SENFENG

SF4020H4+ Material Loading and Unloading System

Max6KW

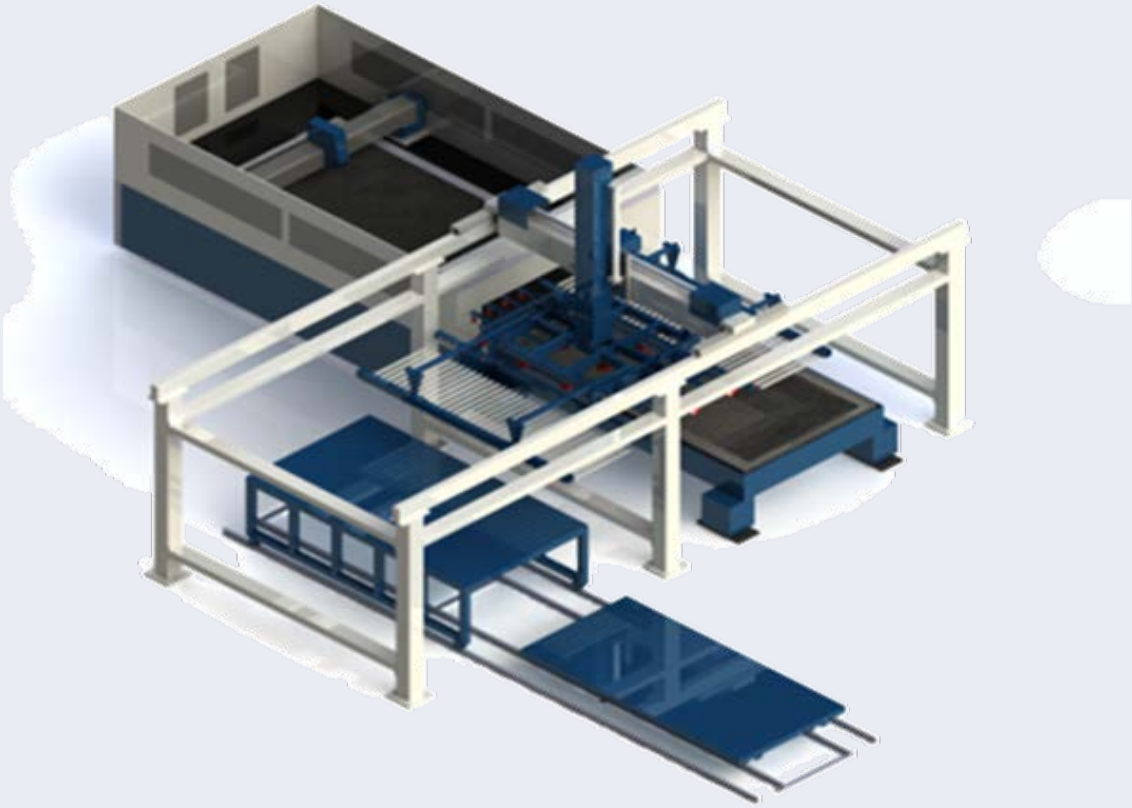
Laser Cutting Machine

TECHNICAL SOLUTIONS

Versatile and Efficient

SF4020H4+ Loading and Unloading System

- Material warehouse + loading and unloading system
- Steel plate storage
- Ultra-high speed cutting
- Automatic loading



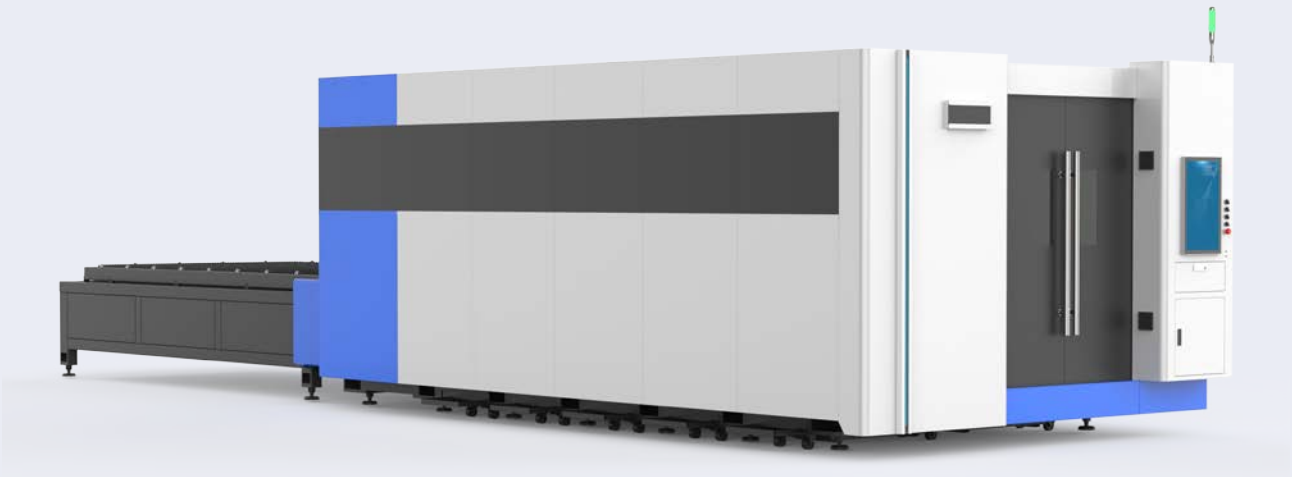
※The picture is for reference only, the actual appearance and size shall prevail

