Hymson

Laser Cutting Machine Technology Document

MP•6022 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


ATL


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ASUS

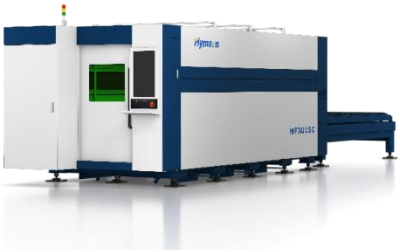

LITEON

PRODUCT **CATALOG**

SHEET METAL LASER CUTTING MACHINE

HF-A SEIRES(Single Platform)

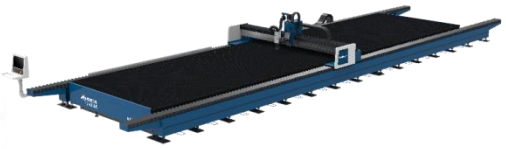
HF-B SERIES(High Power)



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

Hymson's brand new MP·6022D series laser tube cutting machine is a new and all-round upgraded model, with a breakthrough in machining efficiency. It is your ideal production tool for high efficiency laser processing and tube cutting.

- High speed, high efficiency, high precision, and highly integrated, suitable for most of the pipe processing and cutting,
- Wide tube diameter range, wide stroke range and good applicability,
- New chuck clamping force of up to 300kg, industry-leading, the rear card fully sealed dust proof effect greatly improved,
- Standard configuration containing nesting software for more intelligent and efficient production and machining,
- The brand new FSCUT professional tube cutting system integrates multiple tube cutting functions,
- Optional full-automatic/semi-automatic loading system for reducing labor cost,
- Optional short tail material for maximizing tube utilization rate.

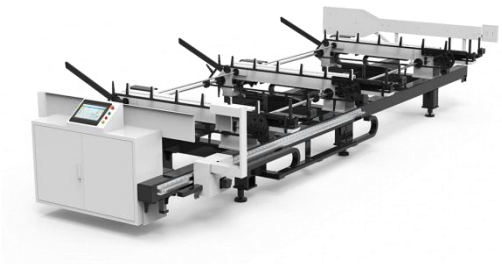
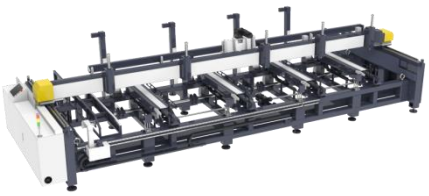
Core Configuration

Model	MP-6022
Control System	FSCUT
Machine Lathe	MP-6022D-V1.0
Servo Motor and Drive	INOVANCE
Chuck	Fully Sealed Pneumatic Chuck
Precision Reducer	DESBOER
Precision Toothed Rack	JT
Precision Guide Rail	JW/ROUST
Intelligent Pneumatic System	SMC
Fiber Laser	≤3000W
Auto Zoom Cutting Head	HYMSON
Dedusting System	HYMSON
Dedusting Fan	HYMSON
Nesting software	HYMSON
Unloading Components	3M● (Optional)
Automatic Feeding Device	6M● (Optional)
Clamping Detection	● (Optional)

Performance Indexes

Equipment Model		MP-6022D
Tube Specification	Full-Automatic Loading:	Circular Tubes: Φ15mm~Φ180mm Square Tubes and Rectangular Tubes: □15mm~□140mm
	Manual Loading:	Circular Tubes: Φ10mm~Φ220mm Square Tubes and Rectangular Tubes: □10mm~□150mm
Length of Cutting Residue		≥210mm/100mm
Maximum Weight of a Single Tube		300kg
Floor Space of the Whole Machine		12000mm×3000mm
X-axis/Y-axis	Positioning Speed	60m/min
	Acceleration	1.0g
	Positioning Accuracy	0.03mm
Z-axis	Positioning Speed	60m/min
	Acceleration	2g
	Positioning Accuracy	0.03mm
B1-axis and B2-axis	Infinite Rotation	100rpm/min
	angular acceleration	100rad/s²

Automatic Loading configuration (optional)

Name	Semi Automatic Loading	Full Automatic Loading
Equipment Model	MP-6022D	MP-6022D
Length Of Loading Tube	6200mm	3000mm - 6200mm
Maximum Weight Of Loading	500kg	2000kg
Tube Specification	Circular Tubes: φ15mm~120mm Square Tubes And Rectangular Tubes: ■15mm~120mm	Circular Tubes: φ15mm~180mm Square Tubes And Rectangular Tubes: ■15mm~140mm
Floor Space Of The Whole Machine	7000mm x 3000mm	8000mmx4000mm
		

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.

