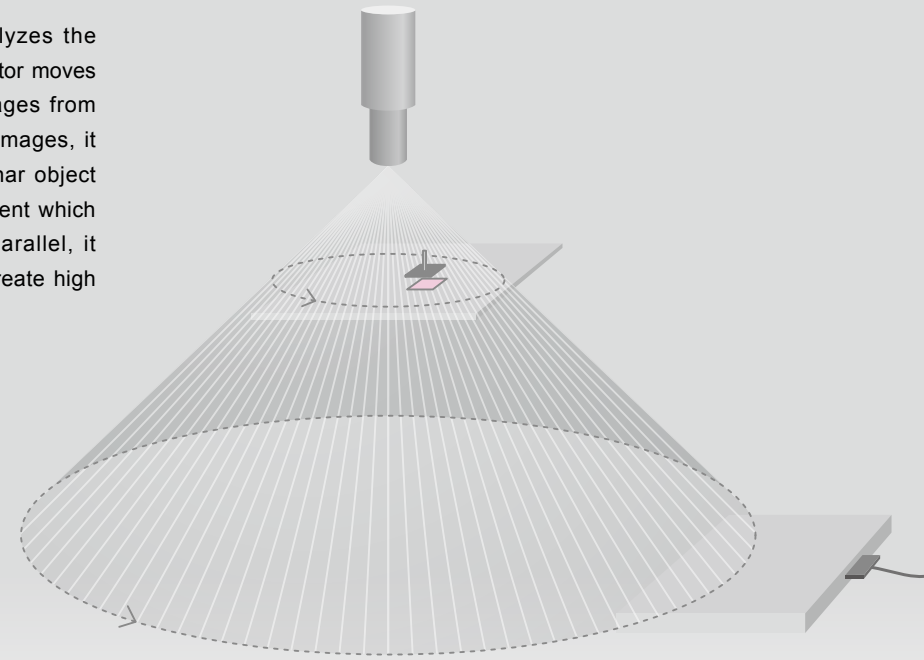


New Technology

Our unique technology “Planar CT” enables to make high-precision 3D 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. By using these diagonal images, it calculates the tomographic views of the planar object quickly and accurately. By the unique movement which both the detector and the objects moves parallel, it enables to correct the position reflecting to create high resolution image by less images taken.

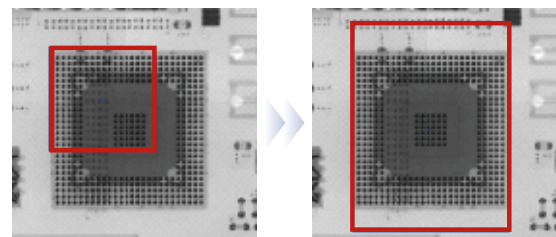


3D X-ray becomes major solution in SMT inspection.

Improve the cycle time dramatically

BF-X3 is equipped with a new generation of high resolution flat panel detector. FOV area becomes three times larger compared to previous model without compromising resolution conditions.

As a result, BF-X3 has significant faster throughput and is the ideal solution for in-line inspection.

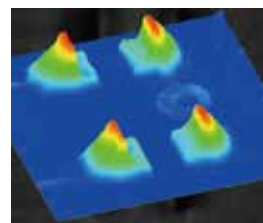
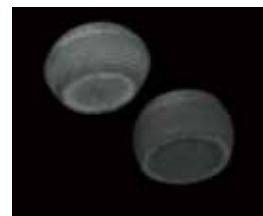


FOV of Previous Model

FOV of New Model

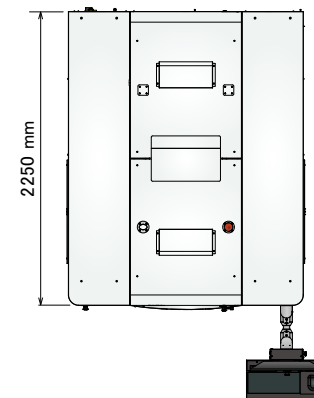
Broaden the range of inspection objects

BF-X3 is a unique 3D X-ray inspection system which inspects not only soldering of BGA, LGA and QFN but also Chip, Lead IC, PTH and most used components on PCB. 3D X-ray is the suitable technology to reconstruct the shape of solder ball and fillet accurately, and to realize reliable solder inspection.

