Model ID		NPM-DX						
PCB dimensions *When the long spec. conveyor is selected		Single-lane mode	L 50 ㎜ × W 50 ㎜ ～ L 510 ㎜ × W 590 ㎜					
		Dual-lane mode	L 50 ㎜ × W 50 ㎜ ～ L 510 ㎜ × W 300 ㎜					
PCB exchange time *When the short spec. conveyor is selected		2.1 s (L 275 ㎜ or less) 4.8 s (L 275 ㎜ or over to L 460 ㎜ or less) *May differ depending on PCB specifications.						
Electric source		3-phase AC 200 , 220 , 380 , 400 , 420 , 480 V 5.0 kVA						
Pneumatic source *1		Min.0.5 MPa , 200 L / min (A.N.R.)						
Dimensions		W 1 665 ㎜ *2 × D 2 570 ㎜ *3 × H 1 444 ㎜ *4						
Mass		3 600 kg (Only for main body : This differs depending on the option configuration.)						
Placement head		Lightweight 16-nozzle head V2 (Per head)		Lightweight 8-nozzle head (Per head)		4-nozzle head (Per head)		
		High-accuracy mode「OFF」	High-accuracy mode「ON」	High-accuracy mode「OFF」	High-accuracy mode「ON」	High-accuracy mode「OFF」	High-accuracy mode「ON」	
Max. speed		46 200 cph (0.078 s / chip)	35 000 cph (0.103 s / chip)	24 000 cph (0.150 s / chip)	18 000 cph (0.200 s / chip)	8 500 cph (0.424 s / chip) 8 000 cph (0.450 s / QFP)	6 500 cph (0.554 s / chip)	
Placement accuracy(Cpk≧1)		±25 μm / chip	±15 μm / chip *5	±25 μm / chip ±40 μm / QFP □12 ㎜ Under ±25 μm / QFP □12 ㎜ ～ □32 ㎜	±15 μm / chip *5	±25 μm / chip ±20 μm / QFP	±15 μm / chip *5	
Component dimensions (㎜)		0201 chip *6 *7 / 03015 chip *6 0402 chip *6 to L 8.5 × W 8.5 × T 3 *8		0402 chip *6 ～ L 45 × W 45 or L 100 × W 40 × T 12		0603 chip ～ L 120 × W 90 or L 150 × W 25 × T 30		
Component supply	Taping	Tape : 4 / 8 / 12 / 16 / 24 / 32 / 44 / 56 ㎜				Tape : 4 ～ 56 / 72 / 88 / 104 ㎜		
		4、8 ㎜ tape : Max.136						
	Stick	Max.32(Single stick feeder)						

* 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: 2 265 ㎜ 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: Accuracy valid for components 6 ㎜ square or smaller.

*6: 0201 / 03015 / 0402 component requires a specific nozzle / tape feeder.
*7: 0201 component placement is optional. (Under conditions specified by Panasonic)
*8: To any parts being in size greater than or equal to L 6 ㎜ × W 6 ㎜ , the head with purple label is applicable.

