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Welcome to KOCEL

KOCEL INTELLIGENT MACHINERY（ANHUI）CO., LIMITED

AJS 1800 M2 PRINTER INRODUCTION

Content

1. Printer Parameters
2. Printer Functions
3. Printer Structures & Supporting Facilities
4. Kocel's 3D Printing Advantages

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1 Printer Parameters

Equipment Parameters

➢Equipment Overview

Introduction

The AJS 1800 is an industrial-grade foundry sand mold 3D printer developed by Kocel Intelligent Machinery with independent intellectual property rights. The printer is based on the three-dimensional printing (3DP) process and adopts a unidirectional sand laying and printing working mode.

Advantage

Printing sand molds has **high efficiency, excellent quality and low cost**, and is suitable for industrial production applications of various types of sand molds;

Application Scenario

With supporting equipment and industrial robots, a digital factory can be formed;

Market performance

Since the equipment was put on the market, more than 300 units have been sold.

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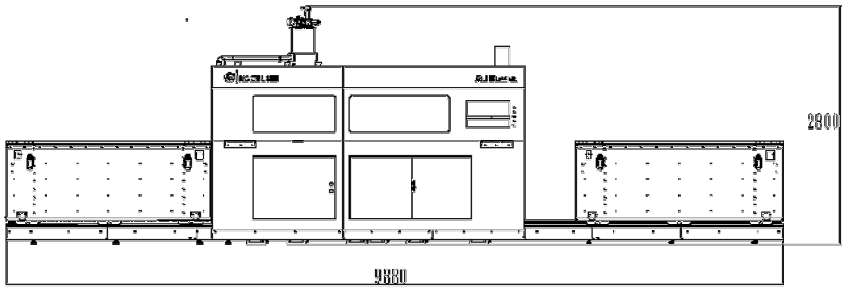
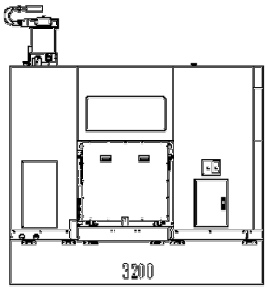
Equipment Parameters

➢Key Parameters

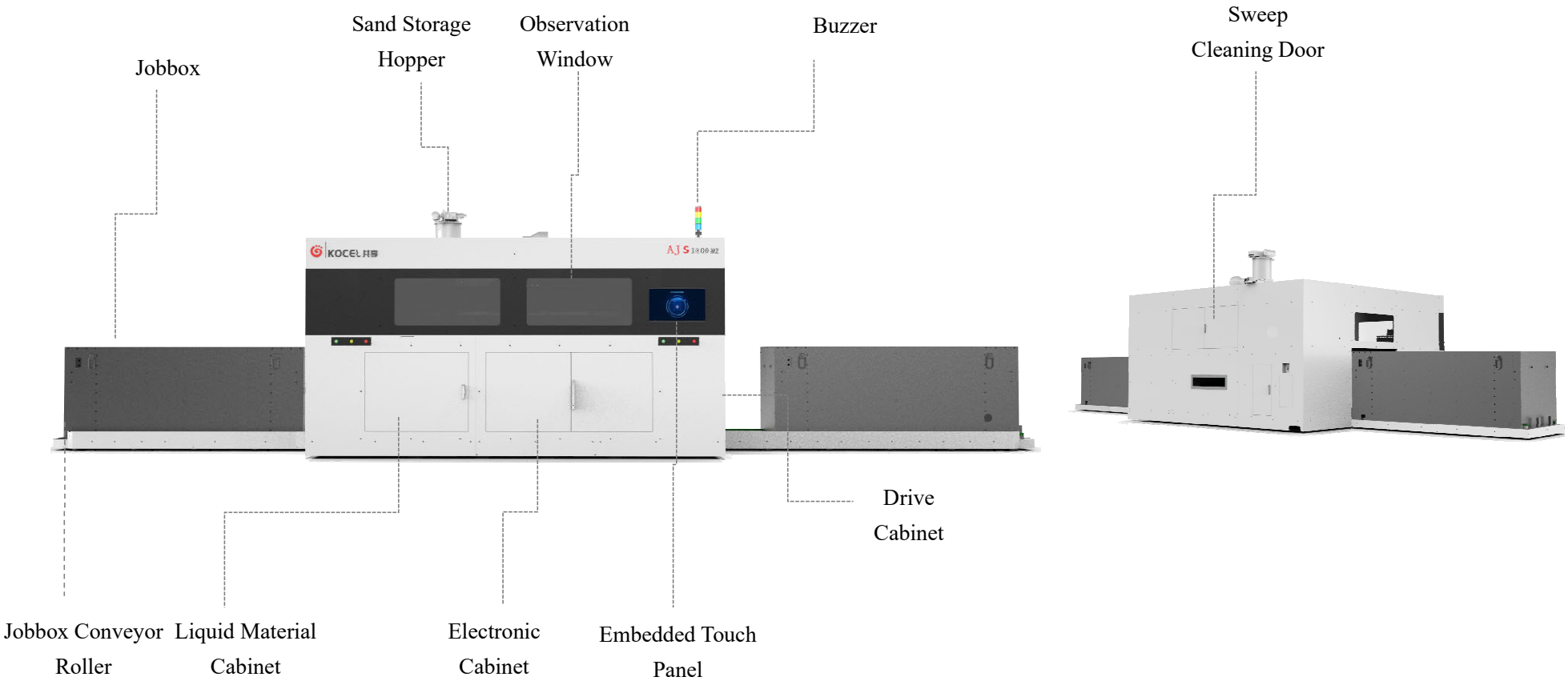




Name	Project	Requirement
Printer Size	Length（mm）	9880
	Width（mm）	3200
	Height（mm）	2800
Molding Size	Length（mm）	1800
	Width（mm）	1000
	Height（mm）	700
Printer Weight	Weight（t）	15
Printing Indicators	Print Thickness (mm)	0.2-0.5
	Print Efficirncy (L/h)	70-200
	Print Accuracy (mm)	±0.3
Print Format	Format	CLI/SLC

