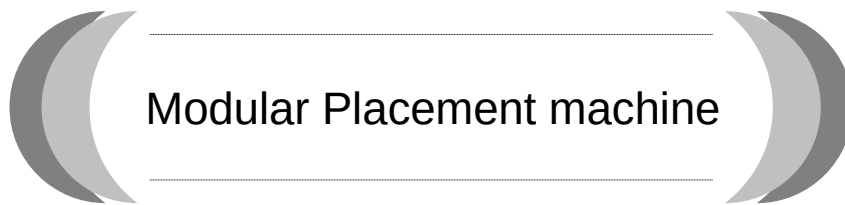


Specification

【 Electronic Component Mounting System 】



Model ID : **AM100**

Model No. : NM-EJM4D

Panasonic Connect Co., Ltd.

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12. The contents of this document are valid as of October 02, 2023.

 Precautions for Safe Use	
● Thoroughly read the instruction manual and use the machine only as directed.	● The machine described in this Specification is an industrial machine. Confirm the operation requirements described in the separate instruction manuals. Regarding machine installation, operation and maintenance, and handling of necessary materials, the local laws and requirements may be applied. ● Before carrying out the operation and maintenance of this machine, confirm the descriptions in the separate instruction manuals and warning information attached on this machine regardless of the operating condition of this machine. Ignoring safety functions might cause injury, electric shock or machine trouble.

Revision History

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

Revision date	Version	Revised page	Revisions
Apr. 18, 2013	Ver. 2013.0418	---	First edition
Jun. 17, 2013	Ver. 2013.0617	P. 9, 19	- Revision of "4.2 Nozzle Type & Configuration: Small nozzles" - Revision of "4.4 Line Configuration: Example of connection with NPM series"
Jul. 22, 2013	Ver. 2013.0722	---	- Addition of options (System software): PanaCIM-EE ready, Automatic changeover and Component verification etc. - Editing the explanation for Manually setting tray
Sep. 9, 2013	Ver. 2013.0905	P. 19, 62	- Addition of quality information viewer - Change of the nozzle for jig chip (1005) calibration: 230M nozzle → 226M nozzle
Dec. 20, 2013	Ver. 2013.1220	P. 3, 6, 12, 33, 34, 38, 46, 47, 51, 52, 55, 59, 62, 66, 67, 76	- Addition of 8 mm thin type single tape feeder and its associated options. - Addition of Feeder Setup Navigator (License) - Additional explanation associated with NPM-D3 release
Mar. 3, 2014	Ver. 2014.0303	P. 12, 68	- Addition of explanation for 44/56 mm deep groove tape feeder - PC for IFCU: Revision of hardware requirements (Interface)
Apr. 28, 2014	Ver. 2014.0428	P. 18	FA PC: Model change
Jun. 16, 2014	Ver. 2014.0616	P. 12, 17, 48, 61	24/ 32 mm, 44/ 56 mm tape feeder: Unified to Deep Groove Type (26mm) - PanaCIM Express (Material verification): AM-LNB support
Nov. 4, 2014	Ver. 2014.1104	P. 6, 20	- Revision of tact time (IPC9850): 22 000 → 23 000 CPH - Revision of "4.4 Line Configuration: Example of connection with NPM series"
Dec. 16, 2014	Ver. 2014.1216	P. 3, 6, 7, 13, 14, 21, 47, 51, 52, 55, 56, 60, 67	- Addition of 4 mm thin type single tape feeder and its associated options - Additional explanation associated with NPM-W2 release
Apr. 1, 2015	Ver. 2015.0401	P. 13, 34, 35, 48, 52, 68 ~ 70	- Addition of maintain the thin type single tape feeder by IFCU - Feeder Setup Navigator (support mobile terminal, others)
Apr. 28, 2015	Ver. 2015.0428	P. 48, 57, 68, 69	- Addition of Automatic Tape Splicing Unit (ATSU) - The restriction of Y direction for the automatic replacement of support pins has been changed (expansion).
Jun. 15, 2015	Ver. 2015.0615	P. 38, 49, 71, 72, 81	Addition of Component Supply Navigator Addition of Feeder Maintenance Unit (IFMU).
Jul. 15, 2015	Ver. 2015.0715	P. 10	Nozzle:Model change 184M ⇒ 184MTR、199M ⇒ 199MR
Jul. 24, 2015	Ver. 2015.0724	P. 39, 49, 56	Revision of Component Supply Navigator
Aug. 20, 2015	Ver. 2015.0820	P. 31	Change of the product name of wireless scanner(PDA). MC75 ⇒ MC55
Oct. 27, 2015	Ver. 2015.1027	P. 11	Nozzle:Model change 120MT ⇒ 120M
Feb. 19, 2016	Ver. 2016.0219	P. 5, 19, 43 ~ 47, 55, 70, 71, 89	- Addition of APC system (License) - Addition of interface software of the inspection machine from other companies (License)

Oct. 18, 2016	Ver. 2016.1018	P. 2, 3, 14 ~ 16, 56, 61, 62, 80, 82, 84	• Addition of 8mm Auto Load Feeder and its associated options
Nov. 18, 2016	Ver. 2016.1118	P. 32, 42	• Revision of Component Verification
Jul. 14, 2017	Ver. 2017.0714	P. 22	• FA PC: Model change
Jul. 28, 2017	Ver. 2017.0728	P. 58, 79 ~ 84, 87	• Revision of Automatic Tape Splicing Unit (ATSU) • Revision of Feeder Maintenance Unit (IFMU)
Oct. 13, 2017	Ver. 2017.1013	P. 84	• Addition of Microsoft® Windows® 10 Pro for IFMU
Nov. 07, 2017	Ver. 2017.1107	P. 23, 39, 45, 50, 84, 86	• Change of software OS specifications, etc.
Nov. 20, 2017	Ver. 2017.1120	P. 8, 17, 18, 58, 65	<u>Function addition</u> • Single stick feeder
Sep. 03, 2018	Ver. 2018.0903	P. 85, 98	• Addition of specification to the PC requirements about IFMU • Addition of "Important Notes"
Nov. 16, 2018	Ver. 2018.1116	P. 2, 13, 15, 20, 59, 64, 74, 76, 97	• Addition of iLNB ready • Corrected errors, added descriptions, revised descriptions
Jan. 17, 2020	Ver. 2020.0117	P. 8	• Added the installable number of auto load feeders
Apr. 27, 2020	Ver. 2020.0427	P. 21, 22, 23, 45, 50, 87, 88	• AM-LNB, Quality information viewer, Support station, Software that interfaces with other company inspection machines (operating system compatibility updated) • Deleted explanations about IFCU
Jun. 25, 2020	Ver. 2020.0625	P. 39	• Modification of the "System Requirements" about Feeder Setup Navigator
Aug. 28, 2020	Ver. 2020.0828	P. 85 ~ 87	• Revised Feeder Maintenance Unit(IFMU)
Jan 5, 2021	Ver. 2021.0105	P. 59, 80,91	• Added Primary air hose to the options (illustration changed) • Added separators to options
Oct 15 2021	Ver. 2021.1015	P. 53	• Added a note about PCB color and surface materials
Apr. 01, 2022	Ver. 2022.0401	P. 21, 22, 32, 33, 34, 37, 45, 49, 51, 97	• Changed our company name • Changed recommended HUB type • Standard change
Apr. 28, 2022	Ver. 2022.0428	P. 58, 66	• Deleted tape splicing jig
Jun. 10, 2022	Ver. 2022.0610	P. 39	• Feeder Setup Navigator (Added Microsoft® Windows® 11 Pro)
Oct. 02, 2023	Ver. 2023.1002	P. 3, 6 ~ 9, 15, 21, 27 ~ 32, 40, 43, 47, 48, 50, 53~ 56, 58 ~ 62, 64 ~ 66, 69, 76 ~ 78, 80, 81, 83 ~ 90, 92, 101, 102, 108	Evolutionary Development • Multi-recognition camera V2 • Height sensor • Bypass tray on the mounter(2 trays) • Long PCB(1 500 mm) Specification • 8 mm double feeder (Thin embossed tape) • Pickup error automatic recovery • Polarity test before pickup • Tray 1 Pallet 10 Kind

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1. General Description

■ High Productivity

High-speed placement is achieved through simultaneous scanning of two rows of components with dimensions of 14×14 mm (19.1 mm diagonal), which contribute to the enhancement of total productivity.

■ Versatility

The adoption of 14-nozzle head allows for compatibility with a wide variety of components ranging from 0402 (01005") chips to large, odd-shaped components. It is ready for large, odd-shaped components measuring up to 150×25 mm (or 120×90 mm), and is capable of feeding components even with the manually setting tray, which has further improved its versatility.

■ Efficient Changeover

Multi-job production (optimal placement of components of multiple (different) products) system allows for a changeover with a minimal amount of work. 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

High-quality placement is possible carrying over various unit and functions of NPM series.

2. Features

High Productivity

High-speed, high-efficiency placement

High-speed placement is achieved through simultaneous scanning of two rows of components with dimensions of 14×14 mm* (19.1 mm diagonal), which contribute to the enhancement of total productivity.

* There are size limitations (component with its four corners being C 0.5 or more).

Versatility

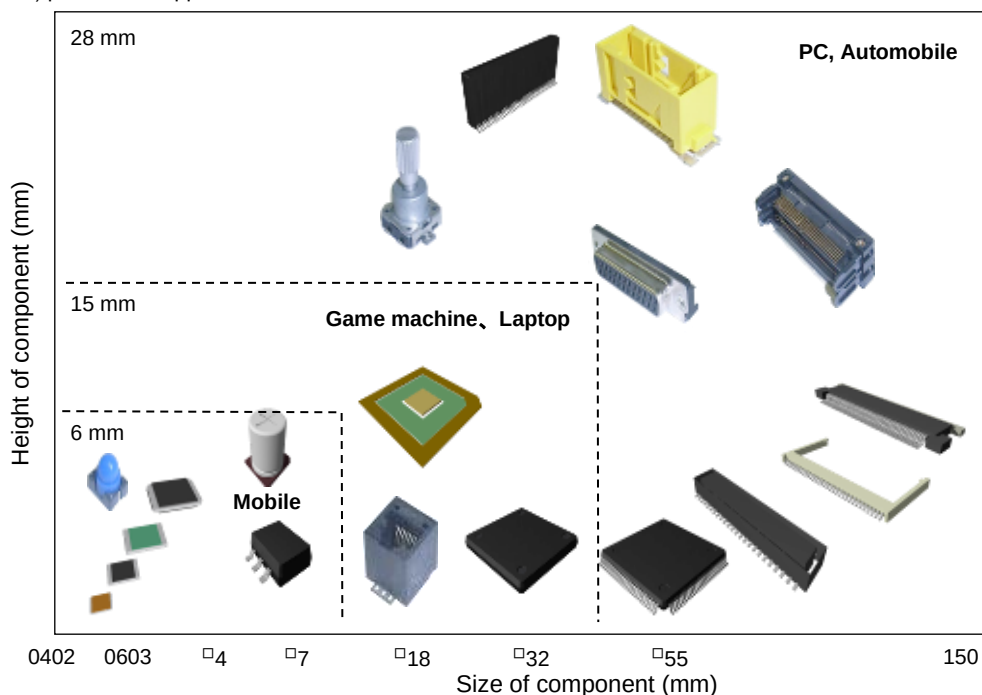
Capability to be compatible with a wide range of components

The adoption of 14-nozzle head allows for compatibility with a wide variety of components ranging from 0402 (01005") chips* to large, odd-shaped components. It is ready for large, odd-shaped components measuring up to 150×25 mm (or 120×90 mm).

* Please select "0402 (01005") placement support."



14-nozzle head



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.

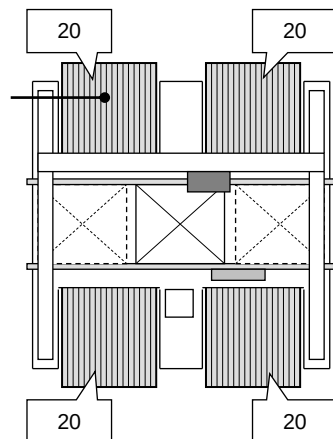
Number of setting feeder and tray

Up to 80 double tape feeders can be placed on AM100.

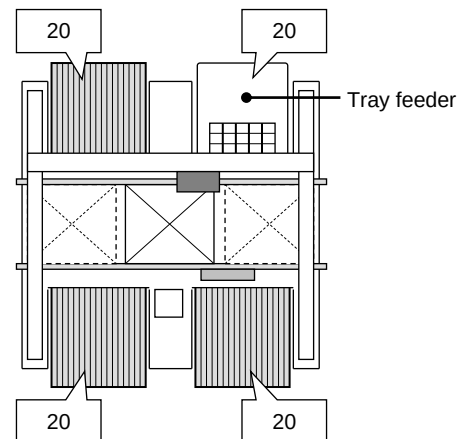
At this time, 160 reels can be set. (for the small reel)

For tray feeder specification, Up to 20 tray components and up to 60 double tape feeders can be set.

At this time, 120 reels can be set. (for the small reel)



Tape feeder specification



Tray feeder specification

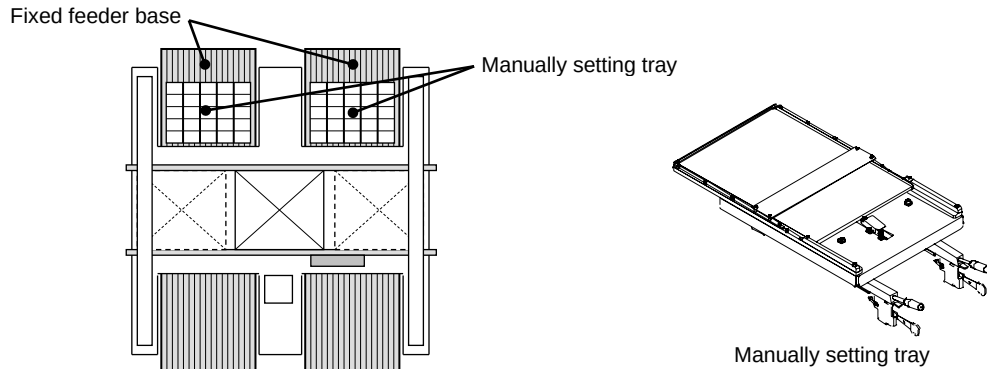
Manually setting tray

This is effective for small lot production involving a small number of tray components.

Two sets of manually setting trays can be set when the fixed feeder bases are installed on the rear (one set on each of the right and left fixed feeder bases).

A manually setting tray can accommodate a tray with L 230 × W 335 mm max.

Several trays can be set on a manually setting tray if they all are within a size limit of L 230 × W 335 mm (up to 10 types of tray components).



Bypass tray on the mounter (2 trays)

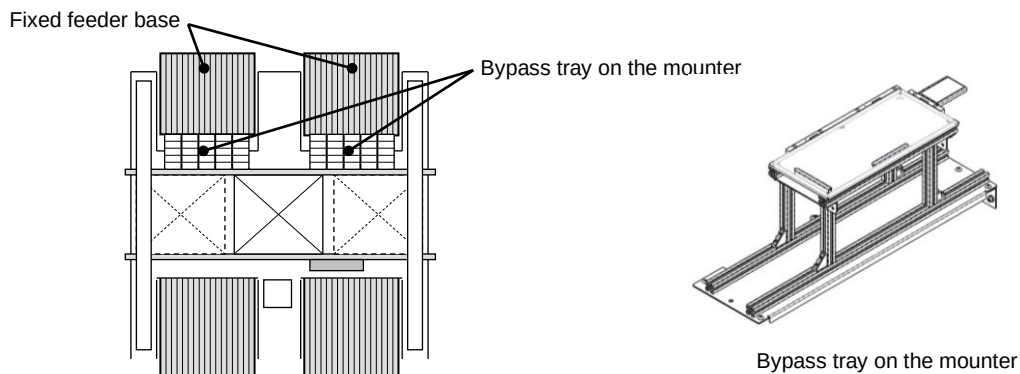
This is effective for small lot production, including a small number of tray components.

There are 2 patterns compatible with the Rear Supply Stage : Fixed Feeder and No Supply Unit.

In addition, you can combine Feeder Supply Stage.

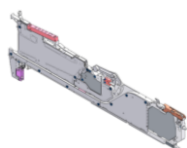
The tray can accommodate a tray with a maximum of L 140 × W 335 mm.

Several trays can be set on a tray if they all are within a size limit of L 140 × W 335 mm. (up to 10 types of components)

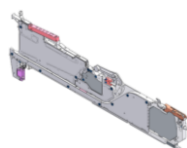


Versatility of feeders

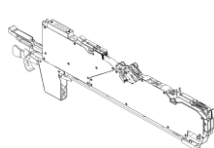
The feeders, which are compatible with the NPM series and CM series, support 4-mm up to 104-mm paper/embossed tape. Tape feeding is driven by the servomotor; feed pitch and feed speed are set according to the components. These parameters are set by the data sent from the main body.



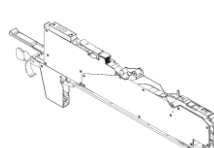
4 mm thin type
single tape feeder*



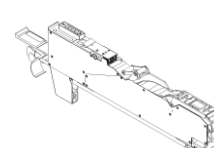
8 mm thin type
single tape feeder*



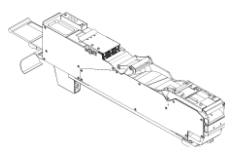
8 mm double tape feeder



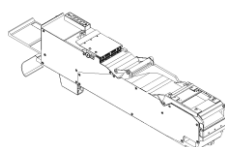
12/ 16 mm tape feeder



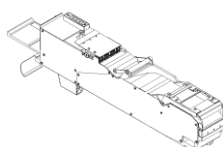
24/ 32 mm tape feeder



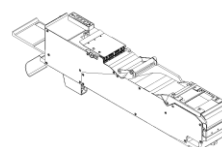
44/ 56 mm tape feeder



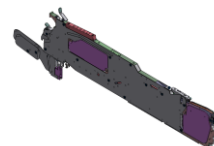
72 mm tape feeder



88 mm tape feeder



104 mm tape feeder



8 mm thin type
auto load feeder*

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

Efficient Changeover

Multi job production

Per AM100, up to 160 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.

* For tape feeder specification.

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.

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 three types, "External scanner read type", "Head read type", and "Planned form read type."

High-Quality Placement

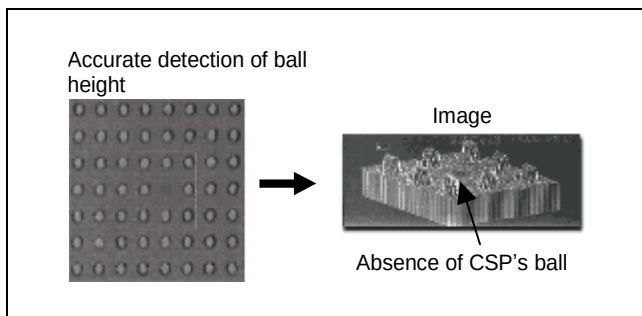
■ Component Thickness Measurement Function(Multi-recognition camera V2: Type 2/ Type 3)

Two functions provide high quality placement.

