SENFENG

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TECHNICAL SOLUTIONS

SF6024T

Tube Laser Cutting Machine (Adaptive-Following Version)

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Tube Laser Cutting Machine (Adaptive-Following Version)

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SENFENG

Versatile & Efficient

SF6024T

Tube Laser Cutting Machine (Adaptive-Following Verison)

1 Superior cutting stability

2 Powerful dynamic performance

3 Automated system for greater efficiency

4 Pneumatic self-centering chuck

※ The picture is for reference and the actual appearance and size shall prevail.

Technical Parameters

SF6024T

No.	Item	Parameter	Remarks
1	Tube Length Range	2000~6500mm	
2	Tube Diameter Range	Φ20~Φ230mm	National standard tube
3	Side Length of Square Tube	□20~□230mm	National standard tube
4	X/Y-axis Positioning Accuracy	±0.05mm	
5	X/Y-axis Repeated Positioning Accuracy	±0.03mm	
6	Maximum Rapid Traverse Speed	100m/min	As tube weight increases, processing speed and moving parameters decrease.
7	Maximum Chuck Rotation Speed	100r/min	
8	Maximum Acceleration	1.0 G	
9	Weight	3150 kg	Depends on actual factory delivery
10	Maximum Load	260kg Tube Weight ≤43kg/m	
11	Dimension (L×W×H)	9530*1950*2200mm	Depends on actual factory delivery
12	Phase	Three-phase	
13	Rated Supply Voltage	380V	
14	Frequency	50Hz	
15	Main Power Protection Level	IP54	

Note: 1. The achievable workpiece accuracy partly depends on factors such as the workpiece type, pretreatment condition, sheet size, and the sheet position within the working area.

2. The above technical parameters are subject to change without prior notice. The final technical parameters shall be as specified in the actual order agreement.

Technical Parameters

SF6024T

Precautions

1. Pipes being processed should be free from significant rust, as it can affect the cutting section quality.
2. Pipes should not be stored in the open air and should be placed flat, preferably with surface oil coating or packaging. Ensure that the front end is even, and the burr height at both ends is ≤5mm. Bundled pipes should have consistent lengths, with a deviation of less than 300mm.
3. For welded pipes, the external weld seam should be relatively flat, with a height of less than 0.3mm. The internal weld seam should have a height of less than 2mm.
4. The distortion and bending of the pipe should be lower than the tolerances specified in "GB/T 6728-2002 Dimensions, Shape, Weight, and Permissible Deviations of Cold-formed Hollow Sections for Structural Use."
5. The pipe should be straight, with a bending curvature of less than 1mm/1m (3mm/6m).
6. For the lengthwise torsion of the pipe, the total torsion should be less than 0.02% of the total length.
7. The outer diameter tolerance of the profile should not exceed ±0.5% of the outer diameter, with a minimum of 0.2mm (according to the standard deviation level D4 specified in GB/T 17395-1998 for standardized outer diameter deviations).
8. When loading the pipes, ensure the safety of personnel and equipment. Bundle loading should be carried out using cranes operated by qualified and certified professionals. The crane should have both fast and slow speed functions, and slow speed should be used when approaching the loading platform.
9. Considering material errors, the positional error should be within IT12, and the shape and profile error should be within IT12.
10. The surface roughness of the pipe cross-section varies with the material and thickness.
11. Users must perform regular maintenance of the machine as instructed in the manual. Failure to do so may result in damage to the machine, and our company reserves the right to refuse repairs in such cases.
12. To ensure cutting effectiveness and minimize pipe deformation, the pipe thickness should meet the following criteria based on the pipe diameter:

① For pipe diameters greater than φ50: 1/40 ≤ pipe thickness ≤ 1/10 of the pipe diameter.

