2025

Laser Tube Cutting Machine

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Laser Tube Cutting Machine | HTLT-12035GA

一、Production Introduction: High Performance Laser Tube Cutting Machine

The HTLT-12035GA laser tube cutting machine, a flagship model in the HTG series, is engineered for demanding industrial applications that require both high precision and high efficiency. Featuring a robust 12,000W continuous fiber laser source, it offers ultra-long tube cutting capabilities for metal pipes ranging from Φ16 mm to Φ350 mm in diameter. Designed for long-term reliability, it meets the operational needs of energy equipment manufacturing, construction steel processing, heavy machinery, and precision metal fabrication.

1.1 Versatile Applications Across Industries

Thanks to its comprehensive profile compatibility and intelligent system design, the HTLT-12035GA is widely adopted in sectors including:

✧ Renewable energy structures

- ✧ Heavy engineering and industrial equipment
- ✧ Automotive chassis and structural components
- ✧ Bridge and steel construction
- ✧ Custom metal fabrication

Its ability to handle round, square, rectangular, elliptical, channel, H-beam, and angle steel profiles makes it a versatile solution for complex industrial cutting tasks.

1.2 Key Technical Advantages

- ✧ **Auto-Focus Laser Cutting Head** The OSPRI or BOCI branded laser head features an advanced auto-focus mechanism with capacitive sensing, allowing consistent cutting height and optimal beam quality across various wall thicknesses. The dynamic lens system enhances cutting accuracy and reduces cycle time

- ✧ **Three-Chuck Zero Tailing Desig**n Featuring a patented triple chuck system with full-stroke pneumatic clamping, the machine supports ultra-long tube cutting with zero tailing waste, significantly increasing material yield and reducing production cost.

- ✧ **Dual-Control Servo Floating Support System** Driven by Inovance EtherCAT servo motors and pneumatic cylinders, the intelligent floating support mechanism automatically aligns with diverse pipe geometries to ensure optimal material positioning, minimize deflection, and maintain ±0.03 mm repeatability even during high-speed rotation (up to 85 rpm).

- ✧ **Integrated Remote Monitoring via Our Company's Cloud Platform** The machine is connected to our proprietary industrial cloud platform, which enables live equipment diagnostics, intelligent fault alerts, production tracking, and predictive maintenance, improving operational visibility and reducing unplanned downtime

二、Laser Cutting Performance

No	Item	Specification
1	Cutting Diameter Range	Φ20–Φ350 mm
2	Max Tube Cutting Length	12,300 mm
3	Positioning Accuracy	±0.05/1000mm
4	Repeated Positioning Accuracy	±0.03/1000mm
5	Max Accelerated Speed	1.0 G
6	Max Rotary Speed of Chuck	85 rpm
7	X/Y/Z Axis Max Speed	120 / 120 / 80 m/min
8	Load Capacity	800 Kg
9	Tailing	≥ 0mm
10	Power Supply	380V, 50Hz ±10%

