Model ID		NPM-W2					
Front head	Rear head	Lightweight 16-nozzle head V3A	12-nozzle head	Lightweight 8-nozzle head	3-nozzle head V2	Dispensing head	No head
Lightweight 16-nozzle head V3A		NM-EJM7D				NM-EJM7D-MD	NM-EJM7D
12-nozzle head							
Lightweight 8-nozzle head							
3-nozzle head V2							
Dispensing head		NM-EJM7D-MD				———	NM-EJM7D-D
Inspection head		NM-EJM7D-MA					NM-EJM7D-A
No head		NM-EJM7D				NM-EJM7D-D	

PCB dimensions	Single-lane *1	Batch mounting	L 50 mm × W50 mm ~ L 750 mm × W 550 mm	2-positin mounting	L 50 mm × W50 mm ~ L 350 mm × W 550 mm
	Dual-lane *1	Dual transfer (Batch)	L 50 mm × W50 mm ~ L 750 mm × W 260 mm	Dual transfer (2-positin)	L 50 mm × W50 mm ~ L 350 mm × W 260 mm
		Single transfer (Batch)	L 50 mm × W50 mm ~ L 750 mm × W 510 mm	Single transfer (2-positin)	L 50 mm × W50 mm ~ L 350 mm × W 510 mm

Electric source	3-phase AC 200 , 220 , 380 , 400 , 420 , 480 V 2.8 kVA
Pneumatic source *2	0.5 MPa , 200 L / min (A.N.R.)
Dimensions *2	W 1 280 mm *3 × D 2 332 mm *4 × H 1 444 mm *5
Mass	2 470 kg (Only for main body:This differs depending on the option configuration.)

Placement head		Lightweight 16-nozzle head V3A (Per head)		12-nozzle head (Per head)		Lightweight 8-nozzle head (Per head)	3-nozzle head V2 (Per head)
		High production mode[ON]	High production mode[OFF]	High production mode[ON]	High production mode[OFF]		
Max. speed		42 000 cph (0.086 s / chip)	35 000 cph (0.103 s / chip)	32 250 cph (0.112 s / chip)	31 250 cph (0.115 s / chip)	20 800 cph (0.173 s / chip)	8 320 cph (0.433 s / chip) 6 500 cph (0.554 s / QFP)
Placement accuracy (Cpk≧1)		± 40 μm / chip	± 30 μm / chip (± 25 μm / chip) *6	± 40 μm / chip	± 30 μm / chip	± 30 μm / chip ± 30 μm / QFP *7	± 30 μm / QFP
Component dimensions (mm)		0402 *8 chip ~ L 8.5 × W 8.5 × T 3 / T 6 *10	03015 *8 *9 / 0402 *8 chip ~ L 8.5 × W 8.5 × T 3 / T 6 *10	0402 *8 chip ~ L 12 × W 12 × T 6.5		0402 *8 chip ~ L 45 × W 45 × T 12 or L 100 × W 40 × T 12	0603 chip ~ L 120 × W 90 × T 30 / T 40 *11 or L 150 × W 25 × T 30 / T 40 *11 or L 135 × W 135 × T 13 *12
Component supply	Taping	Tape : 4 / 8 / 12 / 16 / 24 / 32 / 44 / 56 mm				Tape : 4 ~ 56 mm	Tape : 4 ~ 56 / 72 / 88 / 104 mm
		Max.120 (Tape : 4 , 8 mm)				Front / rear feeder cart specifications : Max.120 (Tape width and feeder are subject to the conditions on the left) Single tray specifications : Max.86 (Tape width and feeder are subject to the conditions on the left) Twin tray specifications : Max.60 (Tape width and feeder are subject to the conditions on the left)	
	Stick	———				Front / rear feeder cart specifications : Max.30 (Single stick feeder) Single tray specifications : Max.21 (Single stick feeder) Twin tray specifications : Max.15 (Single stick feeder)	
	Tray	———				Single tray specifications : Max.20 Twin tray specifications : Max.40	

Dispensing head		Dot dispensing	Draw dispensing
Dispensing speed		0.16 s / dot (Condition : XY = 10 mm , Z = less than 4 mm movement , No θ rotation)	4.25 s / component (Condition : 30 mm x 30 mm corner dispensing) *13
Adhesive position accuracy (Cpk≧1)		± 75 μm / dot	± 100 μm / component
Applicable components		1608 chip to SOP , PLCC , QFP , Connector , BGA , CSP	BGA 、CSP

