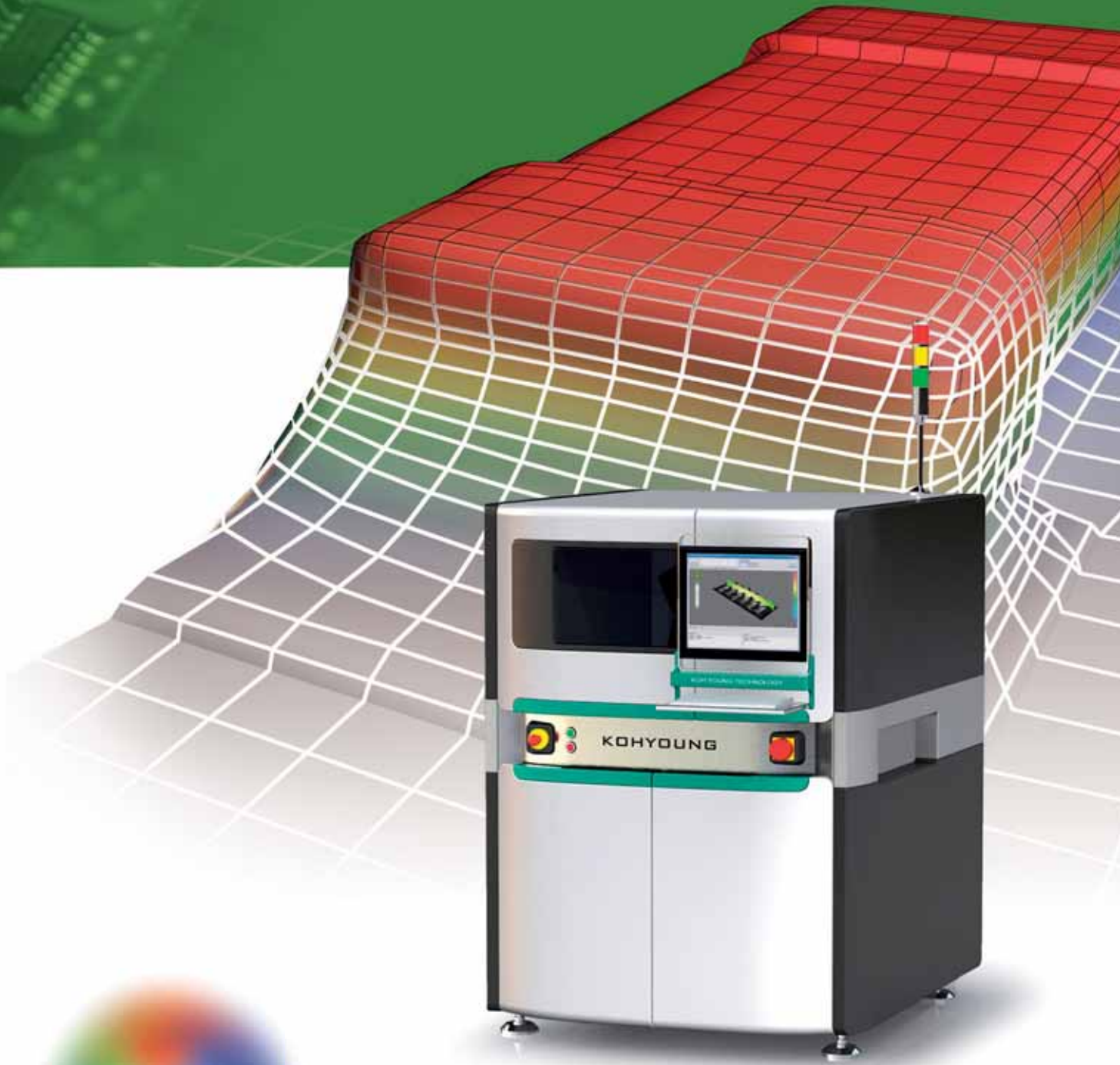


# Zenith Profilometric 3D Automated Optical Inspection



# ZENITH

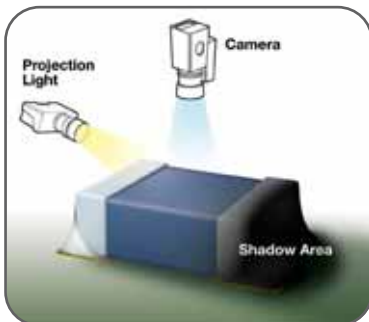
Measure to Optimize:  
A Complete 3D Inspection Solution

