

# MAKER-RAY

Make Industrial Inspection More User-Friendly

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Model

AIS 20X-HW | AIS 30X-HW | AIS 50X-HW | AIS 63X-HW  
AIS 40X-HW | AIS 43X-HW | AIS -COATING-HW



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MAKER-RAY



## Intelligent Optical Inspection Solution Provider Globally

MAKER-RAY is a product-oriented enterprise focused on AI AOI solutions for THT, SMT, and coating processes. MAKER-RAY pioneered AI in automatic optical inspection, enhancing programming efficiency and detection rates while reducing false calls, overcoming traditional algorithm bottlenecks.

With outstanding technical expertise and innovation, MAKER-RAY has deep cooperation with many top 500 companies. Its products are widely used in automotive electronics, home appliances, power supplies, and consumer electronics. MAKER-RAY grows rapidly with an average annual revenue increase of over 80%. It has 21 service points worldwide and has won global customer trust through its leading products and high-quality services.



## Oversea and Domestic Layout

Services are Available in more than 400 Cities Nationwide

### 11 Industrial Parks



In 6 cities such as Guangzhou, Beijing, Xi'an, Suzhou, Hefei, and Chongqing is taken into use.

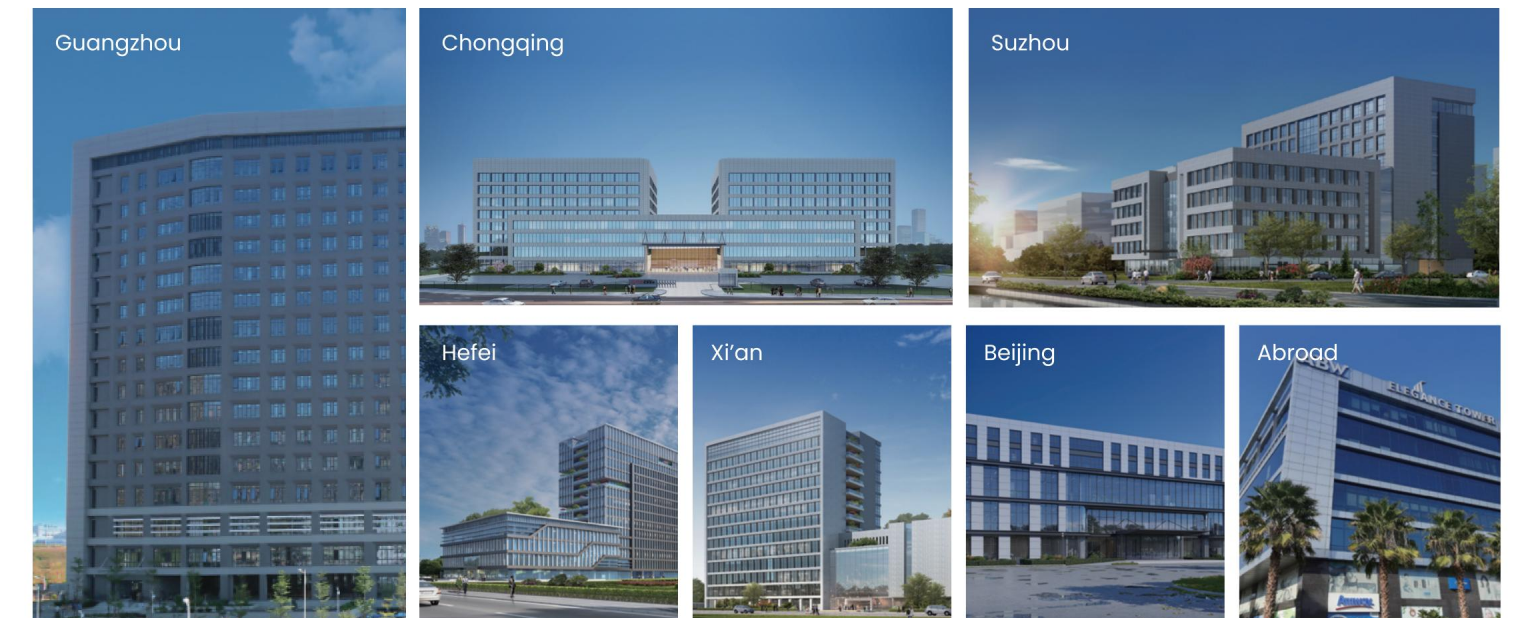
### 8 Industrial Parks



There are also 8 industrial parks under construction in Shanghai, Wuhan and other places.

### Oversea 21 Local Service Globally

Vietnam, Thailand, Malaysia, Japan, India, United States, Türkiye, Italy, Romania, Netherlands, Mexico...



CE Certificate

ISO 9001  
Environmental Management System Certification

ISO 14001  
Quality Management System Certification

Artificial Intelligence Demonstration Enterprise

## 3 Major Manufacturing Bases

MAKER-RAY integrates product design, R&D, pilot optimization, mass production, and shipment, achieving seamless interconnection, collaboration, and management. This enables 'trial production in one location and mass production in multiple locations'.

About **12000** m<sup>2</sup>  
Area

About **600**  
Million RMB Annual Yearly Yield Output

Technical Support  
Motion Control, Structure, Optics, Reliability Analysis and Other Professional Laboratories

Production Management  
A Process Management System Ensures Consistency and Reliability from Raw Materials to Finished Product Debugging and Shipment Inspection



## High-Quality Team Providing High-Quality Services

01

### Registered International Vocational Trainer

8 years of training experience, focusing on the combination of theory and application scenarios, providing practical training solutions

02

### Remote Service

Online quick response  
Troubleshoot and solve problems

03

### Onsite Support

80% have more than 5 years of industry experience to handle equipment failures on site in a timely manner



## Driven by Technological Innovation

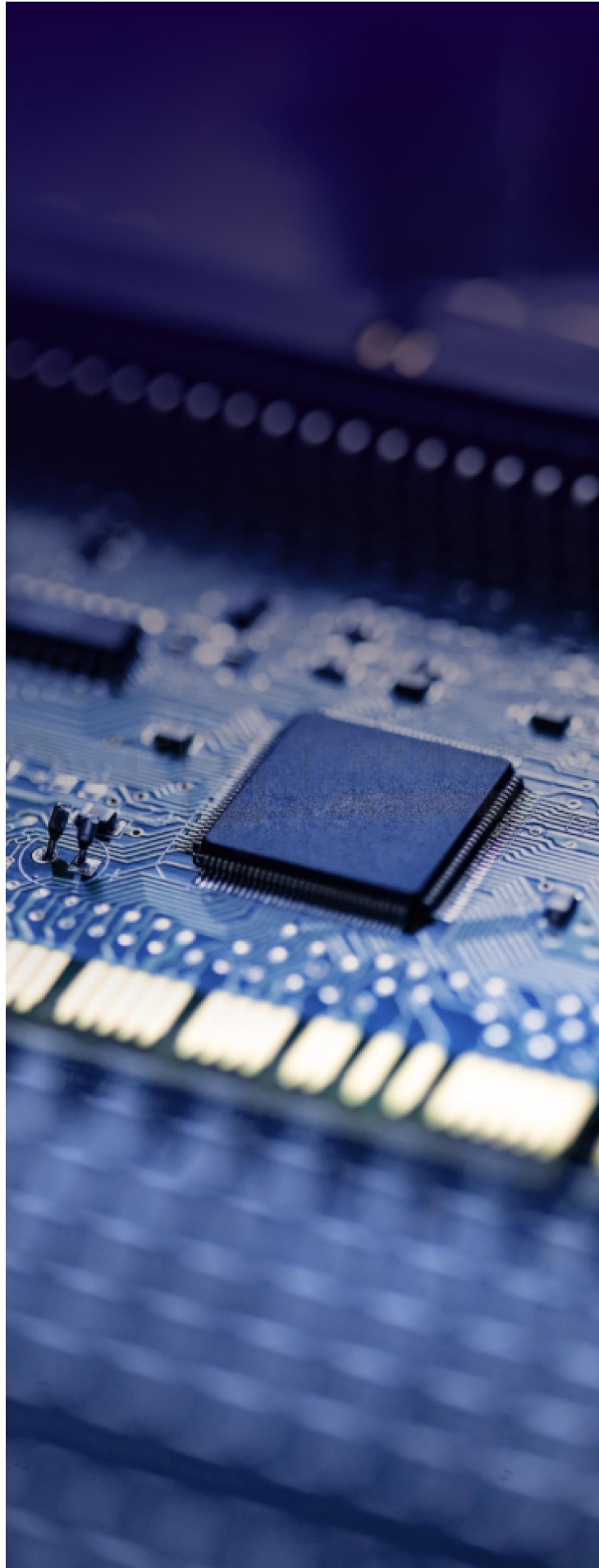
### R&D Investment

Over <b>200</b> Patent Application	<b>15%</b> R&D Investment of Revenue
<b>50%</b> Proportion of Invention Patents	<b>100%</b> Compound Annual Growth Rate

