

# KYSON-T5X 1021/1022

## TECHNICAL PROPOSAL



### KYSON T5X 1021

#### Simple and efficient

(1) 5-axis tube fiber laser cutting system

(2) System self-control, fully automatic loading and unloading system.

(1) Tubes - Taper Cutting maximum angle is up to 45°

(2) Kyson T5X-1020-3kW is one of RMT's laser tube cutters, which is very ideal for cutting various standard tube materials, with tube diameter up to 10" x 22' ( Fully Automated 21'4")

(3) It is applied to cutting

Round tube (outside diameter: 0.5 ~ 10") Square tube (□ 0.5" x 0.5" ~ □ 7.875" x 7.875"/ edge length)

Rectangular tube, elliptical tube and flat elliptical tube Special forms (similar to

elliptical tube: 0.78" x 1.5" ~ 4.72" x 2.75" )

(4) This tube cutter is especially suitable for cutting normal type tubes rather than special tube types and open typed tubes or frequently converting tube types.

## Equipment Configuration List

Name	Quantity	Specification/ model	Model/ Specifications
Laser	1 set	<b>IPG 3kW</b>	<b>USA</b>
Special precision cutting head for fiber	1 set	According to different laser power	Germany
Mechanical platform and accessories of tool	1 set	RMT	USA
Precise rack	3 suits	YYC	Taiwan, China
Precise linear guide rail	8 suits	HIWIN/PMI	Taiwan, China
Reducer (including gears)	5 suits	SHIMPO	Japan
Machine tool accessories	1 suits	Standard configuration	Taiwan, China
Control system	1 suits	Beckhoff / HSG9500	Germany
Nesting software	1 suits	RadTube /SigmaTube	USA
Fully automatic centering chunk	1 suits	<b>HSG Customization</b> Rexroth, SANYO DENKI,	HSG
AC servo motor and driver	8 suits	<b>Panasonic</b>	Germany/Japan
Electric control	1 set	Schneider	France
Gas circuit control	1 set	SMC, CKD, Rexroth, Parker	Japan, Germany, USA

Performance index	Parameter
Laser wavelength	1070-1080nm
Electro-optics conversion efficiency	25-30%
Material-cutting thickness (subject to material and laser power)	.02" - .394" / 0.5-10mm
Repetitive machine tool positioning precision	.001" / ±0.03mm
Machine tool positioning precision	.001" / ±0.03mm/m
Maximum traveling speed	5516in/min 140m/min
Maximum acceleration speed	1.2G
Net Weight	33,000 lbs.
Maximum upper bundling tube weight	6600 lbs.
Maximum single tube weight	440 lbs.
Overall dimension (L x W x H)	39' 5" x 14' 9" x 7' 11"
Number of phases	3
Rated voltage of power source	460V
Frequency	60Hz
Protection rating of main power	IP54

## I. Equipment processing capacity

Tube type	Round tube	Square tube	Angle iron	Elliptical tube	Polygonal tube
Specs	Outside Diameter Min - .5" Max - 10"	Outside Diameter Min - .47 x .47 Max - 7.88" x 7.88"	Outside Diameter Min -.787 x .787 Max - 5.9" x 5.9"	Outside Diameter Min - .787" Max - 5.9"	Outside Diameter Min - .787 Max - 5.906

The main body frame bed: use the whole-body welding structure to make rough processing after stress annealing, and then make the vibration aging treatment. The natural aging can eliminate the stress of welding and processing. It has good rigidity, high precision and can be used for a long time for 20 years without deformation.



### **Welding of main body**

The main body frame is welded with the carbon dioxide protection welding, with such advantages as stable welding process, free internal defect, minimum splash, etc. At present, such welding becomes the most important welding for the black metal material.

### **Stress annealing**

The material stress resulting from welding is eliminated. A very large fuel heating annealing furnace is used to perform stress annealing for several body frames at 600°C at the same time. With stable furnace temperature and uniform electronic monitoring, the welding stress is thoroughly removed, with guaranteed quality. Annealing of one small non-common electric furnace with non-uniform temperature cannot guarantee to thoroughly eliminate the stress.

### **Rough machining**

Rough machining is designed to quickly cut the work blank margin. When rough machining is performed, the large load and cutting depth as much as possible shall be chosen, to cut the cuttings as much as possible within a short period of time.

