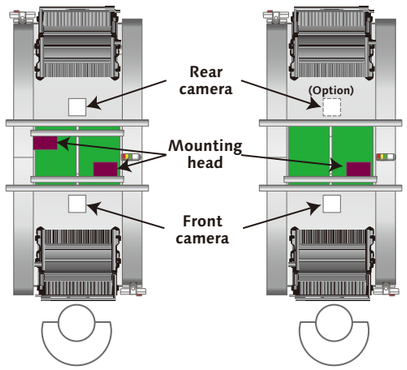
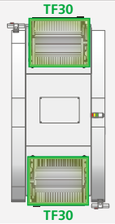
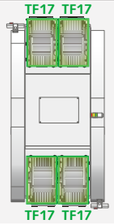
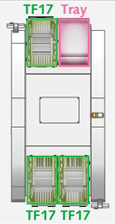
Machine configuration

NPM-WX / NPM-WXS



Supply unit layout

Layout 1	Layout 2	Layout 3	Layout 4	Layout 5
8 ㎜ taping : 120 Tray : 0	8 ㎜ taping : 136 Tray : 0	8 ㎜ taping : 94 Tray : 24	8 ㎜ taping : 102 Tray : 24	8 ㎜ taping : 68 Tray : 48
				

Model ID		NPM-WX	NPM-WXS
Model No.		NM-EJM9D	NM-EJM2E
PCB dimensions	Single-lane mode	Batch mounting : L 50 ㎜ × W 50 ㎜ ～ L 750 ㎜ × W 610 ㎜	2 position mounting : L 50 ㎜ × W 50 ㎜ ～ L 350 ㎜ × W 610 ㎜
	Dual-lane mode	Dual transfer(Batch) : L 50 ㎜ × W 50 ㎜ ～ L 750 ㎜ × W 300 ㎜	Dual transfer(2 position) : L 50 ㎜ × W 50 ㎜ ～ L 350 ㎜ × W 300 ㎜
		Single transfer(Batch) : L 50 ㎜ × W 50 ㎜ ～ L 750 ㎜ × W 590 ㎜	Single transfer(2 position) : L 50 ㎜ × W 50 ㎜ ～ L 350 ㎜ × W 590 ㎜
Electric source		3-phase AC 200 , 220 , 380 , 400 , 420 , 480 V 3.0 kVA	3-phase AC 200 , 220 , 380 , 400 , 420 , 480 V 2.1 kVA
Pneumatic source *1		Min.0.5 MPa、200 L / min (A.N.R.)	
Dimensions		W 1 410 ㎜ *2 × D 2 570 ㎜ *3 × H 1 444 ㎜ *4	
Mass		2 740 kg (Only for main body:This differs depending on the option configuration.)	2 660 kg (Only for main body:This differs depending on the option configuration.)
Placement head		1 head on each side (front, rear)	1 head (rear camera is optional)
Component supply	Taping	Tape : 4 ～ 56 / 72 / 88 / 104 ㎜	
		Front rear 17-slot feeder cart specifications: Max.136 product types (4 , 8 ㎜ tape)	
	Stick	Front rear 17 -slot feeder cart specifications: Max.32 product types (single stick feeder)	Front rear 17 -slot feeder cart specifications: Max.16 product types *5(single stick feeder)
	Tray	One side tray specifications : Max.24 , Front-rear tray specifications : Max.48 One side tray stocker specifications : Max.72 , Front-rear tray stocker specifications : Max.144	

Placement head	Lightweight 16-nozzle head V2 (Per head)	Lightweight 8-nozzle head (Per head)	4-nozzle head (Per head)	3-nozzle head V2 (Per head)
Max. speed	43 000 cph (0.084 s / chip)	23 000 cph (0.155 s / chip)	8 400 cph (0.429 s / chip) 7 800 cph (0.462 s / QFP feeder) 7 100 cph (0.507 s / QFP tray) *8	9 400 cph (0.383 s / chip) 7 300 cph (0.493 s / QFP feeder) 6 350 cph (0.567 s / QFP tray) *9
Placement accuracy(Cpk≧1)	±25 μm / chip	±25 μm / chip ±40 μm / QFP □12 ㎜ Under ±25 μm / QFP □12 ㎜ ～ □32 ㎜	±20 μm / QFP	±20 μm / QFP
Component dimensions (㎜)	0201 chip *6 *7 / 03015 chip *6 0402 chip *6 ～ L 6 × W 6 × T 3	0402 chip *6 ～ L 45 × W 45 × T 12 or L 100 × W 40 × T 12	0603 chip ～ L 120 × W 90 × T 40 or L 150 × W 25 × T 40	0603 chip ～ L 120 × W 90 × T 40 or L 150 × W 25 × T 40

*Placement tact time and accuracy values may differ slightly depending on conditions.
*Please refer to the specification booklet for details.

