool

Figure 1

Purpose and application range of the machine tool

The machine tool adopts welded steel plate construction. Eliminate internal stress by heat treatment, assuring high strength, good rigidity, small deformation, easy operation and high endurance.

The machine with hydraulic driving system can run stably and repair easily. The upper die is sectional type that can combine to 0the different length willfully, suitable for the plate and case part's manufacture. The working angle can be adjusted rapidly.

The machine is widely used by manufacturers for forming electrical and electronic switch boxes, which is also used in cooking utensil, furniture, all kinds of work-pieces, decorative industry and all shops of other industries.

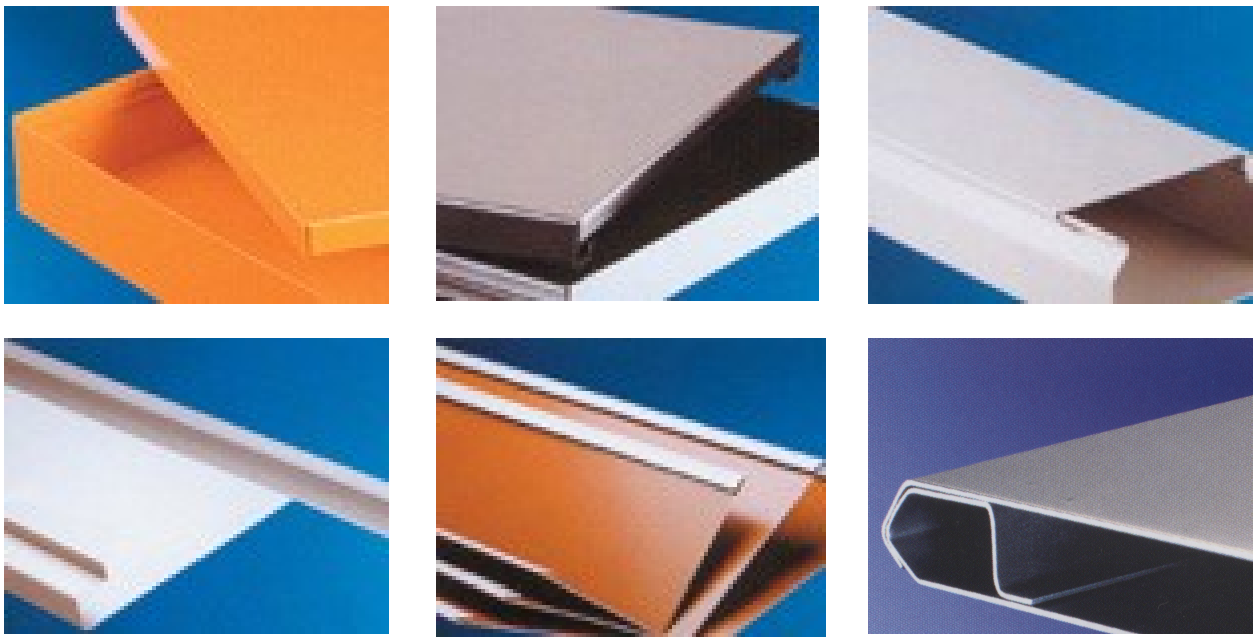


Figure 2: Shapes of Bending Parts

Main specification and basic parameter

Item \ Mode / Uni			2×2500	2×3200	4×1320	4×2000	3×2500	3×3200
Max. Bending thickness		mm	2	2	4	4	3	3
Max. Bending width		mm	2500	3200	1320	2000	2500	3200
Bending angle		°	120°	120°	120°	120°	120°	120°
Max distance between pressing beam and worktable		mm	110	110	110	110	110	110
Main Motor	Model		Y100L-4	Y100L-4	Y112M-4 B3	Y112M-4	Y112M-4	Y112M-4
	Power	KW	2.2	2.2	4	4	4	4
Oil Pump	Model		PVL1-8	PVL1-8	PVL1-14	PVL1-14	PVL1-14	PVL1-14
	Volume	L/r	8	8	14	14	14	14
	Pressure	Mpa	16	16	21	21	21	21
Size	Length	mm	3300	4000	1520	3700	3700	4340
	Width	mm	800	800	1640	1640	1640	1640
	Height	mm	1500	1500	1650	1650	1650	1650
Weight		Kg	1800	2500	1800	2350	2750	3900

Main specification and basic parameter

Item \ Mode / Uni			4×4000	5×2500	5×3200	6×2000		
Max. Bending thickness		mm	4	5	5	6		
Max. Bending width		mm	4000	2500	3200	2000		
Bending angle		°	120°	120°	120°	120°		
Max distance between pressing beam and worktable		mm	110	110	110	110		
Main Motor	Model		Y112M-4 B3	Y132M-4	Y132M-4	Y132M-4		
	Power	KW	4	5.5	5.5	5.5		
Oil Pump	Model		PVL1-19	PVL1-19	PVL1-28	PVL1-19		
	Volume	L/r	18.6	18.6	19	18.6		
	Pressure	Mpa	21	21	21	21		
Size	Length	mm	5200	3700	4340	3200		
	Width	mm	1550	1640	1640	1640		
	Height	mm	1650	1650	1750	1650		
Weight		Kg	6000	4400	5200	4000		

Main structure and working principle

1. Main structure

The main parts of the machine tool adopt welded steel plate construction. Eliminate internal stress by heat treatment, assuring high strength, good rigidity and lightweight.

The machine is composed of 1.bed 2.pressing beam 3.bending beam 4.back gauge 5.die sets 6.hydraulic system 7.safty guards 8.electrical system, working harmoniously and reliably.

