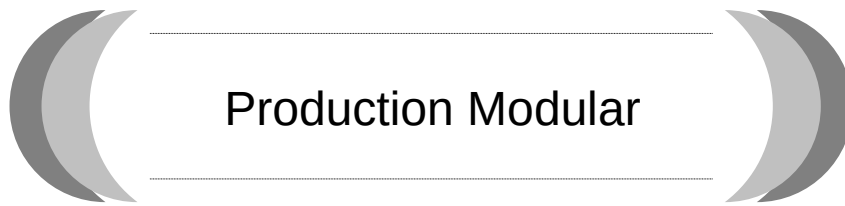


Specification

【 Electronic Component Mounting System 】



Model ID : **NPM-D3A**

Model No. : NM-EJM6E (Mount)

Panasonic Connect Co., Ltd.

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 Precautions for Safe Use	
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Revision History

This document content is based on the version of the last date printed below.

Revision date	Version	Revised page	Revisions
Mar. 3, 2020	Ver. 2020.0303	---	First edition
Apr. 27, 2020	Ver. 2020.0427	P. 26, 51, 89, 90, 103, 119, 122, 123, 124	• Corrected errors on "LCR checker" • Corrected errors on "03015 ready" • Deleted the "Maintenance jig(Only for Lightweight 16V3)" sentence • Quality information viewer, Support station (Compatible OS updated)
Jun. 25, 2020	Ver. 2020.0625	P. 45	• Modification of the "System Requirements" about Feeder Setup Navigator
Aug. 3, 2020	Ver. 2020.0803	---	• Added lightweight 8 nozzle head and 2 nozzle head and modified accordingly
Sep. 4, 2020	Ver. 2020.0904	P. 141	• Added an additional explanation to Head Maintenance Unit
Oct 30, 2020	Ver. 2020.1030	P. 106	• Specified the fact that multi-recognition camera Type3 comes with side lighting
Jan 5, 2021	Ver. 2021.0105	P. 52 ~ 54, 106, 140, 141, 157	• Added LCR checker(Built-in type) • Added Primary air hose to the options (illustration changed) • Added separators to options
Feb 12, 2021	Ver. 2021.0212	P. 25	• Corrected an operational standard between pickup depth and nozzle length
Feb 19, 2021	Ver. 2021.0219	P. 53, 133	• Added rules on LCR checker(Built-in type) and Load checker
Jun 30, 2021	Ver. 2021.0630	P. 88	• Added some explanations about E-Link(equipment control) of biometric authentication
Apr. 01, 2022	Ver. 2022.0401	P. 39, 55, 56, 57, 60, 68, 72, 80, 87, 166	• Changed our company name • Changed recommended HUB type • Standard change
Jun 10, 2021	Ver. 2022.0610	P. 62	• Feeder Setup Navigator (Added Microsoft® Windows® 11 Pro)
Nov. 30, 2022	Ver. 2022.1130	P. 1, 2, 5, 7 ~ 10, 16 ~ 22, 26, 31, 42 ~ 46, 48, 50, 51, 69, 72, 79, 80, 83, 90 ~ 93, 96, 105 ~ 108, 110 ~ 114, 116, 121 ~ 124, 130, 131, 133, 134 141 ~ 149, 167	Changed Individual specifications to option specifications • Loading of Lightweight 16-nozzle head V3A • Extend Mount points (50 000 points/8 000 patterns) • Bump diameter 45 μm ready • Other Company Bad Mark Communication • 8 mm double feeder(Thin embossed tape ready) • BGA recognition balls to 15 000 • Extending component size scope at Lightweight 8NH • Extending component height scope at Lightweight 16NH(short nozzle) • Tray 1 Pallet 10 Kind
Sep 20, 2023	Ver. 2023.0920	----	Full review and modified

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1. General Description

■ High Productivity

Simultaneously materialized the further improved area productivity and the high precision placement through a lightweight 16-nozzle head V3A, a multi-recognition camera and a high rigid frame. In addition, through reduction in PCB transport time losses, total productivity can be improved.

■ Versatility

It is possible to combine “Lightweight 16-nozzle head V3A”, suitable for super-high speed placement of microchips, “Lightweight 8-nozzle head”, suitable for high speed placement of microchips to medium-size components, and “2-nozzle head” that supports various kinds of irregular-shaped components.

It is also possible to upgrade from 2D inspection specification to 3D (Thickness, 3D measurement) because this machine has employed “Multi-recognition camera” where 3 functions (2D, Thickness measurement, 3D measurement) are integrated.

■ Efficient Changeover

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

■ High-Quality Placement

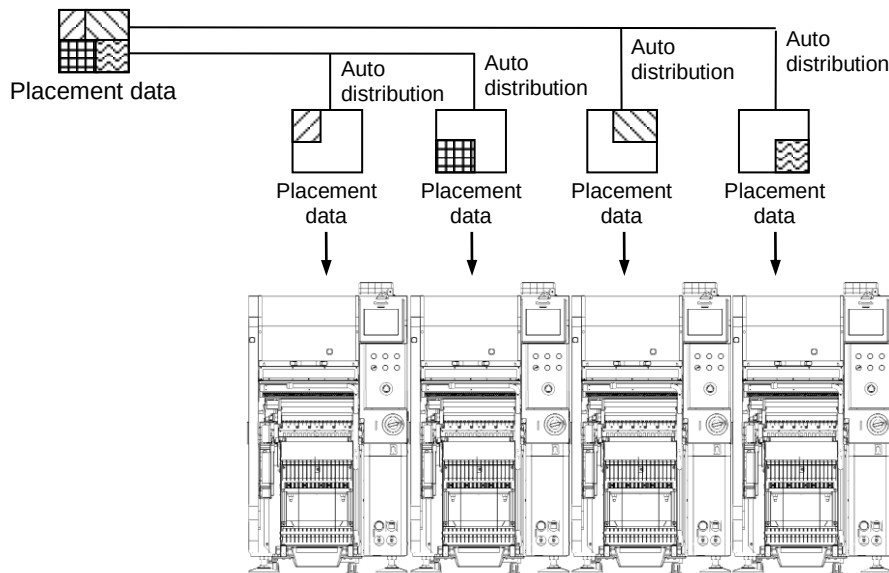
It has inherited NPM-series units and features and achieves high-quality mounting.

2. Features

High Productivity

Support for machine coupling (modularizing)

NPM-D3A supports coupling (modularizing); up to 30 machines* can be coupled.

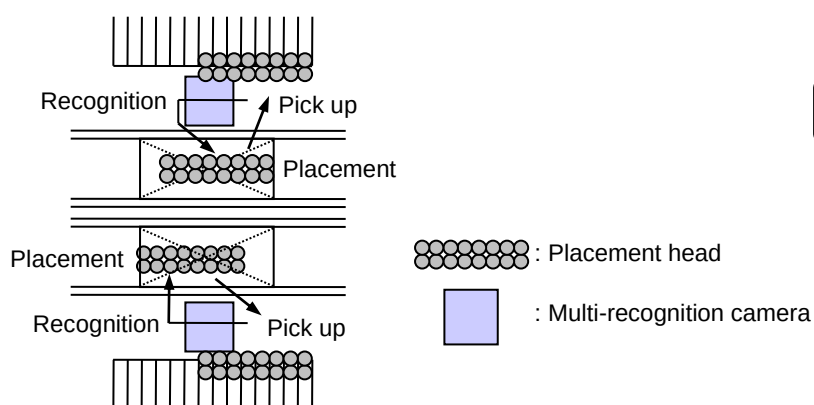


Conceptual illustration of data distribution for a total of four NPM-D3A machines

* To couple 16 or more NPM-D3As together, HUB and the power source unit (option) are required for far right N-CONR in a line. For details, please refer to “4.4 Line Configuration.”

* Connecting to NPM-W2/ W/ W2S requires a traverser between them. It cannot be connected to NPM (NM-EJM9B series).

Placement tact time



0.039 s/chip

With 16-nozzle head V3A specifications
(When high production mode is "ON")
(At oblique scanning)

 : Placement head

 : Multi-recognition camera

Conceptual illustration of placement.
(Lightweight 16-nozzle head V3A)

** Remarks **

- Optimum conditions mean the placement conditions defined by our original standards.

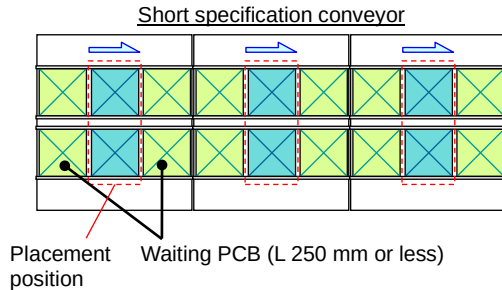
Reduction in PCB transport time loss

NPM-D3A can increase total productivity by reducing PCB transport time losses.

1) Splitting the PCB transport conveyor into 3 sections to reduce PCB transport time losses.

By having PCBs waited upstream or downstream from the placement position, you can shorten the PCB transport time.

(The figure below is an example of PCBs on standby on a short specification conveyor)

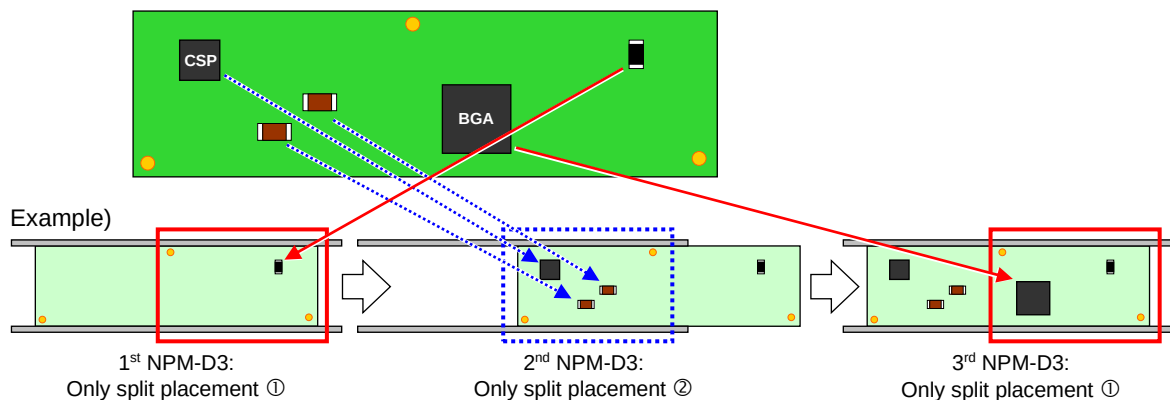


2) Improving the PCB ejection timing to reduce PCB transport time losses.

The time lag between the start of the descending motion of the PCB support and the start of PCB ejection can be minimized. (In the presence of components mounted on the underside)

3) Implementing “Optimization of non-sliding motion*” to reduce the PCB transport time loss in split placement mode.

The placement area is split into several sections, one for each machine, so that the sliding motion of PCBs can be eliminated during times of split placement.



* To use this function, you need at least 3 machines per line.

* You will perform this function only if it is effective in increasing productivity, and under some production conditions (the number of component reels, limitations on the supply unit space, etc.), you may fail to implement the optimization of non-sliding motions or enable sliding motions.

Versatility

Auto Load Feeder (8 mm) *

This is a thin type feeder materialized automatic component tape setup.

The off-line setup time can be drastically reduced by the simple work of inserting a tape, then pressing the “Send” button. (Approx. 30s/reel ⇒ Approx. 15s/reel)

If insert a following component in advance, this feeder can detect the tape end of preceding component and automatically supply the following component during production.

Because you don't need a tape splicing work, the error stop of splice mistake can be prevented.

This auto load feeder can also use a short cut tape (longer than 120mm).

* Not available for emboss tape.

* Available for 0402, 0603, 1005 and 1608 paper tape components.

If want to use 2012 or 3216, please contact us.

Flexible location of the tape feeder*

The tape feeder can be located flexibly within the same table.

You can locate components alternately and the feeder for the next product at an empty slot.

* Using the “Support station: Component verification type”, you need to write data to tape feeders in advance.
“Component verification (license)” is also needed.

Head exchange function

In NPM-D3A, you can select a head for each table.*¹

*¹ Please select a head for each table. It is possible to set separate head types on front table and on rear table.
On tray feeder tables, however, possible to set lightweight 8-nozzle head or 2-nozzle head only.

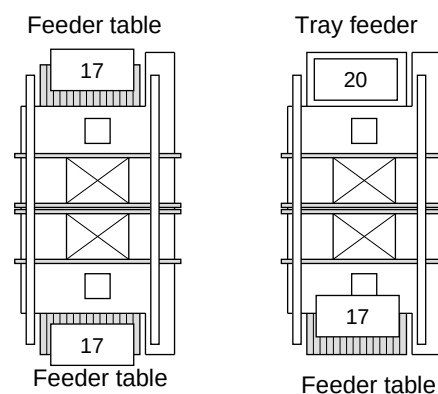
The numbers of feeders and trays

Up to 34 double tape feeders can be set on NPM-D3A. (When the tape width is 8 mm)

At this time, 68 reels can be set.

17 feeders × 2 reels × 2 tables
= 68 reels of 8 mm tape can be set.

Tray feeder(option) tables can have a maximum of 20-type trays.



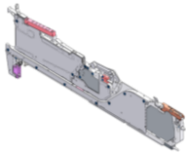
Compatibility with the CM series

Compatibility of feeders, nozzle and others are secured for NPM series with CM series (CM602, CM402, CM401, CM400, DT401, CM232, CM212 and CM101) having good track record.

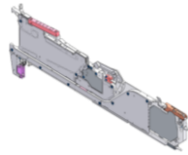
Versatility of feeders

Feeders are compatible with AM100 and CM series and support 4mm up to 104mm paper tapes/embossed tapes.

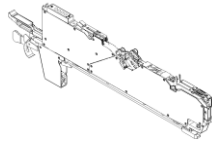
Tape feeding is driven by a servomotor; and feeding pitch and its speed are set according to components. These parameters are set based on the data sent from main body.



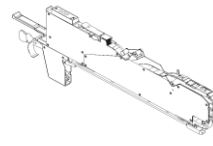
4 mm thin type
single tape feeder*



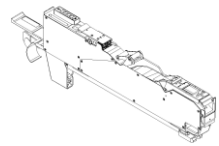
8 mm thin type
single tape feeder*



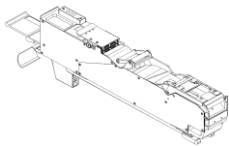
8 mm
double tape feeder



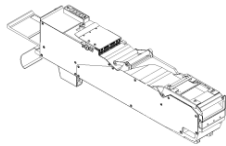
12/ 16 mm
tape feeder



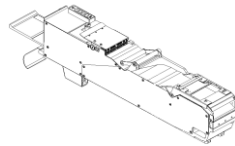
24/ 32 mm
tape feeder



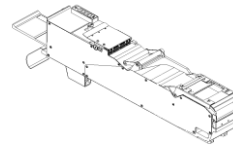
44/ 56 mm
tape feeder



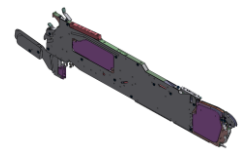
72 mm
tape feeder



88 mm
tape feeder



104 mm
tape feeder



8 mm thin type
auto load feeder*

* Thin type tape feeders cannot be used with CM series.

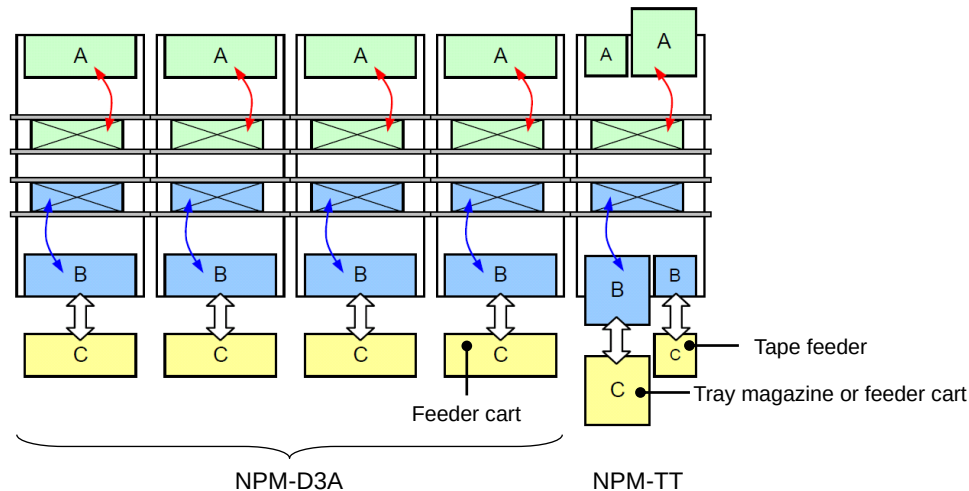
Efficient Changeover

Independent changeover

In the independent mode, you can perform a changeover (product data change and feeder cart replacement) on one lane while production continues on the other lane.*

* It is not possible to do works by opening safety covers (such as manual replacement of support pins).

Production example of the different types of products in the independent mode

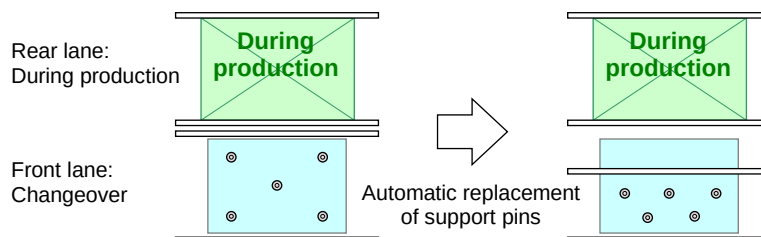


Automatic replacement of support pins

A function to automatically set up the support pins using the placement head.

This does not need to access an operator inside the machine, contributing manpower saving for changeover and prevention of human errors.

It also realizes non-stop changeover during production in dual lane mode.



Automatic Changeover

This supports changeovers (production data change and rail width change), minimizing the time loss of operation caused by product changes. In accordance with each customer's operation, selection can be made from following two types, "External scanner read type", and "Head read type".

Multi job production

Per NPM-D3A, 68 types of components (on an 8 mm tape basis) can be set. Even while the machine is running, it is possible to set the taped components for another model to vacant slots in advance, increasing the efficiency of changeovers. The data creating system NPM-DGS can sort the placement data for each stage, taking this multi-job production system into consideration.

High-Quality Placement

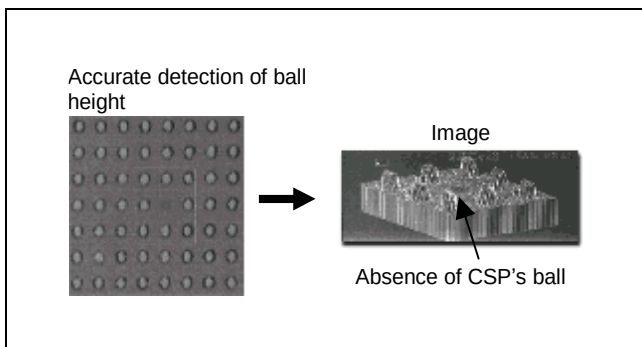
■ Component thickness measurement function (Multi-recognition camera: Type 2/ Type 3)

Two functions provide high quality placement. These are applicable for each Placement head.

- Measurement function of component thickness:
Component thickness is measured, and the results are reflected on placement height, making the placement more stable. Standing/tilted standing of micro components at the time of their pickup can also be checked simultaneously.
- Check function of nozzle tips:
Placement quality can be enhanced by periodical nozzle height checks.

■ 3D-measurement function (Multi-recognition camera: Type 3)

Detects coplanarity(flatness) of all the leads in QFP/SOP and other packages, and presence or absence of all the balls, and partially broken balls in its shape in BGA/CSP and other packages.



■ Calibration feature

Our unique calibration program realizes high accuracy placement. An automatic calibration feature maintains initial high precision even during operation. (Each parameter is automatically corrected by periodically recognizing the gauge mark during operation.)

■ High speed low vibration control

High speed low vibration control has been introduced to the XY unit operation.

■ APC (Advanced Process Control) System

APC-FF (Feed Forward)

APC-FF is our unique in-line process control system to improve the quality of mounting; it feedforwards deviation of the mounting position to mounters based on the position data of soldering inspection.

APC-MFB (Mounter Feed Back)

APC-MFB is a control system to maintain the quality of mounting; it feedbacks the position data of mounted parts measured with inspection machines (AOI) to mounters after the parts were mounted.

■ Height Sensor

It controls the placement height of the nozzle by measuring the height (warpage) of PCB.

If a measurement result exceeds the acceptable value, a warning is issued prior to placement to prevent the occurrence of quality defects.

It has the PCB warpage correction (for placement head) function.

- PCB warpage correction (for placement head)

Controls the placement height by measuring the height (warpage) of the whole PCB.

3. Specification

3.1 Standard Specifications

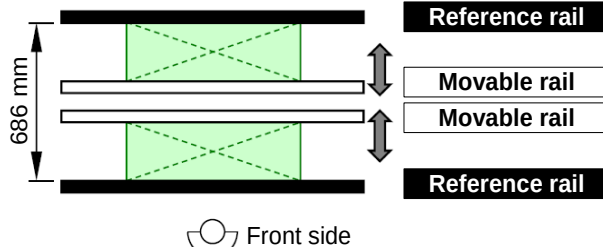
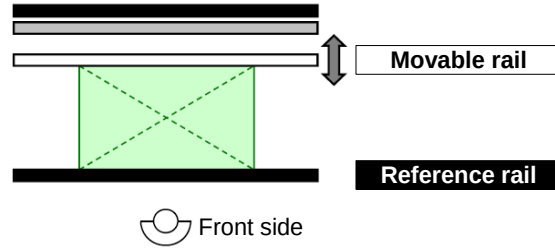
Item	Specifications	
Electric source	- Rated voltage - Frequency - Rated capacity - Feeding specification - Peak current value during operation	3-phase, AC 200/ 220 V $\pm$ 10 V, AC 380/ 400/ 420/ 480 V $\pm$ 20 V 50/ 60 Hz 2.7 kVA For the case of AC 290 V or more (380 V or more tap), make sure that the feeding side is in star (Y) connection and the voltage between the PE (protective earth) terminal and each phase is AC 290 V or less. 30 A (Rated voltage: AC 200 V) *Please take this into account when choosing the capacity of the primary power supply AVR (the stabilized power supply), etc. *Please be careful of a voltage drop due to the primary power cable length and the wire diameter.
Pneumatic source	- Supply air pressure - Supply air amount	0.5 MPa ~ 0.8 MPa (Working air pressure: 0.5 MPa ~ 0.55 MPa) 100 L/min (A.N.R.)
Dimensions	- Feeder cart spec. - Tray feeder spec.	W 832 $\times$ D 2 652 $\times$ H 1 444 mm (Conveyor width: 830 mm) (without 3-Color Signal Tower and Touch Panel) W 832 $\times$ D 2 683 $\times$ H 1 444 mm (Tray feeder connected) W 832 $\times$ D 2 729 $\times$ H 1 444 mm (Feeder cart connected) (without 3-Color Signal Tower and Touch Panel)
Mass	- Main body - Feeder cart - Tray feeder - Standard structure mass	1 680 kg 110 kg 200 kg 1 900 kg (Main body and two feeder carts)
Environment	- Temperature - Humidity - Altitude	10 $^{\circ}$ C ~ 35 $^{\circ}$ C (Placement head) 25 %RH ~ 75 %RH (No condensation) 1 000 m or less, above sea level
Operating unit	- Interactive operation with LCD color touch panels (Standard equipment) - One touch changeover between English, Chinese and Japanese - Recognition screen display (Chip/PCB recognition screen is displayed in superimpose screen* with one touch of a button.) - Hierarchical operation (Operator/Engineer)	* Recognition screen is displayed on operating screen.
Paint color	Standard color	White: W-13 (G50) * The paint color cannot be designated.
Control System	- Microcomputer system (VxWORKS) - Full closed-loop system (Linear servomotor) [X, Y axis and Z axis (Lightweight 16-nozzle head V3A)] - Semi closed-loop system (AC servomotors) [Z axis (Lightweight 8-nozzle head/2-nozzle head), θ axis]	
Command System	Designation of X, Y, Z, θ and SC coordinates	
Production data	- No. of placement points: Max. 10 000 points/machine, Max. 10 000 points/line*¹ (Mounting coordinates, recognition mark coordinates, bad mark coordinates and PCB warp measurement points are included.) - No. of Patterns (Blocks): Max. 1 000 patterns/machine, Max. 1 000 patterns/line (If PCB warpage measurement points are included, it shall be Max. 100 patterns/machine.) - No. of Mark settings*: Max. 1 000 patterns/machine, Max. 1 000 patterns/line * The number exclusive of representative bad marks and group bad marks.	
Others	- Program Functions - Data creation	Please refer to "6. Other Standard Functions." Please refer to "NPM-DGS Specification."

*1 In the dual lane mode production, it is the total of placement points in both front and rear lanes.
 When you choose the option of Extend Mount points, the max mounting point is 50 000 points, and the max pattern is 8 000 patterns.
 If the line is made up with the CM and NPM series coupled, please contact us.

3.2 Standard Functions

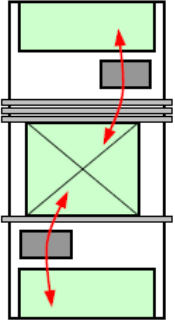
Item	Specifications			
	Lightweight 16-nozzle head V3A		Lightweight 8-nozzle head	2-nozzle head
Placement tact time (Under optimum conditions)	92 000 CPH* ¹ (Chip: 0.039 s/chip) 76 000 CPH* ² (Chip: 0.047 s/chip)		43 000 CPH (Chip: 0.084 s/chip)	11 000 CPH (Chip: 0.327 s/chip) 8 500 CPH (QFP: 0.423 s/chip)
	IPC9850 (1608C): 66 200 CPH* ¹ 57 800 CPH* ²			
* This may vary depending on components. *1 When high production mode is “ON.” *2 When high production mode is “OFF.”				
Placement accuracy (Under optimum conditions)	<u>0402(01005”), 0603(0201”), 1005 placement</u> ±0.037mm* ¹ : Cpk ≥ 1	0402(01005”), 0603(0201”), 1005 placement ±0.03 mm: Cpk ≥ 1		QFP placement ±0.03 mm: Cpk ≥ 1
	<u>03015*², 0402(01005”), 0603(0201”), 1005 placement</u> ±0.03 mm* ³ : Cpk ≥ 1		QFP placement ±0.05 mm: Cpk ≥ 1 (12 × 12 mm or less) ±0.03 mm: Cpk ≥ 1 (12 × 12 mm over to 45 × 45 mm or less)	
	±0.025 mm* ⁴ : Cpk ≥ 1			
* This may vary depending on components. * This data is applicable when the placement angle is 0°, 90°, 180°, or 270°. For the other angles, the data changes. * Sudden ambient temperature changes may affect the accuracy. *1 When high production mode is “ON.” *2 When “03015 placement support” is selected. (Panasonic specified requirements). *3 When high production mode is “OFF.” *4 When “±0.025 mm placement support” is selected. (Panasonic specified requirements)				

Item	Specifications			
	Lightweight 16-nozzle head V3A		Lightweight 8-nozzle head	2-nozzle head
Applicable component				
Component dimensions	03015* ¹ chip ~ 8.5 × 8.5 mm (There are pickup limitations on components over 6 × 6 mm)		0402 (01005") chip ~ 45 × 45 mm or 100 × 40 mm (There are pickup limitations on components over 12 × 12 mm.)	0603 (0201") chip ~ 100 × 90 mm
*1 When "03015 placement support" is selected. (Panasonic specified requirements)				
Component height	Max. 6 mm* ¹ * ²		Max. 12 mm* ²	Max. 28 mm
	*1 When component size is over 3 mm, it is limited to 6.5 mm x 6.5 mm. At mounting of components over 3 mm, short nozzle(101GS, 101GSN, 102GS, 102GSN) is necessary. *2 Applies to components with a pickup depth (the distance between the top surface of an embossed tape and the pickup surface) of 2 mm or less. (Mechanical constraints of tape feeder and nozzles).			
Mass	---		---	Max. 30 g
Placement load control	Constant load control 1.0 N* ¹		---	0.5 N ~ 50 N (In increments of 0.01 N)
	*1 Constant load control is optional.			
Placement Angle	-180° ~ 180° (In increments of 0.01°)			
Recognition	<u>Head camera</u> Offset of PCB position and orientation by using recognition mark. <u>Multi-recognition camera: Type 1</u> Recognition and offset of all applicable components. <u>Multi-recognition camera: Type 2 (Type 1 + Component thickness measurement)</u> Measurement of component thickness (chip data registration, placement height control), detection of standing/tilted standing of components at the time of pickup, nozzle tip check. <u>Multi-recognition camera: Type 3 (Type 2 + 3D-measurement function)</u> Detects coplanarity(flatness) of all the leads and XY-direction positions in QFP/SOP and other packages. Detects presence or absence of all the balls, and partially broken balls in its shape in BGA/CSP and other packages.			
PIP lighting (Applicable heads)	2-nozzle head			

Item	Specifications			
PCB exchange time	Long specification conveyor		Short specification conveyor	
	Dual lane mode	Single lane mode	Dual lane mode	Single lane mode
	0 s (If cycle time is greater than 3.9 s)	3.9 s	0 s (If cycle time is greater than 3.6 s)	3.6 s
Applicable PCB				
Dimension	50 × 50 mm ~ 510 × 300 mm	50 × 50 mm ~ 510 × 590 mm	50 × 50 mm ~ 460 × 300 mm	50 × 50 mm ~ 460 × 590 mm
Placement area	50 × 43 mm ~ 510*× 293 mm	50 × 43 mm ~ 510*× 583 mm	50 × 43 mm ~ 460*× 293 mm	50 × 43 mm ~ 460*× 583 mm
	* Split placement will be applied to the PCB of “350 mm < L 510 mm.”		* Split placement will be applied to the PCB of “260 mm < L 460 mm.”	
Thickness	0.3 mm ~ 8.0 mm			
Mass	1.5 kg or less (After mounting, including the carrier mass.)			
Flow direction	Left → Right, Left ← Right (Selectable)			
Reference	Dual lane mode  Single lane mode*¹  *¹ The rear reference is available when the machine is reversed. (For single lane mode production only) * Connecting to NPM-W2/ W/ W2S requires a traverser between them. It cannot be connected to NPM (NM-EJM9B series).			
PCB transfer height	900 mm ~ 920 mm			

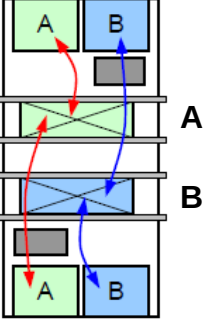
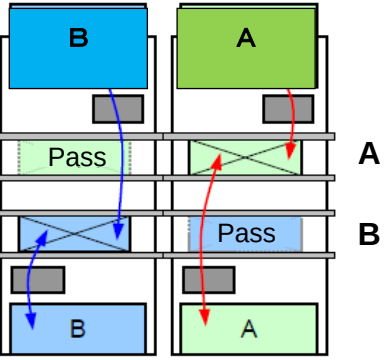
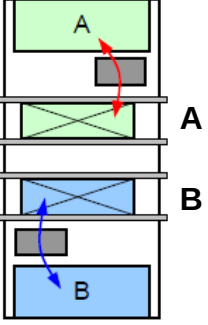
3.3 Placement mode

■ Single lane

	Share mode
Pattern	
Motion	Heads move in an alternating pattern during production.

■ Dual lane

Dual lane allows for 3 different placement modes with the movement of the front and rear heads.

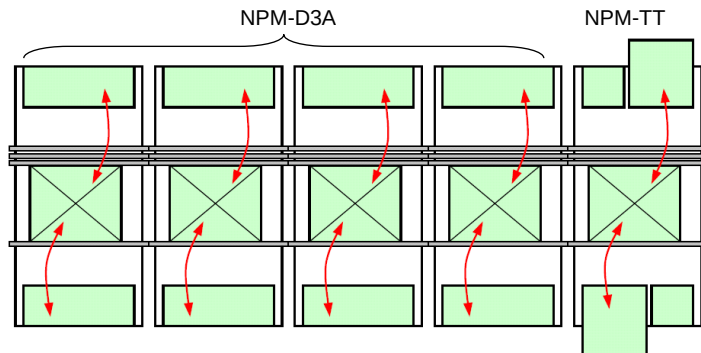
	Share mode	Share mode (front/ rear)* ¹	Independent mode* ¹
Pattern			
Motion	Each head works on boards in both lanes. The heads, moving alternately, handle boards in one lane once completing production in the other lane.	< Share mode (front) > The front and rear heads are used to handle boards in the front lane while those in the rear lane just pass through. < Share mode (rear) > The front and rear heads are used to handle boards in the rear lane while those in the front lane just pass through.	Each head independently handles production boards in each lane. Front head: handling front lane Rear head: handling rear lane
Feature	PCB transport losses are minimized.	Production can be initiated or stopped according to lane.	Production can be initiated or stopped according to lane. The elimination of the heads' standby time (waiting for the opposed head's movement) associated with their alternating movement contributes to increased productivity.* * Some PCB board sizes bring the heads into a standby state.
Changeover	Changeover can be conducted in each lane after stopping the machine.	Changeover (production data change, feeder cart replacement, and tray magazine replacement) can be conducted in a suspended lane while boards are passing through the other lane.* ²	Changeover (production data change, feeder cart replacement) can be conducted in a suspended lane while producing boards in the opposite lane.* ²

*¹ Independent mode and Share mode (front/rear) are available for placement head specifications only.

*² It is not possible to do works by opening safety covers (such as manual replacement of support pins).

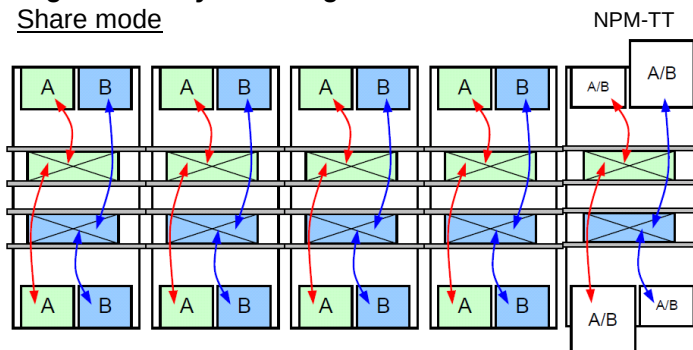
The combination of placement modes allows NPM-D3A to respond to the needs of your various production patterns. The following is an example when coupling with NPM-TT.

■ **Large size PCB mounting line**
Share mode (Single lane)



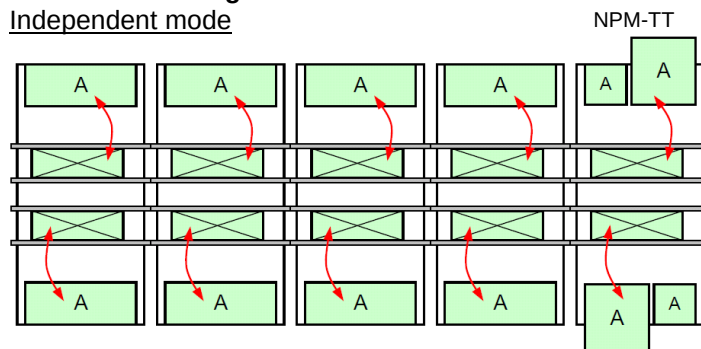
- Specifically designed for large size boards that cannot make use of dual transport.

■ **High-efficiency mounting line**
Share mode



- Minimizes board transport losses.
- Realizes highly efficient production through the smallest number of feeder locations.

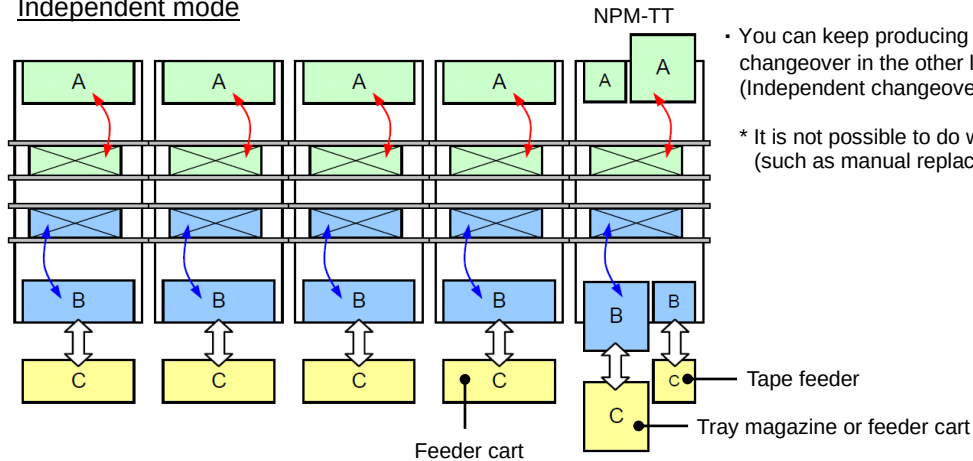
■ **Fastest mounting line**
Independent mode



- Realizes the fastest placement of PCBs of a pattern at the fastest rate.

■ Non-stop changeover line

Independent mode

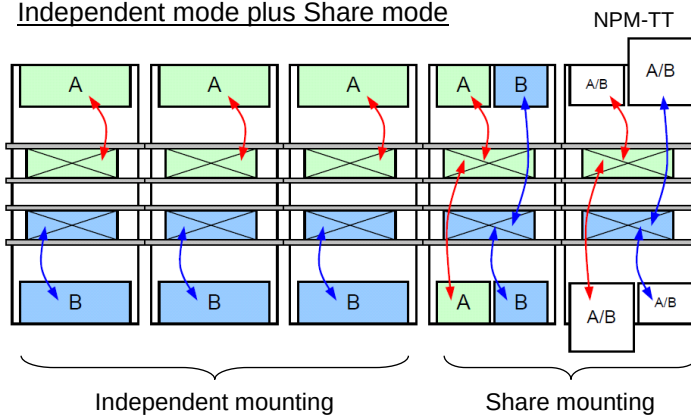


- You can keep producing in one lane while conducting a changeover in the other lane.* (Independent changeover)

* It is not possible to do works by opening safety covers (such as manual replacement of support pins).

■ High-speed/High-efficiency mounting line

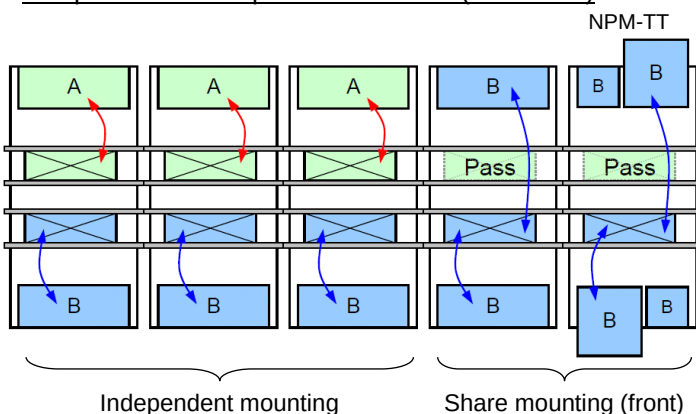
Independent mode plus Share mode



- Line configuration that utilizes the merits of Independent and Alternate modes.
- Chip parts can be mounted faster, and atypical or tray components, more efficiently.

■ Imbalanced mounting line

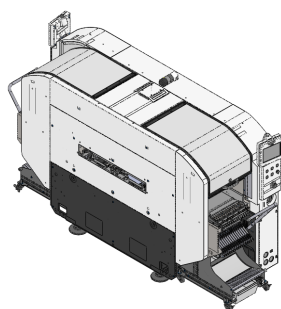
Independent mode plus Share mode (front/ rear)



- You may configure the mounting line shown in the left figure if unable to achieve a production balance between the front and rear lanes.

e.g.) Board A: 300 placement points (chip parts only)
Board B: 600 placement points (chip parts plus atypical components)

4. Machine Configuration



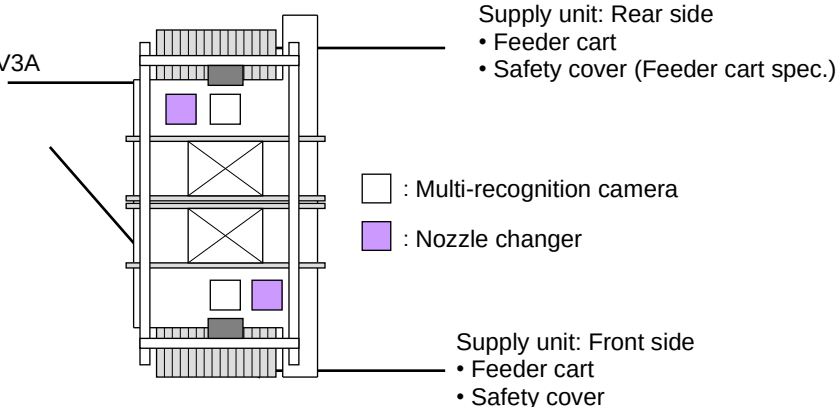
	Rear side	
Front side	Placement head	No head
Placement head	NM-EJM6E	NM-EJM6E
No head	NM-EJM6E	

■ Placement configuration

- Feeder cart specification (tray feeder cannot be installed on the rear side)

Head: Front/ Rear side

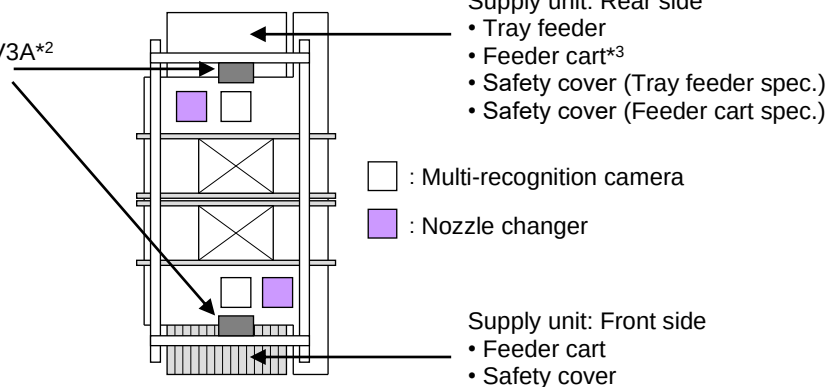
- Lightweight 16-nozzle head V3A
- Lightweight 8-nozzle head
- 2-nozzle head
- No head*1



- Tray feeder specification (tray feeder or feeder cart*3 can be installed on the rear side)

Head: Front/ Rear side

- Lightweight 16-nozzle head V3A*2
- Lightweight 8-nozzle head
- 2-nozzle head
- No head*1



*1 "No head" cannot be selected on both front side and rear side at the same time.

*2 When tray feeder is used on the Rear, lightweight 16-nozzle head V3A cannot be supported.

*3 To use Feeder cart under "Tray feeder" specification, Feeder cart change unit (option) is required.

■ Data creation

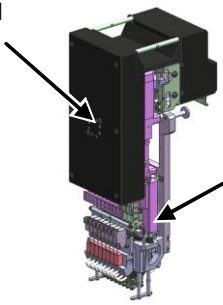
All data are created on NPM-DGS, the data creation system. (NPM-DGS is a separate product.)
The hardware for NPM-DGS should be prepared by customer.

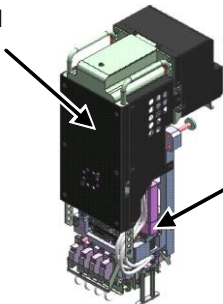
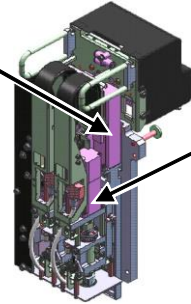
** Remarks **

- The special specifications may potentially not comply with the CE mark specifications.
- The floor slope in the feeder cart installation area needs to be 6 mm or less in the right/left direction and 11 mm or less in the forward/backward direction.
If the floor slope is beyond the above limit, the feeder cart cannot be taken in and out.

4.1 Head Configuration

■ Placement head

Lightweight 16-nozzle head V3A	
Motor for vertical motion (Z-axis) (Inside the cover)  Motor for rotary motion (θ-axis)	
Accessories	Nozzle changer (For 16-/ 12-nozzle head)

Lightweight 8-nozzle head*1	2-nozzle head
Motor for vertical motion (Z-axis) (Inside the cover)  Motor for rotary motion (θ-axis)	Motor for vertical motion (Z-axis)  Motor for rotary motion (θ-axis)
Accessories	Accessories
• Nozzle changer (For 8-nozzle head)	• Nozzle changer (For 2-nozzle head)

* Nozzle changers are compatible with NPM-series heads and NPM-X series heads.
*1 Nozzle holders for lightweight 8-nozzle head are only for lightweight 8-nozzle heads.

*** Remarks ***

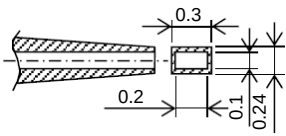
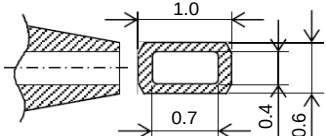
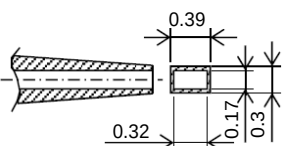
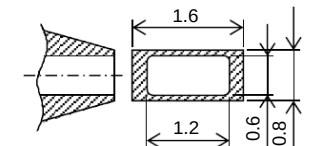
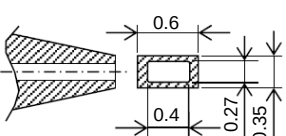
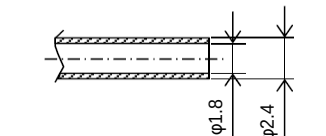
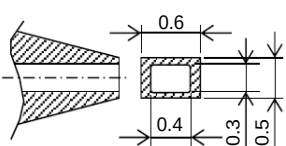
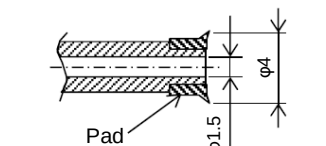
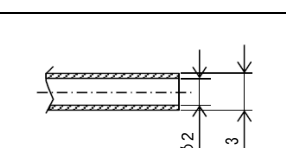
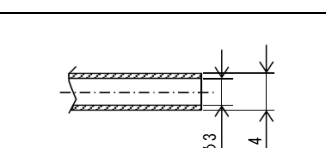
- The above accessories do not come together with spare head.
When you select spare heads, be sure to select options according to each head as well.
Please refer to "9. Options" for details.

4.2 Nozzle Configuration

All nozzles are available as options so that you will be able to select an optimal combination that suits your production style.

- All the shapes of holes shown here are maximized. Therefore the actual shapes are different.
- The tips of nozzles which include "C" in their No. are made from the ceramic.
- Nozzle No. including "N"
is nozzles that 2D code is on their nozzle flange and that are for NPM series and NPM-X series only.
Wrong nozzle setup can be detected by verification of nozzle No. for the nozzles with the code.
- The nozzles which do not include "N" in their No. are common with CM series (CM602, CM402, CM401, CM400, DT401, CM232, CM212, and CM101).
- The recognition method depends on components.

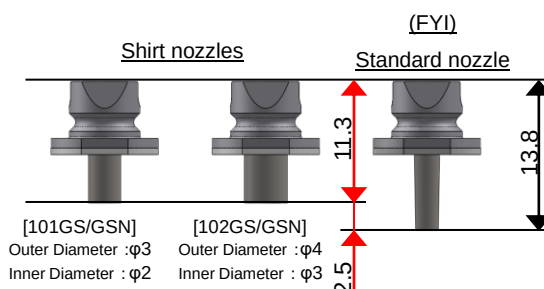
■ Nozzles for lightweight 16-nozzle head V3A

No.	Tip shape (Unit: mm)	Applicable component (Typical examples)	No.	Tip shape (Unit: mm)	Applicable component (Typical examples)
276CS 276CSN		03015R	230CS 230CSN		1005R/C (0402" R/C) 1608R/C (0603" R/C)
256CS 256CSN		0402R/C (01005" R/C)	235CS 235CSN		1608R/C (0603" R/C) 2012R/C 3216R/C SS-Mini Tr/Di S-Mini Tr/Di
225CS 225CSN		0603R/C (0201" R/C)	240CS 240CSN		3216R/C 4532R/C TAN-X
226CS 226CSN		0603R/C (0201" R/C) 1005R/C (0402" R/C)	140S 140SN		Al electrolysis SOP
101GS 101GSN *1		Inductor 4532R/C 5848R/C Al electrolysis	102GS 102GSN *1		Inductor 4532R/C 5848R/C Al electrolysis

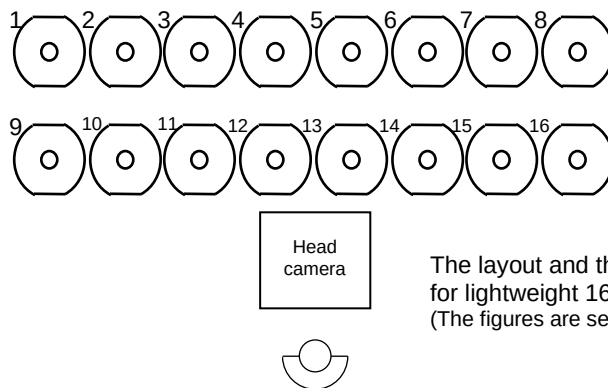
*1 101GS/GSN and 102GS/GSN are for Lightweight 16-nozzle head and are short nozzles.