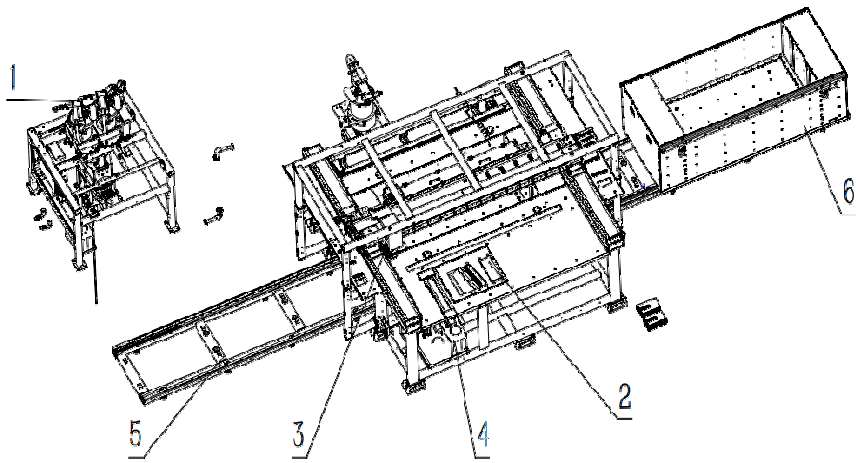
Equipment Parameters

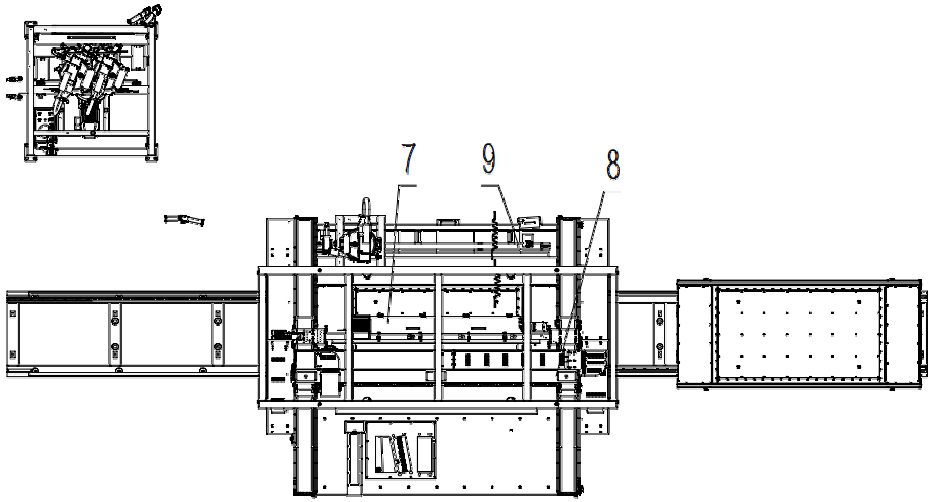
➢Key Parameters



Equipment Parameters

➢Equipment Composition





AJS 1800 Printer Main Structure					
No.	Name	Function	No.	Name	Function
1	Sand Mixer	Mix sand and curing agent	6	Jobbox	Provide printing space
2	PH Protect Station	Clean and protect printhead	7	Sand Spreader	Laying printing sand
3	Printhead	Spray the resin onto the sand surface according to the layered slice pattern	8	Printhead Beam	Support print head motion system
4	Liquid Material Cabinet	Storage Resin	9	Cleaning Mechanism	Clean the loose sand on the scraper plate of the recoater
5	Sand Cleaning Station	Clean sand mold and sand core			

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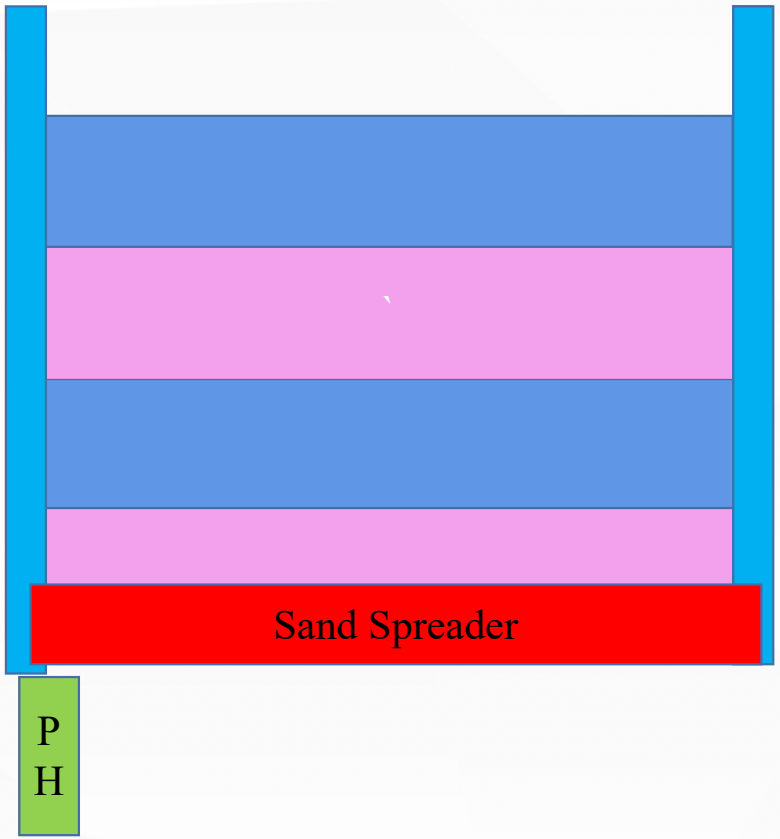
Equipment Parameters

➢Printing Principle



Model	AJS 1800
Printing method	Follow-up single origin one-way printing
Nozzle resolution (DPI)	400
Layer time (S/layer)	≤18
Printing efficiency (L/h)	70-200
Printing layer thickness (mm)	0.2~0.5
Printing accuracy (mm)	±0.3

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Equipment Parameters

➢Printer Advantages

Intelligent 01

- Unattended, holiday mode, remote operation and maintenance, inter-layer printing
- One-click printing, blank printing, offset printing, random point printing

"Double High" 02

- High precision, high efficiency
- Printing accuracy ±0.3mm, nozzle accuracy 400DPI,
- Print head and sander are independently controlled, white-skip printing, efficiency 200L/H

Printer Stability 03

- The printing control software is independently developed and has obtained the corresponding copyright.
- All components and core parts are first-line international and domestic brands

Low Cost 04

- Sand and liquid materials are localized
- Sand and liquid materials can be recycled; the recovery rate of old sand is ≥90%, and the recovery rate of resin is ≥85%.
- The sand road system uses wear-resistant materials, and the operation and maintenance cost is low

High-Quality After-sales Service 05

- 6 service centers have been established nationwide and 2 overseas service centers,
- 7*24 hours response of regular supplies to improve the response speed of after-sales service

Brand Advantage 06

- The cumulative sales of equipment exceeded 300 units, nearly 10 smart factories and more than 20 3D printing production lines have been built.
- Passed EU CE certification and ISO 9001 certification. Obtained more than 750 authorized patents (400 inventions and more than 70 PCTs), and issued 2 national standards.

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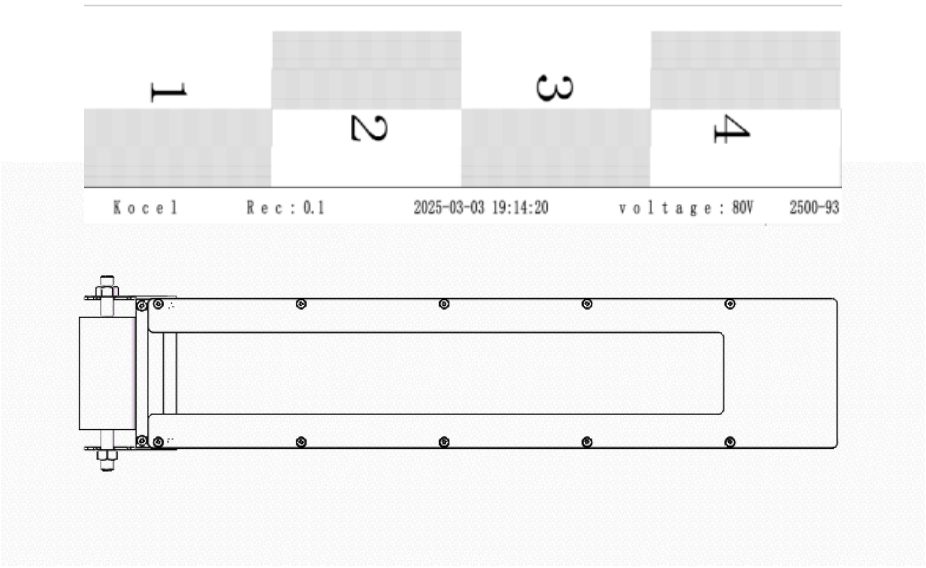
2

Printer Functions

Equipment Functions

➢ Inkjet Status Monitoring

- Equipped with inkjet detection device, the equipment detects the ink ejection rate of the nozzle before printing, ensuring stable printing quality and reducing the scrap rate of sand molds



• Inter-Layer Printing

- Equipped with a "memory" function, the software can automatically save the current printing status information when the printing is paused. When printing again, it can continue printing from the interrupted layer to avoid waste caused by restarting the printing task.

