bodor
Dare to dream

M Series Technical solutions

Flagship fiber laser metal tube cutting machine

Maximum capacity, for all tube cutting demands;
Various tube cutting lengths and unloading lengths are available with M-Series.

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Bodor Laser Ranking

No.1 Globally By Sales Volume

Source: The ranking serves as the result of independent research by Shenzhen FORWARD Industry Research Institute Co., Ltd., which is measured in terms of Global Sales Volume covered all sales channels of Laser Cutting Machine with Power of 1kW and above from 2019 to 2021. The research is completed on June 28th, 2022.

M series

Four-chuck laser metal tube cutting machine Flagship model

- **EtherCAT bus control:** advanced system in the industry, more accurate control, faster response, and higher processing efficiency.
- **Independently-developed BodorThinker system:** third generation bus system with excellent performance and greatly reduced system failure.
- **New Bodor style design:** international IF design award winner. Classic and iconic design of Bodor products is distinguishable in the market.
- **BodorNest Tube:** a variety of nesting methods catered to customers' various cutting demands.
- Independently developed spike-shaped laser cutting head to make cutting easier
- **Four chucks zero tail material cutting:** four chucks, double side can be clamped, cutting position is not limited by the chuck clamping, to achieve the real zero tail material processing so as to maximize the utilization of the tube.

Function&parameter list

Model	M3-12-12 Rotterdam warehouse
Tube size range	Round tube Φ25-Φ356mm Square tube □25 - □356mm Rectangular tube 25mm≤Side length≤350mm I-beam 10#-22#
Optioan the special jaws	I-beam 100-320mm Hea profiles 100-320mm
Max. length of machinable tubes	12000mm
Maximum tube weight	800kg
Overall sizes	27430mm×2710mm×3160mm
Machine weight	16000kg
Positioning accuracy	0.06mm/m
Repeated positioning accuracy	0.04mm
Max. speed of chuck with no-load	75r/min
Max. speed of chuck feed axis	80m/min
Max. speed of laser head moving axis	60m/min
Max. acceleration of chuck feeding axis	1G
Maximum acceleration of laser head moving axis	0.6G
Max. speed of Z-axis	60m/min
Total power capacity/current with 12KW source	×
Total power capacity/current with 6KW source	123KVA/156A
Total power capacity/current with 3KW source	108KVA/137A
Total power capacity/current with 1.5KW source	×

Note: The tube cross section error and the curvature shall adhere to GB/T 6728-2002 standard.

Function&parameter list

Item		Subitem	
Intelligent function	Time savings	Automatic positioning	
		High Speed Cutting Expert Database	
		Servo roller	
		Following servo feeding bracket	
		Bodor Lightning perforation technology	
		Cutting gas automatic pressure regulation function	O2
		Display function	
		Manual / Automatic control modes	
		Automatic focusing function of laser head	
		Laser cutting technology database	
	Quality cutting	Bevel cutting	option
		Automation	Included
		Corrugated protection	
		Active collision prevention	(Not available with optional bevel cutting)
		Cutting Angle Steel and I-beam	
	Cost savings	Gas-saving steady flow nozzle	
		Out-of-material alarm	
		Intelligent maintenance reminder	
	Service	BodorCloud sevice	
		WIFI internet connection	
	Processing precision (□38mm stainless steel square tube)	Φ20mm roundness	≤0.15mm
		□20mm square diagonal size difference	≤0.20mm
		□20mm square position size difference	≤0.40mm
Configuration	Optical system	Laser source	BodorPower
		laser head	BodorGenius T
	Mechanical system	Chuck	pneumatic chuck
		Number of chucks	4
		Linear Rails	Bodor
		Rack	Bodor
	Electrical system	X-axis、Y-axis、Z-axisServo motor and driver	Bodor
		Control system	BodorThinker Tube
		Special typesetting software for cutting tube machine	BodorNest Tube
		File format	IGS、DXF、G Code
		Display size	21.5 inches
	Peripheral system	Water Chiller	
		Dust removal	Centrifugal fan
	Other parameters configuration	File format	IGS
		Total power capacity/current with 6KW source	123kVA/156A
		Total power capacity/current with 3KW source	108kVA/137A

Note: The tube cross section error and the curvature shall adhere to GB/T 6728-2002 standard.