*1: Only for main body
*2: 2 010 ㎜ in width if extension conveyors (300 ㎜) are placed on both sides.
*3: Dimension D including feeder cart
*4: Excluding the monitor, signal tower and ceiling fan cover.
*5: Stick feeders cannot be used on the rear feeder cart of NPM-WXS.

*6: 0201 / 03015 / 0402 component requires a specific nozzle / tape feeder.
*7: 0201 component placement is optional. (Under conditions specified by Panasonic)
*8: For any QFP □20 ㎜ or less in size
*9: For any QFP □28 ㎜ or less in size

⚠ 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.

Please check the homepage for the details.
panasonic.com/global/corporate/sustainability

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3-1-1 Inazu-cho, Toyonaka City, Osaka
561-0854, Japan

All data as of April 25, 2022

Ver.April 25, 2022

●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**

2022

Panasonic CONNECT

Modular Placement Machine

Electronics Assembly System

Catalogue

NPM X

Model ID

NPM-WX,WXS

Model No.NM-EJM9D/NM-EJM2E

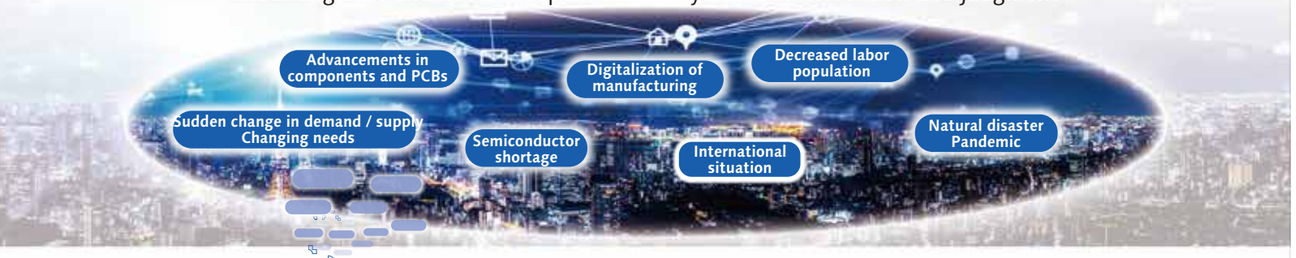
*Photograph is NM-EJM9D

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



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

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.

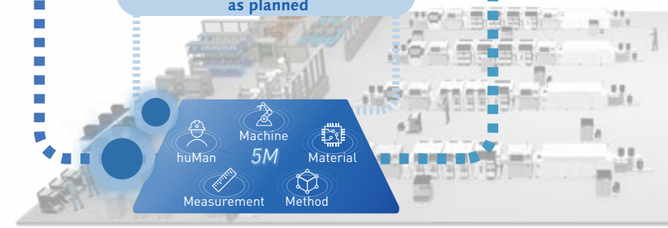
Project optimization/Resource* allocation
Giving instructions to maximize production volume with specified existing resources*

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



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

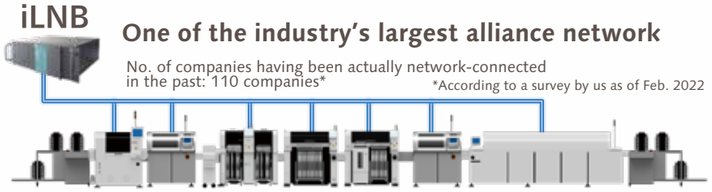
Automation/Labor-saving Solution + Improving Intelligence Solution to Achieve Manufacturing That Is Further in Line with Production Plan

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

Improving intelligence

Print Automated supply

Perforated pot type automatic solder supply

- A perforated pot is used to enable automated solder supply during production.
- Used in combination with solder remaining detection sensor, it can keep the right amount of solder on metal mask.

Perforated pot type automatic solder supply

Solder remaining detection sensor

Solder pot

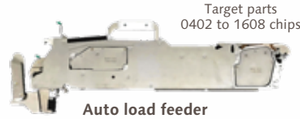
*SPG2 option

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

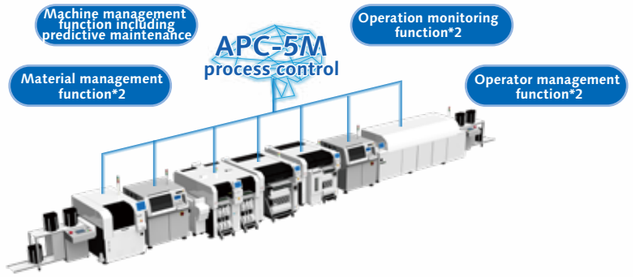
*NPM-WX option

Line Improving intelligence

Process control APC-5M *1

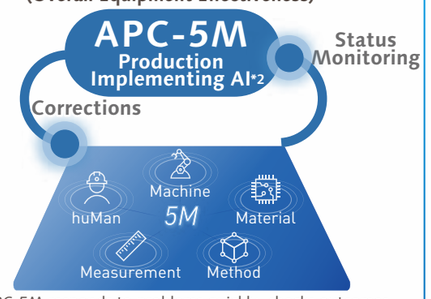
*1:5M (huMan/Machine/Material/Method/Measurement)

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.