Equipment Functions

➢Double Jobbox

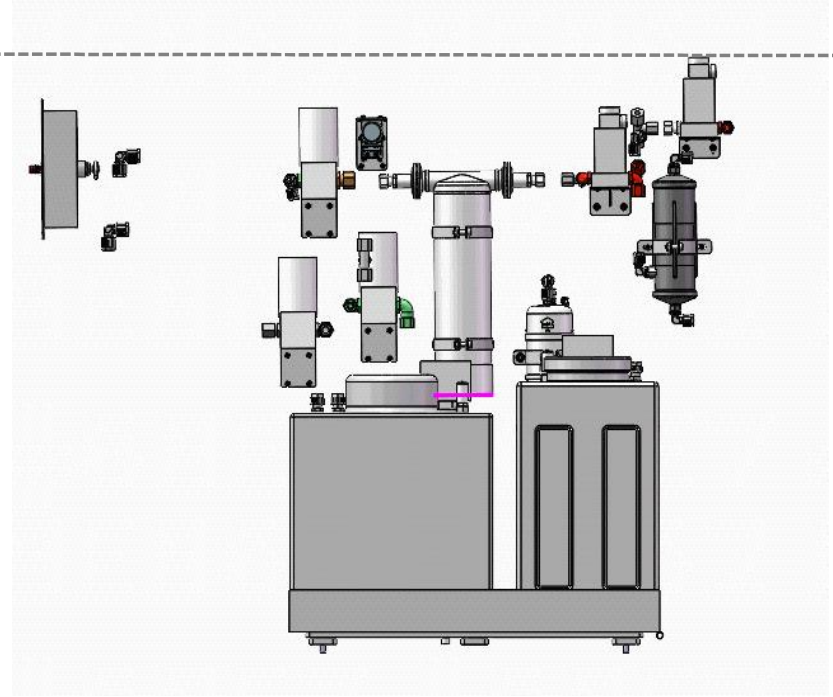
- The printer is equipped with double jobbox and a sand recycle system for easy sand cleaning.
- There is no waiting during the printing process and continuous printing is possible. The printer utilization rate is high.

1#Jobbox

2#Jobbox

➢ One-Touch Liquid Addition

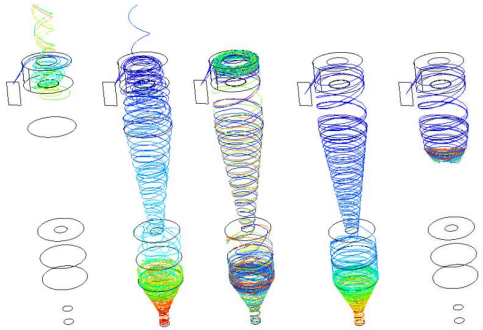
- The equipment integrates an intelligent liquid filling system and is equipped with a one-touch filling function, which improves operating efficiency by 60% and completely eliminates the risk of splashing and pollution caused by manual liquid filling.



Equipment Functions

➢ High Wear-Resistant Sand Supply System

- The damaged parts of the sand supply system are made of highly wear-resistant materials, with a service life of **≥3 years**, maintenance frequency reduced by **60%**, and maintenance costs reduced by **80%**.



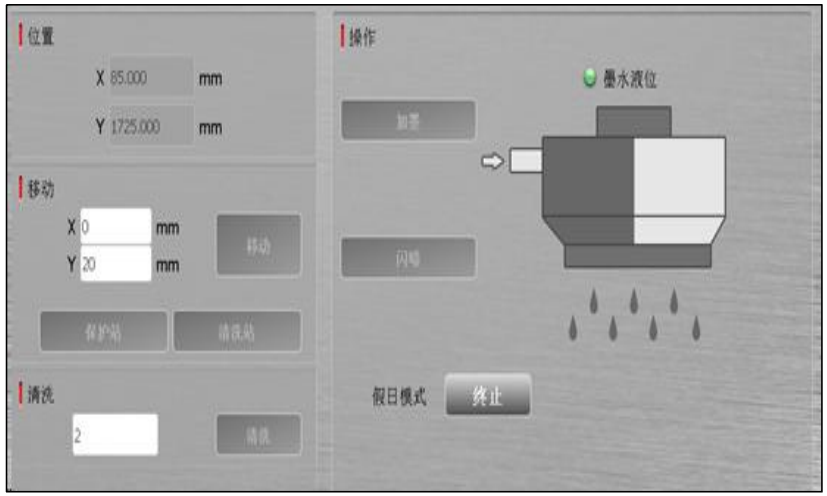
➢ Integrated Remote Operation and Maintenance Platform

- The full life cycle management of components is achieved. The equipment operation data is integrated, intelligently analyzed and monitored in real time through the platform, breaking the time and space limitations of traditional equipment management, improving equipment operation efficiency, reducing maintenance costs, and promoting the digital transformation of enterprises.

Equipment Functions

➢ Holiday Mode

- When there is no production task during holidays or for a short period of time, the printer can automatically clean and maintain the printer nozzle regularly according to the time interval set by the user.



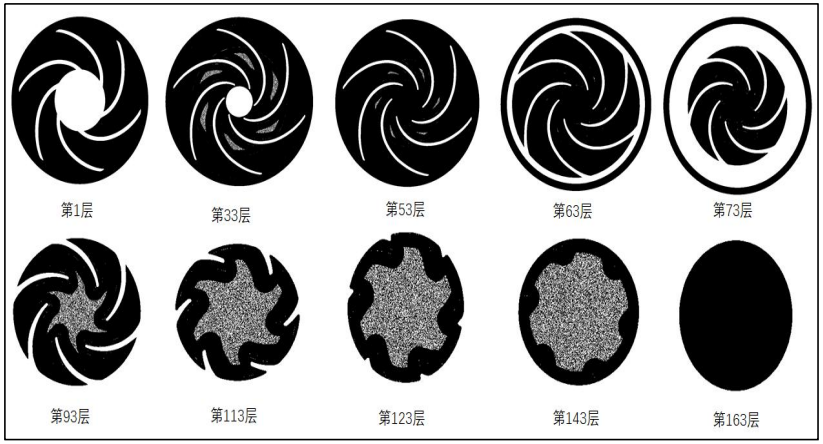
➢ One-Click Printing

- After the raw materials are prepared, you can start printing with just one click, which is easy to operate.

Equipment Functions

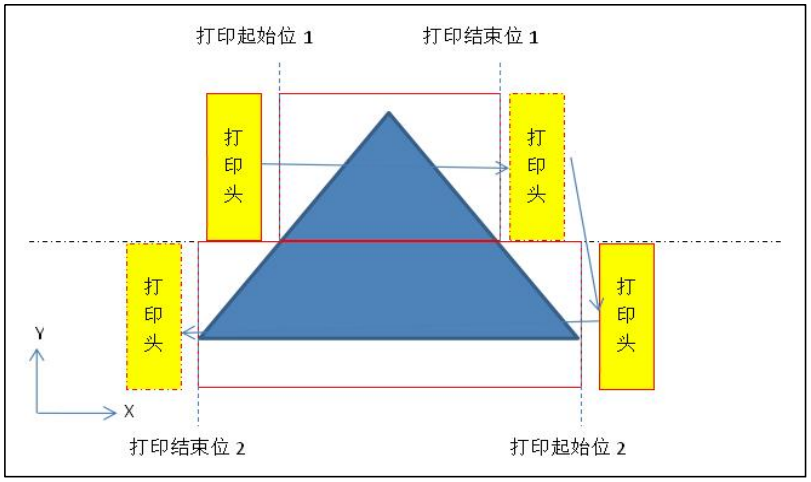
➢ Random Point Printing

- Ensure that the outer edge of the sand mold has sufficient strength. Less ink jetting in the sand mold can not only reduce the total gas generation of the sand mold, but also reduce the cost of use.