- 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 V2: Type 3)

Detects coplanarity 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.

■ Height sensor

It measures the height (warp) of PCBs and controls the height of nozzles being placed, thereby allowing improved mounting quality.

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

■ APC (Advanced Process Control) system

It is our unique inline process control system to improve placement quality by feed forwarding offset amount of placement position to placement head based on the position data measured by solder inspection.

3. Specification

3.1 Standard 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 2.0 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. 25 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 ~ 0.505 MPa) 200 L/min (A.N.R.)
Dimensions	• W 1 970 × D 2 019 × H 1 500 mm: • W 1 970 × D 2 105 × H 1 500 mm: • W 1 970 × D 2 282 × H 1 500 mm:	For fixed feeder base specification Tray feeder connected (Front side: Fixed feeder base) Feeder cart connected (Front/ Rear) (without Signal Tower and Touch Panel)
Mass	• Main body • Fixed feeder base • Tray feeder • Cutting unit • Reel box • Standard structure	2 370 kg 70 kg 200 kg 25 kg 9 kg 2 780 kg (Main body, Fixed Feeder Base × 3, Tray Feeder) • Feeder cart 135 kg • Manually setting tray 15 kg • Reel holder 30 kg • Bypass tray on the mounter(2 trays) 10.5kg/unit
Environment	• Temperature • Humidity • Altitude	10 °C ~ 35 °C 25 %RH ~ 75 %RH (No condensation) 1 000 m or less, above sea level
Operating unit	• Interactive operation with LCD color touch panel (Rear side: Option)	One touch changeover between English, Japanese and Chinese 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 (G10) * The paint color cannot be designated.
Control System	• Microcomputer system (VxWORKS)	
	Full closed-loop system (Linear servomotor): X axis Semi closed-loop system (Servomotors): Y axis , Z axis and θ axis	
Command System	• Designation of X, Y, Z and θ coordinates	
Production data	• No. of placement points • No. of Patterns (Blocks) • No. of Mark settings*	
	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.) Max. 1 000 patterns/machine, Max. 1 000 patterns/line (If PCB warpage measurement points are included, it shall be Max. 100 patterns/machine.) Max. 1 000 points/machine, Max. 1 000 points/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 booklet."

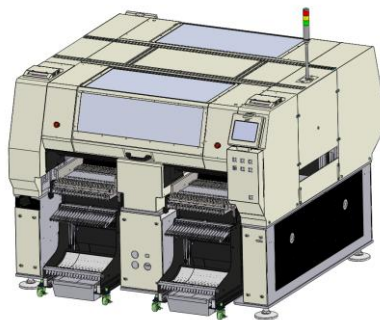
*1 If the number of placement points exceeds 10 000 points/line, please contact us.
 If the line is made up with the CM and NPM series coupled, please contact us.

3.2 Standard Functions

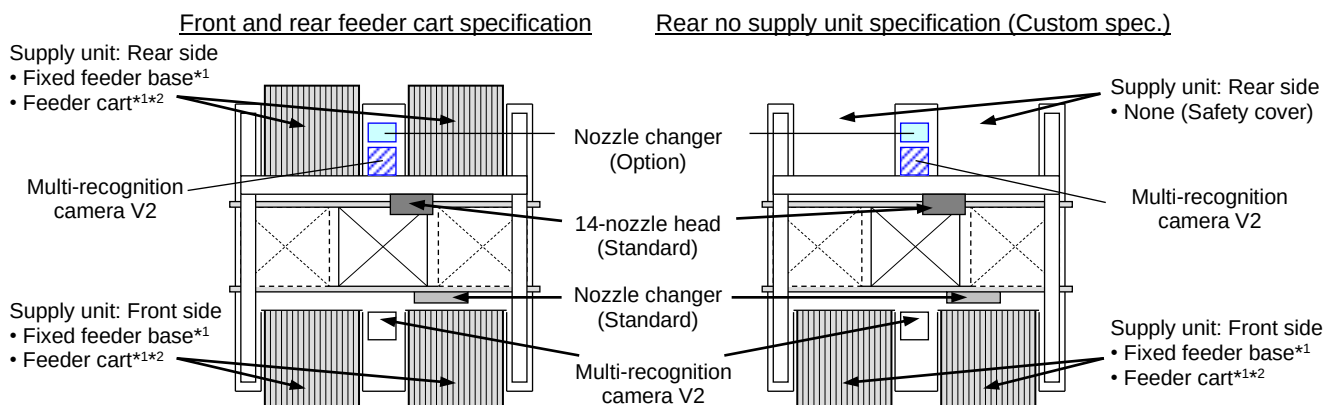
Item	Specifications	
Placement tact time (Under optimum conditions)	Chip	35 800 CPH (0.1006 s/chip)
		IPC9850(1608C): 23 000 CPH (0.157 s/chip)
	QFP	12 200 CPH (0.295 s/QFP): 12 × 12 mm or less
		IPC9850(QFP-208): 3 200 CPH (1.125 s/QFP)
	* This may vary depending on components.	
Placement accuracy (Under optimum conditions)	Chip	±0.04 mm (Cpk ≥ 1): 0402 (01005")* ¹ , 0603 (0201"), 1005 chip
	QFP	±0.05 mm (Cpk ≥ 1): 12 × 12 mm or less (XY-axis speed: 60 %) ±0.03 mm (Cpk ≥ 1): 12 × 12 mm over (XY-axis speed: 20 %)
	* 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 Please select "0402 (01005") placement support."	
Applicable component	Dimensions	0402 (01005")* ¹ ~ 120 × 90 mm or 150 × 25 mm* ²
	Height	Max. 28 mm* ³
	Mass	Max. 30 g
	* ¹ Please select "0402 (01005") placement support." * ² Component dimensions may be subject to constraints under either of two conditions; the placement of a large-sized connector and the relation between the pickup position and the recognition range. Any components over 45 × 45 mm are subject to the restriction of the placement speed. For more information, please contact us. * ³ For components with a height of 25 mm or more, a dedicated nozzle is required. For details, please contact us.	
PCB exchange time	Single conveyor Standard Specification	Single conveyor Long PCB (1 500 mm) Specification
	4.0 s (L 515 mm or shorter)* ¹	7.0 s (L 857.5 mm or shorter)* ² 7.5 s (Over L 857.5 mm - L 1 500 mm or shorter)* ³
	* ¹ When back mounting is included, it is 4.5 s. * ² When back mounting is included, it is 7.5 s. * ³ When back mounting is included, it is 8.0 s.	
Applicable PCB	Dimensions	50 × 50 mm ~ 515 × 460 mm (Standard Specification)
		50 × 50 mm ~ 1 500 × 460 mm (Long PCB Specification)
	Placement area	50 × 44 mm ~ 515 × 454 mm (Standard Specification)
		50 × 41 mm ~ 1 500 × 451 mm (Long PCB Specification)
	Thickness	0.3 mm ~ 8.0 mm
	Mass	3.0 kg or less: PCB mass after placement (including carrier mass)

Item	Specifications
Flow direction	Left → Right, Left ← Right (Selectable)
Reference	Front, Rear (Selectable)
PCB transfer height	900 mm ~ 920 mm
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 V2: Type 1</u> - Recognition and offset of all applicable components <u>Multi-recognition camera V2: Type 2 (Type 1 + Component Thickness Measurement)</u> - Measurement of component thickness (component data registration, placement height control), detection of standing/tilted standing of components at the time of pickup, nozzle tip check. <u>Multi-recognition camera V2: Type 3 (Type 2 + 3D Measurement)</u> - Detects coplanarity 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.
Component Supply Unit	- Taping 4 mm Max. 160 inputs : Thin type tape feeder 8 mm Max. 160 inputs : Double/ Thin type tape feeder (Small reel) - Max. 80 inputs : Double/ Thin type tape feeder (Large reel) 12/ 16 mm Max. 80 inputs 24/ 32 mm Max. 40 inputs 44/ 56 mm Max. 24 inputs 72 mm Max. 20 inputs 88 mm Max. 16 inputs 104 mm Max. 12 inputs 32 mm adhesive Max. 24 inputs - Single stick feeder Max. 40 inputs 3-lot stick feeder Max. 20 inputs - Tray Max. 20 pieces/tray feeder - Manually setting tray Max. 2 pieces - Bypass tray on the mounter (2 trays) Max. 2 trays You need to choose the "Rear/Fixed Feeder Base Specification" or the "Rear/Others_No Supply Unit(Safety Cover)" Specification. - Auto load feeder Max. 160 pieces*: When attachments for auto load feeder are used

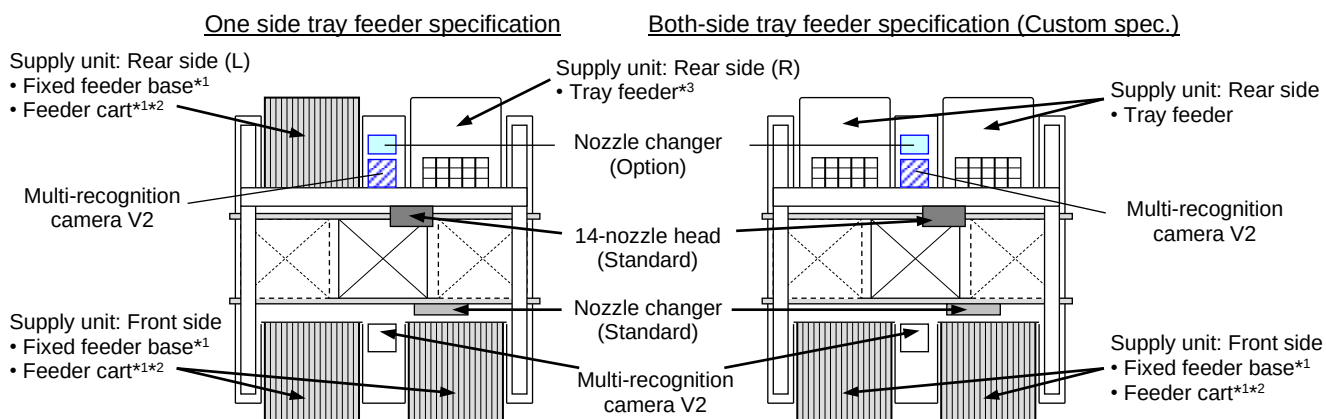
4. Machine Configuration



■ Tape feeder specification



■ Tray feeder specification



*1 Fixed feeder bases cannot be mixed with feeder carts.

*2 Feeder carts (20-slot) are exclusive to AM100.

*3 Tray feeder of "One-side tray feeder specification" shall be installed in the right rear position, regardless of the flow direction. Tray feeder is shared with the NPM series. (However, tray feeder installation brackets are unique to each machine.)

■ Data creation

All data are created on NPM-DGS, the data creation system. (NPM-DGS is a separate product.)

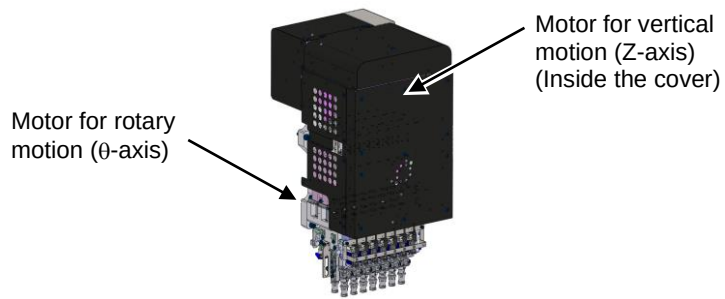
The hardware for NPM-DGS should be prepared on your own.

** 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

■ 14-nozzle head

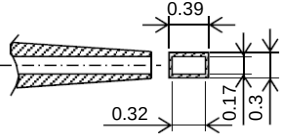
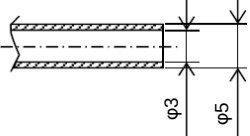
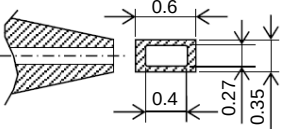
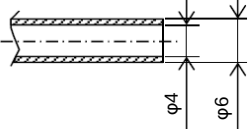
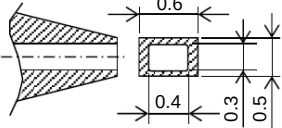
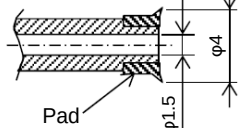
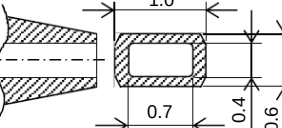
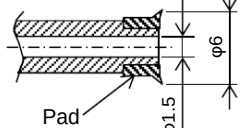
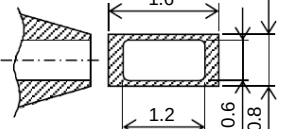
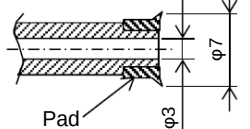
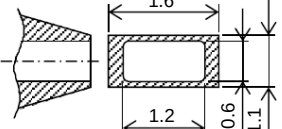
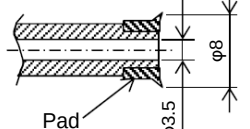
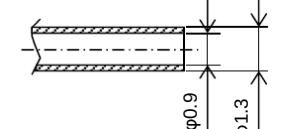
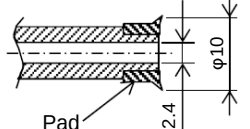
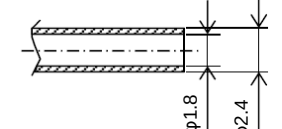


4.2 Nozzle Configuration

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

■ Small nozzles (Exclusive to AM100)

- Nozzles designed specifically for AM100 (the nozzles for use with the NPM and CM series cannot be used).
- 2D code is marked on the nozzle flange section of each nozzle to help you detect an error in setting the nozzle.
- All the shapes of holes shown here are maximized. Therefore the actual shapes are different.
- The recognition method depends on components.

No.	Tip shape (Unit: mm)	Applicable component (Typical examples)	No.	Tip shape (Unit: mm)	Applicable component (Typical examples)
256M*		0402R/C (01005" R/C)	260M		TAN-X/B/C/D Al Electrolytic -A/B/C
225M		0603R/C (0201" R/C)	184MTR		SOP, QFP PLCC, BGA
226M		0603R/C (0201" R/C) 1005R/C (0402" R/C)	140M		TAN-D Al Electrolytic -D SOP, SOJ PLCC, CSP
230M		1005R/C (0402" R/C) 1608R/C (0603" R/C)	185M		SOP, QFP PLCC, BGA
235M		1608R/C (0603" R/C) 2012R/C 3216R/C SS-Mini Tr/Di S-Mini Tr/Di	388M		SOP, QFP PLCC, BGA
387M		3216R/C 4532R/C SS-Mini Tr/Di S-Mini Tr/Di	389M		SOP, QFP PLCC, BGA
120M		2012R/C 3216R/C S-Mini Tr/Di Mini Tr/Di	199MR		SOP, QFP PLCC, BGA
240MT		3216R/C 4532R/C TAN-X/B/C/D Al Electrolytic -A/B/C			

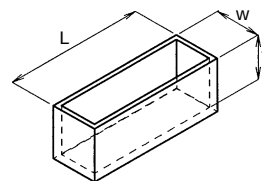
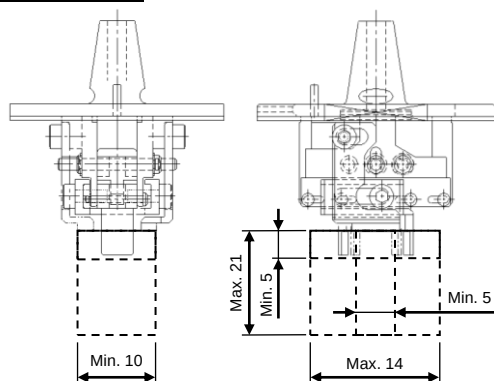
* Select "0402 (01005)" placement support" when selecting the 256M nozzle.

■ Grip nozzle (Large nozzle: Exclusive to AM100)

Holds a component that is incapable of being picked up with a chuck and picks up the component.

- A nozzle designed specifically for AM100 (the grip nozzles for use with the NPM and CM series cannot be used).
 - 2D code is marked on the nozzle flange section of each nozzle to help you detect an error in setting the nozzle.
- (The nozzle changer (rear side) for large nozzles is needed.)

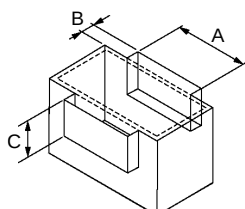
2907M nozzle



Outer size of applicable component		
T	W	L
5 mm ~ 21 mm	5 mm ~ 14 mm	Min. 10 mm

Feeding type: Taping, stick and tray

Tolerances for the grip nozzle's chuck (during tape/tray feeding)

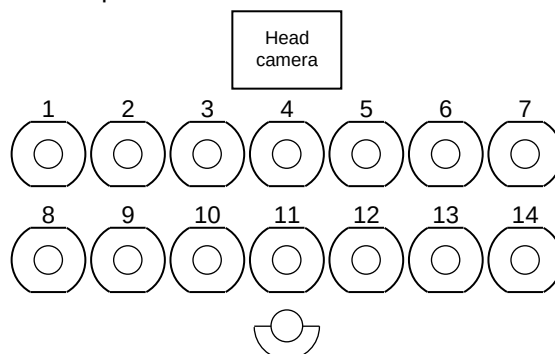


A	B	C
Min. 6 mm	Min. 3 mm	Min. 4 mm

* The table above shows the space required for the component supply unit in consideration of the chuck stroke.

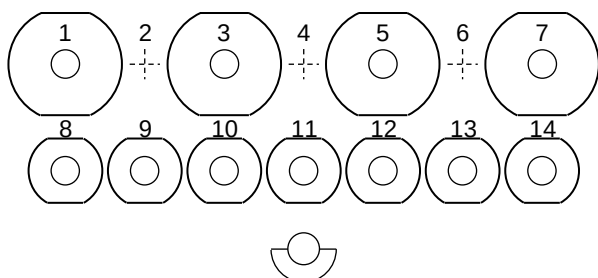
■ Nozzle layout for 14-nozzle head

Small nozzles (all nozzles listed in the previous page) which support components with width across corners of 19.1 mm or less can be attached to all positions.

