W24S-16 PROFILE BENDING MACHINE

Operation Manual

Contents

1. Main purpose and scope of application

This machine is a hydraulic three-roll profile bending machine. It is a kind of equipment dedicated to the bending and forming of specific profiles. It can roll round, spiral and other workpieces. It is widely used in petroleum, chemical, shipbuilding, hydropower, metal structures and machinery. Manufacturing and other industries.

2. Main technical parameters

Model / Technical Parameters		W24S-16
Maximum bending section modulus of profile cm3		16
Bending speed m/min		About 4m/min
Profile yield limit MPa		245
Hydraulic system working pressure MPa		20
Motor Power KW		4
Motor Power	Maximum section size mm	Minimum bending diameter mm
Angle steel outside bend	L70*8	1000
Angle steel inside bend	L80*8	1000
Channel Steel Outward Bending	⌈12	800
Channel steel inside bending	⌈12	900
Round tube bending	Φ76*4.5	800
Round steel bending	Φ52	800
Square tube bending	□60*4	900
Flat steel bending	75*10	1000
Flat steel vertical bending	75*10	1000
Diameter of main roll mm	----	

Side roller diameter mm		
Oil pump motor	Model number	Y112M-4 B35
	Work rate	4Kw
	Rotating speed	1420 m/min

3. Overview of the main structure of the product

The structure of this machine is shown in Figure 1, which is mainly composed of bed part, side roller part, idler part, mould part, transmission part, electrical system and hydraulic system.

The bed part adopts a steel plate welding structure, and the left and right rotating arms are installed in the cavity of the bed. Two side roller cylinders realize that the side rollers can move in an arc around the central axis along the arc groove on the bed. The supporting roller is installed on the left and right rotating arms. It can move in an arc with the side rollers. At the same time, it can rotate and lift around the rotating arm within a specified angle through the roller rotating cylinder and the supporting roller lifting cylinder. The lift is equipped with a digital display device for easy operation.

All movements of the machine are driven by the hydraulic system, and the electric control system is centrally controlled. All movements are realized by operating the buttons on the electric console. The up and down strokes of the rollers on both sides are sensed and detected by high-precision photoelectric encoders and displayed on the console through a digital display device.

Special reminder: During the rolling process, the rotation movement of the three-axis roller and the lifting movement of the upper roller cannot be carried out at the same time to avoid failure; in principle, the upper roller can move up and down after the mold is installed on the three-axis roller.

4. Mechanical transmission system

The lower two-roller mold of this machine is the driving roller, which is directly driven by the main motor acceleration and deceleration machine, and is transmitted to the two side rollers through gear transmission. The upper roller is driven by the oil cylinder to move up and down, and passively rotates after touching the rolled workpiece. At the same time, the workpiece is pressed to make it become, thereby completing the bending.

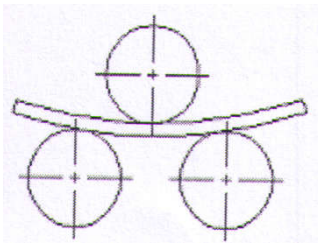
5. The function, working process and scope of the machine

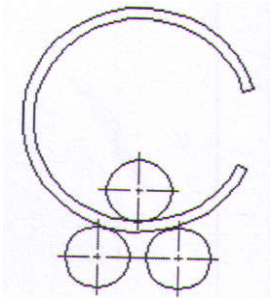
5.1 The function of the machine

The machine can pre-bend the end of the profile, and by adjusting the idler roller, it can correct the distortion of the asymmetric profile during the rolling process.

5.2 Work process

The profile can be pre-bent on this machine, and the bending process is as shown in the figure below.





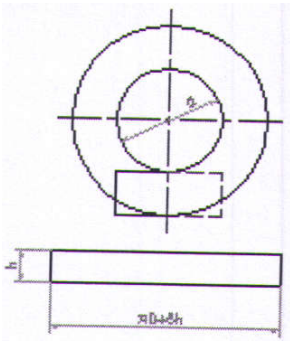
a. The upper roller descends to contact the workpiece on the left and right rollers, clamps it, and moves left and right to select the work roller to make the workpiece move left and right, and ensure that the workpiece does not jam.
b. The upper roller descends to press the workpiece to bend (the amount of descending is determined by the size of the workpiece, not too large), move left and right to select the work roller to move the workpiece left and right to complete the first bending. Repeat several times until the required rolling requirements are completed.
Special reminder: The bending process provided above is for users' reference. Due to the inconsistency of the actual parameters of various profiles, (even if the profile of the same specification has different performance parameters, the performance parameters are different). Users should explore the bending system based on field experience.

5.3 The scope of work

This machine is a special type bending machine. The profile parameters specified in the basic parameter table refer to the maximum working capacity of the machine under reasonable use conditions. For other profile rolling, the bending section modulus must be less than 16 cm^3 , and the upper and lower rolls are equipped with molds to meet the line speed designed by this machine before they can be bent on this machine.