➢ White Space Skipping Printing

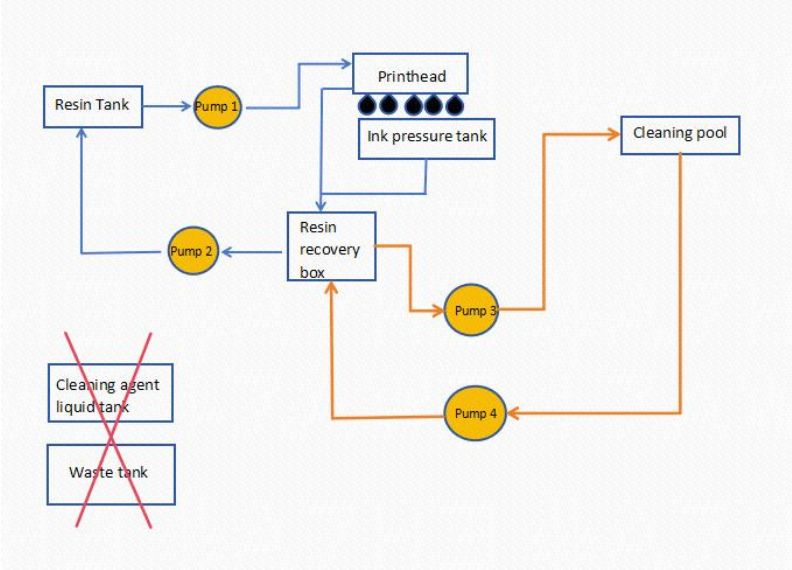
- When printing, the part without data is automatically skipped, which shortens the invalid movement time of the printhead and improves the printing efficiency.



Equipment Functions

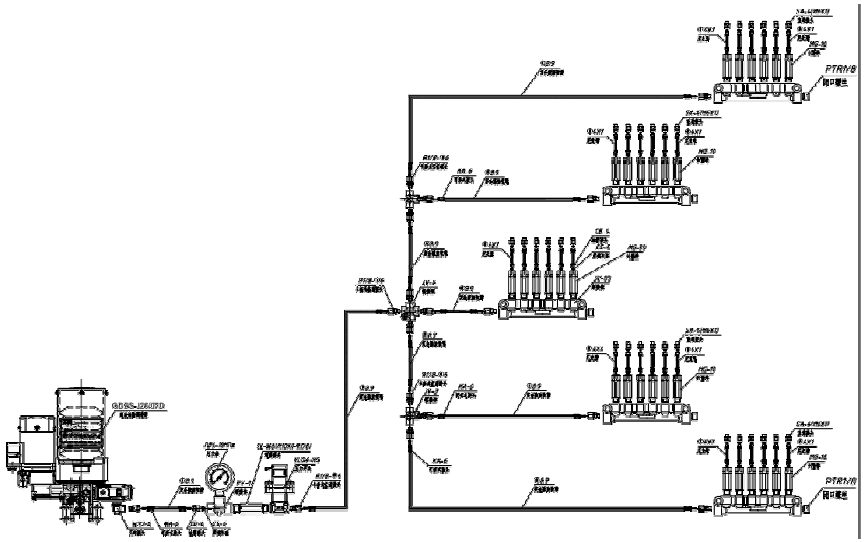
➢ Resin Self-Circulation and Self-Cleaning

- Low cost
- Resin recycling: Using multi-stage filtration + intelligent detection and control technology, the resin used for ink cleaning during the printing process can be recycled.



➢ Automatic Lubrication

- Each motion axis is equipped with an independent lubricating oil filling port, and the guide rail part adopts automatic lubrication to achieve long-term automatic maintenance and lubrication.



Equipment Functions

➢ CE Certification

- Reasonable design layout, in compliance with relevant safety standards and certifications

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MACHINERY DIRECTIVE
ATTESTATION OF CONFORMITY

Technical file of the company mentioned below has been inspected and audit has been completed successfully.

2006/42/EC Machinery Directive Annex VIII has been taken as references for these processes.

Company Name	: KOCEL INTELLIGENT MACHINERY (ANHUI) LIMITED
Company Address	: Chungu 3D Printing Industrial Park, Fanchang Economic Development Zone, Wuhu, Anhui Province, China
Related Directives and Annex	: 2006/42/EC Machinery Directive/Annex VIII
Related Standards	: EN ISO 12100:2010; EN 60204-1:2018
Product Name	: Binder Spray Sand Mould 3D Printer
Report No and Date	: ZYY20231218mD03
Product Brand/Model/Type	: AJS 2500 A, AJS 300 A, AJS 800 A, AJS 1200 A, AJS 1800 A, AJS 1800 B, AJS 2400 A, AJS 3000 A, AJS 4000 A, AJS 2200 B
Certificate Number	: M.2023.286.C14930
Initial Assessment Date	: 29.12.2023
Registration Date	: 02.01.2024
Release Date/No	: -
Expiry Date	: 01.01.2029

UDEM International Certification Auditing Training Centre Industry and Trade Inc. Co.

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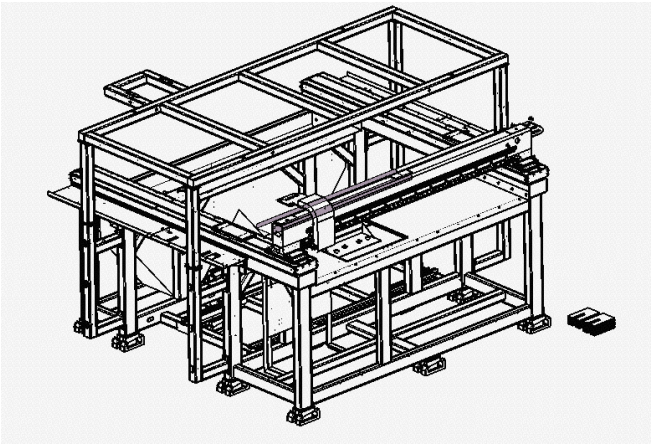
3

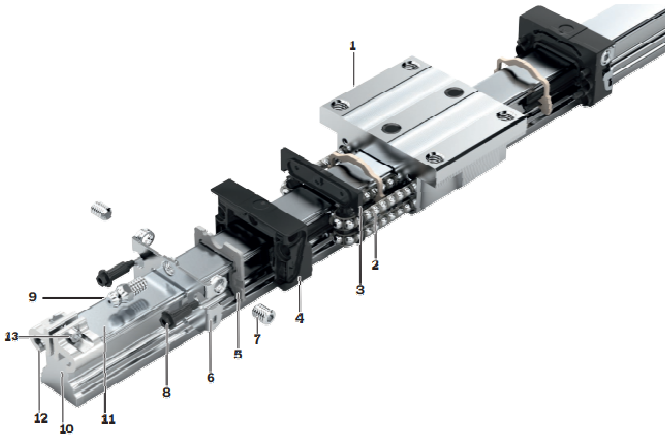
Printer Structures & Supporting Facilities

Equipment Structuers & Supporting Facilities

➢Frame and motion system

- **Print head X/Y axis motion system:** X/Y axis motion is achieved through an integrated frame structure + high-precision guide rail slider + motor drive.
- **High sealing: customized high sealing module, long life and low maintenance cost**
- **Jobbox lifting Z axis:** the jobbox Z direction movement is realized through the integrated frame + high-precision screw + servo motor

