

SENFENG

TECHNICAL
SOLUTIONS



SF1503CH+3015KHC

Laser Blanking Line

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Laser Blanking Line

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Cutting for a Bright Future

SF1503CH

Laser Blanking Line



SENFENG drafted the "Laser Blanking Management Standard for Passenger Car Panels" based on this series of laser blanking lines.



1

Stepless speed regulation

2

High-precision deviation correction

3

Rapid stress relief technology

4

Automated production line

*The image is for reference only; the appearance and dimensions are subject to the actual product from the factory.

APPLICATIONS AND PROCESSING RANGE

SF1503CH

1 Processable Materials

Carbon steel, stainless steel, galvanized sheet, etc.

2 Application



Aerospace



Auto parts



Chassis and cabinets



Security door



Construction machinery



New energy



Kitchenware and bathroom ware



Decorative curtain wall



Office furniture



Medical devices



Sheet metal



Aluminum products

3 Uncoiling, Leveling and Cutting Capability

Parameters may deviate slightly due to different material composition

0.8–3.0 mm carbon steel and galvanized sheets, 0.8–2.0 mm stainless steel ($\sigma_b \leq 235$ MPa).

Damage caused by operating beyond the above working range is not covered under warranty.

4 Coil Requirements

Coil edge burr: $\leq 0.1\text{--}0.2$ mm; axial camber deformation: ≤ 1.0 mm

Technical Parameters

SF1503CH

Technical Parameters of Uncoiling and Leveling Unit

No.	Item	Parameter
1	Coil thickness	0.8-3.0mm
2	Coil width	600-1500mm
3	Maximum outer diameter of coil	Φ1400mm
4	Coil inner diameter	Φ508mm
5	Maximum coil weight	10000kg
6	Leveling accuracy	±1.5mm/m ²
7	Feeding speed	0-15m/min
8	Feeding length	0-3000mm

Technical Parameters

SF1503CH

Technical Parameters of Laser Cutting Unit

No.	Item	Parameter
1	Working area (length x width)	3000*1500mm
2	X-axis travel	1500mm
3	Y-axis travel	3000mm
4	Z-axis travel	100mm
5	X/Y-axis positioning accuracy	±0.05mm
6	X/Y-axis repeated positioning accuracy	±0.02mm
7	Phase number	Three-phase
8	Power supply rated voltage	380V
9	Frequency	50Hz
10	Total power protection level	IP54

Note:

1. Workpiece accuracy depends on factors like type, pre-treatment, sheet size, and position.

2. Technical parameters are subject to change without notice. Final parameters are based on the order agreement.

Configuration List

SF1503CH

No.	Item	Qty	Brand
	Uncoiling and leveling unit		
1	Loading trolley	1	Hydraulic 10T
2	Uncoiling unit	1	Cantilever 10T
3	Feed mechanism	1	Hydraulic drive
4	Leveling mechanism	1	Four-layer 13-roller structure (with 2 traction rollers)
5	Correction device	1	Patented sheet positioning and alignment technology
	Cutting unit		
1	Laser cutting machine	1	SF3015KHC
2	Laser source	1	Raycus
3	Cutting head	1	Raytools
4	Transmission system	4	Taiwan AIRTAC/SENFENG
5	Machine tools and accessories	1	SENFENG
6	Reducer	3	Germany EREFAT / Japan SHIMPO
7	Electrical and pneumatic systems	1	France SCHNEIDER Japan SMC & Taiwan AIRTAC
8	AC servo motors and drivers	4	INOVANCE
9	Water chiller	1	Hanli
10	Cutting slats	1	SENFENG (wearing parts)
11	Safety monitoring	2	Camera
12	Electrical system	1	Multifunctional operating interface
	CNC cutting system		
1	CNC cutting system	1	SENFENG Mimir

Note: 1. This configuration is the optimal configuration verified by our company. If the brand and configuration are changed, irreversible effects may occur. Please be aware of this.