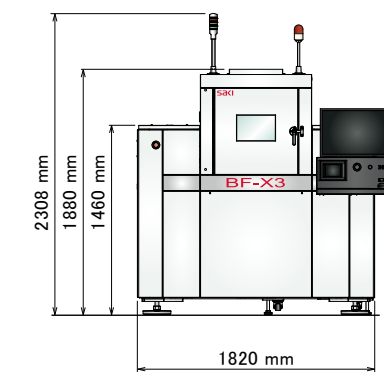


External View

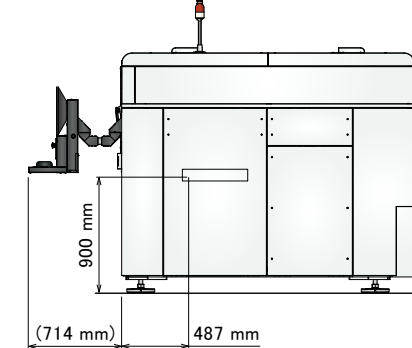
■ Top View



■ Front View



■ Side View



Product Specifications

Model Name	BF-X3
Resolution	12 to 29 μm
PCB Size	50 x 100 to 460 x 510 mm (1.97 x 3.94 to 18.11 x 20.08 in.)
PCB Thickness	0.5 to 4.0 mm (0.02 to 0.16 in.)
PCB Warp	+/- 2 mm (0.08 in.)
Component Height	Top: 40 mm (1.57 in.), Bottom: 40 mm (1.57 in.)
Inspection Categories	<ul style="list-style-type: none"> • Surface Mount Device Non Wetting, Head in Pillow(HIP), Fillet defect, Lifted lead, Lifted component, Excess and insufficient solder, Missing component, Flipped component, Tombstone, Shifted component, Bridge, Void, PAD shape, Foreign material, Co-planarity • IGBT Device Void inspection of a solder
3D Capturing Speed (Planar CT)*	Approx. 5 sec./FOV
Detector	Flat panel, 14 bit, 3M Pixel
X-ray Tube	130 kV, 16 W, Close X-ray Source
X-ray Leakage	0.5 μSV/h or less
Conveyor Method	Flat Belt Transfer
Conveyor Height	880 to 920 mm (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 30 °C (86 °F) / 15 to 80 % RH (Non-condensing)
Dimensions	1820 x 2250 x 1880 mm
W x D x H	(71.65 x 88.58 x 74.02 in.)
Weight	Approx. 5300 kg

Optional Systems

Repair Terminal	
Offline Teacher System	

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

BF-X3

Visualize the inner structure and achieve an innovative automated inspection



SAKI Saki Corporation

Headquarters
 Ogawa Building, 4-14-7, Nakanobu,
 Shinagawa-ku, Tokyo, Japan, 142-0053
 TEL: +81-3-5788-6280 FAX: +81-3-5788-6295
 E-mail: sagicorp@sakicorp.com



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

BF-X3

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

Saki changes 3D X-ray inspection system to become a one of the common equipments in any SMT line. Based on our planar CT technology, SAKI Corporation have implemented a new high-resolution detector and a new CT calculation method for PCBA inspection. These improvements leads to much faster throughput compared with previous models. SAKI proudly introduces BF-X3 machine which sets a new inspection standard for PCBA inspection.



Three strengths useful in production site

1 Automated high-resolution 3D measuring technology

Enables to detect the defects by using the high quality image.

2 Reliable hardware design

Achieved both machine safety and easy maintenance.

3 Worldwide service

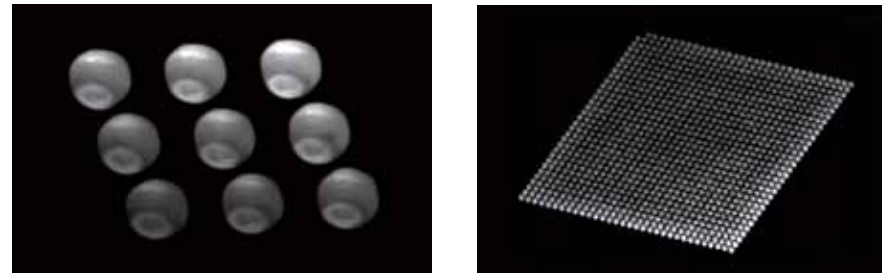
We are offering satisfactory supports all over the world.

