



张家港市张运机械制造有限公司  
Zhangjiagang City Zhangyun Machinery Manufacturing Co.,Ltd.

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# ZY76 (Enlarged to 114) HF Welded Pipe Mill Solution

( $\Phi 25.4 \sim \Phi 114 \text{mm} \times 1.2 \sim 4.0 \text{mm} \times 4 \sim 10 \text{m} \times 30 \sim 80 \text{ m/min}$ )

To: Zehtabchiyan

From: Zhangjiagang City Zhangyun Machinery Manufacturing Co.,Ltd.



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## I Summary

This high-frequency welding pipe mill is specialized equipment to produce high frequency straight seam welded pipes for structural pipe and industrial pipe with  $\Phi 25.4\text{mm} \sim \Phi 114\text{mm}$  and wall thickness of 1.2~4.0mm. Through optimization design, best materials choice, and accurately fabrication and rolls, the whole line can be reached high precision and high speed. Within suitable range of pipe diameter and wall thickness, pipe production speed can be adjusted.

## II General technical specification

### 1. Raw material requirements

- ◇ Material: Hot rolling or cold rolling steel
- ◇ Tensile strength:  $\sigma_b \leq 600\text{Mpa}$
- ◇ Yield point:  $\sigma_s \leq 315\text{MPa}$
- ◇ Coil width: 80~360mm
- ◇ Coil outer diameter: Max.  $\Phi 1600\text{mm}$
- ◇ Coil inner diameter:  $\Phi 508\text{mm}$
- ◇ Coil weight: Max.3T
- ◇ Material thickness: 1.2~4.0mm for Round pipes /  $\leq 3.5\text{mm}$  for Square & rectangle pipes

### 2. Output product scope

- ◇ Pipe type: Straight seam high frequency welded pipes
- ◇ Pipe purpose: Electric heating tube, fridge pipe, Auto car pipe, sporting facility tube, furniture pipe, cooler pipe, pressure feeding pipe, construction pipe, configuration pipe.
- ◇ Round pipe size:  $\Phi 25.4\text{mm} \sim \Phi 114\text{mm} * 1.2\text{mm} \sim 4.0\text{mm}$
- ◇ Square pipe size:  $20 \times 20\text{mm} \sim 90 \times 90\text{mm} * 1.2\text{mm} \sim 3.5\text{mm}$
- ◇ Rectangle pipe size:  $15 \times 25\text{mm} \sim 60 \times 120\text{mm} * 1.2\text{mm} \sim 3.5\text{mm}$  (a:b $\leq$ 2:1)
- ◇ Producing length: 4~10m (can be designed by customer request)
- ◇ Cutting length precision:  $\pm 3\text{mm}$
- ◇

### 3. Line capability

- ◇ Line direction: Pending and will be decided by Buyer
- ◇ Producing speed: 30~80m/min



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## 4. Scope of supply

### 4.1. Technology process

- ◇ Uncoiling→ Accumulating→ Leveling→ Forming→ HF welding→ Deburring (outer) → Cooling→ Sizing→ Straightening→ Cutting→ Discharging

### 4.2. Parts of Line

- ◇ Double heads Decoiler-----1 set
- ◇ Shear & butt welding device-----1 set
- ◇ Horizontal accumulator-----1 set
- ◇ Forming & Sizing unit-----1 set
- ◇ Hot saw-----1 set
- ◇ Run out table (single side discharging)-----1 set
- ◇ Control system-----1 set
- ◇ Roller-----Optional / prepared by Buyer
- ◇ Pneumatic system-----Prepared by Buyer

## IV Main structure

### 1. Double heads Decoiler (Hydraulic type)

- ◇ Configuration: Two drums expanding by hydraulic
- ◇ Coil inner dia.:  $\Phi 508\text{mm}$
- ◇ Coil outer dia.:  $\leq \Phi 1600\text{mm}$
- ◇ Material width: 80~360mm
- ◇ Coil weight:  $\leq 3\text{T}$
- ◇ Braking type: Two phase braking by pneumatic
- ◇ Drums exchanging: 180° turning by hand





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## 2. Automatic shearing & butt welding (Hydraulic shear)

### ◇ 2.1. Shearing method:

Type: Hydraulic shearing

Pneumatic system: 0.4~0.7Mpa

Adjustable range:  $\Phi$ 120

Cutter blade: 1 pair

Material of blade: Cr12 (HRC58~62)

