

System Descriptions and Specifications

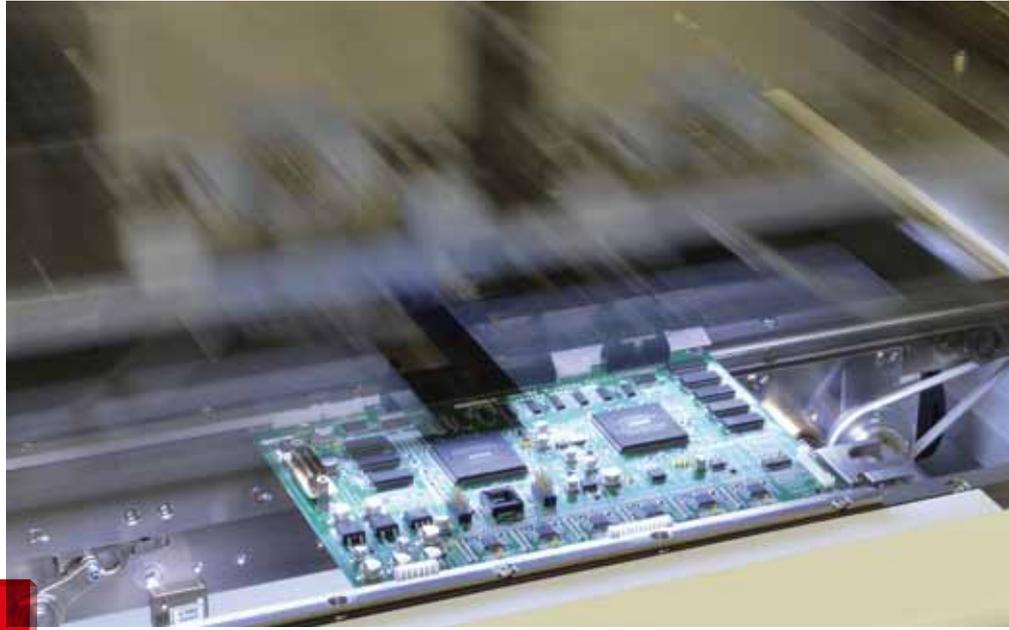
2D AOI Lineup

Unique, Innovative and Accurate Inspection Technology



Our Line Scan Technology is Changing the Game...

Saki 2D AOI systems employ the Company's ingenious Line Scan Technology and Co-axial Overhead Lighting combined with a revolutionary imaging system and simple transport mechanism, providing the best choice for manufacturers looking for accurate, highly-reliable, high-speed inspection.



Fast, Accurate, Reliable

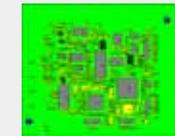
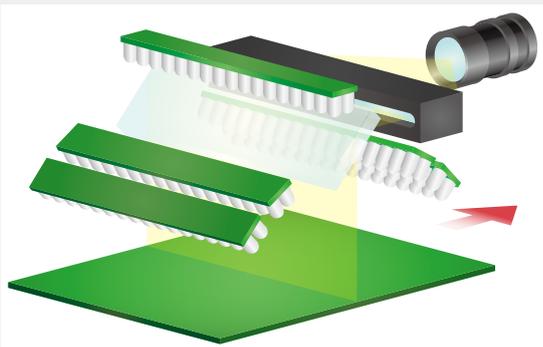
FAST - To meet the demands of ultra high-speed production, Saki is introducing a new camera and lighting system enabling the full image capture of an M-size board in 8 seconds^{(*)1} and an L-size board in 10 seconds^{(*)2}. Ultra high-speed dual-lane inspection is also available, doubling throughput.

(*1) Using BF-Tristar II (10 μ m resolution). Loading / unloading time is not included.

(*2) Using BF-Frontier II (18 μ m resolution). Loading / unloading time is not included.

ACCURATE - Saki's new vibration-free line scan mechanism is unaffected by mechanical noise produced by adjacent production equipment, with very low false failure rates and accurate inspection data.

RELIABLE - All Saki 2D AOI systems - both single lane and dual lane models - are built with the same firm and simple transport mechanism and housed in a compact footprint and providing years of productive and reliable operation.



