

Model	HYDRAULIC ROLLING MACHINE	Total 30 pages
		Page 1

Catalogue

I . Major Introduction.....	1
II. Major specification	2
III. Structure	3
IV. Characteristics	4
V. Rolling Techniques.....	9
VI. Hydraulic instruction.....	14
VII. Lubrication system	19
VIII. Electric operation system	20
IX. Shifting	23
X. Installation	23
XI. Maintaining	24
XII. Electric diagram.....	24
Hydraulic diagram.....	24
Certification	25
Packing list	27

Model	HYDRAULIC ROLLING MACHINE	Total 30 pages
		Page 2

I . Major Introduction

W11s series of arc-low driven rolling machine combined with the advanced technology and market conditions. Rolling and pre-bending with higher precision can be shaped with only one operation, besides this, less investigation and no assistant equipments are required. It is widely used in petroleum chemical industry, boiler, shipbuilding, mental structure and engine manufacturing.

It is the hydraulic 3-roller rolling machine for rolling the mild plates into cylinders under normal temperatures.

Upper roller can move in vertical and in level.

Pre-bending can be achieved by adjusting upper roller in unsymmetrical position comparing with bottom rollers.

Rolling is made through bottoms rollers driven by major and speed-reducing motors.

Height of bottom rollers is fixed which is convenient for plate feeding. Operated by PLC programmable reader.

Hydraulic elements are all famous brands.

Reliable quality, reversed by hydraulic cylinder, upper roller movement is driven by hydraulic.

This machine is steady and flexible operation. No noise, jam, leakage and so on.

Working environments: temperature:-5~40° C; humidity≤80%; Power:380V±10% 50Hz。

Major Specification

Model	Unit	W11S-25*3000
Pressure	T	230
Max plate thickness	mm	3000
Roller working length	mm	3050
Max plate end yield	mm	20
Max plate thickness central	mm	25
Diameter of upper roller	mm	420
Diameter of bottom roller	mm	235
Central distance between bottom rollers	mm	380
Rolling speed	m/min	4
Pressing speed of upper roller	mm/min	120
No. of support roller		4
Groups of support rollers	group	1
Major motor power	KW	30
Hydraulic motor power	KW	11
Lifting motor power	KW	4

Model	HYDRAULIC ROLLING MACHINE	Total 30 pages
		Page 4

III. Structures

This machine is made up of upper roller part, bottom rollers, lifting elements, support rollers, main drive system, reversing equipments, balance equipments and so on.

3-1、 Upper roller part

This part contains upper roller, major oil cylinder, bearing seat and upper roller adjusting bearing and so on.

Drum like upper to meet the reflection of upper roller.

This part supplies the major press power.

Upper roller is after annealing and heat treatment for better quality.

3-2、 Bottom rollers and lifting element

The lower roller part includes: lower roller, bearing seat, input gear, sliding bearing and so on.

Bottom rollers supply the positive and negative power when rolling.

Bottom rollers are after annealing and heat treatment.

Flat displacement part is driven by the shift motor, through worm gear and pole box, worm gear and pole, leading screw and nuts to achieve the dissymmetrical rolling.

3-3、 Support rollers

Support roller part contains support roller, bearing pedestal, inclined wedge framework, etc.

Adjusting the bolts to make the strips close or separate, so it makes the support roller up or down.

Support rollers are made of No. 45 steel, annealing treatment, the hardness is lower than bottom rollers.

3-4、 Main drive system

This part contains major motor, speed-reducer, output gears and so on.

The system can roll both in positive and negative directions to supply the driving force of the whole machine.

3-5、 Reversing equipments

It's made of sliding pole, reversing oil cylinder. The reversing system is convenient for taking out the production alone the roller. When it works, it drives the reversing side works, reverse or reset. When it is reversed, the work piece can be taken

3-6、 Balance equipments

This equipment contains two pull-bars and balance pole.

When reversing, it presses the end of upper roller to keep it balanced.

3-7、 Frame

The whole frame is well welded and heat treatment.

3-8、 Bottom seat

The seat is well welded and treatment. For installing all kinds of parts

Model	HYDRAULIC ROLLING MACHINE	Total 30 pages
		Page 5

IV. Characteristics

4. 1. The machine adopts drum like upper roller and smaller bottom rollers, bottom rollers are supported by support rollers.

When rolling, adjust the height of support rollers according to conditions to improve the rolling precision.

4. 1-1 Adjustment when rolling thick plate (Diagram 1)

When rolling thick ones, support rollers rise to supply the anti-pressure to meet the reflections of bottom rollers to improve the precision of work pieces.

4. 1-2 Adjustment when rolling thin plate (Diagram 2)

When rolling thin ones, support rollers rise to supply the anti-pressure to meet the reflections of bottom rollers to improve the precision of work pieces.

4. 1-3 Shapes of work pieces (Diagram 3):

If the errors in the level directions are small, after proper adjustment, work piece with high precision is achieved. 4. 2 Backward rolling (plate feeding direction is opposite to direction of upper roller), upper roller presses when bottom rollers roll for continuous rolling. Cause press the end of plate directly, so the rest linear can be controlled.