2. The warranty period for the entire equipment (excluding wearing parts and consumables, non-force majeure natural disasters, war and illegal operation, man-made damage, etc.) is 1 year.

Production Line Features

SF1503CH

1 Stepless Speed Regulation

The coil material on the hydraulic expanding mandrel is rotated by a geared motor through a chain and sprocket mechanism, keeping the sheet between the uncoiler and the leveling & feeding unit under constant tension in preparation for stress relief.

2 High-precision Deviation Correction

A special lead screw and nut drive the sliding block that mounts the correction rollers, enabling the guide rollers to precisely align and position the sheet metal. This prevents scratching during movement and saves sheet cutting time.

3 Rapid Stress Relief Technology

The patented leveling technology, uniquely developed for laser applications, simultaneously levels the sheet metal and relieves its internal stress right after uncoiling. This results in a flatter sheet and delivers an outstanding laser cutting experience and improved efficiency.

4 Lightning Cutting With Bright-finish Blanking

The laser cutting machine, designed specifically for coil materials, is paired with a self-developed laser blanking line system and a top-tier laser process package. This ensures excellent cutting surface quality and enables customized blanking. Equipped with a globally renowned full-servo motion control system, it delivers fast response and high precision.

5 Automated Production Line

From loading, uncoiling, leveling, and laser cutting to unloading, the entire process is designed as a fully automated production line. It maximizes material utilization and can achieve near-zero waste.

SF1503CH-COMPOSITION AND FUNCTION

1. Loading and Uncoiling Unit

1

Loading Trolley

Components:

- (1) V-shaped support base and trolley frame
- (2) Hydraulic cylinder lifting mechanism
- (3) Motor-driven four-wheel loading trolley mechanism

Function:

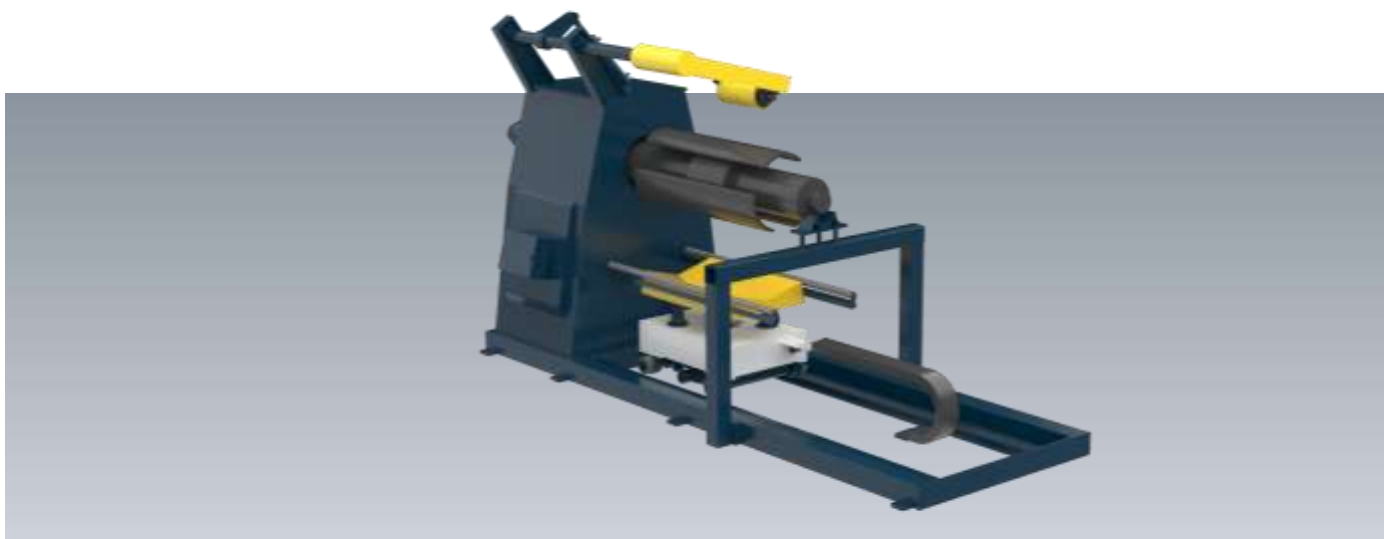
The loading trolley feeds coil material to the uncoiler. The V-shaped support base and trolley frame are welded structures. The base is raised by hydraulic cylinders and guided by four posts to align the coil's inner diameter with the uncoiler mandrel.