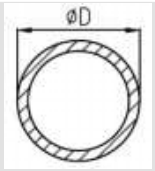
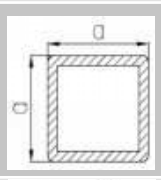
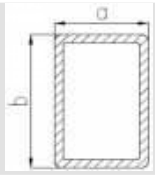
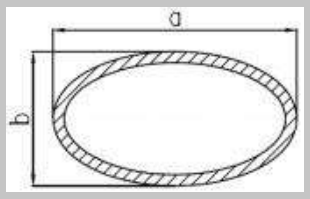
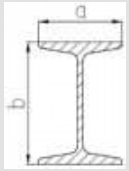
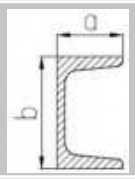
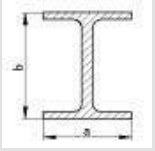
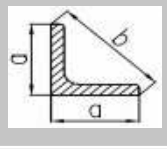
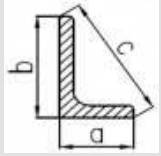
② For pipe diameters smaller than φ50: 0.8mm ≤ pipe thickness ≤ 1/10 of the pipe diameter.

③ For cases where the bending deflection exceeds the relevant standards, the cutting quality cannot be guaranteed.

13. Equipment temperature requirements: 0–40 °C (If the ambient temperature of the equipment installation site exceeds this range, the Buyer shall provide written notice to the Supplier at the time of purchase); the laser source should be placed in an environment with a temperature of 18–25 °C. If the ambient temperature of the installation site exceeds this range, it is recommended to install air conditioning.
14. Equipment humidity requirements: ≤ 70% (laser source only).
15. Cutting gas purity requirements: Nitrogen ≥ 99.7%; Oxygen ≥ 99.5%.

Cutting Parameters

SF6024T

Type	Cross-sectional shape	Clamping range min~ max a(mm)
Round tube		min~ max D(mm): 10~230 φ10-φ230
Square tube		min~ max a(mm): 10~230 □10x10-□230x230
Rectangular tube		min~ max a(mm): 10~230 min~ max b(mm): 10~230 □10x10-□230x230
Oval tube		For better clamping effect, please provide detailed drawing then we can design the jaws accordingly.
I beam		min a(mm): 10 max b(mm): 200 (Standard configuration): 10-20# (Optional accessory): 22#
U beam		min a(mm):10 max b(mm):180 (Standard configuration): 5-20# (Optional accessory): 22#
H beam		min~max a (mm) : 10~140 min~max b (mm) : 10~140
Equal angle steel		min~max a(mm): 10~110 max b(mm): 140 2-11#
Unequal angle steel		min~max a(mm): 10~75 min~max b(mm): 10~150 max c(mm): 155 2.5/1.6-14/9#

Note: To ensure better machining accuracy, the tube diameter must be ≥ 20 mm.

Cutting Parameters

SF6024T

Material	Thickness [mm]	1.5KW	2KW	3KW	4KW	6KW
		Speed[m/min]/Gas				
Carbon Steel	1	10-13(N2/Air)	15-20(N2/Air)	25-35(N2/Air)	25-35(N2/Air)	30-45(N2/Air)
	2	4-5(O2)	6-8(N2/Air)	13-17(N2/Air)	15-18(N2/Air)	20-25(N2/Air)
	3	3-4(O2)	3-4(O2)	7-10(N2/Air)	8-10(N2/Air)	12-14(N2/Air)
	4	2.3-2.8(O2)	2.5-3(O2)	5-8(N2/Air)	6-8(N2/Air)	7-8(N2/Air)
	5	1.8-2.3(O2)	2.2-2.6(O2)	3-3.2(O2)	3-3.2(O2)	5-6(N2/Air)
	6	1.6-2.0(O2)	1.8-2(O2)	2.3-2.5(O2)	2.5-2.8(O2)	4.5-5(N2/Air)
	8	/	1.2-1.6(O2)	1.8-2.2(O2)	2-2.3(O2)	2.2-2.5(O2)
	10	/	/	1.4-1.8(O2)	1.6-2(O2)	2.0-2.3(O2)
	12	/	/	1-1.4(O2)	1-1.4(O2)	1.9-2.1(O2)
	14	/	/	/	/	1.4-1.7(O2)
	16	/	/	/	/	1.2-1.4(O2)
	18	/	/	/	/	0.8(O2)
	20	/	/	/	/	/

Note:

1. When processing carbon steel tubes with a thickness > 5 mm and a diameter or side length < 50 mm, it is not recommended to use oxygen as the assist gas. For tubes of the above dimensions, please consult the process engineering team.
2. The parameters are for reference only! The above values are theoretical values; tube dimensions, equipment speed, and other factors will affect the cutting speed.