When you use a short nozzle, there are restrictions, including the following (1) to (7). For the details, see the Chapter, Options.

- (1) Measurement by nozzle recognition is not available, Unable to check for deposits.
- (2) Pickup on concave surface is not allowed.
- (3) Short nozzle length is fixed to 11.3 mm
- (4) Pressing force is ≤ 0.3 mm when components are picked up.
- (5) Transmission recognition does not work(Transmission recognition components are not available)
- (6) LCR checker does not work.
- (7) It is not compatible with Lightweight 16-nozzle head constant load control (License).



■ Nozzle layout for lightweight 16-nozzle head V3A



The layout and the maximum number of attachable nozzles for lightweight 16-nozzle head V3A (The figures are seen from above.)

* Standard Lightweight 16-nozzle head V3A nozzles are 8 types described in the previous page.

You can also use NPM series, NPM-X series 16/ 12 nozzle head nozzle or CM series 12-nozzle head nozzle.

* You cannot use NPM series, NPM-X series Lightweight 8/ 8 nozzle head nozzle or CM series 8-nozzle head nozzle.

* Nozzles for AM100 cannot be used.

■ Pickup-ready component size and nozzle arrangement

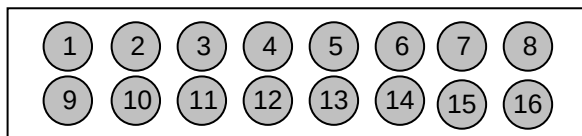
Component size(A) that lightweight 16-nozzle head V3A can pick up is as follows.

(●: Can pick up, ○: Cannot pick up)

Component size compatible with pickup at transparent recognition is limited to 6×6 mm or smaller.

Components of 6×6 mm or less

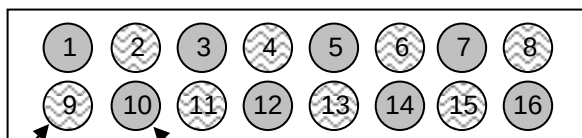
($A \times A \leq 6 \times 6$)



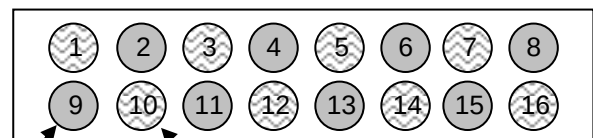
6×6 mm ~ 8.5×8.5 mm

($6 \times 6 < A \times A \leq 8.5 \times 8.5$)

- Vacuums up to eight components of larger than 6×6 mm in a same turn and there are two staggered arrangements as below.
- Nozzles next to a nozzle vacuuming components of larger than 6×6 mm can vacuum components of 3×3 mm or smaller.

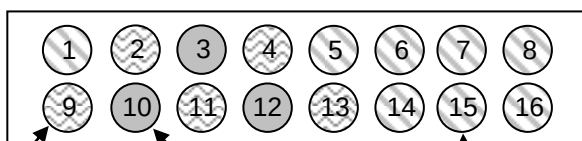


3×3 mm or smaller Larger than 6×6 mm



Larger than 6×6 mm 3×3 mm or smaller

(e.g.) When ③, ⑩ or ⑫ nozzles vacuum components over 6×6 mm as below, neighbouring ②④⑨⑪⑬ nozzles can vacuum components of 3×3 mm or smaller. Other nozzles can vacuum components of 6×6 mm or smaller.



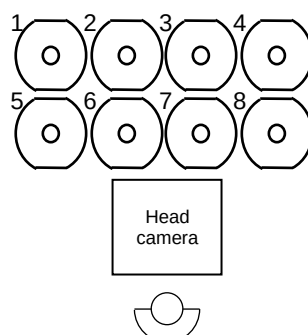
3×3 mm or smaller Larger than 6×6 mm 6×6 mm or smaller

■ Nozzles for lightweight 8-nozzle head

No.	Tip shape (Unit: mm)	Applicable component (Typical examples)	No.	Tip shape (Unit: mm)	Applicable component (Typical examples)
256C 256CN		0402R/C (01005" R/C)	240C 240CN		3216R/C 4532R/C TAN-X/B/C/D Al Electrolytic -A/B/C
225C 225CN		0603R/C (0201" R/C)	140 140N		TAN-D Al Electrolytic-D SOP, SOJ PLCC, CSP
226C 226CN		0603R/C (0201" R/C) 1005R/C (0402" R/C)	185 185N		SOP, QFP PLCC, BGA } 18 × 18 mm
230C 230CN		1005R/C (0402" R/C) 1608R/C (0603" R/C)	199 199N		SOP, QFP PLCC, BGA } 32 × 32 mm
235C 235CN		1608R/C (0603" R/C) 2012R/C 3216R/C SS-Mini Tr/Di S-Mini Tr/Di			

■ Nozzle layout for lightweight 8-nozzle head

Small nozzles (all nozzles listed in the above chart) which support components with or within □12mm can be attached to all positions.



The layout and the maximum number of attachable nozzles for lightweight 8-nozzle head
(The figures are seen from above.)

* Standard Lightweight 8-nozzle head nozzles are the above 9 types.

You can also use NPM series, NPM-X series 8-nozzle head nozzle or CM series 8-nozzle head nozzle.
(#450 nozzle and #460 nozzle cannot be used.)

* You cannot use NPM series, NPM-X series Lightweight 16/ 16/ 12 nozzle head nozzle.

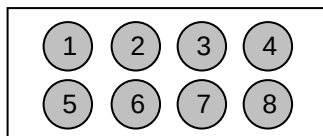
* Nozzles for AM100 cannot be used.

■ Pickup-ready component size and nozzle arrangement

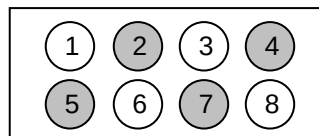
Component size is as follows where lightweight 8-nozzle head can pick up. (●: Can pick up, ○: Cannot pick up)

Pickup-ready component size for transmission recognition is 12×12 mm or less.

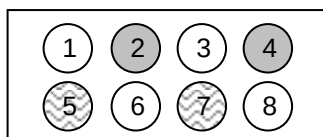
Components of 12×12 mm and less
($A \times A \leq 12 \times 12$)



Exceeding 12×12 mm to 18×18 mm
($12 \times 12 < A \times A \leq 18 \times 18$)

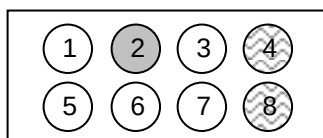


Exceeding 18×18 mm to 24×24 mm
($18 \times 18 < A \times A \leq 24 \times 24$)

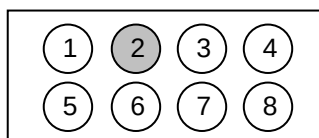


(5) and (7) can pick up components of 12×12 mm and less.

Exceeding 24×24 mm to 28×28 mm
($24 \times 24 < A \times A \leq 28 \times 28$)



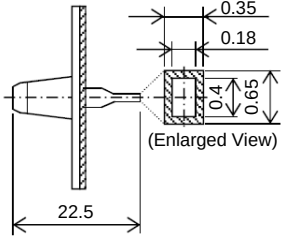
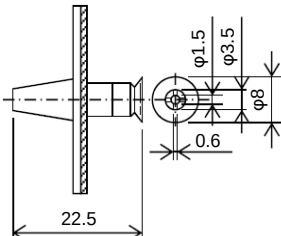
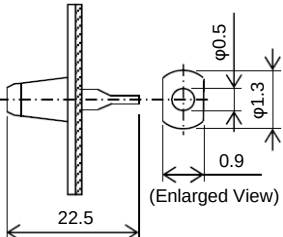
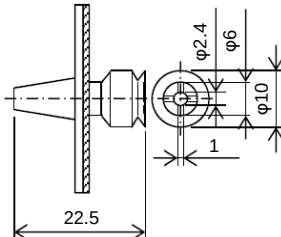
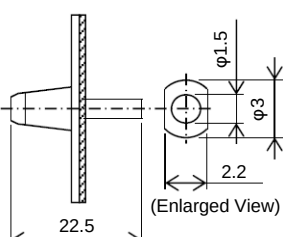
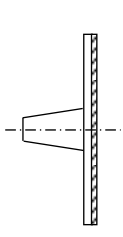
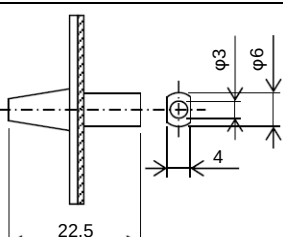
Exceeding 28×28 mm to 45×45 mm or 100×40 mm
($28 \times 28 < A \times A \leq 45 \times 45$)



(4) and (8) can be picked up a component of less than
 12×12 mm

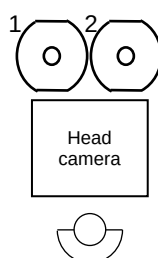
■ Nozzles for 2-nozzle head

Special nozzles can support the components whose vacuum pick up surface's shape is special, such as irregular shaped chips. For details, please consult us.

No.	Shape (Unit: mm)	Applicable component (Typical examples)	Max. component mass	No.	Shape (Unit: mm)	Applicable component (Typical ex- amples)	Max. component mass
1582 1582N		0603R/C (0201" R/C)	0.007 g	1004 1004N		SOP, SOJ QFP, PLCC BGA	23.4 g
1001 1001N		1005R/C (0402" R/C) 1608R/C (0603" R/C) 2012R/C (0805" R/C) SS-Mini Tr/Di S-Mini Tr/Di Mini Tr/Di	0.021 g	1005 1005N		SOJ QFP, PLCC BGA	36.6 g
1002 1002N		3216R/C (1206" R/C) 4532R/C (1812" R/C) TAN-X/B/C/D Al electroly- sis- A/B/C	0.192 g	1006 1006N	 This is a nozzle (reflector) to be attached to the head that will not pick up owing to the combination of pick up components. That will enhance the stability of recognition for the head that picks up. *For the components measuring 33 × 33 mm or over, this nozzle needs to be attached to one of the two nozzle heads.		
1003 1003N		Al electroly- sis- D/E/F SOP, SOJ PLCC BGA, CSP	0.768 g				

* From a productivity viewpoint, we recommend that 0603 chips be placed with lightweight 16-nozzle head V3A or lightweight 8-nozzle head.

■ Nozzle layout for 2-nozzle head

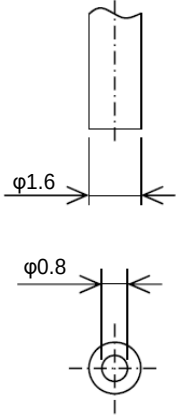
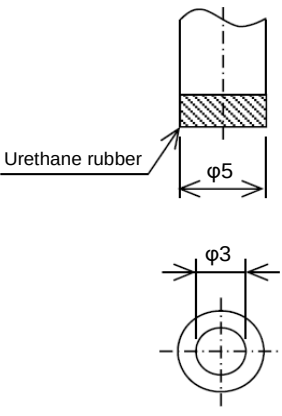
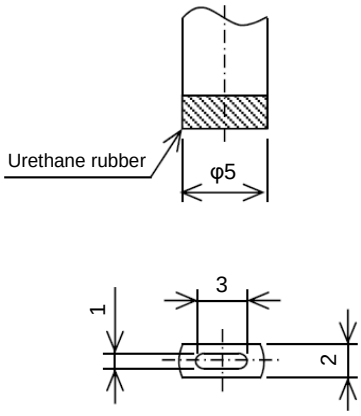


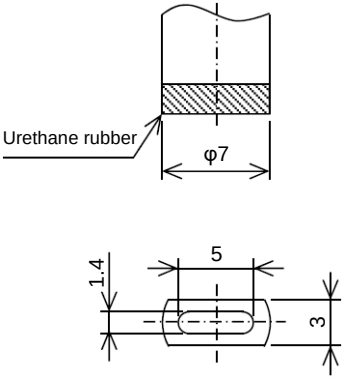
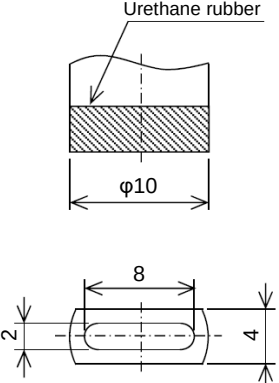
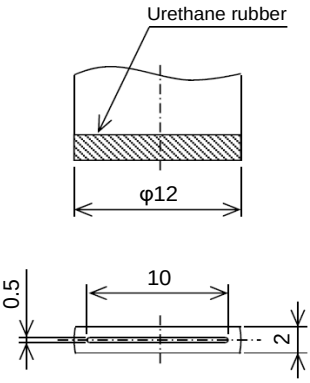
The layout and the maximum number of attachable nozzles for 2-nozzle head
(The figures are seen from above.)

* Nozzles for AM100 cannot be used.

■ Nozzles for 2-nozzle head (For odd-shaped components)

*We would ask you to use product numbers when you order.

Nozzle No.	1551 / 1551N	1479 / 1479N	2405 / 2405N
Product number	KXFX05J7A00 N610127747AA (With 2D code)	KXFX05ASA00 N610117226AA (With 2D code)	KXFX05BVA00 N610117223AA (With 2D code)
Shape (Unit: mm)			
Max. component mass	0.12 g	3.5 g	1.5 g
Max. component height	28 mm	25.5 mm	28 mm
Remarks	Nozzle length: 22.5 mm	With urethane rubber Nozzle length: 27.5 mm	With urethane rubber Nozzle length: 22.5 mm

Nozzle No.	1404 / 1404N	1421 / 1421N	2467 / 2467N
Product number	KXFX0558A00 N610117224AA (With 2D code)	KXFX056AA00 N610117225AA (With 2D code)	KXFX05F9A00 N610128174AA (With 2D code)
Shape (Unit: mm)			
Max. component mass	3.0 g	8.0 g	2.5 g
Max. component height	28 mm	28 mm	28 mm
Remarks	With urethane rubber Nozzle length: 22.5 mm	With urethane rubber Nozzle length: 22.5 mm	With urethane rubber Nozzle length: 22.5 mm

■ Nozzles for 2-nozzle head (For odd-shaped components)

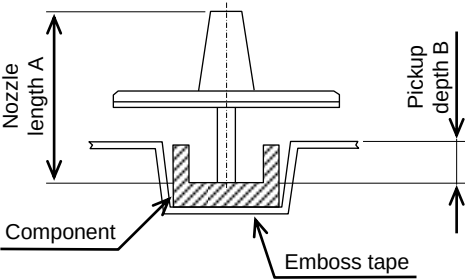
* We would ask you to use product numbers when you order.

Nozzle No.	1115 / 1115N	2418 / 2418N	1424 / 1424N
Product number	KXFX04PJA00 N610117221AA (With 2D code)	KXFX05CMA00 N610117211AA (With 2D code)	KXFX056PA00 N610127619AA (With 2D code)
Shape (Unit: mm)			
Max. component mass	2.0 g	6.5 g	4.8 g
Max. component height	28 mm	28 mm	28 mm
Remarks	Nozzle length: 22.5 mm	With urethane rubber Nozzle length: 22.5 mm	With NBR pad Nozzle length: 22.5 mm

Nozzle No.	1427 / 1427N	2421 / 2421N
Product number	KXFX0570A00 N610127623AA (With 2D code)	KXFX05CTA00 N610117212AA (With 2D code)
Shape (Unit: mm)		
Max. component mass	9.7 g	14.5 g
Max. component height	28 mm	28 mm
Remarks	With NBR pad Nozzle length: 22.5 mm	With NBR pad Nozzle length: 22.5 mm

■ **Correspondence between the pickup depth of electronic component and the nozzle length**

Necessary nozzle length varies according to the pickup depth (distance from top of embossed tape to pickup surface) of electronic components to be placed.



Pickup depth B	0 mm to below 3 mm	3 mm to below 8 mm	8 mm to below 13 mm
Nozzle length A	22.5 mm	27.5 mm	32.5 mm

* The list above is limited to 2 nozzle heads.

4.3 Feeder Carriage Configuration

■ Intelligent Tape Feeder

There are two groups of tape feeders: with or without the joint detection sensor, which detects splicing positions for the purpose of managing the component traceability and etc. According to the tape width, each group is classified as shown below.

The feed pitch is automatically set according to the production data.

Feeder type		Type	Setting pitch	Maximum depth of Boss	Reel*1 diameter	Maximum Setting reel	Feed pitch (1 pitch = 4 mm)																
							0.25	0.5	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
4 mm thin type single*2*3 (No detection sensor)		Emboss	10.5 mm	0.5 mm	Small	68	○ 1 mm																
8 mm thin type single*2*3		Paper/ Emboss			21 mm	3 mm	Small	68	○ 1 mm	○	○												
8 mm double*4			Large	34			1 mm																
8 mm double for 0402 (01005")*4			Small	68			○ 1 mm	○	○														
8 mm double*4 (For thin embossed tape)			Large	34			1 mm																
			Small	68					○	○													
			Large	34																			
			Small	68			○ 1 mm	○	○														
			Large	34			1 mm																
12/ 16 mm	12 mm	Emboss	21 mm	15 mm	Small	34				○	○	○	○										
	16 mm				Large	34*5																	
24/ 32 mm												○	○	○	○	○	○	○	○	○	○	○	○
44/ 56 mm			42 mm	26 mm*6	Large	16					○	○	○	○	○	○	○	○	○	○	○		
			63 mm			10							○	○	○	○	○	○	○	○	○	○	
72 mm			84 mm	15 mm 21 mm		8						○	○	○	○	○	○	○	○	○	○		
88 mm (With detection sensor)			105 mm			6						○	○	○	○	○	○	○	○	○	○		
104 mm (With detection sensor)			126 mm	21 mm		4						○	○	○	○	○	○	○	○	○	○		

*1 Small reel: $\phi 178$ mm, Large reel: $\phi 178$ mm ~ $\phi 382$ mm

*2 When thin type tape feeders are installed, "Attachment for thin type tape feeder" is required for each feeder slot.
It is not possible to set a small reel and a large reel to the reel holder in the same slot.

*3 For thin feeder inspection with IFCU, contact us.

*4 The 8 mm double tape feeder holds two small reels.

It is not possible to set a small reel and a large reel to the reel holder in the same slot.

*5 Depending on the width of reel, the maximum setting count may be reduced.

*6 When emboss depth of components is over 21 mm, you need to make modifications to the feeder cart (or 13-slot feeder base).
(Custom specifications)

Applicable emboss depth after modification: Max. 26 mm

* Customer-owned 32mm adhesive feeder can be used.

** Remarks **

- In the case of 8 mm emboss tape, the emboss depth is possible to up to 3 mm.
If you want to use the "paper / embossing shared block" which is included with the feeder, the emboss depth is limited to 1.2 mm or less.
- In the case of 12 mm/ 16 mm emboss tape, the emboss depth is up to 15 mm.
If the tape width is narrow, you need to adjust the feeder groove width for restraining the tape.
In this case, the emboss depth is limited to 13 mm or less. For further information, please contact us.

■ Auto Load Feeder*

This is a thin type feeder materialized automatic component tape setup.

The off-line setup time can be drastically reduced by the simple work of inserting a tape, then pressing the “Send” button. (Approx. 30s/reel ⇒ Approx. 15s/reel)

If insert a following component in advance, this feeder can detect the tape end of preceding component and automatically supply the following component during production.

Because you don't need a tape splicing work, the error stop of splice mistake can be prevented.

This auto load feeder can also use a short cut tape (longer than 120mm).

* Not available for emboss tape.

Feeder type	Tape	Setting pitch	Reel diameter	Maximum Setting reel	Feed pitch (1 pitch = 4 mm)															
					0.25	0.5	1	2	3	4	5	6	7	8	9	10	11	12	13	14
8 mm thin type auto load feeder*1*2*3	Paper	10.5 mm	Small	68	●	●														
			Large	34	1 mm															

*1 When auto load feeders are installed, “Attachment for thin type tape feeder” is required for each feeder slot.

*2 If you want use IFCU to check auto load feeder, please contact us for details.

*3 To make good use of it, we suggest setting two reels on one auto load feeder.

One preceding component reel and one following component reel.

In this case, the maximum setting reel of auto load feeder is

Small reel: 34 reels (preceding component 34 reels, following component 34 reels)

Large reel: 16 reels (preceding component 16 reels, following component 16 reels)

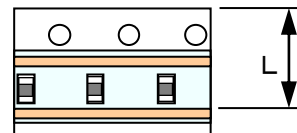
If you want more reels, please contact us.

Restrictions

The auto load feeder is not available for the reels or utilizations below.

- The tape end is fixed on the reel by adhesive tape etc. (Taping spec.)
(If reel and tape are hard to be separated, by cutting the end of tape will be available.)
- The tape which is be spliced.
- Availability by taping spec. from the last component to the tape end:
280 mm or below: Available without restrictions
Over 280 up to 680 mm: Available depending on the machine setting
Over 680 mm: Component exhaustion error will result.
- When either of the following requirements for the cover tape sticking specification is not satisfied:

Tape guide type	Target components	L (mm)
Tape guide S	0402	5.85mm or over
Tape guide A	0603	5.85mm or over
Tape guide B	1005	6.00mm or over
Tape guide C	1608	6.30mm or over



When the dimension L does not satisfy (shorter than) the above requirement, peeling mistake would happen.

*If need the tape guide for 2012 or 3216, please contact us.

- The tape end is cut obliquely. New and old tape may not be replaced automatically.
- Tape length.
Usable tape length is 120 mm or more.
Insertion slot to be used and available functions differ with the tape length as follows:
 - Tape of 120 or more but less than 500 mm in length should be inserted through the slot dedicated to short tape.
In this case, the automatic sending/replacement function and the component verification function cannot be used.
 - When 500 mm is exceeded, insert the tape through the tape slot on the rear of the feeder.
In this case, the automatic sending and replacement are available. A reel is required to use the component verification function.
- Conditions of automatic replacement.
The following condition is not available for automatic replacement.
 - When “pickup error stop” is setting in “one time” and component remaining number has not been input or wrong number, automatic replacement is not available.

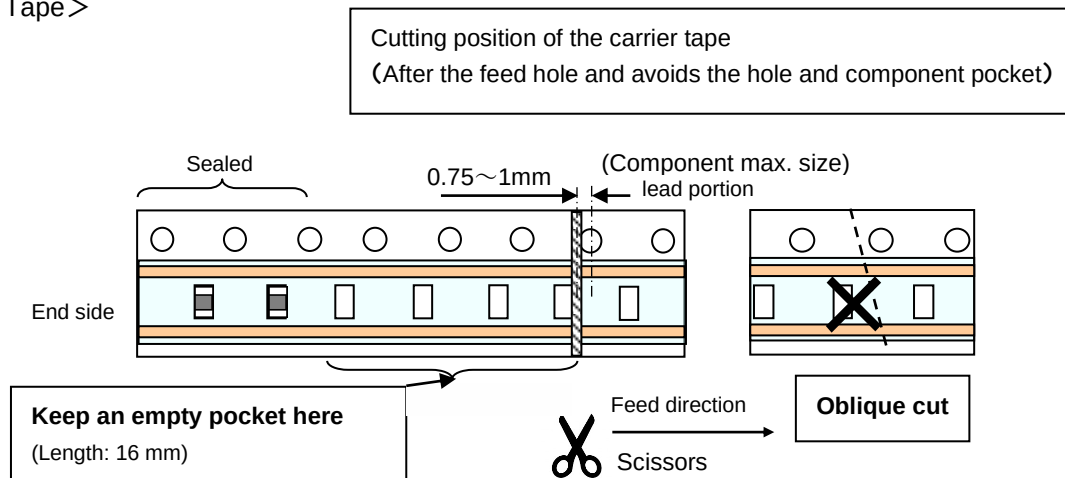
Top portion (Lead portion) processing

The lead portion processing of auto load feeder should satisfy the following conditions.

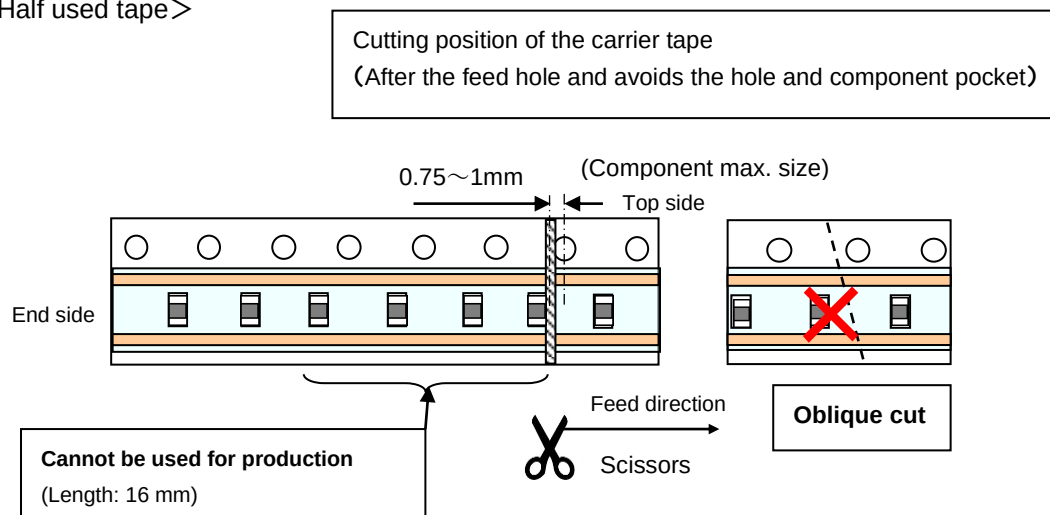
(The cutting position of lead portion)

Before you insert tape to the auto load feeder, please cut the lead portion with a scissors as the picture below. (To prevent a peeling mistake and tape replacement mistake, please cut perpendicularly.)

<New Tape>



<Half used tape>

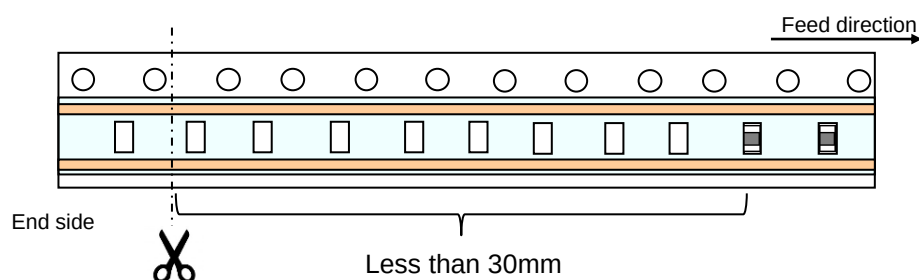


End portion (Trailer portion) processing

Please cut the empty tape less than 30mm.

The replacement time will be longer if over 30mm.

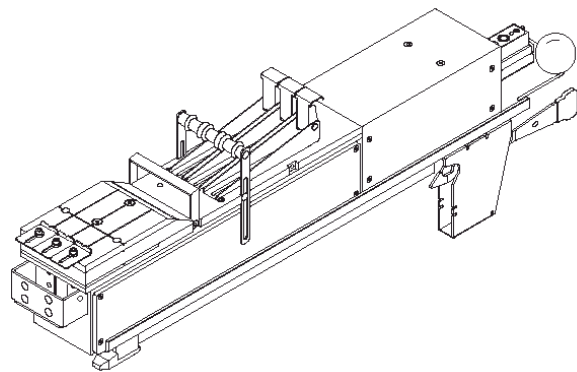
When the length of empty pocket positions is between 280 and 680 mm, machine setting is required. However, when it is longer than 680mm, a shortage error will happen.



■ Intelligent Stick Feeder

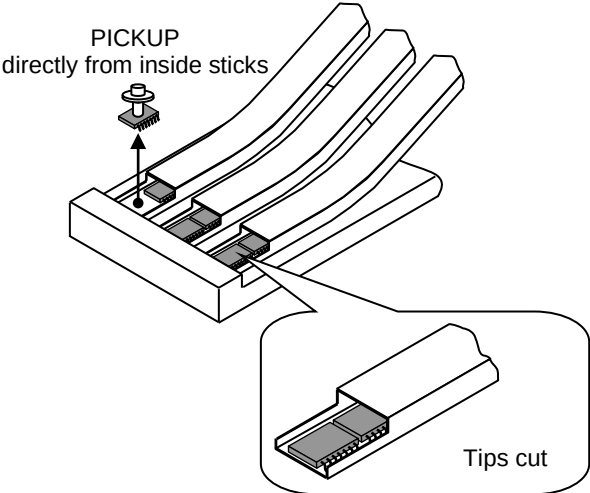
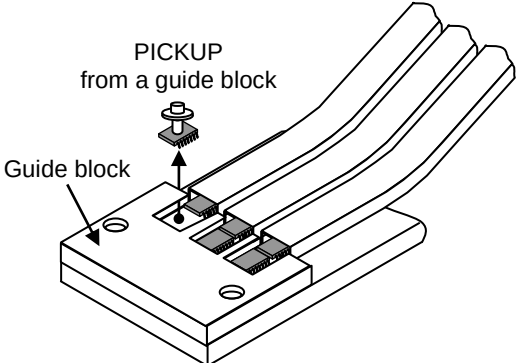
Stick feeders supply components through stick vibration.
Intelligent stick feeder has traditional merits such as high versatility*1, quick delivery*2, and maintenance-free*3, and has also improved compatibility with large-sized components..
(Lightweight 8-nozzle head and 2-nozzle head only)

- *1 It supports not only SOP, SOJ, and PLCC but also odd-shaped components such as the connector.
- *2 With the feeding method that cuts out stick tips (see below), it can feed components as soon as you get them.
- *3 It needs no particular maintenance except for cleaning, such as dust removing.



	Single stick feeder	3-lot stick feeder
Setting pitch	42 mm	84 mm
Maximum number of setting feeders	16 inputs	8 inputs

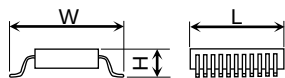
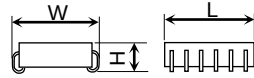
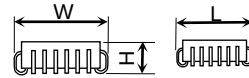
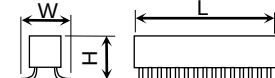
Component feeding methods

Feeding with stick tips cut out	Feeding with a guide block (Option)
When components in sticks are level and stable while the sticks are placed in a horizontal position, cut out the stick tips so that the components will be picked up directly from inside the sticks. PICKUP directly from inside sticks 	When components in sticks are not level and not stable while the sticks are placed in a horizontal position, attach a block (called a guide block) to solve those problems so that the components will be picked up from the guide block. The guide block is created separately according to the component dimensions to be used. How to design the guide blocks is open to the public, so the users can make them. PICKUP from a guide block 

Applicable components

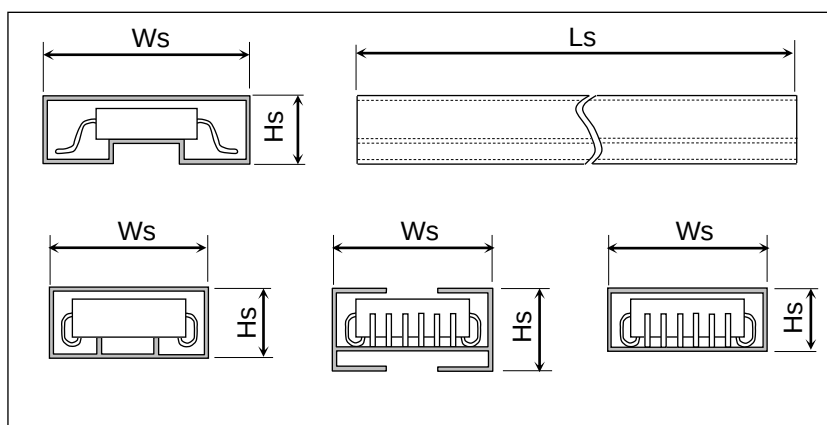
Standard				Special			
SOP, SOJ, PLCC				Except for the standard component types and dimension range, depending on the component and stick shapes, components of up to the following dimensions may also be used. If using such components, you need to flow them actually to check of feeding conditions or consult us. (All dimensions in mm)			
(All dimensions in mm)							
	W	L	H				
Min	8	9	2.5				
Max	31	31	6				

	W	L	H
Min	-	-	-
Max	31	60	25

SOP**SOJ****PLCC****Connector****Applicable sticks**

(All dimensions in mm)

	Ws	Ls	Hs
Min	-	300	-
Max	34	600	28

**Number of attachable sticks**

Feeding with stick tips cut out	Feeding with a guide block
See Table 1 for the number of attachable sticks.	See either Table 1 or 2, whichever has less number, for the number of attachable sticks.

Table 1

	Stick width Ws (mm)	Number of attachable sticks
Single Stick Feeder	$Ws \leq 34$	1
3-lot Stick Feeder	$Ws \leq 19$	3
	$19 < Ws \leq 28$	2
	$28 < Ws \leq 34$	1

Table 2

	Component width W (mm)	Number of attachable sticks
Single Stick Feeder	$W \leq 31$	1
3-lot Stick Feeder	$W \leq 16$	3
	$16 < W \leq 25$	2
	$25 < W \leq 31$	1

* In principle, production must be limited only for one type product when you attach multiple sticks on 3-lot stick feeder..
 Production for different type products is available with limitations of the shape and dimension of the stick. For details, please consult us.

■ Stackable Stick Feeder

There are two size types of stackable stick feeders: S size and L size, both are equipped with unique adjustment mechanisms, adjustable according to stick size and/or component dimensions, and are flexible feeders.

There are two types: In addition to common type, there is another type that applies to component verification. You can combine these 2 specifications, and there are, therefore, 4 types in total you can select from.

Feeder type	Type		Feeding pitch	Max load *1	Component dimension		Max component mass	Packing Dimension	
Stackable Stick Feeder *2	S	Standard	No step (adjustable)	6 pcs	W	4mm~20mm	2kg (Total mass of components set in feeder,)	Stick length 380 mm~700 mm	Stick width 8~24mm
		Traceability			L	5mm~70 mm			Stick height 10~29mm
	L	Standard		6 pcs	W	4mm~60mm			Stick length 8~64mm
		Traceability			L	5mm~70 mm			
					H	12mm~30 mm			

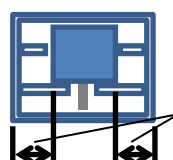
^{*1} When front and rear side is feeder cart (Excluding when tray is attached)

^{*2} Depending on the size and shape of the components, guide rail, special pushers or other special parts may be required. This will be classified as customized spec.

For parts with leads protruding from the side of the part body and parts with steps and protrusions on the bottom and sides of the body, please consult us separately.

In addition, when pushing components in the stick, the components that overlap or ride up will not be applicable.

- * When both sides of length between the side surface of a component and the side surface of stick is 3mm or larger than 3mm, special support is needed. Contact us for the details.



When both length are 3mm or larger than 3mm, special support is needed..

- * The use of stackable stick feeders requires "Air Supply Unit for Feeder"

*We design to make the component feeding unit or the stick of the feeder adjustable to improve the versatility. However, depending on the shape of parts and sticks, there are cases where it cannot fully correspond with the standard adjustment range. At that time customization is required. We recommend to confirm the components and stick used in advance.

*We do not recommend daily changeover work. We recommend stackable stick feeder changeover for per component

*Full length : 1 325.5 mm ~ 1 560 mm

The maximum length changes with stick length. When the stick you are using reaches to a certain length (about 460 mm or longer), full length gets long enough for the stick to be put inside.

Height : 699.5 mm

*The stackable height is 216mm + H (H : stick height.)

Below is an indication of attachable sticks.

S type 22 pcs (When stick height is minimum of 10mm)

L type 11pcs (When stick height is minimum of 21mm)

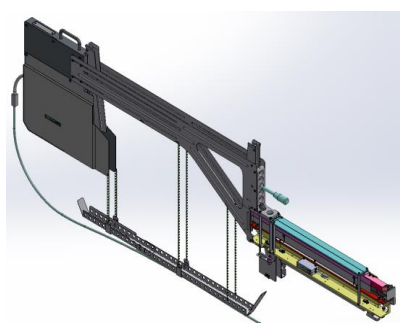
*In traceability type, with parameter, it is possible to select individual verification which collates sticks one by one to replenish sticks or group-verification which collates sticks in a group to replenish.

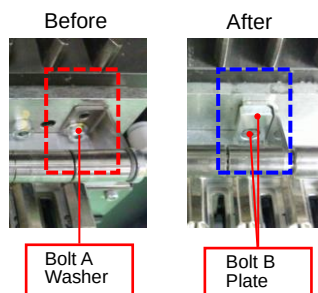
Stackable stick feeder is used in individual verification, it can attach up to 4 sticks.

*Components to be set in the stick should be the quantity that can be pushed from the rear where 10N or less is applied with the stick held horizontally.

*Be sure to attach and detach stackable stick feeder to and from the cart only when the machine is equipped with the cart. Operation is impossible in the following situations.

1. Attach and detach the cart to and from the machine while it is attached to the cart
2. Move the stick feeder with it attached to the cart.
3. Store the stackable stick feeder on the cart.

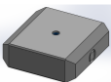
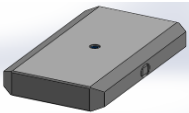




- * Mounting stackable stick feeder on a feeder requires to add reinforcing plate in order to prevent deformation of a clamp part of a feeder.
(Deformation may cause attaching/detaching defect)
(Reinforcing plate is packed with stackable stick feeder)
When reinforcing plate runs short, arrange them individually.
(Model No. : MTKP009217AA (one set consists of six plates))

■ Pusher for Stackable Stick Feeder

Pushers for stackable stick feeder are available in the 5 types shown below.

Pusher type	Shape	Dimensions	Max. component width (Reference value)	Stackable Stick feeder	
				S	L
S size *		W 4×H 4×L25mm	10mm	Standard	Standard
M size		W10×H10×L25mm	15mm	Option	Option
L size		W15×H10×L30 mm	30mm (20mm for stick feeder S)	Option	Option
LL size		W30×H10×L30 mm	50mm	—	Option
LLL size		W50×H10×L30 mm	60mm	—	Option

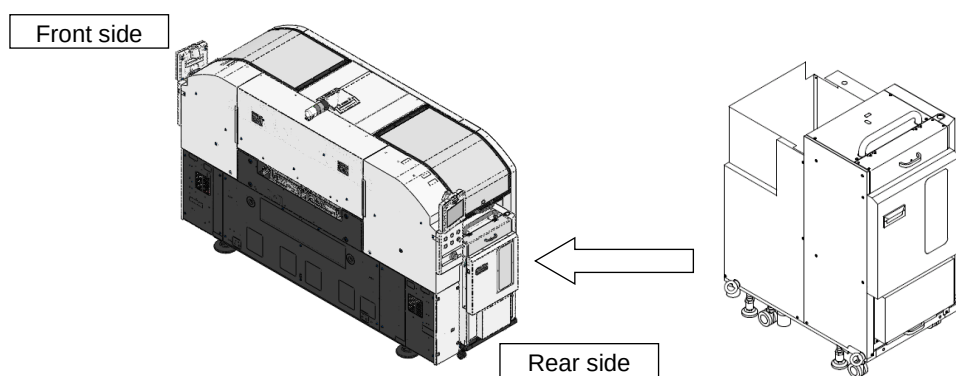
- * S size pusher is included as standard with S size stackable stick feeder.
If S size pusher is purchased as spare, it will come in a set with the feeding wire because the pusher is glue-fixed to the wire.
- * For M~LLL size pushers, they are designed such that they can be used by slotting into the S size pusher.
Depending on the size and shape of the components, special pushers or other special parts may be required.
This will be classified as customized spec.

■ Tray Feeder

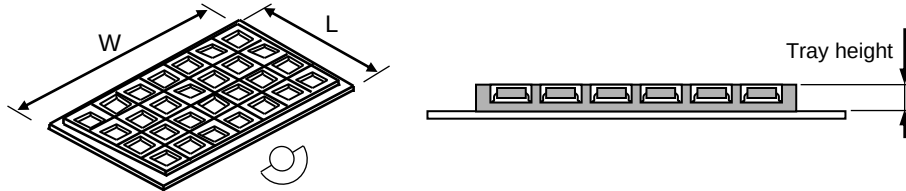
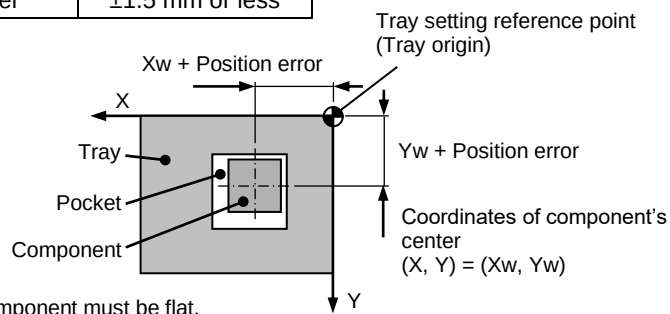
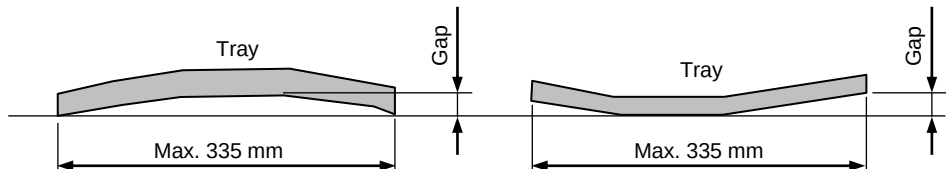
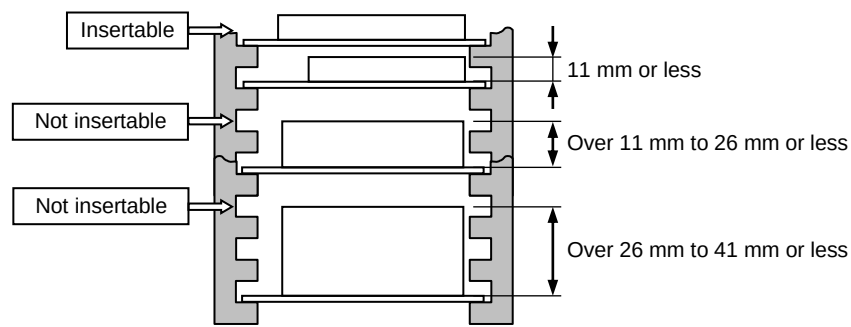
When NPM-D3A main unit is tray feeder specification, tray feeder can be connected to the rear side.

Tray feeder cannot be installed to the front side.

Applicable head: Lightweight 8-nozzle head, 2-nozzle head



Tray Conditions

Item	Specification							
Tray dimensions	Tray dimensions	L 85 × W 100 mm ~ L 230 × W 335 mm						
	Tray height	2 mm ~ 56 mm (2 nozzle head) 2 mm ~ 17 mm (Lightweight 8 nozzle head) * When there is a tray higher than 30 mm, you cannot use tray supply side.						
								
Component position error	<table><tr><th>Pick up face of components</th><th>Position error</th></tr><tr><td>Under 10 × 10 mm</td><td>±1.0 mm or less</td></tr><tr><td>10 × 10 mm or over</td><td>±1.5 mm or less</td></tr></table>  * The pick-up face of a component must be flat.	Pick up face of components	Position error	Under 10 × 10 mm	±1.0 mm or less	10 × 10 mm or over	±1.5 mm or less	
Pick up face of components	Position error							
Under 10 × 10 mm	±1.0 mm or less							
10 × 10 mm or over	±1.5 mm or less							
Permissible tray warpage (Gap)	Warpage (Gap): Max. 0.5 mm 							
Type	Use an injection molded tray of sufficient strength and dimension accuracy. If you use any tray other than the above, consult us, separately.							
Mass	Mass of the tray: 1 kg or less Tray + components = Max. 1 kg/ pallet (Excluding the mass of pallet) Total mass of the tray magazine: 20 kg or less Magazine + pallets + trays + components = Max. 20 kg/ magazine							
Pallet insertion limitations	There must be a space of minimum 4mm between tray pallets. Which slot to occupy and insert will be determined based on that. (Example) 							

4.4 Line Configuration

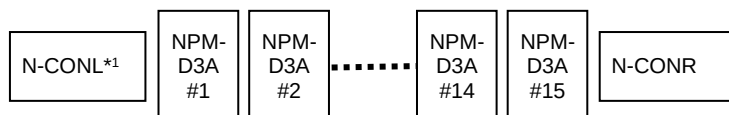
■ Examples of line configuration

The line configuration of NPM-D3A and the location of the conveyors (N-CONL/ R) are as follows.

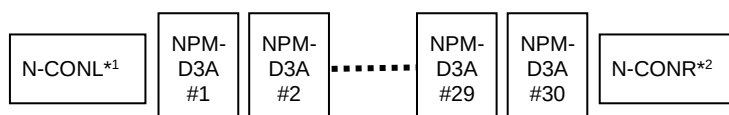
It is required for the first and last equipment of the NPM-D3A to ensure the safety of the transfer opening.

1. Line configuration of NPM-D3A only

1.1. 15 or less machines coupled



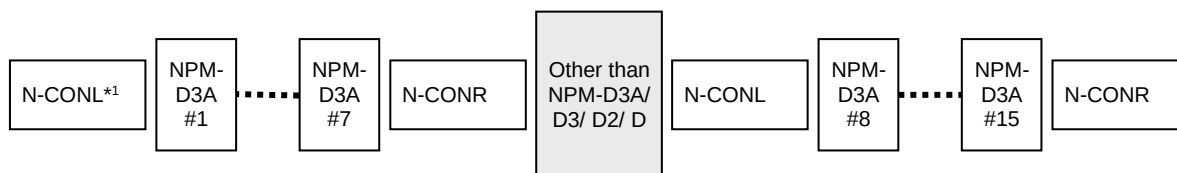
1.2. 16 or more and 30 or less machines coupled



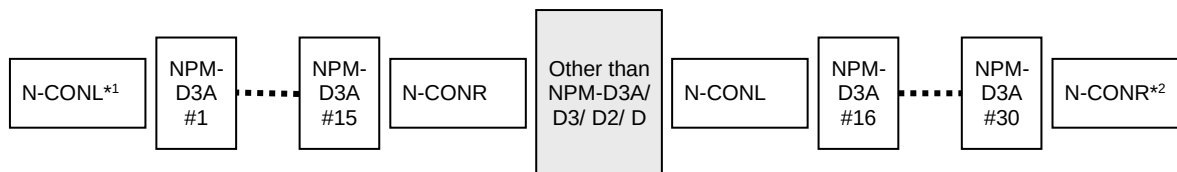
2. Line configuration including the machine other than NPM-D3A/D3/D2/D*

Make sure to select a conveyor at the point where NPM-D3A/D3/D2/D lies next to another system.

2.1. 15 or less machines coupled



2.2. 16 or more and 30 or less machines coupled



* These line configurations are examples. They vary with your line configuration and the arrangement of the machine other than NPM-D3A.

For details, please contact us.

* Connecting to NPM-W2/ W/ W2S requires a traverser between them. It cannot be connected to NPM (NM-EJM9B series).

*1 FA PC, and HUB and the power source unit (option) are required for far left N-CONL in a line.

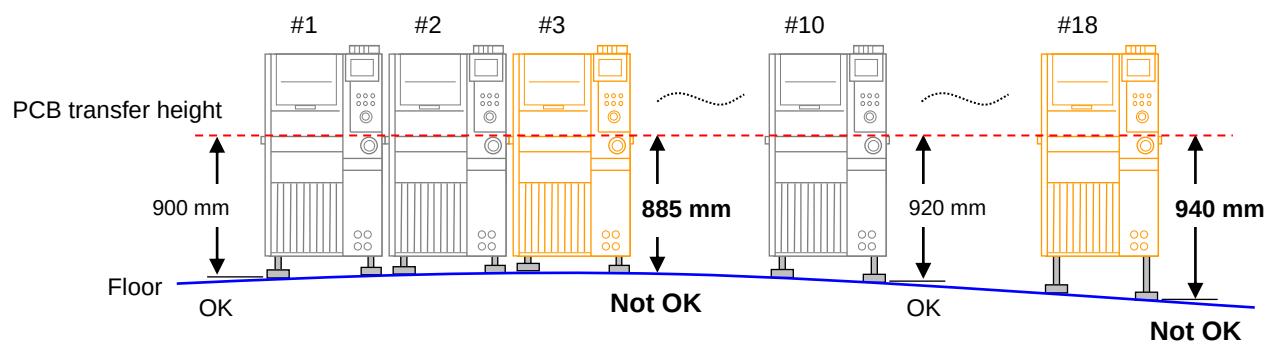
*2 To couple 16 or more NPM-D3A/D3/ D2/ Ds together, HUB and the power source unit (option) are required for far right N-CONR in a line.

■ PCB transfer height

The standard NPM-D3A PCB transfer height is 900 mm to 920 mm.

The PCB transfer height of the production line may differ based on the condition of the floor in the customer's factory. The figure below shows an example in which the feeder cart for #3 and #18 cannot connect with the equipment as usual.

Please contact us if all of the NPM-D3A transfer heights in a production line are not 900 mm to 920 mm.



Regardless of stand-alone installment or line connection, FA PC is always needed to set up NPM-D3A.

FA PC (Option)

It is a computer only for FA, which has a line server function, and the whole set is necessary per line.
You can choose a location where to put a FA PC: inside N-CONL* or to put outside.
LNB will be installed.