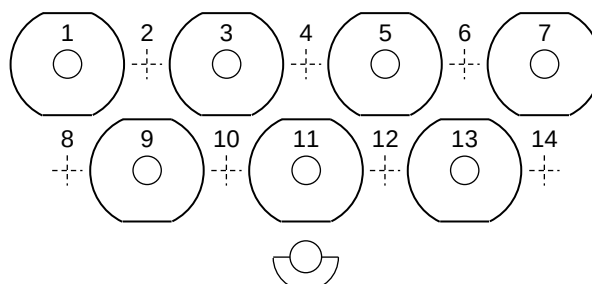


The layout and the maximum number of attachable nozzles for 14-nozzle head
(The figures are seen from above.)

Small/large nozzle attachment example



Large nozzle attachment example

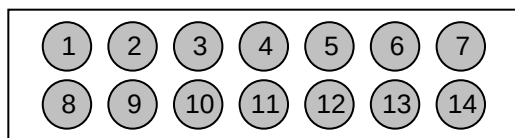


■ Pickup-ready component size and nozzle arrangement (●, ☉ : Can pick up, ○: Cannot pick up)

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

Components of 14×14 mm (19.1 mm diagonal)
or less

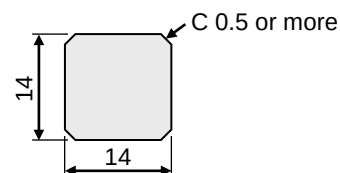
$$(A \times A \leq 14 \times 14)$$



- Only small nozzle

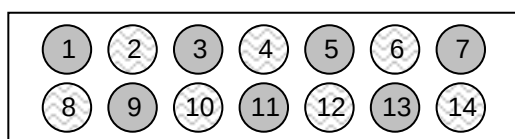
Limitations on components measuring 14×14 mm

The following size limitations (component with its four corners being C 0.5 or more) will be applied when you try picking up components measuring 14×14 mm with all nozzles.



Exceeding 14×14 mm (19.1 mm diagonal) ~ 22×22 mm

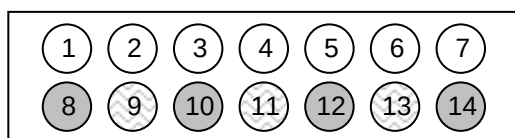
$$(14 \times 14 < A \times A \leq 22 \times 22)$$



- Staggered arrangement
1, 3, 5, 7, 9, 11, 13 or
2, 4, 6, 8, 10, 12, 14

Exceeding 22×22 mm ~ 26×26 mm

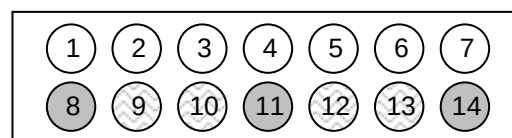
$$(22 \times 22 < A \times A \leq 26 \times 26)$$



- Arrangement of every second front-row nozzle
8, 10, 12, 14 or 9, 11, 13

Exceeding 26×26 mm ~ 38×38 mm

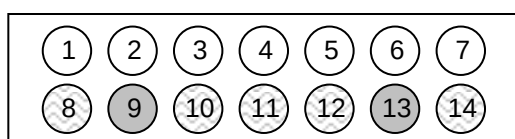
$$(26 \times 26 < A \times A \leq 38 \times 38)$$



- Arrangement of every third front-row nozzle
8, 11, 14 or 9, 12
or 10, 13

Exceeding 38×38 mm ~ 45×45 mm

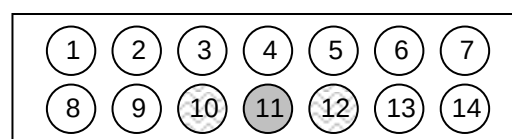
$$(38 \times 38 < A \times A \leq 45 \times 45)$$



- Arrangement of every fourth front-row nozzle
9, 13 or 8, 12
or 10, 14

Exceeding 45×45 mm

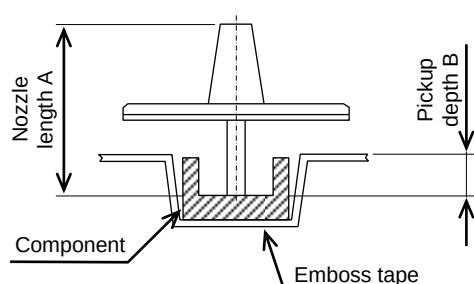
$$(45 \times 45 < A \times A)$$



- Particular front-row nozzle
Any of 10, 11, and 12

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

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



Head	Nozzle length A	Pickup depth B
14 nozzle head	22.5 mm (standard)	0 mm ~ 9 mm
	27.5 mm	0 mm ~ 14 mm
	32.5 mm	0 mm ~ 19 mm
	37.5 mm	0 mm ~ 24 mm

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 (No detection sensor)		Emboss	10.5 mm	0.5 mm	Small	160	○ 1 mm																		
8 mm thin type single*2		Paper/ Emboss			21 mm	3 mm	Small	160	○ 1 mm	○	○														
8 mm double*3			Large	80			○ 1 mm		○	○															
8 mm double for 0402 *3*4			Small	160			○ 1 mm		○	○															
8 mm double *3*4 (For thin embossed tape)			Large	80																					
12/ 16 mm			Emboss	21 mm			15 mm	Large	80	○ 1 mm		○	○	○	○										
12 mm	80																								
16 mm	80*5																								
24/ 32 mm		42 mm		26 mm*6	Large	40				○	○	○	○	○	○	○	○								
44/ 56 mm		63 mm				24					○	○	○	○	○	○	○	○	○	○	○	○	○	○	
72 mm		84 mm		15 mm 21 mm		20					○	○	○	○	○	○	○	○	○	○	○	○	○		
88 mm (With detection sensor)		105 mm		21 mm		16					○	○	○	○	○	○	○	○	○	○	○	○	○		
104 mm (With detection sensor)		126 mm				12					○	○	○	○	○	○	○	○	○	○	○	○	○		

*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 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.

*4 Select "0402 (01005)" placement support" when selecting the 8 mm tape feeder for 0402 (01005").

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

*6 When emboss depth of components is over 21mm, you need to make modifications to a feeder cart or a Fixed Supply Unit of a main unit.
(Custom specifications)

Applicable emboss depth after modification: Max. 26 mm

** 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 possible to 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	160	●	●														
			Large	80	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: 80 reels (preceding component 80 reels, following component 80 reels)

Large reel: 40 reels (preceding component 40 reels, following component 40 reels)

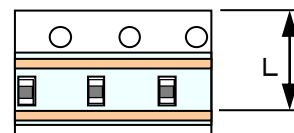
If you want more reels, please contact us.

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.

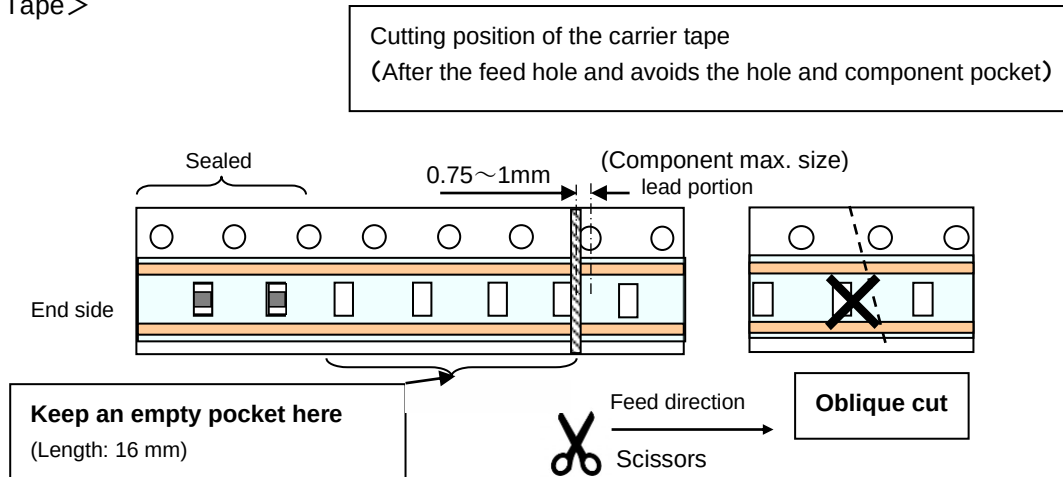
Top portion (Lead portion) processing

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

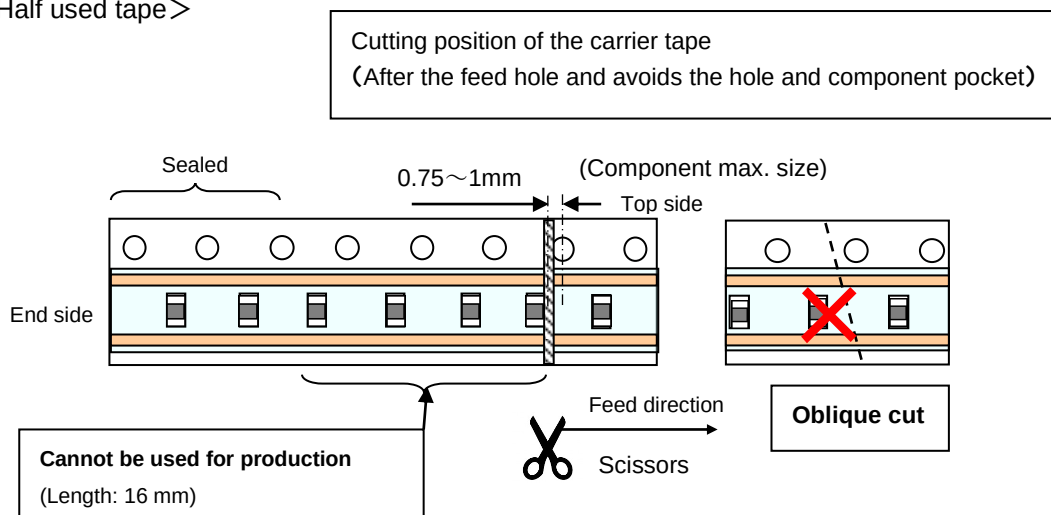
(The cutting position of lead portion)

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>



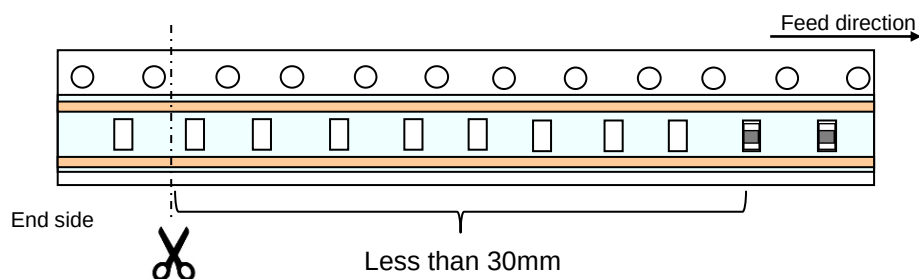
End portion (Trailer portion) processing

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.



■ 32 mm Adhesive Tape Feeder *

Feeder type	Type	Setting pitch	Maximum height of component	Reel diameter	Maximum Setting reel	Feed pitch (1 pitch = 4 mm)
32 mm adhesive (No detection sensor)	Adhesive	63 mm	2.8 mm	Large	24	3 pitch = 12 mm

* When adhesive tape feeder is used, "Air supply unit for the feeder" is necessary.

■ Intelligent Stick Feeder

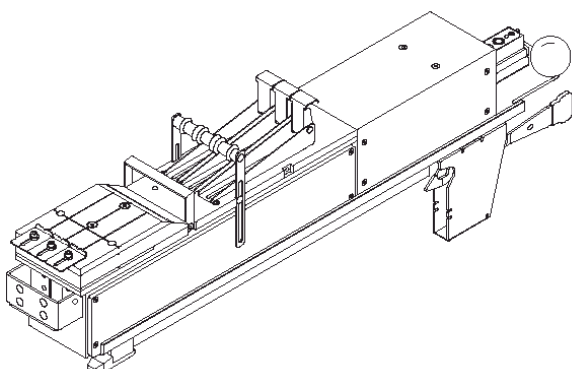
The stick feeder supplies components through the stick by vibration.

The intelligent stick feeder has improved its ability to support large-sized components, in addition to the traditional merits such as high versatility^{*1}, quick delivery^{*2}, and maintenance-free^{*3}.

*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 such cleaning as dust removing.



	Single stick feeder	3-lot stick feeder
Setting pitch	42 mm	84 mm
Maximum number of setting feeders	40 inputs	20inputs

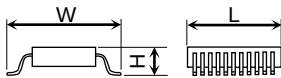
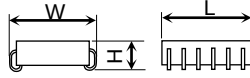
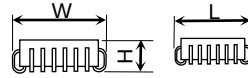
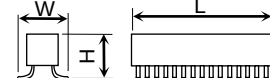
Component feeding methods

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.	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.

Applicable components

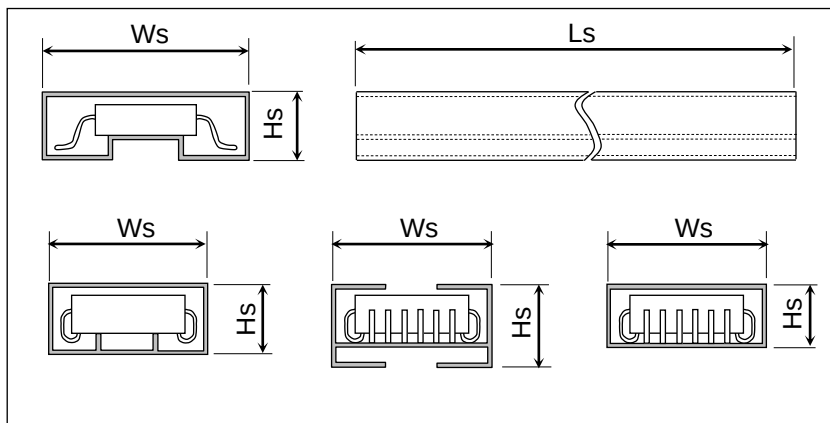
Standard				Special			
SOP, SOJ, PLCC				Except for the standard component types and dimension range, depending on the component and stick shapes, components of up to the following dimensions may also be used. If using such components, you need to flow them actually to check of feeding conditions or 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

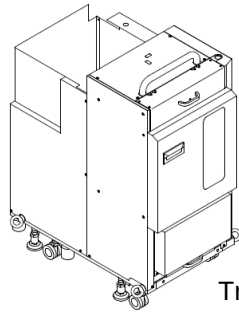
	Component width W (mm)	Number of attachable sticks
Single Stick Feeder	$W \leq 31$	1
3-lot Stick Feeder	$W \leq 16$	3
	$16 < W \leq 25$	2
	$25 < W \leq 31$	1

* 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.

■ Tray Feeder

Up to 20 types of tray components can be set.

“Rear operation panel (option)” is required to use the tray feeder.



Tray feeder

■ Manually setting tray

This tray is effective for small lot production involving a small number of tray components.

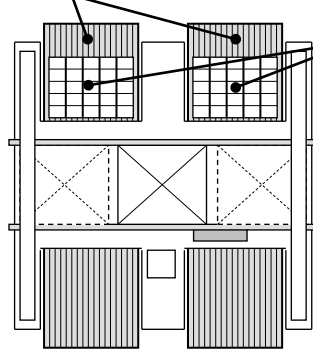
Two sets of manually setting trays can be set when the fixed feeder bases are installed on the rear (one set on each of the right and left fixed feeder bases).

A manually setting tray can accommodate a tray with L 230 × W 335 mm max.

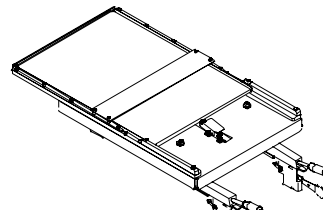
Several trays can be set on a manually setting tray if they all are within a size limit of L 230 × W 335 mm (up to 10 types of tray components).

“Rear operation panel (option)” is required to use manually setting trays.

Fixed feeder base



Manually setting tray



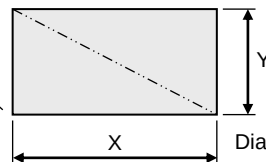
Manually setting tray

• Dimensions of applicable components

When manually setting trays are used, the sizes of target components will be subject to the following limitations.

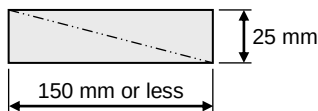
Limiting conditions

152.1 mm or less diagonal; 150 mm or less in X direction, 45 mm or less in Y direction

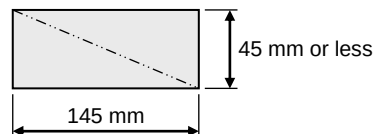


Diagonal: 152.1 mm or less

Example 1)
Diagonal: 152.1 mm or less



Example 2)
Diagonal: 152.1 mm or less



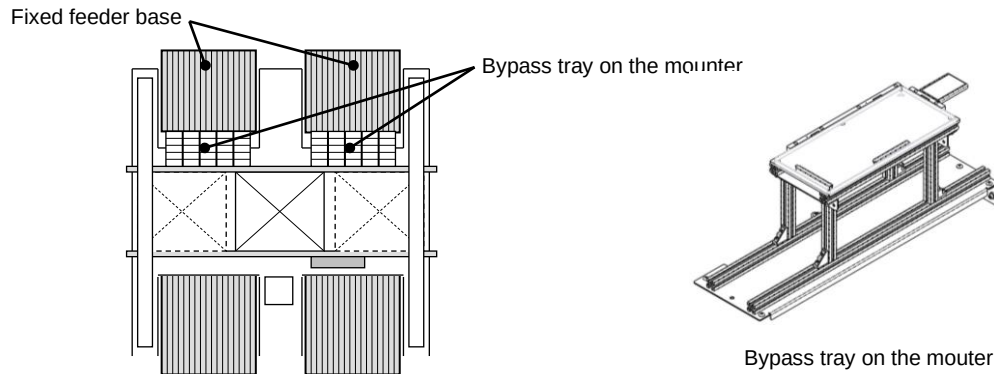
■ Bypass Tray on the Mounter (2 trays)

This tray is effective for small lot production, including a small number of tray components.

There are 2 patterns compatible with the Rear Supply Stage: Fixed Feeder and No Supply Unit. In addition, you can combine Feeder Supply Stage.

The tray can accommodate a tray with a maximum of L 140 × W 335 mm.