Cutting Parameters

SF6024T

Material	Thickness [mm]	1.5KW	2KW	3KW	4KW	6KW
		Speed[m/min]/Gas				
Stainless Steel	1	15-20(N2/Air)	15-20(N2/Air)	25-35(N2/Air)	25-35(N2/Air)	30-45(N2/Air)
	2	7-10(N2/Air)	8-14(N2/Air)	13-17(N2/Air)	15-18(N2/Air)	20-25(N2/Air)
	3	4.5-5.5(N2/Air)	6-7(N2/Air)	6-10(N2/Air)	8-12(N2/Air)	12-18(N2/Air)
	4	2.0-2.5(N2/Air)	2.8-3.5(N2/Air)	5-6(N2/Air)	6-7(N2/Air)	10-12(N2/Air)
	5	1.4-1.8(N2/Air)	1.5-2.5(N2/Air)	3-4(N2/Air)	4-4.5(N2/Air)	7-8(N2/Air)
	6	0.7-0.9(N2/Air)	1-1.5(N2/Air)	2.3-3(N2/Air)	3-3.5(N2/Air)	4.5-5(N2/Air)
	8	/	/	1.0-1.5(N2/Air)	1.5-1.8(N2/Air)	2.5-3.5(N2/Air)
	10	/	/	0.8-1(N2/Air)	1-1.2(N2/Air)	1.2-2(N2/Air)
	12	/	/	/	/	1-1.2(N2/Air)
	14	/	/	/	/	0.8-1(N2/Air)
	16	/	/	/	/	0.5-0.6(N2/Air)
Alluminum Alloy	1	10-13(N2/Air)	15-20(N2/Air)	25-35(N2/Air)	20-25(N2/Air)	30-45(N2/Air)
	2	4-5(N2/Air)	8-13(N2/Air)	13-17(N2/Air)	25-35(N2/Air)	20-25(N2/Air)
	3	1.5-2.5(N2/Air)	4-4.5(N2/Air)	6-8(N2/Air)	15-18(N2/Air)	14-16(N2/Air)
	4	1-1.3(N2/Air)	2.5-3(N2/Air)	4-5(N2/Air)	8-12(N2/Air)	8-10(N2/Air)
	5	/	1.5-2(N2/Air)	2.5-3.5(N2/Air)	6-7(N2/Air)	5-6(N2/Air)
	6	/	/	2-2.3(N2/Air)	4-4.5(N2/Air)	3.5-4(N2/Air)
	8	/	/	0.8-1.3(N2/Air)	2.5-3(N2/Air)	1.5-2(N2/Air)
	10	/	/	/	1-1.3(N2/Air)	1-1.2(N2/Air)
	12	/	/	/	/	0.6-0.7(N2/Air)
	14	/	/	/	/	0.4-0.6(N2/Air)

Note:

1. When processing carbon steel tubes with a thickness > 5 mm and a diameter or side length < 50 mm, it is not recommended to use oxygen as the assist gas. For tubes of the above dimensions, please consult the process engineering team.
2. The parameters are for reference only! The above values are theoretical values; tube dimensions, equipment speed, and other factors will affect the cutting speed.

Cost-Benefit Analysis

SF6024T

Laser Power		3kw			4kw			6kw		
Item		Air	O_2	N_2	Air	O_2	N_2	Air	O_2	N_2
Peak Power Consumption	Laser Source Power(kW)	10	10	10	16	16	16	16	16	16
	Chiller Power (kW)	3	3	3	6	6	6	6	6	6
	Air Compressor Power(kW)	15	/	/	15	/	/	15	/	/
	Host Power (kW)	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5
	Dust Removal Power (kW)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	Loading & Unloading Power (kW)	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85
Consumables and Gas Consumption (CNY/H)		0.5	4.5	60.5	0.5	4.5	60.5	0.5	4.5	60.5
Total Power (kW)		45.85	30.85	30.85	54.85	39.85	39.85	54.85	39.85	39.85
Total Power Consumption (kW/H)		27.51	18.51	18.51	32.91	23.91	23.91	32.91	23.91	23.91
Total Operating Cost (1RMB/kWh)		28.01	23.01	79.01	33.41	28.41	84.41	33.41	28.41	84.41

If the cutting auxiliary gas is dried compressed air, the cost includes air compressor electricity, machine power consumption, and consumables (protective lenses, cutting nozzles).

