Model ID	NPM-GH					
PCB dimensions	Single-lane mode	L 50 ㎜ × W50 ㎜ ～ L 510 ㎜ × W 590 ㎜ *1				
	Dual-lane mode	L 50 ㎜ × W50 ㎜ ～ L 510 ㎜ × W 300 ㎜ *1				
PCB exchange time	2.3 s (L 350 ㎜ or less)　5.0 s (L 350 ㎜ or over to L 510 ㎜ or less)　May differ depending on PCB specifications.					
Electric source	3-phase AC 200 , 220 , 380 , 400 , 420 , 480 V　2.1 kVA					
Pneumatic source *2	Min.0.5 MPa ～ Max. 0.8 MPa、200 L / min（A.N.R.）					
Dimensions *3	W 975 mm × D 2 473 ㎜ × H 1 444 ㎜ *4					
Mass *3	2 330 kg					

Placement head	FC16 head（Per head）		FC08 head（Per head）		FC03 head（Per head）	
	High production mode	High-accuracy mode 1	High production mode	High-accuracy mode 1	High production mode	High-accuracy mode 1
Max. speed *5	51 500 cph (0.069 s / chip)	37 500 cph (0.096 s / chip)	25 500 cph (0.141 s / chip)	20 500 cph (0.176 s / chip)	10 100 cph (0.356 s / chip) 7 840 cph (0.459 s / QFP)	9 000 cph (0.4 s / chip)
Placement accuracy（Cpk≧1）*5	±25 μm /chip	±15 μm /chip *6	±25 μm / chip	±15 μm /chip *6	±25 μm / chip ±20 μm / QFP *7	±15 μm / chip *6
Component dimensions (㎜)	0201 chip *8 *9 / 03015 chip *8 ～ L 10 × W 10 × T 3		0402 chip *8 ～ 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 ㎜		Tape: 4 ～ 56 / 72 / 88 / 104 ㎜
		ITF *10 cart(17-slot) specifications：Max.68				
	Stick	—		ITF *10 cart(17-slot) specifications：Max.48 *11		
	Tray	—		Max.24		

Please refer to the specification booklet for details.

*1：L＞350 mm is optional.
*2：Only for main body
*3：Machine dimensions and mass for standard configuration (NPM-GH and ITF *10 cart(17-slot) x 2). They differ depending on the optional configuration.
*4：Excluding the monitor and signal tower.
*5：Values such as the maximum takt time and placement accuracy may differ slightly depending on conditions.

*6：Accuracy valid for components 6 mm square or smaller.
*7：The placement angle recognition setting needs to be enabled.
*8：0201 / 03015 / 0402 component requires a specific nozzle / tape feeder.
*9：0201 component placement is optional. (Under conditions specified by Panasonic)
*10：Intelligent Tape Feeder
*11：When using 3-slot stick feeder

⚠ 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 IMP**ACT**

Inquiries…

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Process Automation Business Division

