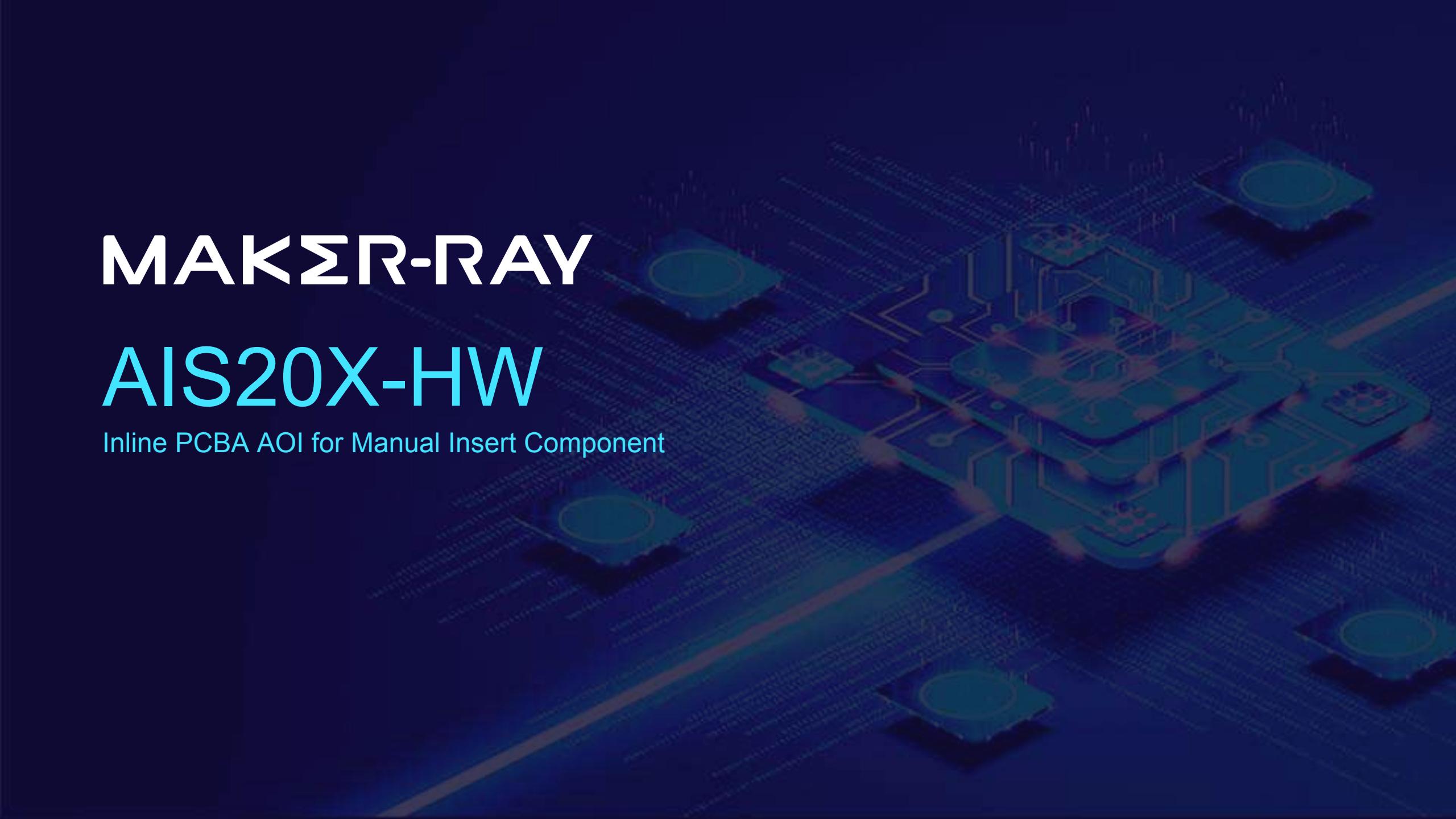


MAKER-RAY

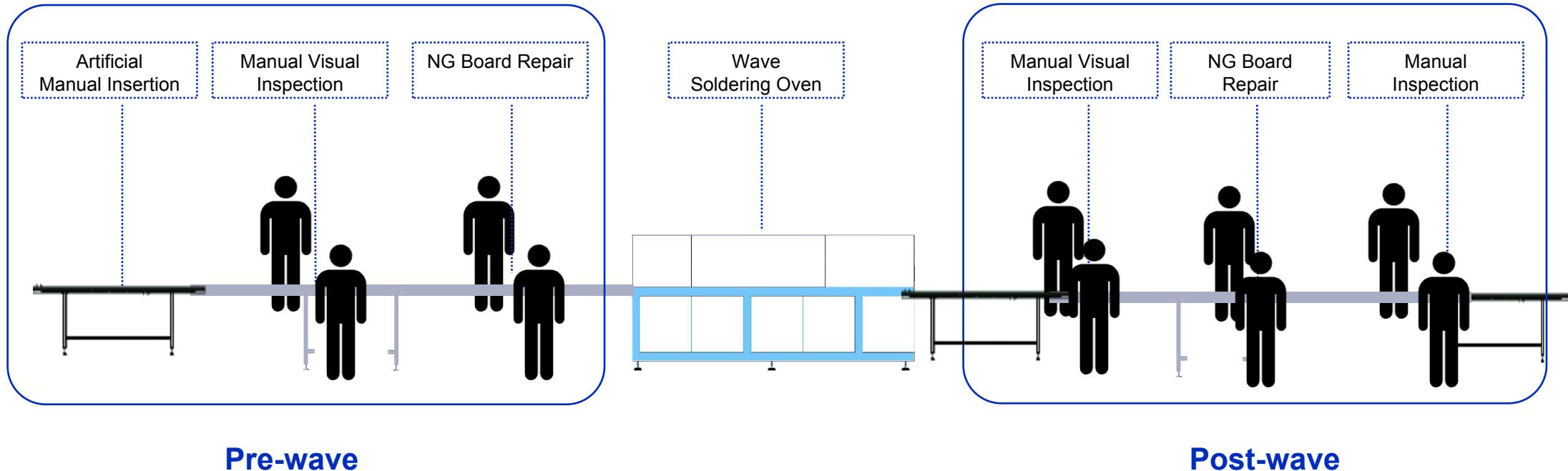
AIS20X-HW

Inline PCBA AOI for Manual Insert Component



Traditional Production Line without THT AOI

MAKER-RAY



01

Various MI components

MI components with different shapes and heights. Thus the inspection is easily disturbed.

