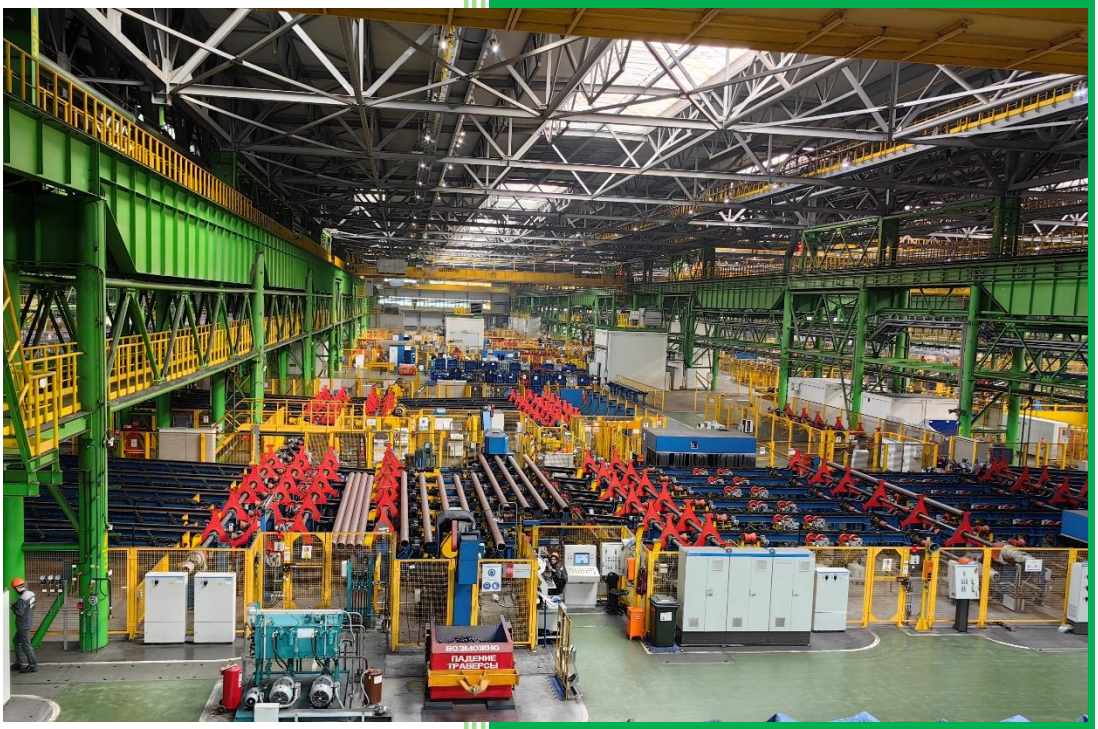
2025

Pipe Threading Machine



Hotstone Zhou

Hotstone Group Co., Ltd

2025-6-12

CNC Pipe Threading Machine | DSMT-13

High Efficiency · High Precision · Intelligent Control

一、Production Introduction: High Performance Pipe Threading Machine

This product is a domestically developed high-end CNC pipe threading machine, independently designed by our company based on advanced structural technologies from overseas models. It is specifically engineered for the metallurgical steel pipe industry, targeting multi-tool, three-directional simultaneous threading operations on both ends of oil casing pipes.

1.1 Processing Method

The machine adopts a cutting method where the pipe rotates while the tool feeds linearly. It can perform a wide range of machining operations, including external turning, end face machining, internal and external chamfering, thread cutting, deburring of thread starts, as well as sealing surface and shoulder processing.

1.2 Thread Compatibility

It supports the efficient and precise machining of API 5CT, API 5B, and various special thread types, meeting diverse production requirements.

1.3 System Configuration

The machine offers high automation, precision, and productivity, and can be equipped with mainstream CNC systems such as FANUC or Siemens according to user preferences.

二、Equipment Composition

This equipment is mainly composed of the following components

No	Item	Qty	Remarks
1	Loading Roller Conveyor Bench	1 Set	Auxiliary
2	Walking Beam & Transfer Table	1 Set	Auxiliary
3	Align Roller Table	1 Set	Auxiliary
4	Rotary Reset Roller with lifting Adjustment Device	1 Set	Auxiliary
5	Conveyor roller with lifting Adjustment Device	1 Set	Auxiliary
6	Servo Feeding Roller	1 Set	Auxiliary
7	Threading Machine	1 Set	
8	Pipe Stopper	1 Set	
9	Conformator	1 Set	
10	Hydraulic System	1 Set	
11	Lubrication System	1 Set	
12	Emulsion Cooling System	1 Set	
13	Chip Conveyor Device	1 Set	
14	Control System	1 Set	

三、Pipe Threading Process Flow Description

3.1 Loading to Pre-Alignment Roller Table

The stepping beam transfer machine moves the pipe material onto the pre-alignment roller table.

3.2 Initial Alignment

The rollers on the pre-alignment table rotate to feed the pipe toward the alignment stopper for preliminary positioning.