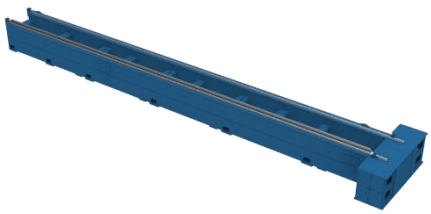
- High power/ small light spot
- High stability
- High electro-optical conversion efficiency
- Modular design and installation, for easy machine maintenance and reducing downtime
- Compact and stable design
- A low cost solution, taking semiconductor fiber as laser generation medium, without generation 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
- smoothly worldwide
- Compliant with safety standards, realizing visual and safe system running

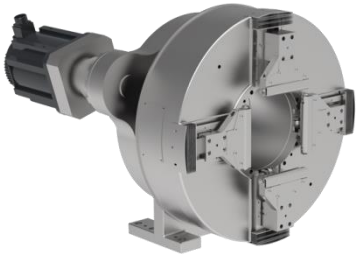
Machine Structure

Machine with Plate-Tube Welding Structure



- The main machine body welded has undergone annealing treatment to eliminate internal stress.
- Flatness and Straightness of Guide Surface ≤0.05mm, Max. Surface Roughness: 0.8.

Pneumatic Fully Sealed Chuck

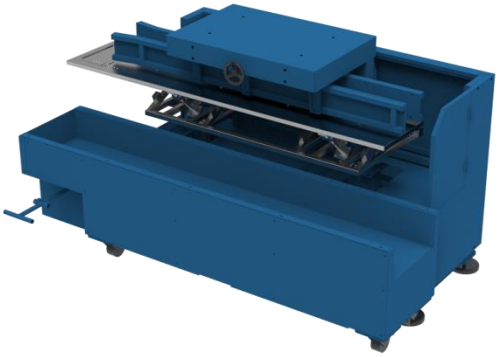


- Full stroke high precision chuck with high clamping force, industry leading.
- Large clamping stroke, low rotational inertia, high rotational speed, greatly improved cutting efficiency, to meet most of the pipe cutting needs
- The rear chuck adopts fully sealed dust prevention structure to greatly improve the effect of dust prevention.