4. 2-1 Backward rolling

Upper roller presses when bottom rollers roll (Diagram 4a), directly press on end of plate (Diagram 4b), so no vertical angle, it improves the precisions (Diagram 4c).

4. 2-2 Symmetrical rolling

Bottom rollers roll in both positive and negative to prebend the two ends (4d), then symmetrical rolling. (4e)

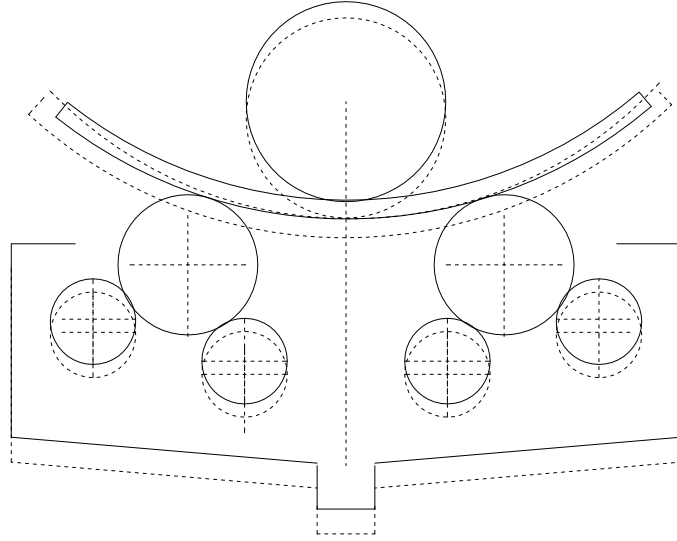


图1 卷制厚板时的调节-托辊上升

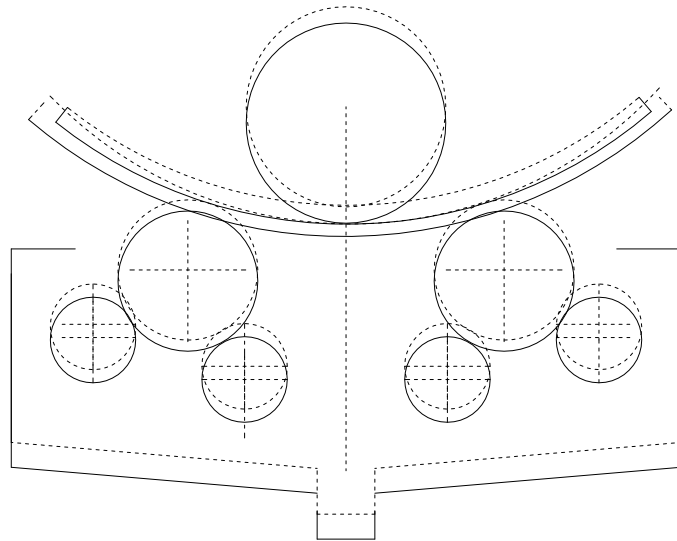


图2 卷制薄板时的调节-托辊下降

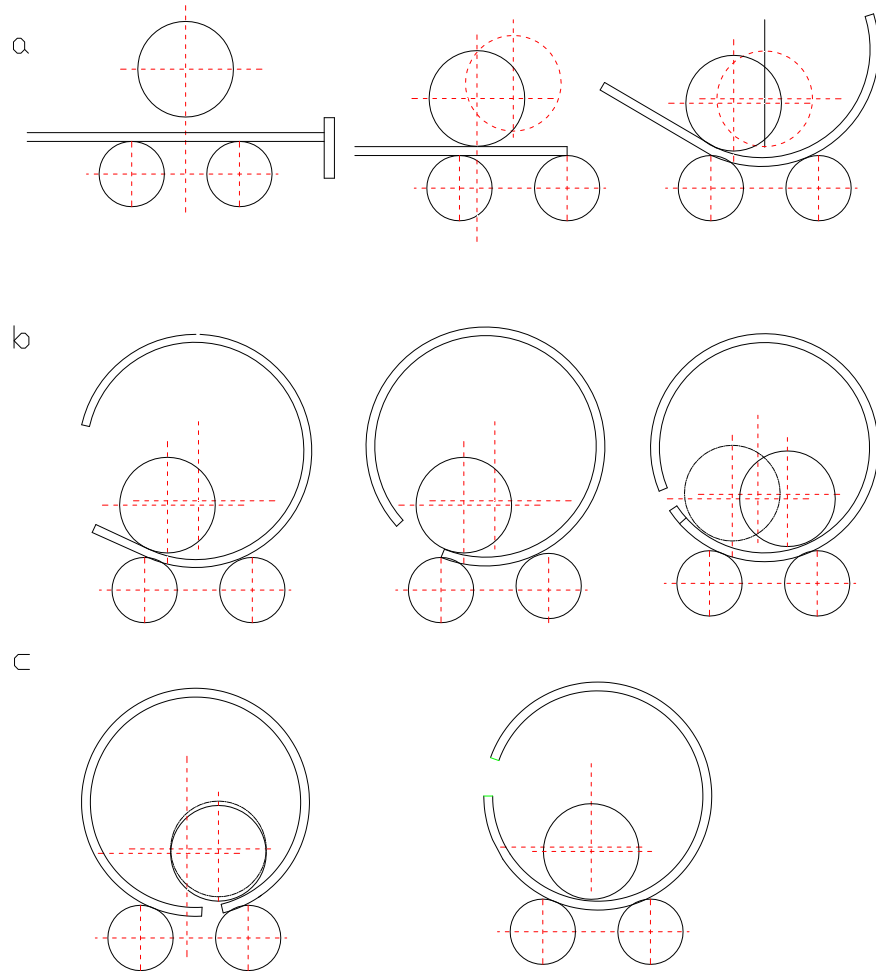


图4 对曲方式对制品精度的影响
后方弯曲

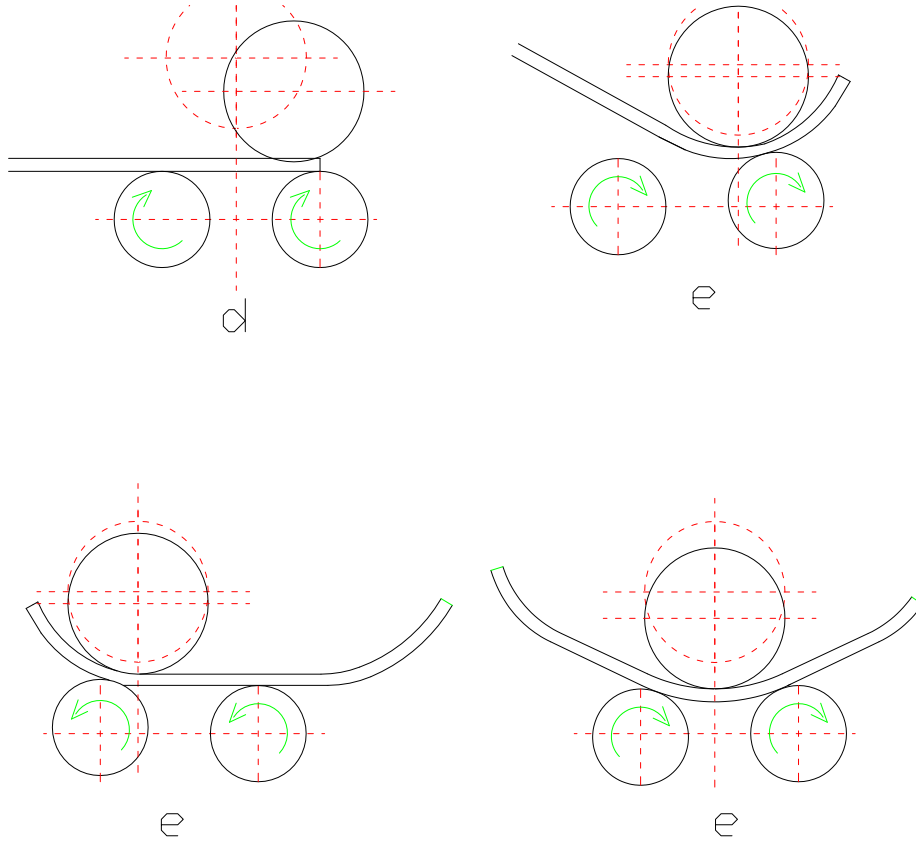


图4 对曲方式对制品精度的影响
(对称弯曲)

Model	HYDRAULIC ROLLING MACHINE	Total 30 pages
		Page 9

V. Rolling Techniques

1. plate feeding and regulate (5a)
2. upper roller move back X, decline to Y1 as 5b, then bottom roller roll in negative and make the plate in position.
3. bottom roller roll in positive and upper roller presses. (5c)
4. upper roller press to Y2 and stop, bottom roller keep rolling in positive.
5. bottom roller stops until to the end of plate, upper roller press to Y3 5e and stop. Regualte, then bend the end of the plate.
6. upper roller rise ot Y3 and move forward to X2 as 5f, bottom roller keep rolling in negative.
7. bottom roller keep rolling in negative and stop until the end, upper roller press to Y3 as 5g and stop. Press the end of plate directly.
8. upper roller move to the central, press Y4 as 5h, bottom roller works in both positive and negative.