Inspection head		2D inspection head（A）	2D inspection head（B）
Resolution		18 μm	9 μm
View size		44.4 mm × 37.2 mm	21.1 mm × 17.6 mm
Inspection processing time	Solder Inspection *14	0.35 s / View size	
	Component Inspection *14	0.5 s / View size	
Inspection object	Solder Inspection *14	Chip component : 100 μm × 150 μm or more (0603 or more) Package component : φ150 μm or more	Chip component : 80 μm × 120 μm or more (0402 or more) Package component : φ120 μm or more
	Component Inspection *14	Square chip (0603 or more) , SOP , QFP (a pitch of 0.4 mm or more) , CSP , BGA , Aluminum electrolysis capacitor , Volume , Trimmer , Coil , Connector *15	Square chip (0402 or more) , SOP , QFP (a pitch of 0.3 mm or more) , CSP , BGA , Aluminum electrolysis capacitor , Volume , Trimmer , Coil , Connector *15
Inspection items	Solder Inspection *14	Oozing , blur , misalignment , abnormal shape , bridging	
	Component Inspection *14	Missing , shift , flipping , polarity , foreign object inspection *16	
Inspection position accuracy (Cpk≧1) *17		± 20 μm	± 10 μm
No. of inspection	Solder Inspection *14	Max. 30 000 pcs. / machine (No. of components : Max. 10 000 pcs. / machine)	
	Component Inspection *14	Max. 10 000 pcs. / machine	

* Placement tact time,inspection time and accuracy values may differ slightly depending on conditions
*Please refer to the specification booklet for details.
*1 : Please consult us separately should you connect it to NPM-D3 / D2 / D. It cannot be connected to NPM-TT and NPM.
*2 : Only for main body
*3 :1 880 mm in width if extension conveyors (300 mm) are placed on both sides.
*4 : Dimension D including tray feeder : 2 570 mm Dimension D including feeder cart : 2 465 mm
*5 : Excluding the monitor , signal tower and ceiling fan cover.

*6 : ±25 μm placement support option. (Under conditions specified by Panasonic)
*7 : The placement angle recognition setting needs to be enabled.
*8 : The 03015 / 0402 chip requires a specific nozzle / feeder.
*9 : Support for 03015 mm chip placement is optional. (Under conditions specified by Panasonic : Placement accuracy ±30 μm / chip)
*10 : T 6 needs dedicated short nozzles and is □6.5 mm or less.
*11 : T 40 is option.(PCB thickness + Max component height ≦ T48; so, for T40, the max PCB thickness is 8.0 mm)
*12 : □135 mm is option.
*13 : A PCB height measurement time of 0.5 seconds is included.

*14 : One head cannot handle solder inspection and component inspection at the same time.
*15 : Please refer to the specification booklet for details.
*16 : Foreign object is available to chip components. (Excluding 03015 mm chip)
*17 : This is the solder inspection position accuracy measured by our reference using our glass PCB for plane calibration. It may be affected by sudden change of ambient temperature.

⚠ 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**

● 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

Production Modular
Electronics Assembly System
Catalogue

NPM
NEXT PRODUCTION MODULAR

Manufacturing Process Innovation

Model ID **NPM-W2**

Model No.NM-EJM7D
Model No.NM-EJM7D-MD   Model No.NM-EJM7D-D
Model No.NM-EJM7D-MA   Model No.NM-EJM7D-A

