Global Network

Headquarters
DMG MORI Tokyo Digital Innovation Center
3-1-4, Edagawa, Koto-ku, Tokyo, 135-0051, Japan
Tel. +81-3-6632-7910
Fax. +81-3-6632-7915

Nagoya Office
2-35-16, Meieki, Nakamura-ku Nagoya-shi, Aichi, 450-0002, Japan
Tel. +81-52-587-1853
Fax. +81-52-587-1854

West Japan Office
119 Mitsuiseimeikoubesannomiya Bld.9F, Itomachi, Chuo-ku Kobe-shi, Hyogo, 650-0032, Japan
Tel. +81-78-392-0127
Fax. +81-78-392-0128

Saki Shanghai Co., Ltd.
Room 113, 1st floor, 16 Bldg
No.481 Guiping Road, Xuhui District, Shanghai 200233, China
Tel. +86-21-6282-2266
Fax. +86-21-5230-5002

Saki (Shanghai) Co.,Ltd. Shenzhen Office
Room 106, Building 8, 1970 Science Technology Park, Minkang Road 112, Longhua District, Schenzhen, China
Tel. +86-755-2583-8315
Fax. +86-755-2583-8317

Saki Corporation Korea Representative Office
12, Iljik-ro 106beon-gil, Manan-gu, Anyang-si, Gyeonggi-do, Republic of Korea 13901
TEL:+82-31-361-5621
FAX:+82-31-361-5628

Saki Asia Pacific Pte,Ltd.
2 Ang Mo Kio St. 64 #03-09A Econ Industrial Building 569084, Singapore
Tel. +65-6483-9330
Fax. +65-6853-5730

Saki Asia Pacific (Thailand) Co., Ltd.
200 Moo 4, Jasmine International tower, 14th floor, unit 1403B, Chaengwattana Road, T. Pakket, A. Pakket, Nonthaburi 11120, Thailand
Tel. +66-2-100-3480
Fax. +66-2-100-3460

Saki Europe GmbH
Landsberger Strasse 183, D-80687 Munich, Germany
Tel. +49-89-309-04-69-0
Fax. +49-89-309-04-69-99

Saki Europe, Czech Office
Severni 334, 252 25 Orech, Czech Republic
Tel. +420-311-36-37-36
Fax. +420-311-36-37-37

Saki America,Inc.
47338 Fremont Blvd. Fremont, CA 94538, U.S.A
Tel. +1-510-623-7254

● **Service Sites**
- Tianjin, China
- Dalian, China
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- Jakarta, Indonesia
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- Charlotte, U.S.A
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Saki Corporation
Headquarters
DMG MORI Tokyo Digital Innovation Center
3-1-4, Edagawa, Koto-ku, Tokyo, 135-0051, Japan
TEL: +81-3-6632-7910 FAX: +81-3-6632-7915
E-mail:sales-plan@sakicorp.com

Global Network
http://www.sakiglobal.com

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[SJ3901DCB1-05E]