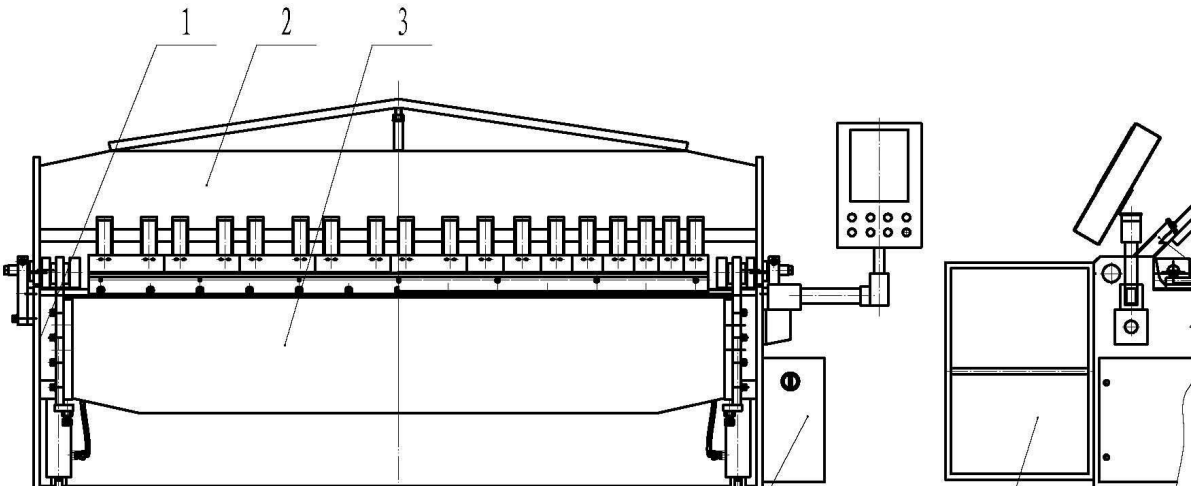


Figure 3

Both clamping and bending are controlled by the hydraulic system and the power of clamping and bending can be adjusted according to the requirement. Servo motor drives scotch to position back gauge precisely and rapidly.

The die sets adopt high-harbonnium steel material that process through forging, heat treatment, milling and grinding, with high rigidity and good endurance. The up-die of the clamping beam is connected by some short dies, which are of high precision, exchange ability, easy to install and remove the parts.

Electrical system with high protection level is safe and reliable, carrying on the pressure resistance, insulation rank and earth resistance tests. Select high reliable parts, adopting multiple-chain locks and mutual locks in order to avoid the mal-function of the machine tool.

2. Working principle

1) The principle of Hydraulic system

The series machines adopt hydraulic system transmission. The principle of the system see figure 3:

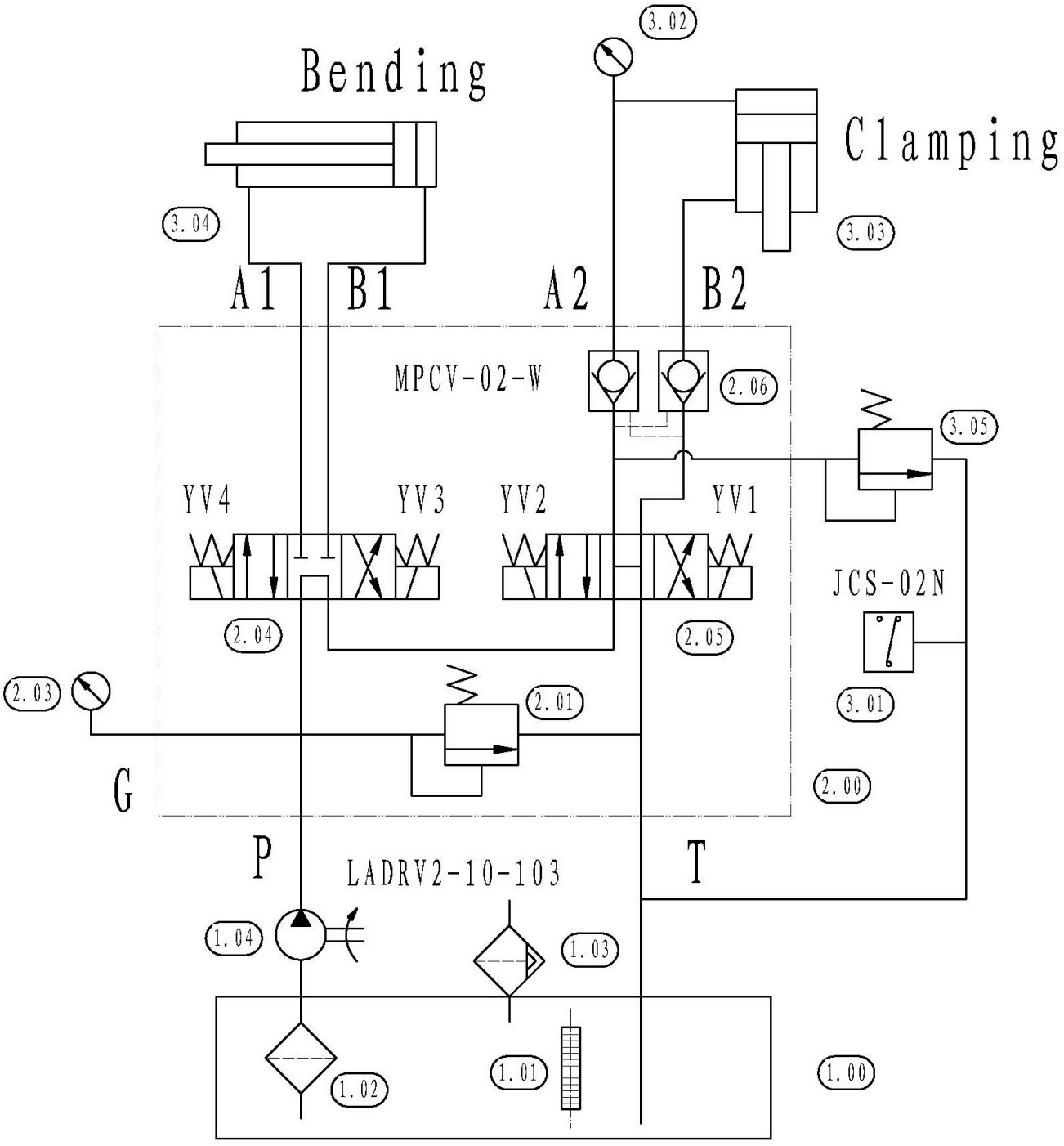


Figure 4: The principle of Hydraulic system

Specification / Solenoid Valve	Clamp	Release	Bend	Return
YV1	+	−	−	−
YV2	−	+	−	−
YV3	−	−	+	−
YV4	−	−	−	+
SP	+	−	−	−

Figure 5: The steps of hydraulic valve's movement

The electric motor clockwise revolves to drive vane pump 1.04 to make the filtrated oil to enter the hydraulic valve group through the oil suction pipe, the Solenoid valves 2.04 and 2.05 don't act, hydraulic oil returns directly to the oil tank after flowing through the middle position of Solenoid valves 2.04 and 2.05.Both the pressing beam and bending beam don't act.

