Hymson

Laser Cutting Machine Technology Document

HF·B Series

Your Reliable Partner We Grow Together

Company Profile

Hymson Laser Technology Group Co.,ltd(Stock code: 688559), founded in 2008, is a national high-tech enterprise, which integrates research and development, manufacturing, sales and service in laser and automation integrated solutions provider.

The company focuses on laser core optics and control technology research and development, advanced laser innovative applications (cutting, welding, surface treatment, etc.), precision automation intelligent manufacturing, products are widely used in lithium, photovoltaic, new display, 3C, sheet metal, pan semiconductor and other industries.

With the mission of "changing the world's equipment pattern and promoting the progress of human intelligence", we are committed to becoming "the world's leading industrial laser and automation intelligence brand", providing high-quality one-stop intelligent manufacturing solutions for global customers.

Partners


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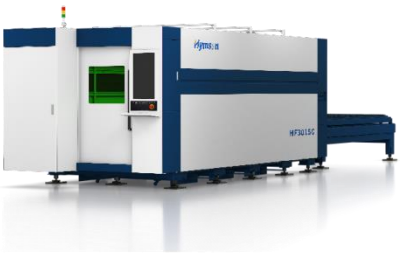
LITEON

PRODUCT **CATALOG**

SHEET METAL LASER CUTTING MACHINE

HF-A SEIRES(Single Platform)

HF-B SERIES(High Power)



HF-C SERIES(Dual-platform)

SHEET METAL LASER CUTTING MACHINE

HF-G SERIES(Flagship Product)

HF-T SERIES(Large Format)

SPECIAL PROFILE LASER CUTTING MACHINE

HP SERIES

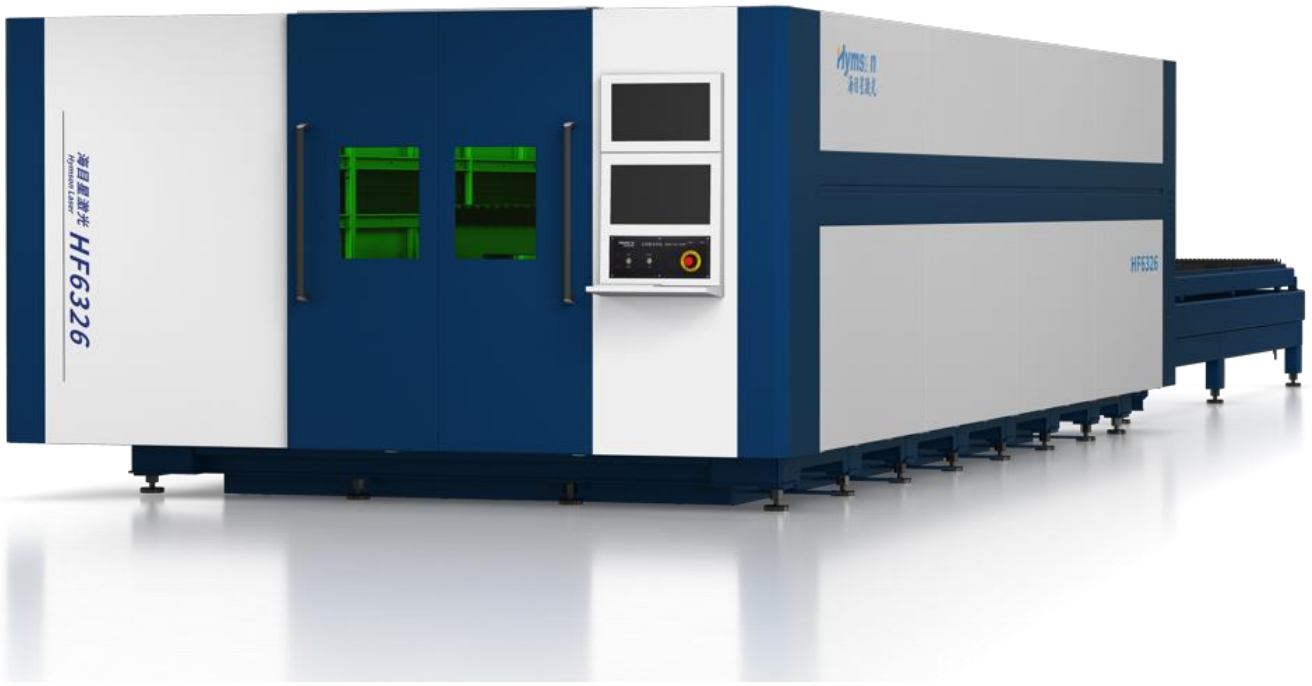
TUBE METAL LASER CUTTING MACHINE

MP SERIES(Professional)

S SERIES(Standard)

TP SERIES(Heavy-duty)

Product Introduction



Pictures are for reference only

HF·B series fiber laser cutting machine is a widely popular Hymson professional laser cutting machine. Brand new upgraded mechanical mechanism can ensure long-term stable operation and production safety protection, the ultra-high power machine lathe can stably and continuously process all kinds of ultra-thick plates.

- Modular design for high quality matching of the whole machine,
- Hymson dynamic compensation technology for thermal effect, effectively ensuring long-term and stable use and guaranteeing cutting precision of machine,
- Upgraded machine with metal plate welded and mortise and tenon joint structure for effectively solving problems of deformation of machine body and unstable machining,
- Multi-point support balancing technique, providing multiple guarantees for stability and guaranteeing stress equilibrium to prevent machine from sinking,
- Intelligent zoned ventilation system with high efficiency of ventilation and dust removal for good health and environmental protection,
- Can be equipped with automatic warehousing, full-automatic loading/unloading system, etc. for extension of automatic production line.

