Our Solutions, Your Value

Model ID		NPM-D3					
Front head	Rear head	Lightweight 16-nozzle head	12-nozzle head	8-nozzle head	2-nozzle head	Dispensing head	No head
Lightweight 16-nozzle head		NM-EJM6D				NM-EJM6D-MD	NM-EJM6D
12-nozzle head							
8-nozzle head							
2-nozzle head							
Dispensing head		NM-EJM6D-MD				———	NM-EJM6D-D
Inspection head		NM-EJM6D-MA					NM-EJM6D-A
No head		NM-EJM6D				NM-EJM6D-D	

PCB dimensions*1	Dual-lane mode	L 50 mm × W 50 mm ~ L 510 mm × W 300 mm	PCB exchange time	Dual-lane mode	0 s* *No 0s when cycle time is 3.6 s or less
	Single-lane mode	L 50 mm × W 50 mm ~ L 510 mm × W 590 mm		Single-lane mode	3.6 s* *When selecting short conveyors
Electric source		3-phase AC 200, 220, 380, 400, 420, 480 V 2.7 kVA			
Pneumatic source *2		0.5 MPa、100 L /min (A.N.R.)			
Dimensions *2		W 832 mm × D 2 652 mm*3 × H 1 444 mm*4			
Mass		1 680 kg (Only for main body:This differs depending on the option configuration.)			

Placement head

Placement head		Lightweight 16-nozzle head (With Dual Heads)		12-nozzle head (With Dual Heads)	8-nozzle head (With Dual Heads)	2-nozzle head (With Dual Heads)
		High production mode[ON]	High production mode[OFF]			
Placement speed	Max. speed	84 000 cph(0.043 s/ chip)	76 000 cph(0.047 s/ chip)	69 000 cph(0.052 s/ chip)	43 000 cph(0.084 s/ chip)	11 000 cph(0.327 s/ chip) 8 500 cph(0.423 s/ QFP)
	IPC9850 (1608)	63 300 cph *5	57 800 cph *5	50 700 cph *5	—	—
Placement accuracy(Cpk≧1)		±40 μm / chip	±30 μm / chip (±25 μm / chip) *6	±30 μm / chip	±30 μm/ chip ±30 μm/QFP □12 mm ~ □32 mm ±50 μm/QFP □12 mm Under	±30 μm / QFP
Component dimensions (mm)		(01005") 0402 chip *7 to L 6 × W 6 × T 3	03015 *7*8 / (01005") 0402 chip *7 to L 6 × W 6 × T 3	(01005") 0402 chip *7 to L 12 × W 12 × T 6.5	(01005") 0402 chip *7 to L 32 × W 32 × T 12	(0201") 0603 chip to L 100 × W 90 × T 28

Component supply	Taping	Tape:8 / 12 / 16 / 24 / 32 / 44 / 56 mm 8 mm tape : Max. 68 (8 mm thin type single feeder, double tape feeder, small reel)	Tape : 8 to 56 / 72 / 88 / 104 mm
	Stick,Tray	———	Stick:Max.8 , Tray :Max. 20 (per tray feeder)

Dispensing head

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	SOP,PLCC,QFP,Connector,BGA,CSP

Inspection head

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 *9	0.35s/ View size	
	Component Inspection *9	0.5s/ View size	
Inspection object	Solder Inspection *9	Chip component : 100 μm × 150 μm or more((0201")0603 mm or more) Package component : φ150 μm or more	Chip component : 80 μm × 120 μm or more ((01005")0402 mm or more) Package component : φ120 μm or more
	Component Inspection *9	Square chip ((0201")0603 mm or more), SOP, QFP (a pitch of 0.4 mm or more), CSP, BGA,Aluminum electrolysis capacitor, Volume, Trimmer, Coil, Connector *10	Square chip ((01005")0402 mm or more), SOP, QFP (a pitch of 0.3 mm or more), CSP, BGA,Aluminum electrolysis capacitor, Volume, Trimmer, Coil, Connector *10
Inspection items	Solder Inspection *9	Oozing, blur, misalignment, abnormal shape, bridging	
	Component Inspection *9	Missing, shift, flipping, polarity, foreign object inspection *11	
Inspection position accuracy (Cpk≧1)*12		± 20 μm	± 10 μm
No. of inspection	Solder Inspection *9	Max. 30 000 pcs./machine (No. of components : Max. 10 000 pcs./machine)	
	Component Inspection *9	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: Due to a difference in PCB transfer reference. a direct connection with NPM (NM-EJM9B) / NPM-W (NM-EJM2D) dual lane specs cannot be established.
*2 : Only for main body
*3 : Dimension D including tray feeder : 2 683 mm Dimension D including feeder cart : 2 728 mm

