2025

Billet Cutting Saw Product

Hotstone Zhou

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JBS Billet Cutting Saw | JBS-850

一、Production Introduction: High Performance Billet Cutting Saw

This high-performance **circular cold saw** is designed for precise and efficient cutting of metal billet and round bar Materials. Featuring a **horizontal cutting mechanism** and **carbide-tipped saw blades**, it delivers fast, accurate cuts suitable for a wide range of industrial applications.

The machine body is constructed with a **concrete-filled base**, offering exceptional vibration absorption and deformation resistance. A **dual horizontal guide rail system** ensures smooth and stable cutting operations, while the integrated **hydraulic damping system** minimizes vibration during cutting, extending blade life and improving cut quality.

Equipped with a **SIEMENS PLC control system**, the saw offers a user-friendly interface with simple parameter input and quick start-up. The **automatically separating clamps** at the infeed and outfeed ports prevent collisions between the saw blade and the workpiece, enhancing operational safety. Additionally, **chip removal is handled by a chain-type conveyor**, keeping the workspace clean and efficient.

This circular cold saw is the ideal solution for achieving high-efficiency, high-precision, and safe metal

cutting.

二、 Equipment Composition

This equipment is mainly composed of the following components

No	Item	Qty	Remarks
Billet Cutting Saw Components			
1	Billet Cutting Saw	1 Set	
2	Hydraulic System	1 Set	
3	Air Cooling System	1 Set	
4	Centralized Lubrication System	1 Set	
5	Control System	1 Set	
Auxiliary Equipment			
1	Servo Cut-to-Length Device	1 Set	
2	Chips Conveyor	1 Set	
3	Blade Changing Device	1 Set	

三、Equipment Specification

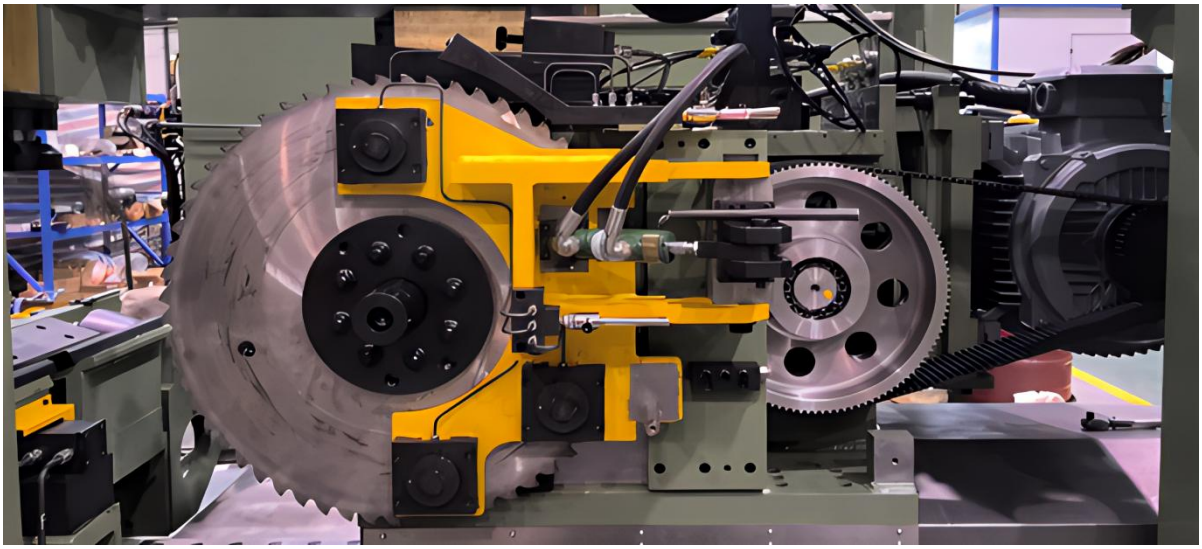
Item	Unit	Specification	Remarks
Performance			
Processed Billet Dia Range	mm	Φ80, Φ100, Φ180, Φ200	
Processed Billet Length	mm	12000	
Fixed Measure Length	mm	- 4500	
Spindle System			
Spindling Rotating Speed Pattern		CVT	
Overall Ratio		29.859	
Spindle Motor Power	Kw	55	
Blade Dia	mm	Ø 830	
Pressure Plate Flange Dia	mm	Ø 340	
Feed System (X Axis)			
X Axis Travel	mm	320	
X Axis Ball Screw (Dia x Lead)	mm	Ø 63 x10	
X Axis Servo Motor		1FK7108 8KW	
Fast Moving Speed	m/min	6	
Clamping System			
Drive Pattern		Hydraulic	
Vertical Claw Stroke	mm	320	
Horizontal Claw Stroke	mm	50	
Clamping Force	kN	35-55(2 sets)	