* To install FA PC to N-CONL, HUB and the power source unit (option) are needed.

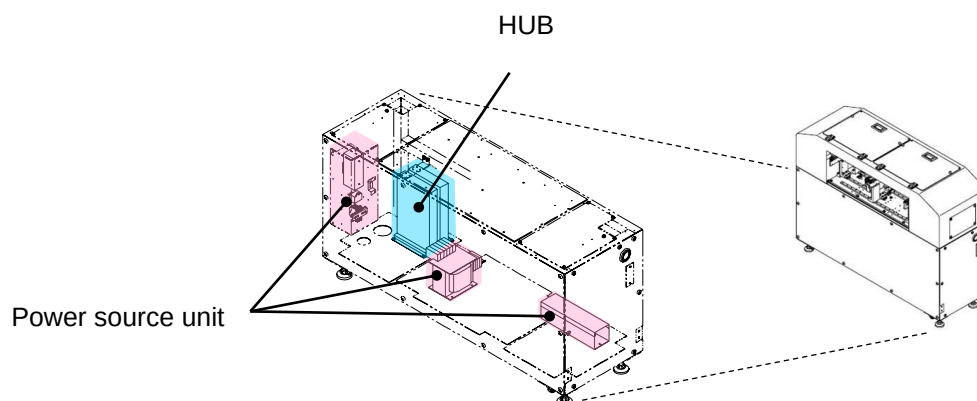
Basic specifications of FA PC

Type	FC-E27B-GL2CP7 (made by NEC)
Auxiliary storage	Internal HDD: 500 GB × 2 as standard (Mirroring supported)
OS	Miracle Linux (Version 6)
Outside dimension	W 100 × D 360 × H 310 mm
Mass	10.0 kg

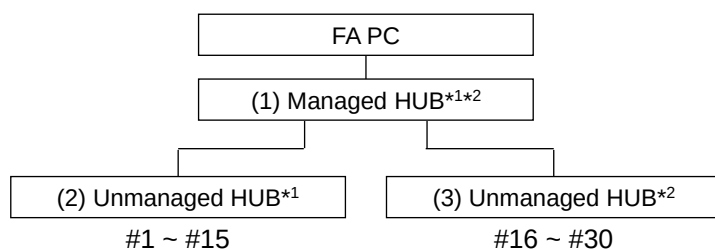
* Please prepare the LAN cable by yourself.

HUB and power source unit (Option)

This option consists of HUB, a breaker, a transmitter, a terminal block and others.



Example of the connection between a FA PC and a HUB



*1 (1) and (2) are included with HUB and the power source unit (option) of N-CONL.

*2 (1) and (3) are included with HUB and the power source unit (option) of N-CONR.

LNB (Line Network Box)

LNB (Line Network Box) is a relay system connecting the machine and NPM-DGS (Data Creation System), being installed on the FA PC.

It handles multiple machines as a line; thereby centrally managing information, downloading production data, and compiling production management information.

(This software is included in the NPM-D3A system software DVD-ROM.)

Main functions:

- ① Downloading production data to machines
- ② Retaining production data and managing differences
- ③ Retaining/Compiling production management information
- ④ Retaining event information

LWS (Line Work Station)

LWS can display the result data retained in LNB by accessing to LNB through the use of PC*.

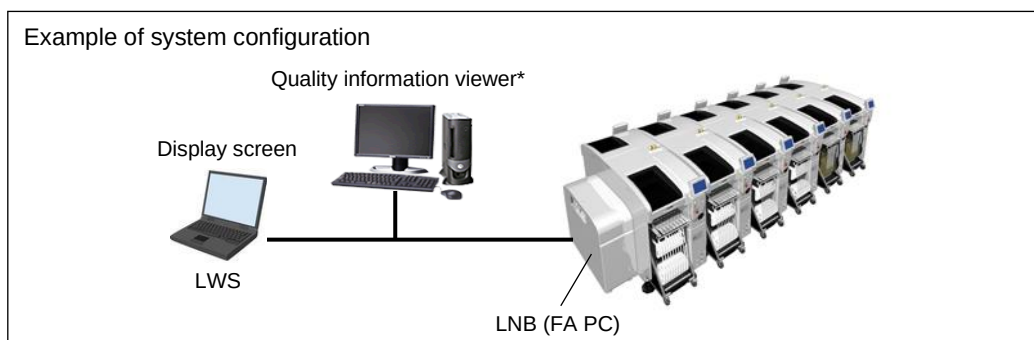
* A PC is to be prepared by the customer. Google Chrome(the latest version recommended) is required for access.
Please refer to "NPM-DGS Specification booklet" for details.

Quality information viewer

Comprehension of changing points and analysis of defect factors are supported by displaying the information on quality (the position of the feeder used, recognition compensation value, parts data and others) per PCB and per mounting point.

Main features:

- Gathers/Stores weekly quality information
- Displays quality information to LWS



* Please prepare PC by customer. It cannot be shared with the NPM-DGS.
This software is included in the NPM-D3A system software DVD-ROM.

Operating environment of quality information viewer

• Hardware Specifications

Item	Specification	Required or Recommended
Main body	IBM PC/AT compatible machine (A desktop PC is strongly recommended.)	Required
CPU	Intel® Core™2 Duo E6700 equivalent or greater	
Mother board	IBM-fully-compatible machine	
Serial I/O	1 IBM-fully-compatible machine	
Graphic board	SXGA or higher Desk top region: 1 280 × 1 024 dot or more	
Memory	4 GB or more	
HDD	500 GB or more of available space (NTFS file system)	
Optical drive	DVD drive To be used in installation	
Keyboard	English version: 101 English keyboard Japanese version: 106 Japanese keyboard	
Mouse	Supported by your OS as standard	
Monitor	SXGA-compliant	
Network card	For 100/1000BASE-T	
Uninterruptible power supply (UPS)	Supported by your OS as standard	Recommended

• Software Specifications

Item	Specification	Required or Recommended
OS	Microsoft® Windows® 11 Pro Microsoft® Windows® 10 Pro (64-bit version)	Required
Support language	English, Chinese, Japanese	
Framework	Microsoft® .Net Framework 3.5	
Virus check	Virus Buster™ Program version 7.0	Recommended

Microsoft and Windows are registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.
Intel and Intel Core are registered trademarks or trademarks of Intel Corporation in the United States.
Virus Buster is a registered trademark or trademark of Trend Micro Incorporated.

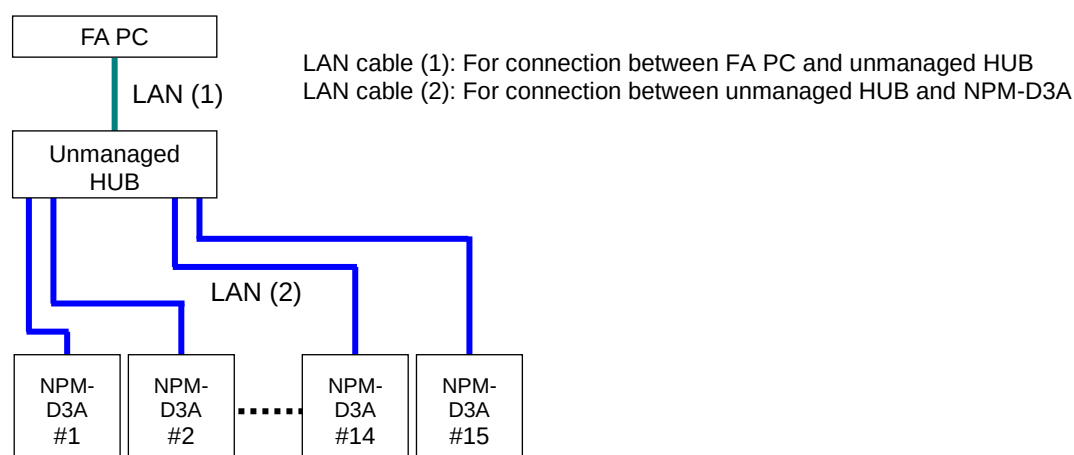
■ Example of NPM-D3A line connection

LAN cables are required together with an FA PC and HUB prepared on your own.
Please prepare them according to the number of NPM-D3A coupled together.

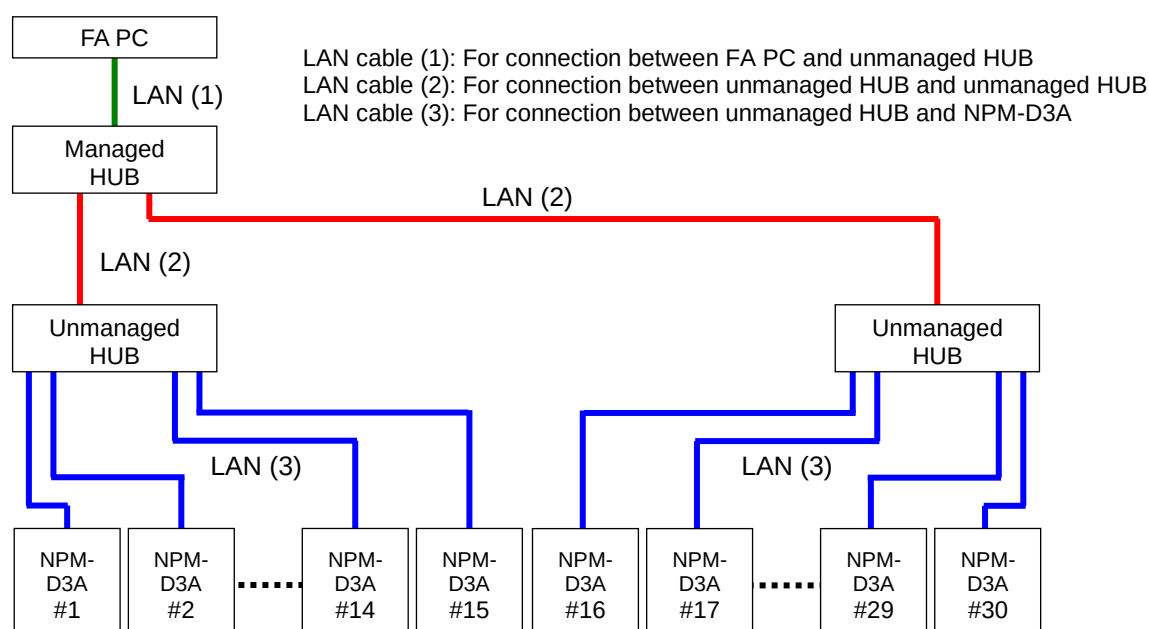
Basic specifications of HUB and LAN cable

Standard	IEEE802.3 standard
Data rate	10BASE-T/ 100BASE-TX/ 1000BASE-T(Auto-Negotiation)
Recommended type	Unmanaged HUB: DGS-1016L (made by D-Link) Managed HUB: DGS-1016L (made by D-Link)* * Required when more than 16 NPM-D3A are coupled.
LAN cable	UTP cable of enhanced category 5 or later

15 or less machines coupled



• 16 or more and 30 or less machines coupled



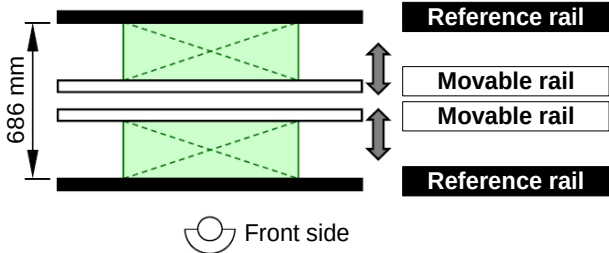
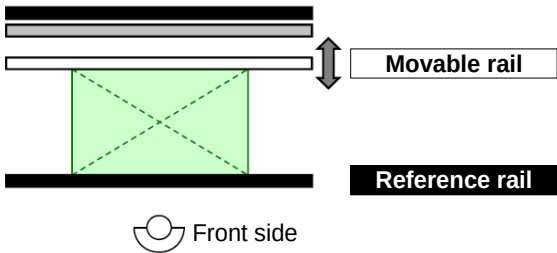
Please install the FA PC and HUB prepared to any given location.

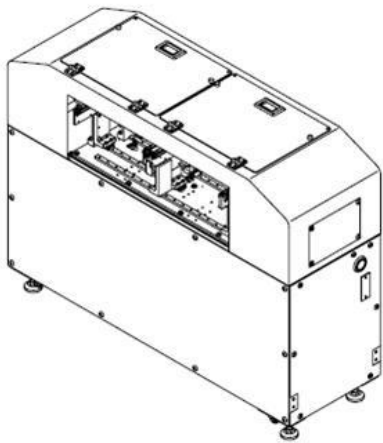
They should not be installed to N-CONL.

For installation of FA PC* to N-CONL, HUB and the power source unit (option) are required.

* Please use a PC recommended by us.

■ Standard Specifications of Conveyors (N-CONL, N-CONR)

Item	Specifications
Electric source	Supply by NPM-D3A* * When a HUB and a power source unit (option) are selected, the following electric source is required. ▪ Rated voltage Single-phase, AC 100 V ~ 240 V ▪ Frequency 50/ 60 Hz ▪ Rated capacity 320 VA: N-CONL (NM-EJK3B) 40 VA: N-CONR (NM-EJK4B)
Applicable PCB	▪ Dimension Dual lane mode: 50 × 50 mm ~ 510 × 300 mm Single lane mode: 50 × 50 mm ~ 510 × 590 mm ▪ Thickness 0.3 mm ~ 8.0 mm ▪ Mass 1.5 kg or less (After mounting, including the carrier mass.)
Flow direction	Left → Right, Left ← Right (Selectable)
Reference	Dual lane mode  Single lane mode *¹  *¹ The rear reference is available when the machine is reversed. * It cannot be connected to NPM-W2/ W and NPM (NM-EJM9B series).
PCB transfer height	900 ⁺⁷⁰ ₋₂₀ mm
Outside dimension	W 450 × D 1 360 × H 1 042 mm
Mass	150 kg
Environment	▪ Temperature 10 °C ~ 35 °C ▪ Humidity 25 %RH ~ 75 %RH (No condensation) ▪ Altitude 1 000 m or less, above sea level
Paint color	White: W-13 (G50)



Conveyor

Machine Configuration

NPM-D conveyor L Model ID: N-CONL Model No.: NM-EJK3B • Installed to the left side of NPM-D3A Options • FA PC • HUB and power source unit	Diagram showing the front side view of the NPM-D conveyor L configuration. The conveyor is installed on the left side of the machine. Arrows point to the 'Opening sensor' on the left and the 'PCB detection sensor' on the right. Front side
NPM-D conveyor R Model ID: N-CONR Model No.: NM-EJK4B • Installed to the right side of NPM-D3A Options • HUB and power source unit	Diagram showing the front side view of the NPM-D conveyor R configuration. The conveyor is installed on the right side of the machine. Arrows point to the 'PCB detection sensor' on the left and the 'Opening sensor' on the right. Front side

4.5 Recognition Unit Configuration

■ Head camera

- Field of view: 7.68 × 7.68 mm

(For information about the PCB recognition mark dimensions, please refer to “7. PCB Design Standard.”)

■ Multi-recognition camera: Type 1

The position and the angle deviation in picking up the chip are corrected.

In addition, the presence of solder balls can be detected* for BGA/ CSP through the side lighting (option).

Recognition method	Recognition speed	Applicable Component
Batch recognition	High	General chip components including the square chips measuring 03015* or over. BGA, CSP, QFP, SOP, and connector etc. * When "03015 placement support" is selected.

* There are limitations on the components for which the ball detecting is available.

Please refer to the item describing the recognition condition of BGA/ CSP.

* The multi-recognition camera on NPM-D3, NPM-W2 or later, some parts cannot be shared with the conventional line camera.
(Such as using the option of the brightness check function etc.)

Recognition conditions of QFP/ SOP (Type 1)

Placement conditions of QFP / SOP are as follows.

(Basically, in QFP/SOP mounting, we will receive samples and then decide whether it is mountable after going through consideration and experiments)

	Lightweight 16-nozzle head V3A	Lightweight 8-nozzle head	2-nozzle head
Outside dimensions	See “3.2 Standard Functions”. *1		
Thickness			
Lead pitch	0.4 mm or over		
Lead width	0.2 mm or over		
Lead shape	Leads must be protruding out of the mold area by 1 mm or over.		

- Feeding type: tapes, trays

*1 When the short side of component outer dimensions exceeds 45 mm × 45 mm, it is split recognition.

* For information about components that are not conforming to the above specifications, please consult us.

Recognition conditions of BGA/ CSP (Type 1)

Placement conditions of BGA / CSP are as follows.

(Basically, placement of BGA/ CSP is studied and experimented after getting the sample of it, and then it is judged to be placed or not.)

	Lightweight 16-nozzle head V3A	Lightweight 8-nozzle head	2-nozzle head
Outside dimensions	See "3.2 Standard Functions". *1		
Thickness			
Ball pitch	0.075 ^{*2*3} mm ~ 1.5 mm		
Ball diameter	ϕ 0.045 mm ^{*3} ~ ϕ 0.9 mm (Ball diameter should be uniform)		
Ball shape	Globular or cylindroid ^{*4}		
Materials of ball	High temperature solder, eutectic solder		
Balls	Lattice arrangement : 2 × 2 ~ 64 × 64 (Rows × Columns) (Staggering arrangement : 2 × 2 ~ 32 × 32 (Rows × Columns)) *Ball pitch and ball dimensions should be uniform. At arrangement that is not lattice : 2 ~ 15 000 balls		

- To enable the simultaneous recognition of BGA/ CSP appearance and solder balls, the body shall be made of the glass epoxy. There are some cases in which the recognition is difficult depending on conditions (pattern, with or without through hall, luster, etc.) of placement surfaces of solder balls.
- BGA/ CSP which is made of ceramic or has the gold body is placed with only the contour recognition.
- Surface of ball
The surface of ball should be free from the blur due to oxidation.
(Effect extent of oxidation for the recognition needs to be checked by an experiment.)
- Feeding type: tapes, trays

*1 When the short side of component outer dimensions exceeds 45 mm × 45 mm, it is split recognition.

*2 Consult us regarding large-sized, minimal pitch components.

*3 At split recognition, the minimum ball pitch is 0.15 mm, and the minimum ball diameter is 0.09 mm.

*4 Placement may fail depending on the combinations of ball pitches or ball diameters.

Recognition conditions of connector (Type 1)

The general conditions of placement connectors are as follows.

(Basically, placement of connector is studied and experimented after getting the sample of it, and then it is judged to be placed or not.)

	Lightweight 16-nozzle head V3A	Lightweight 8-nozzle head	2-nozzle head
Outside dimensions	See “3.2 Standard Functions”. *1		
Thickness			
Lead pitch	0.5 mm or over		
Lead width	0.2 mm or over		
Lead shape	Leads must be protruding out of the body by 1 mm or over.		
Other shape	No through holes around contact pins shall exist in a vertical direction. Contact pins shall not be exposed to the underside.		

- Feeding type: tapes, trays, sticks

* In the case of the placement of large sized connectors, in addition to those, some limitations may be imposed on the dimensions depending on the relation between the pickup position and the recognition range.
For further information, please contact us.

*1 When the short side of component outer dimensions exceeds 45 mm × 45 mm, it is split recognition.

■ Component thickness measurement function (Multi-recognition camera: **Type 2**)

In addition to Type 1 features, Type 2 has the component thickness measuring feature and the top/bottom detecting feature and improves mounting quality.

Item	Description		
Applicable component	03015R*1 ~ Mini Tr/ Di (Max: 6 × 6 mm)		
	Minimum component thickness: 0.1 mm (For standing/tilted standing detection at the time of pickup, 50 μm or more is required as difference between any two of thickness, width, or length of components.)		
Functions	Measurement function of component thickness	Every time	Component thickness is measured every time, reflecting the result on placement height. Micro components' standing/tilted standing and flip of Tr/ Di at the time of their pickup can also be checked simultaneously.
		First time of parts exchange	The part detection will be done at the first part after the following operations: "Automatic operation starts", "Parts replenishment", "Tape splicing detection", "Chip data correction".
		Component teaching	Thickness measurement and chip data registration are possible for respective components.
	Check function of nozzle tip	A check is done for nozzle tip height's abnormality (break or nozzle holder sliding defect).	
	Ejection detecting function	After component ejection following recognition errors or etc., a check is done to make sure there's no adhesive material on the nozzle tip.	

* This detection is not applicable when you use the nozzle with pad or the nozzle with steps on its tip.

* Measurement with short nozzle is not included.

* Please make purchase for each table at the front/ rear sides.

* The multi-recognition camera on NPM-D3, NPM-W2 or later, some parts cannot be shared with the conventional line camera.
(Such as using the option of the brightness check function etc.)

*1 When "03015 placement support" is selected.

■ 3D-measurement function (Multi-recognition camera: Type 3)

In addition to Type2 features, Type 3

- Detects coplanarity(flatness) of all the leads and XY-direction positions at high speed in QFP/SOP and other packages.
- Detects presence or absence of all the balls, and partially broken balls in its shape in BGA/CSP and other packages.

Recognition method	Recognition speed	Typical example of components	Min. lead/ Min. ball pitch	Min. lead width/ Min. ball diameter	Min. ball height
Batch recognition	3D high speed	QFP, SOP	0.4 mm ^{*1}	0.2 mm	—
		BGA, CSP	0.4 mm ^{*2}	0.25 mm	0.25 mm

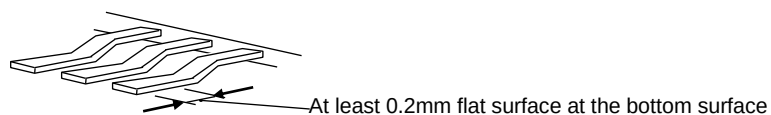
* The multi-recognition camera on NPM-D3, NPM-W2 or later, some parts cannot be shared with the conventional line camera. (Such as using the option of the brightness check function etc.)

* Coplanarity(Flatness) measuring range is ± 0.5 mm.

* Depending on recognition speed and/or the number of electrodes, there may be recognition waiting time at mounting.

* BGA/ CSP is limited to the ones that electrode shape is circle and that the bottom surface has ball-shape terminals.

* When it is QFP/ SOP, there must be at least 0.2mm flat surface at the bottom surface of a lead.



*1 For QFP/ SOP of a lead pitch less than 0.4 mm, please consult us.

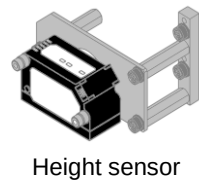
*2 For BGA/ CSP of a ball pitch less than 0.4 mm, consult us.

■ Height sensor

It controls the placement height of the nozzle by measuring the height (warpage) of PCB.

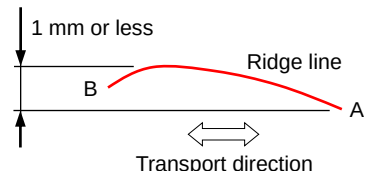
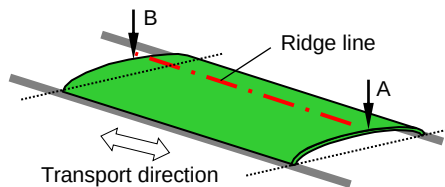
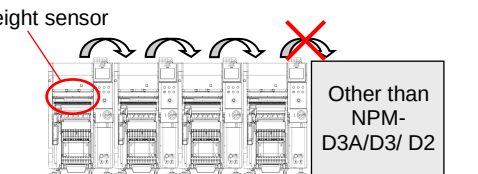
If a measurement result exceeds the acceptable value, a warning is issued prior to placement to prevent the occurrence of quality defects.

It has the PCB warpage correction (for the placement head) function.



PCB warpage correction (for the placement head)*1

Controls the placement height by measuring the height (warpage) of the whole PCB.
The measurement is after PCB recognition.

Item		Description			
Applicable PCB*2	Dimensions	Long specification conveyor		Short specification conveyor	
		Dual lane mode	Single lane mode	Dual lane mode	Single lane mode
		50 × 50 mm ~ 350* × 300 mm	50 × 50 mm ~ 350* × 590 mm	50 × 50 mm ~ 260* × 300 mm	50 × 50 mm ~ 260* × 590 mm
		* For the PCB (PCB for split placement) which exceeds the size of L 350 mm, advanced proof is necessary.		* For the PCB (PCB for split placement) which exceeds the size of L 260 mm, advanced proof is necessary.	
	Thickness	0.3 mm ~ 8.0 mm*3			
	Mass	1.5 kg or less (Do not cause a change in PCB shape due to mount component mass)			
	Material	Glass epoxy			
	Measuring surface material	The area of 1.5 × 1.5 mm or larger on the copper foil + the resist surface, the copper foil surface or the silk surface. Transparent and translucent area are excluded. (e.g., glass epoxy material face)			
Warpage	Upward warp: 2 mm or less, downward warp: 2 mm or less and a warping gradient of 0.5 % or less Difference in ridgeline(transfer direction) height is 1 mm or less. 				
Functions	PCB warpage acceptable value detecting	If a measurement result exceeds the acceptable value, a warning is issued prior to placement to prevent the occurrence of quality defects. Acceptable warping gradient (%) can also be checked.			
	Height control	Controls the placement height by measuring the height (warpage) of the whole PCB.			
	Measurement data passing	The data measured by the first NPM-D3A (placement head + placement head) in line is passed to the downstream NPM-D3A/D3/ D2*.  NPM-D3A/D3/ D2 Other than NPM-D3A/D3/ D2 * If any machine other than NPM-D3A/D3/ D2 is coupled together, no data passing is allowed.			
Measurement condition	Measurement height	PCB upper surface ±4 mm (A measurable range but not a PCB warpage acceptable range.)			
	Measurement area	You need to set a measurement point at 5 mm inside from a slit in the edge of a PCB.			
	Measurement points*4	Whole warp correction: more than 9 points (Up to 25 points/PCB) Pattern warp correction: more than 9 points/pattern (Up to 25 points/pattern)			
Measurement time		2.0 s (350 × 300 mm in an optimal condition, with 9-point measurement)			

*1 Select the height sensor for the first NPM-D3A (placement head + placement head) in line.

It is required only on the front of the machine in the single lane production mode, and, on the front and rear, in the dual lane production mode.

*2 PCB warpage correction can correct only simple curved surfaces with a U-shaped cross-section.

Complicated warp geometry can be corrected as a combination of simple curved surfaces with the use of the pattern warp correction. You are recommended to use the pattern warp correction for PCBs with a slit or thin PCBs since they tend to have a complicated warp shape. (See the next page)

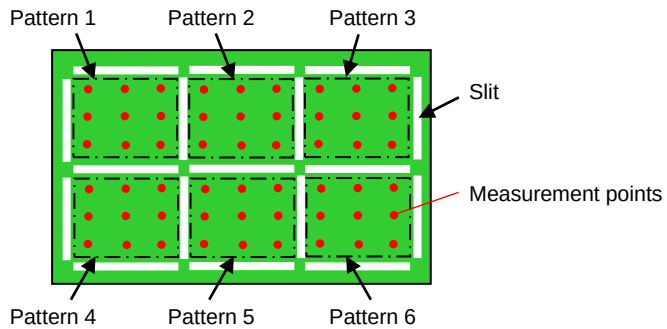
*3 A PCB, which is 0.3 to 1.0 mm thick, needs to be verified in advance.

*4 For the maximum number (total number of settings) of measurement points that can be set, please refer to "3.1 Basic specifications Production data."

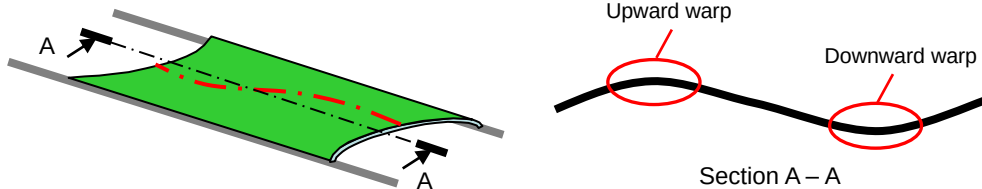
PCB with a slit

It is unlikely that PCBs with a slit have smooth (even) curved surfaces because of their complicated warp geometries. In such a case, you are recommended to use the pattern warp correction.

Pattern warp correction: corrects a warp at the measurement per pattern. (See the following figure)

**Uncorrectable warp shape**

e.g.) PCB with an undulating surface



4.6 LCR checker(Built-in type)

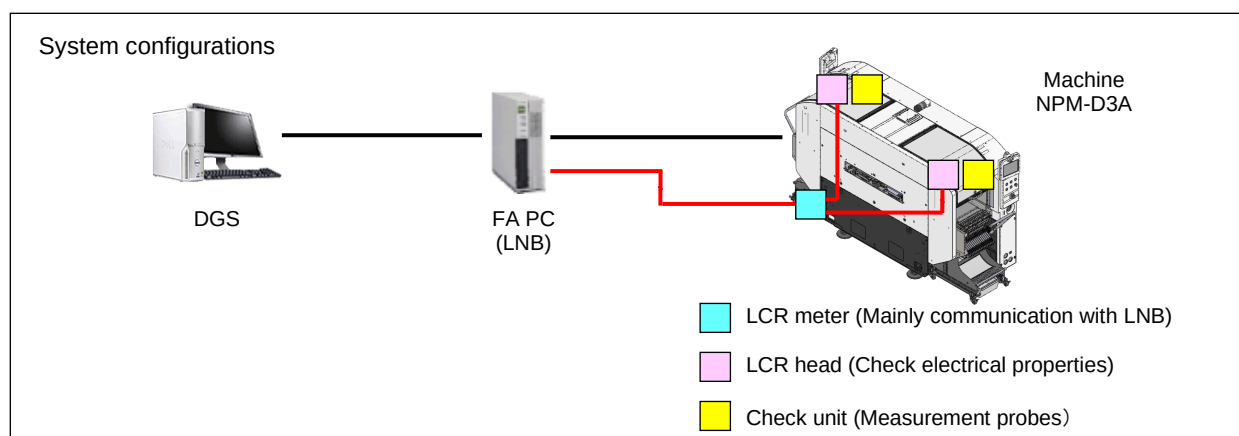
LCR checker (Built-in type) measures electrical properties of chip components to prevent error mounting caused by erroneous picking up of chip components.

FA PC receives component electrical properties measured with LCR checker and checks whether machine is within the acceptable range.

■ Standard configuration

FA PC keeps operation history on it.

When you use LCR checkers, you need to enter settings with DGS.



■ Overviews

Check

- Measures electrical properties of chip components and checks whether the values are within the set range.

Production stop

- When judged as NG, i.e. when electrical properties of chip components are out of the set range, productions will go in to error stop.

■ Standard specifications (1)

Items	Descriptions
Applicable heads	- Lightweight 16-nozzle head V3A, V2 - Lightweight 8-nozzle head
Components	L:0.4 mm x W:0.2 mm ~ L:6.0 mm x W:6.0 mm, H:5.0 mm or lower • The conditions must be: In Dimension "L", chip components have electrodes on both sides and both sides have electrodes underside.
Measurable parameter range	Resistance(R) : 0 Ω ~ 100 M Ω Condenser(C) : 1 pF ~ 100 μ F (Polar capacitor are not included) Inductor(L) : 4.7 nH ~ 1 mH Diode/Zener diode : 0 V ~ 3.4 V * Polarity evaluation only
Measurement accuracy	Resistance(R) : 0 Ω ~ 0.999 Ω $\pm$ 0.05 Ω 1 Ω ~ 9.999 M Ω $\pm$ 3 % 10 M Ω ~ 100 M Ω $\pm$ 5 % Condenser(C): 1 pF ~ 99.99 pF $\pm$ 5 % 100 pF ~ 4.699 μ F $\pm$ 10 % 4.7 μ F ~ 100 μ F $\pm$ 40 % ($\pm$ 10 % *) Inductor(L) : 4.7 nH ~ 1 mH $\pm$ 20 % ($\pm$ 10 % *) Diode/Zener diode : 0 V ~ 3.4 V $\pm$ 10 % * The values (in brackets) are the accuracy range of electrical capacitance, frequency response considered. (For details on how to calculate the percentage, refer to operational manuals)
Measurement tact	Less than 5 seconds / points (Picking up and collecting chip components are included)

■ Standard specifications (2)

Item	Description
Eligible nozzles	Standard-specification nozzles that match targeted measurement component size. * Nozzles that are used for LCR Checker Electrical Correction Lightweight 16-nozzle head V3A, V2 : 230CS nozzle Lightweight 8-nozzle head : 230C nozzle
Supply unit rules	Applies to tape feeder. You can use this option only on feeder carts (17-slot). You cannot use this option on single tray tables.
Placement mode	• Share mode • Independent mode * When a measurement unit is only on one table, chip components on the other table that does not have a measurement unit are NOT subject to LCR checks.
Determine electrical property constants (Resistance, Capacitance, Inductance, Forward voltage, Zener voltage)	This is a function that checks electrical property constants with LCR checkers in the process of production and that the constant values will be showed on the machine's screen or LNB. (constant check timing is as follows) • When picking up is for the first time after production start* • When picking up is for the first time after splicing is detected to go to a next tape • When picking up is for the first time after feeders are disconnected • When picking up is for the first time after chip components run short and production restarted • When teaching is ongoing and you are manually measuring values * When chip components are the same before and after changeover and went through electrical property checks at the previous production, the tests at this time are not performed.
Judge the measurement values	• This is a function to detect whether the values are not in acceptable range when the values are exceeded "Value Maximum Limit" or when the values are lower than "Value Minimum Limit", based on the values you defined for each chip component with DGS. • When the values are not in acceptable range, detection will be repeated until the maximum number of trials is reached to the entered "the number of attempts to retry". When the re-tried values are in acceptable range, measuring continues. • When all of the retrials are not in acceptable range, measuring will go in to error stop.
LCR checker Calibration features	• Placement position calibrations The NPM-W2 machine corrects coordinate axes of LCR checkers in X-direction and Y-direction with its head camera recognition functions, and coordinate axes in Z-direction with its nozzle height measuring functions. • Electrical Corrections There are two corrections to maintain measurement accuracy; Short Corrections and Open Corrections.
Storing measurement values	The values measured in the process of productions will be kept on LNB for 7 days; you can see the data and output them in a CSV format.
Rules with Load checker	• LCR checker(Built-in type) and Load checker cannot be selected on a same table. • You can select LCR checker(Built-in type) and Load checker separately; you can select LCR checker(Built-in type) for a front table and Load checker for a rear table, or LCR checker(Built-in type) for a rear table and Load checker for a front table.

■ Preparations on your end

Items	Descriptions	Specifications
USB cables	USB cables are used for LAN settings of LCR meters.	USB 2.0 A-A Type A  Type A
0 Ω Resistance	0 Ω Resistance is used for LCR Checker Electrical Corrections.	Dimensions : L x W = 1.6 mm x 0.8 mm, t = 0.5 mm Resistance : 50 m Ω or lower *Recommended resistance Manufacturer model number : TLRZ1JTDD Manufacturer : KOA Speer (Model number : D0YBR0000045)

5. System software

5.1 Component Verification*1

This prevents components from being put wrongly. If you set components that are inconsistent with production data that are downloaded to the machine, interlock function of the machine operates to create automatically the mode where production cannot be continued. It is possible to customize order of barcode scanning and/or barcode definition, according to customers' operation.

Regarding the main body of the scanner, please choose between the wired scanner and the wireless scanner (PDA).

(We ask you to prepare a wireless scanner on your end)

Purchase of this option is required for the optional "Feeder Anywhere" feature.

*1 This is an option list of Component Verification.

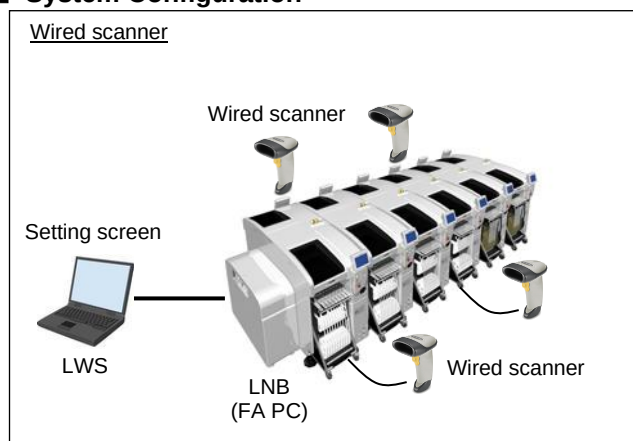
When NPM-DX is in production line, please select "Material Verification" from "PanaCIM-EE Gen2"

Option		Hardware	Floor level control*2
Equipment	Component Verification : Wired scanner type	Wired scanner	Unsupported
PanaCIM-EE Gen2*3	Material verification : wireless scanner type	Wireless scanner (PDA) , Access point iLNB PC	Available

*2 It is impossible to control multiple lines in the floor and use modules like Material Control Module, Traceability Module, etc.

*3 See PanaCIM-EE Gen2 Specifications for details.

■ System Configuration



* It is impossible to implement operation where the wired and wireless scanners (PDA) are used in combination.

■ Function List

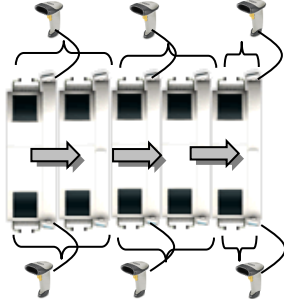
Item		Description
Feeder verification* ¹	Component verification at the time of preparation	Components are verified at the time of preparation.
	Component verification at the time of component exhaustion	Components are verified when they are replenished at the time of component exhaustion
	Component verification at the time of splicing	Components are verified at the time of splicing.
Periodic check		Components are checked at random time, such as time of shift change, etc. There's no need for stopping production while the periodic check is done.
Re-check	Re-check for feeder jam releasing	Re-check is done at the time of feeder jam releasing.
	Re-check for releasing splicing error detection	Re-check is done at the time of releasing splicing error detection.
	Re-check function for Inserting/removing of feeder	Re-check is done in the case where feeder insertion/removal is done due to some reasons while single stop occurs.
Automatic line selection		When you prepared a wireless scanner(PDA) on your end, you can choose a line in the GUI. The wireless scanners (PDA) on other lines can also be used.
Setting function	Defining verification flow (*This is a function that optionally defines scanning order of some 1D/ 2D codes which are attached to reels.)	Verification flow can be defined according to customers' operation. By entering code, which indicates type, into barcode, you can make setting for two modes: random mode which does not specify scanning order or sequential mode which specifies scanning order.
	Barcode setting	This defines barcode. This is applicable for complicated multi barcode. (Even in the case that one barcode includes multiple meanings, you can accomplish scanning by only one scan.)

*1 It does not support component verification of stick feeders.

■ Standard Specifications

Item	Description
Scan code	 <u>1D code(Barcode):</u> UPC/EAN/JAN, UCC/EAN 128, Code 39, Code 128, etc.
	 <u>2D code:</u> Maxicode, Data Matrix(ECC 200), QR code, etc.
Restrictions for code	Restrictions for code used for Part name, Lot name, Vendor name, and etc. ASCII alphanumeric and signs within 30 characters As for signs, only followings can be used: - + = , . _ @
Display language	English, Chinese, Japanese 1) Applicable for the display screen of the setting terminal on LWS

■ Standard Configuration

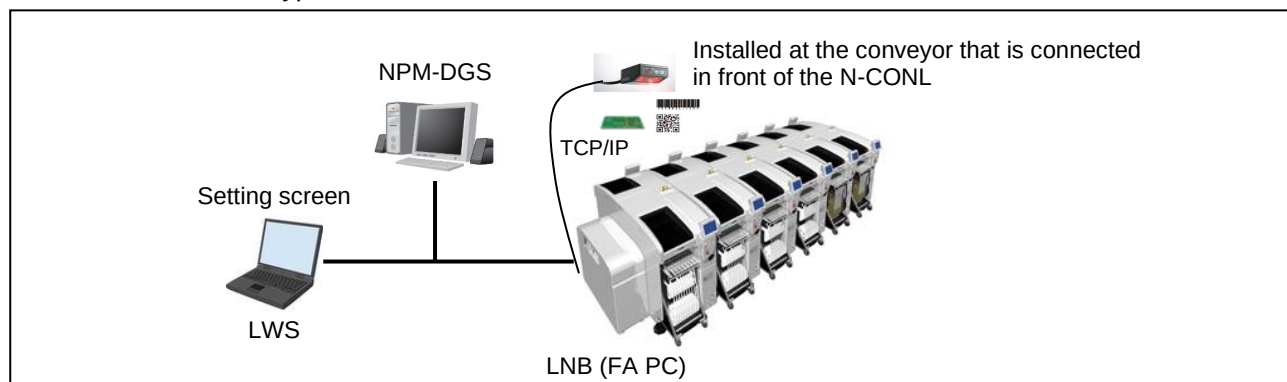
Item	Description	
Wired scanner	Main body of wired scanner	This is a unit for reading barcodes. Single main body of scanner makes the operations for two tables possible. We recommend the main body of scanner to be installed alternately at both sides of front and rear. Please make purchase in accordance with your line configurations. 
	Scanner holder	This is a unit which holds scanner onto the machine.

5.2 Automatic Changeover

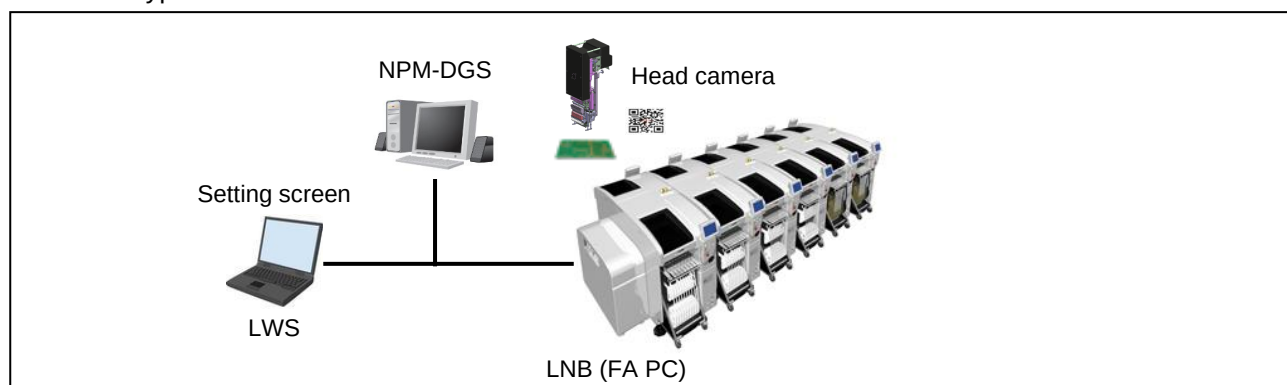
This supports changeovers (production data change and rail width change), minimizing the time loss of operation caused by product changes. In accordance with each customer's operation, selection can be made from following two types, "External scanner read type", and "Head read type".

■ System Configuration

External scanner read type



Head read type



■ Function List

Item		Description
Changeover function	External scanner read type	External scanner is installed on the first conveyor, and the scanner reads 1D/ 2D codes* ¹ on boards, automatically implementing changeovers.
	Head read type * With production data restrictions* ³	2D code* ¹ on boards is read by Head camera on the first NPM-D3A, making it possible to implement automatic changeover.
Setting function	Barcode setting	This defines barcode. This is used to specify production data, and two types of method of specifying are available. • <u>Method of specifying character string</u> Method in which data extracted from barcode is character string, which corresponds to production data name on a one-to-one level. • <u>Method of specifying range</u> Method in which data extracted from barcode is numeric value, and its range corresponds to production data name on a one-to-one level.

*1 This option does not include printing function of 1D/ 2D code on PCBs.

*2 This option does not include printing function of 1D/ 2D code on papers.

*3 Board width cannot be adjusted. So, all data of board width must be common.
All data of 2D code coordinate, which is used for changeover, also must be common.
(As for the 2D code coordinate of splittable board, there's no need for the commonality.)

■ Standard Specifications

Item	Description
Readable code	External scanner read type  <u>1D code (Barcode):</u> CODE39, ITF, Industrial2of5, COOP2of5, NW-7, CODE128, EAN128, CODE93, JAN/EAN/UPC(supporting add-on), TriopticCode39, etc.  <u>2D code:</u> QR code, MicroQR, Data Matrix(ECC200), PDF417, MicroPDF, Maxicode, etc.
	Head read type  <u>2D code:</u> QR code, MicroQR, Data Matrix(ECC200) Max. dimension: 5 × 5 mm
Restrictions for code	Restrictions for code used for Board ID and Pattern ID ASCII alphanumeric and signs within 128 characters. As for signs, only followings can be used: - + = , . _ @
Display language	English, Chinese, Japanese (Applicable for display screen of setting terminal on LWS)

■ Standard Configuration

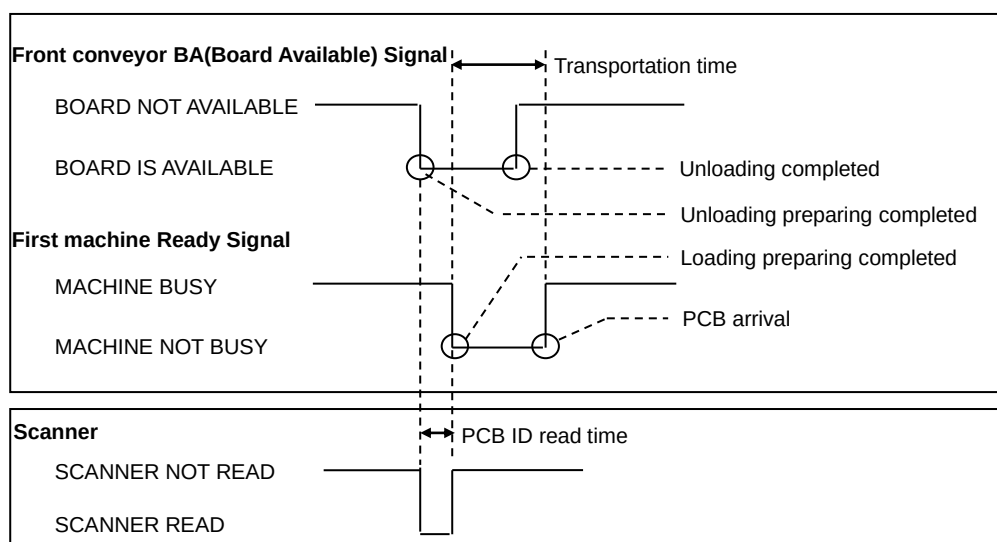
Item	Description
Hardware	External scanner read type • <u>External scanner unit</u> This is not supplied by us and for the purpose of 1D/ 2D code reading. One device is required for each lane in a line. Following is the scanner for which operation was confirmed by us. Please consult us when you use other scanners. Scanner: SR-510, SR-600, SR-600HA, SR-610, SR-750, SR-750HA, SR-1000, SR-2000 (KEYENCE CORPORATION) Communication unit: N-L1 (KEYENCE CORPORATION) ^{*1} ^{*1} The communication unit is required for SR-600, SR-600HA, SR-610. • <u>Conveyor</u> This conveyor is not supplied by us. This is located on the Head of the line. This must be in conformity with following specifications. 1) Availability of board waiting with stopper 2) Equipment of mechanism that can change width automatically or manually with a handle. 3) Availability of SMEMA communication*
	Head read type Head camera is used, so hardware is not needed.
	Planned form read type • <u>Main body of wired scanner</u> This is for reading barcode, and connected to first machine. One device is required for a line. Common use with component verification option (wired) is possible. • <u>Scanner holder</u> This is for placing the scanner on the machine. Common use with component verification option (wired) is possible.
License	A license is required for each machine. Please refer to "14. Regarding Licenses".

* LNB controls scanner through intervention in SMEMA communication.

TCP/IP is used to interconnect LNB and an external scanner, and LNB and a machine.

There is a timing chart of SMEMA communication below.

SMEMA communication between conveyor and machine must be in conformity with this timing chart.

