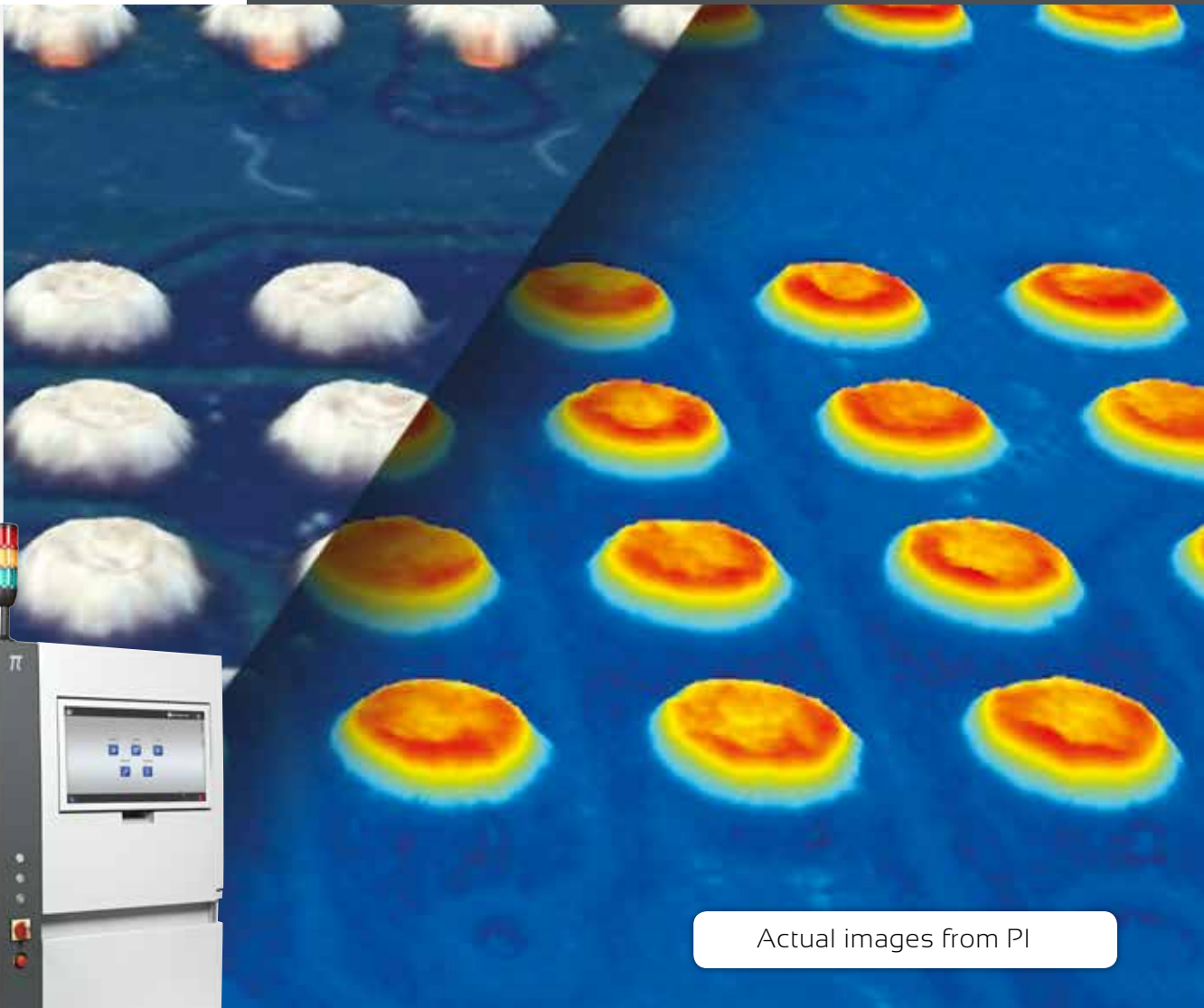# π SERIES

Predictive manufacturing with a new generation

3D SPI

Actual images from PI

Vi TECHNOLOGY®

Inspect with simplicity

A natural user interface accessible to anyone

PI is useable by anyone.
Operators, not just engineers, can program the machine.
PI's powerful capabilities are just a fingertip away.

