

News Release

Yamaha Robotics Releases 3D Hybrid AOI System - YRi-V TypeHS

With a 25-megapixel high-resolution camera, achieving approximately 1.6 times faster speed than conventional models

Yamaha Robotics announced today that on March 1st, 2024, the Company will add the high-end specification YRi-V TypeHS to the YRi-V 3D hybrid automated optical inspection (AOI) system, which achieves both high speed and high precision in operation, for electronic component mounting factories.

YRi-V TypeHS has significantly improved image processing capability by adopting a high-resolution 25-megapixel camera, which is more than twice that of previous models, and the latest high-performance CPU and GPU applications. As a result, high-definition inspection with resolutions of 7 μm and 5 μm is approximately 1.6 times faster than previous models, making the new model one of the fastest in the industry¹.

In addition to the conventional high-precision 8-direction 3D projector, a high-performance 3D line laser has been newly installed. By combining this with 3D projector images using the phase shift method, it is now possible to reproduce the shapes of specular and transparent components more accurately, further improving inspection capabilities.

This provides greater accuracy in detection capability for 0201 (0.25mm x 0.125mm) sized ultra-small chips and specular-glossy components, further contributing to improved quality in module and device PCB production.



3D Hybrid AOI System - YRi-V TypeHS

¹ 3D inspection speed 16.2 cm²/s with resolution 5 μm (Company optimal conditions when using 4 projectors: According to Yamaha Motor research as of January 18, 2024)

Market Background and Product Outline

The reliability shown with SMT (Surface Mounting Technology) processes directly affects the market value of the products. The SMT field in recent years has seen the shift toward smaller sizes, higher densities, greater functionality, and more diversifications accelerate rapidly, and faster yet more precise inspection across all items via automated optical inspection (AOI) will be even more sought after. Also more recently, the use of thin and extremely small WLCSPs and FOWLPs², which have specular gloss on the package surface, has risen significantly in the market. So, in addition to specular components that are difficult to inspect, the need for compatibility to mount ultra-small chips at narrow pitch is dramatically increasing.

In response to these market changes and demands, with the YRi-V being developed and released in July 2021, Yamaha Robotics has produced an AOI system that is extremely fast and highly accurate, achieving accurate detection even for 0201-sized ultra-small chips and specular glossy components.

With the recently developed YRi-V TypeHS as a high-end specification machine for the YRi-V, further refining of its traditional features such as inspection speed and specular component inspection abilities have been achieved.

With Yamaha's unique concept of a 1 STOP SMART SOLUTION, the Company is the industry's leading manufacturer of a full lineup of mounting equipment, including surface mounting machines, SMD storage, solder paste printers, glue dispensers, and inspection system. By leveraging this strength, the Company is promoting the Intelligent Factory, a smart system that comprehensively improves the efficiency of the mounting process through smooth and advanced inter-equipment coordination without black boxes in equipment within the mounting line.

² WLCSP = Wafer Level Chip Size Package FOWLP = Fan Out Wafer Level Package

Basic Specifications Specifications and appearances may change without notice

Model	YRi-V TypeHS	
Camera Pixels Nos.	25 Megapixels	
Resolution	7μm	5μm
3D inspection speed ³	30.5cm ² /s	16.2cm ² /s
3D Projector	8 Projectors/4 Projectors	
4-direction angle Camera Pixels	20 Megapixels	
Applicable PCB Dimensions	L50mm x W50mm (minimum) to L610mm x W610mm (maximum) *L760mm long-type PCB compatible (optional)	
PCB height that can be carried in	Top surface: 45mm; Bottom surface: 85mm ^{4 5}	
Inspection Lighting	Visible light (Red/Green/Blue) and Infra-Red & coaxial	
Inspection Items	Status of components immediately after mounting Status of components and soldering after hardening	
Power Supply	Single phase AC 200-230V ±20V 50/60 Hz	
Air Supply	0.45MPa or more, clean, and dry state	
External Dimensions	L1,252mm x W1,497mm x H1,614mm (excluding protrusions)	
Weight	Approx. 1,430kg	

³Description under Yamaha optimum conditions when using 4 projectors

⁴ When selecting the 3D laser option, the height of parts that can be loaded onto the PCB is limited to 33mm on the top surface

⁵ Description when using single lane

About Yamaha Robotics SMT Section

Yamaha Surface Mount Technology (SMT) Section, a subdivision of Yamaha Motor Robotics Business Unit in Yamaha Motor Corporation, produces a complete selection of equipment for high-speed inline electronic assembly. This 1 STOP SMART SOLUTION includes solder paste printers, component mounters, 3D solder paste inspection machines, 3D PCB inspection machines, flip-chip hybrid placers, dispensers, intelligent component storage, and management software.

Bringing the Yamaha way to electronics manufacturing, these systems prioritize intuitive operator interaction, efficient coordination between all inline processes, and modularity enabling users to meet the latest manufacturing demands. Group competencies in servo-motor control and image recognition for vision (camera) systems ensure extreme accuracy with high speed.

The current product line includes the latest YR equipment generation, with advanced automated features for programming, setup, and changeovers, and new YSUP management software with state-of-the-art graphics and built-in data analytics.

Combining design and engineering, manufacture, sales, and service competencies, Yamaha SMT Section ensures operational efficiency and easy access to support for customers and partners. With regional offices in Japan, China, Southeast Asia, Europe and North America, the company provides truly global presence.

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