3.3 Transfer to Threading Machine Feed Rollers

The stepping beam transfer machine moves the pipe from the pre-alignment table to the feed roller table in front of the main machine.

3.4 Clamping by Servo Feeding Rollers

The servo-driven feeding rollers clamp the pipe material securely.

3.5 Fast Feeding

The feeding rollers rapidly advance the pipe toward the processing area.

3.6 Slow Precision Feeding

As the pipe approaches the stopper, the rollers switch to slow speed for precise positioning.

3.7 Centering and Clamping by Chucks

The centering arms of the front chuck extend to align the pipe. Then, the front and rear chucks clamp the pipe in sequence to secure it.

3.8 Retraction of Positioning Devices

The centering arms and stopper retract to clear the processing area.

3.9 Support by Rotating Rollers and Hook

The rotating support supports the rollers lift to support the pipe. For pipes with an outer diameter of 4 1/2" or less, a hook presses down to prevent movement.

3.10 Lowering of Feed Rollers

The feeding rollers lower to avoid interference during processing.

3.11 Conformator Extension

The conformator mechanism extends to brace the pipe from within, ensuring stability and concentricity during machining.

3.12 Spindle Rotation and Rapid Approach to the pipe

The main spindle of the machine begins to rotate. Simultaneously, the machining axis rapidly moves toward the positioned pipe material, preparing for the cutting or processing operation.

3.13 Cutting Operation Begins

Once the spindle reaches the specified cutting speed and maintains stable rotation, the cutting tool engages the pipe material and performs the machining operation.

3.14 Completion Of Machining And Conformator Retraction

After the machining process is completed, the conformator loosens and retracts from the pipe.

3.15 Pipe Unloading Preparation

- The feed roller table rises.
- The rotating support rollers lower.

- For pipes with an outer diameter of 4 1/2" or less, the hook lifts to release the pipe.
- The servo feeding rollers clamp the pipe again.

3.16 Chuck Release

The front and rear chucks release the pipe material.

3.17 Rapid Pipe Retraction

The servo feeding rollers rapidly retract the pipe from the threading machine.

3.18 Feeding Rollers Open

The servo feeding rollers open to release the pipe completely.

3.19 Transfer to Next Station

The stepping beam transfer machine moves the processed pipe to the next workstation and simultaneously loads a new pipe for processing.

3.20 Next Pipe Processing Begins

The cycle repeats as the next pipe begins its processing sequence.

四、Equipment Specification

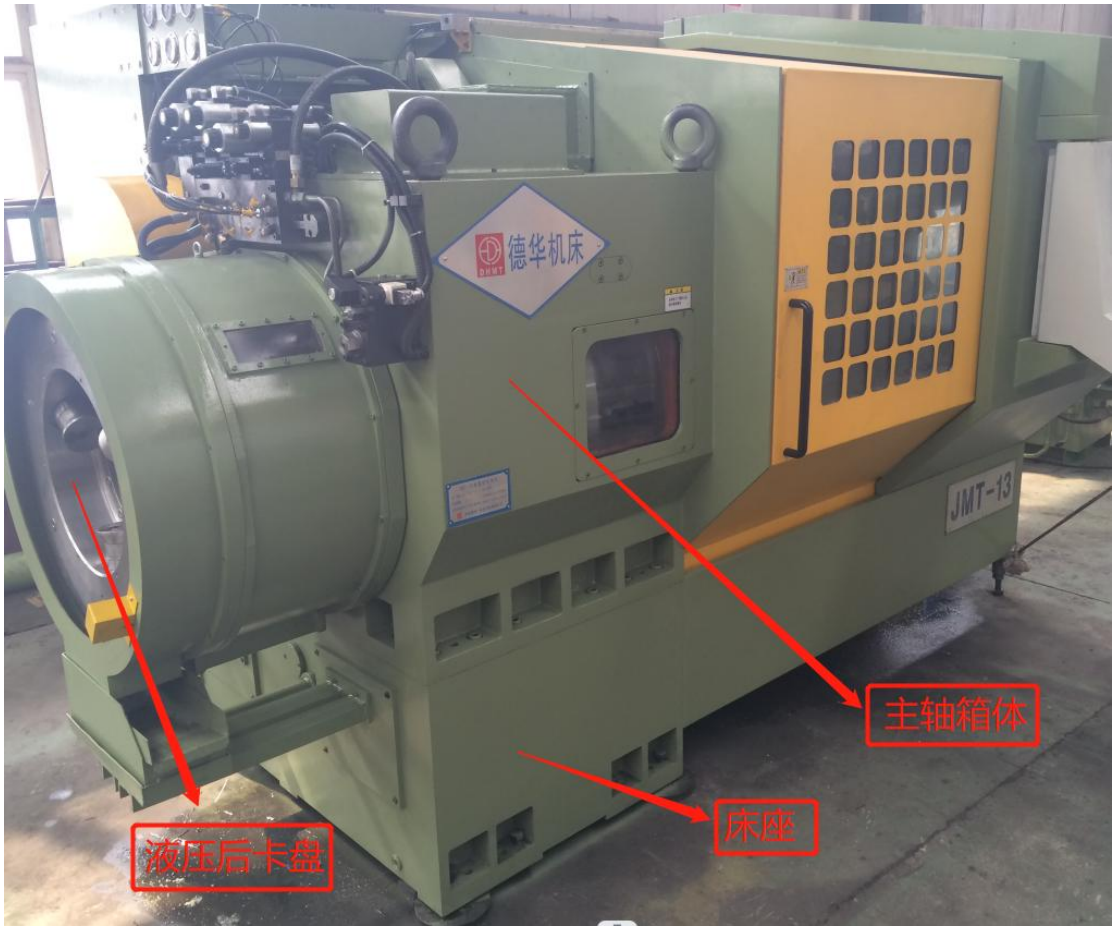
No	Item	Unit	Specification
			DSMT-13
1	Max Cutting Pipe Dia	inch	4 1/2 ”- 13 3/8 ”
2	Max Cutting pipe Length	mm	12000
Spindle Performance			
1	Spindle Through Hole	mm	380
2	Spindle Speed	Rpm	600
3	Spindle Motor Power	Kw	160
4	Height of spindle center	mm	1200
Feeding Axis System			
1	X1/Y1/Z1 Travel	mm	160/160/550
2	X2/Z2 Travel	mm	140/700
3	X1/Y1/Z1 Fast Moving Speed	m/min	15/15
4	X2/Z2 Fast Moving Speed	m/min	20/20
Turret System			
1	Turret Positions		5
2	Turret Drive Pattern		Servo Motor
Clamping Chucks			
1	Hydraulic Chucks		Double
Hydraulic System			