# Zenith 3D AOI with Revolutionary New 3D Measurement

The ZENITH 3D AOI system measures the true profilometric shape of components, solder joints, patterns and even foreign material on assembled PCBs with true 3 dimensional measurement, overcoming the shortcomings and vulnerabilities of 2D AOI.

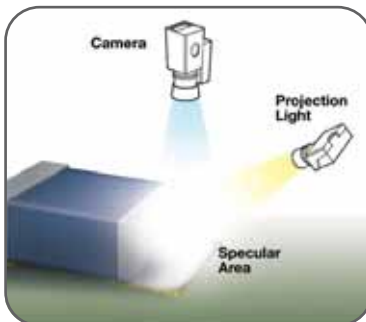
## ■ Benefits of 3D Measurement for Assembled PCBs

Many attempts have been made to overcome the limitations of conventional 2D AOI, without success. Now, Koh Young Technology makes complete, accurate and comprehensive 3D profilometry available with the ZENITH 3D AOI system.



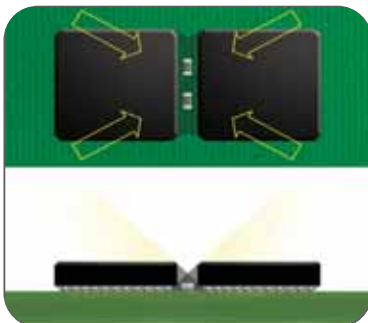
### Illumination

Conventional AOI systems rely on repeatable and even illumination. In the absence of which, inspection is subjective. ZENITH performs 3D measurement and is indifferent to illumination and color changes.



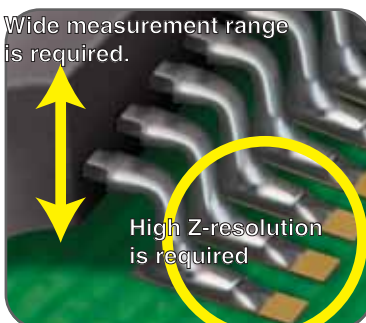
### Specular Reflection

Shiny solder joints produce specular reflections and sensor saturation in conventional inspection. ZENITH performs volumetric measurement of the solder joint.



### Tall Obstacles

Conventional AOI systems can not inspect components shadowed by tall neighboring components reliably. ZENITH has the ability to measure accurately even in shaded areas.



### Measurement Range

ZENITH provides a large height measurement range without compromising Z-resolution, delivering an industry first 3D image accuracy and quality.



Using patented 3D and 2D imaging technology, ZENITH overcomes the common problems in 2D AOI and 3D measurement.

Utilizing proven technology of our 3D SPI, Koh Young now provides same accuracy measurement for the range of assembled and soldered boards.

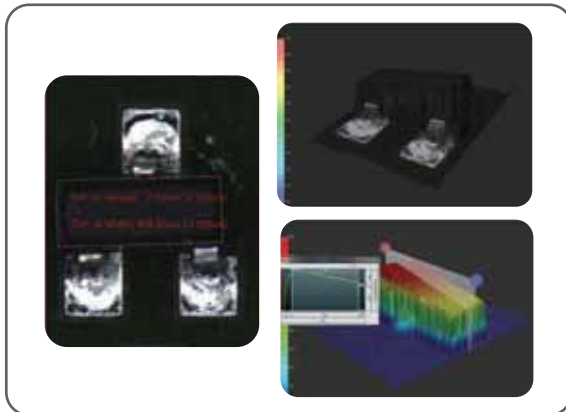
## Intuitive Programming and Inspection Condition Setting

Using true 3D measurement data, Koh Young opens a new concept of easy programming which has never before been possible. Utilizing Koh Young's 3D Component Library, setting up a test program is fast and intuitive. ZENITH AOI doesn't require fine tuning, as all thresholds and inspection results are measured values.