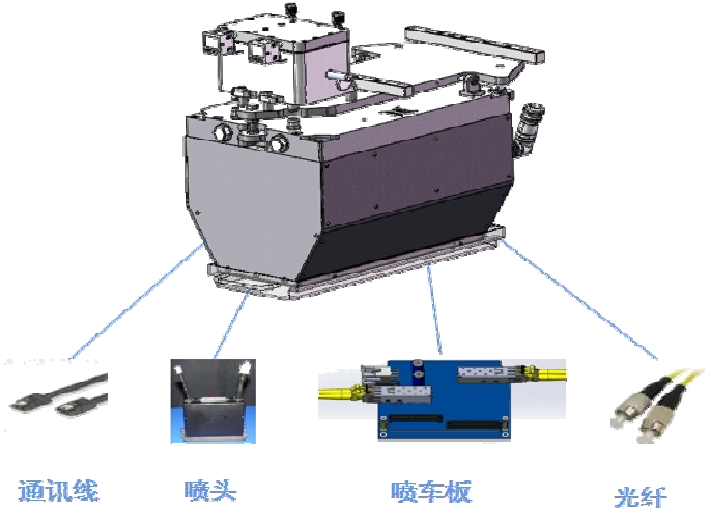


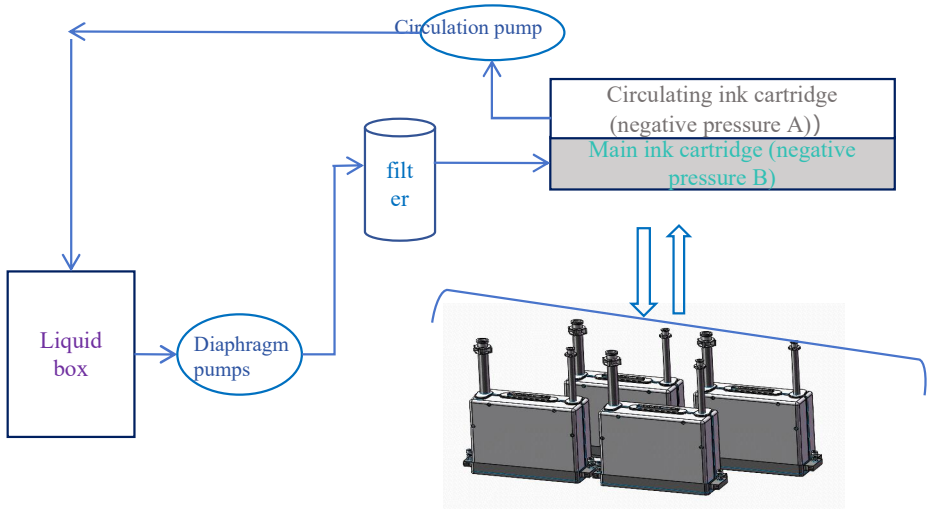


Equipment Structuers & Supporting Facilities

➢Printhead

- The combination of **Fuji high-resolution printhead** + dual ink cartridge structure + domestic board card is used to achieve stable negative pressure of the printhead and high printhead resolution.
- The print head has its own **ink circulation function** to ensure internal circulation of the printhead and prevent ink crystallization inside the printhead, which has a long service life and low maintenance cost.





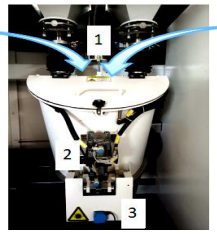
Main Parameter	Numeric	Unit
Inkjet volume	60-140	pl
Printing format	258	mm
Printing resolution	250~600	dpi
Printhead speed	540~1200	mm/s

Equipment Structuers & Supporting Facilities

➢Sand Supply and Mixing System

- **High-precision automatic feeding:** Raw materials are fed automatically throughout the entire process. Printing sand is weighed and added using a high-precision three-point weighing sensor, with an addition accuracy of ≤2%; curing agent is added using a high-precision electromagnetic metering pump, with an addition accuracy of ≤1.5%
- **Efficient sand mixing mode:** ① Adopting three-stage high-efficiency and high-precision sand mixing technology, the amount of sand mixing meets the requirements of multi-layer thick printing, and the uniformity of sand mixing is **≤4%**; ② Equipped with a dual quantitative device, it can realize three sand mixing methods: new sand, all old sand, and new and old sand (new and old sand are set according to the required proportion according to process requirements); ③ Reserve a high-precision additive adding device installation interface to meet project customization needs

吸砂部分
①吸砂管
②砂斗



混砂部分
①砂闸
②混砂罐
③料位计

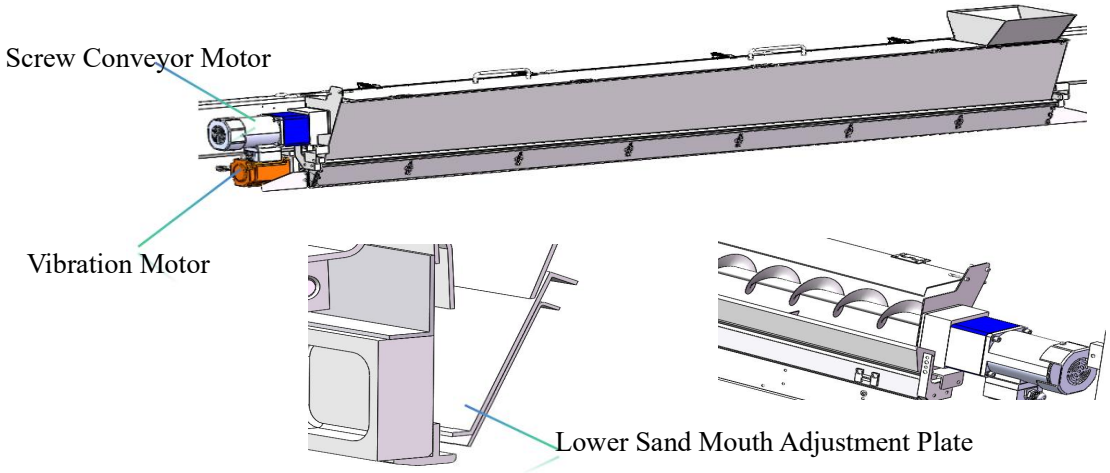

固化剂加入装置

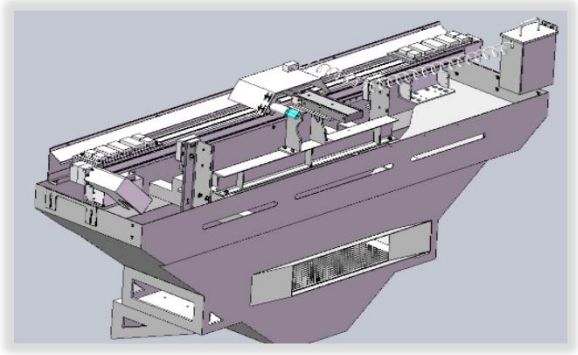
Main Parameter	Numeric	Unit
Sand mixing amount	6~10	Kg
Ratio of new sand to old sand	8/2~7/3~5/5 (Determined by production process)	——
Curing agent addition amount	0.02~0.6 (Determined by production process)	%
Sand mixing time	60~120	s

Equipment Structuers & Supporting Facilities

➢Recoater

- **High efficiency and high precision:** ① Adopt single sand scraper structure to achieve follow-up printing; ② Adopt one-time sand adding technology, sand adding time ≤3s, sand adding uniformity ≤5%; ③ Use **stacked trough high-frequency micro-vibration sanding** and **micro-angle paving technology**, sand paving uniformity ≤5%, high density of printed sand molds.
- **Multi-material printing:** The sand paving machine adopts adjustable sand opening gap to realize the printing of various materials such as silica sand, ceramsite sand, pearl sand and corresponding reused sand (mechanical, thermal method).
- **Automatic cleaning:** The automatic cleaning device is used to clean the impurities at the bottom of the sand scraper plate of the sand paving machine to improve the quality of printed products



