

November 29, 2024
 Apic Yamada Corporation

Multi-process auto-molding equipment

Launched the "MS-R Series"

~Productivity and molding accuracy improved through a complete renewal of the system, and pursuing versatility and expandability~

November 29, 2024 - APIC YAMADA CORPORATION has developed the MS-R Series of molding machines, ideal for packaging a wide variety of semiconductors, and will be released on December 1, 2024.

The "MS-R Series" is developed as the successor to the "GTM Series", which has an established reputation for superior productivity, molding accuracy, and versatility. The MS-R Series maintains and expands the high process compatibility with a wide range of semiconductor packages, while improving production capacity and molding accuracy. In addition, it is equipped with our latest molding technology.



Molding Equipment "MS-R Series"

Target construction method	Target Package	Release Date
Transfer molding Compression molding Sintering bonding Hybrid bonding etc.	Advanced Logic Semiconductor Memory Sensor/LED Analog/Logic/Discrete Power, etc.	December 1, 2024

Market Background and Product Overview

In recent years, the trend toward miniaturization, thinness, and cost reduction has accelerated in the semiconductor package production field, and the adoption of finer packaging processes has progressed. In response to this trend, there is an increasing demand for higher molding accuracy, improved productivity through shorter cycle time, which directly affects packaging costs, and maximization of the number of processes per shot by supporting large format and high-density substrates.

For power packages and modules, which are becoming larger and more high-power, we are expected to provide process solutions to address the following issues: (1) Complex shapes, exposed molding of terminal pin press-in areas and mounted pins (2) Exposed molding of heat sinks on one or both sides to enhance heat radiation (3) Optimize positioning and holding of large workpieces to ensure the flatness of compound thickness (4) Increased available compound volume.

High-performance and high-tech semiconductor modules for building the rapidly spreading generative AI are attracting attention for their wide applications ranging from big data utilization servers, high-speed signal processing networking, and edge computing close to the end user. In order to solve the issue of miniaturization of the semiconductor chip itself in the front-end semiconductor process, breakthroughs are required through semiconductor packaging technology in the back-end process, and the evolution of semiconductor modules is being realized through chiplet technology known as 2.xD and 3D packaging processes.

The newly developed MS-R Series of next-generation molding platforms will quickly respond to such market demands and changes and provide new value to customers by realizing versatility and expandability in addition to improved productivity and molding accuracy.

In order to improve the product appeal of this series and update the development of elemental technologies, on October 29, 2024, we established the open laboratory "APIC YAMADA Future Technology Laboratory" in collaboration with National Institute of Technology (KOSEN), Nagano College and started joint research. We will jointly work on continuous product enhancement, including vibration countermeasures for high-speed operation, achievement of high-precision molding technology, and minimize manpower by using AI technology.

Product Features

1. Multi-process for packaging

Process changes for transfer molding and compression molding, from general-purpose semiconductor packages where leadframes and organic substrates are mainly used, to state-of-the-art packages, are available on a single platform.

In addition, the dedicated die design allows for the sintering bonding process and hybrid bonding, which are increasingly used in next generation SiC power devices.

2. High productivity

The work handling mechanism that makes up the equipment has been fundamentally reviewed, and the adoption of a highly rigid mechanism based on vibration analysis and optimization of axis control has ensured reliability in high-speed operation, reduced the loss of standby time for the press that actually performs the resin molding, and optimized the cycle time.

While achieving maximum throughput by supporting large-format and high-density substrates, the newly developed highly rigid mold base unit and high-precision, high-pressure clamping mold unit ensure uniform and good forming quality in all areas of the substrate.

3. High-precision molding

Flashless, voidless, and good filling molding quality could be achieved by the newly developed highly rigid mold base unit and high-precision high-pressure clamping mold unit, mold design and recipe optimization based on analysis of resin flow simulation technology.

The above newly developed unit enables stable process quality for MUF (Mold Under Fill) technology, which is used to fill compound uniformly and without voids into the narrow inter-chip gap of the multi-layered chip structure applied to chiplet products such as AI products.

4. Automation and labor saving

Automation of workpiece transfer supplied and collected by magazine is realized by linking with automatic transfer such as OHT/AGV/AMR/HTC. We have also begun development and study of automated functions such as automatic resin supply and waste collection.

Basic Specifications

Model name	MS-R Series		
Applicable strip sizes	Width: 35 to 100mm	Length:150 to 300mm	Thickness: 0.1 to 1 mm
Electricity	3-phase AC200V 50/60Hz		
Air	0.5MPa 350L/min. or more		
Machine size	1press/(W)2,570x(D)1,795x(H)1,993mm		
	2press/(W)3,250x(D)1,795x(H)1,993mm		
	3press/(W)3,930x(D)1,795x(H)1,993mm		
	4press/(W)4,610x(D)1,795x(H)1,993mm		
Machine weight (including the molds)	1press/5,900kg		2press/9,500kg
	3press/13,100kg		4press/16,700kg

Contact for inquiries

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