⚠ 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

Inquiries…

Panasonic Connect Co., Ltd.
Process Automation Business Division

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

All data as of April 1, 2022

Ver.April 1, 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**

Panasonic CONNECT

2022

Modular Placement Machine

Electronics Assembly System

Catalogue

Model ID **NPM-DX**

Model No.NM-EJM8D

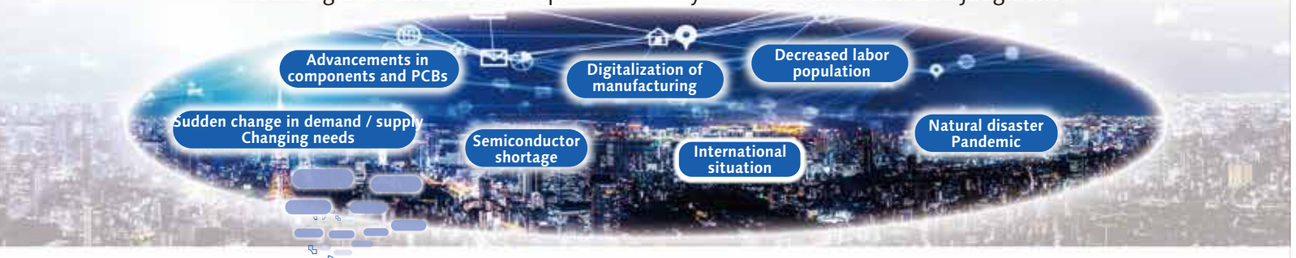
CE

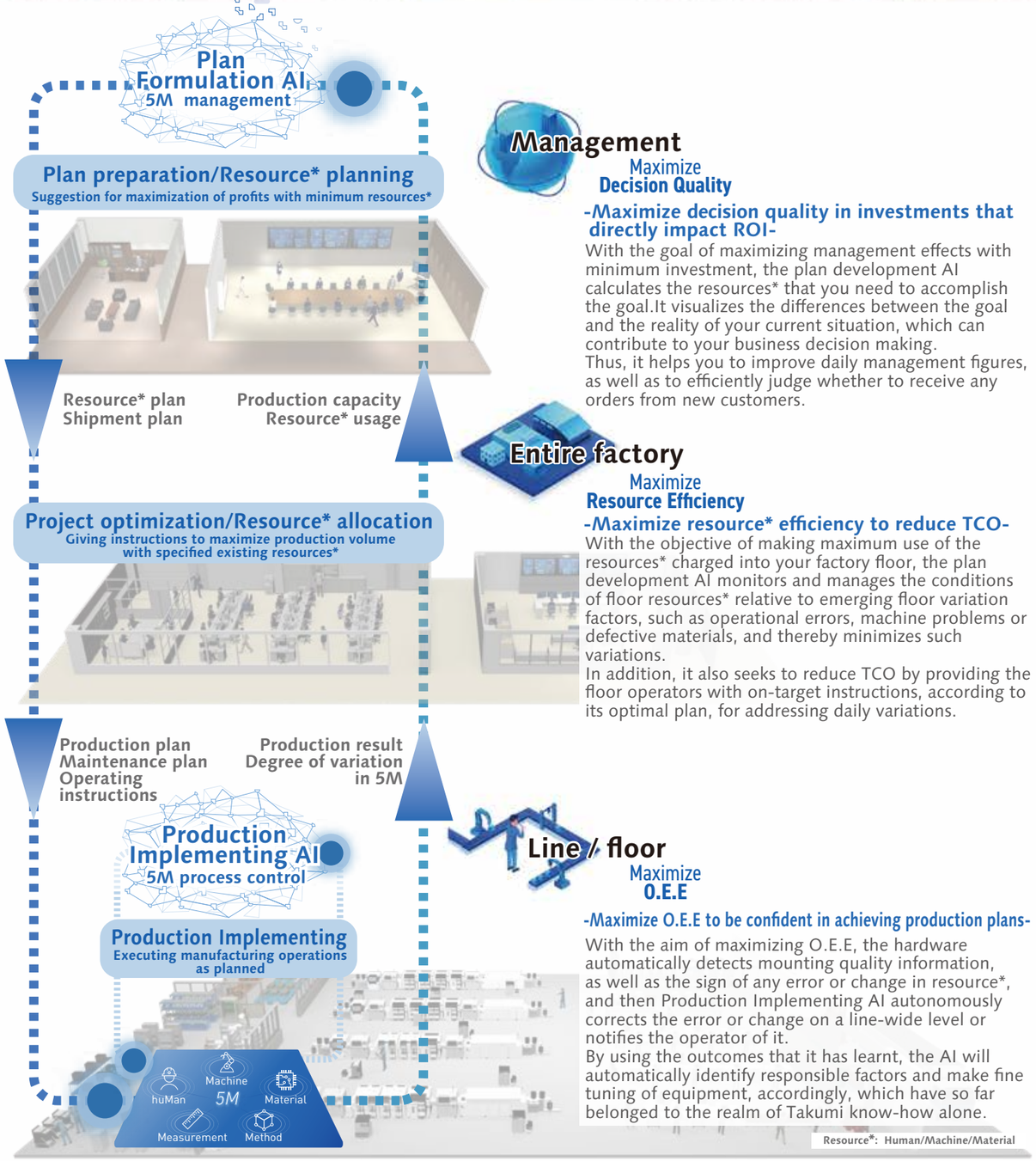
*It may not conform to Machinery Directive and EMC Directive in case of optional configuration and custom-made specification.