- PI is designed to operate solely with a touch screen icon based interface with no keyboard and no mouse.

- Anyone is up and runnig after just an hour's training.

- Calibration is done at a press of button with embedded geometric and radiometric calibration tools to ensure consistent performance over time, and machine-to-machine portability.
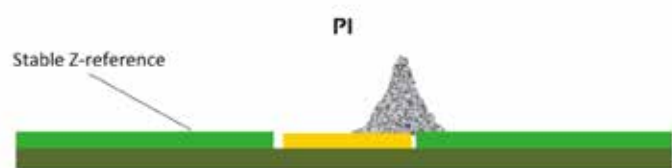
Inspection without doubts

Demand accuracy, not just repeatability

PI's patented Z-referencing technology overcomes the limitation of traditional SPIs and brings unprecedented accuracy to paste volume measurement.

- Accuracy in production is about Z-referencing. All traditional SPIs set threshold (typically 40 µm) under which height and thus volume is no longer measured. As a result,volume is under estimated on small pads, precisely when you need to know much paste is truly deposited.

- PI's patented Z-referencing method leverages the entire textured 3D board information, not just cropped images around pads, to define stable and accurate Z-reference.

- PI's multi-frequency, multi pattern Moiré combined with patented dual Z axis motion, offer unique wrap compensation to deliver accurate measurements in real production environments, with no false calls.

- High resolution textured 3D images provide unambiguous information for defect classification.
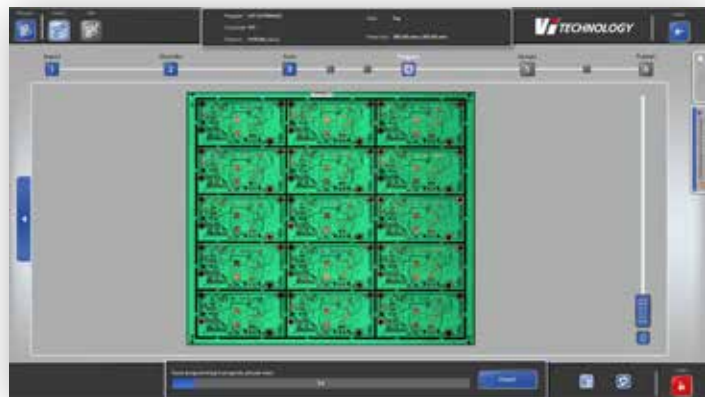
Inspect without effort

Let the machine program itself

PI is the only SPI to program automatically.
Auto-programming enables high quality inspection independently of programmer's skill level.

- Just scan a bare board, to ensure accurate measurement, and let the machine program itself.

- With auto-programming, fine tuning is no longer required. Performance is consistent, regardless of color or finish variations. Thus, PI is ideal for New Product Introduction.

- In addition to paste inspection, PI offers simultaneous glue dot inspection.
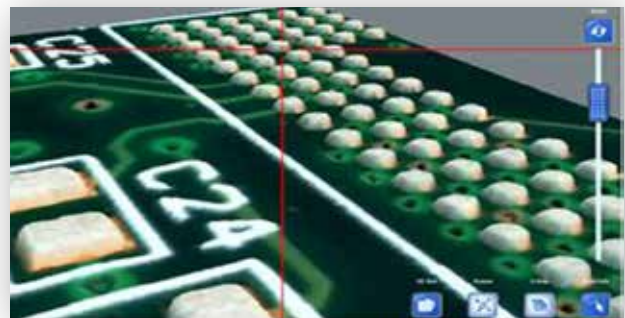
Inspect with a purpose

Control the print process to increase yield

PI's automatic pad grouping by AAR is just one the many features targeted specifically at process control. Combined with SIGMA Link software suite, inspection data becomes actionable process information.