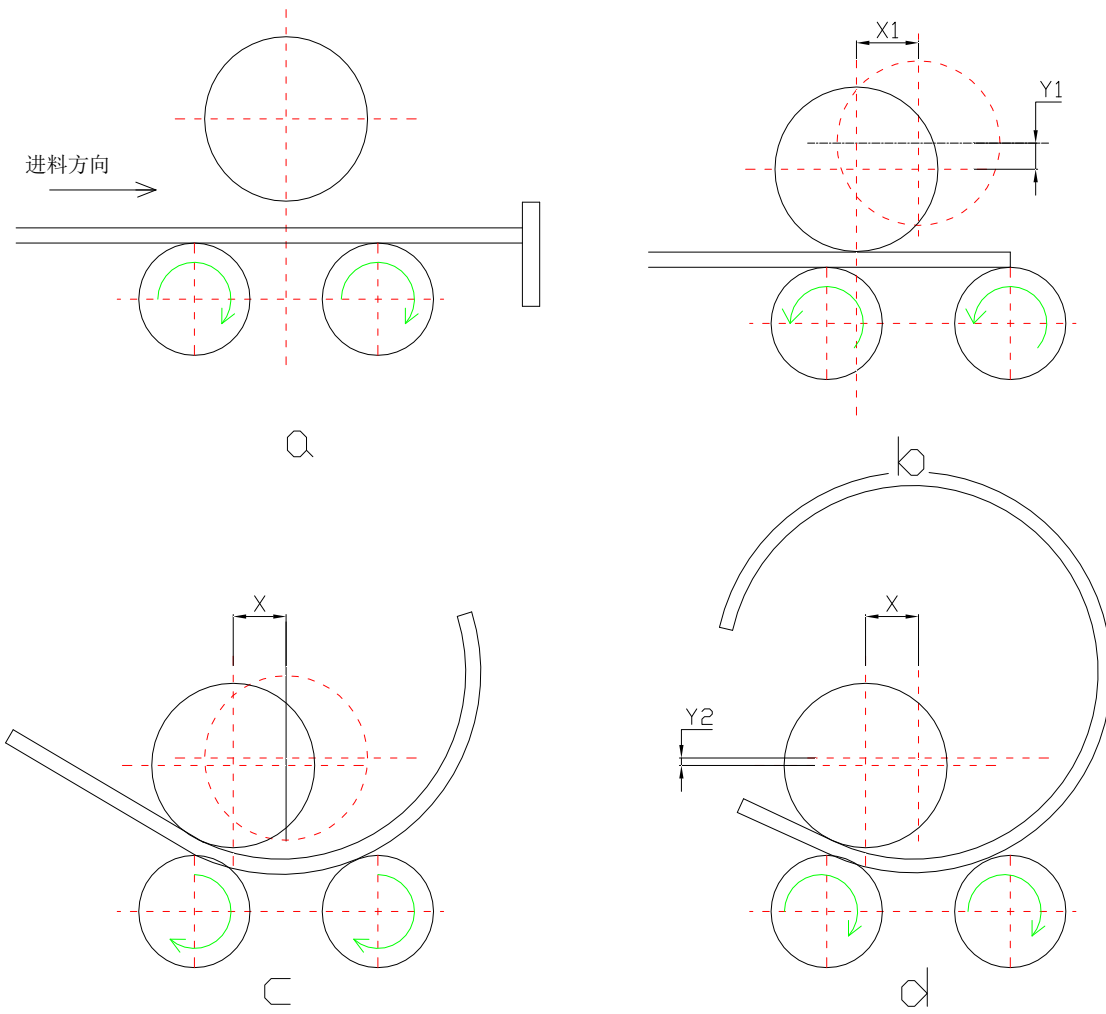


图5 卷制工艺

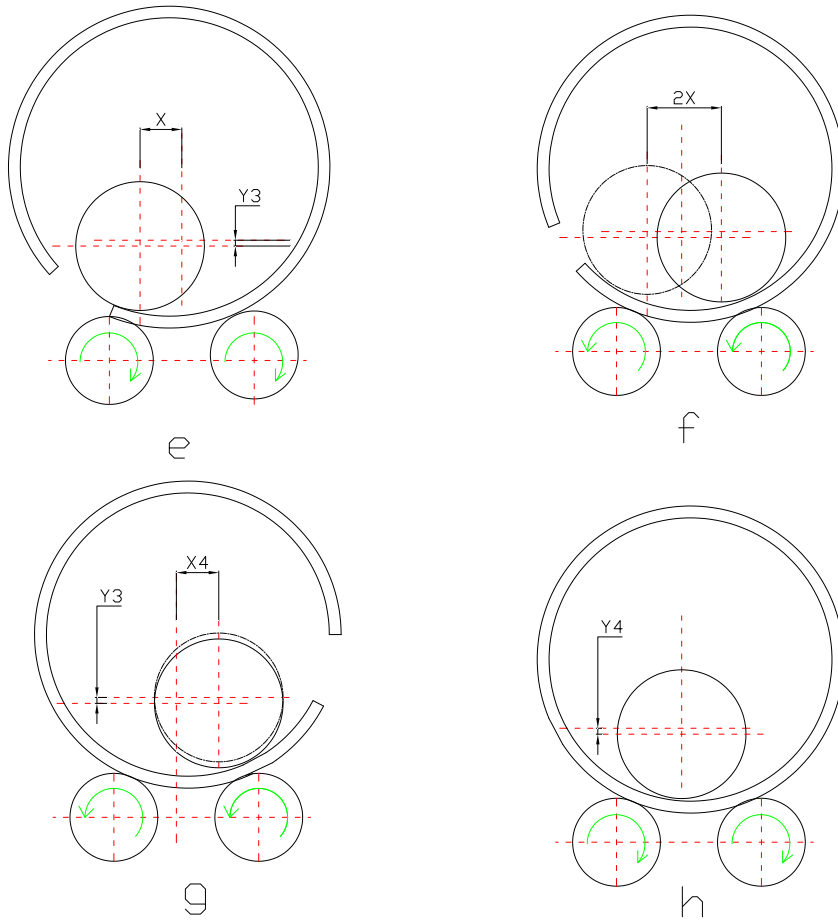


图5 卷制工艺

Model	HYDRAULIC ROLLING MACHINE	Total 30 pages
		Page 12

Skills:

When rolling cylinders as 5-1 shows, pre-bend the end at first, then symmetrical rolling.