"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





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 + 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

*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 Automated quality

LCR checker

- It automatically checks if any parts having different electrical characteristics are mistakenly set.

*NPM-DX option

Load checker

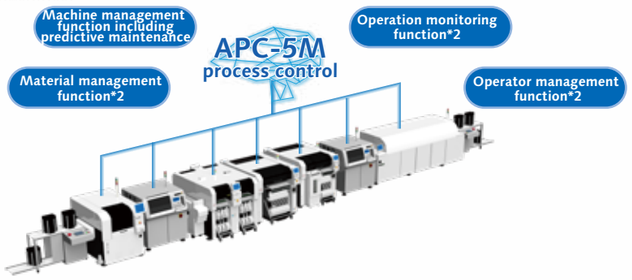
- It automatically checks for nozzle sliding motions and by that ensures mounting quality.

*NPM-WX option

Line Improving intelligence

Process control APC-5M *1

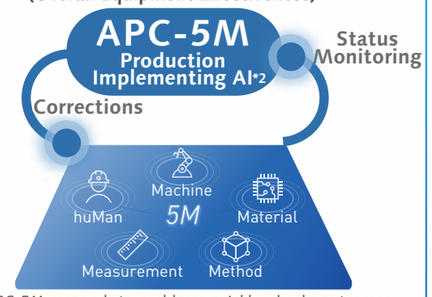
By monitoring real-time "5M conditions" and "machine operating conditions," the AI detects any variations or changes in 5M for a line and performs more intelligent 5M process control and predictive maintenance of the line and, by that, realizes production of non-defective items and stable operation of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



*2:Currently under development

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

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

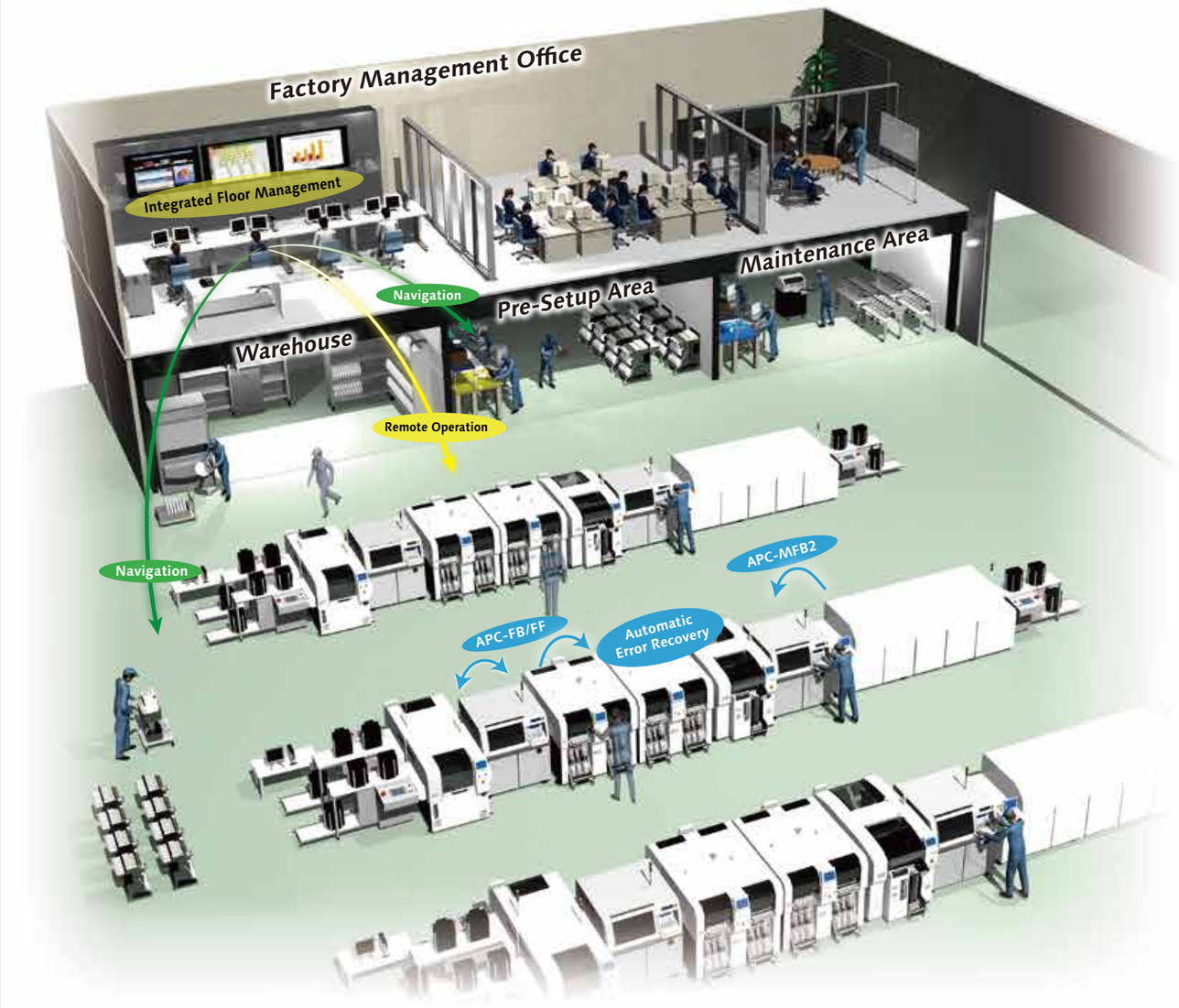
Developing high-quality, high-throughput unmanned floor