	The travel between the feeding and discharging fixtures	mm	5	
Hydraulic System				
	Servo Motor		22KW	
	Hydraulic Pump Flow	L/min	105	
	Working Pressure	bar	120	
	Oil Tank Capacity	L	600	
Centralized Lubrication System				
	Type		AMO-II-150S	
	Motor	Kw	20w 220V/50HZ	
	Hydraulic Pump Flow	L/min	0.15	
	Working Pressure	bar	20	
	Oil Capacity	L	4	
Air Cooling System				
	Flow	Nm3/h	300	
	Working Pressure	bar	5-6	
Chain-Pattern Chips Conveyor				
	The height of the chip-discharging opening from the ground level	mm	1000	
	Speed	m/min	2.5	
	Motor		0.55Kw 380V 50HZ	
	Control System		Siemens	

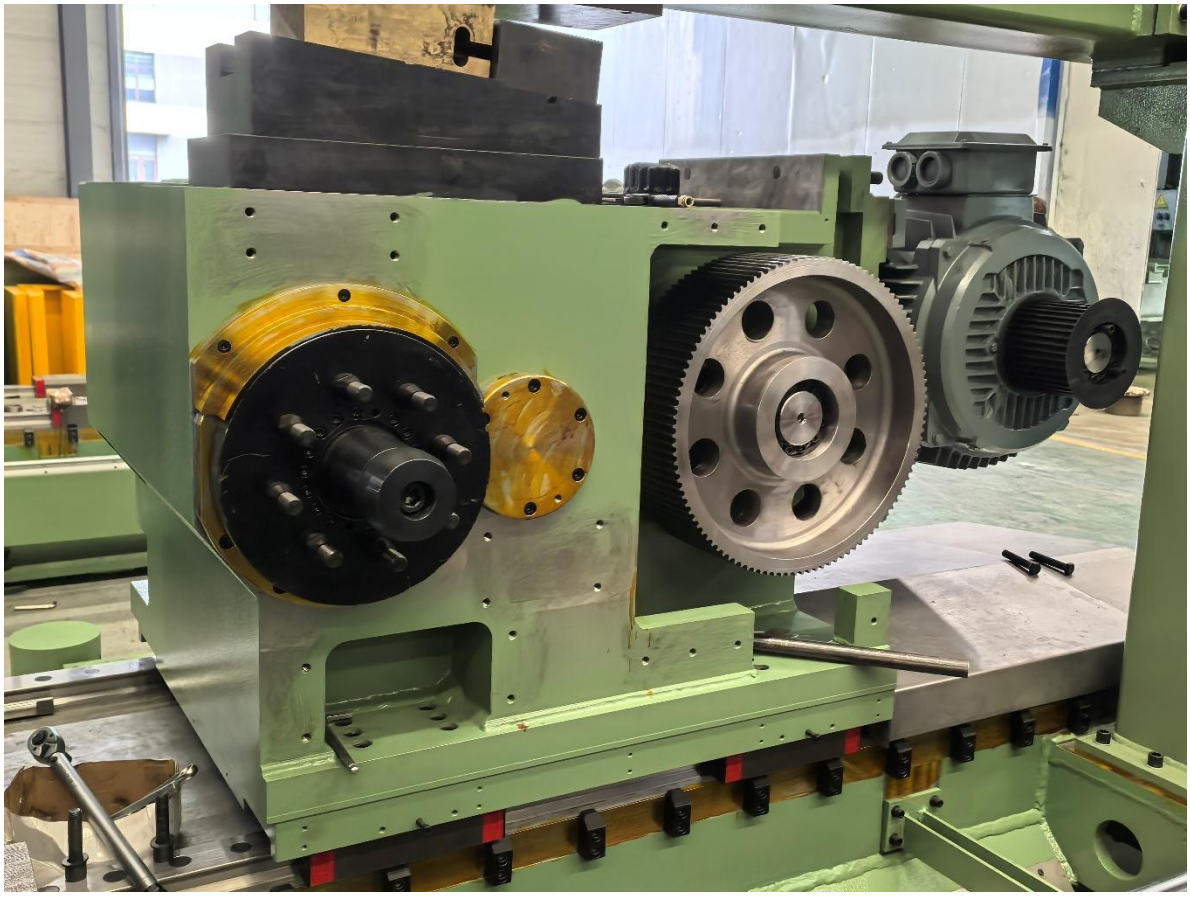
四、The Main Description Of The Mechanical Components

4.1 Billet Cutting Saw

The Billet Cutting Saw is composed of the following parts: saw box (including pulley wheel), main transmission device, slide plate feeding device, bed base, etc.



4.1.1 Saw Box (Tooling Box)



The Tooling box is a critical transmission component of the circular cold saw, engineered for high precision, durability, and stability. It is constructed from **Q345-B structural steel** through a **welded assembly**, followed by **stress-relief aging treatment** to eliminate internal stresses and ensure long-term structural integrity.