*2:Currently under development

Maximizing O.E.E
(Overall Equipment Effectiveness)



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

Realization of Autonomous Mounting Line

NPM X

Developing high-quality, high-throughput unmanned floor

[1] Panasonic's next generation of mounting production (X series) concept

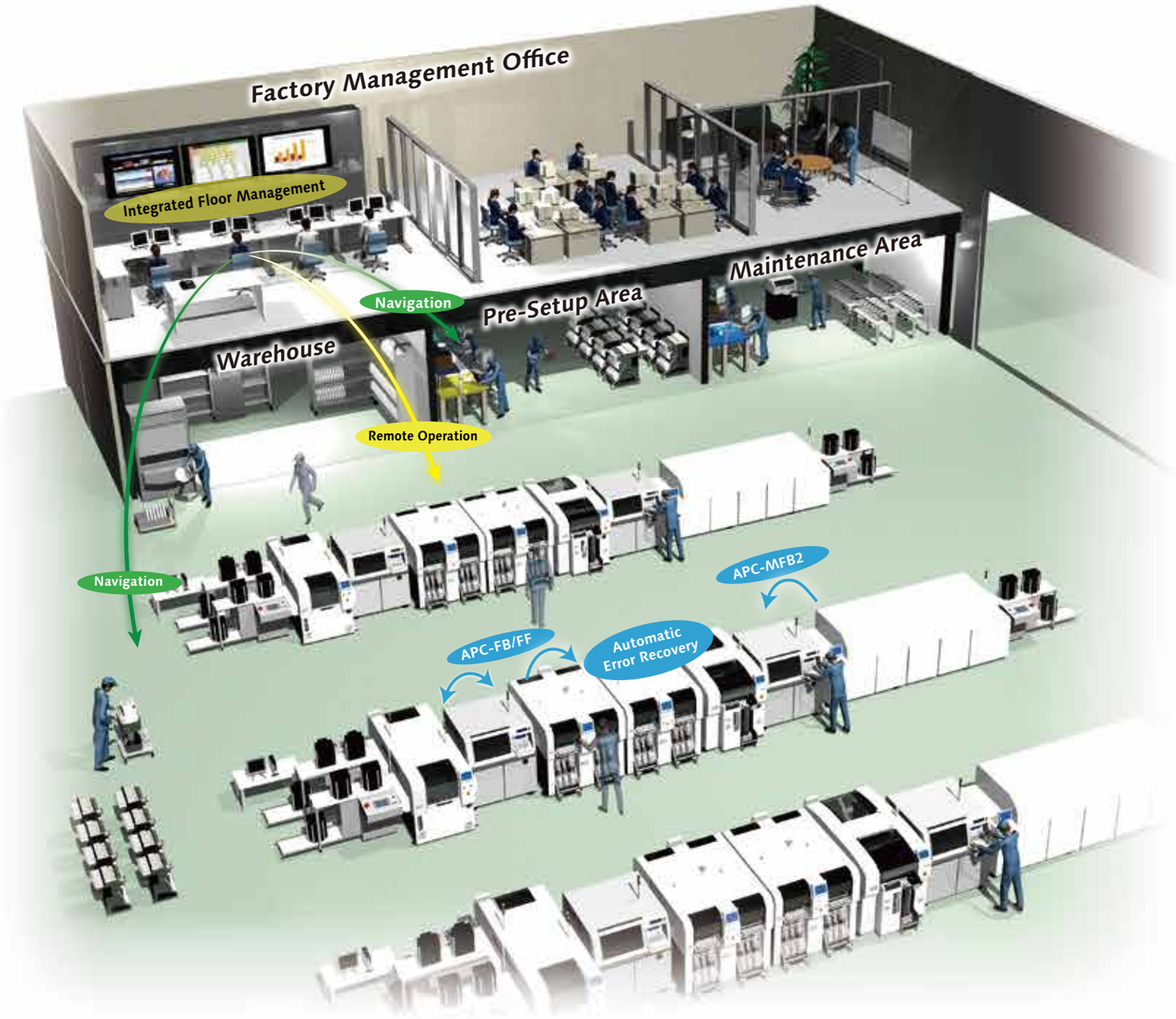
"Smart manufacturing"

