

Realized High-Speed, High-Precision, and High-Efficiency in AOI, Omron Proprietary Imaging Technique Combines Both Speed and Accuracy



Working together with our customers to create a better manufacturing environment

The technological evolution of the market has made manufacturing demands more complex and diverse, with higher quality requirements. In parallel, labor shortages are only adding to these challenges.

There is an urgent need to not only purchase new manufacturing equipment and improve performance, but also develop and train a skilled workforce able to support production.

In order to respond to these trends, Omron Inspection Systems Division is committed to:

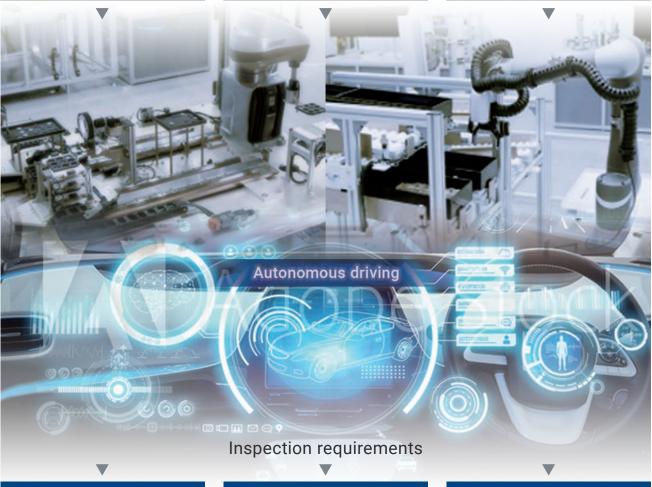
- · Zero defect products through reliable, high-precision inspection
- · Minimizing programming time and skill through AI and quantitative inspection
- Maximizing good-quality throughput to prevent defects through the utilization of accurate quality data from inspection equipment alongside manufacturing data

Trends of manufacturing environment

Increasing quality requirements

Labor shortages

Increasing product complexity and diversification





Zero defect products

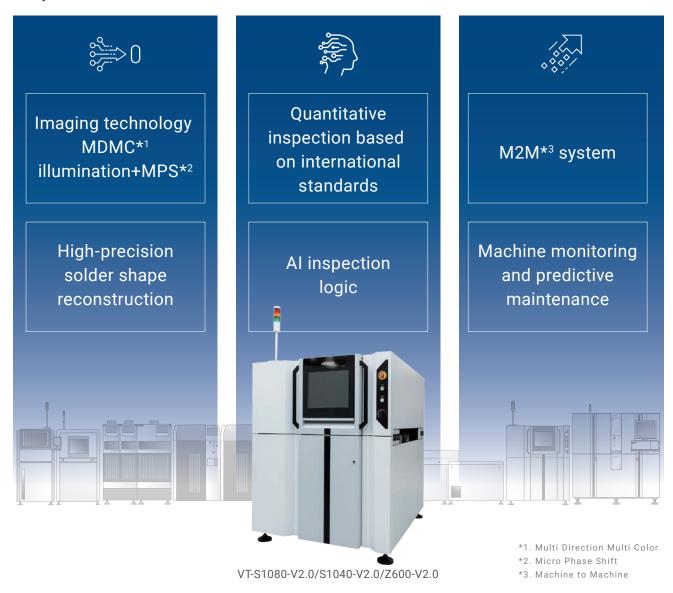


Minimizing programing time or skill



Maximizing good-quality throughput

Omron's unique technology achieves the inspection requirements



Remove takt time bottlenecks and reduce operator related steps and man-hour related inspections.



^{*4:}VT-S10 Series ratio*5 on our verification board is CoaXPress 2.0. An interface standard that enables high-speed transmission of large amounts of data.

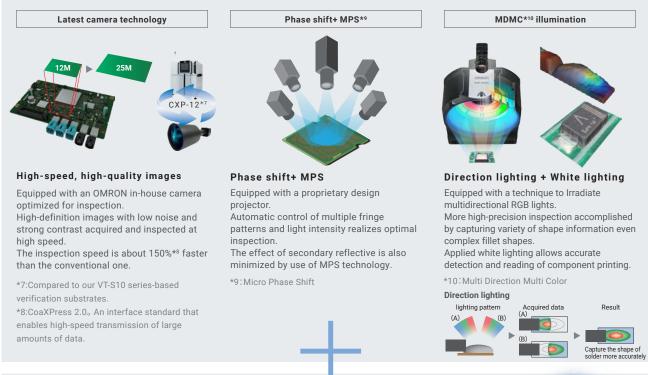
^{*5:}Compared to our VT-S10 series-based verification substrates.

High-precision solder shape reconstruction helps achieve zero defect products



The combination of Omron's own patented technologies achieves highly robust*6 and reliable inspection performance.