BodorNest Tube

The sore point in the industry:

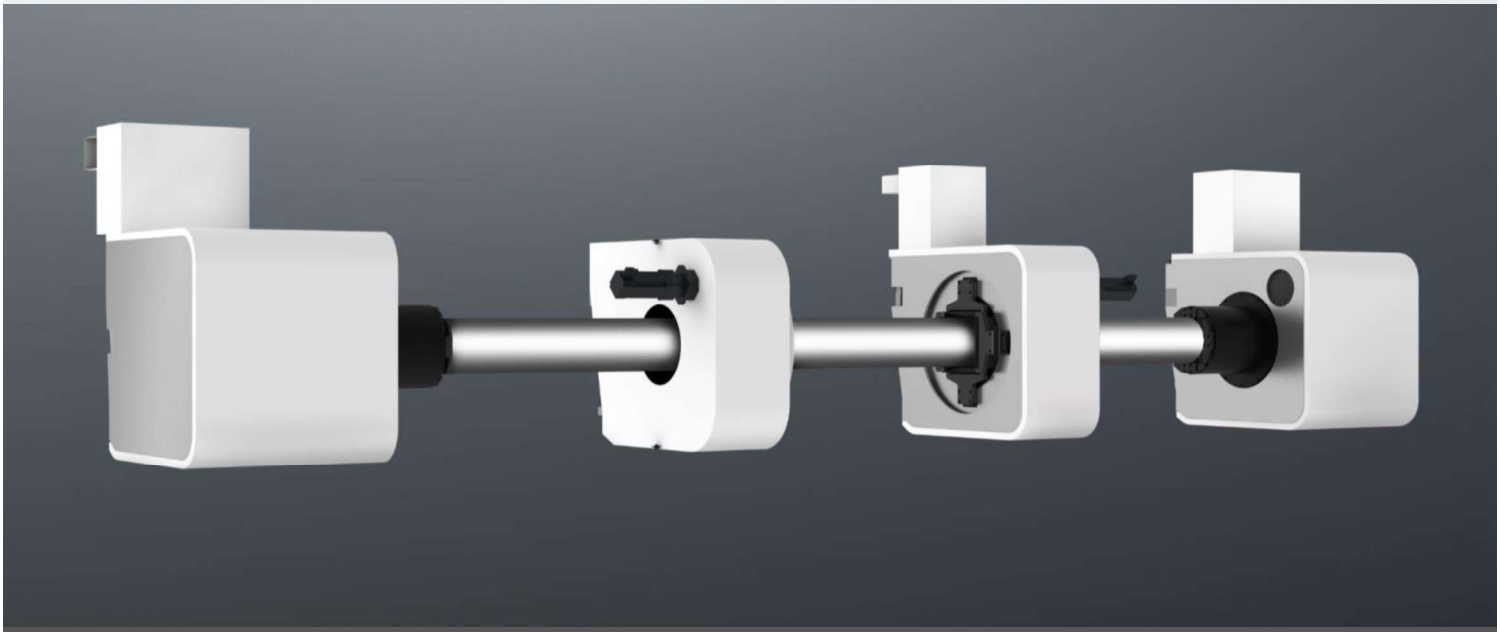
Tube can not be processed thoroughly, and the cutting pattern is limited; waste of tube due to long tail material.

Our strengths:

1 **Our Strength:**
Four-chuck is capable of loading and unloading the tube

2 **100% Zero tail material cutting**

Four chucks, double side can be clamped, cutting position is not limited by the chuck clamping, to achieve the real zero tail material processing so as to maximize the utilization of the tube.



Nesting Software

Our strengths:

1 Applicable to a broad range of equipment

Adaptable to multiple brands and models of laser head, automatically perform interference check to avoid laser head collision. Able to generate a variety of CNC system G code file, adaptable to different equipments.