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

All data as of February 28, 2023
Ver.February 28, 2023

●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
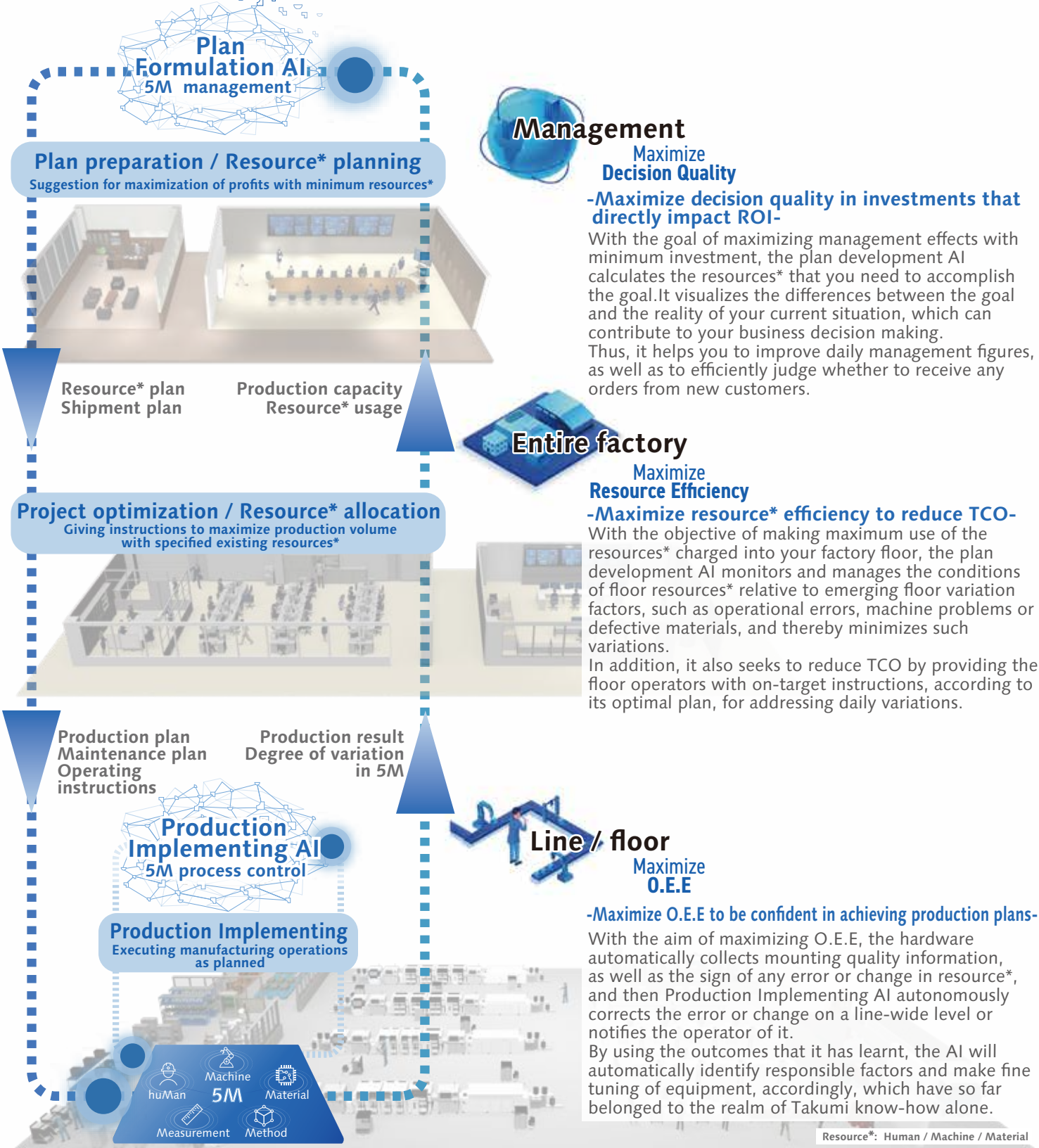# NPM-GH
Model No.NM-EJM8E

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 / Material
5M
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 One of the industry's largest alliance network

No. of companies having been actually network-connected in the past: 134 companies*

*According to a survey by us as of Feb. 2023

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

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 *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

Machine / huMan / Material
5M
Real-time Monitoring Real-timeControl
Measurement / Method

APC-5M

Maximizing O.E.E
(Overall Equipment Effectiveness)

APC-5M
Production Implementing AI *2

Status Monitoring

Corrections

huMan / Machine / Material
5M
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

NPM-GH　　Aiming for Actualization of　Autonomous Factory

NPM-GH's features
New platform to realize "Autonomous Factory"

1 The industry's top-class edge device

2 Autonomous control of variations in 5Ms

3 Departure from skill-based operations

NPM-GH

FC16 head
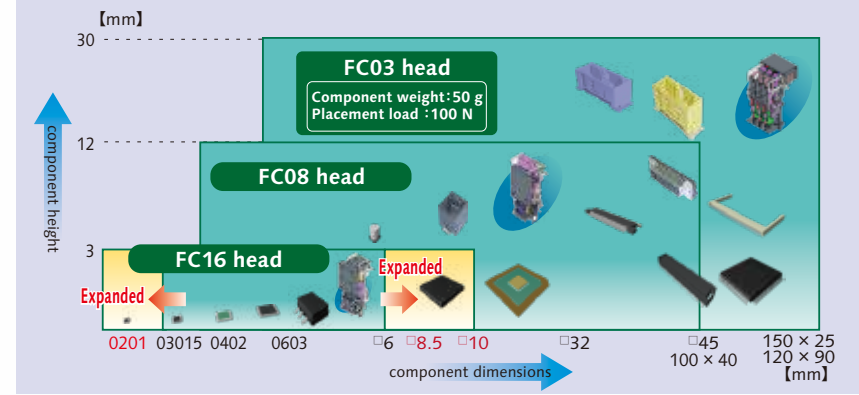FC08 head　FC03 head

1 The industry's top-class edge device

Increased productivity / quality

【High production mode】
Max.speed：103 000 cph＊
IPC9850 (1608)：74 000 cph＊
Placement accuracy：±25 μm