Several trays can be set on a tray if they all are within a size limit of L 140 × W 335 mm. (up to 10 types of components)

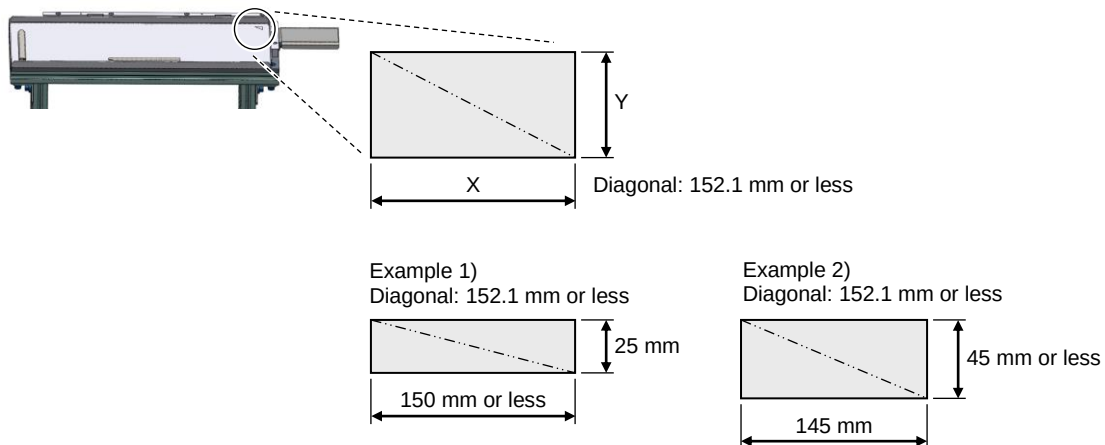


▪ Dimensions of applicable components

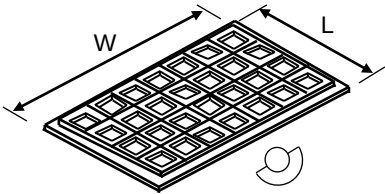
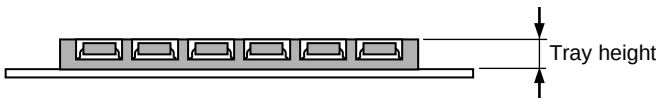
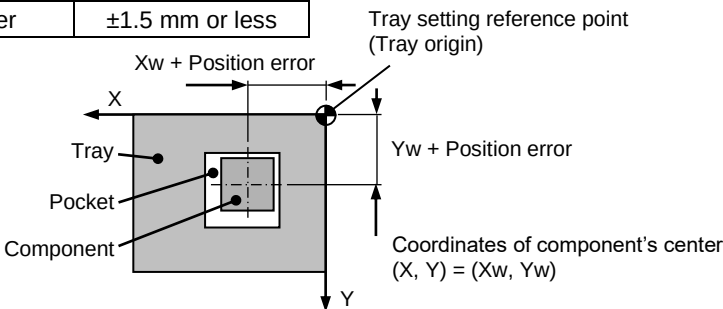
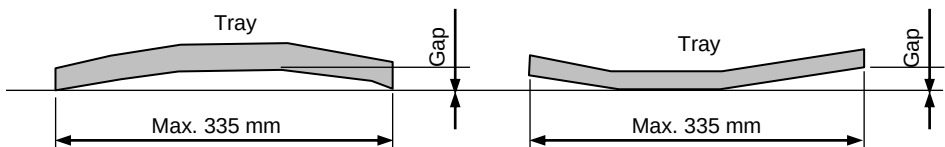
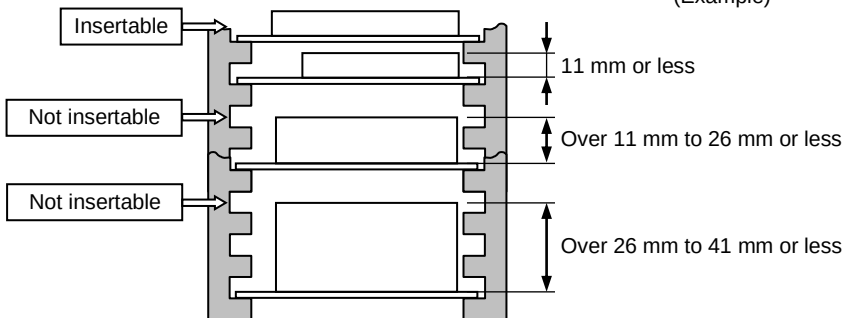
When the tray is used, the sizes of target components will be subject to the following limitations.

Limiting conditions

152.1 mm or less diagonal; 150 mm or less in X direction, 45 mm or less in Y direction



Tray Conditions

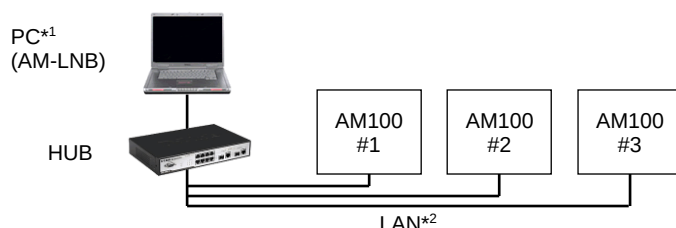
Item	Specification							
Tray dimensions	L 85 × W 100 mm ~ L 230 × W 335 mm							
								
Tray height	Tray feeder	2 mm ~ 56 mm * When trays higher than 30mm are included, the supply part of the trays cannot be used.						
	· Manually setting tray · Bypass tray on the mounter(2 trays)	2 mm ~ 11 mm						
								
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 (Tray feeder)	• 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

Regardless of stand-alone installment or line connection, PC for LNB is always needed to set up AM100. (When the number of machines coupled together is equal to or more than 4, a FA PC is needed.)

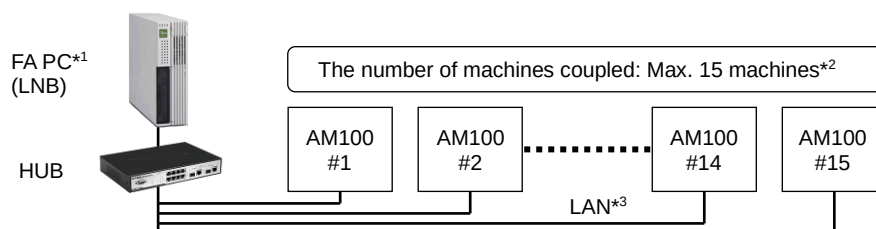
■ Examples of system configuration

1) When the number of machines coupled together is equal to or less than 3



- *1 Please prepare PC for AM-LNB on your own.
It can be shared with the NPM-DGS. (Applicable OS: Windows® 10 Pro or Windows® 11 Pro only)
To use any of the following options, you need an FA PC. (AM-LNB cannot be used.)
- Automatic changeover
 - Component verification
 - Feeder Setup Navigator
 - Upper communication
 - Support station box (Component verification type)
 - PanaCIM-EE ready (For material verification of PanaCIM Express, AM-LNB can be used)
 - APC system ready
 - Pattern mark communication
- *2 Please prepare the LAN cable on your own.
(Because the required cable varies in length depending on where you install the PC and the HUB)
Basic specification: UTP cable of enhanced category 5 or later

2) When the number of machines coupled together is equal to or more than 4



- *1 You may use an FA PC even when the number of machines coupled together is equal to or less than 3.
- *2 When the number of machines coupled exceeds 15 machines, please consult us.
- *3 Please prepare the LAN cable on your own.
(Because the required cable varies in length depending on where you install the FA PC and the HUB)
Basic specification: UTP cable of enhanced category 5 or later

Basic specifications of HUB:

Standard	IEEE802.3 standard
Data rate	10BASE-T/ 100BASE-TX/ 1000BASE-T(Auto-Negotiation)
Recommended type	DGS-1016L (made by D-Link) In accordance with laws and regulations, when the following countries are the destination or the place where to put, read the recommended type carefully India : DGS-1016D (Made by D-Link India)

* Please prepare the LAN cable by yourself.

• LNB (Line Network Box)

LNB 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 AM100 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

- AM-LNB

LNB that can operate on Windows® PC.

(Use when the number of machines coupled together is equal to or less than 3)

(This software is included in the AM100 system software DVD-ROM.)

- 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.

- FA PC:

A set is required for each line in the case of FA PC equipped with line server function.

(When the number of machines coupled together is equal to or more than 4)

LNB will be installed.

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 mm × D 360 mm × H 310 mm
Mass	10.0 kg

* Please prepare the power supply cable by yourself.

Operating environment of AM-LNB

When the number of AM100s coupled together is equal to or less than 3, please have the following hardware and software ready for yourself.

When a PC is shared with NPM-DGS, the PC for NPM-DGS must meet the following specifications.

* We cannot ship AM-LNB to the California state or the Oregon state because of IoT Security Law(SB 327).

Please consider introduction of FAPC (Factory Automation PC).

- Hardware Specifications

Item	Specification	Required or Recommended
Main body	IBM PC/AT compatible machine (A desktop PC is strongly recommended.)	Required
CPU	Intel® Core™ i5-2430M equivalent or greater	
Mother board	IBM-fully-compatible machine	
Serial I/O	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	120 GB or more of available space (NTFS file system)	
Optical drive	DVD drive To be used in installation	
Network card	For 100/1000BASE-T	

- 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	
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.

- Quality information viewer

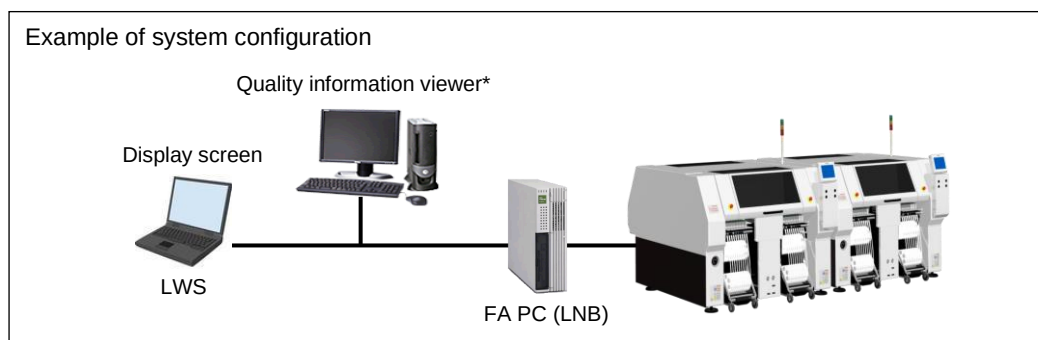
Comprehension of changing points and analysis of defect factors are supported by displaying the information on quality (the position of the feeder used, recognition compensation value, parts data and others) per PCB and per mounting point.

And, in the presence of the inspection head (NPM series), information about defect locations and information about quality can be matched with each other and displayed.

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 AM100 system software DVD-ROM.

* FA PC is needed when you use quality information viewer. (AM-LNB cannot be used.)

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

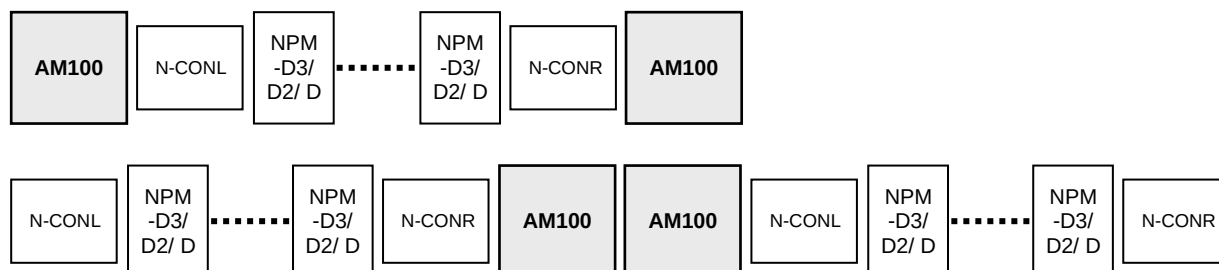
- Microsoft and Windows are registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.
- Intel and Intel Core are registered trademarks or trademarks of Intel Corporation in the United States.
- Virus Buster is a registered trademark or trademark of Trend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

■ Example of connection with NPM series (left to right flow)

When an AM100(s) is connected with an NPM series machine(s), please refer to the example below. Then, the maximum number of machines, including both the NPM series and AM100s, to be coupled together is 15.

* When coupling an NPM series machine and an AM100, you cannot use AM-LNB.
(An FA PC (LNB) is necessary for each line.)

• Example of connection with NPM-D3/ D2/ D

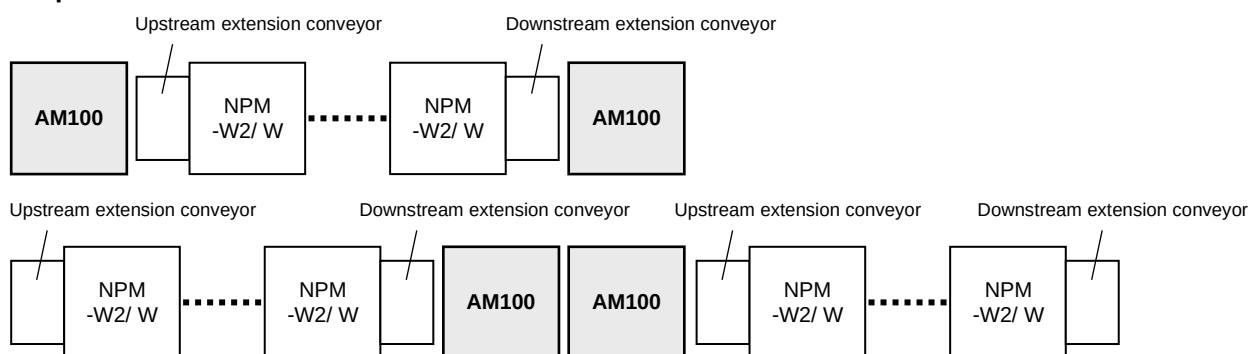


Coupling conditions

NPM-D3/ D2/ D: Single lane mode

AM100: Front reference

• Example of connection with NPM-W2/ W



Coupling conditions

NPM-W2/ W: Single conveyor specification or Single lane mode

AM100: Front reference

* Please consult us separately when you directly connect NPM series and AM100 without an extension conveyor (or N-CON.)

4.5 Recognition Unit Configuration

■ Head camera

- Field of view: 10.24 × 10.24 mm

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

■ Multi-recognition camera V2: Type 1

Corrects position deviation and angle deviation at component pickup.

In addition, Side Lighting(option) detects*1 BGA/ CSP solder balls(Presence • Absence).

*1 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.

Recognition method	Recognition speed	Applicable Component
Batch recognition	High	General chip components including square chips larger than 0402*2 BGA, CSP, QFP, SOP, Connectors, and others *2 When you choose "03015 Component Placement Support".

* Mounters having multi-recognition camera after NPM- WX,WXS,DX, NPM-D3, NPM-W2,W2S, NPM-TT2 may not be compatible with the existing Line Camera Parts Library.

(When you use the recognition option, such as brightness check)

Recognition conditions of QFP (Multi-recognition camera V2:Type 1)

Placement conditions of QFP are as follows.

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

	Specification
Outside dimensions	2 × 2 mm ~ 80 × 80 mm*1
Thickness	1.0 mm ~ 28 mm*2
Lead pitch	0.4 mm, 0.5 mm, 0.65 mm, 1.0 mm, 1.27 mm, 1.5 mm
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: Taping and tray

*1 When the outside dimensions exceed 45 × 45 mm, split recognition (low recognition speed) comes into use.

*2 For components with a height of over 25 mm, a dedicated nozzle is required. For details, please contact us.

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

Recognition conditions of BGA/ CSP (Multi-recognition camera V2: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.)

	Specification
Outside dimensions	2 × 2 mm ~ 90 × 90 mm ^{*1*2}
Thickness	0.3 mm ~ 28 mm ^{*3}
Ball pitch	0.3 mm ^{*1} ~ 1.5 mm
Ball diameter	φ0.15 mm ~ φ0.9 mm
Ball shape	Globular or cylindroid ^{*4}
Materials of ball	High temperature solder, eutectic solder
Maximum ball count	4 096 In positive grid arrangement, number of rows on most outer regions × number of columns is 64 × 64 In staggered arrangement, number of rows on most outer regions × number of columns is 32 × 32
Minimum ball count	9 Number of rows on most outer regions × number of columns is obtained by 3 × 3.
Arrangement of ball	The pitch and dimensions of ball shall be consistent. (The ball missing and the staggered pattern are the same as those defined by JEDEC and EIAJ regarding BGA/ CSP.)

- 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 hole, 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: Taping and tray

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

*2 When the outside dimensions exceed 45 × 45 mm, split recognition (low recognition speed) comes into use.
(recognition range: 80 × 80 mm)

*3 For components with a height of over 25 mm, a dedicated nozzle is required. For details, please contact us.

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

Recognition conditions of connector (Multi-recognition camera V2: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.)

	Specification
Outside dimensions	L 120 × W 90 mm or less ^{*1*2} L 150 × W 25 mm or less ^{*1}
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: Taping, tray and stick

*1 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 pick up position and the recognition range.
For further information, please contact us.

*2 When the recognition range (W) is more than 45 mm but less than 80 mm, split recognition (low recognition speed) comes into use.

■ Component thickness measurement function (Multi-recognition camera V2: 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	0402 component* 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 component 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 a nozzle with a pad or a nozzle with steps on its tip. ([e.g.] 205A)

* Measurement with short nozzle is not included.

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

* The multi-recognition camera on NPM- WX, WXS, DX, NPM-D3, NPM-W2, W2S, NPM-TT2 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 "0402 placement support" is selected.

■ 3D Measurement (Multi-recognition camera V2: Type 3)

In addition to Type 2 features, Type 3

- Detects coplanarity (flatness) of all the leads and XY-direction positions in QFP/ SOP and other packages at high speed.
- Detection is possible for existence or nonexistence/absence of all balls of such as BGA/ CSP.

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}	0.12 mm	—
		BGA, CSP	0.5 mm ^{*2}	0.3 mm	0.25 mm

* Mounters having multi-recognition camera after WX, WXS, DX, NPM-D3, NPM-W2, W2S, NPM-TT2 may not be compatible with the existing Line Camera Parts Library.

(When you use the recognition option, such as brightness check))

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

*2 For CSP of a ball pitch less than 0.5 mm, consult us.

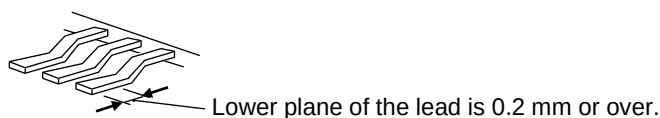
Recognition conditions of QFP (Multi-recognition camera V2: Type 3)

Placement conditions of QFP are as follows.

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

	Specification
Outside dimensions	2 × 2 mm ~ 80 × 80 mm ^{*1}
Thickness	1.0 mm ~ 28 mm ^{*2}
Lead pitch	0.4 mm, 0.5 mm, 0.65 mm, 1.0 mm, 1.27 mm, 1.5 mm
Lead width	0.12 mm or over
Lead shape	Leads must be protruding out of the mold area by 1 mm or over.

- The measuring range of lead coplanarity is up to ±0.5 mm.
- For 3D sensor recognition, 0.2 mm-or-more flat part is needed on the lead underside.