*Photograph is NM-EJM7D

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
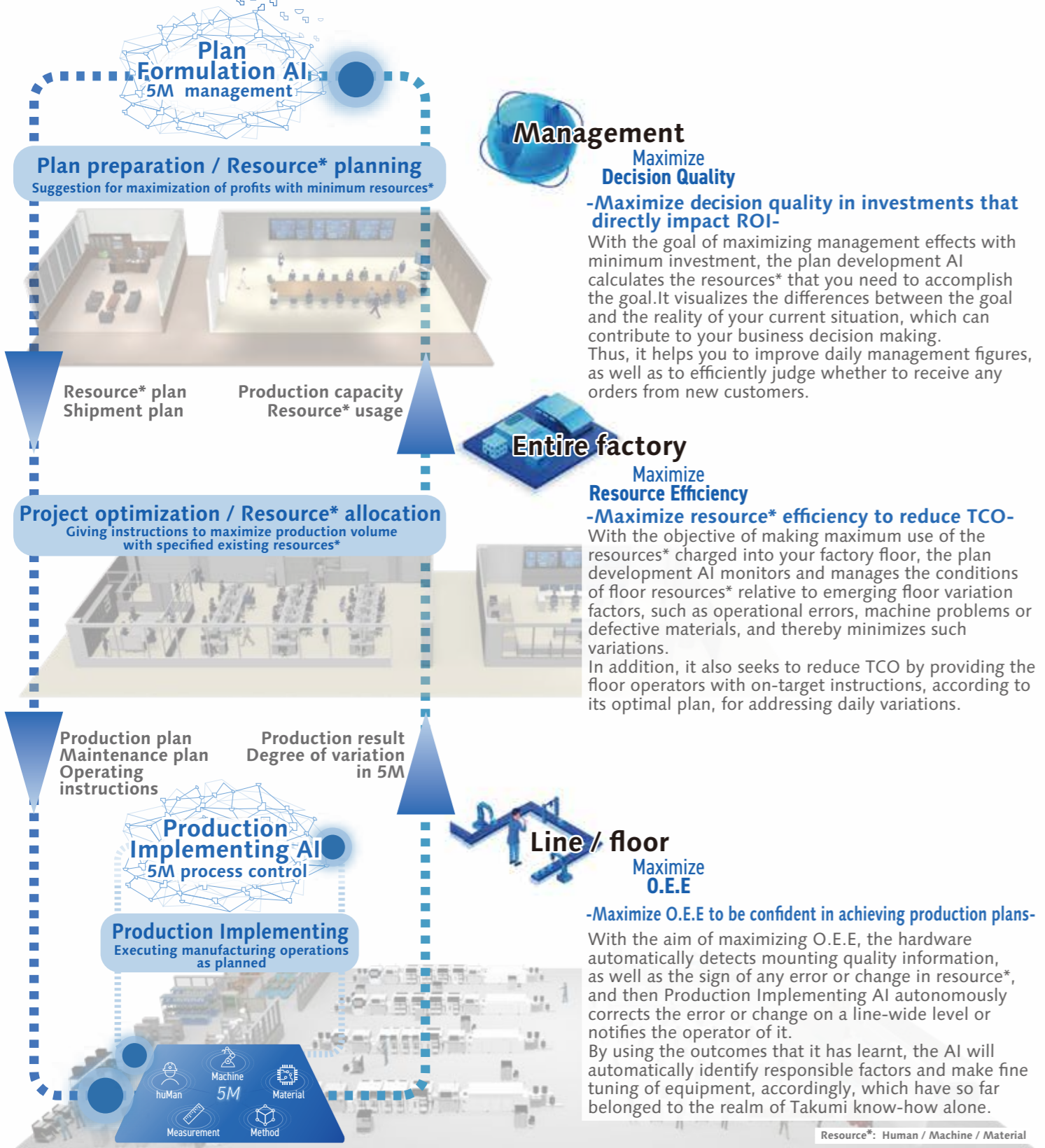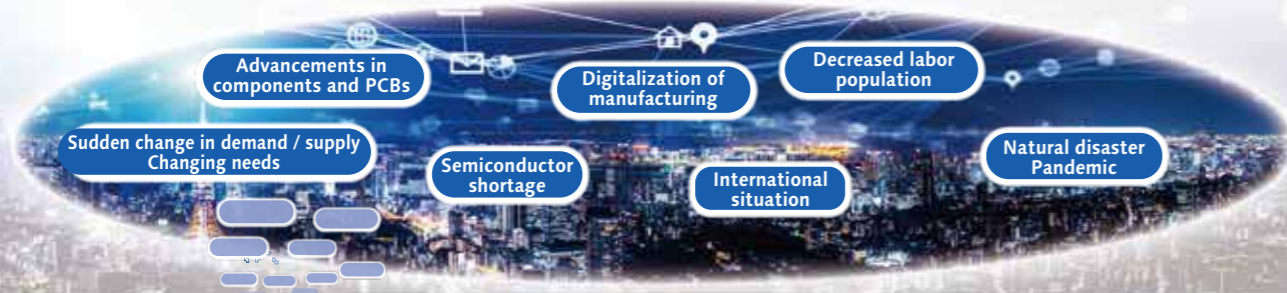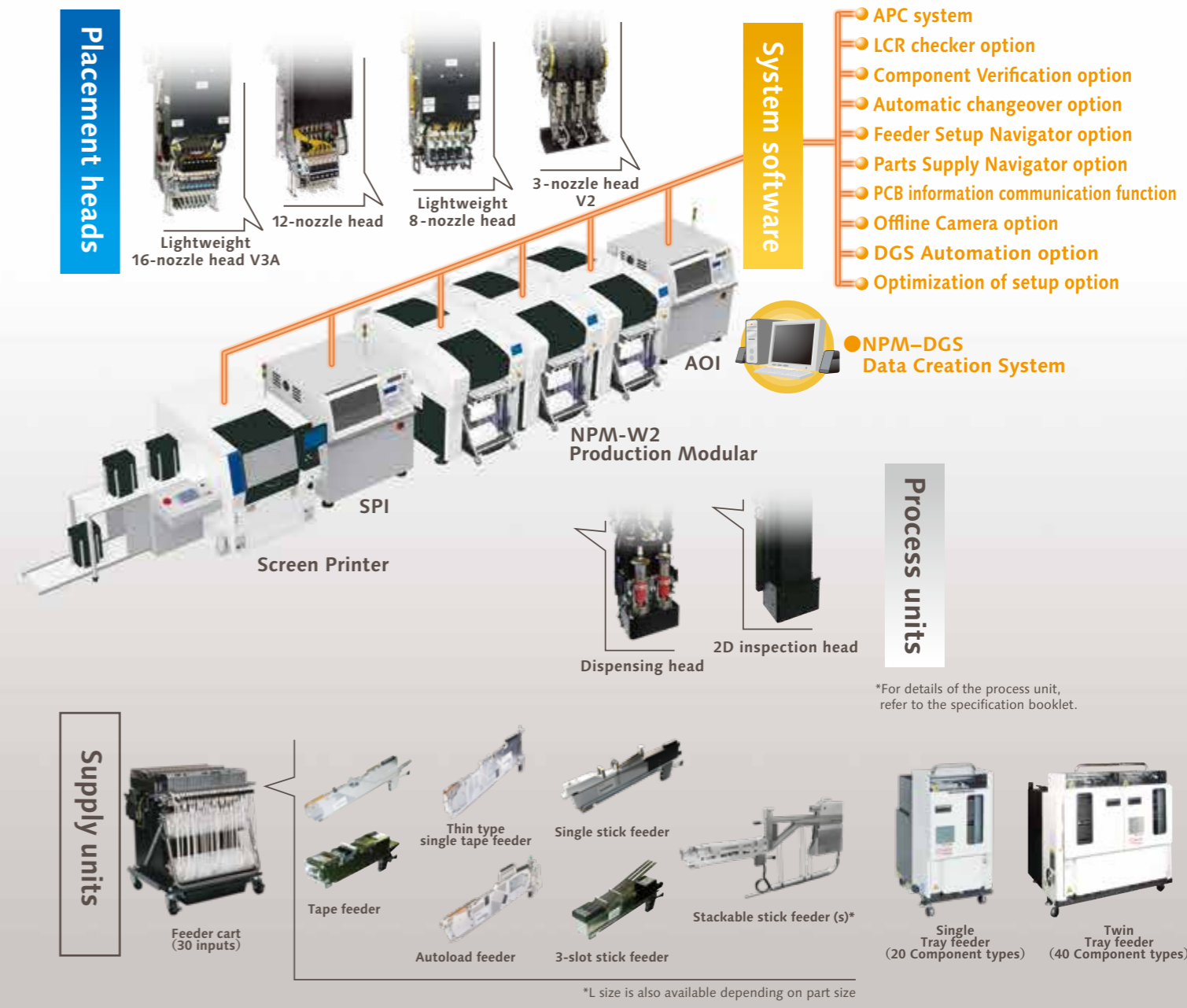
Advancements in components and PCBs