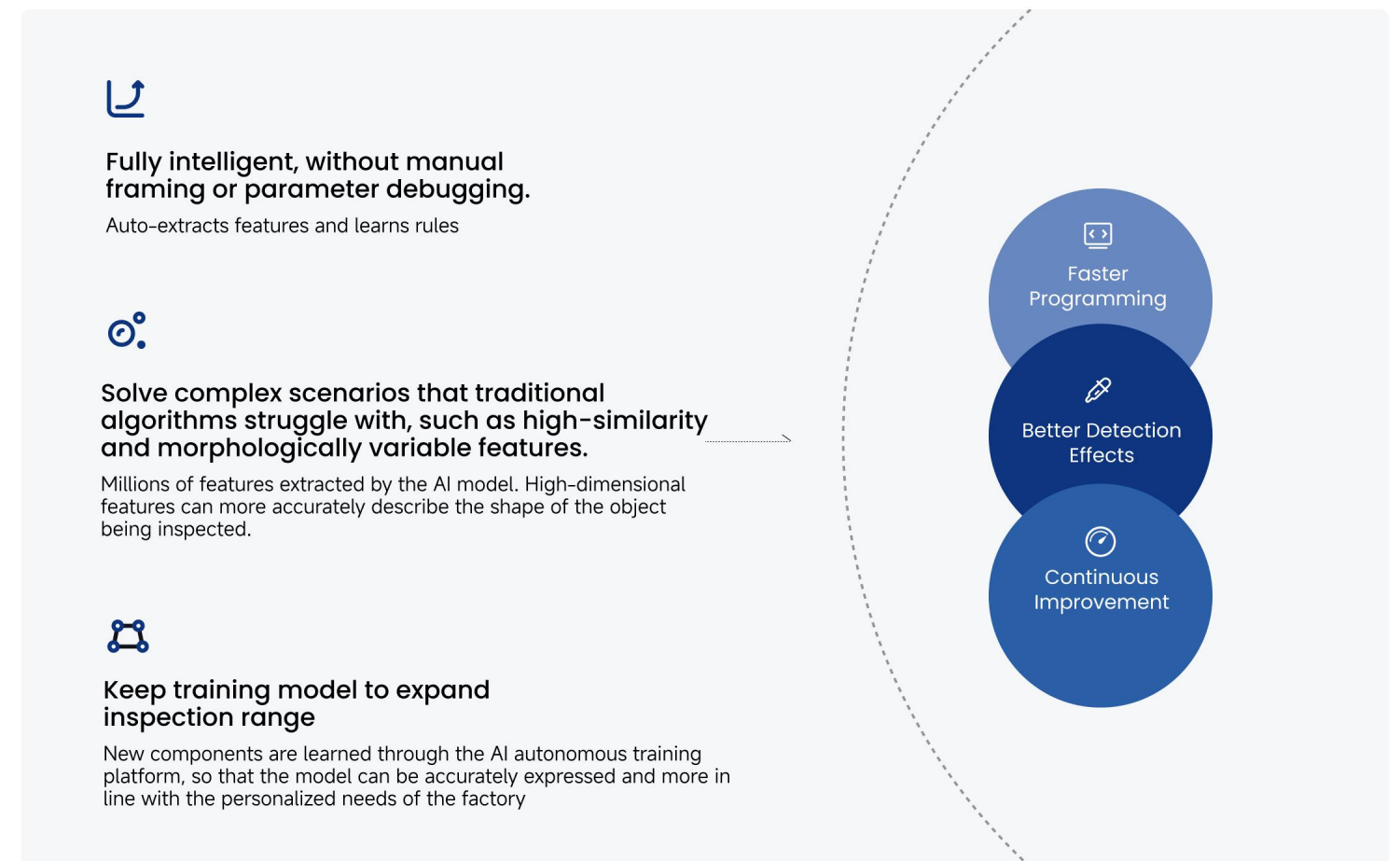
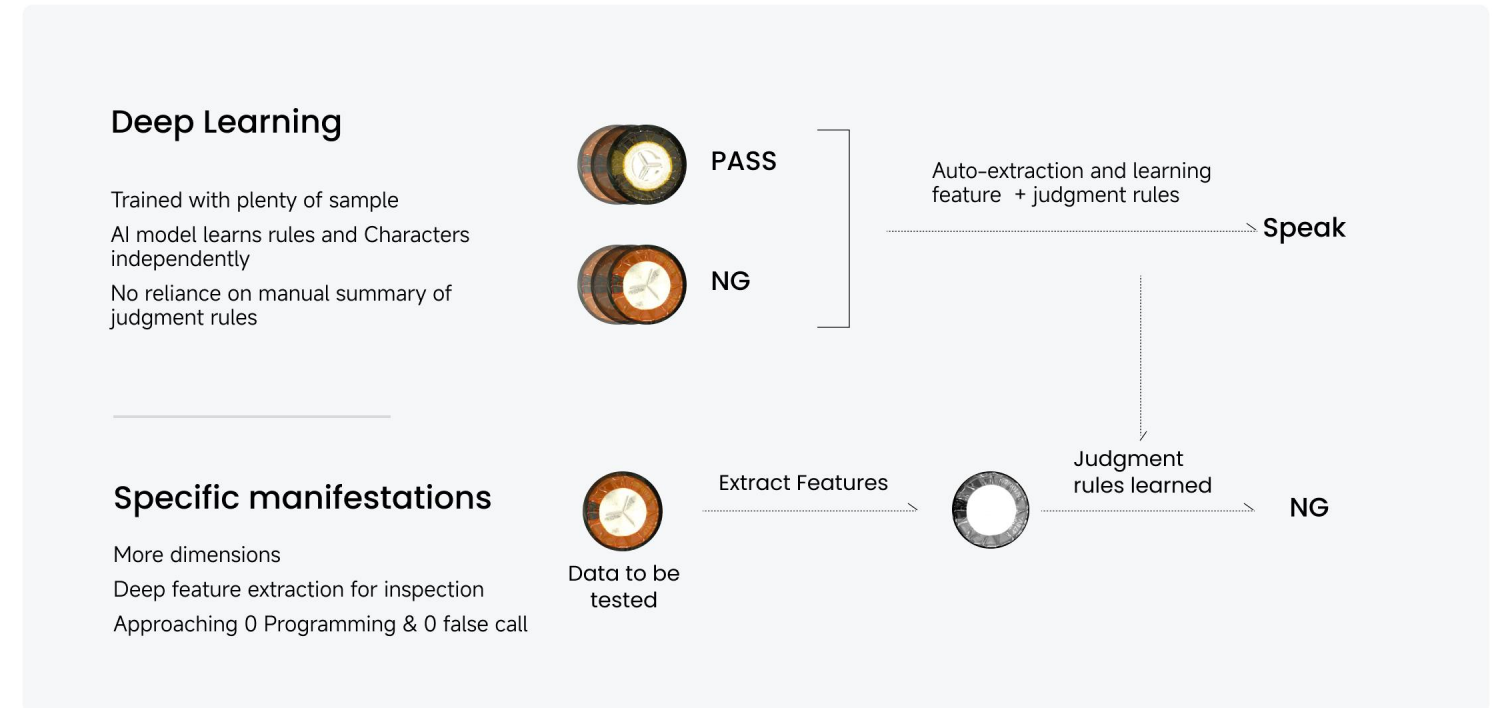
R&D Personnel Ratio <b>60%</b>	Bachelor Degree or Above <b>100%</b>	PhD <b>3</b>
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### Core Advantages

<b>AI</b>	Digital AI Model in Industrial Scene First Billion-Level in AOI Field
<b>3D</b>	3D Imaging Reconstruction Technology Research and Practice Multiple Independently
<b>HIGH</b>	Mechanical Operation Control Platform High Precision and High Stability



## AOI Empowering AOI with AI Revolutionary Technological Breakthroughs



# Product Layout



# Industry Solution

Focus on Solving the Detection Pain Points  
Provide Customers with Practical Solutions

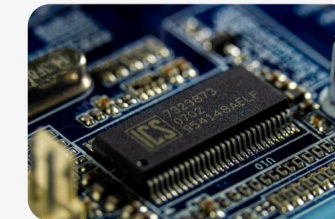
## Automotive

Solve the imaging deformation problem caused by uneven illumination and dense component occlusion, meet the 3D imaging of special-shaped devices and various long pins, and provide accurate height



## Prototyping

AI Simplified programming, fast line exchange, improve production efficiency of small batches and multiple varieties



## New Energy Vehicle

Flexible FPC anti-deformation detection technology reduces false calls caused by positioning deviation due to bending deformation



## Server

Self-developed CPUSOCKET-specific light source and algorithm, compatible with various SOCKET type detection, ensuring accurate detection results



## Consumer Electronics

Underfill inspection  
High-precision testing of precision devices  
Helps improve manufacturing quality



# AIS 20X-HW

Inline PCBA AOI for THT Component



2014 01

Invention of Product and Implementation in Market

2000+ 02

Recognized by Thousands of Factories Worldwide

NO.1 03

The Market Share has Ranked First for 6 Consecutive Years

## Core Advantage



### High Accuracy. Low False Call

Using a deeper neural network trained on massive data to learn and identify complex, fuzzy features, such as similarly colored sockets and various styles of color ring resistors.