1. bend on the end
 - ① raise the upper roller.
 - ② upper roller moves in the level direction to make the proper position for plate feeding.
 - ③ upper roller decline.
 - ④ start bottom roller, bend the rest linear of one side.
 - ⑤ same process on the other side.

2. symmetrical rolling

- ① make the roller in symmetrical position according to bottom roller and feed in the plate.
- ② start the oil cylinders and press, drive the bottom roller bend the plate.
- ③ press the upper roller step by step and roll repeatedly to finish the rolling.

3. outloading.

Move the upper roller in central and up limit, reversing side keeps still, now the balance equipment works.

Reversing frame reverses and outload.

Reversing frame reset.

When rolling arcs, pre-bending on the end is the first step.

- 1) 5-3, upper roller move to one side and press to the set height and pre-bend.
- 2) Start working roller and bend in the central.
- 3) Working roller rolls in the negative, make the right side of finished parts to the near right bottom roller position.
- 4) Upper roller raise and move to one side.
- 5) Upper roller decline to the set height, make the unfinished plate in the central to finish rolling.
- 6) last step, bend on the other side.

图5-1
端部预弯

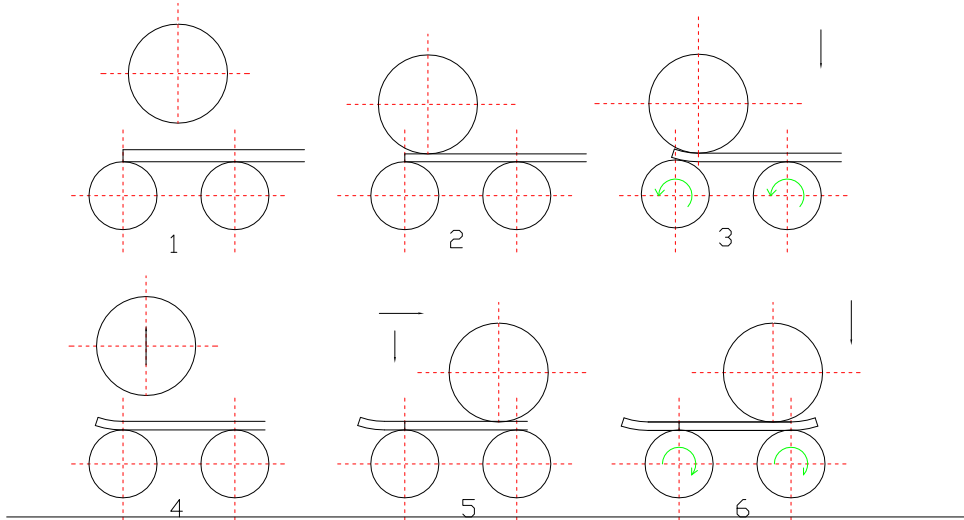


图5-2
对称弯曲

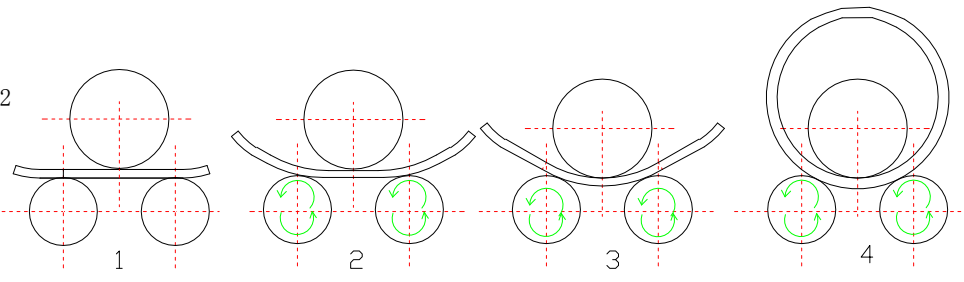
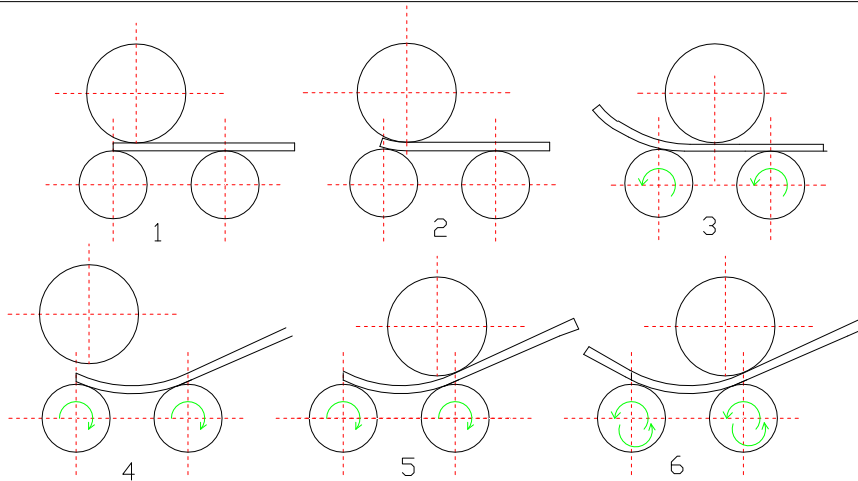


