

**Panasonic**



# SP SERIES

Any-mix manufacturing solution for evolving assembly needs

An exceptional platform for high-quality, consistently stable screen printing with excellent aperture fill regardless of board complexity. Ideal companions to our placement machines and available for both single- and dual-lane production.

total solutions for  
**any mix**  
**any volume**

# DESIGN CONCEPT

Over 50 years of exceeding customer needs with proven industry excellence... and over 100,000 solutions installed

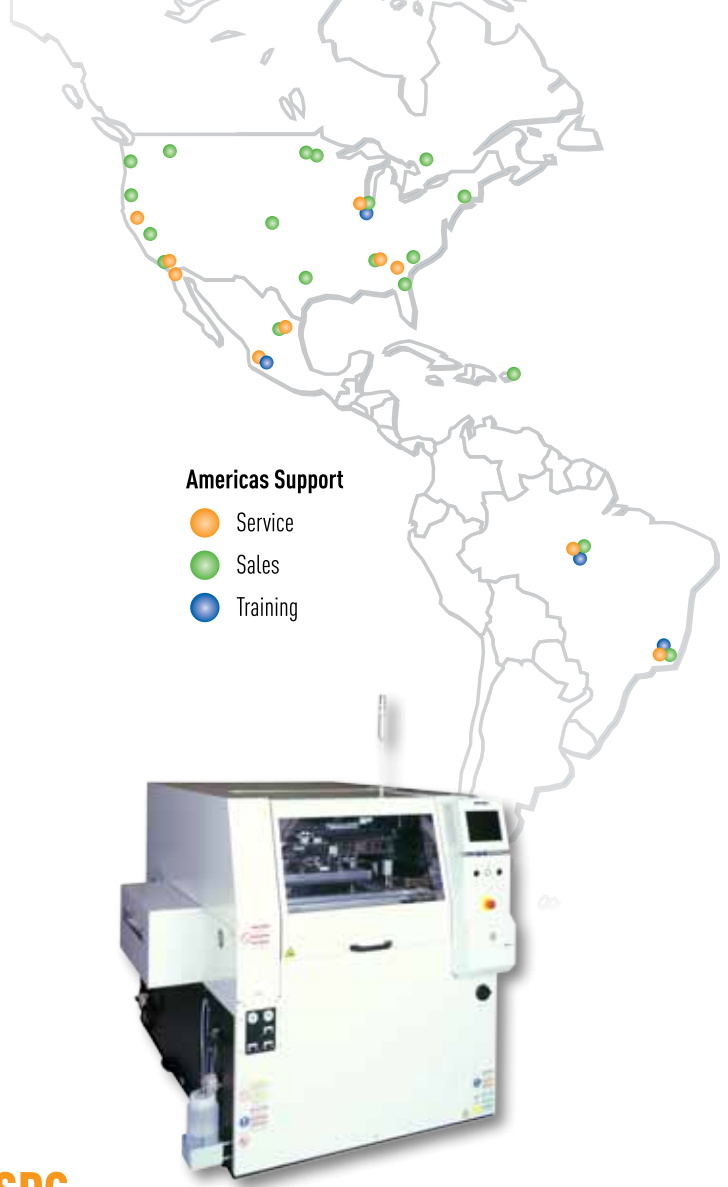
The rapid growth of electronic devices is driving manufacturers to modify assembly techniques by expanding and updating facilities or assets, cost-engineering, implementing new processes, and reducing costs. The potential to build scrap increases dramatically. A balance between costs and output must be struck while maintaining quality. A trending option is low-cost printing material; however, process stability is key.

With over 30 years in printing, Panasonic has cultivated leading expertise by pioneering numerous process improvements to satisfy customer requirements such as:

- Hybrid dual-blade squeegee for stable paste deposition at any speed
- Twice the accuracy of competitive offerings—5 microns at  $6\sigma (\pm 3\sigma) \geq 2.0$  Cpk
- Robust to use low-cost materials and consumables while delivering high yields

## 50+ YEARS IN PCBA 1963–2016

1963	Panasonic Factory Solutions Founded
1968	1st Insertion Machine Developed
1973	1st Axial Machine Delivered
1980	1st Surface Mount Machine Delivered
1984	1st Solder Paste Screen Printer Delivered
1988	10,000th Solution Installed
1988	PFSA Established for North American Market
1992	Microelectronics Group Expands Offerings
1993	ISO Standard Certifications
2000	30,000th Solution Installed
2000	PanaCIM Enterprise Edition Released
2012	Total Solutions for “Any Mix, Any Volume”
2014	100,000th Solution Installed
2015	NPM-W2 & D3 with Multi Recognition Camera