### Simplified Programming

Auto-generate detection frames based on AI algorithms, intelligently configure algorithm parameters. Simplify operation, easy to use and reduce training costs.



### Continuously Improving Detection Performance

The AI training platform iterates the model's recognition, enabling AOI to detect various devices and improve accuracy.

## Option



### Production Line Control Box

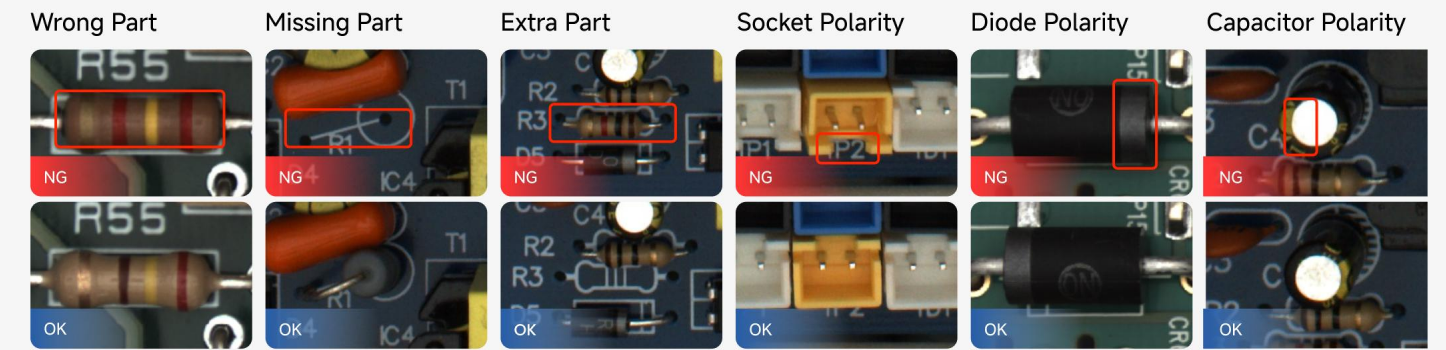
Installed on the assembly line, supporting manual or automatic start/stop. The NG signal triggers a stop via the control box, allowing operators to promptly handle defects.



### NG Board Tracker

Installed inside the edge of the assembly line and connected with AOI to auto-tracking NG board. Easy for Operator to find the NG board to repair timely.

## Inspectable Defects



## Product Specification

Category	Item	AIS203-HW	AIS203P-HW
Board Dimension	Measurable Board Size	400* 266mm	520mm* 390mm
	Camera	20Mp color high speed camera	31Mp color high speed camera
Vision Module	Light Source	High brightness LED open plane light + High brightness low angle light	
	FOV	400mm* 266mm	520mm* 390mm
	Resolution	75um	80um
Inspection	Inspectable Items	Insertion Components: Wrong part, Missing part, Polarity(Reversed part), Extra part, Skew	
	Main Algorithm	AI Algorithm Mainly: AI polarity, AI offset and AI missing parts algorithm, OCR recognition etc.	
	Multi-scene Inspection	Support mixed board, multi-panel, mixed components, etc	
Programming	Programming Method	AI one-click programming: Auto-drawing detection box for trained parts. Intelligently analyze NG to configure the required algorithm and related parameters. Non-required manual framing or adjusting color and parameters.	
	In-line on fly program and fine-tune	Feature allow users perform programming, components changes or parameters updates without stop or distract the active production line.	
	Component Library	Feature allow user store default parameter setting for specific component become standard or template for common parts and shorten programming time.	
Other Features	AI Training Tool	AI training tools can be used for targeted model training when there is new or unseen components to improve the stability and accuracy of algorithm detection to reduce false calls.	
	Statistical Data Analysis	Software solution to display AOI inspection record, analysis, graph and chart plotting. Extract data summary in excel or .csv file format.	
	Human Voice Alert	Audible report on NG status inspection.	
	Barcode Identification	1D / 2D barcode & QR code identification(5* 5mm above)	
Options	NG Board Tracker	Installed inside the edge of the assembly line and connected with AOI to auto-tracking NG board. Easy for Operator to find the NG board to repair timely.	
	Production Line Control Box	Installed by assembly line. Support starting and stop manually or automatically. When there is NG board, the signal transmitted to control box to trigger the stop for operator intercept and handle the defective products in time.	
Hardware	Industrial Computer	CPU: Intel i5   Graphics: Nvidia GTX1050Ti Memory: 16G DDR4   Storage: 256G SSD + 2T HDD Network: 1000M network card	CPU: Intel i7   Graphics: Nvidia GTX1050Ti Memory: 24G DDR4   Storage: 256G SSD + 2T HDD Network: 1000M network card
	Display	23.8 inch	
	Operating System	Ubuntu 18.04 LTS 64bit	
	Dimension and Weight	(L* H* W) 715* (1315-1700 Adjustable)* (730-940 Adjustable)mm, 100KG ; Connecting Rod: Short (inner width 730-940 adjustable) mm. Long(inner width 960-1150 adjustable) mm	
	Power Supply and Power	AC 220V. Rated power 200W	
	Environmental Requirements	Temperature: 10-45°C. Humidity: 30-85%RH	

# AIS 30X-HW

Inline THT Solder Automated Optical Inspection Machine



## Inspection

01

Extract Tens of Thousands of Hole Defect Features in Multiple Dimensions, with Strong Detection Capabilities

## Programming

02

Intelligent Programming in Just 5 Minutes

## Speed

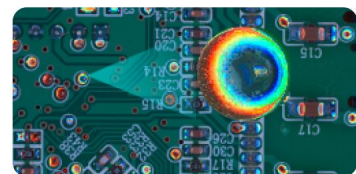
03

Intelligently Plan the Shooting Path and Greatly Improve the Detection Speed

## Core Advantage

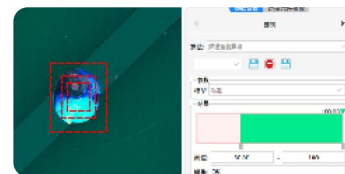
**01**  
**Accurate Solder Shape Restoration with Specific Light Source**

RGB light sources at different angles accurately reflect surface slopes, enhancing solder joint stratification and revealing poor soldering



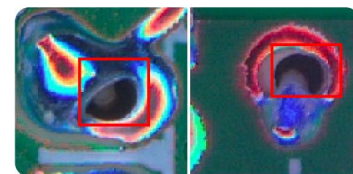
**02**  
**AI Algorithm Intelligent Recognize Solder on Entire Board**

Auto-identifies solder across the board, covering 97% of models with default algorithm parameters, no manual color sampling needed

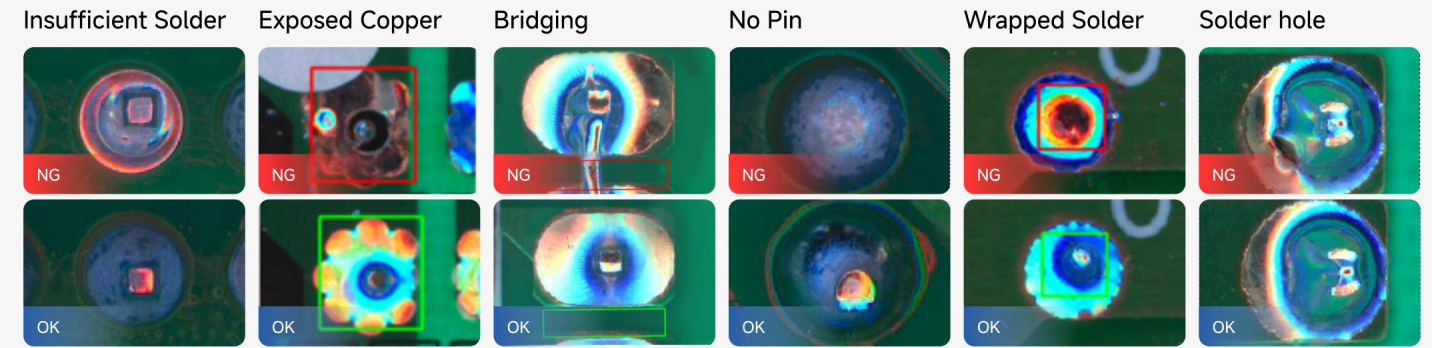


**03**  
**Multi-Dimensional Feature Extraction and Stable Identification**

Trained on big data, the model excels in detection and generalization, reducing false calls from solder deviations, pin influences, and device changes, while solving missed inspection issues