A. Clamp and release of pressing beam

The clamp of pressing beam

When electro-magnet(YV1) of the Solenoid valve2.05 acts, the hydraulic oil arrives to the upper side of cylinder3.03 after flowing through the middle side of Solenoid valve2.04 and the left side of Solenoid valve2.05, simultaneously opens the double-direction hydraulic lock2.02 which connects with the lower side of cylinder 3.03,the piston of hydraulic cylinder3.03 moves downward, the lower side hydraulic oil of cylinder3.03 returns to the oil tank directly after opening the hydraulic lock; The piston pushes the pressing beam to contract the parts, when the pressing beam touches the parts, the hydraulic cylinder3.03's piston is blocked, the system pressure rise, its value of pressure demonstrates through the pressure gauge3.02, when value of pressure rises to equal to the setting value of the pressure relay 3.01，the pressure relay3.01 starts to work , the Solenoid (YV1) stops working , the hydraulic lock locks again, causing the hydraulic cylinder3.03 to maintain the same pressure as the pressure relay3.01's installation pressure to keep the parts to contract. You can change the installation value of pressure relay3.01 to adjust the pressure while bending.

The release of pressing beam

When electro-magnet (YV2) of the Solenoid valve2.05 acts, the hydraulic oil arrives to the lower side of cylinder3.03 after flowing through the middle side of Solenoid valve2.04 and the right side of Solenoid valve2.05, simultaneously opens the double-direction hydraulic lock2.02 which connects with the upper side of cylinder 3.03,the piston of hydraulic cylinder3.03 moves upward, the upper side hydraulic oil of cylinder3.03 returns to the oil tank directly after opening the hydraulic lock, the piston pulls the pressing beam to release the parts.

B. The bend and return of bending beam

The bend of bending beam

When electro-magnet (YV4) of the Solenoid valve2.04 acts after starting the pressure relay3.01, the hydraulic oil arrives to the right side of cylinder3.04 after flowing through the right side of Solenoid valve2.04, the left side hydraulic oil of cylinder3.04 returns to the oil tank directly after flowing through the middle side of Solenoid valve2.04 and 2.05.The piston3.04 move left to push the bending beam to bend the parts; The power of bending displays in pressure gauge and the system pressure can be changed by adjusting the overflow valve2.01.

The return of bending beam

When electro-magnet (YV3) of the Solenoid valve2.04 acts, the hydraulic oil arrives to the left side of cylinder3.04 after flowing through the left side of Solenoid valve2.04, the right side hydraulic oil of cylinder3.04 returns to the oil tank directly after flowing through the middle side of Solenoid valve2.04 and 2.05. The piston 3.04 move right to pull the bending beams to return.