Strip width: 100~280mm

Strip thickness: 1.2~4.0mm

### ◇ 2.2. Automatic Argon Arc welding

Type: PLC control, Frequency controlled TIG automatic welding

Welder: TIG

Welder current: 22~315A

Protection gas: Argon whose purity over 99.99%

Welding gun: 1 set

Clamping: Pneumatic

Welding time: 75~350mm/min

### ◇ 2.3. Outer size: 1100 x 1100 x 1650mm

## 3. Horizontal accumulator

◇ Accumulator: introduce peripherally and feeding from center

◇ Out diameter: 4.5m

◇ Width of metal strip: 80~360mm

◇ Thinness of metal strip: 1.2~4.0mm

◇ Feeding speed:  $\geq$ 150m/min

◇ Configuration: Turning frame, Pinch machine (11kw AC motor), Main body (15kw AC motor)

◇ Feeding control: Feeding is manual control which same as Uncoiler; Discharge is non-power style.



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## 4. Forming & Sizing unit

### ◇ 4.1. Forming & Sizing

#### ➤ 4.1.1. Parts of Forming & Sizing:

- Driving system-----2 set
- Second grade transmission-----13 sets
- Feeding & Leveling device-----1 set
- Horizontal roll frame-----13 sets
- Vertical roll frame-----13 sets



➤ 4.1.2. Driving system

Forming & Sizing driving system: 2 sets

Motor type: Z4-225-31 132Kw/1500rpm

Reducer type: ZLY hard gear reducer

Motor driving system: Control by DC digital converter

➤ 4.1.3. Second grade transmission

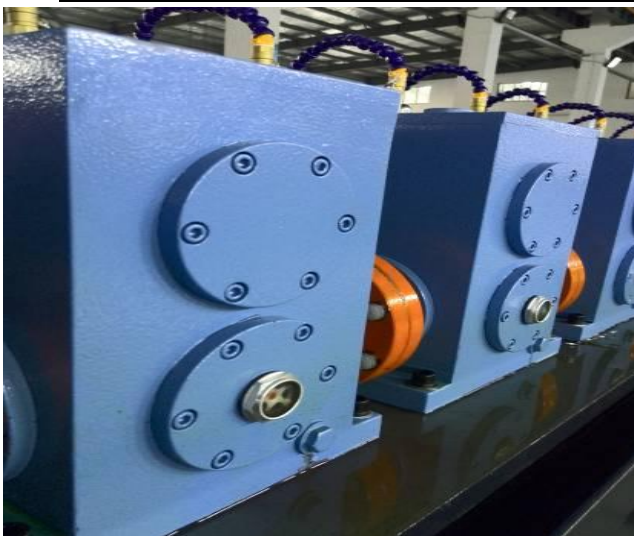
Transmission type: Gear box and gimbaled joint

Gearbox configuration: Spiral bevel gear & cylindrical helical gear

Lubricating: Gear oil soaking

Oil level display: Inspection glass on box

	Quantity	Spiral bevel gear	Gear box
Forming unit	7	20CrMnTi	HT200
Sizing unit	6	20CrMnTi	HT200



➤ 4.1.4. Horizontal roll frame & Vertical roll frame

Forming height:  $\Phi 160\text{mm}$

Adjusting of Horizontal roller: Manual (or manual sync adjustment)

Adjusting of Vertical roller: Manual sync screw adjusting

Name	Section	Quantity	Shaft dia.	Material	Treatment
Horizontal roll frame	Forming unit	7	$\Phi 80\text{mm}$	42CrMo	HF quenching
	Sizing unit	6	$\Phi 80\text{mm}$	42CrMo	HF quenching



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Name	Section	Quantity	Shaft dia.	Material	Treatment
Vertical roll frame	Forming unit	7	Φ50mm	40Cr	HF quenching
	Sizing unit	6	Φ50mm	40Cr	HF quenching

## ◇ 4.2. Welding

### ➤ 4.2.1. Parts of Welding:

Guiding frame-----1 set  
 Welding pinch frame-----1 set  
 HF welder-----1 set (or prepared by Buyer)  
 Deburring cutter (Pneumatic) -----1 set

### ➤ 4.2.2. Welding pinch frame

Type: 3 rollers pinch  
 Shaft diameter: Φ50mm  
 Material of shaft: 40Cr (HF quenching)  
 Adjusting: Manual screw adjusting

