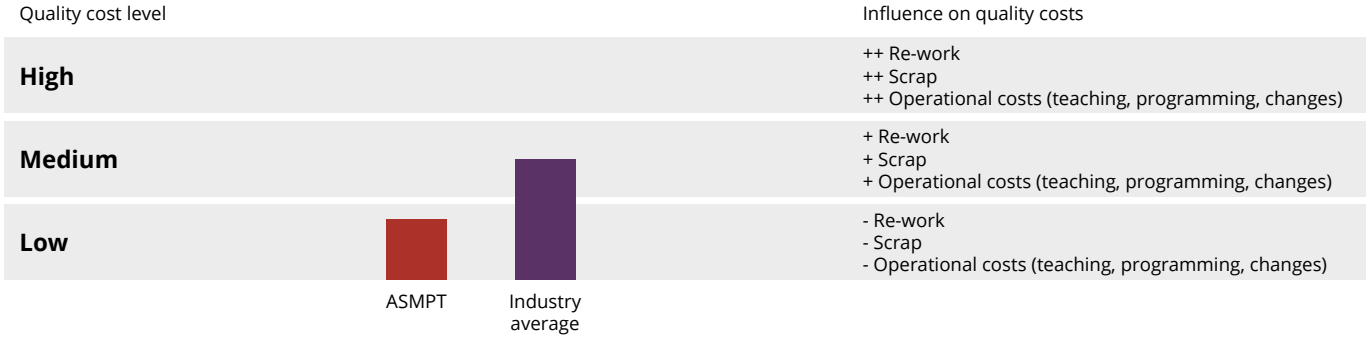
ASMPT enabling the digital world

# KPI: Quality

## Focus on precision – when excellence begins with the details

**Quality is at least as crucial as speed for maximum overall equipment effectiveness. Even a single wrongly or inaccurately placed component can necessitate the expensive new production of the entire module. In addition, quality problems always lead to increased operating costs as rework (if permitted), troubleshooting and reprogramming tie up valuable human resources and slow down the production process. Each defect raises the cost of achieving the level of quality that the customer demands.**

### Premium quality at a lower cost




*Quality cost comparison between ASMPT placement machines and the industry average: Thanks to tried-and-tested, highly advanced technologies, SIPLACE machines ensure compliance with required quality standards at significantly lower operating costs.*

**Is your investment really profitable?**
**Five KPIs provide the answer.**

When purchasing placement machines, there is much more to consider than just the purchase price. To make informed decisions, you need to keep an eye on long-term operating costs – and thus the total cost of ownership (TCO). A key factor for a profitable investment is overall equipment effectiveness (OEE), which can be measured and optimized using **five key performance indicators (KPIs):** Real Speed, **Quality**, Flexibility, Availability, and Ease of Use.

## By significantly reducing fault rates, placement machines from ASMPT make a noticeable contribution to overall equipment effectiveness

**What is crucial for high quality?**

- Exact measurements
- Individual component inspections, also for OSCs
- Highly accurate sensor technology
- Precisely adjustable placement forces
- Consideration of PCB warping
- Trouble-free operation
- Highly accurate motion systems

**For what is maximum quality particularly important?**

- Highly complex products where any rework is not permitted for example, for the automotive industry
- Cost-intensive products such as server boards for AI
- Safety-critical products

**How does ASMPT achieve maximum quality?**

- SIPLACE placement heads with integrated cameras
- Universal component sensor
- Optimized SIPLACE Vision System
- Adjustable placement force with automatic learning function
- Automatic adjustment to PCB warping
- Robust machine frame and linear drives
- Maintenance-free SIPLACE feeders
- Low-maintenance SIPLACE placement heads
- Precisely controllable SIPLACE Glue Feeders
- 3D component coplanarity measurement
- 100-percent detection and measurement, from pickup to placement
- On-board PCB inspection
- Full OSC support, with stereo measurement
- SIPLACE Measuring Feeder

## Excellence is the result of many perfectly coordinated components

### SIPLACE Placement Heads set the standard for quality with precision

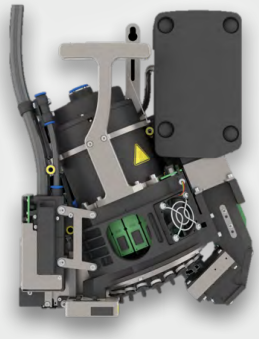
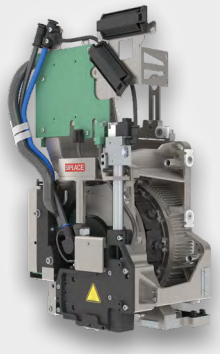
With their integrated component cameras, SIPLACE Placement Heads play a crucial role for quality assurance and optimize the process control.

