



# 严创科技

YAN CHUANG TECHNOLOGY CO.,LTD

FUZHOU • CHINA

# Company Introduction

Fuzhou YANCHUANG Environmental Technology Co., Ltd. based in Minhou Fuzhou. The company has 130 employees, including 37% high-tech talents. At the same time, the company cooperates with many universities and designing institutes to jointly develop and tackle various project projects. We honored by Fujian Science and Technology Department in September 2016. In 2018, we were awarded "National High-tech Enterprises", with ISO 9001 Quality System Certificate and several practical patents. The company's aim is to innovate in science and technology, strictly control quality and provide efficient service. The company operates environmental protection flue gas treatment engineering, environmental protection water treatment engineering, furnace manipulator, automation control technology, customized mechanical design and manufacturing, etc. We has provided special services such as mechanical design customization for many countries and regions, and we also has won unanimous praise.





# Enterprise honor



# Enterprise patents







# Product summary



## Metallurgy Equipment

01. Manipulator
02. Charging Vehicle
03. Electric Ladle Vehicle
04. 45°Hydraulic Shear for CCM
05. Continuous Casting Machine



## Environmental protection smoke treatment

01. Flue Gas Treatment Engineering of IF
02. Heating Furnace Flue Gas Treatment Project



## Automatic control process



## Hydraulic Equipment



## Metallurgy Equipment



I.F Manipulator



Charging Vehicle



Tapping car



45° Hydraulic Shear for CCM

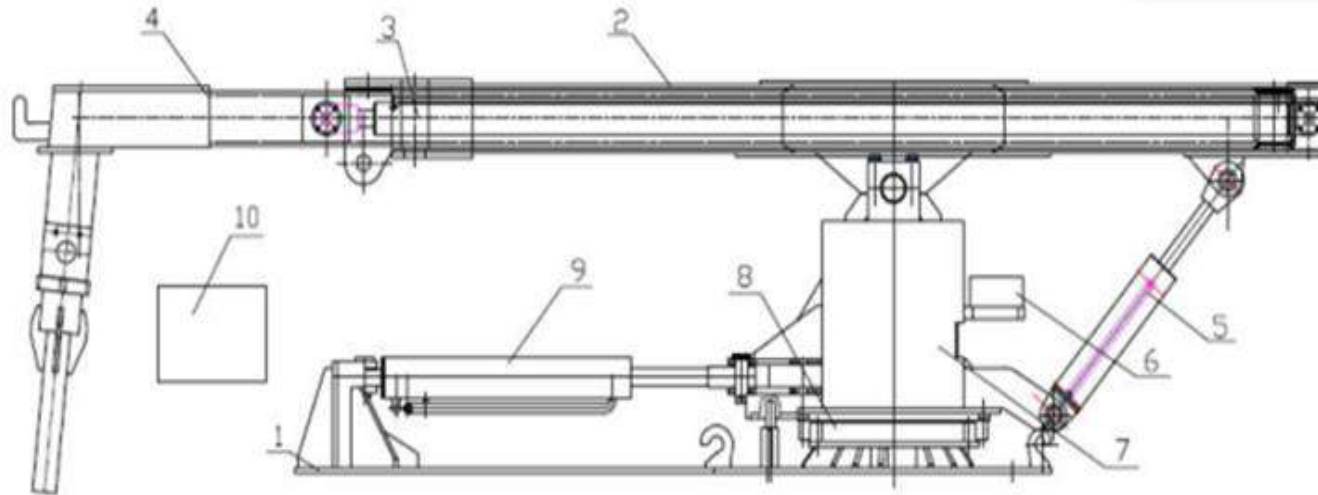


Continuous Casting Machine



# Metallurgy Equipment

Equipment general drawing(frame diagram)



炉前机械手结构简图

主要部件: 1、底座 2、外横梁 3、推拉油缸; 4、内横梁 5、升降油缸 6、油路块装配  
7、旋转柱装配 8、回转支承 9、旋转油缸 10、液压站

**Main components:** 1、pedestal 2、External beam 3、Push-pull cylinder 4、inner beam 5、Lifting cylinder 6、manifold block assembly 7、Rotary column assembly 8、slewing bearings 9、Rotary cylinder 10、Hydraulic station

## Induction Furnace Manipulator

**Main technical parameters (Maybe changed after exactly design)**

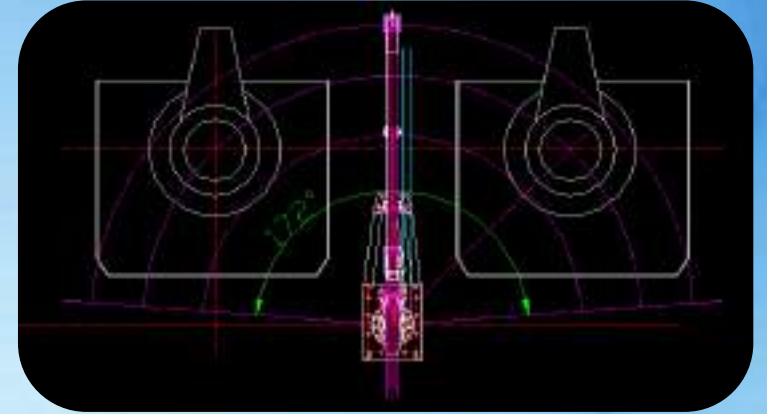
- 1) Rotation range :  
-86 ° ~ 86 °
- 2) Expansion stroke :  
0 ~ 3100mm
- 3) Lifting mechanism stroke :  
+1510 ~ -1170mm
- 4) Equipment size L×W×H :  
5900×1100×1500
- 5) Push-pull torque :  
0 ~ 4T
- 6) Lower pressing torque :  
0 ~ 3.5T
- 7) Rotating torque : 0 ~ 2.5T
- 8) System pressure: 0 ~ 16MPa