The Fourth Generation·Versatile and Efficient

SF4020H4 max 6000W

Laser Cutting Machine

- Heavy-duty heat-isolated hollow bed
- Intelligent multi-directional spiral negative pressure dust removal
- Laser cutting process database
- Storm cutting system



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TECHNICAL PARAMETERS

TECHNICAL PARAMETERS (SF4020H4 6000W)

No.	Items	Parameters
1	Work area (length x width)	4000*2000mm
2	X-axis travel	2030mm
3	Y-axis travel	4050mm
4	Z-axis travel	390mm
5	X/Y-axis positioning accuracy	±0.05mm
6	X/Y-axis repeated positioning accuracy	±0.02mm
7	Maximum speed	130m/min
8	Maximum acceleration	1.0G
9	Total weight	9280KG
10	Maximum load of workbench	3200KG
11	Dimensions (length x width x height)	10908*3363*2513mm
12	Phase	Three-phase
13	Rated voltage of power supply	380V
14	Frequency	50Hz
15	Power supply protection grade	IP54

Note: 1. The accuracy of the workpiece depends to some extent on factors such as workpiece type, preparation, sheet size and position.

2. The above technical parameters are subject to change without notice, and the final technical parameters are subject to the order agreement.

CUTTING PARAMETERS

CUTTING PARAMETERS (SF4020H4 6000W)

material	thickness（MM）	Cutting speed (m/min)	gas
SS	1	45-55	N2/Air
	2	30-35	N2/Air
	3	18-22	N2/Air
	4	10-14	N2/Air
	5	8.0- 10	N2/Air
	6	4.3-5.0	N2/Air
	8	3.0-4.0	N2/Air
	10	1.8-2.5	N2/Air
	12	1.0-1.5	N2/Air
	14	0.8-1.2	N2/Air
	16	0.6-1.0	N2/Air
	20	0.4-0.7	Air
CS	1	40-45	N2/Air
	2	20-28	N2/Air
	3	12-17	N2/Air
	4	8.0- 10	N2/Air
	6	2.5-3.3	O2
	8	2.3-3.0	O2
	10	2.0-2.5	O2
	12	1.8-2.2	O2
	14	1.4-1.7	O2
	16	1.0-1.6	O2
	20	0.6-1.2	O2
	25	0.5-0.7	O2
	30	0.4-0.6	O2

Note: 1. Due to the
shall prevail.
2. The dark pa

CUTTING PARAMETERS

CUTTING PARAMETERS (SF4020H4 6000W)

material	thickness（MM）	Cutting speed (m/min)	gas
brass	1	40-45	N2/Air
	2	20-25	N2/Air
	3	12-15	N2/Air
	5	5.0-6.0	N2/Air
	6	3.0-4.0	N2/Air
	8	1.5-2.5	N2/Air
	10	1.0-1.5	N2/Air
	12	0.8- 1	N2/Air
Al	1	50-55	N2/Air
	2	25-30	N2/Air
	3	13-16	N2/Air
	4	10-13	N2/Air
	6	3.0-4.0	N2/Air
	8	2.0-3.0	N2/Air
	10	1.0-2.0	N2/Air
	12	0.7-1.2	N2/Air

Note: 1. Due to the difference in carbon content of materials, the cutting parameters are for reference only, and the actual material shall prevail.

2. The dark part means that the whole metal plate cannot be processed, but the sample can be cut, please be informed.

COST BENEFIT ANALYSIS

COST BENEFIT ANALYSIS (SF4020H4 6000W)

Items		Air compressor cutting	Oxygen cutting	Nitrogen cutting
Power consump	Laser source	16KW	16KW	16KW
	Water chiller power	10.4KW	10.4KW	10.4KW
	Air compressor power	15KW	/	/
	Machine tool host	10KW	10KW	10KW
	Dust removal equipment	5.5KW	5.5KW	5.5KW
	Material warehouse + loading and unloading	0.5rmb/H	4.5rmb/H	60.5rmb/H
Consumables and gas consumption		56.9KW	41.9KW	41.9KW
Total power		34.1KW/H	25.1KW/H	25.1KW/H
Total power consumption		34.6rmb	29.6rmb	85.6rmb
Total operating cost (1RMB/kwh)		16KW	16KW	16KW

If the cutting auxiliary gas is compressed air that has been dried, the cost is the air compressor electricity consumption + machine tool electricity consumption + consumables (protective lenses and nozzles).

Note: 1. The electricity and gas prices listed above are for reference only and may vary from region to region.