02

Defective loss cost

NG are not found pre-wave. Difficult to repair post-wave. Pcba would be scrapped costly.

03

Complicated programming

Traditional AOI requires color extraction, threshold setting, brightness, contrast, saturation and other parameters, which is complex to operate.

04

Complicated programming

Hard to inspect the the components whose color is similar to pcba body, silk screen character by traditional color sampling detection

THT Production Line with THT AOI

MAKER-RAY



Pre-wave AOI

Wave-Soldering Oven

Post-wave AOI

AIS20X-HW

Inspect missing part, wrong part, polarity, extra part, etc of manual insert components



1st Brand Develop Inline Pre-wave AOI



The market share has **ranked first** in the industry for **5 consecutive years**



Trusted by **thousands of** factories worldwide



Inspectable Defects

MAKER-RAY

Wrong Part

Missing Part

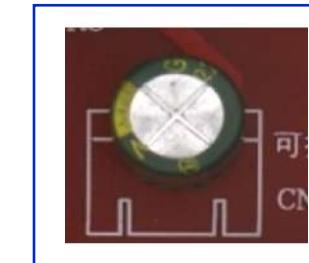
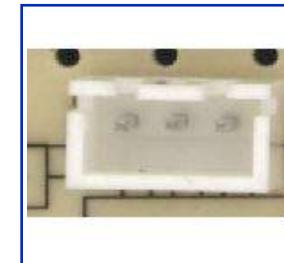
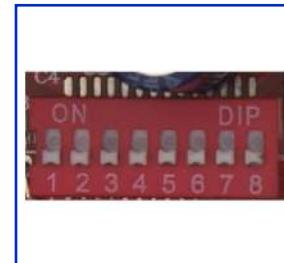
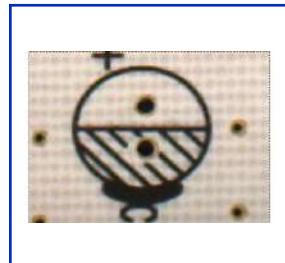
Extra Part

Socket Polarity

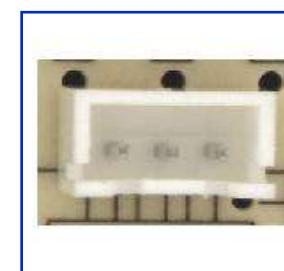
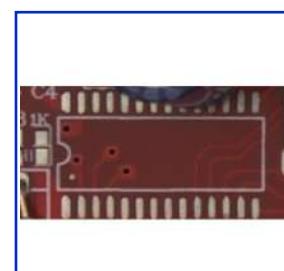
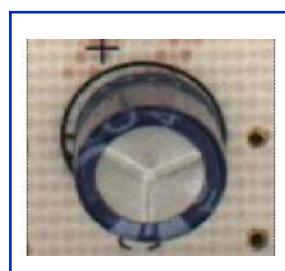
Diode Polarity

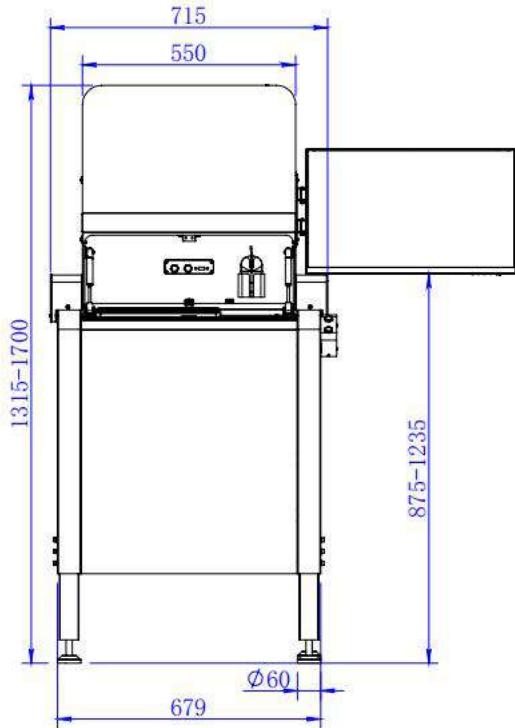
Capacitor Polarity

NG

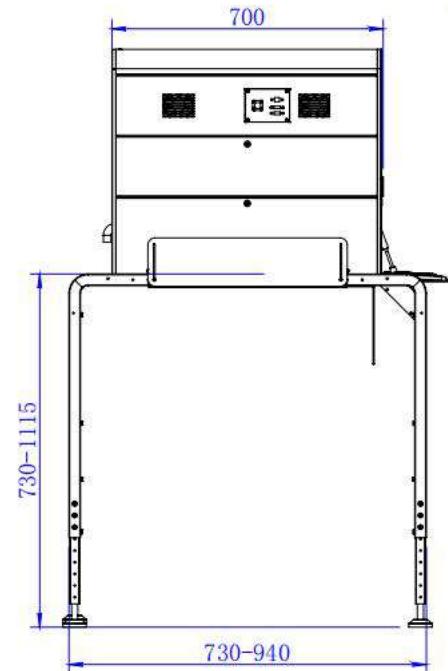


OK





*AIS203-HW



Unit, mm

- Cross-span structure. **Easy** to install.
- Installation position is not limited, **no need** to change the production line.
- **Adjustable** height and width. Strong applicability.