### **Vibration aging**

Another method to eliminate the internal residual internal stress is as follows: When the vector sum of the residual internal stress in the workpiece and additional vibration stress reaches or exceeds the yield strength of the material, the material has a minor plastic deformation, so that the internal stress in the material is loosened and relieved.



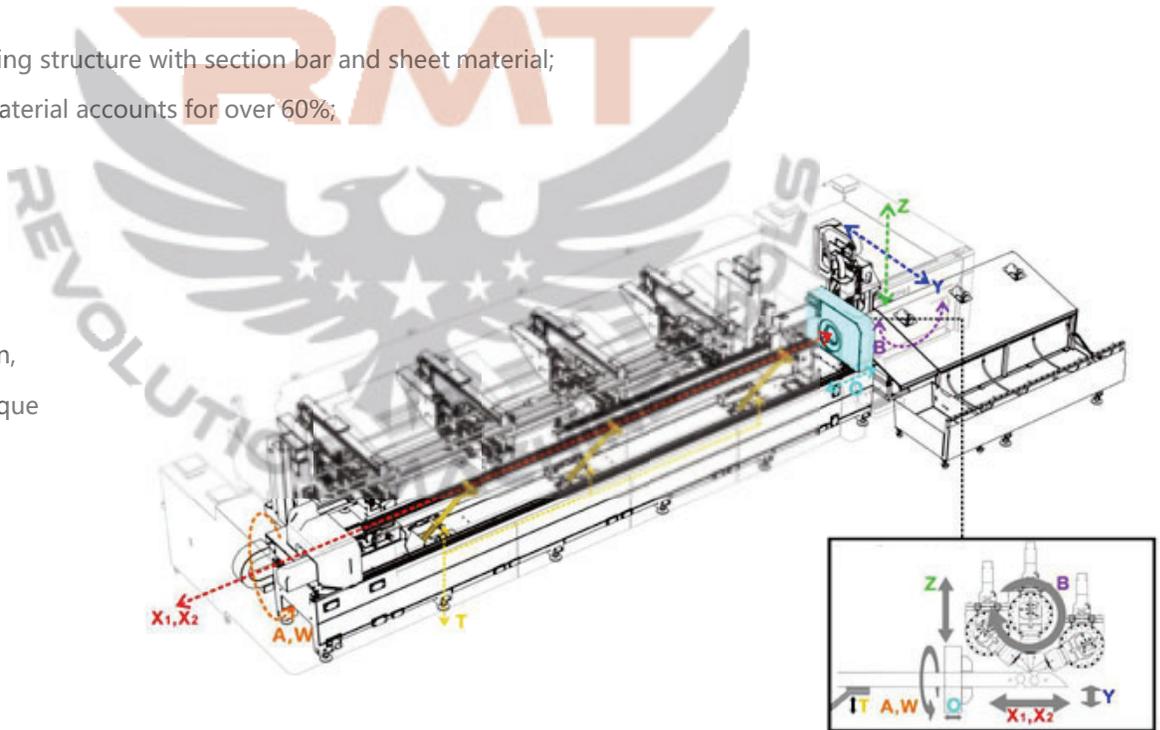
### Natural aging

Place the body outdoors for more than one month. Eliminate the repetitive temperature stress caused for several times to relieve the residual stress, obtain the stable dimension accuracy, enhance the rigidity and enhance the deformation resistant capacity, to ensure the dimension stability of the body.

### Precise processing

The CNC pentahedral machining center is used to machine the guide rail, rack, etc. which have high precision requirements to obtain the high-quality installation base plane, to ensure the cutting accuracy of the tool.

- (1) Hybrid welding structure with section bar and sheet material;
- (2) The sheet material accounts for over 60%;
- (3) Advantages
  - High rigidity,
  - convenient manufacturing
  - Flexible design,
  - good torque resistance
  - Reasonable structure layout



Laser:

IPG Photonics is a global leader of the high power fiber laser. The fiber laser manufactured by it has such advantages as high quality light beam quality and reliability, ultrahigh output power, higher electro-optical conversion efficiency, lower maintenance cost, volume with compact structure, mobility and durability, low consumption, environment friendly, etc.



