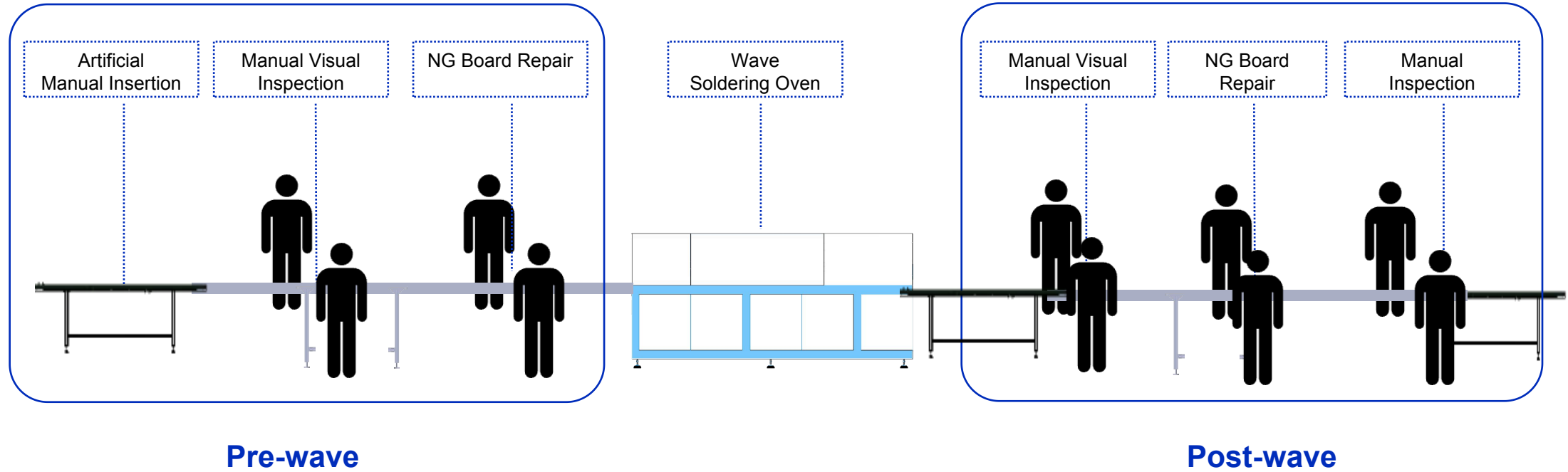




MAKER-RAY

AIS30X-HW

Inline THT Solder Automated Optical Inspection Machine



01

Serious Consequences of Missed Inspection of Solder

NG soldering lead to short, potential safety hazards and others, so 100% detection is crucial.

02

Long Programming Time

Vrious solder joint defects. Conventional algorithms require drawing frames and extracting colors one by one, which takes a long time to program and debug.

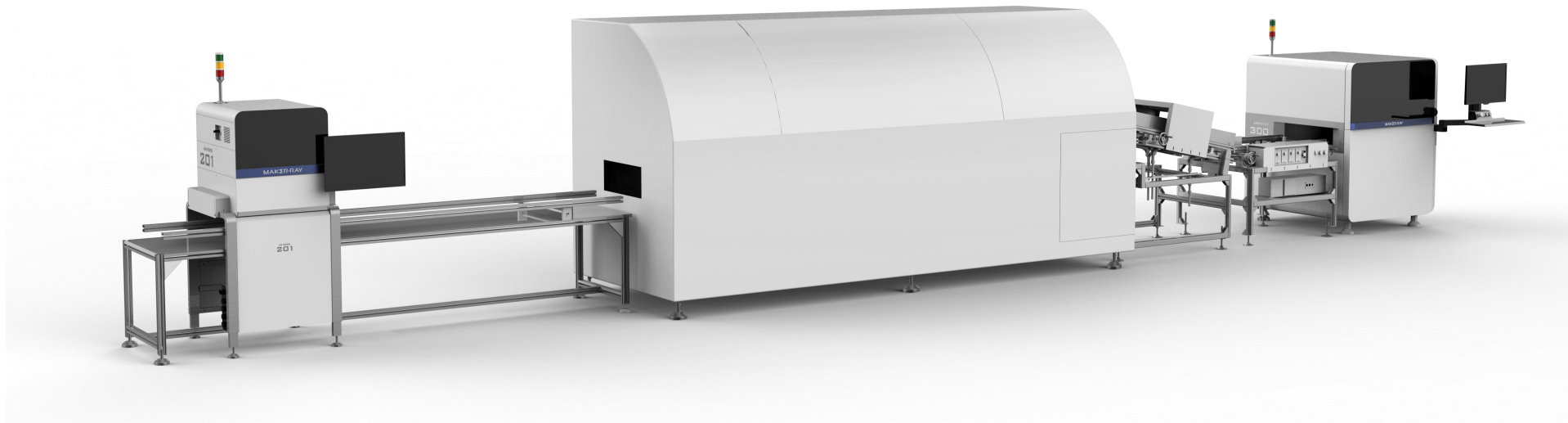
03

Difficulty in Solder Joint Inspection

Solder joint morphology varies greatly. Conventional color extraction algorithm is easily disturbed, resulting in missed inspection and false call.

THT Production Line with THT AOI

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Pre-wave AOI

Wave-Soldering Oven

Post-wave AOI

AIS30X-HW

Inspect THT Solder joints defects at bottom

97%

AI intelligent algorithm covers more than 97% of inspection items

Solder hole

Extract tens of thousands of solder hole defect features in multiple dimensions, with strong inspection capability