图5-3
圆弧工件弯曲



6. 1 hydraulic system

It is made up of gear pump, valve group, assistant pipes and so on.

Hydraulic valve adopts nestification valve, simply and convinient for operation.

The system contains 3 loops, press adjusting, sychronous, and speed.

Pressure adjusting works through the major overflow valve, system working pressure is 19.5 Mpa.

Sychronous works through dividing and throttle valve on upper roller working.

Light encode checking, precision of positioning checking of upper roller is $\pm 0.15\text{mm}$.

Speed operate on reversing frame working through the throttle valve.

6-2、maintaining.

7-2-1、 Daily checking

- 1)、unusual condition on the surface.
- 2)、oil in the oil tank.
- 3)、leakage in the pipe system.
- 4). leakage in oil pump, valve, oil tank and so on.
- 5)、working condition on operation bar, switch.
- 6)、refill the oil regularly.
- 7)、driving equipment.
- 8)、electric system maintaining.
- 9)、other condition checking.

The above terms are after system break.

6-2-2、 regular checking: 500-600 hours

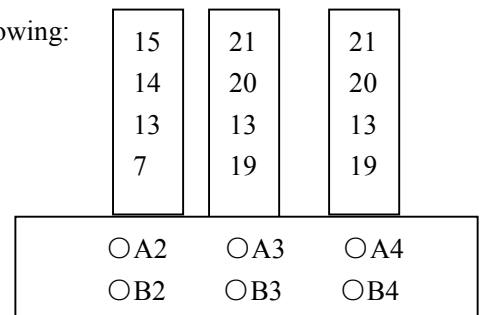
- 1)、daily checking.
- 2) hydraulic system checking.

5-2-3、 working oil changing.

In general, check the oil according to 2-1. Besides, oil should be changed every one year and also pls take the cover off and clean the filter and oil tank.

6-3、 Adjustment on hydraulic system

6-3-1、 the systm adopts the superposed valve seirse, each valve is fixed as the following:



7-3-2、 Adjustment on hydraulic pressure

A、 Adjustment on pressure of upper roller

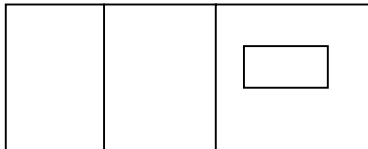
Press the upper roller down button on the portable to press on the bottom rollers. When upper roller stops, keep presing the button and adjust valve 7 to see the max readout is 19.5 Mpa, and adjust for 2-3 times, when finish, tighten the locking nut of it.

19.5MPa

b、 adjust on upper roller rising pressure.

Press the upper roller rising button on the portable, when it is in position and stops, keep on pressing it and adjust valve 19, the readout is 12 Mpa, adjust for 2-3 times, then tighten the nut.

12Mpa



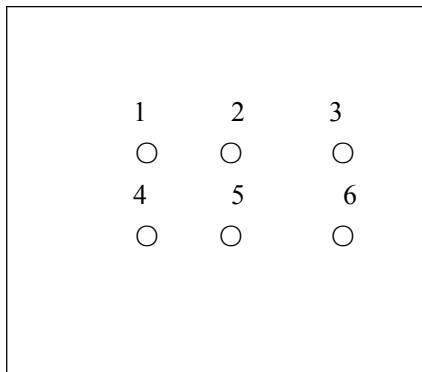
B、Speed adjust on reversing element.

When adjusting this part, the singal-direction throttle valve should be adjusted to make the movement steady and 30 seconds or so.

6-3-4、 Other hydraulic elements.

A、 pressure switch

When there is some pressure in the up of upper roller cylinder, a signal is given out by the pressureswitch, then upper roller stops moving in level. Open the cover of pressure switch to down upper roller, when pressure is 6.3 Mpa, adjust the double screw bolt to make signal out again.