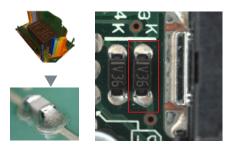
*6: Excellent filtering of noise that effects the judgement of inspection results such as shadows, secondary reflections, abnormal defect shapes and other uncertain factors.



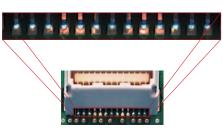
Higher accuracy with AI model generated from huge number of images.



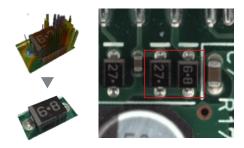
Noise reduction



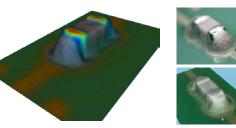
Visibility even at the connector solder joint



Reduces the effect of shadows due to large parts



Stable inspection of microscopic parts





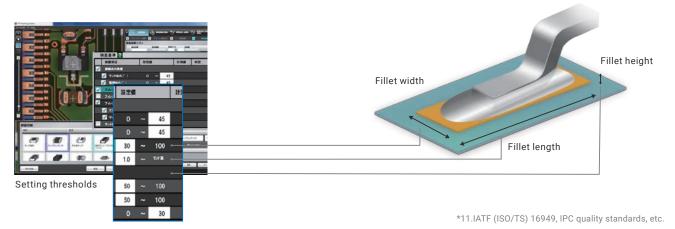
For sample image details Please check here.

Minimization of programming efforts by quantitative inspection and Al-assisted qualitative inspection



Quantative inspection is compliant with international standards*11

Directly set machine inspection criteria is based on internatioal standards applied as inspection criteria, it doesn't rely on the skill and expertise of the programmer.

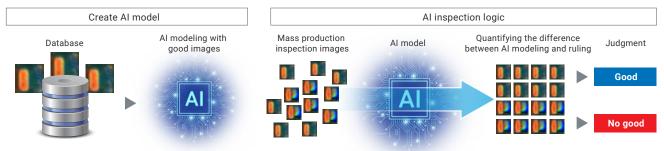


Al inspection logic that reduces man-hours dependent inspection

Omron has been developing a variety of reliable AI tools to address customer concerns such as defects going undetected and/or managing large amounts of machine learning data when using AI for inspection. AI judgement makes inspection more less skilled dependent and it contributes to the improvement of production by enhancement of detection and reduction of false calls or visual checks.

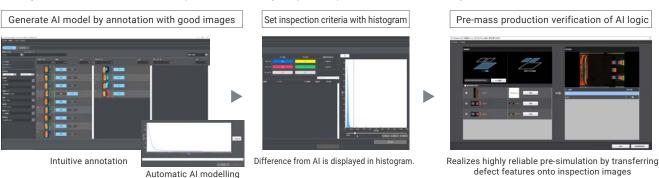
"OK image" base

Al model is based on inspection images judged as good from the machine learned database. The difference between the Al model and the inspection target is quantified to determine the good or no good product.



Al learning tool

Learning tools enable skill-less annotation, inspection criteria setting, and pre-mass production verification of Al logic.

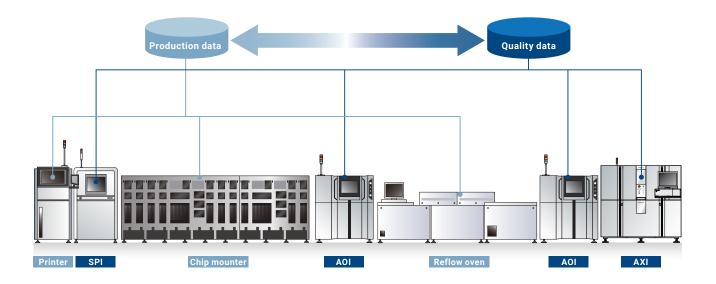


Maximizing good-quality throughput by using quality focused, M2M system

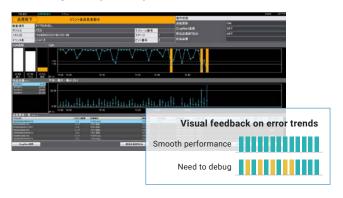


M2M system

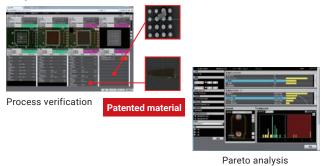
To optimize the quality and equipment operation status without human intervention, made possible by enabling autonomous communication and exchange of information between various connected, production equipment.