The trolley moves along steel rails, driven by a motor and chain system, and delivers the coil to the mandrel. Once the coil is clamped in place, the support base lowers and returns to the loading position.

The trolley includes cable and hose drag chains, and the V-shaped surface is lined with nylon to prevent coil surface scratches.

Technical Parameters

Item	Parameter	Note
Carrying capacity	10T	
Feeding speed	5-8m/min	



SF1503CH-COMPOSITION AND FUNCTION

1. Loading and Uncoiling Unit

2

Uncoiler + Mandrel Drum Auxiliary Support

Components:

- (1) Support mandrel drum
- (2) Three-segment hydraulic mandrel expanding mechanism
- (3) Variable frequency geared motor
- (4) Disc-type pneumatic brake
- (5) Cantilever gantry-type auxiliary support for mandrel drum end
- (6) Gear motor-driven coil head pressure roller

Function:

The uncoiler supports and automatically feeds the coil to the leveling machine. The mandrel drum aligns with the coil axis. The loading trolley positions the coil onto the mandrel drum, which clamps the coil using a hydraulic cylinder-driven expanding wedge. The mandrel drum rotates via a variable frequency geared motor with chain drive and is stopped quickly by a pneumatic disc brake. Sheet tension is maintained between the uncoiler and leveling feeder during feeding.

Key Component Materials and Processes of the Uncoiler

Uncoiler frame	Steel plate welding	Heat treatment annealing
Sliding sleeve	Steel plate welding	Quenching and tempering
Spindle	45	Quenching and tempering
Expanding plate	45	Quenching and tempering with galvanizing/chroming
Chain drive system	40Cr	Quenching and tempering

SF1503CH-COMPOSITION AND FUNCTION

1. Loading and Uncoiling Unit

3

Technical Parameters of Uncoiling Unit

Item	Parameter
Maximum coil weight	10t
Coil width	600 ~ 1500mm
Coil outer diameter	Φ800 ~ Φ1400mm
Expansion range of mandrel segments	Φ475 ~ Φ515mm
Mandrel expansion cylinder	φ150mm, stroke 120mm
Uncoiling speed	≤15 m/min
Braking method	Pneumatic disc brake

SF1503CH-COMPOSITION AND FUNCTION

2. Feeding and Leveling Unit

1

Feeding Unit

Components:

- (1) Hydraulic cylinder-driven telescopic material guide plate
- (2) Hydraulic cylinder-driven sheet head straightening mechanism

Function:

The feeding mechanism straightens and aligns the coil head from the uncoiler into the leveler. It includes a telescopic guide plate and a head straightening unit, both driven by hydraulic cylinders. For coils thicker than 1.5 mm, the head is often too curved to enter the leveler directly. During feeding, a pressure roller holds down the coil head to prevent recoil when cutting the binding strap. The pressure roller is driven by a geared motor to assist feeding and rewinding. The telescopic guide plate swings and extends hydraulically based on coil diameter, guiding the straightened head smoothly into the leveler for automatic feeding.

2

Leveling Unit

Components:

- (1) 1 pair of traction rollers
- (2) 11 leveling rollers
- (3) Worm gear lifter for leveling roller sliders
- (4) Worm gear motor for traction roller sliders
- (5) Variable frequency motor

Function:

The leveler flattens coil sheets before processing.