- Improve your process and set tolerances independently of products with automatic pad grouping by AAR (Area Aperture Ratio)
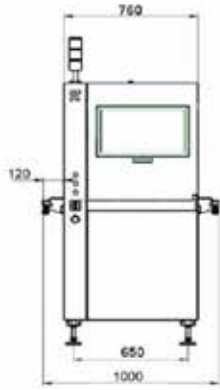

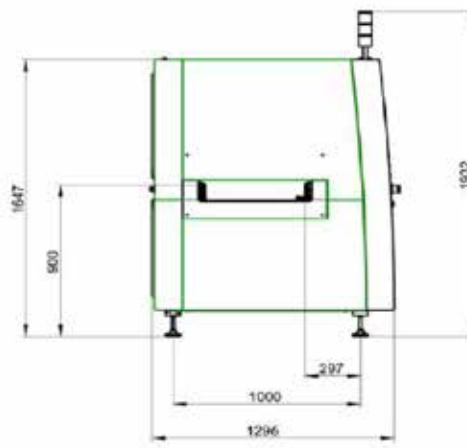- Understand your process with an extra-large review image in textured 3D for easy diagnostic.

- Monitor your process in real-time with SIGMA Analysis - Off-line SPC - or simply with PI's embedded SPC.
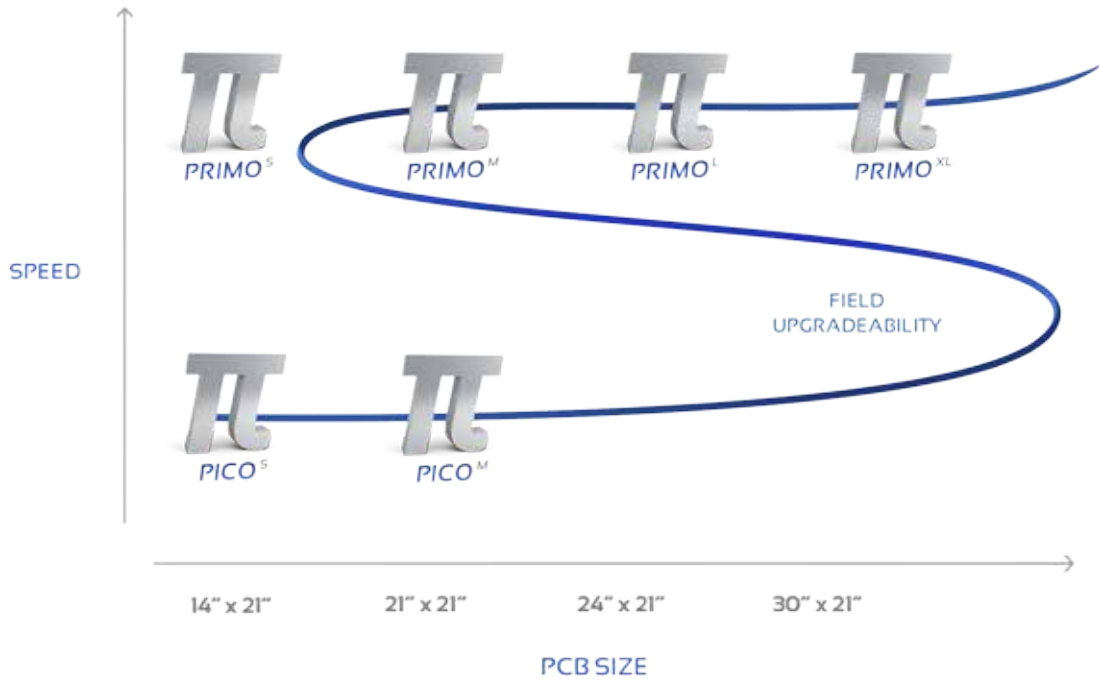
Front view   Side view

