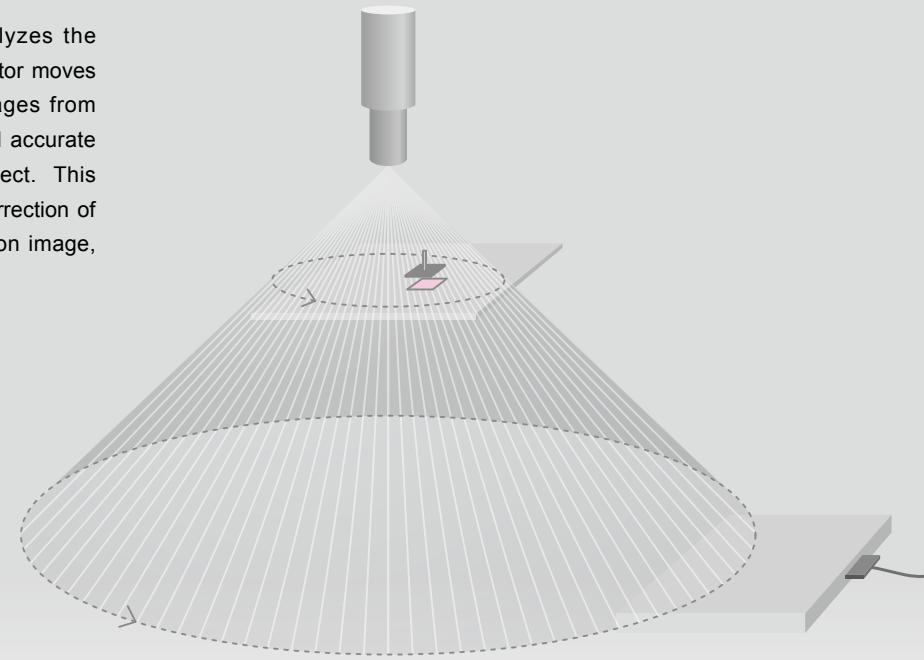


New Technology

Saki's unique "Planar CT" technology generates high-precision 3D inspection data

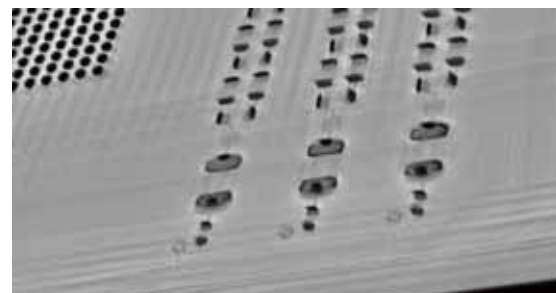
Saki's unique "Planar CT Technology" analyzes the internal structures of planar objects. The detector moves parallel with the planar object capturing images from various directions, thereby enabling quick and accurate generation of the tomogram of the planar object. This unique parallel movement permits 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.

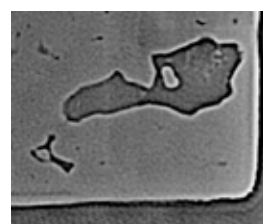
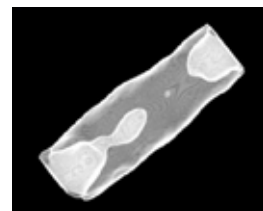
Visualize the inner structure to eliminate defects

The BF2 eliminates the concern of defects not being detected via optical inspection, and opens the way to perfect quality. The high-resolution images and numerical data produced by the automated measurement system's visualization of the entire internal view, permit defect detection and disposition to achieve "zero defects."



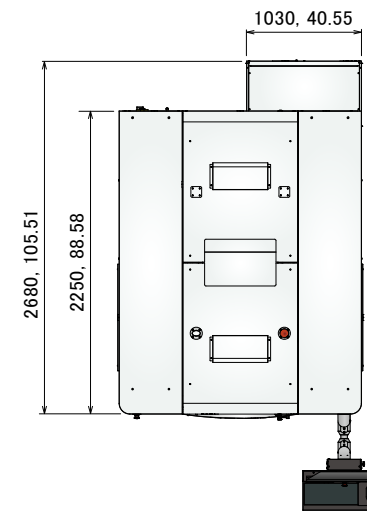
Broaden the range of objects able to be inspected, from Semiconductor to Power module

The BF-X2, 3D X-ray inspection system, with its adjustable system using 130kV or 200kV micro-focus, open X-Ray tubes, is the ideal inspection platform for various test applications. With such customized solutions, the BF-X2 can inspect and detect various objects, such as flip chip soldering, void in TSV and LTH in semiconductor field, as well as IGBT power module soldering in the power device field. The BF-X2 also offers a wide range of solutions for NDT.

