

MPM

Electronic Assembly Equipment

TW EAE

Momentum® II HiE & Elite Printing System



Momentum II Fresh look and innovative new features for further enhancement in ease of use, yield, quality, productivity, and versatility.

Effective and efficient solution for the most challenging printing applications.



Momentum: Thinking Ahead

The MPM Momentum II is designed to meet the ever-growing challenges of today's electronics manufacturing world: high performance, user-friendliness, space and operational efficiency, and flexibility.

Momentum's Patented Technology

- EnclosedFlow™ Print System
- Paste Management System
- Camalot Inside
- EdgeLoc™ Board Clamping
- RapidClean™
- Auto Pin Placement
- RapidView™ Inspection
- BridgeVision®
- StencilVision™
- Closed-loop SPI Print Optimizer
- Benchmark™ 5.0

Repeatable Printing Quality for High Yields

Momentum II is designed and built to be a no-nonsense production machine. Cost-efficient and featuring a modest footprint, it grows with the user; innovative patented features can be added on or retrofitted as needed as the user's throughput demands grow. Numerous patents protect the Momentum, which incorporates tried and true systems and features from other successful MPM printers that were designed prior to Momentum II (and still in use today). Momentum's alignment repeatability is ± 11 microns @ 6 sigma, $Cpk \geq 2$. Its 6 sigma capability is designed in and independently verified. Wet print accuracy is ± 17 microns @ 6 sigma, $Cpk \geq 2$. Tighter performance tolerances mean higher repeatability with fewer defects.



The Momentum II HiE (for High Efficiency) is a single-rail printer with servo motors, rather than stepper motors, driving the vision system's X, Y, and Z axes. Faster than steppers, servos drive the vision gantry at higher speed and thus increase throughput and cut cycle time, making the Hi-E an efficient high volume printer.

The Momentum II Elite is the top-performer of the Momentum series, boasting the highest throughput and shortest cycle times of all. It is configured with a highly efficient triple track rail system featuring an input buffer, a central processing section, and an output buffer.

Best Performance Closed-loop Squeegee

Momentum II offers an advanced print head with a high precision load cell with closed-loop pressure control and motor drive system enabling precise and consistent squeegee force control across print stroke in both directions, which helps improve yields especially for challenging thin substrate printing and stencil printing applications, such as semicon back end packaging.

Momentum® II New Features

- ◆ Newly designed cover set with larger window and wider access inside the printer.
- ◆ Adjustable stencil shelf for flexibility handling board varieties.
- ◆ EdgeLoc II and EdgeLoc+ precise board clamping.
- ◆ New jar paste dispenser for increased productivity.
- ◆ Solder paste roll height monitoring for yield improvement and traceability.
- ◆ Solder paste temperature monitoring for yield improvement and traceability.
- ◆ Quick release squeegee for faster changeover.
- ◆ Upgraded Benchmark GUI with customizable production page and Quickstart program.
- ◆ Windows 10 operating system.

High Performance

Innovative Standard and Optional Features



RapidClean™

RapidClean is a high speed stencil solvent cleaning innovation that slashes cycle time and improves stencil cleaning performance, especially for fine-pitch. RapidClean reduces 3 wipe strokes to 2 and cuts cycle time by 5 – 6 seconds per print cycle over the standard wiper; and because fewer cleaning cycles are required, RapidClean can save up to \$10K USD per annum in paper savings per printer.



EnclosedFlow™

The MPM EnclosedFlow Print Head delivers uniform aperture filling and superb printing performance especially for fine pitch devices, with tremendous savings on solder paste over squeegee blade printing – in excess of 50% over blades for dramatically fast ROI. Printing fine features such as 01005s and 0.3mm pitch CSPs with up to 50% greater volume and 25% lower deviation than metal blades.



Camalot Inside

Only ITW EAE, with industry-leading core competencies in printer AND dispenser technologies, can bring both together to the customer's advantage. Camalot Inside consists of two dispense pumps integrated into one printing machine. Camalot Inside provides ultimate flexibility, allowing the dispensing of two different materials, or the same material (doubling dispense throughput speed) with two needle sizes to easily administer multiple dot sizes.