## Metallurgy Equipment

## Induction Furnace Manipulator



### Main Functions and Application Scope:

1. The IF manipulator is mainly used in the IF steel making workshop of steel plant and foundries which is installed between the two furnace shells.
2. The larger volume of scrap steel or the lighter material with partial blockage can be easily compacted, which makes the volume of scrap steel shrink rapidly and the compactness increase, thus improving the energy conversion and greatly improving the smelting efficiency of IF.
3. It can sweep scrap steel and packaged compacts around induction furnace (about 2-3 tons per large compact) into the furnace body quickly and flexibly which can solve the problem of low efficiency and high danger of manual treatment when the material block is stuck in the furnace body.
4. Long-distance remote control operation, so that the operator away from the hearth area, to solve the hearth high temperature (about 1500 C temperature radiation) labor intensity and potential safety hazards, greatly reducing the occurrence of casualties among workers.
5. When the workshop is busy and inconvenient to hoist, the fireproof material and other materials can be hoisted by the manipulator in front of the furnace.





## Metallurgy Equipment

### Induction Furnace Manipulator

**Main technical parameters (Maybe changed after exactly design)**

- 1) Rotation range:  $-86^{\circ} \sim 86^{\circ}$
- 2) Expansion stroke:  $0 \sim 3100\text{mm}$
- 3) Lifting mechanism stroke:  
 $+1510 \sim -1170\text{mm}$
- 4) Equipment size  $L \times W \times H$ :  
 $5900 \times 1100 \times 1500$
- 5) Push-pull torque:  $0 \sim 4\text{T}$
- 6) Lower pressing torque:  $0 \sim 3.5\text{T}$
- 7) Rotating torque:  $0 \sim 2.5\text{T}$
- 8) System pressure:  $0 \sim 16\text{MPa}$





# Metallurgy Equipment

## Induction Furnace Manipulator

### Major technologies and innovations:

1. The special anti-static hydraulic cylinder is used to drive the telescopic, lifting and rotating functions of the manipulator. The driving force is large and the operation is stable. The push-pull device is equipped with water-cooled cylinder, which prolongs the service life of the seals.
2. The design of hydraulic components is concentrated in the back of the equipment, far from the heat source of the furnace hearth. The hydraulic station adopts 11KW high-efficiency and energy-saving motor, which is increase the reliability and stability of the operation of the equipment.
3. Electrical control adopts split design which can be switched freely, so that the electrical control part is far away from the heat source and increases the reliability of the equipment. Remote control design wireless remote control and wire control to deal with sudden failure of wireless remote control;
4. Integrated installation design of equipment, convenient and fast on-site installation, small equipment volume, less occupied space, and easy operation and flexible use.







## Metallurgy Equipment

### Induction Furnace Manipulator

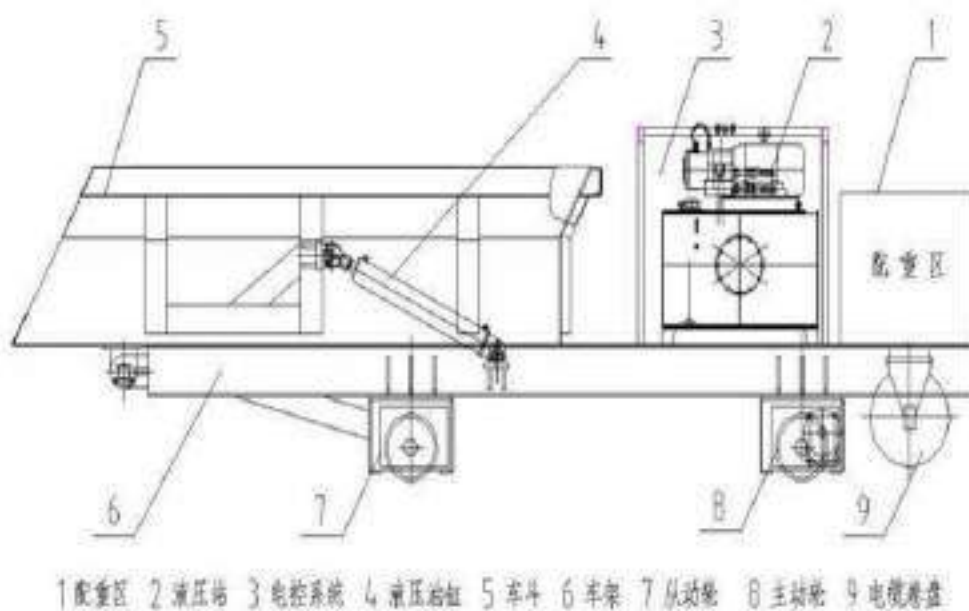
#### Main advantages:

- 1) The person does not need to operate directly to the mouth of the furnace, using the remote control operation, reduce the accident rate;
- 2) Reduce labor intensity, saving labor, reduce labor from 4 to 2 workers;
- 3) Make scrap material to achieve no blocking phenomenon, quickly melting rate, the average tapping time spent per each furnace will be saved between 8 and 10 minutes (if use of light and thin materials will be even faster), so that to improve more than 10% of the steel yield;
- 4) Because tapping quickly, so it will save electrical power 3 ~5KWH/ton;
- 5) Makes the furnace refractory more durable, due to rapid pressure, the refractory is not easy to bear high heat, if a furnace can only use 30~ 32 furnace before, now, the furnace can be used for at least about 38 heats;
- 6) Can be used to lift refractory materials when the workshop is busy, so that will save time and labor.





The charging car is used in refining furnace, intermediate frequency furnace and other steelmaking workshops in steel works. It is installed at the back end of the furnace shell. According to the site conditions, it is arranged horizontally or vertically. Each furnace is equipped with 1 to 3 charging car (depending on the size of the furnace).



1. Counter weight area 2. Hydraulic station 3. Electric control system 4. Tilting cylinder 5. Vehicle hopper 6. Vehicle frame 7. Trailing wheel assembly 8. Driving wheel assembly 9. Cable reel

### Main technical parameters(Maybe changed after exactly design)

- 1) Loading of vehicle hopper:  $\leq 3$  Tons
- 2) Tilting Angle range:  $0^{\circ} \sim 28^{\circ}$
- 3) Tilting cylinder stroke:  $0 \sim 730$  mm
- 4) Size(L×W×H):  
6600×2120×1550 mm
- 5) Tilting force:  $0 \sim 10$  Tons
- 6) System pressure:  $0 \sim 16$  MPa
- 7) Driving motor power:  
1.5KW×2 sets
- 8) Moving speed: 20m/min
- 9) Space between tracks: 1300mm





## Metallurgy Equipment

Charging car

### Main advantages:

1. The scrap steel is added to the furnace quickly and centrally, instead of manual or sucker operation, so as to reduce labor intensity (high temperature radiation at furnace mouth) and labor cost.
2. The centralized feeding mode is realized by the rear feeding truck, which reduces the frequency and time of feeding in the original process, greatly improves the charging efficiency and makes the IF work at full load, thus increasing the output.
- 3 The transportation and tilting of the charger vehicle eliminate the contradiction which the original hanging chuck impacts on the space of the dedusting system, thus contributing to the dust collection.
4. The remote control operation of the equipment is helpful to the simple and convenient operation on the spot.





# Metallurgy Equipment

Charging car

## Main technological innovation points:

- 1)The vehicle hopper tilting is driven by double hydraulic cylinder, which has large driving force and stable operation
- 2)Hydraulic components are concentrated in the design of the rear part of the device,keep away from heat source,and increase the reliability of equipment operation.
- 3)Using remote electrical control which can achieve shut down and emergency power off freely.
- 4)Small equipment volume,save space,convenient operation,flexible application.
- 5)The hopper is made of cambered pressed-steel plate wholly,increases the strength and reduces the resistance of scrap steel while tipping over (the traditional hopper is made of welded steel plate, but the disadvantage is that too much welding seam reduces the strength and the welding stress causes large deformation, and too much welding seam increases the resistance of scrap steel while tipping over).
- 6)The cable collecting device running simultaneously with vehicle(avoid damage caused by dragging power line on the ground while vehicle moving) is added at the end of the vehicle.