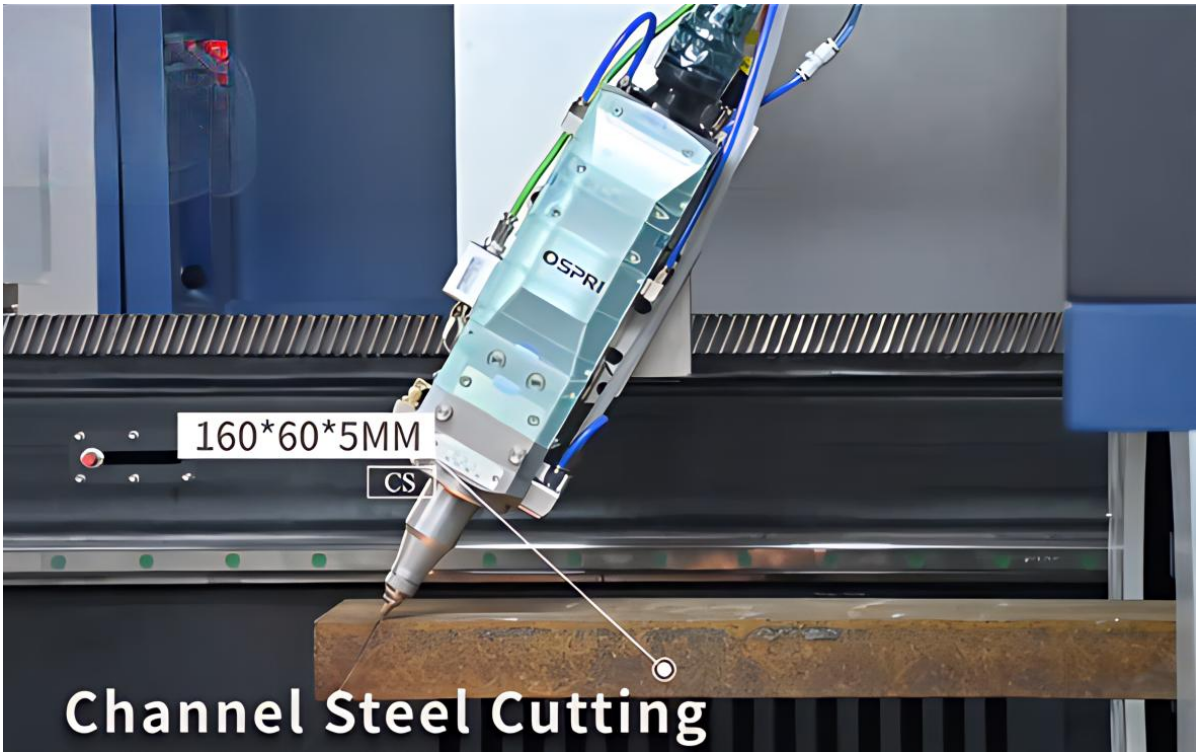
三、Equipment Composition

No	Item	Specification
1	Control System	FSCUT 5000A Ethercat control system
2	Cutting Software	FSCUT TubePro 3D Cutting Software
3	Laser Source	MAX 12000W
4	Laser Cutting Head	OSPRI or BOCI Bevel Cutting Head (Straight)
5	Cooling System	S&A Water-Cooled Chiller
6	Servo Motor	Yaskawa Servo Motor system
7	Reducer	Nidec (shimpoo Reducer from Japan)
8	Transmission System	YYC Rack and Pin, HIWIN Guide Rails
9	Machine Bed	Plate-welded, Excellent engineered, Stress-Relieved
10	Pipe Support System	Servo Floating Follow-up support & Platform servo support
11	Chuck System	3 pneumatic chucks/ Double pneumatic chucks

12	Electronic Parts	Schneide /Omron and Igus Cable
13	Hydraulic Parts	Schneide /Omron and Igus Cable
14	Electronic Cabinet	Independent
15	Smoke /dust Remove system	Yes
16	Protective Cover	Yes
17	Centralization Lubrication	Yes
18	Loading and unloading system	Optional

四、Main Components Introduction

4.1 Laser Cutting Head



±45° 3D Swing Cutting Capability

This laser head supports ±45° 3D swing bevel cutting, enabling precise processing of complex curved

surfaces. It is widely used in industries such as sheet metal fabrication, automotive manufacturing, and architectural decoration. The flexible swing mechanism ensures smoother cutting edges and improved overall cutting accuracy and aesthetics.

High-Speed Servo Collimation and Zoom System

Equipped with a high-speed servo-driven collimation and zoom system, the laser head allows for rapid and precise focal adjustments. This ensures optimal cutting performance across various material thicknesses, significantly enhancing cutting efficiency and consistency.

Triple Dust-Sealed Protective Lenses

The laser head features three tightly sealed protective lenses that effectively prevent dust from entering the optical path. This design extends the lifespan of optical components and ensures stable operation even in harsh industrial environments.

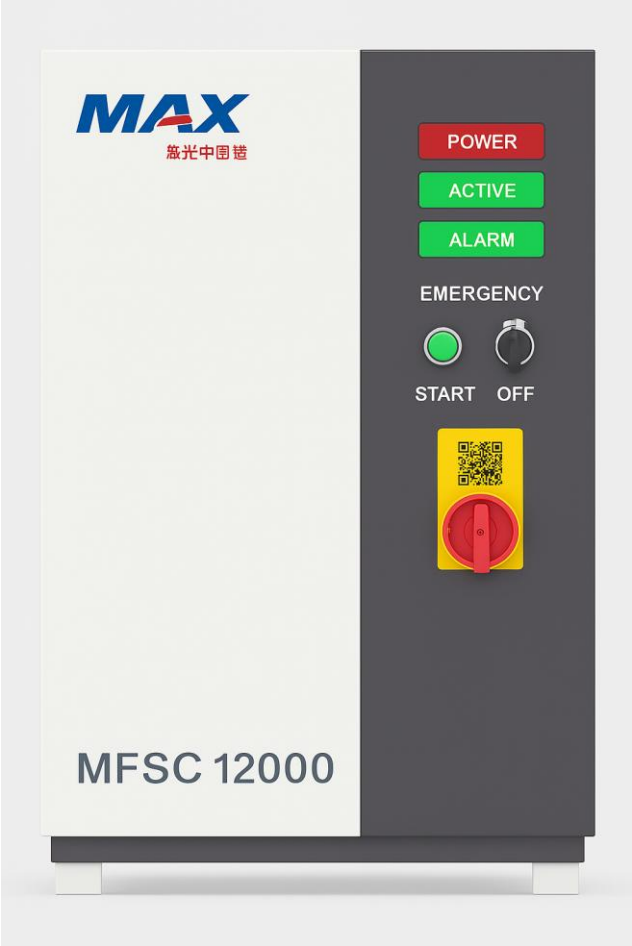
Standard QBH / QD Interface Compatibility