Specifications

Inspection technology	PI PICO	PI PRIMO
3D engine	360° Moiré – Shadow free, Multi-camera, Multi-projector, Multi-pattern	
Camera	80 Mpixel, 12-bit CMOS sensor	160 Mpixel, 12-bit CMOS sensor
Image resolution	15 µm	
Projection	4 HD, 10 bit Industrial projectors	8 HD, 10 bit Industrial projectors
Field of View (X x Y)	160 mm x 55 mm	350 mm x 55 mm
Lighting	White LED + RGB lighting	
High speed frame grabber	Up to 30 Gbit/s	
Warp compensation	+/- 5 mm with patended dual Z axis motion for real time Z and tilt adjustments	
Z-reference	Full PCB inspection for Z-referencing with no cropping around pads	

System		
Operating system	Linux	
Processor	Intel Core i7 8-Core, 32 GB memory	Intel Core i7 8-Core, 48 GB memory
Storage capacity	6 TB, including 4 TB in RAID1	
Massive parallel computing	3.2 Teraflops, 1 593 - Core	6.4 Teraflops, 3 186 - Core
Motion control	Linear optical encoder (1 µm resolution)	

Inspection performance		
Measurements	Height, Area, Volume, Offset, Bridging, Shape 2D, Shape 3D, Coplanarity	
Defect types	Insufficient / Excessive / Missing paste, Bridge, Shape 2D, Shape 3D, user defined defects	
Maximum paste size	20 mm x 20 mm	
Minimum paste size	150 µm x 150 µm	
Maximum paste height	400 µm (consult us for higher paste height)	
Height resolution	100 nm	
Height accuracy	<< 1 µm on Certification target at operating temperature	
Height repeatability	<< 1 µm @ 3 σ on Certification target at operating temperature	
Volume repeatability	< 3% @ 3 σ on PCB at operating temperature	
Gage R&R	<< 10%	
Cycle time	3 sec per Ultra-large FOV + 2.5 sec (load/unload)	

Software suite		
Offline programming software	SIGMA Import (Gerber & CAD data)	
Online SPC (Statistical Process Control)	Histograms, X-R charts, Signature, Cp/Cpk, Gage R&R	
Offline SPC	SIGMA Analysis (Web-based software)	

Options		
External barcode reader (ID/2D)	Cognex DM 50 (requires 1 000 mm conveyor)	
Internal barcode reader (ID/2D)	Yes	
Closed loop to printers	With all major printers	
Others	Consult us	

Facilities		
Interface	IPC-SMEMA-9851	
Power requirements	Single Phase 2P+ Earth, 100 - 240 VAC / 16A, no need for compressed air	
Dimensions (W x D x H)	1 000 mm (Option 800 mm) x 1 296 mm x 1 647 mm	
Weight	430 kg	
Operating temperature	15°C to 30°C	
Relative humidity	20 – 75% (without condensing)	

Regulatory compliance		
Norms and standards	CE (European Safety Requirements), IEC 60204, IEC 61010-1, IEC 60950, IEC 61000-2-2	

SPEED (vertical axis) — **PCB SIZE** (horizontal axis)

PRIMO ˢ · PRIMO ᴹ · PRIMO ᴸ · PRIMO ˣᴸ

PICO ˢ · PICO ᴹ

FIELD UPGRADEABILITY

14" x 21"   21" x 21"   24" x 21"   30" x 21"

Specifications

PCB handling	PI PICO / PI PRIMO		PI PRIMO	
Minimun PCB dimensions (L x W)	50 mm x 50 mm (2 x 2 inch)			
PCB thickness	0.1 mm to 5.0 mm			
Minimum edge clearance	3 mm			
Top clearance	20 mm			
Bottom clearance	50 mm			
Conveying direction	Left to right - Right to left - Left to left - Right to right			

	S	M	L	XL
Maximum PCB dimensions (L x W)	350 x 533 mm (14 x 21 inch)	533 x 533 mm (21 x 21 inch)	609 x 533 mm (24 x 21 inch)	762 x 533 mm (30 x 21 inch)
Conveying height	830 mm to 930 mm (Standard) / 900 mm to 1000 mm (Option)			
Conveyor lenght	1000 mm (800 mm option)	1000 mm	1000 mm	1250 mm
Maximum PCB weight	4 kg			4,5 kg

Robust design
Embedded guide
Easy maintenance

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