[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-DX's features

New platform to realize Smart Manufacturing

NPM-DX

1 Evolved basic performance

2 Maximized actual throughput

3 Minimization of human-dependent work


Lightweight 16-nozzle head V2


Lightweight 8-nozzle head


4-nozzle head

1 Evolved basic performance

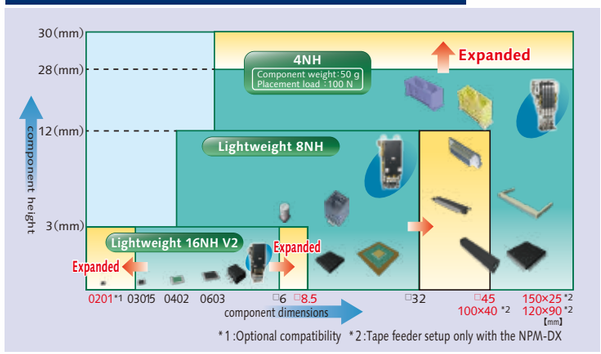
Increased productivity/quality

【High-accuracy mode OFF】
Max.speed : 184 800 cph*
IPC9850(1608) : 130 000 cph*
Placement accuracy : ± 25 μm

【High-accuracy mode ON】
Max.speed : 140 000 cph*
IPC9850(1608) : 96 000 cph*
Placement accuracy : ± 15 μm

*Tact for 16NH × 4 head

Improved ability to support components



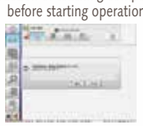
*1 :Optional compatibility *2 :Tape feeder setup only with the NPM-DX

Standard installation of new functions for better workability (reduced labor needs)

Changeover	· Short-cut screen for changeover operation · Instruction of non-teaching components before starting operation
Component supply	· Pitch misalignment automatic correction · Warning of component exhaust rush occurrence
Error recovery	· Standardization of recovery operation for feeder related error · Modification of non-stop data

Inclusion of more functions useful to reduce operator's workload as standard

Instruction of teaching component before starting operation



Extracts components on which automatic teach cannot perform though self-diagnosis at the stat of production and displays the start-up support screen after changeover.

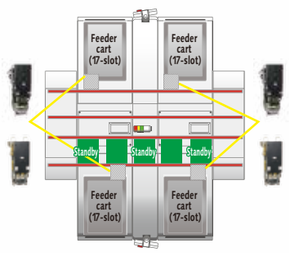
Warning of component exhaust rush occurrence

Predicts simultaneous exhaustion of different components (rush) and notifies the operator of such rush (warning: support request)
Normally , displays the length of time before the next component exhaustion takes place on the screen.