Core Configuration

Unit	Name	Model / Specification
I. Control Programming	Control System	FSCUT
II. Mechanical Drive	Machine Lathe	HF-B Honeycomb Heavy Duty Lathe
	Servo Motor and Drive	INOVANCE
	Precision Reducer	DESBOER
	Precision Toothed Rack	JT
	Precision Guide Rail	JW/ ROUST
	Table Type	Shuttle Table
III. Pneumatic Control	Intelligent Pneumatic System	SMC
IV. Optical System	Fiber Laser	≤40000W
	Auto Zoom Cutting Head	HYMSON
V. Dedusting System	Intelligent Zoned Exhausting System	HYMSON
	Dedusting Fan	HYMSON

Performance Indexes

Equipment Model	HF3015B	HF4020C	HF6025C	HF8025C	HF12025C
Power	6000W-40000W				
Effective Cutting Range	3000mmX 1500mm	4000mmX 2000mm	6000mmX 2500mm	8000mmX 2500mm	12000mm X2500mm
X/Y-axis Positioning Accuracy	±0.03mm/ m	±0.03mm/ m	±0.03mm/ m	±0.03mm/ m	±0.03mm/ m
X/Y-axis Repositioning Accuracy	±0.02mm	±0.02mm	±0.02mm	±0.02mm	±0.02mm
Maximum Speed of X/Y-axis Linkage Positioning	140m/min	140m/min	110m/min	110m/min	110m/min
Maximum X/Y-axis Acceleration	1.5g	1.2g	1.0g	1.0g	0.8g
Floor Space of Whole Machine	8330mmX 5700mm	10500mm X5900mm	15000mm X7000mm	20000mm X7000mm	30000mm X7000mm

Main Components

Fiber Laser Generator

A fiber laser refers to a laser with rare-earth element doped glass fiber as gain medium. As the diameter of the fiber core is small, high power density can be formed easily in the fiber core. Therefore, a fiber laser has high conversion efficiency, a low threshold value and a high gain and it can be connected to the current fiber communication system easily and efficiently. Fibers are very flexible, therefore, a fiber laser has the characteristics of being small and flexible, compact, cost-effective and easier system integration.

- High power/ small light spot
- High stability
- High electro-optical conversion efficiency
- Modular design and installation, for easy machine maintenance and reducing downtime
- Compact and stable design
- A low cost solution, taking semiconductor fiber as laser generation medium, without generation gas, which is environment-friendly.

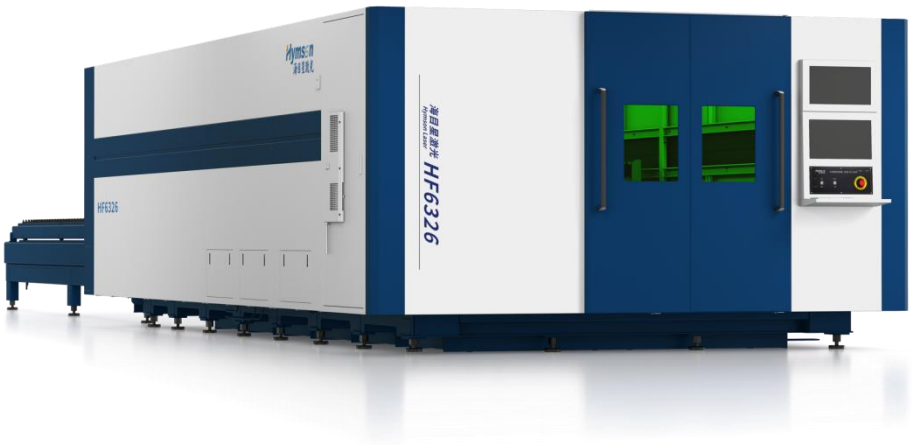
Laser Cutting Head

- Auto focus system
- Lightweight design, with fast acceleration
- Drift-free range sensor
- Continuous protective lens monitoring
- Closed optical path protection
- Automatic piercing
- The cooling technique cools the surface temperature of the sheet metal rapidly
- LED operational tell-tale shows the status of the cutting head
- With pressure sensors in the cutting head and at the nozzle

Machine Structure

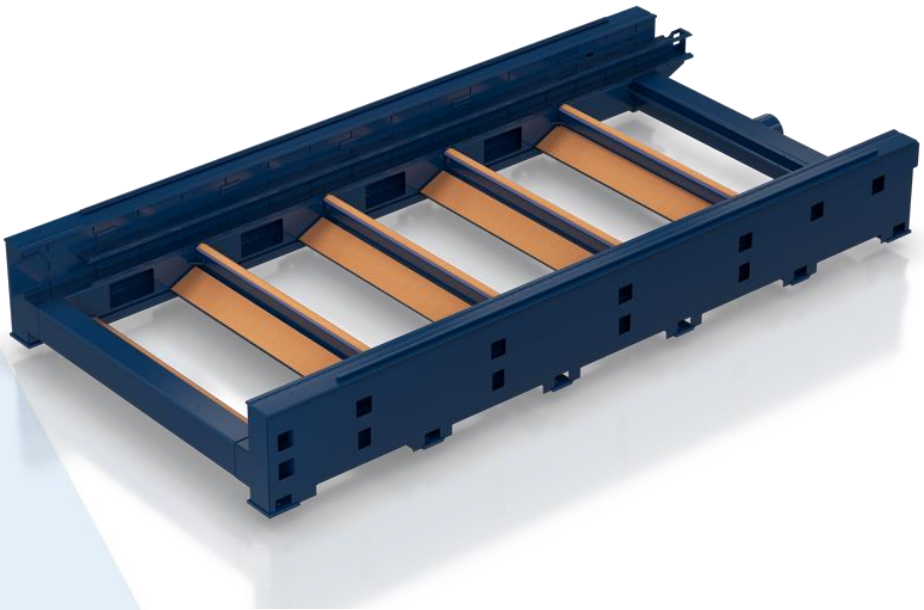
I. Modular design

- Several components with independent functions are integrated scientifically and systematically for high quality matching of the whole machine.
- With high strength and high reliability of the machine guaranteed, the product development speed is improved to respond to market demand rapidly.



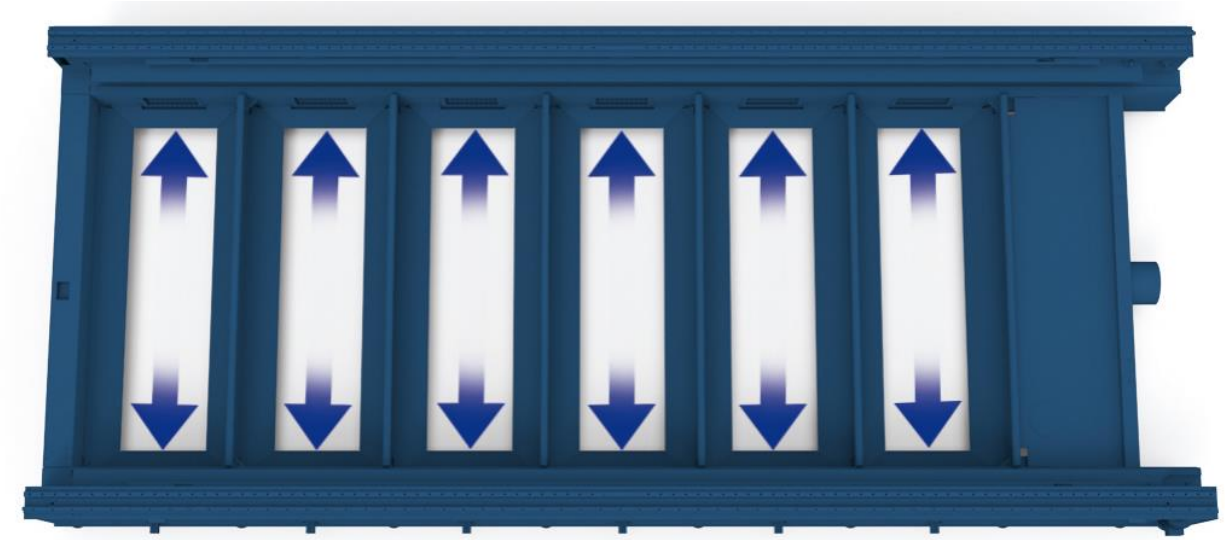
II. Machine Body with High Strength Structure

