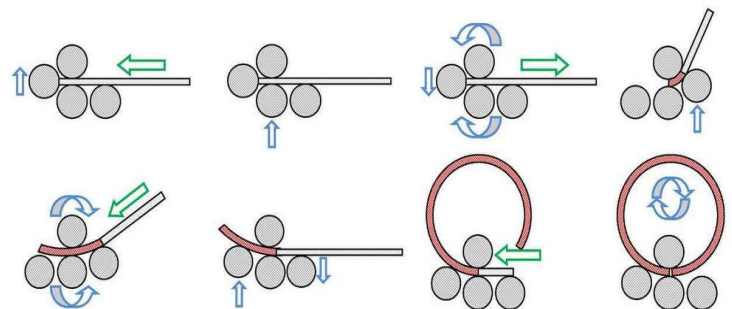


PLATE ROLLING MACHINE (FOUR ROLLER)

MODEL : W12-16 x 3100

4 Roll Bending



MACHINE DESCRIPTION:

The equipment has the pre-bending function of the plate end and the CNC rolling function. It can feed the metal plate at a time, and can complete the pre-bending and the roll forming of the work piece without turning the head.

The upper working roll of the machine is the main drive roll, and the lower roll and both sides of the roll are hydraulically driven. The lift displacement is controlled by the computer and is automatically leveled. The screen display shows the synchronization accuracy of $\pm 0.1\text{mm}$. The tilting and resetting of the rollover bearing body is hydraulic transmission, the balance of the upper roll is equipped with a balance mechanism, which out the rolled work piece. It has a mobile stand-alone console that can be moved at any time; the machine is equipped with a safety interlocking device and is safe.

Due to its full-featured, high-precision, and easy-to-use operation, this device is the ideal contemporary CNC coiling device. It is the ideal model for rolling circular and arc-shaped work pieces in energy, transportation, petroleum, chemical, boiler, shipbuilding, hydropower, and metal structure industries.

TECHNICAL PARAMETER:

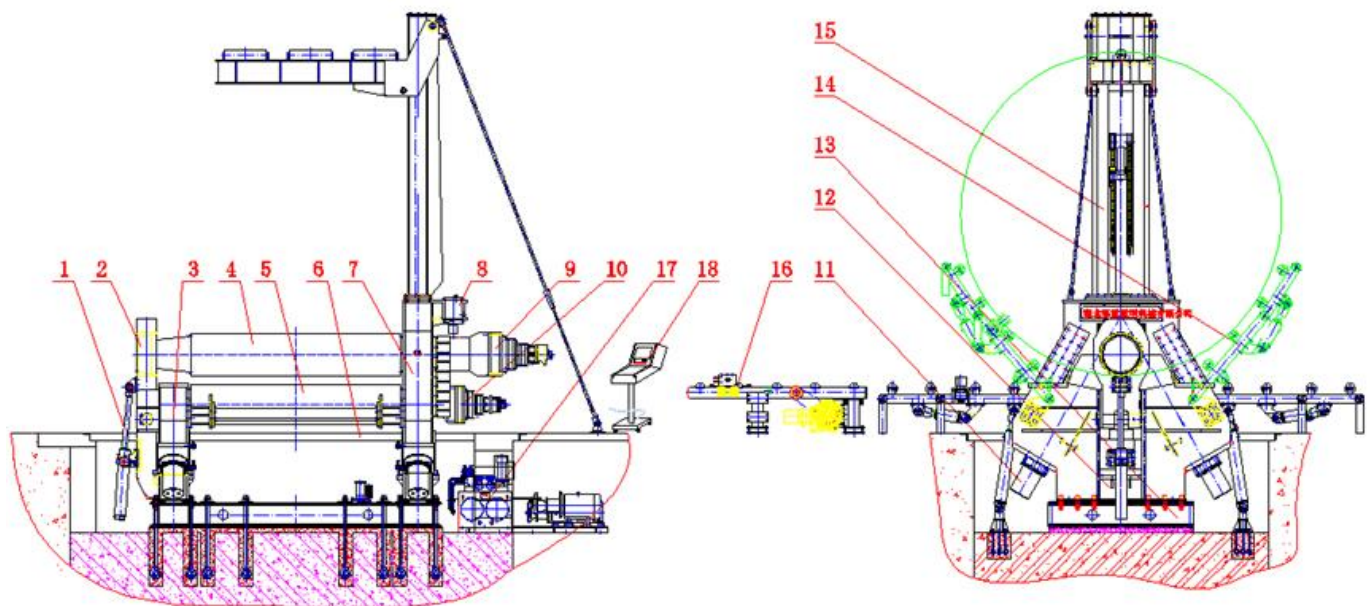
| | |
|--|--|
| Four-Roller Plate Rolling Machine | |
| Model No | W12-16×3100 |
| Max width | 3100mm |
| The length of working roller | 3200mm |
| Max thickness (central) | T16*B3100*φmin800 (σs≤245Mpa) mm |
| max thickness (end) | T12*B3100*φmin800 (σs≤245MPa) |
| Top roller diameter | Φ390 mm |
| Lower roller diameter | Φ360 mm |
| Side roller diameter | Φ300 mm |
| Rolling speed | About 3.5 m/min |
| Main motor power | 18.5 kW |
| Max working pressure of hydraulic system | 19.5 MPa |
| Source of power | : Hydraulic |
| Driving model of roll | : Hydraulic motor and planetary gearbox |
| Voltage and frequency | : 380V, 3 phase, 50Hz(can be customized) |
| Control system (CNC control) | : Compatible with CNC automatic and manual control |