The sawbox features **four rows of bearing bores**, which are machined using an optimized process. After the housing and cover are assembled, all bores are **machined in a single pass using a combined boring bar**, ensuring high **positional and dimensional accuracy** across the entire bore system.

Internally, the gearbox adopts a **zero-backlash gear transmission structure**. All gears are made from **high-grade alloy steel**, subjected to **quenching and precision grinding**, achieving **Grade 6 gear accuracy**. The input, output, and intermediate shafts are also made from high-quality steel and undergo **quenching and grinding** to ensure strength and wear resistance.

The bearing system incorporates **imported precision bearings**: **INA needle bearings** are used for critical positions, while other bearings are sourced from **NSK or FAG**, ensuring smooth operation and extended service life.

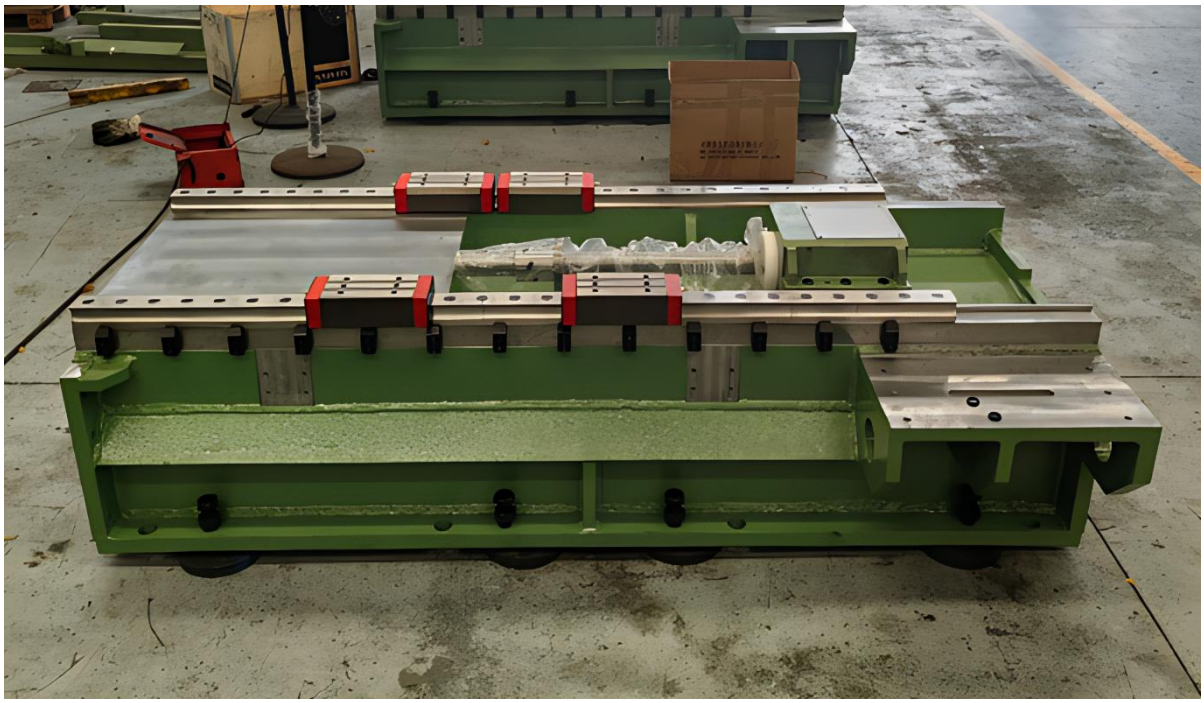
To prevent deformation of the input shaft (I-shaft), a **load-relief structure** is implemented between the pulley and the shaft. This design maintains the pulley groove position for consistent alignment with the main motor, while also allowing for easy assembly and disassembly.

The **main spindle bearings and gears are lubricated via an oil cooling system**, which provides excellent thermal management. This results in a transmission system with **high rigidity, low temperature rise, and superior precision**.

The **zero-backlash gear design** not only reduces impact loads on gears and bearings—extending their lifespan—but also significantly **lowers operational noise**, contributing to a quieter and more efficient working environment.

4.1.2 Guide Mechanism

The guide mechanism is designed with high-precision components, consisting of a carriage, a pair of preloaded roller linear guides, and an auxiliary pressure unit. It enhances the stability and service life of sawing equipment under heavy-load conditions.



4.1.2.1 Preloaded Roller Linear Guide:

Offers high rigidity and load capacity, ensuring precise and stable linear motion of the carriage

4.1.2.2 Auxiliary Pressure Unit

Composed of a hydraulic cylinder, wedge block, and flat guide rail, it dynamically applies pressure:

- ✧ During feed-in: the cylinder pushes the wedge to press the flat guide, transferring cutting force to the base and reducing overturning moment on the main guide.
- ✧ During idle: the cylinder retracts to reduce system load.