2. The auxiliary gas consumption will be different when cutting plates of other thicknesses. The oxygen column takes 25mm carbon steel as an example, and the nitrogen column takes 1mm stainless steel as an example. The values are for reference only and are subject to actual use.

ADVANTAGES OF LASER CUTTING

ADVANTAGES OF LASER CUTTING

(SF4020H4 6000W)

Items	Plasma cutting	Laser cutting	Laser cutting advantages
Positioning accuracy	0.4mm (specifically 10m bed)	0.14mm (specifically 10m bed)	High precision
Section taper	5mm (specifically thickness 40mm)	0.4mm (specifically thickness 40mm)	No finishing required
Kerf	4-6.0mm	0.2-1.6mm	Save 6-9% of materials
Bleed margin and co-edge	10mm	3-4mm	Save 6-9% of materials
Heat affected zone	0.5-2.0mm	0.1-0.4mm	Less heat absorption, less deformation
Cutting effect	Average	Excellent, less slag	No sanding required
Cutting speed	Average	Very fast	High productivity
Piercing	Can't cut small holes	Diameter to depth ratio 10-20%	Save on drilling machine and transfer costs
Working environment	Smoky	Clean	Healthy and environmentally friendly

CONFIGURATION LIST

CONFIGURATION LIST (SF4020H4 6000W)

No.	Items	Quantity	Brands
	Laser source		
1	6000W Laser source	1	max
	Laser cutting head		
1	Laser cutting head	1	raytools
	Machine tool · host		
1	Transmission system	4	Taiwan LAPPING/SENFENG
2	Machine tool and accessories	1	SENFENG
3	Reducer	3	France MOTOREDUCER
4	Electrical and pneumatic systems	1	France SCHNEIDER Japan SMC & Taiwan AirTAC
5	AC servo motor and driver	4	INOVANCE
6	Water chiller	1	Teyu
	CNC system		
1	CNC system	1	CYPCUT

Note: 1. This is the optimal configuration verified by our company. If you change the brand or configuration, it may cause irreversible effects. Please be aware of this.

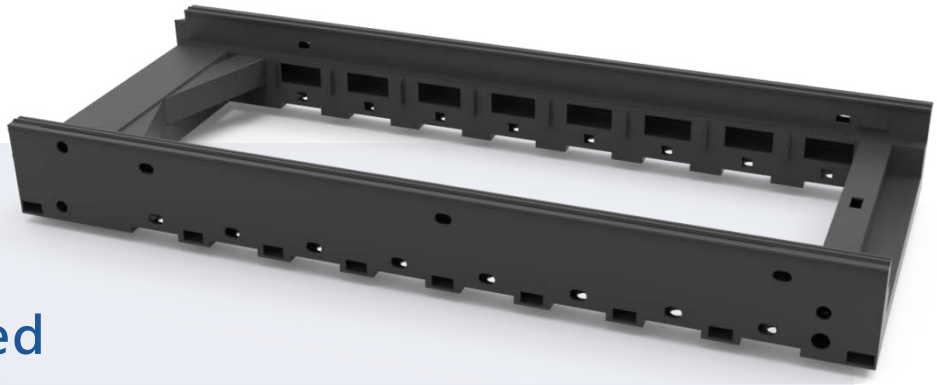
2. The warranty period for the entire machine (excluding consumables, force majeure natural disasters, wars and violations, human damage, and other reasons) is 1 year.

CUTTING SAMPLES

CUTTING SAMPLES (SF4020H4 6000W)

CUTTING SAMPLES

MACHINE BED SYSTEM
SF4020H4-MACHINE BED SYSTEM



Heavy-duty heat-isolated hollow bed

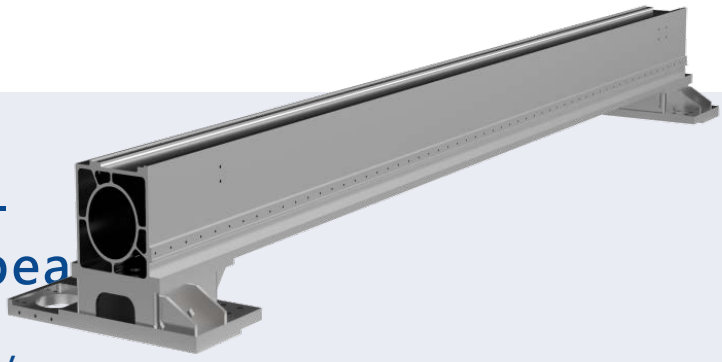
Higher processing efficiency

Technology

Welding is followed by stress relief annealing, secondary aging treatment, and precision machining using a super large gantry milling machine to ensure sufficient structural stability and shock resistance of the bed body, allowing it to withstand high acceleration.

Feature

The bed body has no internal connections to prevent heat transfer and accuracy decrease during cutting and ensure long-term use without deformation, thus improving its service life.