Our company's control system is equipped with an automatic rolling program, which can realize one-button operation. It can automatically roll and roll once at a time. It also has data number, storage and recalls functions, and can store hundreds of data. Various specifications of automated rolling. The system is compatible with manual operation programs and can be manually operated when needed.

| | |
|------------------|----------------|
| Brand New | : China |
|------------------|----------------|

Remarks:

1. Length of remain straight edge≤1.5 times of plate thickness.
2. Bending precision, roundness, linearity, ends surface error all less than 2mm/m.



| | |
|-----------------------------|---|
| 1) Drop end cylinder | 10) Lower roll driven device (optional) |
| 2) Drop end | 11) Side roll cylinder |
| 3) Left frame | 12) Lower roll cylinder |
| 4) Upper roll | 13) Bottom frame |
| 5) Side roll | 14) Side support system (optional) |
| 6) Lower roll | 15) Top support system (optional) |
| 7) Right frame | 16) Electric feeding electric roll (optional) |
| 8) Balancing system | 17) Hydraulic system |
| 9) Upper roll driven device | 18) Electronic control system |

1) THE WORKING ROLL

One of the most important components of the rolling machine, its quality and performance has a direct impact on the service life of the rolling machine and the precision of rolling.

(1.1) MATERIAL OF WORKING ROLL

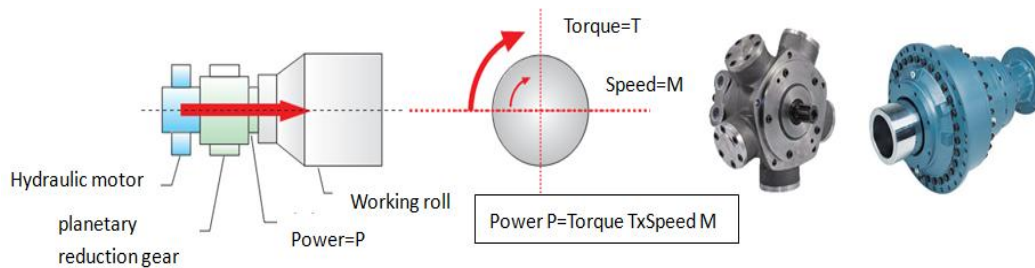
Working rolls are made of high-strength high-quality steel 42CrMo material, after forging, roughing, quenching and tempering, HB240 ~ 300, finishing after the intermediate frequency quenching HRC47-58, according to JB/ZG4289-86 roll steel standards, the stiffness is consistent (1/700 ~ 1/1000) L. L-----The distance between the centerlines of the sides rack. And strictly in accordance with the working process of manufacturing all the standard rolls manufacturing, to ensure its comprehensive mechanical properties.

(1.2) WORKING ROLL ROTATION

Working roll rotation: Hydraulic Motor \Rightarrow Planetary Gearbox \Rightarrow Working roll



The upper roll is a driving roll of four roll rolling machine (as shown below). The independent hydraulic motor on the upper roll and the high-power box are directly coupled (straight), not through the intermediate gear transmission, which is the most energy-saving drive method. The hydraulic motor is equipped with an immediate brake to allow the roll to stop accurately in the pre-bending state.



(1.3) WORKING ROLL MOVEMENT

According to the movement method of the working roll (side roller) of the rolling machine, the linear slide technology is adopted. The oil cylinder adopts an inverted oil cylinder, which greatly increases the contact area between the slider and the slide rail, and improves the stability and the rolling precision of the machine tool.

2) BEARING AT BOTH ENDS OF THE WORKING ROLL



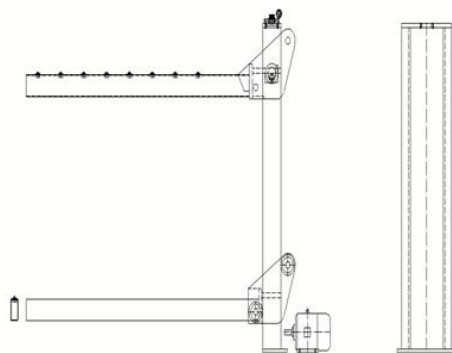
The four-roll rolling machine adopts very durable double-row self-aligning roller bearings recommended by the industry for each roller.

