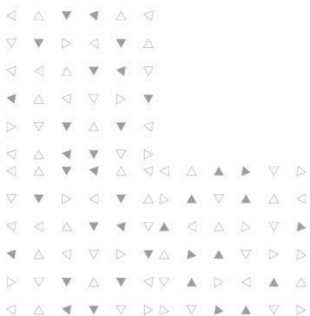


# HS-R7

## TECHNICAL SCHEME



Beyond(HSG) Laser is a national high-tech enterprise who is dedicated to providing laser intelligent equipment solutions to customers all over the world. We focus on the field of laser intelligent equipment manufacturing with the concept of efficient, intelligent, environmental protection and compatible product development.

Since our establishment in 2006, Beyond(HSG) Laser has developed rapidly with four standardized intelligent equipment manufacturing base covering an area more than 40,000 square meters. In the area of laser robot, multi-axis professional cutting pipe cutting, precision welding automated production lines and the related, We achieve Flexible Manufacturing and Digital Hierarchical Management. Beyond(HSG) laser intelligent equipment work steadily more than 100 countries and regions. And we have a wide range bench-marking paradigm in the area of precision appliance, auto parts, kitchen hardware, electronics, intelligent home industry. With professional, independent core R & D team and perfect systematic after-sales technical department, we truly provide customer-oriented service experience.

As an important enterprise of laser intelligent equipment, Beyond(HSG) Laser has been providing key technology and customized integration solutions for Industry 4.0 and future factories, helping enterprises to carry out intelligent manufacturing, making intelligent manufacturing to change our

## HSG Value

### ▶ Laser makes

#### **manufacturing easier**

Flexible manufacturing.

Information interconnection.

Product full manufacturing process solutions.

### ▶ Agile innovation

Prime product strategy.

Leading unit technology.

Insight into industry opportunities.

### ▶ Extreme experience

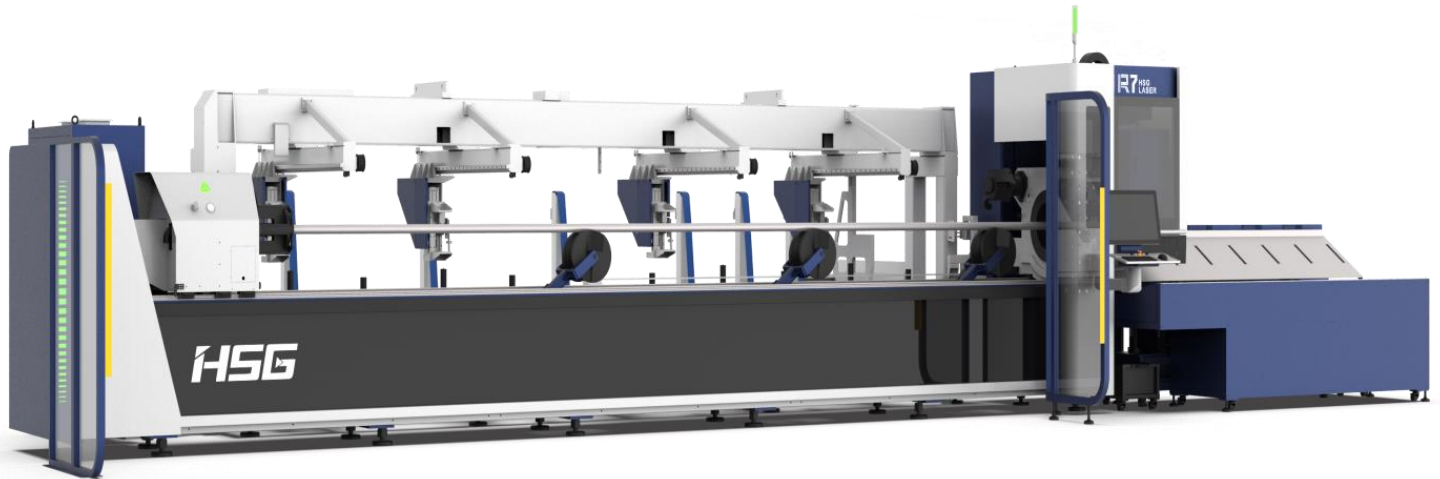
Creat value for customers.

Develop with customers.

Become a brand loved by the customers.



# R7



(All pictures shown are for reference only)

## Model features

### High-speed professional pipe cutting machine

- Chuck feeding speed: 120m/min; running speed: 120r/min; acceleration: 1.2G, reducing the dry running time.
- Leading Zhuifeng loading device in the industry, and low costs of cutting of single products;
- Industry-specific cross-space leapfrog patented technology for pipe cutting in a “flying” state, increasing the cutting efficiency.