*4 : Excluding monitor and signal tower
*5 : It is the reference value of the tact time by the IPC9850 conformity. (The independent mode)
*6 : ±25 μm placement support option. (Under conditions specified by PFSC)
*7 : The 03015/0402 mm chip requires a specific nozzle/feeder.
*8 : Support for 03015 mm chip placement is optional. (Under conditions specified by PSFC : Placement accuracy ±30 μm / chip)

*9 : One head cannot handle solder inspection and component inspection at the same time.
*10 : Please refer to the specification booklet for details.
*11 : Foreign object is available to chip components. (Excluding 03015 mm chip)
*12 : 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.
*13 : A PCB height measurement time of 0.5s is included.

⚠ 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.
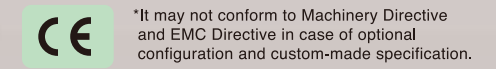
Panasonic®

NPM
NEXT PRODUCTION MODULAR

Manufacturing Process Innovation

Model Name **NPM-D3**

Model No.NM-EJM6D
Model No.NM-EJM6D-MD   Model No.NM-EJM6D-D
Model No.NM-EJM6D-MA   Model No.NM-EJM6D-A

LNB conveyor + 3 production modulars in-line setup

CE

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

NPM NEXT PRODUCTION MODULAR
System evolution according to mounting changes NEW CONCEPT MACHINE

1 High area productivity with total mounting lines

Higher productivity and quality with printing, placement and inspection process integration
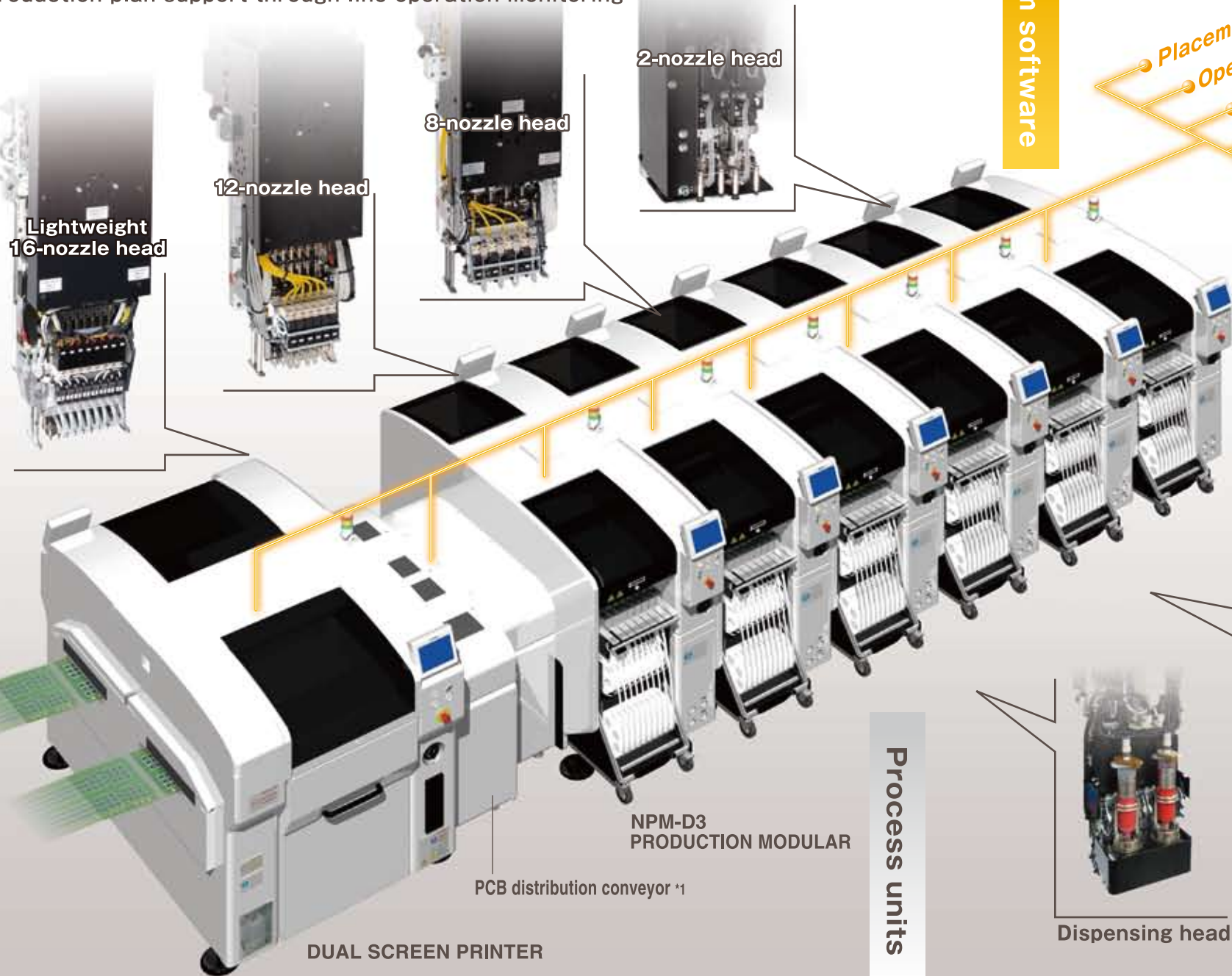
2 Configurable modules allow flexible line setup