1	Hydraulic Pump Power	Kw	5.5
2	Hydraulic Pump Flow	L/Min	40
3	Working Pressure	Bar	70
4	Oil Tank Capa City	L	200
5	Accumulator capacity	L	20L @ 35 Bar
Spindle Cooling System			
1	Oil Pump motor Power	hp	3
2	Oil Pump Flow	L/min	60
3	Working Pressure	Bar	3-5
4	Oil Tank Capacity	L	4
Centering Lubrication System			
1	Oil Pump motor Power	Kw	20
2	Oil Pump Flow	L/min	0.15
3	Working Pressure	Bar	20
4	Oil Tank Capacity	L	4
Emulsion Cooling System			
1	Oil Pump motor Power	Kw	4
2	Oil Pump Flow	L/ Min	100
3	Working Pressure	Bar	25
4	Oil Tank Capacity	L	1200
Processing Accuracy Performance			
1	Position Accuracy (X1/Y1/Z1)	Mm	0.006/0.006/0.008
2	Repeat Position Accuracy	Mm	0.006/0.006/0.008
3	Backsplash (X1/Y1/Z1)	mm	0.02
4	Workpiece circular run-out error	Mm	0.01/200mm
5	Roughness	Um	Ral1.6 Less
Control System			
1	Control System		Sinumerik One/Simens

五、The Main Description Of The Mechanical Components

The threading machine adopts resin sand molding and high-strength stress-free cast iron, maximizing the vibration damping performance of castings to ensure long-term precision stability. The design incorporates computer finite element analysis and a framework-type internal rib plate structure, offering superior resistance to vibration, bending, and torsion.

The auxiliary machine's large structural components are made of welded steel plates, combined with advanced pre-welding treatment, advanced large-part welding techniques, heat treatment, and machining processes. This effectively reduces welding stress while ensuring excellent rigidity and strength.



5.1 Spindle Box

The spindle box is integrally cast from high-strength cast iron and undergoes dual high-temperature annealing to eliminate internal stress, ensuring long-term dimensional stability and resistance to deformation and its internal ribbed structure enhances rigidity and improves vibration damping.

The spindle features a large through-bore design for machining large-diameter or long-shaft parts. It is supported by high-precision imported tapered roller bearings and uses a hydraulic system for oil cooling and forced lubrication, ensuring excellent thermal stability and consistent accuracy under high-speed, heavy-load conditions.

The spindle assembly offers high rigidity, low thermal distortion, minimal temperature rise, and outstanding machining precision—ideal for demanding, high-efficiency applications.

5.2 Machine Bed

The machine adopts a 45° slant bed design, providing optimized force distribution during cutting and effectively withstanding multi-directional cutting forces. The enlarged chip evacuation space prevents chip entanglement around pipe threads. The bed is integrally cast from high-grade cast iron and undergoes dual annealing to eliminate internal stress. Its internal rib structure features a closed-frame design, widely recognized for superior resistance to bending and torsion, significantly enhancing rigidity, machining accuracy, and long-term stability.

The guideways are steel-inlaid, induction-hardened, and precision-ground, with a hardening depth of no less than 2.5 mm and a surface hardness of HRC70. The base adopts an integrated box-type structure with densely arranged reinforcing ribs. The spindle lubrication chamber is cast integrally with the base, ensuring excellent structural rigidity and completely eliminating the risk of oil leakage during operation.