### Innovative and intelligent multi-functional digital chuck

- Intelligent feedback: real-time monitoring of jaw status, closed-loop control, safe and reliable;
- Intelligent clamping: adaptive clamping force, avoiding the deformation of small pipes and ensuring the stability of large pipe clamping;
- Convenient full-stroke clamping

### Independently developed and easy-to-operate HSG-MT pipe cutting system

Expanded graphics of pipes for real-time and more intuitive planar display;

Real-time status detection and intelligent fault diagnosis of core components;

Due reminder of machine tool commissioning and maintenance to facilitate automatic lubrication and intelligent management.

### Equipment Configuration List

Name	Quantity	Model/ Specifications
Special precision cutting head for fiber	1 set	Klinge
Mechanical platform and accessories of tool	1 set	HSG
Precise rack	3 suits	YYC
Precise straight guide rail	5 suits	HIWIN/PMI
Reducer (including gears)	5 suits	SHIMPO
Machine tool accessories	1 suits	HSG
Control software	1 suits	HSG-MT
Nesting software	1 suits	SigmaTube
Fully automatic centering chunk	1 suits	HSG Customization
AC servo motor and driver	6 suits	SANYO DENKI/Panasonic
Electric control	1 set	Schneider
Gas circuit control	1 set	SMC/Aventics/Parker
Water chilling unit	1 set	Standard configuration
Waste recovery unit	1 set	Standard configuration
Front/rear chuck exhaust tubing system	1 set	Standard configuration
Operating platform(with standard loading part)	1 set	HSG
Automatic loading rack (Optional)	1 set	HSG

### Technical Parameters and Specification Description

Performance index	Parameter
Chuck speed	120r/min
Repetitive machine tool positioning precision	±0.03mm
Machine tool positioning precision	±0.03mm/m
Maximum traveling speed	120m/min
Maximum acceleration	1.2G
Total Weight	12000Kg (Incl. loading rack)
Maximum upper bundling tube weight	3000kg
Maximum single tube weight	200kg
Overall dimension (L x W x H)	12400×5300×2500mm

Note: This configuration table is valid before Jan. 30, 2021.

### Operation requirement

content	
Electricity:(Industrial stabilizer is suggested) (1) Voltage: 380V (2) Frequency: 50Hz (3) Voltage stability + 5% (4) Voltage regulation: <2%	Assist gas : Purified dry compressed air and high purity oxygen (O2) and nitrogen (N2) purity not less than 99.9%
Sheet metal : Homogeneous, smooth and clean.	Compressed air supply device (1) Pressure: 14 bar (2) Volume: 1 m <sup>3</sup>

### Cutting range

Tube type	Tube dimensions(mm)	6500
Circular tube Also note: 1. When cutting a round tube, there is power rotation for both front and back, so tube scratching is not easy to occur when the stainless steel round tube is cut. At the same time it can also cut hexagonal tube, waist tube, oval tube and so on. 2 There is no longer a 60:1 slender ratio limit when cutting 6m pipes. 3. The Y direction adopts rack drive, and the speed is faster than that of a conventional ballscrew drive. 4 Because of the double W rotation, there is no lag and the cutting quality of the product is guaranteed. 5. Because there is a feeding device underneath when cutting 6m tube, there will be no large swing in the middle of the tube.	Φ20 - Φ273	

(The above parameters are for reference only. Material quality, cutting pressure, cutting graphics, etc. all affect the cutting speed and cutting quality.)