Auxiliary Support

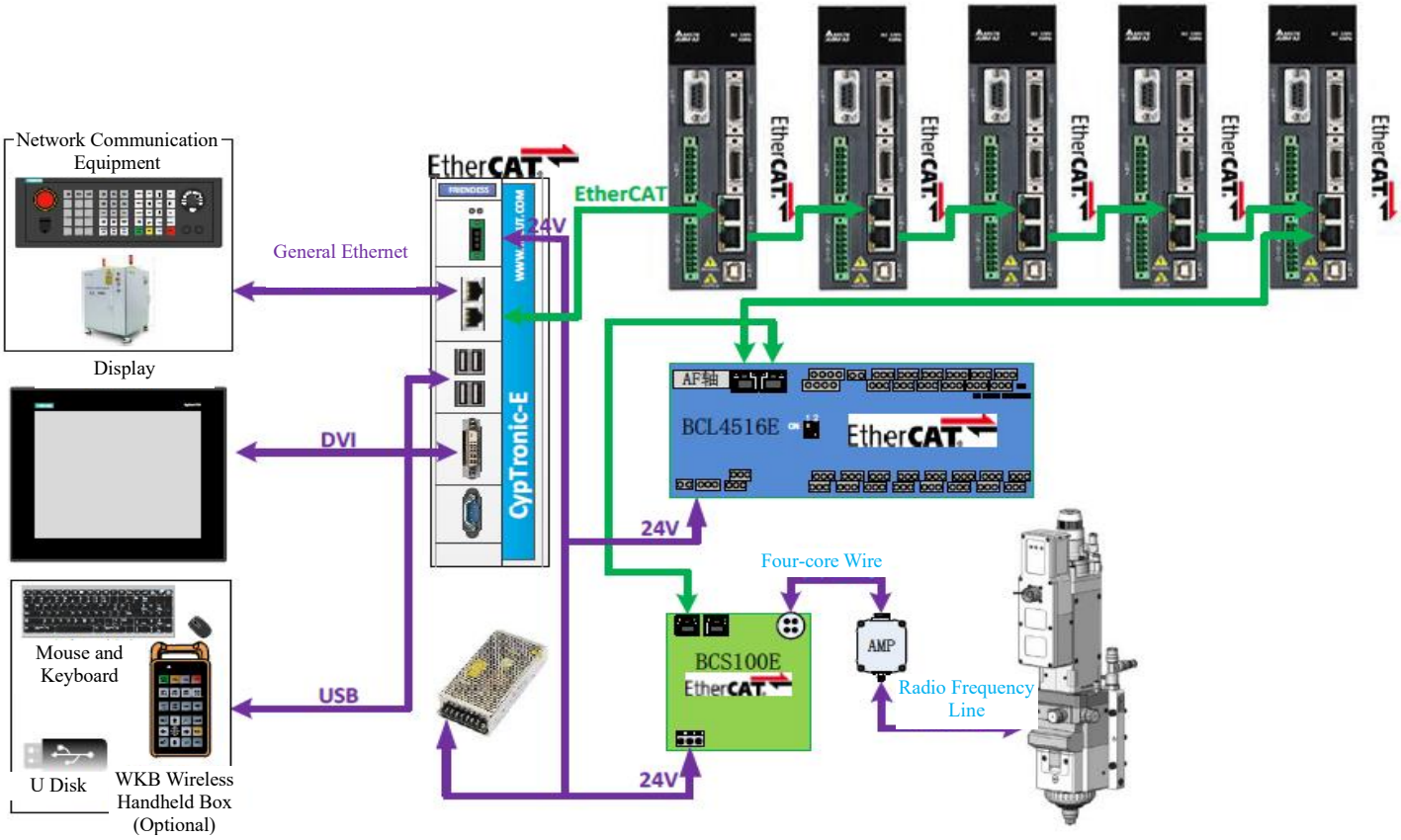
- The auxiliary support adopts variable diameter wheel.
- Effectively preventing the tube from swaying from side to side during high speed rotation and guaranteeing the precision of rotation of the tube during cutting.
- Playing the roles of guiding and supporting during feeding.

Unloading Mechanism



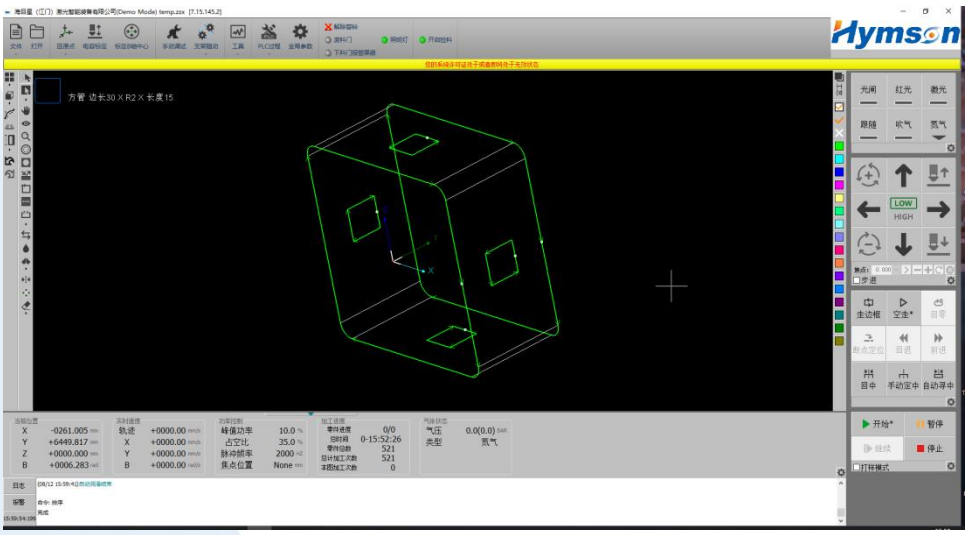
- The unloading mechanism adopts servo type liftable plate turnover platform to effectively solve the problem of sway of tube caused during rotation.
- Adapting to tubes of different sizes automatically to improve unloading efficiency.