Head location flexibility with plug-and-play functions

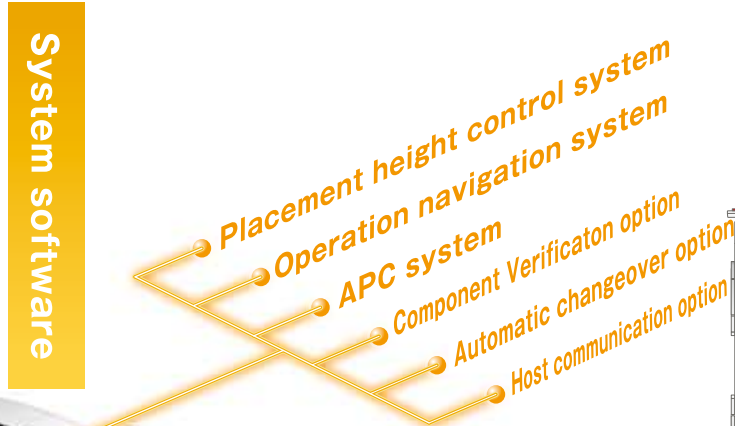**3** Comprehensive control of lines, floor and factory with system software

Production plan support through line operation monitoring

Total line solution

Smaller-footprint modular lines by installing inspection heads

Provides high-quality manufacturing with in-line inspection

- 16 ⋯ Lightweight 16-nozzle head
- 12 ⋯ 12-nozzle head
- 8 ⋯ 8-nozzle head
- 2 ⋯ 2-nozzle head
- ADH ⋯ Adhesive dispensing head
- SPI ⋯ Solder Inspection
- AOI ⋯ Component Inspection

DUAL SCREEN PRINTER

PCB distribution conveyor*1

16 12 8 2

SPI 16 ADH AOI

SPI ⇒ Feedback to the printer*2   SPI ⇒ Feed-forward to the placement head and AOI

Placement heads

- Lightweight 16-nozzle head
- 12-nozzle head
- 8-nozzle head
- 2-nozzle head

System software

- Placement height control system
- Operation navigation system
- APC system
- Component Verificaton option
- Automatic changeover option
- Host communication option

● NPM-DGS
Data Creation System

Multi-Production Line

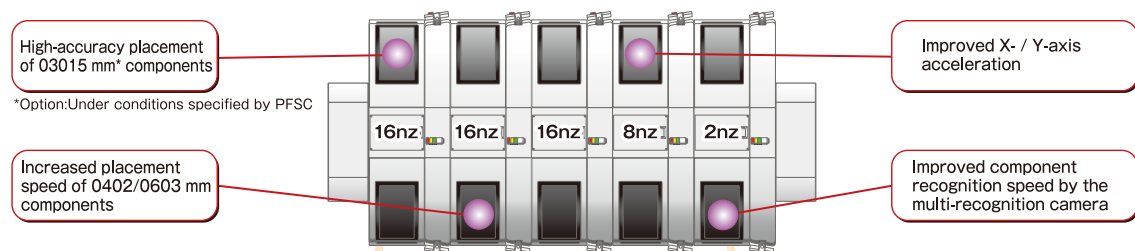Mixed production with different type substrates on the same line is also provided with the dual conveyor.