- Adopting high strength sheet for welding to guarantee stable structure of the machine and long-time and stable operation of the equipment..
- The machine body processed has undergone high temperature treatment to eliminate internal stress caused by the material itself and welding to the utmost extent, which ensures high strength, high precision and high tolerance.



III. Zoned Ventilation System

- Adopting zoned and segmental ventilation and using follow-up control to control the acts of cylinders in various zones to realize lower energy consumption and higher efficiency.
- Only the suction opening for the cutting operating range is opened for shorter path, more centralized and stronger wind power, and better dust removal effect.



IV. Ultra-high-temperature protection

- Using a variety of specifications, customized high-temperature refractory materials;
- 360-degree all-around high-temperature protection of the machine lathe, the perfect solution to the problem of high-power machine tool heat protection.

V. High Strength Cross Beam

- Adopting Hymson's patented structural design of drawn aluminum cross beam for light overall mass, high tensile strength and superior dynamic performance.
- Through simulated data analysis and testing of different models and lengths, ensuring quality, rigidity and dynamic nature of the cross beam in long-time running.

VI. Servo Motor

- Branded servo motor and drive, with high encoder resolution.
- Integrating high dynamics, compact structure and energy efficiency.

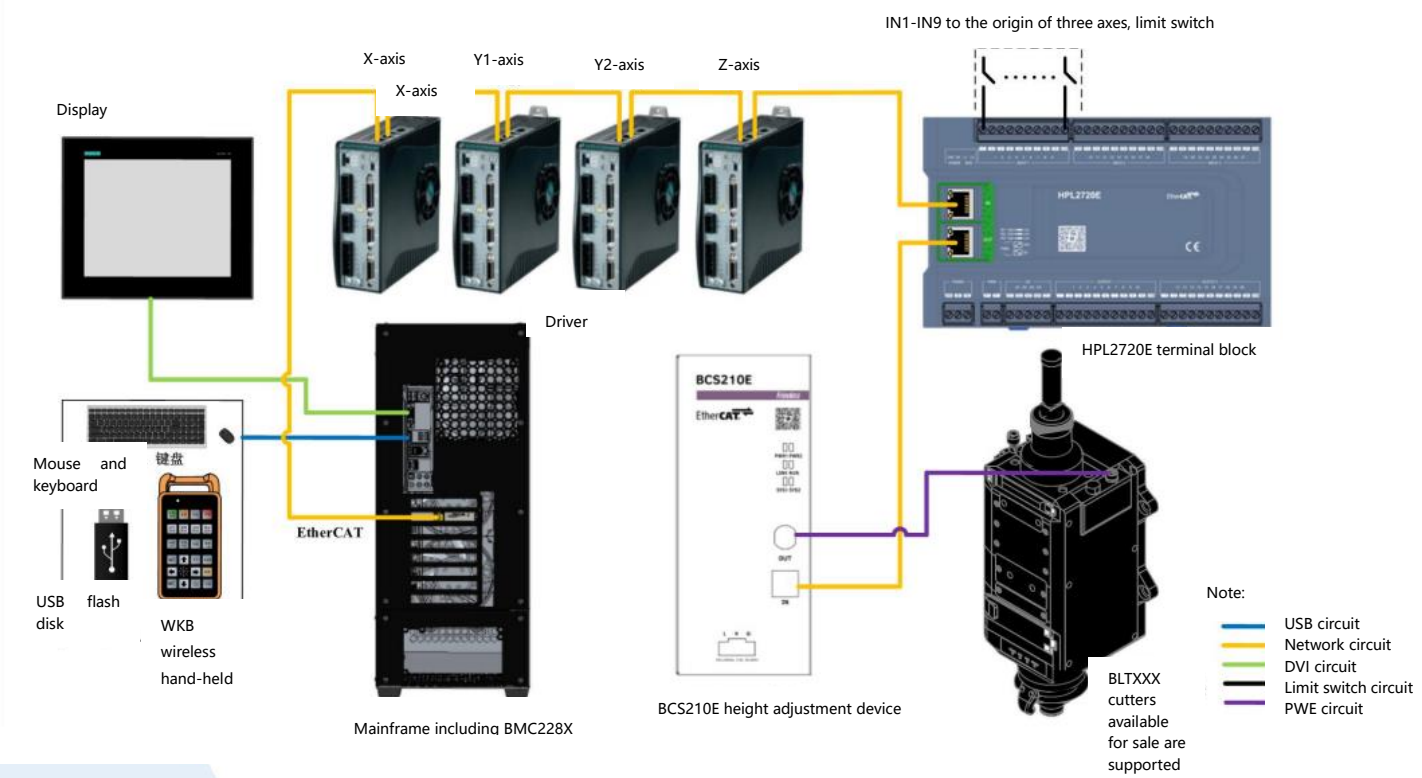
VII. Precision Gear Drive

- Precision machined high precision pinions and racks having been finished and ground.
- Super high matching rate and precision, high bite rate, smoother and quiet rotation.
- Compact load driven structure for effectively reducing driving torque and eliminating vibration.
- Adopting double drive gantry motion system for higher acceleration and faster movement speed.