## Inspectable Defects



## Specification

Category	Item	AIS303B-HW	AIS303-L-HW
Board Dimension	Dimension	Three section track: 50* 50mm-350* 400mm Single section track: 50* 50mm-450* 400mm	50* 50mm-550* 650mm
	Thickness	0.5mm-6mm	
	Height Clearance	750mm	
	Max weight	20Kg	
	Max Component Height	Top: 110mm (can be reached 150mm by removing the baffle). Bottom: 25mm	
	Edge Clearance	3mm	
Vision Module	Camera& Light Source	12MP color high speed camera & RGB+W	
	Resolution& FOV	15um@60mm* 45mm	
	Inspection Speed	0.23sec/FOV	
Inspection	THT Solder Defects	Excessive, Insufficient, Bridging, No Pin, Cold Solder, Solder Hole, and Solder Balls, etc.	
	Main Algorithm	AI Algorithm Mainly: AI Solder Algorithm, AI Solder Hole Algorithm, AI Bridging Algorithm and AI No Pin Algorithm, etc.	
	Multi-scene Inspection	Support Auto-change program, multi-panel, mixed components, etc	
Programming Method	Programming Method	1. AI one-click programming: Auto-drawing detection box for trained parts. 2. Intelligently analyze NG to configure the required algorithm and related parameters.	
	In-line on fly program and fine-tune	Feature allow users perform programming, components changes or parameters updates without stop or distract the active production line.	
	Component Library	Feature allow user store default parameter setting for specific component become standart or template for common parts and improve shorten programming time.	
Other Features	Barcode Identification	1D / 2D barcode & QR code identification(5* 5mm above)	
	Industrial Computer	CPU: intel i5   Graphics: Nvidia GTX1050Ti Memory: 32G DDR4   Storage: 256G SSD+2T HDD Network: 1000M network card	CPU: intel i5   Graphics: Nvidia GTX1050Ti Memory: 64G DDR4   Storage: 256G SSD+2T HDD Network: 1000M network card
Hardware	Display	23.8 inch	
	Operating System	Ubuntu 18.04 LTS 64bit	
	Communication	Standard SMEMA interface	
	Width Adjustment	Manual/automatic.	
	Motion Structure	High precision screw + servo motor	
	Dimension and Weight	(L* H* W)1100* 1340* 1161mm (Tower light excluded), 780Kg	(L* H* W) 1125* 1340* 1411mm (Tower light excluded), 870Kg
	Power Supply and Power	AC 220V. Rate power 520W	
	Air	0.4-0.6Mpa	
	Environmental Requirements	Temperature: 10~45°C. Humidity: 30~85%RH	

# AIS 50X-HW

Inline PCBA Double-sided Optical Inspection Equipment



## Multiple Scenes

By Switching Different Light Sources to Meet Various Inspection Scenarios such as Components, Solder

01

## AI Programming

Generate Inspection Box with One Click to Make Programming Faster

02

## High Inspection Accuracy

Embedded AI Algorithm has Better Detection Effect on Complex Features

03

## Core Advantage



### Higher Range. Wider Shooting FOV

Self-developed optimized lens improves shooting accuracy while ensuring detection accuracy, meeting higher component detection requirements with a larger range

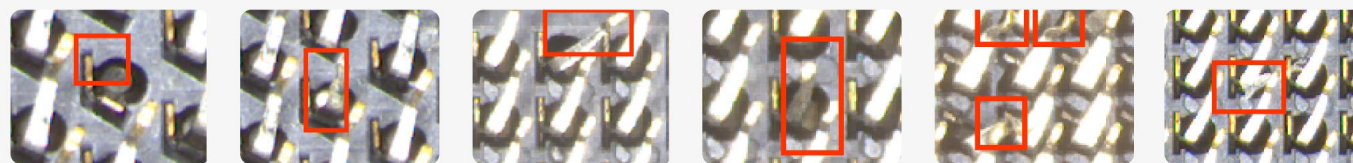


### AI Driving more Powerful Detection Capabilities

Excelling in generalization and anti-interference, the AI model effectively detects black materials on blackboards, holes, solder balls, and other industry challenges

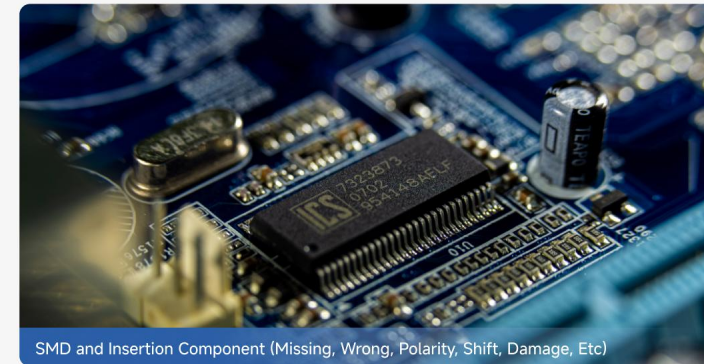
## Self-Developed Specific CPU Algorithm With Powerful Inspection Ability (\*Customized Option)

The dedicated light source improves the pin imaging effect. Combined with the CPU pin matching algorithm, the entire CPU pin programming can be completed in 1 minute, covering various defect types detection.

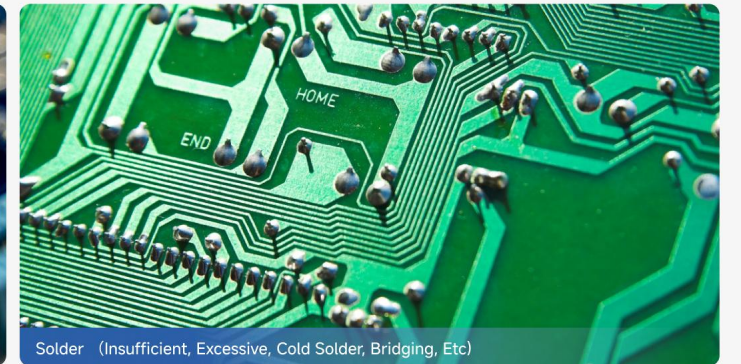


Missing Broken Shift Sank Deformation Foreign matter

## Inspectable Defects



SMD and Insertion Component (Missing, Wrong, Polarity, Shift, Damage, Etc)



Solder (Insufficient, Excessive, Cold Solder, Bridging, Etc)

## Specification

Category	Item	AIS501-HW	AIS501B-HW	AIS501-L-HW
Board Info	Dimension	Chain track: 50* 50mm-510* 460mm (Large board mode supports 730* 460mm) Roller track: 50* 50mm-430* 460mm (Large board mode supports 730* 460mm)	Belt & Chain track: 50* 50mm-510* 460mm (Large board mode supports 730* 460mm)	50* 50mm-510* 650mm (Large board mode supports 730* 650mm)
	Thickness	0.5mm-6mm		
	Height Clearance	750mm/900mm		
	Max weight	Belt: ≤3KG; Chain: ≤10KG; Roller: ≤25KG		
	Max Component Height	Top: 75mm, Bottom: 50mm (Can be adjusted to 75mm)		
	Edge Clearance	3mm		
Vision Module	Camera&Light Source	Top& Bottom: 12MP color high speed camera & RGB+W		
	Resolution&FOV	15um:60mm* 45mm & 10um:40mm* 30mm (Option)		
	Inspection Speed	0.23sec/FOV		
Inspection	SMD and THT Defects	Wrong, Missing, Polarity(Reversed), XY Offset, Angle Offset, Damaged, Skewed, Etc.		
	Main Algorithm	AI Algorithm Mainly: AI Skew Algorithm, AI Missing Algorithm, OCR Algorithm, AI Solder Algorithm, AI Solder Hole Algorithm, AI Bridging Algorithm, AI No Pin Algorithm, CPU Algorithm, Collinearity algorithm, Foreign Materials Algorithm, Etc.		
	Multi-scene Inspection	Support Auto Change Program, Multi-Panel, Mixed Components, Etc		
Programming	Programming Method	1. Support importing CAD file 2. AI One-click search for components and solder, intelligent identifies and matching parameters		
	In-line on fly program and fine-tune	Feature allow users perform programming, components changes or parameters updates without stop or distract the active production line.		
	Component Library	Feature allow user store default parameter setting for specific component become standard or template for common parts and shorten programming time.		
Other Features	Barcode Identification	1D/ 2D barcode& QR code identification(5* 5mm above)		
	Industrial Computer	CPU: intel i7   Graphics: Nvidia GTX1050Ti Memory: 64G DDR4   Storage: 256G SSD+2T HDD   Network: 1000M network card		
Hardware	Display	23.8 inch		
	Operating System	Ubuntu 18.04 LTS 64bit		
	Communication	Standard SMEMA interface		
	Width Adjustment	Manual/automatic.		
	Motion Structure	High precision screw + servo motor		
	Dimension and Weight	(L* H* W) 1080* 1629* 1336mm (750mm Height Clearance. Tower light excluded), 1000Kg	(L* H* W) 1080* 1629* 1536mm (750mm Height Clearance. Tower light excluded), 1150Kg	(L* H* W) 1080* 1684* 1336mm (900mm Height Clearance. Tower light excluded), 1200Kg
	Power Supply and Power	AC 220V. Rate power 500W		
	Air	0.4-0.6Mpa		
Environmental Requirements	Temperature: 10-45°C. Humidity: 30-85%RH			

# AIS 63X-HW

Inline Solder Paste PCBA 3D Optical Inspection Equipment



## Fast Programming

01

AI Intelligent Programming  
Double Programming Efficiency

## Low False Calls

02

Strong Anti-Interference Reducing False  
Calls of Bridging and Solder Silk

## Comprehensive Data

03

SPC Data Empowering Production  
Management

## Core Advantage



### Dedicated Light Source Technology Enhances Surface Feature Visibility

Improves the 3D imaging quality of the object being inspection, and provides a solid imaging foundation for the detection accuracy of 3D SPI.