saki
The Future in Focus

3D Automated Optical Inspection (AOI) Systems

3Di Series

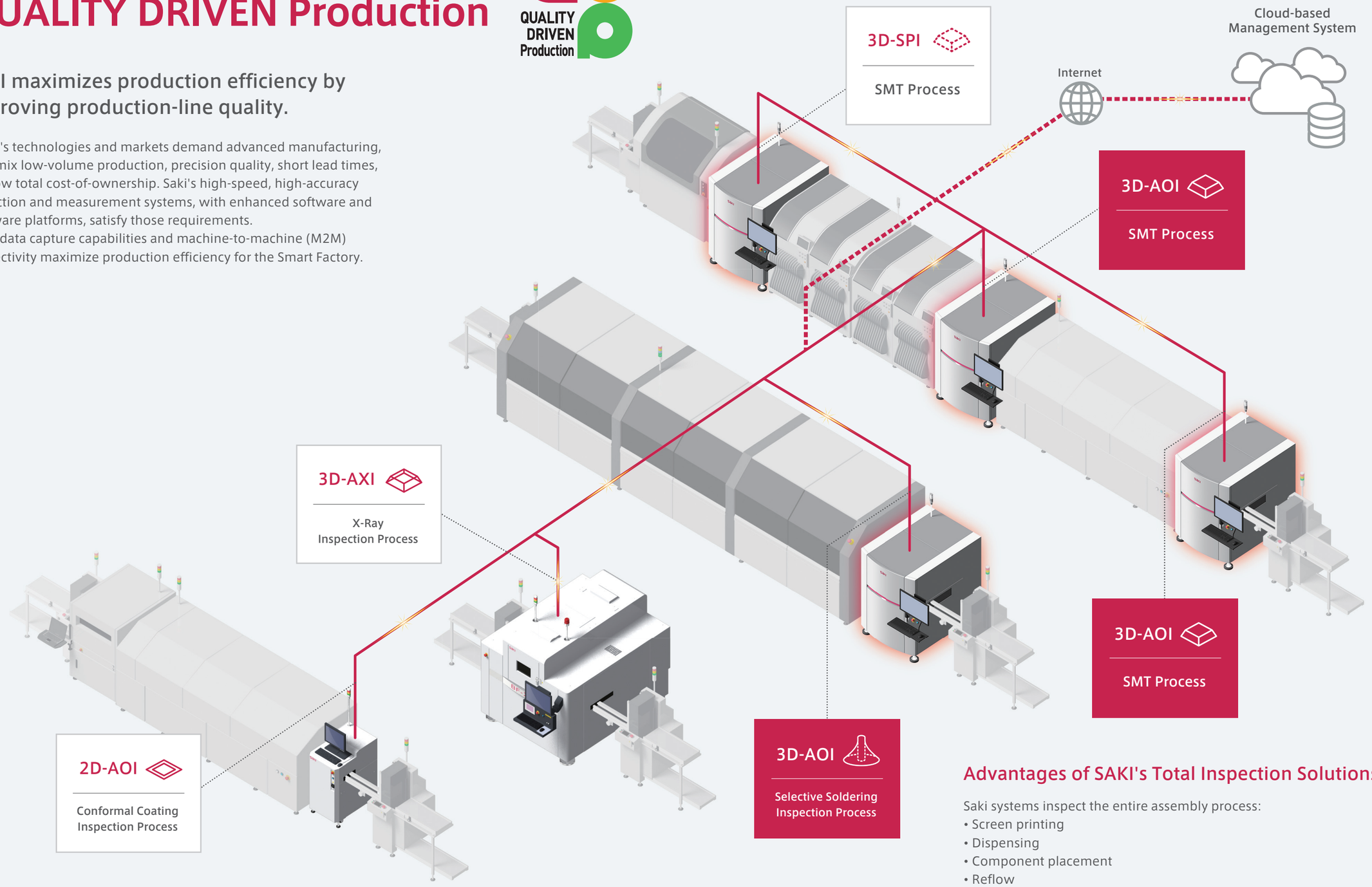
SAKI's 3D AOI Series is designed for the Smart Factory Connection

Saki's Total Smart Factory Inspection Solution

QUALITY DRIVEN Production

SAKI maximizes production efficiency by improving production-line quality.

Today's technologies and markets demand advanced manufacturing, high-mix low-volume production, precision quality, short lead times, and low total cost-of-ownership. Saki's high-speed, high-accuracy inspection and measurement systems, with enhanced software and hardware platforms, satisfy those requirements.
Saki's data capture capabilities and machine-to-machine (M2M) connectivity maximize production efficiency for the Smart Factory.



※ SPI: Solder Paste Inspection　AOI: Automated Optical Inspection

Advantages of SAKI's Total Inspection Solutions

Saki systems inspect the entire assembly process:
- Screen printing
- Dispensing
- Component placement
- Reflow
- Selective soldering
- Conformal coating

QUALITY DRIVEN Production

Quality First

Saki's 3D-AOI systems improve process quality, efficiency, and productivity to improve profits.

Benefits provided with Saki's 3D-AOI series

- Improve production quality
- Improve production efficiency
- Improve profits

Saki combines proprietary hardware and software to produce a stable, highly accurate system that improves production and maximizes process efficiency and product quality.