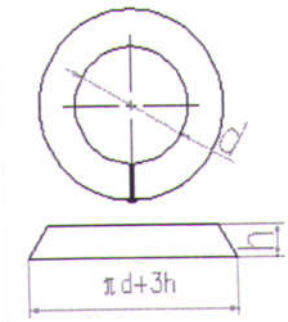
5.4 Rolling method

There are three rolling methods, as shown in the figure below.



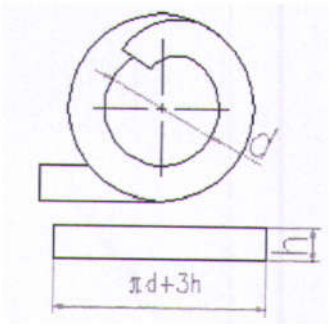
Rolling method 1

It is suitable for heavy workpieces, cutting the remaining straight edges after being bent into a circle or when rolled to a certain arc.



Rolling method 2

It is suitable for medium and small profile or single-piece rolling. The corners must be cut before rolling, and the end bends are asymmetrical.



Rolling method 3

It is suitable for various profiles, and the bending diameter is larger than that of a single bending workpiece.

6. Electrical system

The power circuit of the electrical system of the machine uses three-phase 380V, 50HZ AC power supply. The control circuit converts 380V to 220V, 110V power supply through a control transformer, and centralizes the control of the machine functions through the console. For details, see the electrical system instructions.

7. Hydraulic system

The upper roller of this machine is driven up and down by hydraulic drive, please refer to the operating instructions of hydraulic system for details.

8. Commissioning and installation of the machine

8.1 Machine installation

After the machine has passed the inspection by the quality inspection department, the whole machine is packaged and shipped. When opening the box, the user should first check whether the actual product matches the packing list quantity and whether the technical information is complete.

The machine is installed horizontally (or can be installed vertically according to user needs). Generally, the machine can be used when it is placed on the ground or fixed on site with expansion bolts.

8.2 Machine debugging

8.2.1 Preparation before test run

Safety Tips: Operators must be familiar with the structure and performance of the machine and operating procedures before they can operate.

Check all the connecting parts, whether the fastening is reliable.

Check whether the lubrication points are adequately supplied with good lubrication, and whether the oil level in the oil tank of the pump station is below the specified line.

8.2.2 No-load test run

Safety Tips: Please make sure that there are no persons unrelated to the operation around the machine, and no persons around the bending arm. After the inspection is normal, an operator who is familiar with the performance of the machine can carry out a test run.

The test run process is as follows:

The dry running test of the main drive and the lifting drive is carried out alternately in an intermittent manner. Every 15 minutes is a cycle. In each cycle, the operation time ratio of the single stroke of the main drive and the lifting movement is 2:1.

In a single main drive operation, the main roll mold should be in contact with the side roll mold to make it suitable to rotate, and each of the forward and reverse takes

half the time.

During a single auxiliary transmission time, the lifting is repeated.

8.2.3 Commissioning requirements

1. The upper roller should rise and fall smoothly.
2. The lower roller is running normally and in reverse.
3. All transmission parts should be light, stable and free of abnormal noise.
4. All fastening couplings are not allowed to loosen, and the whole machine is well lubricated.

8.2.4 Load test

After the no-load test is normal, the load test can be carried out. The general procedure is as follows:

Cut the material according to the relevant profile parameters specified in the basic parameter table, and pre-bend the end of the profile after processing.

According to the proficiency of the operation, it is rolled into a circular workpiece with a specified diameter in several passes.

8.2.5 Load test requirements:

The load test should meet the relevant performance regulations in the basic parameters.

During load and load operation, the transmission system should be stable, without impact and abnormal noise. The working system and operating system should be flexible, accurate and reliable, the rollers should not swing, and the temperature of each bearing should not exceed the above regulations.

During the rolling process, there must be no slippage between the mold and the profile.

9、Use and operation

9.1 Preparation and inspection before use

Before use, please read this manual to understand the machine’s performance and operating methods, strictly abide by the safety operation system, and make preparations in accordance with the requirements of 8.2.1, then remove the scale of the rolled profile and polish the edges at the same time Shovel the weld seam.

Safety tips: non-professional operators are not allowed to operate.

9.2 Safety and protection

When using this machine, please pay great attention to the following safety

precautions.
It is strictly forbidden to overload the machine.
During use, if there is irregular noise, impact or swing, stop and check immediately.
During use, check the transmission mechanism and connecting parts frequently to keep them free of looseness and damage.

9.3 Operation method

①According to the profile dimensions, lower the rollers on both sides to a certain height.
② Feed the profile to be processed between the upper roller and the two rollers.
③Round round according to the process of 5.2 until it meets the requirements.
④After the main drive stops, lower the side roller before taking out the workpiece.