Core Advantages

MAKER-RAY

Scientific Light Source Solution

Adopting scientific light source solution, it has excellent component detection capability in high-component and high-density scenes.

AI Algorithm. Easy Programming

Based on deep learning algorithm training, it can be programmed intelligently with simple operation. Easy for New employees to start, and reduce training costs.

Accurate detection, low false calls

Excellent detection capabilities for character, component whose body color being the same or similar to pcba, special polarity, partial feature, etc.,

Multi-Inspection Modes to Adapt to Production Diversity

Supports multi-panel, mixing (no restrictions on board order), mixed material inspection mode, and multi-angle placement of boards.

AI Training Tool. Keep Updating

The device side can autonomously train special devices, continuously iterate recognition capabilities, and improve inspection accuracy.

SPC Statistics

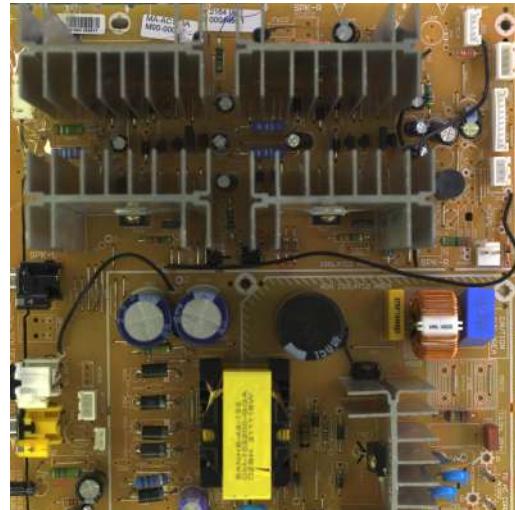
SPC statistical data has rich dimensions and various presentation forms, supports docking with MES system, and meets the needs of data statistical analysis.

Excellent Light Source Solution for Imaging Effect

MAKER-RAY

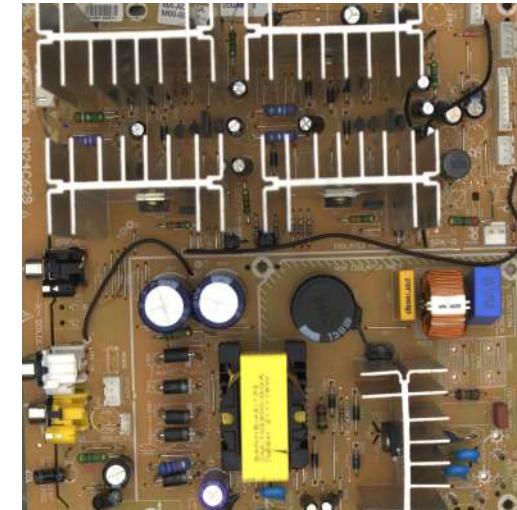
Developed a scientific light source solution to effectively solve the problem of MI blocking each other, and have excellent component inspection capabilities in **high-component and high-density scenarios**.

Under normal light sources



Dark

Maker-ray 20X-HW light source

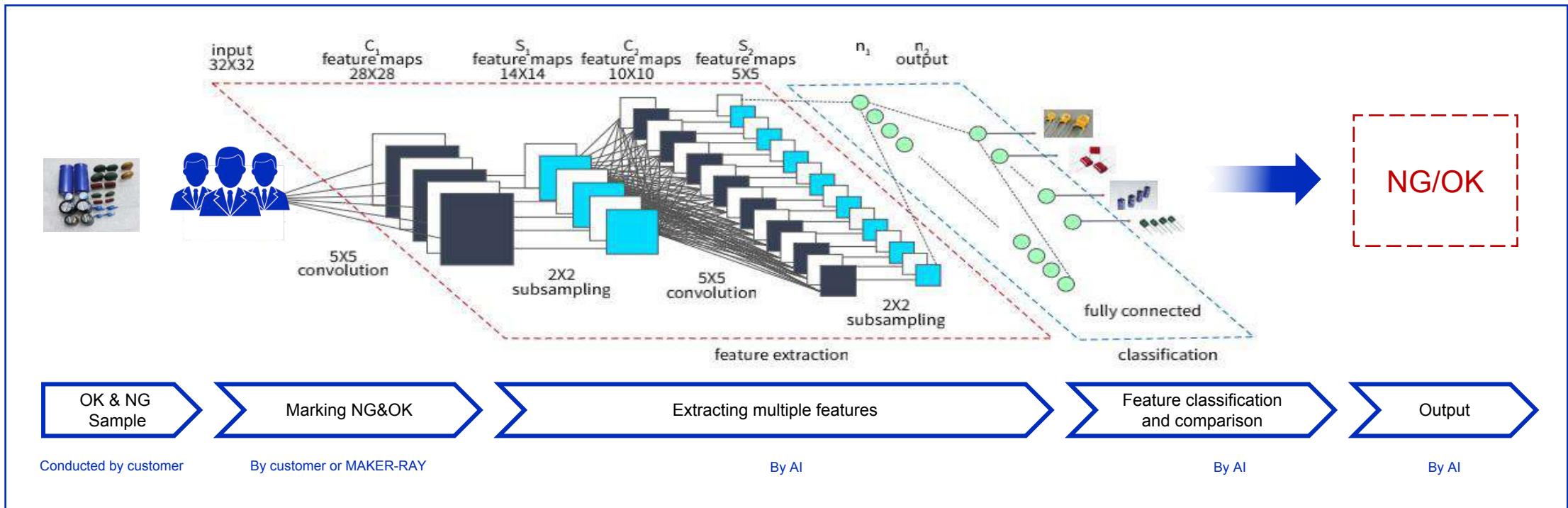


Clearly visible

Core Technology: AI Deep Learning Algorithm

MAKER-RAY

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.



Intelligent Programming. Shorten Programming Time by 50%

MAKER-RAY

Intelligent and convenient programming method, easy to use, does not rely on engineer experience, and can ensure program consistency.