5.3 5-Axis Feeding System

Three-Axis Feed System (1st Route) & Two-Axis Auxiliary Feed System (2nd Route)

These two configurations serve as the core feed and auxiliary feed functions, respectively. By integrating high-precision bearings, ball screws, servo motors, and encoder-based closed-loop

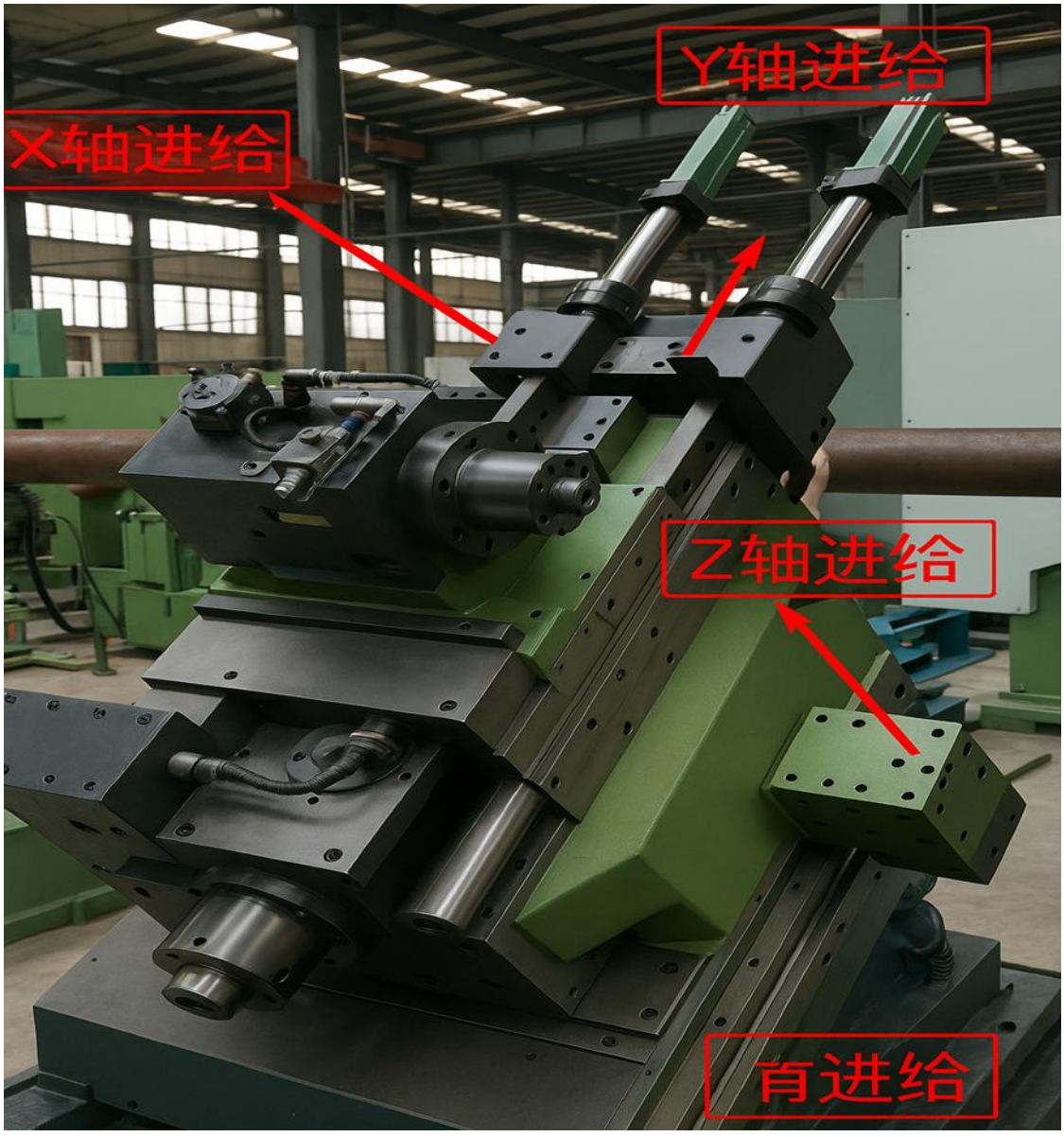
control, they ensure high precision, rigidity, and thrust in CNC machines.