Unlike conventional image-matching type solutions, defining ZENITH inspection conditions is easy and intuitive as it judges defects by measuring solder joint, component height and volume. ZENITH AOI is the only tool that enables true process optimization after placement, by giving process feedback based on reliable inspection results.

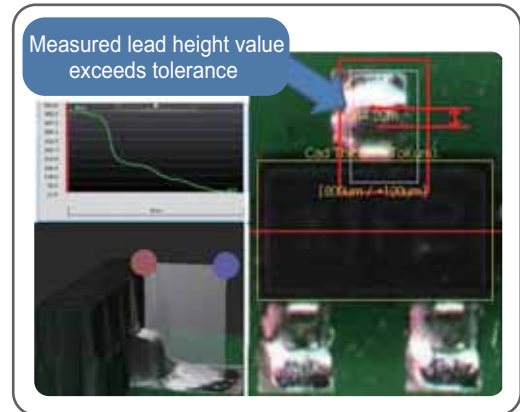
## Intuitive and Accurate Defect Judgment

### Lifted Body(Body Coplanarity)



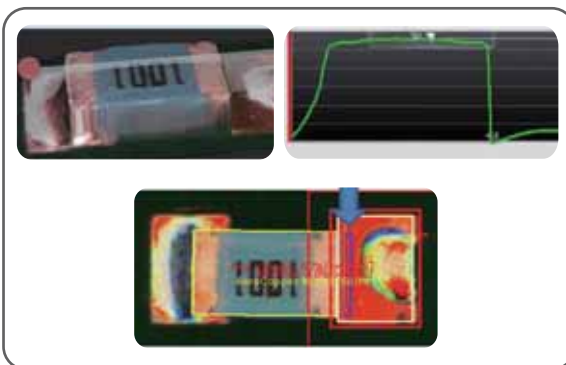
Judge defect by measured component height profile

### Lifted Lead(Lead Coplanarity)

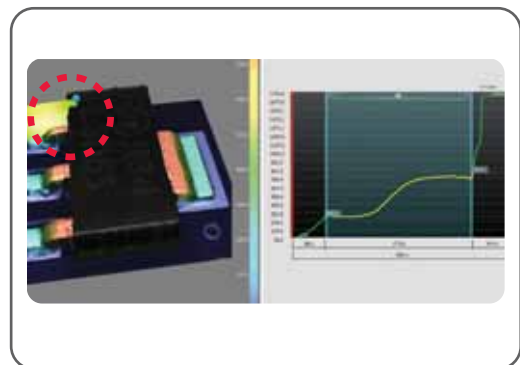


Judge defect by measured lead shape profile

### Solder Joint Defects



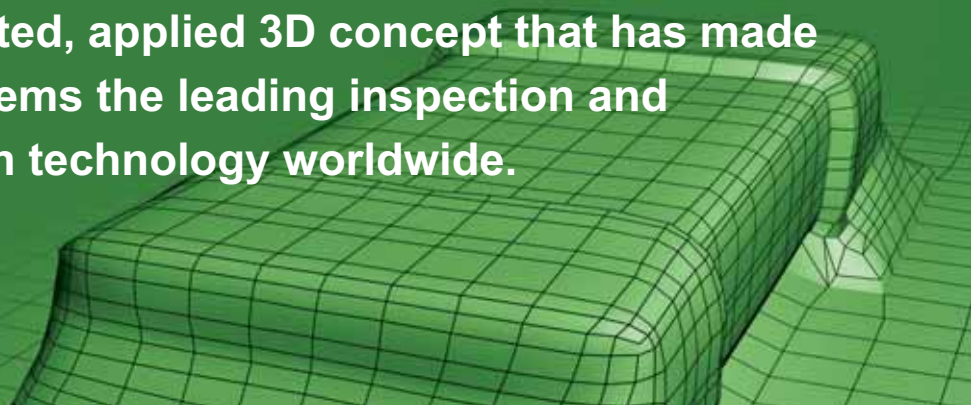
Judge defect by measured height and volume information of all pixels in the joint area



3D Measurement of Solder Joint



Koh Young Technology's ZENITH system now brings true profilometric 3D inspection to AOI. It's the same revolutionary, patented, applied 3D concept that has made Koh Young SPI systems the leading inspection and process optimization technology worldwide.