→ AI One-click Programming

AI searches for components on the entire board with one click, automatically generates frames, and intelligently configures algorithm and parameters.

→ Algorithm Management Tool

Be able to customize the required algorithms according to the inspection scenarios, generate personalized algorithm libraries, and improve programming efficiency and accuracy.

→ Component library synchronization

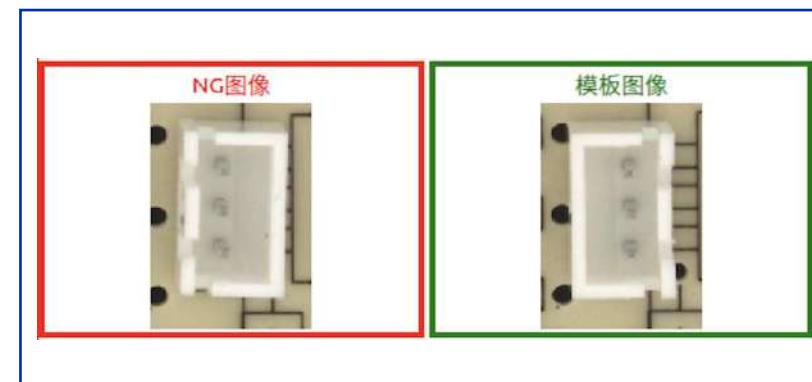
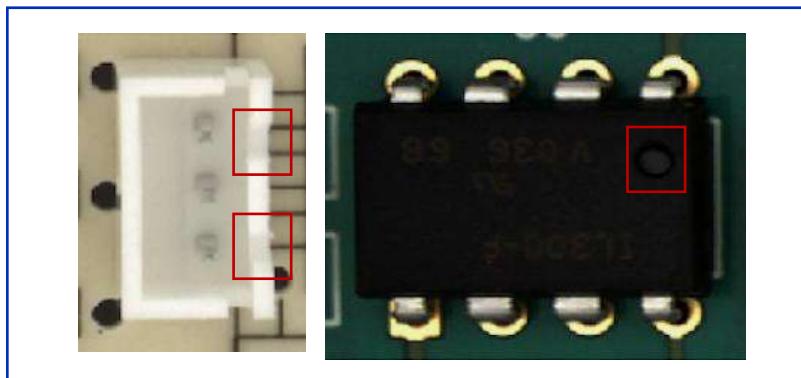
Supports synchronizes the parameters after AI automatic search and programming to the component library for subsequent use.



Strong Fuzzy Feature Recognition Capability

MAKER-RAY

The image classification algorithm is independently designed based on the **deep learning algorithm**. It has strong nonlinear analysis capabilities, can learn and represent complex relationships and patterns in images, and automatically learn and **extract high-level features of images**. Therefore, it can detect defects even when the features and entities are extremely similar, ensuring inspection accuracy.

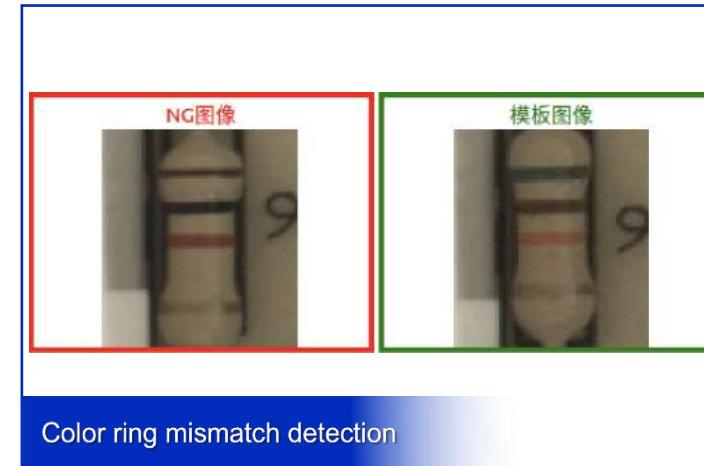
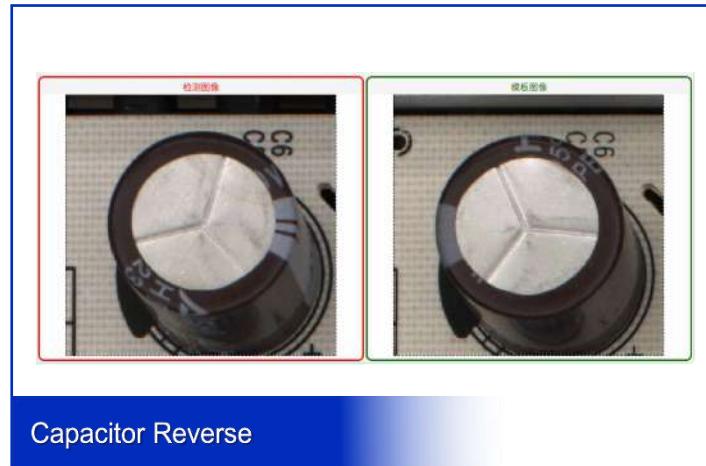