9.4 Profile rolling

9.4.1 Coiling of flat steel, see attached picture 3

The flat steel is a symmetrical profile, and the pre-bending adopts asymmetrical bending.
During the rolling process, a certain degree of distortion is unavoidable. If the rolling capacity permits, the distortion can be reduced if it is rolled once or less.
When rolling, please follow the basic parameter table Table 1
During the rolling process, the sprocket friction clutch should be adjusted in a loose state. The flat steel is bent asymmetrically, and the side roller is slowly raised, otherwise the material will be distorted.

9.4.2 The coiling of the angle steel outer bend is shown in Figure 4

The angle steel is an asymmetric profile, and it is often twisted and deformed during the rolling process. Therefore, it is necessary for the roller to give the angle steel an anti-deformation external force during the rolling process to correct it and reduce the deformation.
The roller must be adjusted slowly to prevent the angle steel from being twisted outward. Pre-bending adopts asymmetrical type, and rolling adopts symmetrical type.
The sprocket friction clutch should be loosened.

9.5 Friction clutch adjustment

As shown in Figure 5, the friction clutch can be adjusted by opening the rear cover of the machine, and the power transmission can be adjusted by tightening and loosening the adjustment screw.
The friction clutch is set to low power transmission state at the factory.

9.6 Reasonable lubrication of the machine

It is an effective measure to reduce power consumption and increase the life of the machine. For this reason, reasonable lubricating materials must be selected and the necessary lubrication system must be established.

9.6.1 Lubrication method

This machine uses oil cup lubrication and manual lubrication according to working conditions.
The machine is equipped with oil cups, should be refueled once every shift; gear teeth and parts, chain transmission parts, side roller rotating contact parts, should be manually refueled once a week; bearing parts should be refueled once every six months; hydraulic oil in the tank is the first It should be replaced once every six months after use; thereafter it should be replaced once a year.

9.6.2 Lubricant selection

The artificial lubrication place uses calcium-based grease; the oil cup lubrication point uses 2# calcium-based grease in summer and 1# calcium-based grease in winter.

9.6.3 Lubrication system and matters needing attention

The user establishes a specific lubrication system according to the specific work items, load and operation of the machine.
① The lubrication point must be supplied with sufficient oil before the machine starts.
②When the machine is working continuously, the frequency of lubrication should be increased.
③The entire lubrication system of the machine is cleaned once a year.

10. Maintenance

Correct use and reasonable maintenance can not only extend the service life of the machine, but also reduce repair costs. The maintenance of the aircraft and the work of the security guard mainly include the following points:
10.1 The machine must operate under the condition of normal operation and good lubrication, so the lubrication system should be strictly implemented. Safety Tips: Be sure to add enough lubricating oil and hydraulic oil in the hydraulic system tank to avoid damage to the machine.
10.2 When the profile is rolled, the oxide scale between the profile and the mold should be removed in time.
10.3 Timely replace the wearing parts with excessive wear and the parts that have

lost the original performance requirements.
10.4 Regularly check and repair the electrical system to remove dust, and replace failed components in time.
10.5 During the operation of the machine, it should be noted that the temperature of each moving part does not exceed the specified limit.

11. Common faults and troubleshooting methods

Please refer to the related introduction of the table for common faults and troubleshooting methods of this machine

No.	Fault type	Cause Analysis	Method of exclusion
1	The machine is not working properly	Bad button contact	Replace button and contactor Adjust the supply voltage
2	The system produces severe noise	Clogged suction filter	Clean or replace
		The oil viscosity is too high or the oil temperature is low	Use hydraulic oil or heating oil of recommended viscosity
		Oil level too low	Refuel to the required position
		Mechanical vibration	Tighten the pipe clamp or align the oil pump---motor center shaft
		Oil pump is damaged	Repair or replace
3	Insufficient pressure or no pressure at all	The oil pump rotates in the wrong direction	Rewiring and correct the direction of rotation of the oil pump
		Oil pump is damaged	Repair or replace
		The viscosity of the oil is too low	Use hydraulic oil of recommended viscosity
		Overflow valve malfunction	Clean or replace
4	Control valve malfunction	Damaged reversing valve	Clean or replace
		Poor electrical contact	Check or tighten electrical plug for solenoid valve
5	The system does not hold pressure	Hydraulic control check valve malfunction	Clean or replace

Certificate of conformity

Product model number: W24S-16

Product name: Curved downward profile bending machine

Product factory number:

Production unit:

The product has passed the inspection and is allowed to leave the factory.

Inspectors：

Packing List

Serial number:

Contract No:

W24S - 16 Profile Bending Machine

No.	Name	Specifications	Qty.	Remark
1	Host part		1	
2	Hydraulic part		1	
3	Electric control cabinet		1	
4	Instruction manual		1	
5	Hydraulic manual		1	
6	Electrical manual		1	
7	Certificate of Compliance		1	
8	Packing List		1	