Aviation-grade high-strength aluminum bea

Strong structural stability
Strong impact resistance

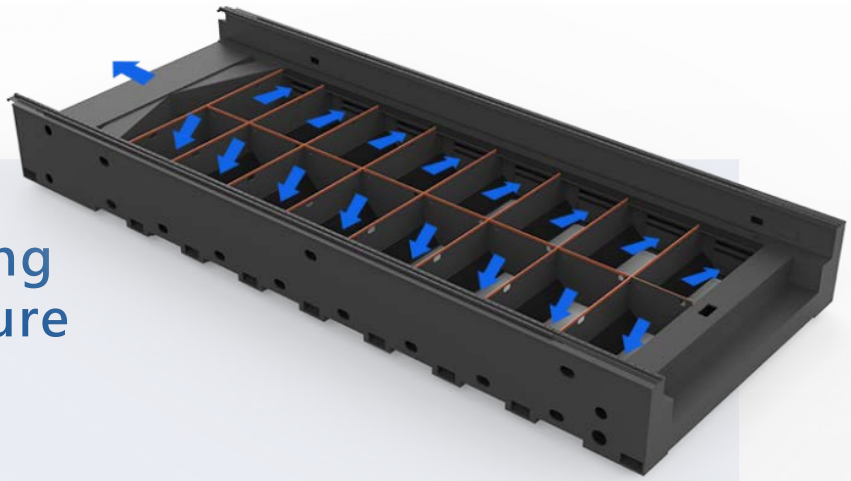
Technology

The beam is made of high-strength aviation-grade aluminum alloy and undergoes extrusion, quenching, heat aging treatment, and precision machining. It has excellent rigidity and surface quality and is corrosion-resistant, lightweight, high in rigidity, and has good toughness due to the properties of aluminum alloy.

Feature

The internal structure is optimized through finite element analysis to ensure perfect dynamic performance during high-speed laser cutting. This allows for high-speed cutting of various shapes while maintaining accuracy.

MACHINE BED SYSTEM
SF4020H4-MACHINE BED SYSTEM



Intelligent surrounding spiral negative pressure dust removal

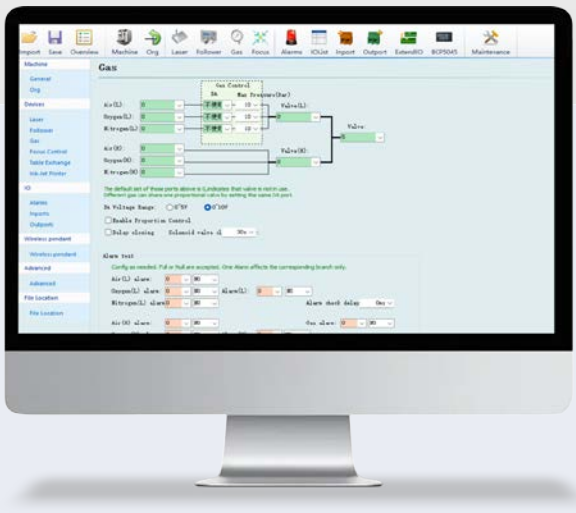
Green and smart

Core

The dust removal system is designed to divide the cutting area into sections and exhaust in a time-sharing, zonal, and segmented manner according to the current cutting position.

Feature

It is also equipped with a sealed bottom structure to achieve smoke-free cutting.



Pneumatic system

Precise control

Core

The gas system is equipped with well-known brands of SMC and AirTAC control valves and proportional regulating valves, which controls the pressure and flow of each gas through electricity.

Feature

Auxiliary cutting gases (O2, N2, compressed air etc.).