5.3.1 Three-Axis Feed System (1st Route)

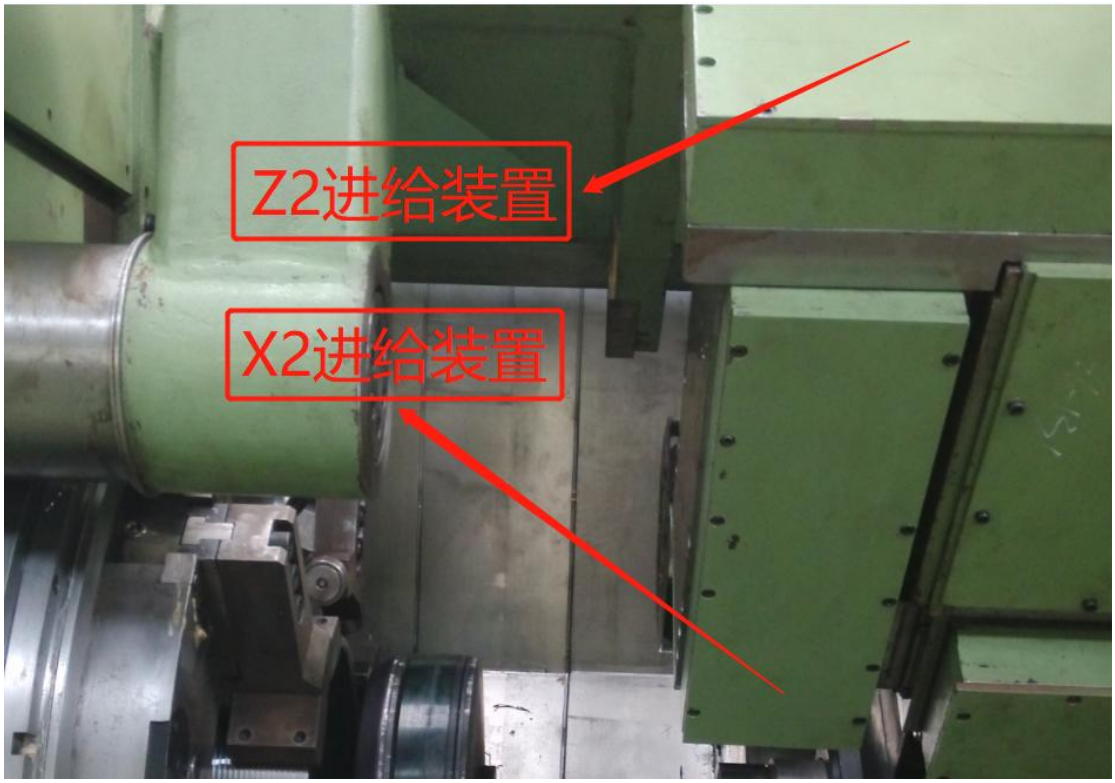
5.3.1.1 Utilizes INA ZARN heavy-duty needle thrust cylindrical roller bearings for high precision and load capacity.

5.3.1.2 The feed motor and ball screw adopt synchronous belt speed reduction transmission to enhance feed thrust and minimize drive inertia.

5.3.1.3 encoder is installed at the end of the ball screw to provide real-time position feedback, enabling closed-loop control and further improving machine accuracy.



5.3.2 Two-Axis Auxiliary Feed System (2nd Channel)



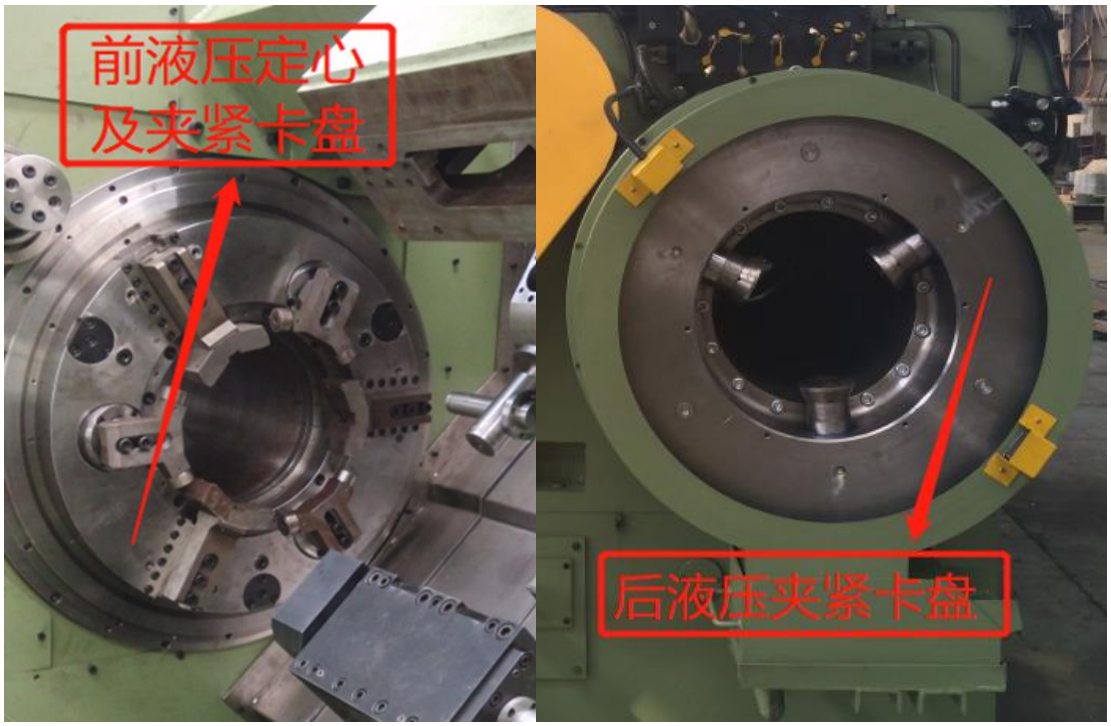
5.3.2.1 X2 (transverse axis) and Z2 (longitudinal axis) use servo motors + high-precision ball screws + rolling guide rails for transmission, ensuring stability and accuracy.