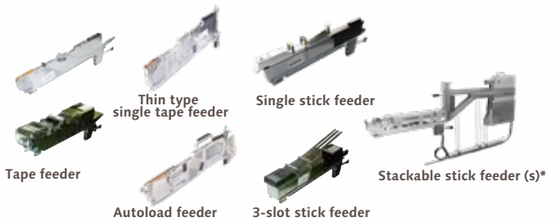
Taking the concept and compatibility of NPM series

Data creation, the feeder cart (17-slot) , tape feeder and nozzle are compatible with NPM series
Taking the concept of NPM series Line connection with NPM-D and NPM-TT series is enabled

Dual lane and multi-production
Plug and play function 4-head location free




Feeder cart
(17 inputs)



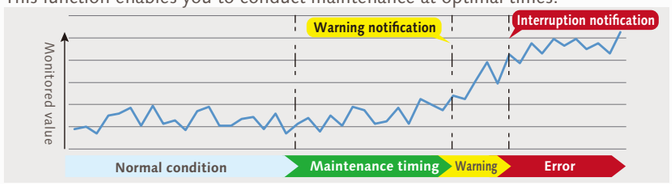
*L-sized one is available separately, depending on the component size.

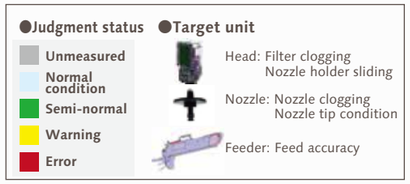
2 Maximized actual throughput

APC system

APC-5M: Real-time unit monitoring

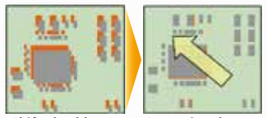
APC-5M monitors the conditions of target units in real time and provides notification of the timing of maintenance of each unit or any error condition that could interrupt production, depending on variations in monitored unit values.
This function enables you to conduct maintenance at optimal times.





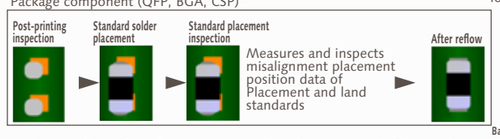
APC-FB *1
Feedback to the printing machine

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



APC-FF *1
Feedforward to the placement machine

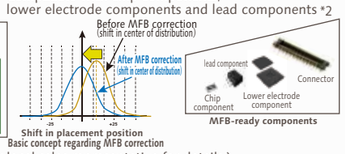
・ It analyzes solder position measurement data , and corrects component placement positions (X , Y , θ) accordingly.
Chip components(0402C/R ～)
Package component (QFP, BGA, CSP)



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

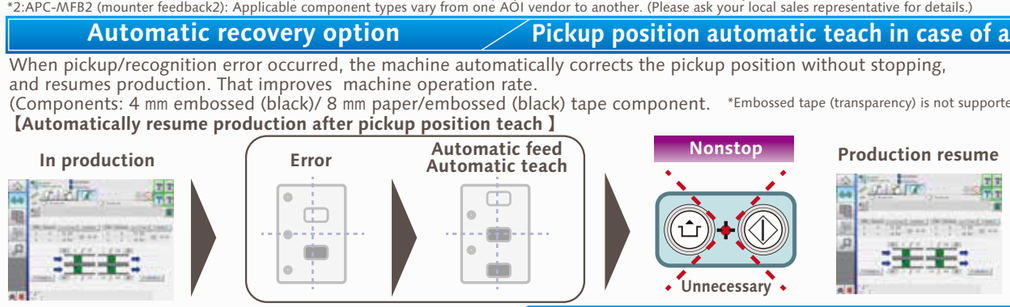


*1:APC-FB (feedback)/FF (feedforward): 3D inspection machine of another company can be also connected. (Please ask your local sales representative for details.)
*2:APC-MFB2 (mounter feedback2): Applicable component types vary from one AOI vendor to another. (Please ask your local sales representative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

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.)