4.1.2.3 Optimized Structural Design

The lowest surface of the auxiliary rail aligns with the lowest point of the largest saw blade, maximizing force transfer efficiency and protecting the guide system.

4.1.2.4 High Guiding Accuracy and Stability

Coordinated structure ensures precision under high-frequency, high-load conditions.

4.1.2.5 Extended Service Life

Reduces stress and wear on the main guide, enhancing overall reliability.

4.1.2.6 Reduced Energy Consumption and Maintenance

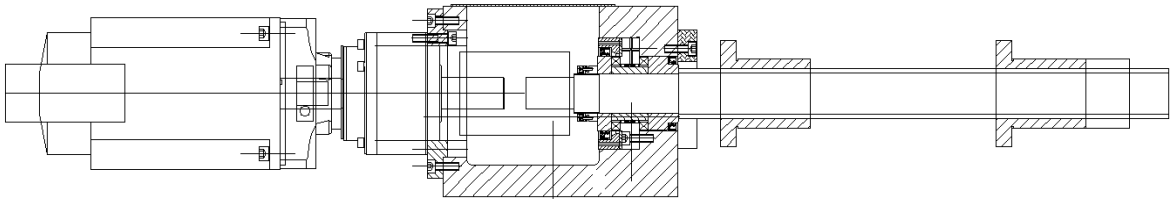
Automatic unloading minimizes energy use and mechanical stress during idle periods.

4.2 Main Transmission System

The machine tool is equipped with a powerful variable frequency motor. The spindle motor drives the spindle and saw blades rotate at high speed through belts and gears.

4.3 Slide Feeding System (X-Axis Feeding System)

The servo motor is decelerated by a precision reducer and connected to a ball screw to drive the saw box to move forward and backward along the bed guide rail.



4.4 Bed Base of The Sawing Machine

The machine bed, serving as the fundamental load-bearing structure, is fabricated from thick welded

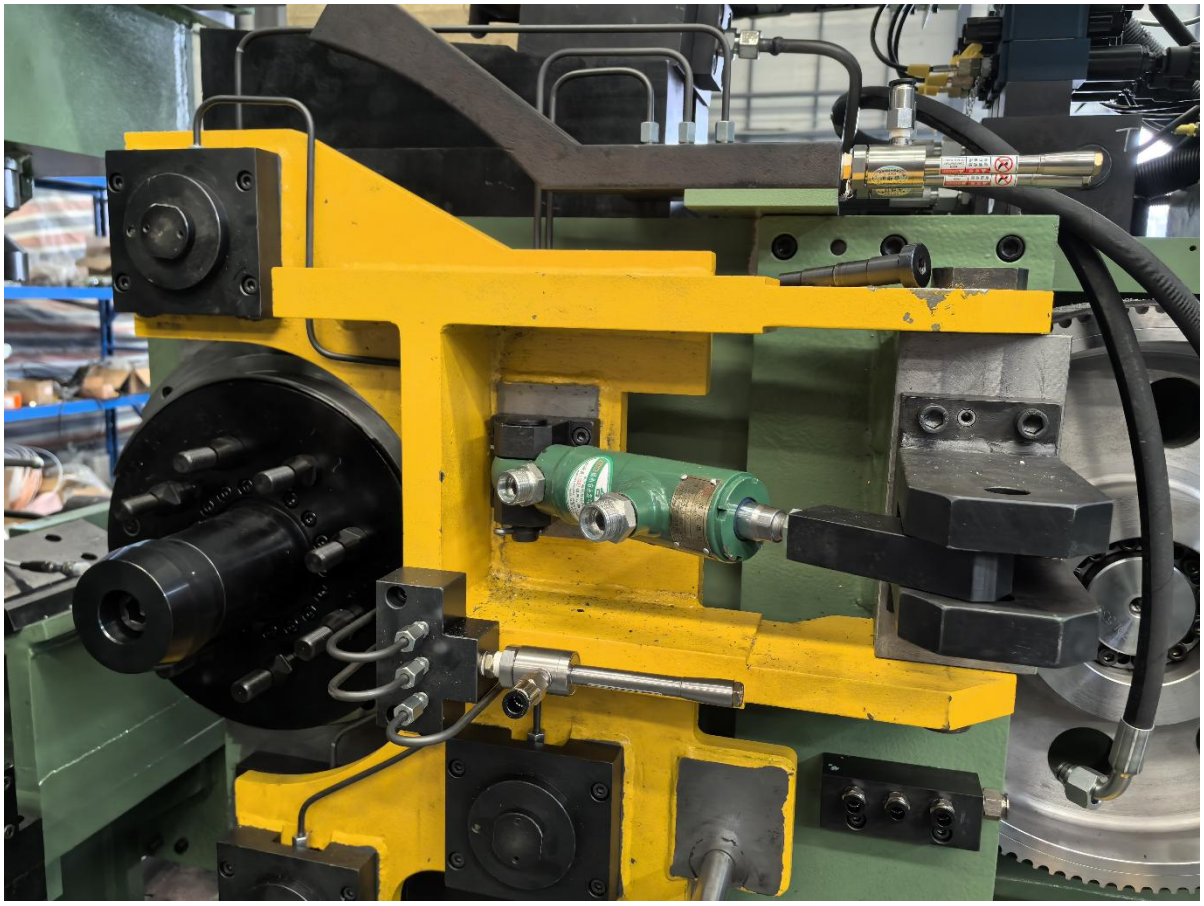
steel plates with densely arranged internal rib reinforcements forming a closed box structure.