【High-accuracy mode 1】
Max.speed：75 000 cph＊
IPC9850 (1608)：52 000 cph＊
Placement accuracy：±15 μm

*Tact time for the machine with FC16 x 2 heads

Improved ability to support components

【mm】
30
12
3

component height

FC03 head
Component weight：50 g
Placement load：100 N

FC08 head

FC16 head

Expanded
Expanded
Expanded

0201　03015　0402　0603　□6　□8.5　□10　□32　□45　150×25
　　　　　　　　　　　　　　　　　　　　　　　　　　　100×40　120×90
component dimensions　　　　　　　　　　　　　　　　　　【mm】

Newly designed constituent units

Base	XY beam	Head	Part recognition camera
		FC16　FC08　FC03	
Greater rigidity	New vibration damping control system, a lower center of gravity	Weight reduction, reduced stroke, improved θ accuracy, improved constant load control	Reduced camera size in Y-direction, added lighting variations

Taking the concept and compatibility of NPM series

Dual lane and multi-production
Plug and play function 2-head location free

Rear supply unit
*2
待機
Feeder cart

Data creation, ITF*1 cart , tape feeder and nozzle are compatible with NPM series
Can be connected to any NPM-D, NPM-TT and / or NPM-X series

ITF*1 cart(17-slot)

Tape feeder　Thin type single tape feeder　3-slot stick feeder

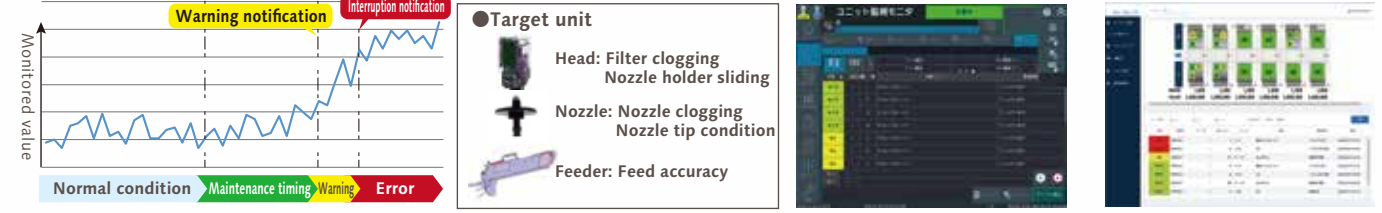Single tray feeder
(24 Component types)

*1 ：Intelligent Tape Feeder
*2 ：Machine that allows the interchangeably use of feeder cart and tray feeder is under development.

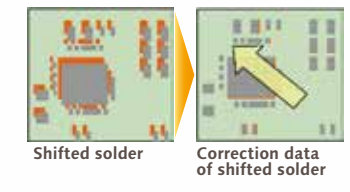**2** Autonomous control of variations in 5Ms

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.
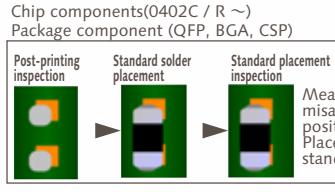
Machine screen　　　LPC screen

Monitored value

Warning notification　Interruption notification

●Target unit
Head: Filter clogging
Nozzle holder sliding

Nozzle: Nozzle clogging
Nozzle tip condition

Feeder: Feed accuracy

Normal condition　Maintenance timing　Warning　Error

| APC-FB *1 Feedback to the printing machine	APC-FF *1 Feedforward to the placement machine	APC-MFB2 Feedforward to AOI / Feedback to the placement machine
·Based on the analyzed measurement data from solder inspections, it corrects printing positions. (X，Y，θ)	· It analyzes solder position measurement data , and corrects component placement positions (X，Y，θ) accordingly. Chip components(0402C / R ～) Package component (QFP, BGA, CSP)	· 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