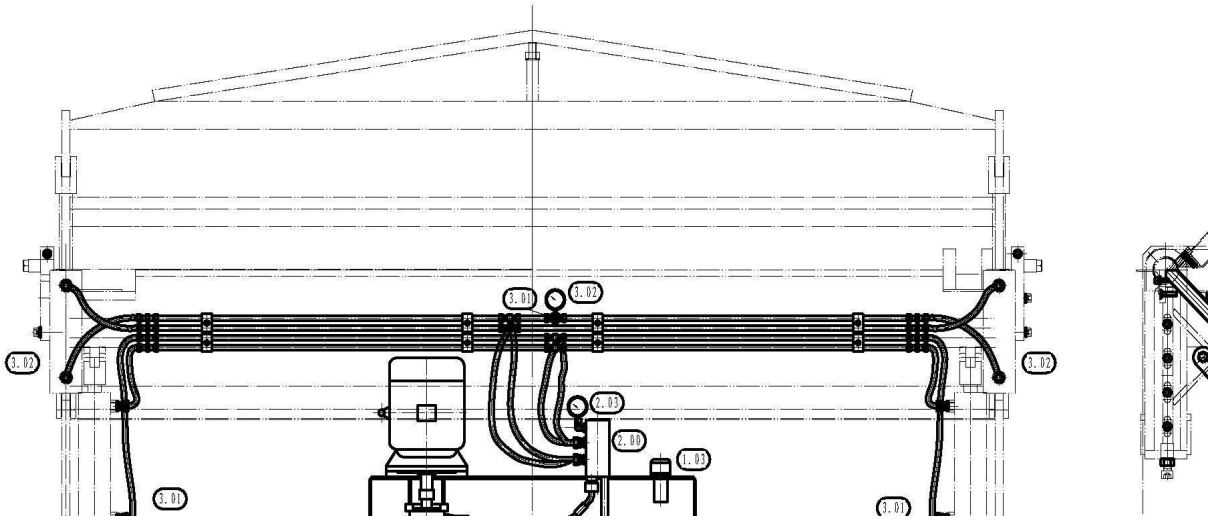


Figure 6: Position of hydraulic parts

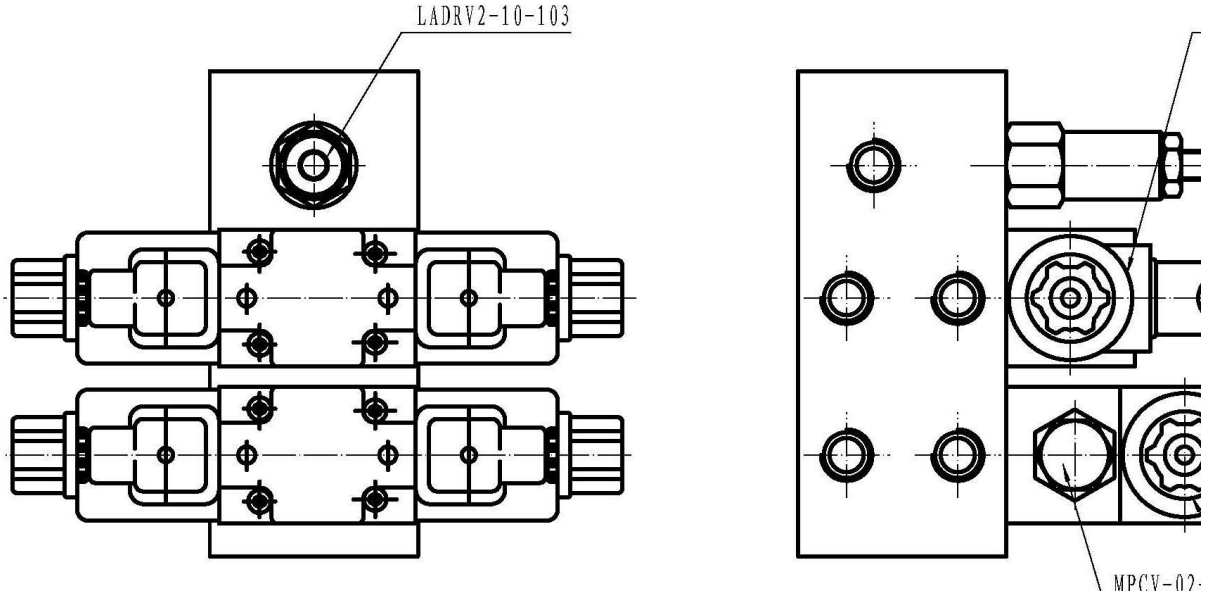


Figure 7: Installing position of the valve

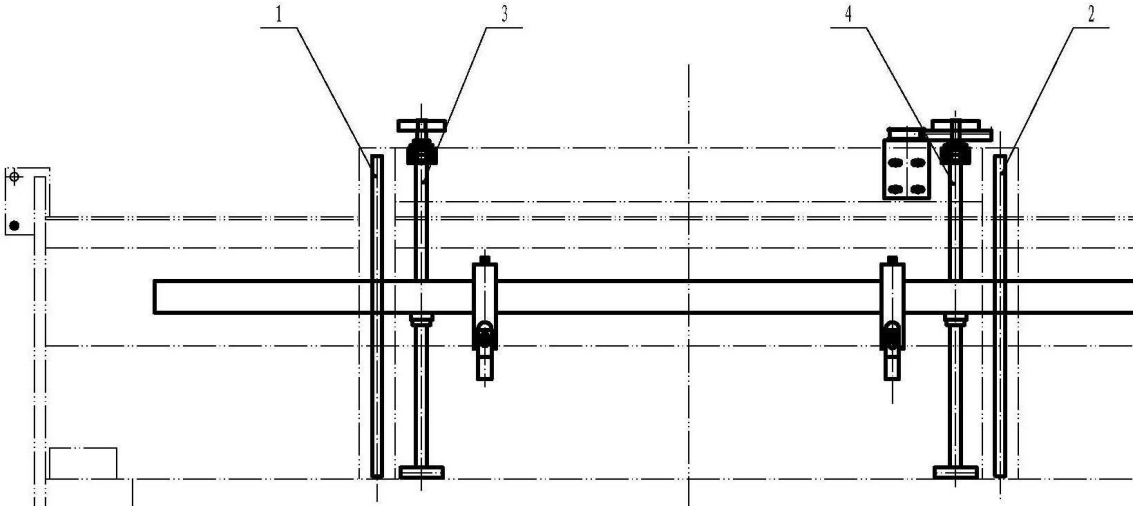
No:	Qty	Name	Model	Remark
1.00	1	Oil tank		
1.01	1	Liquid temperature&level meter	YWZ-80T	
1.02	1	Oil filter	WU100*100	
1.03	1	Air cleaner	EF4-50	
1.04	1	Vane Pump	PVL1-28	
2.00	1	Valve block		
2.01	1	Overflow valve	LADRV2-10-103	
2.02	1	Double-direction hydraulic lock	MPCV-02-W	
2.03	1	Pressure gauge	YN-60 (0-25Mpa)	
2.04	1	Solenoid Valve	DG4V-3-8C-A-AC/DC	
2.05	1	Solenoid Valve	DG4V-3-0C-A-AC/DC	
3.01	1	Pressure Relay	802-200-281	
3.02	1	Pressure gauge	YN-60 (0-25Mpa)	
3.03	2	Clamping cylinder		
3.04	2	Release cylinder		
3.05	1	Overflow valve	LADRV2-10-103	

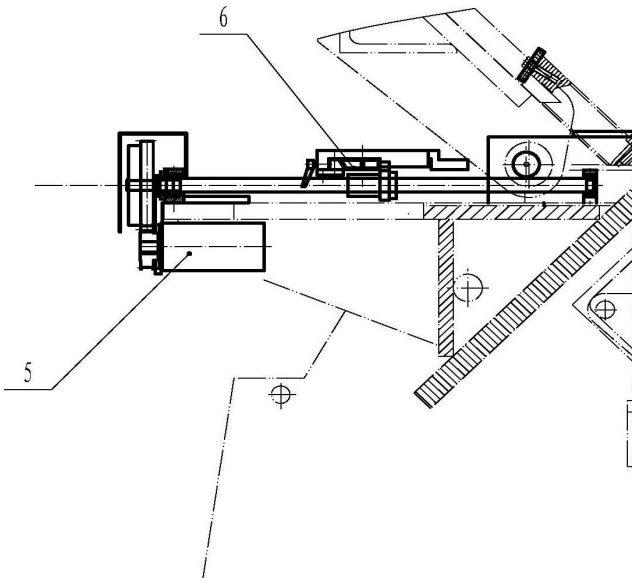
Figure 8: Hydraulic parts list

2) Adjustment of the back gauge

Back gauge adjustment in CNC mode

The back gauge of the machine tool consists ball screw, straight line slide-way and baffle etc with features that quick transmission, and position rapid and correct position.





1---straight line slide-way
2---straight line slide-way
3---right guide
4---left guide
5---Servomotor
6---baffle

Figure 9: Structure of the back gauge

When position the back gauge, the CNC system transmiss instructions to the servo motor 5 to drive the right guide and left guide to revelov, making the baffle move with the two guides to position the back gauge. (Refer to CNC Operation Manual for details)

