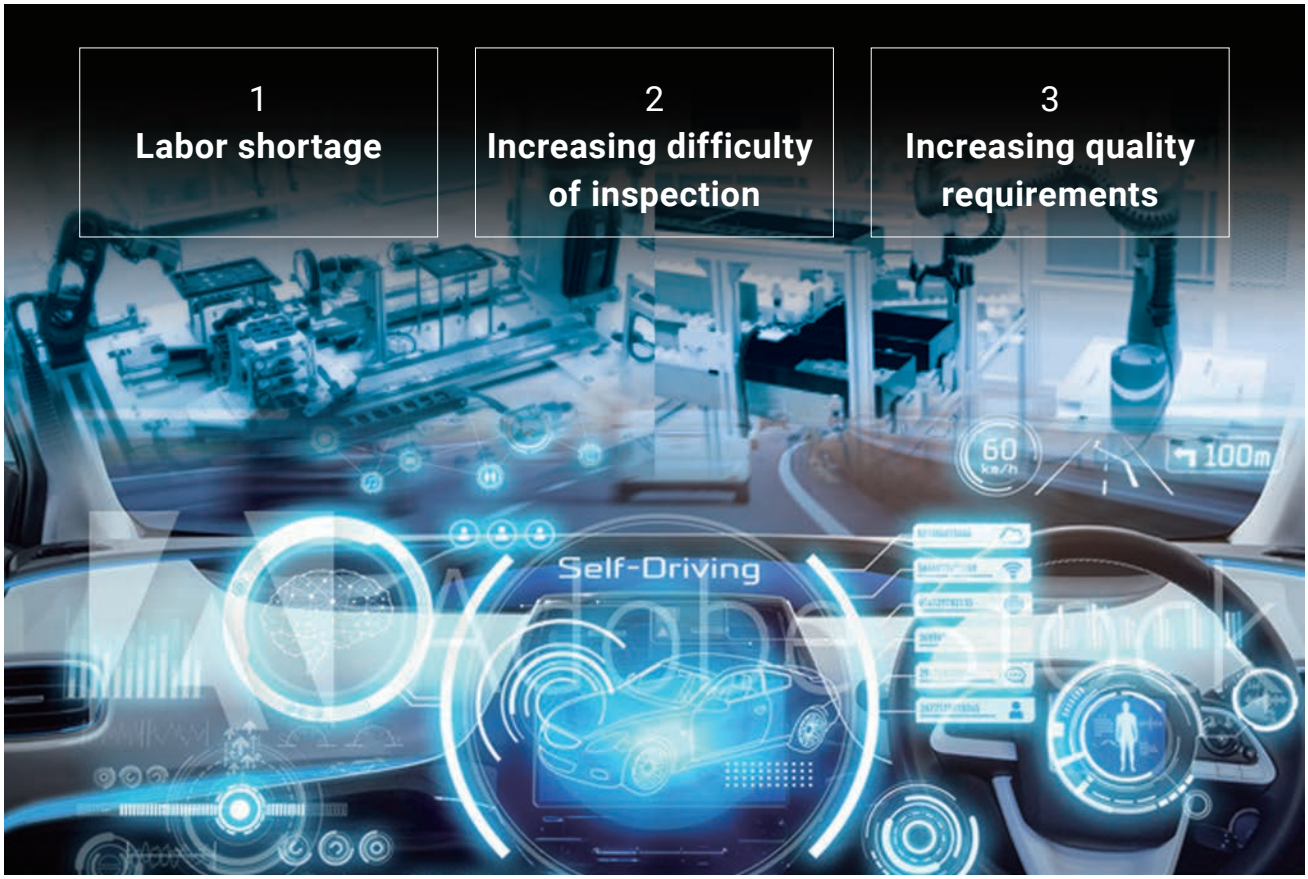
PCB Inspection System
Model: VT-S1080

Innovating manufacturing through Omron advanced inspection technology

Working with customers to help create better manufacturing sites

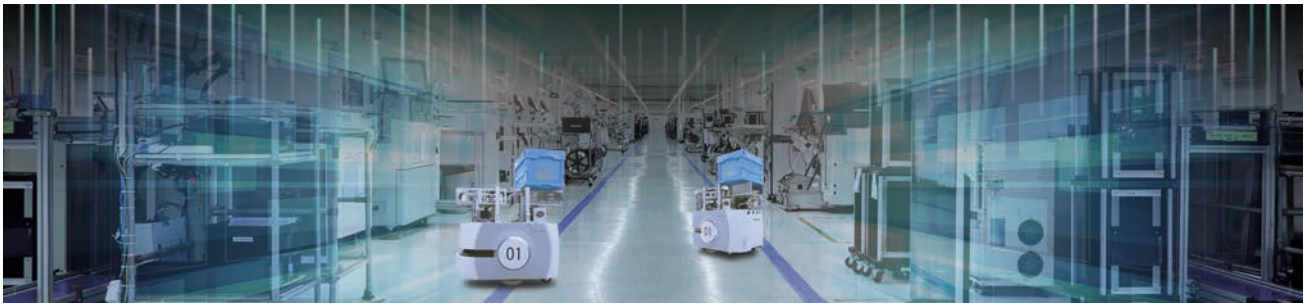
In pursuit of inspection system performance for over 30 years, Omron's Inspection Systems Division has continued contributing to quality, the core element of manufacturing.
Various social issues and trends in business call for transformations in the conditions at the manufacturing site. In addition to performance and quality improvements at the manufacturing site, Omron is working on effeciency related aspects such as man-hour and skill level reductions.