## SPG

Panasonic's SPG high-speed screen printing machine is the ultimate lean SMT manufacturing solution. Equipped with multi-stage board handling, PCB exchange time is reduced, making sure the printer does not become the bottleneck of the production line. Our hybrid printing method delivers the right amount of solder with high-speed snap-off and reduced solder waste. The intuitive interface and changeover wizard helps the operator efficiently navigate the NPI changeover process. Once established, the parameters are stored for fast retrieval. What's more, Panasonic mounters use the same program file, which further reduces setup time.

The Panasonic SPG's printer feedback to the AOI/SPI and patented feed-forward communication to the mounter helps further enhance overall line productivity. Print capabilities reach beyond high speed and quick changeover. The inherent SPG print capability supports 020125mm (008004") components—roughly 75% lower volume than the 0402mm (01005") chip.

### Features & Benefits

- High-speed 15-second clean and print cycle time, every time
- Eco-friendly solution for lean manufacturing
- Compatible with industry-standard stencils

## PRINTING INNOVATION >30 YEARS

Since 1984 Panasonic has been designing printer solutions. From this proven, innovative history working with both our customers and our own production requirements we acquired incredible process expertise.

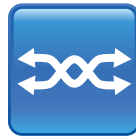
Our expertise is further complemented by the leading-edge material science program we developed with in-house production of solder and resin pastes.

For these reasons, the SP series of printer solutions are commonly adopted at major OEM and EMS to build for automotive and high volume markets.



### Scalable

- Match line capacity to production needs
- Integrate software modules when business dictates
- Single-line facilities to multi-nationals



### Integrated

- For any machine platform or business system
- Communicates with numerous peripheral systems
- Multi-level traceability throughout the SMT process



### Efficient

- Asset utilization optimized by zero changeover
- Offline set-up, teach, and changeover tools
- Highly-accurate inventory management



## SPV

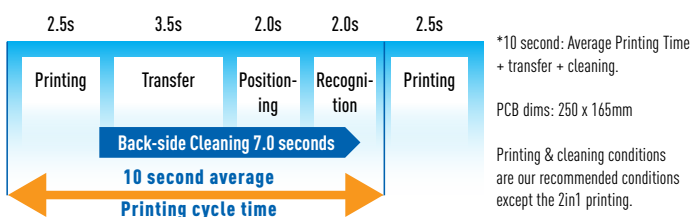
The revolutionary SPV transforms the traditional production model by supporting a myriad of options to print multiple 350x300mm (M-size) boards simultaneously. Complementing the versatility is a feature set rich with changeover options and an inherent print-clean cycle of 10 seconds.

### Features & Benefits

- Lower WIP inventory and reduce changeover time by handling up to 4 unique products simultaneously
- Minimize capital expenditures by reducing printer investment by 50%
- Maximize floor space utilization with new hybrid board handling concept

### Achieve 10 second Average Printing Cycle Time

- Newly developed automated cleaning unit
- Multi-stage board handling conveyors
- Hybrid dual-blade squeegee



## SP-70

The SP-70 screen printer is designed to address ultra-high accuracy printing for both high- and low-volume manufacturers with boards up to 510x510mm. With a focus on advanced printing challenges, the SP-70 affords automatic solder paste dispensing via sealed cartridges and syringe containers to reduce replenishment frequency and increase capabilities for ultra fine-pitch bump printing.

Like other Panasonic printers, the SP-70 features advanced hybrid dual-blade squeegee for high quality, stable printing while reducing the amount of wasted paste.

### Features & Benefits

- Excellent snap-off performance for advanced applications
- Hybrid squeegee head and selectable multi-level stencil release control provides stable print process and control
- Universal stencil holder for 21" to 29" frames without adapters along with automated stencil location and mask detection

# STANDARD FEATURES

The SP Series of printers provides numerous standard features to ensure high quality printing process. A few examples are highlighted below with numerous other options available.

## Hybrid Squeegee Head

- Dual-blade, motor-controlled squeegee for stable solder fill
- Closed-loop print pressure control with warning alarm



## Changeover Navi

- Wizard guides operator through changeover process
- One touch squeegee and support pin release



## Multi-level Mask Release

- Control printing shape quality through speed and stroke settings
- Automated release program for ideal print conditions



# CONFIGURATION OPTIONS

Like our award-winning NPM placement machines, the SP Series of printers provides numerous standard features and optional enhancements to ensure high quality printing process. A few examples are highlighted below with numerous other options available.