Economical loading and unloading manipulator

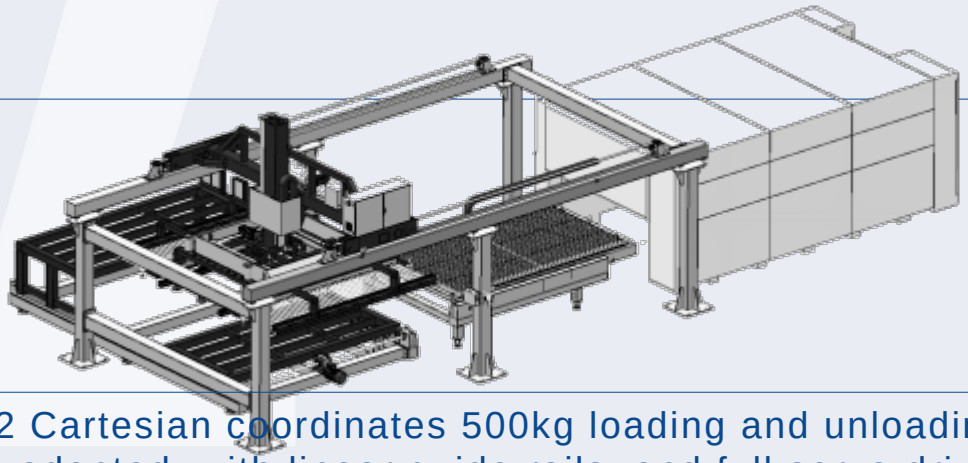
Technical specifications

1. Technical parameters of loading and unloading manipulator:
1.1 The whole machine adopts the structure of double truss gantry type, vacuum suction cup and blanking fork compound loading and unloading. The material cart adopts a double-layer exchange material cart.
1.2 Cartesian coordinates 500kg loading and unloading manipulator are adopted, with linear guide rails, and full servo drive. The translation running speed is 10-50m /min adjustable. The lifting speed is 5-10m/min, which is infinitely adjustable.
1.3 The repeated positioning accuracy of the loading and unloading manipulator ± 1.5mm.
1.4 The vacuum suction cup rack is compounded with the blanking material car, and the feeding vacuum suction cup rack is equipped with 12 groups of Miaode series heavy-duty vacuum suction cups, which are suitable for the maximum format of the plate 4000mm×2000mm, the smallest size of 800mm×800mm, and the rated load of the full width is 500kg. The blanking method is a left and right double-fork structure, and the running distance of the blanking fork is short and the failure rate is low. The opening and closing of the cutting fork is driven by the electromagnetic brake motor, and the two-way synchronous opening and closing of the double-fork extension linear guide rail is configured, and the fork supporting plate is configured to make the fork run stably and without shaking. The fork is made of 40CrMn alloy steel after heat treatment, hard chrome plating on the surface and polishing, the surface is smooth, the contact area with the plate is small, and the plate is not scratched. Large bearing capacity and strong anti-deformation ability. The maximum load of the full width is 500kg.
1.5 The vacuum system is equipped with a vacuum energy storage tank and a Japanese Panasonic vacuum controller, and the vacuum suction cup can maintain normal operation within a certain period of time in case of sudden power and gas outage during operation to ensure safety.
1.6 The material car adopts a double-layer exchange material car. The upper layer is the blanking material car, and the lower layer is the raw material material car. The double-layer material car is driven and exchanged by a frequency conversion motor through a reducer, with a maximum plate width of 4000mm×2000mm, a maximum load of 5 tons per layer of full format, a maximum stacking height of 400mm (including material support), and a raw material height of 350mm.
1.7 The numerical control system adopts Omron program controller + Weiluntong touch screen. Teaching memory mode programming, can switch between automatic loading mode, automatic loading and unloading mode, manual mode, suitable for different working states. Intelligent automatic start-stop system, energy saving and environmental protection.
1.8 The installed power of the whole set of equipment is 14KW. It needs to be equipped with 380V60A AC power supply and compressed air source with a working pressure of 0.6MPa.
1.9 The working environment of the machine should meet the temperature of 0-45 °C, the relative humidity should be less than 80%, no flammable and explosive, strong electromagnetic interference, no corrosive gas, no liquid splash, and good lighting indoor environment.

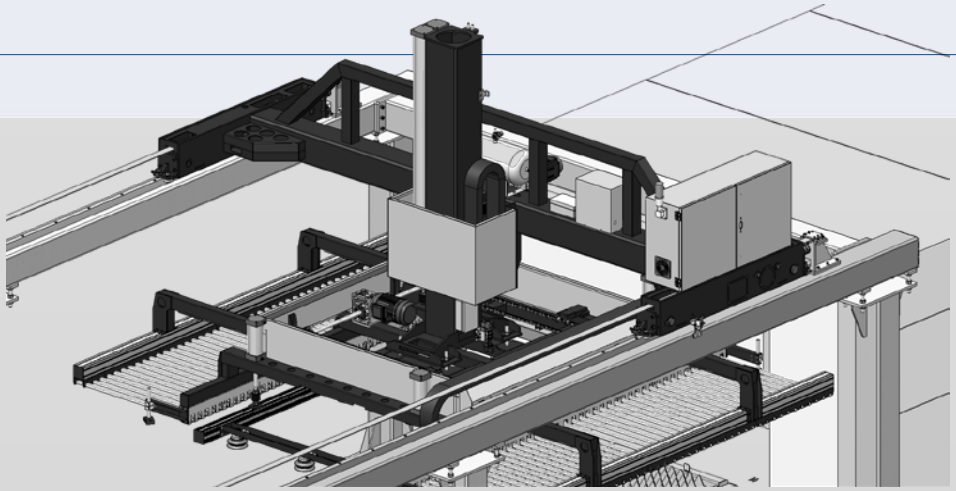
Second, the composition of the loading and unloading manipulator:
The whole machine consists of a gantry frame, a composite loading and unloading structure of a vacuum suction cup and a blanking fork, a double-layer exchange cart, a numerical control system, a control system, a safety protection system, etc. It can effectively reduce the labor of operators, improve production efficiency, and avoid potential safety hazards.

Economical loading and unloading manipulator

2.1 The whole machine adopts a double-sided truss gantry structure, due to the large length of the gantry beam, in order to avoid the beam from being bent due to gravity deformation in long-term work, the loading and unloading manipulator beam is made of manganese steel square tube after overall welding vibration stress relief treatment, and is processed by a large CNC gantry milling machine. Good rigidity and high precision. The main frame beam is connected with the outrigger by adjusting bolts, and it is convenient to adjust the levelness of the gantry beam.