CNC Numerical Control System



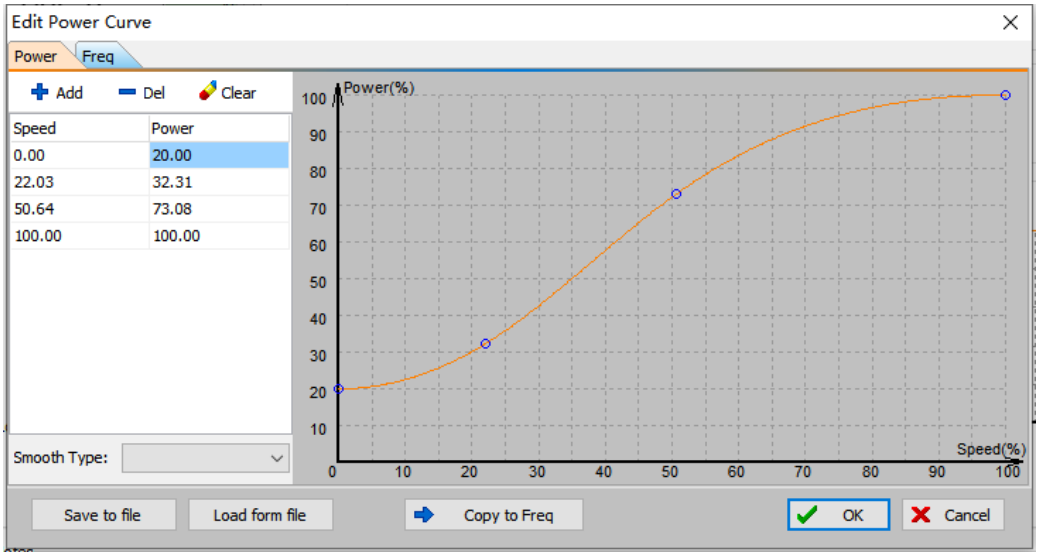
FSCUT control system

- FSCUT laser cutting control system, developed on the basis of Windows 10 operating system, communicates through Erthercat bus and integrates laser cutting modules with special functions. The simple and concise interface, power and practical functions, touch display screen and wireless keyboard and mouse make it easy to operate.



Real-time frequency/power curve

- To obtain high-quality acute and right angles, the software is equipped with a real-time frequency/power curve, which can be used to automatically adjust the laser radiation power according to the moving speed of the cutting head. When the speed of the cutting head is zero (stopping at the corner), the output radiation power is equal to the minimum power set in the setting to prevent the corner from burning out.