Back gauge adjustment in Manual mode

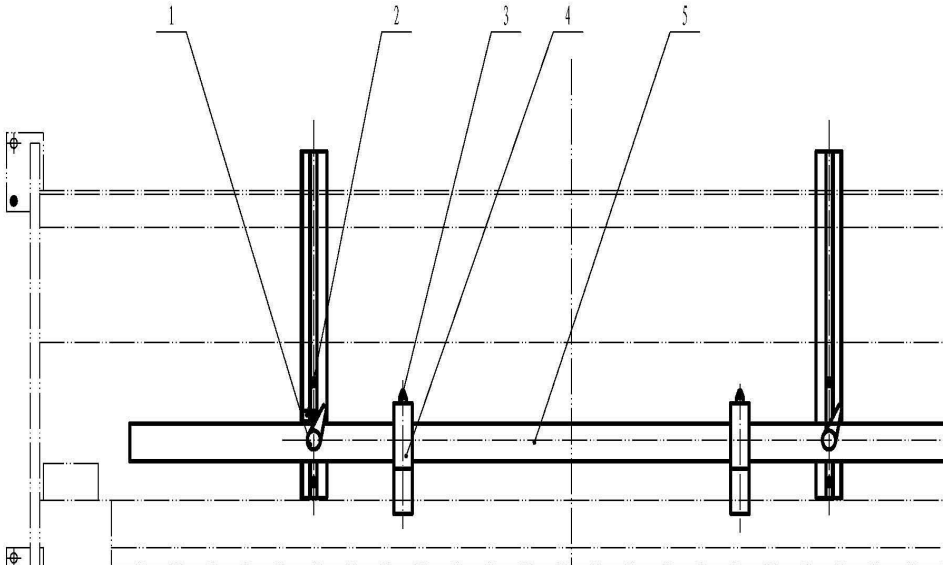


Figure 10: Diagram of the structure of the back gauge

When adjust the back gauge in manual model, first loose the locking handle 1 and adjust the baffle 5 to make the back gauge move to the required position. Then lock the handle 1, the value of indicating block 2 is equal to the actual position of the fixture plate 4. The position of fixing plate 4 can be adjusted by loosing the locking handle 3.

3) Adjustment of the die

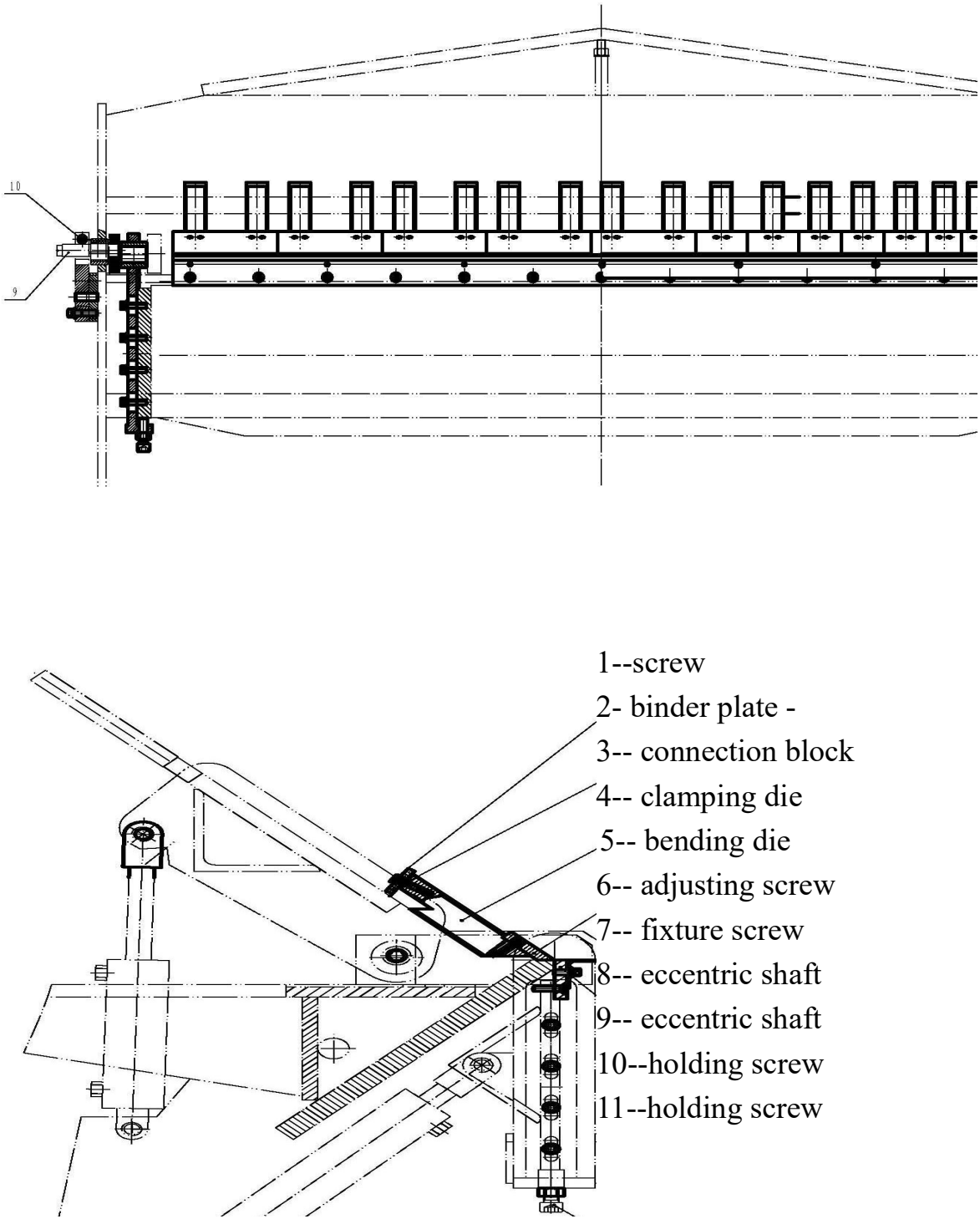


Figure 11: Diagram of the structure of the die

The bending die consists of many partite dies of different length, which can combine the bending die according to length of the bending parts. The concrete way of adjustment loosen the screw 1 at first to release the binder plate of the fixture connection block, then re-clamp the binder plate after combining the bending die according to the requirement, After the adjustment guarantees that the bottom and front of bending die are parallel.

It needs to adjust the distance between the front of bending die and the bending axis of working table. The concrete way of the adjustment: To make the bending die approach to the working table without clamping. Loosen the holding screw 10 and 11, adjust the eccentric shaft 8 and 9 to keep the distance between the front of bending die and the bending axis of working table to meet the requirement.

The concrete way of the adjustment: loosen the fixture screws 7, Properly adjust the adjusting screw 7 to keep the distance between top surface of the bending die and surface of the working table to meet the requirement

4) The electrical system

Please refer to 《Electrical Operation Manual》and 《CNC Operation Manual》 for concrete application.

Lifting and installation of the machine tool

1. Points for Lifting

Pay attention to balance gravity center of the machine tool during the hanging and installing. Please swing the machine tool as Figure 10 shows to guarantee safty and precision of the machine tool.