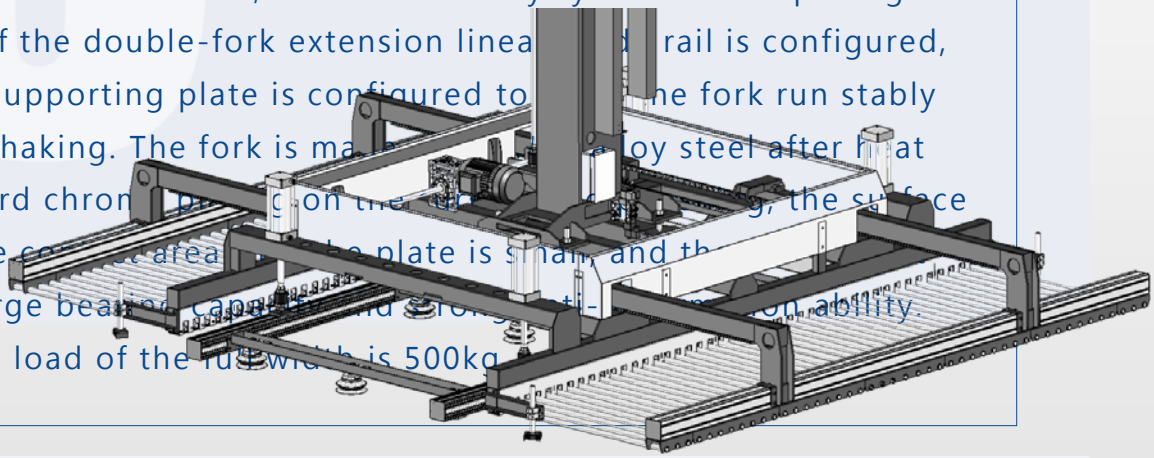


2.2 Cartesian coordinates 500kg loading and unloading manipulator are adopted, with linear guide rails, and full servo drive. The translational running speed is adjustable from 10-50m/min. The lifting speed is 5-10m/min, which is infinitely adjustable. The repeated positioning accuracy of the loading and unloading manipulator ± 1.5mm.

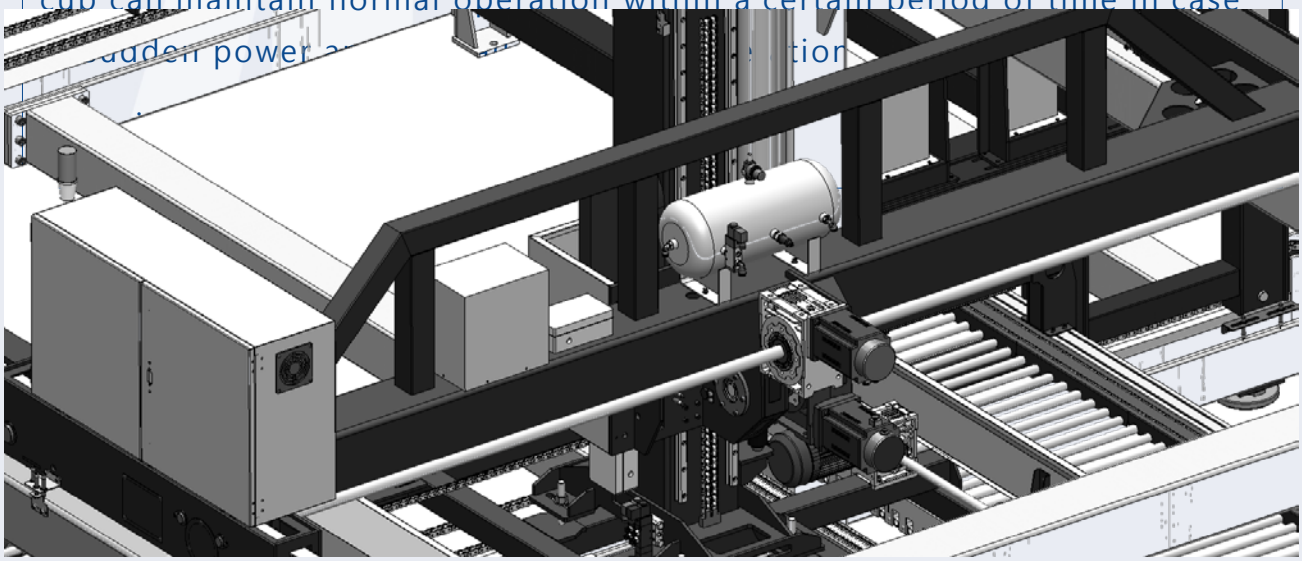


Economical loading and unloading manipulator

2.3 The vacuum suction cup rack is compounded with the blanking car, and the feeding vacuum suction cup rack is equipped with 12 sets of Miaode series heavy-duty vacuum suction cups, which are suitable for the largest format of the plate 4000mm×2000mm, the smallest format of 800mm×800mm, and the rated load of the full width is 500kg. The blanking method is a left and right double-fork structure, and the running distance of the blanking fork is short and the failure rate is low. The opening and closing of the cutting fork is driven by the electromagnetic brake motor, and the two-way synchronous opening and closing of the double-fork extension linea[illegible] rail is configured, and the fork supporting plate is configured to [illegible]he fork run stably and without shaking. The fork is ma[illegible]loy steel after heat treatment, hard chrom[illegible] the [illegible], the surface is smooth, the co[illegible] area [illegible] plate is small, and th[illegible] scratched. Large bea[illegible] capacity and [illegible] ability. The maximum load of the full width is 500kg.