Digitalization of manufacturing

Decreased labor population

Sudden change in demand / supply Changing needs

Semiconductor shortage

International situation

Natural disaster Pandemic

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.

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

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.

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.

huMan
Machine
Material
5M
Measurement
Method

Resource*: Human / Machine / Material

NPM NEXT PRODUCTION MODULAR
System evolution according to mounting changes Production Modular

1 Higher productivity and quality with printing, placement and inspection process integration
Depending on the PCB you produce , you can select High-speed mode or High-accuracy mode.

2 For larger boards and larger components
PCBs up to a size of 750 × 550 mm with component range up to L 150 × W 25 × T 30 mm
The range of available components can be further broadened optionally.

3 Higher area productivity through dual lane placement
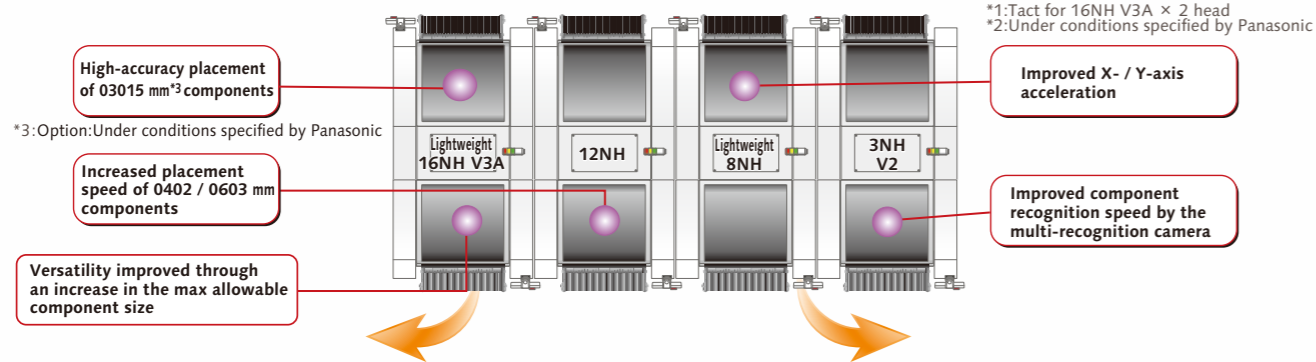Depending on the PCB you produce, you can select an optimal placement mode – "Independent""Alternate"or"Hybrid"

