西湖未来智造
enovate3D

MICRO-DIRECT INK WRITING METAL 3D PRINTER FOR SIP AND ADVANCED PACKAGING

EP600-ES

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MICRO-DIRECT INK WRITING METAL 3D PRINTER

Simplifies manufacturing processes

Enhances shielding performance

Reduces packaging size

eenovate3D's EP600-ES micro-direct ink writing metal 3D printer adopts micro/nano direct writing printing technology with self-developed multinozzle adjustable printhead modules. It enables the fabrication of three-dimensional structures such as conductive vertical walls and pillars. These metal structures provide electromagnetic shielding and interlayer interconnection functions. Users can achieve software-driven automated printing operations through CAD data or parametric programming. This solution can replace the traditional compartment shielding methods such as wire bonding or laser grooving with conductive paste filling, simplifying manufacturing processes, enhancing shielding effectiveness, and reducing package size. It is applicable to substrate, wafer, and other product processing scenarios. The printed 3D metal structures are formed by micro-nano conductive paste.

KEY FEATURES

- Supports in-situ printing of metal shielding structures on substrates, wafers, and other products
- Compatible with DXF drawing import or parametric programming interfaces for automated software-driven processing
- Equipped with adaptive closed-loop adjustment capabilities for process parameters, enabling online intelligent parameter tuning without manual intervention
- Utilizes self-developed conductive paste with high stereoscopic forming capability to achieve in-situ formation of diverse 3D structures
- Post-processing temperature remains below 200°C, minimizing thermal impact on products
- Features self-developed adjustable arrayed printhead modules to accommodate varying module layouts
- Supports standard substrates or wafers up to 12 inches in diameter

SPECIFICATIONS

Motion System	
Support Frame	Granite Motion Stage
Travel Range	600 × 600 × 50 mm
Accuracy	X/Y: ±1 μm ; Z: ±5 μm
Max Motion Speed	X/Y: 500 mm/s ; Z: 100 mm/s
Max Acceleration	X/Y: 1 g ; Z:0.2 g
Printing System	
Printing Valve	Specialized printing valve for high viscosity materials
Ink Volume	30 cc syringe barrels
Printing Nozzles	Ceramic nozzles; Inner diameter: ≥50 μm; Number of nozzles: ≥3
Handling System	
Substrate Dimensions	Optional 240 mm×76.3 mm standard substrate or 12-inch wafer
Carrier Materials	Aluminum vacuum chuck
Handling Methods	Optional substrate loading/unloading or EFEM
Auxiliary System	
Vision System	5-megapixel vision camera; visual alignment accuracy: ±5 μm
Laser Rangefinder Sensor	Laser coaxial displacement sensor that supports dynamic height tracking of the print nozzles and substrate
Printhead Cleaning Unit	Automated roller brush cleaning or dust-free wiping for the print nozzles
Purification	Equipped with an FFU
Process Capacity	
Dispensing Accuracy	Typical wall thickness: 100-400 μm; wall height: 200-1400 μm; aspect ratio ≤4 Thickness accuracy: ±20%@ yield ≥99.5%, material adhesion: 5B
Operational Efficiency	>4500 walls/hrs (ex. 150 μm wall thickness, 400 μm wall height, 1000 μm wall length)
Installation	
Equipment Dimensions	W3710 × D2120 × H2340 mm (Includes main unit and substrate auto-handling module)
Equipment Weight	2800 kg (approx.)
Electrical Requirements	220 VAC/ 50 Hz, 10 kW
Air Supply Pressure	≥0.6 MPa(CDA)
Operating Environment	Temperature: 22±2 ℃;Humidity: ≤65%

APPLICATIONS

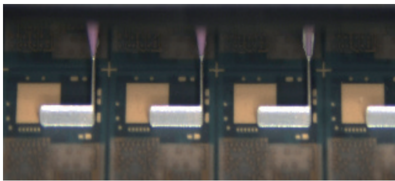
APPLICATION SCENARIOS

It can be applied to compartment shielding in SiP(System-in-Package) and RF front-end modules,replacing traditional wire bonding or laser grooving with conductive paste filling. This approach achieves cost reduction, enhanced shielding performance, and reduced package size.

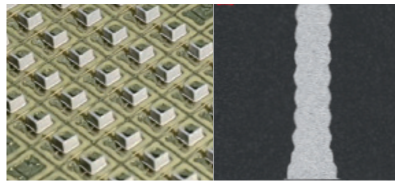
PROCESS SOLUTIONS

The printing materials are micro/nano metal particle inks, and the printing method utilizes micro/nano direct ink writing layer-by-layer to form specific three-dimensional metal structures.

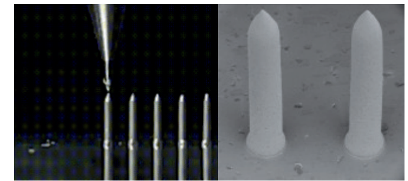
EXAMPLES



Multinozzle printing modules enable the high-efficiency 3D metal structure printing

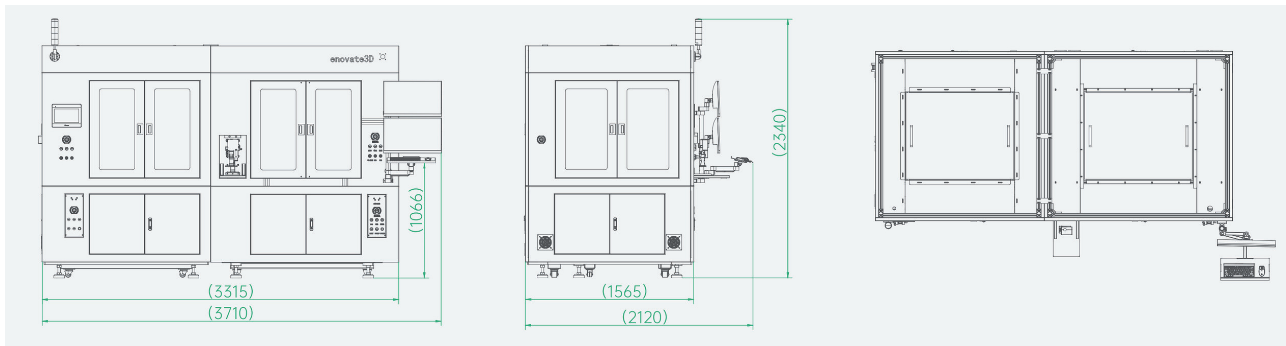


High viscosity conductive ink withhigh fidelity, allowing the printing of 3D structures directly on product



Supports fabrication of various 3D structures including vertical walls and pillars

DIMENSIONS



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