More line throughput, better quality and lower cost with
fully automated mounting system floor

1 Stable operation based on the autonomic function
Autonomous line control
APC system and automatic recovery option

2 Labor-saving, improved utilization
Concentrated control
Floor management system and remote operation option

3 Reduced work variations
Navigation/automated items
Feeder setup navigation, component supply navigation and automated items



[2] NPM-WX 、WXS's features

New platform to realize Smart Manufacturing

NPM-WX,WXS

1 Evolved basic performance
2 Maximized actual throughput
3 Minimization of human-dependent work

1 Evolved basic performance

Increased productivity/quality

Max.speed : 86 000 cph*
IPC9850(1608) : 64 500 cph*
Placement accuracy : ±25 μm


Lightweight 16-nozzle head V2

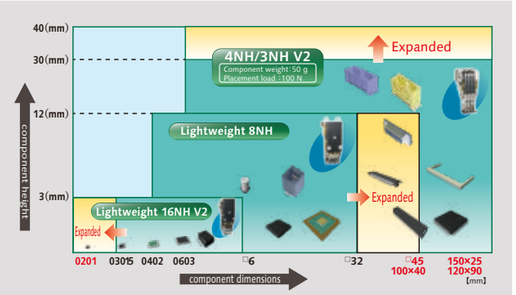

Lightweight 8-nozzle head


3-nozzle head V2


4-nozzle head

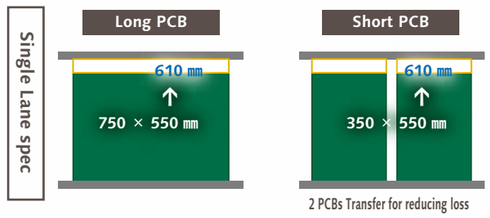
* : NPM-WX (Tact for Lightweight 16NH V2 × 2 head)

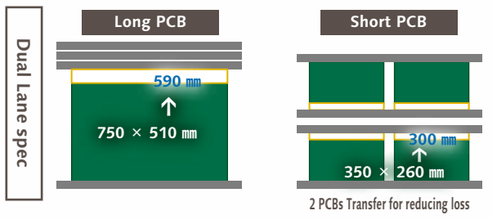
Improved ability to support components



Increased PCB adaptability

Increase in transportable PCB size (The following figures show increases compared to NPM-W2.)





Greater versatility in supply units

The feeder carts of both the NPM-W (30-input) and the NPM-D (17-input) series are now installable; in addition to that, the interchangeability between a feeder cart (17-input) and newly developed single tray feeder (24-product type) allows you to replace them by each other on your own.


Feeder cart (30inputs)


Feeder cart (17 inputs)

Interchangeable


Single tray feeder (24 Component types)


Tray stocker

It can handle 24 product types for production and stock the maximum number of 48 tray pallets, thus reducing the frequency of refilling of tray components.

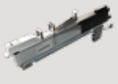
*The dedicated tray feeder is necessary.

Attachable to 30-/17-input feeder carts


Tape feeder


Thin type single tape feeder


Autoload feeder


Single stick feeder


3-slot stick feeder


Stackable stick feeder (s)*


Multi-functional transfer unit

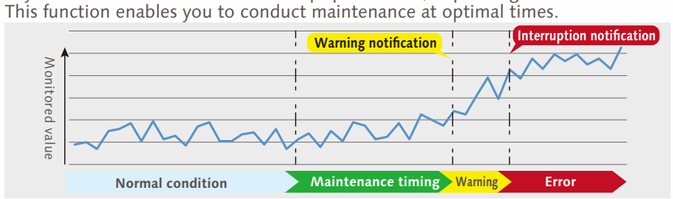
*L-sized one is available separately, depending on the component size.

2 Maximized actual throughput

APC system

APC-5M: Real-time unit monitoring

APC-5M monitors the conditions of target units in real time and provides notification of the timing of maintenance of each unit or any error condition that could interrupt production, depending on variations in monitored unit values.
This function enables you to conduct maintenance at optimal times.

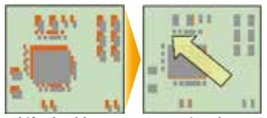


●Judgment status
Unmeasured
Normal condition
Semi-normal
Warning
Error

●Target unit
Head: Filter clogging
Nozzle holder sliding
Nozzle: Nozzle clogging
Nozzle tip condition
Feeder: Feed accuracy

APC-FB *1
Feedback to the printing machine

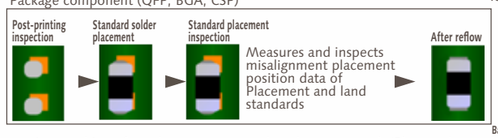
・Based on the analyzed measurement data from solder inspections, it corrects printing positions. (X , Y , θ)



APC-FF *1
Feedforward to the placement machine

・It analyzes solder position measurement data , and corrects component placement positions (X , Y , θ) accordingly.