Line Scan Method: Entire image capture in one rapid motion

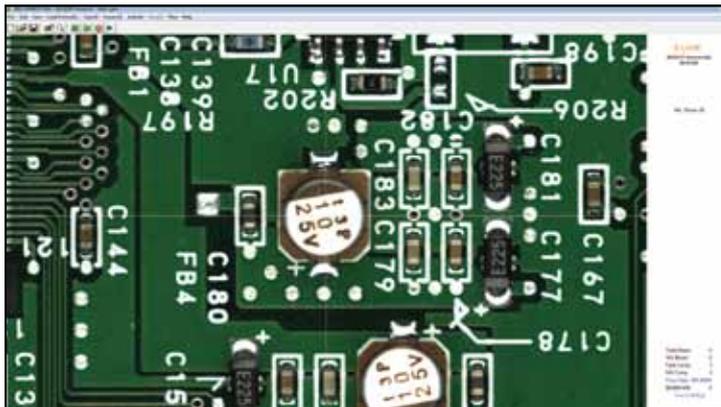
FOV Method: Captures one camera field-of-view at a time.

"What is Line Scan Technology?"

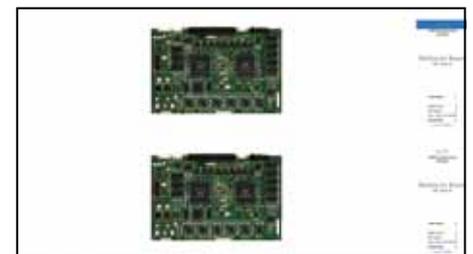
Saki 2D AOI Systems are using a unique line array CCD camera to capture the entire image of a PCB for each inspection. The speed of image capture is unaffected by the number of components on the PCB, as can be the case with conventional FOV-type AOI systems. Our Line Scan Technology is the backbone of our 2D AOI systems, producing accurate and reliable inspection data at high speed.

| Technology 01 | Evolutionary Software

Including a growing number of rich inspection algorithms



Single Lane Mode

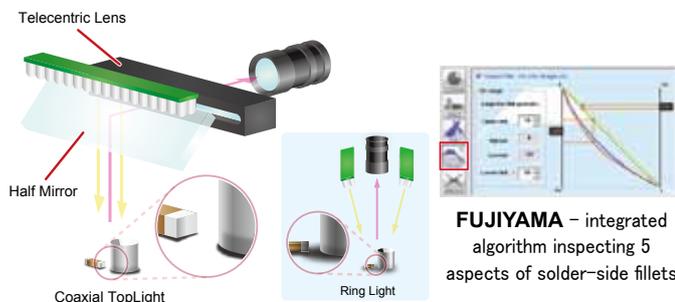


Dual Lane Mode

Saki is always applying the latest image processing technology and image analysis techniques to its ever evolving software, improving performance and speed with each new version. In addition, newer software versions are backward-compatible with older hardware, enabling the upgrading of new and older systems to the same software revision. This approach offers users the ability to keep their Saki 2D AOI systems up to date with new inspection algorithms and libraries, providing reduced programming times and faster production ramps, while keeping support issues at a minimum.

| Technology 02 | Coaxial TopLight

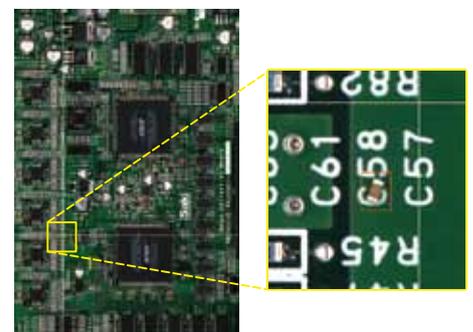
Applying Saki's Unique Coaxial TopLight Illumination



Saki's unique Coaxial TopLight illumination projects light perpendicular to the surface, eliminating shadowing from any objects on the surface. Coaxial TopLight is the best lighting for solder fillet inspection, due to the difference in reflection when a good fillet is formed and when it is not.

| Technology 03 | Whole Area Inspection

ECD - extra components, solder balls and foreign objects detection



Take advantage of Saki's full PCB scanning by inspecting for loose components, solder balls, and/or foreign materials across the entire surface. Eliminating these defects improves the quality of production while reducing the PPM failure level.

