Line Solution

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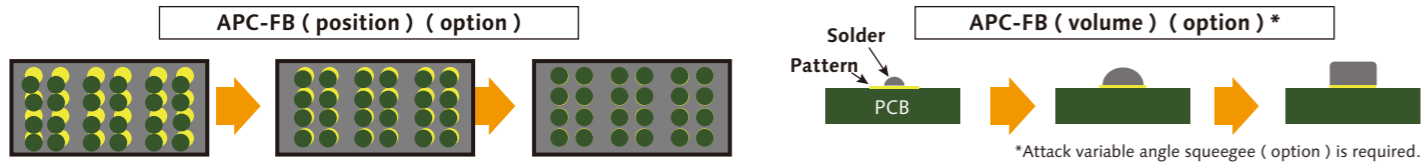

NPM-GP/L　Third-party SPI　NPM-DX　NPM-WX　Third-party AOI

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.

APC-FB (position) (option)

APC-FB (volume) (option) *

Solder Pattern

PCB

*Attack variable angle squeegee (option) is required.

■ **System configuration**

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

LPC + NIP　NPM-DGS　LNB / iLNB (FA-PC)　NPM-GP/L　Third-party SPI　NPM-DX

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

NPM-DGS + NIP　LNB/iLNB (FA-PC)　NPM-GP/L　Third-party SPI　Third-party placement machine

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

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.

For details here

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●Please contact us via our website at **https://industrial.panasonic.com/ww/r/fw**