Furthermore, without being limited to inspection solutions, Omron also aims to bring more transperancy to the manufacturing process by developing systems to build defect-free products.

Issues at manufacturing sites



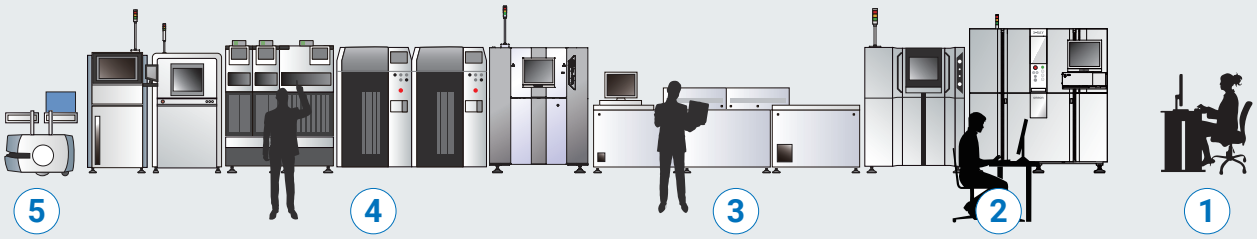
Omron's proposed solution: unmanned inspection system

Omron's ultimate solution of an unmanned inspection system aims to resolve the social issues and production floor challenges.

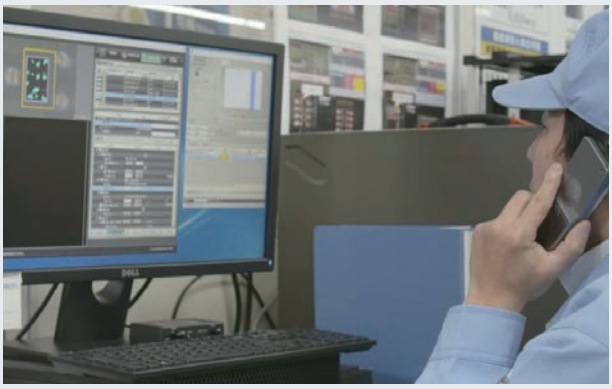


What is an unmanned inspection system?

It is an initiative to automate the human tasks involved in production, inspection and quality control.



1 Minimization of work involving visual checks



2 Minimization of programming

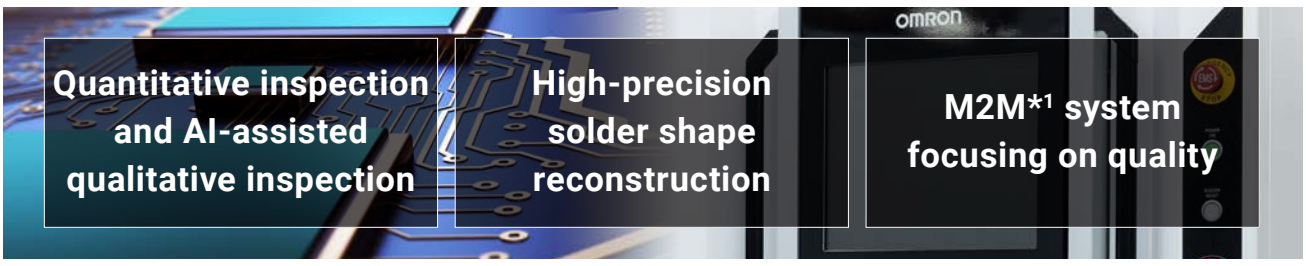
3 Maximization of equipment operation rate