Installation Example in SMT line

Our models BF-Planet-XII (M-size board) and BF-FrontierII (L-size board) are ideal for single lane production lines. For dual lane production lines, BF-10D is ideal model.

This model was developed especially for high-speed dual lane production. The BF-10D employs our new high-speed color camera and a new gantry frame designed for high-speed transport of the camera. When combining these new features with our new image processing tools that take advantage of multi-core CPU processing, the BF-10D can easily keep up with production tact times as short as 8 seconds. The dual lanes can also inspect the same or different products simultaneously, increasing the BF-10D's flexibility.

Our newest model, BF-10Z, was developed especially for manufacturers building XXL size panels up to 686 x 870 mm (27.01 x 34.25 in.) for the product like communication base stations, server & storage assemblies and LED back panels. The BF-10Z employs "Selective Resolution System" which enables users to operate in 10 μ m or 20 μ m resolution scanning mode. Now users can select between either resolution operating modes, choosing the one that best matches their accuracy needs with their throughput needs. The BF-10Z's tact time is 63 seconds in 10 μ m and 39 seconds in 20 μ m.

If your factory requires selective solder inspection and/or simultaneous Top/Bottom PCB inspection at high speed, model BF-Tristar II is the best solution. It can inspect top-side SMT and bottom-side reflow, or through-hole components on both sides in one pass, including inspection for scattered parts. Optional Ultraviolet Lighting for conformal coating inspection is also available on the BF-Tristar II.

In addition, the BF-10BT which is off-line simultaneous double-sided AOI system is suitable for the final optical inspection of hand-placed parts or one-by-one production.

All AOI models easily connect with Saki BF-RP1 Repair Terminal for re-work, BF-Editor for creating inspection programs off-line, BF-Monitor Control Software for real-time control of operation status for multiple lanes and BF-View Monitoring Software for real-time management of production quality and AOI operation. These optional software packages help you to streamline your quality process, improve production ramp time, control your in-line quality and guarantee final quality.

Pre-reflow Inspection

For inspecting Missing, Misalignment, etc., use models:

- BF-Planet-X II
- BF-Frontier II
- BF-10D

Variable algorithms enable you to inspect for the position/angle of misalignment, for controlling the accuracy of the mounter.