NPM-D3

PCB distribution conveyor *1
DUAL SCREEN PRINTER

Dual printer

NPM-D3
PRODUCTION MODULAR

PCB distribution conveyor *1

DUAL SCREEN PRINTER

Process units

Dispensing head

2D inspection head

Supply units

Feeder cart
(17 inputs)

Tray feeder
(20 Component types)

8 mm thin type
single feeder
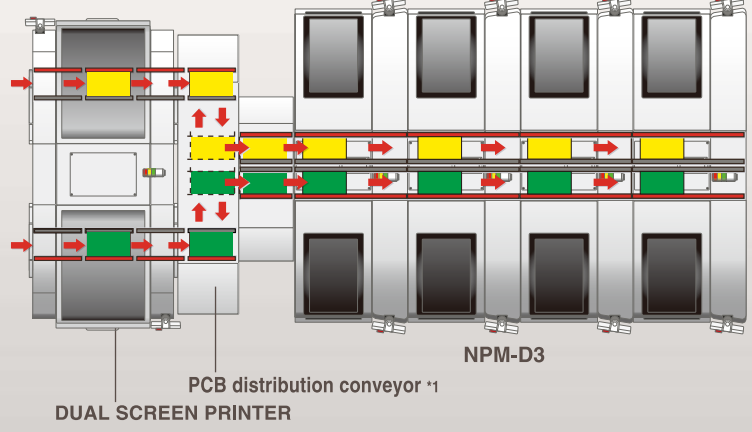
*1:Please prepare the PCB distribution conveyor from other companies
*2:SPD,SP70 can be connected to APC system

NPM NEXT PRODUCTION MODULAR | Higher area productivity through dual lane placement
Placement Heads

NPM NEXT PRODUCTION MODULAR | In-line dispensing, inspection achieve high-quality mounting
Dispense & Inspection Head

Features
Simultaneous realization of high area productivity and high-accuracy placement

◆**High production mode : 20 % increase in productivity / equal placement accuracy** (as compared to NPM-D2)
(High production mode: ON)
Max. speed: 84 000 cph / Placement accuracy: ±40 μm (Cpk ≧ 1)

◆**High accuracy mode : 9% increase in productivity / 25% increase in placement accuracy** (as compared to NPM-D2)
(High production mode : OFF)
ax. speed: 76 000 cph / Placement accuracy: ±30 μm : ±30μm (Option : ±25μm*) *Under conditions specified by PFSC

High-accuracy placement of 03015 mm* components
*Option:Under conditions specified by PFSC

Increased placement speed of 0402/0603 mm components

16nz | 16nz | 16nz | 8nz | 2nz

Improved X- / Y-axis acceleration

Improved component recognition speed by the multi-recognition camera

New placement head
· lightweight 16-nozzle head

New high-rigidity base
· High rigidity base supporting high-speed / accuracy placement

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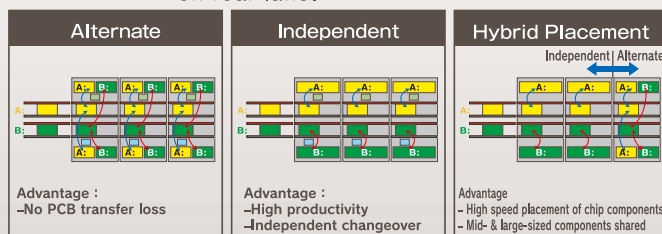· Upgradable from 2D to 3D specifications

Multi-recognition camera

Conventional recognition camera
Line camera + Vertical line camera (OP) + 3D sensor (OP)
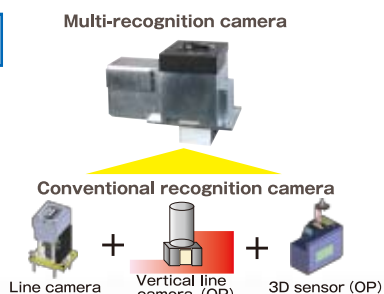
High productivity / Employs dual mounting method

Alternate,Independent & Hybrid Placement
Selectable "Alternate" and "Independent" dual placement method allows you to make good use of each advantage.
· A l t e r n a t e :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

High productivity through fully independent placement
Achieved independent placement of tray components by directly linking with NPM-TT.
Capable of fully independent placement of tray components improving cycle time of mid-, large-size component placement with 3-nozzle head. Output of entire line is enhanced.