Key Factor 1 Advanced Hardware Features

Machine Stability and Accuracy

SPI AOI

- Self-diagnostic functions
- Rigid gantry structure and dual motor drive system
- High resolution linear scale for accurate positioning
- CoaXPress camera for faster inspection & measurement process

Flexible Configurations for Diverse Requirements

- Accurate 3D inspection & measurement for entire PCBA
- Scalable optical resolutions of 7µm, 12 µm, and 18 µm
- Flexible gantry for M/L/XL PCBA sizes and dual lanes

Key Factor 2 Advanced Software Features

Programming

SPI AOI

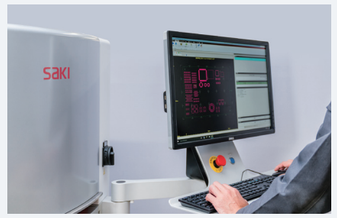
- One common platform supports 3D-SPI, 3D-AOI, and 3D-AXI
- Saki Self-Programming (SSP) Software
- Compliant with IPC standards

Measurement Inspection & Tuning Function

- Offline-debugging with real-time program adjustments
- Height and extra component detection (ECD) functions
- Through-hole device solder inspection

Verification

- History Management System for data logging and history
- Golden & Silver Sample Check Function for process verification
- Side cameras capture areas missed by overhead cameras



Key Factor 3 Applied Technology

Machine-to-Machine Systems

SPI AOI

- Feed-back from SPI to printer
- Feed-forward from SPI to Pick-and-Place
- Feed-back from AOI to Pick-and-Place

Stand-alone Systems

- RMS remotely manages multiple BF2-Monitors with one PC
- MPV lets operators see every inspection result in real time

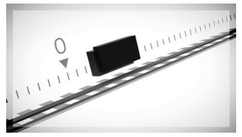
Applied Technology

SAKI Technology for M2M Communication

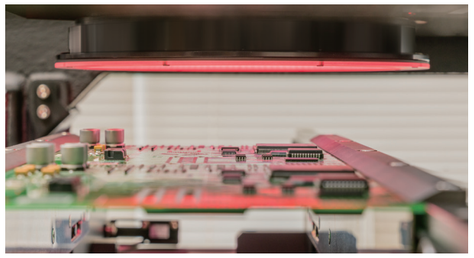
Key Factor 1 Advanced Hardware Features

Proprietary Hardware provides accurate measurements

- Saki's machines are built with hardware that's made to last.
- A closed-loop, dual servo-motor drive system, high-resolution linear scale, and rigid gantry structure provide unsurpassed accuracy and repeatability for absolute measurements.
- An optimized conveyor system, driven by step motors, enables fast PCBA loading and unloading.

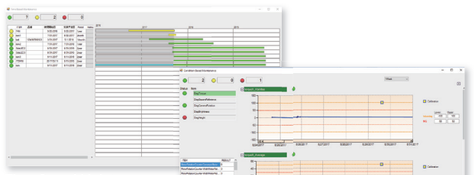


Linear scale image



Self-diagnostic System

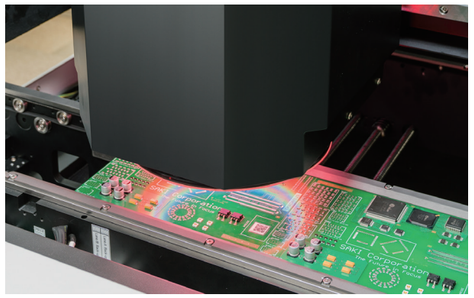
Saki's predictive and preventive maintenance management system assures stable machine conditions and repeatable, consistent performance. Every key component is monitored along with system conditions, and a detailed diagnostic log is recorded. The optimized preventive maintenance plan reduces maintenance time, machine down-time, manpower, and costs.