Post-printing inspection　Standard solder placement　Standard placement inspection

Shifted solder　Correction data of shifted solder

Measures and inspects misalignment placement position data of Placement and land standards

After reflow

Before MFB correction (shift in center of distribution)
After MFB correction shift is center of distribution

lead component　Connector
Chip component　Lower electrode component

Shift in placement position
Basic concept regarding MFB correction

MFB-ready components

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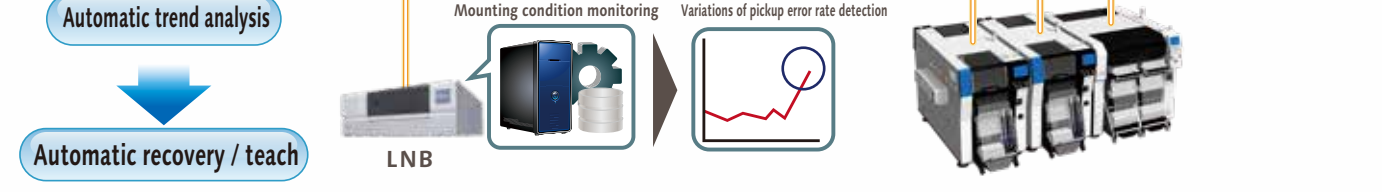
Automatic recovery option　／　Pickup position automatic teach in case of an error

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

In production　Error　Automatic feed Automatic teach　Nonstop　Production resume

Unnecessary
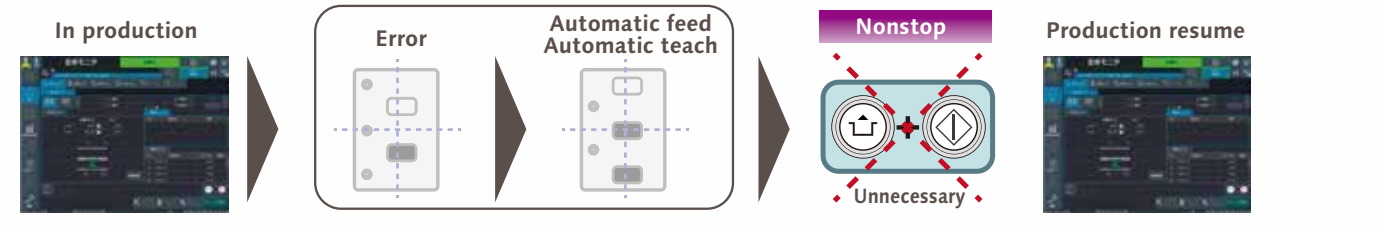
Evolved automatic recovery（predicted control）

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

Automatic trend analysis

Mounting condition monitoring　Variations of pickup error rate detection

Automatic recovery / teach　LNB

LCR checker

Nozzle

Nozzle picks up a component from feeder.

The nozzle places the component on top of the contact block. (Then, the nozzle moves away.)

*Chip component (L / C / R / D)

Component holding lever

Contact block

Value and polarity checks are performed on the component fastened in place by the holding lever.

An LCR check is performed at the start of production and during part supply or model changeover.
This makes it possible to prevent mounting of wrong parts, detect abnormal parts and trace / record the LCR values of each part.

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

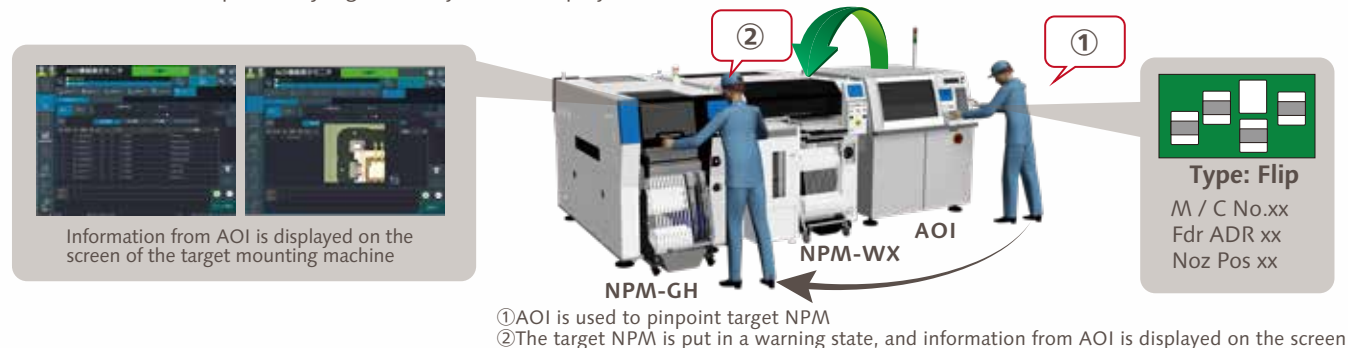## 3 Departure from skill-based operations