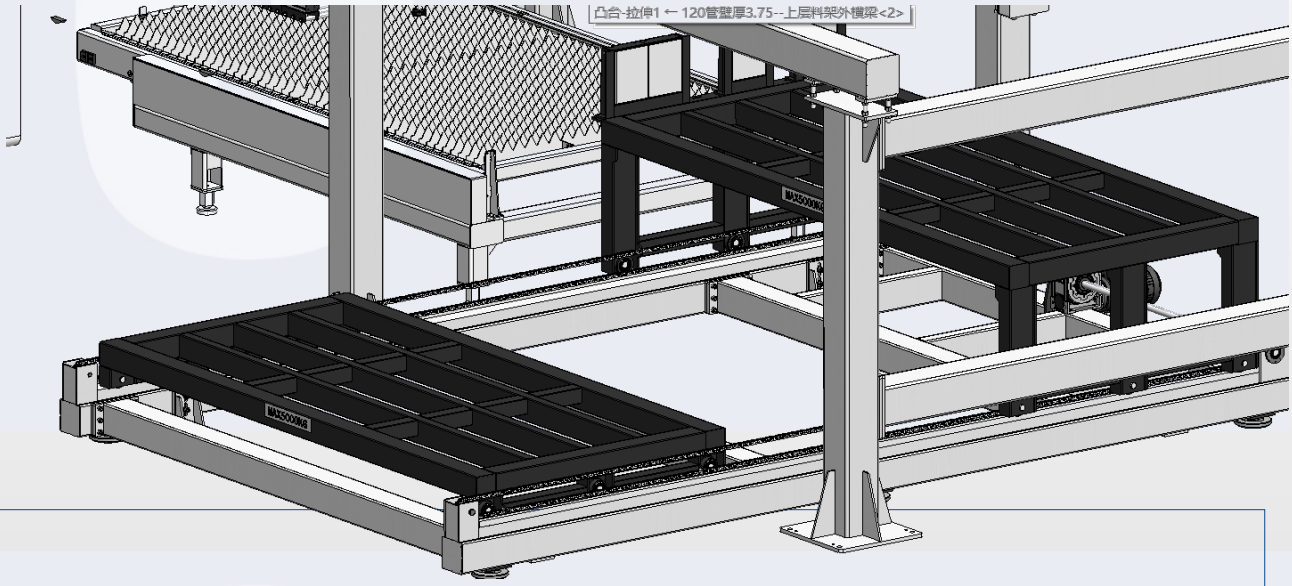


2.4 The vacuum system is equipped with a vacuum energy storage tank and a Japanese Panasonic vacuum controller, and the vacuum suction cup can maintain normal operation within a certain period of time in case [illegible]sudden power [illegible]tion



Economical loading and unloading manipulator

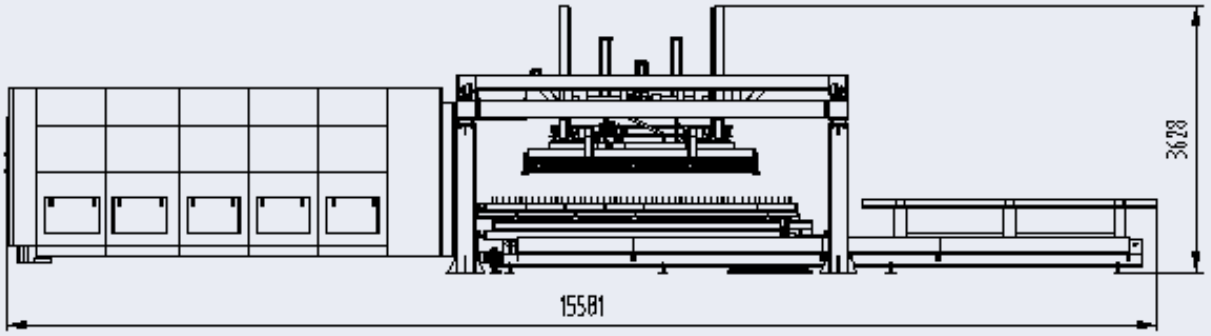
2.5 The material car adopts a double-layer exchange material car. The upper layer is the blanking material car, and the lower layer is the raw material material car. The double-layer material car is driven and exchanged by a frequency conversion motor through a reducer, with a maximum plate width of 4000mm×2000mm, a maximum load of 5 tons per layer of full format, a maximum stacking height of 400mm (including material support), and a raw material height of 350mm.