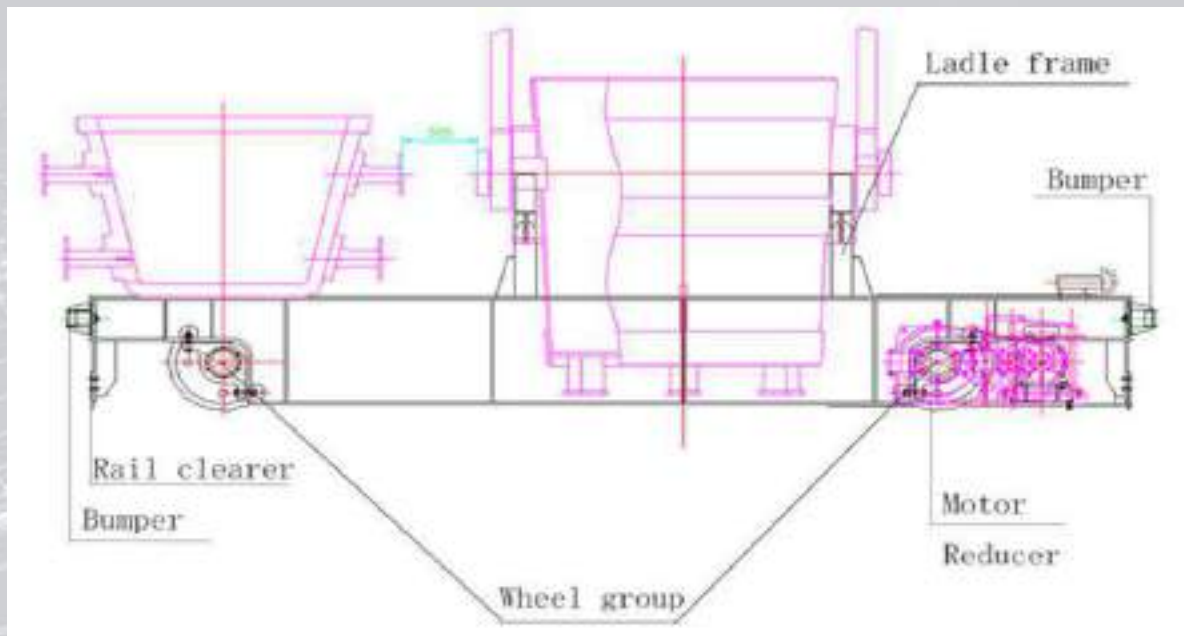


# Metallurgy Equipment

## Tapping Car

### Main technological innovation points:

Tapping car is a metallurgical vehicle for transporting molten steel tanks and slag tanks under the furnace of steelmaking plant to and from various related stations. It has the characteristics of reasonable design, high structural strength, large carrying capacity and smooth operation. Because of the heat insulation layer and protective cover around the transmission device, the thermal radiation of molten steel and slag is effectively avoided, and the service life of the transmission device is greatly improved.



### Main technical parameters (Maybe changed after exactly design)

- 1) Load capacity: 0-45t
- 2) Walking speed: 2-20 m/min
- 3) Wheel diameter: 720mm
- 4) Rail gauge: 3000mm
- 5) Working itinerary: 0-56m
- 6) Working voltage: 380V 50HZ



## 45°Hydraulic Shear for CCM

Main technological innovation points:

- 1.The racks and cylinder are both with internal water cooling, increasing the life of the blades and seals.
- 2.Four edges of the blade can be rotated , increase the usage rate of the blade (about 50 to 80 thousand times per blade)
- 3.Due to adopting PLC programmable controller control , the system works stably and reliably.
- 4.Adopt automatic sizing shearing device; Flat shear (diagonal shearing, tiny head, convenient for rolling mill), small size error.







# Metallurgy Equipment

## 45°Hydraulic Shear for CCM

### Main mechanism parameters

No.	Name and content of parameters				
1	Shear cylinder	Type	FYG360/260-340	Quantity	1Set
		Nominal pressure	4000KN	Route	340mm
2	Traveling cylinder	cylinder	DG-J80/40-1100	Quantity	1Set
		Nominal pressure	200KN	Route	1100mm
3	Cutting blade	Size	165×80×40	Material quality	Alloy steel
4	Traveling track	Size	940×155×80	Material quality	Foundry iron
5	Traveling track	Size	2900×980×180	15kgLight rail	
8	Main machine size; below the roll surface: 1450 mm, above the roll surface: 1500 mm, casting center: left 1400 mm, right 900 mm.				
6	Maximum opening size		233×233	Shearing time	5 ~ 8S
7	Maximum opening size for feeding		220×220	Main machine weight	About4.5T





## Metallurgy Equipment

### 45°Hydraulic Shear for CCM

**Cost comparison table between traditional flame cutting (including manual cutting) and hydraulic shear:**

NO.	Expense	Flame cutting(including manualcutting)	Hydraulic shear	Remarks
1	Kerf	4~6mm	Nothing	
2	Fuel	Oxygen andacetylene	Hydraulic fluid	Hydraulic fluid can be circularly used,ignorant to most of it
3	ConsumableSup plies	Cutting nozzle and flame cutting torch	Blade	50 to 80 thousand times per blade,ignorant to most of it
4	Labour force	Hand-cut and Slag removal		
5	CaloricExpendit ure	Cutting time:20S~25S	Cutting time:3S~5S	

- 1.The temperature of billet is controlled above 800 degrees,normal shear section: 80 x 80mm ~ 180 x 180mm
2. The shear cylinder diameter:560mm;Instantaneous shearing time:3s
3. Expansion stroke:310mm;Minimum strand distance of continuous casting machine:1200mm
4. The power of pump set:37KW(A dual-use equipment )







## Metallurgy Equipment

### Continuous Casting Machine

#### Main technological innovation points

Based on the strong technical force and many leading experts absorb new technology and new process from the world, and practical experience of every user. Low manufacturing cost, It is easy to maintenance.





## Metallurgy Equipment

### Continuous Casting Machine



#### Main advantages:

1. Energy-saving withdrawing and straightening machine: Energy-saving withdrawing and straightening machine is a key parts of continuous casting machine which is used insert the dummy bar into mould and withdraw strand from mould and straighten it with dummy bar.
2. High-efficiency mould / Water jacket: 4-8mm/ Copper tube length(mm): 812 850 900 1000
3. Ladle turret: Ladle turret plays the role of move the molten steel from ladle to pouring position. It consist of Rotary arm, rotary bearing, transmission device / Load Capacity: 50-200 ton./ Angle of rotation: 360 degree / Rotating speed: 1 rotation/min. / Swing motor capacity: 7.5-15kw
4. Dummy bar and dummy bar storage Transmission speed: 0-3.8m/min.