### Excellent Anti-Interference Performance, Higher Accuracy in Detecting Bridging

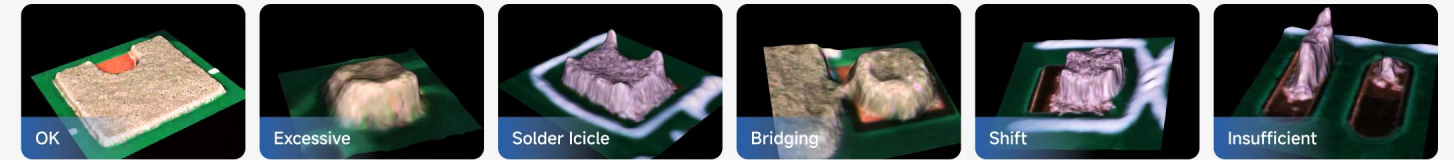
Trained on large data, the algorithm accurately resists interference and distinguishes bridging, solder silk, and dirt, reducing false calls.

## Comprehensive SPC Data. Empowering Production Management

Real-time detection data retention with rich statistics and analysis charts. Supports exporting or connecting to MES for detailed reports, aiding production traceability and process improvement.



## Inspectable Defects



## Specification

Category	Item	AIS631MB-HW	AIS631M-D-HW
Board Info	Dimension	50* 50mm-510* 460mm (Large board mode 710*460mm)	Single Lane: 50* 50mm-510* 610mm ; Dual Lane: 50* 50mm-510* 330mm(Minimum between middle Lane 55mm)
	Thickness	0.5mm-6mm	
	Height Clearance	900mm	
	Max weight	≤3KG	
	Max Component Height	Top: 25mm. Bottom: 40mm	
Vision Module	Camera&Light Source	5MP high frame rate black and white industrial camera & RGBW+Projector	12MP high frame rate black and white industrial camera & RGBW+Projector
	Resolution&FOV	15um: 36* 30mm/ 10um: 24* 20mm (Option)	10um: 40* 30mm/ 15um: 60* 45mm (Option)
	Inspection Speed	0.28sec/FOV	
Inspection	Main Algorithm	AI Algorithm Mainly: AI Solder Paste Algorithm. Reference plane correction algorithm. Tilt algorithm. Dimension detection algorithm	
	Solder Paste Insoection Height, area, volume, excessive, insufficient, projections, bridging, XY offset, angle offset, etc.		
Programming Method	Multi-scene Inspection	Support multi-panel, mixed components, spot inspection, random inspection, etc.	
	Support importing Gerber file. Quick Programming: Intelligently realize auto-search and drawing of detection frames for the solder paste and configure algorithms		
	In-line on fly program and fine-tune	Feature allow users perform programming, components changes or parameters updates without stop or distract the active production line.	
Other Features	Component Library	Feature allow user store default parameter setting for specific component become standart or template for common parts and shorten programming time.	
	Barcode Identification	1D / 2D barcode & QR code identification(5*5mm above)	
Hardware	Statistical Data Analysis	Software solution to display SPI inspection record, analysis, graph and chart plotting. Extract data summary in excel or .csv file format.	
	Industrial Computer	CPU: intel i7   Graphics: Nvidia RTX3050 Memory: 32G DDR4, 256G SSD+2T HDD Network: 1000M Network card	CPU: intel i7   Graphics: Nvidia RTX3050 Memory: 64G DDR4, 256G SSD+2T HDD Network: 1000M Network card
	Display	23.8 inch	
	Operating System	Ubuntu 18.04 LTS 64bit	
	Communication	Standard SMEMA interface	
	Width Adjustment	Manual/automatic.	
	Motion Structure	High precision screw + servo motor	
	Dimension and Weight	(L* H* D)1015* 1670* 1445mm (Tower light excluded), 807Kg	(L* H* D)1015* 1670* 1695mm (Tower light excluded), 1000Kg
	Power Supply and Power	AC 220V. Rated power 510W	
	Air	0.4-0.6Mpa	
Environmental Requirements	Temperature: 10~45°C. Humidity: 30~85%RH		

# AIS 40X-HW

Inline SMD Automated 2D Optical Inspection Machine



AIS401-HW



AIS401B-HW

## Core Advantage



### AI Simplified Programming. Saving Personnel and Cost

Through AI training model to identify components and solder. Auto-search, configure algorithm models, adjust parameters, and display algorithm judgment results. Simple and easy to operate.



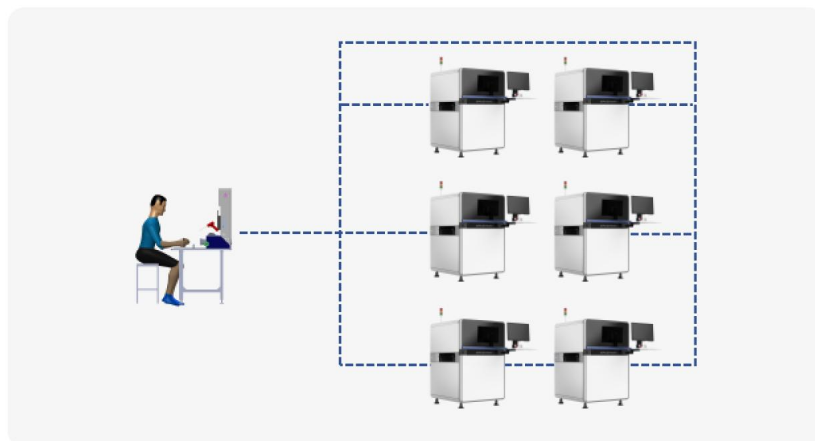
### OCR Recognizes Silk-Screen Characters with Higher Accuracy

Intelligent positioning and end-to-end character recognition: no manual preprocessing. High accuracy under blurred/dark scenes

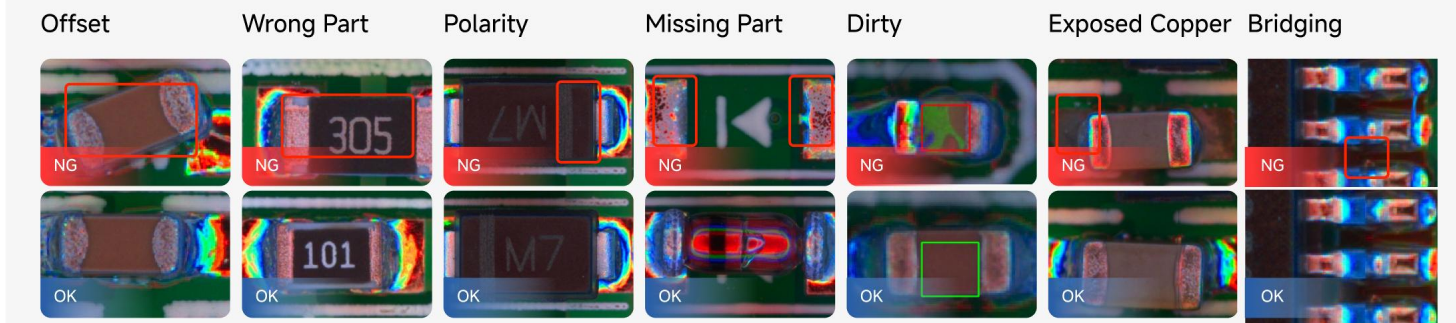
## Interconnected Devices for Convenient Remote Centralized Management

Supports remote programming, debugging, management, and one-to-many re-judgment, saving line change time and improving production efficiency.