Placement heads

Lightweight 16-nozzle head V3A

12-nozzle head

Lightweight 8-nozzle head

3-nozzle head V2

System software
- APC system
- LCR checker option
- Component Verification option
- Automatic changeover option
- Feeder Setup Navigator option
- Parts Supply Navigator option
- PCB information communication function
- Offline Camera option
- DGS Automation option
- Optimization of setup option

AOI

● NPM–DGS
Data Creation System

NPM-W2
Production Modular

SPI

Screen Printer

Dispensing head

2D inspection head

Process units

*For details of the process unit, refer to the specification booklet.

Supply units

Feeder cart (30 inputs)

Tape feeder

Thin type single tape feeder

Single stick feeder

Autoload feeder

3-slot stick feeder

Stackable stick feeder (s)*

Single Tray feeder (20 Component types)

Twin Tray feeder (40 Component types)

*L size is also available depending on part size

Higher area productivity through dual lane placement
# Placement Heads

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Features

Simultaneous realization of high area productivity and high-accuracy placement

◆ **High production mode** (High production mode: ON)

Max. speed: 84 000 cph*1 (IPC9850（1608）：61 200 cph*1) / Placement accuracy: ±40 µm

◆ **High accuracy mode** （High production mode : OFF）

Max. speed : 70 000 cph*1 / Placement accuracy : ±30 µm（Option：±25 µm*2）

*1:Tact for 16NH V3A × 2 head
*2:Under conditions specified by Panasonic

High-accuracy placement of 03015 mm*3 components

*3:Option:Under conditions specified by Panasonic

Increased placement speed of 0402 / 0603 mm components

Versatility improved through an increase in the max allowable component size

Lightweight 16NH V3A | 12NH | Lightweight 8NH | 3NH V2

Improved X- / Y-axis acceleration

Improved component recognition speed by the multi-recognition camera

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Lightweight 16NH V3A

The introduction of lightweight 16NH V3A allows the X- and Y-axes to be driven simultaneously during parts recognition , thus improving placement takt through optimal routing.

Multi-recognition camera
Feeder
Multi-recognition camera
Feeder
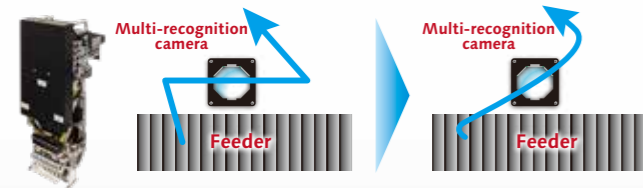
Multi-recognition camera

· Three recognition functions combined into one camera
· Faster recognition scan including components height detection
· Upgradable from 2D to 3D specifications

Multi-recognition camera

Conventional recognition camera

Line camera + Vertical line camera（OP) + 3D sensor (OP)
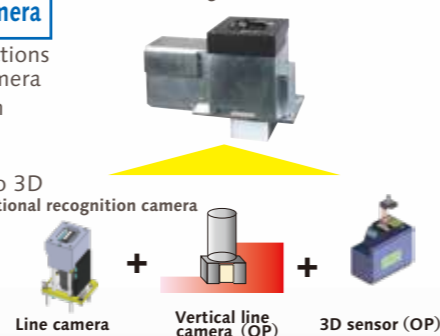
Machine Configuration

Rear & Front Feeder Layout

TF30

TF30
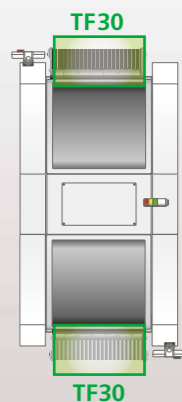
60 different components can be mounted from 16 mm tape feeders.

Single Tray Layout

TF13 Tray 20

TF30

Multi-functional transfer unit
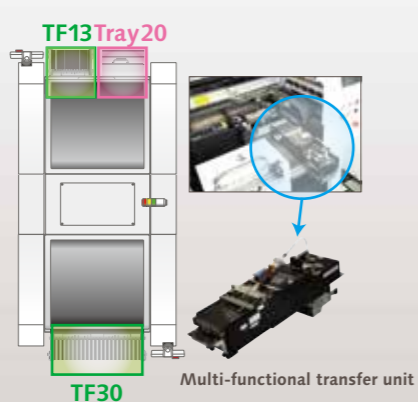
13 fixed feeder slots are available. PoP tray mounting is possible via a transfer unit.