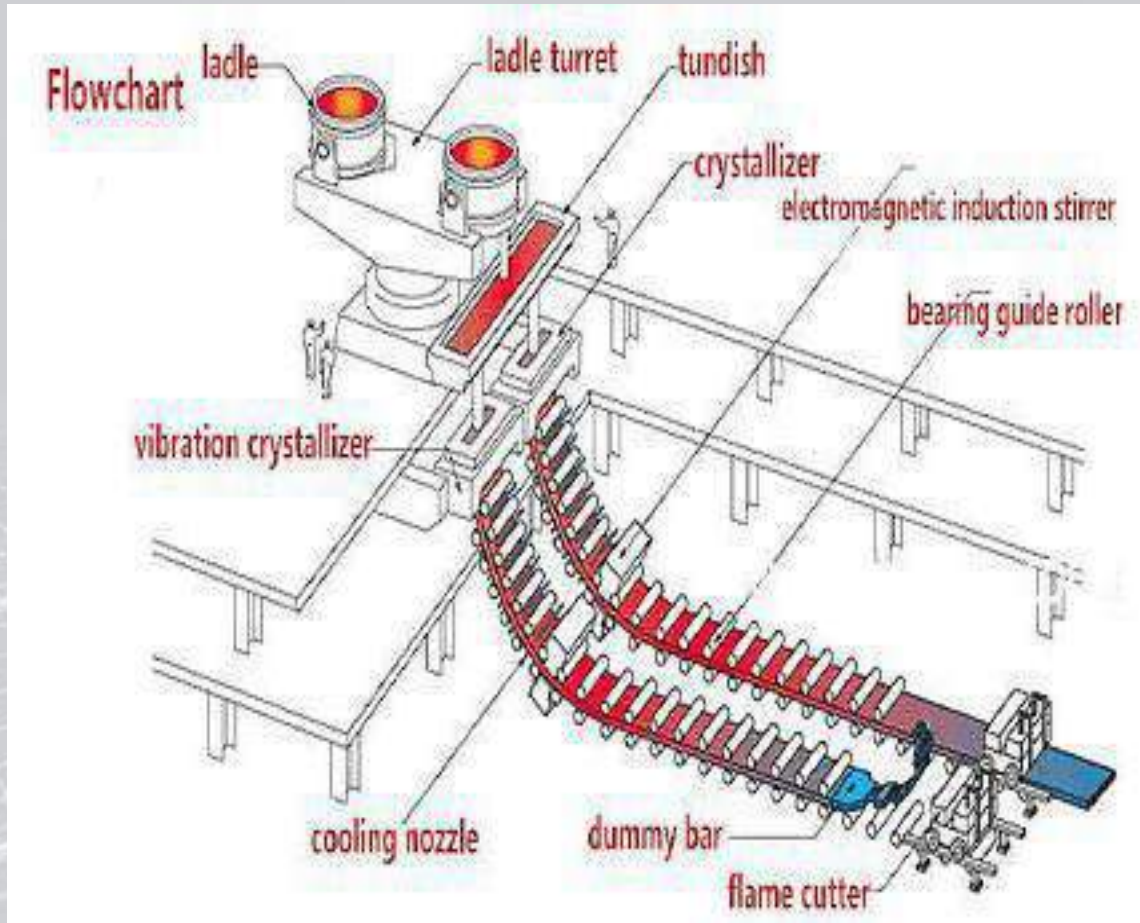


## Metallurgy Equipment

Equipment general drawing  
(frame diagram)

Main technical parameters(Maybe changed after exactly design)

### Continuous Casting Machine



Type	Full-arc Continuous Straightening Rectangular Billet Caster		
Radius (M)	3-16m		
Number of Strand	1-10		
Section(mm)	70 <sup>2</sup> -200 <sup>2</sup> 165*225 180*400 180*600 Φ80-500		
Length billet (m)	2-12		
Variety of steel available	Low alloy steel, pinion steel, bearing steel, spring steel.		
Casting speed(m/min)	120×120: 3.8m/min	150×150: 3.5m/min	200×200: 2m/min
Mould length (mm)	812 850 900 1000		
Cutting method	Narrow slit high efficiency automatic flame cutting machine, hydraulic shear		
Control method of second cooling	Automatic water distribution by aerosol, automatic water distribution		
Method of pushing billet	Billet pushing car, Chain push car, Bridge push car		



## Metallurgy Equipment

## Other metallurgical supporting equipment



**Ladle hooks**



**Liquid steel ladle**



**Hydraulic Station**



**DIY Hydraulic Cylinder**



**Steel ladle**





## Environmental protection smoke treatment



**Intermediate frequency furnace dust removal system**



**Heating furnace desulfurization and dust removal system**



# Environmental protection smoke treatment

## Intermediate frequency furnace dust removal system

### Main advantages:

The induction furnace dust removal system consists of dust hood, air duct, electronic valve, mixed valve, bag filter, draught fan, chimney and electrical control system. After the smoke and dust from the intermediate frequency furnace were generated by the dust hood, they enter the dust collector through the adjusted butterfly valve and the air inlet pipe, to collect large particles and play a role of flame retardance. Then, the dust is trapped outside the filter bag by the pulse bag type dust collector. Finally, the dust collected by the dust collector and the bagged dust collector is recycled through the swing valve.