5.3.2.2 Z2 longitudinal auxiliary axis is mounted on the X2 transverse auxiliary axis, utilizing it as a support structure for coordinated movement.

5.3.2.3 Positioning data is fed back to the CNC system via servo motor encoders, ensuring the precise operation of the auxiliary carriage axis.

The combination of these feed systems enhances **machine stability and control accuracy**, making them well-suited for **high-precision machining applications**.

5.4 Front and Rear Clamping Chuck



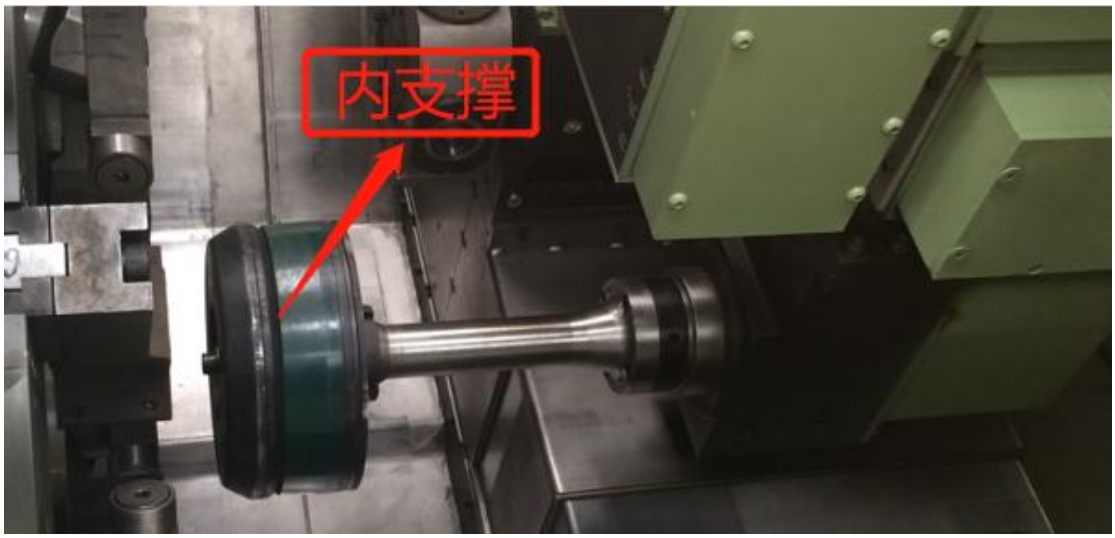
The front and rear clamping chuck system adopts a dual hydraulic chuck structure to ensure stability and precision during steel pipe processing. Before clamping the steel pipe, the front chuck utilizes a multi-thread screw mechanism driven by a hydraulic motor to extend the three-jaw centering clamping device, achieving floating clamping positioning. This process automatically adjusts the center, ensuring the pipe end centerline is as close as possible to the lathe spindle centerline for precise alignment.

After the centering operation is completed, the front and rear hydraulic chucks synchronously drive the clamping jaws to extend and further secure the steel pipe. This dual-chuck clamping design significantly enhances material fixation, effectively maintaining high stability of the steel pipe during rotational machining, thereby improving machining accuracy and production efficiency. The optimized structure ensures an even distribution of clamping force, reducing misalignment risks for more reliable processing.

5.5 Conformator

The Conformator consists of a rotating spindle and a hydraulic cylinder, which controls the expansion and contraction of the stabilizer via hydraulic actuation. Various stabilizer specifications can be installed depending on the inner diameter of the steel pipe.

The stabilizer is made of polyimide material, which, when compressed, tightly conforms to the internal surface of the steel pipe and rotates synchronously with it. The optimized design ensures even distribution of clamping force, reducing misalignment risks and enhancing processing reliability.



Its primary functions include:

- **Enhancing stability and reducing vibration:** Effectively minimizes vibration risks during machining, ensuring a stable process and significantly reducing noise levels.
- **Sealing the pipe end and optimizing fluid control:** Completely seals the pipe end to prevent emulsified fluid from leaking from the machining area to the opposite end of the pipe, maintaining the efficiency of the cooling and lubrication system.
- **Improving cutting precision:** Reduces workpiece vibration, ensuring smoother cutting processes and high-quality thread surfaces that meet precision machining standards.
- **Preventing contamination and material accumulation:** Effectively blocks cutting fluid and metal debris from entering the pipe interior, preventing contamination and residue buildup, thereby enhancing the reliability of the manufacturing process.

This refined structure guarantees stability during rotational machining, improving both production efficiency and machining quality.