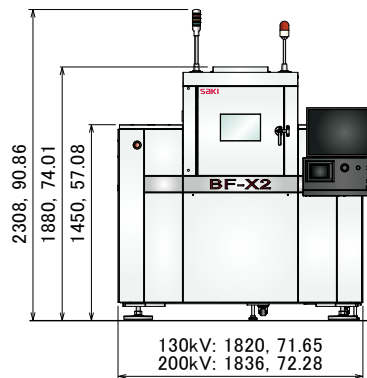


External View

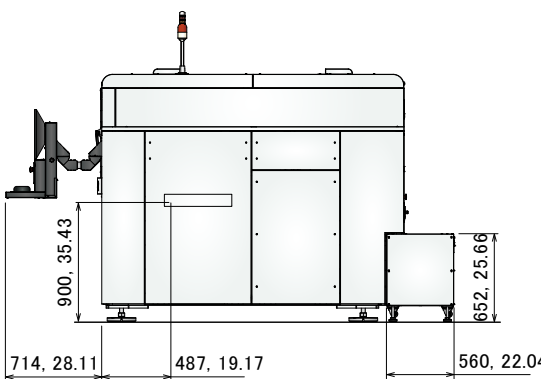
■ Top View (mm, in.)



■ Front View



■ Side View



Product Specifications

Model Name	BF-X2
X-ray Tube	130 kV / 200 kV Open X-ray Tube
Resolution	130kV model : 8 to 25µm 200kV model :21 to 68µm
PCB Size	130kV model : 50 x 120 to 460 x 510mm (1.97 x 4.72 to 18.11 x 20.08 in.) 200kV model : 50 x 140 to 460 x 510mm (1.97 x to 18.11 x 20.08 in.)
PCB Thickness	0.8 to 4.0mm (0.031 to 0.157 in.)
PCB Warp	+/- 2mm (0.08 in.)
Component Height	Top: 40mm (1.57 in.), Bottom: 40mm (1.57 in.)
Inspection Categories	<ul style="list-style-type: none"> • Surface Mount Device Presence/Absence, Misalignment, Tombstone, Bridge, Foreign material, Absence of solder, Insufficient solder, Dryjoint, Lifted lead, Lifted bump, Lifted chip, Fillet defect, Void, HIP • IGBT Device Void inspection of a solder • Packaged Print Circuit Board Void inspection of a through hole • Flip Chip Device (Inner bump) Dryjoint, Void
3D Capturing Speed (Planar CT)*	Approx. 6 sec./FOV
Detector	130kV model : 14 bit, 3M Pixel 200kV model : 12 bit, 1M Pixel
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

* It may change according to capturing settings.

System Requirements

Electric Power	Three Phase ~ 400 V +/-10 %, 50/60 Hz
Power Consumption	7 kVA
Air Requirement	0.5 MPa, 60 L/min (ANR)
Usage Environment	15 °C (59 °F) to 28 °C (82°F) / 15 to 80 % RH (Non-condensing)
Noise Level	69.4 dB
Dimensions W x D x H	130kV model : 1820 x 2680 x 1880mm (71.65 x 105.51 x 74.01 in.) 200kV model : 1836 x 2680 x 1880mm (72.28 x 105.51 x 74.01 in.)
Weight	130kV model : Approx. 5500kg (12125.43 lbs) 200kV model : Approx. 6500kg (14330.05 lbs)

Optional Systems

Repair Terminal, Offline Programming System

saki Saki Corporation

Headquarters
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In-line 3D automated X-ray inspection system for Semiconductor, Power module inspection

BF-X2

Visualize the inner structure with innovative automated inspection



In-line 3D automated X-ray inspection system for Semiconductor, Power module inspection

BF-X2

X-ray “measurement”
that exceeds “inspection”.

Saki's BF-X2 X-ray inspection system takes inspection to a greater level.

The high-accuracy 3D image provides easier and better defect detection.

Saki proudly offers its BF-X2 3D X-ray inspection system, establishing the new standard in inspection systems.



Three strengths useful in any production site:

1 Automated high-resolution 3D measurement technology

Providing high image quality defect detection.

2 Reliable hardware design

Superior reliability, safety, and ease of maintenance.

3 Worldwide service

Saki provides a strong worldwide network of service and support.

1 Technology Automated high-resolution 3D measurement technology

The BF-X2 uses high-accuracy 3D data generated by the Planar CT (PCT) system to capture a wide variety of defects.