- 1、 Reposition 19.5MPa
- 2、 Decline pressure 19.5MPa
- 3、 Decline pressure 19.5MPa
- 4、 Pressure in system
- 5、 Raising pressure 12MPa
- 6、 Raising pressure 12MPa

6-4、 Errors Checking

Errors	Reasons	Resolve
NO Oil Can Be Pumped Out	Low position in oil box	Do not make the oil level under the oil pointer, or fill in the oil
	Oil soaking pipe is suffocated	Clean the pipe and filter
	Some air in the oil soaking pipe	
	The pump works in wrong direction	Change the direction to the required
	Oil is too sticky	Find some proper oil
	Rolling speed is not enough Airs in oil	Meet the least required REV. Find out where air is mixed and repaired.
Working Pressure Is Not Enough	The set pressure is too low leakage in oil cylinder and valve	Reset the press gauge Check the relative independent elements. Plot different areas in the oil loop
	Hydraulic valve doesn't work	Check the electric loop and all the hydraulic valve.
	Troubles in oil pump	Take out the pump and fix it
	Leakage in hydraulic system	Check and fix it
	Airproof material of oil cylinder piston is shattered	Fix the oil cylinder and change a new airproof
	Dust in operating system	Clean it
	Indraft pipe and filter is blocked	Clean it

Errors	Reasons	Resolve
Noise Of Oil Pump Is Thundering	Air enters into the Inbreathe side	Put some grease in the conjunct part, screw down it if noise is lower
	Filter sieve is jammed	Clean the filter sieve
	Air enters from pumps	Lubricate the pump with grease, if noise is lower, change a new seal element
	Bolts of pumps and motors Become flexible	Screw down the bolts
	Connecting axis of pump and Motor are not in the same level	Check and fix it
	Flooding valve vibrates Oil is too sticky	Check whether some air or not And find some proper oil
	Air bubbles in oil	Check if there is some moisture in The reflex pipe
	Oil level is under the datum line	Fill in more oil until it is over the datum line
Oil cylinder Works slowly	Hermetical material of oil cylinder and pipes is shattered	Test run on single element and change a new seal part
	Not enough oil outflows Speed adjust valve is not in right position	Fix it according to the reasons why no oil pumped out
	Counterforce of the pipe connecting oil cylinder is over powerful	Change a bigger type of pipe or increase the system pressure
	Filter sieve jammed	Clean the filter sieve

Hydraulic station is made up of a motor and a gear pump. Gear pump is fixed inside to save the rooms and less noise.

VII. Hydraulic System

All the bearings in slippage are made of the new type oleic material.

Major points are as the following:

A. For the new machine, after 3 months of using, engine oil should be changed, then change for every half an year.

Gear speed reducer for major driving (46#)

Flat displacement worm gear and pole in upper roller. (46#)

B. Grease, oil filling on schedule

Worm and gear in bearing seat of bottom rollers.

Rolling bearings of upper rollers.

Rolling bearings of bottom rollers.

Exposed gear of major driving.

Rolling bearings of support rollers.

Raising bearing nut of support rollers.

C. Liquid lubricant filling parts, oil filling on schedule.

Track surface of fixing frame.

Top of piston bar of reversing cylinder.

Model	HYDRAULIC ROLLING MACHINE	Total 30 pages
		Page 20

VIII. Electric Operation System

8-1、 Electric Parameter

- Power supply
- Opeartion power
- Major motor
- Mobile motor
- Rotary encoder

8-2、 Electric Principle

Contactors are the center of electric controlling part with operating system and hydraulic executive system to operate the machine tool. Floating button box and operating platforms are the main operating keys.

The numerical display instrument is convenient for intuitionistic operation.

8-2-1、 Operations

A. Upper roller upward

Press the upward button, the middle relay KA1 starts to work, 3 pairs of contacting points will drive electromagnetic loops: YV2, YV4 and YV6 to raise the both sides of upper roller.

B. Upper roller down

Press the descend button, the middle relay KA2 works, 3 pairs of contacting points will drive electromagnetic loops YV1, YV3 to decline both sides of upper roller.

C. Fixing side falling

Press the side falling button, middle relay KA3 works. 3 pairs of contacting points will drive electromagnetic loop YV3 to decline the fixed side.

D. Reversing side falling

Press the reversing side falling button, middle relay KA4 works, a pair of contacting points will drive electromagnetic loop: YV1 descend alone.

E. Upper roller forwards

Press the forward button, contactor KM21 works. Floating motor M2 will drive the upper roller to move. The limit switch SQ2 controls the forward distance of upper roller.

F. Upper roller backwards

Press the backward button, contactor KM22 works. Floating motor M2 drive the upper roller to move, backward distance is controlled by limit switch SQ3.

Model	HYDRAULIC ROLLING MACHINE	Total 30 pages
		Page 21

G. Lower roller rolling forward

Press the rolling forward button, contactor KM11 works. The auxiliary normal open contacting point will drive time relay KT1 shuts, KM10 works. The lower roller rolls forward.

H. Lower roller rolling back

Press the rolling back button, contactor KM11 works, the auxiliary normal open contacting point will drive time relay KT1 to shut, KM10 and main motor M1 work. The lower roller will roll back.

I. Reverse frame reversing

The indicator lights of Upper roller up in position and middle position will lighten when it is in up and middle. Press the reversing button, middle relay KA6 starts working to drive the electromagnetic valve. The limit switch SQ5 will cut the reversing loop when the frame is in the lowest-point.

J. Reverse frame reset

Press the reset button, middle relay KA5 will drive electromagnetic valve YV2, YV4, YV6 to work. The frame is reset. When it is in the highest point, after checking limit switch SQ6, resetting loop will be cut in 3s delay time.