2 For simple workpiece, fast graphic drawing

One click to complete graphic drawing， perforating, truncating, slotting and other operations.

3 Flexible sorting methods

With a variety of manual sorting methods to create a variety of complex graphics

4 Typesetting methods up to your choice

A variety of typesetting arrangement catering to customers' different cutting situations. All equal co-edge, island co-edge, three-knife cutting co-edge and other co-edge methods.

Following servo feeding bracket

The sore point in the industry:

Long tubes stick out, which resulting in the tube cutting area fluttering, hence the cutting accuracy.

Our strengths:

Moving up and down in correspondence of the tube size, the servo following plallets ensure the stability of tube during rapid rotation.
The pallets are compatible with tubes of various sizes to avoid jamming during unloading.

Following servo roller

The sore point in the industry:

Rapid rotation might ressult in the tube fluttering while the square and rectangular tubes are being processed, and the excessive flutter can be potentially affecting the tube cutting accuracy.

Our Strength:

Our strengths:

Moving up and down in correspondence to the size of the tube, the rollers are equipped with a support device on both sides, so that the tube will not fly out of the support range of the rollers due to rapid tube rotation.

Lightening Perforation

The sore point in the industry:

The material must be perforated before cutting. By significantly reducing the perforating time, the processing cost will be reduced and and the processing efficiency will be improved. The reduced perforating time entails consistent effort in technological innovation trials.

Our strengths:

1. Carbon steel oxygen perforation: reduce 90% of perforating time for the sheets within 20mm.
2. Nitrogen perforation: reduce 75% of perforating time for medium thick plates.

High stability of continuous piercing, reducing the waste hole rate from about 5% to 2‰; high accuracy, less slag piling, stable following-through, stable starting point, ensuring the best cutting cross-section; significantly reducing the burst hole rate, eliminating impermeable cutting, improving the cutting quality and the utilization of the processed workpiece.
Reduced perforating time, gas consumption, electricity consumption, reduced risk of laser head damage, nozzle burnout, spattering, and focus protection mirror spattering, etc., which effectively improve the durability of the nozzle and focus protective mirror.
Encapsulated process adaptable to various processing scenarios and needs.

High quality cutting package

The sore point in the industry:

The rapid advance of laser technology has gradually taken over the place of conventional cutting technology, the market demand for cutting gradually increased, cutting, not only requires fast cutting speed, stable quality, and requires surface treatment without burr, so that cutting efficiency is higher, better safety and lower costs.

Our strengths:

Smooth Cutting is an application of fiber optic cutting technology designed to optimize the cutting surface and to be able to cut a wider range of materials with higher speed, better quality and lower cost. Applicable to laser source of low, medium to high power.

- Applicable to laser tube cutting machine with power ranging from 2KW-10KW. Suitable for various metal materials such as aluminum, copper, stainless steel, carbon steel, etc.
- Faster Higher perforating efficiency and higher cutting speed. Compared with the traditional process, the overall processing efficiency of "ultra-delicate cutting technology" can be increased by more than 30%.
- Economical extensive gas selection, over 35% of cost saving.

Optical Configuration

Independently-developed laser plate cutting machine auto-focusing laser head

Lightweight design, with excellent acceleration performance and cutting speed; excellent airflow and water-cooled structure design makes the laser head able to work continuously and efficiently at high power; built-in drive unit, auto-focusing range +10- -12mm, the accuracy up to 0.05mm; collimating mirror and focusing mirror are made of composite lens for the best optical quality and flawless cutting results. Bodor independently developed laser cutting head ensures the unmatched cutting efficiency and qualitty, fast response and no deviation from distance detection device.