Time Based Maintenance

Condition Based Maintenance

Optical Unit

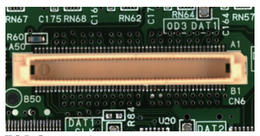
- Four, multi-frequency digital projectors provide accurate 3D measurements for high-quality images.
- Three camera resolution levels—7µm, 12µm, 18µm—are available to match application requirements.
- Saki's CoaXPress interface in the overhead camera captures images 1.7 times faster than previous models.
- Enhanced 2D and 3D calibration uses multiple calibration height targets for positive and negative heights to guarantee height measurement accuracy.

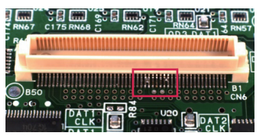


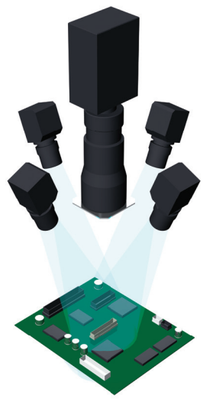
Side Cameras*

A quad side camera system ensures inspection of the entire board, including dead angles and areas missed by overhead cameras.

*factory-installed option


TOP Camera Image

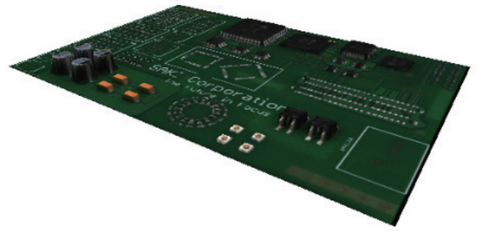

SIDE Camera Image



Key Factor 2 Advanced Software Features

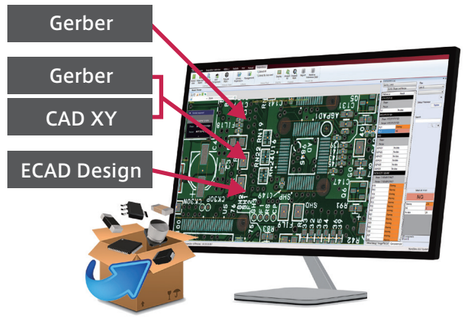
Programming

- Special BF2 software has a common user-interface for Saki's 3D SPI, AOI, and AXI systems.
- The software saves a full 3D image of the whole PCBA, so the operator can create inspection data without using the physical board.



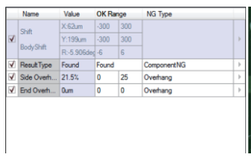
- Saki Self-Programming (SSP) Software

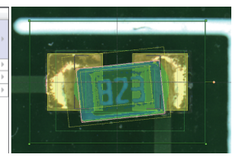
Saki's Self-Programming Function was developed on the concepts of Board less, Skill less, and Stress less. Accurate libraries are automatically created for both SPI and AOI based on the database and BOM data associated with about 300,000 types of components.



Inspection Data per IPC Standards

Default thresholds of inspection data conform to IPC standards.





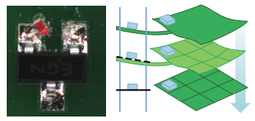
Measurement Inspection and Tuning Function

Offline Debugging

Operator can edit inspection data to check previous Good/NG images, or real-time defect images, offline without any production interruptions.

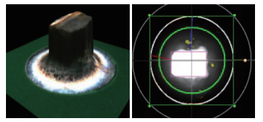
Warpage Adjustment

Warpage is compensated automatically. An accurate height map is made of the entire PCBA surface, enabling the Extra Component Detection function to detect foreign material.


Height ECD function

Fujiyama (Through-hole Device Solder Inspection)

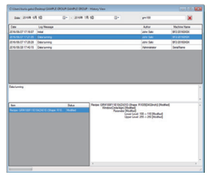
The Fujiyama algorithm provides complete through-hole joint inspection in a single step. It simultaneously inspects for copper exposure, pin detection, pin-holes, solder fillets, and bridges.