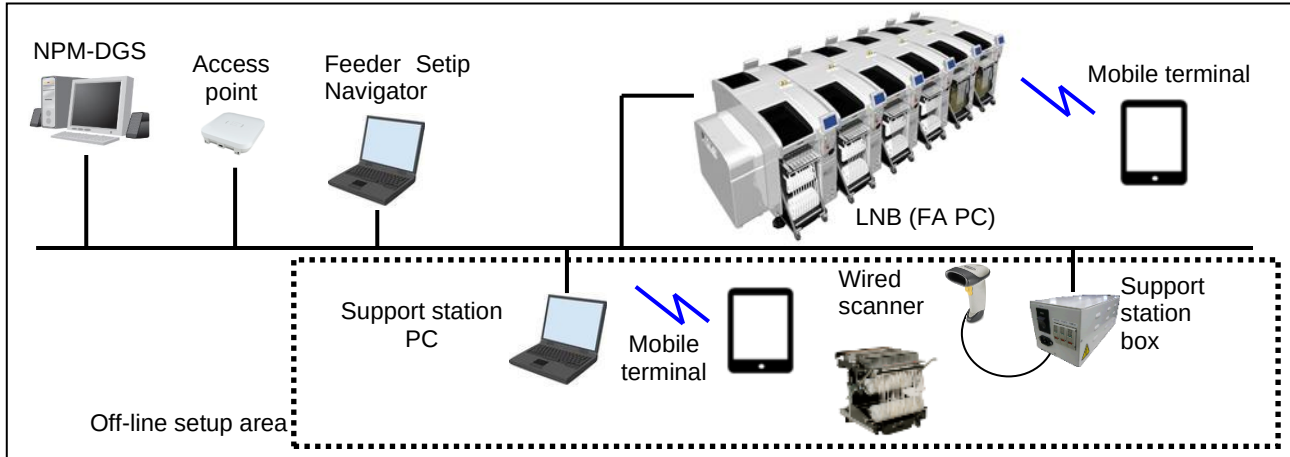


5.3 Feeder Setup Navigator

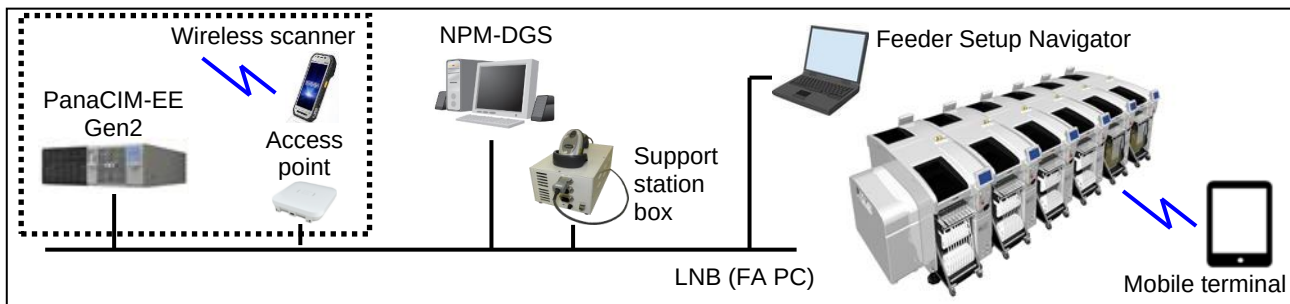
It is a support tool to navigate efficient setup procedure. The tool factors in the amount of time it takes to perform and complete setup operations when estimating the time required for production and providing the operator with setup instructions. This will visualize and streamline setup operations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

■ System Configuration

For support station (Component verification type)



For PanaCIM-EE (Material verification)



■ Function List

Item	Description
Production plan creation function	Based on the specified model, production volume and number of workers involved in the setup task, it creates a production plan that factors in the amount of time it takes to perform and complete the setup is created. The estimated time of completion of production can also be confirmed on a per-model basis.
Setup instruction display function	It displays setup tasks necessary for production of the next and following models. It permits you to check the status of the feeders being mounted on the machine in real time and the progress on the ongoing setup task, and also to perform a setup task on the machine in operation. In addition, one and the same view can be displayed in web browser on several different PCs or mobile terminals.

■ Standard Configuration

Item	Description
License	A license is required for each machine. Together with the license, select the options below. <u>Required</u> Support station box (Component verification type) <u>Choice (Select any of the following options)</u> 1) Component verification (License) + Support station: Component verification type (License) 2) PanaCIM-EE ready (License) Please refer to "14. Regarding Licenses".
PC	It is a PC used to display production plans and setup instructions. * Please prepare on your own. Can also be shared with NPM-DGS and support station PCs.

■ System Requirements

• Hardware specifications

Item	Specifications	Class
Main body	IBM PC/AT-compatible machine	Required
CPU	Intel® Core™2 Duo E6700 equivalent or greater	
Mother board	Fully compatible with IBM	
Graphic board	SXGA or higher Desk top region: 1 280 × 1 024 dot or more	
Memory	4 GB or more	
HDD	20 GB or more (NTFS file system)	
Optical drive	4x speed or faster of DVD drive To be used in installation	
Keyboard	English version: 101 keyboard Japanese version: 106 keyboard	Required
Mouse	Supported by your OS as standard	
Monitor	SXGA ready	
Printer	Supported by your OS	Recommended
Network card	100BASE-TX network card	Required
Display terminal	iOS 11.0 or later, Android™ 4.3 or later Resolution : WUXGA or later	Recommended

• Software specifications

Item	Specifications	Class
OS	<PC> Microsoft® Windows® 11 Pro (64-bit version) Microsoft® Windows® 10 Pro (64-bit version) Microsoft® Windows Server® 2012 (64-bit version)	Required
	< Mobile terminal> iOS Safari : 11.0 and later versions (e.g. : since iOS 11.0) Android Chrome : 56 and later versions (e.g. : since Android™ 4.3)	Recommended
	Support Language	Required
	Framework	
	.Net Framework 4.7.2 or later	
Virus check	Virus Buster™ Program version 12.0 or later	Recommended

- Microsoft, Windows, and Windows Server are registered trademarks or trademarks of Microsoft Corporation in the United States.
- Intel and Intel Core are registered trademarks or trademarks of Intel Corporation in the United States.
- Virus Buster is a registered trademark or trademark of Trend Micro Incorporated.
- iOS is a registered trademark or trademark of Cisco Corporation
- Android is a registered trademark or trademark of Google Inc.

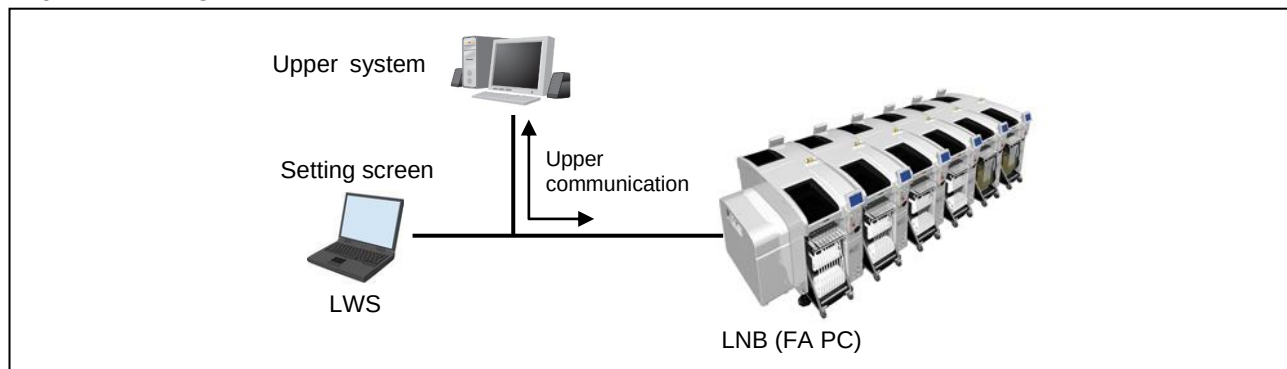
■ Constraint condition

Item	Description
Target feeder	Intelligent tape feeder, thin type single tape feeder, tray feeder *Tray feeders can display only job instructions, and does not show progress status.
Target area	In-line setups (Setups or preparations inside the machine) Off-line setups (Feeder cart setups or preparations)
Other	When a product changeover is performed on one lane during the independent mode, both the first machine in line and the other lane in operation need to temporarily stop production.

5.4 Upper Communication

This is an interface which is in cooperation with customer's existing system. As standard interface is prepared, it's possible to intercommunicate necessary information. Depending on the purpose of customer's system, functions of "Event", "Component verification with other vendor's machine", and "Information for component management" can be used.

■ System Configuration



■ Function List

Item	Description	
Standard Interface	Event* ¹	This outputs machine's events in real time. e.g.) When you would like to construct a system which combines machine's events and displays machine's status in real time.
	Component verification with other vendor's machine	This intercommunicates with customer's component verification system. e.g.) When there is other vendor's machine in the floor, and you would like to construct a component verification system that functions in cooperation with the machine by setting our system.
	Information for component management	This outputs following two information regarding components. 1) component remaining information 2) Trace information Combined information of components* ² and boards* ³ is output. e.g.) When you would like to construct a system which controls component remaining in the whole floor by receiving component remaining information that is transmitted after production of every single board in real time.
Setting function	This sets network transmission.	

*1 This is a function that transmits information to the upper system at the timing of the machine's detection of disorders, such as occurrence of component exhaustion.

*2 Component information inputs, which are done by using function of component verification option or "component verification with other vendor's machine" of this option, are required.

*3 Board information inputs, which are done by using function of automatic changeover option, are required.

■ Standard Specifications

Item	Description	
Communication form	Socket communication form	Sockets are used for this communication. There is no over head caused by hard disc accesses. This communication can be used when the file sharing is prohibited.
	Text communication form	Windows file-sharing function is used for this communication. Technologically, it is easier to construct this form than that of socket communication, because text files, which were input/output to file-sharing area, are used. This communication is also suitable for debugging.
Communication format	XML form	
Communication cache	This makes it possible to receive events of late 3 hours at the time of reconnection after the occurrence of disconnection.	
Upper system connection	One upper system can be connected for one LNB (FA PC).	
Display language	English, Chinese, Japanese (Applicable for display screen of setting terminal on LWS)	

■ Standard Configuration

Item	Description
License	A license is required for each machine. Please refer to "14. Regarding Licenses."

5.5 Component Supply Navigator

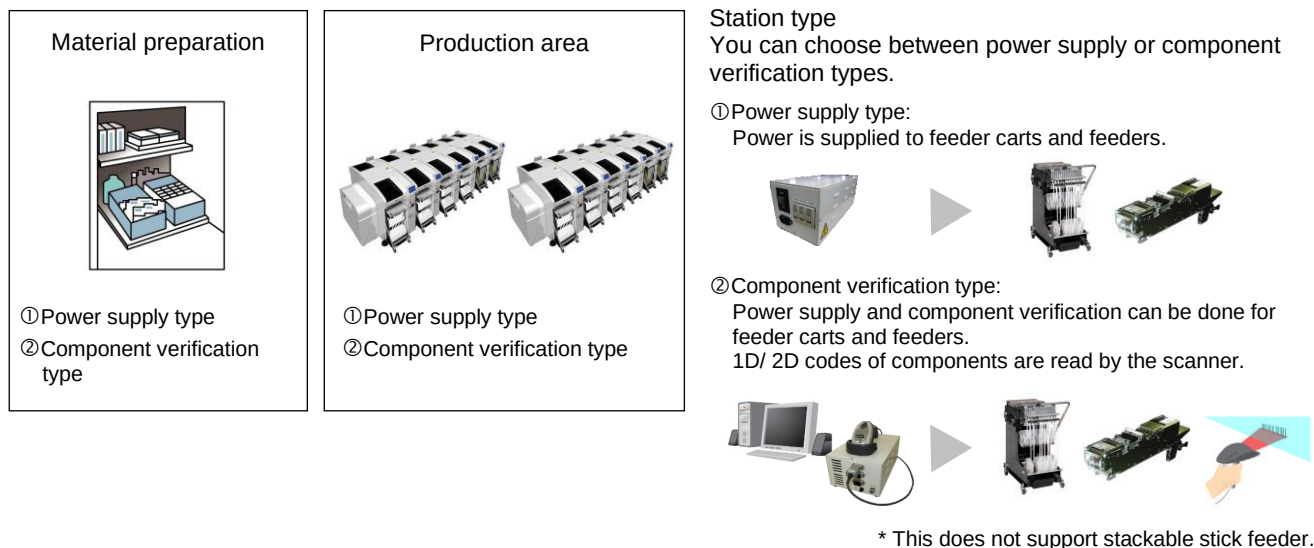
This navigator can prevent short time breakdown in the production line and contribute to manpower saving. It optimizes the supply sequence to provide a shortest route without component shortage. The optimized supply sequence will be displayed as a best supply route on wireless scanner or the monitoring PC for each operator. Component Supply Navigator is included in the PanaCIM-EE Gen2 product architecture. For the details, see the PanaCIM-EE Gen2 Specifications.

5.6 Support station

Time loss caused by changeover is drastically reduced by using spare feeder carts or feeders, which you have, and by preparing for next products while the machine continues its operation.

This has two types: one of them only supplies power to feeder carts and feeders, and another one implements component verification in addition to the power supplying.

* Component verification type is required for the optional “Feeder Anywhere” feature.



Function List

Item	Description	
	Power supply type	Component verification type
Feeder cart preparation	This supplies power to feeder carts, enabling preparations for next products while the machine continues its operation.	This supplies power to feeder carts, enabling preparations for next products while the machine continues its operation. This has a navigation function like pointing out positions that require preparation.
Feeder preparation	This supplies power to feeders, enabling preparations for next products while the machine continues its operation.	This supplies power to feeders, enabling preparations for next products while the machine continues its operation. This has a navigation function like pointing out positions that require preparation.
Component verification	Not supported	This verifies components of next products.

* In NPM series, “Change Cart Preparation Unit” in CM series is not available.

■ Standard Configuration

Power supply type

Item	Description
Power supply unit*1 *2 	This supplies power to feeder carts and feeders. The following items are included in this unit. • Power supply unit Rated voltage : Single-phase, AC 100 V ~ 240 V Frequency : 50/ 60 Hz Rated capacity : 90 VA • Power supply cable to feeder • Power supply cable to feeder cart

Component verification type

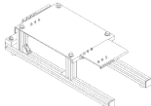
Item	Description
Support station box*1 *2 	This supplies power to feeder carts and feeders and additionally verifies components. The following items are included in this unit. • Power supply unit Rated voltage : Single-phase, AC 100 V ~ 240 V Frequency : 50/ 60 Hz Rated capacity : 90 VA • Power supply cable to feeder • Power supply cable to feeder cart • Wired scanner Scanner connecting cable * Select this option when PanaCIM-EE is used for off-line setup (component verification).
License	A license is required for each machine. Please refer to "14. Regarding Licenses." * The license is not required for off-line setup (component verification) using PanaCIM-EE.
Support station PC*3 	This is for verifying components. * This is not supplied by us.

*1 The electric source cable is not prepared by us. Regarding the connecting plug, please use the ones that are suitable for the following standards:

AC plug (IEC 60320 C13: 10 A/ 250 V)

*2 In NPM series, "Change Cart Preparation Unit" in CM series is not available.

*3 Software for the support station PC is included in NPM-D3A system software DVD-ROM.

Item	Description
Feeder setting Jig 	This is a jig dedicated for setting tape feeders. Can set one 8mm-104mm tape feeder. (Two 8mm tape feeders, two 12/16mm tape feeders, four thin type tape feeders*) * "Attachment for thin type tape feeder" is required to install thin type tape feeders.

■ Component verification type—Standard Specifications

Item	Description
Readable code	 <u>1D code (Barcode):</u> UPC/EAN/JAN, UCC/EAN 123, Code 39, Code 128, etc.  <u>2D code:</u> Maxicode, DataMatrix(ECC200), QR code, etc.
Restrictions for code	Restrictions for code used for Part name, Lot name, Vendor name, and etc. ASCII alphanumeric and signs within 30 characters As for signs, only followings can be used: - + = , . _ @
Display language	English, Chinese, Japanese

■ Component verification type—Support station PC

• Hardware Specifications (Required)

Item	Specification
Main body	IBM PC/AT compatible machine
Processor	1 GHz or faster with 2 or more cores on a compatible 64-bit processor or SoC (System-on-a-chip)
Mother board	IBM-fully-compatible machine
Graphic board	WXGA or higher Desk top region: 1 280 × 768 dot or more
Memory	4 GB or more
Storage	80 GB or more
Optical drive	DVD drive
Keyboard	English version: 101 keyboard Japanese version: 106 keyboard
Mouse	Supported by your OS as standard
Monitor	WXGA-compliant
LAN port	1000/100BASE-TX × 2

• Software Specifications (Required)

Item	Specification
OS	Microsoft® Windows® 11 Pro Microsoft® Windows® 10 Pro (64-bit version)
Support language	English, Chinese, Japanese

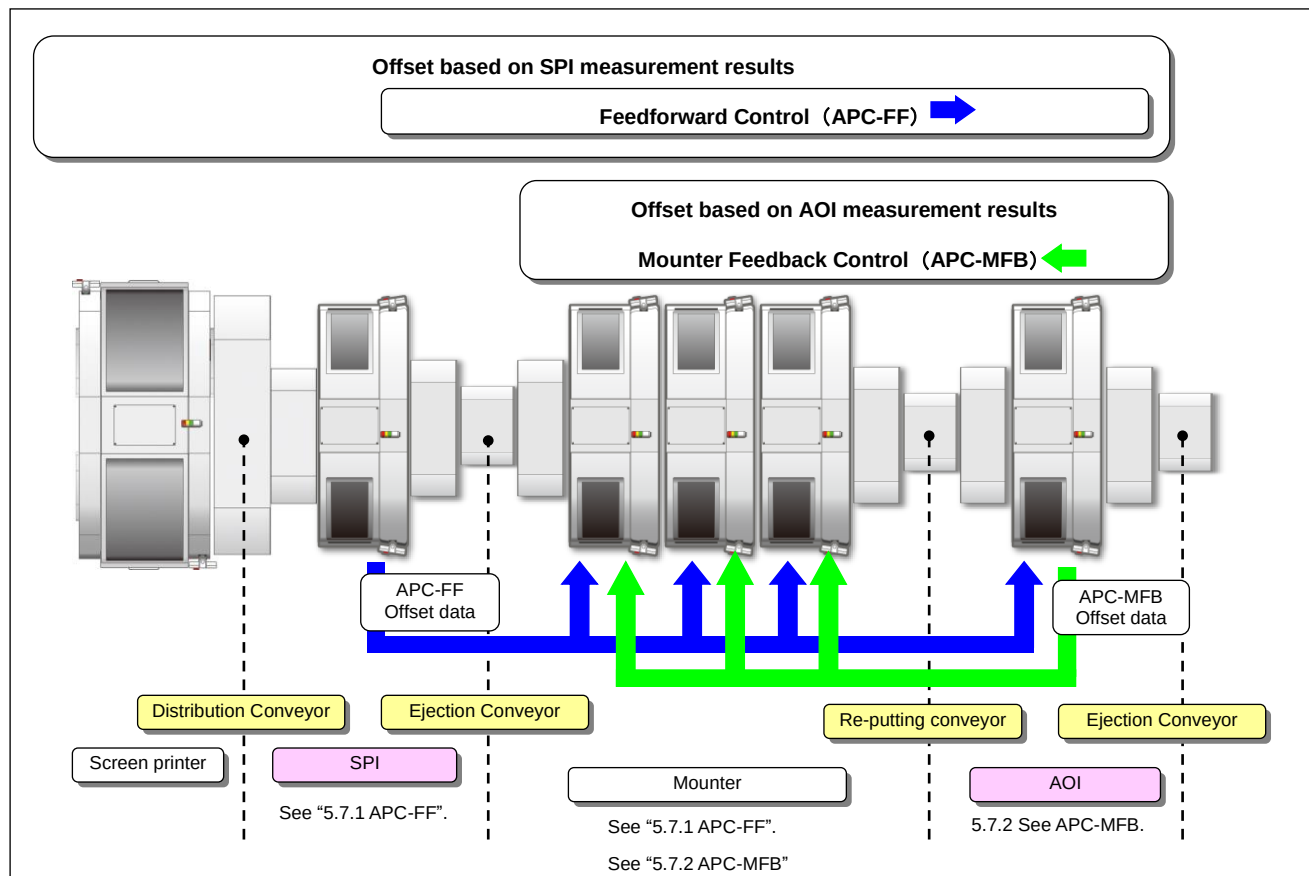
Microsoft, Windows and Windows Vista are registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.
Intel is a registered trademark or trademark of Intel Corporation in the United States.

5.7 APC system

With miniaturization of component size and high density packaging, variations in PCB size or solder printing position might cause misalignment between the positions of solder printing and the positions for components to be placed on a mounting machine, which will be a factor for defective placement or degradation of placement accuracy.

APC (Advanced Process Control) system reduces mounting defects arising from such misalignments of solder printing or part placement.

■ Overall configuration of APC system



■ Circles[O] indicate necessary licenses for APC system ready.

Function	License	Printer	Mounter (you need as many licenses as machines)
APC-FF	APC system ready		○*
APC-MFB	APC-MFB2 system ready		○

* When solder inspection is conducted with SPI of inspection machines from other companies, you need as many "Interface software of the inspection machine from other companies" licenses as machines.

See "5.7.1.1 When you use SPI of inspection machine from other companies" for details.

The existing "APC-MFB system ready" supports to compensate only chip components having a size of ≤ 1005 .

"APC-MFB2 system ready" has expanded the scope of the components to be compensated.

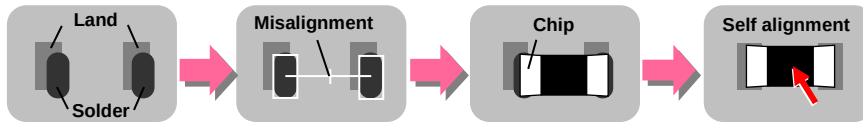
See "5.7.2 APC-MFB" for details.

■ Feed-forward control (APC-FF) See “5.7.1 APC-FF” for details.

Placement position correction (Target machine: NPM series, NPM-X series)

Places components in the optimal positions based on the measured location of solder paste.

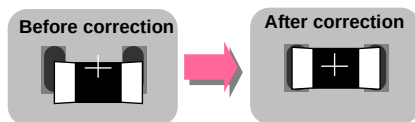
Mounting to appropriate position allows to make good use of self alignment effect in achieving high quality placement.



■ Mounter feedback control (APC-MFB) See “5.7.2 APC-MFB” for details.

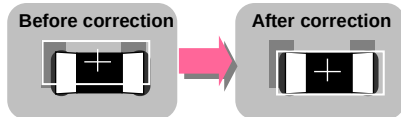
Component placement position correction (Target machine: NPM series, NPM-X series)

- Compensate misalignments based on the AOI measurement results to place components. Appropriately positioned placement provides stable quality after placed.



When APC-MFB is used with APC-FF, placement positions can be controlled and compensated before component inspections. (Target machine: Other companies' MFB-authorized AOI)

- Components are inspected based on compensated placement positions.

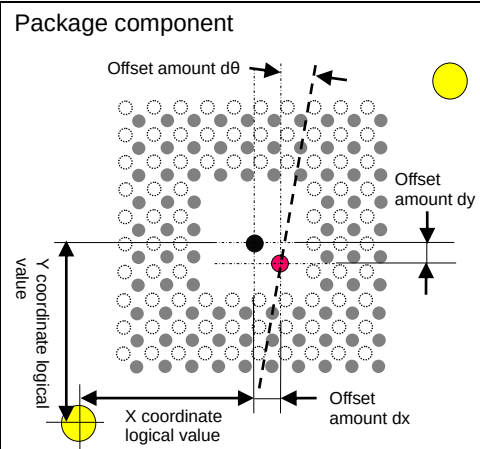
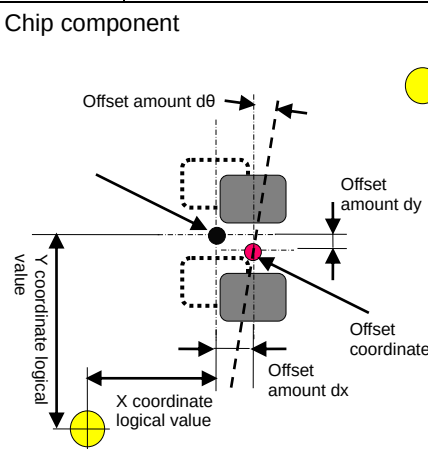


5.7.1 APC-FF

APC-FF ability to place components at appropriate positions based on SPI measurement results improves the quality after placed.

■ Basic specification

Items	Description	
Communication method	Ethernet communication	
Supported head	Lightweight 16-nozzle head V3A, V2 Lightweight 8-nozzle head 2-nozzle head	
Feed-forward control	Solder	Measure solder position and feed forward the offset amount of X direction (offset dx), Y direction (offset dy), and angle direction (offset dθ).
	Land	Measure land position and feed forward the offset amount of X direction (offset dx), Y direction (offset dy), and angle direction (offset dθ).
	Chip component	Package component



You can select SPI solder inspections for feedforward control (APC-FF) from the following options.

- When you use SPI of inspection machine from other companies : See 5.7.1.1 section

■ Effects

Mounting quality improvement^{*1}

- Bonding strength will be improved through reduction in defects, such as lifted, misaligned and missing, in miniature components (0402 or 0603 chips, etc.).
- Mounting defects arising from variations in the positions of the lands can be reduced. (Flexible or ceramic boards, PCBs to be transported via a carrier, etc.)
- Reduce the occurrence of voids on BGA/CSP to improve bonding reliability.
- The impact during component placement can be reduced so that cracking or chipping tendency of components will be decreased.

Cost reduction^{*1}

- Skipping the placement of components to NG coordinates or patterns will cut the cost associated with the loss of components.

Enhanced productivity^{*1}

- For a PCB having a number of patterns, the PCB recognition time will be extended in proportion to the number of patterns.
Owing to the use of APC system, high precision placement of components can be achieved only by using the standard PCB recognition (AB-point recognition), thereby leading to enhanced productivity.

^{*1} We cannot assure you that these effects will work on all your product placements.

5.7.1.1 When you use SPI of inspection machine from other companies

This section explains basic specifications for the use of SPI of inspection machines from other companies.

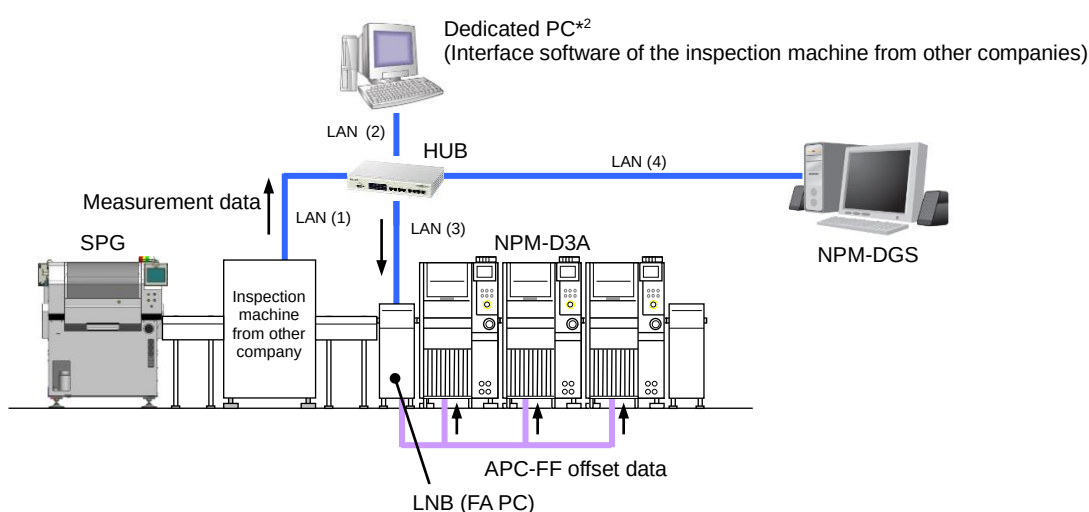
■ Basic specification

Items	Descriptions
What to be compensated : Solder, Component	Depends on the functions of inspection machines from other companies
Number of components	Depends on the functions of inspection machines from other companies

■ Interface software of the inspection machine from other companies

This is interface software to enable APC-FF system using a measurement data of inspection machine*¹ (solder inspection) from other companies.

This option (License) is required per equipment that receives APC-FF offset data. (In case of below, 3 licenses are required.) Select this option, together with "APC system-ready (License)" for the same number.



*¹ Target inspection machines need to satisfy the requirements of our specifications. For details, please contact us.

*² A dedicated PC needs to be placed between the inspection machine from other company and LNB (FA PC). Please prepare a PC, a HUB and LAN cables (LAN (1)-(4) shown in the figure above) by customers.

■ Inter-machine connection conditions

- SMEMA connection (BA and Ready signals) is essential for inter-machine connection. (NPM turns ON the Ready signal to the upstream machine (inspection machine or conveyor made by other company) after confirming the BA signal from the upstream machine.)
- Up to one conveyor can be placed between other company's inspection machine and NPM. (Except for N-CONL) Additionally, the number of PCBs that can wait on the conveyor is not more than one. Barcode operation control is required if you are likely to have more than two PCBs waited on the conveyor. Barcode reading specifications, and conveyor specifications for reading conform to the descriptions in the "Standard Specifications" and "Standard Configuration" paragraph of the "5.2 Automatic Changer" section. For details, please contact us.
- When NPM are connected via a machine, such as other company's inspection machine or conveyor, APC communication will fail to work properly.
- When you change an NPM-X upstream process from single lane to dual lane with a traverser (horizontal moving transfer equipment), you may need to remodel NPM-X about signals between machines. Contact us for the details.
- Connection conditions between machines vary when you also use iLNB or PanaCIM. Contact us for the details.

In case of using interface software of the inspection machine from other companies, please prepare the following hardware and software at customer side.

■ Hardware specifications

Dedicated PC

Item		Specifications	Class
Main body		IBM PC/AT-compatible machine	Indispensable
	CPU	Intel® Core™2 Duo E6700 equivalent or greater	
	Mother board	Fully compatible with IBM	
	Serial I/O	Fully compatible with IBM	
	Graphic board	SXGA or higher Desk top region: 1 280 × 1 024 dot or more	
	Memory	2 GB or more	
	HDD	20 GB or more of available space (NTFS file system)	
	Optical drive	DVD drive To be used in installation	
Keyboard		English version: 101 keyboard Japanese version: 106 keyboard	Indispensable
Mouse		Supported by your OS as standard	
Monitor		SXGA or higher ready	
Network card		100BASE-T or greater	
Uninterruptible power supply (UPS)		Supported by your OS as standard	Recommended

HUB and LAN cable

Item		Specifications	Class
HUB	Transfer rate	100BASE-T or greater	Indispensable
	Number of port	4 ports or more	
LAN cable		100BASE-T: UTP Cat 5 or larger (4 pieces)*	

* Please arrange appropriate length of LAN cables according to your installation environment as it varies depending on factory layout.

■ Software specifications

Item		Specifications	Class
OS		Microsoft® Windows® 11 Pro (64-bit version) Microsoft® Windows® 10 Pro (32-bit/ 64-bit version)	Indispensable
	Support language	English, Chinese, Japanese	
	Framework	Microsoft® .Net Framework 2.0, 3.0, or 3.5 shall be installed.	
Virus check		Virus Buster™ Program version 7.0 or later	Recommended

- Microsoft and Windows are registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.
- Intel and Intel Core are registered trademarks or trademarks of Intel Corporation in the United States.
- Virus Buster is a registered trademark or trademark of Trend Micro Incorporated.

** Remarks **

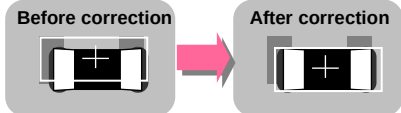
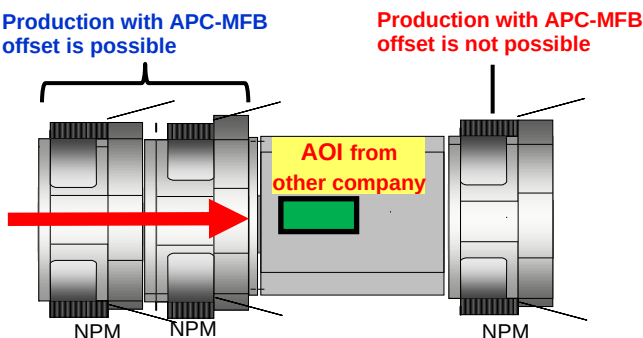
- The hardware/OS should be prepared and installed by yourself.

5.7.2 APC-MFB

APC-MFB (Advanced Process Control-Mounter Feed Back) compensates for misalignment based on the results of AOI inspection to stabilize the post-mounting quality.

Divided into categories focusing on nozzles, feeders, components, and mounting positions, the results of AOI inspection are presented as a process capability index. This helps variation management and supports appropriate response when the process varies.

■ Basic specification

Items		Description
	Communication method	Ethernet communication
	Supported head	Lightweight 16-nozzle head V3A, V2 Lightweight 8-nozzle head 2-nozzle head
	AOI	Applicable AOI for “APC-MFB2 system ready” • Please contact us to confirm the applicable makers. • The AOI should be installed in line. • When APC-MFB is used with APC-FF, placement positions can be controlled and compensated before component inspections. 
	System	About the applicable system version of NPM and AOI which support “APC-MFB system ready”, please contact the AOI maker or us.
	Placement mode	• Independent mode / Share mode • Single lane / Dual lane * When using the Automatic Changeover line, Update of MFB offset starts after production model agrees between NPM and AOI.
	Remarks	Production with APC-MFB offset is not applicable to NPM placed at the downstream process of AOI from other company because the system cannot receive mounting positions. (Example) Line configuration: Some equipment is not applicable for Production with APC-MFB offset 
Components	Type	APC-MFB2 Inspection target*
		APC-MFB Offset target
	Number of offset component	
		Chip components, lower electrode components, lead components (electronic components with a lead drawn out from one side are not included) (depend on the specification of AOI)
		When there are AOI measurement results and component placement uses nozzles, APC-MFB compensates for the placement positions of the targeted components for offset.
		Number of offset components depends on the specification of machines

*Differences in components to be measured under APC-MFB licenses (depend on the specification of AOI)

License	Components to be measured
「APC-MFB system ready」	Chip components having a size of ≤ 1005
「APC-MFB2 system ready」	chip components, lower electrode components, and lead components (electronic components with a lead drawn out from one side are not included)

Licenses are necessary per equipment.

“APC-MFB system ready” supports only NPM-D3A.

When you have equipment for “APC-MFB system ready” and have purchased its license, compensation of chip components having a size of ≤ 1005 is supported even if equipment for “APC-MFB2 system ready” for which you have purchased the license exist in a line.

New purchase is available only for “APC-MFB2 license ready”.

* AOI recognition level and type of components where MFB could be applied

Type of components where MFB could be applied depends on the AOI recognition level of inspection machine manufactures.

AOI recognition level	Type of components where MFB could be applied
Not yet recognized	None(Cannot use MFB)
MFB-recognition	1005 chip components or chip components having size of under 1005
MFB2-recognition	All components (components with leads drawn out from one side, odd-shaped components, components with unmeasurable AOI leading position are not included)

■ Programming specification

This programming specification is for production data of NPM and AOI.

(NPM) : When using DGS, please put the circuit code (like R123) which is used in the AOI into the comments section of placement coordinate setting. Make sure there is no duplicate code in the same pattern.

(AOI) : Make sure the circuit code for component on PCB board is the same code which is set in the DGS.
(Including space, “ - “, etc.)

The numbering rule of pattern is same as NPM.

(Make sure the combination of pattern code and circuit code is the same one between NPM and AOI.)

■ System specification

Item		Description	
Increased line tact time of production (VS normal production)		- Line tact time under 50 s : less than 1.0 s - Line tact time over 50 s : less than 2%	
Functions	Mounting position MFB offset function*	Offset functions for mounter. - An offset function to correct the machine variation of each XY shaft, recognition unit, and nozzle angle. - An selection function to pick-up the components for calculating offset data.	
	Process variation management function	APC-MFB offset monitor display function	(1) Mounting points - Display the Cp/Cpk of each head. - Display the correction factor of each mounting point. (Top 20) (2) Unit - Cp/Cpk of each nozzle or angle. Correction factors - Cp/Cpk of each feeder, Correction factors - Cp/Cpk of each component, Correction factors - Cp/Cpk of each area, Correction factors (3) The correction factor of each nozzle of multi-recognition camera position. (4) The correction factor of XY shaft.
		Process variation warning function	(1) Manage CPk value of each head (2) Check for Cp value falling of each unit

* When using the mounting position MFB offset function, the effect of placement accuracy depends on solder conditions, chip shapes, and/or other conditions.

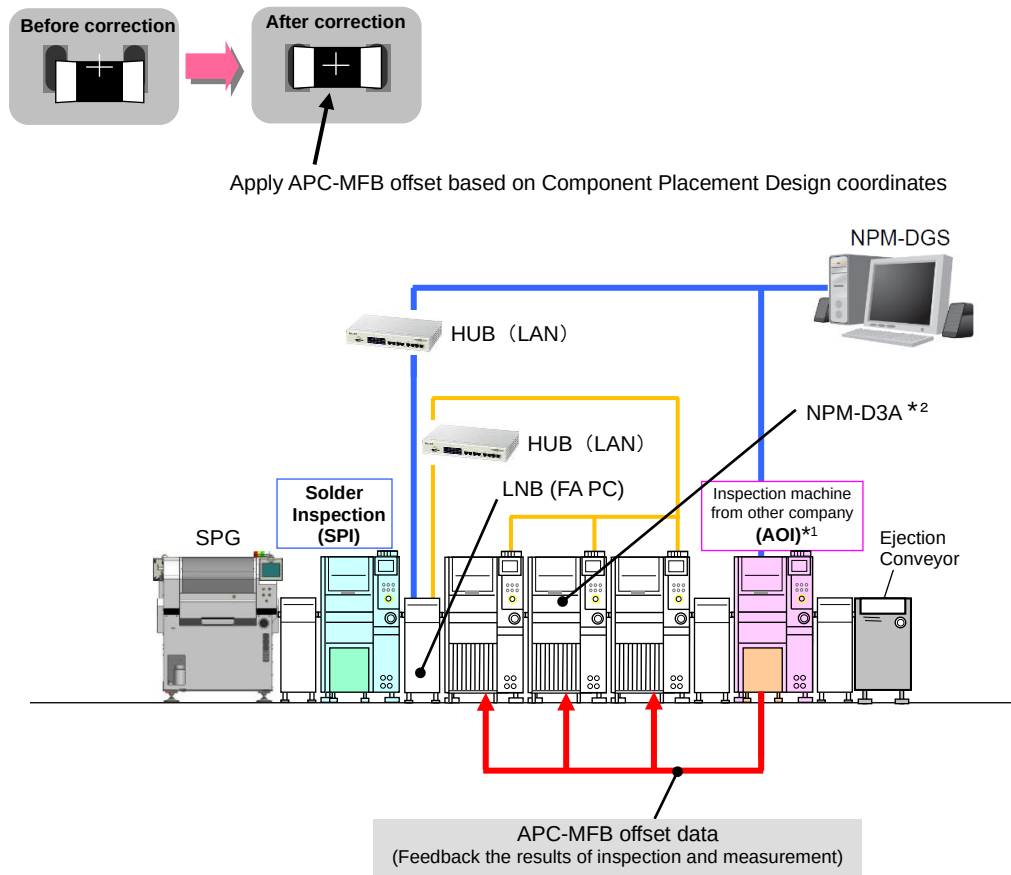
** Remarks **

- When using licenses for “APC-MFB2 system ready”, placement accuracy, applicable PCB size, the number of offset component and etc. are depend on the performance of AOI from other company.

■ Example of system configuration

When using APC-MFB system only.

AOI takes misalignment measurements based on Component Placement Design coordinates. Misalignments are compensated through the AOI measurement results.

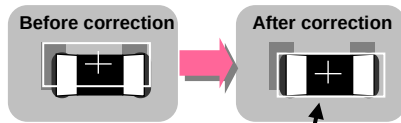


*1 Contact us for inspection machines (AOI) that support "APC-MFB2 system ready" licenses.

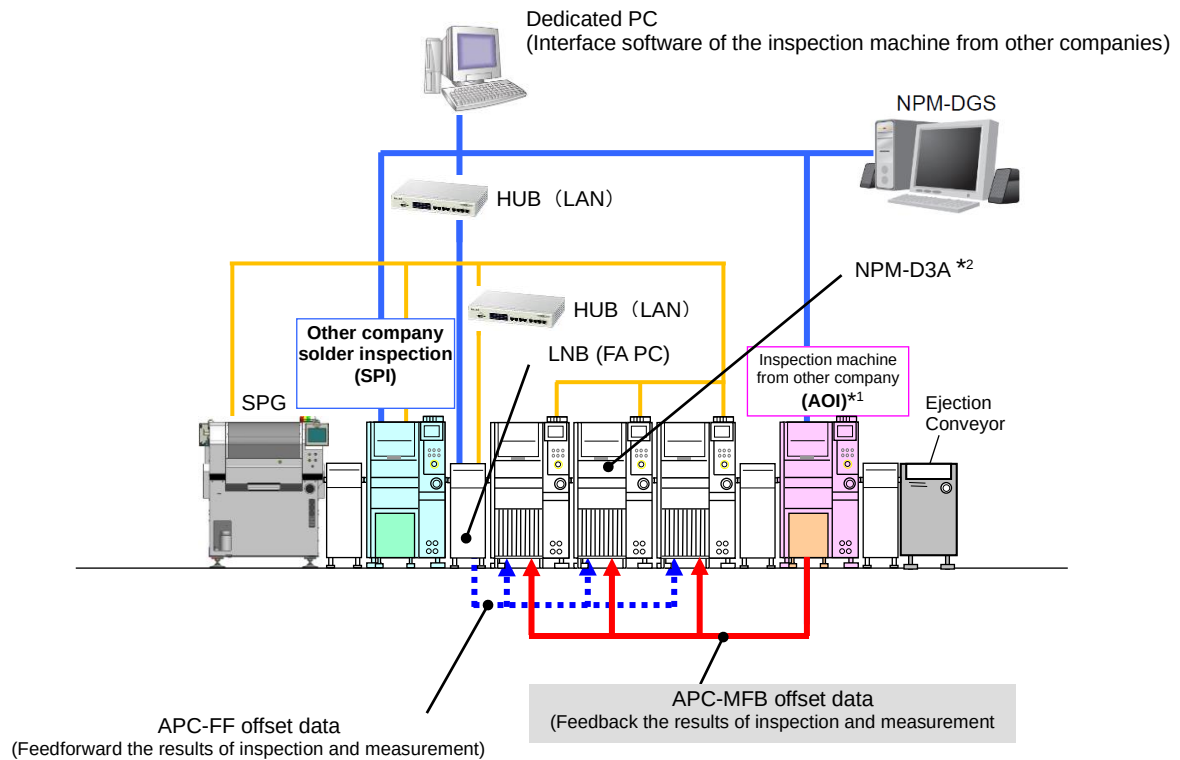
*2 "APC-MFB2 system ready" licenses are necessary per equipment.

When using APC-MFB in APC-FF Line.

AOI takes misalignment measurements based on Component Placement coordinates in light of the misalignments of printing positions. Misalignments are compensated through the AOI measurement results.



Apply APC-MFB offset based on Component Placement coordinates
in light of the misalignments of printing positions



*1 Contact us for inspection machines (AOI) that support “APC-MFB2 system ready” licenses.

*2 Licenses for APC-FF or APC-MFB are necessary per equipment.

When using APC-FF/ FB functions in solder inspections with SPI from other companies, a dedicated PC (NIP: Interface software of the inspection machine from other companies described in “5.7.1.1”) is required.

■ Effect

Maintain placement quality*

- Compensation based on AOI measurement results helps maintain the initial accuracy of facilities and provide stable quality after placed.
- Maintenance of placement accuracy reduces lifted electrodes or misalignments of small components.
- Maintenance of placement accuracy contributes to SMT with narrow pitches.
- Placement accuracy management divided into nozzles, feeders, components, and areas using Cp/Cpk helps observe the changes of Cp/Cpk, and a warning is shown when Cp exceeds the control value.
- Showing placement accuracy divided into nozzles, feeders, components, and areas using Cp/Cpk helps identify failures of nozzles, feeders, components, and/or areas.

Reduce cost*

- Maintenance of initial accuracy of facilities reduces failures arising from misalignments and offers loss cost savings and/or repair cost savings.
- Managing the changes of Cp/Cpk of nozzles provides maintenance at appropriate timing suitable for production lines.

* We cannot assure you that these effects will work on all your product placements.

** Remarks **

- APC-MFB offset is a function to feedback the mounting position of mounted parts measured with AOI to mounting machine, and does not guarantee placement accuracy.
 - For APC-MFB offset, mounting machine and AOI from other company will do a network communication. It's necessary to establish the network connection of LNB and AOI and change a signal cable for APC-MFB offset when delivering the system.
- *The signal cable between mounting machine and AOI uses the Board Available (BA) signal including a board request signal.

5.8 PCB information communication function (standard feature)

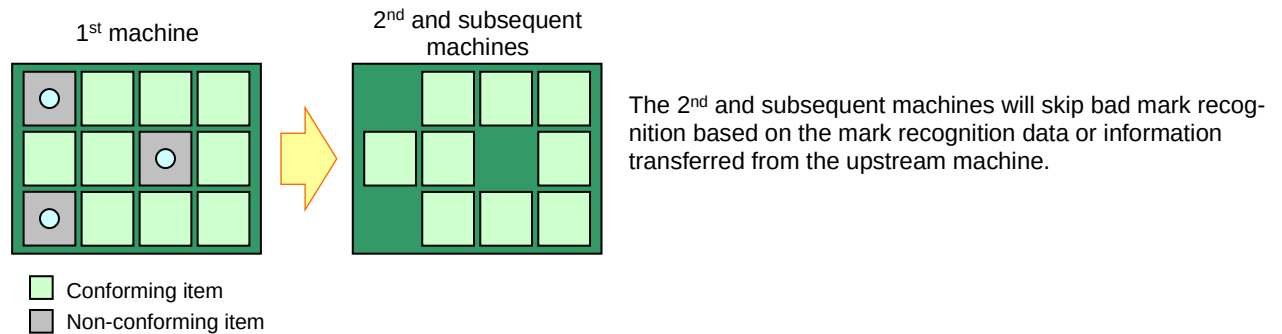
The first machine in the line performs mark recognition and then passes mark recognition data or information on to the downstream machines.

The use of the transferred data by the downstream machines can enable a shortening of the tact time.

■ Bad mark communication

Bad marks are recognized by the first machine in line, and then the bad mark recognition data is passed on to the downstream machines.

This enables the downstream machines to shorten the time required to recognize the bad marks.

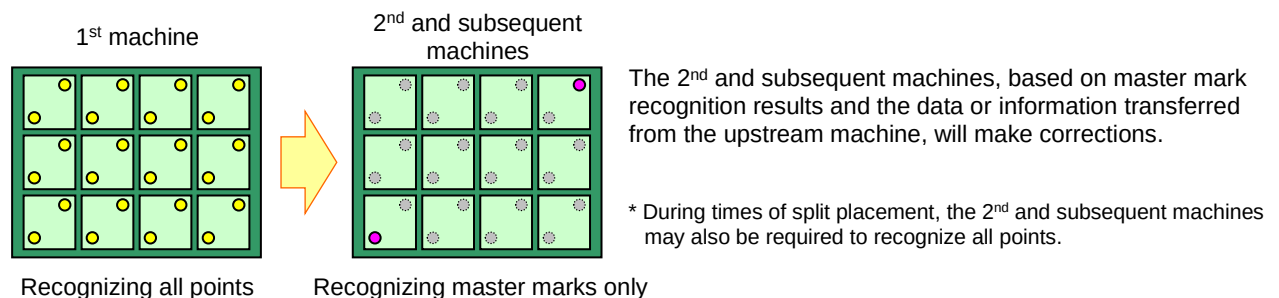


* For connection with other company inspection machines, see the optional "Other Company Bad Mark Communication".

■ Pattern mark communication

The first machine in the line recognizes pattern marks and then passes correction value data on to the downstream machines.

This allows the downstream machines to recognize only master marks, which helps shorten the PCB recognition time.



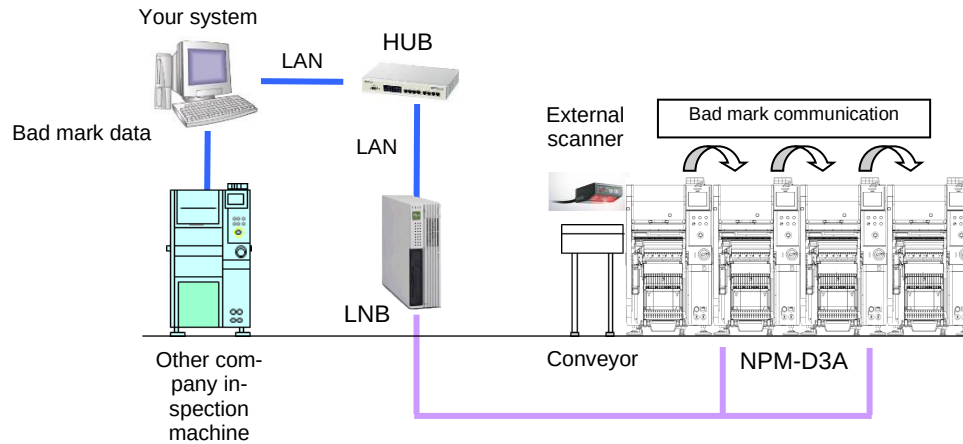
* Discussion on an individual basis is necessary when receiving PCB data from machines other than NPM-X series or NPM-series, or when you use together with APC.
For details, please contact us.

5.8.1 When Receiving Bad Marks from Other Company Inspection Machines

■ Bad Mark Communication from Other Company Machines (License)

Transfers bad mark data using bad mark data in each PCB written on a LNB's shared folder from your systems, for example other company inspection machines. This reduces bad mark reading time on a stage at the head of a line.

■ System Configuration Example



■ Processing

1. Write bad mark data in each PCB to a LNB's shared folder in the given format.

【Sample】

```
<?xml version="1.0" encoding="UTF-8" ?>
<BoardInformation>
  <Element>
    <Lane>1</Lane>
    <BoardNumber>123</BoardNumber>
    <BoardBarcode>BARXXX</BoardBarcode>
    <BadMark>010001110010010100010010101010101</BadMark>
  </Element>
</BoardInformation>
```

2. Transfers bad mark data using bad mark data associated with PCB barcodes read with a mounter's head camera or an external scanner.

* Deletes bad mark data from oldest once gets accumulated more than 10 bad mark data in an LNB shared folder.