## Auto-feed

- Novel, efficient dispensing stabilizes solder volume and reduces waste
- Dual pot design ideal for high volume



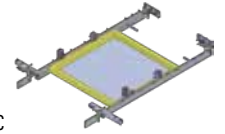
## SPI Function

- Identifies, bridging, misalignment, blur, and oozing defects
- User-defined quality thresholds and intervals



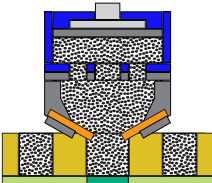
## Universal Mask Holder

- Expand beyond the 29" frame to multiple alternate frame sizes
- Combine with automatic screen positioning for simplified setup



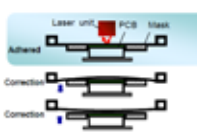
## Cartridge Head

- Enclosure prevents material from drying and improves control of process
- Longer material life and reduced waste



## Mask Height Detection

- Laser identifies and corrects mask and board clearance for stable printing
- Detects PCB thickness data input errors



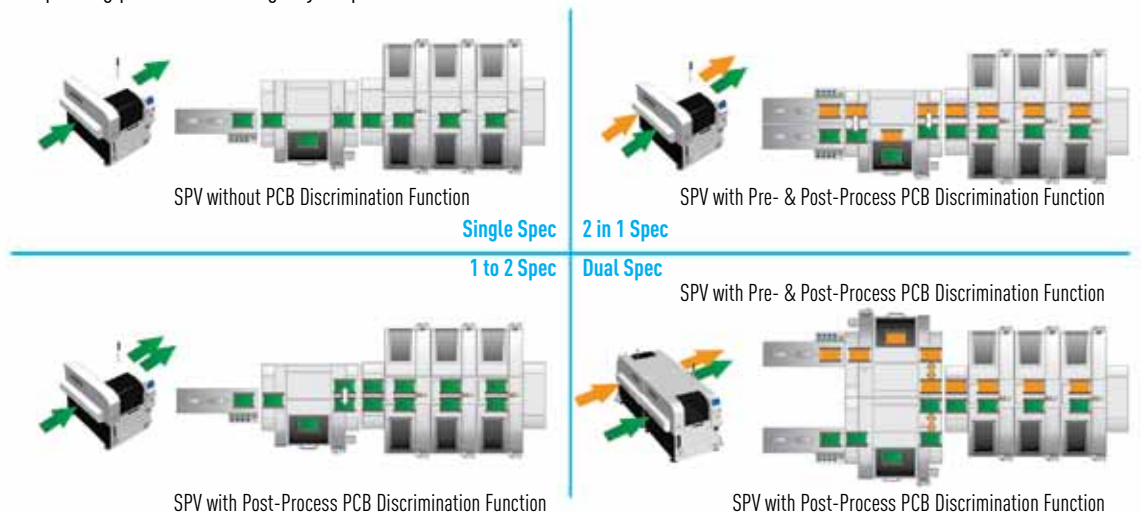
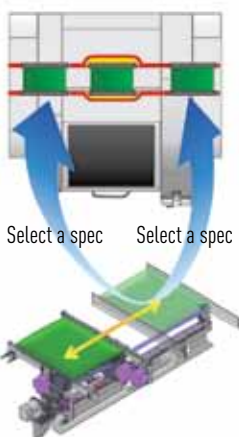
## High Speed Mask Cleaning

- Cleaning system reduces paper consumption
- Parallel processing & vacuum cleaning increase performance



# SPV BOARD HANDLING OPTIONS

Triple conveyor solution establishes a printing process according to your production.



SPV without PCB Discrimination Function

Single Spec

2 in 1 Spec

SPV with Pre- & Post-Process PCB Discrimination Function

1 to 2 Spec

Dual Spec

SPV with Pre- & Post-Process PCB Discrimination Function

SPV with Post-Process PCB Discrimination Function

SPV with Post-Process PCB Discrimination Function



# ADVANCED PROCESS CONTROL



Numerous studies and documentation details how the solder reflow process can help position surface mount components normally on the pads, even if component placement is off pad. However, the trend to shrink components to 0.3mm pitch bumps or 0201mm microchips is opening doors to explore how adaptable Advanced Process Controls (APC) can improve yields in high-density placements.