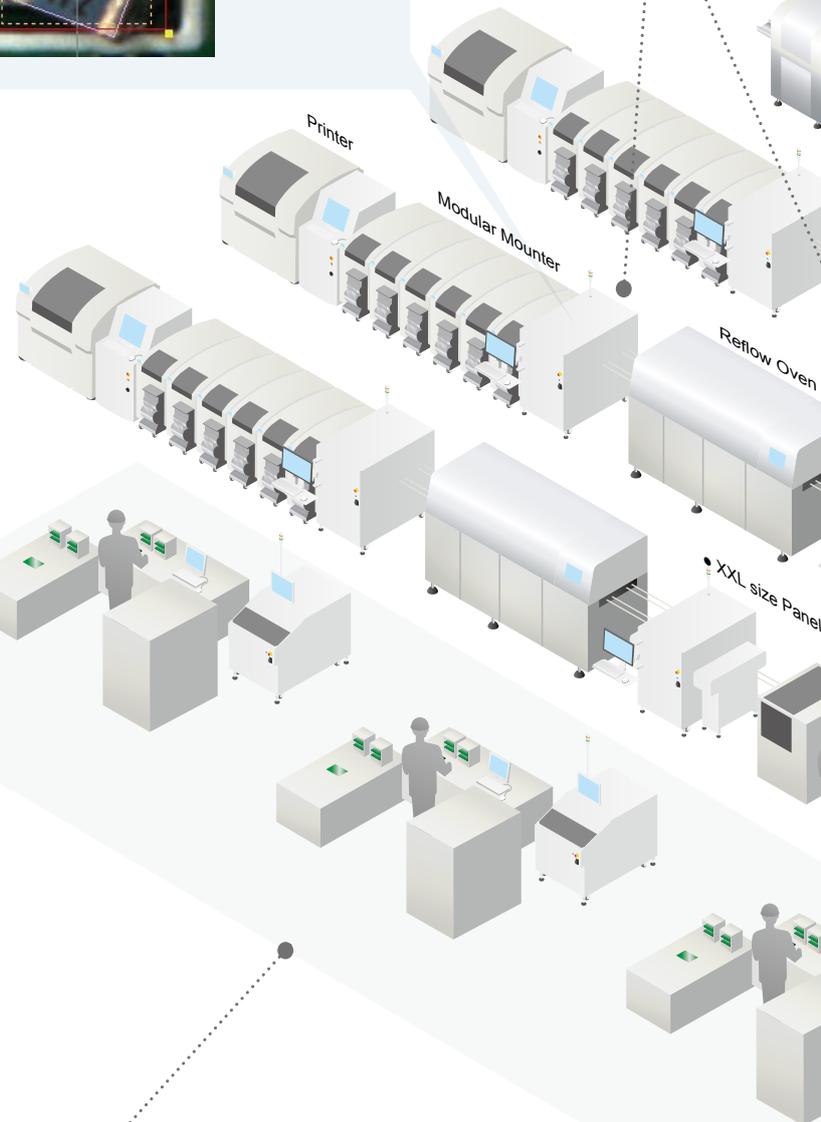
Angular Misalignment

Inspection Results

Analysis and PCB Repair

Connect with Saki's Repair Terminal, BF-RP1, to compare a defective location with a known-good PCB Image.

- BF-RP1



Cell Production Line

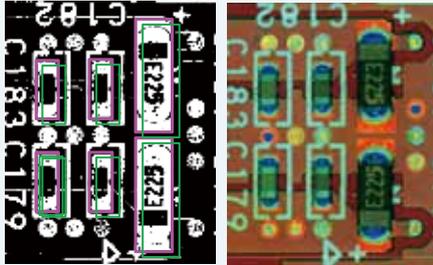
Performing a final AOI inspection on both top and bottom sides simultaneously catches any missed defects and improves production quality. Use model:

- BF-10BT

After Reflow Inspection

For inspecting solder quality, lifted leads, ECD, absence and/or misalignment of components, use models:

