

The inclusion of AOI in M2M system to realize high-quality production

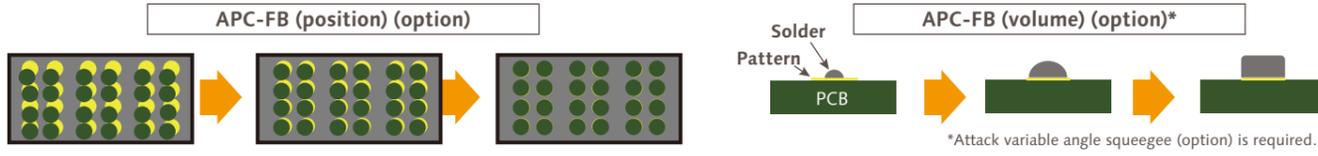


Printing condition optimization control (APC-5M) (option)

By changing each printing parameter condition, such as printing pressure, squeegee speed and snap-off rate, based on result data from SPI, it helps reach and maintains optimal printing condition (volume).

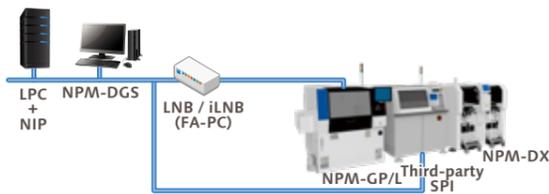
APC-FB function

Based on result data from SPI, it corrects printing positions and volume. There are two correction options available: position correction and volume correction. Since APC-FB (volume) controls solder volume by changing the squeegee angle, it helps reach smoothly and maintains optimal printing condition.

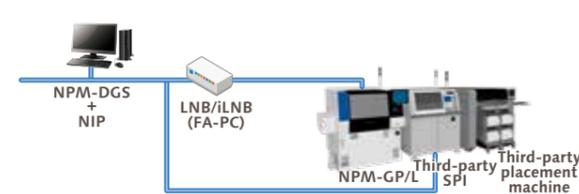


System configuration

NPM-GP/L + Panasonic placement machine + APC-5M + APC-FB



NPM-GP/L + Third-party placement machine + APC-5M + APC-FB



NIP: APC-5M control software (NPM-GP/L-specific) + Third-party interface software, LPC: APC-5M control software (mounter-specific), LNB/iLNB: Line network box, NPM-DGS: Data creation system

Model ID	NPM-GP/L
Model No.	NM-EJP2B
PCB dimensions *1	L 50 mm × W 50 mm to L 510 mm × W 510 mm
PCB exchange time *2	12.0 s including transport, PCB positioning, PCB recognition, printing, each cleaning operation (When PCB = L 250 mm × W 150 mm)
Repeatability	2 Cpk ± 3.8 μm ± 3 σ (Panasonic-specified condition)
Printing accuracy	2 Cpk ± 15.0 μm ± 6 σ (Panasonic-specified condition) *CeTaQ measuring machine used
Screen frame dimensions *3	L 736 mm × 736 mm, L 750 mm × 750 mm, L 650 mm × 550 mm, L 600 mm × 550 mm, L 550 mm × 650 mm, L 584 mm × 584 mm, L 736 mm × 584 mm, L 584 mm × 736 mm
Electric source *4	Single-phase AC 200 V ± 10 V / AC 220 V ± 10 V / AC 230 V ± 10 V / AC 240 V ± 10 V (Taps can be changed), Max.3.3 kVA
Pneumatic source	0.5 Mpa, 30 L / min (A.N.R.) (motor vacuum specs), 400 L / min (A.N.R.) (ejector vacuum specs)
Dimensions *5	W 1 580 mm × D 1 800 mm × H 1 500 mm
Mass *6	1 750 kg

*Values such as cycle time and accuracy may vary depending on operating conditions.
*Please refer to the "Specification booklet" for details.

*1: When "Paper-free Wiping Unit," "automatic support pin exchange" or "Attack variable angle squeegee" has been selected, the limit of the maximum PCB width changes. For details, refer to "Specification manual."
*2: The PCB replacement time differs depending on downstream and upstream machine types, PCB size, the use of PCB holders, etc.
*3: For Metal Mask specs, refer to Specification manual.

*4: Blowers and vacuum pumps (option) included.
*5: Signal tower and touch panel excluded.
*6: When the machine is fully optioned.

⚠ Safety Cautions

- Please read the User's Manual carefully to familiarize yourself with safe and effective usage procedures.
- To ensure safety when using this equipment, all work should be performed according to that as stated in the supplied Operating Instructions. Read your operating instruction manual thoroughly.

Panasonic Group products are built with the environment in mind.