- Remote offline programming, programming without affecting detection
- Remote support, quick response and maintenance
- Review workstation, one-to-many review



## Inspectable Defects



## Specification

Category	Item	AIS401B-HW	AIS401B-D-HW
Board Info	Dimension	50* 50mm-510* 460mm (Large board mode 690*460mm)	Single Lane: 50* 50mm-510* 610mm (Large board mode supports 690* 610mm) Dual Lane: 50* 50mm-510* 330mm(Large board mode supports 690* 330mm)
	Thickness	0.5mm-6mm	
	Height Clearance	900mm	
	Max weight	≤3KG	
	Max Component Height	Top: 25mm, Bottom: 80mm	
Vision Module	Camera&Light Source	12MP color high speed camera & RGB+W	
	Resolution & FOV	10um: 40mm* 30mm/ 15um: 60mm* 45mm (option)	
	Inspection Speed	0.23sec/FOV	
Inspection	SMD Defects	Wrong, Missing, Polarity(Reversed), XY Offset, Angle Offset, Damaged, Etc.	
	Main Algorithm	AI Algorithm Mainly: AI Skew Algorithm, AI Missing Algorithm, OCR Algorithm, AI Solder Algorithm, AI Bridging Algorithm, etc.	
	Multi-scene Inspection	Support Auto Change Program, multi-panel, mixed components, etc	
Programming	Programming Method	1. Support importing CAD file 2. AI One-click search for components and solder, intelligent identifies and matching parameters	
	In-line on fly program and fine-tune	Feature allow users perform programming, components changes or parameters updates without stop or distract the active production line.	
	Component Library	Feature allow user store default parameter setting for specific component become standard or template for common parts and improve shorten programming time.	
Other Features	Barcode Identification	1D / 2D barcode & QR code identification(5*5mm above)	
	Industrial Computer	CPU: intel i5   Graphics: Nvidia GTX1050Ti Memory: 32G DDR4   Storage: 256G SSD+2T HDD Network: 1000M network card	CPU: intel i5   Graphics: Nvidia GTX1050Ti Memory: 32G DDR4   Storage: 256G SSD+2T HDD Network: 1000M network card
Hardware	Display	23.8 inch	
	Operating System	Ubuntu 18.04 LTS 64bit	
	Communication	Standard SMEMA interface	
	Width Adjustment	Manual/automatic	
	Motion Structure	High precision screw + servo motor	
	Dimension and Weight	(L* H* W) 1015* 1512* 1070mm (Tower light excluded), 670Kg	(L* H* W) 1015* 1512* 1330mm (Tower light excluded), 790Kg
	Power Supply and Power	AC 220V. Rate power 380W	
	Air	0.4-0.6Mpa	
Environmental Requirements	Temperature: 10~45°C. Humidity: 30~85%RH		

# AIS 43X-HW

## Inline SMD Automated 3D Optical Inspection Machine



### More Detailed 01

Detects Side Defects and Solves 3D Imaging Distortion from Shadows

### More Intelligent 02

Advanced AI Model and User-Friendly Design for Convenient Operation

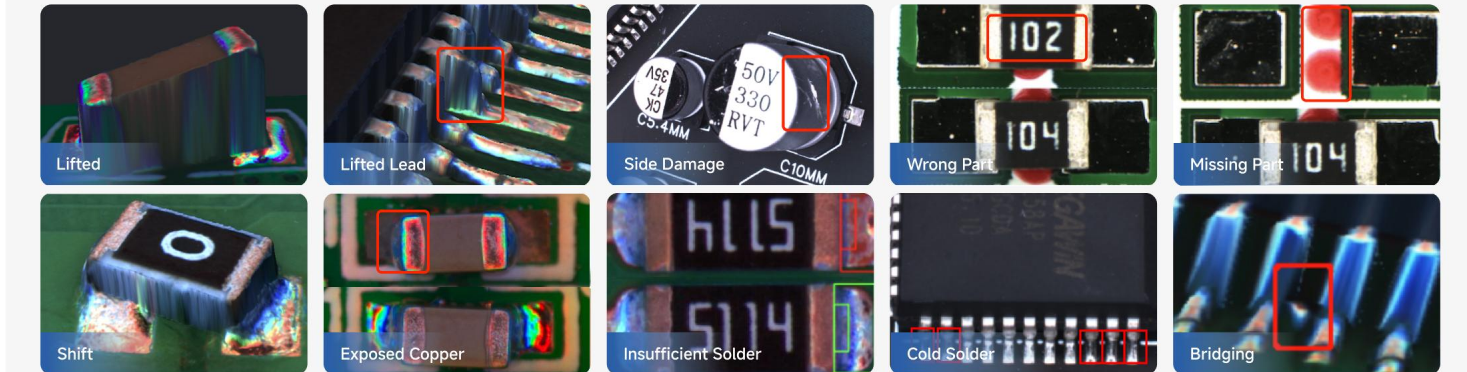
### More Efficient 03

Multiple Cameras Combined with Large FOV and Industry-Leading Inspection Speed

### More Stable 04

New Modular Anti-Shake Platform, Pursuing Ultimate Stability

## Inspectable Defects



## Specification

Category	Item	AIS431B-HW	AIS431-D-HW
Board Info	Dimension	50* 50mm-510* 460mm (Large board mode 710* 460mm)	Single Lane: 50* 50mm-510* 610mm (Large board mode supports 710* 610mm) Dual Lane: 50* 50mm-510* 330mm (Large board mode supports 710* 330mm)
	Thickness	0.5mm-6mm	
	Height Clearance	900mm	
	Max weight	≤3KG	
	Max Component Height	Top: 35mm, Bottom: 50mm	
Vision Module	Camera&Light Source	21MP area array high-speed industrial camera + 4 side cameras & RGBW+Projector	
	Resolution & FOV	13um: 66mm* 53mm/ 10um: 51mm* 40mm	
	Inspection Speed	Fastest Speed: 0.5sec/FOV	
Inspection	SMD Defects	Wrong, Missing, Polarity(Reversed), XY Offset, Angle Offset, Damaged, Skewed, Floating, Tombstone, Lifted lead, Wrapped pin, Etc.	
	Main Algorithm	AI Algorithm Mainly: AI Skew Algorithm, AI Missing Algorithm, OCR Algorithm, AI Solder Algorithm, AI Bridging Algorithm, 3D Pin Height Algorithm, Solder Height Algorithm, etc.	
	Multi-scene Inspection	Support Auto-change program, multi-panel, mixed components, spot inspection, random inspection, etc.	
Programming	Programming Method	1. Support importing CAD file 2. AI One-click search for components and solder, intelligent identifies and matching parameters	
	In-line on fly program and fine-tune	Feature allow users perform programming, components changes or parameters updates without stop or distract the active production line.	
	Component Library	Feature allow user store default parameter setting for specific component become standard or template for common parts and improve shorten programming time.	
Other Features	Barcode Identification	1D / 2D barcode & QR code identification(5* 5mm above)	
	Industrial Computer	CPU: intel i7   Graphics: RTX3060 12G Memory: 128G DDR4   Storage: 256G SSD+6T HDD Network: 1000M network card	
Hardware	Display	23.8 inch	
	Operating System	Ubuntu 22.04 LTS 64bit	
	Communication	Standard SMEMA interface	
	Width Adjustment	Manual/automatic.	
	Motion Structure	High precision screw + servo motor	
	Dimension and Weight	(L* H* W) 1015* 1670* 1445mm (Tower light excluded), 830Kg	(L* H* W) 1015* 1670* 1695mm (Tower light excluded), 970Kg
	Power Supply and Power	AC 220V, Rated power 470W	
	Air	0.4-0.6Mpa	
Environmental Requirements	Temperature: 10-45°C. Humidity: 30-85%RH		

## Core Advantage

High-Precision 3D AI Imaging System:  
Self-developed Panoramic Multi-Camera and AI Algorithms for Accurate 3D Shape Restoration

**01**

**Capable of Inspecting Side Defects**

Damage, cold solder of leads at sides

**02**

**Clear Capture of Screen Printing on Varying Height Devices**

Able to inspect the silkscreen printing of 10mm components and boards

**03**

**Higher Detection Range**

Captures 3D Images of 25mm Devices without Lens Adjustment. Supports Devices up to 40mm

**04**

**More Realistic 3D Imaging Details**

Avoid overfitting that causes loss of details and false calls

**05**

**Reduce Shadow Interference**

Solve the imaging deformation caused

**06**

**Supports Higher Precision Inspection**

Measured height of 01005 SMD: 212um

# AIS-COATING-HW

## Inline PCBA Coating Inspection Equipment



### Programming 01

AI Auto-Identifies Irregular Coating Areas with One-Button Programming

### Bubble 02

AI with Multi-Dimensional Analysis Effectively Inspects Bubbles

### Thickness 03

High-Resolution Thickness Detection for Coating Thickness

## Core Advantage



### AI Bubble Algorithm. Efficiently Detect Various Bubble Scenarios

Through massive bubble scene data training, it can detect subtle bubble points, bubbles between ic pins, dense bubble groups, etc.