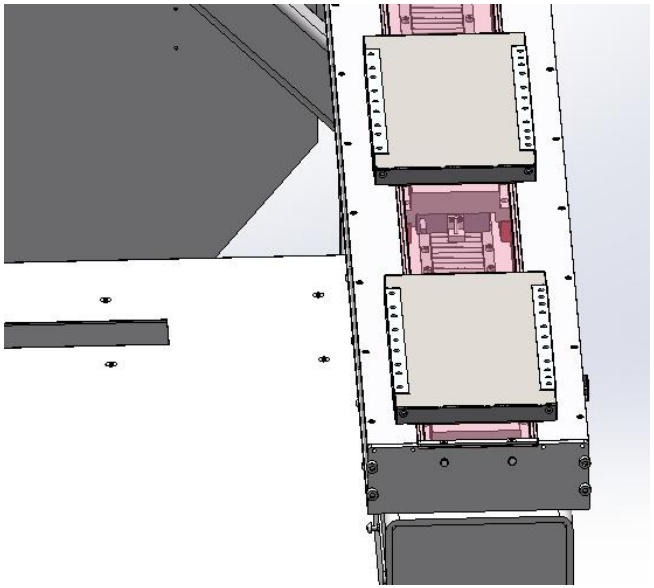


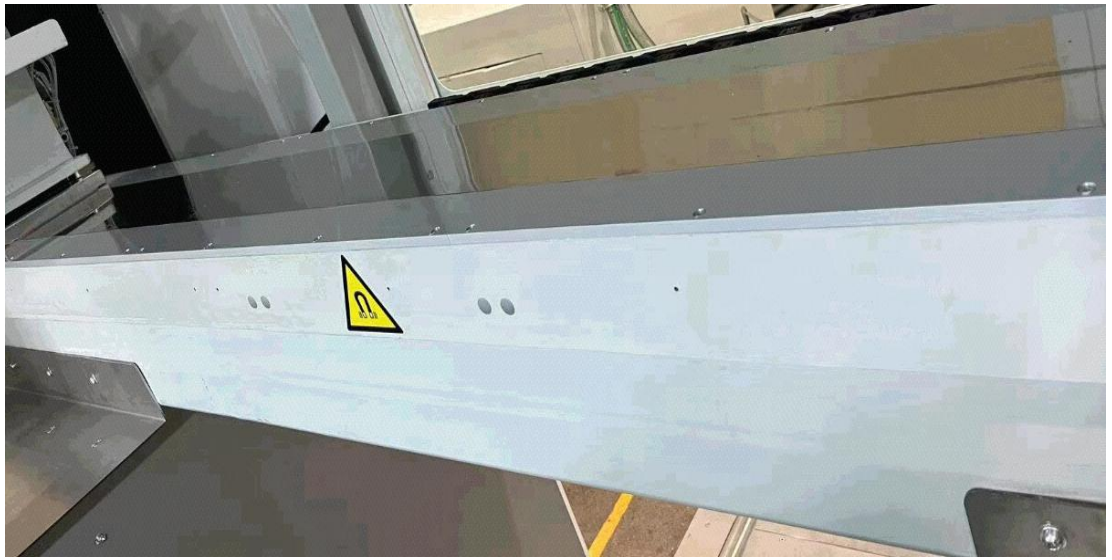
Automatic cleaning structure of scraper plate

Equipment Structuers & Supporting Facilities

➢High Sealing Module

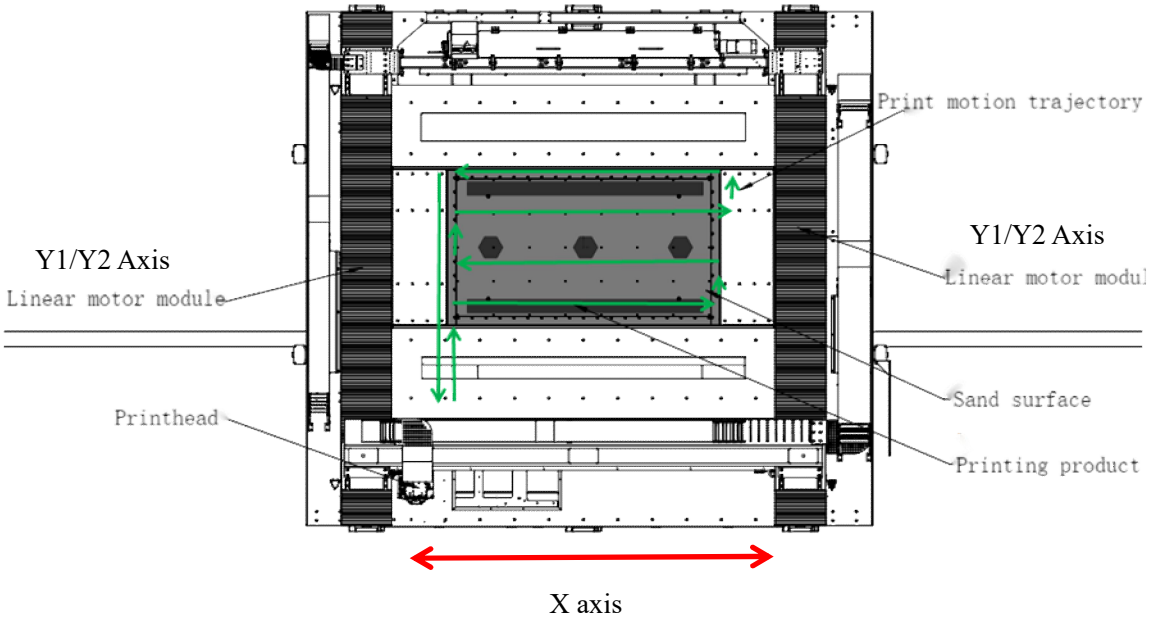
- **High precision:** high-precision linear motor module + servo control system to achieve precise positioning.
- **High sealing:** use high wear-resistant steel belt, customized sealing felt to protect the linear module, improve the sealing and environmental interference resistance of the linear module.
- **High reliability and long life:** use integrated frame installation, stable and reliable support, high sealing effectively extends the life of the module and reduces maintenance costs.

