Momentum® Series Printing System

A proven high-performance printing platform - flexible, configurable, and easy to use, with speed and accuracy unmatched by any other printer in its class.

A cost-effective, high-performance printing solution featuring innovative technology and outstanding capability.
Momentum: Thinking Ahead

The MPM Momentum Series 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 Series

Repeatable Printing Quality for High Yields

Momentum 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 (and still in use today). Momentum’s alignment repeatability is ±12.5 microns @ 6 sigma, Cpk ≥ 2. Its 6 sigma capability is designed in and independently verified. Wet print accuracy is 20 microns @ 6 sigma, Cpk ≥ 2. Tighter performance tolerances mean higher repeatability with fewer defects.

Momentum’s Patented Technology

- EnclosedFlow™ Print System
- SPI Print Optimizer
- Camalot Inside
- EdgeLoc™ Board Clamping
- RapidClean™
- Auto Pin Placement
- Paste Height Monitor
- RapidView™ Inspection
- Benchmark™ 4.0
- BridgeVision®
- StencilVision™

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

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. Print fine features such as 01005s and 0.3mm pitch CSPs with up to 50% greater volume and 25% lower deviation than metal blades.

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.
Momentum:
Features and Capabilities that Deliver Measurable Value

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.

EdgeLoc Board Snugging
The EdgeLoc system securely holds the board during printing using a side snugging technique. Flippers engage to secure the board across the top edge, which ensures board flatness, and removes any warpage from the board. This technique delivers the best print quality and is the most adaptable system for the widest range of applications. A ‘must’ for thin board printing.

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. The sensor is mounted on the back of the squeegee head and measures solder paste bead diameter during the front-to-rear stroke. It’s a non-contact solution that can automatically add more paste to the stencil as it is needed.

Auto 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.

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’.

Benchmark 4.0 User Interface
Benchmark 4.0 operates with the Windows 7 operating system and incorporates the familiar Benchmark GUI and functionality, with added improvements in feature function that come from using Windows 7. 4.0 also incorporates a unique, empowering new Open Software Architecture, OpenApps (patent pending), that creates new communication possibilities for easy two-way communication between the printer and Manufacturing Execution System (MES).
Patented, Innovative Features add Capability and Value to your Process

Momentum - 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’s major assemblies are driven by precision ball screws, not belts, which eliminates the need for calibrations. The work nest and camera gantry are decoupled for optimum motion stability, shorter settling time, and faster board and stencil alignment.

CAN Control Drive Architecture supports faster processing speeds and the consequent overall reduction in wiring reduces Mean Time to Repair (MTTR). Momentum’s rigid frame is welded for low vibrations. This allows for higher repeatability and great reliability over time. Board alignment is achieved with minimum table motion; thus the PCB travels to the stencil more quickly.

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’s 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.

...With GerberEZ Teach
GerberEZ Teach makes the industry’s most advanced inspection system more powerful and user-friendly. With its user-friendly tool bar and features like fast component identification, custom device, off angle, and device specific capabilities GerberEZ Teach makes 2D inspection programming a point and click routine.

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.

The Momentum series is designed with production needs and the needs of the operator in mind. They’re champion performers, meeting the demands of high throughput and accuracy, yet at the same time are easy to learn, easy to use, and offer user-friendly features including built-in wizards in the Benchmark software program that provide direction for all machine functions, utilities, and error recovery.
### MPM MOMENTUM SERIES SPECIFICATIONS

#### BOARD HANDLING
- **Maximum Board Size (X x Y)**: 609.6 mm x 508 mm (24” x 20”)
- **Staging Mode - Momentum Elite**: 457 mm x 508 mm (18” x 20”)
  - *A dedicated workholder is required for boards with an X size greater than 20”*
- **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**: Fixed top clamps, centernest vacuum, EdgeLoc (Optional on HiE)
- **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**: ±12.5 microns (±0.0005”) at 6 sigma,
  - Accuracy and Repeatability: \( \text{Cpk} \geq 2.0^* \)
  - Qualification is performed using production environment process variables; print speed, table lift and camera movement are included in the capability figure.
- **Wet Print Deposit**: ±20 microns (±0.0008”) at 6 sigma,
  - Accuracy and Repeatability: \( \text{Cpk} \geq 2.0^* \)
  - Based upon actual wet printing with positional accuracy and repeatability verified by a 3rd party measurement system.
- **Cycle Time**
  - Momentum HiE: 7.5 seconds standard
  - Momentum 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) (6.89 bar @ 1.9 L/s to 8.5 L/s), 12.7 mm (0.5”) diameter line
- **Height (excluding light tower)**: 1638.4 mm (64.5”) at 940 mm (37.0”) transport height
- **Machine Depth**
  - Momentum HiE: 1593.1 mm (62.72”)
  - Momentum Elite: 1675.5 mm (65.96”)
- **Machine Width**
  - Momentum HiE: 1202.7 mm (47.35”)
  - Momentum Elite: 1675.5 mm (65.96”)
- **Minimum Front Clearance**: 508 mm (20.0”)
- **Minimum Rear Clearance**: 508 mm (20.0”)
- **Machine Weight**
  - Momentum HiE: 862 kg (1900 lbs)
  - Momentum Elite: 899 kg (1982 lbs)
- **Crated Weight**
  - Momentum HiE: 1155.5 kg (2547 lbs)
  - Momentum Elite: 1192.5 kg (2629 lbs)

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* 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 plus or minus 6 standard deviations within the specification limits), the Cpk is greater than or equal to 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.

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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 (Speedline), Vitronics Soltec and Despatch.

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**MPM MOMENTUM SERIES**

**Electronic Assembly Printers**

ITW EAE