3D DIP Soldering

Inspection Data Verification

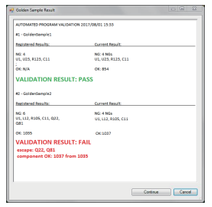
History Management System

The History Management System records the detailed data modification system in detail (who, what, when, where, why, and how)



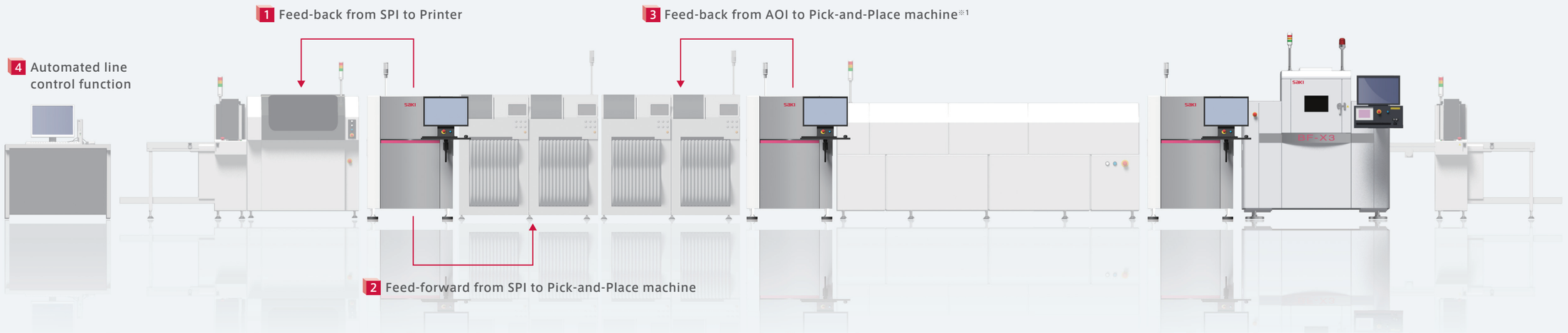
Golden & Silver Sample Check Function

Maintains inspection accuracy by checking machine status and inspection conditions before starting auto operation.



Solution

Saki's QUALITY DRIVEN Production Solution



Key Factor 3 **Applied Technology**

M2M Solution

1 Feed-back from SPI to Screen Printer.

Feeds back misalignment data and prevents print errors by automatically alerting the user when the stencil needs cleaning.

Correction of the print position

Automatic cleaning instructions

2 Feed-forward from SPI to Pick-and-Place machine

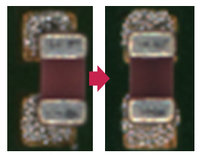
Measures the degree the printing position shifts to correct placement positioning. A NG board skip function improves efficiency, quality, and cost.

NG board skip

3 Feed-back from AOI to Pick-and-Place machine

Feeds back placement position and location data from AOI to pick-and-place and feeds forward data from SPI to improve quality and efficiency.

*1 factory installed option



Placement position correction*1

4 Automated line control function

Automates control of the assembly line to reduce rework and waste and increase throughput.

※1～4 Saki partners with the leading PCB equipment manufacturers. Ask us which products we connect with.