Twin Tray Layout

Twin Tray 20+20

Production | Preparation

TF30
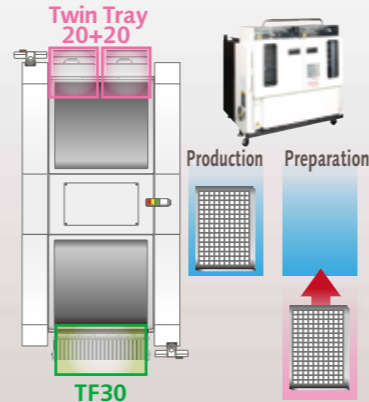
While one tray is used for production, the other tray can simultaneously be used to setup the next production in advance.
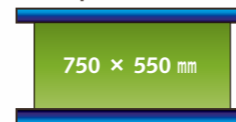
Automation units

Feeder maintenance unit

*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".

Head maintenance unit
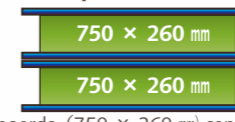

Versatility

Large Board

Single-lane specifications (Selection spec.)

750 × 550 mm

Large Board up to 750 × 550 mm can be handled

Dual-lane specifications (Selection spec.)

750 × 260 mm
750 × 260 mm

Large boards（750 × 260 mm）can be handled collectively.
Boards（up to a size of 750 × 510 mm）can be handled collectively during single transfer.

Large Components

Compatible to component sizes up to 135 × 135 mm(option)

Max. placement load 100 N

Multi-FunctionalHead （3 Nozzle Head V2）

3NH V2
Component weight：30 g 300g(option) Placement load : 100 N

Lightweight 8NH

12NH

Lightweight 16NH V3A ショートノズル Expanded

Expanded

option option

03015 0402 0603 □6 □8.5 □12 □32 □45 150×25 135×135
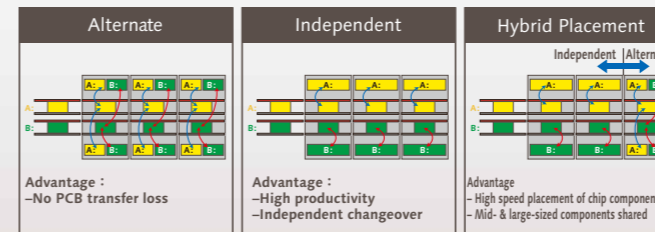100 × 40 120×90
[mm]

component dimensions
component height
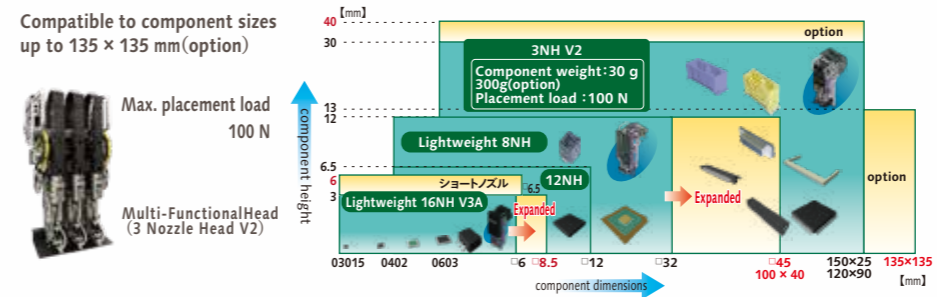
High productivity ／ Employs dual mounting method
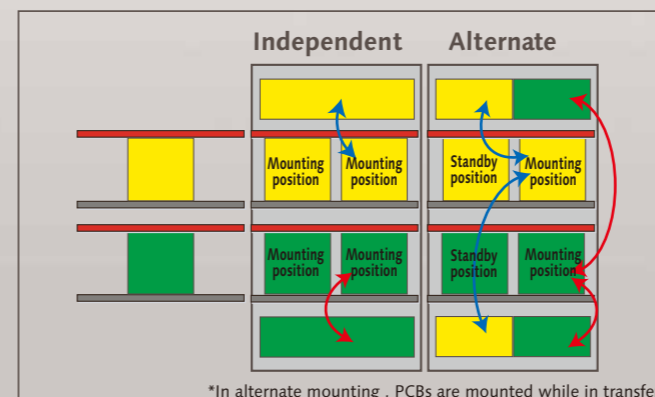
Alternate,Independent & Hybrid Placement

Selectable "Alternate" and "Independent" dual placement method allows you to make good use of each advantage.