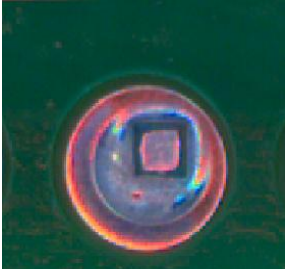
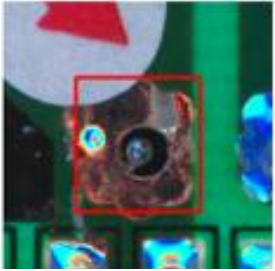
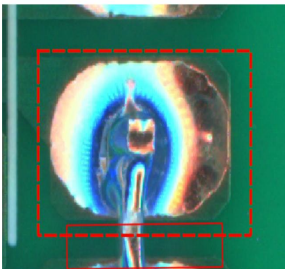
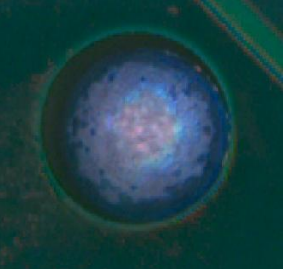
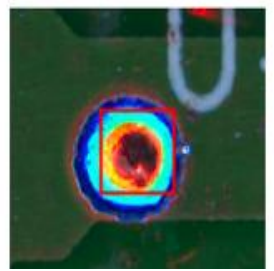
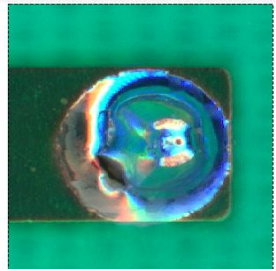
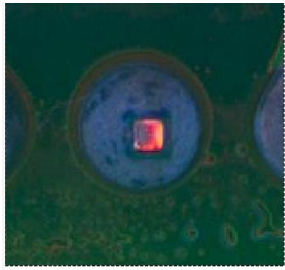
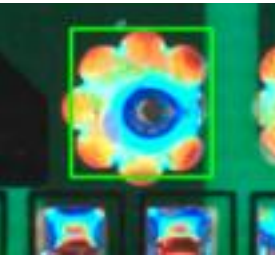
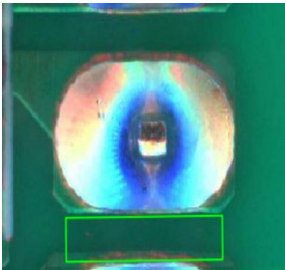
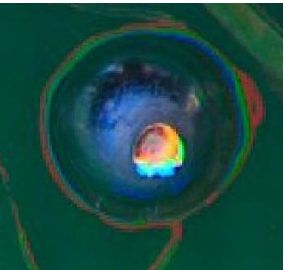
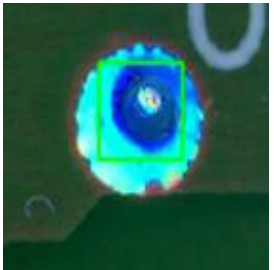
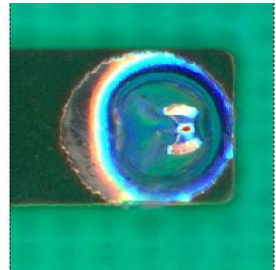
5 min

Intelligent programs in just 5 minutes



Inspectable Defects

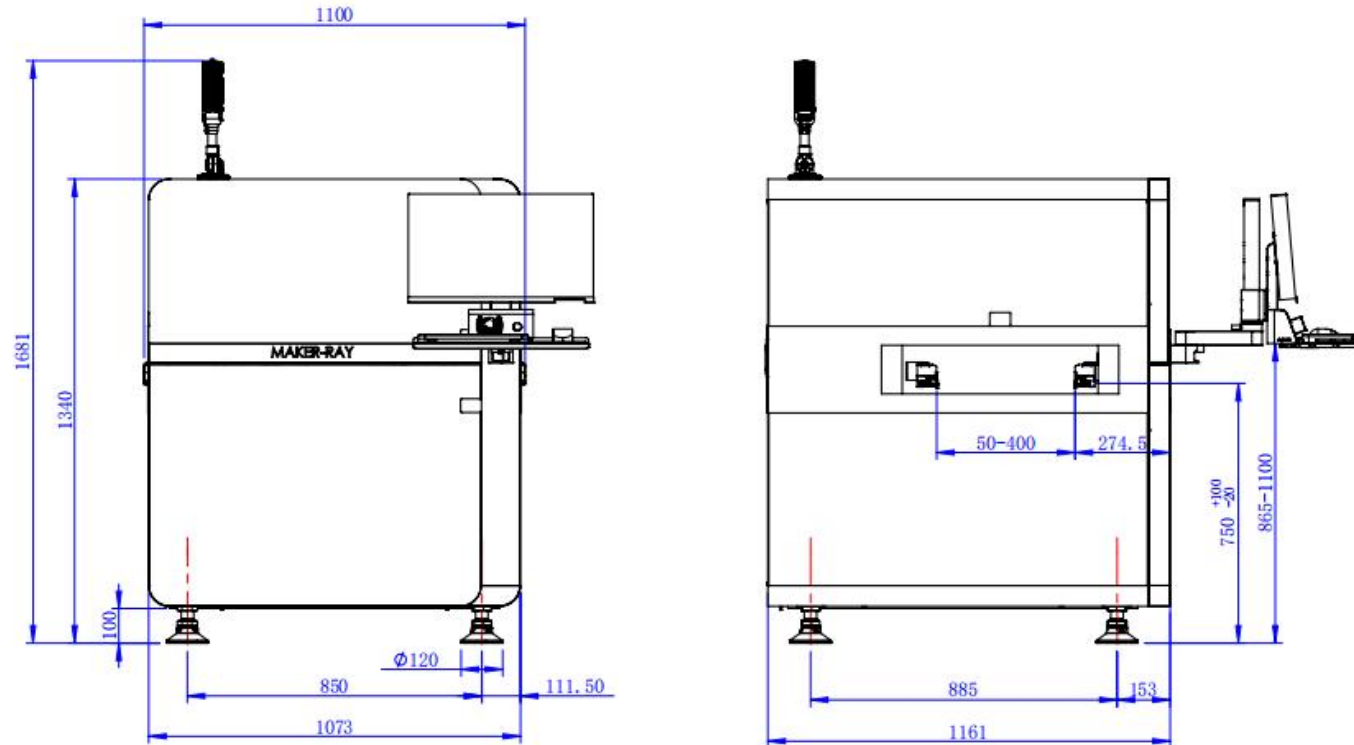
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	Insufficient Solder	Exposed Copper	Bridging	No Foot	Wrapped Solder	Solder Hole
NG						
OK						

AIS30X-HW Architecture Diagram

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Professional designed to ensure product performance while reducing the size of the equipment. **Light and simple shape** to make production line layout more flexible.