Note:

1. The electricity and gas prices are for reference only and may vary by region.
2. Auxiliary gas consumption varies with plate thickness. The oxygen data is based on cutting 8mm carbon steel, and nitrogen on 1mm stainless steel. For reference only; actual usage may vary.

Configuration List

SF6024T

No.	Item	Qty.	Brand
	Laser Source		
1	Fiber Laser Source	1	Raycus
	Laser Cutting Head		
1	Laser Cutting Head	1	SENFENG TYRFING
	Machine Tool · Host		
1	Transmission System	8	SENFENG
2	Machine Tool and Accessories	1	SENFENG
3	Reducer	6	TECHMECH / MOTOREDUCER
4	Cutting Gas Circuit System	1	AVENTICS (Germany)
5	Main Machine Air Circuit System	1	AIRTAC (Taiwan, China)
6	AC Servo Motor and Driver	8	France SCHNEIDER / INOVANCE
7	Water Chiller	1	HANLI
	CNC Cutting Software System		
1	CNC System	1	FSCUT 3000DE-G
2	Nesting Software	1	TubesT professional nesting software
	Automation System (optional)		
1	Loading System	1	Fully automatic/simplified fully automatic/semi-automatic (three options available)
2	Unloading System	1	Standard: 2m Optional: 3m/4m

Note:

1. This is SENFENG's optimized configuration. Changes in brand or configuration may cause irreversible effects.
2. The warranty period for the entire machine (excluding consumables, non-force majeure natural disasters, war, improper operation, and human damage) is 1 year.

SF6024T-Laser Source

1. Small Fiber Core: Better beam quality.
2. Faster Cutting Speed: Enhanced cutting efficiency.
3. Improved High-Reflection Resistance: New optical components with multi-layer anti- reflection design.
4. Enhanced Intelligence: Real-time dynamic monitoring of operating indicators.
5. High Electrical-Optical Conversion: Over 40% efficiency, reducing power consumption.
6. Upgraded Components: New generation pump sources offer greater reliability and stability, with improved beam quality and 30%-40% increased brightness due to patented nonlinear suppression technology.
7. Lightweight and Compact: Small size and compact design for easier integration.
8. Enhanced Safety: Improved safety features.

1. Small Fiber Core: Better beam quality.
2. More efficient cutting of medium and thin plates.
3. Improved High-Reflection Resistance: New optical components with multi-layer anti-reflection design.
4. Enhanced Intelligence: Real-time dynamic monitoring of operating indicators.
5. High Electrical-Optical Conversion: Over 40% efficiency, reducing power consumption.
6. Versatile Applications: The modulation frequency range has been upgraded to 1-20 kHz, making it suitable for a wide variety of processes.
7. Lightweight and Compact: Small size and compact design for easier integration.
8. High Sealing Performance: Sealing and reliability have been further improved, with the protection rating upgraded to IP66.

SF6020T-Laser Head

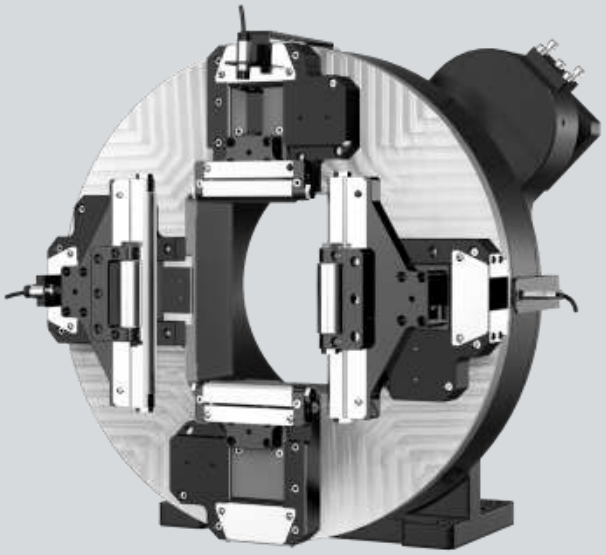
3kw 6kw

Optional BOCI brand

1. Optimized Design: Enhanced optical configuration and streamlined airflow design significantly improve cutting quality and efficiency.
2. Auto-Focusing: Minimizes human intervention with a focusing accuracy of 0.05 mm.
3. Multiple Protective Lenses: The collimation module includes additional protective lenses to effectively safeguard the collimating lens.
4. Drawer-Style Lens Holder: Allows for quick and easy replacement of protective lenses.
5. High Compatibility: Equipped with QBH and QD fiber interfaces