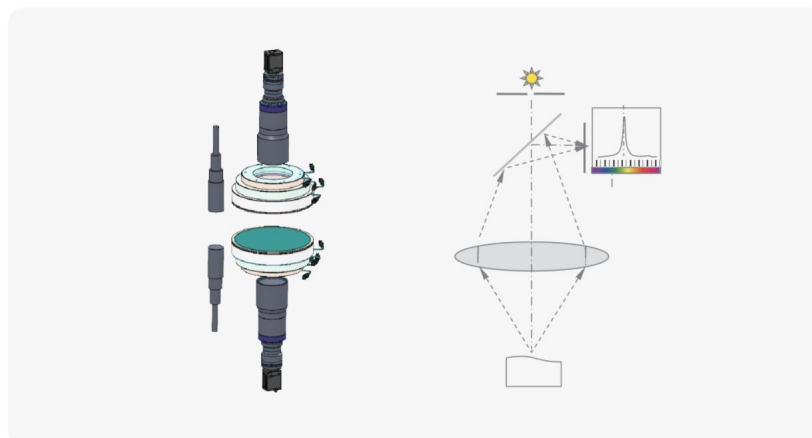


### Scattered Points and Foreign Matter Detection

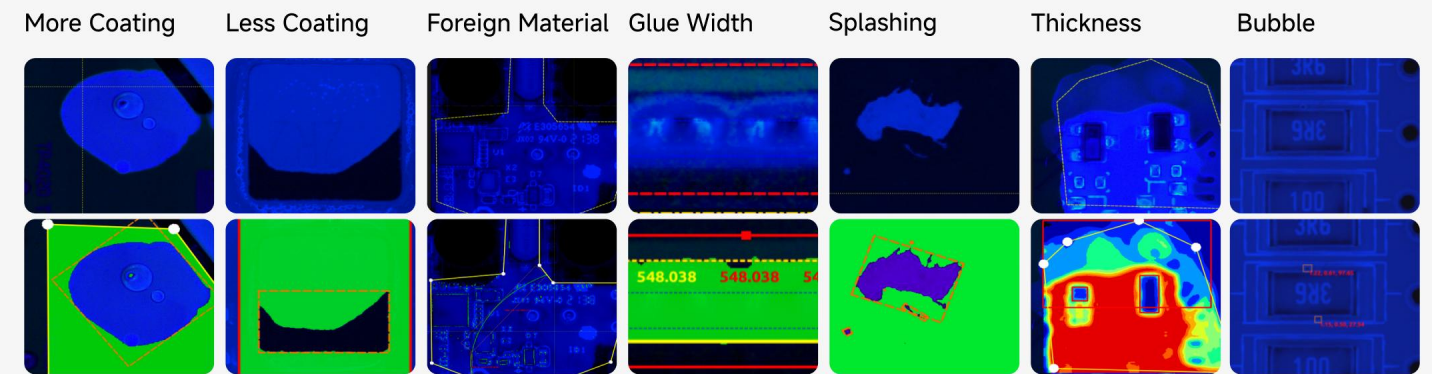
Special scattered point foreign body detection algorithm, intelligently identifies scattered points or foreign bodies (such as hair, etc.) in the test area, without the need for human debugging

## Thickness Data Visualization (Optional)

Point spectrum confocal thickness measurement infers coating thickness by analyzing fluorescence signal intensity at different depths. Non-contact and non-damaging, it offers high resolution to capture subtle changes within ±5um accuracy, enabling real-time monitoring of coating quality.



## Inspectable Defects



## Specification

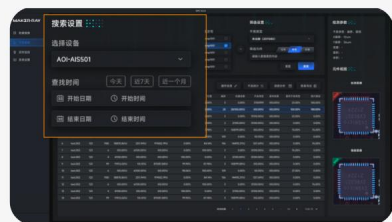
Category	Item	AIS401-C-HW	AIS501-C-HW
Board Info	Dimension	50* 50mm-510* 460mm (Large board mode 710* 460mm)	Belt and chain track:50* 50mm-510* 460mm (Large board mode supports 730* 460mm) Roller track: 50* 50mm-430* 460mm (Large board mode supports 730* 460mm)
	Thickness	0.5mm-6mm	
	Height Clearance	900mm	750mm/900mm
	Max weight	Belt ≤ 3KG / Chain ≤ 10kg	Chain ≤ 10KG
	Max Component Height	Top: 35mm, Bottom: 80mm (The board edge within 10mm support only 40mm)	Top: 75mm, Bottom: 50mm (Can be customized to 75mm)
Vision Module	Camera&Light Source	5MP color high speed camera & UV+W, UV+RGBW(optional)	
	Resolution&FOV	5MP: 36mm* 30mm/ 12MP: 60mm* 45mm(optional)	5MP: 52mm* 44mm/ 12MP: 60mm* 45mm(optional)
	Inspection Speed	0.28sec/FOV	
Inspection	Coating Inspection	Less coating, more coating, bubble, splashing, foreign matters, glue width, glue thickness(Optional)	
	Algorithm	AI Algorithm mainly: AI polygon, AI coating, AI bubble, AI foreign matters and bilateral distance detection algorithm	
	Component Inspection(Optional)	Insertion Components and SMD: Wrong part, missing part, polarity, XY offset, angle offset and damage, etc. (Before Coated)	
	Solder Inspection (Optional)	Excessive solder, insufficient solder, bridging, cold solder, solder balls, etc. (Before coated)	
	Multiple Inspection Scenarios	Mixed board inspection, multi-panel inspection, mixed material detection, large board mode detection (optional)	
Programming	Programming Method	Auto-generates the coated polygon area, auto-configures the coating detection algorithm, and adjusts the parameters	
	In-line on fly program and fine-tune	Feature allow users perform programming, components changes or parameters updates without stop or distract the active production line.	
Other Features	Barcode Identification	1D / 2D barcode & QR code identification(5* 5mm above)	
Hardware	Industrial Computer	CPU: intel i5   Graphics: Nvidia GTX1050Ti Memory: 32G DDR4   Storage: 256G SSD+2T HDD Network: 1000M network card	CPU: intel i5   Graphics: Nvidia GTX1050Ti Memory: 64G DDR4   Storage: 256G SSD+2T HDD Network: 1000M network card
	Display	23.8 inch	
	Operating System	Ubuntu 18.04 LTS 64bit	
	Communication	Standard SMEMA interface	
	Width Adjustment	Manual/automatic.	
	Motion Structure	High precision screw + servo motor	
	Dimension and Weight	(L* H* W) 1015* 1541* 1166mm (Tower light excluded), 728Kg	(L* H* W)1080*1629*1336mm (750mm Height Clearance. Tower light excluded), 1000Kg (L* H* W) 1080* 1684* 1336mm (900mm Height Clearance. Tower light excluded), 1200Kg
	Power Supply and Power	AC 220V. Rate power 380W	
	Air	0.4-0.6Mpa	
	Environmental Requirements	Temperature: 10-45°C. Humidity: 30-85%RH	

# AOI InsightX

## Intelligent Integrated Platform



### Core Advantage



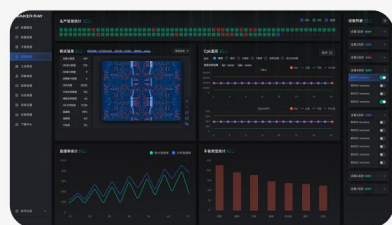
#### Multi-Device Data Integration for Efficient Queries

Centralized multi-device data management enables quick queries without moving between lines, ensuring efficient work



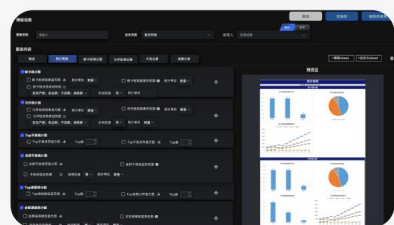
#### Professional Data Analysis for Efficient Problem Tracing

Comprehensive statistics of NG enable quality personnel to quickly analyze defects and locate problems.



#### Real-Time Monitoring and Early Warning to Accurately Locate Abnormalities

Intelligently monitor product quality, issue real-time warnings for abnormalities, and ensure production stability.



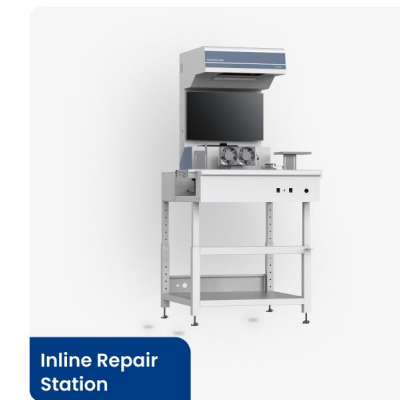
#### Rich Report Templates for Flexible Data Dashboard Construction

Provide rich report templates, multiple combinations, and flexibly build data large screens to meet enterprise management needs.

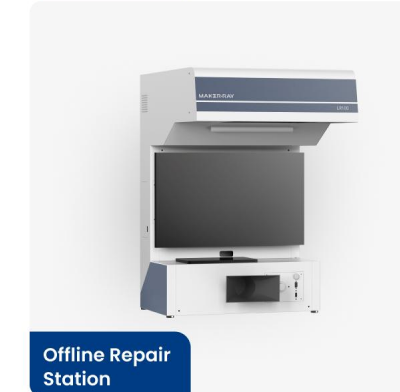
## Inline/Offline Repair Station

### The Cursor Quickly Locates the Defect Position to Improve Maintenance Efficiency

Freely select offline or inline, support multi-station operation, flexible and efficient. Support whole board/divided area. Single point/multi-point and different size cursor projection methods. Support arbitrary cursor color setting. Adapt to various pcb board background colors.