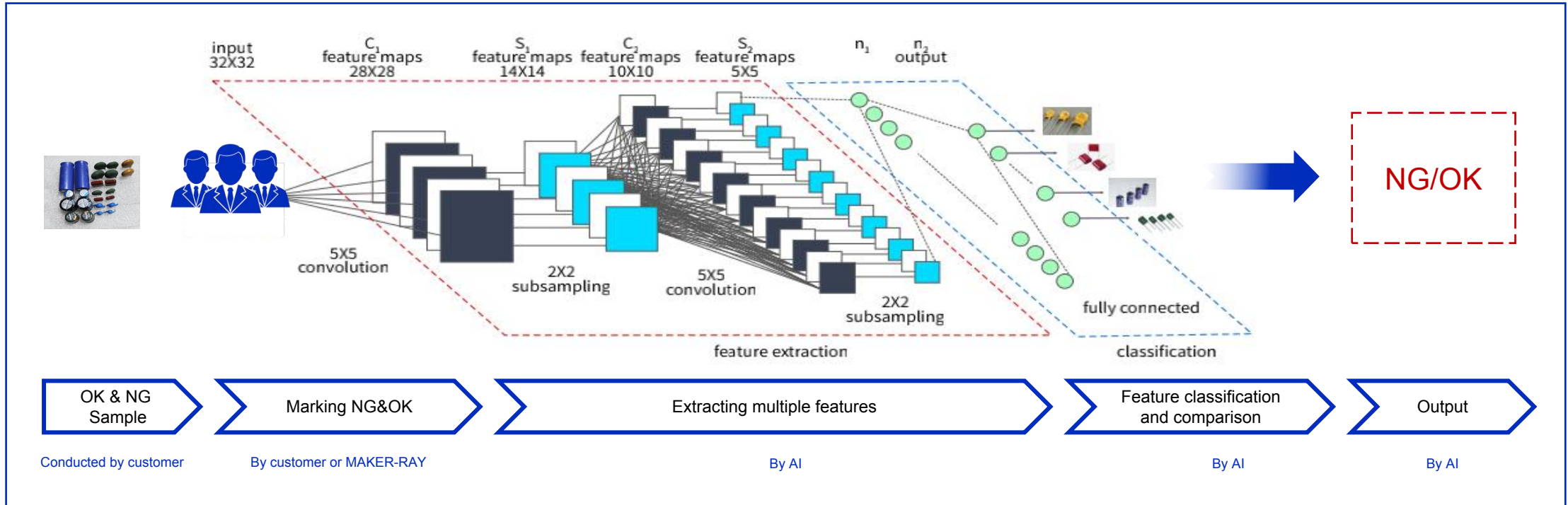


*AIS303B-HW

Unit, mm

Core Technology: AI Deep Learning Algorithm

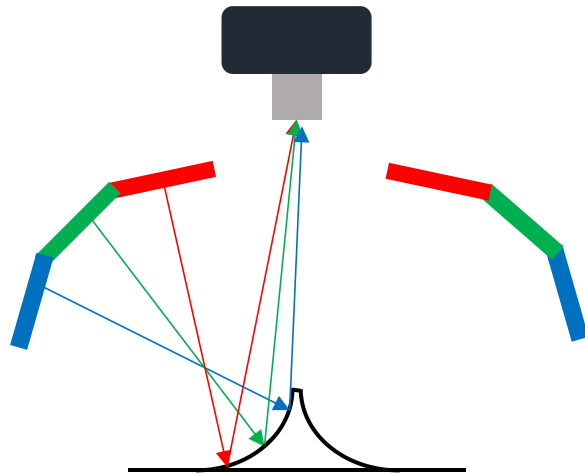
The convolutional neural network algorithm is used to recognize images, **extract** image **features** for learning and training, realize **one-click** automatic identification of components, and **intelligently** judge defects.



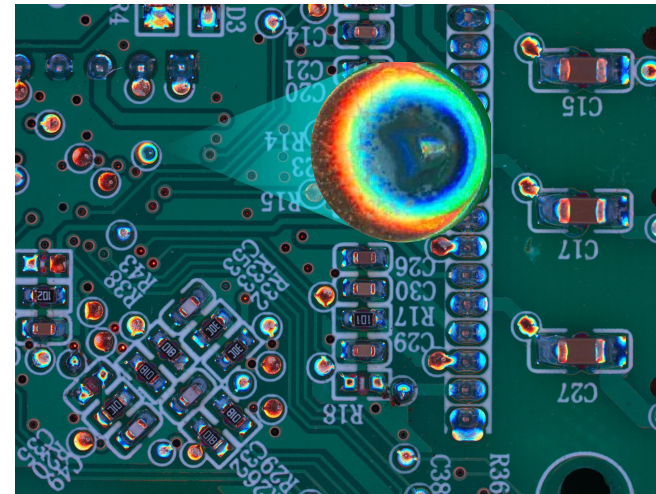
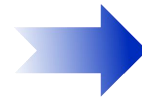
Core Advantage: Professional Multi-color Integral Light Source. Truly Restore Solder Joint Shape

MAKER-RAY

RGB light sources at different angles can accurately reflect the surface slope information of the object, making the stratification of solder joints **more obvious and clearly showing NG soldering**.



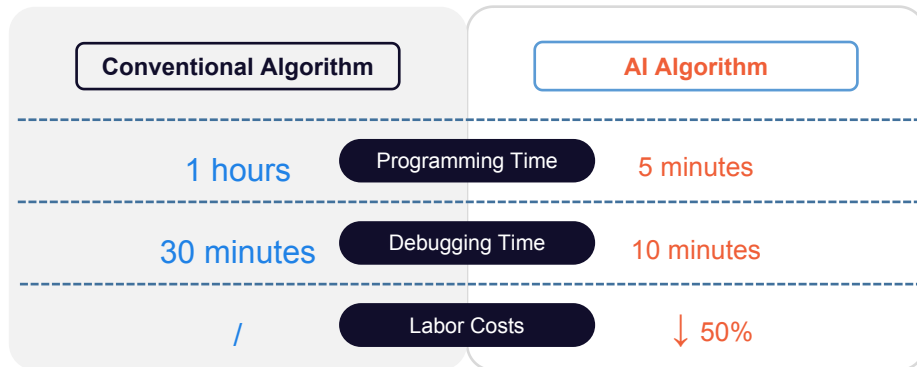
Multicolor RGB Light source Irradiation



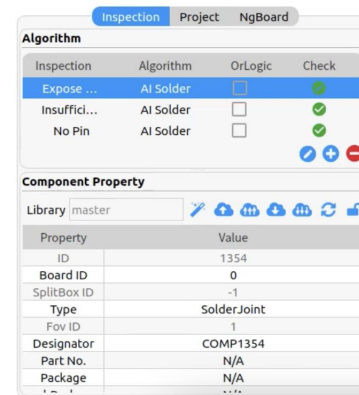
Highlight the 3D information of solder

Core Advantages: Intelligent Programming, Efficiently Leading the Industry

Based on big **data + AI deep learning algorithm** training, it covers more than 90% of solder joint models, realizes automatic identification and parameter adjustment of solder joints on the whole pcba. Easy to operate. Not rely on engineer experience. **Improves line change speed. Saves manpower.**

