W12-20×2500
Four-roller plate rolling machine

1. Overview

This machine is four-roller plate rolling machine, top roller are main drive and do rotation movement, lower roller makes up-down movement to make the plate can get the friction along with length direction, two side rollers makes Up-down movement which is an angel with straight line, which can make the steel plate get the needed plastic deformation. Because adjust the side roller can achieve symmetric bending and asymmetrical bending, the flat end will be very short in theory, comparing with three-roller plate rolling machine, which can save pre-bending procedure and pre-bending device, meanwhile it can make rough leveling of steel plate. It is extensively applied in petroleum industry, chemical industry, boiler, shipbuilding industry, hydroelectricity, metal structure and machinery industry.
2. Main Technical Parameters

<table>
<thead>
<tr>
<th>Four-Roller Plate Rolling Machine</th>
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<tbody>
<tr>
<td>Model No</td>
<td>W12-20x2500</td>
</tr>
<tr>
<td>Brand Name</td>
<td>&quot;WEIDA&quot;</td>
</tr>
<tr>
<td>Max width</td>
<td>2500mm</td>
</tr>
<tr>
<td>The length of working roller</td>
<td>2600mm</td>
</tr>
<tr>
<td>Max thickness (central)</td>
<td>T20<em>B2500</em>φmin800 (σs≤245MPa) mm</td>
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<tr>
<td>Max thickness (end)</td>
<td>T16<em>B2500</em>φmin800 (σs≤245MPa) mm</td>
</tr>
<tr>
<td>Top roller diameter</td>
<td>Φ390 mm</td>
</tr>
<tr>
<td>Lower roller diameter</td>
<td>Φ360 mm</td>
</tr>
<tr>
<td>Side roller diameter</td>
<td>Φ300 mm</td>
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<tr>
<td>Rolling speed</td>
<td>About 3.5 m/min</td>
</tr>
<tr>
<td>Main motor power</td>
<td>18.5 kW</td>
</tr>
<tr>
<td>Max working pressure of hydraulic system</td>
<td>19.5 MPa</td>
</tr>
<tr>
<td>Brand New</td>
<td>Made in China</td>
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3. Main structure

The main body structure of the machine is composed of upper roller device and driving device, lower roller device, side roller device, hydraulic drop end device, lubrication device, Left and right frame, chassis and etc.

3-1. top roller and driving device

Top roller device is composed of top roller, hydraulic drop end, fixed bearing, hydraulic motor and bearing.

Top roller pass the torque through connecting hydraulic motor and top roller makes rotation movement. Hydraulic drop end is installed with protection steel bushing.

3-2. lower roller and position inspection device

Lower roller device is composed of lower roller, oil cylinder, bearing of lower roller, self-aligning bearing.

The two side of sliding bearing block (which supports lower roller) coordinate with frame guide rail. Underside is fixed on the two oil cylinder, hydraulic system offer power for up-down movement of lower roller. The rated pressure for main oil cylinder is 16Mpa. The up-down distance is inspected by sensor installed on the lower roller and frame and displayed by LCD. Because the pressure of hydraulic system can be adjusted freely, it can get needed hydraulic power easily according to the needed rolling power.

3-3. side roller device

The side roller device is composed of main oil cylinder of side roller, self-aligning bearing and bearing.

The bearing block support the side roller and the two side of bearing block coordinate with frame guide rail.

Side roller drives side roller bearing block makes up-down movement through four oil cylinders which are installed in the inside of two frames. The up-down distance of two
side rollers is inspected by sensor installed on the side roller and frame and displayed by LCD.

To roll cone shape, we use self-aligning bearing for both side roller and lower roller, when the lower roller keep level and when the horizontal line become slope line, lower roller and side rollers can close tightly through fine adjusting; there is a degree of inclination between horizontal line and lower roller & side roller.

3-4、hydraulic drop end

Hydraulic drop end device is composed of oil cylinder, oil cylinder joint, bearing block, oil cylinder bearing and etc.

The hydraulic drop end device is easy to take out the product along Roller shaft. When the hydraulic drop finishes closing or opening, the stroke of oil cylinder is zero. The power comes from hydraulic station.

3-5、Balance device

Balance device adopts compact structure, when the tipping rack slip off bearing face of top roller and make tipping movement, this end of top roller will drop due to gravity. To make the top roller keep level, the balance device is installed on the fixed side (out of fixed side frame, namely there is a distance between fixed frame and balance device) and meanwhile it is fixed on the frame by screws.

4. Hydraulic system

Hydraulic system is composed of gear pump, valve group and assistant pipelines. Hydraulic valve adopts Yuken superposition hydraulic valve series, the pipeline layout is simple, few leakage and easy for maintain.

The system is made up of three loop, pressure adjusting loop, synchronization loop and speed loop.

The pressure adjusting loop adjusts the system working pressure through main overflow valve. The system working pressure is 16Mpa.

Synchronization loop can adjust lower roller up and down in-phase through flow divider valve and throttle valve and throttle valve can make fine adjust speed up, down.

Speed loop control frames drop and reset and adjust the speed through throttle valve.

5. Electric control system

The electric control system is made up of electric cabinet, operation control table, portable button box. The power is 380V/50Hz. The main switch has short circuit protection and over-loading protection of main motor. The positive rotation and reverse rotation are controlled by AC contactor; the machine adopts PLC programmable control, which is with few relay, stable and long working life. All the buttons and instruction lights for completing the whole rolling process are on the control table, which can control the whole operation process and working status.
6. NC system

The system adopts rotation encoder, matching with high reliability industry controller, which builds up a control system of stable performance.

NC function
NC system is of real time monitoring, data pass and power off memory during the process of rolling.
Industry control PLC will inspect the lower position and two end of side roller position automatically and control it to ensure synchronization precision ±0.15mm
Programmable display shows real time lower roller position and two end of side roller position and it can be set.
Displacement transducer resolution is 0.10mm, display precision is ±0.10mm
Automatic Self-judge function

7. Main out-sourcing standard parts

1. Double-row Self-aligning Roller Bearing    Wafangdian
2. Main hydraulic valve                      YUKEN
3. PLC programmable controller              OMRON
4. Programmable touch display               Taiwan weilun
5. Encoder                                   OMRON
6. Main motor                                Shanghai
7. Hydraulic motor                           Ningbo in Zhejiang

8. Within supply scope

1 Machine body
2 Hydraulic devices
3 electric control devices
4 lubrication device
5 technical documents