Designed with standard QBH and QD interfaces, the laser head is compatible with most mainstream laser sources. This facilitates quick integration and replacement, improving system flexibility and ease of use.

Modular Focus Protection Window

The independently designed modular focus protection window allows for easy and quick replacement. This reduces maintenance time and costs, while enhancing the overall maintainability and user convenience of the system.

4.2 Laser Resources



The **MAX MFSC series** single-mode continuous fiber laser is a high-performance industrial laser source designed for precision cutting, fine welding, and micromachining. Built by a globally recognized brand, it features a modular and highly integrated architecture that ensures long-term reliability and maintenance-free operation.

With high **photoelectric conversion efficiency**, the system delivers stable, high-density energy output while minimizing power consumption. Its **superior beam quality** ensures clean, accurate processing with minimal thermal impact. The laser supports continuously adjustable power and uses a **QBH fiber output interface**, making it compatible with a wide range of laser processing systems. Designed for industrial environments, it offers **long service life** and consistent performance with minimal downtime.

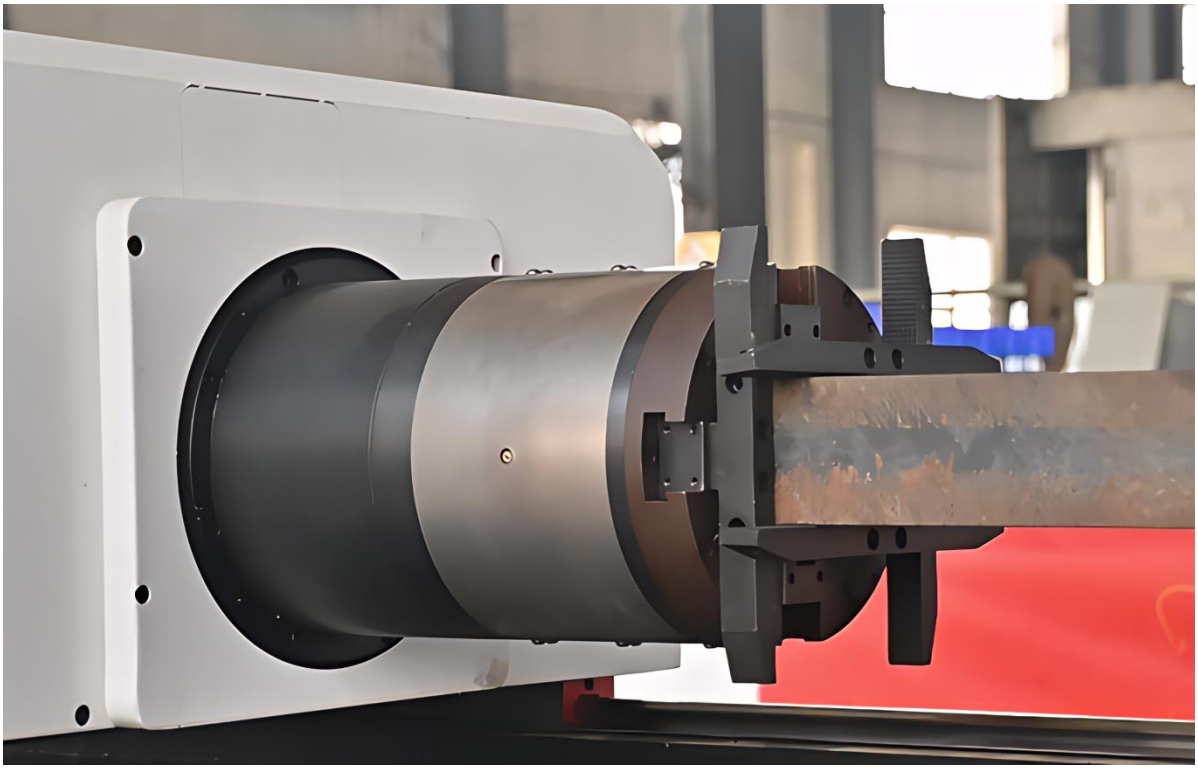
4.3 Patented Full-Stroke Pneumatic Chuck (Front-Mounted)