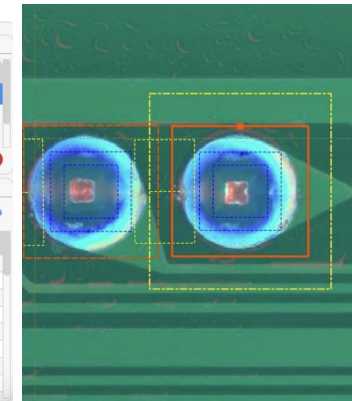


*Take the programming for the same board by same person as an example



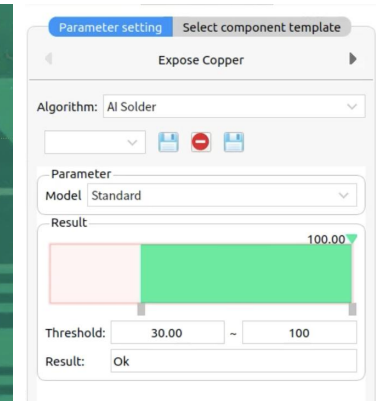
Intelligently configure algorithm

Verify the type of solder joint to be detected to configure the algorithm



Automatic identification of solder joints

One-click search for solder joints and draing the inspection boxes on the entire board automatically



Intelligently bringup parameters

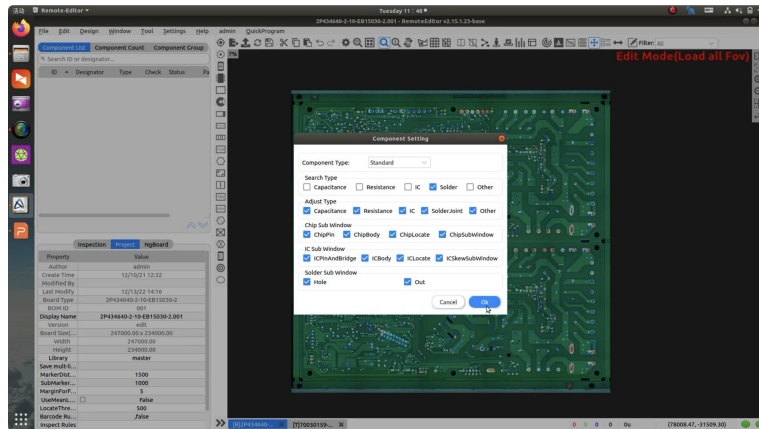
Intelligently configure parameters by default. Can also be adjusted manually

Core Advantages: Intelligent Programming, Efficiently Leading the Industry

MAKER-RAY

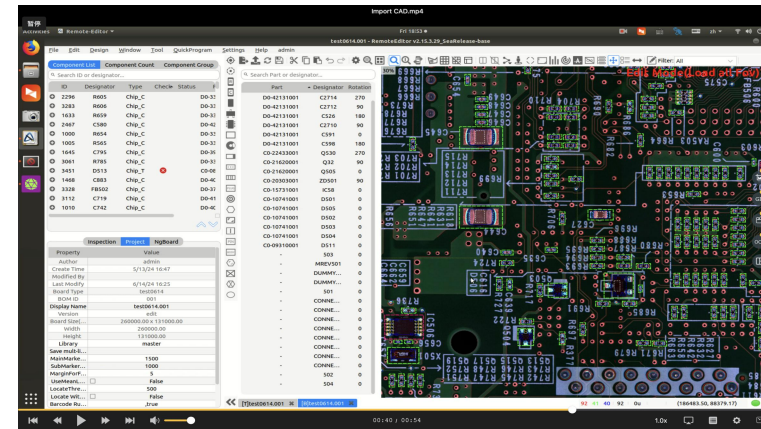
Algorithm Management Tool

Algorithms library can be personalizedly setup according to the inspection scenarios. Improve programming efficiency and accuracy



Component Library Synchronization

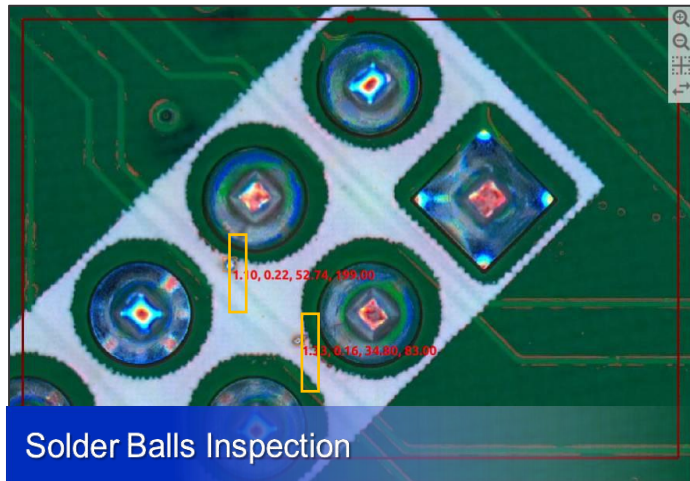
Supports auto-matching with CAD, and synchronizes the parameters programmed by AI search to the component library for subsequent use.