* Socket Reverse

Powerful Inspection of Complex Features

MAKER-RAY

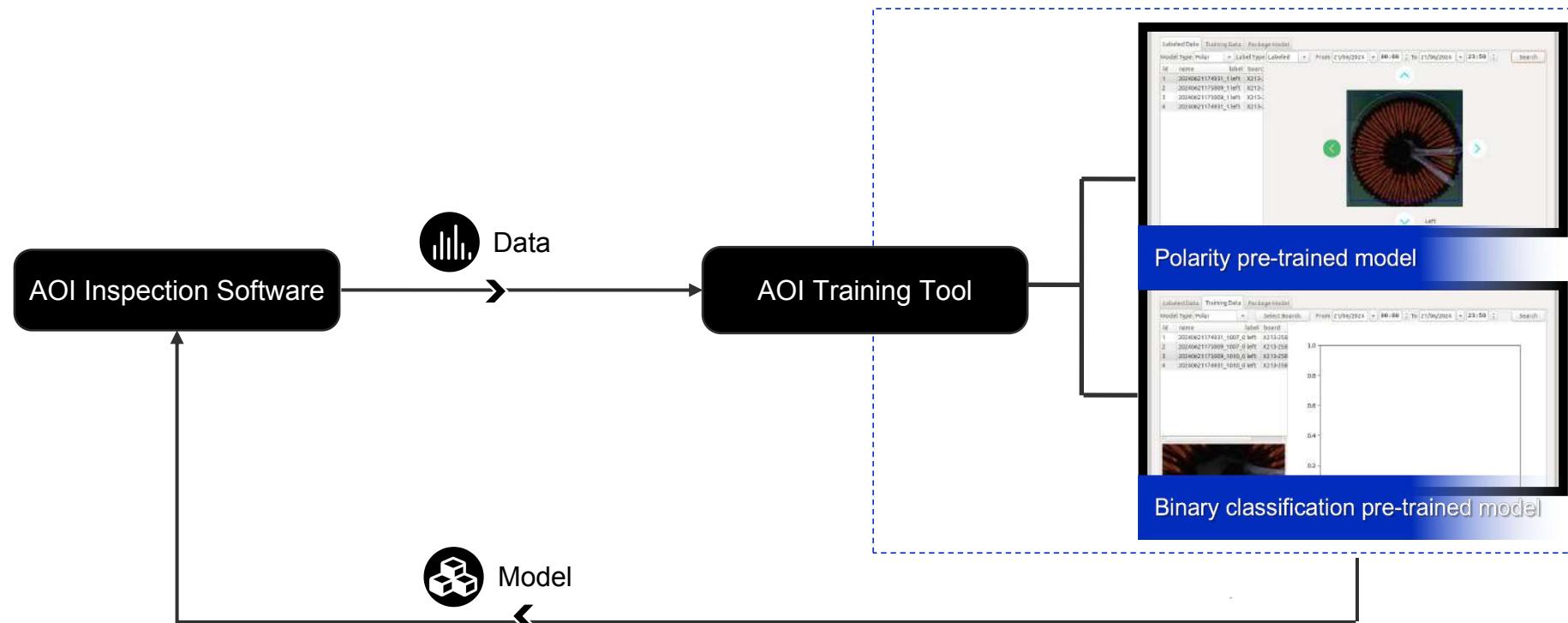
Relying on **massive sample learning**, it has strong generalization ability and be able to extract more **essential and subtle features of complex detection items**, improve recognition ability for subtle feature differences, and inspection accuracy.



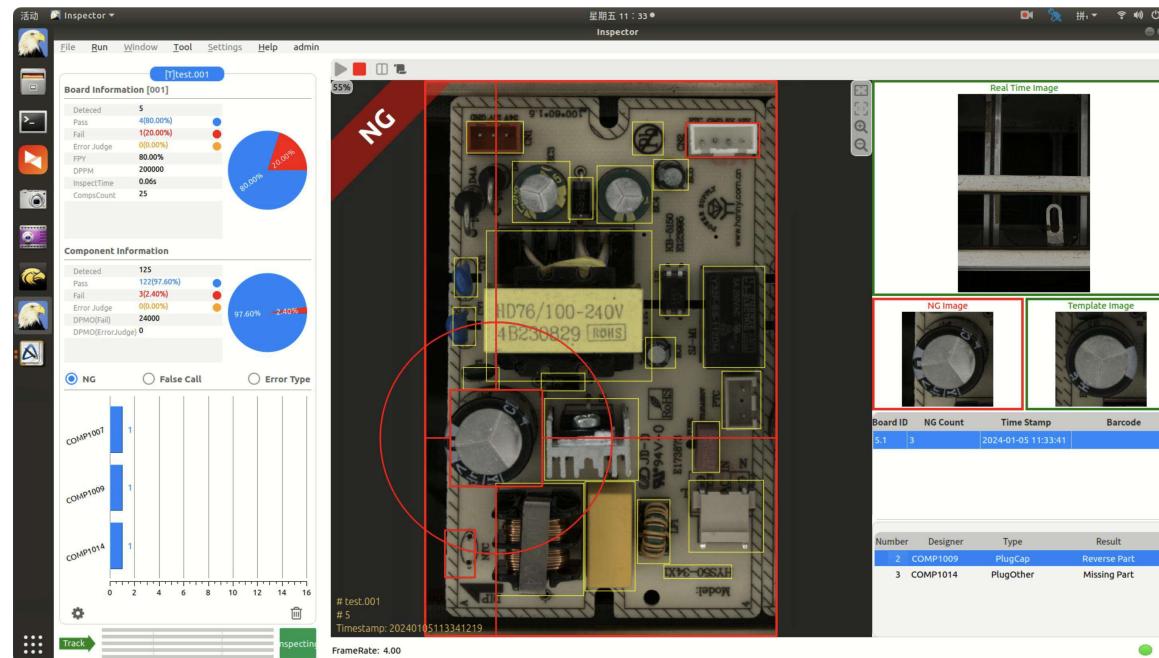
AI Autonomous Training to Continuously Upgrade Inspection Capabilities

MAKΣR-RAY

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.



When a NG board is generated, the AOI will broadcast the position number, type of component and type of the NG board **in real time**. The operator behind the AOI can immediately grasp the NG and repair it quickly. It can also help the manual **insertion operator** in the front pay more attention to this NG to avoid the wrong insertion again.



Production Line Control Box to Achieve Intelligent Linkage

MAKER-RAY

- Through the production line control box to control of the start and stop when there is NG, which is realized to ensure **timely repair of defects**.
- Output alarm when there is NG, meanwhile the **warning light** alarm.
- A set of interactive interfaces is reserved and **can be designed** according to on-site needs.
- Flexible application. The control box is small in size and **easy to place**.