5.6 Auxiliary Equipment: Pipe Loading and Unloading Table

The pipe loading and unloading table consists of a pipe pre-alignment system, pipe transport rollers, rotary roller system, stepping beam transfer mechanism, transport roller and rotary roller size adjustment mechanism, and servo feed system. Its primary function is to provide processing support for pipes and facilitate material transfer, ensuring precise pipe input and output

5.7 Emulsion Cooling System

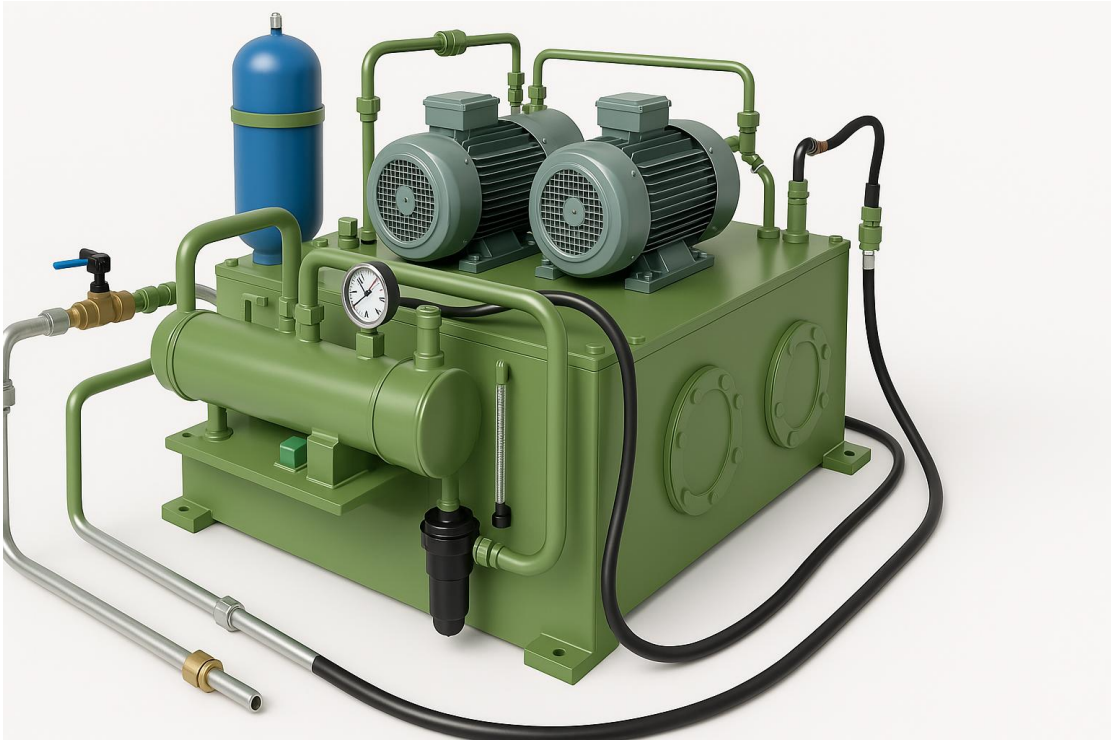
The system is equipped with a high-pressure, high-flow emulsion cooling mechanism. Through the cooling holes integrated into the tool head and tool holder of the threading machine, the cutting fluid is directly sprayed onto the cutting edge and machining area. This enables rapid cooling of the tool and workpiece, extending tool life and improving machining quality. The system ensures efficient cooling of the cutting tool edge and facilitates the removal of metal chips, thereby maintaining high-quality turning performance.

Emulsion Cooling System

Additionally, the system is fitted with a chip conveyor, which includes a return pump for filtering the emulsion fluid that enters the chip conveyor tank before returning it to the cooling reservoir. A liquid level detection device is also incorporated to ensure stable emulsion fluid supply and continuous operation.

5.8 Hydraulic System Overview

The hydraulic system features a modular design. The standalone Hydraulic Power Unit (HPU) can be installed flexibly to suit site requirements. It supplies hydraulic power for all machine tool and loading platform operations.



Control Functions

A central valve block on the spindle housing integrates solenoid valves, pressure-reducing valves, and actuators. It controls:

- Chuck jaw clamping and centring
- Workpiece stop mechanism
- Feed slide and tool turret balancing

Electro-hydraulic proportional control ensures fast and accurate operation.

Monitoring Features

The system includes:

- **Oil level sensor** – prevents dry running
- **Pressure sensor** – ensures safe operating pressure
- **Oil temperature sensor** – protects against overheating

5.9 Machine Tool Safety and Protection System

5.9.1 Multi-Level Limit Protection

The X, Y, and Z axis drive systems of the machine tool are equipped with electrical limit switches, software limits, and mechanical limiters. These multiple safety mechanisms ensure the machine operates within safe parameters, effectively preventing overtravel and other abnormal conditions, thereby guaranteeing the absolute safety of the operator.

5.9.2 Guideway and Leadscrew Protection

The bed and carriage guideways are protected by fully enclosed telescopic covers made of stainless steel, offering excellent corrosion resistance and impact protection. This design effectively shields the guideways and leadscrews from chips, coolant, and emulsions, significantly extending the service life of key components and enhancing overall machine reliability.