- Depending on the recognition speed and/or the lead count, the waiting time for recognition processing may occur in placement. For further information, please contact us.
- Feeding type: Taping and tray

*1 When the outside dimensions exceed 45 × 45 mm, split recognition comes into use.

*2 For components with a height of over 25 mm, a dedicated nozzle is required. For details, please contact us.

Recognition conditions of BGA/ CSP (Multi-recognition camera V2:Type 3)

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.)

	Specification
Outside dimensions	2 × 2 mm ~ 90 × 90 mm ^{*1}
Thickness	0.3 mm ~ 28 mm ^{*2}
Min. ball pitch	0.4 mm
Min. ball diameter	φ0.25 mm
Ball shape	Globular
Materials of ball	High temperature solder, eutectic solder
Number of balls	Matrix of Min. 2 × 2 to Max. 64 × 64
Arrangement of ball	The pitch and dimensions of ball shall be consistent. The ball missing and the staggered pattern are the same as those defined by JEDEC and EIAJ regarding BGA/ CSP.

- Depending on surface conditions of ball, it may not be possible to recognize such balls.
- The underside must have terminals in ball form at the time of feeding.
- Depending on the recognition speed and/or the ball count, the waiting time for recognition processing may occur in placement. For further information, please contact us.
- Feeding type: Taping and tray

*1 When the outside dimensions exceed 45 × 45 mm, split recognition comes into use. (Recognition range: 80 × 80 mm)

*2 For components with a height of over 25 mm, a dedicated nozzle is required. For details, please contact us.

Recognition conditions of connector (Multi-recognition camera V2:Type 3)

The general conditions of connector placements are as follows.

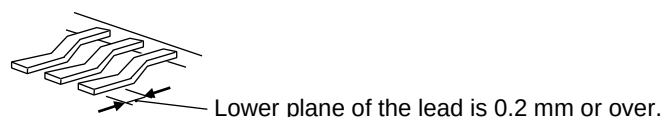
(Basically, placement of connector is studied and experimented after getting the sample of it, and then it is judged to be placed or not.)

	Specification
Outside dimensions	L 120 × W 90 mm or less ^{*1*2} L 150 × W 25 mm or less ^{*1}
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.

*1 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 pick up position and the recognition range.
For further information, please contact us.

*2 When the recognition range (W) is more than 45 mm but less than 80 mm, split recognition comes into use.

- The measuring range of lead coplanarity is up to ±0.5 mm.
- 0.2 mm-or-more flat part is needed on the lead underside.

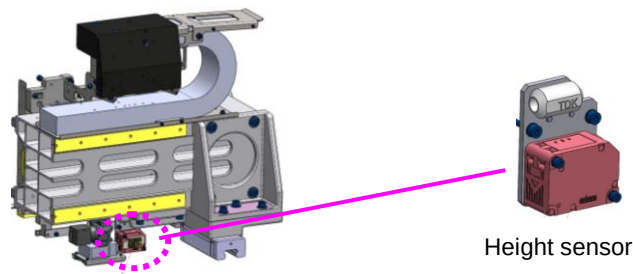


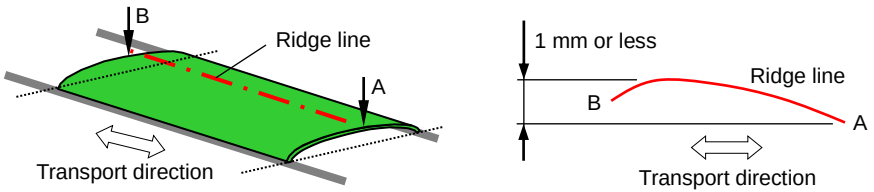
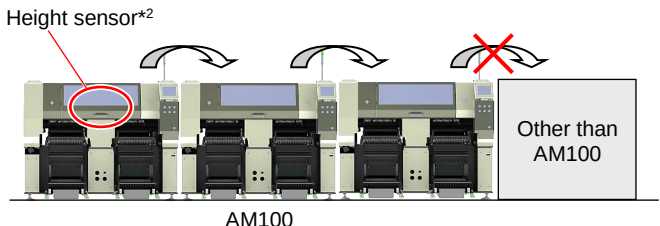
- Depending on surface conditions of lead underside, it may not be possible to recognize such leads.
- Feeding type: Taping, tray and stick

■ 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.



Item		Description
Applicable PCB* ¹	Dimensions	50 × 50 mm ~ 1 200 × 460 mm
	Thickness	1.6 mm ~ 8.0 mm
	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, a warping gradient of 0.5 % or less, and a ridge line (in the transfer direction) with a height difference less than 1 mm. 
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 AM100 in line is passed to the downstream AM100*.  AM100 * If any machine other than AM100 is coupled together, no data passing is allowed. * For any PCB whose warp shape changes each time it is clamped, please consult us separately.
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* ³	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		3.0 s (515 × 460 mm in an optimal condition, with 9-point measurement) 5.0 s (857.5 × 460 mm in an optimal condition, with 9-point measurement) 7.0 s (1 200 × 460 mm in an optimal condition, with 9-point measurement)

*¹ 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)

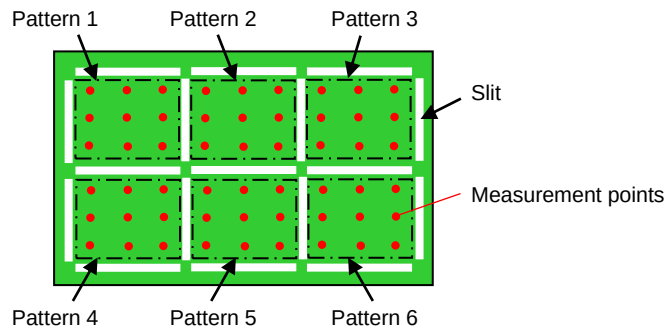
*² Select the height sensor for the first AM100 in line.

*³ 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

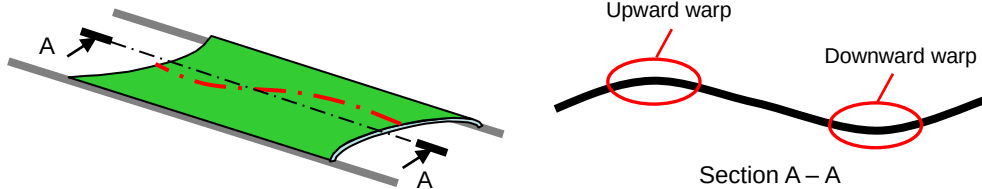
It is unlikely that PCBs with a slit have smooth (even) curved surfaces because of their complicated warp geometries. In such a case, you are recommended to use the pattern warp correction.

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



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).

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

* FA PC is needed when you select this option. (AM-LNB cannot be used.)

*¹ This is an option list of Component Verification.

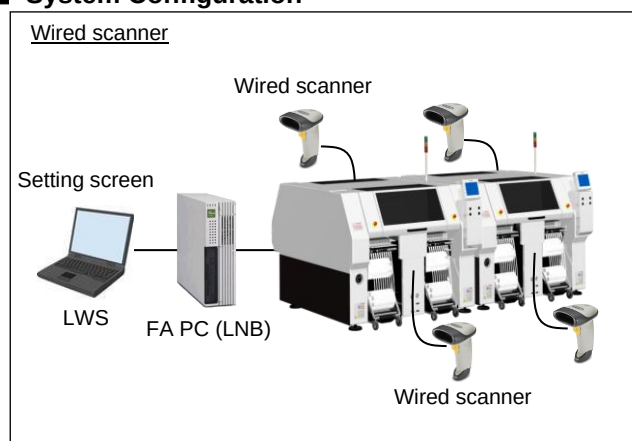
When NPM-DX is in production line, please select "Material Verification" from "PanaCIM-EE Gen2"

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

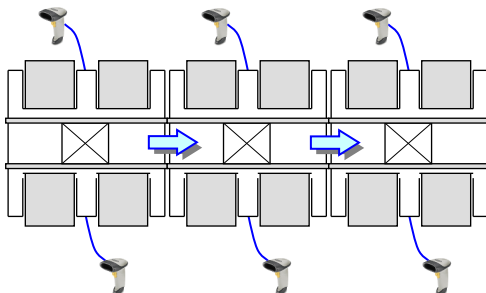
Item		Description
Feeder Verification*1	Component verification at the time of preparation	Components are verified at the time of preparation.
	Component verification at the time of component exhaustion	Components are verified when they are replenished at the time of component exhaustion
	Component verification 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.
Automatic line selection		For the wireless scanner (PDA), line selections by the GUI are possible. 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 the component verification of the stick feeder.

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. Operation on two tables is made possible by one scanner. Please make purchase in accordance with your line configurations. 
	Scanner holder	This is a unit which holds scanner onto the machine.

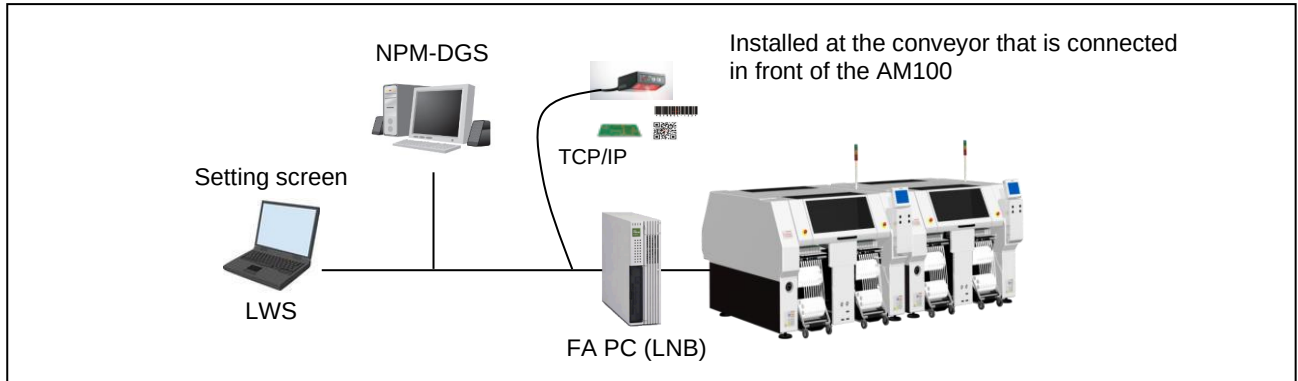
5.2 Automatic Changeover

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 three types, "External scanner read type", "Head read type", and "Planned form read type."

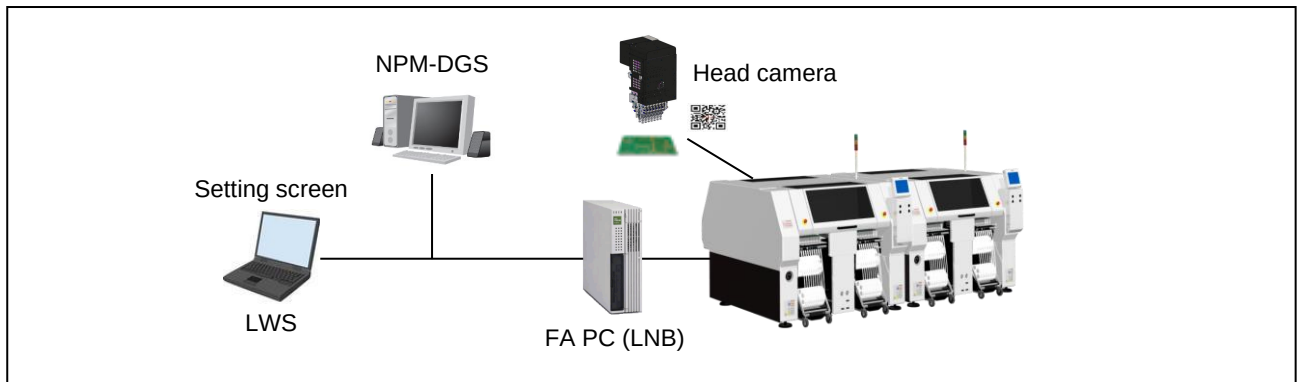
* FA PC is needed when you select this option. (AM-LNB cannot be used.)

■ System Configuration

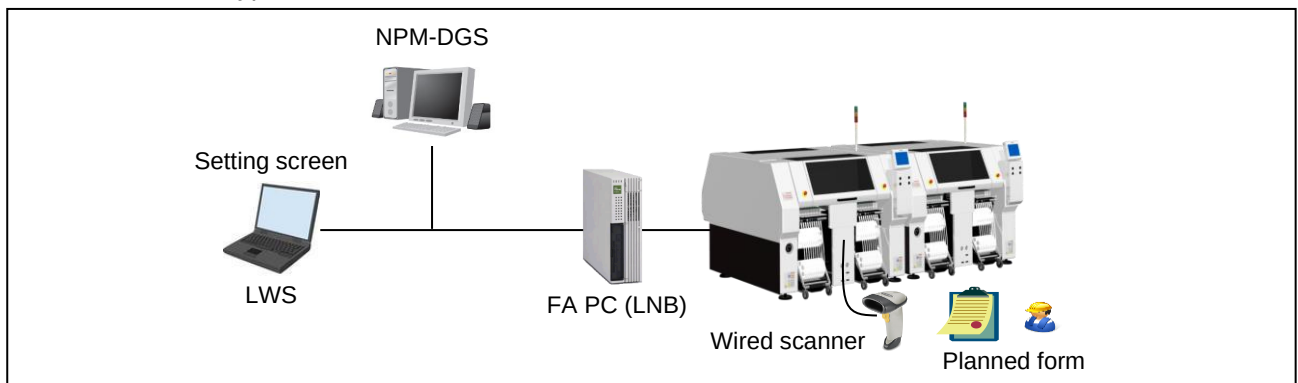
External scanner read type



Head read type



Planned form 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 AM100, making it possible to implement automatic changeover.
	Planned form read type	You print out lot list of production per day as planned form on paper using 1D/ 2D code* ² . Then you let the wired scanner read the planned form, 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 splitable board, there's no need for the commonality.)

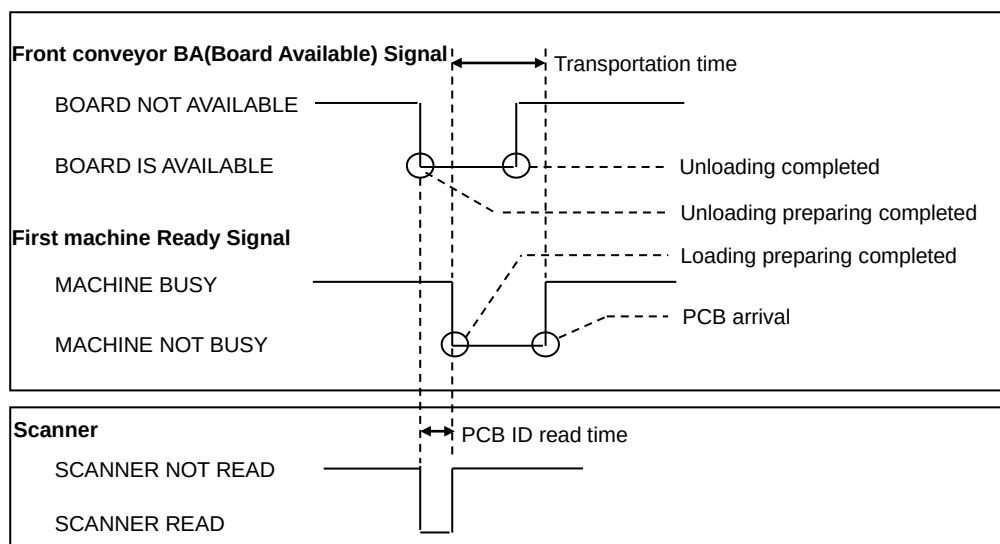
■ Standard Specifications

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
	Planned form read type  <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 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.

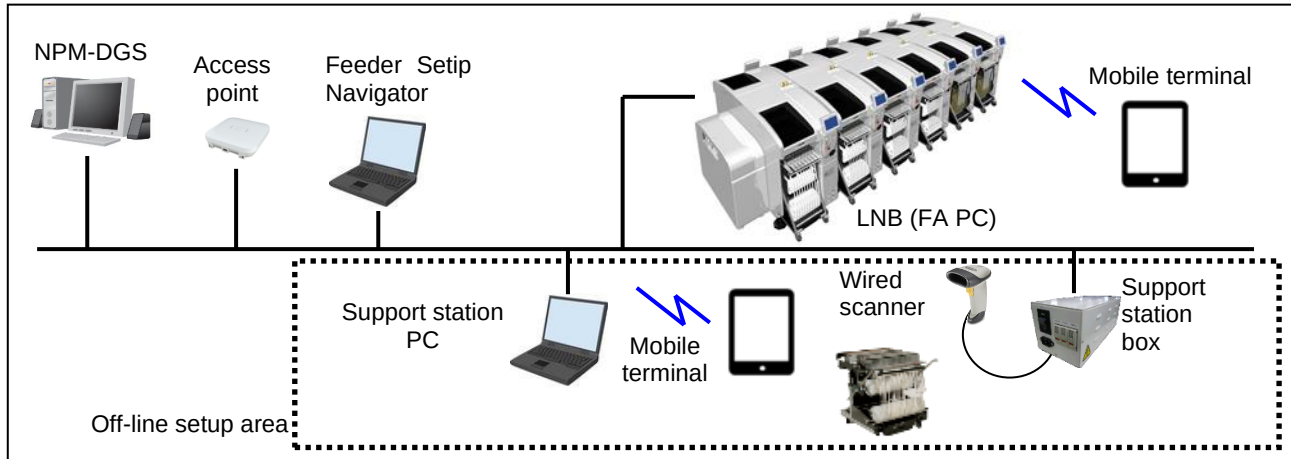


5.3 Feeder Setup Navigator

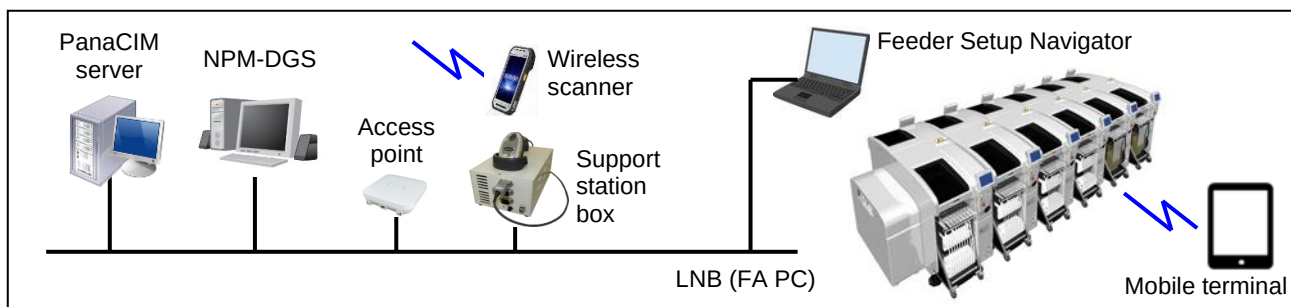
It is a support tool to navigate efficient setup procedure. The tool factors in the amount of time it takes to perform and complete setup operations when estimating the time required for production and providing the operator with setup instructions. This will visualize and streamline setup operations 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: 1 024 × 768 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、 or、 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

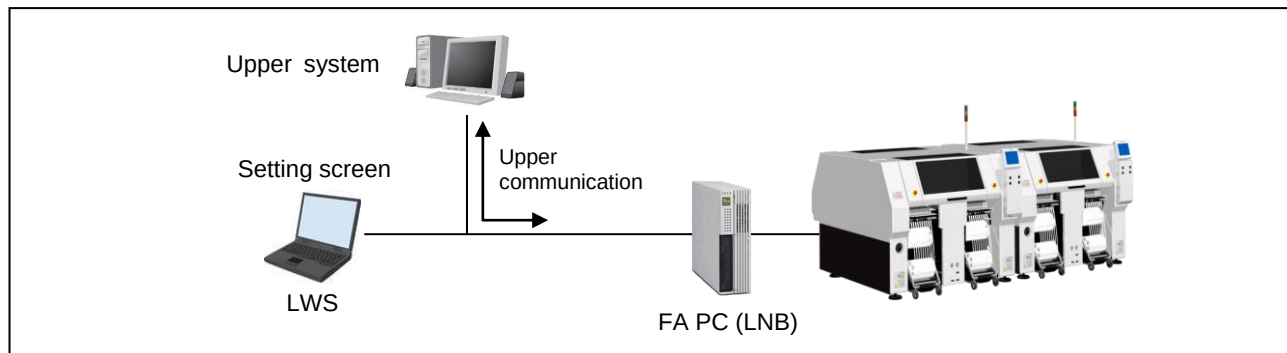
Item	Description
Target feeder	Intelligent tape feeder, thin type single tape feeder, tray feeder *Only can display the setup instructions on tray feeder. Cannot check the status of the feeders in real time.
Target area	In-line setups (Setups or preparations inside the machine) Off-line setups (Feeder 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.