**Your benefits:**

- **Precise component control:** Individual inspection of each component for maximum accuracy.
- **Top quality:** Optimal placement in collect-and-place mode thanks to individually rotatable segments.
- **Fault minimization in real time:** Instant rejection of faulty or incorrectly picked-up components.
- **Maximum availability:** Mature technology and long maintenance cycles ensure stable operation.

**SIPLACE CP20 and CPP Heads sets highest quality standards in placement technology.**

**SIPLACE Placement Heads CP20 and CPP**

| Consistently designed for speed | Powerful all-rounder |
|---|---|
|  |  |
| **CP20** | **CPP** |
| 0201 metric up to<br>8.2 mm × 8.2 mm × 4 mm<br>(L×W×H) | 01005 up to<br>50 mm × 40 mm × 15.5 mm<br>(L×W×H) |

## Embedded laser sensor for component inspection mix ensures consistent quality on the line at all times

The component sensor integrated into each SIPLACE head uses a laser beam to check the position of each component. It also detects the component height, a parameter that is crucial for compensating for warped PCBs and controlling the placement force with precision.

**Your benefits:**

- **Multiple position checks:** Both before and after component pickup, as well as before and after placement.
- **Optimized travel paths:** Enabled by precise height measurement.
- **Reliable detection:** Even for the smallest components, such as 0201 metric.
- **No limitations:** All component shapes and nozzle types are supported.

**The more accurately the machine measures each component's parameters, the more reliable and precise the placement will be.**

### Integrated component sensor

Reliable – no matter the component mix

## Maximum placement quality thanks to individually controllable placement forces for each single component

Precisely controlled placement force is a critical factor for top quality. SIPLACE machines ensure exact force control – even for demanding mixed-placement applications, reliably protecting expensive components from damage.

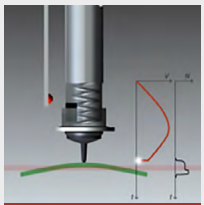
**Your benefits:**

- **Precise placement:** Placement forces from 0.5 to 15 N for a broad range of components.
- **Flexible control:** Individually adjustable for each individual placement position – for maximum adaptability.
- **Component-specific optimization:** Exact adaptation to each component's specific requirements.
- **Maximum efficiency:** Optimized speed-time curve for gentle and precise placement.

**From sensitive dies to heavy OSCs – each component gets placed with maximum precision and the optimal placement force.**

### Precisely adjustable placement forces

Individually optimized for each component

| | CP20 | CPP |
|---|---|---|
| | **Speed** | **Flexibility** |
|  |  |  |
| **Placement force** | **0.5 N - 4.5 N** | **1 - 15 N** |

## No compromises on quality: SIPLACE Vision System with high-resolution camera

The SIPLACE Vision System inspects each component individually, including critical solder paste pads.

**Your benefits:**

- **Precise measurement technology:** Optimal measurement settings thanks to rotatable SIPLACE placement head segments.
- **Reliable component recognition:** Reliable face-down detection of SOT23 components without markings.
- **Precise pin measurements:** Complete inspection of special components such as OSCs.
- **Continuous quality assurance:** Regular inspection of nozzle tips for damage.
- **Maximum process control:** Detailed inspection of solder paste deposits.
- **Seamless component control:** Comprehensive inspection for maximum placement quality.

The placement area of the circuit boards also gets optically inspected in detail.

**Your benefits:**

- **High-resolution component camera:** Enables 3D PCB inspection.
- **Detection of foreign matter prior to placement:** Prevents placement errors.
- **Detection and inspection of placed components:** Ensures reliable placement of shields and BGAs, reducing the need for rework and minimizing scrap costs.

**The high-resolution cameras of SIPLACE placement machines are used in numerous inspection processes – always with the aim of ensuring maximum quality.**

**SIPLACE Vision System**

Inline inspection for maximum quality


PCB Inspection
- Solder paste
- Post-placement

## Maximum placement quality despite PCB warping

SIPLACE placement machines ensure optimal results by automatically compensating for PCB warpage.

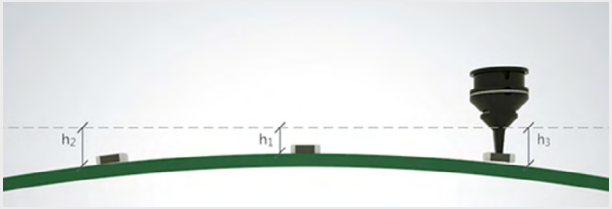
**Your benefits:**

- **Comprehensive precision:** Complete 3D measurement of the substrate surface for accurate placements.
- **Dynamic corrections:** Automatic warping adjustment during the placement process for maximum process reliability.