### ➤ 4.2.3. Deburring cutter

Type: Two cutters setting  
 Feed/retract: Pneumatic adjusting  
 Cutter adjustment: Manual screw adjusting

### ➤ 4.2.4. High frequency welder:

Type: High frequency influence welding  
 Size: GGP-300-0.4-HC  
 Power: 300Kw

## ◇ 4.3. Cooling

Cooling way: Spray and soaking  
 Length of cooling: 4000mm

## ◇ 4.4. Speed supervising device

Type: Two roller type with pneumatic clamping  
 Quantity: 1 set



Outer dia. of roller:  $\Phi 111.4\text{mm}$

Material of roller: Cr12

◇ 4.5. Turkey head straightening device

Type: Single face and with 4 rollers

Configuration: Turning adjusting from top, bottom, left and right

Adjusting method: Manual screw adjustment

Shaft material: 40Cr (HF quenching)

Quantity: 2 sets



## 5. Hot friction computer saw

◇ Type: CPU controlling saw

◇ Application:

- 1) Supervise and fix the product length, quickly start to match with pipe mill
- 2) Keep the saw moving synchronously with pipe mill while cutting
- 3) Return quickly

◇ Control method: CPU Controller-> Motor-> Reducer-> Gear & rack-> Saw car motion

◇ Cutting method: Hot friction cutting

◇ Max running speed: 80m/min

◇ Applicable pipe size:  $\Phi 25.4\sim\Phi 114\text{mm}$

◇ Applicable pipe thickness:  $\leq 4.0\text{mm}$

◇ Cutting length precision:  $\pm 3\text{mm}$

◇ Saw blade size:  $\Phi 600/\Phi 650\times 70\times 4.0$

◇ Saw blade speed: 3400rpm

◇ Blade turning motor: 22Kw





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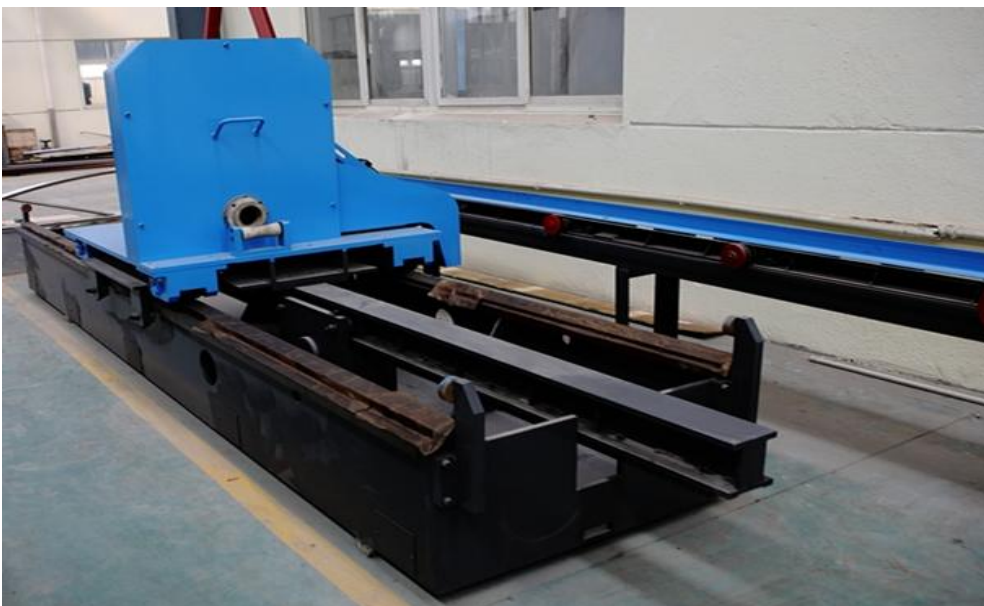
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- ◇ Tracking motor: 22Kw
- ◇ Pneumatic system: 0.4~0.7Mpa



## 6. Run out table (single side discharging)

- ◇ Configuration: Frame type
- ◇ Length: 15m
- ◇ Discharging speed: 130m/min
- ◇ Driving motor: AC3Kw



## 7. Shearing device (Hydraulic)

- ◇ Shearing method: Hydraulic cutting
- ◇ Hydraulic system: AC 3.0KW、10Mpa
- ◇ Cutter blade: 1 pair
- ◇ Material of blade: Cr12 (HRC58~62)
- ◇ Strip width: 80~360mm
- ◇ Strip thickness: 1.2~4.0mm
- ◇ Welder: Prepared by Buyer