1. Closed-loop system with active feedback alarms for precise issue detection.
2. Protective lens temperature monitoring detects contamination during operation and triggers immediate alarms to stop the machine, preventing damage such as head burning or lens breakage.
3. Monitors cutting gas pressure in real-time, triggering alarms for insufficient gas supply, low pressure, or unstable pressure.
4. Cutting head anti-collision design enables easy replacement of components after impact, reducing downtime.

SF6024T-Chuck



1. Pneumatic self-centering chuck: Fast clamping speed and high efficiency.

2. Low inertia chuck: Made of aerospace-grade aluminum, featuring lightweight construction, low inertia, high rotation speed, reduced power consumption, and lower operating costs.

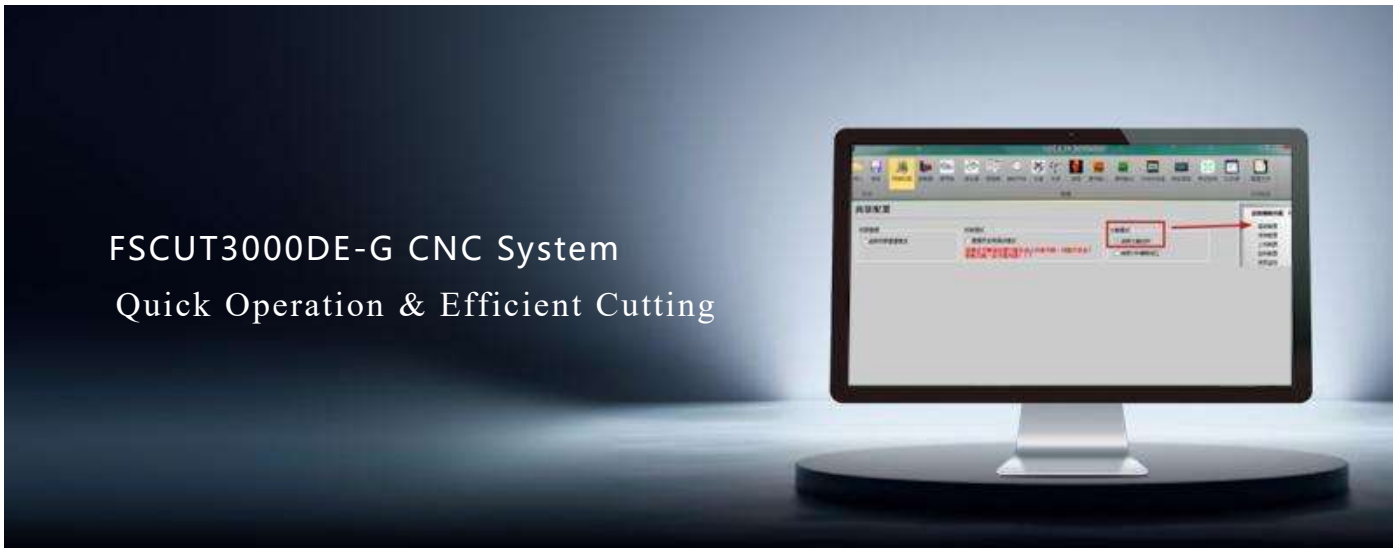
3. Fully enclosed chuck protection: Prevents dust and debris from entering, ensuring smooth operation without stoppages.

4. Internal gears and external jaws: Enhanced dust resistance, longer lifespan, high precision, and easier adjustment and maintenance.