Options

BF2-Editor

Create data and debug the process offline

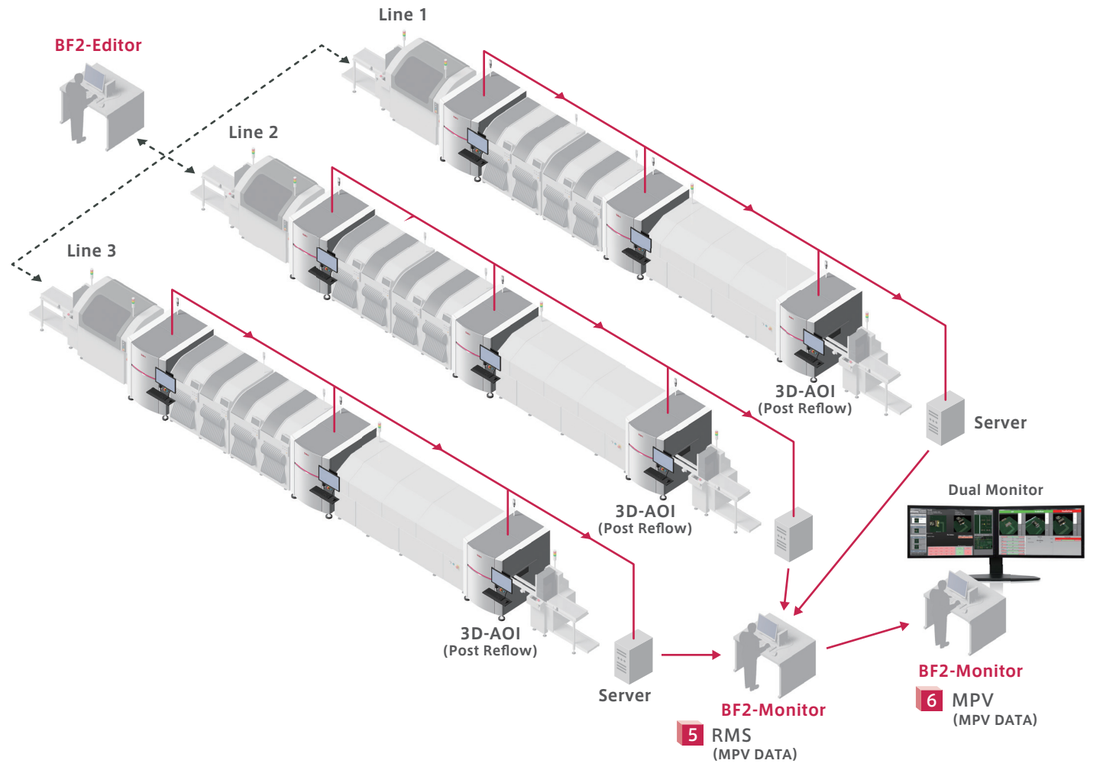
BF2-Monitor (Offline verification terminal)

5 RMS (Remote Management System)

Remotely control multiple BF2-Monitors with a single PC. Reduces assembly-floor personnel. Moreover, the production status of each device can be confirmed.

6 MPV (Multi Process View)

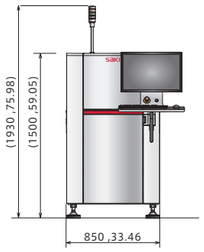
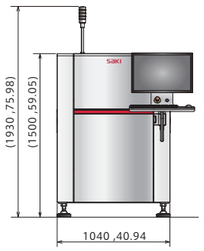
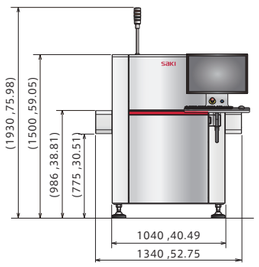
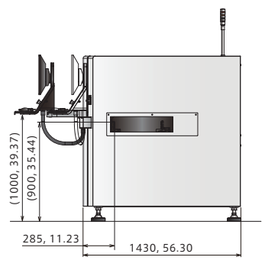
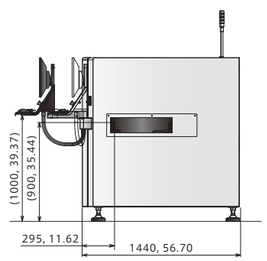
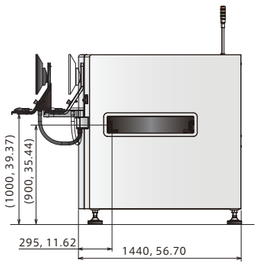
The BF2-Monitor shows the results of all inspection processes (SPI, pre-reflow, and post reflow) on one screen in real time for operator review, simplifying the verification process and making it less subject to error. It is also useful for analyzing the cause of a defective board.