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.

Concentrated monitor room

Recover after teaching the pickup position by remote operation

Pickup position error

REF

Operating condition monitor

Remote operation

Recover after checking whether or not components are placed by remote operation

Component placement error

Error occurred

REF
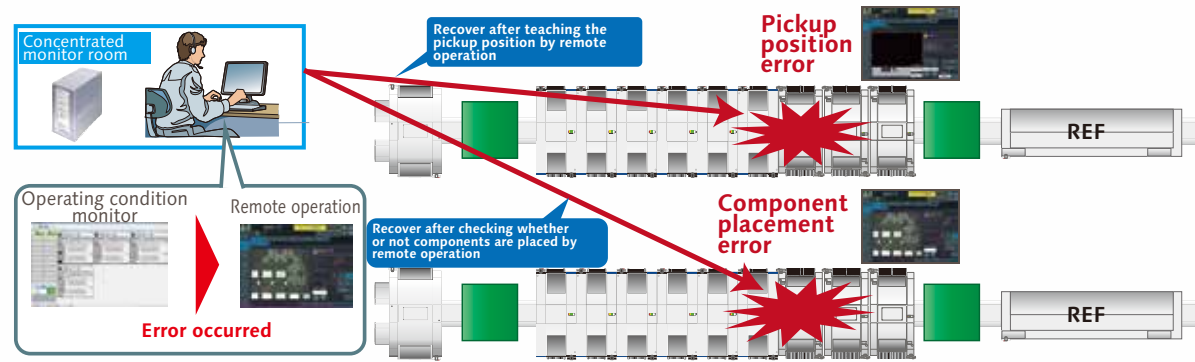
AOI Info Display option

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

② ①

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

AOI

NPM-WX

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

NPM-GH
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

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.

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 *Currently under development

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.
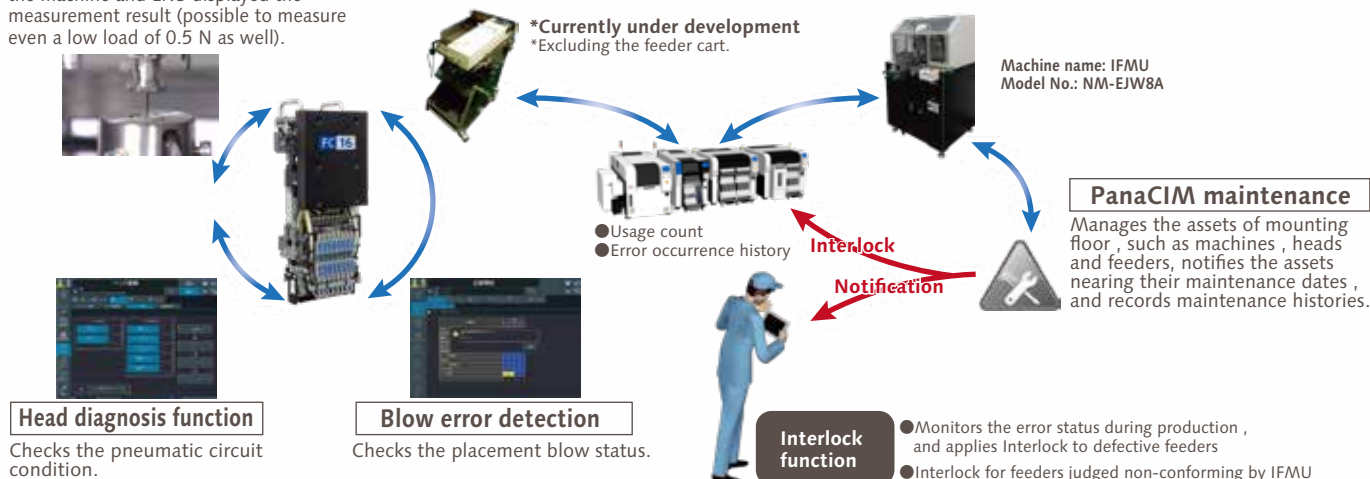
Load checker V3
Measures the "indentation load" imposed by placemen head and has the machine and LNB displayed the measurement result (possible to measure even a low load of 0.5 N as well).