5.9.3 Fully Enclosed External Guarding

The machine features a modular, fully enclosed sheet metal guarding system with an aesthetically pleasing and compact design. It provides excellent sealing performance, effectively preventing the splashing of chips, oil, and emulsions during machining, thus improving workplace cleanliness and safety.

5.9.4 Interlocked Doors and Electrical Safety

The protective doors are equipped with interlock switches to ensure the machine cannot be operated when the doors are open. Additionally, the electrical cabinet includes a power-off protection mechanism when the door is opened, preventing accidental operation or electric shock during maintenance.

5.9.5 Compliance with International Safety Standards

The entire safety and protection system is designed in strict accordance with the European CE safety certification standards, ensuring the machine meets high international safety requirements and is compliant for global market access.

5.10 Electrical Control System

The machine is equipped with an internationally renowned CNC system (SIEMENS or FANUC), supporting automatic, semi-automatic, and manual operation modes to enable comprehensive automation of pipe machining processes.

The control panel features mode selection switches for manual, semi-automatic, and automatic operations, allowing flexible adaptation to varying process requirements. Real-time status

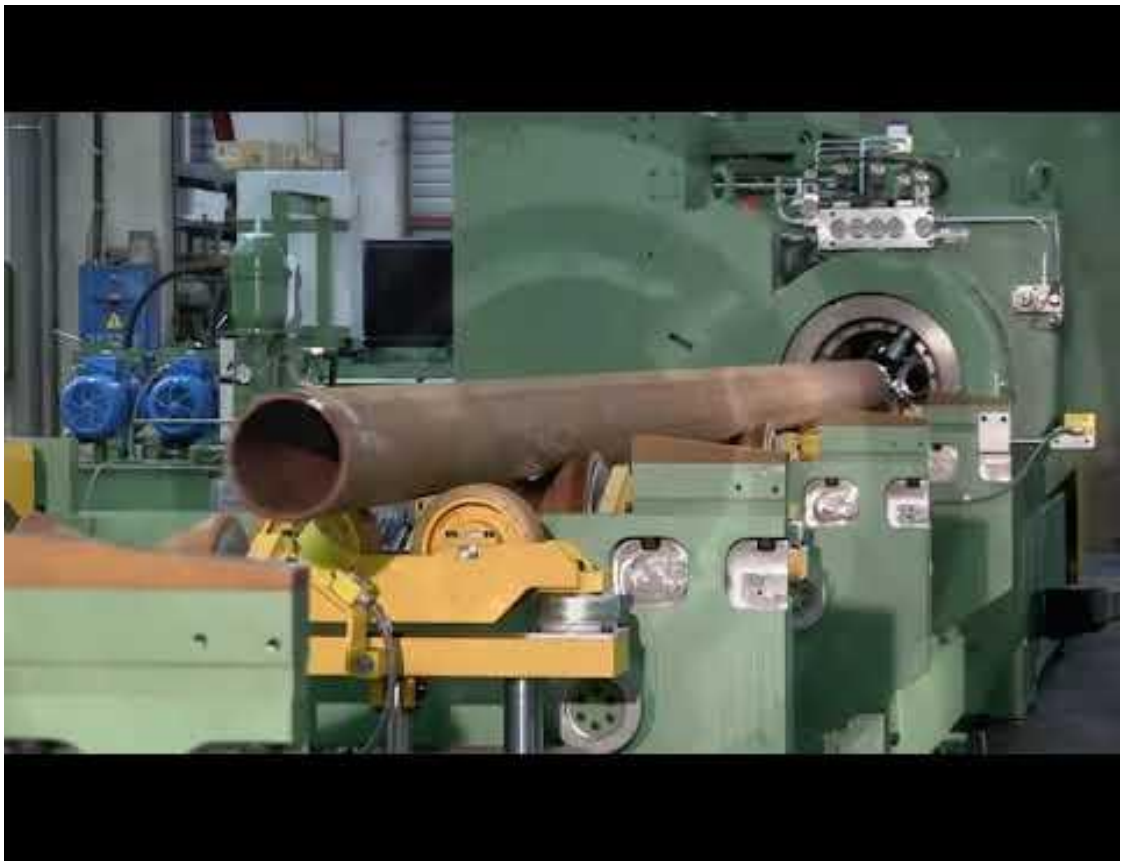
indicators enhance operational transparency and ensure safe, intuitive use.

A high-resolution touchscreen is integrated into the control panel, serving as the primary human-machine interface (HMI). It allows intuitive input of critical machining parameters—such as pipe diameter, thread profile, length, cutting speed, and feed rate—facilitating efficient and precise process configuration.

The system incorporates a built-in counter for tracking the number of processed workpieces, supporting production monitoring and traceability. It also enables parameter storage and retrieval, streamlining repetitive tasks and enhancing overall operational efficiency.

The control system supports graphical programming and parameterized configuration, offering high openness and compatibility. This simplifies program development, debugging, and maintenance, significantly lowering the technical barrier for operators.

六、Machine Working Video Referral



七、Contact Us

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