Panasonic CONNECT

Electronics Assembly System

Screen Printer
Catalogue

Model ID

NPM-GP/L
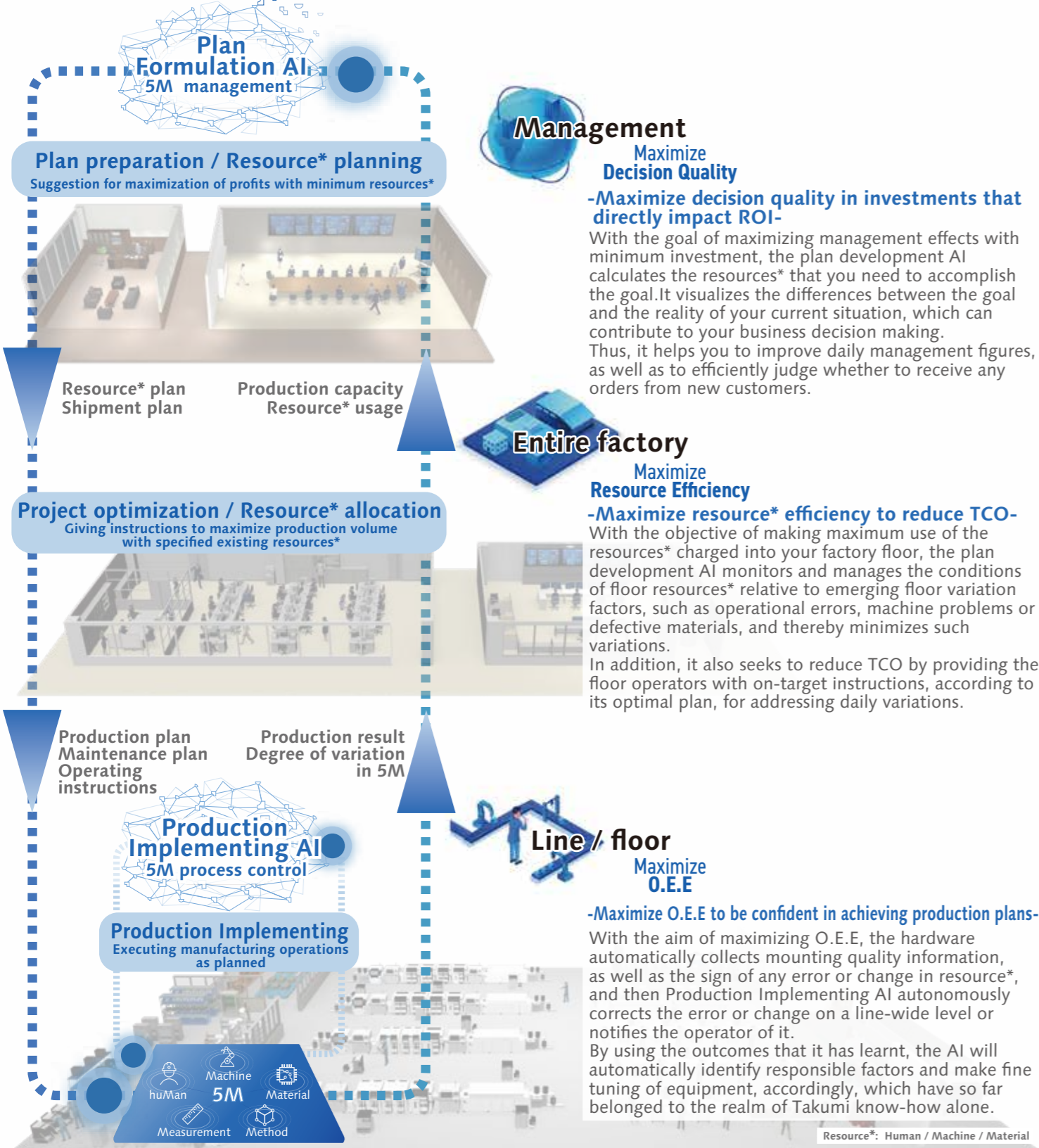
Model No.
NM-EJP2B

NPM G

CE

*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

- Advancements in components and PCBs
- Digitalization of manufacturing
- Decreased labor population
- Sudden change in demand / supply Changing needs
- Semiconductor shortage
- International situation
- Natural disaster Pandemic

*Under development toward the realization of the concept

Plan Formulation AI
□5M management

Plan preparation / Resource* planning
Suggestion for maximization of profits with minimum resources*

Resource* plan
Shipment plan

Production capacity
Resource* usage

Project optimization / Resource* allocation
Giving instructions to maximize production volume with specified existing resources*

Production plan
Maintenance plan
Operating instructions

Production result
Degree of variation in 5M

Production Implementing AI
□5M process control

Production Implementing
Executing manufacturing operations as planned

huMan · Machine · 5M · Material · Measurement · Method

Resource*: Human / Machine / Material

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 collects 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.

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 Well-established alliance network
Machines from 134* partners are connectable.

*According to a survey by us as of January. 2025

- 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

Solder | Solder

● Metal Mask changer

Magazine

Up Down

*NPM-GP/L option

Mount — Automated supply
ASF *1
· Paper and embossed tapes of all widths can be used.*2
· Automated loading of new component tapes requires no special skills.
· LU*3 enables component tapes to be resupplied automatically without need for splicing.

ASF*1 (Standard)

ASF*1 (With LU*3 installed)

Tape resupply (Standard)

Tape resupply (With LU*3 installed)

· Tapes can be loaded with a single button press, streamlining work processes to resupply components.
· Components can be resupplied at any time in a skill-less manner.

*1：Auto Setting Feeder
*2：ASF for 4 mm tape currently under development
*3：Loading Unit

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 *1

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.

*1:5M (huMan / Machine / Material / Method / Measurement)

- Real-time monitoring
- Intelligent system to identify appropriate maintenance intervals
- Intelligent system to improve error rate *2
- Intelligent system to reduce short downtime *2
- Intelligent system to perform quality control *2
- 5M Real-time Monitoring Real-timeControl
- Machine · huMan · Material · Measurement · Method
- APC-5M

Maximizing O.E.E (Overall Equipment Effectiveness)

APC-5M Production Implementing AI *2

Status Monitoring

Corrections

huMan · Machine · 5M · Material · Measurement · Method

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

*2:Currently under development

Realization of Autonomous Mounting Line

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.

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

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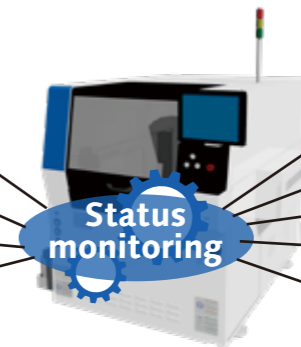
- PCB clamper contamination detection (option)
- PCB clamper moving monitoring
- PCB clamper height measurement*
- Vacuum Pump start-up time monitoring
- Vacuum Pump operating time monitoring

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

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.