Total rollers	2 pinch rollers + 11 leveling rollers
Leveling roller material	42CrMo, quenched and tempered with medium-frequency induction hardening, hardness HRC 60–63
Support rollers	2 rows on top and bottom
Leveling roller diameter	φ85mm
Running speed	≤15 m/min
Main reducer	Hardened gear reducer
Main motor	Variable frequency motor

2. Feeding and Leveling Unit

2

Leveling Unit

Composition:

The leveler mainly consists of pinch rollers, frame, leveling rollers, support rollers, roll gap adjustment unit, drive system, and lubrication system.

Pinch Rollers:

Arranged in upper and lower pairs to pull the sheet head into the leveler. The lower roller is fixed, the upper roller is lifted by a hydraulic cylinder. Both rollers rotate actively and synchronize with the leveling rollers.

Frame:

The frame is a welded structure, subjected to annealing and aging heat treatment to relieve welding stress. It is precision machined on a large CNC floor-type boring and milling machine, ensuring sufficient strength, accuracy, and stability.

Leveling Rollers:

There are 11 leveling rollers in total, arranged with 5 on the top and 6 on the bottom. Made from forged 42CrMo steel, the manufacturing process includes: cutting, rough machining, quenching and tempering, semi-finishing, power frequency quenching, precision grinding, chrome plating, and polishing, achieving a surface finish of $Ra\ 0.4\ \mu m$.

The rollers are equipped with NSK and SKF rolling bearings, providing high load capacity and long service life.

Support Rollers:

The stiffness and assembly accuracy of the support rollers are crucial for sheet metal straightening precision, as they bear most of the correcting force during operation. Multiple sets of support rollers jointly support the leveling rollers, ensuring high processing quality along with sufficient rigidity and strength. This setup minimizes leveling roller deformation and allows easy adjustment. Support rollers are arranged both above and below and use a wedge mechanism for vertical adjustment.

2. Feeding and Leveling Unit

2

Leveling Unit

Roll Gap Adjustment:

The leveler features a fixed lower roller set and an upper roller set mounted on a rigid sliding block. The sliding blocks are raised and lowered by two pairs of screw and worm gear actuated lifts to adjust the gap and tilt angle between the upper and lower leveling rollers. The front and rear roll gaps are independently adjustable, with linear displacement sensors monitoring their positions.

Drive System:

The drive system consists of a variable frequency motor, hardened gear reducer, gear distribution box, and universal couplings.

The variable frequency motor powers the gear reducer, which drives the gear distribution box. The distribution box then transfers power through universal couplings to each leveling and pinch roller.

The gear distribution box uses cylindrical gears and rolling bearings, ensuring a long service life.

Lubrication System:

The gear distribution box uses splash lubrication with thin oil.

The support bearings at both ends of the leveling rollers use centralized lubrication with a grease pump.

The support bearings at both ends of the support rollers use timed, point-to-point grease lubrication.

SF1503CH-COMPOSITION AND FUNCTION

2. Feeding and Leveling Unit

3

Sheet Positioning and Correction Device

Composition:

1. Correction vertical roller
2. Mounting slider

Function:

This correction device precisely positions and aligns the incoming sheet metal.

The correction guiding system consists of a frame, feed rollers, vertical guide rollers and sliders. The vertical roller sliders are driven by a screw nut, pressing the vertical correction rollers against both sides of the sheet to guide and align it accurately.

Correction vertical rollers are installed at both the front and rear of the leveling feeder, and can be adjusted to center the sheet based on its width.