## Technical supplementary notes

1. There should be no serious rust on the processed pipe, which will affect the quality of the cutting section.
2. Pipe can not be stored in the open air, it should be placed flat, oiled or packaged are the best. Ensure that the front end is flush, and the burr height at both ends is $\leq 5\text{mm}$ . Bundles of pipes shall be of the same length with a length error of less than 300mm.
3. For welded pipes, the outer weld seam is basically flat and the height needs to be $\leq 0.3\text{mm}$ . Inner cavity welding seam height should be $\leq 2\text{mm}$ .
4. The twist and bend of the pipe must be lower than the dimensions, weights and allowable deviations of GB / T 6728-2002 cold-formed hollow steel for structural usage.
5. The pipe is required to be straight and the bending degree is less than 1mm / 1m (4mm / 10m).
6. The twist of the pipe in the length direction should be less than 0.02% of the total length.
7. The outer diameter tolerance of the pipe is not greater than $\pm 0.5\%$ of the outer diameter, and the minimum is 0.2mm (according to GB / T 17395-1998 standardized outer diameter deviation level D4).
8. Be caution to the safety of people and equipment when loading the pipe. The loading of the bundles needs to be carried out by trucks, and it must be operated and transported by qualified professionals. Both fast and slow speed functions are mandatory when it's running. When the material is close to the equipment, it needs to use the slow speed to approach the loading platform.
9. Work-piece accuracy: Based on the material error, the position error is IT12, and the shape contour error is IT12.
10. The cut surface roughness of 0-6mm tube varies with different materials and thickness.
11. The buyer / user must perform regular maintenance on the machine according to the instructions. Our company has the right not to provide repair service due to damage to the machine caused by unscheduled maintenance.
12. In order to ensure the cutting effect and deformation of the pipe, the relationship between the pipe thickness and the pipe diameter (maximum diagonal) is required: When the pipe diameter is greater than $\phi 50$ : $1/40$ of the pipe diameter $\leq$ pipe thickness $\leq 1/10$ of the pipe diameter When the pipe diameter is less than $\phi 50$ : $0.8\text{mm} \leq$ pipe thickness $\leq 1/10$ of the pipe diameter The cutting effect cannot be guaranteed when the bending disturbance exceeds the relevant standards.
13. For automatic loading, make sure that the difference between the length and width of the rectangular tube is $\geq 10\text{mm}$ , otherwise the material cannot be effectively divided. For cases where the bending disturbance exceeds the relevant standard, it is not guaranteed that each time the material is successfully loaded.
14. Automatic loading can only be applied to standard rectangular tubes, round tubes, square tubes and runway tubes. For other shapes (asymmetric shapes of opposite sides), the pipe cannot be automatically loaded.
15. Automatic loading related parameters: Round tube diameter: 20-200mm; Square tube side length: 20-140mm; diagonal cannot exceed 200mm; Single length 6500mm; Max weight of pipe: 120kg; Pipe length: 3600mm-6500mm; Maximum storage area load: 3 tons; maximum cross-sectional area (height x width) $\leq 450\text{mm} * 800\text{mm}$

## Sample Cutting Display



## Installation and Training

### 1. Installation and Debugging

The numerical control fiber laser cutting machine is installed and operated according to two national standards including GB7247-87 Radiation Safety of Laser Product, Equipment Classification and Requirements and User Guide and GB10320-88 Electrical Safety of Laser Equipment and Facilities.

(1) After the Contract takes effect, we understand the geological position of the plant installation of the demander as soon as possible to determine the specific equipment installation position, and provide the equipment installation guide within seven (7) working days after the Contract takes effect.

(2) Prior to installation and debugging, the demander shall construct the equipment foundation according to the equipment installation guide provided by us to ensure that the installation on site allocation complies with the equipment installation requirements.

(3) After the demander completes the equipment installation guide and the cargo is delivered to the delivery site, our personnel will install and debug the equipment with the necessary tools and be responsible for completing the equipment installation, debugging, technical index test, trial cutting, training, acceptance and delivery to the demander within five days. The demander shall provide necessary coordination and assistance for equipment installation and debugging by our engineer.

(4) All expenses relating to installation and debugging and personnel dispatched are borne by us and the demander provides the machine for unloading and personnel's accommodation.

(5) All equipment provided in the Contract is installed and debugged by us. After the equipment is installed and debugged, we will perform self-inspection for it. After various technical indexes comply with the technical requirements of the Contract, the supplier and demander may accept and use the equipment.

### 2. Personnel training

Before the equipment is shipped, the demander may dispatch 1-2 operator(s) to our factory or exhibition hall for one-week training. The specific time is subject to the confirmation with our Customer Service Department.

Training contents include laser principles, equipment structure, process description, equipment maintenance, laser safety protection, operation procedure and simple troubleshooting, etc. The trainee shall be the mechanical, electrical or optical assistant engineer or engineer, be familiar with the computer operation and AutoCAD drawing, who must pass the assessment of equipment operation, fundamental laser principles, laser safety protection, maintenance, etc. organized by our Company prior to induction.

### 3. Training process



### 4. Packaging, transportation and equipment acceptance

(1) Standard packaging for long-distance motor transportation, dampproof, anti-rust and vibration resistance, suitable for overall hoisting and the hoisting gravity and position are indicated.

(2) Transportation mode: Motor transportation. We are fully responsible for it, including freight and insurance.

(3) A detailed packing list, certificate of quality, equipment specification and all other documents and materials are put into the packaging box. The packing list is attached outside the packaging box and the certificate of quality is put into the packaging box.