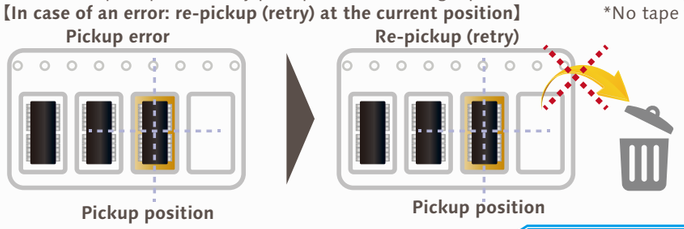
【Automatically resume production after pickup position teach 】



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



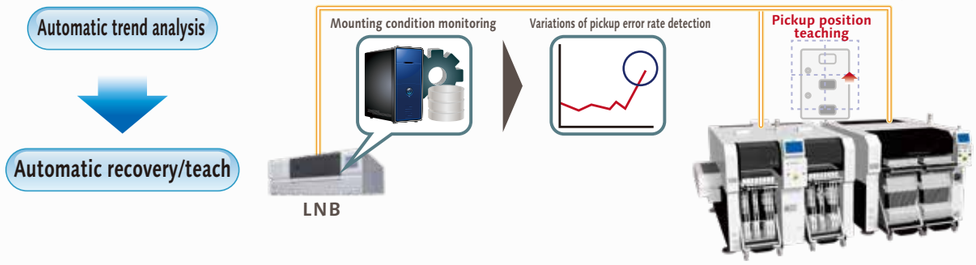
No discard component because tape is not fed.*

☐ 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.

Evolved automatic recovery (predicted control)

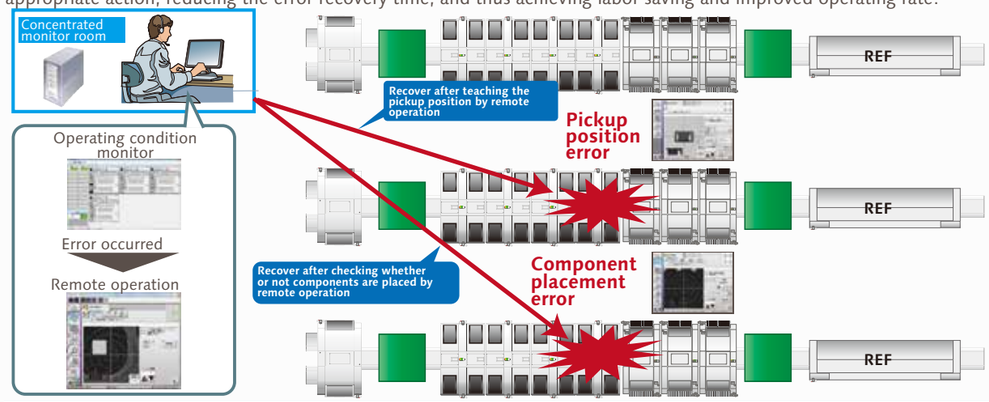
LNB automatically analyzes the variation of pickup/recognition error rate and instructs the machine to perform teaching to prevent machine error stop.



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.



Navigation / Feeder setup 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.

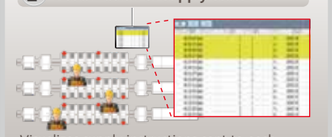
Component supply navigator option

A component supply support tool that navigates efficient component supply priorities. It considers the time left until component run-out and efficient path of operator movement to send component supply instructions to each operator. This achieves more efficient component supply.

1 Wireless scanner indication of supply priorities

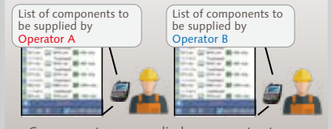
Considers the time left until component run-out and efficient path of operator movement to send supply priority instructions.

2 Visualization of supply statuses



Visualizes supply instructions sent to each operator on the main troubleshooting console.

3 Cut down of redundant work and waiting times



Components are supplied per operator to prevent any overlaps.

*PanaCIM is required to have operators in charge of supplying components to multiple production lines.

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.

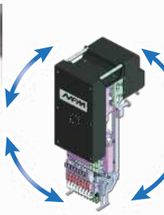
Load checker V2

Measures the "indentation load" imposed by placemen head and has the machine and LNB displayed the measurement result (possible to measure even a low load of 0.5 N as well).

Head mentenance unit

To automate the inspection and maintenance of the placement head.

Machine name: HMU
Model No.: N610154798AA
*Excluding the feeder cart.



●Usage count
●Error occurrence history

Head diagnosis function
Checks the pneumatic circuit condition.

Blow error detection *1
Checks the placement blow status.
*1 : This function comes standard with the machine

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.