NPM-D3 NPM-TT
PCB distribution conveyor
Dual Screen Printer
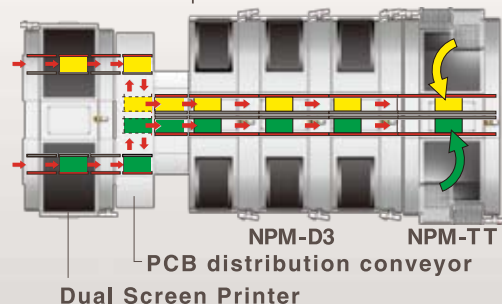
PCB exchange time reduction
Allow standby PCB with less than L=250mm* at upstream conveyor inside machine to reduce PCB exchange time and improve productivity. *When selecting short conveyors

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).

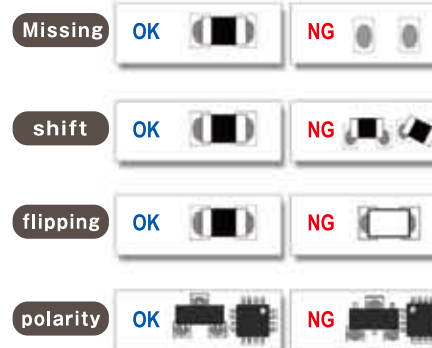## Solder Inspection (SPI)・Component Inspection (AOI) / Inspection head
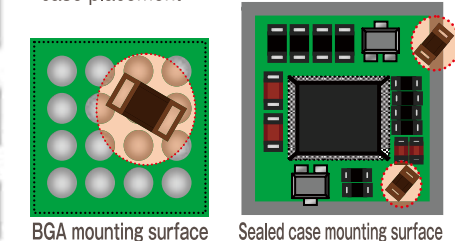
Solder Inspection
· Solder appearance inspection

	OK	NG
Oozing	OK	NG
blur	OK	NG
misalignment	OK	NG
abnormal shape	OK	NG
bridging	OK	NG
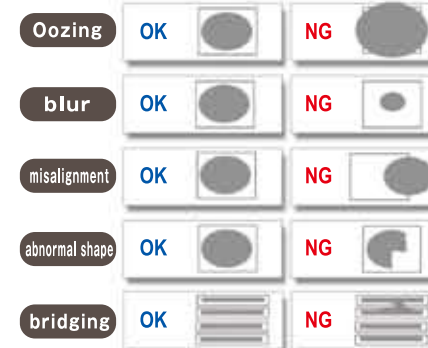
Mounted component Inspection
· Appearance inspection of mounted components

|	OK	NG
Missing	OK	NG
shift	OK	NG
flipping	OK	NG
polarity	OK	NG

Pre-mounting foreign object[*1] inspection
· Pre-mounting foreign object inspection of BGAs
· Foreign object inspection right before sealed case placement

BGA mounting surface | Sealed case mounting surface

*1: Intended for chip components (except for 03015 mm chip).

SPI and AOI automatic switching
· Solder and component inspection is switched automatically according to production data.

SPI | AOI
SPI | AOI
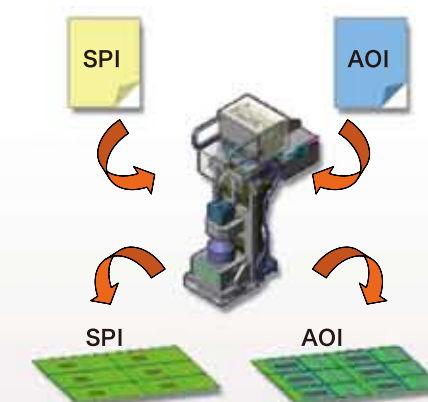
Unification of inspection and placement data
· Centrally managed component library or coordinate data does not require two data maintenance of each process.

DB
Solder inspection data
Placement data
Component inspection data
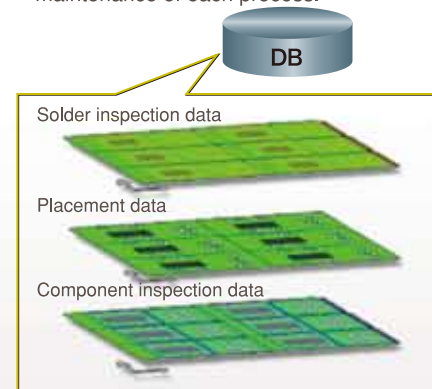
Automatic link to quality information
· Automatically linked quality information of each process assists your defect cause analysis.