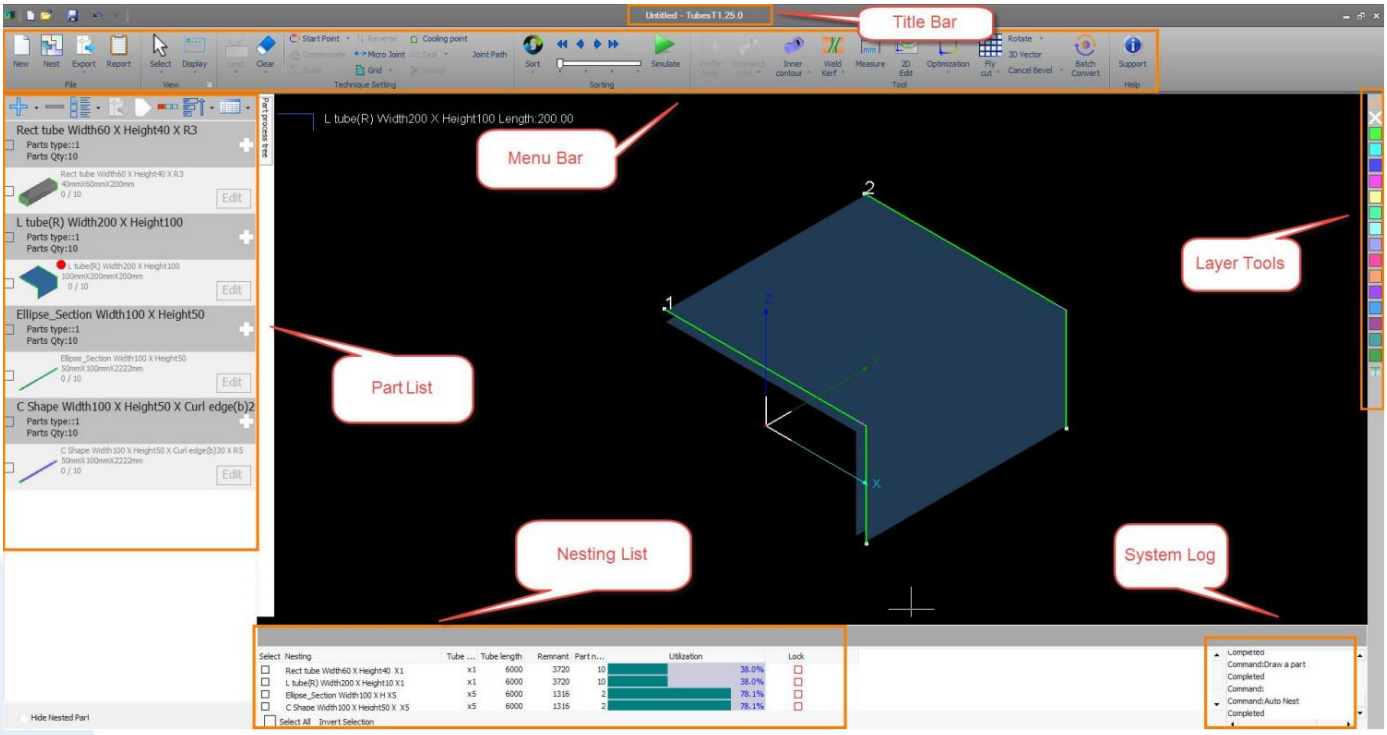


Extensive technological layer interface

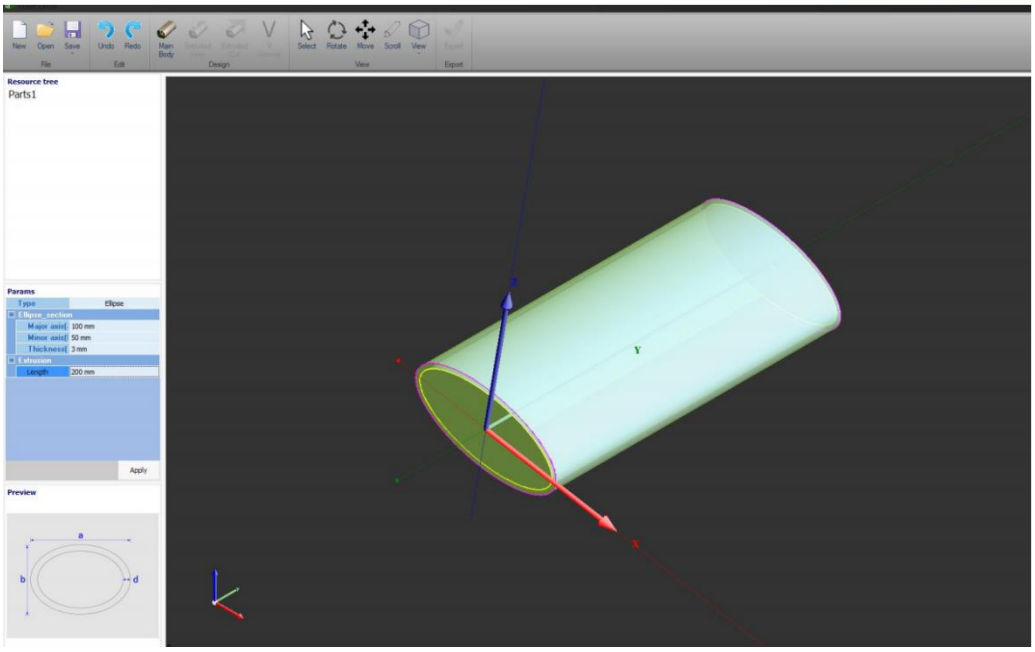
- FSCUT provides 16 cutting layers, each of which can be set with a separate cutting speed, laser power, air pressure, cutting height and other technological parameters. The color of each layer is unique, which makes it easy to browse and configure the cutting graphic parameters.