High-strength concrete is filled inside to enhance overall rigidity and damping performance, effectively suppressing vibration and deformation.

The entire structure undergoes thermal or vibratory stress relief treatment to eliminate residual welding stress and ensure long-term dimensional stability.

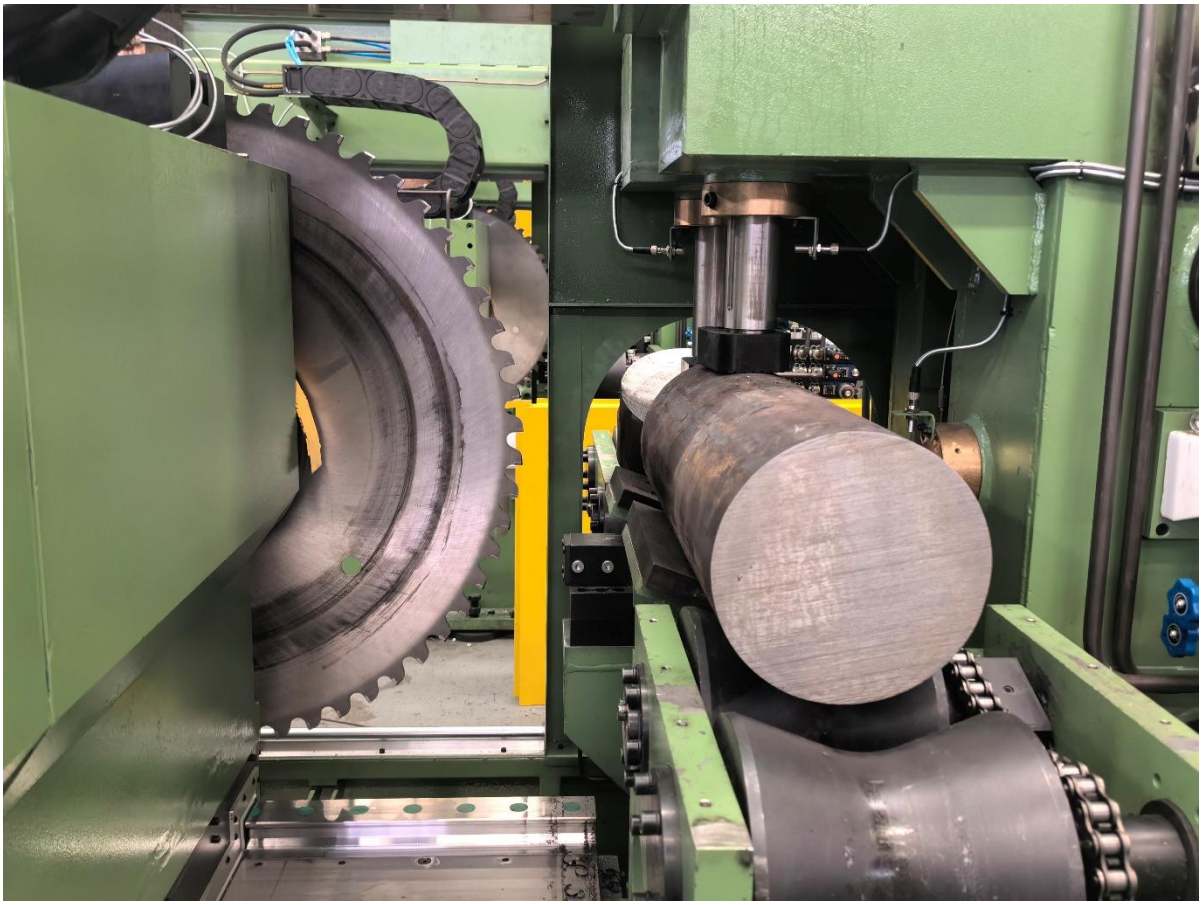
Two high-precision linear guideways are mounted on precisely machined surfaces of the bed, providing smooth and accurate linear guidance for the saw head with excellent load capacity and operational stability.