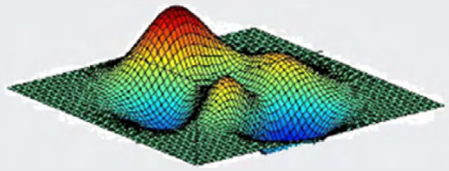
**PCB surfaces can vary, but the innovative placement technology from ASMPT ensures top quality at all times.**

### Compensation of PCB warpage

Precise placements despite substrate unevenness




Adjustment for warped PCBs



Dynamic 3D terrain generated in machine

## Highest placement quality – even with increasingly smaller components

Ever smaller components and increasingly dense assemblies require exceptional placement accuracy. SIPLACE placement machines accommodate this trend with stable and future-proof technology.

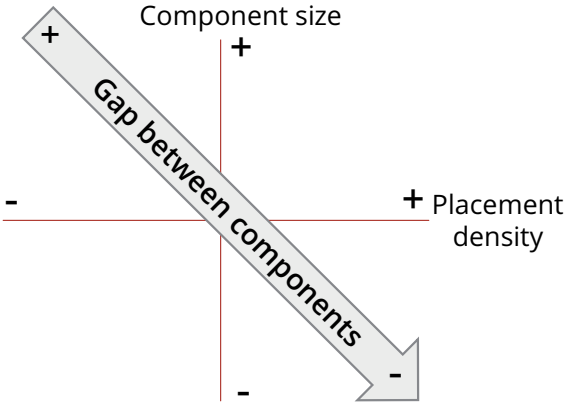
**Your benefits:**

- **Robust construction:** Torsion-resistant machine frame for maximum stability and precision.
- **Minimized vibrations:** Massive base plate reduces vibrations.
- **Maximum repeat accuracy:** Precise linear drives for exact and reliable placements.

**With SIPLACE placement machines, you are optimally prepared for the demands of future product generations.**

### Highest placing accuracy

Precision despite advancing miniaturization



## Closed-loop sensor technology: Precise measurements for perfect placements

SIPLACE placement machines detect and combine components heights and board profiles in real time to optimally adjust the placement force and ensure maximum precision.

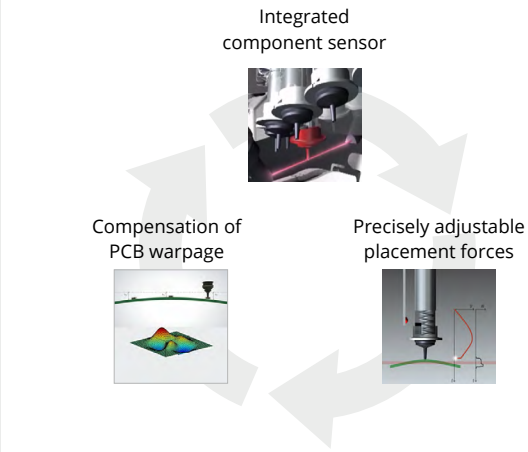
**Your benefits:**

- **Intelligent data integration:** Combines component sensor data with the PCB profile.
- **Automatic compensation:** Takes variations in PCBs and components into account.
- **Self-learning system:** A continuous closed control loop optimized placements in real time.

**Precision comes not from individual measurements, but from their perfect interaction. SIPLACE measurement technology sets new standards in quality control.**

**Closed-loop sensor technology**

The perfect team for maximum quality




## SIPLACE Glue Feeder: Highest quality thanks to controlled glue application

The glue application is also precisely defined and optimally integrated into the placement process with SIPLACE placement machines.

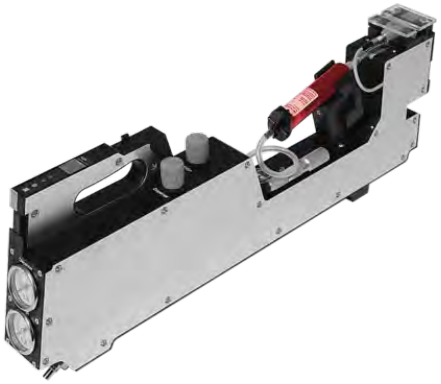
**Your benefits:**

- **Maximum process control:** Glue points are continuously monitored by the SIPLACE Vision System.
- **Maximum flexibility:** Positions are individually programmable.
- **Precise dosing:** Glue dot diameters can be precisely defined and adjusted.

**The SIPLACE Glue Feeder can be easily retrofitted in a standard slot and seamlessly integrated into the production process.**

**SIPLACE Glue Feeder**

Secure hold for special components



## SIPLACE Measuring Feeder

The easily retrofittable SIPLACE Measuring Feeder provides effective protection against placement errors through electrical verification prior to placement.

**Your benefits:**

- **On-demand CRDL measurement and validation:** Resistance, capacitance, polarity, and inductance.
- **Automatic measurement:** During setup changes and reel replenishments.
- **Enhanced process reliability:** Prevents misplacements caused by mislabeled component reels or quality fluctuations.