# Environmental protection smoke treatment

## Induction furnace dust removal system



### Main technological innovation points:

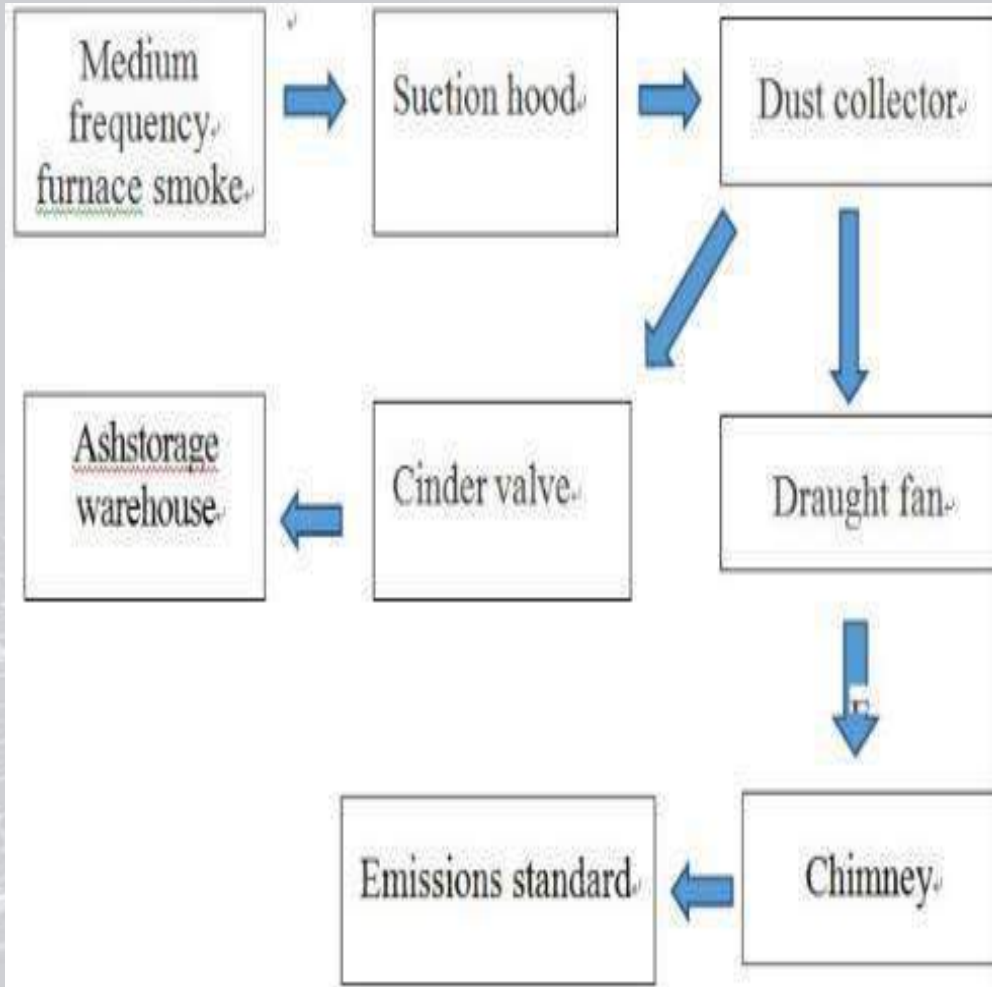
- 1) On the premise of ensuring that the relevant pollutant emission standards are met, "Reliable operation never affect smelting process and workers' operating habit" is considered as an important design objective.
- 2) Optimize and design carefully to reduce and save one-time engineering investment.
- 3) To ensure fire safety, to strive for the advancement of comprehensive benefits, and to fully improve the dust capture rate under the premise of ensuring the emission concentration of pollutant is up to the standard.
- 4) Ensure long-term stable operation, simple and convenient management.





# Environmental protection smoke treatment

## Induction furnace dust removal system



No.	Project	Unit	Operational Indicators	Remarks
1	Fume capture rate	%	$\geq 95$	Full smelting process
2	Dust collection capacity	kg/t steel	$\geq 10$	
3	Emission concentration	mg/Nm <sup>3</sup>	$\leq 25$	
4	Dust removal efficiency	%	$\geq 99$	
5	Working noise	dB	$\leq 85$	
6	Dust in front of furnace position	mg/m <sup>3</sup>	$\leq 10$	(deducting background value)
7	Dust in workshop	mg/m <sup>3</sup>	$\leq 10$	(deducting background value)
8	Dust removal power consumption	kwh/ t steel	$\leq 30$	





# Environmental protection smoke treatment



## Heating furnace desulfurization and dust removal system

### Main technological innovation points

1. New technology of flow field equalization in built-in pipeline of desulfurization tower
  2. Solid spray technology and agglomeration atomization technology
  3. Swirl Disturbance and Surge Mass Transfer Technology for Special Airfoils
  4. Automatic cleaning of baffle interception defogging and gas-water separation technology
  5. New process layout desulfurizer regeneration technology
- Sodium-calcium double-alkali desulfurization process is similar to other wet desulfurization processes such as limestone-gypsum process.