Advanced Process Control collects solder location data from a Solder Paste Inspection (SPI) system, and then sends the data downstream to pick and place molder

The molder uses the received data to update the placement program; thereby, ensuring the components are placed onto the solder deposits rather than onto the substrate pads. This approach to placing components on the printed solder uses the self-alignment principle to increase production yields and reduce defects.

When solder is off pad and components are placed to the programmed CAD location, self-alignment is not effective. During reflow, components will shift off pad or bridge with other pads; thereby, causing rework or scrap.

Alternatively, APC-controlled placements will maximize the self-alignment principle. Using APC to mount microchips onto the solder instead of the pad will increase yields and quality.

In general, communication between a printer and molder will improve process repeatability by automatically adjusting component placement to the solder deposition, rather than to the pad location. This advanced process further improves microchip mounting reliability. When implementing APC in production, manufacturers can realize dramatic process improvements compared to a conventional placement approach lacking communication between the printer and molder.

## Total Solutions for Any Mix Any Volume

Panasonic collaborates with the following leading AOI and SPI providers to provide you a turnkey, integrated solution with one single point of contact:

Koh Young	Mirtec	Viscom	TRI
Parmi	Cyber Optics	Omron CKD	Nagoya



# LOW-COST PRINTING PAPER

The rapid growth of electronic devices is driving manufacturers to enhance high-volume PCBA techniques. As manufacturers strive to balance costs with production, they can expand facilities, update equipment, or implement novel processes. In any case, as manufacturers increase production volume, the potential to scrap product or rework boards increases dramatically.

Manufacturers have two general paths to reduce the PCBA costs. The first path is to reduce cost by focusing on high quality printing and mounting. The other, increasingly popular option is to utilize low-cost materials. Regardless of the path, the baseline must provide a consistent high-speed solder paste printing method, which considers fill, snap-off, and cleaning processes.

In the end, both paths aim to maximize profitability. As such, understanding how manufacturers can successfully integrate low-cost materials will help ensure high-quality production, reduce costs, and maximize profitability.

**Our expertise and testing provide a unique perspective on how low-cost materials affect print performance as well as help provide a stable printing process**

# SOFTWARE AND PROGRAMMING

## Data Generation System

DGS (Data Generation System) is our intuitive, PC-based programming software. Taking line balance into consideration, it assigns parts from CAD data, optimizes them, and then creates the placement program for the line.



### Multi-CAD Import

- Retrieves data and allows properties like polarity and position to be verified on-screen



### Component Library

- Registers and unifies component mount data
- Large library of standard component definitions available



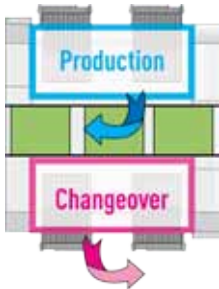
### Simulator

- Provides on-screen confirmation in advance of production



### Virtual PCB Inspection

- Overlays program data on board image to validate or adjust component alignment and rotation



### Changeover Mode

- Continuous production on one side of the machine while changing over the opposite side

**Complete MES software solutions for digital manufacturing... developed in the US, deployed globally**



**Award Winner**

**Circuits Assembly**  
NPI Award  
Production Software



**Award Winner**

**Global SMT & Pkg**  
Technology Award  
Best Product Americas



**PanaCIM**  
Enterprise Edition

PanaCIM integrates cooperating software modules to solve key production problems by addressing the top objectives for successful manufacturing.

### Customizable

The PanaCIM modules were developed based on user feedback to provide a complete assembly software suite. Select the best modules for your current situation and easily add others as needed.

Cloud-level	Seamless integration of business systems
Enterprise-level	Connect all departments to schedule and analyze production and integrate with MRP/ERP systems
Facility-level	Ensure visibility to track WIP, dispatch operators, and take proactive measures
Line-level	Manage OEE through traceability, WIP tracking, and automated changeover
Machine-level	Machine-to-machine communication to assure yield, materials, and quality

## PanaCIM<sup>®</sup> *express*

### Eliminate IT infrastructure costs with PanaCIM Express

A self-contained, pre-configured system especially for smaller installations requiring digital data collection, yet do not have dedicated IT staff.