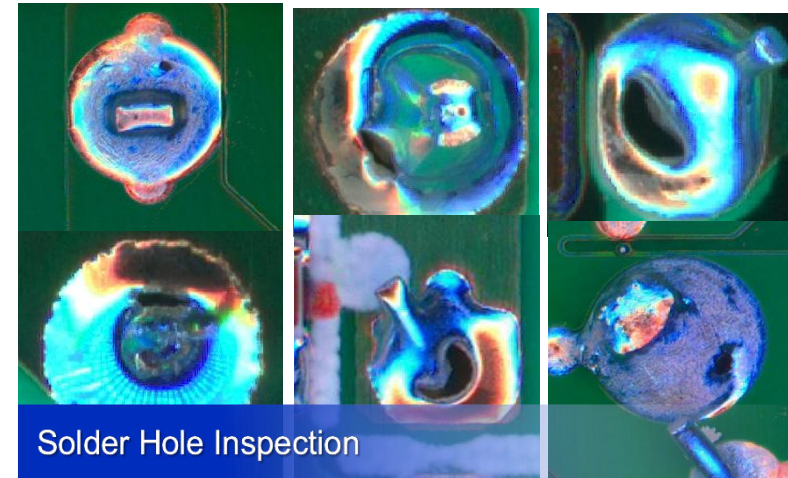
Core Advantages: Multi-dimensional Feature Extraction Supporting Stable Identification of Difficult Items

MAKER-RAY

The model trained based on big data has **strong detection and generalization capabilities**, which can ensure the inspection caused by diversified deviations of solder joints, and solve the problems of missed inspection and false calls caused by large changes in solder joint components and susceptibility to the influence of pins and components.



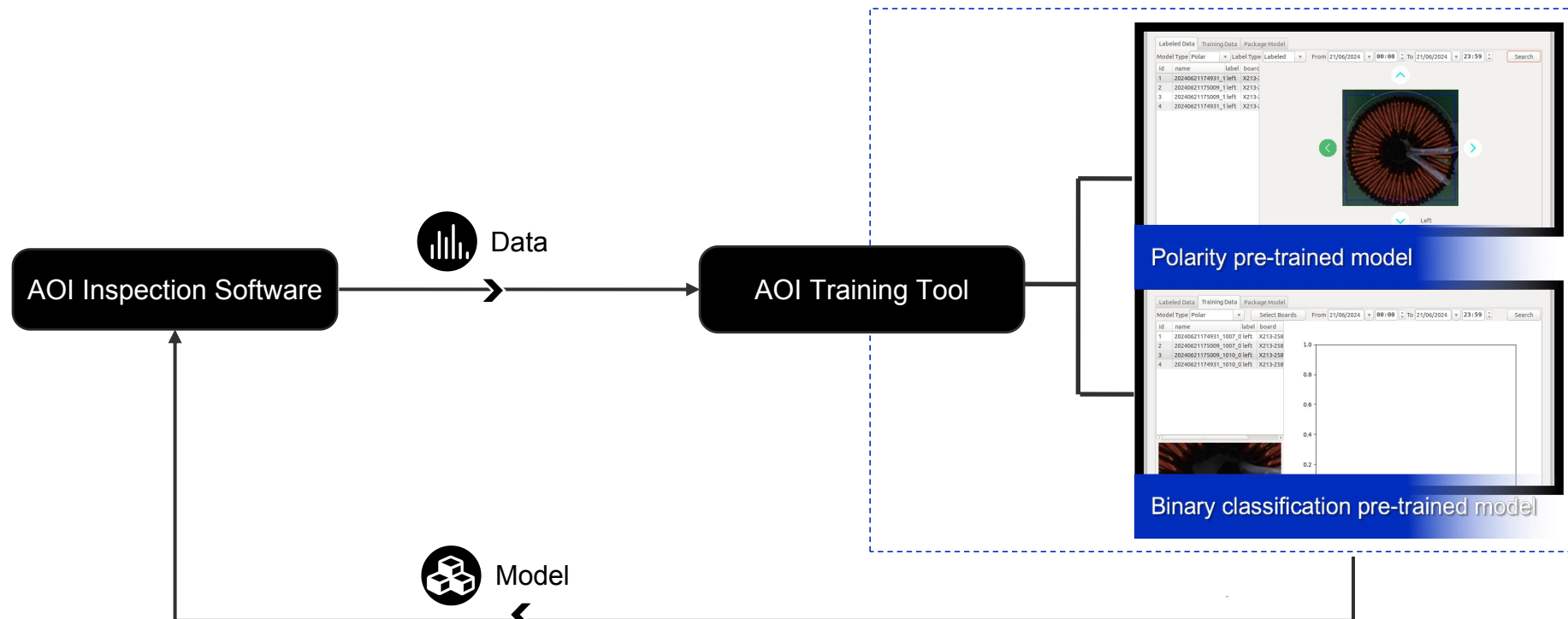
No manual intervention is required, and it is not affected by silk screen printing or dirt. It can intelligently identify the solder balls, size and position of the entire board.



Covers various hole shapes, with strong anti-interference and generalization capabilities.

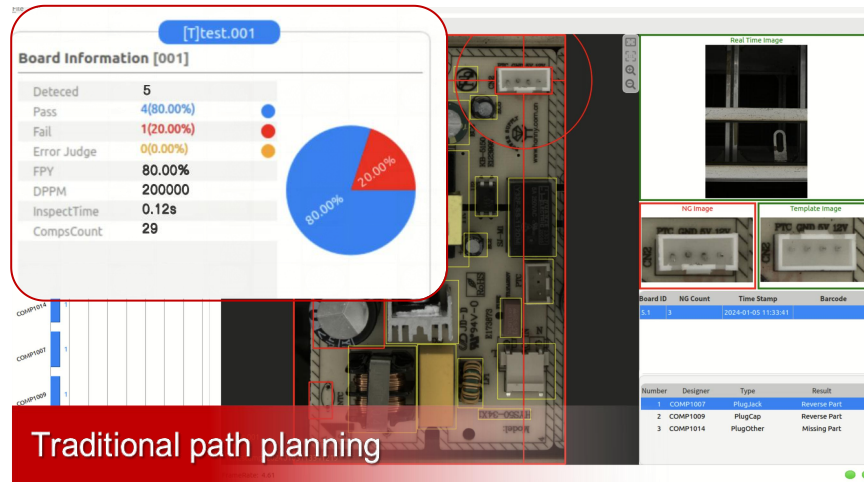
Core Advantage: AI Self-training and Continuous Upgrading of Inspection Capabilities

The machine can conduct AI training autonomously, allowing the device to quickly **learn new and special components**, continuously iterate recognition capabilities, and improve inspection capabilities.