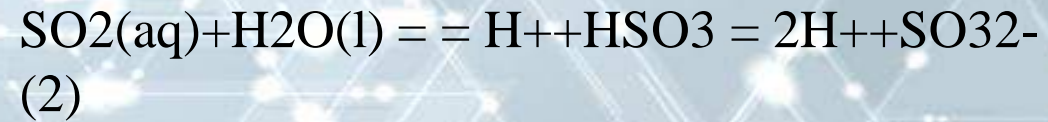
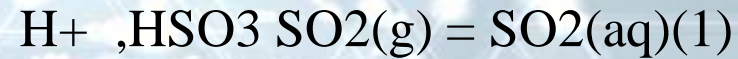
# Environmental protection smoke treatment

## Heating furnace desulfurization and dust removal system



### Main technological innovation points

The main reaction is that SO<sub>2</sub> in flue gas is dissolved in absorption solution and then dissociated into:



Formula (1) is a slow reaction, which is one of the speed control processes.

Then H<sup>+</sup> reacts with OH<sup>-</sup> in solution to form salt and water, which promotes the continuous absorption and dissolution of SO<sub>2</sub>.

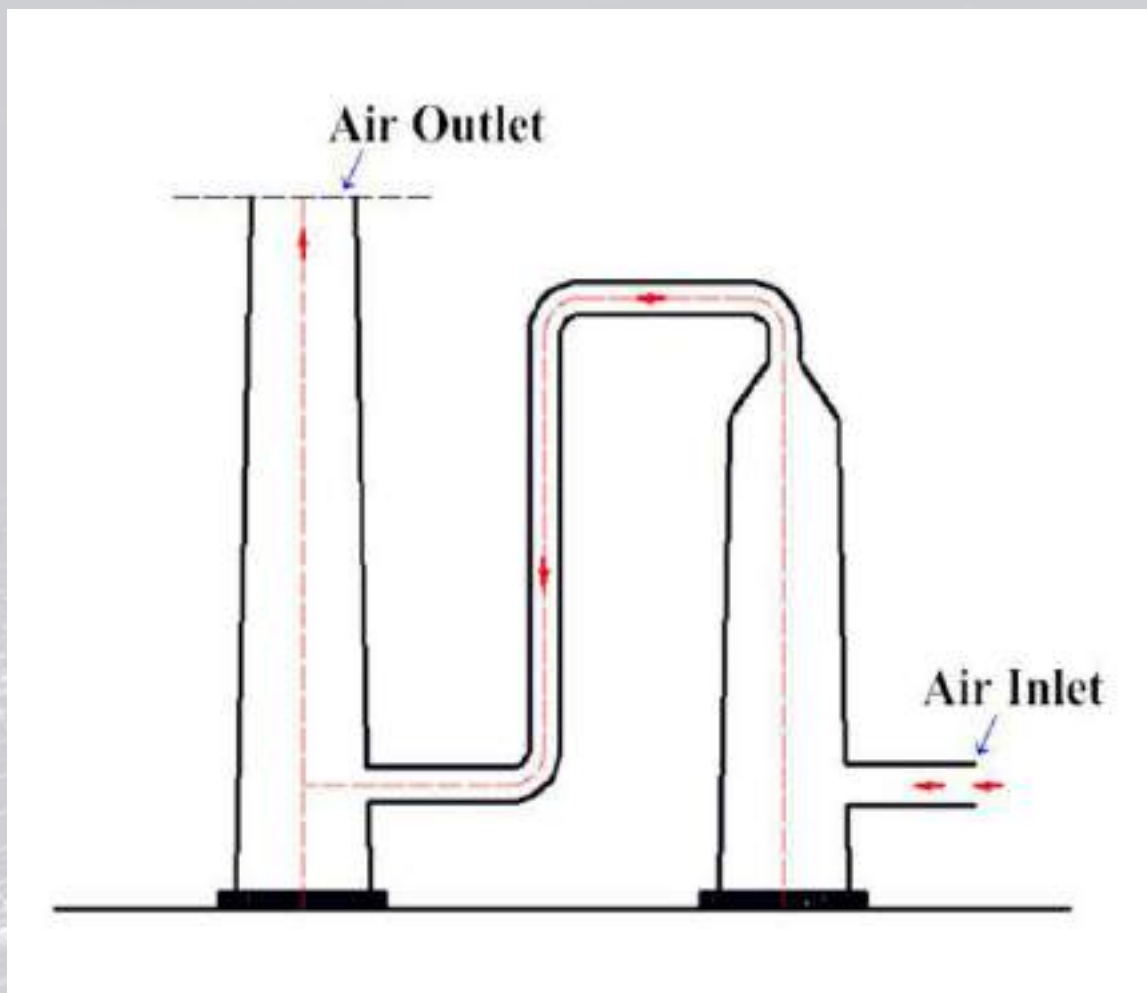






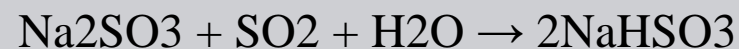
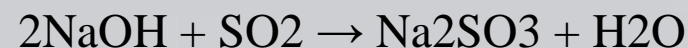
# Environmental protection smoke treatment

## Heating furnace desulfurization and dust removal system

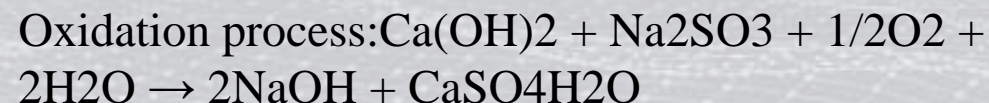
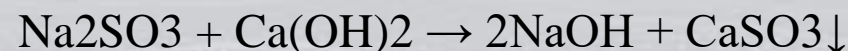


**The main reaction equations are as follows:**

Absorption process:



Regeneration process



Negative products under desulfurization precipitate in the form of  $\text{CaSO}_3$  and  $\text{CaSO}_4$ , and then they are beaten to ash water drainage treatment system by slurry pump and disposed of harmlessly directly for sale.