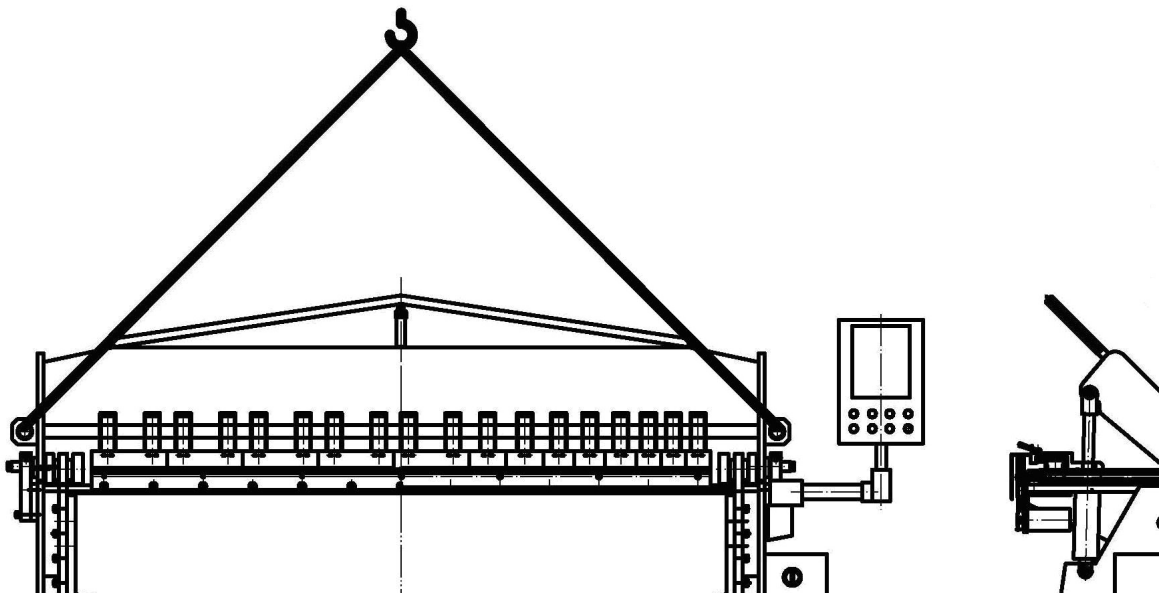


Figure 12: Diagram of the lifting

2. Points for Installation

Allowance of level should be adjusted within 1000:0.20mm. Please refer to the below figure of construction of ground, then fix the foot screw and concrete. Wait until the foot screw and cement completely concrete to start adjusting the bed horizontally.