5.9 Automatic recovery function for pickup error

This function recovers the pickup / recognition error automatically in order to continue production without stoppage.

■ Function Summary

Pickup position teaching when pickup error occurs

This function enables the machine to automatically teach the pickup position when an error is detected.
After teaching is complete, machine will continue production.
With this function, line stop times will be reduced and the utilization can be improved.

The re-pickup of pickup error components

The most of large components are not available to automatically teach the pickup position, that the function "Pickup position teaching when pickup error occurs" is not applicable.

This function enables the machine to automatically re-pick up the error components without transferring.
If pickup is complete, machine will continue production.
With this function the pickup error times and line stop times will be reduced, the machine utilization can be improved.
Available components: 12 mm ~ Embossed tape.

1 mm ⇔ 2 mm, 2 mm ⇔ 4 mm Automatic pitch switching

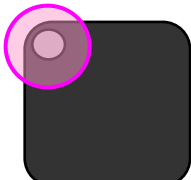
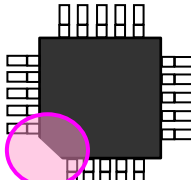
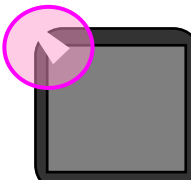
When there are same components whose tape pitch is 1mm, 2mm and 4mm, and tape pitch at component supply is mixed, at the timing of tape switching(for example, at component supply, at splicing or when you cancel an error), it automatically calculates tape pitch in the process of automatic pickup position teaching and changes to the calculated pitch and continues production.

Automatic pitch switching conditions

Items	Description
Component data	With pickup position automatic teaching * There is component size limit.
Tape width	8 mm
Applicable tape	Paper
Supply pitch	1 mm ⇔ 2 mm、2 mm ⇔ 4 mm

5.10 Component inspection before pickup (Polarity)

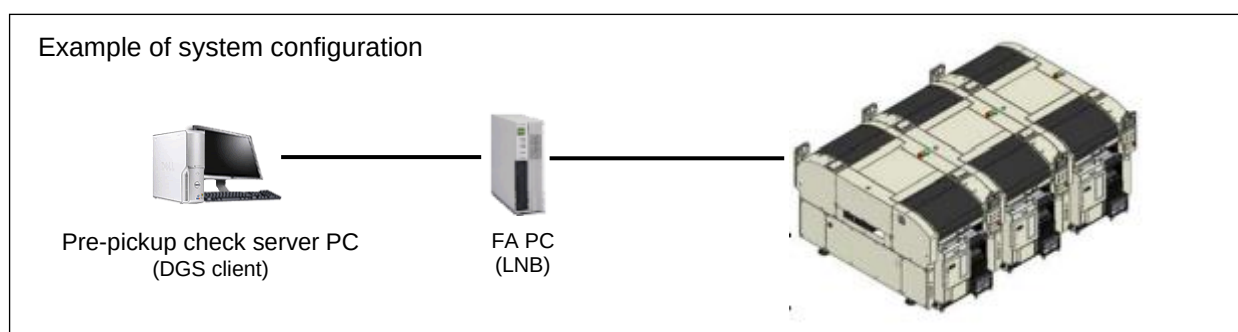
This function recognizes the surface of components with a head camera before them picked up from trays or tape feeders, in order to prevent possible misloading through polarity checks.

Misloading prevention This function detects the orientation of the components by recognizing any of the following features on the components to prevent misproduction.		
Polarity mark	Chamfering	Feature of luminosity
		

If the polarity is right, go on with pickup and mounting. But the polarity is wrong; it will show the picture with a single stop.

■ System Configuration

Recognition images are captured by the machine, and polarities are confirmed by the pre-pickup check server PC. Pre-pickup check PC is to be connected to one line (1 FA PC). (Recommended^{*1}) Besides, the pre-pickup check server PC can also be served as NPM-DGS client PC.)



*1 When the heads to be checked is 6 or less, up to 2 lines (2 FA PCs) can be connected.
In case of more than 6 heads, required check time may be longer.

■ Function List

Items	Description
Polarity inspection (Misloading prevention)	Inspection method: Select from among "Pattern matching", "Chamfering detection" and "Average luminance". 1) Select "Pattern matching" to recognize the polarity mark. 2) Select "Chamfering detection" to recognize the chamfering. 3) Select "Average luminance" to select any features of luminosity.
Setting when to check	Selectable from among "First component", "All components", and "Specified interval". Feeders capable of detecting the joint of taper components can perform component inspection of the joint position.
Handling components judged as NG	Components judged as NG can be handled by either of the following: 1) If the component is correct, press [OK] to pick it up. 2) If the component is wrong, change it to a correct one, and make check again.
Automatic pickup angle adjustment function	This function automatically corrects the angle in order to continue pickup and placement without stoppage.

■ Basic specifications

Items		Description			
Applicable components		Tray components, Tape feeder components			
Processing time required (including image pickup)* ¹		Approx. 1 s per component (1 FOV) Approx. 2 s (4 FOVs)			
Recognition requirements * ²					
Polarity mark	Mark type* ³	Processed or printed with ink			
	Mark shape				
		Circle	Square	Ring	Frame
Chamfering	Component shape	Must have a lead in four directions respectively and only one corner out of four corners must be chamfered.			
Feature of luminosity	Component shape	Must have one characteristics luminosity area at the position other than the center of the component.			

^{*1} Time required may vary depending on the conditions, such as production data.

^{*2} Recognition performance may be degraded if:

- 1) there is a soil, damage or foreign matter on the surface of the component
- 2) the working environment of the machine or designed shape of the pocket may affect the captured images

^{*3} Check result may not be satisfactory if the laser markings are low contrast image.

* Recognition check can be performed in advance by Panasonic. Contact us for details.

■ Basic configuration

Item	Specification
Pre-pickup check (Polarity) license	A license is required for each machine.
Pre-pickup check server PC	PC used to run the pre-pickup check server software for polarity recognition. Hardware and software specification comply with those of the NPM-DGS. * Must be prepared by customer. * The pre-pickup check server PC can also be served as NPM-DGS client PC. (Recommended) The pre-pickup check server PC cannot be served as NPM-DGS server PC.

5.11 Pre-pickup Inspection(Char · 2D Recognition)

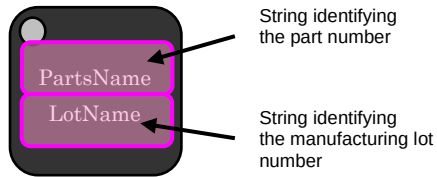
■ Overview

Recognizes the characters or 2D code on the surface of a component captured by the head camera immediately before picking it up from the tray or tape feeder, in order to prevent possible misloading and to support traceability.

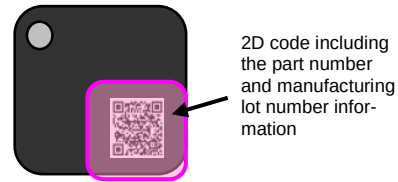
* It applies to Rear Supply Unit.(Front Supply Unit is Individual Specification. For the details, contact us)

Misloading prevention	Recognizes the part number to detect any wrong number, thus preventing wrong model from being produced.
Traceability support	Recognizes the manufacturing lot number to help ensure traceability.

Character Recognition



2D code Recognition

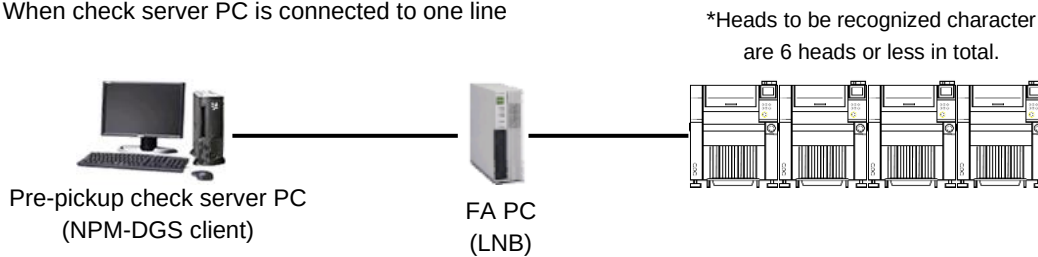


■ System configuration

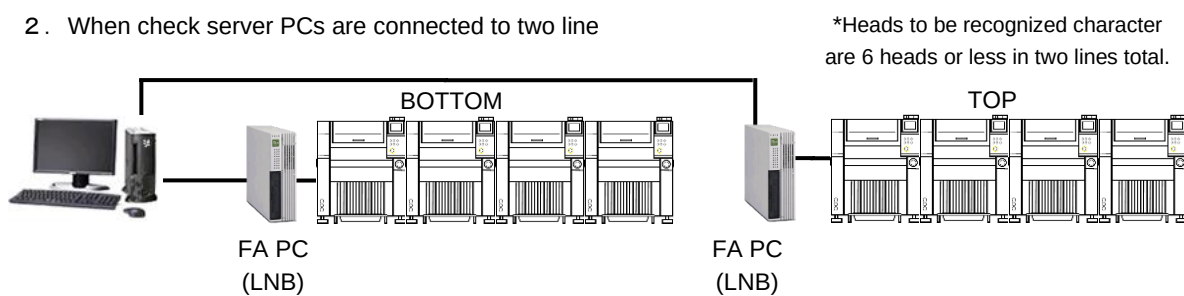
Recognition images are captured by the machine, and characters or 2D codes are recognized by the pre-pickup check server PC. Pre-pickup check PC is to be connected to one line (1 FA PC). (Recommended*1)
Besides, the pre-pickup check server PC can also be served as NPM-DGS client PC.)

System configuration example

1. When check server PC is connected to one line



2. When check server PCs are connected to two line



*1 The following conditions should be met.

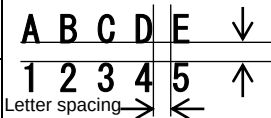
- Heads to be checked connectable to 1 check PC should be 6 heads or less in total.
- FA PC (LNB) connectable to 1 check server PC should be 2 FA PCs (2 lines) or less in total.

■ Function List

Item	Specification
Component verification (Misloading prevention)	Recognizes the string identifying the part number in the characters or 2D code in the preset area on the surface of the component, and compares it with the preset string to detect any wrong number.
Trace check (Traceability support)	Recognizes the string identifying the manufacturing lot number in the characters or 2D code in the preset area on the surface of the component.*1
Setting when to check	Selectable from among "First component", "All components", and "Specified interval". Feeders capable of detecting the joint of taper components can perform component inspection of the joint position.
Handling components judged as NG	Components judged as NG can be handled by either of the following: 1) If the component is correct, press [OK] to pick it up. 2) If the component is wrong, change it to a correct one, and make check again.

*1 Manufacturing lot numbers can be traced and managed by PanaCIM-EE. Contact us for details.

■ Basic specifications

Item		Description	
Applicable components		Tray components, Tape feeder components	
Verifiable characters		Max. 30 characters	
Traceable characters		Max. 30 characters	
Inspection processing time* ¹ (Component Verification +Trace Check)	1FOV	1.5 s or less	
	4FOV	2.5 s or less	
Recognition requirements* ²			
Characters	Recommended fonts		Sans-serif* ³ * Italic, dotted, and underlined characters are not supported.
	Applicable characters		Numbers, Upper-case letters, Lower-case letters * Following lower-case letters are not supported: 'i', 'j', 'l'
	Printing conditions	Printing method	Laser marking
		Size (Width x Height)	≥0.5 mm x 0.8 mm
		Letter thickness	≥0.1 mm
		Letter spacing	≥0.1 mm
2D code	Applicable codes		QR code, Micro QR code, Data Matrix (ECC200)
	Printing method	Printing method	Laser marking
		Cell Size	≥0.15 mm
			

*1 Inspection processing time may vary due to the following situations

- 1) Communication load on network
- 2) Running state of other applications on check server PC

*2 Recognition performance may decrease due to the following reasons:

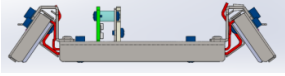
- 1) Dirt, scratches, or foreign matter on the surface of the component.
- 2) Printing defects such as fading or dropouts
- 3) Captured image affected by the use environment of equipment, pocket shape design, etc.
- 4) Number of characters is fixed and similar letters may be printed on the same position:
(For example, letter "O" and number "0")

*3 Fonts have not been defined clearly since there are many similar fonts, and original fonts by laser marker manufactures also exist.
The proven samples of recognizable fonts are shown below for your reference.



We can evaluate the recognizability of fonts in advance. Contact us for details.

■ Basic configuration

Item	Description
Head camera LED light 2 	LED lighting for the head camera provided with additional LED for recognizing characters or 2D codes.
Tray feeder installation kit	Adjust bolt dedicated for pre-pickup check (Character • 2D recognition) Installation of the tray feeder uses adjust bolt.
Pre-pickup check (character/2D code recognition) license	License is required machine by machine.
Pre-pickup check server PC	PC used to run the pre-pickup check server software for polarity recognition. Hardware and software specification comply with those of the NPM-DGS. * To be prepared by the customer. * Can also be served as NPM-DGS client PC (Recommended). Note that it cannot be used as NPM-DGS server PC.
Image processing software license	License required to use the image processing software for character/ 2D code recognition. Must be installed on the pre-pickup check server PC. Insert the included USB dongle into the USB port to enable recognition. * Please purchase one license for the major equipment of the line.

5.12 Message board

This function can display different images*² for a certain period of time*¹ on touch panels that are not in active use. By using the inactive time of touch panels to display training information, work instructions and etc., training and handoff can be conducted smoothly.

*1 Display time can be changed for each equipment by customer.

*2 By downloading the images from LNB, the display content can be changed for each equipment.

■ Function Summary

The number of images

Each machine can display up to 10 different images.

The images can be set during production.

Error messages display first

If an error occurred in message board images displaying, the error messages will be displayed first.

5.13 Head diagnosis

With this function, errors can be prevented in advance, and a stable production can be ensured.

■ Function Summary

Air Leak Check (*3)

Under closed state, this function measures air- flow value when turn ON/OFF the valve.

Flow Sensor Zero Check

Measure the range of flow sensor.

Air Stuff Check

Under open state, this function measures air- flow value when turn ON/OFF the valve.

Z-axis /θ-axis Action Check

Measure the motor torque of Z-axis /θ-axis at high speed and low speed.

*3 Air leak checks require jigs (nozzles).

Nozzle type its quantities required on air leak checks depend on nozzle head types. See the list below.

Jigs nozzles for 2 nozzles are dedicated for head diagnosis; they do not have barcodes.

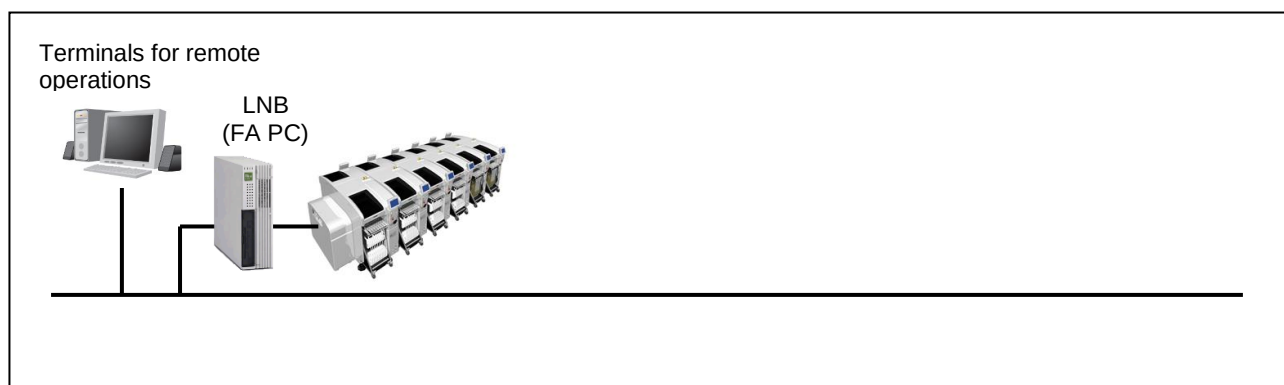
	Required quantity	No barcodes		With barcodes	
		Parts No.	Nozzle No.	Parts No.	Nozzle No.
Lightweight 16 nozzle head V3A, V2	16	N610148258AA	256CS	N610148260AA	256CSN
Lightweight 8 nozzle head	8	N610140967AB	256C	N610140968AB	256CN
2 nozzle head	2	MTKU002588AA	DIAG	—	—

5.14 Remote operation

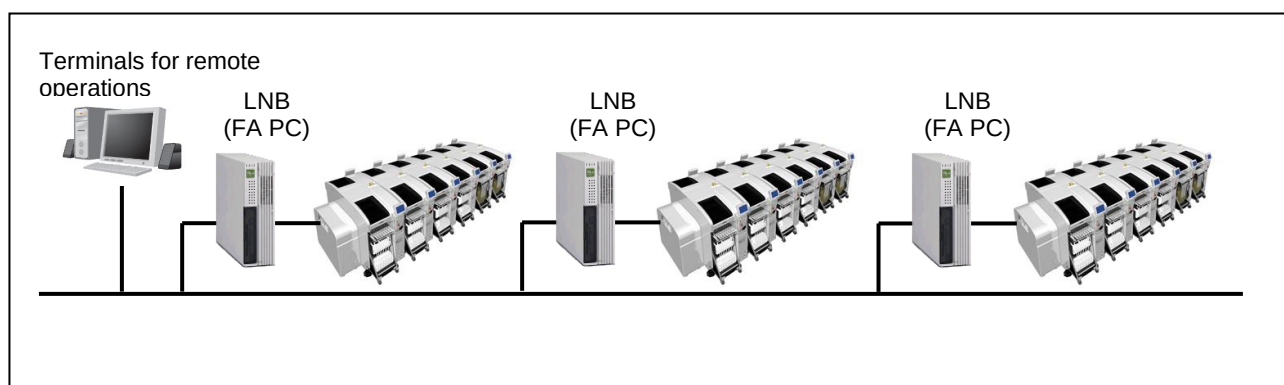
Remote operation function allows centralized collection of errors generated in the machines and offers remote-controlled recovery, reducing error recovery time and contributing to efficient capacity utilization and labor-saving. This provides a system where it detects errors when they occur and allows remote-controlled recovery. This centralized recovery system helps reduce “the need for operators to notice errors” and “the travel time to the targeted error machine”, thereby reducing error recovery time.

■ System configuration

Standard configuration



Centralized control



■ Function List

Item	Description
Remote operation function	Remote operation function offers remote-controlled operations to the screens and operation switches. This allows remote-controlled recovery operations of errors generated in the machine to resume productions. The function works only when the machine is in an automatic operation state.
Remote access function	Remote access function offers remote access to the screens. You can get the actual screen that shows how the machines are working and how on-site workers are operating.
Status monitor function	Status monitor function shows present errors that are subject to remote recovery of controlled lines. With this function, you can open the remote panel on which you can get the screen from a status monitor and operate it.
Event list function	Event list function lists the present error events of the controlled lines and shows whether those errors are subject to remote recovery. Present error event information contains when it happened and what it's like. You can open or close the remote panel on which you can get the screen from event lists and operate it.

■ Standard Configuration

Item	Description
License	Licenses are necessary per machine. For more details for licenses, see “14. License” .
PC	This is for remote access. Install remote access client software before use * We ask you to prepare it

■ System requirements

Computers Hardware specifications

Item	Specifications (primary PC)	Specifications (secondary PC)
Unit	IBM PC/AT compatible machine (We recommend primary PC be desktop PC)	
Processor	1 GHz or faster with 2 or more cores on a compatible 64-bit processor or SoC (System-on-a-chip)	
Mother board	Fully compatible with IBM	
Memory	8 GB or more	4 GB or more
Storage	100 GB or more	
Optical drive	DVD drive To be used in installation	
USB port	USB Type-A x 1 or more ports (when you use an option license)	—
Keyboard	English version: 101 keyboard Japanese version: 106 keyboard	
Mouse	Supported by your OS as standard	
Monitor	WXGA Supported, Desktop size : 1 280 x 768 dots or higher	
LAN port	100BASE-TX or faster x 1 port	

Computers Software specifications

Item	Specification	Notes
OS	Microsoft® Windows® 11 Professional Microsoft® Windows® 10 Professional (64 bit version)	Required
Display Language	Japanese, English, Chinese	—
Framework	Microsoft® .Net Framework 4.5.2 or later	—

• Microsoft and Windows are registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

* Environmental requirements are based on Microsoft® Windows® 10 Professional.

* When you use anti-virus software or others, do not block the following port ranges.
(59 000 ~ 59 999)

Mobile devices Operation specification(Standards)

Operations specifications on remote control operations with a smartphone or a tablet(Android) are as follows.

Item	Specifications	Notes
OS	Android 9 ~ 11	Recommended
Devices	Resolution : 1 280 x 720 dots or higher (Operation tested devices are as follows) TOUGH BOOK FZ-S1 (Android 10) Galaxy Tab S7 (Android 11)	Some actions using devices other than those on left may vary.

IOS are not supported.

■ Constraints

Machine status		Remote access activation	Constraints and other notes	Notes
When machine is in an automatic operation state		Can activate	Working on machines always has priority.	When remote access is active and at the same time you operate a machine, working on the machine always has priority and is effective. You cannot resume remote access operations until working on the machines is finished. When safety covers were open, remote access operations are disabled until on-site workers resume productions.
	When there are errors			
When machine is NOT in an automatic operation state		Cannot activate	Read only Only on-site workers can operate machines, including start-up of the machines.	Before the start-up of machines, on-site workers must visually check whether the machines are operational.

5.15 Biometric authentication

With biometric authentication, you can connect it with external authentication devices that accept biometrics such as iris recognition or facial authentication and can access to a machine without having to enter a password with a keyboard.

■ Overviews

Authenticate

Authenticates users with an external authentication device.
(External authentication management system manages users)

Operation constraints

Prevents access from unauthorized users.
With an operator customized tool, you can set limitations by the user.

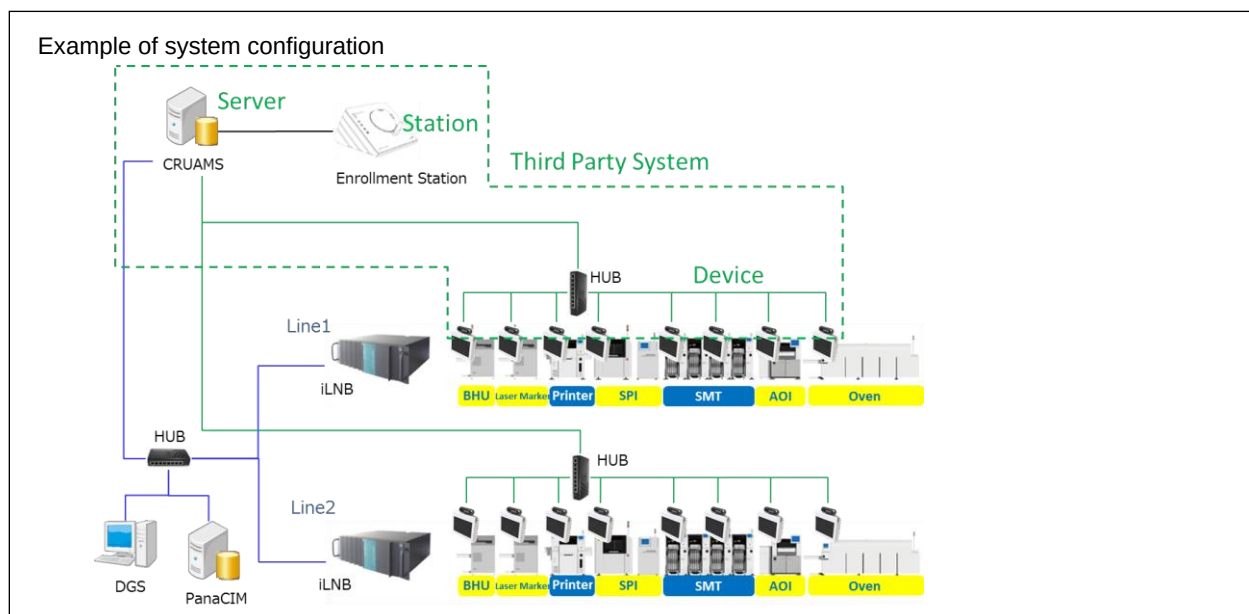
Trace

Collects operation logs.

■ System configuration

Biometric authentication function checks who is using the machine with an external authentication management system, and send user information to iLNB.

iLNB changes authority for access based on user information.



■ Standard configuration

Item	Description
Machine software	Switches access authority based on user information identified with an external authentication system.
iLNB	FA PC (iLNB) *LNB needs individual basis supports. A license for E-Link (equipment control) is required. The license is required for each stage of a machine.
Biometric authentication license	Licenses are necessary per machine.
External authentication management system (external authentication device)	You need authentication management system that you can link to our authentication system. For the details, contact us. We do not take any responsibility or liability for personal information management on other company's biometric authentication system.

5.16 Mount complete position recognition

This option contains the following two functions.

Section	Functions
5.16.1	Mount complete position recognition function
5.16.2	Shield case warping inspection function before mounting

5.16.1 Mount complete position recognition function

Mount complete position recognition function measures the brightness of two areas of shielded components with a head camera and detects improper mountings from the brightness.

When detected an improper mounting, machine gets into single stop.

■ Overviews

Detect improper positions

After all components were mounted, the head camera measures two areas' brightness per one component.

When detected as a NG component, machine gets into single stop.

Show NG components

When the function detected as a NG component, it lists NG components and automatically shows the list.

Teaching

You can adjust the instructions of lamp value, areas, and threshold by the component about recognition points set on each component.

■ Standard specifications

Item	Description
PCB constraints	When PCB needs separate mounting, it does not activate this option.
PCB height constrains after mounting	When PCB has mounted tall components, it does not activate this option because the tall components may be the cause of interference.

■ Standard configuration

Item	Description
Mount complete position recognition option license	Licenses are necessary per machine.

5.16.2 Shield case warping inspection function before mounting

The machine checks shield case warping. When it detects components as warping, the components become disposal. The inspection before mounting prevents improper shield components from being mounted.

■ Overviews

Warping detection

This function measures the characteristic points of shield cases and detects warped components. NG components become disposal.

Teaching

Component recognition teaching function also detects warped components. When NG components were detected, it shows an error.

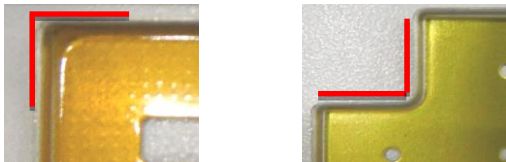
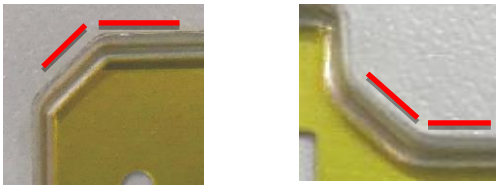
■ Components to be measured

In order to measure the floats or warping of shield cases, at least four heights of characteristic points must be measured.

Here are measurable characteristic points.

*Set a point on the same height surface to a characteristic point.

(Basically, we will receive samples and then decide whether to be able to detect or not after going through consideration and experiments)

Item	Description
Corners (Max 8 corners)	Size must be 2 mm or less and its corner R, roundness, must be maximum 0.8 mm. (e.g.) 
Pair lines * Non-parallel two lines combination (Max.8 pairs)	Size must be maximum 2 mm and its corner R, roundness, must be maximum 0.8 mm. (e.g.) 
Circles (Max 20 circles)	Size must be 2 mm or less.
Lead groups (Max 16 lead groups)	Lead group size must be 2 mm or less.

*When you would like to make sure of shield-warping detectable components, contact us at any time.

■ Standard configuration

Item	Description
Mount complete position recognition option license	Licenses are necessary per machine.
Multi recognition camera Type3	Multi recognition camera Type3 is necessary.

5.17 Tray 1 Pallet 10 Kind

This is a feature that uses tray units to achieve production by putting small volume components packaged in cut embossed tapes onto a pallet. You can put onto a pallet up to 10 kinds of components.

For example, you can use small volume components packaged in cut embossed tapes for trial production and/or small lot production.



(e.g.) Component Layout

■ Feature List

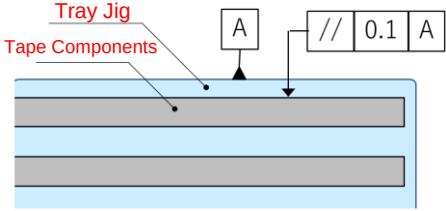
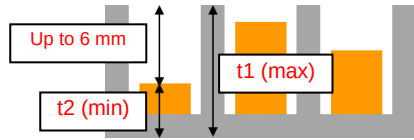
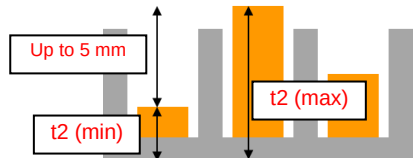
Items	Descriptions
Create Production Data	Uses DGS to create production data that it is up to 10 kinds of components onto 1 pallet.
Edit Production Data	Views/Edits the related layout data on the screen.
Teaching	Teaching about the related tray pickup positions on the screen.
Production	Based on the above production data, production is up to 10 kinds of components onto 1 pallet.
Component Shortage	Deals with component shortage by component type.

■ Standard Configuration

Items	Descriptions
License	License is necessary by the machine. For License details, see "14. License".
Tray jig	We ask you to prepare a dedicated tray when you use this option.

■ Tray Jig Design Specification

Tray jig design specification basically conforms to “Tray Conditions” in the “4.3 Feeder Carriage Configuration” section.

Items	Descriptions
Component Layout	As shown below, put tape components parallel to PCB transfer direction on a jig. (We recommend that tray jig end face parallelism be 0.1 mm or smaller) 
Height	① When component height in all the components is equal to or lower than tray jig maximum height t1, the following formula about height difference of t1(max) and component minimum height t2(min) should be satisfied. $t1(\max) - t2(\min) \leq 6 \text{ mm}$  ② When there is a component higher than tray jig maximum height t1, the following formula about height difference of component maximum height t2(max) and component minimum height t2(min) should be satisfied. $t2(\max) - t2(\min) \leq 5 \text{ mm}$ 

■ Restrictions

- When this option is activated, the following features will be deactivated.
 - 1) Use tray supply side
 - 2) Tray outside comp collation
 - 3) Tray stock Auto Change
- This option does not work with Lightweight 16-nozzle head V3A.
- You cannot attach this option in some cases; it depends on your jigs or components.
For details about whether to be able to attach it, contact us.

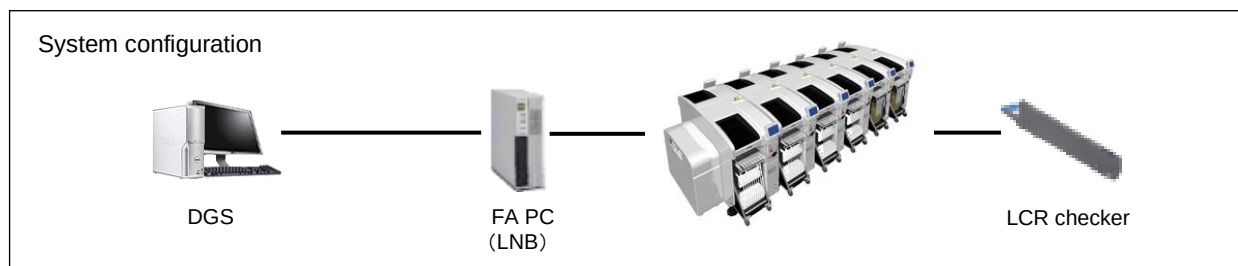
5.18 LCR checker(Feeder shape type)

LCR checker (Feeder shape type) measures electrical properties of components and prevents improper mounting because of component-setting mistakes.

■ Standard configuration

LCR checker measures electrical properties of components, and FA PC checks if the measurements are within a normal range. FA PC manages measurement histories.

When you use LCR checker, adjust the settings with DGS.



■ Overviews

Check

Measures electrical properties of components checks if the measurements are within the set range.

Production stop

When judged as NG, i.e. when electrical properties of components are out of the set range, production stops

■ Standard specifications

Item	Description
Components	L:0.6mm x W:0.3mm x H:0.23mm ~ L:3.2mm x W:1.6mm x H:1.5mm • Square chip components (Both edges of L length must have an electrode and the sides of the edges must have an electrode, and chips must be in a state current pass through)
Measurable parameter range	Resistance(R) : 10 Ω ~ 100 M Ω Capacitors(C) : 10 pF ~ 100 μ F Inductors(L) : 1 μ H ~ 47 μ H * The above is a measurable range that has taken into account the use of LCR checker and variations in measurement accuracy. (For measurable range based solely on LCR checker, see the checker specifications)
Measurement accuracy	Resistance(R) : ± 10 % Capacitors(C) : ± 10 % Inductors(L) : ± 10 % * The above accuracy is the maximum measurement accuracy variations when a machine installs and operates LCR checker. (For measurable range based solely on LCR checker, see the checker specifications) * In some cases, depending on electrical properties of components, they may not be eligible for measurement even measurement accuracy is within the values indicated above,
Eligible nozzles	Standard-specification nozzles that match targeted measurement component size * Nozzles for calibration when LCR checker is installed Lightweight 16 nozzle head V3A : 230CS nozzle Lightweight 8 nozzle head : 230C nozzle 2 nozzle head : 1001 nozzle
Where to install checker	• You can install LCR checker on a place where tables have feeder supply units and tables have component recognition camera. (Installation fills up one slot of supply place)
Placement mode	• Share mode • Independent mode * When LCR checker is installed on one table of a 2-table beam machine, components supplied on the table not installing LCR checker are not eligible for LCR checking.

■ Standard configuration

Item	Description
LCR checker (Feeder shape type) 	LCR checker (Feeder shape type) is a tool that measures electrical properties of components.
LCR checker license	Licenses are necessary per machine.

5.19 Tray Pickup Positions Offset (Standard Specification)

Recognizes the place where trays are during production and revises pickup positions based on the recognized positions to prevent pickup errors.

■ What Is Recognized?

Head camera checks the following items to revise pickup positions.

Tray Corner Recognition	Scans diagonal 2 corners of a tray and revises pickup position.
Mark Recognition	Scans the specified 2 marks of a tray and revises pickup position.

■ Compatible Components

It applies to tray components, such as interposer components and long, narrow connector components.

*Does not apply to tape components.

*Does not apply to soft material trays that warping occurs when securing pallets .

■ Tray Data Setting

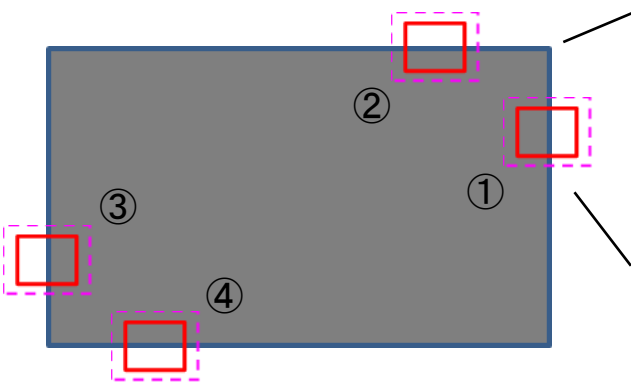
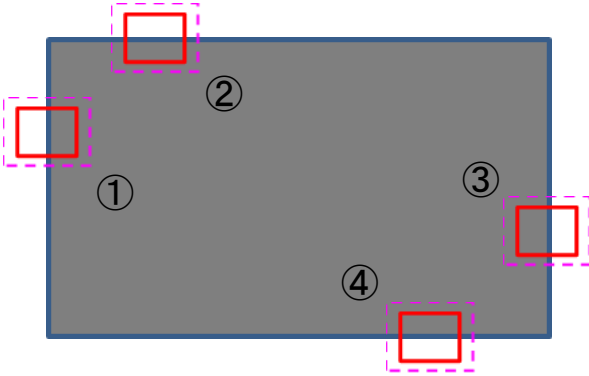
As to the following data, input accurate design data.

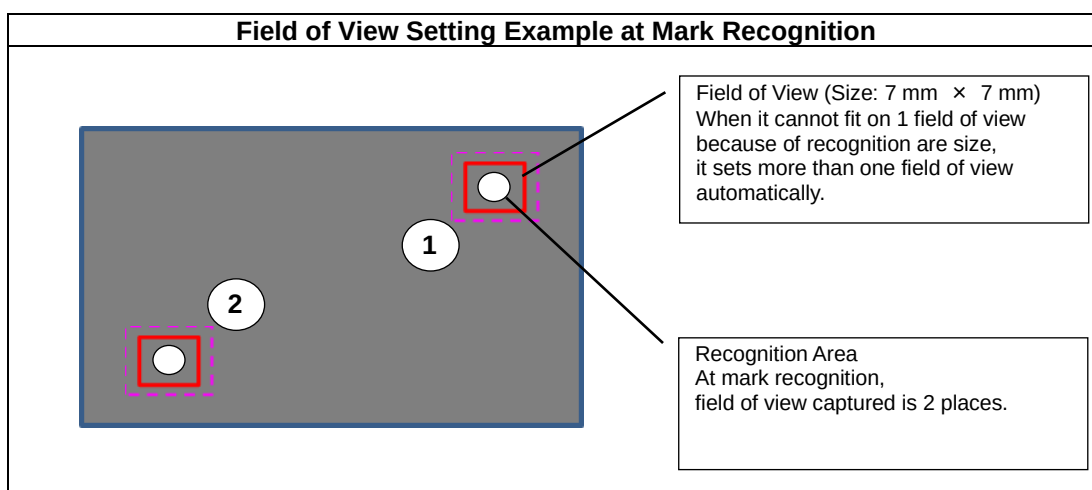
- Tray size (X, Y)
- Tray height
- 1st pickup
- Last Pickup
- Mark coordinates X*, Y*

*When it scans marks on a tray to revise.

■ Field of View

Here is an overview of the field of view that camera can image.

Where to Scan	Field of View Setting Example at Tray Corner Recognition
「Top Right/ Bottom Left」	 Field of View (Size: 7 mm × 7 mm) When it cannot fit on 1 field of view because of recognition are size, it sets more than one field of view automatically. Recognition Area At tray corner recognition, field of view captured is 4 places.
「Top Left/ Bottom Right」	



6. Other Standard Functions

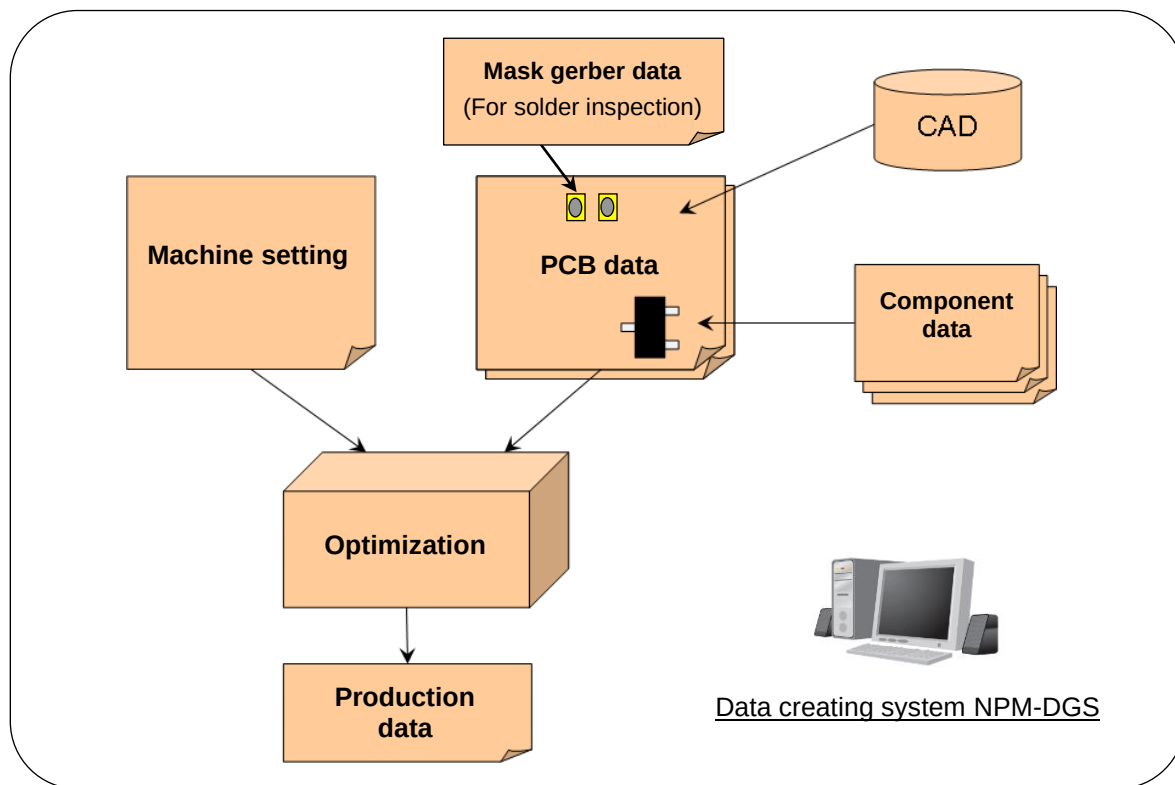
6.1 Programming Functions

Data are created on NPM-DGS, the data creating system. The production data created on NPM-DGS will be downloaded to the machine via LNB (FA PC). Some data, however, can be modified on the machine. The data modified on the machine and what was taught will be retained and reusable.

* The hardware for NPM-DGS should be prepared by yourself. (NPM-DGS should be purchased separately.)

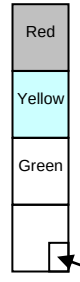
Regarding the license in NPM-DGS and in the option of NPM-DGS, a license is required for each machine, so you need to purchase license as many as the number of the machine you have.

For details about NPM-DGS, please refer to "NPM-DGS Specification."



6.2 Signal Tower

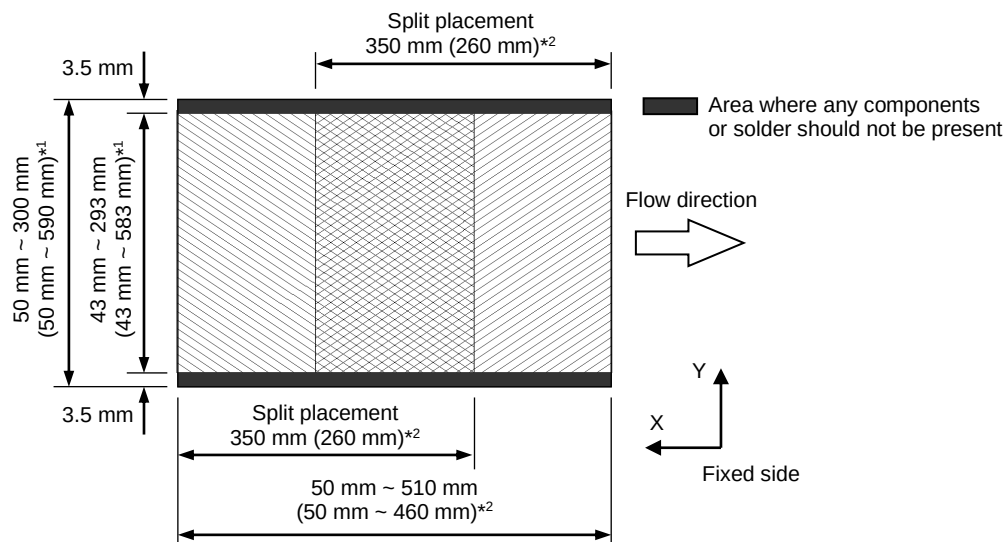
Color of signal tower and lighting standard

Standard: Horizontal mounting  (Blue or Red) 1 629 mm from floor  Vertical mounting is also possible. The height is 1 629 mm above the floor. (Blue or Red)	Signal Color	Classification	Lighting Standard
	Red	Emergency stop error	• Trouble in shafts of motors, etc. • Drop in air pressure • Trouble in PCB supports • Head trouble • Tape trouble and etc.
	Yellow	Single stop error	• Pickup error • Placement error • PCB transfer error • Component run out • Nozzle change error and etc.
	Green	In operation	Electric source ON (e.g., in automatic operation) (This, however, is off while red or yellow is blinking.)
	Blue or Red	Blue is lighted up on the machine that becomes bottleneck –the machine that requires longest cycle– among the machines coupled. Red is lighted up when the emergency stop switch is pushed.	

* Lighting specifications are programmable.

7. PCB Design Standard

7.1 PCB Specifications



*1 Numerical value in (): For single lane mode

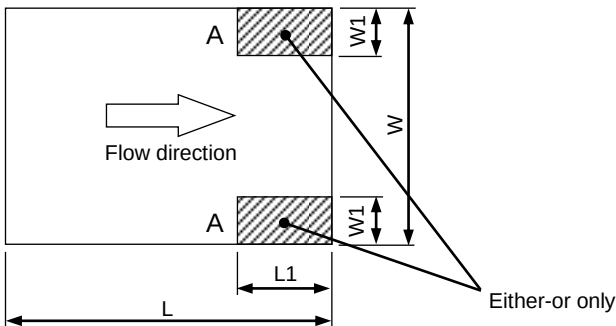
*2 Numerical value in (): For short specification conveyor

Item	Long specification conveyor		Short specification conveyor	
	Dual lane mode	Single lane mode	Dual lane mode	Single lane mode
PCB dimensions	50 × 50 mm ~ 510 × 300 mm	50 × 50 mm ~ 510 × 590 mm	50 × 50 mm ~ 460 × 300 mm	50 × 50 mm ~ 460 × 590 mm
Placement and inspection area	50 × 43 mm ~ 510 × 293 mm	50 × 43 mm ~ 510 × 583 mm	50 × 43 mm ~ 460 × 293 mm	50 × 43 mm ~ 460 × 583 mm
PCB thickness	0.3 mm ~ 8.0 mm			
PCB mass	1.5 kg or less (After mounting, including the carrier mass.)* ³			
Permissible PCB warpage	Max. 0.5 mm PCB section Max. 0.5 mm			
Conditions of PCB before placement	3.5 mm 3.5 mm 3.5 mm 3.5 mm 28 mm φ3 Support pin*⁴ (Please leave 2 mm or more between this and back side components.) Area where any components should not be present Lightweight 16-nozzle head V3A: 6.5 mm Lightweight 8-nozzle head: 12 mm 2-nozzle head: 28mm			

*3 When mass of PCB (including carrier mass) exceeds 1.5 kg, please consult us separately.

*4 When an automatic replacement function of support pin is used, the support pin shape and pin configuration conditions are differ. For details, please refer to "9. Option: Automatic replacement of the support pins."

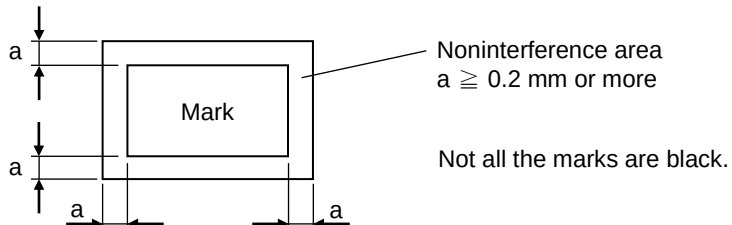
* For ceramic PCBs, please consult us.

Item	Specifications																								
PCB notch condition	PCB notch dimensions should meet the following conditions.  ■ For long specification conveyor <table border="1"> <thead> <tr> <th>L</th><th>L1</th></tr> </thead> <tbody> <tr> <td>$50 \text{ mm} \leq L \leq 350 \text{ mm}$</td><td>Less than $L/4$</td></tr> <tr> <td>$350 \text{ mm} < L \leq 510 \text{ mm}$</td><td>Whichever is smaller, $L/4$ or 100 mm.</td></tr> </tbody> </table> <table border="1"> <thead> <tr> <th>W</th><th>W1</th></tr> </thead> <tbody> <tr> <td>$50 \text{ mm} \leq W \leq 300 \text{ mm}$</td><td>Whichever is smaller, $W/3$ or 30 mm.</td></tr> <tr> <td>$300 \text{ mm} < W \leq 590 \text{ mm}$</td><td>Please consult us.</td></tr> </tbody> </table> ■ For short specification conveyor <table border="1"> <thead> <tr> <th>L</th><th>L1</th></tr> </thead> <tbody> <tr> <td>$50 \text{ mm} \leq L \leq 260 \text{ mm}$</td><td>Less than $L/4$</td></tr> <tr> <td>$260 \text{ mm} < L \leq 460 \text{ mm}$</td><td>Whichever is smaller, $L/4$ or 70 mm.</td></tr> </tbody> </table> <table border="1"> <thead> <tr> <th>W</th><th>W1</th></tr> </thead> <tbody> <tr> <td>$50 \text{ mm} \leq W \leq 300 \text{ mm}$</td><td>Whichever is smaller, $W/3$ or 30 mm.</td></tr> <tr> <td>$300 \text{ mm} < W \leq 590 \text{ mm}$</td><td>Please consult us.</td></tr> </tbody> </table> * The above cases show PCBs of 1.6 mm or more in thickness. For PCBs less than 1.6 mm, consult us.	L	L1	$50 \text{ mm} \leq L \leq 350 \text{ mm}$	Less than $L/4$	$350 \text{ mm} < L \leq 510 \text{ mm}$	Whichever is smaller, $L/4$ or 100 mm.	W	W1	$50 \text{ mm} \leq W \leq 300 \text{ mm}$	Whichever is smaller, $W/3$ or 30 mm.	$300 \text{ mm} < W \leq 590 \text{ mm}$	Please consult us.	L	L1	$50 \text{ mm} \leq L \leq 260 \text{ mm}$	Less than $L/4$	$260 \text{ mm} < L \leq 460 \text{ mm}$	Whichever is smaller, $L/4$ or 70 mm.	W	W1	$50 \text{ mm} \leq W \leq 300 \text{ mm}$	Whichever is smaller, $W/3$ or 30 mm.	$300 \text{ mm} < W \leq 590 \text{ mm}$	Please consult us.
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W	W1																								
$50 \text{ mm} \leq W \leq 300 \text{ mm}$	Whichever is smaller, $W/3$ or 30 mm.																								
$300 \text{ mm} < W \leq 590 \text{ mm}$	Please consult us.																								
Condition for component protruding from the edge face of PCB	Please consult us.																								