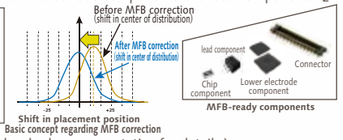
Chip components(0402C/R ～)
Package component (QFP, BGA, CSP)



APC-MFB2
Feedforward to AOI / Feedback to the placement machine

・Inspects part location based on APC offset correction position.

・The system analyzes AOI component position measurement data , corrects placement position (X , Y , θ) , and thereby maintains placement accuracy.
Compatible with chip components, lower electrode components and lead components *2

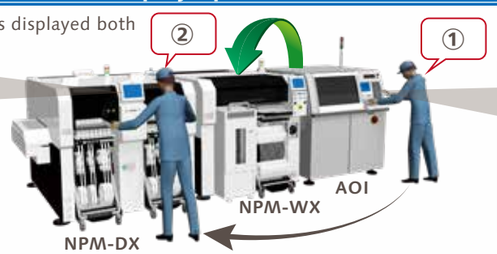


*1:APC-FB (feedback)/FF (feedforward): 3D inspection machine of another company can be also connected. (Please ask your local sales representative for details.)
*2:APC-MFB2 (mounter feedback2): Applicable component types vary from one AOI vendor to another. (Please ask your local sales representative for details.)

AOI Info Display option

Information on components judged NG by AOI is displayed both on AOI and NPM.

Information from AOI is displayed on the screen of the target mounting machine



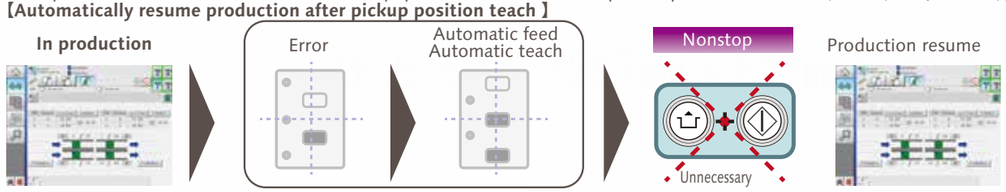
Type: Flip
M/C No.xx
Fdr ADR xx
Noz Pos xx

①AOI is used to pinpoint target NPM
②The target NPM is put in a warning state, and information from AOI is displayed on the screen

Automatic recovery option / Pickup position automatic teach in case of an error

When pickup/recognition error occurred, the machine automatically corrects the pickup position without stopping , and resumes production. That improves machine operation rate.
(Components: 4 ㎜ embossed (black)/ 8 ㎜ paper/embossed (black) tape component. *Embossed tape (transparency) is not supported.)

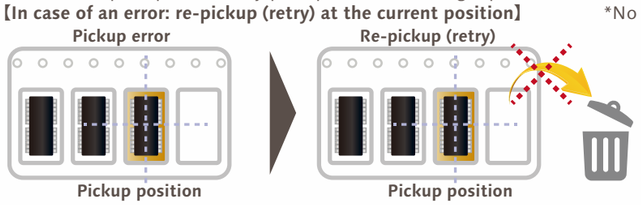
【Automatically resume production after pickup position teach 】



Re-pickup of error component (retry)

In case of a pickup error, retry pickup without feeding tape. It reduces discard components.

【In case of an error: re-pickup (retry) at the current position】 *No tape feed



No discard component because tape is not fed.*

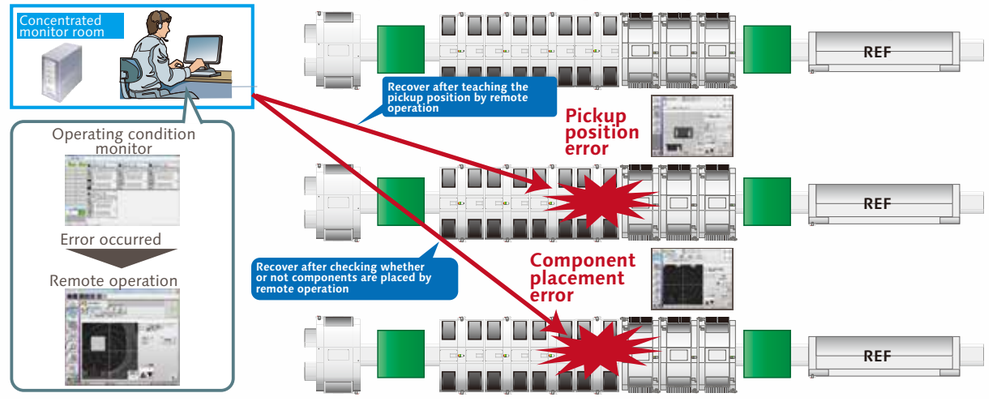
☐ When re-pickup (retry) is succeeded, the error is not counted
☐ The number of re-pick (retry) counts can be set.