* FA PC is needed when you select this option. (AM-LNB cannot 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 overhead 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 FA PC (LNB).	
Display language	English, Chinese, Japanese (Applicable for display screen of setting terminal on LWS)	

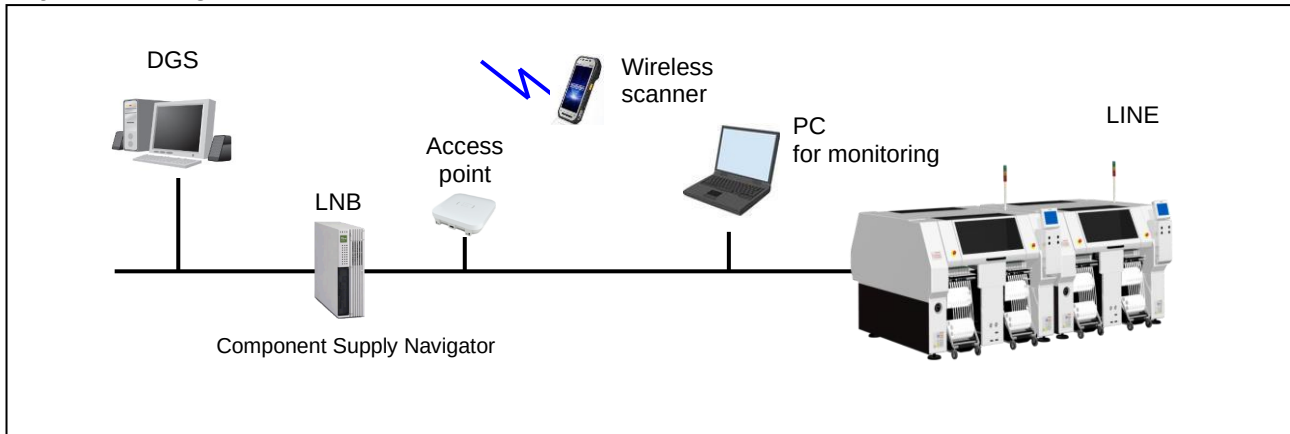
Standard Configuration

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.

■ System Configuration



■ Function List

Item	Description	
Component Supply Navigator	Supply sequence optimizes	Optimizes the supply sequence to provide a shortest route without component shortage in a certain period of time. The following supply units are available. • Intelligent Tape Feeder • Auto Load Feeder • Direct tray
	Supply route instructions	The optimized supply sequence will be displayed as a best supply route on wireless scanner or the monitoring PC for each operator.

■ Standard Configuration

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

■ Restrictions

It is not available for the Intelligent Stick Feeder which without component remaining management function.

- Intelligent Stick Feeder
- Manual Setting Tray
- Bypass Tray on the Mounter (2 trays)

■ Remarks

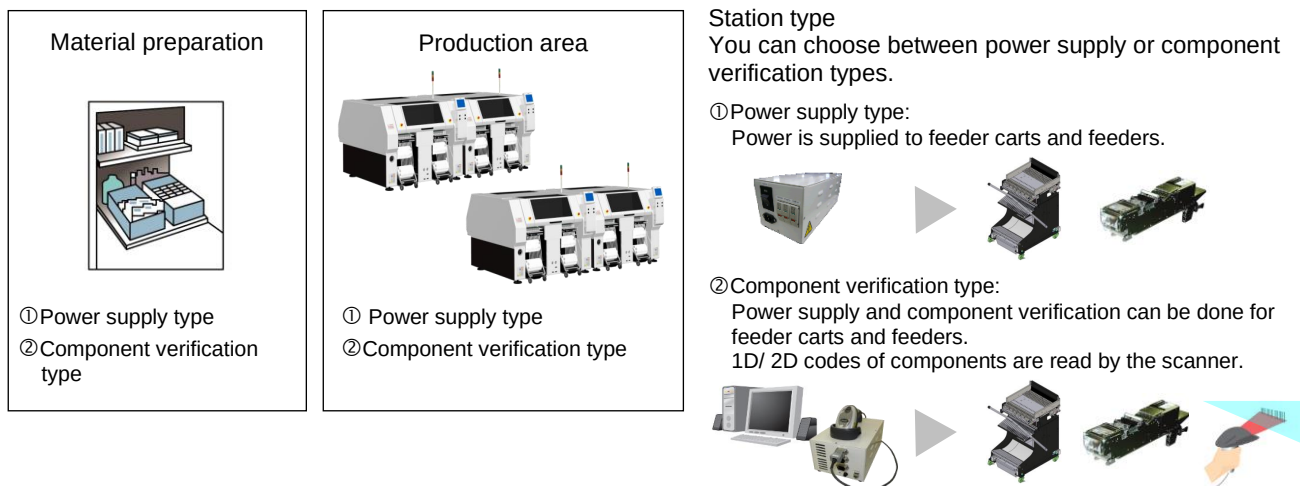
- ① We recommend using the Component verification (License)-Wireless scanner (PDA) type together.
- ② This option is used for one line. If you want to use the navigator in multiple lines, please buy the component supply navigator of PanaCIM-EE.

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. (Common to NPM series)

* 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 AM100, “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

* FA PC is needed when you select this option. (AM-LNB cannot be used.)

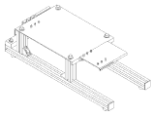
Item	Description
Support station box* ¹ * ² 	This supplies power to feeder carts and feeders and additionally verifies components. The following items are included in this unit. • Power supply unit Rated voltage : Single-phase, AC 100 V ~ 240 V Frequency : 50/ 60 Hz Rated capacity: 90 VA • Power supply 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 power 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 AM100, "Change Cart Preparation Unit" in CM series is not available.

*3 Software for the support station PC is included in AM100 system software DVD-ROM.

Item	Description
Feeder setting Jig 	This is a jig dedicated for the purpose of setting tape feeders. Setting of one tape feeder of 8 mm to 104 mm is possible. (Two 8 mm or 12/ 16mm tape feeders or four thin type tape feeders* can also be set at a time.) * "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

Variations of PCB size and solder printing position might cause misalignment between positions of printed solder and placed component by mounting machine. For miniaturization of component size and high density packaging, this may become a factor for defective placement or degradation of placement accuracy.

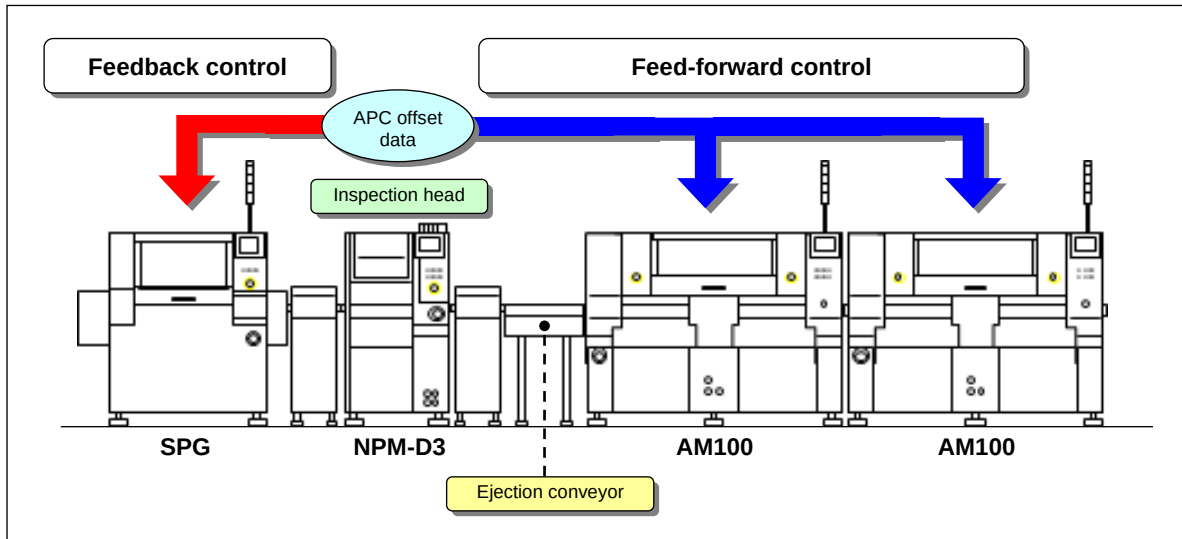
APC system helps reduce mounting defects arising from the shift in solder printing position as described above.

* APC: Advanced Process Control

* FA PC is needed when you select this option. (AM-LNB cannot be used.)

■ Example of system configuration

AM100 is APC system-ready when connected to NPM series.



* The above system configuration is one example.

* The license of APC system is required per equipment that receives APC offset data.

* APC system-ready equipment:

NPM series, NPM-X series, AM/ VM series, SP series (Compatible even at a mixed line)

If line is made up with other equipment than the above, please contact us.

■ Effects

Mounting quality improvement*

- 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.)
- Improved bonding reliability of BGA solder joints, CSPs or the like will decrease the occurrence of voids.
- The impact during component placement can be reduced so that cracking or chipping tendency of components will be decreased.

Cost reduction*

- Skipping the placement of components to NG coordinates or patterns will cut the cost associated with the loss of components. (2D inspection head standard feature)
- Land inspections before placement will cut the costs involved in prior PCB inspections or the process for marking NG patterns. (2D inspection head standard feature)

Enhanced productivity*

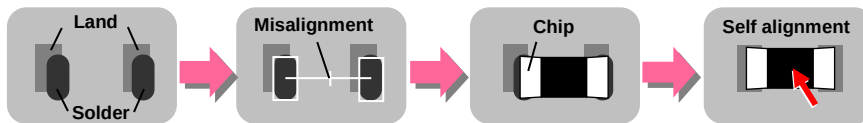
- For a PCB having a number of patterns, the PCB recognition time will be extended in proportion to the number of patterns.
Owing to the use of APC system, high precision placement of components can be achieved only by using the standard PCB recognition (AB-point recognition), thereby leading to enhanced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

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

■ Feed-forward control

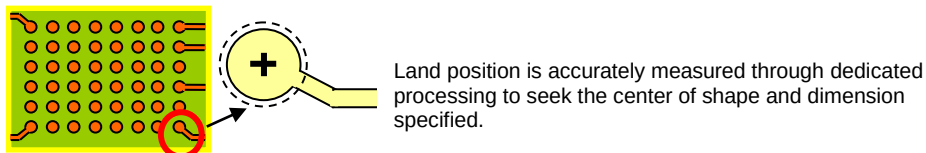
Placement position correction (Target machine: NPM series, NPM-X series, AM/ VM series))

- 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.



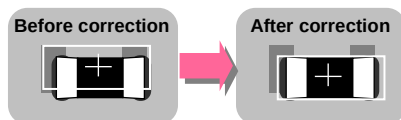
Also direct recognition of land positions where components are placed upon can support deformed PCB enabling components to be placed with high accuracy.

It is effective for flip chip which is placed with flux or solder transfer.



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

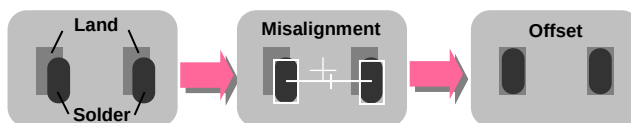
- Inspects components in the right position based on the component placement position after offset.



■ Feedback control

Print position correction (Target machine: SP series)

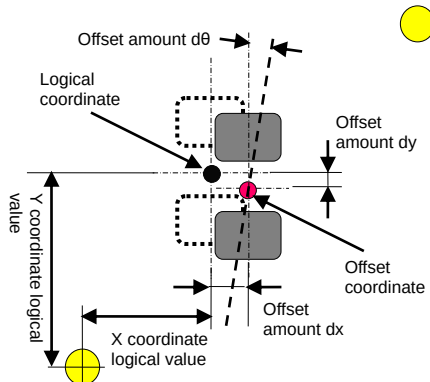
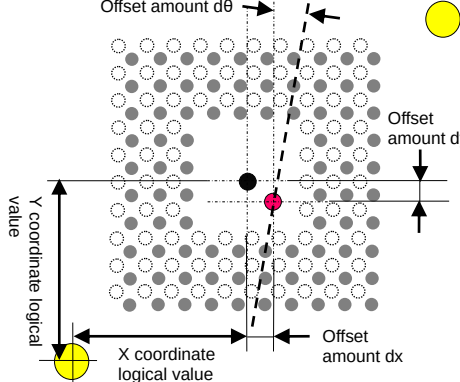
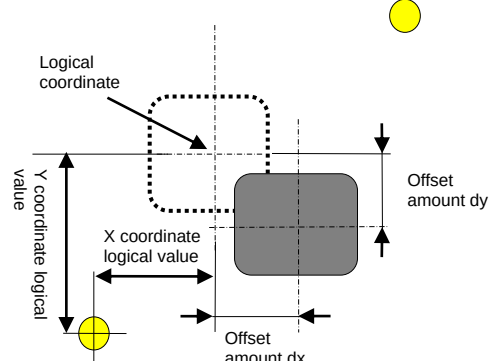
- It analyzes measurement data of solder inspection and offset printing positions (X, Y, θ).



Mask cleaning (Target machine: SP series)

- According to the solder inspection result (blur, oozing, bridging, etc.), mask cleaning is performed.

Basic specification

Items		Description	
Communication method		Ethernet communication	
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
			
Feedback control	All solder pastes included Makes a correction to optimize the solder paste printing position that yields the least misalignment amount of solder (dx,dy). 		
Offset target		2D inspection head A (18 μm)	2D inspection head B (9 μm)
	Solder paste	<u>Chip components:</u> 0.1 × 0.15 mm or more (0603 [0201"] or more) <u>Package components:</u> φ0.15 mm or more	<u>Chip components:</u> 0.08 × 0.12 mm or more (0402 [01005"] or more) <u>Package components:</u> φ0.12 mm or more
	Components	Chips (0603 [0201"] or more), SOP, QFP (Larger than 0.4 mm pitch), BGA, CSP, aluminum electrolytic capacitors, trimmer potentiometers, trimmers, coils, connectors, network resistor, transistors, diodes, inductors, tantalum capacitors, cylindrical chip	Chips (0402 [01005"] or more), SOP, QFP (Larger than 0.3 mm pitch), BGA, CSP, aluminum electrolytic capacitors, trimmer potentiometers, trimmers, coils, connectors, network resistor, transistors, diodes, inductors, tantalum capacitors, cylindrical chip
Number of offset component		Max. 10 000 points/machine (number of measuring solder: Max. 30 000 points/machine)	

5.8 Interface software of the inspection machine from other companies

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

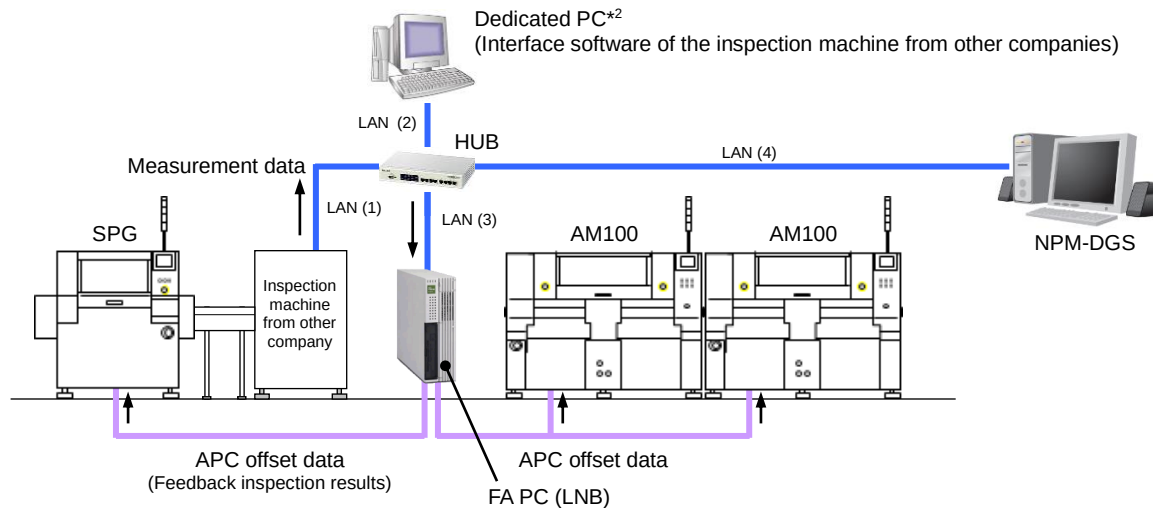
This option (License) is required per equipment that receives APC offset data.