7.2 Recognition Mark

PCB needs two PCB recognition marks at its opposite corners.

■ PCB Recognition Mark Specifications

Standard Mark Shapes and Dimensions	Standard Mark Shapes	Dimensions
	○	φ0.5 mm ~ φ1.6 mm
	△ (Equilateral triangle)	Length of one side: 0.5 mm ~ 1.6 mm
	□	Length and width: 0.5 mm ~ 1.6 mm
	+	Length and width: 0.5 mm ~ 1.6 mm
	Length and width means the dimensions of the quadrangle circumscribing the mark.	
Mark Materials and Circuit Pattern	Because PCB recognition correction is based on the positional relationship between the marks and the circuit pattern (conductor pattern), the marks must be made in the same process and of the same materials as those of the circuit pattern from the viewpoint of correction accuracy.	
Image Conditions of Mark Materials and PCB Base	Because, basically, mark recognition process is carried out based on the intensity difference of reflected light, a fixed contrast is required between the mark materials and the PCB base. This difference varies significantly depending on the plating condition, oxidation condition, surface height, unevenness, degree of mirroring, coating, or disturbance light; therefore, the assessment of the marks is required beforehand.	
Mark Dimensions and Background	Noninterference area of larger than a certain dimension is required outside of the mark.  Noninterference area $a \geq 0.2 \text{ mm}$ or more Not all the marks are black.	

■ About PCB recognition marks during split placement

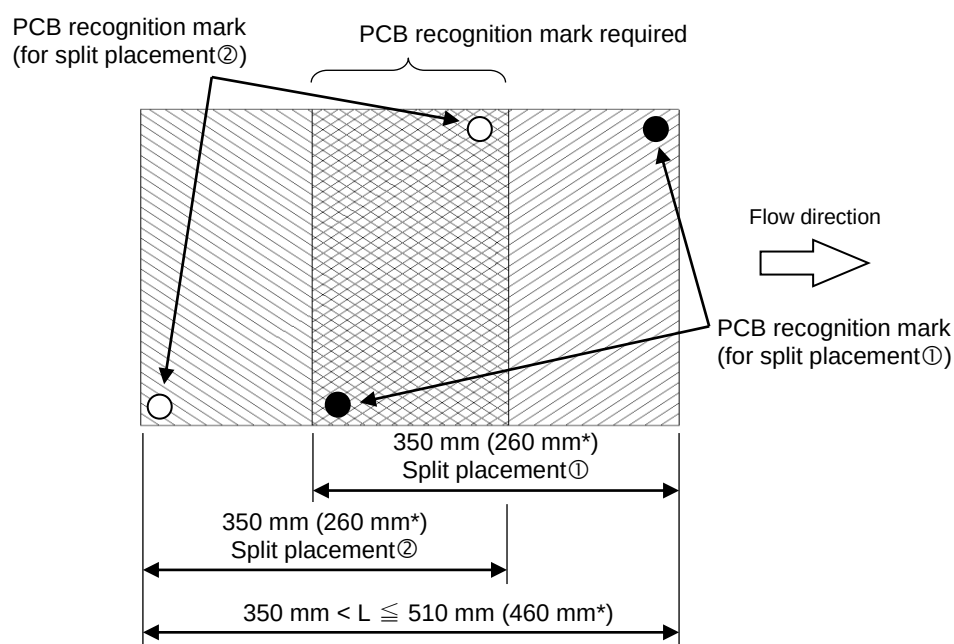
Two PCB recognition marks are required in the opposite corners on PCB.

Split placement will be applied to the PCB exceeding 350 mm* of transfer-direction dimension (L).

Even in split placement, two PCB recognition marks are required in the opposite corners, and we recommend that they exist as below.

* When using short specification conveyor: PCBs having a L exceeding 260 mm will be handled in split placement mode.

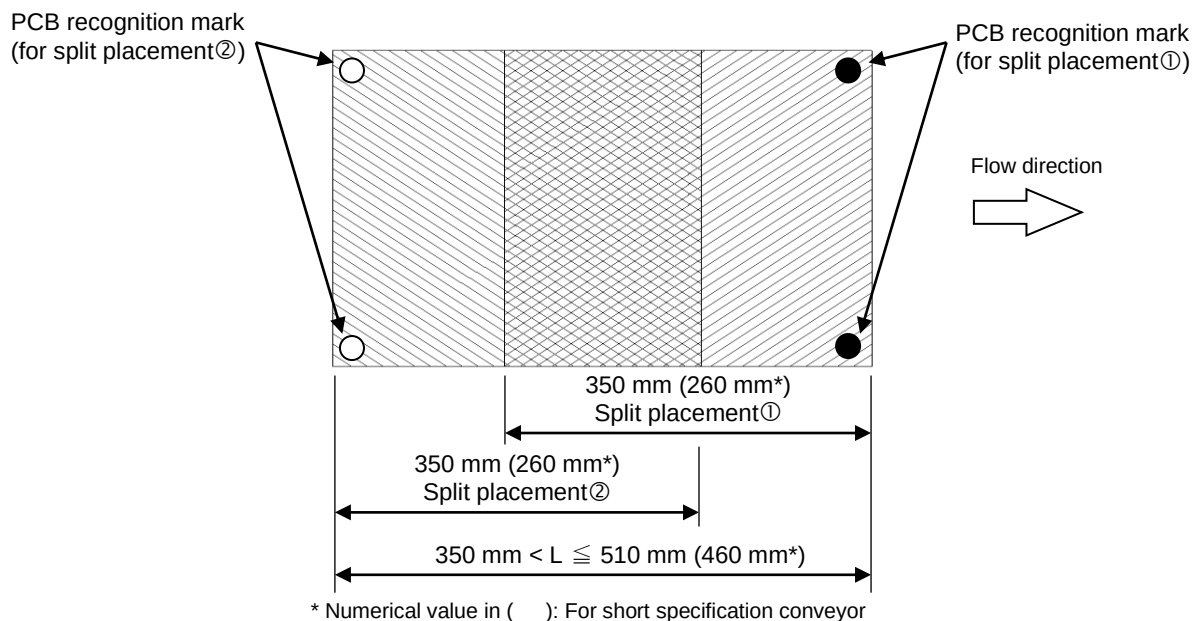
Recommendation)



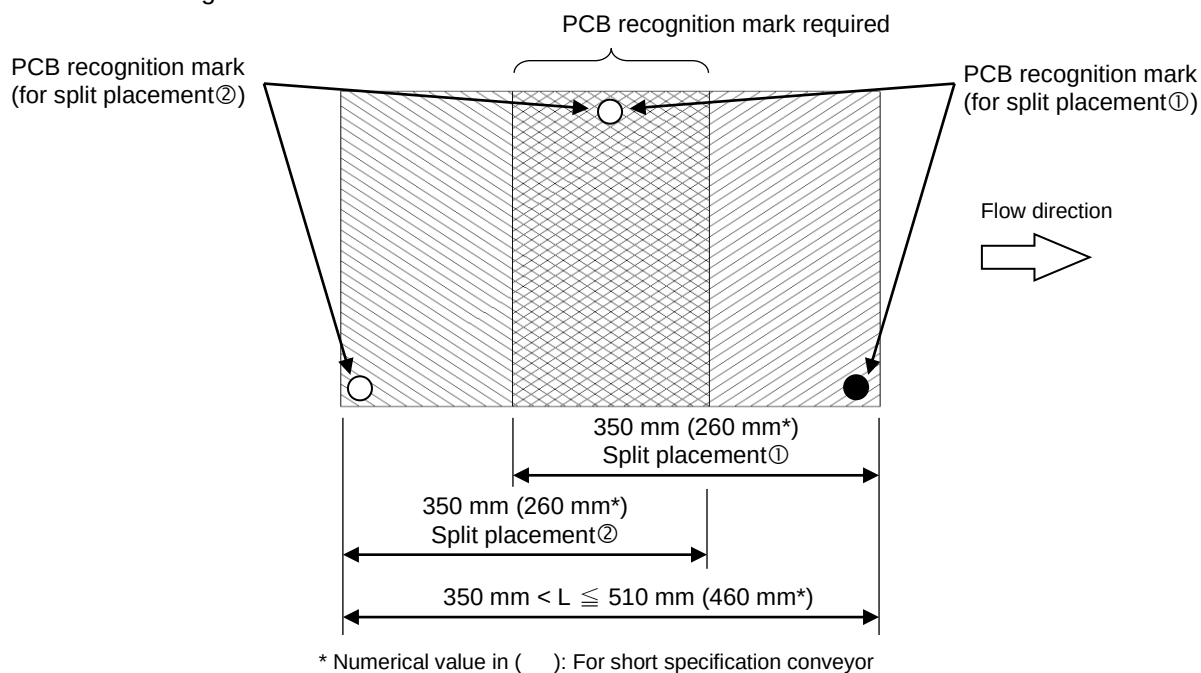
* Numerical value in (): For short specification conveyor

Other applicable examples:

- For four PCB recognition marks



- For three PCB recognition marks

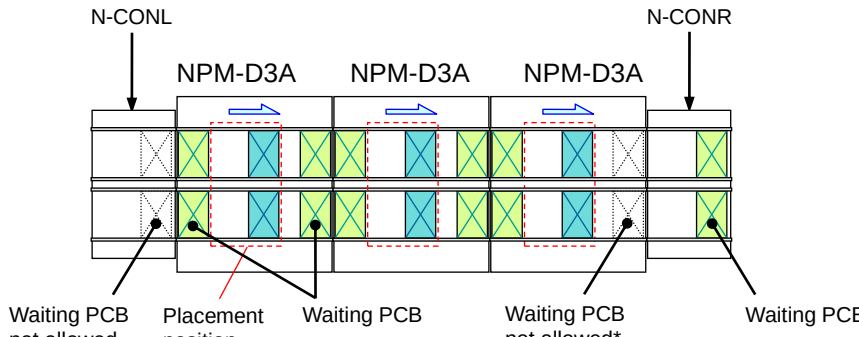
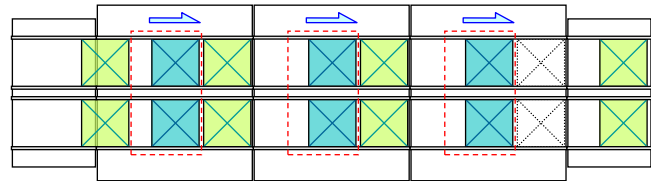
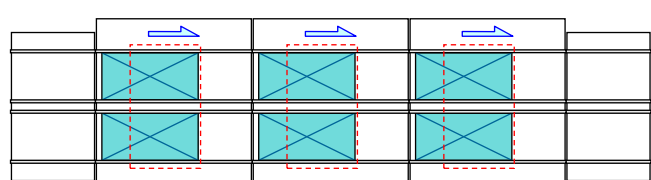


* These positions of PCB recognition marks are examples. The applicable conditions vary depending on your PCB specifications. For details, please contact us.

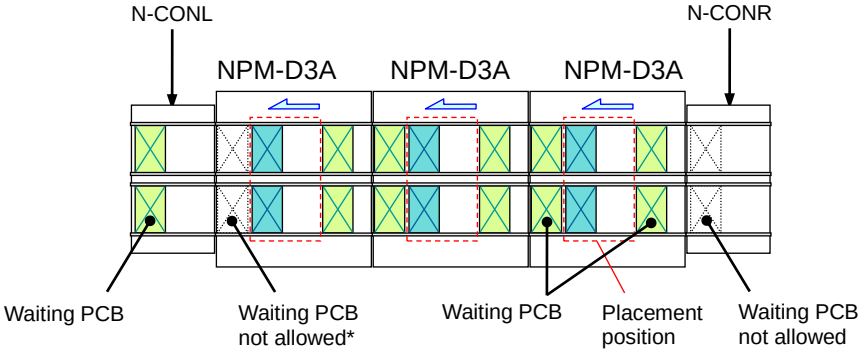
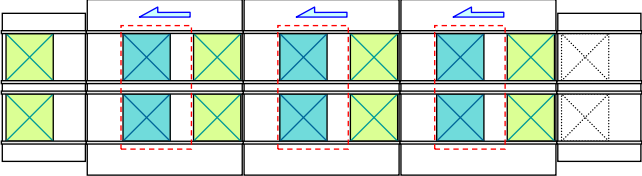
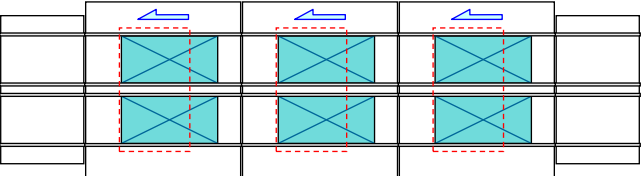
7.3 PCB waiting condition

The following shows the PCB waiting positions in NPM-D3A line that are determined according to PCB size L (flow direction size).

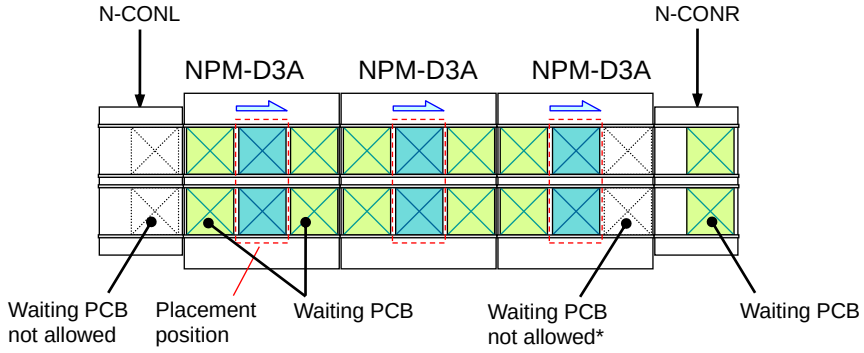
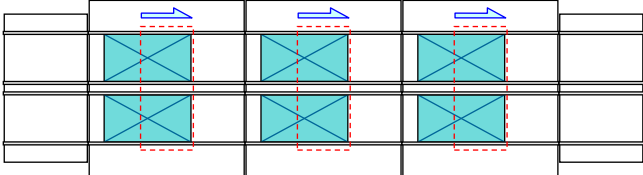
■ Long specification conveyor (For left to right flow)

PCB length: L	Description
$50 \text{ mm} \leq L \leq 160 \text{ mm}$	 A single PCB is allowed to wait on each of the upstream and downstream sides of the placement position. A single PCB is allowed to wait at N-CONR. * No PCB is allowed to wait in the spot adjacent to N-CONR.
$160 \text{ mm} < L \leq 350 \text{ mm}$	 A single PCB is allowed to wait at the border between N-CONL and the machine. A single PCB is allowed to wait downstream from the placement position. * No PCB is allowed to wait in the spot adjacent to N-CONR.
$350 \text{ mm} < L \leq 510 \text{ mm}$	 Waiting PCB not allowed.

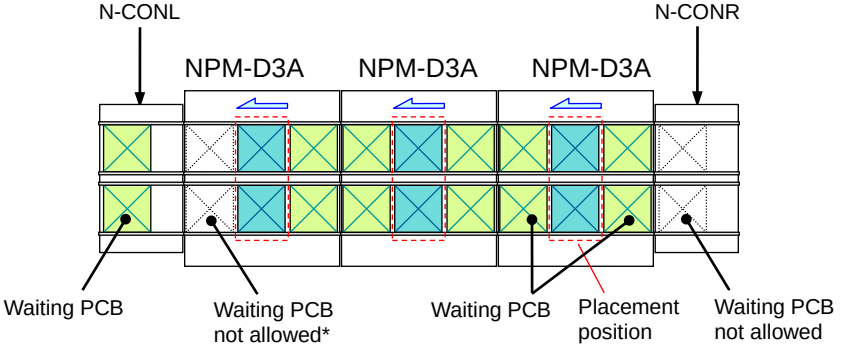
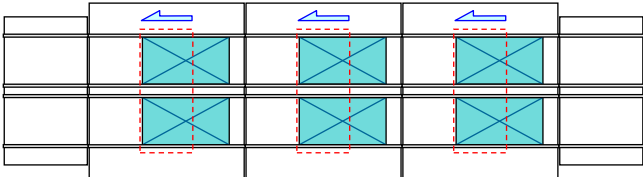
■ Long specification conveyor (For right to left flow)

PCB length: L	Description
$50\text{ mm} \leq L \leq 160\text{ mm}$	 A single PCB is allowed to wait on each of the upstream and downstream sides of the placement position. A single PCB is allowed to wait at N-CONL. * No PCB is allowed to wait in the spot adjacent to N-CONL.
$160\text{ mm} < L \leq 350\text{ mm}$	 A single PCB is allowed to wait upstream from the placement position. A single PCB is allowed to wait at N-CONL.
$350\text{ mm} < L \leq 510\text{ mm}$	 Waiting PCB not allowed.

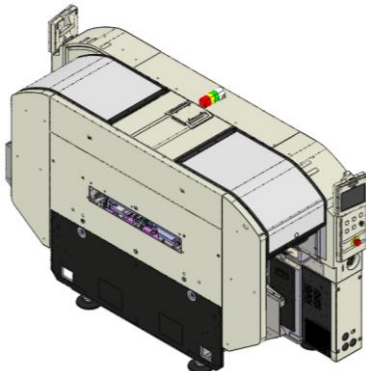
■ Short specification conveyor (For left to right flow)

PCB length: L	Description
$50 \text{ mm} \leq L \leq 250 \text{ mm}$	 A single PCB is allowed to wait on each of the upstream and downstream sides of the placement position. A single PCB is allowed to wait at N-CONR. * No PCB is allowed to wait in the spot adjacent to N-CONR.
$250 \text{ mm} < L \leq 460 \text{ mm}$	 Waiting PCB not allowed.

■ Short specification conveyor (For right to left flow)

PCB length: L	Description
$50 \text{ mm} \leq L \leq 250 \text{ mm}$	 A single PCB is allowed to wait on each of the upstream and downstream sides of the placement position. A single PCB is allowed to wait at N-CONL. * No PCB is allowed to wait in the spot adjacent to N-CONL.
$250 \text{ mm} < L \leq 460 \text{ mm}$	 Waiting PCB not allowed.

8. Standard Machine Configuration

Item	Description	Quantity
Main body		1 set
Accessories	System disk ▪ Machine system, Recognition system, and LNB system (DVD-ROM) ▪ Machine parameter SD card ▪ Install system SD card ▪ Password-changing SD card	1 set each
	PCB support pin	20 pieces
	Manual Parts List Control wiring diagram	1 set/Line

9. Options

Options are classified as follows.

Category	Description
Factory	These options need to be supported when the machine is being manufactured before shipment.
On-site	These options can be added after the machine has been delivered. However, a construction work is required on the spot.
Customer	These options can be added after the machine has been delivered. A construction work on the spot is not required.

Category	Table	Whole machine
	Can be supported for each table.	Supported as a whole of machine.

* Depending on user's machine specification, the manufacturing No., etc., some options may not fit the above classification.
For details, please consult us before purchasing the machine.

Please select options that answer your purposes.

No.	Purpose / Feature	Option name	Category	
A	1 To couple NPM-D3As in a line.	• N-CONL • N-CONR • FA PC	On-site	-
		• HUB and power source unit	Factory	-
	2 To select the PCB transfer specification in accordance with the production pattern.	• PCB transfer conveyor: Long specification • PCB transfer conveyor: Short specification	Factory	Whole machine
	3 To select a component recognition unit suitable for the intended use.	• Multi-recognition camera: Type 1/ 2/ 3 • Side lighting	On-site	Table
4	To set the PCB transfer height at 930 mm/ 950 mm above the floor.	• Support for 930 mm transfer line • Support for 950 mm transfer line	Factory	-

No.	Purpose / Feature	Option name	Category	
B	1 To select the nozzle in accordance with the production pattern.	• Nozzle • Storage nozzle case	Customer	-
	2 To select the tape feeder in accordance with the production pattern.	• Tape feeder	Customer	-
	3 To use thin type tape feeder.	• 4 mm thin type single tape feeder • 8 mm thin type single tape feeder • Attachment for thin type tape feeder • Power connector for thin type tape feeder • Handle for 4 mm thin type tape feeder • Reel holder for 4 mm thin type tape feeder	Customer	-
	4 To eliminate the tape splicing work. To reduce the feeder setup time.	• 8 mm thin type auto load feeder • Auto load feeder common attachment	Customer	
	5 To select the stick feeder in accordance with the production pattern.	• Single stick feeder • Guide block (For Single stick feeder) • 3-lot stick feeder • Guide block (For 3-lot stick feeder)	Customer	-
	6 To select the stackable stick feeder in accordance with the production pattern.	• Stackable stick feeder (S) • S, M, L size pusher for S type • Stackable stick feeder (L) • S, M, L, LL, LLL size pusher for L type	Customer	-
		• Air Supply Unit for Feeder	On-site	Table
	7 To prepare for the replacement of a support pin.	• PCB support block set for batch exchange	On-site	Whole machine
		• Additional PCB support block • Support pin setting jig • Additional support pins	Customer	-
	8 To replace the support pins automatically.	• Automatic replacement of support pins	On-site	Whole machine
		• Nozzle for support pin changeover • Support pin (For automatic replacement)	Customer	-
	9 To prepare feeders in advance and change them collectively.	• Feeder cart	Customer	-
	10 To change spec adoptions from tray feeder to feeder cart.	• Feeder cart change unit	Customer	-
	11 To manage and store tape feeders.	• Tape feeder stand	Customer	-
	12 To manage and store stackable stick feeder. To prepare in advance.	• Feeder stand • Power and air supply unit (For stand)	Customer	-
		• Tray feeder	On-site	-
		• Additional tray magazine • Additional tray pallet • Additional components-ejection tray • Pallet for vacuum-molded-tray	Customer	-
	14 To improve the workability of tape splicing.	• Splicing cart	Customer	-
	15 To mount thin embossed tape components (Feeding holes become deformed when tape thickness is equivalent to 0.2mm or thinner)	• 8 mm double feeder (Thin embossed tape ready)	Customer	-

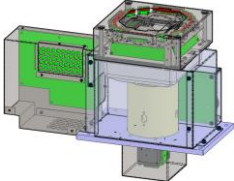
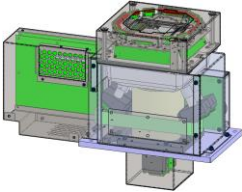
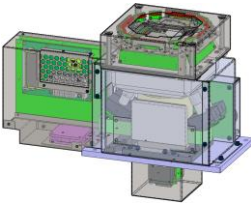
No.	Purpose / Feature	Option name	Category	
C	1	• Spare placement head • Spare nozzle changer	Customer	Table
		• Spare multi-recognition camera: Type 1/ 2/ 3 • Spare side lighting	On-site	Table
	2	• Height sensor	On-site	Table
		• Height sensor teaching jig	Customer	-
	3	• ±0.025 mm placement support • 03015 placement support	Factory	Whole machine
	4	• NG-components ejection conveyor	Customer	Table
	5	• No Head attachment • Safety cover	Customer	-
	6	• Head stand (For two Heads)	Customer	-
	7	• Support station	On-site	-
		• Feeder setting jig • Attachment for thin type tape feeder • Power connector for thin type tape feeder	Customer	-
	8	• PanaCIM-EE ready (License)	On-site	-
	9	• iLNB ready (License)	On-site	-
	10	• Automatic changeover (License)	On-site	-
	11	• Component verification (License)	On-site	-
		• Wired scanner	On-site	Table
		• Scanner holder	On-site	Whole machine
	12	• Feeder Setup Navigator (License)	On-site	-
	13	• Upper communication (License)	Customer	-
	14	• Component verification (License) • Support station: Component verification type	On-site	-
	15	• Interface software of the inspection machine from other companies (License)	On-site	-
		• APC system ready (License)	Customer	-
	16	• APC-MFB 2 system ready (License)	Customer	
	17	• Multi-functional transfer unit • Coating thickness gauge	Customer	-
		• Air supply unit for the feeder	On-site	Table
	18	• Remote operation (License)	On-site	
	19	• Biometrical authentication (License)	On-site	-
	20	• Lightweight 16-nozzle head constant mount load control (License)	On-site	-
	21	• Lightweight 16-nozzle head transfer (License)	On-site	-
	22	• Load checker	Factory	-
	23	• Pre-pickup Inspection (Char/2D) (License)	Factory	-
	24	• Multi-recognition camera PIP lighting	Factory	-
	25	• AOI info display function (License)	On-site	-

No.	Purpose / Feature	Option name	Category	
C	26 To see whether electrical properties of components is within a predefined range before they are going to be mounted	•LCR checker (Feeder shape type) (License) • LCR Checker(Built-in type)	On-site	-
	27 To do simple test for checking shield component conditions after mounting.	•Mount complete position recognition (License)	Customer	-
	28 To do simple test for checking shield component conditions before mounting.	•Mount complete position recognition (License)	Customer	-
	29 To connect the factory-side plumbing to equipment to enable primary air connecting	• Primary air hose unit	Customer	-
	30 To use large reels	• Separator for feeder cart	Customer	-
	31 To use small volume components packaged in the cut tapes and do mounting for production trial and small lot production	• Tray 1 Pallet 10 Kind (License)	Customer	
	32 To increase mount points and patterns	• Extend Mount points (50 000 points, 8 000 patterns) (License)	Customer	
	33 To communicate bad marks with other company machines	• Other Company Bad Mark Communication (License)	Customer	
	34 To perform polarity test of tray components and tape feeder components right before pickup.	•Pre-pickup test (polarity) (License)	Customer	-
	35 Automatic recovery when pickup error or recognition error occurs and to continue production	• Pickup error automatic recovery (License)	Customer	-
	36 To display a chosen image when you haven't used touch panel for a certain period.	• Message board (License)	Customer	-
	37 Visual control of placement head conditions and to prevent troubles.	• Head Diagnosis (License)	Customer	-

No.	Purpose / Feature	Option name	Category	
D	1 To keep the machine condition in regular maintenance.	• Greasing set • Maintenance jig • Nozzle holder cleaning jig	Customer	-
	2 To calibrate as needed.	• Jig kit for accuracy verification • Standard calibration jig kit • Jig kit for adjusting the main body • Plane calibration jig	Customer	-
	3 Required for exchanging/removing the head.	• Unit exchanging tool	Customer	-
	4 To maintain the nozzle head automatically.	• Head maintenance unit • Air supply connection kit • Side filter • Bottom filter • Additional nozzle holder pallet	Customer	
	5 To splice the parts tape automatically	• Automatic tape splicing unit • Splicing tape • Battery box (Including connection cable) • Charge Terminal • Rubbish box	Customer	
		• Battery • Battery Charger	Customer	
	6 To maintain the tape feeder automatically	• Feeder maintenance unit • Master jig • Thin type single feeder attachments • Thin type single feeder master jig • Auto load feeder jig tapes	Customer	-

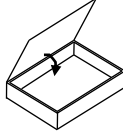
A-1	To couple NPM-D3As in a line.
On-site	N-CONL (NM-EJK3B) N-CONR (NM-EJK4B) • Please select the necessary conveyors according to your line configuration. • For selection of the conveyors, please refer to "4.5 Line Configuration." • They are required even for NPM-D3A on a standalone basis. * It cannot be connected to NPM-W2/ W and NPM.
On-site	FA PC
Factory	HUB and power source unit

A-2	To select the PCB transfer specification in accordance with the production pattern.
Factory	Whole machine PCB transfer conveyor: Long specification PCB transfer conveyor: Short specification • Long specification: One PCB of L350mm or smaller can be kept on the placement position in the downstream side. • Short specification: One PCB of L 250 mm or smaller can be kept on the placement position in each upstream and downstream side. • Please refer to "7. PCB Design Standard" for details.

A-3	To select a component recognition unit suitable for the intended use.
On-site ☐ Table ☐	Multi-recognition camera: Type 1 
	• The position in picking up the chip and the angle deviation are corrected. • Please be sure to select it for the table where the placement head is selected. • Please refer to “4.5 Recognition Unit Configuration” for details.
On-site ☐ Table ☐	Multi-recognition camera: Type 2 (Type 1 + Component thickness measurement) 
	• A component thickness measurement function will be added to “Type 1.” • This provides component thickness measurement (added to chip data entry and reflected in placement height), component's standing/tilted standing is detected, flip of Tr/ Di is detected, and nozzle tip is checked. • This supports each Placement head. • Please refer to “4.5 Recognition Unit Configuration” for details.
On-site ☐ Table ☐	Multi-recognition camera: Type 3 (Type 2 + 3D-measurement function) 
	• A 3D-measurement function will be added to “Type 2.” • Detects coplanarity(flatness) and XY-direction positions of all the leads in QFP/SOP and presence or absence of all the balls, and partially broken balls in its shape in BGA/CSP and other packages. • This supports each Placement head. (Multi-recognition camera Type3 comes with side lighting) • Please refer to “4.5 Recognition Unit Configuration” for details.
On-site ☐ Table ☐	Side lighting 
	• This is required for bump recognition of the BGA/ CSP. (Exclusive to multi-recognition camera) • Multi-recognition camera Type3 comes with side lighting.

* Multi-recognition camera is exclusive to NPM-D3A/D3, NPM-W2S/W2 and NPM-TT2.

A-4	To set the PCB transfer height at 930 mm/ 950 mm above the floor.
Factory	
	Support for 930 mm transfer line (Adjustable range: 920 mm ~ 950 mm) Support for 950 mm transfer line (Adjustable range: 940 mm ~ 970 mm)
	The standard height of the PCB transfer line is 900 mm to 920 mm above the floor.

B-1	To select the nozzle in accordance with the production pattern.
Customer	
	Nozzle
	• Please refer to “4.2 Nozzle Configuration” for details. • Wrong nozzle setup can be detected by nozzle No. verification with 2D code for the nozzles which include “N” in their nozzle No. • For information about the special nozzles, please contact us. • The nozzles are compatible with CM602, CM402/ DT401 series, CM232, CM212, CM101, NPM series and NPM-X series.
Customer	
	Storage nozzle case for 16-/ 12-/ 8-nozzle head Storage nozzle case for 8-/ 3-/ 2-nozzle head
	
	• This case, which is made of plastic, is manageable because it can be checked for its contents from outside. • 16-/ 12-/ 8-nozzle head case can accommodate 50 nozzles. (Less than nozzle diameter $\phi 5$ mm) • 8-/ 3-/ 2-nozzle head case can accommodate 21 nozzles. (Nozzle diameter $\phi 5$ mm or more) • The nozzle case is compatible with AM100, CM602, CM402/ DT401 series, CM232, CM212, CM101, NPM series and NPM-X series.

B-2	To select the tape feeder in accordance with the production pattern.
Customer	
	Intelligent tape feeder
	• Please refer to “4.3 Feeder Carriage Configuration” for details. • The tape feeder is compatible with AM100, CM602, CM402/ DT401 series, CM232, CM212, CM101, NPM series and NPM-X series.

B-3

To use thin type tape feeder.

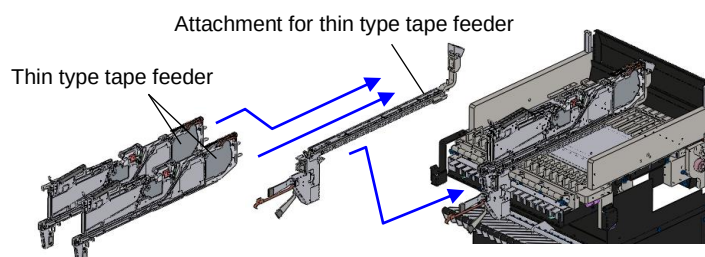
Customer

4 mm thin type single tape feeder (No detection sensor)
8 mm thin type single tape feeder

- Please refer to "4.3 Feeder Carriage Configuration" for details.
- Not available for CM602, CM402/ DT401 series, CM232, CM212, and CM101.
- * As for the inspection of a thin type tape feeder by IFCU, "Master attachment for thin type tape feeder (option)" is required.

Customer

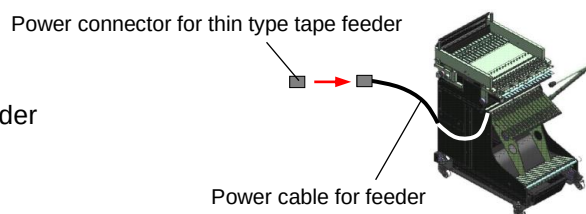
Attachment for thin type tape feeder



- One piece is required per slot when you attach a thin type tape feeder.
Two thin type tape feeders can be attached to each slot.
- This is required even when you use a "Feeder setting jig" in offline setting.
- * A dedicated attachment for 4mm/ 8mm thin type tape feeder. (This attachment cannot be used on auto load feeder.)

Customer

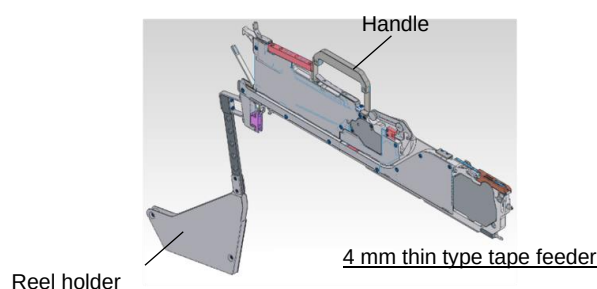
Power connector for thin type tape feeder



- Required to directly supply electricity to thin type tape feeders (at the time of preparation, etc.).
- Used by connecting to the power cable for feeders, which comes with feeder carts.
It can also be connected to the feeder power cable of the support station.
- When power to thin type tape feeders is supplied through "Attachment for thin type tape feeders", this option is not required.
(Use a standard type power cable for feeders.)

Customer

Handle for 4 mm thin type tape feeder
Real holder for 4 mm thin type tape feeder



- Handle for 4 mm thin type tape feeder
This handle is attached to tape feeder.
To improve the usability of setting and carrying.
- Real holder for 4 mm thin type tape feeder
This real holder is integrated in tape feeder. One reel can be set in.

B-4

To eliminate the tape splicing work.
To reduce the feeder setup time.

Customer**8 mm thin type auto load feeder**

This is a thin type feeder materialized automatic component tape setup.

The off-line setup time can be drastically reduced by the simple work of inserting a tape, then pressing the “ Send ” button. (Approx. 30s/reel ⇒Approx. 15s/reel)

This auto load feeder can also use a short cut tape (longer than 120mm).

The 'Tape guide' is different in each size. (Same feeder body)

Depending on the component size, please select from the following types.

Type	Target components	Remarks
Type S	0402R/C	It is possible to purchase the tape guide only. The service life of cover tape peeling blade: about 3 000 h Equivalent to 1500 times of peeling * Not available for emboss tape. * If need the tape guide for 2012 or 3216, please contact us.
Type A	0603R/C	
Type B	1005R/C	
Type C	1608R/C	

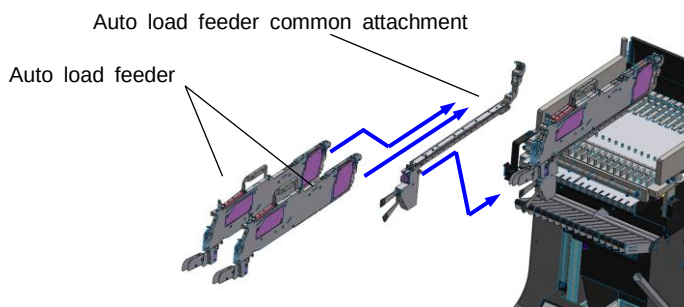
Please refer to “4.3 Feeder Carriage Configuration” for details.

Not available for CM602, CM402/ DT401 Series, CM232, CM212, CM101.

* If you want use IFCU to check auto load feeder, please contact us for details.

* When the auto load feeder is used, a reel holder for setting the reel to be used up and a newly supplied reel is required.

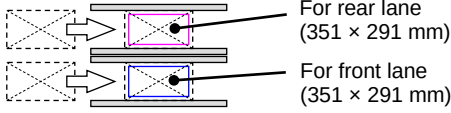
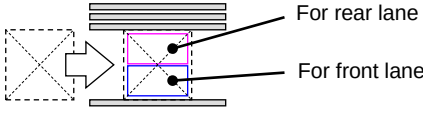
Please consult us separately.

Customer**Auto load feeder common attachment**

- One piece is required per slot when you attach an auto load feeder.
Two auto load feeders can be attached to each slot.
 - This is required even when you use a “Feeder setting jig” in offline setting.
- * This attachment can also be used on 4 mm/ 8 mm thin type tape feeder.

B-5	To select the stick feeder in accordance with the production pattern.
Customer	Single stick feeder • Please refer to “4.3 Feeder Carriage Configuration” for details. • Supporting only lightweight 8-nozzle head and 2-nozzle head. • Single stick feeder cannot be used in CM602, CM402/ DT401 series, CM232, CM212, CM101.
Customer	3-lot stick feeder • Please refer to “4.3 Feeder Carriage Configuration” for details. • Supporting only lightweight 8-nozzle head and 2-nozzle head. • 3-lot stick feeder is compatible with AM100, CM602, CM402/ DT401 series, CM232, CM212, CM101, NPM series and NPM-X series.
Customer	Guide block (For Single stick feeder, 3-lot stick feeder) * Guide block is used when components are difficult to be picked up by the machine in the feeding method with the tip-cut sticks because the transfer state of components and the components posture at the pick-up position are not good depending on the component/stick shape, etc.

B-6	To select the stackable stick feeder in accordance with the production pattern
Customer	Stackable Stick feeder Stackable stick feeder (S) S, M, L size pusher for S type Stackable stick feeder (L) S, M, L, LL, LLL size pusher for L type
	• Please refer to “4.3 Feeder Carriage Configuration” for details
On-site	Table
	Air Supply Unit for Feeder
	• Air Supply Unit for Feeder is necessary when using stackable stick feeders. (13-slot feeder base comes with “Air supply unit for the feeder”.)

B-7	To prepare for the replacement of a support pin.
On-site	Whole machine
PCB support block set for batch exchange (20 support pins attached)	
- It is a set of PCB support blocks for batch exchange (one each for front lane / rear lane) and a batch exchange unit. This is not used with "Automatic replacement of support pins." - Please select "Additional PCB support block" as needed. - To set up the positions of support pins for new PCB externally, please select "Support pin setting jig" separately.	
Customer	
Additional PCB support block	
A set of blocks for front and rear lanes. No support pin is included. Please select "Additional support pin" as needed.  Dual lane mode  Single lane mode	
Customer	
Support pin setting jig	
Required for the external setup work of the support pin.	
Customer	
Additional support pins	
- Twenty pieces are included as standard. - Please select when needed in addition. (20 pieces are included in 1 set.) - This is compatible with NPM-series, NPM-X series and AM100.	

B-8

To replace the support pins automatically.

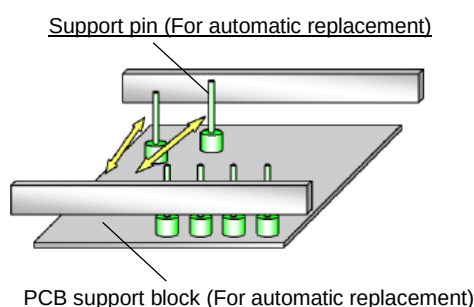
On-site

Whole machine

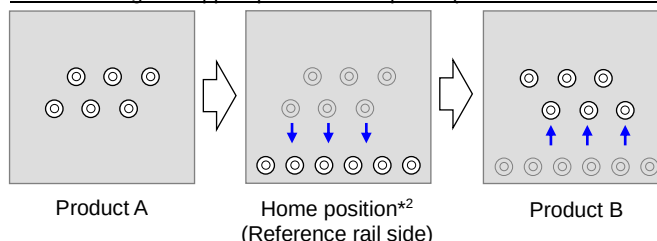
Automatic replacement of support pins

A function to automatically set up the support pin using the placement head. (Standard support pins cannot be used.) For process-plus-placement head (or no head-plus-placement head) specifications, the placement head on one side copes with pin configurations in the front and rear lanes.

Support pin configuration data is created by NPM-DGS. You can check pin configuration on the PC screen.



Time to configure support pins: 90 s/ 10 pins*¹ (Product A → Product B)



*1 For a PCB of 350 × 300 mm

(It does not include time to change the width of the transfer rail.)

*2 Under some conditions, the pin configuration of product A will be directly switched to the one of product B.

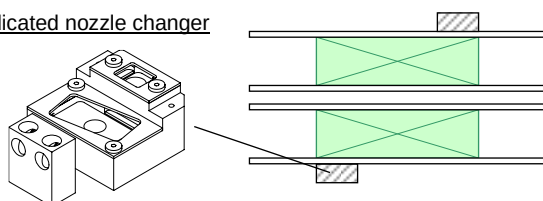
Accessory	Description	Remarks
PCB support block (For automatic replacement)	1 pair (one each of Front/ Rear)	Exclusive to NPM-D3A/D3/ D2
Dedicated nozzle changer	1 pair (one each of Front/ Rear)	Common to NPM-series, NPM series

Selection option	Description	Remarks
Support pin (For automatic replacement)		Common to NPM-series, NPM series, AM100
Nozzle for support pin changeover	100 nozzle: For lightweight 16-nozzle head V3A For lightweight 8-nozzle head 1100 nozzle: For 2-nozzle head	Common to NPM-series, NPM series

The nozzle for support pin changeover is stored in the dedicated nozzle changer.

Each one of #100 nozzle and #1100 nozzle can be stored in the dedicated nozzle changer.

Dedicated nozzle changer



See the next page for the constraint condition when support pins are automatically replaced.

Customer

Support pin (For automatic replacement)

Tip diameter: $\phi 1.5$ mm



	No. of pins that can be configured	
	Dual lane mode	Single lane mode
Long spec. conveyor	Up to 40 pieces (20 pieces/ PCB)	Up to 20 pieces
Short spec. conveyor	Up to 32 pieces (16 pieces/ PCB)	Up to 16 pieces

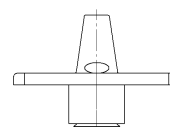
Customer

Nozzle for support pin changeover



100 nozzle

(For lightweight 16-nozzle head V3A/Lightweight 8-nozzle head)



1100 nozzle

(For 2-nozzle head)

Please select according to head configuration. (One nozzle is used for each placement head.)

B-8

To replace the support pins automatically.

The following constraint conditions are required when support pins are automatically replaced.

Constraint condition

(Unit: mm)

Item	Description
Minimum PCB size capable to set up pins	L 50 × W 70 mm
Pin configuration pitch	16 mm or more (X, Y direction)
Pin configuration area (Left-to right flow)* ¹	<u>For dual lane mode</u> <u>For single lane mode</u> *¹ If PCB flow is from right to left, the above dimensions are symmetrically situated. *² Visible outline is included in the pin (center) configurable area. *³ Numerical value in (): For short specification conveyor
Pin arrangement condition	Please configure support pins to the location where the dimensions shown on the left can be secured. Keep away from slit on a PCB when pins are configured.

B-9

To prepare feeders in advance and change them collectively.

Customer

Feeder cart



- The floor slope in the feeder cart installation area needs to be 6 mm or less in the right/left direction and 11 mm or less in the forward/backward direction. If the floor slope is beyond the above limit, the feeder cart cannot be taken in and out.
- This is shared and used for NPM-D3A/ D3/D2/D/TT2/TT and NPM.

B-10

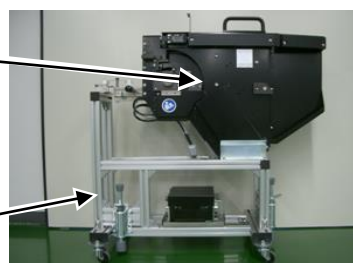
To change spec adoptions from tray feeder to feeder cart.

Customer

Feeder cart change unit

Feeder cart change unit

Change unit cart



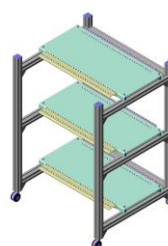
- This is required when specifications are changed from tray feeder specification to feeder cart specification.
- When main body adopts tray feeder spec, you can use a feeder cart when you have installed this unit on the rear side. (When you use a tray feeder, please remove this unit.)
- Feeder cart is not included, and choose "Feeder cart (option)" separately.
- This is exclusively for NPM-D3A/D3/D2/D. (change unit cart is common with NPM.)

B-11

To manage and store tape feeders.

Customer

Tape feeder stand



- This is a stand for intelligent tape feeders.
- For the 8 mm double tape feeder, for example, up to 90 ones can be stocked.

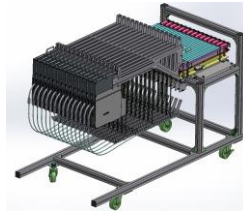
* Please contact us for stocks of thin type tape feeders.
(Enables to stock thin type tape feeders if it is installed to "Thin type feeder attachment.")

B-12

To manage and store stackable stick feeders. To conduct advance preparation

Customer

Feeder stand



- This is a stand for stackable stick feeders.
- For stackable stick feeder (S), up to 15 pcs can be stocked. For stackable stick feeder (L), up to 7 pcs can be stocked.
- This is used when to pull the stackable stick feeder off a machine and when to move the stackable stick feeder.
- When there are intelligent tape feeders only, it is available to use stand for intelligent feeders.

Customer

Power and air supply unit (For stand)

- By adding power and air supply unit to the feeder stand, power and air can be supplied to the feeders and offline feeder movement is possible.
- Items below are included.

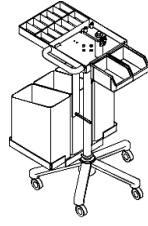
1. Power supply unit

Item	Specification
Rated voltage	Single phase, AC 100 V ~ 240 V
Frequency	50/ 60 Hz
Rated capacity	90VA

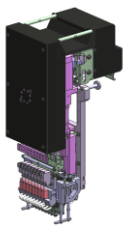
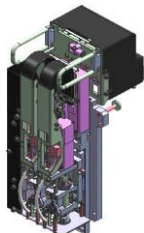
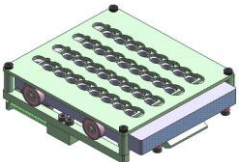
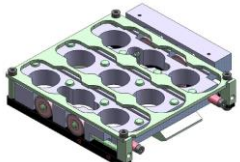
2. Power supply cable for feeder**3. Power supply cable****4. Air connector**

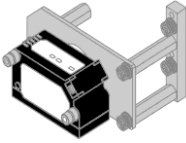
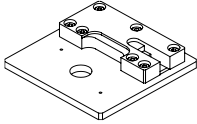
* Please prepare power supply source, cable, air supply source and air hose by yourself.

B-13	To place tray-feeding components.
On-site	Tray feeder Standard accessory • Tray magazine: 2 pcs. • Tray pallet: 21 pcs. • Components-ejection tray: 1 pc.
	• When main body is feeder cart specifications, this unit cannot be connected on the machine. • This is common to tray feeders for NPM-D3A/ D3/D2/ D/TT2/ TT/ W2/ W, NPM and AM100. (tray feeder installation brackets are unique to each machine.)
Customer	Additional tray magazine (15 mm pitch × 10 slots) Additional tray pallet Additional components-ejection tray
	• Please select this when you need more.
Customer	Pallet for vacuum-molded-tray Pallet for vacuum-molded-tray (Magnet fixed type)
	• Please select this option when using vacuum-molded trays. [Applicable tray dimensions] $L \times W = \text{Max. } 230 \times 318 \text{ mm}$ 15 mm or less (Magnet fixed type: 10 mm or less)

B-14	To improve the workability of tape splicing.
Customer	
Splicing cart	
• This cart improves the workability of tape splicing. (For Intelligent tape feeder)	

B-15	To mount thin embossed tape components (Feeding holes become deformed when tape thickness is equivalent to 0.2mm or thinner)
Customer	
8 mm double feeder (Thin embossed tape ready)	
• At embossed tapes that is ultra-thin and weak tape strength, sprockets to feed tapes could deform feeding holes. • Changes to smoother sprocket surface at thin embossed tape feeder, and that increases the contact area with carrier tapes to reduce the deformation of feeding holes. • For the details, see "Intelligent Tape Feeder" in the "4.3 Feeder Carriage Configuration" section.	