### 1. Cutting head



3-dimensional 5-axis  
3-dimensional 5-axis cutting head, with fully German-imported technology;  
Rotation-axis maximum angle  $\pm 135^\circ$ ; Adopting high-speed DD motor;  
**Acceleration speed up to  $3600^\circ/S^2$ , precision up to  $\pm 6''$  ;** Electromagnetic coupling anti-bumping device, to prevent the laser cutting head from damage in case of bumping.

### **RMT9500 professional tubes laser cutting software**

RMT9500 professional laser tube cutting software, with Germany NC system as bottom layer, secondary development for tube cutting industry and streamlined machine tool control parameters, enable the user master the technology through simple training methods of operation, to avoid traditional CNC system complex control requirements and other shortcomings. It is more targeted on laser tube cutting industry, and is widely used in furniture, metal processing industries.

### **Focus on cutting tube industry customization**

RMT9500 professional laser tube cutting software, is based on the Germany NC system as bottom layer based on the two development of laser tube cutting industry, because of its streamlined machine tool control parameters, the user can easily grasp through simple training methods of operation, to avoid the traditional CNC system complex control requirements and other shortcomings, more targeted industry that is now widely used in furniture, metal processing industries.

### **Excellent industry process reserve**

The software interface function is simple, eliminating the tedious manipulation of buttons, can support intelligent touch screen control. Operation is more human-machine friendly. Real-time operation information display allows users to know the whole machine operation clearly. At the same time, powerful process data base support processing of different tube shapes, materials, thickness. By simple selection, you can call the corresponding processing parameters. It is suitable for processing most of the pipes, such as square tubes, round tubes, elliptical tubes, D tubes, polygonal tubes, waist shaped tubes and special-shaped tubes

### **High speed soft PLC development environment**

German bottom hardware CNC system has a built-in high-speed soft PLC development environment PLC-1131-3 DS, conforms to the IEC1131-3 standard, has a strong independent development capacity. It can freely expand loading and unloading and laser control and has formed a complete production line with the SIEMENS SCADA system to write custom processing work, to achieve customer' s requirements of customization processing.

Unique speed advantage greatly improves the production efficiency and processing quality, shorten the production cycle and reduce production costs.

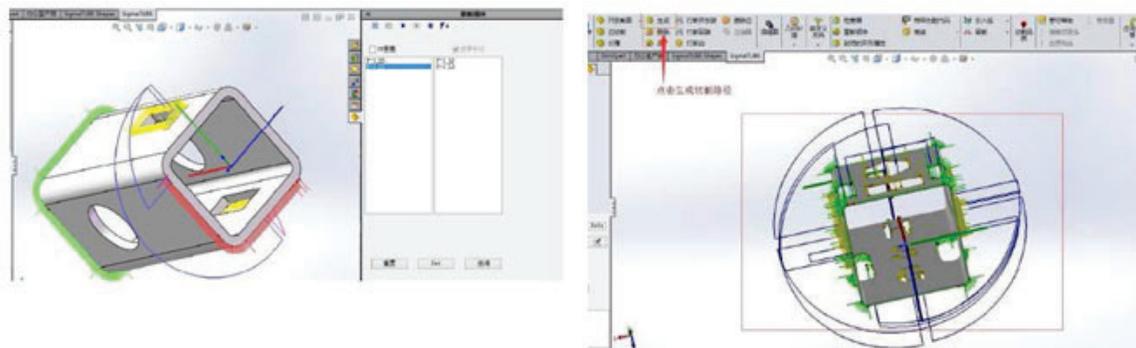
## Nesting

Radan software is developed secondarily on the basis of Solidworks, which is the first 3D CAD system developed on the basis of Windows in the world. Because the technical innovation follows the development tide and trend of CAD technology, SolidWorks Company has become the most profitable company in the CAD/CAM industry within two years. By right of strong 3D processing capacity of SolidWorks, Radan Tube can freely read many data and well support complex processing graphics.

Additionally, it can normally process regular graphics such as round tube, square tube, elliptical tube and polygonal tube, and certain unsealed open tubes. The software can also improve the processing traces of angle steel, groove steel and I-shaped steel.