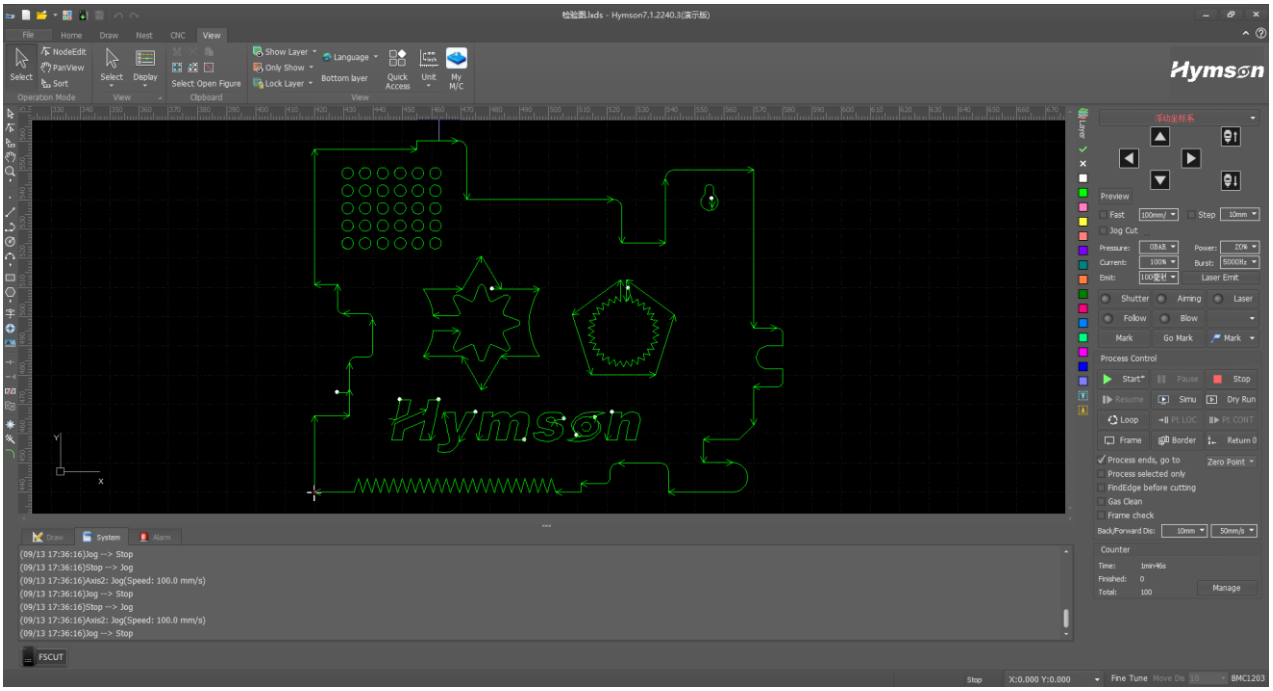
CNC Numerical Control System

FSCUT bus control system

- The system is taken as the Hymson Super Brain-EtherCAT bus control platform and is developed on the basis of Window 10 architecture. The data calculations are conducted with an industrial grade CPU, which is secure, reliable and self-diagnostics.
- FSCUT, applied to the flat laser cutting system, contains such modules as the production management and statistics, laser cutting technology processing, laser processing control, intelligent processing assistance, rapid proofing and debugging, modular diagnostics and maintenance, local and remote assistance to assist users in completing their production tasks promptly. The response time is less than or equal to 100μs.
- The system can be combined with automatic loading and unloading production lines and flexible production lines of FMS laser cutting to support the automated production.



- Supporting interconnection with upper layout CypNest to realize remote network push processing tasks. Managing the local processing data, and automatically generating statistical reports to analyze the production efficiency of the machine tool.

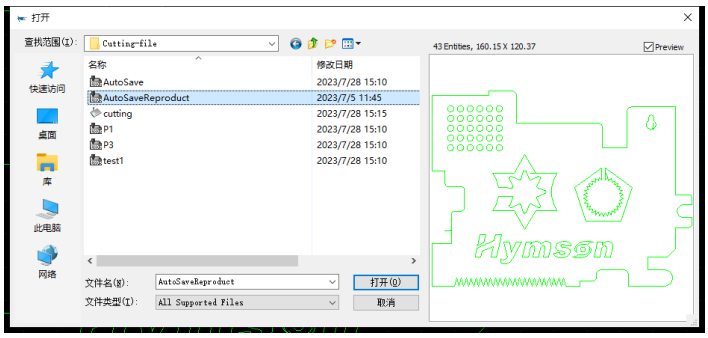


- Supporting flexible/batch processing, supplemented by automatic function modules such as capacitive edge seeking to achieve multi-variety and batch production needs.

- Supporting lightning piercing, segmented piercing, progressive piercing, pre-piercing and grouped pre-piercing; supporting the setup of separate laser power, frequency, laser form, gas type, air pressure, peak current, delay, follow height, etc. for the piercing process and cutting process; processing breakpoint memory, breakpoint forward and backward traceability, supporting positioning to any point during stop and pause and starting processing from any position.

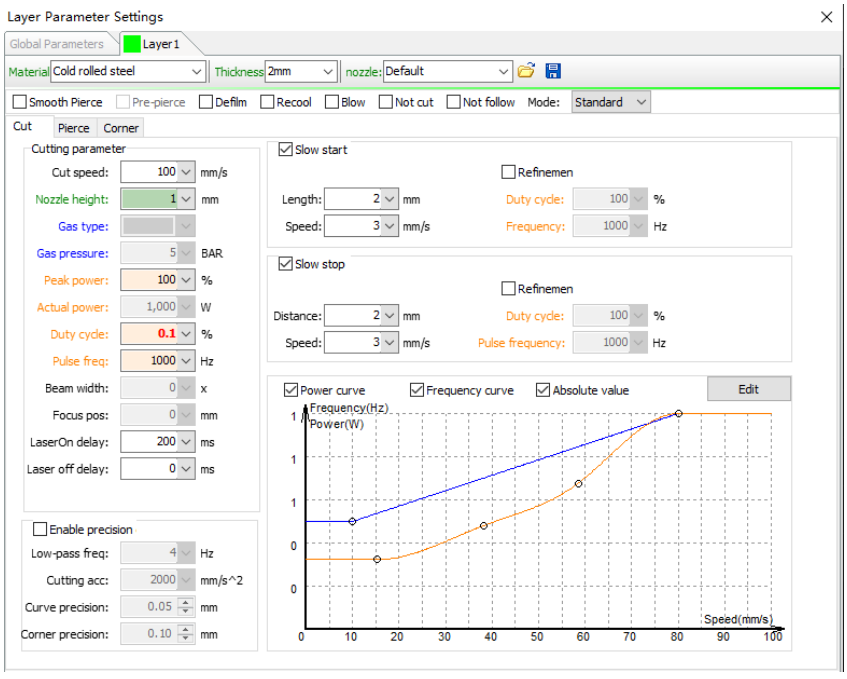
Compatible with multiple files

The system can be compatible with AI、DXF、PLT、Gerber、LXD and other graphic data formats, as well as G-generation international standards from ACTcut, Master Cam, Type3, etc. It is convenient for users to import external graphics quickly for the proofing and debugging.