(In case of below, 3 licenses are required.)

Select this option, together with “APC system-ready (License)” for the same number.

(For SP series, “Inspection result feedback support (License)” is required)

* FA PC is needed when you select this option. (AM-LNB cannot be used.)



*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. (AM100 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 AM100. 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 Changover” section. For details, please contact us.
- When AM100s are connected to a machine, such as other company's inspection machine or conveyor, APC communication will fail to work properly.
- 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	24x speed or faster of CD drive (CD-RW available) 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® 10 Pro (32-bit/ 64-bit version) Microsoft® Windows® 8.1 Pro (32-bit/ 64-bit version) Microsoft® Windows® 7 Professional (32-bit/ 64-bit version) SP1 or later	Indispensable
	Support language	English, Chinese, Japanese	
	Framework	Microsoft® .Net Framework 3.5	
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.

5.9 PCB information communication function (standard feature)

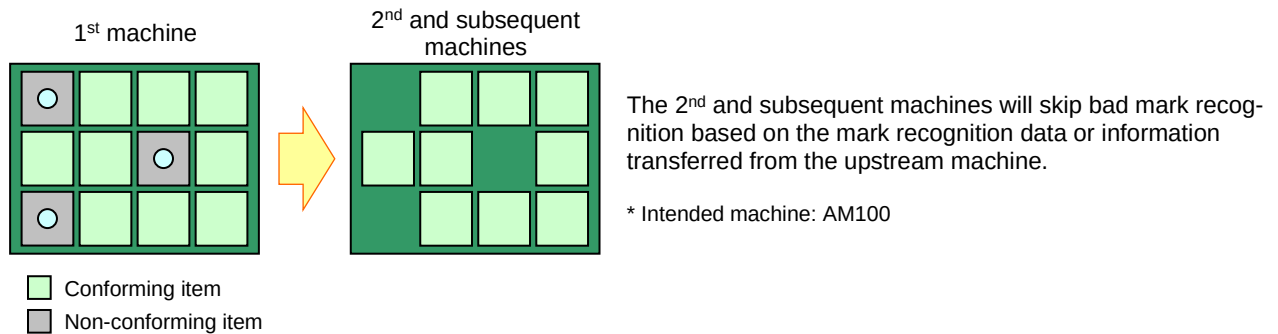
The first machine in the line performs mark recognition and then passes mark recognition data or information on to the downstream machines.

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.

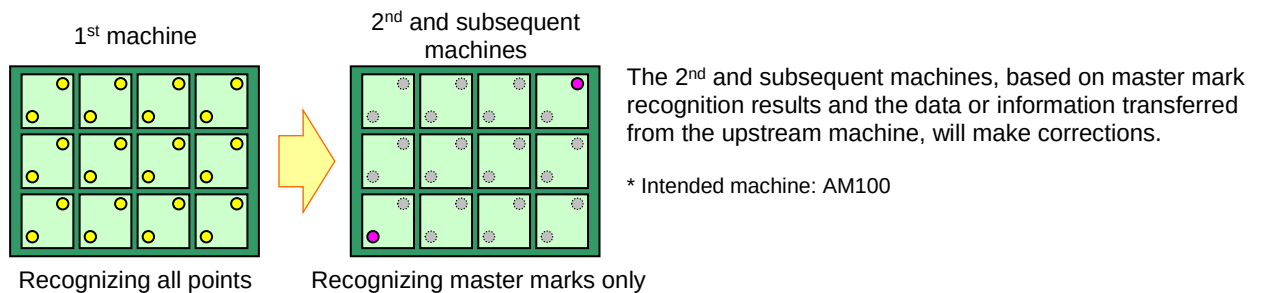


■ Pattern mark communication

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.

* FA PC is needed when you execute Pattern mark communication. (AM-LNB cannot be used.)



* 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.

5.10 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 Automatic pitch switching

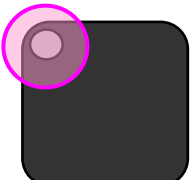
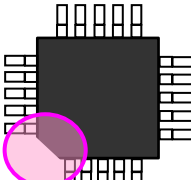
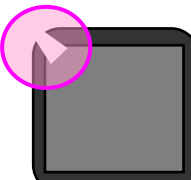
When there are same components whose tape pitch is 1mm and 2mm, and tape pitch at component supply is mixed, at the timing of tape switching(for example, at component supply, at splicing or when you cancel an error), it automatically calculates tape pitch in the process of automatic pickup position teaching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

Automatic pitch switching conditions

Items	Description
Component data	With pickup position automatic teaching
Tape width	8 mm
Applicable tape	Paper
Supply pitch	1 mm or 2 mm (It does not work with 4 mm or over)

5.11 Component inspection before pickup (Polarity)

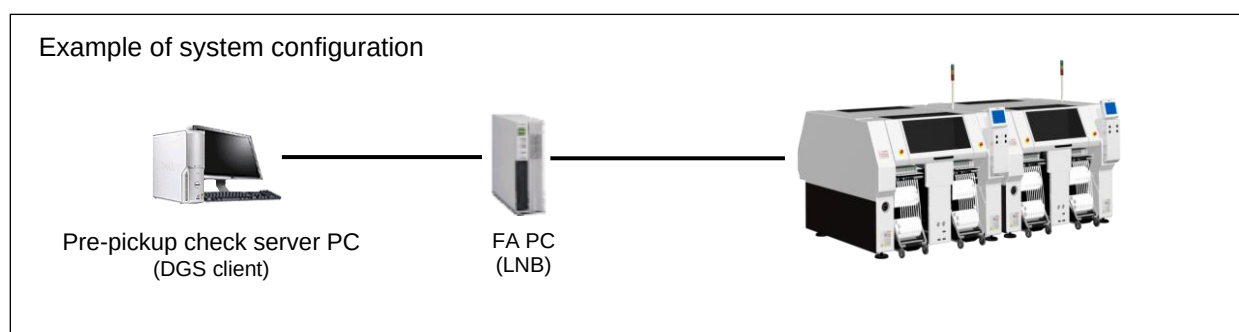
This function recognizes the surface of a component captured by the head camera before picking it up from the tray or tape feeder, in order to prevent possible misloading through the polarity checks.

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 PSFS. 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.

5.12 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.

■ 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
- 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.

6. Other Standard Functions

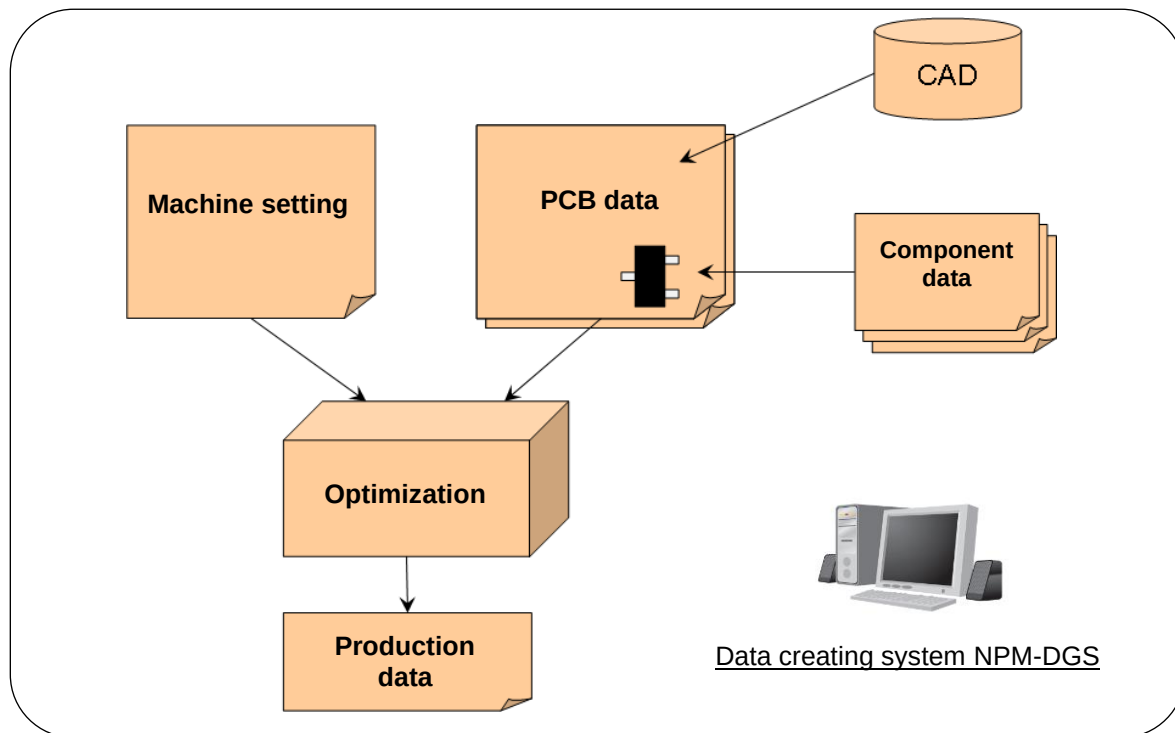
6.1 Programming Functions

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 (or AM-LNB). 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.)

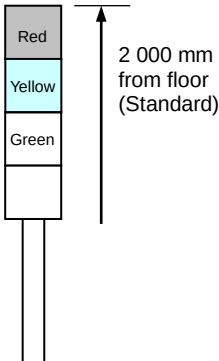
Regarding the license in NPM-DGS and in the option of NPM-DGS, a license is required for each machine, so you need to purchase license as many as the number of the machine you have.

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



6.2 Signal Tower

Color of signal tower and lighting standard

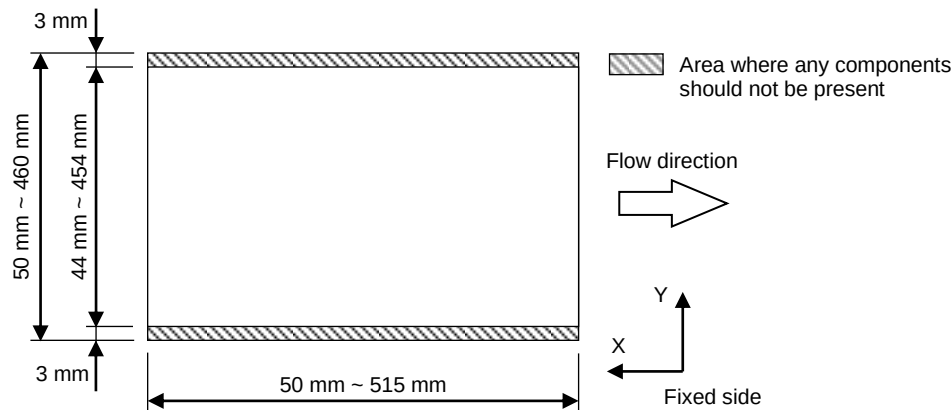
	Signal Color	Classification	Lighting Standard
	Red	Emergency stop error	▪ Trouble in shafts of motors, etc. ▪ Drop in air pressure ▪ Trouble in PCB supports ▪ Head trouble ▪ Tape trouble ,and etc.
	Yellow	Single stop error	▪ Pickup error ▪ Placement error ▪ PCB transfer error ▪ Component run out ▪ Nozzle change error ,and etc.
	Green	In operation	Power ON (e.g., in automatic operation) (This, however, is off while red or yellow is blinking.)

* Lighting specifications are programmable.

7. PCB Design Standard

7.1 PCB Specifications

Standard Specification



Item	Specifications
PCB Dimensions	50 × 50 mm ~ 515 × 460 mm
Placement area	50 × 44 mm ~ 515 × 454 mm
PCB thickness	0.3 mm ~ 8.0 mm
PCB mass	3.0 kg or less* ¹
Permissible PCB warpage	Max. 0.5 mm PCB section Max. 0.5 mm
Conditions of PCB before placement	3 mm 3 mm 28 mm 28 mm φ3 Area where any components should not be present Support pin*² (Please leave 2 mm or more between this and back side components.)

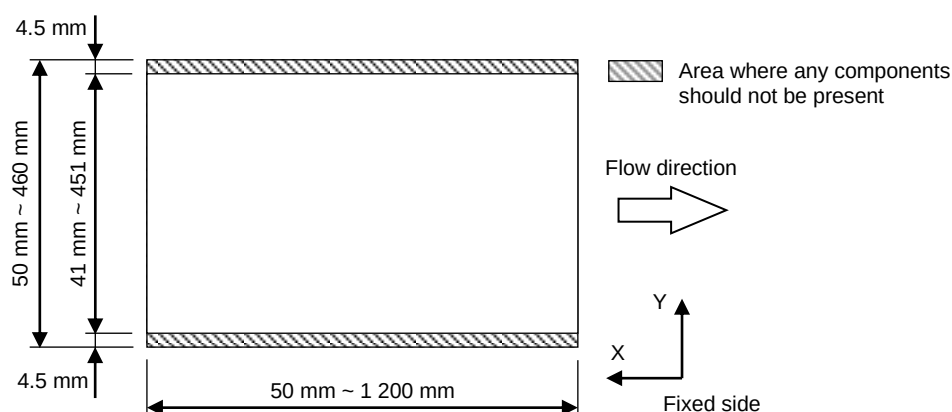
*¹ When mass of PCB (including carrier mass) exceeds 3.0 kg, please consult us separately.

*² 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.

* It may not transfer properly when PCB is transparent, semi-transparent or Frosting; if applicable, please provide information beforehand.

Long PCB (1 500 mm) Specification



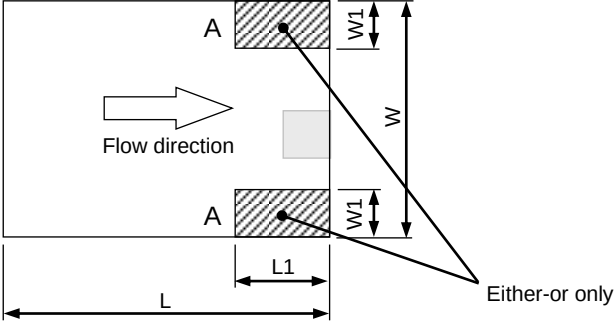
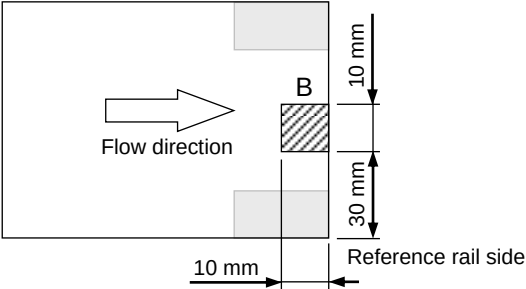
Item	Specifications
PCB Dimensions	50 × 50 mm ~ 1 500 × 460 mm
Placement area	50 × 41 mm ~ 1 500 × 451 mm
PCB thickness	0.3 mm ~ 8.0 mm
PCB mass	3.0 kg or less ^{*1}
Permissible PCB warpage	Max. 0.5 mm PCB section Max. 0.5 mm
PCB before placement (Long PCB (1 500 mm) Specification)	4.5 mm 4.5 mm 28.5 mm 28 mm 28 mm 10.5 mm φ 3 4.5 mm 4.5 mm 1 500 mm PCB Holder^{*2} Support pin Area where any components should not be present Please leave 2 mm or more between this and back side components.

^{*1} When mass of PCB (including carrier mass) exceeds 3.0 kg, please consult us separately.

^{*2} You cannot choose Support Pin Automatic Replacement Unit.

* For ceramic PCBs, please consult us.

* It may not transfer properly when PCB is transparent, semi-transparent or Frosting; if applicable, please provide information beforehand.

Item	Specifications								
PCB notch condition	PCB notch dimensions should meet the following two conditions.								
Condition A	PCB notch dimensions should meet the following conditions.  <table><tr><td>L</td><td>L1</td></tr><tr><td>$50\text{ mm} \leq L \leq 1\,500\text{ mm}$</td><td>Whichever is smaller, $L/4$ or 100 mm.</td></tr></table> <table><tr><td>W</td><td>W1</td></tr><tr><td>$50\text{ mm} \leq W \leq 460\text{ mm}$</td><td>Whichever is smaller, $W/3$ or 30 mm.</td></tr></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	$50\text{ mm} \leq L \leq 1\,500\text{ mm}$	Whichever is smaller, $L/4$ or 100 mm.	W	W1	$50\text{ mm} \leq W \leq 460\text{ mm}$	Whichever is smaller, $W/3$ or 30 mm.
L	L1								
$50\text{ mm} \leq L \leq 1\,500\text{ mm}$	Whichever is smaller, $L/4$ or 100 mm.								
W	W1								
$50\text{ mm} \leq W \leq 460\text{ mm}$	Whichever is smaller, $W/3$ or 30 mm.								
Condition B	There should be no cutout (including slit) in  of the drawing below.  * If there is a cutout (including slit) in the above area, please consult us.								
Condition for component protruding from the edge face of PCB	Please consult us.								

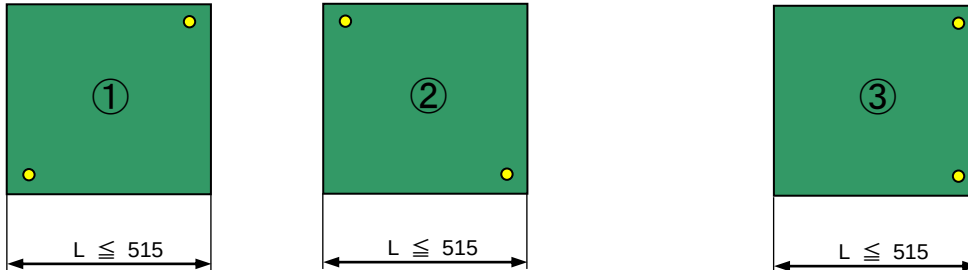
7.2 Recognition Mark

PCB needs two PCB recognition marks at its opposite corners.

■ Standard Specification

Here are examples showing PCB recognition mark positions (Yellow dots) when transfer direction PCB length is : $50 \text{ mm} \leq L \leq 515 \text{ mm}$.