* : When re-pickup (retry) is succeeded.

3 Minimization of human-dependent work

Remote operation option

Recovery by remote operation is available for the error of which recovery can be made based on human judgment alone. This enables concentrated on-the-floor monitoring, eliminating the time lost for the operator to detect error and take appropriate action, reducing the error recovery time, and thus achieving labor saving and improved operating rate.



Component supply navigator option

It is a support tool to navigate efficient setup procedure. The tool factors in the amount of time it takes to perform and complete setup operations when estimating the time required for production and providing the operator with setup instructions. This will visualize and streamline setup operations during setup for a production line.

Parts supply navigator option

It is a parts supply support tool to present an efficient sequence of parts supply. Taking into account the length of time before parts shortage occurs and the least time-wasting moving path possible, the tool provides the operator with instructions for parts supply. This makes parts supply more efficient.

Placement head maintenance

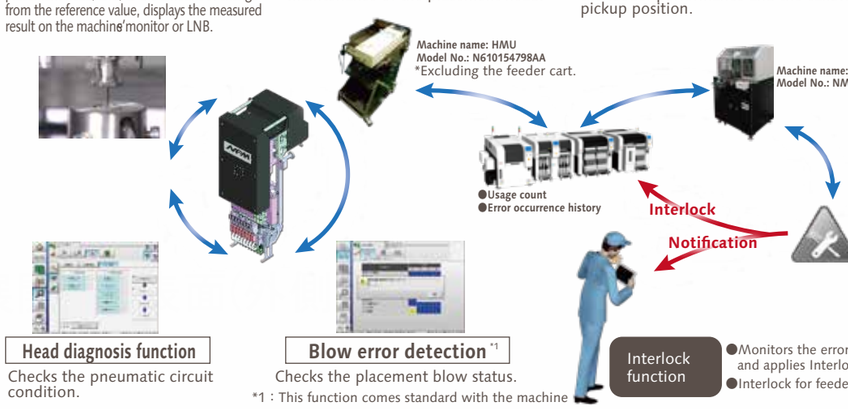
Good use is made of the machine's self-diagnosis function to automatically detect the maintenance timing of the placement head. In addition, the maintenance unit can be used to keep the placement head in working condition without requiring skills.

Load checker(Under development)

Measures the"indentation load" imposed by the placement head, and, as the amount of change from the reference value, displays the measured result on the machine's monitor or LNB.

Head maintenance unit

To automate the inspection and maintenance of the placement head.

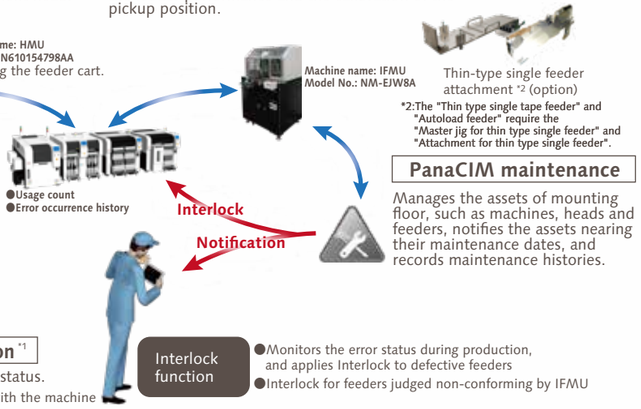


Feeder maintenance

Independent of operator skill, the feeder maintenance unit automatically performs feeder performance inspections and calibrations. Its combined use with the PanaCIM maintenance module can automatically prevent the inclusion of non-conforming feeders into production.

Feeder maintenance unit

Automates the inspection of major parts which affect the feeder performance and the calibration of the pickup position.



Thin-type single feeder attachment *2 (option)

*2:The "Thin type single tape feeder" and "Autoload feeder" require the "Master jig for thin type single feeder" and "Attachment for thin type single feeder".

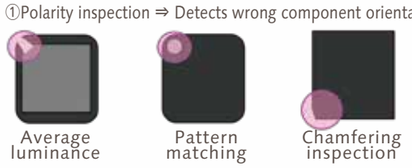
PanaCIM maintenance

Manages the assets of mounting floor, such as machines, heads and feeders, notifies the assets nearing their maintenance dates, and records maintenance histories.