Head mentenance unit
To automate the inspection and maintenance of the placement head.
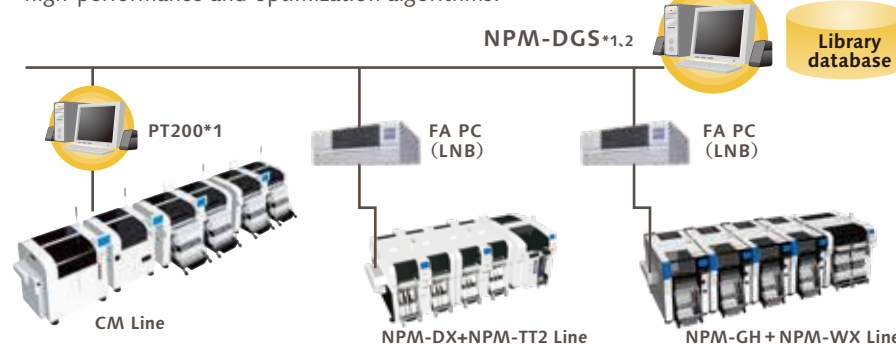
Feeder maintenance

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.

*Currently under development
*Excluding the feeder cart.

Machine name: IFMU
Model No.: NM-EJW8A

●Usage count
●Error occurrence history

Interlock

Notification

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.

Interlock function

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

Head diagnosis function
Checks the pneumatic circuit condition.

Blow error detection
Checks the placement blow status.

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.

NPM-DGS*1,2

Library database

PT200*1

FA PC（LNB）

FA PC（LNB）

CM Line

NPM-DX+NPM-TT2 Line

NPM-GH + NPM-WX Line

*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.
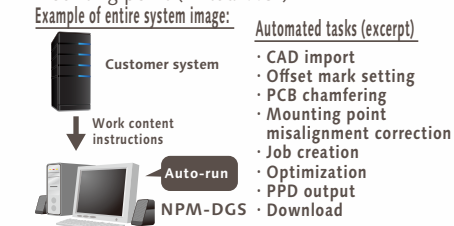
Offline Camera option

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:

Customer system

Work content instructions

Auto-run

NPM-DGS

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:

Line

Line

PCB

Setup group   ●Setup table

A   C
B   D

Group 1   Group 2   Group 3
B / D   C / A
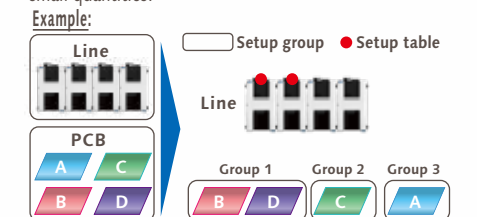
Changeover ability — Automatic changeover option

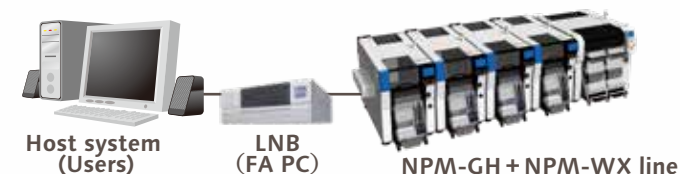Supporting changeover (production data and rail width adjustment) can minimize time loss

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

NPM-DGS

LNB（FA PC）

NPM-GH + NPM-WX line

External scanner   Head Camera   Planning form

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* and PCB information

Host system（Users）

LNB（FA PC）

NPM-GH + NPM-WX line

*Entry of component information with PanaCIM material verification or other company's component verification (this option) is required.