Optical Configuration

Fiber laser source

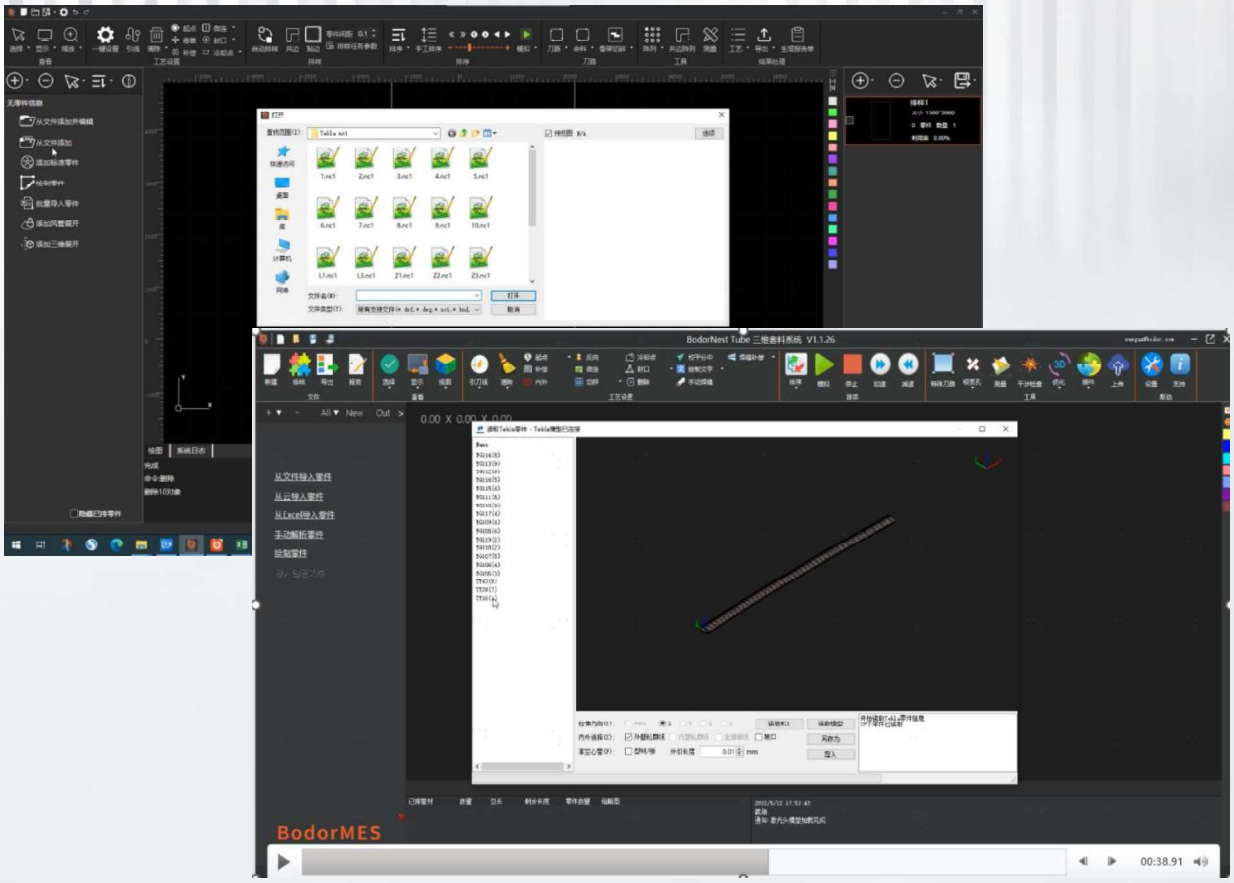
- Bodor's laser has a conversion rate of up to 35%, which is significantly higher than its domestic general counterparts' 25% and far higher than CO2 lasers' 5–10% electro-optical conversion rate. As a result, power consumption and operating costs can be significantly reduced, and the productivity will be improved.

- Unlike CO2 laser, fiber laser does not consume laser-generating CO2 gas and other auxiliary gases (such as helium, nitrogen, etc.) Adopting semiconductor modular and redundant design, fiber laser has compact structure with no optical lens in the resonant cavity. Simpler repair and maintenance, lower failure rate and lower operating cost

- The central wavelength of an optical fiber laser is 1080 nm, or one-tenth the wavelength of a CO2 laser. The processing costs are lowered to a minimum since the output beam has superior quality, a larger power density, and is easier to absorb by metal materials. Optical fibre laser transmitted through the whole machine with simple optical path, stable structure. external optical path is maintenance-free.