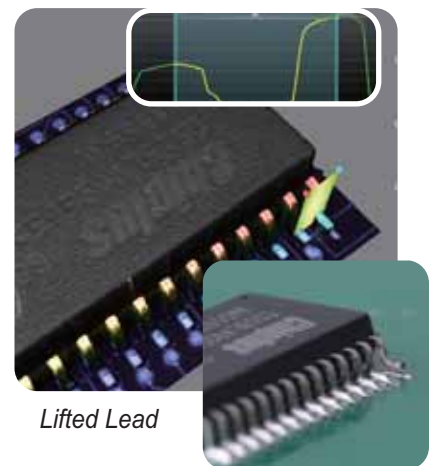


### 3D Measurement Overcoming Shortcomings of 2D

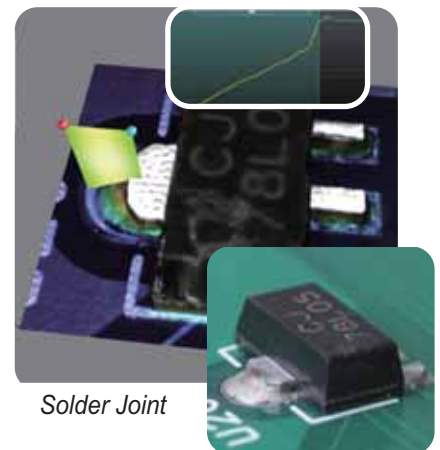
Senses and measures the Z dimension of assembled PCB including electronic components and solder joints, regardless of their color or texture.

### Flags and Quantifies All Defects

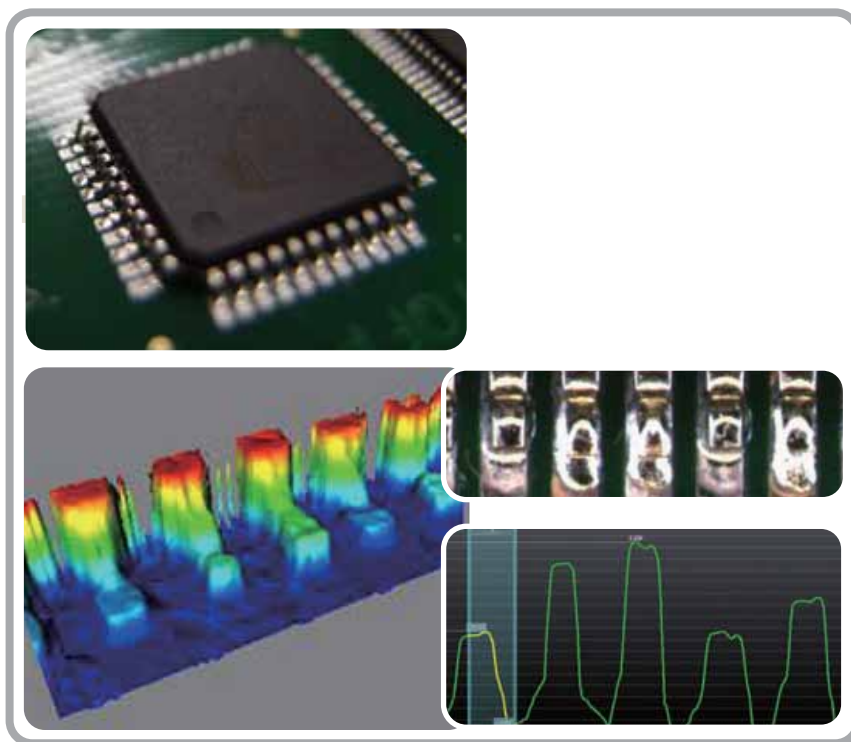
Including Missing, Offset, Rotation, Polarity, Upside down, OCV, Solder filet, Billboarding, Lifted Lead, Lifted Body, Tombstone, Bridging and more.



