Automated X-ray Inspection System
Transmission - SFT™ - Off-Axis

X2.5# High resolution setup / Semi-Backend

The MatriX **X2.5#** is an automated inspection system designed for sophisticated high-speed inspection in SMT production. Transmission X-ray Technology with patented Slice-Filter-Technique (SFT) and Off-Axis technology present a reliable solution for the in-line inspection of double-sided PCB assemblies. The X2.5# movable detector axes allow high-speed off-axis image acquisition from different angles and directions with maximum image quality and resolution.

MIPS_Tune is an off-line programming software package for test program generation with automatic CAD import and for graphical application parameter tuning. It features an automatic inspection list generation based on an advanced algorithm library for transmission and off-axis joint inspection. Proprietary **Tree-Classification** technique with integrated automatic rule generation, graphical measurement & yield display for program optimization.

The verification software module **MIPS_Verify** with its closed-loop repair concept is capable of in-line or off-line verification using a graphical board layout display and X-ray image with defect marking. Support of multiple inspection modes with parallel viewing of transmission oblique view and optical images of the same defect for easy and reliable defect verification.

MIPS_SPC – process control tools for real-time and history statistics.

Features and Benefits

- High Speed AXI System for In-line and Off-Line setups
  Transmission: 2-3 images/s
  Off-axis: 1-2 images/s
- Microfocus X-ray tube (sealed tube / maintenance free)
- 5-axes programmable motion system with servo drives (x-y sample table, z-axes x-ray tube, u,v detector axes)
- Digital CMOS flatpanel detector (14 bit digital output) standard & high-resolution setup
- Automatic grey-level and geometrical calibration
- In-line pass through board handling with automatic width adjust
- Barcode scanner (1D/2D) for serial number and product type selection
- Full product traceability via customized MES-Interface
- Optional: Combination with substrate magazine or stack handler
- Defect marking system

Inspection & Process Software

- PC-Station with multi-core processor setup
- Windows 7 or Windows 10 platform
- CAD Import for automatic inspection list generation
- Advanced Algorithm Inspection Library for chip-packages with wire-bond positions
- Slice-Filter-Technique (SFT) for double-sided board inspection
- Automatic-Tree Classification (ATC) for Auto-Rule-Generatio
- Off-line programming for AXI program generation & simulation, tuning and defect reference catalogue
- MIPS_Verify link with closed-loop repair
- MIPS_SPC for real-time process control

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X2.5# Flexible In-line X-Ray system

Applications

ELECTRONIC COMPONENTS AND SOLDER-JOINT

A unique advanced algorithm library is available for electronic applications, specifically for component and solder-joint inspection on PCB, hybrid or chip level assembly processes.

- All standard SMD and THT/PTH components
- Specific bond-wire algorithm library
- Off-axis imaging for wire-sweep analysis
- Advanced die-attach & voiding algorithm
- Expoxy overlap detection
- Wafer-bump algorithm
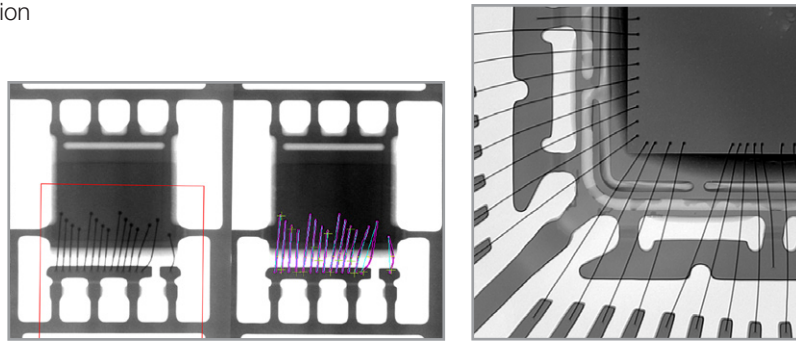
Specifications

Facilities

Dimensions:
1670 mm (H) x 3100 mm (W) x 1760 mm (D)

Adjustable conveyor height (SMEMA):
890 – 980 mm

Weight: 3.000 kg

Safe Operating Temperature:
15° - 32 °C optimal 20° - 25° C

Power Consumption: max. 6 kW

Line Voltage: 400 VAC, 50/60 Hz 3 phase, 16 A
208 VAC, 50/60 Hz 3 phase, 25 A

Air: 5-7 Bar, < 2 l/min, filtered (30µ), dry, oil free

Part Handling / Motion

High-speed sample table
Driving distance X,Y: 510 x 410 mm
X-Ray tube (Z): 0 - 150 mm
Detector Axes (U,V): 220 x 200 mm

X-ray Source (sealed tube)
Energy: 100 kV/20 W
Focal Spot Size: 5 microns
X-Ray Tube Orientation: End window tube
Optional:
Energy: 130 kV/40 W
Focal Spot Size: 5 microns
X-Ray Tube Orientation: End window tube

X-ray Imaging

Grey value resolution: 14 bit
Video output: Camera link interface
Detector Type: CMOS Detector (2.3 k x 2.3 k)
Active inspection area: 115 x 115 mm

Inspection features

Standard setup (100kV/20W)
Angle shot capability: 0 – 25 dgr

Optional setup (130kV/40W)
Angle shot capability: 0-45 dgr

Transmission FoV: 5 mm to 25 mm
Object resolution (@min. FoV): 2-3µm

Standard SMT setup
Max. sample size: 21"x 16" (510 x 410 mm)
Max. inspection area: 20"x 16" (480 x 410 mm)

Common PCB-Sample Spec's
Min. sample size: 4" x 3" (100 x 80 mm)
Max. sample weight: 11 lbs (5 kg)
Sample thickness: 0.03" – 0.2" (0,8-5 mm)

Assembly clearance
Topside: (incl. board thickness): 30mm
Bottom side: (excl. board thickness): 30mm
Edge clearance for clamping: 1-2 mm

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