4.5 Saw Blade Guide/Shock Absorption Device



The machine is equipped with three sets of guiding/damping units mounted on both sides of the saw blade. These units effectively suppress vibration during the blade's entry and exit from the workpiece, ensuring smooth and stable cutting. Additionally, they prevent bending vibrations caused by high-speed blade rotation, thereby improving cutting accuracy and extending blade life. Friction pads are used as lining materials, offering flexible support and excellent energy absorption and damping characteristics for efficient dynamic stability control.

4.6 Clamping System



Each side of the saw blade is equipped with a hydraulic clamping unit, consisting of a horizontal clamp, a vertical clamp, and a clamping base.

These units provide multi-directional, stable clamping of the pipe billet, ensuring precise positioning and rigidity during the sawing process. The clamps are hydraulically actuated, delivering strong clamping force and fast response, making them ideal for high-frequency, automated cutting operations.

To facilitate rapid blade retraction and prevent interference, each clamping unit features an automatic separation function, which opens a 5 mm gap after cutting is completed, allowing the saw blade to exit smoothly and safely, thereby improving cycle time and operational safety.

4.7 Chips Cleaning Device

The micro-motor drives the brush to clean the sawtooth surface

4.8 Lifting Roller Table at The Exit

Near the side of the sawing machine, at the discharge position, there is an adjustable height lift roller in a 140°V shape, hydraulically controlled so that the tube blank can pass through the clamping device without colliding with it.

4.9 Auxiliary Equipment

4.9.1 Chip Conveyor

Discharge the sawdust from the sawing machine processing area. Use a magnetic structure.

4.9.2 Servo Cut-to-Length Device

The feeding trolley is mounted on a vertically adjustable base and driven by a servo gear motor through a rack-and-pinion mechanism for precise linear movement along guide rails. Equipped with a hydraulic clamping arm to secure the billet, the lifting function of the base effectively prevents interference between the billet and the fixture during feeding, ensuring safe and stable operation.

4.9.3 Saw Blade Replacement Device

The saw blade replacement device is placed beside the saw machine and consists of a cantilever hoist and an electric hoist.

4.9.4 Hydraulic System

The hydraulic station primarily supplies stable hydraulic power to the fixture cylinders, discharge swing cylinder, and drive motor.

The system consists of a motor, hydraulic pump, heater, water-cooling unit, oil tank, valve manifold, and indicators for oil level and temperature. It features real-time monitoring and alarm functions for oil temperature, oil level, and system pressure.

The hydraulic system is designed to operate within a temperature range of +5°C to +45°C, with a water-cooled circuit maintaining coolant temperature between 0°C and 35°C, ensuring thermal stability and operational reliability under high-load conditions.

4.9.5 Lubrication System

Function**:** Intermittent, precise oil dose for lubrication points such as guide rails, ball screw nut pairs, etc.

Lubricating pump nominal pressure	**2MPa**
Lubrication pump power	0.02 kW
Lubricating pump flow	0.15 l/min
Tank capacity	4 l

4.9.6 Air Cooling System

This system is primarily designed to provide efficient cooling for the saw blade and cutting zone. It consists of a pipeline cooler, nozzles, and connecting ducts.

Compressed air is pre-cooled via the pipeline cooler before being directed onto the saw teeth and blade surface, effectively reducing the heat generated during cutting.

This cooling method helps lower the operating temperature of the saw blade, extend its service life, reduce equipment thermal load, and enhance overall machining stability and efficiency

五、The Main Description Of The Electrical Components

5.1 Power Supply

No	Item	Specification
1	Voltage	Three-phase AC380V 50HZ
2	Power	About 100 w
3	Short-circuit capacity	≤ 50kA
4	Control Voltage	24 V, DC
5	PLC Voltage	24 V, DC, for input/output,
6	Emergency Stop	24 V, DC
7	Solenoid valve voltage	24 V, DC

5.2 Switch Cabinet

The switch cabinet contains all the electrical equipment. /Control: PLC Siemens Simatic S7-1500

(Siemens)

5.3 Cable

Cables are connected between terminal boxes, consoles and switch cabinets, and are installed in cable trough boxes and soft sheaths.

5.4 Console

The control panel is located near the machine tool, and all the necessary control buttons and displays are on the panel.