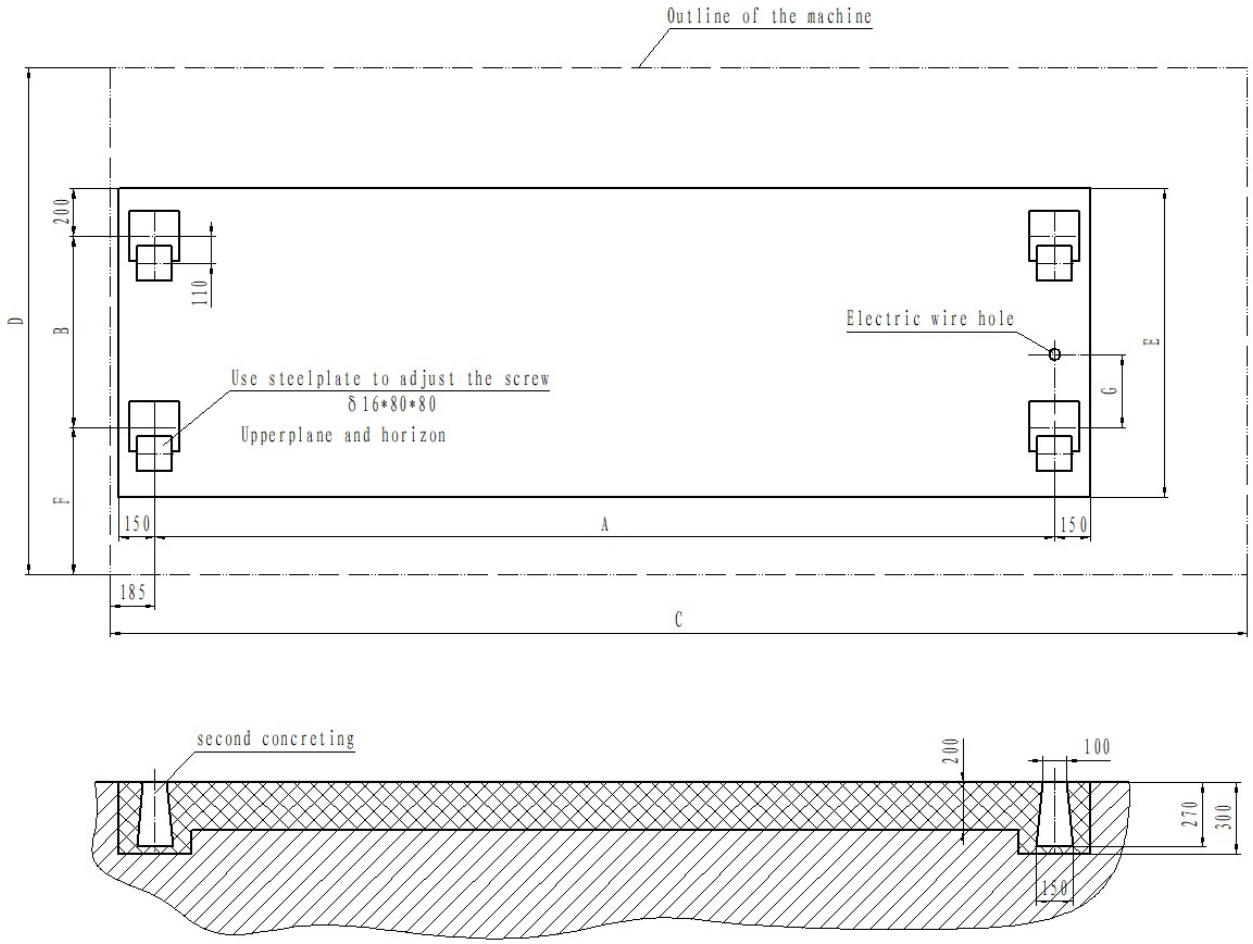


Figure 13: Construction of ground

MODEL	A	B	C	D		E	F	G
				manual	electric			
W62Y-2×2500	2960	690	3700	1900		1250	400	300
W62Y-2×3200	3660	690	3700	1900		1250	400	300
W62Y-3×1320	1850	790	2600	2100		1280	620	300
W62Y-3×2000	2530	790	3500	2100	2450	1280	620	300
W62Y-3×2500	3030	790	4000	2100	2450	1280	620	300
W62Y-3×3200	3730	790	4700	2100	2450	1280	620	300
W62Y-4×4000	4530	790	5500	2100	2450	1280	620	300
W62Y-5×2500	3030	790	4020	2100	2450	1280	620	300
W62Y-5×3200	3730	790	4700	2100	2450	1280	620	300
W62Y-6×2000	2530	790	3500	2100	2450	1280	620	300

Figure 14: The date of ground

Safe explanation/Maintenance and trouble-shooting

In order to operate the machine tool correctly and safely, the operator must read the operation instruction carefully and understand fully.

1. The operator who is in charge of the machine tool must be familiar with the knowledge of operation and production carefully.

2. The bending power should be less than the rating presssure 21Mpa.

3. In order to keep high precision of the machine tool and high endurance of the die,adjust the distance between the front of the clamping die and bending axis while bending plates of different thickness.

4. Add hydraulic oil #32 and #46 to the oil tank. The oil change time is one month after the first time to use, when is nearly every one year. The normal working temperature of the oil is 15-60℃ .Please clean the filter (1.02) to keep the suction unimpeded, otherwise it makes the pipe vibrate.

5. The machine tool adopts dispersed lubrication and referring to the Diagram of lubrication points to add oil.

6. Trouble shooting (Refer to “Troubles and Solutions”)

7. The customers should keep some extra frail parts off the machine tool in case of using while checking the machine tool.

8. No notice if any minor change and upgrade of the machine tool made.

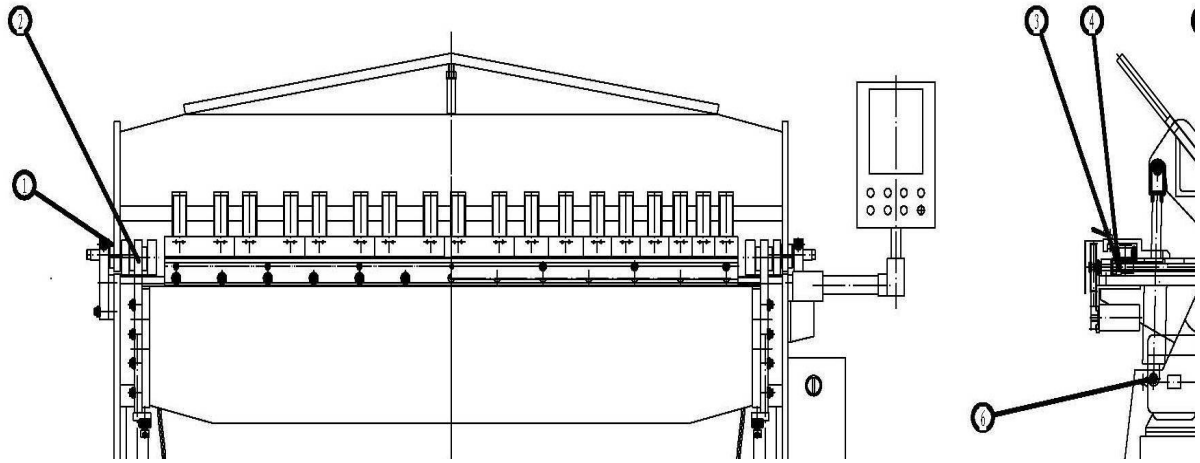


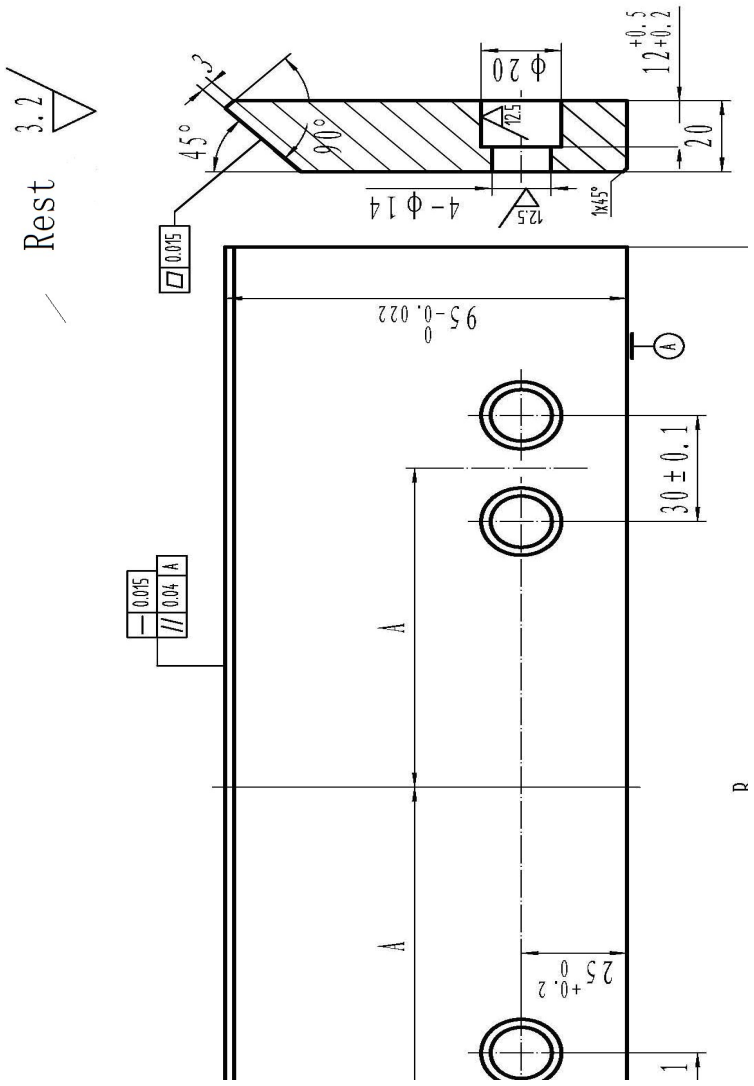
Figure 15: Diagram of lubrication points

