New Technology

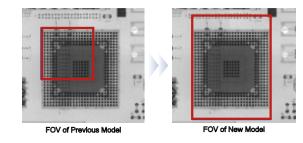
Saki's unique "Planar CT" technology generates high-precision inspection data.

Our "Planar CT" (PCT) technology analyzes the internal structures of planar objects. The detector moves parallel with the planar object, capturing images from various directions, thereby enabling quick and accurate generation of the tomogram of the planar object. This unique parallel movement permits repeated correction of the reflected images to create a high-resolution image, utilizing less images.

3D X-ray becomes a major solution in SMT inspection.

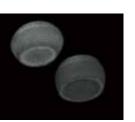
Dramatically improve cycle time

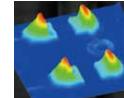
The BF-X3 is equipped with a new generation, highprecision flat panel detector, which increases the FOV threefold compared to the previous model, without compromising image resolution. This significant throughput increase makes the BF-X3 the ideal solution for in-line inspection.



Broaden the range of objects able to be inspected

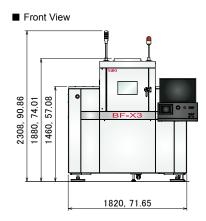
Saki's BF-X3 is a unique 3D X-ray inspection system which inspects not only soldering of BGAs, LGAs and QFNs, but also most widely used components on today's PCBs, like Chips, Leaded ICs, and even PTH components. 3D X-ray is the best technology for accurately reconstructing the shape of solder balls and fillets to perform reliable solder inspection.

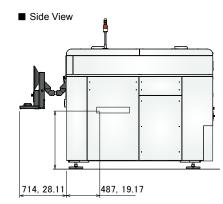




External View







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:sakicorp@sakicorp.com

Global Network http://www.sakiglobal.com

Published August 2018 SJ341DCF1-04E

Product Specifications

Model Name	BF-X3
Resolution	13 to 30µm
PCB Size	50 x 120 to 460 x 510mm (1.97 x 4.73 to 18.11 x 20.08 in.)
PCB Thickness	0.8 to 4.0mm (0.03 to 0.16 in.)
PCB Warp	+/- 2mm (0.08 in.)
Component Height	Top: 40mm (1.57 in.) Bottom: 40mm (1.57 in.)
nspection Categories	 Surface Mount Device Non-wetting, Head-in-Pillow (HiP), fillet defect, lifted Lead, lifted component, excessive/insufficient solder, missing component, flipped component, tombstone, misplaced component, bridge, void, pad shape, foreign material, coplanarity. IGBT Device Solder void
3D Capture Speed (Planar CT)*	Approx. 6 sec./FOV
Detector	Flat panel, 14-bit, 3M pixel
X-ray Tube	130 kV, 16 W, Close X-ray Source
X-ray Leakage	0.5µSV/h or less
Conveyor Method	Flat Belt Transfer
Conveyor Height	880 to 920mm (34.65 to 36.22 in.)
Width Adjustment	Automatic
Operating System	Windows 7 English Version
May vary, depending on ima	age capture settings

System Requirements

Electric Power	Three-phase ~ 400 V +/-10 %, $50\!/60~\mathrm{Hz}$
Power Consumption	7 kVA
Air Requirement	0.5 MPa, 60 L/min (ANR)
Jsage Environment	15 °C (59 °F) to 28 °C (83 °F) / 15 to 80 % RH (Non-condensing)
Noise Level	69.4 dB
Dimensions V x D x H	1,820 x 2,250 x 1,880mm (71.65 x 88.58 x 74.02 in.)
Veight	Approx. 5,200kg

Optional Systems

Repair Terminal

Offline Programming System

BF2-Editor Off-line Programming System

In-line automated 3D X-ray system for PCBA inspection

BF-X3

Visualize the inner structure and achieve innovative automated inspection

Sakl



© 2018 Saki Corporation. All Rights Reserved. Specifications contained in this flyer are subject to change without notice. In-line automated 3D X-ray system for PCBA inspection

BF-X3

The Revolution of 3D X-ray High-Speed Inspection.

Saki revolutionizes 3D X-ray inspection, making its BF-X3 machine destined to become commonplace in SMT production lines.

With its Planar CT (PCT) technology, Saki Corporation implements a new high-resolution detector, and a new CT calculation method for PCBA inspection. These improvements provide much faster throughput compared with previous X-ray machine models.

Saki proudly introduces the BF-X3 machine, setting a new standard for PCBA inspection.