5. Integrated chuck structure: Provides superior dust protection and greater machine stability.

6. Square-opening front chuck: Expands the clamping range and broadens industry applications.

SF6024T-CNC System



FSCUT3000DE-G is a bus control system specifically developed for tube cutting. It supports high-precision, high-efficiency cutting of square tubes, round tubes, racetrack-shaped and oval tubes, as well as angle steel and channel steel. Its performance features are as follows:

- Real-time compensation for tube center deviation reduces clamping requirements and improves efficiency; higher piercing accuracy ensures more precise cutting.
- Based on a real-time bus control system with integrated motion control, corner cutting is faster, corner following is more stable, and cutting quality is more reliable.
- Supports follower bracket function to ensure consistent cutting quality for entire tube processing.
- Supports feeding and cutting with hollow chucks, significantly shortening the overall machine length and enhancing automation.
- Supports automatic loading/unloading and cycle processing, as well as standard automated feeding operations.
- Trajectory accuracy: 0.02 mm; positioning accuracy: 0.001 mm; repeat positioning accuracy: 0.003 mm.
- Supports real-time encoder feedback, with additional error measurement tools to easily obtain optimal machine motion parameters.
- Supports a tube process library for convenient process export and storage.
- Supports seamless piercing, resulting in smoother operation and significantly improved piercing efficiency.
- Compatible with TubePro cutting software and the professional version of TubesT nesting software, capable of processing all types of tubes.

SF6024T-Optional Configuration

1

2m Unloading Unit (Optional)

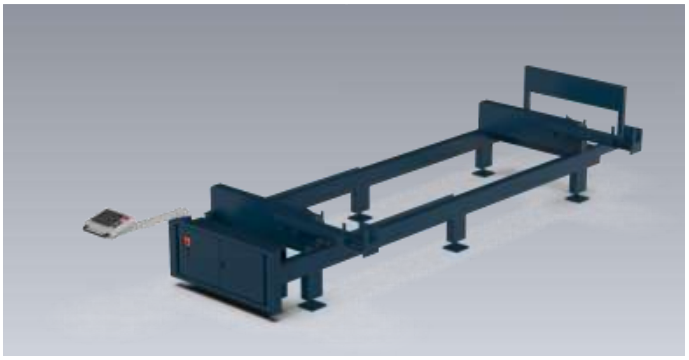
Dimensions (mm)	1950×1060×770
Maximum tube length (mm)	3000
Unloading weight (kg)	300

1. Equipped with an automatic sorting system that separates scrap from finished tubes without manual intervemtion. The receiving cart and unloading rack daopt an integrated design, offering high system integration and a compact footprint.
2. A self-developed servo-following support system automatically adjusts to the tube surface, ensuring optimal support during processing. After processing, the flip plate discharges the finished tubes, which slide into the finished product cart.

2

Dual-Arm Chain-Type Semi-Automatic Loading Unit

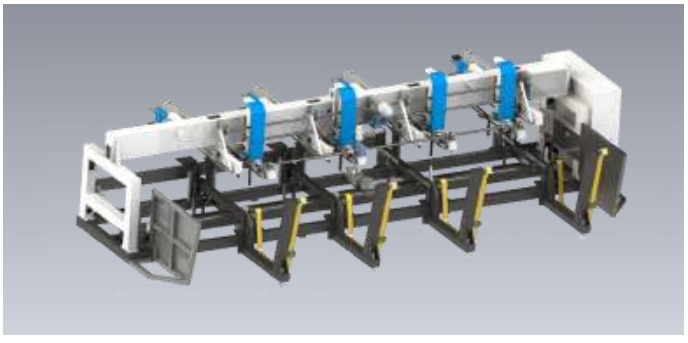
Minimum loading tube length (mm)	4000
Maximum loading tube length (mm)	6100
Tube section side length (or diameter) (mm)	20x20-220x220；Φ20-Φ220
Maximum single pipe weight capacity	240 kg
Tube type	Round tube, square tube, rectangular tube, angle steel, channel steel, I-Beams, etc.



3

Fully Automatic Loading Unit (Optional)

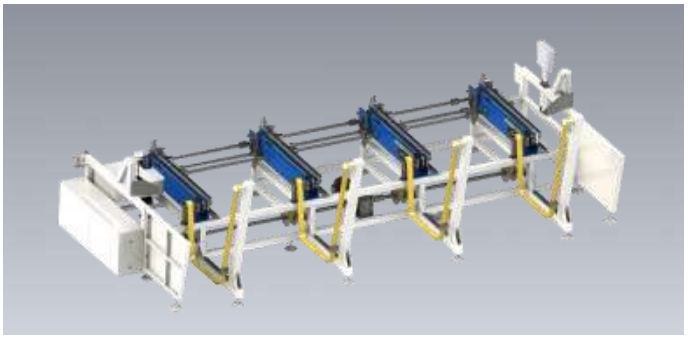
Loading tube length (mm)	3500 - 6100
Tube section side length (or diameter) (mm)	20x20-230x230；Φ20-Φ230
Maximum single pipe weight capacity	260 kg
Warehouse weight capacity	3T
Tube type	Round tube, square tube