The patented front-mounted full-stroke pneumatic chuck is engineered for high-performance tube and profile clamping in industrial laser cutting systems. Featuring a **square-through-hole design**, it offers enhanced material pass-through capability, making it suitable for a wide range of profile types.

Its **full-stroke clamping range** eliminates the need for manual adjustment, significantly improving operational efficiency. The **eight-cylinder clamping structure** delivers double the clamping force compared to conventional chucks, ensuring secure and stable holding even under high-speed rotation.

Designed with the **highest level of dust protection**, the chuck maintains long-term stability and reliability in harsh working environments. It is capable of effectively clamping various profile shapes, including **square, round, rectangular, oval, channel steel, H-beam, and angle steel**, making it a versatile solution for complex processing needs.

4.4 Full-Stroke Pneumatic Rear Chuck



The full-stroke pneumatic rear chuck is designed for high-speed, high-precision tube clamping with built-in **buffering technology** to ensure zero damage to workpieces during operation. With a **maximum rotation speed of 85 r/min**, it supports efficient and stable processing across a wide range of applications.

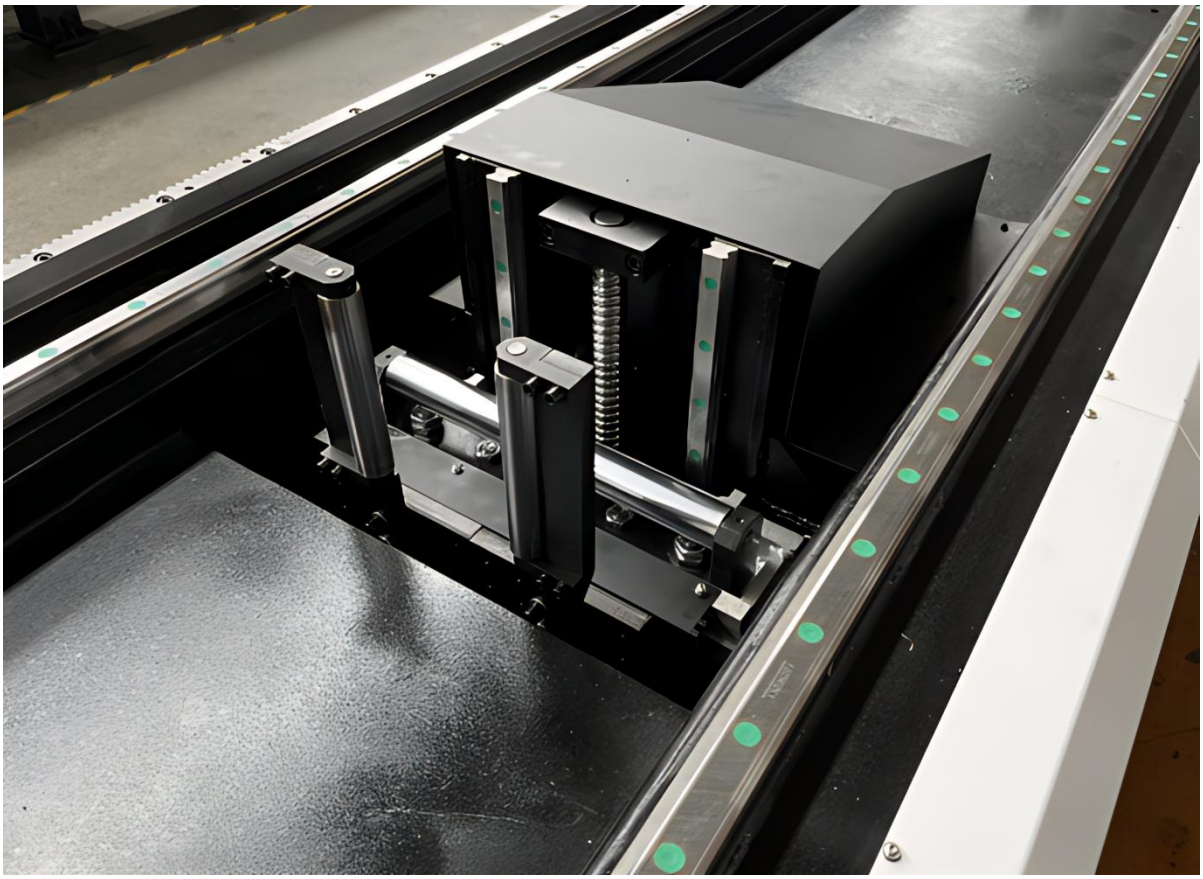
This chuck can **securely clamp tubes up to 350 mm in diameter**, accommodating various shapes and sizes. It features **automatic centering** and **fast response**, significantly improving setup efficiency and cutting accuracy.