Technical Parameters

Item	Parameter
Sheet width	600mm-1500mm
Correction roller	4 pairs, GCr15, HRC53-58

SF1503CH-COMPOSITION AND FUNCTION

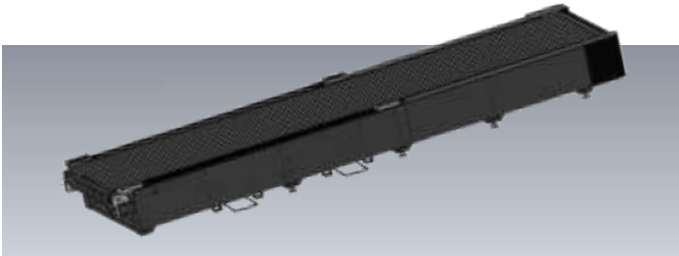
3. Blanking Unit – Metal Sheet Laser Cutting Machine

The metal sheet laser cutting machine, independently developed by SENFENG, is a mature product that has reached an advanced level in China. It performs laser cutting on leveled sheets and is the preferred choice in the metal sheet processing industry, featuring a safe and environmentally friendly design.

1

High-strength Machine Tool Bed

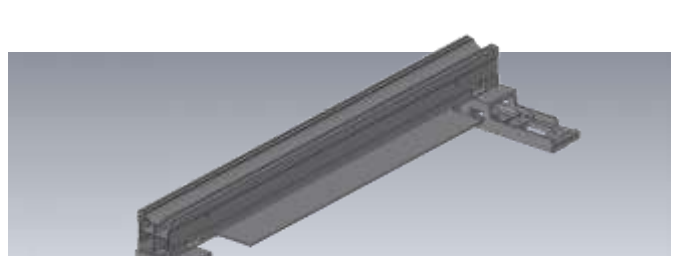
1. Manufactured using precision welding techniques, followed by annealing to relieve internal stress, then further stabilized through secondary vibration aging and precision machining.
2. Finite element analysis ensures optimal stress points and support structure, significantly reducing vibration during operation and ensuring long-term stable performance of the machine.



2

Aircraft-grade High-strength Aluminum Beam

1. The beam is made from aerospace-grade aluminum alloy, extruded, heat-treated, and precision-machined for high rigidity, low weight, corrosion resistance, and excellent surface quality.
2. The optimized internal structure, based on finite element analysis, ensures excellent dynamic performance during high-speed running, enabling fast and precise cutting of various shapes without compromising accuracy.



3

Intelligent Operation

1. The control unit is integrated on the side of the cutting machine door for convenient and intelligent operation. It can be rotated for real-time monitoring of the cutting process during unloading.
2. Real-time monitoring of both uncoiling and cutting reduces blind spots, ensuring safe and stable operation.



SF1503CH-COMPOSITION AND FUNCTION

3. Blanking Unit — Metal Sheet Laser Cutting Machine

Laser Source



1. Smaller core diameter, better beam quality
2. High cutting efficiency
3. Energy-saving, with electro-optical conversion efficiency > 32%
4. Precise and controllable
5. Lightweight
6. Customizable
7. Stable operation, safe, and durable
8. Center wavelength: 1080nm $\pm$ 5

Laser Cutting Head



1. Efficient Cooling: The collimating and focusing lenses have cooling structures, and the nozzle features cooling airflow, protecting the nozzle and ceramic body, and extending operation time.
2. Fast Focusing: Collimated focusing allows for faster movement and a larger adjustment range than traditional focusing.
3. Multiple Protective Lenses: Four protective lenses reduce contamination when replacing fiber and lower protective lenses, extending the life of the collimating and focusing lenses.
4. Optimized Structure: Integrated body design ensures sealing. Improved QBH, QD, and G5 fiber interfaces enhance compatibility with the laser source and prevent jamming caused by issues like rust and water leakage.

SF1503CH-COMPOSITION AND FUNCTION

4. Optional Units

1 Tightening Sleeve (Optional)

The standard inner diameters for steel coils are $\varphi 508\text{mm}$ and $\varphi 610\text{mm}$. Our uncoiling machine is designed for $\varphi 508\text{mm}$ coils. For $\varphi 610\text{mm}$ coils, an additional set of tightening sleeves (2 pieces totally) is required. For non-standard specifications, please contact SENFENG.