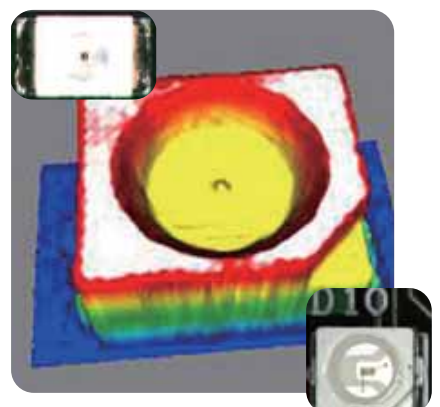
Lifted Lead



Solder Joint



3D Measurement of Lead Joint



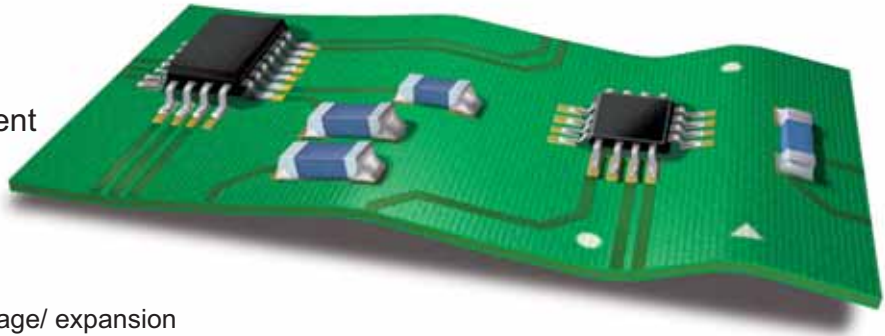
3D Polarity

## The Perfect Warp Compensation Solution

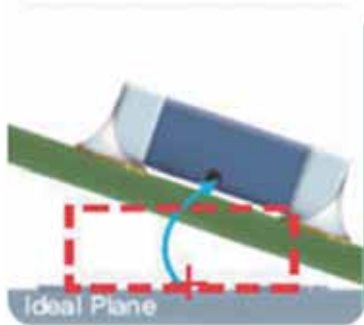
On warped PCBs, pad positions defined by PCB CAD or Gerber files appear distorted. Thus, conventional inspection systems will become confused during the inspection process and will provide incorrect data to the user. PCB warp becomes more pronounced during the reflow process due to the high temperatures required for processing. Ideally, every inspection system should have 3D measurement capability to deal with PCB warp, post reflow!

### Dynamic PCB Environment

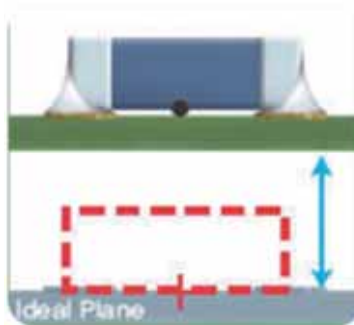
- ✓ flexible PCB
- ✓ board warp
- ✓ slope
- ✓ height difference
- ✓ local board rotation/ shrinkage/ expansion