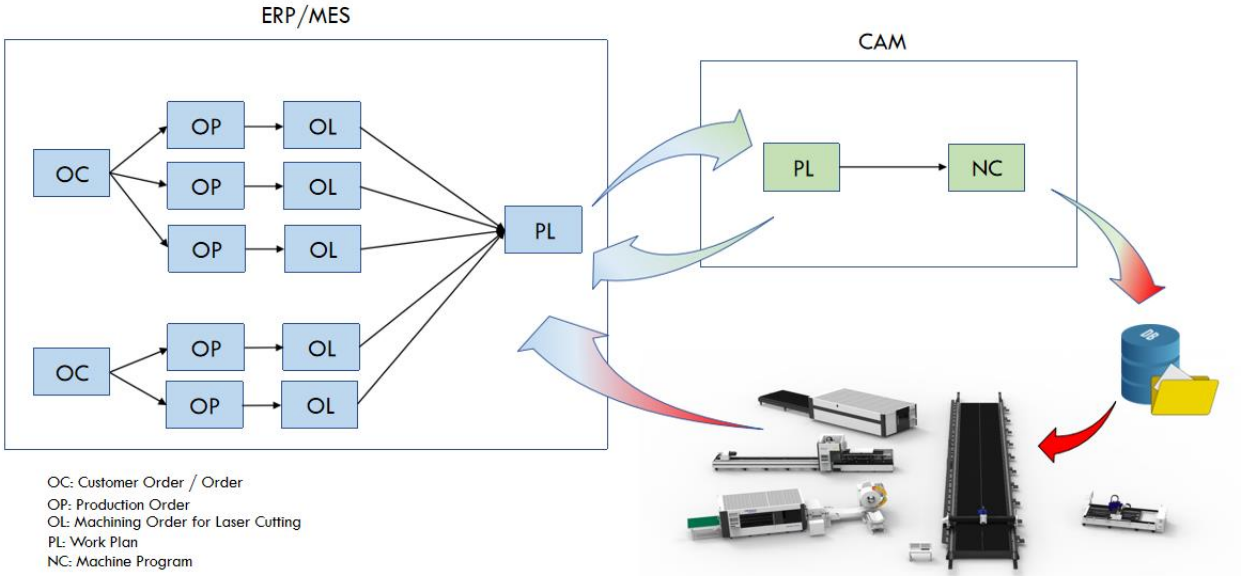
Rich Laser Process Database

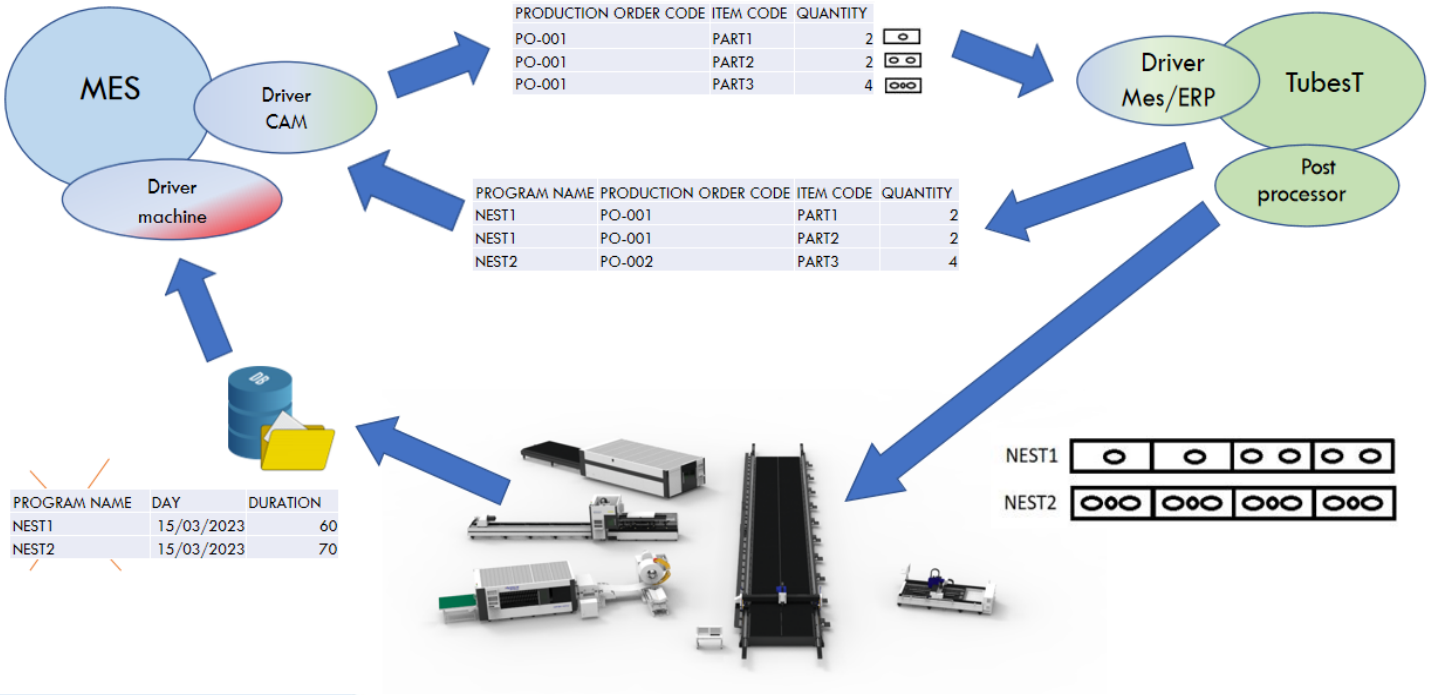
- A rich laser process database is provided; material database parameters are selected according to different materials; the modification and storage operations are convenient.