- BF-Planet-X II
- BF-Frontier II
- BF-10D



Final Inspection

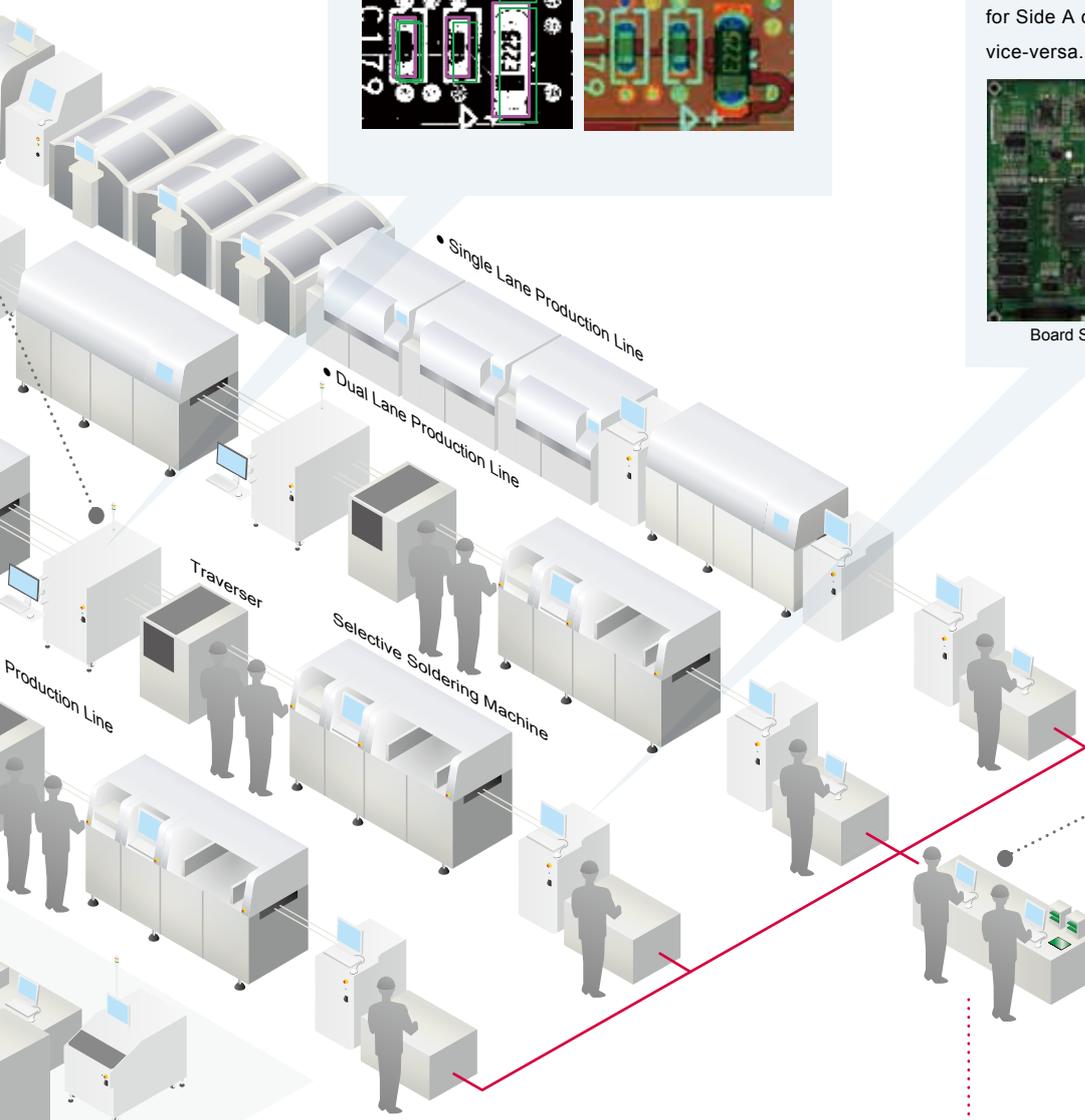
Guarantee the status after component assembly on both sides. Use model:

- BF-Tristar II
- Use this model for final process inspection to check for Side A defects after Side B mounting or vice-versa.



Board Side A

Board Side B

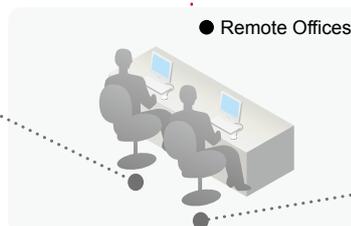


Centralized Control of Multiple AOI Machines

Centralized control and remote judgement of multiple AOI machines is available with BF-Monitor.

Inspection Program Control

Off-line, real-time debugging function enables the programmer to adjust inspection parameters based on past inspection results without stopping the production line using BF Editor.



Test Results Analysis and History

A database of passed boards, defect images and inspection & measurement results makes process management easy using BF View.