To meet diverse processing needs, the system is supplied with **two sets of chuck jaws**:

- One set for standard round, square, and rectangular tubes
- Another set specifically designed for **H-beams, channel steel, and angle steel**

This versatile and robust design ensures reliable performance in demanding industrial environments.

4.5 Servo Floating Follow-Up Support System



The **servo floating follow-up support** is engineered to provide intelligent, adaptive support for pipes and profiles during laser cutting. It **automatically follows the vertical movement** of the material in real time, eliminating the need for manual adjustment and ensuring the pipe remains **self-centered** throughout the cutting process.

This system intelligently adjusts its position based on the shape and size of the pipe, delivering **stable and powerful lifting performance**. It significantly enhances cutting precision, especially when processing long or heavy workpieces.

Capable of handling a wide range of profiles—including **square, rectangular, round, oval, angle steel, channel steel, and C-beam steel**, the support system ensures reliable lifting and alignment, even for **irregular or heavy-duty materials**

4.6 Platform Servo Support System

The **platform servo support system** is designed to enhance automation, precision, and efficiency in tube laser cutting operations. It enables **automatic transfer of cut workpieces** to the designated collection area, while a **waste box is positioned directly beneath the cutting zone** to collect scrap material efficiently.

This system provides **real-time dynamic support** during cutting, effectively preventing pipe vibration and ensuring high cutting accuracy and surface quality. Its **automated material handling** capability reduces manual intervention and improves overall workflow efficiency.

A key feature of this system is its **innovative separation mechanism**, which automatically distinguishes between finished parts and waste. **Finished products are directed into the finished product box**, while **scrap material is simultaneously discharged into the waste box**, ensuring clean and organized material management.

4.7 FSCUT 5000A EtherCAT Control System

The **FSCUT 5000A EtherCAT Control System** is a high-end intelligent solution tailored for advanced tube laser cutting applications. It features **automatic centering compensation**, which continuously collects Z-axis data during processing to calculate the deviation between the pipe center and the chuck rotation center. This enables real-time path correction, ensuring high precision cutting without manual intervention.

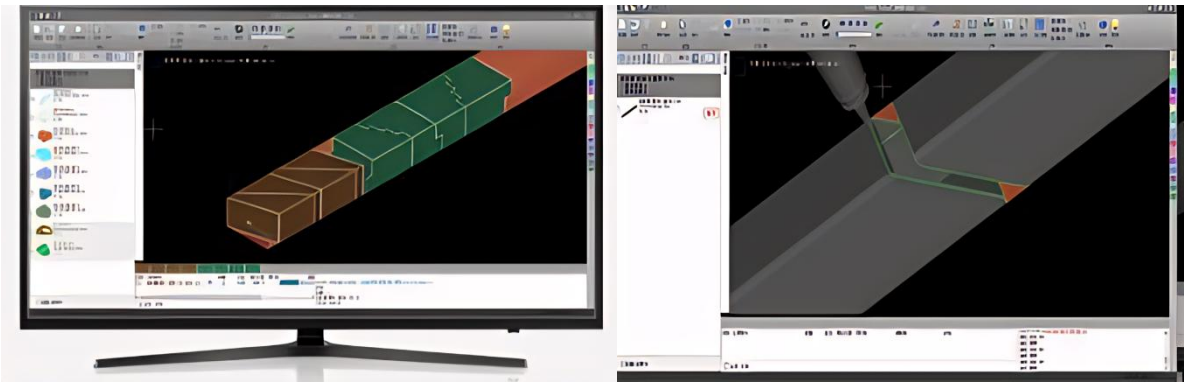
The system supports **cutting of a wide range of profiles**, including round, square, elliptical, waist-shaped, and polygonal tubes, as well as structural steels such as I-beams, channel steel, and angle steel. For all supported shapes, automatic centering is performed to maintain optimal alignment and cutting accuracy.