Proven & Robust



Triple Track Rail System (Elite only)

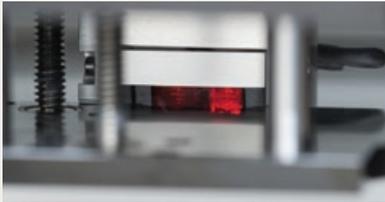
A highly efficient triple track rail system featuring an input buffer, a central processing section, and an output buffer. A new board can be indexed into the machine and positioned next to the centermost, readying to print, while the two others are being loaded and off loaded. Cycle time is shortened because boards don't have to move single file through the printer. Instead of one board at a time linear processing, cycle time can be shaved by buffering PCBs inside the machine.

Momentum® II HiE & Elite

MPM Momentum® II HiE & Elite

Features and Enhanced Technology that Deliver Measurable Value.

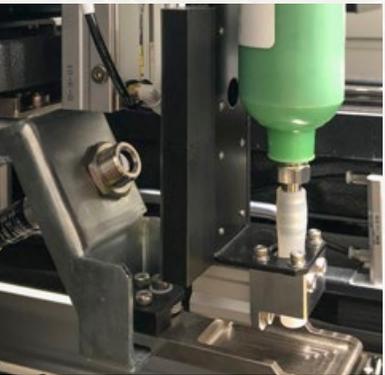
NEW Paste Height Monitor



The Paste Height Monitor is designed to prevent defects caused by inadequate volumes of paste on the stencil. It combines advanced

software and sensor technology to accurately monitor the paste bead for volume consistency. Upper and lower limit roll-height monitoring eliminates insufficient or excess paste volumes. It is a non-contact solution that can automatically add more paste to the stencil as it is needed.

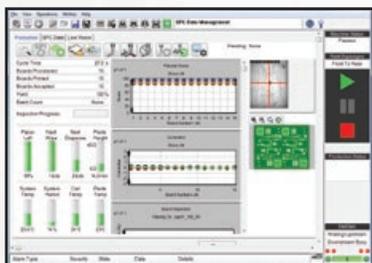
NEW Paste Temperature Monitor



Temperature monitoring ensures proper paste viscosity to avoid bridging and voiding. MPM patent-pending paste temperature monitor allows paste to be measured in the cartridge or on the stencil.

Updated Benchmark™ User Interface

Easy to learn and use for the average operator, MPM's Benchmark software is powerful yet intuitive, and facilitates rapid setup, assists with operational tasks, and makes changeover quick and easy. The software has been



upgraded to Windows 10 and new production tools and new Quickstart programming to make it even easier to use.

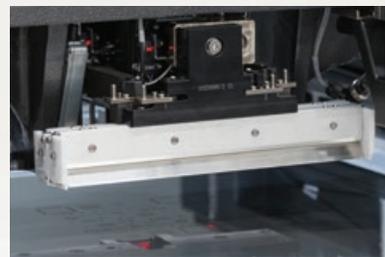
NEW Automatic Paste Dispensing System



Dispense for standard cartridges or choose the new patent-pending jar dispenser. Paste is released in precise, measured amounts across the stencil in a

clean, uniform bead. Deposition volumes, frequency and placement are user programmable.

NEW Quick Release Squeegee



New quick release squeegee blades makes changing blades quick and easy with no tools required. It takes less than 30 seconds to change the blade.

NEW EdgeLoc™ Board Clamping



The EdgeLoc system uses a side snugging technique that removes the need for top clamps which interfere with the PCB to stencil contact.

The result is optimal gasketing and more volumetrically consistent edge-to-edge prints. With EdgeLoc II, robust flippers engage to secure the board across the top edge ensuring board flatness then move out of the way once the board is firmly gripped from the side. EdgeLoc+ board clamping can change between edge and top clamping simply through software.

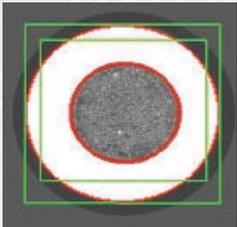
NEW Adjustable Stencil Shelf

Provides the flexibility to handle all stencil sizes with a simple adjustment of the shelf. The robust design provides better stability on all stencil sizes.