1 | *Technology* Automated high-resolution 3D measuring technology

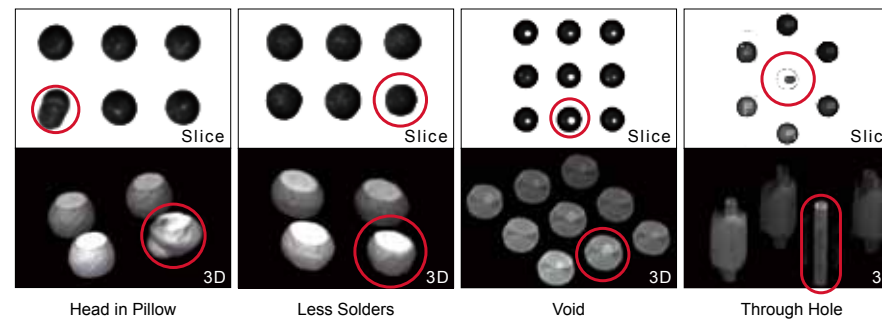
By using high-accuracy 3D data of Planar CT, BF-X3 is capable to capture various defects with 3D configuration. Automated inspection completely separates top and bottom of the board, corrects position gap and warpage based on board pattern, and measures/classifies defects such as dryjoint and void.

Measuring various defects by using high resolution CT data

Saki employed special and/or customized high-resolution Closed X-ray tube among micro focus X-ray tubes. The size, volume, and defect point of the object is measured from the 3D data of planar CT. Based on these, BF-X3 measures the dimension of each component. BF-X3 has superb inspection ability for various inspections such as electronic components inspection, soldering inspection, void inspection in microscopic pore, Head in Pillow (non-wetting) and multi-layer soldering inspection for power modules.

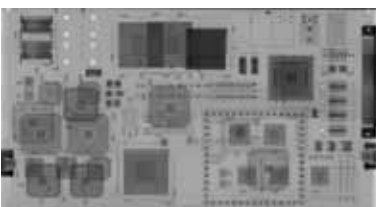


Various measurement examples



Seamless 3D data which improves inspection efficiency

Planar CT has high resolution in both horizontal and vertical direction. This will not be affected by back side mounting because of its capability to separate surface and back side completely. Also, it can capture the warpage of a PCB and joint images completely and correct those automatically by the optimal combination of both the imaging principle and CT reconstruction principle. Even though the original data is FOV images, the achieved 3D data is seamless. We achieved smooth connection of joint areas, which contributes to speeding up, and enlargement of viewing field. Inspection of large parts could also be easily done.



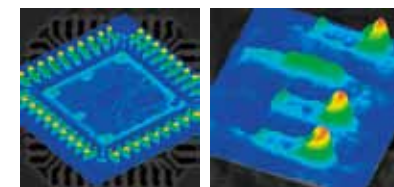
Separate the surface image from the transfer imaging of the whole board



Enables to inspect without any influence from mount condition of flip side

Integrate 3D reconstruction and its view to implement the analysis and automated inspection at the same time

All automatic inspection is practiced by high-resolution 3D data. The high resolution image of the defect is shown immediately. Now, there is no further need to check the defective points by analytical equipments. This is enabled by the software for precise machine control, 3D reconstruction, 3D inspection, 3D view which are all developed by Saki.

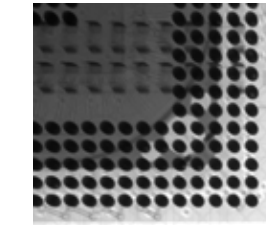


Achieves further efficiency by the peripheral systems

The operator is able to check the defects in 3D view on external PC. The optional "Repair terminal" shows inspected points in 3D movies. Using the mouse, you will feel like having a good look of invisible parts as though they are in your hands. Also, the "Offline teacher system" provides inspection data automatically from CAD data. Based on our abundant AOI experience, we designed this system to accommodate to both high-mix and high-volume production.



2 | *Hardware* Reliable hardware design



High-resolution closed X-ray tube

BF-X3 is equipped with a 130kV closed X-ray tube. This 16W high output tube has very small focal spot size which enables to acquire best on the market high-definition images. High reliability combined with auto conditioning and self diagnostic function ensure tube long life time.



Prolonged stability and high rigidity gantry structure

In order to control the detector and object in submicron accuracy and millisecond speed, we developed a high rigidity two-layer gantry structure which combines granite plate and linear motors. Its mechanism provides high reliability, with long-term stability which sustains the high resolution Planar CT calculation.



High safety based on European standards

BF-X3 is possible to keep X-ray dosage stable and start inspection quickly by the combination of 3 shutters placed in PCB entrance, exit, and X-ray infestation site. Due to these shutters, it secures safety and at the same time provides quick inspection as it doesn't need to stop X-ray source during plate carry-in and carry-out. It is designed to meet European standard which shows that the X-ray leakage dose must be lower than 0.5 μSv/h considering operator's safety.

3 | *Global Support* Worldwide service

We provide quick service and support all around the world using 15 of our worldwide network which currently supports 7000 AOI machines.