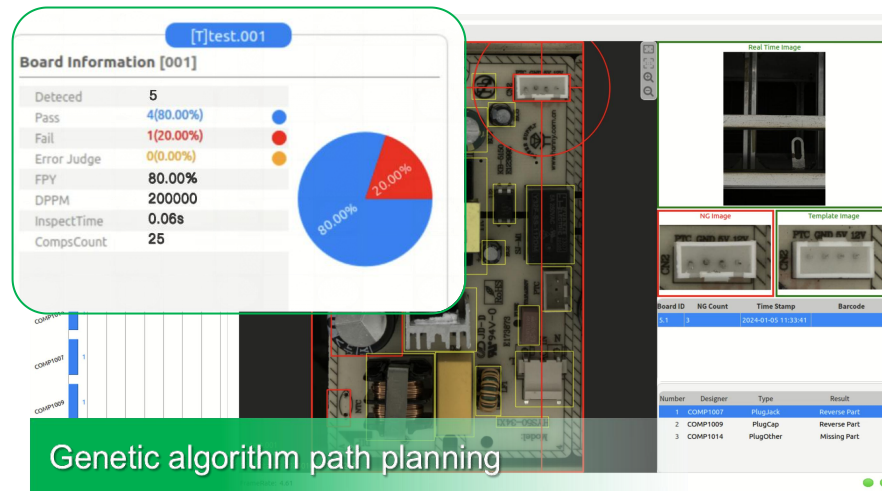


Core Advantages: Genetic Algorithm Path Planning, Faster Inspection Speed

MAKER-RAY



Upgrade the traditional path planning to intelligent planning path. Auto-filter the positions without solder joints, take pictures quickly to reduce the number of FOV, and make the inspection faster.



- ➔ Traditional path planning requires 29 FOVs, and the total inspection time needs 0.12s
- ➔ Genetic algorithm path planning, only 25 FOV needed with 0.06s. Speed increased by 50%

Core Advantage: Complete SPC Data to Empower Production Management

The inspection data is retained in real time, and **rich data statistics and analysis charts** are provided. It supports exporting or connecting to MES system detailed data reports to help enterprises trace production and improve processes.

The screenshot displays the MAKER-RAY Statistical Process Control (SPC) software interface. It features a top navigation bar with options like 'Settings', 'Language', and 'Help'. Below this, there are tabs for 'Search View', 'Single PCB View', 'Defect View', 'Trend View', 'Stability View', 'Export View', and 'Same Position View'. The main area is divided into several sections:

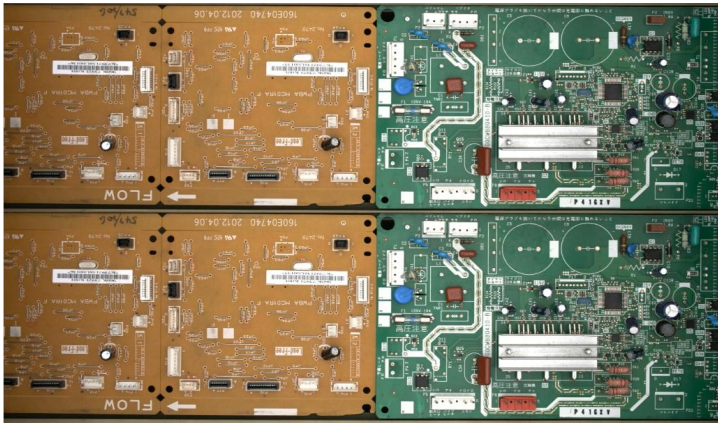
- Inspection Statistics:** A table listing project details such as project name, board count, job, batch, order name, board index, board ID, board side, board no, unique no, and test time.
- Defect Statistics:** A section with a blue header containing various charts including 'Ng Type Bar Chart', 'False Type Bar Chart', and 'Total Board Image'.
- Defective Details:** A section with a blue header showing a detailed view of a defective board, including a 3D image and a table of defect information.

project name	board count	job	batch	order name	board index	board ID	board side	board no	unique no	test time	cost time
11111111	4	EC016018...	V00	None	0	S201	Bottom	CARH1A00...	2024-07-15...	24.278	24.278
wwwwww	2	EC016018...	V00	None	0	S201	Bottom	CARH1A00...	2024-07-15...	24.613	24.613
	4	EC016018...	V00	None	0	S201	Bottom	CARH1A00...	2024-07-15...	24.821	24.821
	4	EC016018...	V00	None	0	S201	Bottom	CARH1A00...	2024-07-15...	24.882	24.882

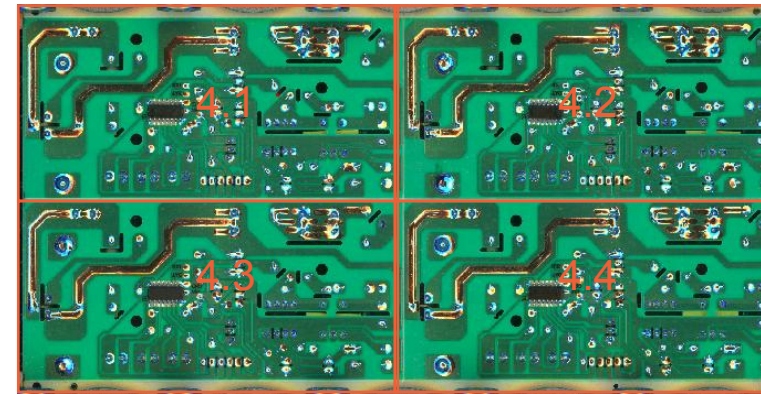
Core Advantage: Rich Inspection Modes. More Practical

MAKER-RAY

Various modes can be setup to support different application, such as alternative materials, post-wave mode use, etc., which is more practical.



