

The **VCTA S1PL** is an advanced, high-speed in-line automated optical inspection (AOI) system engineered specifically for Through-Hole Technology (THT) and DIP component insertion verification. Designed with an ultra-compact overhead bridge architecture, the system mounts directly above existing production conveyors—requiring **zero additional factory floor space**. Utilizing a 25MP ultra-high-resolution industrial camera, multi-angle lighting, and intelligent graphic algorithms, the S1PL inspects moving circuit boards up to 450 × 450 mm on-the-fly, reliably identifying missing parts, incorrect insertions, polarity reversals, and pin shifts prior to wave or selective soldering.

25 MP HIGH-SPEED INDUSTRIAL CAMERA	0 m² EXTRA FLOOR SPACE (OVER-CONVEYOR)	450×450 mm MAX PCB INSPECTION AREA	≤ 80 mm TOP COMPONENT CLEARANCE
--	--	--	---

Key Technological Innovations of the VCTA S1PL Series

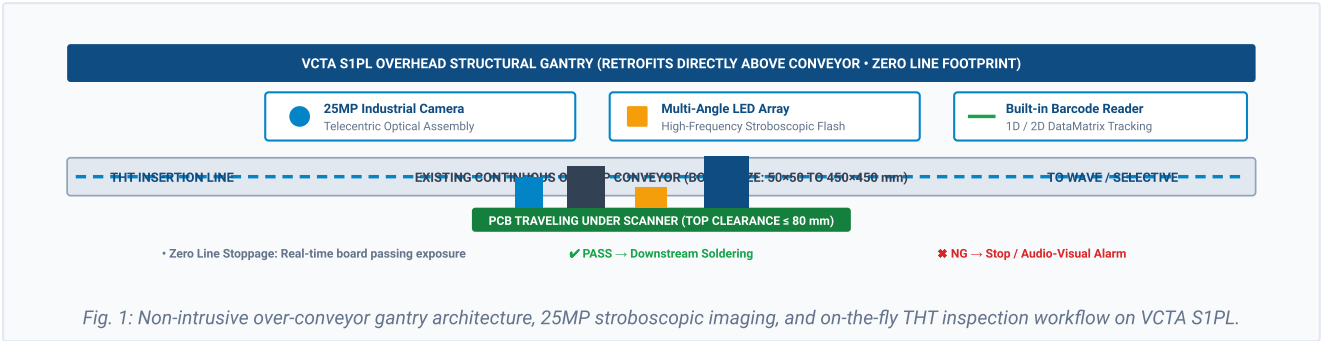
Direct Over-Conveyor Mounting
Installs directly onto your existing assembly line conveyor without cutting tracks or modifying floor footprints. Eliminates line breaks and expensive layout alterations, enabling rapid deployment in manual insertion and automated DIP lines.

25MP Ultra-High-Speed Imaging
Equipped with an industrial 25-megapixel global-shutter sensor paired with a high-resolution telecentric optical assembly. Captures razor-sharp board images on-the-fly without stopping production flow, ensuring zero impact on line cycle times.

Specialized THT Defect Classification
Optimized specifically for complex THT components: electrolytic capacitors, relays, connectors, transformers, and TO-packages. Accurately flags missing pins, wrong part types, body skew, lifted components, and reversed polarity stripes.

Centralized SPC & Traceability
Integrated 1D/2D barcode recognition links every inspected board to defect logs and statistical process control (SPC) charts. Connects directly to central server architectures for multi-line quality analytics and factory MES compliance.

VCTA S1PL Over-Conveyor Mounting & On-the-Fly Inspection Architecture



Technical Specifications & Engineering Parameters

1. OPTICAL IMAGING SYSTEM & CAMERA ARCHITECTURE	
Primary Imaging Sensor	25-Megapixel (25MP) high-speed industrial global-shutter digital camera
Optical Lens Assembly	Custom high-resolution low-distortion optical lens (telecentric configuration)
Illumination Architecture	Multi-angle programmable high-intensity LED array with high-frequency stroboscopic control
Inspection Mode & Capture Velocity	Real-time dynamic inspection on-the-fly (continuous board passing without line stop)
Barcode & 2D Identification	Integrated high-speed barcode reader (supports standard 1D Code 128, 39, and 2D DataMatrix / QR)
2. THT INSPECTION CAPABILITIES & DEFECT CLASSIFICATION	
Target Assembly Processes	Pre-wave soldering, post-manual DIP insertion, selective soldering infeed, press-fit inspection
Compatible Component Geometries	Axial/radial components, DIP ICs, relays, connectors, electrolytic caps, heatsinks, transformers
Critical Defect Types Detected	Missing component, wrong insertion, angular skew/offset, reversed polarity, pin presence & clinch status
Marking & Color Verification	Text/OCR verification, body color matching, polarity band recognition, orientation notch verification
False Call Minimization	Adaptive intelligent algorithm filters component body color shade variations and ambient factory light
3. PCB HANDLING, CONVEYOR DIMENSIONS & CLEARANCES	
Applicable PCB Dimensions	Min. 50 mm × 50 mm — Max. 450 mm × 450 mm
Top-Side Component Clearance	Standard clearance: ≤ 80 mm (accommodates tall coils, transformers, caps & heatsinks)
Mounting Method & Footprint	Direct overhead bridge mount over existing conveyor — zero (0 m²) floor space footprint
Conveyor Compatibility	Compatible with standard belt, roller, or pin-chain transport conveyors (SMEMA trigger ready)
Inspection Board Direction	Bidirectional support: Left → Right or Right → Left (software selectable)
4. SOFTWARE, SPC DATA ANALYTICS, DIMENSIONS & UTILITIES	
Programming & Software Environment	Intuitive graphical teaching software, Gerber CAD import, template learning (program time: < 15 min)
SPC & Quality Traceability	Real-time SPC statistical data output, defect pareto charts, full production lot logging, MES API
Central Server Management	Centralized server management architecture connects multiple inspection lines into a single dashboard
Machine Dimensions (L × W × H)	1,494 mm (L) × 1,900 mm (W) × 847 mm (H) [Overhead bridge structural frame]
Total Net Weight & Electrical	Approx. 250 kg / AC 220V ±10%, single phase, 50/60 Hz; Power consumption: < 1.5 kW

Zero-Footprint Overhead Mounting & Real-Time Throughput

- **No Floor Space Required:** Bridges right across your current conveyor line without requiring line disassembly, track splices, or additional shop floor allocation.
- **Inspection on the Fly:** High-speed 25MP camera captures board imagery while the conveyor is in motion, maintaining 100% throughput with zero bottlenecking.
- **Tall Component Overhead:** Ample 80 mm top-side clearance guarantees safe, collision-free transit for large connectors, heatsinks, inductors, and electrolytic cans.

Intelligent Graphic Teaching, Traceability & SPC

- **Intuitive Graphical Interface:** Fast recipe creation via component template libraries, CAD coordinate import, and automated pin bounding boxes.
- **Integrated Product Traceability:** Built-in barcode/2D reader associates every inspection record and high-res image with individual PCB serial numbers.
- **Factory MES Integration:** Direct network export of SPC metrics, defect PPM rates, and alarm triggers to central servers and plant-wide MES systems.