Efficiency of inspection process



Early identification of factors of defects



*SPI/AOI/AXI inspection-system cooperation

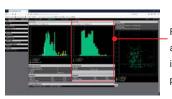
Prevention of defects



Head, nozzle, etc. For each device Visualization of defect trends

Process quality trend analysis

Improvement of Line Orthogonal Rate



For post-reflow inspection results automatic calculation of inspection standards after printing and mounting

Test criterion optimization

^{*}M2M system requires the license linking to chip mounters.

^{*}The license from CKD is required.

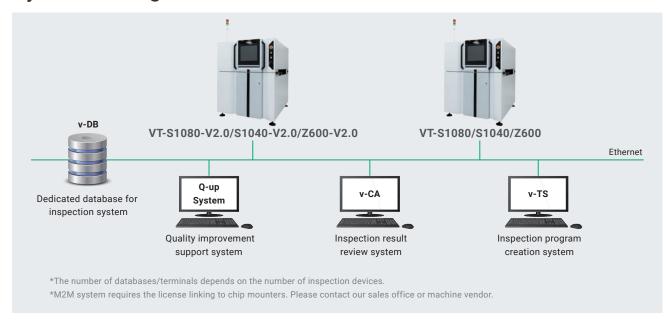
Zero down time production line with equipment monitoring and predictive maintenance

Equipped with Omron control hardware technology, this system allows real-time collection of information from all the IoT connected devices inside the inspection equipment. It allows the equipment status to be visualized, enabling predictive maintenance and quality traceability.





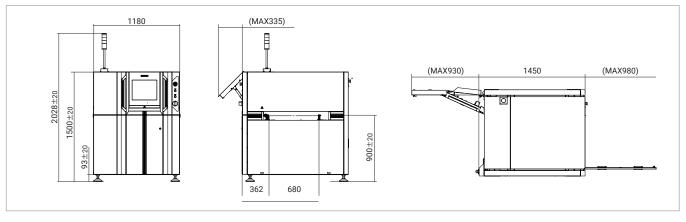
System configuration



VT series product line-up



Outline dimensional drawing



Hardware configuration / Functional specifications

Туре		VT-S1080-V2.0	VT-S1040-V2.0	VT-Z600-V2.0				
Outer dimentions		1180(W) x 1450(D) x 1500(H)mm (excluding tower lamp and monitor)						
Weight		Approx. 1240Kg						
Power supply		200 to 240 V AC (Single phase); Voltage fluctuation range ±10% 50/60Hz						
Rated power		2.0 kVA (Maximum current 10 A)						
Line height		900±20mm						
Air supply		Not required						
Operating temperature range		10~35°C						
Operating humidity range		35 to 80% RH (Non-condensing)						
Camera	Direct	25Mpix						
	Oblique	5Mpix	_	_				
Resolution	Direct	12.5µm						
	Oblique	10μm	_	_				
FOV	Direct	52.5 x 52.5mm						
	Oblique	25.9 x 19.4mm	_	_				
Inspection principle		Hybrid 3DShape reconstruction	Hybrid 3DShape reconstruction	2.5D Shape reconstruction				
		MDMC illumination+Phase shift (MPS *13)	MDMC illumination+Phase shift (MPS *13)	MDMC illumination				
Supported PCB size	Size	Single lane: $50(W) \times 50(D) \sim 510(W) \times 680(D)$ mm Dual lane: $50(W) \times 50(D) \sim 510(W) \times 330(D)$ mm						
	Thickness	0.4~4mm						
	Weight	4Kg						
Clearance		Clearance on PCB: 50mm from board surface						
		Clearance under PCB: 50mm from the back of the board						
		(including PCB warpage, deflection, component tolerance, etc.)						
Height measurement range		25.4mm		_				
Inspection item		Component height, lift, tilt, missing or wrong component, wrong polarity, flipped component,		flipped component, OCR inspection, 2Dcode, component offset (X/Y/rotation), fillet (height/length, end joint width, wetting angle, side joint length)*0, exposed land, foreign material, land error, lead offset, lead posture, lead				
		OCR inspection, 2D code, component offset (X/Y/rotation), fillet (height/length, end joint width, wetting angle, side joint length), exposed land, foreign material, land error, lead offset, lead posture, lead presence, solder ball, solder bridge, distance between components, component angle						
							presence, solder ball, solder bridge, distance between components, component angle	

- *12. MDMC: Multi Direction/Multi Color *13. MPS: Micro Phase Shift *14. Option
- The application examples described in this brochure are for reference only. Please check the functions and safety of the equipment before using it
- When using in conditions or environments not described in this brochure, or for applications such as nuclear energy control systems, railroad systems, aviation systems, vehicles, combustion systems, medical equipment, amusement machines, safety equipment and others that could present a risk to life or property, Omron assumes no guarantee regarding the products except in the case of special product uses identified by Omron or with special agreement.
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