C-1	To replace the Head.
Customer	Table
 Spare Lightweight 16-nozzle head V3A*  Spare Lightweight 8-nozzle head  Spare 2-nozzle head  Head case	
• Head case comes together with spare head. • It should be replaced for each table. Different Heads can be installed to the front and rear tables. • Since nozzle changer and side lighting do not come together, please select it separately as options. • It is for NPM series and NPM-X series only. * You cannot use Lightweight 16-nozzle head V3A with NPM-WXS, NPM-W2S/ W, NPM-TT2/ TT, NPM-D3/ D2/ D, NPM. * You cannot use Lightweight 8-nozzle head with NPM-W, NPM-TT, NPM-D2/ D, NPM. * You cannot use 2-nozzle head with NPM-WX/ WXS, NPM-W2/ W2S/ W, NPM-TT2/ TT. * You can attach lightweight 16-nozzle head V2 on NPM-D3A on conditions.	
Customer	Table
 Spare nozzle changer for lightweight 16-nozzle head V3A (Conventional nozzle changers for 16-nozzle head/12-nozzle head will do)  Spare nozzle changer for lightweight 8-nozzle head (Conventional nozzle changers for 8-nozzle head will do)  Spare nozzle changer for 2-nozzle head	
• It is for NPM series and NPM-X series only. * You cannot use Lightweight 16-nozzle head V3A nozzle changer with NPM-TT2/ TT. * You cannot use 2-nozzle head nozzle changer with NPM-WX/ WXS, NPM-W2/ W2S/ W, NPM-TT2/ TT.	
On-site	Table
Spare multi-recognition camera: Type 1 Spare multi-recognition camera: Type 2 Spare multi-recognition camera: Type 3 (With side lighting)	
On-site	Table
Spare side lighting	
• This is required for bump recognition of the BGA/ CSP. (Exclusive to multi-recognition camera)	

C-2	To correct the PCB height (Warp) and improve placement quality.
On-site	Table
Height sensor	
	• The height sensor supports the placement/the heads. <u>PCB warpage correction (Placement head)</u> • Controls the placement height of a PCB by measuring the height (warp) of the whole PCB. (The measurement is after PCB recognition) Measurement time: 2.0 s (350 × 300 mm in an optimal condition, with 9-point measurement) • Select the height sensor for the first NPM-D3A (placement head + placement head) in line. It is required only on the front of the machine in the single lane production mode, and, on the front and rear, in the dual lane production mode. • The head configuration except for [placement head + placement head], PCB warpage correction does not function. • Measurement data is passed to the downstream NPM-D3A. • Please refer to “4.7 Recognition Unit Configuration” for details.
Customer	
Height sensor teaching jig	
	• It calibrates linearity and offset of the height sensor. • It is necessary if you purchase the height sensor for the first time. • It is common with NPM series, NPM-X series, AM100.

C-3

Improve a lightweight 16-nozzle head V3A function

Factory

Whole machine

±0.025 mm placement support

- It improves placement accuracy. (± 0.025 mm ($Cpk \geq 1$): Under below conditions)
- Make ± 0.025 mm placement-specific parameter settings.
- Possible to simultaneously select "03015 placement support", but the placement accuracy is ± 0.03 mm ($Cpk \geq 1$).

<Placement condition>

Target head	Lightweight 16-nozzle head V3A
Production mode	High production mode: OFF
Applicable components	Jig chips (1005)
Placement angle	0°, 90°, 180°, 270° only
Recognition	Placement angle recognition

Factory

Whole machine

03015 placement support

- 03015 placement is possible. (± 0.03 mm($Cpk \geq 1$): Under below conditions)
- Make 03015-specific parameter settings.
- For 03015 chip placement, "276CS (or 276CSN) nozzle" and 4 mm thin type tape feeder (4W1P) is required.
For details, contact Panasonic.
- Cannot be selected with " ± 0.025 mm placement ready".

<Placement condition>

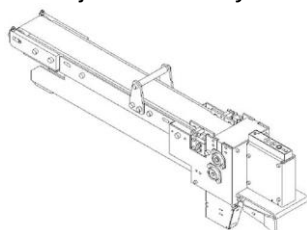
Target head	Lightweight 16-nozzle head V3A
Production mode	High production mode: OFF
Applicable components	03015R (By Panasonic)
Placement angle	0°, 90°, 180°, 270° only
Recognition	Placement angle recognition

C-4

To align and eject the NG components onto the conveyor.

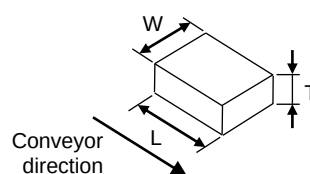
Customer

Table

NG-components ejection conveyor

Applicable component dimensions

Max. W 42 × L 60 mm
T = 1 mm to 16 mm

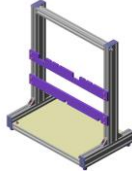


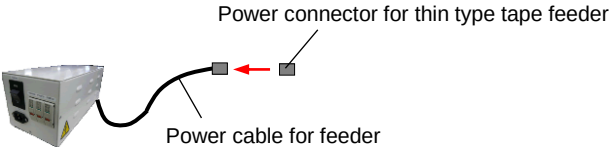
Component shape

- ① No space exceeding 0.3 mm on its underside on a horizontal surface
- ② No extremely unstable shape, e.g. small underside compared with its height

- This is used for ejecting recognition NG components.
- Usable with lightweight 8-nozzle head or 2-nozzle head. (cannot be installed on tray feeder table)
- This occupies four feeder installation slots.
- This is exclusively for NPM series and NPM-X series.

C-5	To implement production with a Head/Heads removed.
Customer	
No Head attachment	
	• This is an attachment that is required to implement production with one side Head in where the other Head is removed due to maintenance. (Normally, machine does not operate with a head removed.) • When attachments installed on both sides (front and rear), machine can pass through PCB and continue operation.
Customer	
Safety cover: Front side	
Safety cover: Rear side (Feeder cart specification)	
Safety cover: Rear side (Tray feeder specification)	
	• Please be sure to select a safety cover specification. (Not required when Feeder cart or Tray feeder is attached.) • This is exclusively for NPM-D3A/D3/D2/D.

C-6	To manage and store the removed Heads.
Customer	
Head stand (For two heads)	
	• This is used to store the removed heads after head-exchanging. • One head stand can store two heads. • This is exclusively for NPM series and NPM-X series.

C-7	To reduce time for changeovers.
On-site	Support station (Power supply type) Support station box (Component verification type) - By using the spare feeder carts and feeders, which you have, you can prepare for next products while the machine continues its operation. - This has two types: one of them only supplies electric source to feeder carts and feeders, and another one implements component verification in addition to the electric source supplying. - To use PanaCIM-EE for off-line setup, "Support station box (Component verification type)" is required. - Please refer to "5.5 Support Station" for details. * In NPM series, "Change Cart Preparation Unit" in CM series is not available.
On-site	Support station: Component verification type (License) This is required for the use of "Support station box (Component verification type)." * The license is not required for off-line setup (component verification) using PanaCIM-EE. * This does not support stackable stick feeder.
Customer	Feeder setting jig The feeder setting jig is used as a feeder holder to set components on the feeder and to verify components. "Attachment for thin type tape feeder" is required to install thin type tape feeders.
Customer	Attachment for thin type tape feeder
Customer	Power connector for thin type tape feeder  - Required to directly supply electricity to thin type tape feeders (at the time of preparation, etc.). Used by connecting to the power cable for feeders, which comes with the support station. - When power to thin type tape feeders is supplied through "Attachment for thin type tape feeders", this option is not required. (Use a standard type power cable for feeders.)
C-8	Wishes to use all sorts of function modules of PanaCIM-EE.
On-site	PanaCIM-EE ready (License) - Please select this option when connecting to PanaCIM-EE. - It supports each functional module of PanaCIM-EE. - It includes "Component verification (License)" and "Upper communication (License)." - Please refer to "PanaCIM-EE Specification booklet" for details.
C-9	Wishes to use all sorts of function modules of iLNB.
On-site	iLNB ready (License) - Please select this option when connecting to iLNB. - It supports each functional module of iLNB. - It includes "Upper communication (License)." - Please refer to "iLNB Specification booklet" for details.

C-10	To implement changeover efficiently.
On-site	
Automatic changeover (License)	
• This supports changeovers (production data change and rail width change), minimizing the time loss of operation caused by product changes. • Please refer to “5.2 Automatic Changeover” for details.	
C-11	To prevent setting error at the time of component change.
On-site	
Component verification (License)	
• This prevents components from being put wrongly. If wrong components are put, interlock function of the machine operates to create themode automatically where production cannot be continued. It is possible to customize order of barcode scanning and/or barcode definition, according to customers' operation. • We have wired scanner type and wireless scanner type(PanaCIM-EE Gen2 Capability). • It is not available to select with “PanaCIM-EE ready (License)” at the same time. (It is included in “PanaCIM-EE ready (License).”) • Please refer to “5.1 Component Verification” for details.	
On-site	Table
Wired scanner	
• Required when “Component verification (wired scanner type)” is selected. • Operation on two tables is made possible by one scanner.	
On-site	Whole machine
Scanner holder	
• Holders, which are for fixing wired scanners, are equipped at the front and rear of the machine.	
C-12	To streamline setup operations during a changeover.
On-site	
Feeder Setup Navigator (License)	
• It is a support tool to navigate efficient setup procedure. The tool factors in the amount of time it takes to perform and complete a setup when estimating the time required for production and providing the operator with setup instructions. • Together with this license, select the following options. <u>Required</u> Support station box (Component verification type) <u>Choice (Select any of the following)</u> 1) Component verification (License) + Support station: Component verification type (License) 2) PanaCIM-EE ready (License) Please refer to “5.3 Feeder Setup Navigator” for details.	
C-13	To use existing system effectively.
Customer	
Upper communication (License)	
• This is an open interface which is in cooperation with customer's existing system. As standard interface is prepared, it's possible to intercommunicate necessary information. Depending on the purpose of customer's system, functions of “Event”, “Component verification with other vendor's machine”, and “Information for component management” can be used. • It is not available to select with “PanaCIM-EE ready (License)” at the same time. (It is included in “PanaCIM-EE ready (License).”) • It is not available to select with “iLNB ready (License)” at the same time. (It is included in “iLNB ready (License).”) • Please refer to “5.4 Upper Communication” for details.	

C-14	To make use of the location-independent tape feeder function.
• The tape feeder can be located flexibly within the same table. • You can locate components alternately and the feeder for the next product at an empty slot. * Using the “Support station box (Component verification type)”, you need to write data to tape feeders in advance. “Component verification (license)” is also needed.	
On-site Component verification (License)	
On-site Support station box (Component verification type) Support station: Component verification type (License)	
• It is necessary to write information to the memory of tape feeders.	
C-15	To enable APC system using the existing SPI.
On-site Interface software of the inspection machine from other companies (License)	
• This is interface software to enable APC system using a measurement data of inspection machine (solder inspection) from other companies. • This option is required per NPM-D3A that receives APC-FF offset data. • Select this option, together with “APC system-ready (License)” for the same number. • Please refer to “5.7.1.1 When you use SPI of the inspection machine from other companies” for details. * Target inspection machines need to satisfy the requirements of our specifications. For details, please contact us. * A dedicated PC needs to be placed between the inspection machine from other company and LNB (FA PC). Please prepare a PC, a HUB and LAN cables by customer. * 03015 components are not eligible.	
Customer APC system ready (License)	
• This is required when using “Interface software (License) of inspection machine from other companies.” • This option is required per NPM-D3A that receives APC-FF offset data.	
C-16	To maintain placement quality by using the AOI measurement data of mounting process.
Customer APC-MFB2 system ready (License)	
• APC-MFB2 System, based on the results of AOI, compensates for the discrepancy between component mounting coordinates and the actual mounting position to maintain the accuracy of an initial mounting and achieve stable mounting quality. • Divided into categories focusing on nozzles, feeders, components, and mounting positions, the results of AOI inspection is presented as a process capability index. This is helpful for process variation management and appropriate response when the process varies. • This option is required per NPM-D3A that receives APC-MFB offset data. • This option supports NPM X/ NPM series. • Please refer to “5.7.2 APC-MFB2 system” for details.	

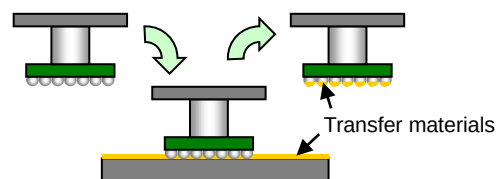
C-17 To perform transfer**Customer**

Multi-functional transfer unit

1. Outline

The multi-functional transfer unit is a device to form the coating of transfer materials in the process, such as PoP top package mounting, requiring transfer of flux etc.

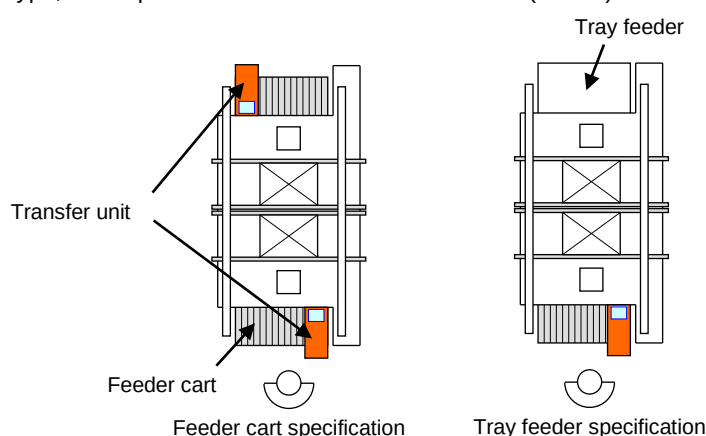
The transfer process will be done when a component picked up by the placement machine is pressed against the coating formed by this unit.

**2. Features**

The squeegee gap is programmable for each chip data. This makes it available to finely select the coating thickness to be transferred according to the size of bumps. (Programmable squeegee gap)

This unit can be installed on the feeder cart in the same way as that of the intelligent tape feeder.

For the feeder cart type, it occupies the addresses No. 10 to No. 17 (8 slots).

**3. Specifications**

Item	Specifications
Electric source	DC 24 V (to be supplied from main body)
Outside dimension	W 165 × D 676 × H 285 mm
Mass	21 kg (including 1 kg of a transfer table)
Environmental condition	Temperature: 20 °C ~ 30 °C (coating-formable temperature*) Humidity: 25 %RH ~ 75 %RH (No condensation)
Exportation/Storage conditions	Temperature: -20 °C ~ 60 °C Humidity: 75 %RH or below (No condensation)

* If the temperature range of target transfer materials is narrower than the above range, the former range should be followed.

4. Availability of transfers based on the feeding method of applicable components

	Applicable head		
	Lightweight 16-nozzle head V3A*	Lightweight 8-nozzle head	2-nozzle head
Feeding method	Taping		
Component dimension	2 × 2 mm ~ 8.5 × 8.5 mm (6 × 6 mm ~ 8.5 × 8.5 mm With conditions added)	~ 20 × 20 mm	~ L40 × W30 mm
Applicable component	BGA, CSP		

*1 Lightweight 16-nozzle head transfer (License) is necessary.

5. Automatic supply of transfer materials

The multi-functional transfer unit has a function to supply transfer materials automatically.

This function is used by specifying the supply frequency parameter. The amount of one supply can be adjusted by specifying the parameter of the discharging time from syringe.

We recommend "Automatic supply" as a supply method of the transfer materials. ("Automatic supply" makes the amount of use of the transfer material a minimum.) To use this function, the optional air supply unit needs to be installed on the feeder cart on which the multi-functional transfer unit is installed.

To use this function, the materials should be set in the multi-functional transfer unit while being encapsulated in the MUSASHI-ENGINEERING-manufactured $\phi 26$ mm syringe (PSY-30E, PSY-50E, PSY-70E, etc.) or its equivalent*.

The customer needs to specify that when purchasing from a materials manufacturer, or to prepare the syringe by yourself and refill it.

* Equivalent: The one that can be used in combination with the MUSASHI-ENGINEERING-manufactured adapter tube AT50-E.
The one that can be used in combination with the MUSASHI-ENGINEERING-manufactured joint J-R-3.

6. Programmable squeegee gap

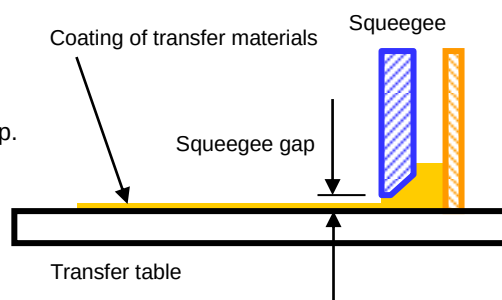
The multi-functional transfer unit determines the coating thickness of transfer materials by controlling the gap (space) between the transfer table forming the coating of transfer materials and the squeegee smoothing them.

This space is called a squeegee gap, and programmable for each chip.

The setting range is as follows.

Squeegee gap setting range: 0.015 mm ~ 0.35 mm

The thickness of the coating to be actually formed varies depending on transfer materials; however, it is generally 50 % to 70 % of the squeegee gap.



Coating-formable materials verified

- By Panasonic MSP521 Flux
- By Indium TACFlux023 (Flux)
- By Senju Metal Industry M705-TVA03.9-F (Solder paste for transfer)

* These materials should not be viewed as our recommendation.

The multi-functional transfer unit does not guarantee to form the coating of every transfer material.

It may not be able to form the coating of even the coating-formable materials verified above, depending on their storage condition, replacement frequency, and so on.

7. Transfer materials

As for the usage of transfer materials, the specifications and instruction manuals provided from their respective manufacturers should be followed. And also, it is necessary to obtain the chemical substances safety data sheets (MSDS) of the transfer materials, and follow their descriptions.

8. Transportation and carry

The mass of the multi-functional transfer unit is 21 kg.

As to the transportation and carry, the precautions described in the instruction manuals should be followed.

* This option is compatible with AM100, CM602, CM101, NPM series, and NPM-X series.

Customer

Coating thickness gauge (0 μm ~ 250 μm , in 10 μm increments)

Coating thickness gauge (0 μm ~ 500 μm , in 20 μm increments)

This is the gauge for measuring the thickness of the coating formed by the multi-functional transfer unit.

Please select the one with the appropriate measurement range.

Recommended manufacturer and type

Manufacturer	Type (identical)
Sanko Electronic Laboratory Co., Ltd. (in Japan)	234R/IV: 0 μm - 250 μm (10 μm)
ERICHSEN (outside Japan)	234R/V: 0 μm - 500 μm (20 μm)

* This option is compatible with AM100, CM602, CM101, NPM series, and NPM-X series.

On-site

Table

Air supply unit for the feeder

- It is necessary when using the automated transfer material supply function.

C-18	To enable remote operation
On-site	
Remote operation (License)	
• Remote operation function allows centralized collection of errors generated in the machines and offers remote-controlled recovery, reducing error recovery time and contributing to efficient capacity utilization and labor-saving. • This provides a system where it detects errors when they occur and allows remote-controlled recover. This centralized recovery system helps reduce “the need for operators to notice errors” and “the travel time to the targeted error machine, thereby reducing error recovery time. • For details, see “5.13 Remote operation”.	

C-19	To login to a machine using biometric information
On-site	
Biometric authentication(License)	
• Biometric authentication uses biometric information and enables login to a machine. (Helps improve security; preventing to someone from stealing passwords and preventing passwords to be shared) • For details, see “5.14 Biometric authentication”.	

C-20

To keep the placement push-in load of the lightweight 16-nozzle head V3A constant

On-site

Lightweight 16-nozzle head constant mount load control (License)

1. Overview

This function keeps the placement push-in load of the lightweight 16-nozzle head constant.

2. Features

Keeps the push in the load constant by controlling the motor current of the Z axis.

This provides the stable mounting without over-pushing the board even when the board has upward warp.

3. Specifications

Item	Specification
Placement load (N)	≤ 1.0 N
Productivity	This function does not decrease the productivity
Setting method	Setting for each table is possible.

4. Reference information

This function controls the push in load.

Use "Placement 2-head Down" in the standard function together when you want to control the contact load of the board.

C-21

To enable bonding involving paste transfer with lightweight 16-nozzle head

On-site

Lightweight 16-nozzle head transfer (License)

1. Overview

Enables transfer mounting with Lightweight 16-nozzle head.

2. Features

Enhances transfer mounting productivity

3. Specifications

Item	Specification
Applicable components	Dimensions: □2 mm~□6 mm (When it is Lightweight 16-nozzle head V3A, it is □8.5 mm) (□6 mm ~ □8.5 mm with conditions added) Thickness: Max. 3 mm (When you use a short nozzle(101GS, 101GSN, 102GS, 102GSN), it is 6 mm at the maximum)
Required condition	The top surface of component picked up by the nozzle must be flat and larger than the pickup nozzle. * However, some restrictions are placed by the transfer process condition.

C-22	To measure the push-in load or impact load during placement and display the results on the monitor of the machine or on the LNB																												
Factory																													
Load checker																													
1. Overview This function measures the “push-in load” of the placement head and displays the results on the monitor of the machine or on the LNB. 2. Definition of loads Impact load: The load that occurs momentarily when the nozzle touches the load cell during placement. Push-in load: The load that occurs when the nozzle is pushed onto the load cell by 0.3 mm. 3. Main features <table border="1"> <thead> <tr> <th>Item</th><th>Specification</th></tr> </thead> <tbody> <tr> <td>Push-in load measurement</td><td>Measures the push-in load of the placement head nozzle by the load checker during maintenance or production, and displays the results on the screen of the machine or on the LNB. * Push-in load measurement: Placement 100% and Place gap 0.3 mm * Measured load is expressed as the deviation from the standard value.</td></tr> <tr> <td rowspan="2">Measured push-in load judgment</td><td>(1) Load Warning Range Displays a warning message if the measured load exceeds the preset range. Measurement range: $\pm 0 \sim 3,000\%$ (Default: $\pm 40\%$)</td></tr> <tr> <td>(2) Load NG Range Displays “NG” if the measured load exceeds the preset range. The axis detected as NG will be set as “Bad nozzle” automatically. Measurement range: $\pm 0 \sim 3,000\%$ (Default: $\pm 60\%$) * Set a value greater than “Load Warning Range”.</td></tr> <tr> <td>Stop production if push-in load is NG</td><td>Stops production if “NG” is detected in the loads measured during production.</td></tr> <tr> <td>Measure push-in load storage</td><td>Stores the push-in loads measured during maintenance or production to be stored in the LNB for 30 days so that they may be checked as necessary.</td></tr> <tr> <td>Applicable heads</td><td>Lightweight 16-nozzle head V3A, V2, Lightweight 8-nozzle head * Multifunctional head are not supported.</td></tr> <tr> <td>Requirements of applicable nozzles</td><td>- Nozzle tip size: $\leq 4.0 \times 4.0$ mm (Tx, Ty in nozzle library) - Total nozzle length: 13.8 mm (TUPH in nozzle library) * Nozzles with non-flat end are not supported. (Special nozzle, bad nozzle, etc.)</td></tr> <tr> <td>Load display</td><td>Represents the measured push-in load as the deviation from the standard value in percent. Least increments: 0.1%</td></tr> <tr> <td>Push-in load Measurement count</td><td>Sets how many times push-in load is to be measured per nozzle axis. 1 ~ 9 times per nozzle * Default: 3 times</td></tr> <tr> <td>Load measuring interval by board count</td><td>Sets the interval of push-in load measurement during production in terms of board count. 0 ~ 9,999 pcs. * Default: 0</td></tr> <tr> <td>Push-in load measurement accuracy</td><td>$\leq \pm 0.2$ N (Common to all heads)</td></tr> <tr> <td>Load checker calibration time</td><td>≤ 15 s per head (Common to all heads)</td></tr> <tr> <td rowspan="2">Push-in load measurement time</td><td>Lightweight 16-nozzle head V3A, V2: ≤ 40 s</td></tr> <tr> <td>Lightweight 8-nozzle head: ≤ 20 s</td></tr> </tbody> </table> 4. Restrictions • Load checker and LCR checker(Built-in type) cannot be selected on a same table. • You can select Load checker and LCR checker(Built-in type) separately; you can select Load checker for a front table and LCR checker(Built-in type) for a rear table, or Load checker for a rear table and LCR checker(Built-in type) for a front table.		Item	Specification	Push-in load measurement	Measures the push-in load of the placement head nozzle by the load checker during maintenance or production, and displays the results on the screen of the machine or on the LNB. * Push-in load measurement: Placement 100% and Place gap 0.3 mm * Measured load is expressed as the deviation from the standard value.	Measured push-in load judgment	(1) Load Warning Range Displays a warning message if the measured load exceeds the preset range. Measurement range: $\pm 0 \sim 3,000\%$ (Default: $\pm 40\%$)	(2) Load NG Range Displays “NG” if the measured load exceeds the preset range. 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Least increments: 0.1%	Push-in load Measurement count	Sets how many times push-in load is to be measured per nozzle axis. 1 ~ 9 times per nozzle * Default: 3 times	Load measuring interval by board count	Sets the interval of push-in load measurement during production in terms of board count. 0 ~ 9,999 pcs. * Default: 0	Push-in load measurement accuracy	$\leq \pm 0.2$ N (Common to all heads)	Load checker calibration time	≤ 15 s per head (Common to all heads)	Push-in load measurement time	Lightweight 16-nozzle head V3A, V2: ≤ 40 s	Lightweight 8-nozzle head: ≤ 20 s
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C-23	To recognize the characters or 2D codes on the surface of a component before picking it up from tape feeder
Factory Pre-pickup Inspection (Char/2D) (License)	
• Right before pickup of tray components and tape feeder components, character recognition or 2D recognition of component surface, captured with head camera, prevents setting wrong (incorrect components) and maintains traceability. * You need to change head camera lighting to an optional lighting(Low Angle Lighting2). * You need to change tray feeder to the one with anti-vibration rubber adjust bolt. • For the details, see “5.11 pre-pickup inspection (Char/2D)”.	

C-24

To recognize the lead pins of the leaded components to be inserted

Factory

Multi-recognition camera PIP lighting

1. Overview

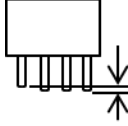
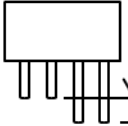
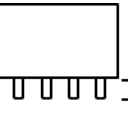
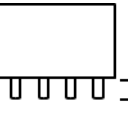
Multi-recognition camera PIP lighting is intended to be used for recognizing only the lead pins of the leaded components to be inserted.

Multi-recognition camera PIP lighting is for 2-nozzle head.

2. Main functions

Item	Specification
PIP lighting	Used to extract/recognize only the inserted leads by concentrating the light.
Side lighting	Used when recognizing the solder balls on BGA / CSP (equivalent to existing side lighting).

3. Basic specifications

Item	Description
Component conditions	Overall dimensions
	Depend on the placement head used.
	Lead pitch
	$\geq 0.5 \text{ mm}$
	Lead sizes
	$\geq 0.2 \times 0.65 \text{ mm}$
	No. of leads/ group
Difference in lead length	Lead group: Max. 32 groups per component No. of leads: Max. 255 leads per group
	$\leq \pm 0.5 \text{ mm}$ (Example)
	In-spec.: $\leq 0.5 \text{ mm}$
	Off-spec.: $> 0.5 \text{ mm}$
	 $\leq 0.5 \text{ mm}$
	 $> 0.5 \text{ mm}$
Lead protrusion	$\geq 2.0 \text{ mm}$ (Example)
	In-spec.: $\geq 2.0 \text{ mm}$
	Off-spec.: $< 2.0 \text{ mm}$
	 $\geq 2 \text{ mm}$
Lead tip	 $< 2 \text{ mm}$
	
	Must be higher than bottom of body
Lead material	Must have an inclined part (chamfered).
	Metallic

NOTE

Dedicated jig is required for luminosity calibration.

Part name: Luminosity calibration jig for PIP lighting unit



C-25

To reduce the time required for checking the positions judged as NG by AOI

On-site

AOI info display function (License)

1. Overview

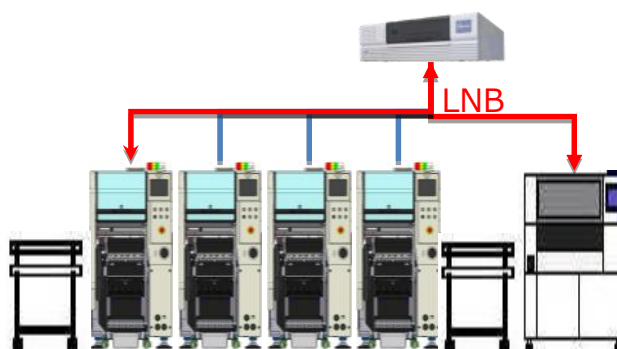
This function provides automatic two-way information display between the AOI and mounters (NPM). It automatically identifies the NG positions so as to save labor.

- * Effect 1: Reduce the time required after NG judgment by AOI until feeder positions are identified.
- * Effect 2: Allows the feeder positions to be identified even by operators with less NPM/DGS skills.

2. System Configuration

AOI exchanges information with the mounters (NPM) through communication via the LNB.

System configuration example

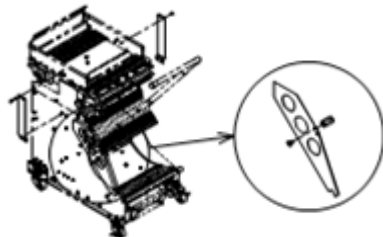
**3. Main functions**

Item	Specification
Displaying NPM information on AOI	Displays the information on the NG component feeder position information automatically on the AOI screen if inspection NG has occurred. Display example: Machine No., Feeder address, Nozzle No. * Displayed information differs with the inspection machine manufacturer.
Displaying AOI information on NPM	Notifies the AOI information with the inspection image to the NPM that mounted the component concerned through the operation via the AOI screen. At this time, a warning message is displayed on the NPM, and information can be checked while continuing production.

C-26	To see whether electrical properties of components is within a predefined range before they are going to be mounted	
On-site		
LCR checker (Feeder shape type) (License)		
• For details, see "5.17 LCR checker (Feeder shape type).		
On-site		
LCR checker (Built-in type)		
1. Common specifications between Feeder-shaped type LCR checker and Built-in type LCR checker • Checks electrical properties of chip components and judges whether they are within the specified limits. • When judged as NG components, productions will go in to error stop to prevent error mounting. • This function detects and prevents erroneous picking up of chip components that shape recognition cannot detect; the shape of chip components is the same but are different. (effective to reduce error mounting due to improper chip components being set on feeders)		
2. Comparing main points between Feeder-shaped type LCR checker and Built-in type LCR checker		
Items	Feeder shape type	Built-in type LCR checker
Component size	0603 ~ 3216, thickness is up to 1.5 mm	0402 ~ □6.0 mm, thickness is up to 5.0 mm
Type and property range	Resistance : 10 Ω ~ 100 MΩ Condenser : 10 pF ~ 100 μF Inductor : 1 μH ~ 47 μH	Resistance : 0 Ω ~ 100 MΩ Condenser : 1 pF ~ 100 μF Inductor : 4.7 nH ~ 1 mH Diode : 0 V ~ 3.4 V * Polarity evaluation only
Occupied slots(Feeder cart)	1 slot	None
License	Need	No Need
• For details, refer to"4.6 LCR Checker (Built-in type)".		

C-27	To do simple test for checking shield component conditions after mounting
Customer	
Mount complete position recognition (License)	
- Measures the brightness of two areas of shielded components with a head camera and detect improper mountings from brightness. When detected an improper mounting, machine gets into single stop state. (Detection of improperly mounted shield components before reflow process reduces repair time) - For details, see "5.15.1 Mount complete position recognition function".	

C-28	To do simple test for checking shield component conditions before mounting
Customer	
Mount complete position recognition (License)	
- Checks shield case warping with the machine. When detected components as warping, the components become disposal. (Prevent improper shield components from being mounted) - For details, see "5.15.2 Shield case warping inspection function before mounting".	

C-29	To connect the factory-side plumbing to equipment to enable primary air connecting
Customer	Primary air hose unit 
	• Primary air hose unit is used for primary air connecting where factory-side plumbing is connected to equipment.
C-30	To use large reels
Customer	Separator for feeder cart 
	• Separator for feeder cart is used when supplying taping components for large reels.
C-31	To use small volume components packaged in the cut tapes and do mounting for production trial and small lot production
Customer	Tray 1 Pallet 10 Kind (License) • You can place onto a pallet up to 10 kinds of feeder supply components packaged in cut tapes and do production. • For the details, see “5.16 Tray 1 Pallet 10 Kind”.

C-32

To increase mounting points and patterns

Customer

Extend Mount Points (50 000 points, 8 000 patterns) (License)

1. Overview

This is a chargeable license to increase the maximum mounting points by model.
(Common to Line/Machine, 2 lane total)

* (The maximum) Mounting point includes patterns and marks.

Now

Models	Mounting points	Patterns	Marks
NPM-W2	10 000	1 000	1 000
NPM-TT2	10 000	1 000	1 000
NPM-D3A	10 000	1 000	1 000
DGS	10 000	1 000	1 000

In the standard specification, there is no system to stop automatic operation due to an error even when production data is over 10 000. When the chargeable license is not activated, however, a warning will be shown when production is started with production data over 20 000.

When Option Activated

Models	Mounting points	Patterns	Marks
NPM-W2	50 000	8 000	8 000
NPM-TT2	50 000	8 000	8 000
NPM-D3A	50 000	8 000	8 000
DGS	100 000	8 000	8 000

In the chargeable license specification, we do not guarantee performance, however, there is no production data limit even when production data is over 50 000.

2. Restrictions

- (1) The following processing may be affected, e.g., Screen response gets slow and screen switching gets slow, Automatic operations do not run smoothly.

* It is not unusual condition. It is because of machine internal processing. Since there are many production data, it takes time to extract and manipulate data.

- Production data loading
- Trace data uploading
- Cycle time
- Teaching, Operations
- Switching to the production data edit screen, Saving, etc.

- (2) It is limited to LNB PC Model No. E27B and after.

C-33

To communicate bad mark data with other company machines

Customer**Bad Mark Communication from other company machines(License)****1. Overview**

Transfers bad mark data using bad mark data in each PCB written on a LNB's shared folder from your systems, for example other company inspection machines. This reduces bad mark reading time on a stage at the head of a line. Each machine using bad mark communication needs this option.

* See "5.8.1 When Receiving Bad Marks from Other Company Inspection Machines" for the details.

2. Restictions

(1) You cannot use with APC system ready or interface software of other company inspection machines(option).

(2) You cannot use with the following iLNB features when PCB barcodes are read with a mounter head camera.

(ア) Automatic changeover of iLNB's PCB ID reading method

(イ) Features needing to read PCB IDs with an iLNB

① (Gate check, Different model check, PCB ID notification to upper systems)

(3) Barcodes must be printed on an upper surface of a PCB.

(4) You need to add barcode data(positions and size) as production data.

(5) 2D codes that can read PCB barcodes are as follows.

1. Compatible with standards(Data Matrix, GR codes, Micro QR codes)

2. Max size : □5 mm

3. Max data : 128(alphanumeric characters)

(6) Use your system and write bad mark data in each PCB to a LNB's shared folder in the given format.

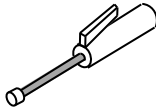
(7) You cannot use LNB automatic changeover of other company machines and bad mark communication from other company machines at the same time.

(8) PCB ID barcodes need reading at the head of a line.

There are cases in which you may have to add an external scanner or other devices.

* (3)(4)(5) are applicable when PCB barcodes are read with a mounter head camera.

C-34	To perform polarity test of tray components and tape feeder components right before pickup.
Customer	
	Pre-pickup inspection (Polarity) (License)
	- Before picking up tray components and tape feeder, head camera captures component images and performs polarity tests to prevent setting wrong. - When test result shows polarity direction is correct, components are picked up and mounted. - When polarity direction is not correct, the image is shown, and it will be in single stop. - For the details, see "5.10 Pre-pickup inspection (Polarity)".
C-35	Automatic recovery when pickup error or recognition error occurs and to continue production
Customer	
	Pickup error automatic recovery (License)
	- It is automatic position teaching when pickup error or recognition error occurs. When teaching is done successfully, production does not stop. It continues running the production. That reduces number of equipment downtime and enhances operating rate. - For the details, see "5.9 Pickup error automatic recovery".
C-36	To display a chosen image when you haven't used touch panel for a certain period.
Customer	
	Message board (License)
	- If you are not going to operate a touch panel for a certain period of time, you can display a user-selected screen on it. - When you make better use of vacant monitors and display screens such as an operator training or shift information on them, you could train and give instructions to operators while working on producing. - See "5.12 Message Board" for the details.
C-37	Visual control of placement head conditions and to prevent troubles.
Customer	
	Head diagnosis (License)
	- Diagnosis of placement heads prevents the occurrence of problems and assures stable operation. - See "5.13 Head Diagnosis" for the details.

D-1	To keep the machine condition in regular maintenance.				
Option name	Usage	Description	Remarks		
Customer Greasing set	Greasing the specified parts of machine	Grease gun Nozzle 	Common with NPM series, NPM-X series, AM100, CM602, CM402, CM401, CM400, DT401, DT400, CM232, CM212 and CM101.		
Customer Maintenance jig	Regular maintenance	Grease for Heads (Contained in a syringe) Nozzle cleaning jig (Pin gauge) Cleaning brush	Common with NPM series, NPM-X series and AM100.		
• These are used for the periodical application of grease and cleaning in machine maintenance, etc. • They are necessary in purchasing the first standard machine.					
Option name	Usage	Description	Remarks		
Maintenance jig (For Lightweight 16-nozzle head V3A)	Regular maintenance (This is for regular cleaning)	Brush for cleaning chart marks off	NPM series, NPM-X series		
	This is for attaching blocks for chart marks (This is for attaching things in the calibration work)	Torque wrench Bit			
• They are necessary in purchasing the first standard machine.					
Customer					
Nozzle holder cleaning jig: For 16-nozzle head* ¹ Nozzle holder cleaning jig: For 12-/ 8-nozzle head* ²					
A set of nozzle holder cleaning jigs is required per line. Please select according to head configuration.					
*1 It is for NPM series, NPM-X series only.					
*2 Common with nozzle holder cleaning jig for NPM series, NPM-X series 12/ 8 nozzle head and the one for CM series 12/ LS 8 nozzle head. (Not available for High-flexibility head (8-nozzle))					
 Cleaning for inner nozzle holder Cleaning for outer Z-axis shaft					
Nozzle holder cleaning jig	Applicable head				Diameter of hole and shaft
	NPM series NPM-X series	CM602-L	CM101-D	CM232-M	
For 16-nozzle head	Lightweight 16V3A/ Lightweight 16V2/ 16	---	---	---	φ2 mm
For 12-/ 8-nozzle head	12/ Lightweight 8/ 8	12/ LS 8	12/ LS 8	12	φ3 mm

D-2	To calibrate as needed.				
Placement head jig kits for various adjustments. Common with NPM series and NPM-X series except for plane calibration jig.					
Option name	Usage	Description	Recommended set		
			Recommended	Calibration after Head exchange	All calibration
Customer (1) Jig kit for accuracy verification	For teaching placement position of chip component and for verifying accuracy	Placement position teaching jig (Glass PCB, Jig chip parts)	(1)	(1) + (2)	(1) + (2) + (3) + (4)
	For teaching placement position of QFP placement and for verifying accuracy	Jig parts, Jig parts supplier, Jig parts supply pallet, Nozzle for each Head (153AS × 2, 153 × 2, 184 × 2, 1001 × 2, 1003 × 2)			
Customer (2) Jig kit for standard calibration	For calibration in changing Heads	Jig station, Jig parts	---		
	For pickup position calibration	Pickup position height teaching jig			
Customer (3) Jig kit for adjusting the main body	For placement height calibration	Placement height jig			
	For line-camera-related calibration	Line camera jig			
	For placement load calibration	Placement load measuring jig			
Customer (4) Plane calibration jig	For plane calibration	Common to NPM-D3A/ D3/D2/ D/TT2/TT			
The following nozzles are separately needed for calibration. (requisite minimum number)					
	For jig chip (1005) calibration (required)		For 0402R calibration (recommended)*2		
Lightweight 16-nozzle head V3A	230CS (or 230CSN) nozzle	16 pcs./ head	256CS (or 256CSN) nozzle	16 pcs./ head	
Lightweight 8-nozzle head	230C (or 230CN) nozzle	8 pcs./ head	256C (or 256CN) nozzle	8 pcs./ head	
2-nozzle head	1001 (or 1001N) nozzle*1	2 pcs./ head	---		
*1 1001 nozzle (two nozzles) comes with (1)Jig kit, Jig kit for accuracy verification. *2 For 0402 chip placement, tape feeder for 0402 or thin type tape feeder is required.					
The following carry case is included in each jig kit.					
					
Case for jig kit for accuracy verification		Case for standard calibration jig kit		Case for jig kit for adjusting the main body	

D-3	Required for exchanging/removing the head.	
Option name	Usage	Description
Customer Unit exchanging tool	Replacement or removal of head unit	Torque wrench Long bit
• It is for NPM series and NPM-X series only. • It is necessary in purchasing the first machine.		

D-4

To maintain the nozzle head automatically.

Customer

Head maintenance unit

1. Summary

Attachment / Detachment of nozzle holder & cleaning and inspection of spline shaft can be done automatically by this unit.

Not only reducing man-hours, but also eliminating inconsistent manual maintenance, the consistency of mounting quality can be controlled.

This unit is Installed on feeder cart of NPM- Series and NPM-X Series, or 13-slot feeder base. (Use the 8-slot right edge)

* When target head is Lightweight 8-nozzle head, you need to select the Side lighting option.

2. Specifications

Item	Specification
Mountable Model	NPM-series, NPM-X series * ¹
Target Head* ²	Lightweight 16-nozzle head V3A/ 12-nozzle head/ Lightweight 8-nozzle head
Function	①Nozzle holder attachment / detachment* ³ ②Nozzle holder shaft cleaning ③Nozzle holder shaft bending inspection ④Nozzle holder sliding inspection
Operation Mode	Full inspection mode Function selection mode (Individual execution ① ~ ④)
Operation Time	Lightweight 16-nozzle head V3A (Full inspection model): About 10 min. / 1 head
External Dimensions	W 166 × D 640 × H 240 mm
Weight	About 9 kg
Electric Source	DC 24 V (Supply form main body)
Pneumatic Source	Supply form main body* ⁴
Environment	Temperature: 10 °C ~ 35 °C (No condensation)
Accessory	Nozzle holder pallet × 1 Side filter for 16-nozzle head × 30 Side filter for 12-/ 8-nozzle head × 30 Bottom filter × 30

*¹ When Install the head maintenance unit on an existing line, may need to update the software of equipment, NPM-DGS(Data generation system), LNB(Line Network Box) and so on. Please consult us separately for details.

*² When target head is 12-nozzle head with NPM-D3A, it is Individual Specification. Contact us.

*³ Nozzle holder cleaning can not be performed.

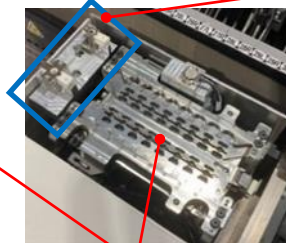
If the nozzle holder of lightweight 8 nozzle head is N610067607AD or before, will be available by exchange to N610067607AE or later.

*⁴ When using this unit on a "17-slot feeder car", the "Air supply connection kit(option)" is required.

Main unit

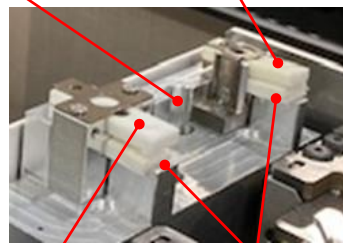


Head maintenance unit



Nozzle holder pallet

Cleaning unit

12/8 nozzle head
Side filter16-nozzle head
Side filter

Bottom filter

D-4

To maintain the nozzle head automatically.

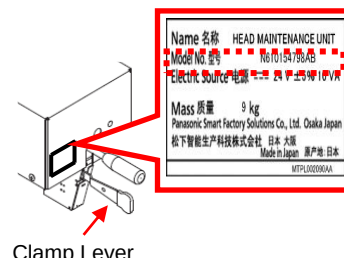
Customer

Head maintenance unit

3. Important Points

- When recovery from an error during operation, must make a visual confirmation before continuing the operation.
- Old type head maintenance unit does not work with Lightweight 16-nozzle head V3 or V3A.
How to tell the difference between old and new is to see a Model No. printed on a nameplate label on the detachable grip side.

	Old N610154798AA	New N610154798AB
Lightweight 16-nozzle head V3A	×	○
Lightweight 16-nozzle head V3	×	○
Lightweight 16-nozzle head V2	○	○
Lightweight 16-nozzle head	○	○
16-nozzle head	○	○

**On-site**

Air supply connection kit

This air supply connection kit is used for feeder cart.

Please refer to the following information and select the kit for each cart.

- When using this unit on the feeder cart without an “Air supply unit for feeder”*

Item name	Item No.	Remodeling target
Air supply connection kit (For 17 slot feeder cart)	N610153400AA	17 slot feeder cart

- This option is used for feeder cart remodeling.
- The removability of air supply section can be improved after remodeling by this option.

- When using this unit on the feeder cart with an “Air supply unit for feeder”*

Item name	Item No.	Remodeling target
Air supply connection kit (With the air supply unit for feeder : 17 slot)	MTKA001660AA	17 slot feeder cart

- This option is used for feeder cart remodeling.
- When using this unit on the feeder cart with an “Air supply unit for feeder”, will need this option to remodel.

* The “Air supply unit for feeder” is a supply port to supply air from a feeder cart or feeder base to stamp unit and etc.

Customer

Additional cleaning filter

- ① Side filter : for 16-nozzle head (100 pcs./1 set)
- ② Side filter : for 12-/ 8-nozzle head (100 pcs./1 set)
- ③ Bottom filter (100 pcs./1 set)

Side filter is used for side cleaning of spline shaft.

(Each filter can be used to clean 2 heads.)

Bottom filter is used for tip cleaning of spline shaft.

(Each filter can be used to clean 4 heads.)

Customer

Additional nozzle holder pallet

It is a palette for the nozzle holder storage.

By setting up the clean nozzle holders, you can exchange them by a palette.

D-5

To splice the parts tape automatically

Customer

Automatic tape splicing unit (Model ID : ATSU Model No: NM-EJW7A)

1. Summary

This unit can splice 8 mm tape automatically.

By eliminating inconsistent manual splicing, this can avoid the low pick up rate and can suppress cuts or out of line of splicing areas. As a result, the operation efficiency can be enhanced.

2. Specifications

Item	Specification
Applicable tape	8 mm Paper/ Embossed *1
Splicing tape	Common to Paper/ Embossed (This unit only)
Empty pockets of splice junction	• 8mm × 4P(Paper/Embossed)= 4pocket *2 • 8mm × 2P(Paper/Embossed)= 8~9 pockets
Operation Time	• Paper tape/ Embossed tape About 10 sec
External Dimensions	W 500 × D 500 × H 1 160 mm
Weight	Approx. 45 kg (Without battery)
Electric Source	DC12 V (Lead-acid battery) Continuous working time: About 16~20hours (With 2 batteries) *3
Environment	Temperature: 10 °C ~ 35 °C (No condensation)
Accessory	• Splicing tape (500 pcs./reel) × 1 pc. • Battery box × 2 pcs. (Including 2 connection cables) • Charging terminal × 2 pcs. • Rubbish box × 1 pcs. • Tape cutting jig × 1 pc
Main body operation (Setting)	Splicing part Recommended setting available

*1) 8 mm × 1P (Paper) : Prior confirmation will be needed.

*2) Empty pockets in 8mm × 4P can become zero by changing pretreatment conditions

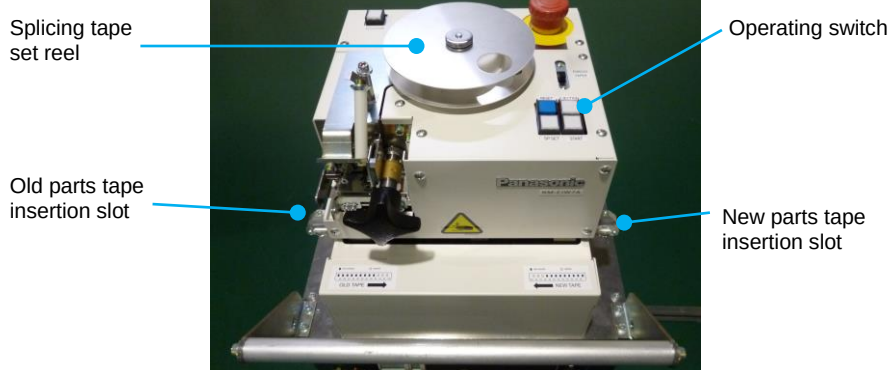
*3) This is estimated time in the situation where 28Ah deep cycle battery is used. Working time may vary depending on battery's capacity.



Automatic tape splicing unit



Paper tape complete example



Embossed tape complete example



Splicing tape

3. Important Points

- Exclusive splicing tape required. (Can purchase the splicing tape from the maker directly)
- We recommend to treat the [parts tape cut blade] and the [splicing tape cut blade] as service parts. Our servicemen will do the replacement work.

Customer

Splicing tape (500 pcs./reel)
 Battery box (Including connection cable)
 Charging terminal
 Rubbish box
 Tape cutting jig

D-5

To splice the parts tape automatically

Customer**Battery · Charger****1. Summary**

Battery and charger are prepared by customers.
Specifications are as the table below.

2. Battery specification

Item	Specification
Type	Lead-acid battery
Nominal Voltage	DC 12V
Nominal Capacity	More than 20 Ah (Recommended capacity is 25Ah or more) *1 *2
External Dimensions	W 185 mm or less × D 125 mm or less × H 175 mm or less
Weight	Below 10 kg
Battery Type	Deep cycle battery (For EV)
Cycle Durability (Charge1 time/Discharge1 time)	More than 300 cycles*1
Terminal Shape	Screw (M5) *3
Others	Maintenance free*1

*1 Recommendation, not necessary.