Momentum® II HiE & Elite:

Real value can be measured in terms of yields. More good and reliable product with fewer defects. Momentum delivers high yields, and higher profitability through a very low cost of ownership and operational efficiency.

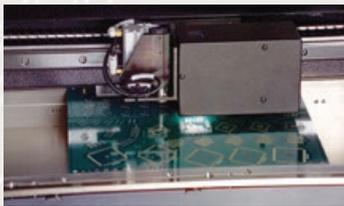
AccuCheck Print Capability Verification



AccuCheck Print Capability Verification allows the printer to measure its own print capability. Users can verify the machine's capability at any time or continuously on their own products. AccuCheck measures the actual print deposit position versus the target pad

to determine a measured print offset. It is an inexpensive, reliable method of obtaining machine quality and process capability information to ensure repeatable results and optimum printing performance.

MPM Vision System & Inspection

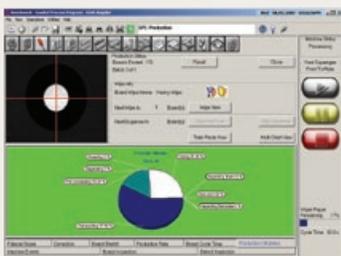


MPM's patented printer-based Vision and Inspection system is a cost-effective way to verify print and paste deposit results. It is flexible enough to handle

the complete range of today's most challenging components. This system measures the amount of paste covering the target pad and compares it with the required coverage. 2D inspection is integrated directly into the stencil printer to provide an immediate source of data.

BridgeVision® and StencilVision™

BridgeVision is a patented method of analyzing bridge defects on circuit boards in the post-print inspection process.



This innovative system utilizes texture-based image acquisition algorithms and a digital camera system with telecentric lenses to support the accurate identification of paste deposit defects.

StencilVision utilizes texture-based technology to check the underside of a stencil for solder paste contamination. Wiper operation can be driven by the results obtained.

Auto Tooling Pin Placement



Automatic Pin Placement is MPM's patented tooling solution that uses the vision gantry to precisely place and remove tooling pins.

The carousel holds 48 pins to match and support the largest board size. A standard grid for single sided boards or an exact pin placement for double sided boards can be developed.

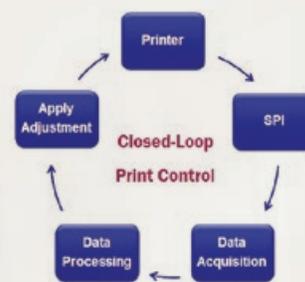
New Support Pin Placement Verification

Pin location can now be verified with bottom side image whether placing pins automatically or manually.

PrinTrack™

PrinTrack™ adds traceability, data harvesting and reporting to your printing process. It can seamlessly integrate with other equipment and elements in the manufacturing cycle, such as MES and ERP, and can be expanded factory-wide.

SPI Print Optimizer



SPI Print Optimizer brings your Solder Paste Inspection (SPI) machine into communication with your MPM printer through a specially-developed common interface. When the SPI machine 'sees' X, Y and theta offset problems

on a just-printed PCB, it analyzes the data virtually instantly and gives the printer instructions to correct those offsets, automatically, and 'on the fly'.

OpenApps™

MPM's OpenApps is an open architecture source code which provides the capability of developing custom interfaces in support of Industry 4.0 initiatives and communication with Manufacturing Execution Systems (MES). ITW EAE is the first SMT company to offer open software architecture.