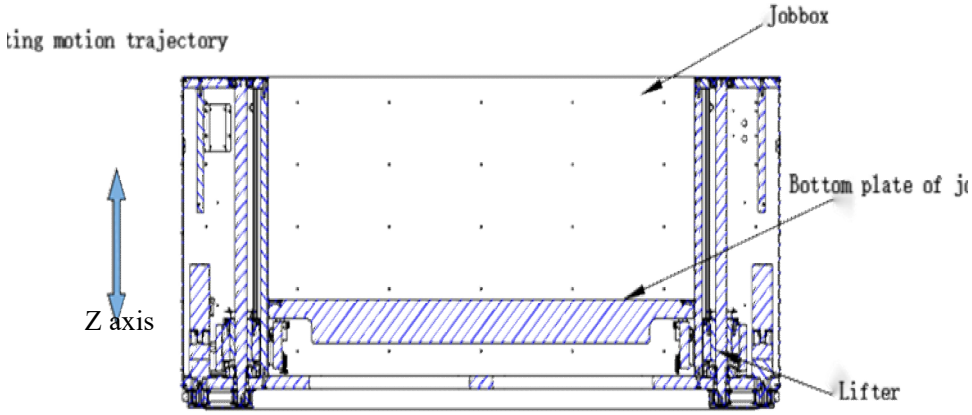




Equipment Structuers & Supporting Facilities

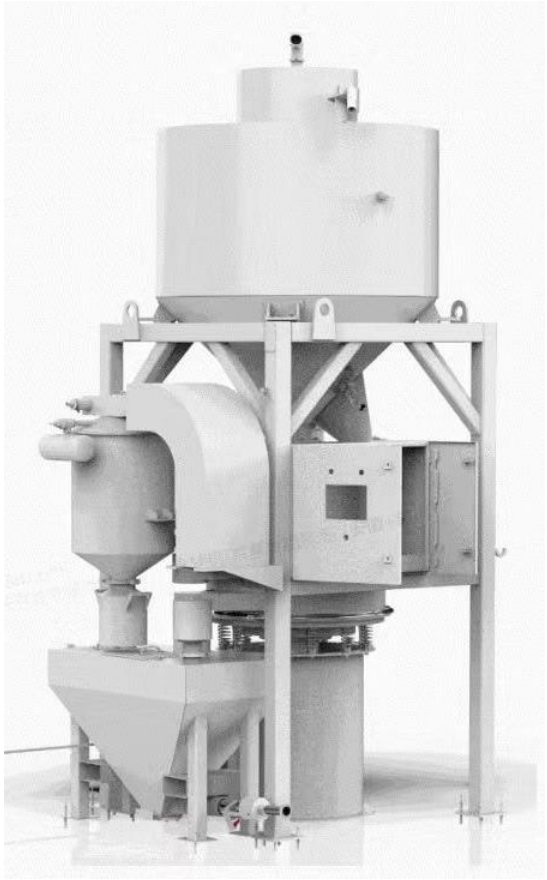
➢Movement System





- Main motion axes of the motion system: X-axis, Y1-axis, Y2-axis, Z-axis;
- Component motion axes: vibration axis and cleaning axis.

Equipment Supporting Facilities



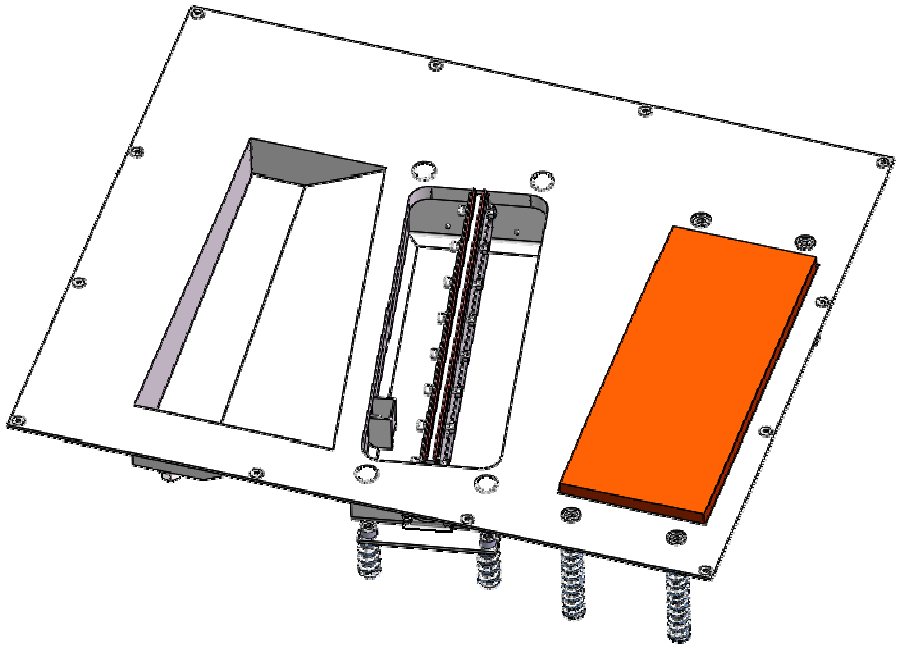
- **Recycling of Used Sand**: Employing negative pressure sand suction, automatic sieving, and an independent automatic control system to achieve feeding of used sand and automatic screening. The loose sand from the cleaning station is recovered for reuse; the number of recycle cycles shall not exceed **four times**.

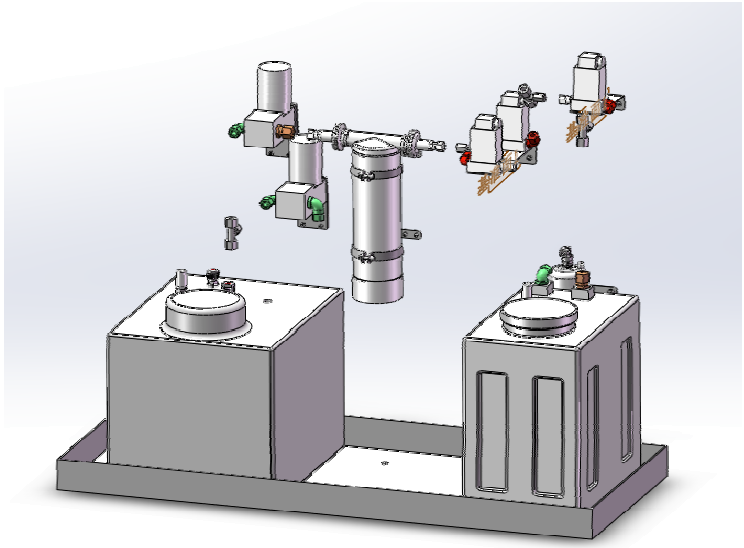
Equipment Structuers & Supporting Facilities

➢Liquid Material, Cleaning Mechanism

- The liquid system only needs to be filled before printing, and full tank printing can be achieved without adding liquid separately during the process.

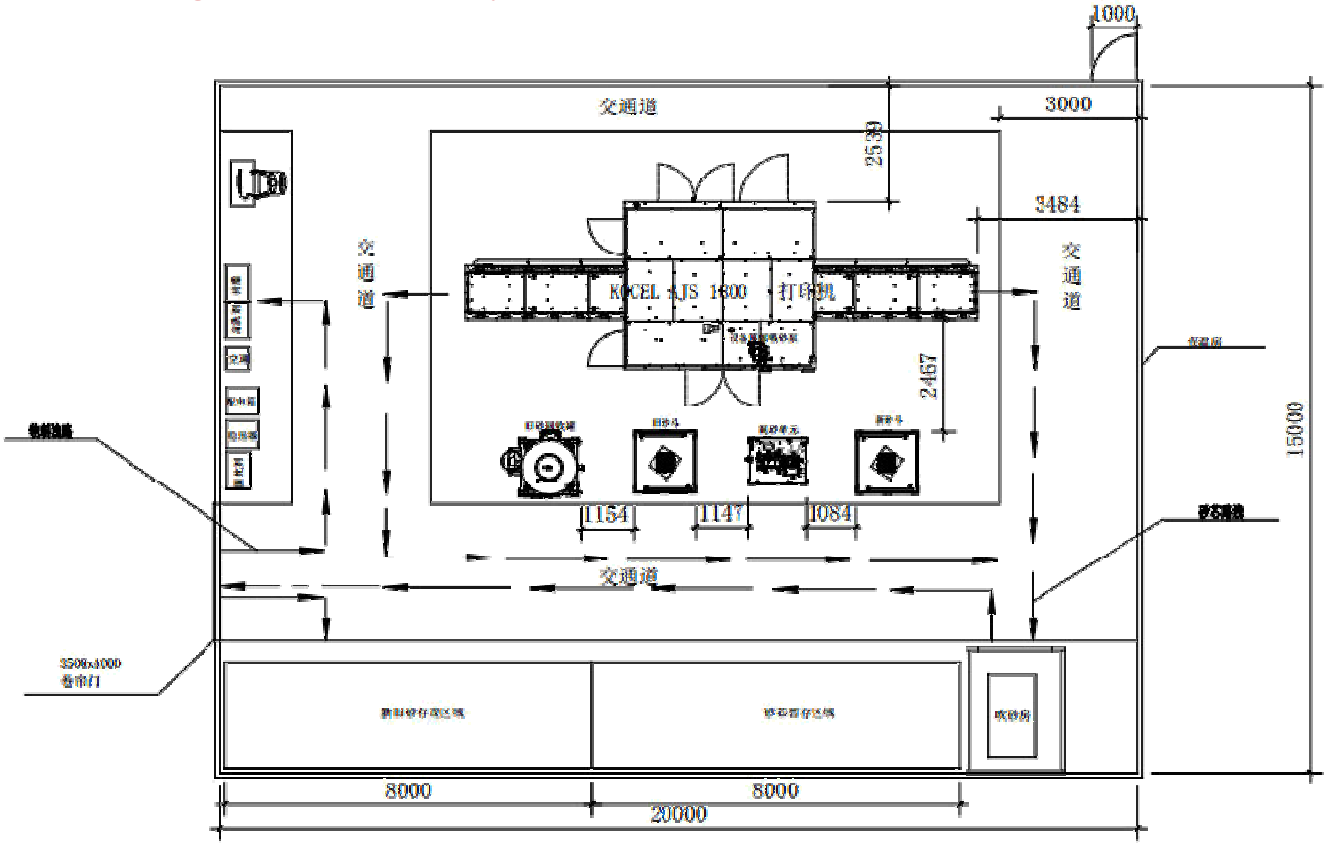
Project	Theoretical value	Actual value	Safety Factor
Resin box volume/L	Printing full jobbox consumption 20	Actual volume 30	1.5