# Automatic control process

Partial project







## Automatic control process



### Scope of Service Technology

- ◆ Development, design and complete set of electrical and automation engineering, undertake the design and manufacture of complete sets of electronic control cabinets.
- ◆ Automation control of blast furnace steelmaking, reduction furnace ironmaking, billet caster, reheating furnace, rolling line, dust removal system, desulfurization system, etc.
- ◆ Undertake automatic control of production line, instrument, manual control interface, configuration software, data acquisition and processing, DCS, frequency conversion energy-saving and other automation engineering technical innovation, development, complete set.



# Hydraulic Equipment

1

Gantry Plate Shears



2

Crocodile Shears



3

Hydraulic Baling Press





## Hydraulic Equipment

### Gantry Plate Shears

#### Main technological innovation points

The heavy steel gantry shears are mainly used for cutting large steel scrap, processing various plates into various materials. Suitable for scrap metal profiles of various shapes (such as section steel, round steel, Angle steel, channel steel, billet, i-beam steel, steel plate, steel pipe, scrap steel bar, aluminum profile, aluminum plate).





# Hydraulic Equipment

## Gantry Plate Shears

**Main technical parameters(Maybe changed after exactly design)**

No	Model	Shear force (KN)	Scissors specification L x W x H	Opening height (mm)	Pressing force (KN)	Shear efficiency /min	Uses and capabilities	Main configuration	Weight(T)
1	YMJ-200/600	2000	600×80×40	150	300	7	Reinforcement bar less than $\phi 25$ , Steel plate below $\sigma 20$	Single cylinder shear ,Single Cylinder Pressure Pump Set 160YCY22KW	6
2	YMJ-300/800	3000	800X80X40	150	300	8	Reinforcement bar less than $\phi 25$ , Steel plate below $\sigma 25$	Single cylinder shear,Single Cylinder Pressure Pump Set 250YCY30KW	8
3	YMJ-400/1000	4000	1000X100X50	200	500	8	Reinforcement bar less than $\phi 30$ , Steel plate below $\sigma 30$	Single cylinder shear,Single Cylinder Pressure Pump Set 160YCY30KWX2	11
4	YMJ-500/1200	5000	1200X100X50	200	500	8	Reinforcement bar less than $\phi 40$ , Steel plate below $\sigma 40$	Twin cylinder shear ,Double Cylinder Pressure Pump Set 250YCY30KWX2	15





# Hydraulic Equipment

## Crocodile Shears



### Main technological innovation points

crocodile shears,are applied in recycling companies,automobile dismantling plants,smelting &casting industry to cold-shear section steel and metallic structural parts,to produce acceptable furnace charges.



### Main technical parameters(Maybe changed after exactly design)

Model	MainCyl.Forc e(Ton)	Blade length(mm )	Max.Openning( mm)	Max.Cutting Force
YCJ-100	100	600	300	100
YCJ-200	200	800	380	150
YCJ-300	300	1000	450	250
YCJ-400	400	1200	520	250



## Hydraulic Equipment

### Hydraulic Baling Press



#### Main technological innovation points:

Hydraulic baling presses are applied in steel mills, recycling plants, ferrous & non-ferrous smelting industry to press scrap metal (steel, copper, aluminum, stainless steel, discarded automobiles, etc) into acceptable furnace charges in shapes of cuboids, cylinders & octagons

#### Main technical parameters (Maybe changed after exactly design)

No	Model	Main Cyl. Force (Ton)	Press Box size (mm)
1	YKB-100	100	1200x700x600
2	YKB-200	200	1800x1400x800
3	YKB-250	250	2000x1400x800
4	YKB-300	300	2600x2000x1200
5	YKB-400	400	4000x2000x1300







## Our Performance

Until 2018, the sales of manipulators in YANCHUANG series products had reached more than 1600, which covering all provinces and cities in China, and also exported to 20 countries such as Indonesia, Bangladesh, Philippines, Turkey, Iraq, Iran, Saudi Arabia, Egypt, Thailand, Algeria and Nigeria.

### Part of the performance

Fujian Wuhang Stainless Steel
Tsingshan Holding Group
Tsingtuo Group
Chengde Group
Wuzhou Jinhai
Guangqing Metal
Angang Lianzhong ( Guangzhou )
Jiangyin Huarun Steel
Gumei (Algeria)
Hoa Phat Group (Vietnam)
BSRM ( Bangladesh )
Shengli ( Vietnam )
Bilecik Demir Celik ( Turkey )
Haiyang Steel & Iron ( Indonesia )
Sahand Steel ( Iran )
Xinkeyuan (Thailand)
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