4 Minimization of defect occurrence

5 Minimization of workforce at the line

New technologies that will prevail

Technological evolution of inspection equipment to achieve the unmanned inspection system



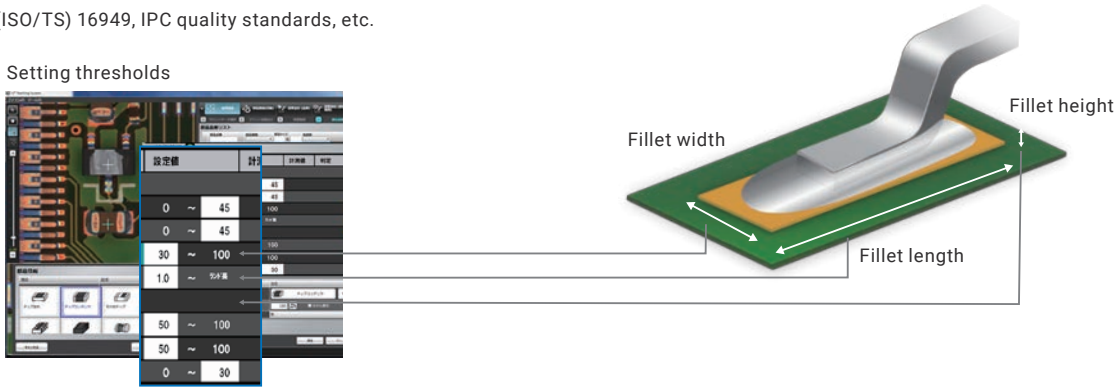
*1: Abbreviation of machine-to-machine.
It is a mechanism to optimize the quality and equipment operation status without human intervention, made possible by enabling autonomous communication and exchange of information between various connected, production equipment.

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

Quantitative inspection conforming to international standards*1

Since values conforming to the standards are directly applied as inspection criteria, there is no dependency on the skill and expertise of the programmer.

*1: IATF (ISO/TS) 16949, IPC quality standards, etc.



Using AI technology to minimize programming and visual inspection efforts

Omron is 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.
By controlling everything from AI image acquisition to model creation and testing, Omron provides end-to-end support to address all concerns about the introduction of AI that caters to production floor needs.

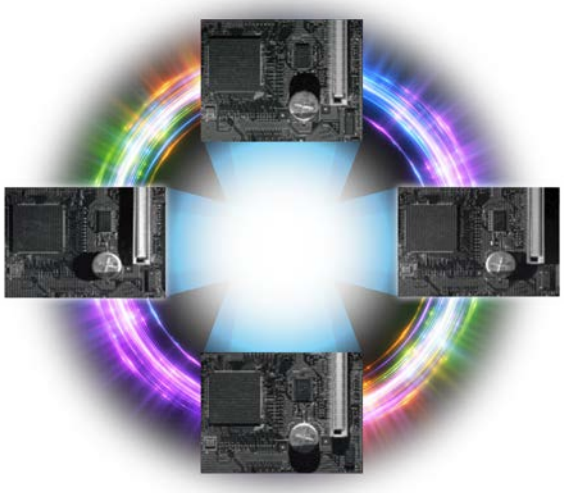
High-precision solder shape reconstruction helps achieve zero defect products

Equipped with Omron's own MDMC (Multi Direction/Multi Color) illumination and new MPS (Micro Phase Shift) moiré technique, the system achieves highly robust*2 and reliable inspection performance.