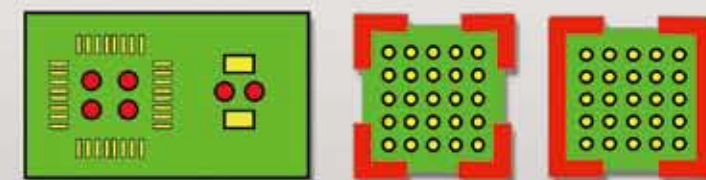SPI | Mount | AOI
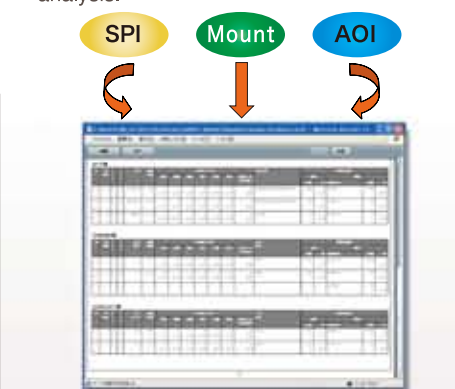
Adhesive Dispensing / Dispensing head

Screw-type discharge mechanism
· Panasonic's NPM has the conventional HDF discharge mechanism, which ensures the high-quality dispensing.

Supports various dot/drawing dispensing patterns

①Misalignment prevention of the large-sized component at board transferring
②Drop prevention of the back side component at reflowing
③Adhesive reinforcement of BGA and CSP*

① | ② | ③Corner adhesive
BGA,CSP

· High accuracy sensor (option) measures local PCB height to calibrate dispensing height, which allows for non-contact dispensing on PCB.
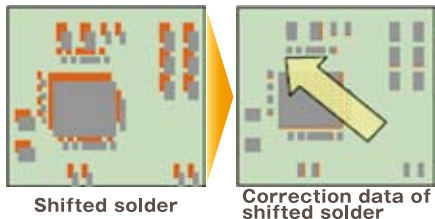
Measure PCB height | Offset height, draw | Mount
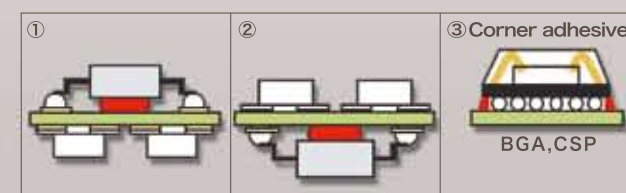
* Pre-demonstration is required.

High-quality mounting / APC system*

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**

*3D inspection equipment of another company can be also connected.
Please inquire with your sales representative for more details.

Feedforward to placement heads

· Solder position measurement and feedforward
Chip components(0402C/R ～)
Package component (QFP, BGA, CSP)

Post-printing inspection → Standard solder mounting → Standard placement inspection → After reflow

Measures and inspects misaligned components with placement position data based on placement / land standards
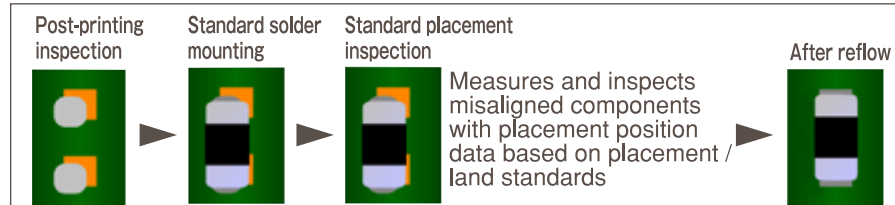
Feedforward to AOI

· Position inspection on APC offset position

Component Verification option

Prevents setup errors during changeover Provides an increase of production efficiency through easy operation
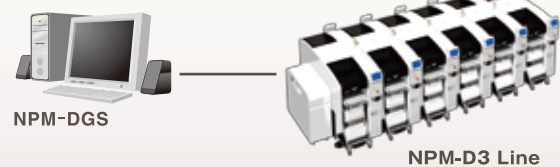
Scanner
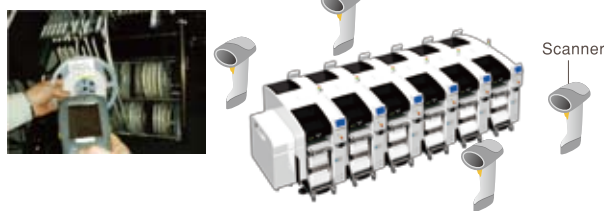
● Component setup error prevention
Prevents setup errors through verifying the NPM-D3 downloaded production data and component barcode data
● Array data activesync function
There's no need to select array data; data is verified with the NPM-D3
● Interlock function
Equipment stops when it has an incorrect and/or incomplete verification
● Navigation function
Clearly provide a verification task with data display and Intelligent feeder performance in sync
● Scanner selection
Users can choose either a wired or wireless scanner (PDA)