Before retrieval   After retrieval

Solder   Solder   Solder

Support pin automatic exchange (option)

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

Pin mounting nozzle

Pin initial position

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.
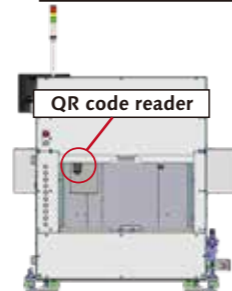
●Metal Mask changer

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

QR code reader   Machine rear   Machine front   QR code

High-quality printing

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

New operation panel

① A large-sized panel (15-inch) introduced to increase ease of use and visibility.
② 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

SPG   NPM-GP/L   Touch panel (15-inch)

Top / side clamper (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.

Top clamp   Side clamp
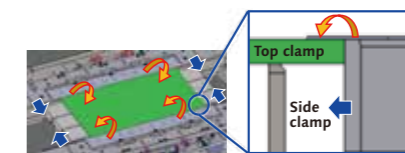
Attack angle variable squeegee (option)

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.

When set to 45°   When set to 70°
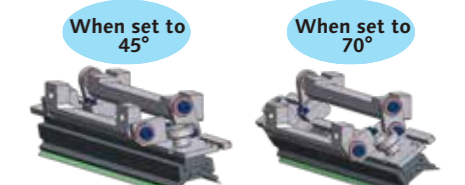
Curved edge high filling pressure squeegee (option)

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.

Typical metal squeegee   Curved edge high filling pressure squeegee   Filling pressure : Higher
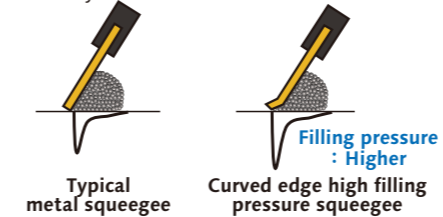
Material verification (option)

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.

Metal Mask   Squeegee   Support   Solder

PCB pickup blower (switch type) (option)

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

Squeegee   Solder   Airflow pathway   Metal Mask   PCB   Support block   Suction (blower motor)   PCB Without blower   PCB With blower
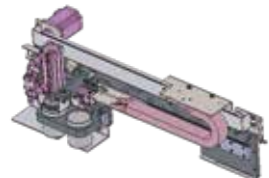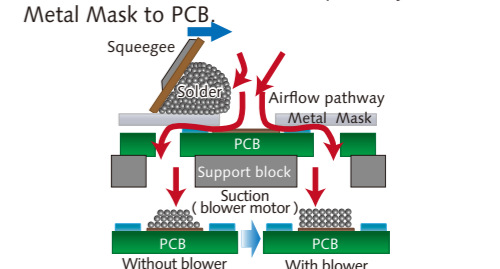
Automatic operation in manufacturing

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 repellence to prevent solder side leakage during printing.
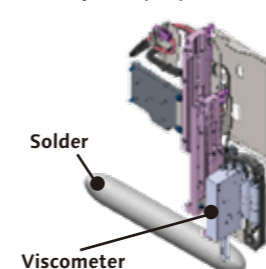Simple construction for easy cleaning.

Stable production

APC-5M helps keep production stable by monitoring material conditions and automatically changing machine parameters.
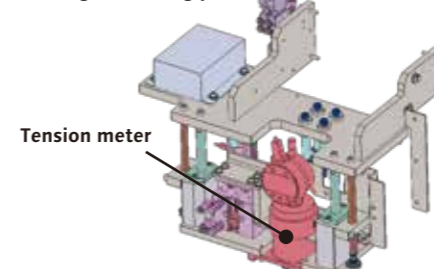
Solder viscosity feedback (option)

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

Solder   Viscometer

Metal Mask tension feedback (option)

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

Tension meter

Solvent discharge feedback (option)

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

Liquid flow meter   Solvent nozzle