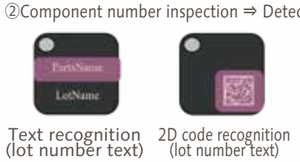
Inspection option before pick-up

Inspect tray or reel components before pick-up to prevent misplacement.

①Polarity inspection ⇒ Detects wrong component orientation



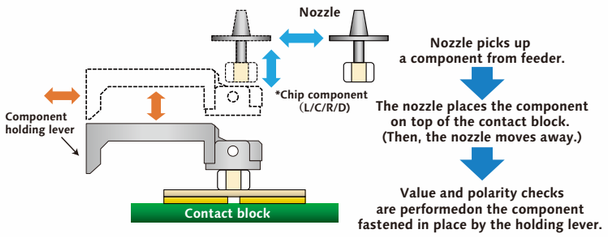
②Component number inspection ⇒ Detects wrong components, traces components.



NPM X

Comprehensive control using system software

Misplacement prevention / LCR checker option



At the start of production, or during component supply or product changeover, it checks mounted component values. This helps improve machine availability through a reduction in time spent on component checks, as well as preventing misplacement due to loading of components on wrong feeder, defective components, or mislabeled reels, and thereby contributes to manufacturing conforming items.
In addition, since checked value data is output to a file on LNB (FA PC), you can subsequently use the data to keep track, for example, of any changes or histories of mounted components.

*Not applicable to NPM-WXS.

Component size	0402 ~ □6 mm
Component	Resistance , Capacitor , Inductor , Diode

Component Verification option

Prevents setup errors during changeover Provides an increase of production efficiency through easy operation

*Wireless scanners and other accessories to be provided by customer

- **Preemptively deters component misplacement**
  Prevents misplacement by verifying production data with the barcode information on changeover components.
- **Automatic setup data synching function**
  The machine itself does the verification, eliminating the need to select separate setup data.
- **Interlock function**
  Any problems or lapses in verification will stop the machine.
- **Navigation function**
  A navigation function to make the verification process more readily understandable.

Off-line setup support station

With the support stations, offline feeder cart setup is possible even outside of the manufacturing floor.

●Two types of Support Stations are available.

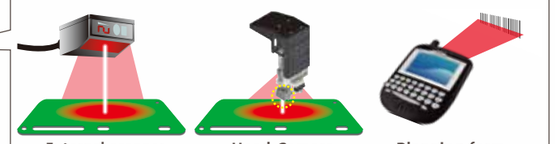
①Component verification station
・Batch Exchange Cart Setup: Provides power to all feeders in cart.
・Feeder setup: Provides power to individual feeders.
・Component verification: Navigator that indicates any location where feeders need exchange.

②Power supply station
The simpler type of station composed of the batch exchange cart setup and the feeder setup features.

Changeover ability / Automatic changeover option

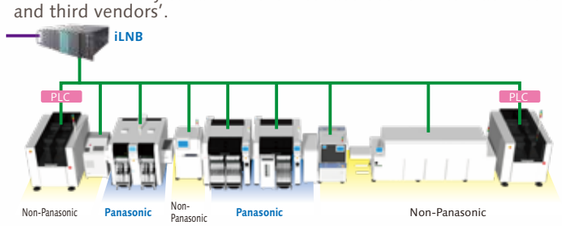
Supporting changeover (production data and rail width adjustment) can minimize time loss

●PCB ID read-in type
PCB ID read-in function is selectable from among 3 types of external scanner , head camera or planning form



M2M / iLNB *(Model No.NM-EJS5B)

Collective control of your line composed not only of Panasonic's machines but of third vendors' through a single PC provides support for your actual production, quality control and processing. Panasonic is ready to take on the interface between its machines and third vendors'.



Item	Panasonic	Non-Panasonic
Information collection/display	○	○
Automatic changeover	○	○

*For details , refer to the catalogue or specification for the integrated line management system"iLNB."

Function list

Function	Details
①Automatic changeover	①Registration of automatic changeover recipe
	②Line automatic changeover
	③Automatic changeover monitoring
	④Line operation monitoring
②E-Link(Information input)	①Download / edit of schedule
③E-Link(Information output)	①Operation information output
	②Trace information output
	③Machine status output
④E-Link(Machine control)	①Machine interlock, Production start control
⑤E-Link(Feeder write)	①Writing of component data by an external system
⑥Communication function (GEM･PLC)	①SECS2/GEM communication
	②OPC communication
	③IO/RS-232C communication

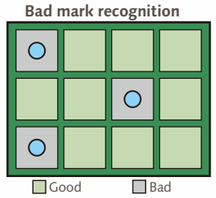
*The iLNB comprises software and a computer (iLNB PC). PLC PC , communication conversion PLC, and other devices should be prepared by customers.