3) RACK AND BASE

The base and frame are the main parts of the equipment. Our company selects high quality steel, uses CNC cutting, grinding and welding, and then sends the welded structural parts to the professional heat treatment factory for stress relief annealing-CNC lathe machining, eliminating welding stress, so that it has enough strength and stiffness, to ensure normal operation at full load. All records of the work piece are included in the quality tracking system.

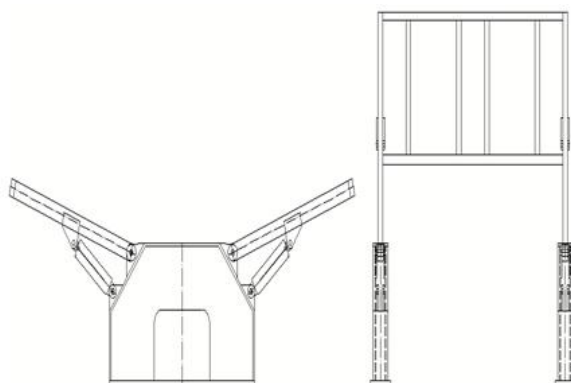
(3.1) TOP SUPPORT SYSTEM (OPTIONAL)

The inner rack is the top bracket and is mounted on the rear fuselage. It consists of a movable stand. The bracket can be translated from the upper part to the lower part according to the size of the barrel, and supports the barrel during the rolling stage. The center stand can be hydraulically and electrically controlled.



(3.2) LEFT AND RIGHT SUPPORT SYSTEM (SIDE SUPPORT SYSTEM)

Both sides of the hydraulic support or outside support frame: for large-diameter work piece on both sides of the holding, to prevent the steel plate rolling process due to weight caused by poor rolling accuracy is not good. Then hydraulic support has multiple rows of rolls to better hold the piece. Hydraulic support can be used for raceway when it is flat.



(3.3) ELECTRIC FEEDING PLATFORM: (OPTIONAL)

It is composed of roll, motor, reducer, hydraulic cylinder, etc. It is used for holding and feeding steel plate to be rolled. Ship and adjust the steel plate to the rolling machine for processing.

(3.4) CONE BENDING ATTACHMENT (OPTIONAL)

The cone bending attachment is based on the principle of relative motion. The work piece and the lower roll or side roll is regarded as stationary, the upper roll is pressed down, and the roll is pressed down and tilted when the cone is reeled. The greater the amount of reduction, the greater the contact area between the work piece and the upper roll and the curvature around it becomes larger. The work piece is rotated by the rotary motion of the work roll, and at the same time, the amount of reduction of the upper roll is constant, and each of the busbars of the work piece has the same curvature. Or curvature distribution, become a cone.

4) HYDRAULIC SYSTEM

Each oil circuit is routed with two relief valve to control pressures. The maximum set pressure for each oil circuit is 25 MPa, which is mainly to control the main cylinder pressure, and the other relief valve is set to 16 MPa, mainly to control the overturning cylinder and balancing cylinder pressure.

In order to ensure the synchronization accuracy of the main oil cylinders at both ends of each moving working roll, high-precision displacement sensors are installed on the left and right racks and the tilting frames. Through the pressure sensors, the microcomputer control system detects and adjusts the movements of the main oil cylinder pistons to achieve the precision of the both working roll ends.

ADVANTAGE OF OUR HYDRAULIC SYSTEM

- A.** The unique pre-discharge technology is adopted to effectively avoid hydraulic shock and improve the life of the pipeline and seal.
- B.** The hydraulic components are selected YUKEN quality products to ensure the stability of the hydraulic system.
- C.** Each input and output port of the hydraulic system is provided with corresponding detection points, which are convenient for maintenance and fault checking. The oil pump adopts a lower-mounted type and positive pressure oil absorption. At the same time, the filters, level gauges, and all transmitting devices can automatically warn of faults.
- D.** The system is manufactured strictly in according to national standards and industry standards. The radius of the tube is reasonable, and the radius is not less than 90°. The transition is smooth and the damper tube clamps are properly arranged, which effectively avoids shock and vibration. Make sure that there is no shock or vibration in the hydraulic circuit.
- E.** The system design fully considers the high efficiency and energy saving, reduces the power waste, and reduces the heat source.

- F. The hydraulic oil pump and motor set are equipped with a special shock absorbing pad, and the oil suction port is equipped with a shock absorbing throat.
- G. Provide the test report of the main oil cylinder. System production strictly perform the national standards, and the proper connection point adopts a special sealant. Avoid leakage.
- H. Provide common fault phenomena and elimination methods for the hydraulic system of rolling machine.
- I. To ensure the manufacturing quality of the hydraulic system, the system is manufactures according to hydraulic professional manufactures and the national GB3766-83 "General technical conditions for hydraulic systems".