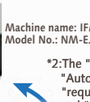
Feeder maintenance unit

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

Thin-type single feeder attachment (option) *2

Machine name: IFMU
Model No.: NM-EJW8A

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



Interlock
Notification

Interlock function
●Monitors the error status during production , and applies Interlock to defective feeders
●Interlock for feeders judged non-conforming by IFMU

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.

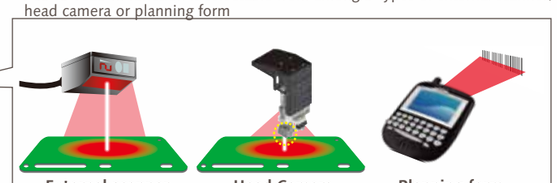
NPM X

Comprehensive control using system software

Changeover ability / Automatic changeover option

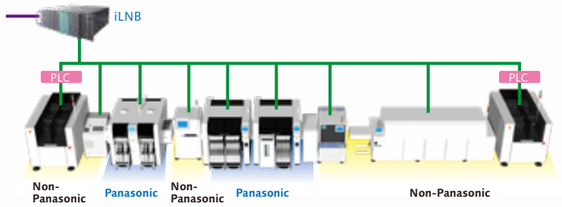
Supporting changeover (production data and rail width adjustment) can minimize time loss

●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	○	○

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.

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

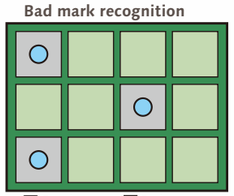
PCB Info Communication Function

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.

The machine can also obtain bad mark information from its upstream third-party machine as well.(option)

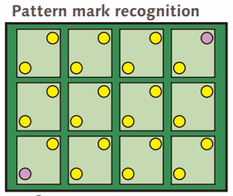
[Subject for communication]

Bad mark recognition



Good Bad
Bad mark is scanned at the first machine.

Pattern mark recognition



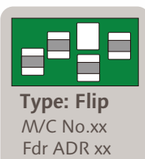
Master mark
All marks are recognized at the first machine and downstream machines only recognize master marks.

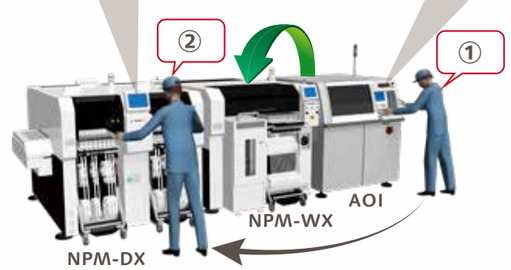
*Please refer to"Specification"booklet for details.

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

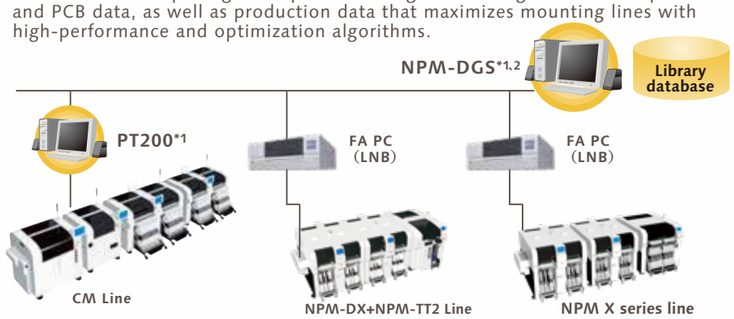




①AOI is used to pinpoint target NPM
②The target NPM is put in a warning state, and information from AOI is displayed on the screen

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.

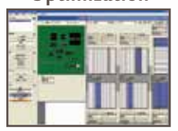


*1 : A computer must be purchased separately.
*2 : NPM-DGS has two management functions of floor and line level.

CAD import

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

Optimization

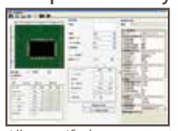


Realizes high productivity and also allows you to create common arrays.

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)

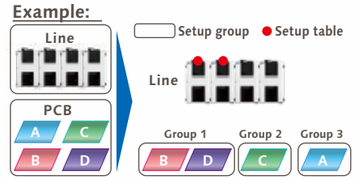
- CAD import
- Offset mark setting
- PCB chamfering
- Mounting point misalignment correction
- Job creation
- Optimization
- PPD output
- Download

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:



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.

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