## PLACEMENT SOLUTIONS

The rapid industry acceptance of the award-winning NPM platform is based on its inherent design flexibility. Each NPM is a completely integrated, single-platform solution that can provide far-reaching solutions to expand and evolve with your electronics assembly needs. In addition to its interchangeable, plug-and-play heads, the NPM can integrate solder paste inspection (SPI), automated optical component inspection (AOI), and dispensing.

Yet, when requirements change, so can the NPM. Simply swap heads to add new machine functionality and investment protection. As always, manufacturers can scale NPM lines to meet production needs while conserving investments until production or technology requirements mandate. OEMs and EMS providers can reconfigure both machine heads in approximately 15 minutes—maximizing flexibility and ROI, while protecting assets. The NPM also incorporates existing feeders, carts, and nozzles to minimize investment and inventory expenses.



Providing  
world-class solutions  
for industrial,  
communications,  
automotive,  
and more...  
regardless  
of company size

## TOTAL SOLUTIONS

Many suppliers claim to provide total solutions, but for Panasonic Factory Solutions Company of America the notion of “Total Solutions” carries a very meaningful and powerful connotation. As a leading electronics manufacturer with a deep and practical understanding of printed circuit board assembly, we have the unique perspective to understand what is required to solve your production challenge.

What’s more, we have the distinctive ability to provide total solutions beyond the production line. While we can provide best-in-class hardware and software tools from our own portfolio, we are part of a supplier collective, which allows us to provide turn-key solutions for your unique application and business model. Yet, the equipment sets are mere building blocks to solving your manufacturing challenges, especially as our industry evolves with the Internet of Things.

## FACTORY OF THE FUTURE

Across the globe, the “Smart Factory” has been highlighted in many national initiatives. Regardless of the name, “Industry 4.0”, “Advanced Manufacturing” or “Smart Factory”, all efforts focus on transforming the manufacturing process from isolated silos to a “lean, agile, and integrated” ecosystem underpinned by the Internet of Things.

Since our humble beginnings, Panasonic founder Konosuke Matsushita focused on manufacturing innovation. In fact, we have been connecting “things” throughout the course of our nearly 100 year history.

Beyond patents, PanaCIM MES software developments are already enabling the connected factory and offering value beyond operational cost savings. It offers compelling solutions to collect and analyze disparate data, in real-time and across time, to transform the business. Furthermore, our software solutions offer opportunities for sustained value creation—and even disruption for those who can imagine the endless Factory of the Future possibilities.



# SPECIFICATIONS

Model ID	SPG	SP-70	SPV			
Model No.	NM-EJP6A	NM-EJP3A	NM-EJP7A	NM-EJP7A	NM-EJP7A	NM-EJP7A/8A
Images per Stencil	One	One	One	One	One	One
Input Board Handling	Single	Single	Single	Single	Dual	Single
Output Board Handling	Single	Single	Single	Dual	Dual	Dual
Board Shuttle Upline	No	No	No	No	Yes	No
Board Shuttle Downline	No	No	No	Yes	Yes	Yes
Min Board Size	50 x 50mm	50 x 50mm	50 x 50mm	50 x 50mm	50 x 50mm	50 x 50mm
Max Board Size	510 x 460mm	510 x 460mm	350 x 300mm	350 x 165mm	350 x 300mm	350 x 300mm
Optional Board Size	650 x 460mm	510 x 510mm	**	**	**	**
Board Exchange Time	15 sec	13 sec	13 sec	10 sec	13 sec	13 sec
Repeatability	+5µm @ 2.0 Cpk	+5µm @ 2.0 Cpk	+5µm @ 2.0 Cpk			
Frame Size: 736 x 736mm	X	X	X	X	X	X
Frame Size: 650 x 650mm	X	X	X	X	X	X
Frame Size: 550 x 650mm	X	X	X	X	X	X
Frame Size: 750 x 750mm			X	X	X	X
Frame Size: 584 x 584mm			X	X	X	X
Cartridge Printer	TBA	X				
Power (VAC)	200 - 240	200	200 - 240			
Power (Phase)	Single	Triple	Single			
Power (Max KVA)	1.7	2.0	2.0			4.0
Air Supply (Mpa)	0.5	0.5	0.5			
Footprint	1580 x 1800mm	1680 x 2070mm	1650 x 1517mm			1650 x 3044mm
Height (excluding Tower)	1500mm	1430mm	1500mm			1500mm
Mass	1500 kg	1730 kg	1550 kg			3000 kg

total solutions for  
**any mix**  
**any volume**<sup>®</sup>

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