High productivity / Automatic changeover option

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

NPM-DGS

NPM-D3 Line

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

External scanner   Head Camera   Planning form
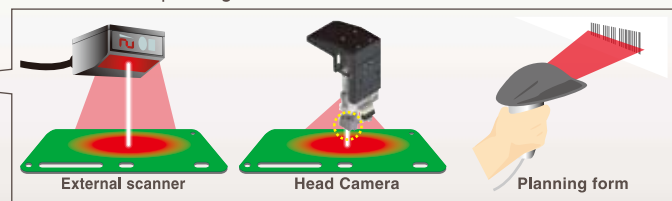
Off-line setup support station

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

● Two types of Support Stations are available.

① Power Supply Station:
Batch Exchange Cart Setup – Provides power to all feeders in cart. Feeder Setup – provides power to individual feeders.
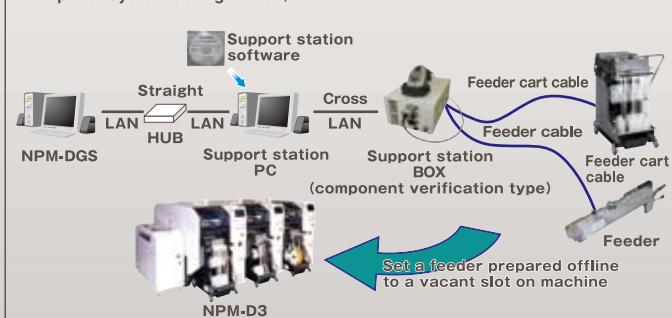
② Component Verification Station:
Additional to the power supply station, Component Verification feature is added to this model.
The station will navigate you to the location where feeders need exchange.

Example of system configuration）

Support station software

Straight   Cross
LAN   LAN   LAN
HUB

NPM-DGS   Support station PC   Support station BOX (component verification type)   Feeder cart cable   Feeder cart cable   Feeder

Feeder cart cable
Feeder cable

NPM-D3

Set a feeder prepared offline to a vacant slot on machine

Open interface / Host communication option

Able to standardize the interfacing with your systems currently used. Provides data communication with our standard interfaces.
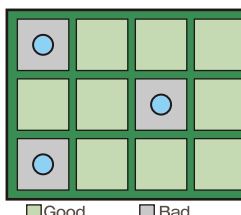
Host system (Users)

NPM-D3 Line
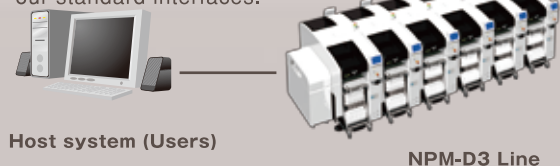
● Events
Outputs a real-time event of equipment
● Other company's component verification
Communicates with your component verification systems
● Component management data
· Component remaining quantity data: Outputs component remaining quantity data
· Trace data: Outputs data linked with component information (*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

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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.
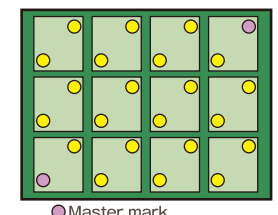
[Subject for communication]
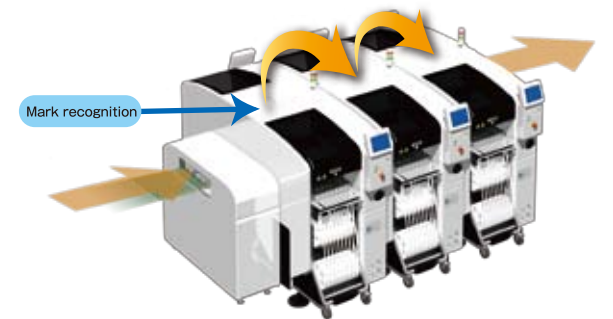
Bad mark recognition

□ Good   ■ Bad
Bad mark is scanned at the first machine.
*Please refer to "Specification" booklet for details.