· Alternate:Front and rear heads execute placement on PCBs in front and rear lanes alternately.
· Independent:Front head executes placement on PCB in front lane and rear head execute placement on rear lane.

Alternate	Independent	Hybrid Placement
		Independent ｜Alternate

Advantage :
–No PCB transfer loss

Advantage :
–High productivity
–Independent changeover

Advantage
– High speed placement of chip components
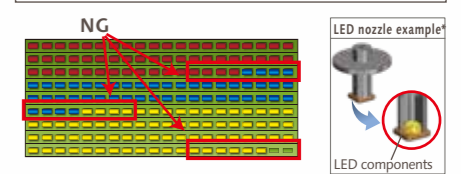– Mid- & large-sized components shared

PCB exchange time reduction

Two PCBs can be clamped on one stage (PCB length: 350 mm or less).And Higher productivity can be realized by reducing PCB exchange time.

Independent | Alternate

Mounting position | Mounting position | Standby position | Mounting position
Mounting position | Mounting position | Standby position | Mounting position

*In alternate mounting , PCBs are mounted while in transfer.

LED Placement

Brightness Binning

NG

LED nozzle example*

LED components

Avoid mixing of brightness and minimizes component and block disposal.
Monitors remaining component count to avoid component exhaust during operation.

*Please ask us for nozzles that support LED components of various shapes

Other functions

· Global bad mark recognition function
  Reduces in travel / recognition time to recognize bad marks
· PCB standby between machines
  (with the extension conveyor attached)
  Minimizes the PCB（750 mm）change time

Independent changeover

In the independent mode, you can conduct a changeover on one lane while production continues on the other lane.You can exchange the feeder cart during the production also with Independent changeover unit (option). It supports automatic support pin replacement (option) and an automatic changeover (option) so that it provides the best changeover for your production type.

Production

Changeover

A: A: A:
B: B: B:
C: C: C:

Feeder cart exchange during the production(Option)
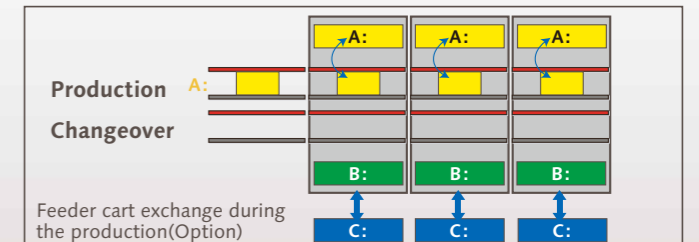
Automatic replacement of support pins (option)

Automate position change of support pins to enable non-stop changeover and help save man-power and operation errors.

Quality improvement

Placement height control function

Based on PCB warpage condition data and thickness data of each of the components to be placed, the control of placement height is optimized to improve mounting quality .

Operating rate improvement

Feeder location free

Within same table, feeders can be set anywhere.
Alternate allocation as well as setting of new feeders for next production can be done while the machine is in operation.

Feeders will require off-line data input by support station (option).

NPM
NEXT PRODUCTION MODULAR,

Total management by system software
System Software

High-quality placement / APC system

Controls variations in PCBs and components, etc. on a line basis to achieve quality production.

APC-FB *1
Feedback to the printing machine

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

Shifted solder | Correction data of shifted solder

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)

Post-printing inspection → Standard solder placement → Standard placement inspection

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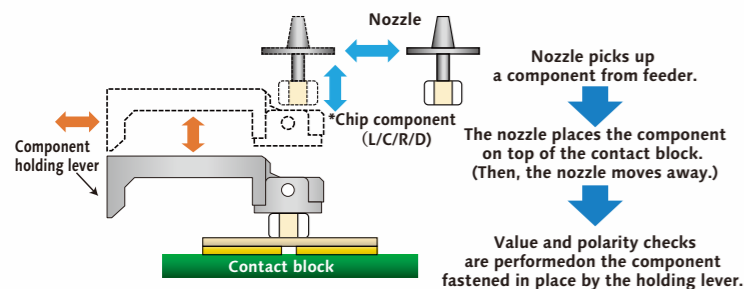
After reflow

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

· Position inspection on APC offset 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

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

Shift in placement position
Basic concept regarding MFB correction

lead component
Connector
Chip component
Lower electrode component
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.)

Misplacement prevention / LCR checker option

Nozzle

Nozzle picks up a component from feeder.

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

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

Component holding lever

Contact block

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

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.

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

●**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.

*Wireless scanners and other accessories to be provided by customer

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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.