Nesting software

- TubesT is a complete set of integrated sheet metal CAD/CAM automatic programming software from design to production. It supports the whole-process CNC operations of the equipment, including drawing, automatic or interactive processing, CNC program simulation, manual and automatic cutting, machining program download and upload.
- The graphic files generated by SolidWork software can be input directly.



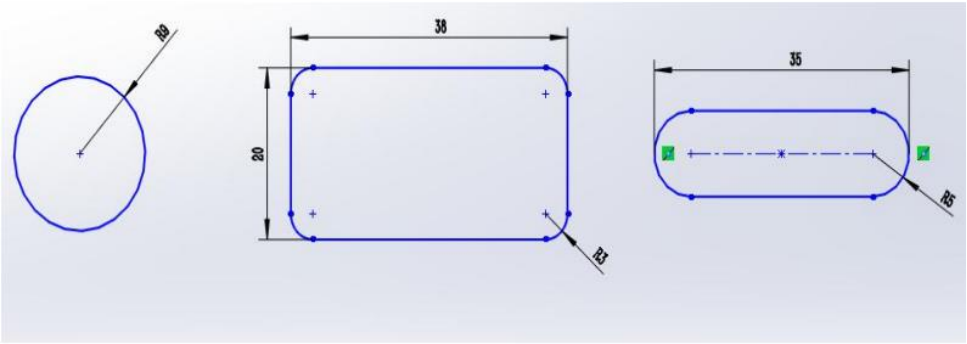
- Drawing 3D parts.
- The built-in function of drawing parts can be applied to draw circular pipes, rectangular pipes, waist-type pipes, angle steels, channel steels, C-type steels, rounded triangles, ellipses and other standard pipe types. Circular holes, rectangular holes and waist-type holes are all viable; the holes can be arrayed along the X/Y/Z direction; and the cutting surfaces in any direction can be acceptable.

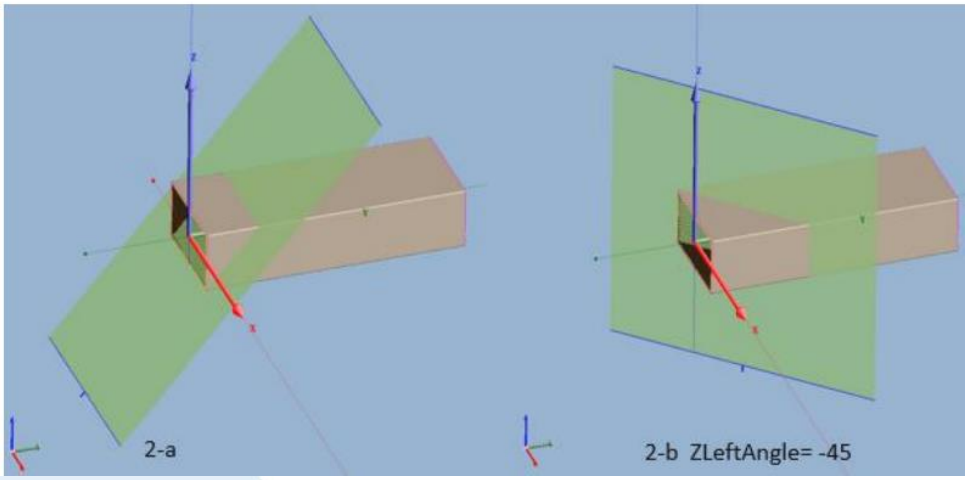


- Importing standard parts in batch

<Importing standard parts in batch> refers to the automatic generation of corresponding parts by the software after importing the section type, dimension and other information of the parts into Excel.