With support for **three-chuck, seven-axis configurations**, the system enables **zero-tail cutting** through coordinated control of two movable chucks and one fixed chuck. This maximizes material utilization and reduces waste, especially in high-volume production environments.

To further enhance performance, the FSCUT 5000A introduces a **dedicated corner cutting process**, allowing fine-tuning of parameters such as air pressure, peak power, and duty cycle. This ensures smoother, faster, and more precise transitions at corners and complex geometries.

Additionally, the system is fully compatible with **ultra-high power laser sources**, maintaining stability and control even under demanding cutting conditions, making it ideal for heavy-duty industrial applications.

4.8 FSCUT TubesT Nesting System



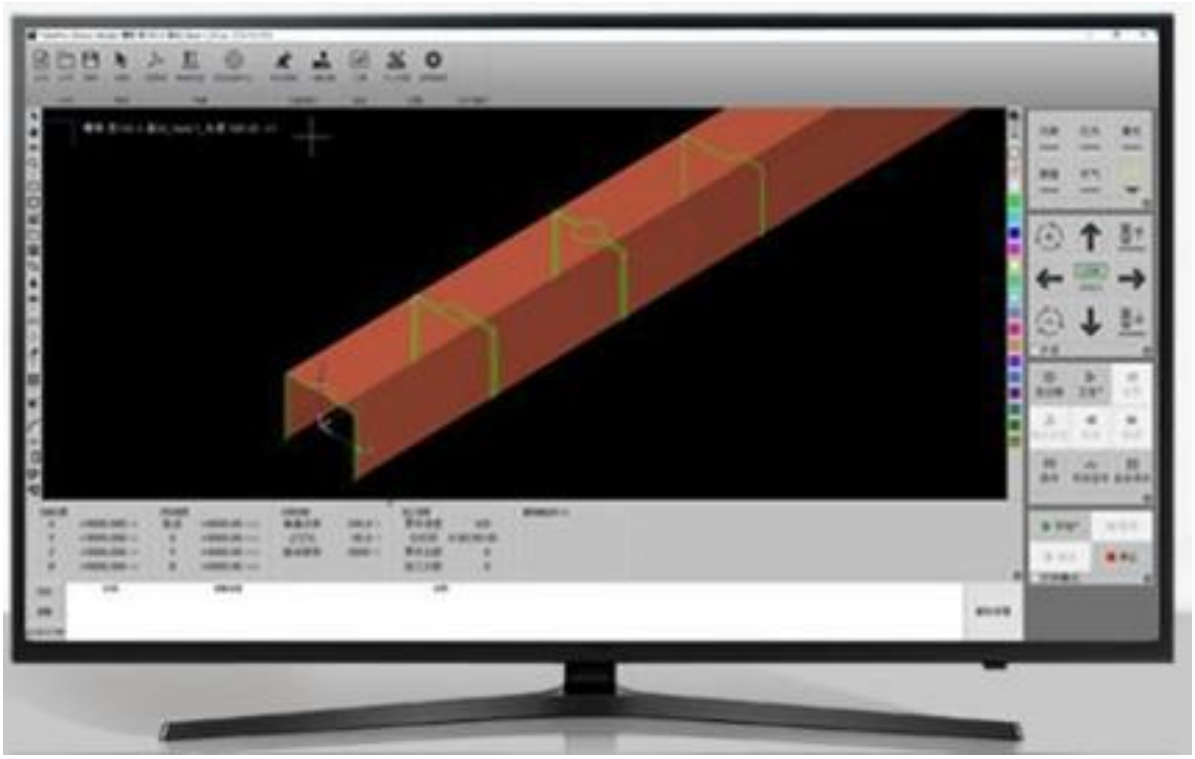
The **FSCUT TubesT Nesting System** is a powerful and intelligent software solution designed specifically for tube laser cutting. It supports both **single-part and multi-part nesting**, maximizing material utilization and minimizing waste through optimized layout strategies.

With its **advanced co-edge processing capabilities**, TubesT enables precise edge sharing between parts—even after weld seam compensation. It also supports **island co-edge nesting** across identical or different parts, significantly reducing cutting paths, saving time, and lowering production costs.

The system offers **fast and intelligent file import**, automatically recognizing the stretching direction of IGS files and supporting **batch import of various cross-sectional profiles**, streamlining the preparation process for complex jobs.