*Option. Video Link: <https://youtu.be/ZQZVq4A-ctk>

NG Board Tracker Improves Maintenance Efficiency

MAKER-RAY

The Tracker is connected with AOI, when a NG appears, the LED light can be used to **locate NG and follow it** to guide employees to quickly locate and repair. **Improve maintenance efficiency** and avoid missing or wrong repairs when boards are close together. Simple to set up, can be placed directly on the production line and **can be moved at any time**.



*Option. Video Link: <https://youtu.be/ZQZVq4A-ctk>



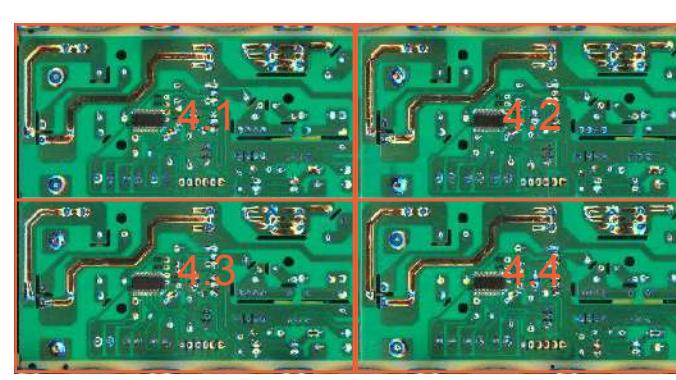
Rich Inspection Modes. More Practical

MAKER-RAY

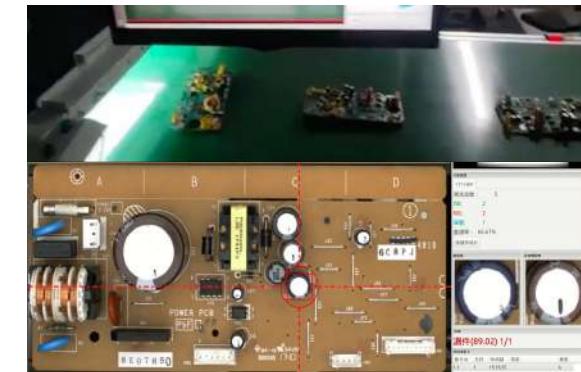
Various modes can be setup to support different application, such as alternative materials, post-wave mode use, etc., which is more practical.



Mixed board Inspection



Multi-panel Inspection

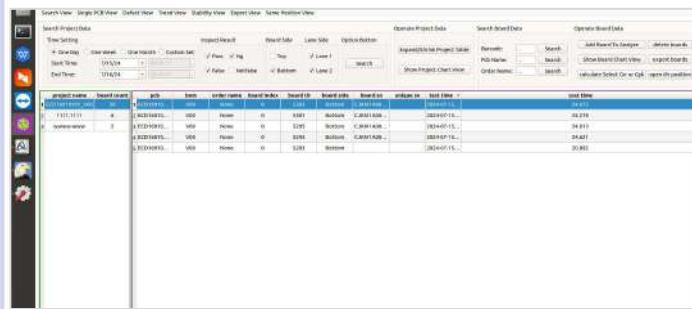


Post-wave mode

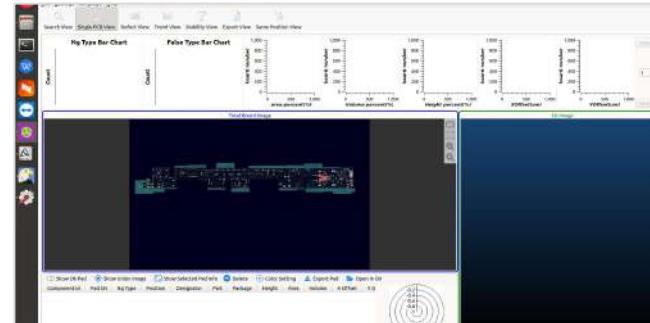
Complete SPC Data to Empower Production Management

MAKER-RAY

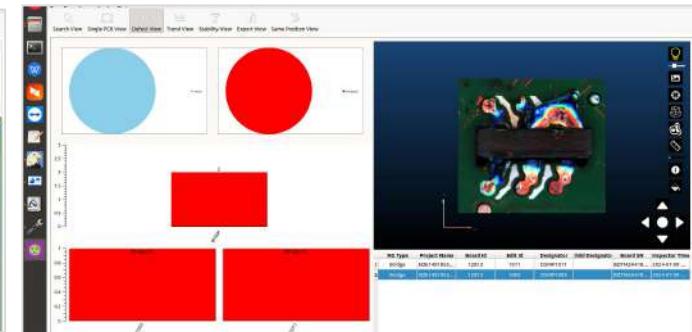
The inspection data is retained in real time, and **rich data statistics and analysis charts** are provided. It supports exporting or connecting to MES system detailed data reports to help enterprises trace production and improve processes.