4

Simplified Fully Automatic Loading Unit (Optional)

Loading tube length (mm)	3500 - 6100
Tube section side length (or diameter) (mm)	20x20-230x230；Φ20-Φ230
Maximum single pipe weight capacity	260 kg
Warehouse weight capacity	3T
Tube type	Round tube, square tube



Providing Global Users with Automated Metal Fabrication Solutions

SENFENG provides automated metal fabrication solutions globally, integrating cutting, bending, welding, cladding, automation, and new energy. With core technologies in laser cutting, welding, and cladding, the company also offers intelligent manufacturing systems like flexible laser processing lines and panel benders. These solutions serve industries including automotive, construction, energy, and petrochemicals, and are used in over 100 countries.

03
International PCT Patents

577
Chinese technology patents

SENFENG has developed key components like laser generators, processing heads, Feng Cloud systems, and CNC systems, used in cutting, welding, cladding, and automation. The company offers a complete industry chain, including laser cutting, welding, cladding, cleaning machines, bending centers, and flexible production lines. These solutions are used in sectors like power towers, construction machinery, shipbuilding, bridges, and aerospace, helping businesses accelerate production and reduce costs for greater economic benefits.

After-sales Service

Technical Training to enhance customer production efficiency

1 Before equipment delivery

The buyer can arrange for 1-2 operators to attend a one-week training at the SENFENG factory. The specific dates should be confirmed with our customer service department.

2 During the warranty period

The buyer can apply for one more session of free training for 1-2 operators at SENFENG.

3 Training

The training includes laser principles, equipment structure, process explanation, equipment maintenance, laser safety protection, operating procedures, and basic troubleshooting.

4 Requirement

Trainees must be mechanical, electrical, or optical engineers and pass assessments on equipment operation, laser principles, safety, and maintenance before starting work.

Packaging & Transportation to ensure equipment quality

1 Packaging

Standard packaging, suitable for long-distance transportation, moisture-proof, rust-proof, and shock-resistant. Designed for full lifting with marked lifting points and center of gravity.

2 Transportation

Domestic transportation within China is fully handled by our company, including freight and insurance.

3 Packing List & Certificate

Each package includes a packing list and certificate of conformity. The user manual and other documents are inside the box, while the packing list is on the outside.

Installation professional and high-quality

1 Installation

SENFENG engineers will install the equipment at the client's site.

2 Equipment Debugging

After installation, the equipment will be debugged for client use.

3 Door-to-door training

On-site training will be provided on equipment maintenance, safety, operation procedures, and basic troubleshooting, with 7 days of guaranteed usage.

4 On-site acceptance

After completing the above steps, the engineer may leave the site only after the customer's acceptance (the customer can veto).

After-sales Service

Premium Customization

In the digital era, intelligent transformation in metal processing is essential. Building unmanned factories is key to upgrading, with customized automation solutions being a top priority.

1

SENFENG understands the client's industry status and specific production processes, identifies issues, and assesses their needs.

2

Through in-depth on-site communication, customize metal fabrication automation solutions based on the client's pain points and needs.

3

A tailored solution, different from competitors' standardized models.

4

Provide a one-stop R&D and production service from design to final machine, with thorough quality checks until customer satisfaction and acceptance.

5-star Fast Service

Efficient

- Our repair hotline is available 24/7.
- A professional engineer will respond to customer inquiries within 10 minutes and provide a repair plan within 1 hour.