2 Laminating Function (Optional)

After uncoiling, a protective film is applied to the mirror-finished colored metal to prevent transportation pollution. The film ensures bubble-free protection. It is designed specifically for laser cutting, offering easy operation and wide applicability.

3 Inkjet Coding System/Coding (Optional)



4 Safety Fence/Light Curtain (Optional)

Safety fences or light curtains should be installed around the equipment, maintaining a sufficient safety distance to prevent accidents.

5 Professional Laser Cutting Software (Optional)

SFNest is a professional nesting software developed by the SENFENG team for coil material. It offers full-coil nesting layout, supports irregular cut-offs, and is the preferred choice for the sheet metal and cabinet industries.

6 Dust Removal System (Optional)

Equipped with a standard fan-based dust removal system. An optional dust collector is available, offering improved dust and smoke filtration and collection for better overall extraction performance.

SF1503CH-COMPOSITION AND FUNCTION

5. Unloading Unit

1 Finished Material Receiving Unit

Composition:

- (1) Finished parts receiving mechanism
- (2) Gear motor

Function:

The receiving mechanism is used to unload finished sheets from the laser cutting machine. After processing, the cutting slats conveyor transfers the finished parts to the pickup position of the receiving mechanism.

6. Hydraulic Unit

1 Hydraulic System

The hydraulic system is equipped with an integrated pump station, with valve blocks distributed on the oil tank and machine bed.

Item	Parameter
Work pressure	$\leq 12\text{Mpa}$
Motor power	AC5.5kW
Hydraulic oil	N46 or N68

7. Electrical Unit

1 Electrical Unit

1. The entire line uses internationally renowned low-voltage electrical components to provide power, logic, and real-time control. Length control is achieved via inverters and Omron encoders.
2. The control system has strong anti-interference capability and features self-diagnosis to quickly identify faults.
3. The automated line prioritizes safety with reliable protection measures to prevent mis-operation. In emergencies, power can be cut off immediately.
4. The automated line is easy to operate: After threading the material, simply press the auto-run button to start the entire line automatically.
5. The electrical control system consists of a distribution cabinet, control panel, external sensors (encoders, photoelectric switches, proximity switches, limit switches, etc.), actuators (motors), and electrical accessories.

Auto Gas Distribution System



Precise Control of Each Gas Flow

The CNC laser cutting machine has two separate gas lines: nitrogen (air) and oxygen. Each gas line can be independently controlled for flow rate and pressure.

- The equipment software terminal is equipped with an automatic auxiliary gas selection feature.
- The type and pressure of auxiliary gases can be automatically set and selected through the CNC program, eliminating the need for manual operation.
- The actual gas pressure at the cutting head outlet can be easily read and displayed on the panel in real-time.

CNC System



1

SENFENG Mimir is a high-end intelligent system known for its stability, reliability, easy deployment, simple commissioning, rich functionality, excellent performance, and high safety. It supports modular, customized, automated, and digital solutions. As one of the most advanced laser blanking line systems on the market, it features memory caching and a powerful process database covering parameters for various materials and thicknesses. These advantages make fast operation and efficient cutting possible.

- Z-axis auto-adjustment with follow-up control to compensate for uneven sheet surfaces.
- User-friendly interface with text-based error analysis reports.
- Automatic selection of assist gas type and pressure.
- Piercing control system.
- Direct pulse power modulation of the laser source.
- Breakpoint resume function.

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 sheet metal bending centers. 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.