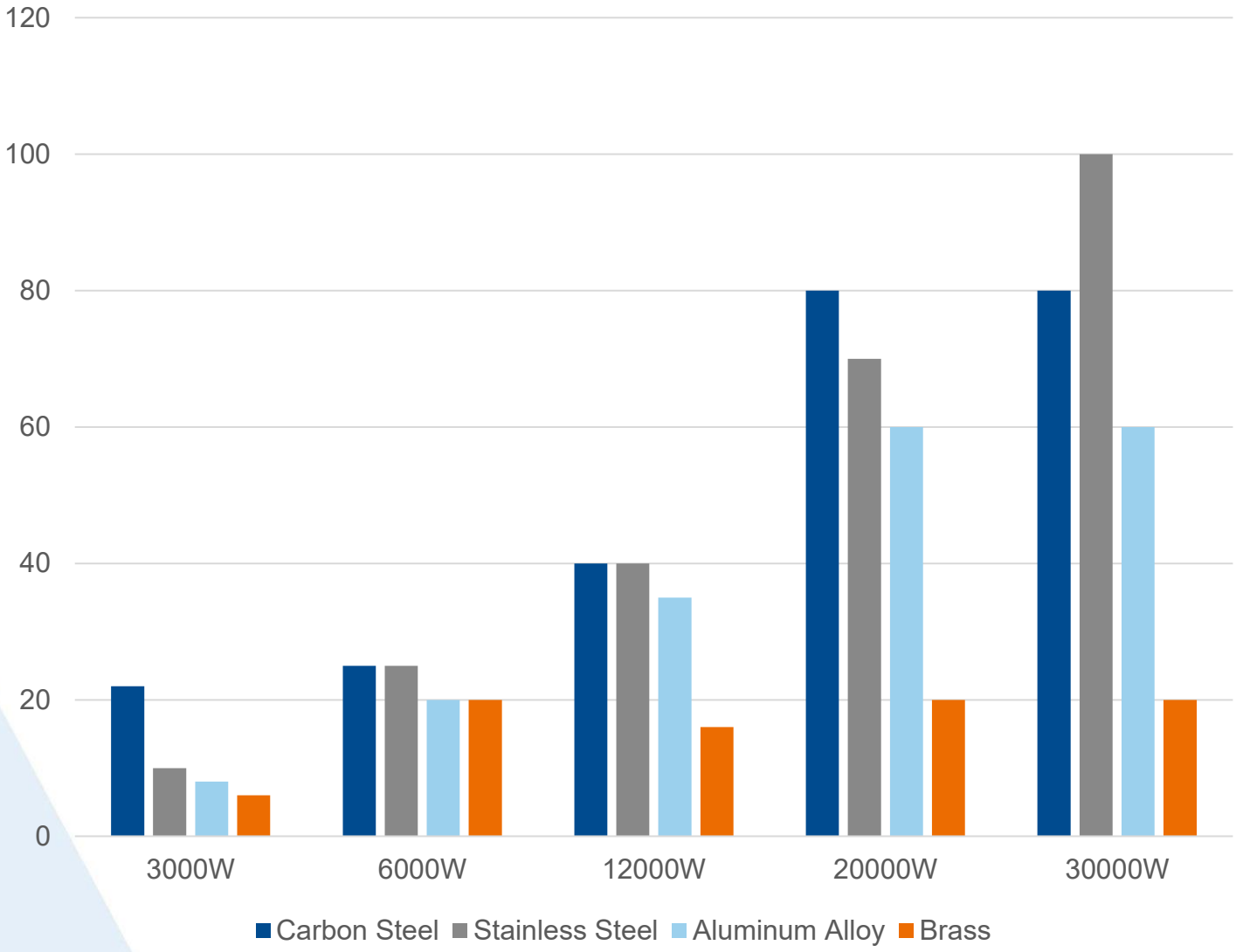
Industry 4.0 Solutions (Optional)

Hymson's laser cutting equipment provides solutions in line with Industry 4.0, can be connected with customers' own MES/ERP, builds a bridge between plate/pipe processing and ERP/MES data transmission, and achieves the return of parts generation and processing progress without manual participation, to meet the construction needs of digital and intelligent factories.





Cutting Ability



Cutting Parameters

3000W				
Material Thickness(mm)	Reference Effective Cutting Speed (m/min)			
	Stainless Steel N_2	Aluminum N_2	Brass N_2	Carbon Steel O_2/N_2
1.0	40.0-50.0	35.0-40.0	25.0-35.0	8.0-10.0/35.0-50.0
2.0	20.0-25.0	15.0-18.0	10.0-15.0	5.0-7.0/15.0-20.0
3.0	8.0-12.0	8.0-10.0	5.0-9.0	3.8-4.0/6.0-10.0
4.0	6.0-7.0	4.0-6.0	3.0-4.0	3.2-3.6
5.0	3.5-4.0	2.5-3.5	1.5-2.5	2.5-3.4
6.0	2.8-3.0	1.5-2.0	0.8-1.2	2.4-2.8
8.0	1.0-1.2	0.7-0.8	0.4-0.5②	1.8-2.3
10.0	0.7-0.8①	0.3-0.5①		1.2-1.5
12.0	0.3-0.4②			0.9-1.2
16.0				0.6-0.8
20.0				0.5-0.6

①Indicates that the graphic is simple, low requirements can be small batch; ②Indicates that proofing can be done, the limit of cutting. The cutting effect and speed may be affected by the difference of material or personnel operation.

6000W				
Material Thickness(mm)	Reference Effective Cutting Speed (m/min)			
	Stainless Steel N_2	Aluminum N_2	Brass N_2	Carbon Steel O_2/N_2
1.0	45.0-60.0	35.0-45.0	35.0-42.0	8.0-12.0/40.0-55.0
2.0	25.0-30.0	20.0-25.0	18.0-22.0	5.0-6.5/25.0-35.0
3.0	16.0-20.0	10.0-15.0	8.0-13.0	3.5-5.0/15.0-20.0
4.0	10.0-13.0	9.0-11.0	7.0-9.0	3.2-4.0/10.0-15.0
5.0	8.0-10.0	5.0-6.5	4.5-5.5	3.0-3.5/7.0-9.0
6.0	5.0-7.0	4.0-5.0	3.0-4.0	2.6-3.0/5.0-6.0
8.0	3.5-4.0	2.5-2.8	1.8-2.2	2.3-2.5
10.0	1.6-2.2	1.5-1.8	0.8-1.2	2.0-2.2
12.0	1.0-1.3	0.8-1.2	0.7-0.9②	1.8-2.0
16.0	0.8-0.9①	0.5-0.6①		1.0-1.3
20.0	0.5-0.6②	0.3-0.5②		0.6-0.7
25.0	0.2-0.3②			0.4-0.5①