For enhanced efficiency, TubesT features **automatic sorting of cutting paths** for all pipe types, including irregular profiles. For standard rectangular and round tubes, it provides two optimized sorting strategies—**plane-based and circular sorting**—to ensure the most efficient and logical cutting sequence.

4.9 FSCUT TubePro 3D Cutting Software

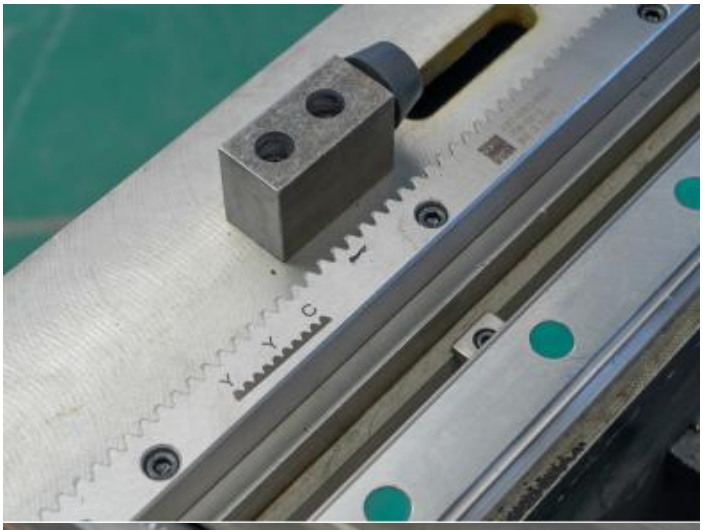


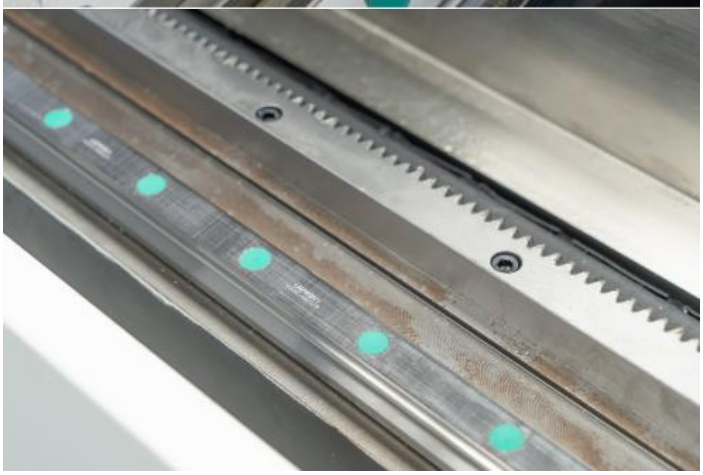
FSCUT TubePro is a professional-grade 3D tube cutting software developed for high-precision and high-efficiency laser processing. It supports a wide range of **tube types and profiles**, including round, square, rectangular, elliptical, and various special-shaped pipes.

The software offers **powerful cutting capabilities**, particularly in complex scenarios such as **corner cutting**, **common-edge nesting**, and **C-beam and L-beam processing**. These advanced functions ensure smoother transitions, reduced cutting time, and improved material utilization.

With its **high-speed and high-precision cutting algorithms**, TubePro significantly enhances processing efficiency and cutting quality. Once the design is complete, users can **export and cut directly**, streamlining the workflow and minimizing setup time.

4.10 Transmission System





The machine is equipped with **Yaskawa servo motors and drives**, delivering fast dynamic response and excellent speed stability. This ensures smooth and precise motion control during high-speed operations. The system supports a **maximum idle speed of up to 120 m/min** with an acceleration of **1.0 G**, enabling rapid positioning and enhanced productivity.

A **Shimpo planetary gearbox** is perfectly integrated with the servo system, working in tandem with a **helical rack and pinion** to significantly improve both **positioning and re-positioning accuracy**. This combination ensures consistent performance even under demanding production conditions.

The **linear transmission system** features high-precision components, including **PEK helical racks** and **HIWIN linear guide rails**, which contribute to improved motion accuracy, reduced vibration, and higher overall efficiency.

The machine's **gantry structure** is made from **high-quality cast aluminum**, which is significantly lighter than traditional cast iron. This not only reduces the moving mass but also enhances **gantry rigidity and structural strength**. The **lightweight, high-rigidity, and modular design** ensures long-term operational stability and supports high-speed, high-precision cutting.