5.5 Data Input

5.5.1 Material data

5.5.2 Tube blank data

5.5.3 Saw blade data

5.6 Display :

5.6.1 Sawing speed (m/min)

5.6.2 Feed/serrations (cutting thickness mm)

5.6.3 Feed rate (mm/min)

5.6.4 Power control of saw blade drive (%)

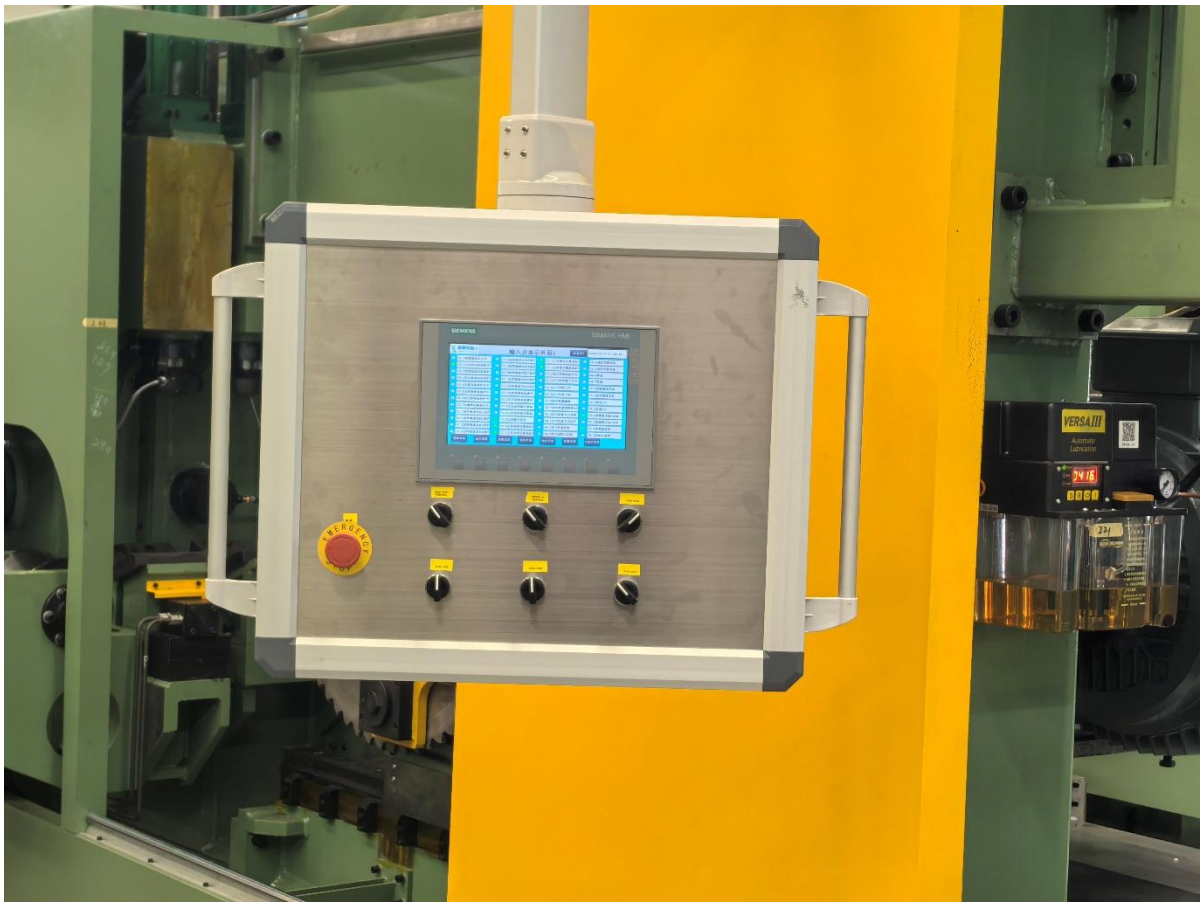
5.6.5 Saw blade travel

5.6.6 Tool life (m^2)

5.7 Data Recording

The sawing machine has the ability to store all necessary information about the steel pipe, such as billet diameter, current, sawing parameters, etc., which can be recorded, archived and summarized for review.