Product

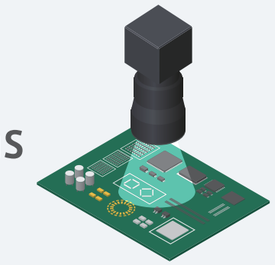
3Di Series Product Specifications

Dual-lane system can inspect 2 different PCBAs simultaneously

Market	Asia			Global			
Dimensions	M Single lane	M Dual lane		L Single lane	L Dual lane		XL Single lane
Model Name	3Di-MS2	3Di-MD2		3Di-LS2	3Di-LD2		3Di-ZS2
Size (W)×(D)×(H) (mm, in.)	850 × 1430 × 1500, 33.46 × 56.30 × 59.06			1040 × 1440 × 1500, 40.94 × 56.69 × 59.06			1340×1440×1500, 52.75×56.69×59.06
Weight	850kg, 1873.93lb			900kg, 1984.16lb			
Electric Power	Single Phase ~ 200-240V+/-10%, 50/60Hz						
Air Requirement	0.5MPa, 5L/min (ANR)						
PCB Size (mm, in.)	–	Single mode	Dual mode	–	Single mode	Dual mode	–
	50×60~330×330, 1.97×2.36~12.99×12.99	50×60~330×330, 1.97×2.36~12.99×12.99	50×60~320×330, 1.97×2.36~12.60×12.99	【7μm camera head】 50×60~330×330, 1.97×2.36~12.99×12.99	【7μm camera head】 50×60~330×330, 1.97×2.36~12.99×12.99	【7μm camera head】 50×60~320×330, 1.97×2.36~12.60×12.99	50×60~686×870, 1.97×2.36~27.00×34.25
				【12/18μm camera head】 50×60~500×510, 1.97×2.36~19.68×20.07	【12/18μm camera head】 50×60~500×510, 1.97×2.36~19.68×20.07	【12/18μm camera head】 50×60~320×510, 1.97×2.36~12.60×20.07	
PCB Clearance	Top : 40mm, 1.57in. Bottom : 60mm, 2.36in.	Top : 40mm, 1.57in. Bottom : 50mm, 1.96in.		Top : 40mm, 1.57in. Bottom : 60mm, 2.36in.	Top : 40mm, 1.57in. Bottom : 50mm, 1.96in.		Top : 40mm, 1.57in. Bottom : 60mm, 2.36in.
Front View (mm, in.)							
Side View (mm, in.)							

● 3Di-ZS2 supports the optical unit with resolution of 18μm.

3Di Series Optical Unit Specifications



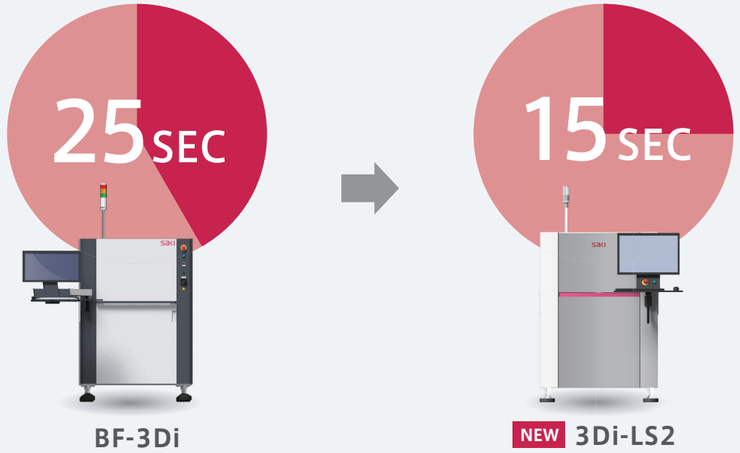
Wide selection of cameras based on various optical resolutions and speeds

Resolution	7μm	12μm	18μm
Height measurement range	4mm, 0.15in.	10mm, 0.39in.	20mm, 0.78in.
Image capture time	1,063mm²/s 1.64in.²/s	3,600mm²/s 5.58in.²/s	5,700mm²/s 8.83in.²/s
Major characteristics	Meets requirements for production of advanced smart phones, wearable devices, and devices and modules for IoT. Capable of 0201mm (008004in.) component inspection.	High-end model with both high-speed and micro part inspection capability.	New optical head increases inspection speed 170% for the highest productivity and throughput speed.

High definition ⟷ High speed

Substantially improves inspection speed

Comparison between BF-3Di and 3Di-LS2 using an optical unit with 18μm resolution and PCB size 330x250mm(12.99x9.84in.).



BF-3Di

NEW 3Di-LS2