Model Lineup

● 2D AOI

NEW



	XXL Size Inline High Resolution and High Speed AOI System	In-line Dual Lane High-speed AOI System	In-line Simultaneous High-speed Double-Sided AOI System	In-line High-speed AOI System
Model Name	XXL-Size Global Model for High-speed Inspection of PCBs XXL-size to S-size. BF-10Z	Line Scan Type Dual Lane High-speed AOI System BF-10D	In-line AOI using Line Scan Technology to inspect both PCB sides in one pass. BF-Tristar II	M-size Standard Space-saving Model, with the smallest footprint in its class BF-Planet-X II
Resolution	10 μm, 20 μm (Selective Resolution System)	10 μm	10 μm	10 μm
Board Size	50 x 60 to 686 x 870 mm, 2 x 2.4 to 27 x 34.3 in.	Single Lane 50 x 60 to 460 x 330 mm, 2 x 2.4 to 18 x 13 in. Dual Lane 50 x 60 to 250 x 330 mm, 2 x 2.4 to 10 x 13 in.	50 x 60 to 250 x 330 mm, 2 x 2.4 to 10 x 13 in.	50 x 60 to 250 x 330 mm, 2 x 2.4 to 10 x 13 in.
Board Thickness	0.6 to 5.0 mm, 24 to 200 mils	0.6 to 3.2 mm, 24 to 126 mils	0.6 to 3.2 mm, 24 to 126 mils	0.6 to 3.2 mm, 24 to 126 mils
Board Warpage	+/-2 mm, 80 mils	+/-2 mm, 80 mils	+/- 1 mm, 40 mils	+/-2 mm, 80 mils
PCB Clearance	Top : 40 mm, 1.57 in. Bottom : 40 mm, 1.57 in.	Top: 40 mm, 1.57 in. Bottom: 40 mm, 1.57 in.	Top: 30 mm, 1.18 in. Bottom: 30 mm, 1.18 in.	Top: 40 mm, 1.57 in. Bottom: 40 mm, 1.57 in.
Rotated Component Support	—	Available from 0 to 359° (1° resolution)	Available from 0 to 359° (1° resolution)	Available from 0 to 359° (1° resolution)
Inspection Categories	Presence/Absence, Misalignment, Tombstone, Reverse, Polarity, Bridge, Foreign material, Absence of solder, Insufficient solder, Lifted lead, Lifted chip, and Fillet defect. (*7)	Presence/Absence, Misalignment, Tombstone, Reverse, Polarity, Bridge, Foreign material. Absence of solder, Insufficient solder, Lifted lead, Lifted Chip, and Fillet defect	Presence/Absence, Misalignment, Tombstone, Reverse, Polarity, Bridge, Foreign material. Absence of solder, Insufficient solder, Lifted lead, Lifted Chip, and Fillet defect	Presence/Absence, Misalignment, Tombstone, Reverse, Polarity, Bridge, Foreign material. Absence of solder, Insufficient solder, Lifted lead, Lifted Chip, and Fillet defect