Panasonic GREEN IMPACT

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● Changes in specifications and appearance may be made without notice for product improvement.
● Please contact us via our website at <https://industrial.panasonic.com/ww/r/fw>



NPM G



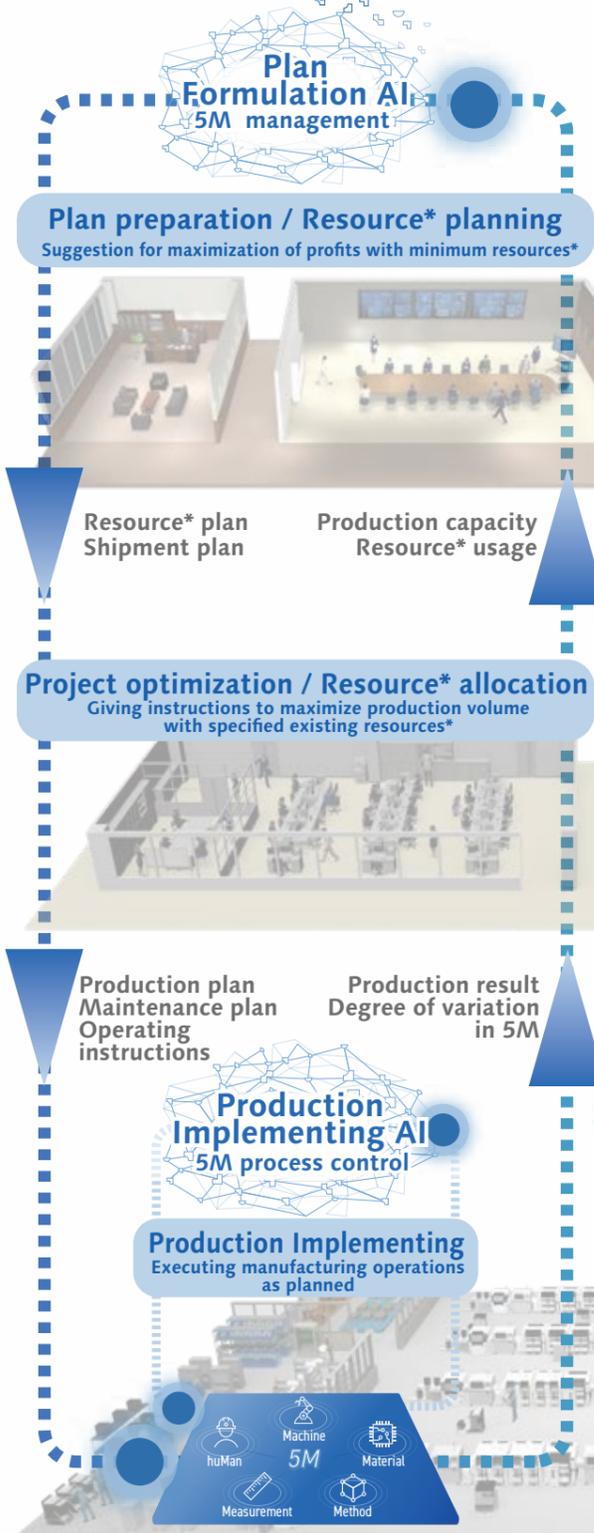
Model ID **NPM-GP/L**
Model No. NM-EJP2B



*It may not conform to Machinery Directive and EMC Directive in case of optional configuration and custom-made specification.

"Autonomous Factory" Concept

A factory that immediately responds to every situation and continues to evolve autonomously
Ensuring the production of non-defective items through the integrated control of autonomous uninterrupted mounting lines and floors independent of any human intervention and judgment



Management
Maximize Decision Quality
-Maximize decision quality in investments that directly impact ROI-
With the goal of maximizing management effects with minimum investment, the plan development AI calculates the resources* that you need to accomplish the goal. It visualizes the differences between the goal and the reality of your current situation, which can contribute to your business decision making. Thus, it helps you to improve daily management figures, as well as to efficiently judge whether to receive any orders from new customers.

Entire factory
Maximize Resource Efficiency
-Maximize resource* efficiency to reduce TCO-
With the objective of making maximum use of the resources* charged into your factory floor, the plan development AI monitors and manages the conditions of floor resources* relative to emerging floor variation factors, such as operational errors, machine problems or defective materials, and thereby minimizes such variations. In addition, it also seeks to reduce TCO by providing the floor operators with on-target instructions, according to its optimal plan, for addressing daily variations.