Three valuable strengths for any production site

Automated high-resolution 3D measurement technology Enables high image quality defect detection



Reliable hardware design

Worldwide service Saki provides a strong worldwide network of service and support

Saki

Technology Automated high-resolution 3D measurement technology

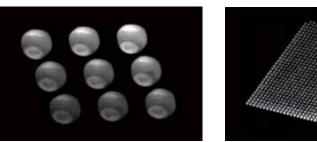
The BF-X3 uses high-accuracy 3D data generated by the Planar CT (PCT) system to capture a wide variety of defects. The automated inspection process completely separates the top and bottom side images of the board, measures components and features, determines placement variance and warpage, and identifies and classifies the defects, such as dry joints and voids.

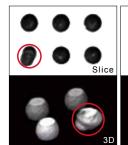
Measuring various defects by using high resolution CT data

Saki employs a customized high-resolution Closed X-ray tube, in conjunction with microfocus X-ray tubes. The 3D Planar CT measures the size, volume, and location of defects, and generates associated data.

Based on these data, BF-X3 determines the dimension of each component.

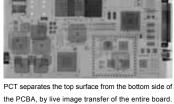
The BF-X3 has superb capability to perform various inspections, such as electronic components, solder, voids in microscopic pores, Head-in-Pillow (HiP), non-wetting, and multi-layer solder inspection for power modules

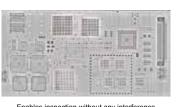




Seamless 3D data improves inspection efficiency

Planar CT (PCT) has high resolution in both the horizontal and vertical directions. The PCT produces high-resolution images for even the bottom side of the PCBA, due to its ability to completely separate the topside and bottom-side images. The PCT also detects PCB warpage and joints, completely, thereby enabling the system to automatically correct for such factors, by utilizing the optimal combination of imaging principles and CT reconstruction principles. This also allows the BF-X3 to produce a seamless 3D image of the entire PCBA, although the original image data are obtained through various FOV captures.





Enables inspection without any interference from the opposite side of the board

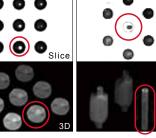
Achieve even greater efficiency with Saki's peripheral systems

Saki's BF-RP1 Repair Terminal, installed on an off-line PC, allows operators to verify defects in 3D images. Using the mouse to select and maneuver images of any portion of the entire PCBA image, makes it seem as if the part were being visualized in the palm of the operator's hand. Additionally, the BF-Editor2 off-line programming software allows the user to automatically create inspection parameter data, directly from CAD data. Saki utilized its abundant AOI experience to design the BF-X3 to accommodate both high-mix and high-volume production environments.



by Saki.





Utilize automated 3D image

reconstruction to perform inspection

High-resolution 3D data are used for all image

acquisition, inspection, and analysis. A high-resolution

image of each defect is displayed immediately, thereby

enabling prompt viewing and analysis, and eliminating

Such precision machine control, 3D reconstruction, 3D

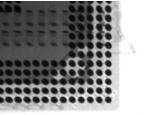
inspection, and 3D viewing are all unique developments

and analysis at the same time

the need for further analytical equipment.



Hardware ิก Reliable hardware design



High-resolution closed X-ray tube

The BF-X3 is equipped with a 130kV closed X-ray tube. This 16W high-output tube, with its very small focal point size, -enables the BF-X3 to acquire the best high-definition images of any machine in the market. High reliability, combined with auto-conditioning and self-diagnostic function, ensure a long operating life of the tubes.



Prolonged stability with the high-rigidity gantry structure

Saki developed the BF-X3's highly rigid, two-layer gantry structure, driven by linear motors and mounted on a granite base, in order to maintain precise control of the detector and inspection object in a very high-speed and submicron accuracy environment. This robust mechanism provides high reliability, with long-term stability, to ensure the integrity of the Planar CT high-resolution inspection results.



High safety based on European standards

The BF-X3 keeps X-ray emissions at a stable and safe level, and is able to start inspection quickly, due to its three shutters located at the PCB entrance, PCB exit, and X-ray emission site. These shutters allow quick inspection by eliminating the need to turn off the X-ray source during board transfer in, and transfer out of the machine. The system meets rigid European (CE) standards, which require the X-ray leakage dose to be less than 0.5 µSv/h.

Global Support Worldwide service

Saki's worldwide network provides service and support to its customers of more than 7,000 AOI, SPI, and X-Ray machines