NO	Lubricating Name	Lubricating Qty	Lubricating Points	Oil change time	Oil Kind
1	Axis of pressing beam	2	Left & right	24 hour	Calcium-base lubrication ester 3#
2	Axis of bending beam	2	Left & right	24 hour	Calcium-base lubrication ester 3#
3	Ball screw	2	Left & right	3month	Calcium-base lubrication ester 3#
4	Straight line slide-way	2	Left & right	3month	Calcium-base lubrication ester 3#
5	Axis adjusting base	2	Left & right	48 hour	Calcium-base lubrication ester 3#
6	Axis of pressing cylinder	4	Left & right Up & Low	24 hour	Calcium-base lubrication ester 3#
7	Axis of bending cylinder	4	Left & right Up & Low	24 hour	Calcium-base lubrication ester 3#

Figure 16: Lubrication interval table

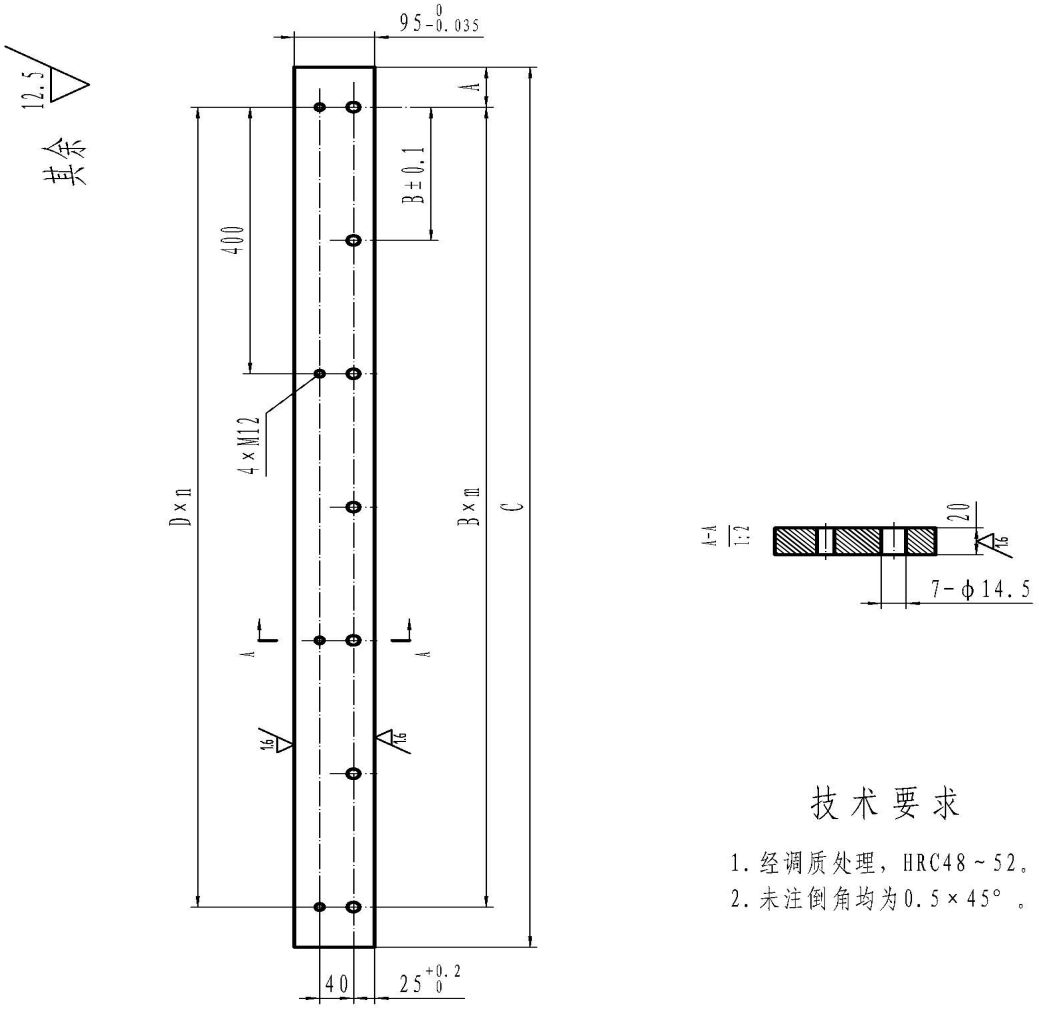
Troubles and Solutions

Trouble	Probable Cause	Solution
Oil pumps don't leave oil	1.Wrong revolving direction of oil pump 2.No oil in the oil tank	1.Exchange random two wires of the power source 2.Refuel to the median of liquid level meter1.01
Oil leakage from hydraulic parts, pipe connection and cylinder	Seals damage or aging, chucks broken	Change the seals or chucks
Pipeline and machine cause vibration, noise of the hydraulic system is big	No oil in the oil tank or filter1.02 jamming to make no oil go into the pipe	Refuel to the median of liquid level meter1.01 or cleaning the filter1.02
The oil duct can't establish pressure	The overflow valve2.01 is jamming or the Solenoid Valves deactivate	Dismantle and clean the core of the overflow valve 2.01,check plugs and wires of Solenoid Valve2.04 and 2.05
The pressing cylinder can't keep clamping	Double-direction hydraulic lock2.02 is jamming or internal seals are broken	Dismantle and clean the Double-direction hydraulic lock2.02 or change the seals
The display shows no clamping after the pressing cylinder clamps	The setting value of pressure relay3.01 is too large	Decrease the value properly



NO	Code Name		Weight	Qty					Remark
	B	A		1320	2000	2500	3200	4000	
1	305	75	4.16	4	5	5	5	10	
2	150	0	2.2	0	0	2	5	4	
3	125	0	1.71	0	3	3	5	2	
4	100	0	1.37	1	1	3	3	1	

Figure 17: The dates of clamping dies



Model	Code name						Qty	Weight
	A	B	C	D	m	n		
1320	60	200	1320	400	6	3	1	19.7
2000	40	240	2000	480	8	4	2	29.8
2500	50	200	2500	400	12	6	1	36.1
3200	100	200	1600	400	7	3	2	47.73
4000	40	240	2000	480	8	4	2	29.8

Figure 18: The dates of bending dies