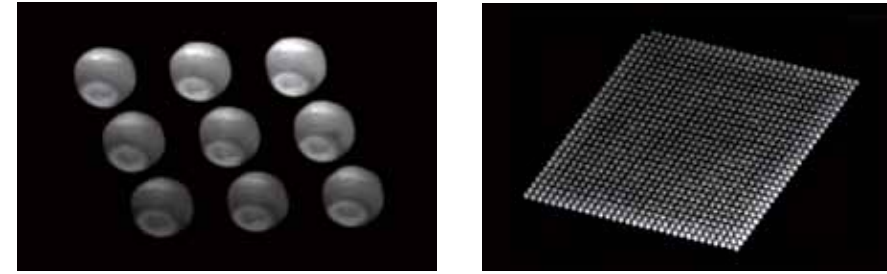
The automated inspection process completely separates the top and bottom side images of the board, measures components and features, determines placement variance and warpage, and identifies and classifies the defects, such as dry joints and voids.

Identifying various defects using high-resolution CT data

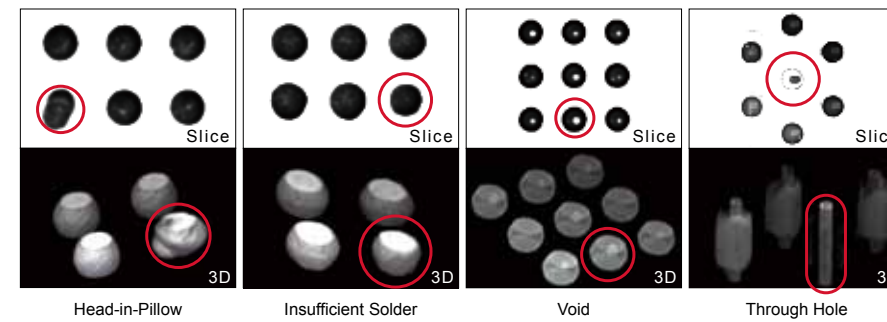
Saki employs a customized high-resolution Closed X-ray tube, in conjunction with micro-focus X-ray tubes. The 3D Planar CT measures the size, volume, and location of defects, and generates associated data.

Based on this data, the BF-X2 determines the dimensions of each component.

The BF-X2 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.

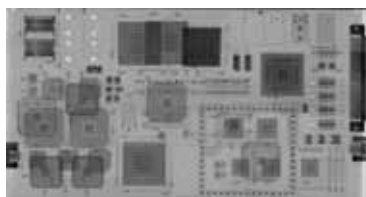


Various measurement examples

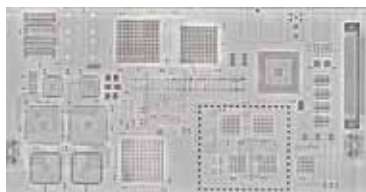


Seamless 3D data improves inspection efficiency

Planar CT (PCT) has high resolution in both the horizontal and vertical directions. PCT produces high-resolution images for even the bottom side of the PCBA, due to its ability to completely separate the top-side and bottom-side images. PCT also detects PCB warpage and joints, completely, thereby enabling the system to automatically correct for such factors, by utilizing the optional combination of imaging principles and CT reconstruction principles. This also allows the BF-X2 to produce a seamless 3D image of the entire PCBA, although the original image data are obtained through various FOV captures.



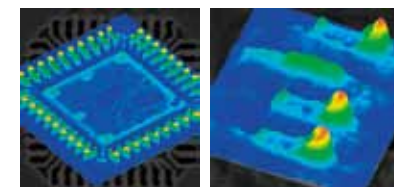
PCT separates the top surface from the bottom side of the PCBA, by live image transfer of the entire board



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

Utilize automated 3D image reconstruction to perform inspection and analysis at the same time

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 the need for further analytical equipment. Such precision machine control, 3D reconstruction, 3D inspection, and 3D viewing are all unique developments by Saki.



Achieve even greater efficiency with Saki's peripheral systems

The BF-Monitor Repair Terminal, installed on an offline 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 BF2-Editor offline programming software allows the user to automatically create inspection parameter data, directly from the CAD data. Saki utilized its abundant AOI experience to design the BF-X2 to accommodate both high-mix and high-volume production environments.



2 Hardware Reliable hardware design

High-resolution and highly stable open X-ray tube

While open X-ray tubes provide the advantage of a small focal spot, with a high-resolution image, they are prone to instability of the X-ray intensity. The BF-X2 overcomes this issue by utilizing an all-new target material and by directly controlling the target current, rather than the tube current. These developments provide very stable and accurate X-ray intensity, with a safe environment, even for prolonged periods of operation.



Prolonged stability with the high-rigidity gantry structure

Saki developed the BF-X2'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-X2 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., thereby allowing an operator to work 40 hours per week / 2,000 hours per year*, safely and securely.

* The time is calculated according to dose constraints in public exposure (1 mSv per year) indicated in the 2007 recommendations of the ICRP.

3 Global Support Worldwide service

Saki's worldwide network provides service and support to its customers of more than 15,000 AOI, SPI, and X-ray machines.