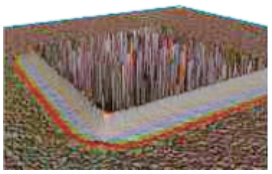
Patented

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

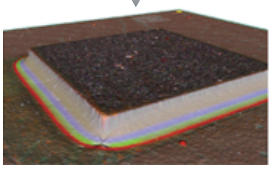
MDMC
(Multi Direction/Multi Color) illumination



3D Imaging

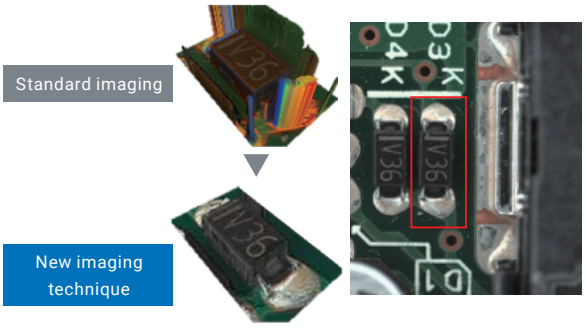


Multi-directional, 3D imaging

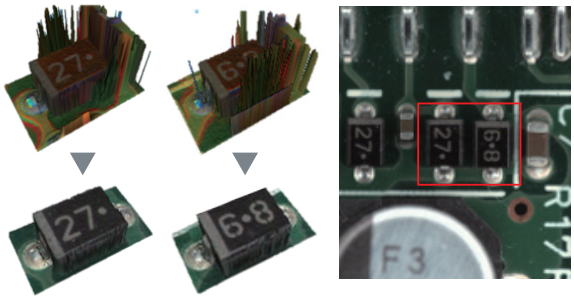


Imaging using MPS
(Micro Phase Shift) technique

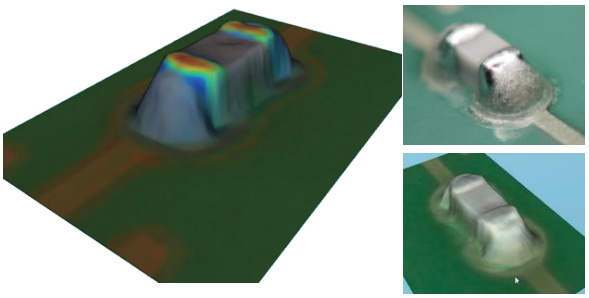
Example of high-precision solder shape reconstruction



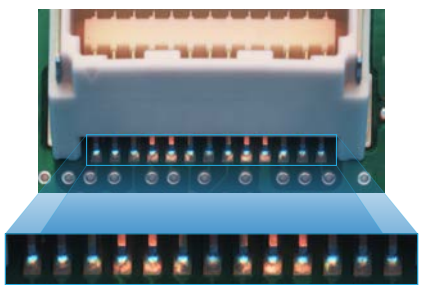
Reduces the noise caused from secondary reflections



Reduces the effect of shadows from large parts



Allows stable inspection of fine parts



Visibility even at the connector solder joint

Example images from test results of customer products

Maximizing good-quality throughput by using M2M*1 system focusing on quality

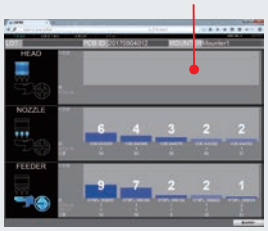
Preventing defects

*Linking with manufacturing equipment such as chip mounters

Monitoring and reporting fluctuations in the measured values during production

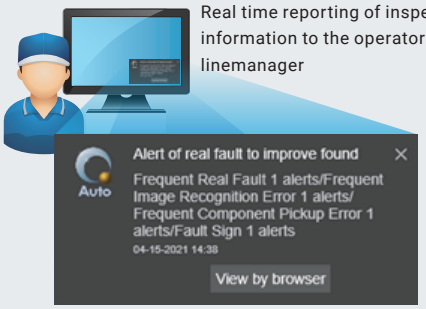
Predictive detection of quality

Visualizing defect trends associated with chip mounter hardware such as heads and nozzles



Process quality trend analysis

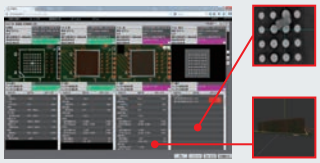
Real time reporting of inspection information to the operator or linemanager