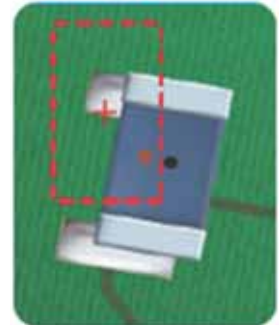
### 3D/2D Problems



- Shape Deformity
- False calls

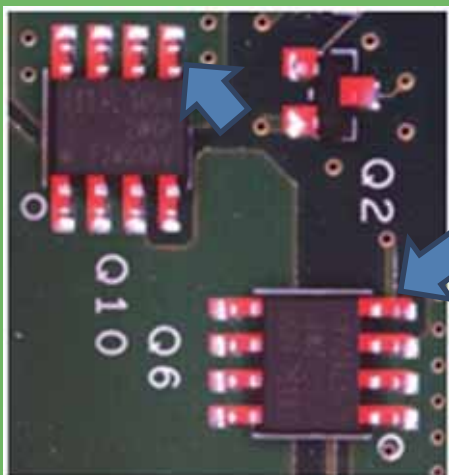


- Size change
- False calls/Escapes

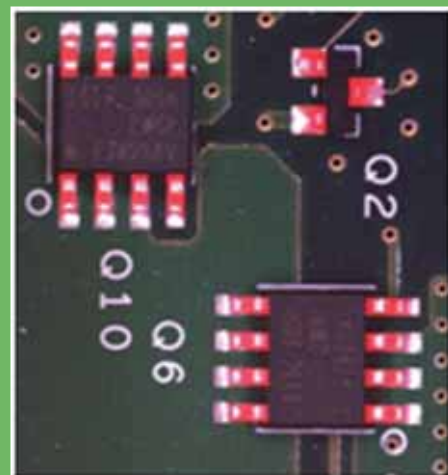


- X,Y,θ misalignment
- False offset

Koh Young's patented 3 Dimensional warp compensation with Multi-frequency height measurement technology ensures uninterrupted real-time inspection under any PCB environment and compensates board warp with respect to the ideal plane. 2 Dimensional warp compensation with Pad Referencing technology matches, in real time, non-inspection objects (patterns, holes and fiducial marks) on the PCB surface with the ideal PCB surface as defined by the CAD file or read from bare PCB.



Before Compensation



After Compensation

## Requirements

- Shadowed Object Measurement
- Specular Solder Joint Measurement
- Shadowed Area between Tall Components
- Wide Measurement Range + Accuracy
- Real Time PCB Warp Compensation
- Dark Component & White Body Component Location
- Legending and Specular Regions on PCB
- Lifted Lead Measurement
- Shallow Polarity Dimple Measurement
- Solder Joint Profile Measurement

## Solutions

- 3D Shadow Free Moiré Technology & 8 Way Projection
- Multi Frequency Moiré Technology
- Pad Referencing + Multi Frequency Moiré Technology
- True 3D Measurement

## Inspection Items

Inspection Task: Missing, Offset, Rotation, Polarity, Upside down, OCV, Coplanarity, Solder fillet, Lifted lead, Lifted body, Billboarding, Tombstone, Bridging, Dimension

## Inspection Performance

Camera	4MPix Camera	
Camera Pixel Resolution	20um	
FOV Size	40 x 40mm (1.57 x 1.57inch)	
Inspection Speed	24cm <sup>2</sup> /sec (3.7in <sup>2</sup> /sec)	0.65sec/FOV
Height Accuracy(on a KY Calibration Target)	2um	
Illumination	RGB LED Dome Illumination	

## PCB Handling

Conveyor Width Adjustment	Automatic	
Conveyor Fix Type	Front/Rear Fixed (factory setting)	
Max. Measurement Height	5mm	
	<b>L</b>	<b>XL</b>
PCB Thickness	0.4 - 5mm (0.016 - 0.20inch)	0.5 - 8mm (0.019 - 0.31inch)
Max. PCB Size	510 x 510mm (20 x 20inch)	810 x 610mm (32 x 24inch)
Max. PCB Weight	5kg (11.02lbs)	10kg (22lbs)

## Software

Supported Input Format	ODB++, PCB Gerber, Placement file, Mounter job file, Allegro, Zuken, Mentor(Optional)
Operating System	Windows 7 64Bit
Barcode Recognition	Barcode Reading Software Using System Camera

## Installation Specifications

	<b>L</b>	<b>XL</b>
Machine Weight	650kg (1433lbs)	850kg (1873lbs)
Machine Size (without Tower Lamp and Monitor)	1000 x 1420 x 1630.5mm (39 x 56 x 64inch)	1310 x 1560 x 1687mm (51 x 61 x 66inch)
Top/Bottom Side Clearance	50mm (1.96inch)	
Supplies	200-240VAC, 50/60Hz Single Phase, 5kgf/cm <sup>2</sup>	
Others	UPS(Basic option)	

## Options

Data Server	Network Based SPC Analysis Software	Network Based Review Station
Offline Programming Station	In-line Barcode Reader(1D,2D)	Standard Calibration Target



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