Nesting software compatible with tekla

- Bodor Nest supports direct NC1 files import.
- Bodor Nest Tube supports Tekla online import.



Compatibility: compatible with various versions of Tekla software.

One click to split the drawing: automatically split whole drawing into individual parts

Intelligent drawing recognition: directly detect the material properties, thickness, quantity etc.

Multi-layer display: marking, part outline, part labeling, etc. are displayed in different layers

Intelligent matching: automatically matching appropriate cutting process parameters with identified material information.

Efficient nesting: Automatic calculation for the optimal nesting solution to maximize plate utilization.

Technical Parameters

Machine Model	M3-120-120-6kW-Stock Rotterdam		
Basic parameter(Metal Plate Cutting)	tube size range	Round tube Φ25-Φ356mm Square tube □25 - □356mm Rectangular tube 25mm≤Side length≤350mm	
	Requirements for tubes	Diameter＜φ50mm thickness≥1.2mm/aluminum thickness≥2mm ; Diameter≥φ50mm Wall thickness≥2.5% of Diameters of tubes	
	Cutting Capacity(Maximum Thickness)	Material	Laser-6kW
		Carbon Steel	**18mm**
		Stainless Steel	**18mm**
Operation parameter	Maximum machinable tube length	12000mm	
	Maximum tube weight	800kg	
	Maximum tube length	12000mm	
	Shortest remaining material	No waste of materials	
	Dimensions	27430mm×2710mm×3160mm	
	Overall weight	16000kg	

Cutting Parameters

		1500W	3000W	6000W	12kW
	Thickness (mm)	speed m/min	speed m/min	speed m/min	speed m/min
Carbon steel	1	17--19	18--21	18--21	18--21
	2	6--8	10--12	15-20	15-20
	3	2.5--3.5	3.5--5	3.8--5.5	4--6
	4	2.3--2.8	3--3.8	3.2--4.3	3.3--4.5
	5	1.8--2.4	2.6--3.2	3--4	3.5--4.3
	6	1.4--1.8	1.9--2.4	2.5--3.5	2.7--4
	8	1--1.4	1.6--2	2--3	2.5--3.5
	10	0.8--1.1	1.2--1.6	1.3--2.2	1.8--2.5
	12	0.6--0.9	0.9--1.3	1.2--1.7	1.5--2
	14	0.5--0.6	0.8--1	0.9--1.3	1.2--1.8
	16		0.6--0.9	0.6--1.1	1--1.5
	18		0.5--0.6	0.5--0.7	0.8--1
	20				0.5--0.8
Stainless steel	1	15--20	23--28	23--28	23--28
	2	9--12	14--18	20--22	20--22
	3	2--3	4.2--5.4	8--10	8--12
	4	1.2--1.5	2.8--3.6	9--12	12--14
	5	0.6--0.9	1.8--2.4	6--8	7--9
	6	0.5--0.6	1--1.5	4--5.5	6--8
	8		0.8--1.2	2--3	3--4
	10		0.4--0.6	1--1.5	1.5--2.5
	12			0.5--1	1--2
	14			0.4--0.7	0.8--1.5
	16			0.2--0.4	0.6--1
	18			0.2--0.4	0.6--0.8
	20				0.4--0.5

M Loader—Auxiliary loading device

1. Integrated material table, material selection and loading function.

2. After placing the raw materials at according workstation, it can complete the cyclic loading of round , square, rectangular pipe, channel steel and I-beam, which can significantly improve the processing efficiency and reduce labor cost.