This software has common functions such as lead adding, path compensation, micro-connection and parallel connection paths, etc. For tubular characteristics, there is a cutting path selection function for multiple processing paths; for offset of a selected sealed loop, geometric deviation function is adopted according to the offset direction and distance, as well as selection function for straight cutting, inner and outer profile cutting of through hole, so as to meet customer's different demands for processing surfaces.



## High efficiency loading system

Loading system (maximum load of 6600 lbs.) is suitable for tubes up to 21.4 long



The loading system selects the tubes one by one and moves them to the measuring station;



Maximize utilization rate of the tubes

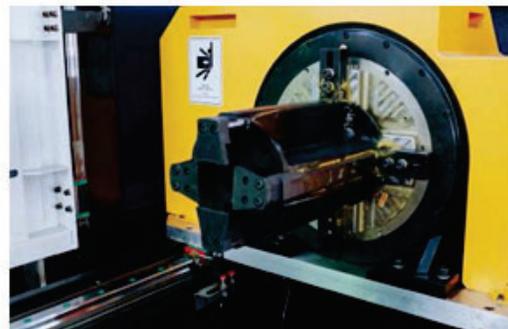
(1) The length of the tubes to be cut will be calculated automatically by the controller, cutting order will be optimized, to maximize the utilization of the tubes.

(2) Tubes will stop at the feeding line and will be supported by the tubes supporters and ensure dropping free.

Non-destructive tube clamps

(1) The accuracy of tube cutting is guaranteed by the 4 air pressure clamps on the chuck;

(2) The thin-walled tube will not deform due to the clamping jaws.



can cut twisted and bent tubes

Tube support frame ensures that the tube is stable and reliable on the cutting line.

During the cutting process, the support of the tubes uses the servo control height adjuster to ensure the high precision of the cutting.



Scrap and small parts collection methods

Due to the advantage that the material can be loaded from the back, additional unloading space is added Conveyor-type unloading trolleys (optional) located behind the device can automatically take workpieces smaller than 19.685" – 23.622" out of the cutting machine

Easy to enter cutting zone

In case of material change, the operator interface provides all the required information to adjust the cutting process.



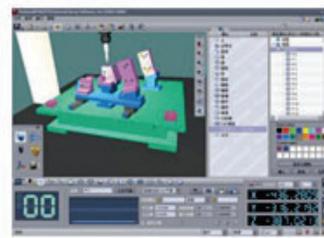
Maintain constant and correct cutting distance for high cutting quality

The cutting wall thickness changes according to the groove thickness, focusing distance can change automatically, to have perfectly smooth cutting edge.



**Before assembly, detect and inspect whether the beam machining form and location tolerance falls into the design range to ensure the equipment quality.**

Three-coordinate detection of beam  
Three coordinates of three  
coordinate measuring machine, it  
is in the range can be measured in  
3D space, according to the return  
probe system data. through the  
software system of three  
coordinate calculation instrument  
with various geometric and size  
measurement ability, also known  
as the three dimensions.



The body beam collimator detect is the guide rail surface and measures the straightness of the guide rail to ensure the accuracy of each equipment.



The precision workpiece is detected with a height indicator and inspect the linear dimension and form and location tolerance required by the drawing of the small precision workpiece to ensure that the equipment accuracy complies with the part and equipment quality.

Swiss Altimeter can be used to measure the internal dimensions, external dimensions, height, depth, or distance of plane, parallel and cylindrical geometry. At the same time, one-dimensional or two-dimensional measurements can be made. Automatically searches the apex of a hole or axis, and calculates the difference between the maximum, minimum, and maximum and minimum values in a dynamic survey.



## 1. During Assembly

Installation detection and fixation of guide rail and rack. The professional technicians assemble such important precision parts such as guide rail and rack and adjust them with a dial indicator to ensure rack & pinion is assembled properly.



## 2. Assembly Completion Detection

Laser interferometer- It has such advantages as high measurement accuracy and speed, etc. Interferometer, mainly laser as light source, constitutes a measuring system with interference. A laser interferometer with various refractive mirror to the linear position, speed, angle, flatness, straightness, parallelism and perpendicularity measurement work, and can be used as calibration of precision machine tool or measuring instrument.



Laser interferometer- Detect the rack accuracy, compensate and correct the error and ensure the rack accuracy.