Reporting function

Visualizing the quality

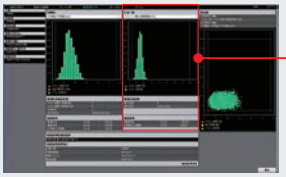
*Linking SPI/AOI/AXI systems



Process comparison

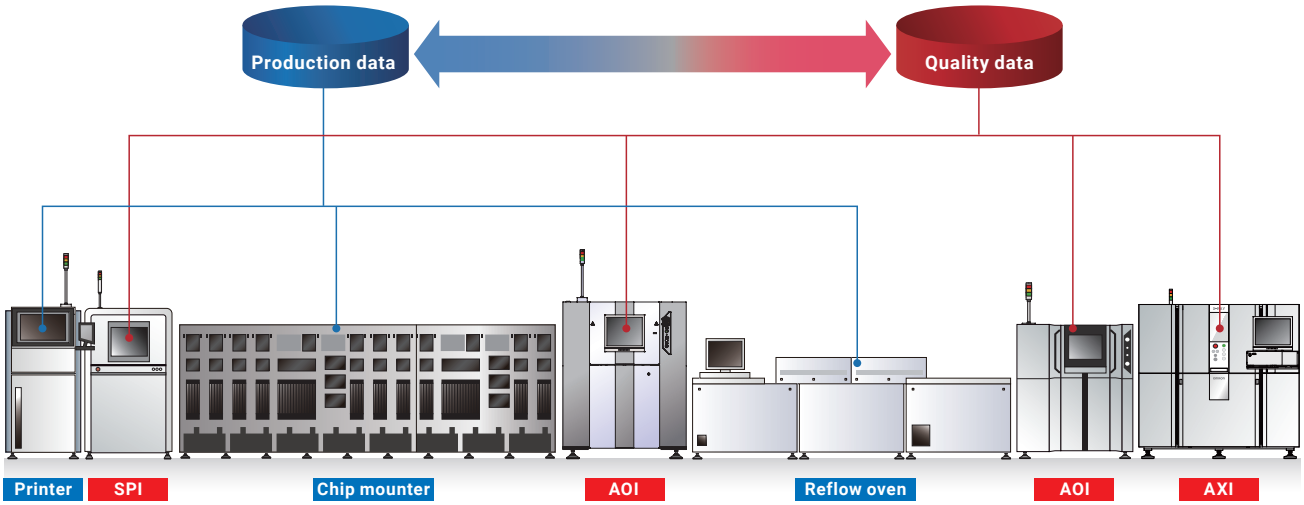
Displaying production status

Improving the first pass yield rate of the line



Automatically calculating post-print/post-placement inspection criteria based on the inspection results after the solder reflow process

Optimization of inspection criteria



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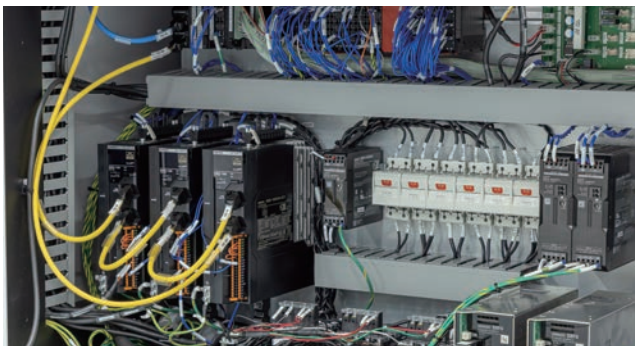
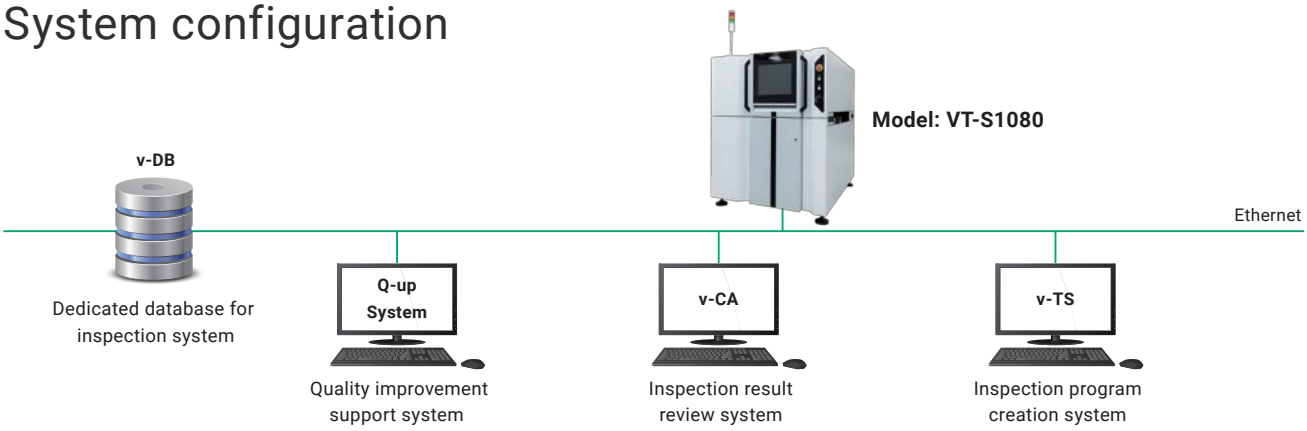
It is a mechanism to optimize the quality and equipment operation status without human intervention, made possible by enabling autonomous communication and exchange of information between various connected, production equipment.