Tact Time (based on PCB Size)	For 686 x 870 mm size board: (*1) 10 μm : Approx. 63 sec. 20 μm : Approx. 39 sec.	For 250 x 330 mm size board: (*1) (*2) Single Lane: Approx. 10 sec.(For 1 board) Dual Lane: Approx.16 sec.(For 2 boards) (*4)	For 250 x 330 mm size board: (*1) (*2) Approx. 21 sec.	For 250 x 330 mm size board: (*1) (*2) Approx. 18 sec.
Scanning Time (based on PCB Size)	For 686 x 870 mm size board: (*1) 10 μm : Approx. 15 sec. x 3 20 μm : Approx. 8 sec. x 3	For 250 x 330 mm size board: (*1) Approx. 5.5 sec.	For 250 x 330 mm size board: (*1) Approx. 8 sec.	For 250 x 330 mm size board: (*1) Approx. 9 sec.
Camera	CCD Line Sensor Camera	CCD Line Sensor Camera	CCD Line Sensor Camera	CCD Line Sensor Camera
Lighting	LED Lighting	LED Lighting	LED Lighting	LED Lighting
Conveyor System	Flat Belt Conveyor	Flat Belt Conveyor	Flat Belt Conveyor	Flat Belt Conveyor
Conveyor Height	900 +/-20 mm, 36 +/-0.8 in.	900 +/-20 mm, 36 +/-0.8 in.	900 +/-20 mm, 36 +/-0.8 in.	900 +/-20 mm, 36 +/-0.8 in.
Conveyor Width Adjustment	Automatic	Automatic	Automatic	Manual (Automatic Width Adjustment is Optional)
Operating System	Windows 7 Professional	Windows 7 Professional	Windows 7 Professional	Windows 7 Professional
Optional System	BF-Editor	✓	✓	✓
	BF-RP1	✓	✓	✓
	BF-Monitor	✓	✓	✓
	BF-View	✓	✓	—
Options	2D Barcode Reading	✓	✓	✓
	Journal Printer	✓	✓	✓
	OK/NG Signal I/O	—	✓	✓
	Conformal Coating Inspection	✓	✓	✓
Electrical Requirements	Single phase ~100-120/200-240V +/-10%, 50/60Hz	Single phase ~100-120/200-240V +/-10%, 50/60Hz	Single phase ~100-120/200-240V +/-10%, 50/60Hz	Single phase ~100-120/200-240V +/-10%, 50/60Hz
Power Consumption	800VA	800VA	800VA	500VA
Air Requirement	0.5MPa, 5L/min (ANR)	0.5MPa, 5L/min (ANR)	0.5MPa, 5L/min (ANR)	0.5MPa, 5L/min (ANR)
Operating Environment	15 (59F) to 30 (86F)°C / 15 to 80% RH (No Condensation)	15 (59F) to 30 (86F)°C / 15 to 80% RH (No Condensation)	15 (59F) to 30 (86F)°C / 15 to 80% RH (No Condensation)	15 (59F) to 30 (86F)°C / 15 to 80% RH (No Condensation)
Noise Level	59.1 dB	59.1 dB	59.7 dB	57.5 dB
Device Emissions	1500 x 1360 x 1380 mm, 59.1 x 53.5 x 54.3 in. (*5)	850 x 1360 x 1380 mm, 33.5 x 53.5 x 54.3 in. (*5)	850 x 1295 x 1130 mm, 33.5 x 51 x 45.5 in.	600 x 915 x 1270 mm, 23.6 x 36 x 50 in.
Weight	Approx. 530 kg, 1168.1 lbs	Approx. 450 kg, 992.1 lbs	Approx. 450 kg, 992.1 lbs	Approx. 275 kg, 606.3 lbs