After completing the equipment installation, debugging and self-inspection, we accept it on the demander's site, including:

1. Inspection and acceptance of the quantity, model, specification, function, technical indexes, etc. of all goods.
2. Perform laser cutting and machining for the typical specimen approved by both parties.
3. Both parties record the acceptance information and evaluate the acceptance result. The performance may be assessed after signature and approval by both parties.

#### Notes:

1. Provided that the fault of the auxiliary facility on site (power source, peripheral environment, etc.) and environment do not comply with the requirements of normal equipment operation, which results in the interruption of the test or acceptance, the demander shall immediately recover it, so as to ensure the normal operation conditions of the equipment.
2. Provided that the equipment is in shortage, damaged or does not comply with the Contract terms and quality standard during acceptance, we will be responsible for supplementing or replacing it and all expenses caused thereby are borne by us.



### 5.List of accompanying documents

Certificate of quality of tool	One copy
Packing list of tool	One copy
Spare parts	One copy
Nesting accessories	One set

### After-sales Services

The warranty period of this complete equipment(excluding such vulnerable parts and consumable as optical device, lens,etc.) is one year after the equipment is accepted. We will help the demander coordinate the after-sales services of the auxiliary equipment. Our after-sales service engineer will provide the corresponding call support and necessary on-site service according to the problems reported by the customer. The call and network response time is within 2h and then we will provide services (except man-made damage or force majeure).

Within the warranty period of the equipment, for the fault caused by the quality of the equipment component, we will maintain or replace the component free of charge and provide free service at the same time (except optical device, vulnerable parts and damage caused by the user's misoperation).

For replacement of the optical devices (including optical device and vulnerable parts), no matter whether they are within the warranty period, they shall be purchased from us to ensure your normal equipment use.

Meanwhile, we will be responsible for maintaining them. We will terminate the free warranty service in case of any damage and fault caused by fittings which are not purchased from us and the warranty period will be terminated.

Within the warranty period, we will not provide warranty for the following articles: Nozzle, ceramic article, support bar for cutting, filter element and component, protective lens, O-ring, all lubricating oil, transmission fiber, collimating lens, focus lens, other optical lenses, SMA line and reducing valve.

The professional trained engineer provides users all over the world with technical support and services via the network, who mainly intuitively identifies the faults quickly online from a long distance with such social software as QQ, WeChat,Teamviewer, etc. and timely deals with them, so as to ensure that the user may better use the equipment.



With the unified fault reporting system via 400hotline email/WeChat/Skype, we provide users with fault reporting services and consulting services in terms of the technology, parts,warranty extension, maintenance, etc. Through national unified fault reporting,a particular person is responsible for accepting the fault information reported to avoid mutual forwarding for several times, and thus delaying the maintenance time. Therefore,we may adjust the service team members and mode of service according to the actual situation in different areas.



After-sales email: [hsgservice@hsglaser.cn](mailto:hsgservice@hsglaser.cn)

The professional, careful and improved pre-sales, on-sales and after- sales service systems provide guarantee for the user's continuous machining. There are installation guide, maintenance guide, unloading guide, training guide, etc.

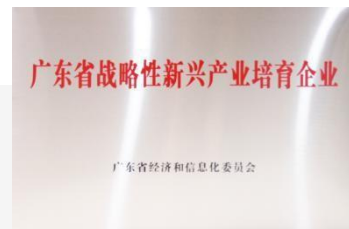


The most improved and largest sales and after- sales service branches in the industry are located in South China, East China, Shandong, North China, Central China , and Southeast China to provide the after-sales service without distance

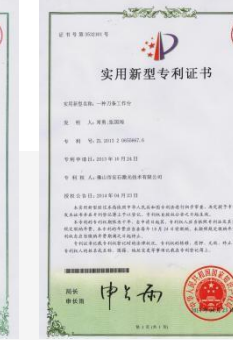
## STRATEGIC PARTNERS



## CERTIFICATE OF HONOR




# PATENT CERTIFICATE



The logo for HSG, featuring the letters 'H', 'S', and 'G' in a bold, blue, sans-serif font. The 'H' and 'S' are connected, and the 'G' has a small white triangle pointing to the right inside its lower loop. The logo is centered horizontally and positioned within a large, light blue, double-lined arrow shape that points to the right.

**HSG**

INTELLIGENTLY MADE IN CHINA  
LOVED BY THE WORLD

A blue, three-dimensional geometric shape, possibly a pyramid or a cube, is partially visible in the bottom right corner of the page.