Continuous manufacturing made possible by 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

PCB inspection system (AOI)

Model: VT-S530

Model: VT-S730/H

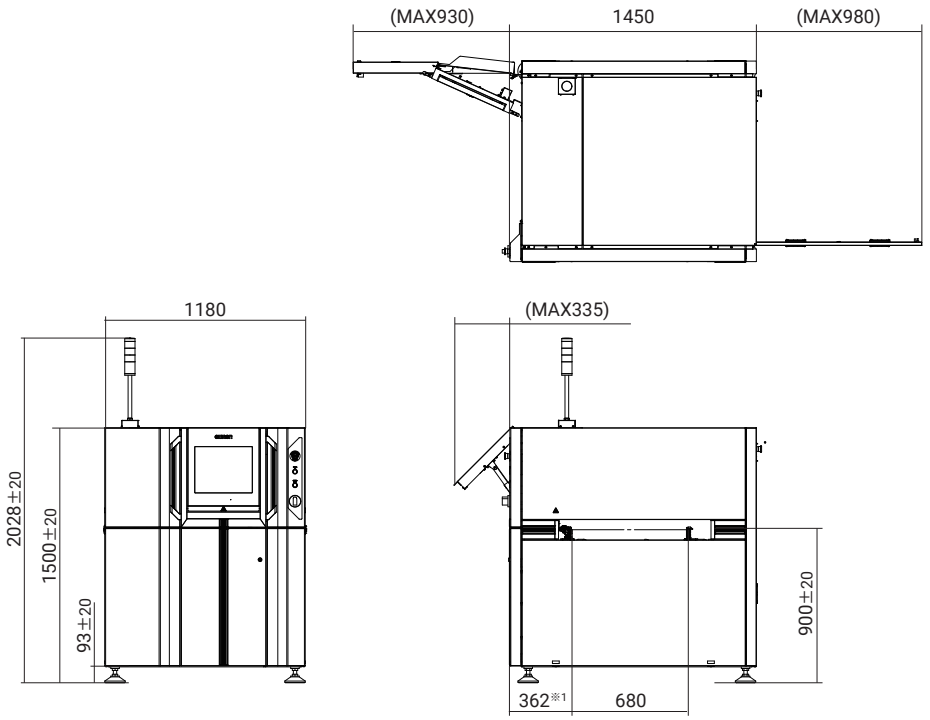
High-speed CT automated X-Ray inspection system (AXI)

Model: VT-X750

Dimensional inspection system (AVI)

Model: VT-M12 series

Outline dimensional drawing



Hardware configuration

Type	VT-S1080	
Outer dimensions	1180(W) x 1450(D) x 1500(H)mm	
Weight	Approx. 1250 kg	
Power supply	Voltage	200 to 240 V AC (Single phase); Voltage fluctuation range ±10%
	Rated power	2.0 kVA (Maximum current 10 A)
Line height	900±20mm	
Air supply	Not required	
Operating temperature range	10 to 35°C	
Operating humidity range	35 to 80% RH (Non-condensing)	
Vision system	Imaging system	12M pixel camera
	Inspection principle	MDMC*1 illumination + 3D reconstruction through MPS*2 technology
	Image resolution	12.5μm
	FOV	50.0 x 37.5mm

*1:Multi Direction/Multi Color *2:Micro Phase Shift

Functional specifications

Supported PCB size	50(W) x 50(D)～510(W) x 680(D)mm
Weight	(Max) 4 kg
Thickness	0.4～4mm
Clearance	Above the conveyor belt: 54 mm or less; Below the conveyor belt: 50 mm or less (Including board thickness/curvature/bend/part tolerance, etc.)
Height measurement range	25mm
Inspection item	Component height, lift, tilt, missing or wrong component, wrong polarity, flipped component, 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

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