12000W			
Material Thickness(mm)	Reference Effective Cutting Speed (m/min)		
	Stainless Steel N_2	Aluminum N_2	Carbon Steel O_2/N_2
1.0	40.0-50.0	40.0-50.0	8.0-10.0/40.0-50.0
2.0	35.0-40.0	35.0-40.0	5.0-6.0/35.0-40.0
3.0	28.0-32.0	28.0-30.0	4.2-4.5/30.0-36.0
4.0	18.0-22.0	18.0-21.0	3.5-3.7/20.0-26.0
5.0	14.0-18.0	13.0-16.0	3.2-3.5/17.0-19.0
6.0	11.0-14.0	10.0-12.0	2.6-3.2/11.0-13.0
8.0	9.0-11.0	7.0-8.0	2.3-2.8/7.0-9.0
10.0	5.0-7.0	4.0-5.0	2.2-2.5/4.5-5.5
12.0	3.5-4.5	2.5-3.0	1.8-2.1/4.0-4.3
16.0	2.0-2.5	1.6-1.8	1.5-1.6
20.0	1.3-1.5	0.8-1.0	1.3-1.5
25.0	0.7-0.8	0.6-0.8	1.0
30.0	0.3-0.4①	0.2-0.4①	0.3-0.5①
35.0	0.2-0.3②	0.2-0.3②	0.2-0.4①
40.0	0.1-0.2②	0.1-0.3②	0.1-0.3①

20000W			
Material Thickness(mm)	Reference Effective Cutting Speed (m/min)		
	Stainless Steel N_2	Aluminum N_2	Carbon Steel O_2/N_2
3.0	35.0-40.0	29.0-32.0	4.2-4.5/35.0-40.0
4.0	28.0-30.0	20.0-25.0	3.5-3.7/26.0-30.0
5.0	23.0-26.0	15.0-19.0	3.2-3.5/23.0-25.0
6.0	18.0-22.0	12.0-16.0	2.6-3.2/20.0-22.0
8.0	13.0-15.0	10.0-12.0	2.3-2.8/13.0-15.0
10.0	10.0-12.0	6.0-8.0	2.2-2.5/10.0-12.0
12.0	8.0-9.0	4.0-6.0	1.8-2.1/8.0-9.0
16.0	4.0-5.0	2.0-3.0	1.5-1.6/3.0-4.0
20.0	2.0-2.5	1.0-1.5	1.3-1.5/2.0-2.5
25.0	1.5-1.8	0.8-1.0	1.2~1.4
30.0	0.8-1.2	0.5-0.8①	1.0-1.2
40.0	0.2-0.3②	0.3-0.5②	0.5-0.8
50.0	0.1-0.2②	0.2-0.3②	0.3~0.5①
60.0	0.1-0.2②		0.1~0.2②
80.0	0.1-0.15②		0.1~0.2②

30000W			
Material Thickness(mm)	Reference Effective Cutting Speed (m/min)		
	Stainless Steel N_2	Aluminum N_2	Carbon Steel O_2/N_2
3.0	40.0	35.0-40.0	/35.0-40.0
4.0	30.0	30.0-35.0	/26.0-30.0
5.0	23.0	23.0-25.0	/23.0-25.0
6.0	20.0	20.0-23.0	2.8/20.0
8.0	17.0	11.0-15.0	2.5/14.0
10.0	12.0	8.0-11.0	2.2-2.5/11.0
12.0	11.0	5.0-8.0	1.8-2.1/8.0
16.0	8.0	2.0-3.0	1.5-1.6/3.0-4.0
20.0	5.0	1.0-2.0	1.3-1.5/3.0
25.0	3.8	0.8-1.0	1.2~1.4
30.0	3.5	0.5-0.8①	1.0-1.2
40.0	0.4②	0.3-0.5②	0.9-1.0
50.0	0.1-0.2②	0.2-0.3②	0.3①
60.0	0.1-0.2②		0.25②
80.0	0.1-0.15②		0.2②
90	0.05-0.1②		
100	0.05-0.1②		

40000W			
Material Thickness(mm)	Reference Effective Cutting Speed (m/min)		
	Stainless Steel N_2	Aluminum N_2	Carbon Steel O_2/N_2
8.0	26.0	45.0	2.5/23.0
10.0	20.0	28.0	2.3/18.0
12.0	17.0	23.0	2.0/15.0
16.0	12.0	12.0	1.6/10.0
20.0	8.0	6.0	1.5/7.0
25.0	5.0	3.5	1.3/5.0
30.0	3.5	1.5-2.0	1.0-1.2/2.2
40.0	1.5	0.6-0.9	0.9-1.0/1.8
50.0	0.3	0.2-0.3	0.8/1.0
60.0	0.1-0.2		0.3/0.8
80.0	0.1-0.15		0.2/0.5

Installation and Commissioning

User’ s Machine Installation Site Condition Preparation

S/N	Content

1	Power Supply Capacity: ≥60KVA
2	Power Supply Requirements: (1) Three-phase voltage stability < ±5%; (2) Unbalancedness of three-phase power supply < 2.5% (Note: Abrupt changes in supply voltage and sudden power failure are not allowed, otherwise, the laser may be damaged easily. Good grounding is required (ground resistance < 3 Ohm).
3	Compressed Air Supply Requirements: (1) Air supply capacity: ≥ 0.8m3/min (2) Air supply pressure: ≥ 7bar (3) Dewpoint ≤ 5℃ (4) Oil content ≤ 0.01ppm Solid particle ≤ 0.01μm
4	Auxiliary gas for cutting: Oxygen (O2)/ Nitrogen (N2): Purity ≥ 99.99%
5	Sheet (Tube) Cutting: Black skin, smooth, level, rustless, evenly rolled, reaching the ISO standard.
6	Installation Site Requirements: 1. The foundation for equipment installation does not settle and should be constructed according to the foundation drawing provided by Party B; 2. Temperature Requirement: [5-30]℃; 3. Humidity Requirement: < 70%; 4. After the equipment is installed and commissioned, separate the laser and install an air conditioner.
7	The equipment operator should have been graduated from a secondary specialized school or above and have the experience in operation of computers and general numerically-controlled lathes. The equipment should be equipped with a programming computer.

Installation and Commissioning

- All the equipment provided under the contract should be installed and commissioned by Hymson. After the contract is signed, we will determine the specific installation location of the equipment in the shortest time and provide the equipment foundation drawing within 5 working days after the contract goes into effect. Prior to the installation and commissioning, you should prepare the equipment foundation strictly according to the requirements specified in the equipment foundation drawing provided by Hymson. After the installation site is ensured, the engineers will install and commission the equipment with the tools they carry and, within 10 days, complete the installation, commissioning, technical index tests, training, acceptance and delivery for use;
- The expenses related to the installation and commissioning and the staff assigned should be borne by Hymson.