Function&parameter list

Model	M-Loader3-120
Adaptable length	12M
Weight	2100kg
tube size range-Round tube	Φ25-Φ350mm
tube size range-Square tube	□25 - □350mm
tube size range-Rectangular tube	350mm≥Side length≥20mm
tube size range-Channel steel	320mm≥Side length≥25mm (220mm-320mm host needs to be equipped with an optional open jaw)
tube size range-I-beam	220mm≥Side length≥25mm
Maximum loading weight	800Kg
Tube loading length range	4500mm-12000mm
Maximum load capacity of storage bin	4.8t
Location number	11（φ<90）6(φ>90)
Module dimensions	12598*3850*1400mm
Total power capacity/current	6.5KVA/15.1A

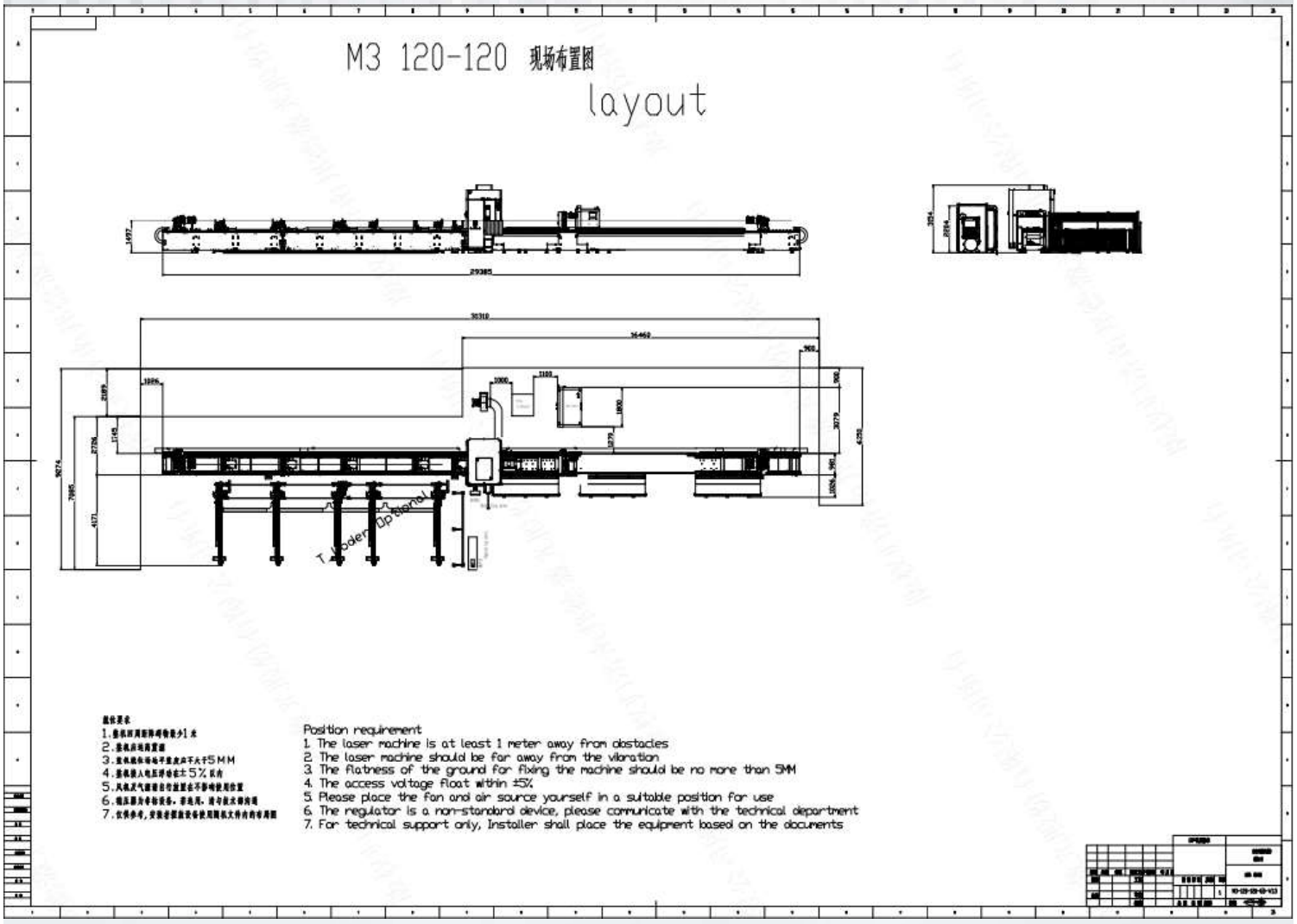
Note: The tube cross section error and the curvature shall adhere to GB/T 6728-2002 standard.