4.11 Hanli Industrial Water Chiller

The **Hanli Industrial Water Chiller** features a **compact and durable design**, offering reliable performance in a wide range of industrial applications. Its space-saving structure allows for seamless integration into laser systems, CNC machines, and other precision equipment.

All key components are sourced from **well-known domestic and international brands**, ensuring exceptional **quality, safety, and long-term reliability**.

Equipped with a **fully automatic control system**, the chiller provides **intuitive operation** and precise temperature regulation, making it ideal for continuous, high-accuracy cooling requirements.

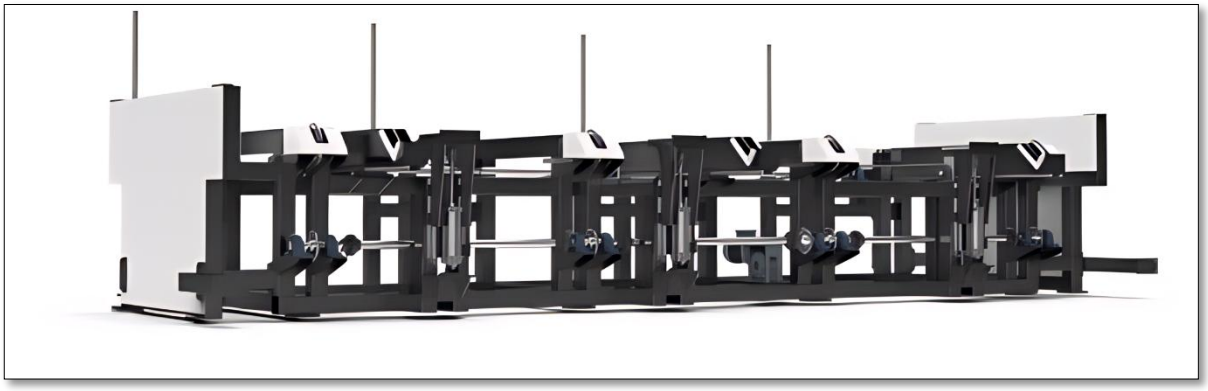
4.12 Precision-Welded Machine Bed Structure

The machine bed is **welded using high-quality raw materials** and undergoes a rigorous multi-stage treatment process to ensure structural integrity and long-term performance. This includes **stress relief annealing** after rough machining, followed by **secondary vibration aging treatment**, and final **precision machining on a large-scale gantry milling center**.

To guarantee machining accuracy, the **guide rail and rack mounting surfaces are processed in a single setup**, ensuring perfect alignment and consistency across the entire structure.

These advanced design and manufacturing techniques result in a machine base with **excellent shock resistance, high rigidity, and structural stability**. Additionally, the bed offers **good toughness, lightweight construction, corrosion and oxidation resistance**, and supports **high-speed, high-precision processing** in demanding industrial environments.

4.13 Semi-Automatic Loading Device (12m)



The **12-meter semi-automatic loading device** is designed for efficient and reliable pipe feeding in automated laser cutting systems. It supports pipe lengths of **5900–6200 mm**, **8900–9200 mm**, and **11900–12100 mm**, accommodating a wide range of production requirements.

The system is compatible with pipe cross-sections up to **200 × 200 mm** (square), and supports a **maximum load capacity of 1500 kg**. With a **feeding time of just 15 seconds**, it significantly improves material handling efficiency.

The **maximum drag speed** of the feeder reaches **15 m/min**, while the **maximum feeding speed** is **6.7 m/min**, ensuring smooth and continuous operation. It is suitable for various tube types, including **round, square, rectangular, oval, angle steel, channel steel, and H-beam**, making it a versatile solution for diverse industrial applications.

4.14 Automatic Unloading Device (12m)

五、Cutting Capacity Reference

Pipe Laser Power Cutting Performance Reference					
Materials	**3000W**	**6000W**	**12000W**	**15000W**	**20000W**
Carbon Steel	14mm/20mm	18mm/23mm	23mm/48mm	28mm/60mm	38mm/80mm
Stainless Steel	6mm/10mm	14mm/18mm	28mm/48mm	28mm/70mm	28mm/99mm
Aluminum	3mm/6mm	8mm/14mm	14mm/20mm	16mm/23mm	20mm/50mm
Copper	3mm/6mm	8mm/14mm	14mm/20mm	16mm/23mm	20mm/25mm
When the material thickness falls within the green zone, it is suitable for large-batch cutting with good quality. The red zone is only suitable for small batch cutting					

六、Working Referral Video

七、Contact Us

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