SENFENG

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

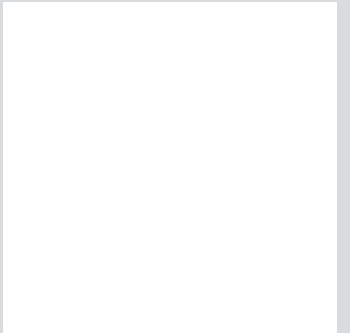
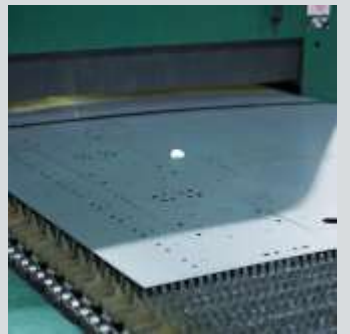
- **Custom Service:** Tailored service plans based on the specific needs of the customer.
- **Service Engineer Certification System:** Each service engineer undergoes rigorous training and assessment before being certified to work.
- **Common Issues Training:** Create a manual for common issues based 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.

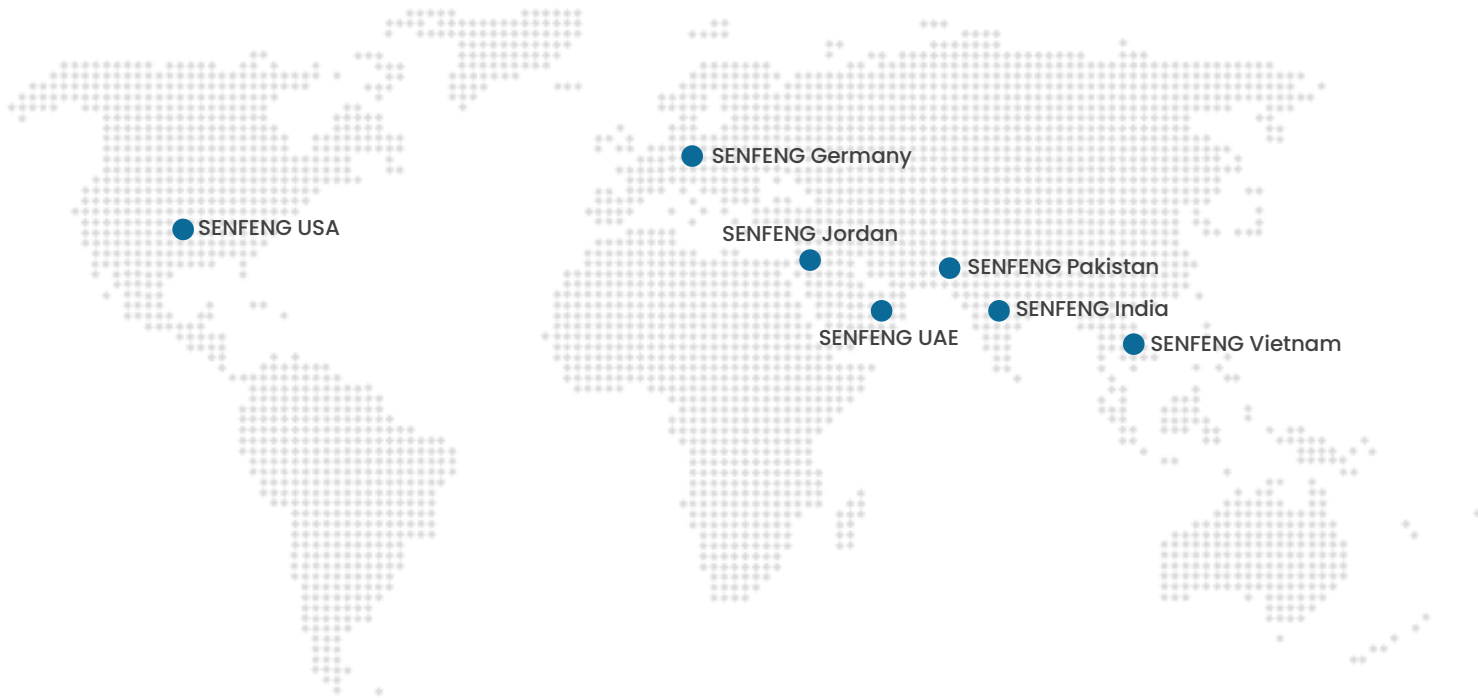


Comprehensive

- **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.







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