Machine Operation Cost Reference Table

Lifetime of Consumable Parts

Consumable Parts	Lifetime（h)
Collimating protective lens	1600
Focusing protective lens	100
Ceramic ring	200
Nozzle	50
Collimator	1600
Focusing lens	1600

Layout Design



The above layout drawings and figures are for referrence only, the actual drawing shipped with machine prevails.

Fume filter for Laser Cutting Machine

No	Item	Technical Description
1	Filtercartridgematerial	HV/Ahlstrom/TORAY， F9
2	NumberofFiltercartridge	4
3	Airvolume	3200m3/h
4	Airpressure	3000
5	Filtrationefficiency	99.99%
6	Filteringarea	82M2
7	Entrifugalfan	5.5KWSIEMENS
8	Collectorcapacity	45L
9	Powerrequirments	THREE-PHASEFIVE-WIRE，380V
10	Airpressurerequest	0.6MP, compressedairwithoutoilandwater
11	Unitweight	700KG
12	Outline Dimension(mm)	A：2198，B：1348， C：1060，D：303

Applicable to Industries

Steel bridge | Pressure vessel | Special vehicle | Mining machinery

Construction machinery | Hardware | Ship container | • • •

Cutting sample

Adopting advanced cutting technology, the cutting sample has neat surface, smooth bottom, no burr, no hanging slag, and no need for secondary processing. Able to work on various shapes of tubes, and achieve the processing of various complex shapes with high precision, bevel cutting, seamless welding, and no overburning

Technical supplementary instruction

1. The processed tube should be free of severe rust. The rust will affect the quality of the cut section.
2.The tubes should be laid flat, preferably with oil or protective covers on the surface, and not be stored in the open air. Make sure the front ends of the tubes are parallel and aligned. The burr residual height of both ends should be ≤5mm. Bundled tubes should be of uniform length and the length error should be less than 300mm.
3. For welded tubes, the external welded joint should be smooth and flat with the height ≤0.3mm. The internal welded joint should be ≤2mm.
4. The curvature and distortion of the tube should adhere to the norm of "GB/T 6728-2002 cold-rolled hollow structural steel size weight and allowable deviation"
5. Tubes should be straight and the distortion should be less than 1mm / 1m (4mm / 10).
6. The longitudinal distortion of tube should be less than 0.02% of the tube total length.
7. The outer diameter tolerance of the sectional material should not be more than ±0.5% of the outer diameter, minimum 0.2mm (according to GB/T 17395-1998 standardized outer diameter deviation grade D4).
8. Pay attention to the operation safety while performing the tube loading. Tube bundles loading should be transported by traveling crane and operated by certified operators professionals. The crane should be able to function in both fast and slow speed mode, and make sure the crane is operating in low speed when approaching the equipment and transferring the tube bundles onto the loading table near function should be used to approach the loading table when the sill is approaching the equipment.
9. Workpiece processing accuracy: on the basis of material variation, the position variation is IT12 and the shape size variation is IT12.
10. Tube 0-6mm cross-section roughness varies according to the material properties and thickness, etc.
11. The machine users should be operating in strict accordance to the operation instructions and performing machine maintenance on a regular basis. Our company is not accountable for providing repair service for machine damage due to the lack of regular maintenance. 。
12. To ensure the cutting results and tube deformation, the tube thickness diameter (maximum diagonal) is required to follow: Tube Diameter < φ50mm Tube wall thicknessthickness≥1.2mm. Tube Diameter Diameter ≥ φ50mm thin-walled tube wall to diameter ratio should not be less than 1/40
13. Automatic loading should ensure that the difference between the length and width of the rectangular tube ≥ 10mm, otherwise the material can not be divided. The loading of the materials that do not meet the standard might not be achieved.
14. Automatic loading can only be applied to standard rectangular, round, square, and runway type tubes. Tubes of other shapes (asymmetrical shapes on the opposite side) are not suitable for automatic loading.