5.8 Electrical Control System

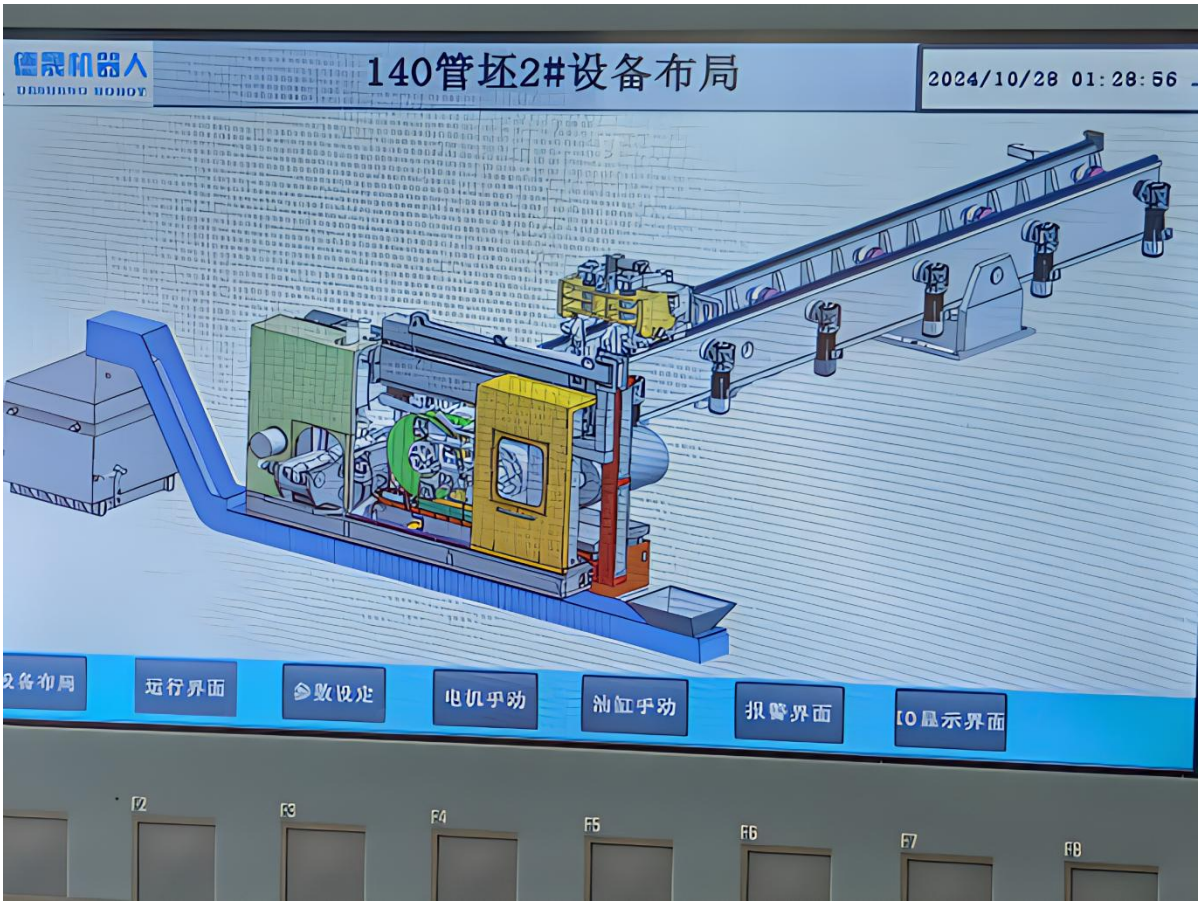


The system adopts Siemens S7-1500 series PLC as the core control platform, integrated with the latest generation servo drive system and G120 inverter to achieve precise control of saw blade feed, spindle speed, and auxiliary operations.

The HMI features a 10.4-inch high-resolution touchscreen for intuitive operation. The servo system utilizes encoder feedback to implement semi-closed loop control, ensuring feed accuracy and stability. The hydraulic system includes pressure, level, and filter differential pressure monitoring, with alarm and maintenance prompts.

The entire system incorporates diagnostic and configurable safety protection functions to ensure efficient and safe operation.

5.8.1 Main Operation Display



The HMI is developed using WinCC software, offering a visually appealing and intuitive interface that clearly displays the operational status of the equipment.

The main operation screen shows the control mode (automatic/manual), the current program and segment in execution, real-time axis positions, spindle speed, and feed rate. The parameter setting screen allows configuration of product-specific parameters and workpiece zero points.

The program editing screen enables creation and selection of programs in automatic mode. The alarm diagnostics screen provides real-time display of alarm codes and error messages.

The system supports centralized control via an upper-level computer in the main control room, enabling remote operation of the pre-saw and post-saw roller conveyors and the loading platform area, fulfilling the requirements for fully automated, unmanned pipe billet sawing.

5.8.2 Operational Model

The pipe billet sawing system consists of the main machine, feeding conveyor, and discharge conveyor, each supporting both automatic and manual operation modes. Automatic operation is initiated via the “continuous operation” button (on the main machine panel as the “Auto” mode key), while manual operation is controlled through individual step buttons (including the “Manual” mode key and other

manual controls). Based on the selected mode, the system supports three operating modes:

- **Automatic Mode**: All sections (feeding, cutting, discharging) operate automatically. After selecting and confirming the appropriate program, the operator starts the process via the “Cycle Start” button on the main panel. The entire line runs in a coordinated, fully automated cycle.
- **Semi-Automatic Mode**: The main machine operates automatically, while other sections may be in manual mode. This mode is used for temporary faults or maintenance, allowing production to continue with partial manual intervention.
- **Manual Mode**: All sections are manually controlled, suitable for initial setup and maintenance. Cutting operations are not permitted in this mode.

六、Working Referral Video

七、Contact Us

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