Line / floor
Maximize O.E.E
-Maximize O.E.E to be confident in achieving production plans-
With the aim of maximizing O.E.E, the hardware automatically detects mounting quality information, as well as the sign of any error or change in resource*, and then Production Implementing AI autonomously corrects the error or change on a line-wide level or notifies the operator of it. By using the outcomes that it has learnt, the AI will automatically identify responsible factors and make fine tuning of equipment, accordingly, which have so far belonged to the realm of Takumi know-how alone.

Resource*: Human / Machine / Material

Automation / Labor-saving Solution + Intelligent system Solution to Achieve Manufacturing That Is Further in Line with Production Plan

iLNB-based "Seamless SMT Line" Control

iLNB One of the industry's largest alliance network
No. of companies having been actually network-connected in the past: 110 companies*
*According to a survey by us as of Feb. 2022

Automation Labor-saving

Intelligent system

Print Automated supply

Screen printer

Fully automated printing process to ensure increased production time and production of non-defective items and, by means of that, to maximize O.E.E

- Solder transfer
 - Before retrieval
 - After retrieval
- Metal Mask changer
 - Magazine
 - Up Down

*NPM-GP/L option

Mount Automated supply

Auto load feeder

- Automated tape parts setup that does not require any skills.
- Automated resupply tape feeding that does not require any splicing.

Target parts 0402 to 1608 chips

Auto load feeder

Reduced man-hours needed for parts resupply
Parts can be set at any time.
⇒ Improved work efficiency and O.E.E

*NPM-DX, NPM-WX option

Mount Labor-saving supply

Tray stocker*

- Replacing / refilling with tray magazines without having to stop the machine
- Labor-saving by reducing the frequency of refilling of magazines

Tray stocker specifications : Max.72

*NPM-WX option

Line Intelligent system

Process control APC-5M**

By monitoring real-time "5M conditions" and "machine operating conditions," the AI detects any variations or changes in 5M for a line and performs more intelligent 5M process control and predictive maintenance of the line and, by that, realizes production of non-defective items and stable operation of in-line machines.

Machine management function including predictive maintenance
Material management function
Operation monitoring function*2
Operator management function*2

APC-5M process control

Maximizing O.E.E (Overall Equipment Effectiveness)

APC-5M Production Implementing AI*2

huMan 5M Machine Material Measurement Method

APC-5M responds to problems quickly, checks outcomes, repeats self-verification / learning, accumulates experiences and thereby improves its problem-solving skills.

*1:5M (huMan / Machine / Material / Method / Measurement)
*2:Currently under development

Realization of Autonomous Mounting Line

NPM-GP/L Maximizing OEE through Replacement of Skills by Automation / Line Solutions

Features

- 1 Increased production time**
 - (1) Reduces machine availability losses through automation of operations required for model changeover.
 - (2) Reduces machine performance losses through automation of operations involved in production.
 - (3) Increases production time by monitoring machine conditions and thereby performing maintenance at right times.
- 2 Maintenance of printing quality at a consistently high level**
 - Reduces losses due to defective items through various functions that actualizes consistently high-quality printing capable of responding to any changes in 5M.
- 3 Support for line solution**
 - Realizes high-quality line production through M2M.

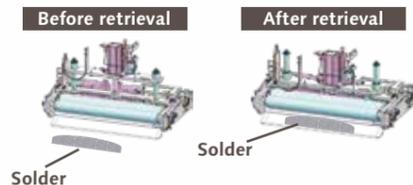
Increased production time

Automated model changeover

Any operations required for model changeover are automated.

Solder transfer (option)

It automatically retrieves on-Metal Mask solder after printing and transfers the solder to the Metal Mask for next model.

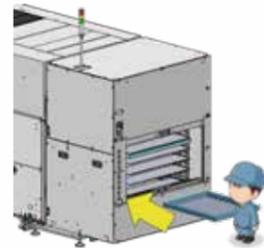


Metal Mask changer (option)

A magazine that can be stocked up with up to 10 Metal Masks is installed at the rear of machine. Upon completion of the production of a model, it automatically put the Metal Mask used for the model in a magazine and sets the Metal Mask for next model on the machine.

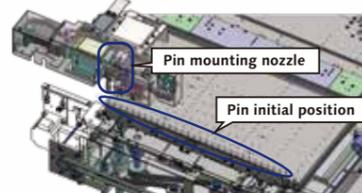
In-magazine Metal Mask can be loaded or unloaded even during production

●Metal Mask changer

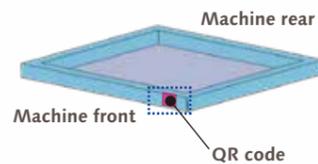
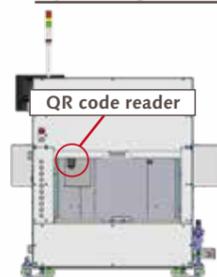


Support pin automatic exchange (option)

During model changeover, it automatically retrieves and puts support pins in place.