Professional

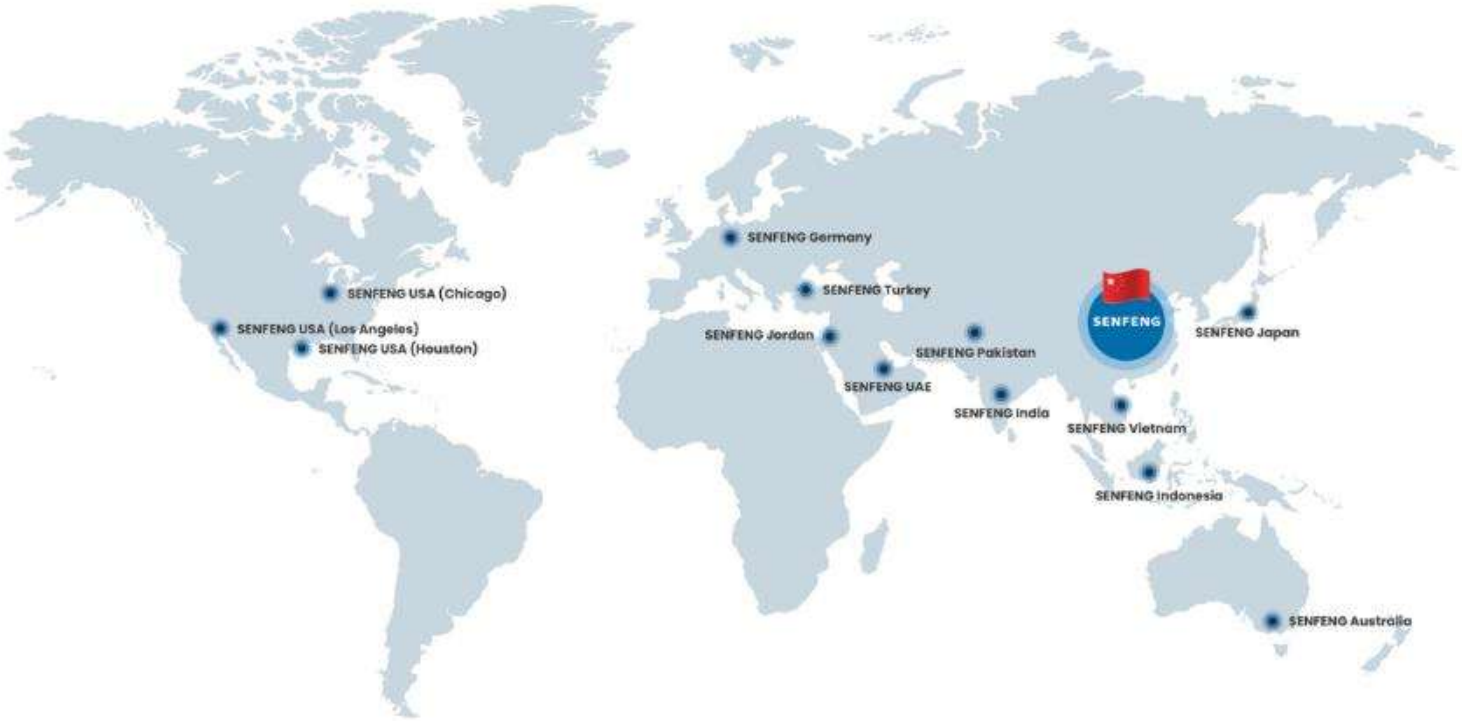
- **Custom Service:** Tailored service plans based on the specific needs of the customer.
- **Service Engineer Certification System:** Each service engineer undergoes rigorous training and assessment before being certified to work.
- **Common Issues Training:** Create a manual for common issues based on equipment models, with certified engineers providing customer training.
- **Online Guidance:** Experienced senior engineers offer support through phone or video calls to help customers resolve issues.
- **Professional Technical Support:** The equipment is properly calibrated during the first installation, and similar issues are resolved in one go.

Comprehensive

- **Pre-service:** Theoretical and hands-on operation training, common fault self-diagnosis training, quick repair guidance for troubleshooting, usage reminders.
- **Regular Service:** Regular maintenance reminders, on-site services, periodic promotional activities.
- **Value-added Service:** Equipment software and hardware upgrades, financing lease services, extended warranty services.

SENFENG

Customer testimonials



Jinan Senfeng Laser Technology Co.,Ltd.

E-mail: senfeng@sfcnclaser.com

Tel: +86 13210546543

Website: www.senfenglaser.com

Add: No. 1777 Kejia Road, High-tech Zone, Jinan City, Shandong Province, PRC