Mixed board Inspection



Multi-panel Inspection

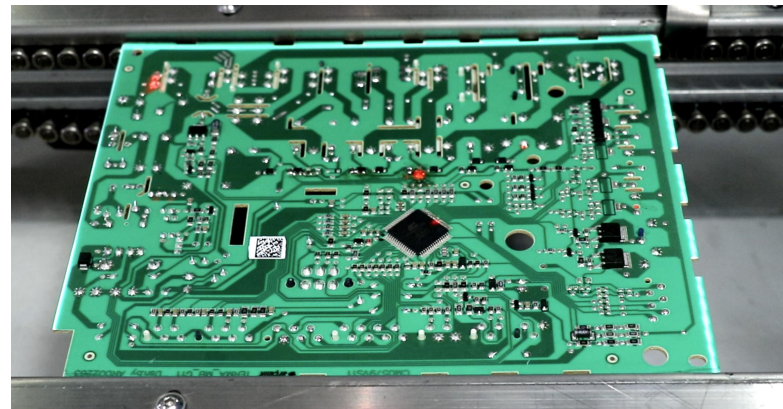
Option: Repair Station Help Quickly Locate the NG Position and Improve the Maintenance Efficiency

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It can be used with post-wave AOI to assist production line workers in board repair and improve work efficiency.



- ➔ There is **Offline or Inline** to support multi-station operation. Flexible and efficient
- ➔ Support whole board/divided area, single point/multi-point and **different size cursor projection ways**
- ➔ Support **color setting**. Be able to adapt to various PCB board background with different colors

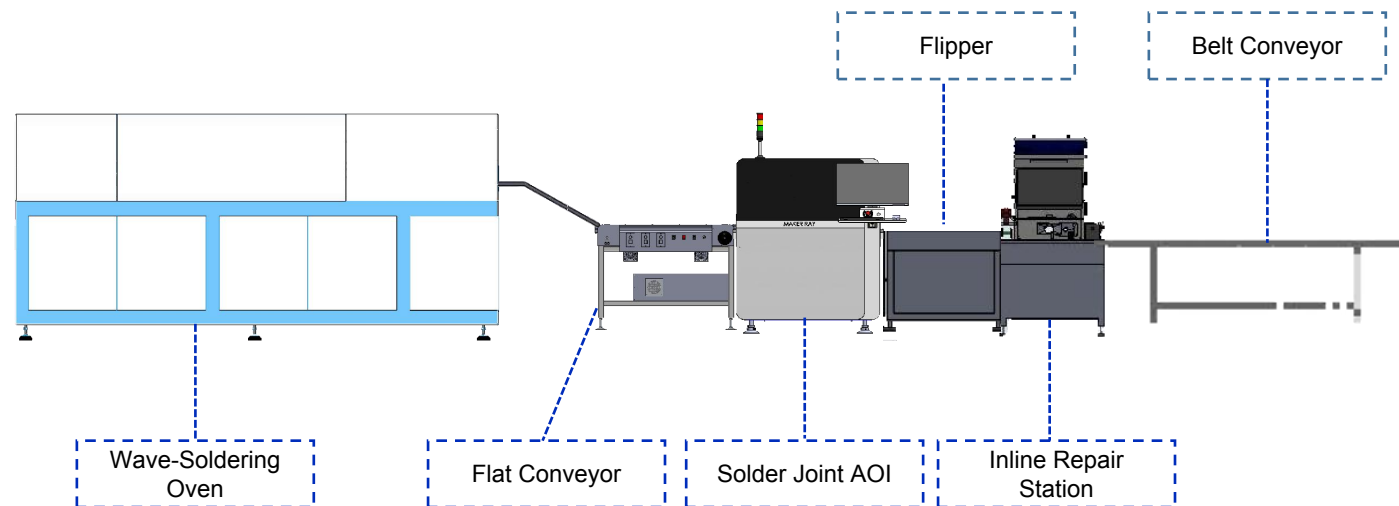


Customer Case: : YG Power Co., Ltd.

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➔ **Problem:** Small Solder joints with various status. Need long programming time by conventional AOI and prone to **missed inspection and false call**. Manual re-inspection is labor-intensive and costly. In addition, NG products will have a negative impact on the quality of the company's products.

➔ **Solution:** Install AIS30X post-wave, collocated with inline repair station to ensure the NG can be repaired timely in this section to avoid it follow to next section, thus **improve the production efficiency and quality**.



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MAKER-RAY

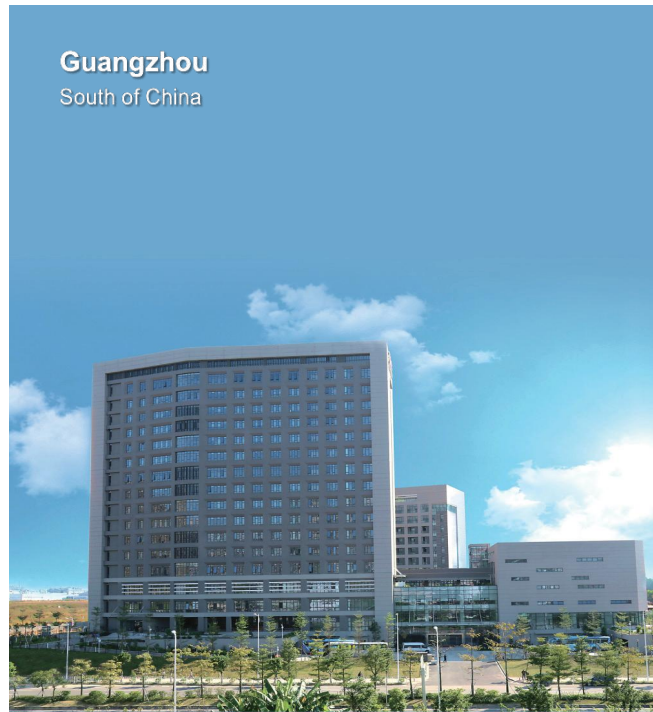
About Us



MAKER-RAY MAKER INDUSTRIAL INSPECTION EASIER

MAKER-RAY

MAKER-RAY focuses on the field of optical inspection in the **PCBA production process**. It is a high-tech enterprise integrating R&D, sales, and services. It adheres to the mission of "making industrial inspection easier", **drives innovation with technology**, and applies **deep learning algorithms to AOI** to provide companies with competitive optical inspection solutions.