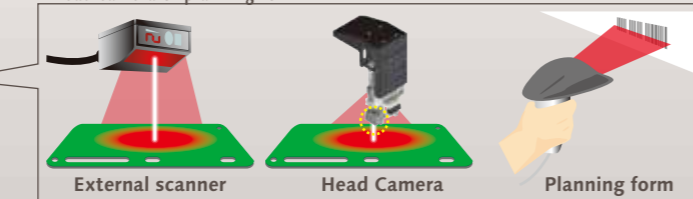
Changeover ability / Automatic changeover option

Supporting changeover (production data and rail width adjustment) can minimize time loss
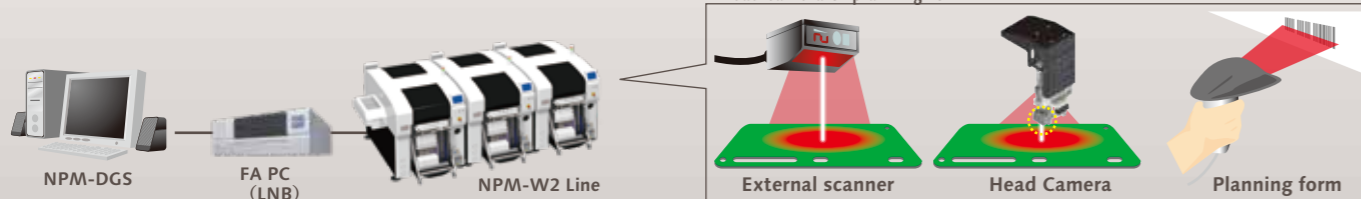
●**PCB ID read-in type**
PCB ID read-in function is selectable from among 3 types of external scanner , head camera or planning form

NPM-DGS → FA PC (LNB) → NPM-W2 Line

External scanner | Head Camera | Planning form

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.

1 Gross Production Time Estimate

Production completion time is estimated based on setup time and available human resource

2 Feeder preparation process instructions

Off-line Preparation Area
Kitting Area
Picking
Reuse
Production Line
Loading

Instructs cart/machine preparation process in three steps: load, remove, and relocate

3 Instruction Display on Tablet Device

Kitting Area
Off-line Preparation Area
Production Line

Instructions can be checked from anywhere

Operating rate improvement / Parts 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

List of components to be supplied by Operator A
List of components to be supplied by Operator B

Components are supplied per operator to prevent any overlaps.

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

## PCB information communication function

Information of mark recognitions done on first NPM machine in line is passed on to downstream NPM machines.
Which can reduce cycle time utilizing the transferred information.
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.
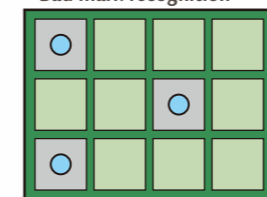
Pattern mark recognition
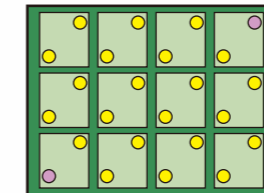
●Master mark
All marks are recognized at the first machine and downstream machines only recognize master marks.

Mark recognition

*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.

NPM-DGS*1.2
Library database

PT200*1
FA PC (LNB)
FA PC (LNB)

CM Line
NPM-W2 Line
NPM-W2 Line
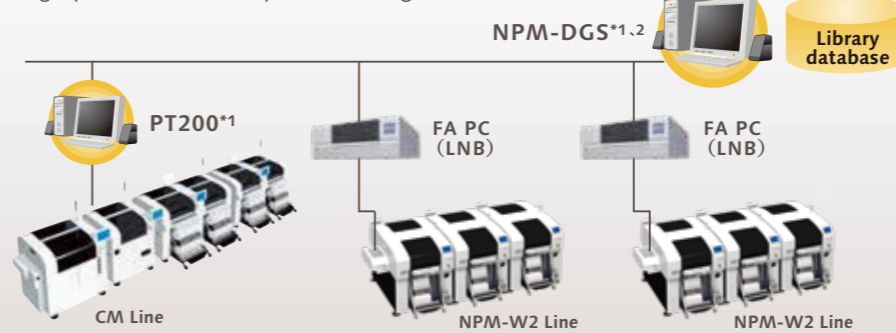
*1 : A computer must be purchased separately.
*2 : NPM-DGS has two management functions of floor and line level.

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.
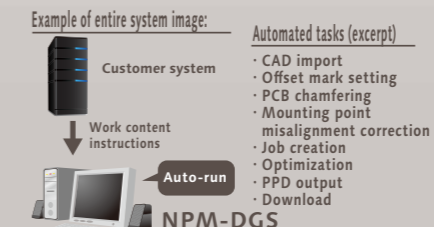

Offline Camera（option）

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 supply 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:

□ Setup group ● Setup table

Line
PCB
A C
Line
Group 1 Group 2 Group 3