Inspection Statistics



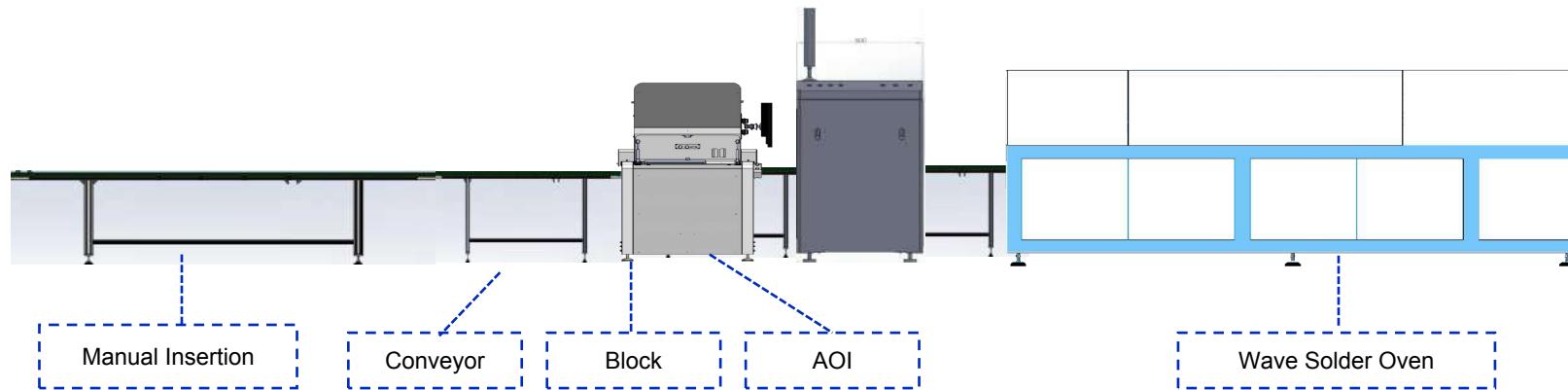
Defect Statistics



Defective Details

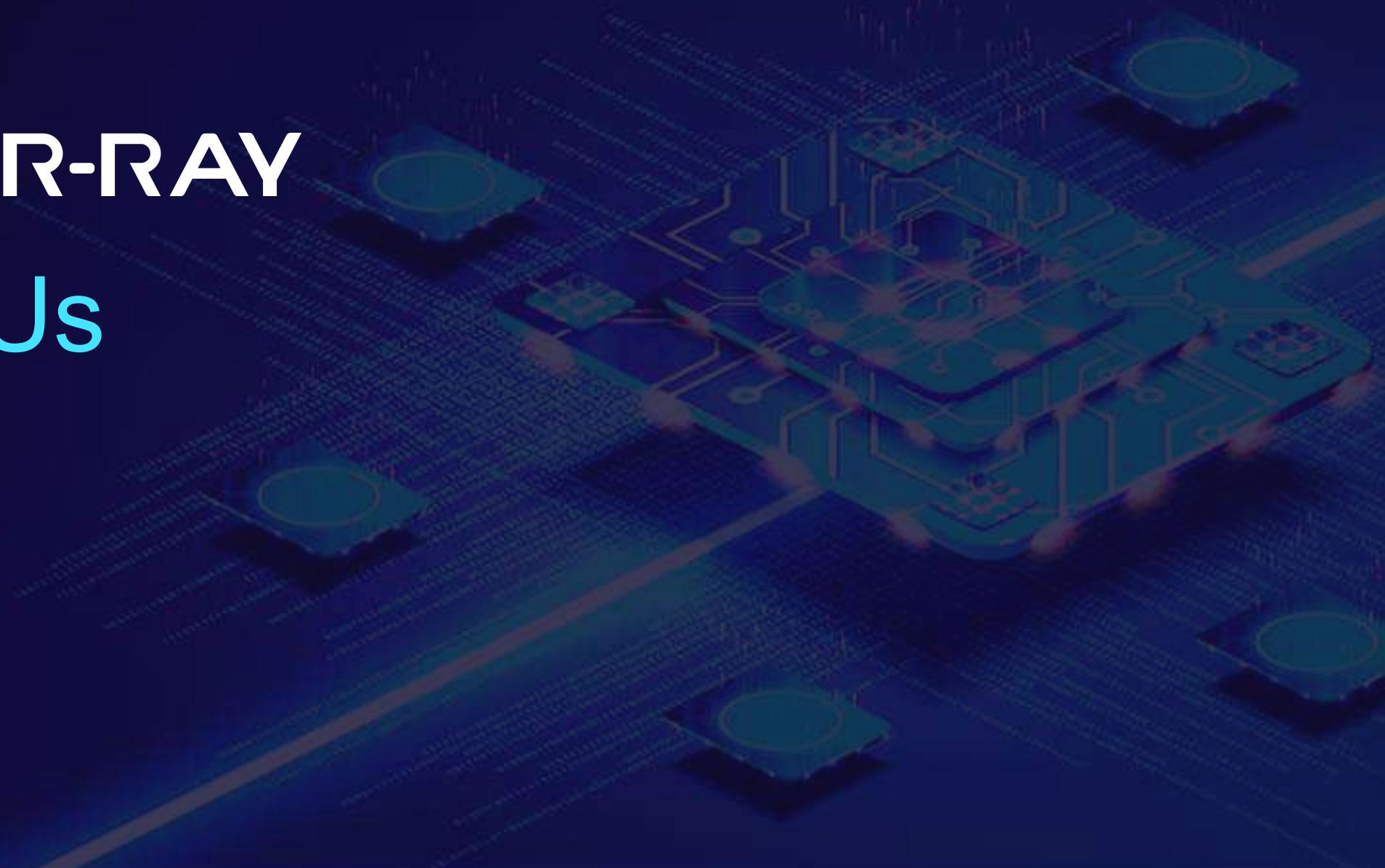
→ **Problem:** Manual visual inspection is prone to **eye fatigue**. They cannot avoid NG products pre-wave efficiently if they are not careful. After soldering, NG are found and need to be removed for repair, which is **time-consuming and labor-intensive**. If they are not careful, the board may be **damaged and scrapped**.

→ **Solution:** Install MAKER-RAY **pre-wave AOI + rearrange the repairman position** which is after AOI before wave soldering machine to buy-off and repair after NG output from AOI immediately. It not only **reduces the number** of NG products post-wave, but also **reduces the maintenance cost**. Using AOI instead of manual visual inspection also improves the detection accuracy and might **save personnel**.