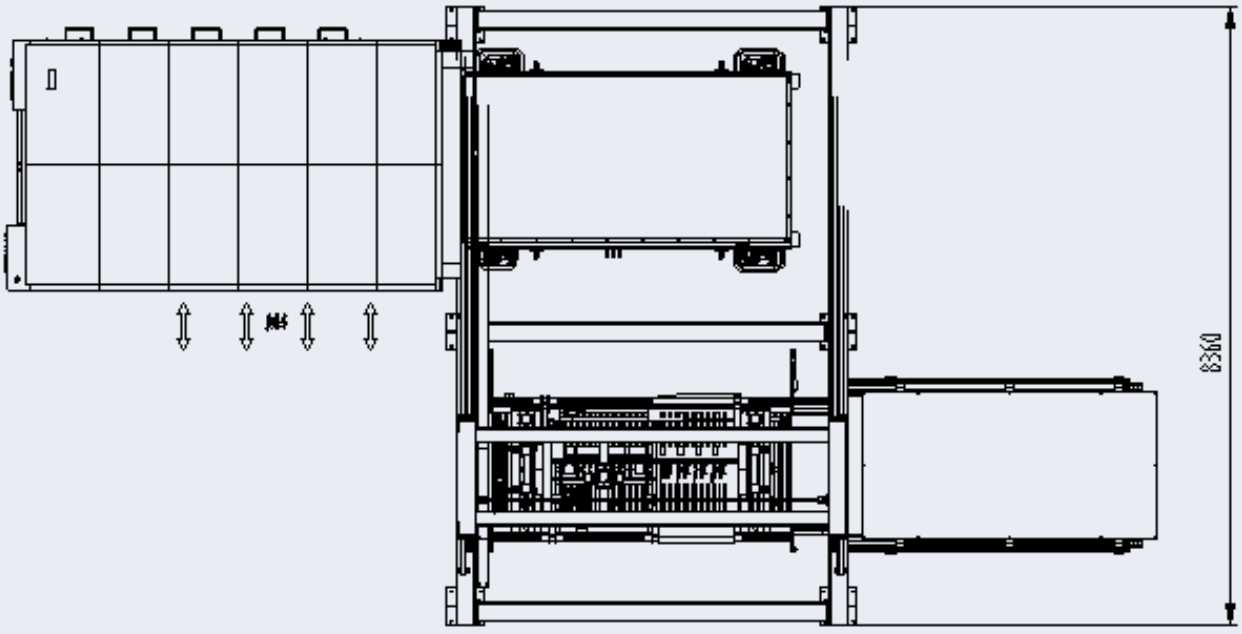


2.6 The CNC system adopts the original Omron program controller + Taiwan Weiluntong touch screen. Teaching memory mode programming, can switch between automatic loading mode, automatic loading and unloading mode, manual mode, suitable for different working states. Intelligent automatic start-stop system, energy saving and environmental protection.

Economical loading and unloading manipulator

Equipment foundation diagram





Economical loading and unloading manipulator

Technical Parameters

No.	Items	Parameters	Units
1	The loading and unloading manipulator is suitable for the plate format	4000×2000	mm
2	The loading and unloading manipulator is suitable for the thickness of the sheet	1-8	Mm
3	The loading and unloading robot handles the weight of the panels	500	kg
4	The loading and unloading manipulator translates the maximum running speed	50	m/min
5	The loading and unloading manipulator lifts and lowers the maximum running speed	10	m/min
6	The running speed of the loading and unloading trolley	5000	kg
7	Speed of rear discharge cart	20	m/min
8	Dimensions of electric discharge cart	4000×2000	mm
9	Supply air pressure	0.6-0.7	Mpa
10	power	14	kw

Economical loading and unloading manipulator

Technical Parameters

No.	Items	Parameters	Units
1	Vertical linear guide	Taiwan HIWIN	
2	Vertical linear slider	Taiwan HIWIN	
3	Touchscreen (human-machine interface)	Taiwan WEINVIEW	
4	Vacuum controller	Panasonic	
5	CNC controller	Japan OMRON	
6	DC power supply	Japan OMRON	
7	Relay	Japan OMRON	
8	Suction cup	Japan CONVUM	
9	Pneumatic components	Taiwan AIRTAC/SNS	
10	Servo motor	Shanghai ECAC	
11	Precision reducer	Guzuo/teco	
12	Reducer motor	Guzuo/teco	
13	Synchronous wheels	MSL	
14	Photoelectric sensors	CHIIB	
15	Breaker	DELIXI	

Economical loading and unloading manipulator

Preparation items before installation

1. 5.1 The equipment shall provide a compressed air source with a working pressure of 0.6MPa and a φ12mm air pipe connected to the equipment at the site of use;
2. 5.2 The equipment shall provide 380V60A power supply and a 6mm² 5-core sheath cable connected to the equipment at the site of use;
3. 5.3 Precast concrete foundation at the equipment installation location;
4. 5.4 When the equipment is installed, 2 necessary lifting and moving machinery and auxiliary installation personnel shall be provided.

SENFENG

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