Inline Repair Station



Offline Repair Station

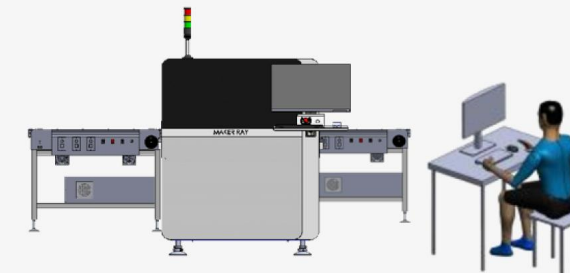
Project	Offline Repair Station	Inline Repair Station
Model	MKR-AOI-OFFLR100	MKR-AOI-ONLR100
Projector Specifications	NEW F3/YF201	NEW F3/YF201
Detection Board Size	Actual Detection Size: 550mm*400mm	Actual Detection Size: 550mm*400mm
Host Type	I3 8G DDR4\128G, Ubuntu 18.04 LTD 64 Bit	I3 8G DDR4\128G, Ubuntu 18.04 LTD 64 Bit
Dimensions	(L* H* W) 550mm* 830mm* 760mm	(L* H* W) 910mm* 1531.5-1831.5mm* 1128mm
Power Supply	Single Phase AC220V,50/60Hz	Single Phase AC220V,50/60Hz
Platform	Aluminum Frame + Sheet Metal	Aluminum Frame + Sheet Metal
Control Method	Botton Box/Metal USB Foot Switch	Botton Box/Metal USB Foot Switch
Other Configurations	Keyboard + Mouse	Keyboard + Mouse
Conveyor	None	Manually Adjustable Docking Station, Adjustable Board Height 700-1000mm
Average Power Consumption	200W	400W

### Review Station: MKR-AOI-RS100

A work software that review the test results, quickly locates the defective area, and guides maintenance. It can be used with AIS30X, AIS40X, AIS50X, And AIS63X to display the defect location.

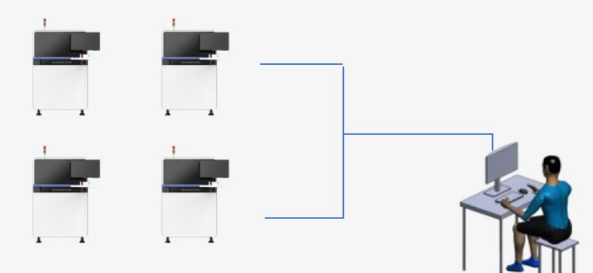
#### Scenario A

Used with AOI one-to-one, review defective results detected by AOI.



#### Scenario B

One-To-Many AOI, one person reviews the inspection data of multiple AOI (Mostly used in smt production lines)



# CUSTOMER CASE

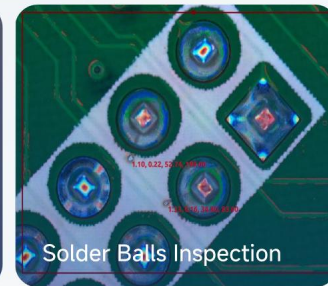
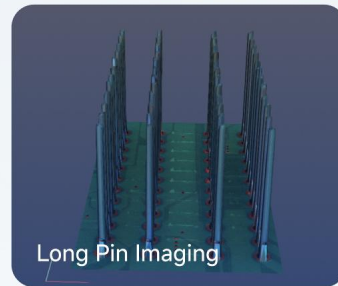
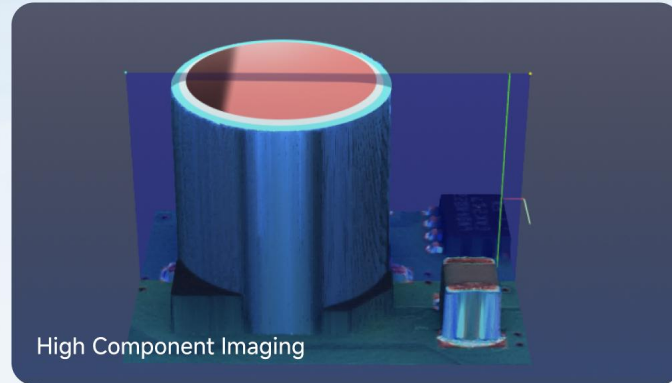
## Automotive

### ► Pain Points

- The quality of 3D imaging needs to be guaranteed to ensure detection accuracy, including special-shaped components.
- Strict board cleanliness requirements of no solder balls allowed.
- The missing inspection rate is required to be 0.

### ► Product: 3D AOI

- High-Precision multi-directional structured light projection combined with AI noise reduction technology enables 3D imaging of long pins and high components, providing accurate height information.
- By training the solder balls detection model with AI, the detection rate and accuracy is greatly improved.



## Home Appliances

### ► Pain Points

- Large product demands and high production capacity required.
- Frequent false calls and missed calls when using traditional AOI, affecting production line efficiency.
- Increasing manual debugging and re-judgment results in high costs.

### ► Product: MAKER-RAY THT AOI of All Series

- AI one-click component search and auto-configuration boost programming efficiency and cut labor costs by over 48%.
- AI enhances inspection stability and accuracy, especially for industry challenges like holes, reducing false calls by 50%.
- MAKER-RAY Pre-Wave AOI enables real-time inspection. Three-stage post-wave inspection reduces CT time by 60%, meeting higher production capacity needs.



## PROTOTYPING

### ► PAIN POINTS

Many varieties and frequent line changes. Complicated and time-consuming traditional AOI programming easily cause board stacking and affect the efficiency of production line operation.

### ► PRODUCT: MAKER-RAY SMT AOI of ALL SERIES

Through the one-click search of MAKER-RAY AI, auto-search and programming of components and solder on the entire board. Shortened the programming time to one third of the original time, greatly improving the detection efficiency.

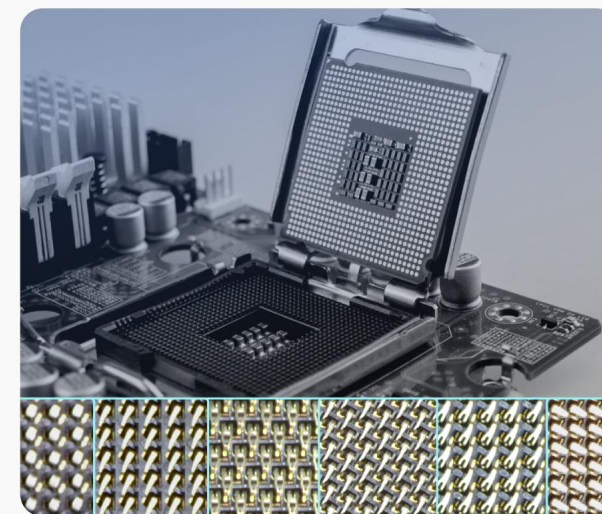
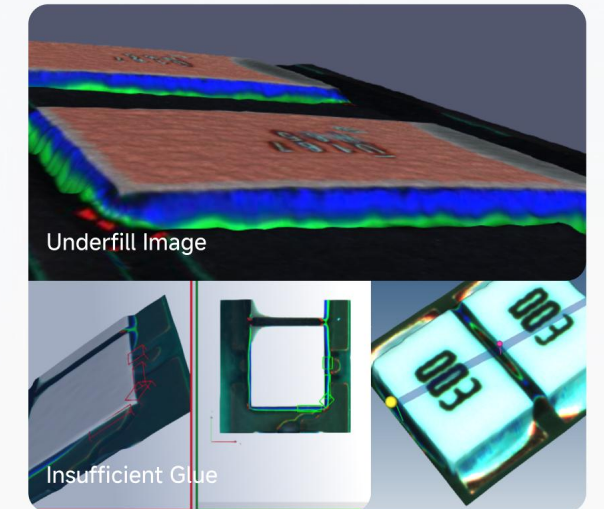
## Consumer Electronics

### ► Pain Points

- Black Underfill glue scatters more electromagnetic waves, and the light reflection energy is weakened, resulting in poor 3D imaging effects and affecting the detection results.
- Air hole vary in size and shape and are easily affected by color. Traditional detection algorithms are difficult to detect accurately, which reduces product reliability.

### ► Product: MAKER-RAY 3D Coating AOI

- Multi-Angle projection and special angle compensation of light source are used to ensure accurate acquisition of underfill glue adhesion and improve detection accuracy.
- Dedicated AI Air Hole Detection Algorithm improves detection efficiency and accuracy.
- The Glue Creeping Multi-Layer Stacking Algorithm can accurately detect glue creeping failure, avoid defects such as voids, and improve product quality and reliability.



## Computer Servers

### ► Pain Points

Various CPU SOCKET styles and different baffle heights, making it difficult to image. Black capacitors and collinearity detection have high false calls, making it difficult to guarantee product reliability.

### ► Product: MAKER-RAY SMT AOI of All Series

- Dedicated CPU light source solution reduces cover interference and is compatible with 6 types of CPU detection (Continuously increasing).
- The AI Algorithm greatly improves the detection effect of items with complex features such as black gold capacitors, black board materials, battery holders, solder balls and solder holes.
- AI Minimalist Programming can realize auto-search of CPU pins, automatic configuration of algorithm models and parameters, and greatly improve programming efficiency.