PCB info communication function

NPM at the line head recognizes marks, and forwards mark information to downstream NPMs. That eliminates the need for the downstream NPMs to recognize the marks.

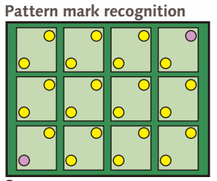
[Subject for communication]

Bad mark recognition

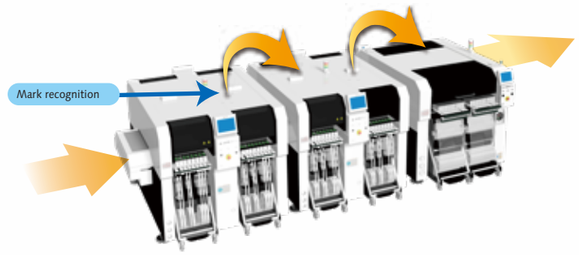


Bad mark is scanned at the first machine.

Pattern mark recognition



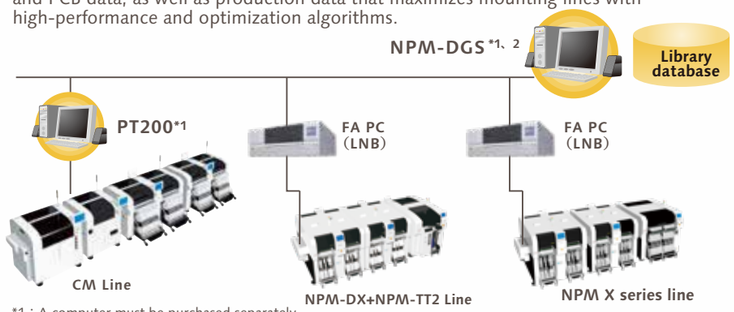
All marks are recognized at the first machine and downstream machines only recognize master marks.



*Please refer to"Specification"booklet for details.

Data Creation System / NPM-DGS (Model No.NM-EJS9A)

This is a software package that provides integrated management of component library and PCB data, as well as production data that maximizes mounting lines with high-performance and optimization algorithms.

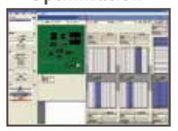


*1 : A computer must be purchased separately.
*2 : NPM-DGS has two management functions of floor and line level.

CAD import

Allows you to import CAD data and check polarity, etc., on the screen.

Optimization



Realizes high productivity and also allows you to create common arrays.

PPD editor

Update production data on PC during production to reduce the loss of time.

Component library

Allows unified management of the component library including mounting, inspection and dispensing.

Offline Camera option

Component data can be created offline even while the machine is in operation.
Use the line camera to create component data. Lighting conditions and recognition speed can be confirmed in advance, so it contributes to the improvement of productivity and quality.

Offline Camera Unit

DGS Automation option

Automated manual routine tasks reduce operation errors and data creation time.
Manual routine tasks can be automated. By collaborating with the customer system , the routine tasks for creating data can be reduced , so it contributes to a significant reduction in production preparation time. It also includes the function to automatically correct the coordinates and angle of the mounting point (Virtual AOI).

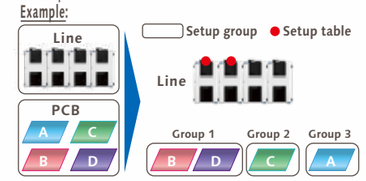
Example of entire system image:

Automated tasks (excerpt)
・CAD import
・Offset mark setting
・PCB chamfering
・Mounting point misalignment correction
・Job creation
・Optimization
・PPD output
・Download

Optimization of setup option

In production involving multiple models, setup workloads are taken into account and optimized.
For more than one PCB sharing common component placement, multiple setups may be required due to a shortage of suppy units. In order to reduce the required setup workloads in such a case, this option divides PCBs into similar component placement groups, selects a table(s) for setup and thus automates component placement operation. It contributes to improving setup performance and reducing production preparation time for customer manufacturing various kinds of products in small quantities.

Example:



Open interface / Host communication option

Able to standardize the interfacing with your systems currently used. Provides data communication with our standard interfaces.

- **Events**
  Outputs a real-time event of equipment
- **Other company's component verification**
  Communicates with your component verification systems
- **Component management data**
  ・Component remaining quantity data: Outputs component remaining quantity data
  ・Trace data: Outputs data linked with component information (*1) and PCB information (*2)

  (*1) Requires input of component information with a component verification option or an other company's component verification system I/F
  (*2) Requires input of PCB information with automatic changeover option