The location of a Metal Mask set is recognized by reading the QR code on the Metal Mask

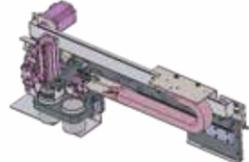


Automatic operation in manufacturing

Any operations required during production are automated.

Perforated pot type automatic solder supply (option)

It automatically supply solder through the hole in the undersurface of solder pot. Used in combination with remaining detection sensor, it can keep the right amount of solder on Metal Mask.



Paper-free Wiping Unit (option)

It is cleaning free of any cleaning paper and solvent. Thus, it can contribute to paper / solvent reduction.



Morene Block (option)

Comes in contact with the Metal Mask using magnet repulsion to prevent solder side leakage during printing. Simple construction for easy cleaning.

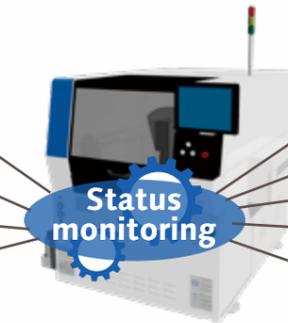


Machine condition monitoring (preventive / predictive maintenance)

It monitors the machine conditions in real time and by that optimizes the timing of maintenance and increases production time.

APC-5M (option)

- Movable axis distance monitoring
- Condition of PCB transport monitoring
- Recognition camera condition monitoring
- Blower operating time monitoring



- PCB clamber contamination detection (option)
- PCB clamber moving monitoring
- PCB clamber height measurement*
- Vacuum Pump start-up time monitoring
- Vacuum Pump operating time monitoring

*The Metal Mask height detection function (option) is required.

High-quality printing

Various functions are ready for use to achieve high-quality printing.

New operation panel

- A large-sized panel (15-inch) introduced to increase ease of use and visibility.
- Screen configuration reviewed (a reduction in the number of screens) to decrease the screen handling time required.

An increase in size from 8.4 - to 15-inch



Top / side clamber (movable type) (option)

Pressing down on PCB edge faces increases printing quality of warped PCB. Either PCB upper or side face can be selected for correction.



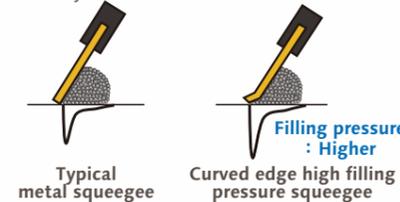
Attack angle variable squeegee (option)

The attack angle can be set at any angle in the 45 to 70 degrees in 1 degree increments. When it is used in conjunction with the APC-FB (volume) function, the attack angle can be changed automatically.



Curved edge high filling pressure squeegee (option)

A metal squeegee of which the curved blade edge can enhance its filling performance. As is the case with typical metal squeegees, it is easy to handle.



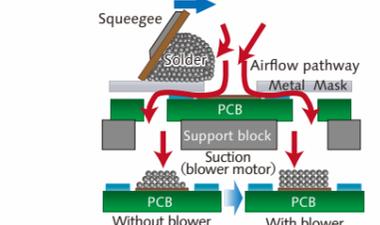
Material verification (option)

It makes verifications of Metal Mask, squeegee, support block and solder and by means of that prevents wrong materials from being set. When a verification error or nonverification occurs, it stops the machine.



PCB pickup blower (switch type) (option)

Printing transcription is improved through the use of blower to create airflow pathways from Metal Mask to PCB.

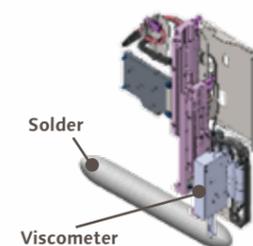


Stable production

APC-5M helps keep production stable by monitoring material conditions and automatically changing machine parameters.

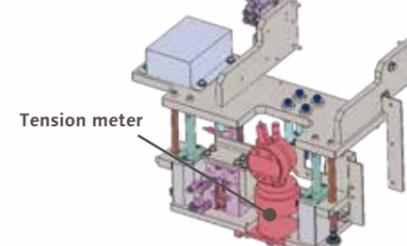
Solder viscosity feedback(option)

It measures and controls the viscosity of on-Metal Mask solder and by that keeps the viscosity at a proper level.



Metal Mask tension feedback(option)

It measures Metal Mask tension prior to printing and changes the snap-off operation setting accordingly.



Solvent discharge feedback(option)

It monitors the amount of solvent discharge during wet cleaning and thereby keeps the discharge amount at an appropriate level.