**The SIPLACE Measuring Feeder is simply inserted into a standard feeder slot and is immediately operational thanks to automatic calibration. All measurement parameters and tolerances are conveniently configured in SIPLACE Pro.**

**SIPLACE Measuring Feeder**

Electrical verification prior to component placement


## SIPLACE Feeders: Consistent quality thanks to precise component feeding

A precisely defined component supply system is a central factor for top quality, and ASMPT has steadily improved it.

**Your benefits:**

- **Maximum precision:** Optimum pickup position thanks to automatic recalibration and software-supported pick-up position correction (X,Y,Z, angle).
- **Optimized component handling:** Secure and reliable cover tape removal – even with highly adhesive cover tapes.
- **Component feeding on demand:** Enables quick and easy cleaning without tearing down of tapes.
- **Maintenance-free:** No regular maintenance required.

**SIPLACE Feeders are designed to be user-friendly to minimize operating errors and maximize process reliability.**

**SIPLACE Feeders**

Maintenance-free design for consistent quality

## Smart Pin Support for automatic placement of support pins

Smart Pin Support from ASMPT is an option for the precise, fully automated positioning of support pins for PCBs in the SMT placement process.

**Your benefits:**

- **Automatic position detection:** Pins are always placed in the optimal location.
- **No manual intervention:** Support pins are positioned automatically.
- **Continuous verification:** A camera measures both pin position and height.
- **Significant time savings:** Approximately 20 minutes saved with every product changeover.

**Smart Pin Support ensures maximum flexibility during product changeovers.**

**Smart Pin Support**

Flexible support for PCBs

## SIPLACE Placement Head maintenance

Regular maintenance of placement heads is a key factor in ensuring consistently high placement quality. It safeguards precision, reliability, and machine availability.

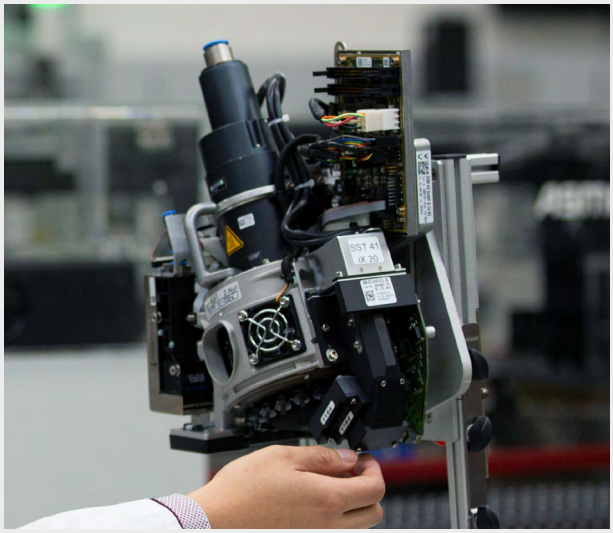
**Your benefits:**

- **Comprehensive maintenance by ASMPT:** Cleaning, inspection, calibration, and software updates.
- **Rental placement heads available:** For uninterrupted production during maintenance.
- **Employee training:** Enables in-house maintenance.

**SIPLACE Placement Head maintenance is performed as needed. ASMPT supports you in keeping your production equipment in optimal condition – either through our own qualified service technicians or by training your in-house staff.**

**SIPLACE Placement Head maintenance**

High quality at all times



# Intelligently integrated for top quality: When hardware and software work together perfectly

## WORKS Optimization: Intelligent process optimization along the entire SMT line

Supporting software for intelligent process optimization along the entire SMT line: As a central instance, WORKS Optimization supports already scarce specialists in their quality management duties.

**Your benefits:**

- **Pre-print optimization:** Virtual printing based on stencil data for the optimization and analysis of critical layout segments.
- **Fast product changeovers:** Printing parameter determination based on new test prints.
- **Permanent print optimization:** Feedback loop with the Process Lens SPI system.
- **Placement process optimization:** WORKS Optimization recommends specific improvement measures.
- **Holistic quality assurance:** Integration of all SPI and AOI systems provides a central quality control instance along the entire SMT line.
- **Third-party integration:** Integration of all SPI and AOI systems into the ASMPT world via a standardized IPC-2591-CFX interface.

**WORKS Optimization**


## Quality – Your benefits at a glance

- Precise component placement through exact control of placement force and position
- Highest repeatability ensures consistent precision
- Automatic compensation for PCB warping
- Comprehensive component inspection with integrated sensors detects every component and monitors process parameters in real time
- Automatische und exakte PIN- Positionierung
- Maintenance-free feeder and low-maintenance placement heads minimize operating errors and maximize process reliability
- Precise glue dispensing ensures secure component fixation
- Comprehensive quality assurance with WORKS Optimization along the entire SMT line
- Integration of all SPI and AOI systems – including those from third-party suppliers – via industrial standard interfaces

ASMPT

More about KPIs

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