Complete Product Layout

MAKER-RAY

Dual in-line Package Inspection (THT)



Pre-Wave AOI



Post-Wave AOI



Double Sided AOI



Inline Repair Station

Surface Mount Inspection (SMT)



2DAOI



3DAOI



3DSPI

Surface Coating Inspection (Coating)



Single Sided CCI



Double Sided CCI

Three Institutes and One Research Station Provide Strong Support for Technology-driven Growth

MAKER-RAY

Academia Sinica

Over 10 years of experience in AI algorithms and machine vision, achieving innovative breakthroughs from traditional algorithms to AI algorithms

Central Academy of Engineering

Conduct research on engineering materials, innovative processes, standardized modular design, and simulation calculations to improve the reliability of equipment design

“3+1”

Innovation Design Institute

Conduct user scenario and human interaction research, gain insight into user pain points, provide design and experience solutions, and create an extremely user-friendly interactive experience

Postdoctoral Research Station

Obtained the qualification of Guangzhou Postdoctoral Innovation and Practice Base, established cooperative relations with well-known domestic and foreign universities and research institutions to ensure the supply of talents

Growth Curve

MAKER-RAY

Drives innovation with technology to provide companies with competitive optical inspection solutions.

1200%

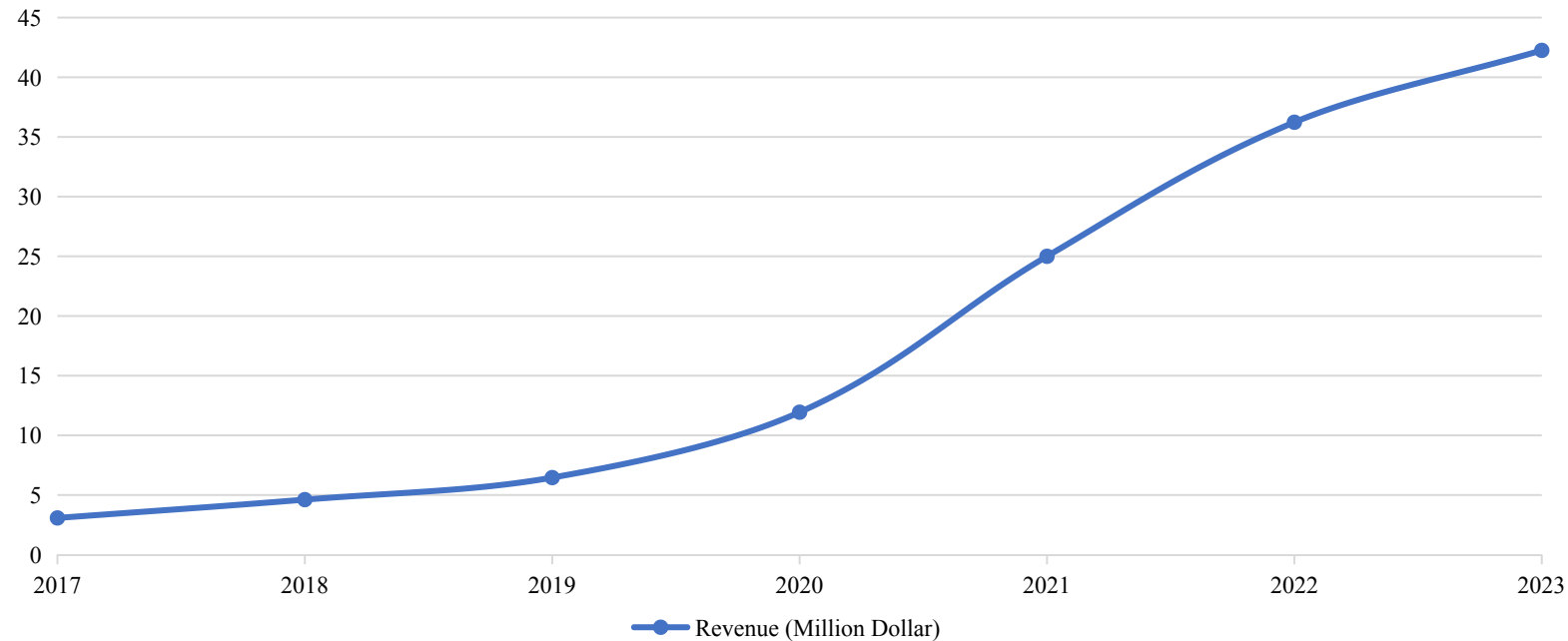
5 years of
performance growth

80%

Compound
Growth Rate

TOP 500

The choice of
world's top 500 companies



Complete After-sales Service System

MAKER-RAY

Maker-ray has been deeply involved in the industry for **more than ten years** and has established **more than 10 service** areas across the country and **20 service areas worldwide**. Its business scope covers **more than 200 cities** across China as well as many overseas regions including **Europe, America, Africa, and Southeast Asia**.



Marketed at Home and Abroad Used by Thousands of Factories

MAKER-RAY



MAKER-RAY Trusted by Them

MAKER-RAY

Home Appliance	 FOTILE 方太 回爱伟大	 Midea	 CHANGHONG 长虹	 Haier 海尔	 HMD 广东华美达电器有限公司	 Panasonic 松下电器	 SKYWORTH 创维
Consumer Electronic	 SUNWODA 欣旺达	 MITAC	 RAMAXEL 亿芯	 HKC 惠科股份	 HEG 海格科技	 Simand 新安电器	 ASUS Rock Solid - Heart Touching
Security and Defense Communication	 FiberHome	 dahua TECHNOLOGY	 HIKVISION	 FLY	 Phenix 凤凰	 CTI 华测检测	 IPW
Power Supply	 林洋能源 LINYANG ENERGY	 Huntkey 航嘉	 MW MEAN WELL 明纬电源	 GOSUPER 高斯宝	 台达 DELTA Smarter. Greener. Together.	 EAGLE RISE 伊戈尔电气股份有限公司	 迈思普电子有限公司 MESS POWER ELECTRONIC LIMITED
Vehicle Electronics	 BYD 比亚迪汽车	 明世电子 www.mshdz.cn	 中国中车 CRRC	 上海电驱动	 MASS POWER	 Valeo 法雷奥	
Instrumentation	 精创股份 — Since 1996 —	 Edon 顿顿	 NARI 国电南瑞	 永泰隆 YTL	 中信华 ZHONGXINHUA	 许继集团	 Ceyear 思仪
Industrial Control	 洲钜科技	 Inovance 汇川技术	 axxon simple and smart	 ORIGIN	 SIEMENS	 yytek 云浦科技	
EMS	 伟创力集团 FLEXTRONICS	 安费诺 ANFEINUO	 LuXshare 立讯精密工业	 英业达 Inventec	 wistron 緯創資通	 深科技 KAIFA	...



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AI+AOI

Make Industrial Inspection Easier