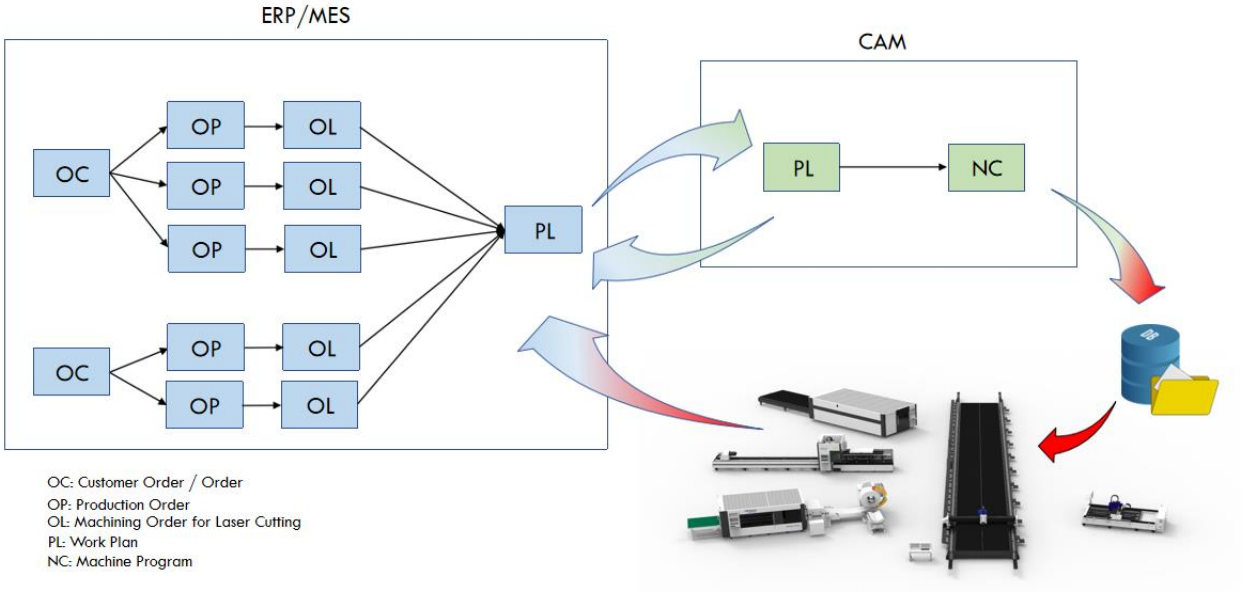
Three types of non-hole parts, i.e. circular pipes, rectangular pipes and waist-type pipes can be imported. The diagonal planes are also acceptable.