GRIPPING PRESSURE CAN BE SET

For different product rolling process requirements, the clamping force between the upper and lower rolls can be set in advance to effectively prevent excessive pressure on the softer material. The clamping force is controlled by the hydraulic station relief valve

5) HYDRAULIC SYSTEM (CNC CONTROL SYSTEM)

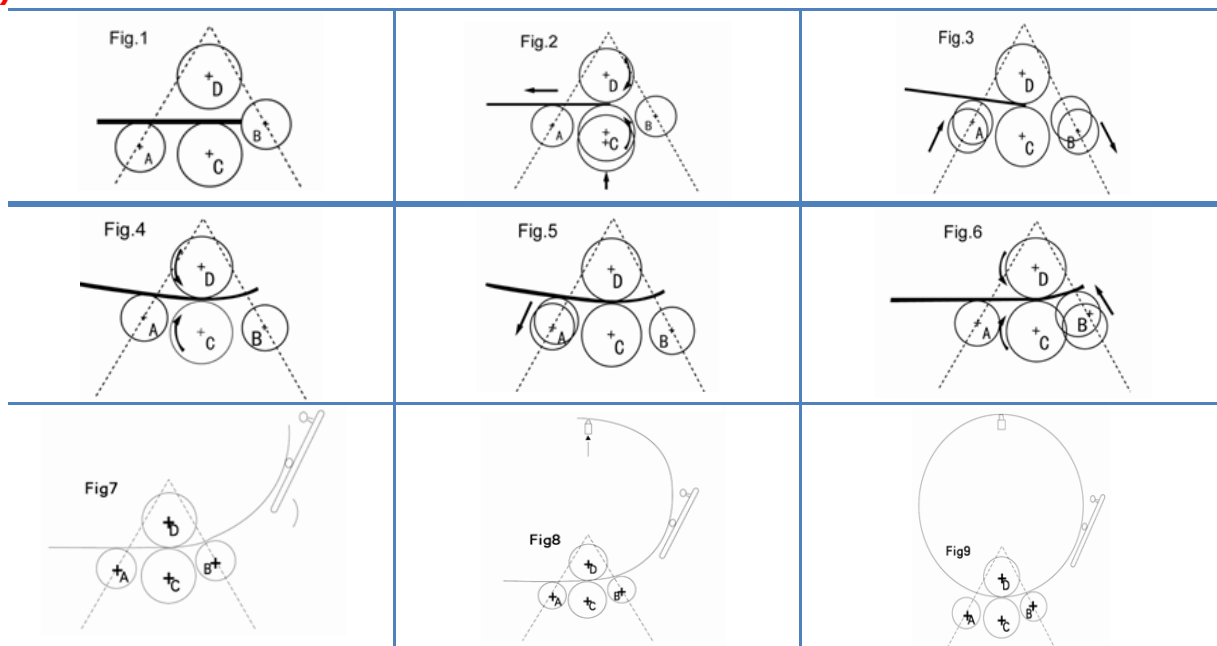
- The micro-control system includes the main electrical cabinets, control cabinets and other hardware components and special control software.
- Main Specifications:
Display accuracy: $\leq \pm 0.05\text{mm}$
When the lower roll is lifted and the side roll is inclined and lifted and the displacement is synchronously controlled, the synchronization accuracy is: $\leq \pm 0.1\text{mm}$. Sensor displacement resolution: $\leq 0.05\text{mm}$
- The core components of the micro-control system



- **CNC control system (OPTIONAL)**

Our company's control system is equipped with an automatic rolling program, which can realize one-button operation. It can automatically roll and roll once at a time. It also has data number, storage and recalls functions, and can store hundreds of data. Various specifications of automated rolling. The system is compatible with manual operation programs and can be manually operated when needed.

6) THE PROCESSES OF ROLLING BOARD



7) MAIN CONFIGURATION

| ACCESORY NAME | BRAND | NUMBER |
|-----------------------------------|------------------------------------|----------|
| Working roller | Nangang | 4 pieces |
| Hydraulic valves | Yuken, Japan | 1 set |
| Hydraulic pump | Changyuan,Hefei | 1 set |
| Main sealing ring | CARCO from Italy or NOK from Japan | 1 set |
| Working roller bearing | Wafangdian | 1 set |
| Motion detector | SIEMENS | 1 set |
| Touching screen | SIEMENS | 1 set |
| PLC programmable logic controller | SIEMENS | 1 set |
| Rotary encoder | REP,Taiwan | 1 set |
| Planetary reducer | JIESITE,Ningbo | 1 set |
| Main motor | Beide | 1 set |