MPM MOMENTUM® II HiE & ELITE SPECIFICATIONS

BOARD HANDLING

Maximum Board Size (X x Y)	609.6 mm x 508 mm (24" x 20")
Staging Mode - Momentum II Elite	457 mm x 508 mm (18" x 20")
<i>A dedicated workholder is required for boards with an X size greater than 20"</i>	
Minimum Board Size (X x Y)	50.8 mm x 50.8 mm (2" x 2")
Board Thickness	0.2mm (0.008") to 5.0mm (0.20"), up to 6.0 mm (0.24") without top clamp foils
Maximum Board Weight	4.5 kg (10 lbs)
Board Edge Clearance	3.0 mm (0.118")
Underside Clearance	12.7 mm (0.5") standard Configurable for 25.4 mm (1.0")
Board Hold-Down	EdgeLoc II, centermost vacuum Optional: Fixed top clamps, EdgeLoc+
Board Support Methods	Magnetic pins Optional: Vacuum side dams, vacuum pins, support blocks, dedicated fixtures, patented auto tooling, Quik-Tool

PRINT PARAMETERS

Maximum Print Area (X x Y)	609.6 mm x 508 mm (24" x 20")
Print Gap (Snap-off)	0 mm to 6.35 mm (0" to 0.25")
Print Speed	Up to 305 mm/sec (12.0"/sec)
Print Force	0 to 20 kg (0 lb to 44 lbs)
Stencil Frame Size	737 mm x 737 mm (29" x 29") Adapters available for smaller sizes

VISION

Vision Field-of-View (FOV)	10.6 mm x 8.0 mm (0.417" x 0.315")
Fiducial Types	Standard shape fiducials (see SMEMA standards), pad/aperture
Camera System	Single digital camera - MPM patented look up/down vision

PERFORMANCE

Total System Alignment Accuracy and Repeatability	±11 microns (±0.0004") at 6 sigma, Cpk ≥2.0*
<i>Qualification is performed using production environment process variables; print speed, table lift and camera movement are included in the capability figure.</i>	
Wet Print Deposit Accuracy and Repeatability	±17 microns (±0.0007") at 6 sigma, Cpk ≥2.0*
<i>Actual test results performed by CeTaQ.</i>	
Cycle Time	
Momentum II HiE	7.5 seconds standard
Momentum II Elite	6.0 seconds standard

FACILITIES

Power Requirements	200 to 240 VAC (±10%) single phase @ 50/60Hz, 15A
Air Supply Requirements	100 psi at 4 cfm (standard run mode) to 18 cfm (vacuum wipe) (7 bar @ 5 L/s to 12 L/s), 12.7 mm (0.5") OD x 9.5 mm (3/8") ID line
Height (excluding light tower)	1526.0 mm (60.0") at 940 mm (37.0") transport height
Machine Depth	1592.0 mm (62.7")
Machine Width	
Momentum II HiE	1203.0 mm (47.4")
Momentum II Elite	1675.5 mm (66.0")
Minimum Front Clearance	508 mm (20.0")
Minimum Rear Clearance	508 mm (20.0")
Machine Weight	
Momentum II HiE	862 kg (1900 lbs)
Momentum II Elite	899 kg (1982 lbs)
Crated Weight	
Momentum II HiE	1155.5 kg (2547 lbs)
Momentum II Elite	1192.5 kg (2629 lbs)

* The higher the Cpk, the lower the variability with respect to the process specification limits. In a process qualified as a 6 sigma process (i.e., one that allows ±6 standard deviations within the specification limits), Cpk ≥ 2.0.

Specification is subject to change without notice. Please consult factory for specifics.

ITW EAE maintains an ongoing program of product improvement that may affect design and/or price. We reserve the right to make these changes without prior notice or liability.

MPM Printers – Built on a Solid Foundation.

Strength and stability are prerequisites for accuracy and precision when system parts are in motion and moving about at high speed. The Momentum® II HiE and Elite's major assemblies are driven by precision ball screws, not belts, which eliminate the need for calibrations. The worknest and camera gantry are designed for optimum motion stability, shorter settling time, and faster board and stencil alignment. Momentum® II HiE and Elite's rigid frame is welded for low vibrations. This allows for higher repeatability and great reliability over time. Alignment is achieved with minimum motion; thus the PCB travels to the stencil more quickly.

ITW EAE is a division of Illinois Tool Works, Inc. It is a consolidation of all of its Electronic Assembly Equipment and Thermal Processing Technology. The group includes world-class products from MPM, Camalot, Electrovert, Vitronics Soltec and Despatch.