## 8. Roller (Optional or prepared by Buyer)

- ◇ 7.1. Forming and Sizing rollers  
Material: Cr12 (JIS-SKD1, ASTM-D3)  
Hardness: Surface quenching HRC 60 ± 2; critically grinding
- ◇ 7.2. Welding roller  
Material: H13 (JIS-SKD61, ASTM-H13)  
Hardness: Surface quenching HRC 50 ± 3; critically grinding



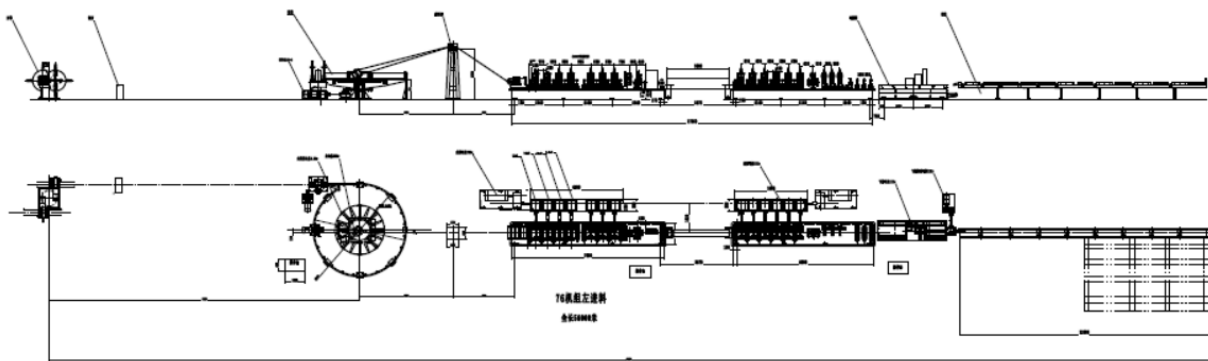
## 9. Brands of main parts

NO	Parts name	Brand	Remarks
1	Main driving motor	SIMO Xi'an	
2	Motor driver (DC digital converter)	PARKER	
3	Bearing	HRB, LYC, ZWZ	
4	Pneumatic element	AIR TAC	

## V Foundation and advised Buyer's necessary

- ◇ Site area of machine (length X Width): 62m × 7m
- ◇ Site area of cabinets (length X Width): 6m × 3m

- ◇ Machine foundation base: See foundation drawing CAD
- ◇ Overhead crane: 2 sets of  $\geq 5$  Ton overhead crane
- ◇ Magnetic bar (impeder core): prepared by Buyer
- ◇ Saw blade: Prepared by Buyer
- ◇ Lubricating oil grease, cooling emulsion and etc will be prepared by Buyer
- ◇ One set of Emulsion water cooling pool (Volume  $\geq 30$  m<sup>3</sup>\*1pools) for pipe-welding mill and plate exchanger of HF-welder, with two sets of pumps (AC4Kw、lift $\geq 30$ m & flux $\geq 30$ m<sup>3</sup>/hour), water pressure meter, valves, and water pipes will be prepared by Buyer. Or use one set of glass fiber cooling tower for Emulsion water cooling pool and plate exchanger of HF-welder.
- ◇ Adopting ground or attic frame and room of high-frequency welder for machine unit, stack basket for welded pipe, made by buyer.
- ◇ The cables which from power station to pipe mill line, and cables & wires between machines and cabinets, all of them will be prepared by Buyer.
- ◇ One set of  $\geq 1$ m<sup>3</sup> /min air compressor and one set  $\geq 0.50$ m<sup>3</sup> air tank, 0.7~1.0Mpa. Whole of the pneumatic supply system will be prepared by Buyer.
- ◇ Lifts、tools、 anchor bolts、 expand bolts、 embedded and fixing materials for installing machine will be prepared by Buyer.
- ◇ Power supply:
  - High frequency welder power: GP-300Kw
  - Power of supply: 3P/4W/380V/50Hz
  - Total power of Line: 650Kw



## VI Additional options

### Worm Wheel adjusting

- ◇ Configuration: Worm and worm wheel
- ◇ Function: To make the inner block and outer block move at same time while adjusting.
- ◇ Display: Number display.