MAKΣR-RAY

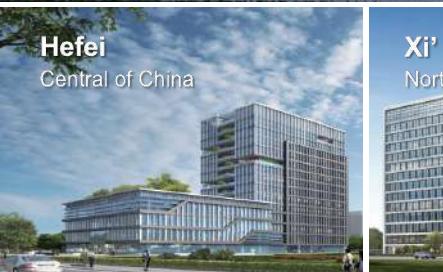
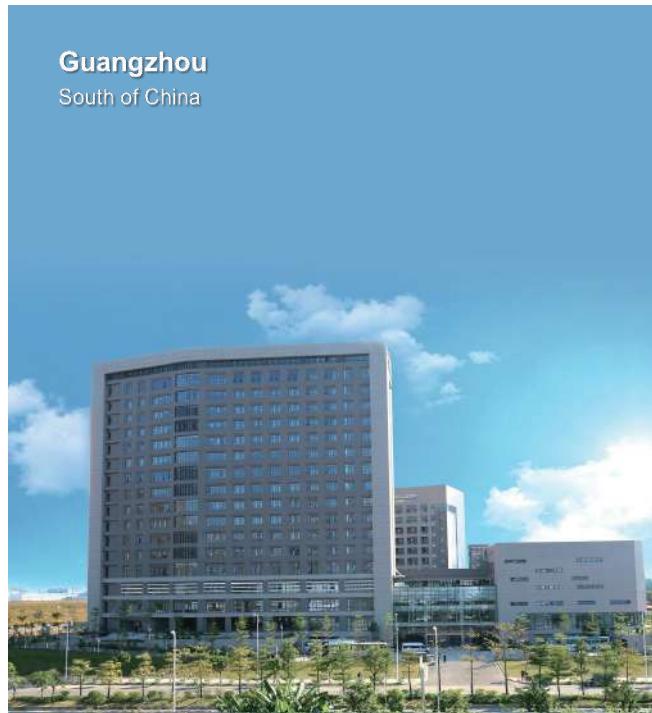
About Us



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.



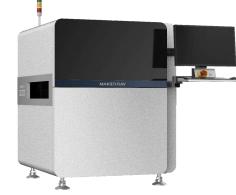
Complete Product Layout

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

MAKΣR-RAY

Academia Sinica

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

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

Central Academy of Engineering

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

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

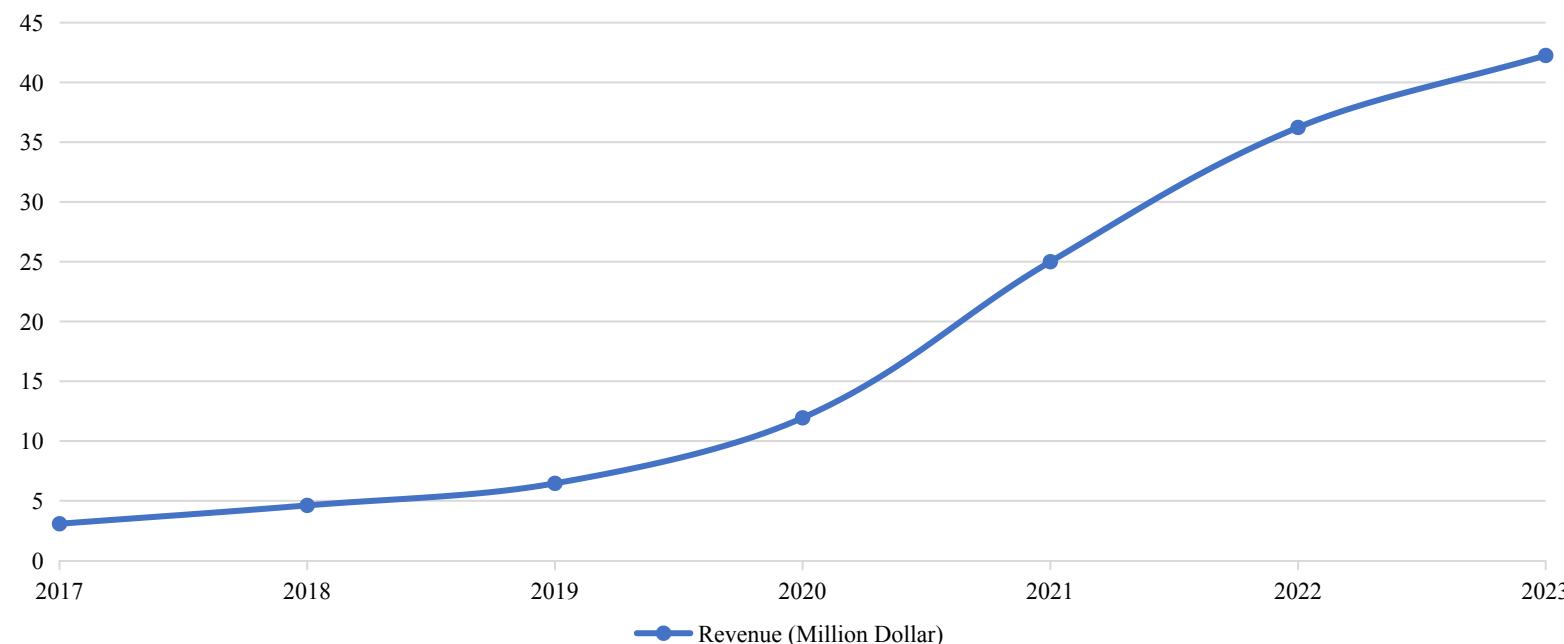
“3+1”

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**.



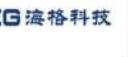
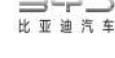
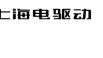
Marketed at Home and Abroad Used by Thousands of Factories

MAKΣR-RAY



MAKER-RAY Trusted by Them

MAKER-RAY

| | | | | | | | |
|------------------------------------|---|---|---|---|---|---|---|
| Home Appliance |  |  |  |  |  |  |  |
| Consumer Electronic |  |  |  |  |  |  |  |
| Security and Defense Communication |  |  |  |  |  |  |  |
| Power Supply |  |  |  |  |  |  |  |
| Vehicle Electronics |  |  |  |  |  |  |  |
| Instrumentation |  |  |  |  |  |  |  |
| Industrial Control |  |  |  |  |  |  |  |
| EMS |  |  |  |  |  |  | |

MAKΣR-RAY

AI+AOI

Make Industrial Inspection Easier