NEW



● System Option

BF-Family

Saki's BF-Family includes optional software programs that help you make the most of your Saki 2D AOI Investment. All BF-Family Software programs can be connected and linked to each other.

[BF-Editor]

Off-line Programming and Debugging - Create, edit and debug Inspection Programs on your PC.

[BF-RP1]

Review and Repair Defects - Install at your Repair or Rework Station. Visually displays defects and NG Images alongside Good Images to make repair easier.

[BF-Monitor]

Provides Control for Multiple AOI Systems at One Location - Use this to manage your factory's inspection process remotely.

[BF-View]

Closed-loop Production Process Control System - Create a database containing test results and repair results. Connect to BF-RP1 for real-time process analysis and control.

	In-line High-speed AOI	Off-line Simultaneous Double-Sided AOI System	Benchtop High-speed AOI Systems	
	LL-Size Global Model for High-speed Inspection of PCBs LL-size to S-size. BF-Frontier II	Off-line AOI using Line Scan Technology to inspect both PCB sides in one pass. BF-10BT	Accurate, High-speed Performance in a Smaller Desktop Model BF-Comet10 BF-Comet18	Accurate, High-speed Performance in a Benchtop Model for LL-size PCBs. BF-Sirius
	18 μm	10 μm	10 μm (BF-Comet10) 18 μm (BF-Comet18)	18 μm
	50 x 60 to 460 x 500 mm, 2 x 2.4 to 18 x 20 in.	50 x 50 to 250 x 330 mm, 2 x 2 to 10 x 13 in.	50 x 50 to 250 x 330 mm, 2 x 2 to 10 x 13 in.	50 x 50 to 460 x 500mm, 2 x 2 to 18 x 20 in.
	0.6 to 3.2 mm, 24 to 126 mils	0.6 to 3.2 mm, 24 to 126 mils	0.6 to 2.5 mm, 24 to 100 mils	
	+/-2 mm, 80 mils	+/-1 mm, 40 mils	+/-2 mm, 80 mils	
	Top: 40 mm, 1.57 in. Bottom: 40 mm, 1.57 in.	Top : 40mm, 1.57 in. Bottom : 40mm, 1.57 in.(*6)	Top: 40 mm, 1.57 in. Bottom: 60 mm, 2.36 in.	
	Available from 0 to 359' (1' resolution)	Available from 0 to 359' (1' resolution)	Available from 0 to 359' (1' resolution)	
	Presence/Absence, Misalignment, Tombstone, Reverse, Polarity, Bridge, Foreign material. Absence of solder, Insufficient solder, Lifted lead, Lifted Chip, and Fillet defect	Presence/Absence, Misalignment, Tombstone, Reverse, Polarity, Bridge, Foreign material. Absence of solder, Insufficient solder, Lifted lead, Lifted chip, and Fillet defect	Presence/Absence, Misalignment, Tombstone, Reverse, Polarity, Bridge, Foreign material. Absence of solder, Insufficient solder, Lifted lead, Lifted Chip, and Fillet defect	
	For 460 x 500 mm size board: (*1) (*2) Approx. 21 sec.	For 250 x 330 mm size board: (*1) (*2) Approx. 14 sec.	For 250 x 330 mm size board: (*1) (*2) Approx. 18 sec. (BF-Comet10) Approx. 13 sec. (BF-Comet18)	For 460 x 500 mm size board: (*1) (*2) Approx. 18 sec.
	For 460 x 500 mm size board: (*1) Approx. 10 sec.	For 250 x 330 mm size board: (*1) Approx. 8 sec.	For 250 x 330 mm size board: (*1) Approx. 11 sec. (BF-Comet10) Approx. 7 sec. (BF-Comet18)	For 460 x 500 mm size board: (*1) Approx. 10 sec.
	CCD Line Sensor Camera	CCD Line Sensor Camera	CCD Line Sensor Camera	
	LED Lighting	LED Lighting	LED Lighting	
	Flat Belt Conveyor	—	—	
	900 +/-20 mm, 36 +/-0.8 in.	—	—	
	Manual (Automatic Width Adjustment is Optional)	—	—	
	Windows 7 Professional	Windows 7 Professional	Windows 7 Professional	
	✓	✓	✓	
	✓	✓	✓	
	✓	—	—	
	✓	✓	✓	
	✓	✓	✓	
	✓	✓	✓	
	✓	—	✓	
	✓	✓	✓	
	Single phase ~100-120/200-240V +/-10%, 50/60Hz	Single phase ~100-120/200-240V +/-10%, 50/60Hz	Single phase ~ 100 - 120/200 - 240V +/- 10% , 50/60Hz	
	750VA	800VA	450VA (BF-Comet10) 400VA (BF-Comet18)	700VA
	0.5MPa, 5L/min (ANR)	0.5MPa, 5L/min (ANR)	—	
	15 (59F) to 30 (86F)°C / 15 to 80% RH (No Condensation)	15 (59F) to 30 (86F)°C / 15 to 80% RH (No Condensation)	15 (59F) to 30 (86F)°C / 15 to 80% RH (No Condensation)	
	58.3 dB	—	56.5 dB	60.5 dB
	850 x 1340 x 1230 mm, 33.5 x 52.8 x 48.4 in.	850 x 1405 x 1130 mm, 33.5 x 55.3 x 45.5 in.	580 x 850 x 452 mm, 22.8 x 33.5 x 17.8 in. (*3)	800 x 1280 x 600 mm, 31.5 x 50.4 x 23.6 in. (*3)
	Approx. 450 kg, 992.1 lbs	Approx. 420 kg, 925.7 lbs	(Un-crated) Approx. 83 kg, 183.0 lbs (BF-Comet10) Approx. 80 kg, 176.4 lbs (BF-Comet18)	(Un-crated) Approx. 175 kg, 385.8 lbs

(*1) If the PCB size is smaller than each described size, Scanning time will be shorter.

(*2) Including scanning time.

(*3) PC, Monitor, Keyboard and Mouse sold separately.

(*4) Inspection and unloading of the last PCB will occur during loading and scanning of the current PCB.

(*5) Monitor and keyboard not included.

(*6) When a PCB's thickness and warp are 1 mm, the top clearance is 38 mm and the bottom clearance is 40 mm from the PCB surface.

(*7) Each defect name can be arranged freely by the system function.



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- Guadalajara, Mexico
- Tijuana, Mexico
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- São Paulo, Brazil
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