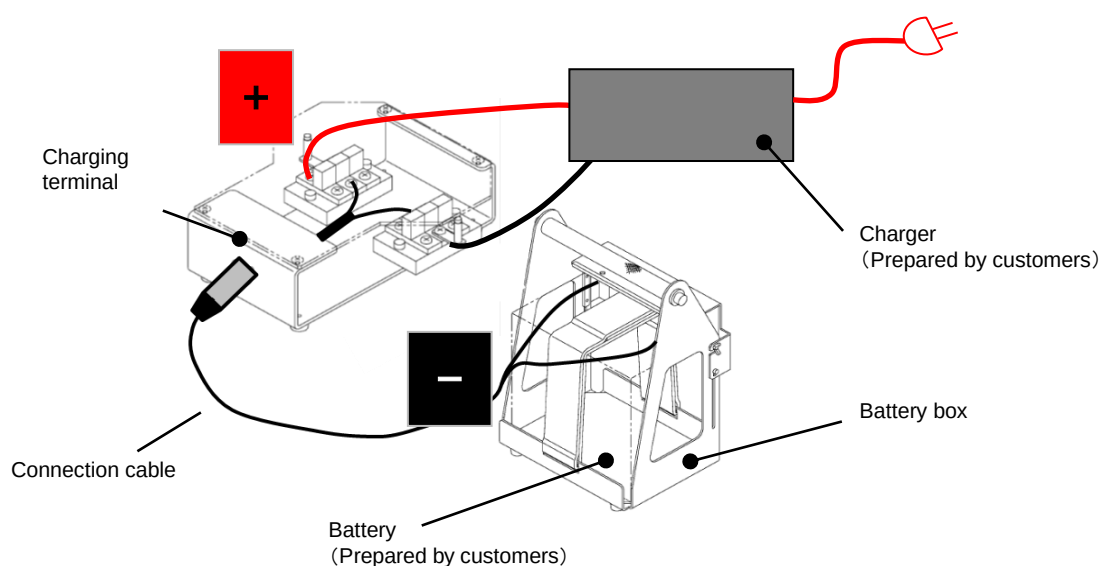
*2 Time to run on one time charge becomes shorter though it runs on 12Ah capacity battery.

*3 The terminal shape of connection cable on Battery box is M5 Ring Terminal. Please make sure the battery is available.

3. Charger specification

Item	Specification
Specification	Adapted to the battery above. Maximum current should be 10A or less when using charging terminal.*4
Others	With protective functions (Reverse-connection protection, Overcharge protection)

*4 Do not use the charging terminal when maximum current is more than 10A, causing the damage of the cable.

4. Constitution (Battery charging)

D-6

To maintain the tape feeder automatically.

Customer

Feeder maintenance unit (Model ID : IFMU Model No. : NM-EJW8A)

1. Overview

This unit is able to maintain the intelligent feeder and to calibrate the pickup position automatically.
You can do the inspections are the same as our shipment inspections for quality control.

2. Specifications

Specifications																																																													
Item	Specifications																																																												
Applicable feeder	8 mm W~ 72 mm (including deep groove) *8 mm single tape feeder, 88 mm tape feeder, 104 mm tape feeder, 8mm double tape feeder and 12/16 mm tape feeder manufactured before 2004 are not included.																																																												
Function	<table><tr><th>Feeder</th><th colspan="5">Tape width(mm)</th></tr><tr><th>Item</th><th>8W</th><th>12/ 16</th><th>24/32</th><th>44/ 56</th><th>72</th></tr><tr><td>Motor torque inspection*1</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td></tr><tr><td>Accuracy measurement of tape feeding (X・Y)*2</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td></tr><tr><td>Height detection of tape hold cover*3</td><td>○</td><td>—</td><td>—</td><td>—</td><td>—</td></tr><tr><td>Clear the maintenance calculation*4</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td></tr><tr><td>Inspection results storage*5</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td></tr><tr><td>Adjustment support of pickup position in X direction*6</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td></tr><tr><td>Switch & I/O inspection*7</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td></tr><tr><td>Feeder firmware update*8</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td></tr></table>	Feeder	Tape width(mm)					Item	8W	12/ 16	24/32	44/ 56	72	Motor torque inspection*1	○	○	○	○	○	Accuracy measurement of tape feeding (X・Y)*2	○	○	○	○	○	Height detection of tape hold cover*3	○	—	—	—	—	Clear the maintenance calculation*4	○	○	○	○	○	Inspection results storage*5	○	○	○	○	○	Adjustment support of pickup position in X direction*6	○	○	○	○	○	Switch & I/O inspection*7	○	○	○	○	○	Feeder firmware update*8	○	○	○	○	○
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	Switch & I/O inspection*7	○	○	○	○	○																																																							
Feeder firmware update*8	○	○	○	○	○																																																								
Number of attachable feeder	Up to 10 tape feeders (It is possible to attach different types.) 8 mmW : 10 feeders 12/ 16 mm : 10 feeders 44/ 54mm : 3 feeders 24/ 32mm : 5 feeders 72mm : 2 feeders																																																												
Operating time	Up to 60 sec / tape feeder																																																												
Dimensions	W 769±5mm × D720±5mm × H 1 407±5 mm(without feeder & safety cover)																																																												
Mass	Approx. 155 kg (without feeder)																																																												
Electric Source	Single-phase, AC 100 V ~ 240 V 50/ 60 Hz *The power cable (Inlet type) should be prepared by customer. * Please use the power plug which measure up to the specification of "AC plug (IEC 60320 C13: 10 A/ 250 V)".																																																												
Pneumatic Source	Supply air pressure	0.5 MPa ~ 0.8 MPa																																																											
	Supply air amount	15 L/min (A.N.R.)																																																											
	Please install moisture and oil separators on the compressor to ensure the supply of cleaned, dried and compressed air.																																																												
Environment	Temperature: 10 °C ~ 35 °C(No condensation)																																																												

*1 A function to determine the quality by confirming motor torque.

*2 A function to measure accuracy verification of sprocket pin (X,Y), and register the offset of start point.

*3 A function to detect the height of tape hold cover.

*4 A function to clear the maintenance calculation.

*5 A function to store the comprehensive judgment and detailed results in feeder memory or PC hard disk.

*6 A function to support the adjustment of pickup position in X direction.
It is a manual adjustment by using the tool.

*7 A function to inspect the sensor, operating switch, LED, etc..

Sensor & Operating switch are manual inspection.

The NG results will be stored in feeder memory or PC hard disk.

*8 A function to update the feeder firmware.

**3. Notice**

Please use the master jig (option) to adjust the offset of starting point regularly.

D-6

To maintain the tape feeder automatically.

Customer

Master jig

To customers who are going to buy the IFMU (Feeder maintenance unit) :

This unit requires a master jig for calibration (a regular offset adjustment of start point).

- The Item No. of master jig is MTKA008066AA.
 - If you have an IFCU (Intelligent Feeder Check Unit), only need to buy a remodeling kit (MTKA007514AA).
- (The case when you are using a master jig which Item No. is N610005354AA or N610005354AB)

Customer

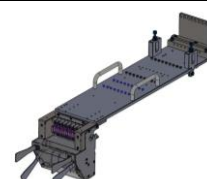
Thin type single feeder attachments

Required for thin type single feeder and ALF.

1. Specifications

Item	Specifications				
Applicable feeder	When selecting thin type single tape feeder options : 8/4 mm thin type single tape feeder, ALF(Auto Load Feeder)				
Number of attachable feeder	For thin type single tape feeders, up to 8 / (16) feeders *When installing 1 / (2) pcs of attachment * It is possible to attach different types.				
Function	Feeder	Tape width (mm)			
	Item	8mm Thin type	4mm Thin type	ALF	
	Motor torque inspection*1	○	○	○	
	Accuracy measurement of tape feeding(X,Y)*2	○	○	○	
	Height detection of tape hold cover*3	○	○	○	
	Clear the maintenance calculation*4	○	○	○	
	Inspection results storage*5	○	○	○	
	Adjustment support of pickup position in X direction*6	○	○	○	
	Switch & I/O inspection*7	○	○	○*8	
	Feeder firmware update*9	○	○	○	
*1 A function to determine the quality by confirming motor torque. When feeder is thin type single tape feeder, quality determination by current is performed. *2 A function to measure accuracy verification of sprocket pin (X,Y), and register the offset of starting point. *3 A function to detect the height of tape hold cover. *4 A function to clear the maintenance calculation. *5 A function to store the comprehensive judgment and detailed results in feeder memory or PC hard disk. *6 A function to support the adjustment of pickup position in X direction. It is a manual adjustment by using the tool *7 A function to inspect the sensor, operating switch, LED, etc.. Sensor & Operating switch are manual inspection. The NG results will be stored in feeder memory or PC hard disk. *8 ALF inspection uses two rolls of jig tapes. *9 A function to update the feeder firmware.					
Operating time	Up to 60 sec / tape feeder (8 mm thin type single tape feeder, ALF) Up to 90 sec / tape feeder (4 mm thin tape single tape feeder)				

- If you have unsupported IFMU (Feeder Maintenance Unit) which does not support thin type single feeder, remodeling to support thin type single feeder and ALF is required. Please contact us.



D-6	To maintain the tape feeder automatically
Customer	Thin type single feeder master jig
Jig to calibrate attachment for thin type single feeder (a regular offset adjustment of start point). Item No. of master jig (with case) for thin type single feeder (8 mm thin type, 4 mm thin type, and ALF) is MTKA015403AA.	
Customer	Auto load feeder jig tapes
This is a jig used only for switch monitoring of auto load feeder and Input/Output status inspection. Product number is MTKP016406AA and this is sold in a set of two jig tapes. * In order to perform switch monitoring of auto load feeder and/or Input/Output status inspection, you will need "Attachments for thin type single feeders"	

D-6

To maintain the tape feeder automatically.

Customer

When using the Feeder maintenance unit (IFMU), the following hardware & software should be prepared by customer.

1. The following items should be prepared by customer.

The following items should be prepared by customer.

Item	Specifications	Quantity																				
PC	IBM PC/AT-compatible machine (including monitor, keyboard, mouse)	1 set																				
Cable	RS232C cable(crossover cable) • Connector : Dsub-9 Pin • Connector screw : #4-40 Inch • Connector pin layout (refer to the figure below) <table><tr><td>Pin No.</td><td>Signal</td></tr><tr><td>1</td><td>Not used</td></tr><tr><td>2</td><td>RXD</td></tr><tr><td>3</td><td>TXD</td></tr><tr><td>4</td><td>Not used</td></tr><tr><td>5</td><td>GND</td></tr><tr><td>6</td><td>Not used</td></tr><tr><td>7</td><td>RTS</td></tr><tr><td>8</td><td>CTS</td></tr><tr><td>9</td><td>Not used</td></tr></table>	Pin No.	Signal	1	Not used	2	RXD	3	TXD	4	Not used	5	GND	6	Not used	7	RTS	8	CTS	9	Not used	1 pc.
Pin No.	Signal																					
1	Not used																					
2	RXD																					
3	TXD																					
4	Not used																					
5	GND																					
6	Not used																					
7	RTS																					
8	CTS																					
9	Not used																					
Conversion cable	USB-RS232C conversion cable *Required when there is no RS232C port on the PC.	1 pc.																				
Power cable	Inlet type	1 pc.																				

2. PC(Hardware/OS)Requirements

Item	Specifications
Main body	IBM PC/AT-compatible machine(A desktop PC is strongly recommended)
CPU	Intel® Core™2 Duo 2.4GHz equivalent or greater
Graphic board	SXGA or higher 1280 × 1024 or more
Memory	2GB or more
HDD	80 GB or more
Optical drive	DVD-ROM
Keyboard	English version: 101 keyboard Japanese version: 106 keyboard
Mouse	Supported by your OS as standard
Monitor	SXGA ready
Network card	1000BASE-T × 1 Port or more (PCI Express network card is recommended) Jumbo Packet (Jumbo Frame) supported *1000BASE-T × 2 Port or more when connecting PanaCIM
RS232C Port	1 Port or more *RS232C card is recommended. When there are no RS232C cards, please prepare an USB-RS232C conversion cable.
OS	Microsoft® Windows® 10 Pro (64-bit)

10. Paint Color

■ Standard color

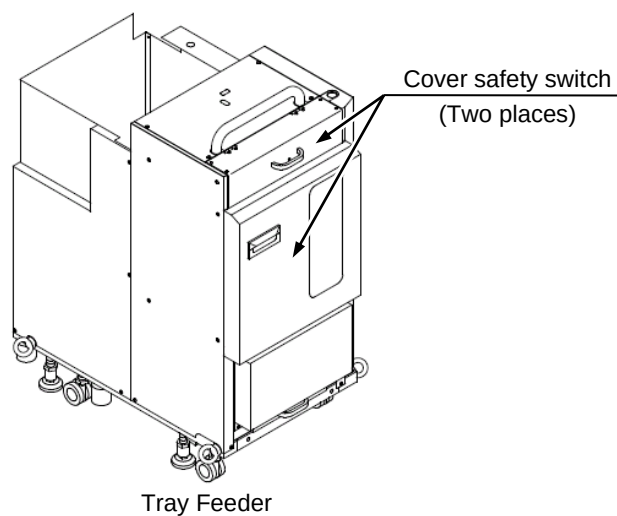
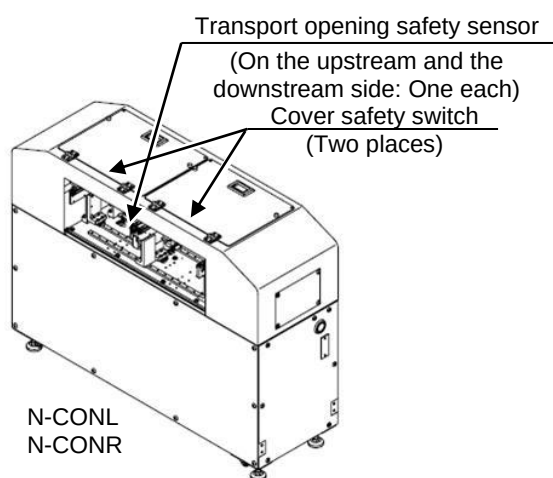
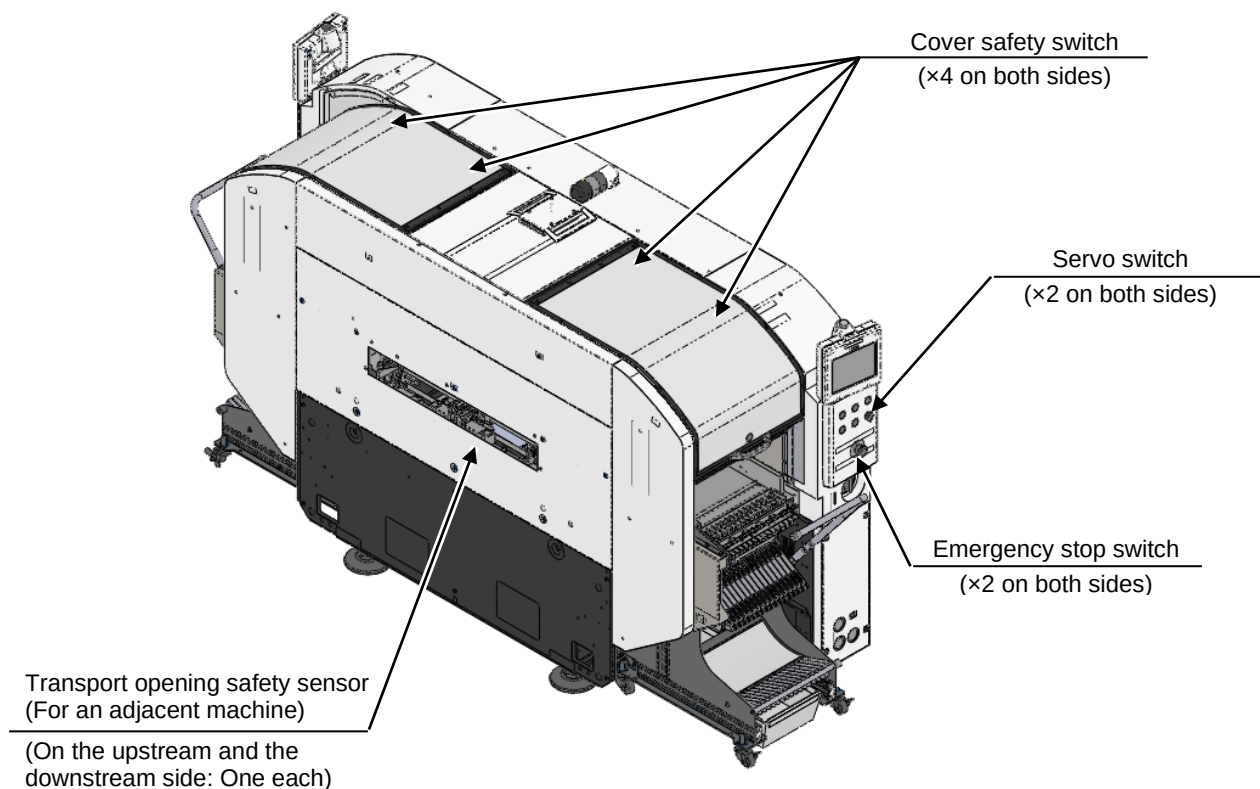
White W-13 (G50)

* The paint color cannot be designated.

11. Safety Devices

NPM-D3A has the following safety devices for the safety use of machine.

When an emergency stop switch is pressed or the cover is opened while the machine is operating, the operation is forcibly stopped.



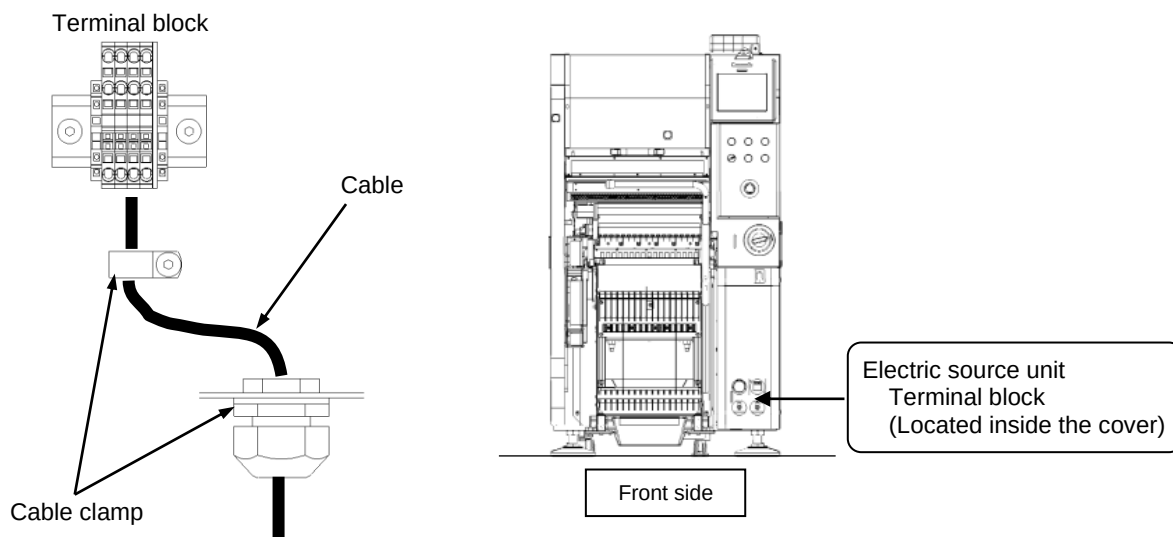
** Remarks **

- Please check enough the separate instruction manuals and the warning instructions of equipment to operate the machine properly, regardless of it being in operation or in stop, for the purpose of safety uses.

12. Electric / Pneumatic

12.1 Electric Source Unit

- The power source should be connected with four-conductor cable ranging from 3.5 mm² to 5.5 mm², by using the exclusive tool.
- The cable should be clamped in two points as the lower-left figure shows.
 1. Outside diameter dimensions of the cable: $\phi 13.5$ mm ~ $\phi 18.0$ mm
 2. Be sure to secure the cable with the cable clamps so that it will not be moved by being pulled (100 N) or turned.



■ Precautions in terminal block connection

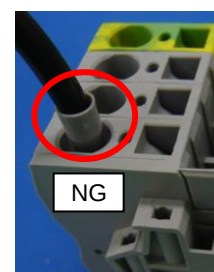
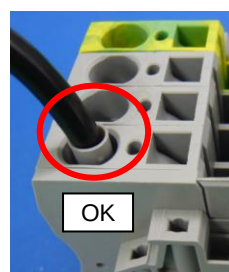
Terminal connecting pin (Recommended)

Manufacturer: Phoenix Contact

Type: 3.5 mm² ~ 4.0 mm² AI 4-12 GY

5.5 mm² ~ 6.0 mm² AI 6-12 YE

1. Insert the sleeve terminal with its uneven surface parallel to the terminal block.
2. Make sure that the sleeve terminal is fully inserted.
3. Use a tool like that shown below.

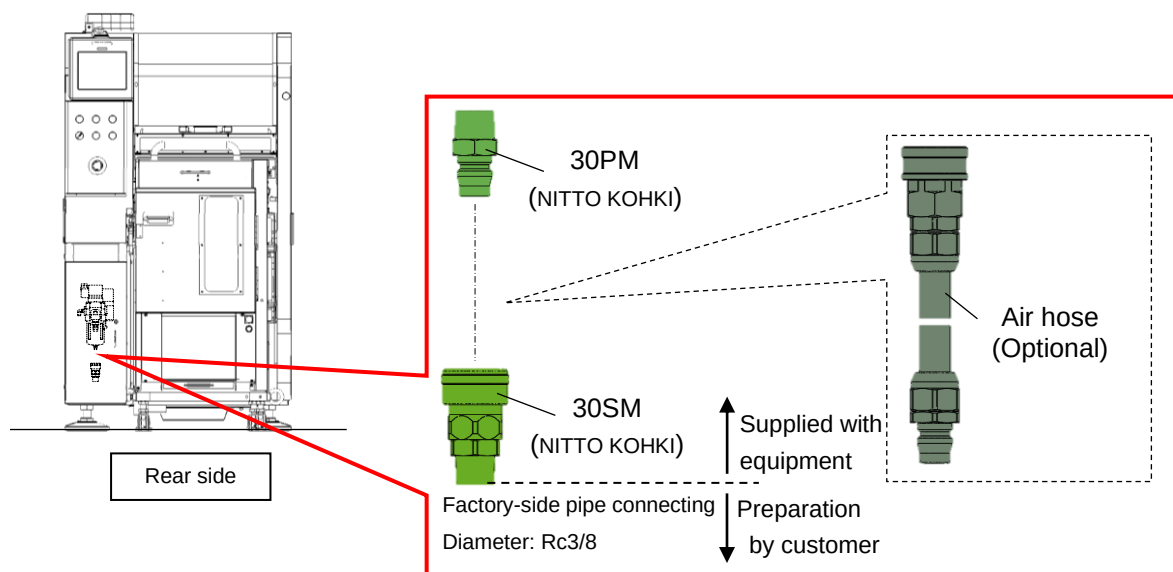


4. If the sleeve terminal is not used, fully check for the conductors spread out and the inserted state.

** Remarks **

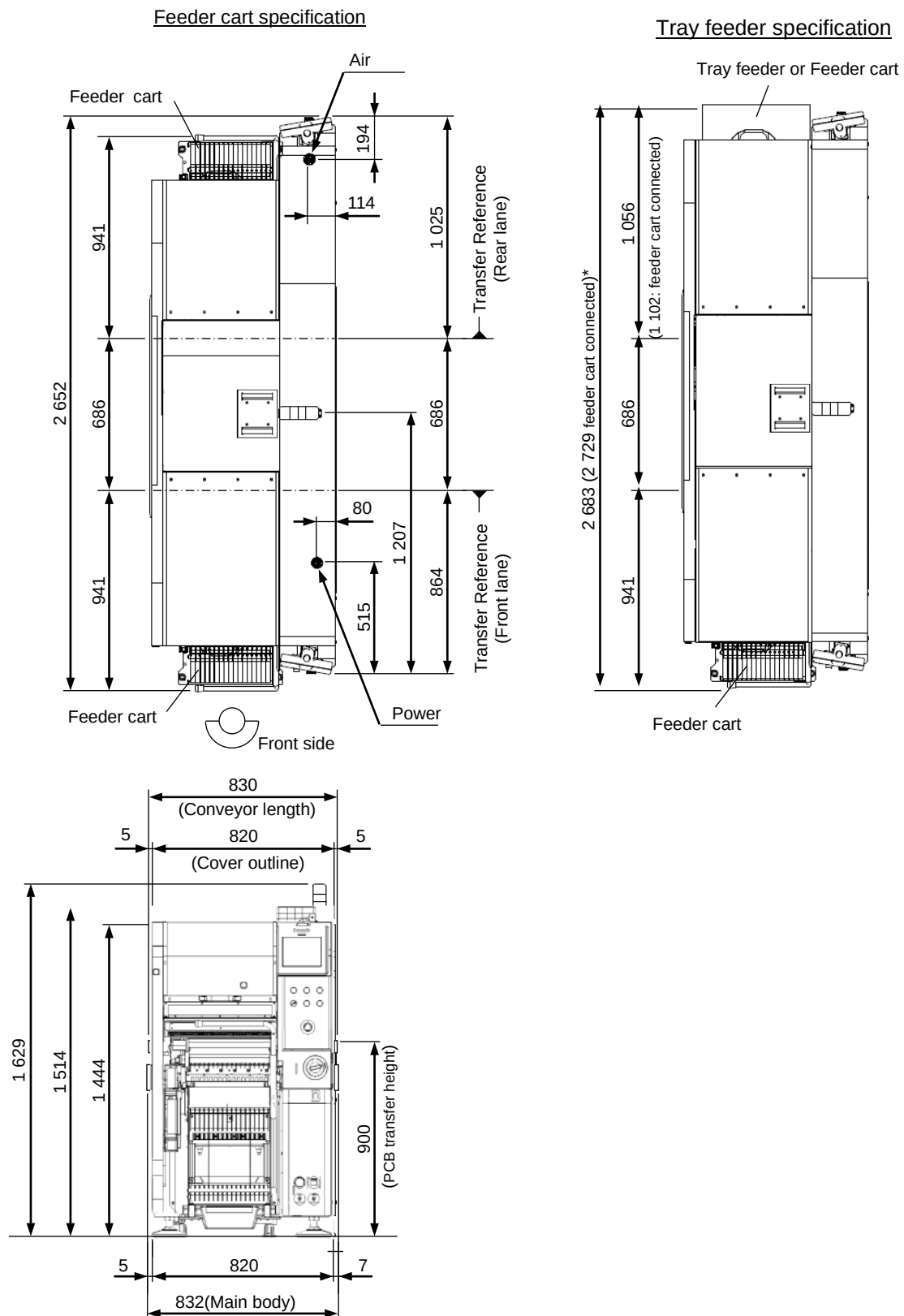
- Please prepare the power supply cable by customer.

12.2 Pneumatic Source Unit



13. Dimensions

(Unit: mm)

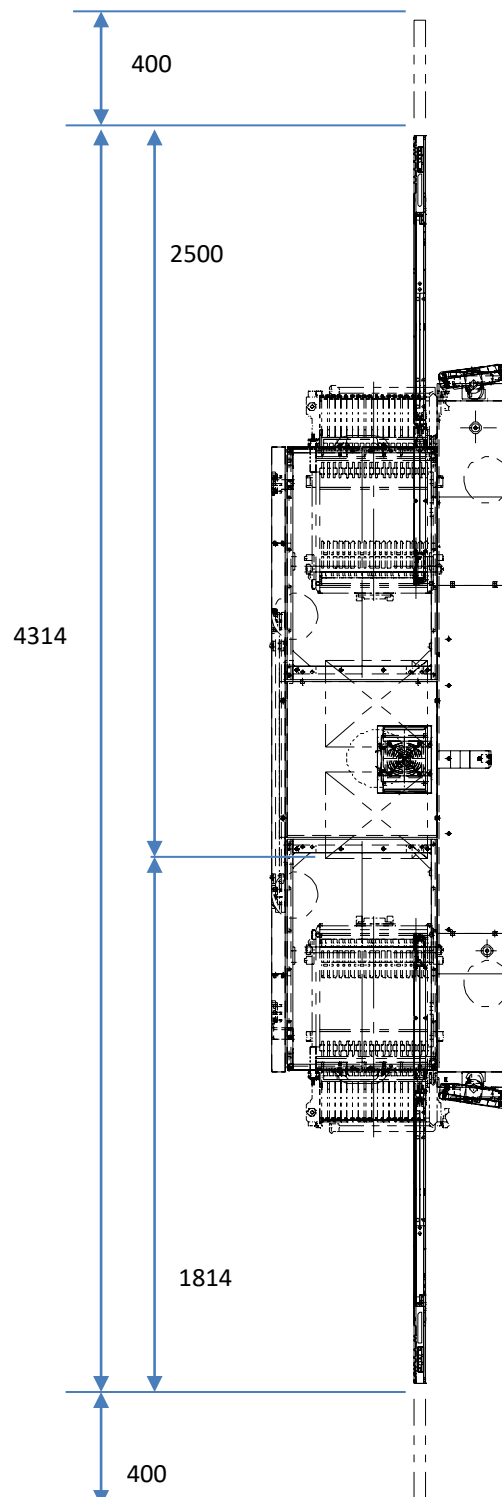


** Remarks **

- The above Illustrations do not strictly agree with the actual machine in a reduced scale, etc. When examining the line configuration, dimensions, etc., please ask for the materials for them.
- If passing ducts etc. under this machine, please secure 40 mm or more space between them.

(Unit: mm)

■ When connecting feeder cart (Including stackable stick feeder)

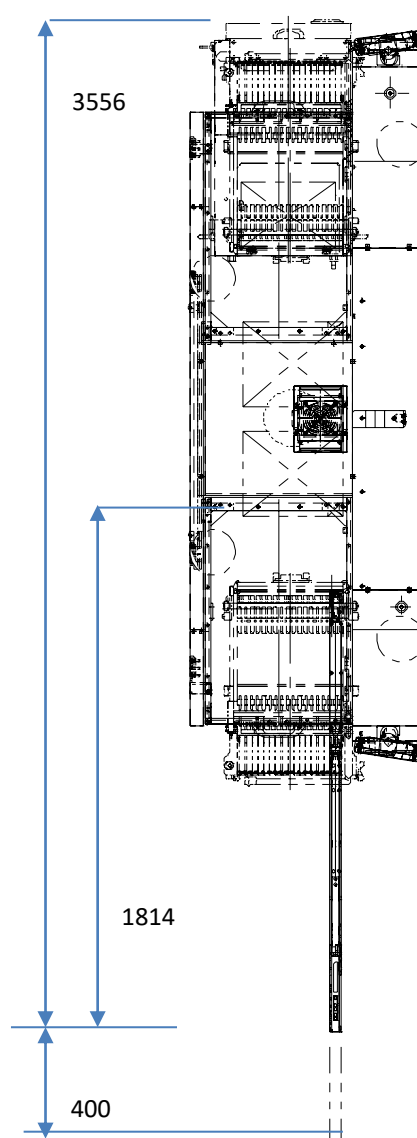


* When exchanging the feeder, the space required is as the following.

- When removing feeders from the side, a space of 400mm as in the figure above is required
- In order to remove a feeder in a middle position with feeders at both sides, space of total feeder length (max. 1 600mm) is required

(Unit: mm)

■ When connecting tray feeder (Including stackable stick feeder)

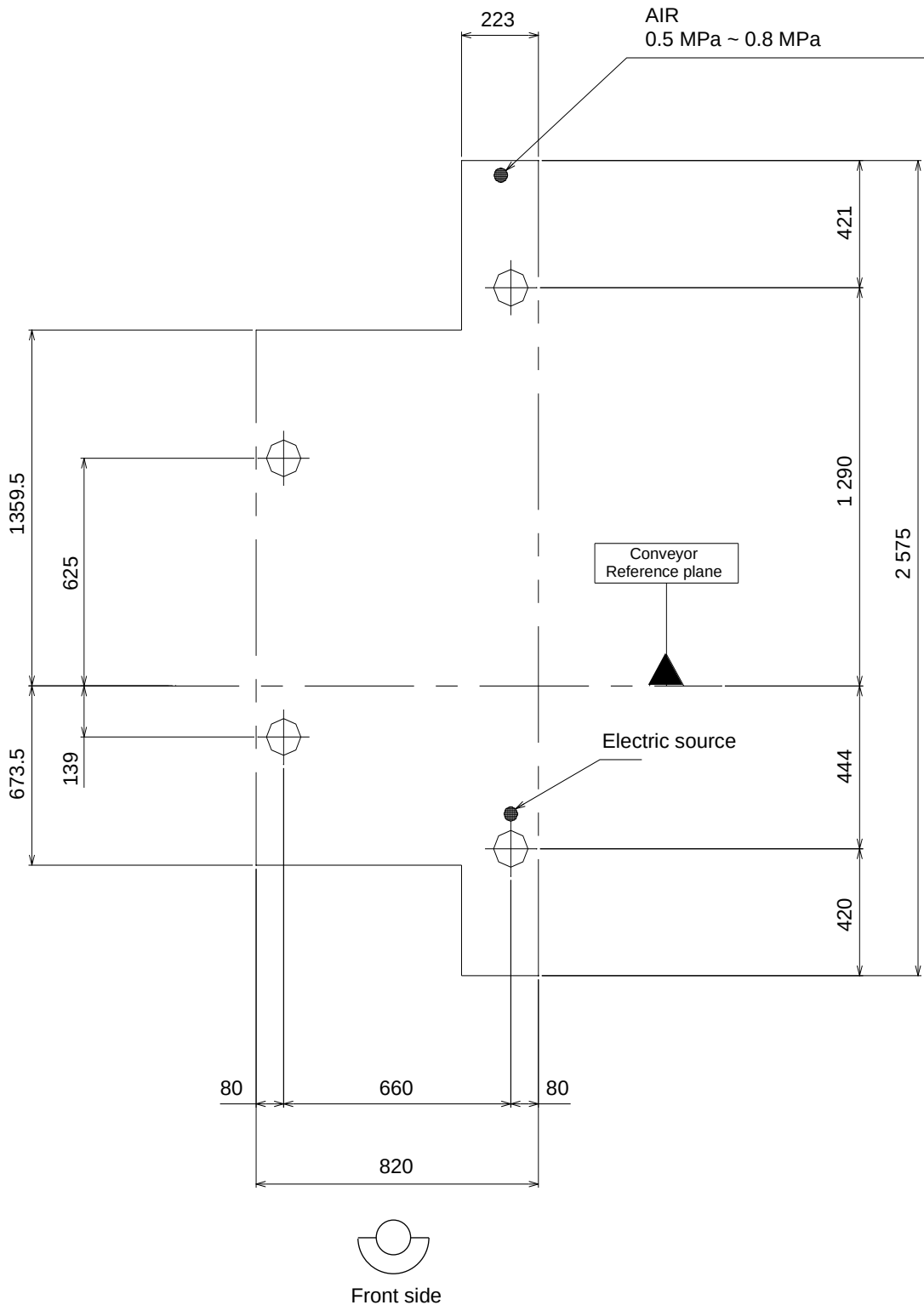


* When exchanging the feeder, the space required is as the following.

- When removing feeders from the side, a space of 400mm as in the figure above is required
- In order to remove a feeder in a middle position with feeders at both sides, space of total feeder length (max. 1 600mm) is required

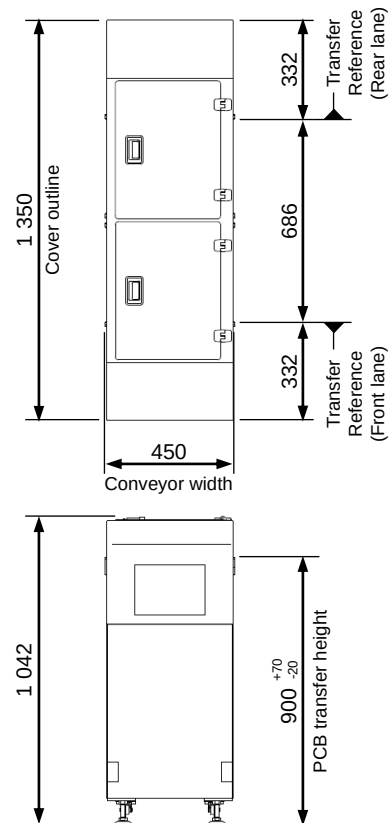
■ Adjust Bolt Diagram

(Unit: mm)

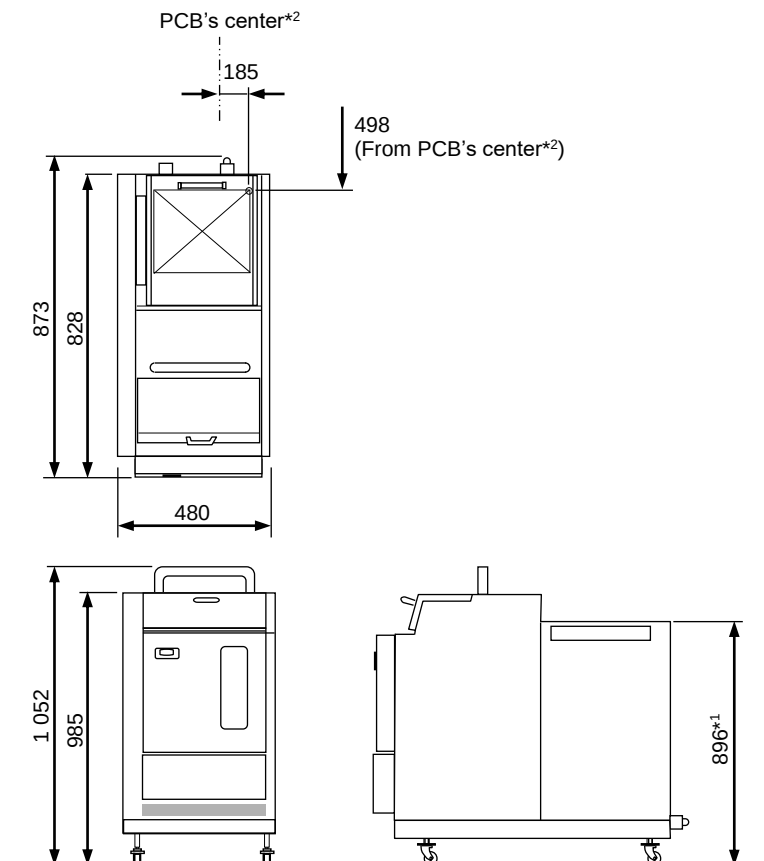


■ Conveyor outside dimensions (N-CONL, N-CONR)

(Unit: mm)



■ Tray Feeder outside dimensions(Individual)

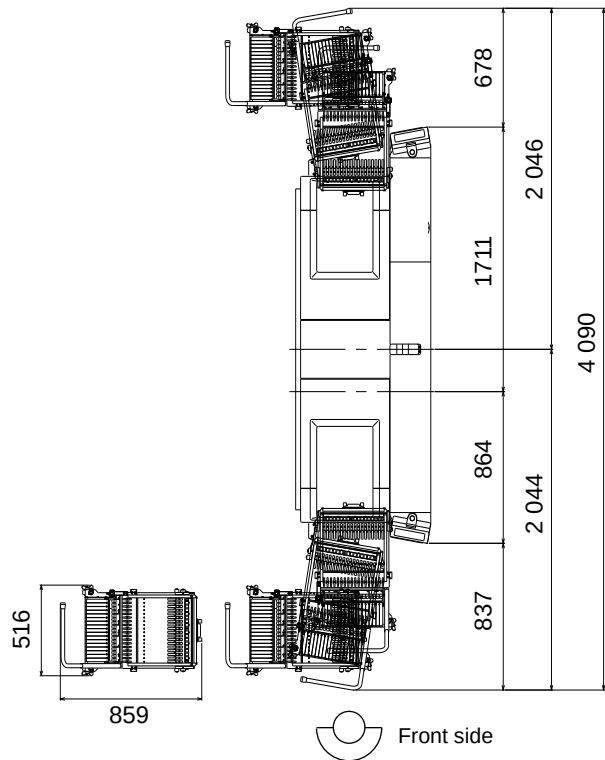


*1 The tray feeding height of 896 mm is a standard value when the PCB transport height of NPM-D3A is 900 mm. The adjustable range is 896^{+1}_{-65} mm

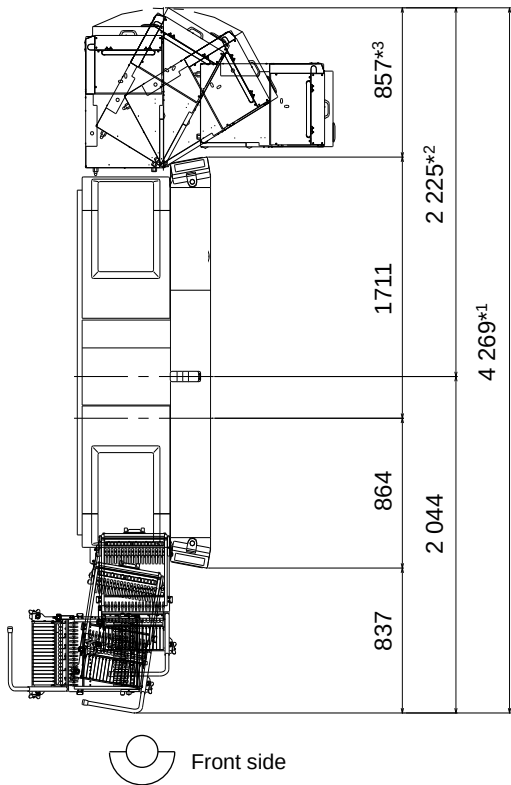
*2 Center of the PCB whose size is 350 × 480 mm.

When exchanging the feeder cart, this is a necessary minimum space.
Before installing the machine, please be sure to secure the following space.

(Unit: mm)



This is the minimum space to be required in installing the tray feeder.
Since the tray feeder may be detached in maintenance, please be sure to secure the following space.



• The followings are dimensions when the spec adoption is changed from tray feeder to feeder cart.

- *1 4 249 mm
- *2 2 205 mm
- *3 837 mm

**** Remarks ****

- The floor slope in the feeder cart installation area needs to be 6 mm or less in the right/left direction and 11 mm or less in the forward/backward direction.
If the floor slope is beyond the above limit, the feeder cart cannot be taken in and out.

14. Regarding Licenses

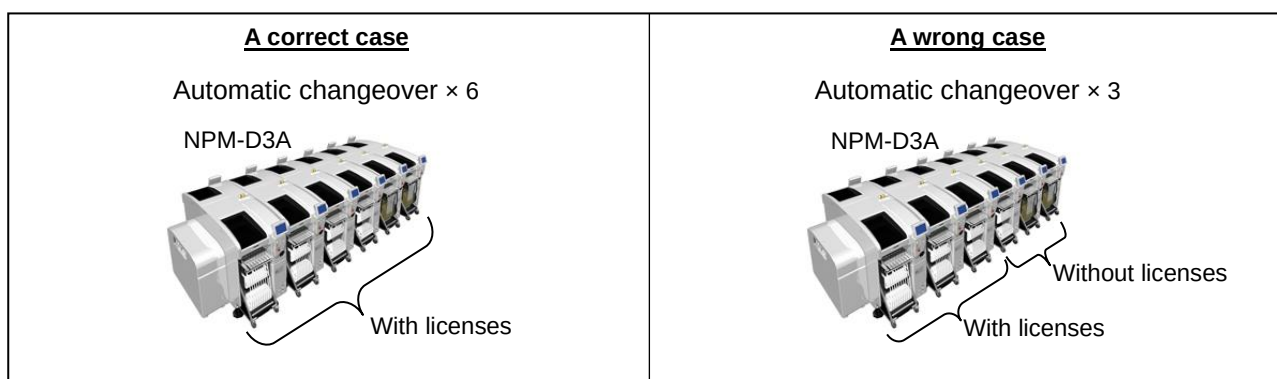
In order to operate the following software (options), you are required to purchase licenses for respective software.

- PanaCIM-EE ready*
- iLNB ready*
- Component Verification*
- Automatic changeover*
- Feeder Setup Navigator*
- Upper Communication*
- APC system ready
- Interface software of the inspection machine from other companies
- APC-MFB2 system ready
- Support station box (Component verification type) *
- Automatic recovery function for pickup error
- Component inspection before pickup (Polarity)
- Message board
- Head diagnosis
- Remote operation *
- Biometric authentication
- Mount complete position recognition
- LCR checker(Feeder shape type)
- Lightweight 16-nozzle head constant mount load control
- Lightweight 16-nozzle head transfer
- Pre-pickup Inspection(Char/2D)
- AOI info display function
- Extend Mount points
- Other Company Bad Mark Communication
- Tray 1 Pallet 10 Kind

A license is required for each machine that is intended for the operation.

*The choices of software must be identical among all machines in a line.

Regarding the case in where machines with or without software licenses mixed up in a line, we cannot assure the operation in the whole line.



IMPORTANT—

In order to use above software, you are required to agree to the “Terms and conditions regarding the use of software” on the following page.

Please be sure to look through it.

Terms and conditions regarding the use of software

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Important Notes

1. Performance assurance of the Product is subject to the condition that the Product is used in accordance with specifications, specification manuals, and operating instructions provided by us. We do not guarantee performance if the Product is used in any way other than those described in such documents.
 - (a) Never use the Product near any noise generation sources such as welding machines, which will result in malfunctions.
 - (b) Do not unnecessarily turn off the power switch, servo switch, or air during operation; it will run without being controlled, which will result in damage.
 - (c) Before teaching operations or conducting manual operations in a servo free state, make sure there is no interference in the unit, which will result in damage.
 - (d) The covers of the main body, loader/unloader, tray feeder, and the other covers may be cylinder-locked.
Do not attempt to forcibly open the covers, which will result in damage to the covers and/or cylinders.
 - (e) Do not take apart or alter the equipment and its units, as it may influence product safety and/or its quality.
 - (f) Data modifications must only be undertaken by professionally trained and approved personnel. Modifications by unqualified personnel may be a cause of input error, which will result in malfunctions.
 - (g) Do not block any of exhaust openings and intakes. Excessive temperature in the control box is a cause of abnormal functioning.
 - (h) Do not turn off the servo switch during operation, as it may result in control failure.
Always set the Product to a temporarily paused state (e.g. single stop or cycle stop) or operation stop state before the Product is turned off.
 - (i) Be attentive to water quality when using spraying devices and/or humidifiers. In an environment where ultrasonic humidifiers are used, for example, mineral components such as calcium or magnesium, and components such as silica, carbonate, or iron, are released to the air. Such airborne particles stick to the equipment, resulting in the malfunction of sliding parts and/or optical components.
 - (j) Do not use the Product in an atmosphere where gasified low molecular weight siloxane exists.
Low molecular siloxane, released by exposed silicone-based materials (e.g. silicone adhesives, silicone oils, or silicone powders), sticks to the electric contact parts and/or optical components, and will result in contact failure and/or malfunction.
 - (k) Do not use the Product in corrosive gas environments (e.g. nitric acid, hydrogen sulfide, or ammonia), halogen gas environments, or any environment where conductive foreign substances may enter.
Electrodes and/or metal parts of electric components will corrode, and will become a cause of the malfunction of electronic circuits and/or malfunctions.
2. We shall not be held liable for the following failures and damages.
 - (a) Failure and/or damage caused by wrong use or improper repair, adjustment or modification
 - (b) Incidental damage (e.g. loss of profits or the interruption of business) arising from the use of or inability to use the Product
 - (c) Failure and/or damage caused by relocation or transportation of the Product, the dropping of the Product itself or by objects falling on the Product after purchase
 - (d) Failure and/or damage caused by fire, earthquake, flood, thunderbolt, other natural or man-made disasters, pollution damage, salt damage, gas damage (e.g. corrosive gas or halogen gas), abnormal voltage, or the use of power sources besides those specified (e.g. voltage or frequency)
 - (e) Failure and/or damage caused by carriers during delivery via vehicle, ship, or other modes of transport.
 - (f) Damage arising from failure to observe the instructions/cautions of the operating instructions provided with the Product.
 - (g) Any failure caused by hacking, unauthorized access, attacks upon the Product or connected networks and from other similar threats
3.
 - (a) We shall not be held liable for any damage caused by any dispute alleging or claiming the infringement of intellectual property rights and other rights arising in connection with manufacturing inspections or other processes performed during the use of the Products, including any allegation or claim that any items manufactured and/or inspected using the Products is infringing intellectual property rights or other rights of any third party.
 - (b) We shall not be held liable for any allegation or claim of infringement which has been settled or which judgment has been reached without our express written consent.
4. We shall in no event be held liable for any indirect or consequential damages, or for loss of profit that may arise in connection with the Products or their use.
5. The user shall be responsible for determining the necessary structural reinforcement or modifications to the building in which the Products will be installed and for the completion of such measures, all at its own cost and expense, prior to the date of delivery of the Products.

Some of our products fall under the export control items (or technologies) established in the Foreign Exchange and Foreign Trade Act. When exporting (or providing technologies overseas), please check its legal restrictions and be sure to take necessary procedures such as to obtain the export permission.

Panasonic Connect Co., Ltd.

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