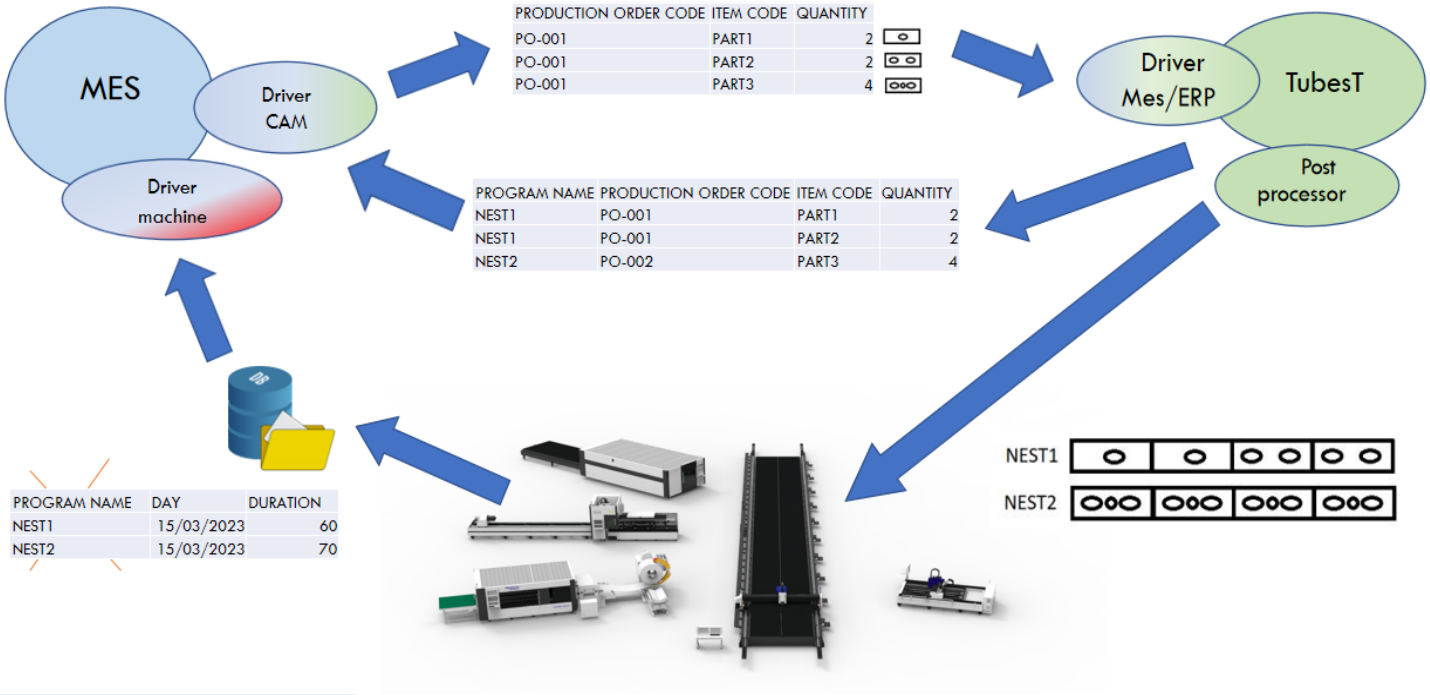




Industry 4.0 Solutions (Optional)

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.





3000W Cutting Speed Reference Table

Thickness (mm)	Material	Cutting Speed (m/min) O_2/N_2
1	Carbon Steel	8.0/18
2		6.0/10
3		4.0/5.0
4		3.5/4.0
5		2.5
6		1.5
8		1.0
10		0.8
1	Stainless Steel (N_2/Air)	18.0
2		13.0
3		6.0
4		3.0
5		2.0
6		1.5
1	Aluminum (N_2/Air)	10.0
2		8.0
3		5.0
4		2.5
5		1.6

Installation and Commissioning

User’ s Machine Installation Site Condition Preparation

S/N	Content
1	Power Supply Capacity: ≥120KVA
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,

Hymson Corporation

Requirements for Pipe Materials
1. There shall be no serious rust on the pipes to be processed, rust of the carbon material may affect quality of the cutting section.
2.The distortion and bending degree of the pipe shall be not less than the value specified in *GB/T 6728-2002 Cold Formed Steel Hollow Sections for General Structure--Dimensions, Shapes, Weight and Permissible Deviations*, the bending degree: 1mm/1m (3 mm/10m); the distortion degree of the pipe in length direction, and the total distortion degree shall be less than 0.02% of the total length.
3. During feeding of the pipes, safety of personnel and equipment shall be paid attention to, the bundled materials shall be lifted with a travelling crane, and the qualified personnel shall operate the crane. The travelling speed shall be able to control, when the bundled material moves close to the feeding table, the crane shall move slowly.
4.Outer diameter tolerance of the profiles shall be not larger than ±0.5% of the outer diameter, the minimum is 0.2mm (as *GB/T 17395-1998 Standardized Outer Deviation Grade D4*).
4. Processing accuracy of the work piece: On the basis of material error, the position error is IT12, the shape contour error is IT12.
5. End of the profile shall be flat, no burrs, if there are hot burrs, height of the burrs shall be less than 2mm.
6. Because the weld's height affects laser penetrability and clamping action, so that the processing and accuracy are affected, when the pipes to be processed are welded pipes, excessive height outside of the welds shall be removed, so that the welds are basically flat, height of the external weld shall be less than 0.3mm, height of inner cavity welds shall be less than 2mm.
7. Party A must regularly maintain and care the machine according to the instructions of Party B, if the machine fails to be regularly maintained, resulting in damage, Party B has rights not to provide repair service.
8. The maximum weight of single pipe is 25kg/m.
10.The pipe forms to be processed shall be square pipe, rectangular pipe and round, if the pipe is other form, which shall be determined through negotiation by the both parties. When the automatic feeding is used, if the bending deflection exceeds relevant national standard, the fine long pipe feeding may not be successful, and the cutting accuracy is difficult to guarantee.
11.The requirements for wall thickness clamped by the chuck: The wall thickness of round pipe and arc face pipe shall be larger than 0.8mm.

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