Pattern mark recognition

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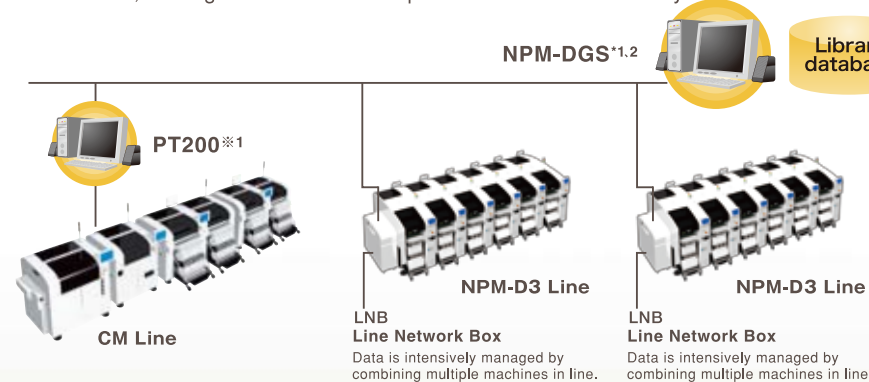All marks are recognized at the first machine and downstream machines only recognize master marks.

Mark recognition

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

The software package helps to achieve high productivity through integral management of creation, editing and simulation of production data and library.
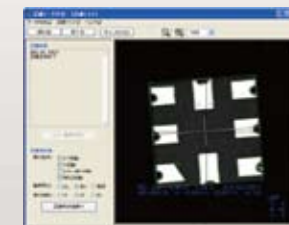
NPM-DGS*1.2

Library database

PT200※1

CM Line

NPM-D3 Line
LNB
Line Network Box
Data is intensively managed by combining multiple machines in line.

NPM-D3 Line
LNB
Line Network Box
Data is intensively managed by combining multiple machines in line.

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

Multi-CAD import

Almost all CAD data can be retrieved by macro definition registration. Properties, such as polarity,also can be confirmed on screen in advance.

Simulation
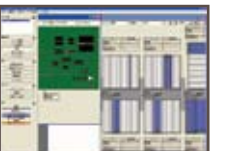
Tact simulation can be confirmed on screen in advance so that line total operation ratio can increase.

PPD／LWS Editor

With quickly and easily compiling placement and inspection head data on the PC display during operation, time loss can be minimized

Component library

A component library of all placement machines including the CM series on floor can be registered to unify data management.

Mix Job Setter（MJS）

Production data optimization allows the NPM-D2 to commonly arrange feeders.Feeder replacement time reduction for changeover can improve productivity

Off-line component data creation
option

With creating off-line component data using a store-bought scanner,productivity and quality can be improved.

Offline Camera Unit（option）

Minimizes time on machine for parts library programming and assists equipment availability and quality.Parts library data is generated using the line camera for NPM-D2.
Conditions not possible on a scanner such as Illumination conditions, and recognition speeds, can be checked offline assuring quality enhancements and equipment availability.   *Component data created on this unit can be directly used with NPM-D3.
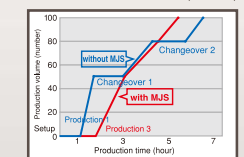
Recognition test/Evaluation screen

Offline Camera Unit

Quality improvement / Quality information viewer

This is software designed to support a grasp of changing points and analysis of defect factors through the display of quality-related information (e.g., feeder positions used, recognition offset values and parts data) per PCB or placement point. In case of our inspection head introduced, the defect locations can be displayed in association with quality-related information

Quality information viewer*
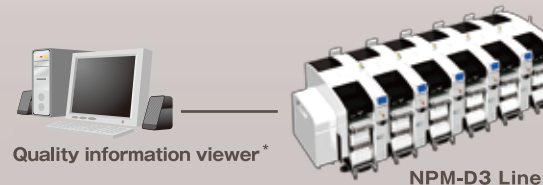
*PC is required for every line.

NPM-D3 Line

Quality information viewer window

Example of use of quality information viewer

Identifies a feeder used for mounting of defect circuit boards. And if, for example, you have many misalignments after splicing, the defect factors can be assumed to be due to;
1) splicing errors (pitch deviation is revealed by recognition offset values)
2) changes in component shape (wrong reel lots or venders)
So you can take quick action to the misalignment correction.