Transportation and Logistics

- The place of delivery should be your installation site.
- Standard packaging suitable for long-distance transportation by truck, being dampproof, rust-proof and shockproof; suitable for integral hoisting and indicating the centre of gravity for

lifting and the hoisting position;

- Mode of Transport: Motor transport. We should bear the freight and insurance.
- Each packaging box should be accompanied by a detailed packing list and a quality certification as well as the instructions on the equipment and other documents and materials. The packing list should be outside the packaging box and the quality certification should be inside the packaging box.

Equipment Acceptance

a. Acceptance Standard: The acceptance should be according to the technical agreement between the customer and Hymson.

b. Final Acceptance

- After we complete the installation, commissioning and self-check of the equipment, the acceptance should be conducted at the demander's site, including the acceptance inspection of the quantity, model/specification, functions, technical indexes, etc. all goods; the typical sample pieces recognized by both parties should be cut with laser.
- The parties should record the situation of acceptance and evaluate the acceptance results. Only after both parties sign the acceptance results can a performance test be conducted.
- c. Other Notes to Final Acceptance
- If the acceptance is interrupted due to the failure of the auxiliary facilities (power supply, surroundings, etc.) at the site or the environment not complying with the normal operation requirements of the equipment, the demander should immediately conduct repair to ensure the conditions necessary for the normal work of the equipment.
- If the equipment is found to lack parts or be damaged or not complying with the contract terms and quality standards during the acceptance, we will be responsible for supplement and replacement at our expense.

Technical Training

- We provide free technical training. After the installation and commissioning, we will provide technical guidance and training for your operators for no less than 5 days till the operators are perfect themselves in the structure and technical principle of the equipment as well the correct programming, operation, check, repair and maintenance of the equipment.
- The main contents of training are as follows: Structure and technical principle of the equipment; programming, operation, repair and maintenance and general fault diagnosis of the equipment; laser processing technology; common faults and troubleshooting of the equipment (including the mechanical, electrical and pneumatic sections); laser processing safety education, etc.

After-sale Services

1. After the equipment passes the strict final acceptance inspection and the final acceptance results are signed, the warranty period of the whole machine is one year.

2. In case of quality problems in the system parts within the warranty period, our well-trained service engineer will provide phone or onsite services at any time. For any injury or damage caused by the quality of the equipment, we will be responsible for part replacement and services for free, except for conventional consumables (such as externally operated optical fibers, optical lenses, and cutting nozzles) and accidents due to the user's operation in violation of regulations;
3. During the warranty period, after receiving the repair notice from the demander, we will designate a specially-assigned person to follow up the matter and reply within 2 hours. If the fault still cannot be removed via phone, WeChat or fax, our technical services staff will arrive within 24 hours (excluding the travel time);
4. Beyond the warranty period, we will still provide wide and preferential technical support and services, regular maintenance of the whole machine and auxiliary machinery and spare parts for the demander, provide whole-process maintenance services for the products supplied, and provide daily consulting and guidance related to the equipment as well as the information and materials in respect of equipment improvement and repair technology at any time.
5. We have sufficient reserve and spare parts and can timely provide technical and spare parts services for the demander to meet the needs in operation and repair.
6. We regularly arrange project engineers to go to the user's site to provide free technical visit services;
7. During our development of new kinds of products and utilization of new technology, we provide related technical services and technical support for free, such as software upgrade services.

Precautions for Starting the Laser Cutting Machine

As a laser cutting machine uses electronic and optical devices, excessive temperature difference between inside and outside may cause dew formation on the surfaces of optical lenses and elements, thus reduces the performance of and even damage the laser and cutting head. Dew formation inside a fiber laser is closely connected with the bad operating habits of the fiber laser operators of the customer. In order to reduce the fault rate of the fiber laser and decrease the losses caused by the downtime of the fiber laser machine of the customer, the operators of the customer are asked to pay attention to the following when using the fiber laser machine:

Switching sequence of the fiber laser machine (By switching on/off the machine strictly according to the switching sequence, the risk of dew formation inside the fiber laser may be reduced, thus decreases the faults of the laser!)

1、Switching-on sequence of the fiber laser machine

（1）Turn on the main power switch of the laser and allow the air conditioner or dehumidifier of the cabinet to run for over 30 minutes.

（2）30 minutes after the laser has been switched on, turn on the power switch of the cooling-water machine.

2、Switching-off sequence of the fiber laser machine

（1）Turn off the power switch of the cooling-water machine.

（2）Turn off the power switch of the laser.

Precautions for Pause

If the duration of pause during the switching-on by the customer exceeds one hour, we suggest that the high voltage of the laser be turned off, the power switch of the fiber laser not be turned off, and the cooling-water machine be turned off. If you need to cut products again, turn on the cooling-water machine and allow it to run till the actual temperature of the high temperature water and low temperature water of the cooling-water machine reaches the set temperature ±1℃. Then turn on the high voltage of the laser, and enable the beam emission for cutting.

Note: The cooling-water machine must not be still running after the power switch of the fiber laser has been turned off!

Environment Requirements of the Fiber Laser:

1、Prepare an independent air-conditioned room for the laser, improve the external work environment for the laser, and allow the laser to work in a dry, constant temperature environment.

2、We suggest that you purchase a hygrothermograph and put it in the air-conditioned room for the fiber laser to monitor the temperature and humidity of the air-conditioned room.

3、According to the ambient temperature, adjust the temperature of the cooling-water machine. Set the high temperature to 28-32℃ and set the low temperature to 23-27℃.

In summer, we suggest that you set the high temperature water in the water tank to 30-32℃ and set the low temperature water to 25-27℃ to prevent dew formation in the laser.

In addition, there are many thunderstorms in summer. In order to guarantee the normal use of the machine, we suggest that you disconnect all power supplies of the laser cutting machine when it thunders and do not power on the machine until after the thunder and lightning. Damages by thunders and lightning are not within the scope of warranty.

It is hereby declared that you should operate the machine strictly according to the above precautions. Dew formation or damages by thunders and lightning due to failure to operate the machine in accordance with the above requirements are not within the scope of warranty provided by the supplier and the using unit should bear all losses arising therefrom.

Hymson (Jiangmen) Laser Intelligent Equipments Co.,Ltd.

We thank you for the opportunity to offer this technical proposal and look forward to serving you in the future!

Sincerely Yours,

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