Equipment Structuers & Supporting Facilities

➢Single Printer Layout Plan



➢ Main components of the solution:

Main part: single printer + sand mixing tank + old sand recycling.

Supporting parts: constant temperature and humidity + sand tank tray + sand blowing room, etc.

➢ Advantages:

1. The equipment does not need to wait, and can realize continuous printing function, greatly shortening the equipment waiting time, with high equipment utilization rate and high degree of automation.
2. It occupies a small area and has high cost performance, and is mainly used in small and medium-sized foundry enterprises for new product research and development.

4

Kocel's 3D Printing Advantages

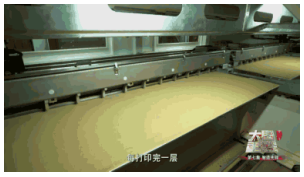
Kocel's 3D Printing Advantages

➢ Industrial Chain Advantages

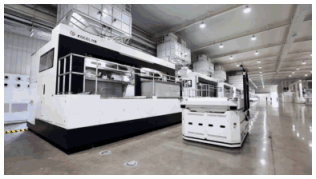
- With nearly 60 years of establishment, we offer an integrated full-chain service encompassing materials, equipment, foundry operations, and intelligent 3D printing factories. Leveraging our talent pool and technological expertise, we are committed to long-termism, providing customers with enduring, stable, high-quality, and upgradable services that evolve over time.

Binder Jetting Additive Manufacturing Raw Materials

3D Printers

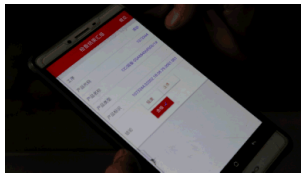


3D Printing



AGV Transfer

Automatic sand removal



APP sand core inspection

Dip coating and drying

Sand core storage

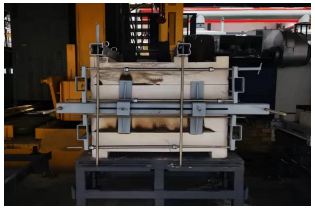
Automatic core assembly

Core package transfer

Fixed point pouring in front of furnace

Press box card box

Automatic pouring



Solidification

Fixed point cooling and dust removal

Turn over the box and drop the sand

Underline

Casting full process technology, digital factory

Kocel's 3D Printing Advantages

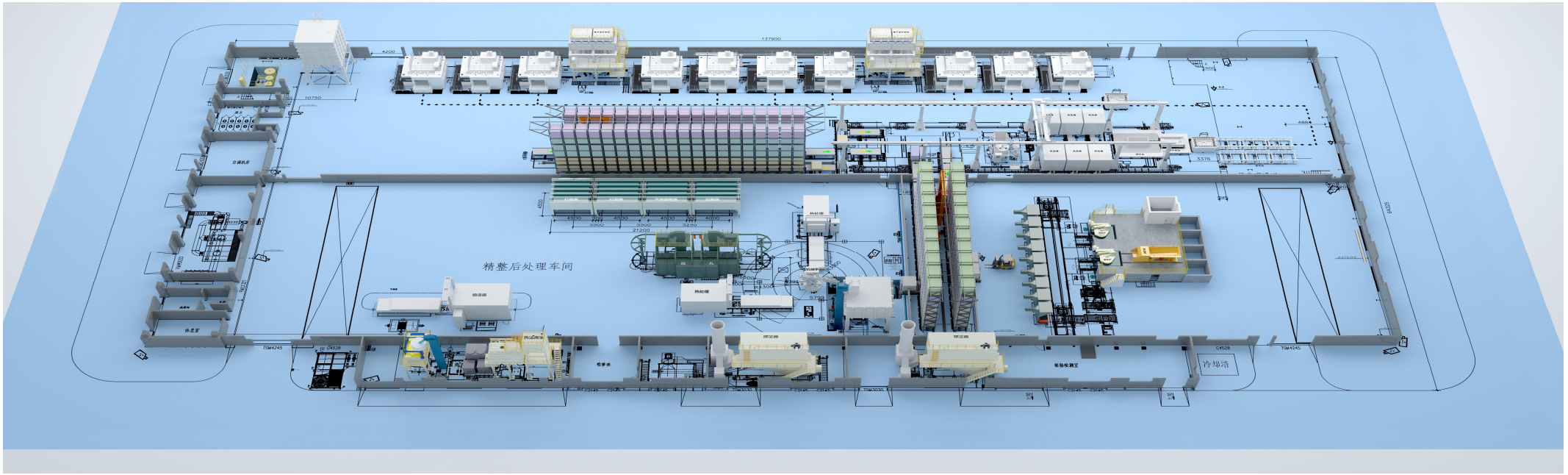
➢Advantages of Industrial Application

We sell both stand-alone machines and production lines, and we can also set up factories, which completely subverts the traditional casting production methods and leads the high-quality transformation of the casting industry.

High efficiency: the production efficiency of a single machine is twice that of competitors; the production efficiency of the assembly line and the establishment of a 3D printing factory is further improved.

High reliability: high-quality raw materials and strict supply chain screening ensure stable operation of the equipment.

Low cost: high production efficiency + high-quality and low-cost raw materials = a significant reduction in production costs.



Kocel's 3D Printing Advantages

➢Product Manufacturing Capabilities and Scale Advantages

- With two major production and R&D bases in Yinchuan and Wuhu, it has an annual production capacity of more than **400** equipments

Kocel Intelligent Machinery（Yinchuan）Production and R&D Base

Kocel Intelligent Machinery（Anhui）Production and R&D Base

Kocel's 3D Printing Advantages

➢Global Service Capability Advantage

- 7×24 service online, with 3D printing marketing, production, and remote operation and maintenance centers in many countries and regions around the world, providing precise services
- Achieve 7*24H response of standing materials, improve the response speed of after-sales service, and monitor the life of key parts of equipment through big data analysis of remote operation and maintenance platform. Early warning reminders, customers can submit spare parts procurement plans in time through early warning reminders