8-3、 Operation on the machine

Shut all the breakers in the electrical box and close the door. Shut the breaker in the right side to supply the power. Press the operation control button, indicator of power control lightens.

Do check every lubricative part before boot-strap to make sure they are fully lubricated.

Normal condition of reversing frame is resetting and the indicator lightens. Now, start the oil pump motor, get ready for upper roller and reversing frame. Rolling is operated through working platform or button box. Make sure the switch is shut when not using.

When power supplies, numerical display instrument reads: HS. Press any origin and reset. Data of last power off will be shown. **(Notice: twice resets will clear up the number)**

Model	HYDRAULIC ROLLING MACHINE	Total 30 pages
		Page 22

- Upper roller ascend -----two sides ascend together
- Upper roller descend -----two sides descend together
- Reversing side down-----reversing side decline alone
- Fixing side down -----fixing side decline alone
- Upper roller forwards-----the frame moves forward
- Upper roller backwards-----the frame moves back
- Lower roller rolls forward-----the frame moves forward
- Lower roller rolls back-----the frame rolls back

When rolling is finished, upper roller raised to the highest position, the origin, the origin, the indicator light of “Upper roller up and center” lightens. Press the “Reversing Frame Reset” to reset it fully, the light lightens. When all the working procedures are finished, descend the upper roller until it reaches the lower rollers and stop the oil pump. Press the “Stop” button and shut the breaker off.

Notes: Welding is carried out on the machine after rolling. Do connect the ground wire of welding motor with the work piece. Taking the rolling machine as transitional ground wire is forbidden. Or displacement checkup and numerical display instrument will be shattered.

Model	HYDRAULIC ROLLING MACHINE	Total 30 pages
		Page 23

IX. Lifting and Safe Keeping

9-1、Lifting

9-1-1、Unbalanced lifting is not allowed.

9-1-2、When lifting, working pieces are not allowed to be collided.

9-1-3、When delivering, machine must be fixed well and rainproof should be taken.

9-2、Safe Keeping

Descend the upper roller until it touches the lower ones, cut the power supply, clean the machine and take measures of moistureproof, anticorrosive and dustproof measures when machine will not be used for a long time.

X. Installation

10-1、Examination before installing

Check the amount of all the components according to the packing list. Confirm the installing position after the assembling drawing. Check the condition of groundwork referring to the foundation drawing.

10-2、Installing

The machine should be installed in the solid foundation according to the foundation drawing. Adjust the level, screw down the foundation bolts. Finish the connection of electric controlling part and pipeline of hydraulic part.

10-3、Examinations on installations

When installations are done, examinations on all the joints, working parts and electrical operation parts should be carried out to find the working conditions. Besides this, tie-ins of hydraulic pipeline and lubricative points should also be checked to get ready for test work.

XI. Daily Examination

	Items	Checking Period					
		Every day	Every Week	Every Month	Half a Year	Others	
The machine body	Clearance of lower roller gearings			☆			
	Clearances of frame sliders			☆			
	Standing balance condition of upper roller		☆				
	Degree of tightness of bolts and noise of oil pump		☆	☆☆			
	Leakage and Pressurizing part in oil cylinder			☆	☆		
	Degree of tightness of fixing bolts		☆				
	Hydraulic System	Hydraulic oil			☆		
		Hydraulic oil worsen				☆	
		Temperature of oil	☆				
		Scathe of hydraulic vitta				☆	
	Scathe of hydraulic tube			☆			
Lubricative System	Oil containing	☆					
	Degree of tightness and cast of pipe connecting points			☆			
	Scathe of tube and vitta			☆☆			
Electric System	Indicator lights and limit switch	☆☆					
	All the connecting points			☆			
	Insulating resistance of wires and emergency button			☆			

Model	HYDRAULIC ROLLING MACHINE	Total 30 pages
		Page 25

W11s Series Universal Rolling Machine

QUALITY CERTIFICATION

Date:

Model	HYDRAULIC ROLLING MACHINE	Total 30 pages
		Page 26

Types:W11S-25*3000

Names:

Delivery No:

Manufacturer:

This machine is proved excellent through examination and is qualified for delivering.

Inspector:

Head of Inspector

Department:

Date:

Model	HYDRAULIC ROLLING MACHINE	Total 30 pages
		Page 27

W11s Series Universal Rolling Machine

Packing List

Date:

Model	HYDRAULIC ROLLING MACHINE	Total 30 pages
		Page 28

Types: W11S-25*3000

Delivery No.: _____

Serial Number	Name	Specification	Quantity
1	Mainframe		1
2	Operation Manual		1
3	Quality Certification		1
4	Packing List		1
5	Hydraulic Element		1
6	Wiring Box		1
7	Oil Gun		1
8	Bayonet Gun		1

Packing Inspector:

Date:

W11S THREE-ROLLER PLATE ROLLING MACHINE

OPERATION MANUAL

Coiling thickness: 25MM

Coiling width: 3000MM

Series NO. : _____