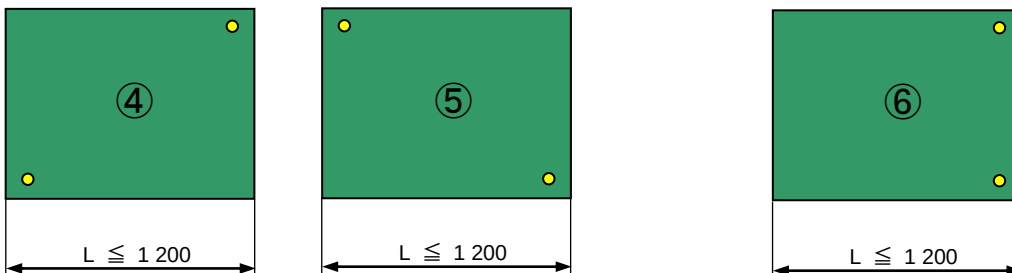
(We recommend Figure① or Figure②)



■ Long PCB (1 500 mm) Specification

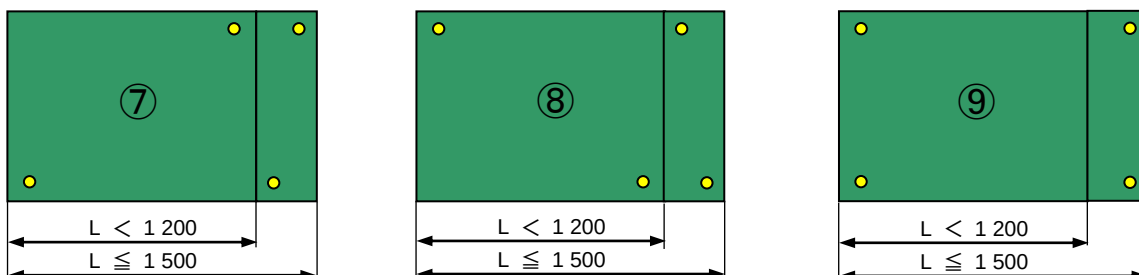
Here are examples showing PCB recognition mark positions (Yellow dots) when transfer direction PCB length is : $50 \text{ mm} \leq L \leq 1\,200 \text{ mm}$.

(We recommend Figure④ or Figure⑤)

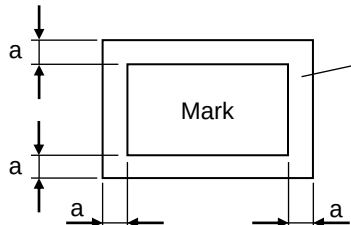


Here are examples showing PCB recognition mark positions (Yellow dots) when transfer direction PCB length is : $1\,200 \text{ mm} < L \leq 1\,500 \text{ mm}$.

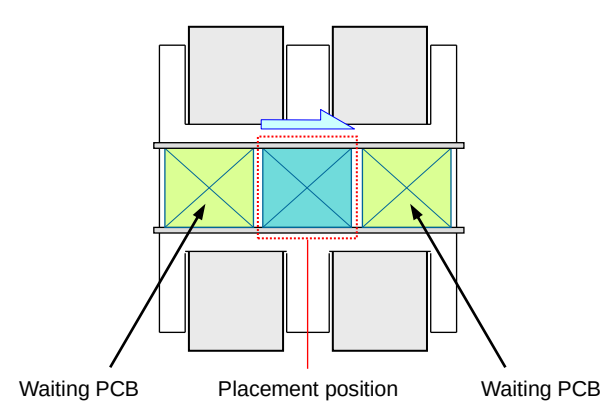
(We recommend Figure⑦ or Figure⑧)



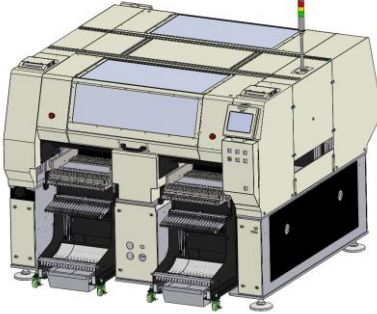
PCB Recognition Mark Specifications

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 (Line width: 0.3 mm or more)
	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.	

7.3 PCB waiting condition

PCB length: L	Description
50 mm ≤ L ≤ 515 mm (Standard Specification)	 Waiting PCB Placement position Waiting PCB A piece of PCB can wait in both the upstream and downstream (total of two pieces).
50 mm ≤ L ≤ 1 500 mm (Long PCB (1 500 mm) Specification)	It does not recognize PCB standby.

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
	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.

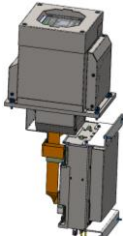
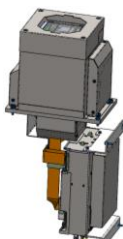
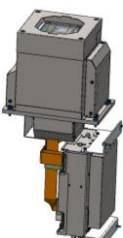
No.	Purpose / Feature	Option name	Category
A	1 To select required options.	• HUB	On-site -
		• Fixed feeder base specification • Feeder cart specification • Tray feeder specification	Factory Table
	2 To couple 4 or more AM100s together. To utilize system software.	• FA PC	On-site -
	3 To set the PCB transfer height at 930 mm/ 950 mm above the floor.	• Support for 930 mm transfer line • Support for 950 mm transfer line	Factory -
4	To select a component recognition unit suitable for the intended use	• Multi-recognition camera V2: Type 1/ 2/ 3 • Side lighting	On-site Table

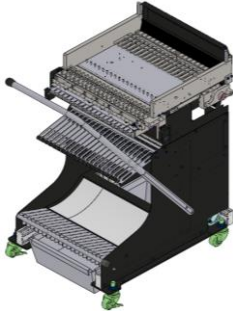
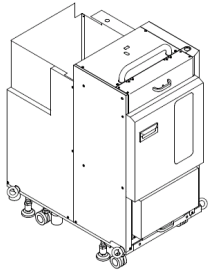
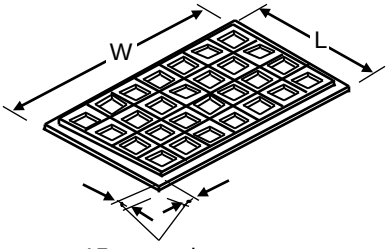
No.	Purpose / Feature	Option name	Category	
B	1 To select options on the component supply unit.	• Fixed feeder base	Factory	Table
		• Feeder cart	Customer	Table
		• Tray feeder	On-site	-
		• Additional tray magazine • Additional tray pallet • Additional components-ejection tray • Pallet for vacuum-molded-tray	Customer	-
	2 To select the nozzle in accordance with the production pattern.	• Nozzle • Storage nozzle case	Customer	-
	3 To select the tape feeder in accordance with the production pattern.	• Intelligent tape feeder	Customer	-
	4 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	-
	5 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	-
	6 To use the 32 mm adhesive tape.	• 32 mm adhesive tape feeder	Customer	-
		• Air supply unit for the feeder	On-site	Table
	7 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	-
	8 To manage and store tape feeders.	• Tape feeder stand	Customer	-
	9 To improve the workability of tape splicing.	• Splicing cart • Component Supply Navigator (License)	Customer	-
	10 To change support pins at once. (To prepare for the replacement of a support pin.)	• PCB support block • Support pins • Support pin setting jig	Customer	-
	11 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	-
12	To select options on the fixed feeder base.	• Reel box	Customer	Table
		• Cutting unit & Reel holder	Factory	Whole machine
		• Manually setting tray & Manually setting tray support unit	Factory	Table
		• Spare manually setting tray	Customer	Table
		• Bypass tray on the mounter(2 trays)	Factory	Table
		Long PCB (1 500 mm) Specification	Factory	Whole machine
13	To use a 1 500 mm conveyor			
14	To mount thin embossed tape components (Feeding holes become deformed when tape thickness is equivalent to 0.2 mm or thinner)	• 8 mm double feeder (Thin embossed tape ready)	Customer	-

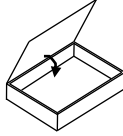
No.	Purpose / Feature	Option name	Category	
C	1	• Nozzle changer & Nozzle changer driving unit	Factory	-
		• Spare nozzle changer	Customer	-
	2	• Multi-recognition camera V2: Type 1/ 2/ 3 • Side lighting	On-site	-
	3	• Height sensor	On-site	-
		• Height sensor teaching jig	Customer	-
		• Height sensor teaching jig (For Long PCB only)	Customer	
	4	• 0402 (01005") chips.	On-site	-
	5	• To operate the machine at its rear side.	Factory	-
	6	• NG-components ejection conveyor	Customer	Table
	7	• Support station	On-site	-
		• Feeder setting jig	Customer	-
		• Attachment for thin type tape feeder • Power connector for thin type tape feeder		
	8	• PanaCIM-EE ready (License)	On-site	-
	9	• iLNB ready (License)	On-site	
	10	• To implement changeover efficiently.	On-site	-
	11	• Component verification (License)	On-site	-
		• Wired scanner	On-site	Table
		• Scanner holder	On-site	Whole machine
	12	• To streamline setup operations during a changeover.	On-site	-
	13	• To use existing system effectively.	Customer	-
	14	• To make use of the location-independent tape feeder function.	On-site	-
	15	• To improve placement quality by controlling process through process measurement data of inspection head (solder inspection).	Customer	-
	16	• Interface software of the inspection machine from other companies (License)	On-site	-
		• APC system ready (License)	Customer	-
	17	• Multi-functional transfer unit • Coating thickness gauge	Customer	-
		• Air supply unit for the feeder	On-site	Table
	18	• To connect the factory-side plumbing to equipment to enable primary air connecting	Customer	-
	19	• To use large reels	Customer	-
	20	• To perform polarity test of tray components and tape feeder components right before pickup	Customer	-
	21	• Automatic recovery when pickup error or recognition error occurs and to continue production	Customer	
	22	• To use small volume components packaged in the cut tapes and do mounting for production trial and small lot production	Customer	-

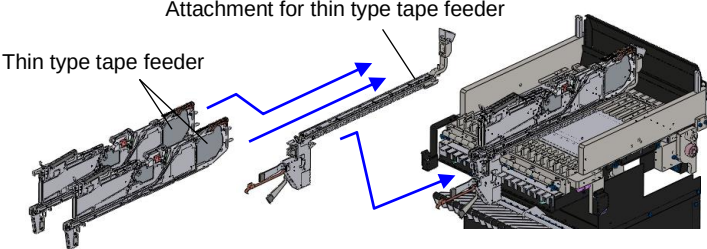
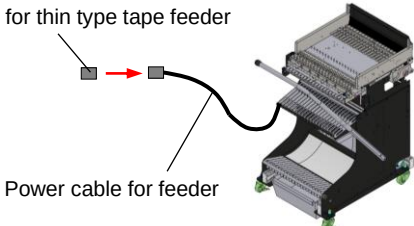
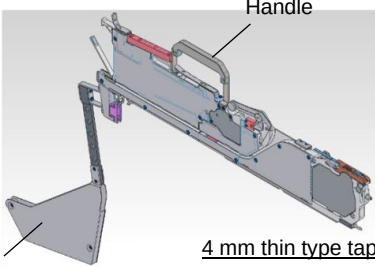
No.	Purpose / Feature	Option name	Category	
D	1 To keep the machine condition in regular maintenance.	• Lubrication set • Maintenance jig	Customer	-
	2 To calibrate as needed.	• Jig kit for accuracy verification & adjusting the main body • Standard calibration jig kit • Plane calibration jig	Customer	-
	3 To splice the parts tape automatically	• Automatic tape splicing unit • Splicing tape • Battery box (Including connection cable) • Charge Terminal • Rubbish box • Tape cutting jig	Customer	
		• Battery • Battery Charger	Customer	
	4 To maintain the tape feeder automatically	• Feeder maintenance unit • Master jig • Attachment for thin type single feeder • Thin type single feeder master jig • Auto load feeder jig tapes	Customer	-

A-1	Selection of required options
On-site	
HUB	
	For more information, please refer to "4.4 Line configuration."
Factory	Table Fixed feeder base specification (Front side/ Rear side) Feeder cart specification (Front side/ Rear side) Tray feeder specification (Only right rear position)
	- Fixed feeder base spec cannot coincide with feeder cart spec. - For more information, please refer to "4 Machine Configuration."
A-2	To couple 4 or more AM100s together. To utilize system software.
On-site	
FA PC	
	- It is needed when 4 or more AM100s are coupled. (a type/line) - It is required to use any of the options below. Automatic changeover, Component verification, Feeder Setup Navigator, Upper communication, Support station box (Component verification type), Pattern mark communication, and PanaCIM-EE ready (For material verification of PanaCIM Express, AM-LNB can be used) - For more information, please refer to "4.4 Line configuration."
A-3	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.

A-4	To select a component recognition unit suitable for the intended use.
On-site Table	Multi-recognition camera V2: 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 V2: 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 V2: 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 V2 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 V2 Type3 comes with side lighting.

B-1		To select options on the component supply unit.	
Factory		Table	
Fixed feeder base (20-slot)			
Customer		Table	
Feeder cart (20-slot))			
• Fixed feeder bases cannot be mixed with feeder carts. • 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.			
On-site			
Tray feeder			 Standard accessory • Tray magazine: 2 pcs. • Tray pallet: 21 pcs. • Components-ejection tray: 1 pc.
• The tray feeder is shared and used for NPM series. (Attachment brackets are exclusive use for each machine) • You should also select "Rear operation panel" when selecting Tray feeder. * When connecting the tray feeder for the existing NPM-D (or NPM), modification of tray feeder wiring may be required. Please ask us for details. (Custom specification)			
Customer			
Additional tray magazine (15 mm pitch × 10 slots) Additional tray pallet Additional components-ejection tray			
• Please select it when it is necessary in the addition.			
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 × W = Max. 230 × 318 mm			 15 mm or less (Magnet fixed type: 10 mm or less)

B-2	To select the nozzle in accordance with the production pattern.
Customer	
Nozzle	
	• Please refer to "4.2 Nozzle Configuration" for details. • AM100-specific. (The NPM/CM series-specific nozzles cannot be used.) • For information about the special nozzles, please contact us.
Customer	
Storage nozzle case for small nozzles Storage nozzle case for small/ large nozzles	
	• This case, which is made of plastic, is manageable because it can be checked for its contents from outside. • The one for small nozzles can accommodate 50 nozzles. (Less than nozzle diameter $\phi 5$ mm) • The one for small/ large nozzles can accommodate 21 nozzles. (Nozzle diameter $\phi 5$ mm or more) • The nozzle case is compatible with NPM series, CM602, CM402/ DT401 series, CM232, CM212, and CM101.
B-3	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 NPM series, CM602, CM402/ DT401 series, CM232, CM212, and CM101.

B-4	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 Thin type tape feeder 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 Power cable for 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 fixed feeder base or feeder cart. 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 Reel holder for 4 mm thin type tape feeder Handle Reel holder 4 mm thin type tape feeder 
	• <u>Handle for 4 mm thin type tape feeder</u> This handle is attached to tape feeder. To improve the usability of setting and carrying. • <u>Reel holder for 4 mm thin type tape feeder</u> This reel holder is integrated in tape feeder. One reel can be set in.

B-5

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

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

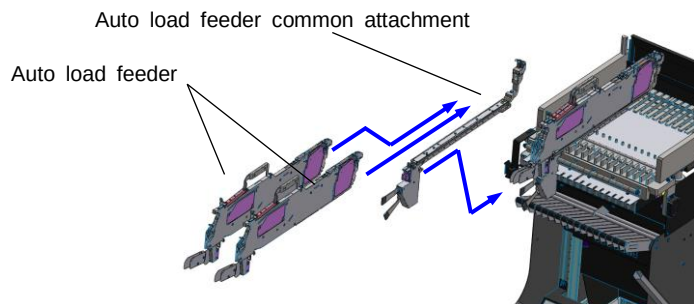
- This is a thin type feeder materialized automatic component tape setup.
The off-line setup time can be drastically reduced by the simple work of inserting a tape, then pressing the “ Send ” button. (Approx. 30s/reel ⇒ Approx. 15s/reel)
- This auto load feeder can also use a short cut tape (longer than 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	

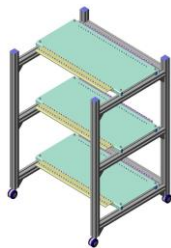
- Please refer to “4.3 Feeder Carriage Configuration” for details.
- Not available for CM602, CM402/ DT401 Series, CM232, CM212, CM101.

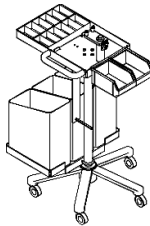
* If you want use IFCU to check auto load feeder, please contact us for details.

* 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-6	To use the 32 mm adhesive tape.
Customer	32 mm adhesive tape feeder - When 32 mm adhesive tape feeder is used, [Air supply unit for the feeder] is necessary. - Please refer to "4.3 Feeder Carriage Configuration" for details. - The tape feeder is compatible with NPM series, CM602, CM402/ DT401 series, CM232, CM212, and CM101.
On-site	Table Air supply unit for the feeder: For fixed feeder base Air supply unit for the feeder: For feeder cart This is necessary when 32 mm adhesive tape feeder is used.
B-7	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. - 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. - The intelligent stick feeder is compatible with CM602, CM402/ DT401 series, CM232, CM212, CM101, and NPM 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-8	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-9	To improve the workability of tape splicing.
Customer	Splicing cart 
	• This cart improves the workability of tape splicing. (For Intelligent tape feeder)
Customer	Component Supply Navigator (License) • 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. • It can optimize the supply sequence including tray components. • We recommend using the Component verification (License)-Wireless scanner (PDA) type together. • This option is used for one line. If you want to use the navigator in multiple lines, please buy the component supply navigator of PanaCIM-EE. • Please refer to "5.5 Component Supply Navigator" for details.

B-10	To change support pins at once. (To prepare for the replacement of a support pin.)
Customer	PCB support block • PCB support block (1) and support pins (20) are included. • It can be purchased by the block. The support pin is not included if additionally purchased. Please select "Additional support pin" as needed. • To set up the positions of support pins for new PCB externally, please select "Support pin setting jig" separately. • Exclusive to AM100. * This is not used with support pin automatic change.
Customer	Additional support pins • Please select when needed in addition. (20 pieces are included in 1 set.) • It is compatible with NPM series, NPM-X series, VM series, and NPM(Dual Lane Specification).
Customer	Support pin setting jig • To prepare the support pins externally, please select the "PCB support block" separately. • Exclusive to AM100

* Not designed to work with the Long PCB Specification.

B-11

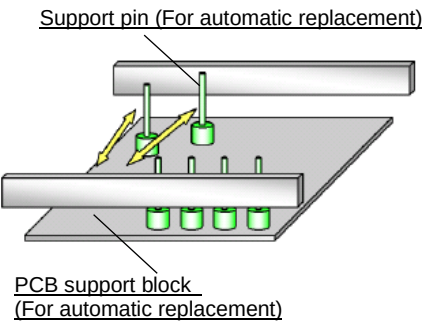
To replace the support pins automatically.

On-site

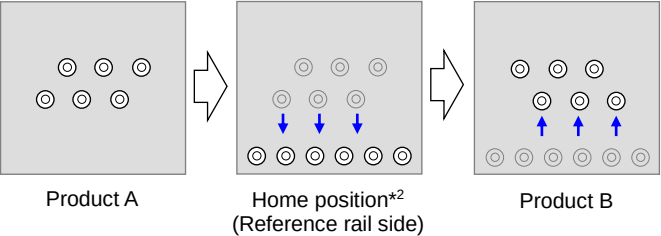
Whole machine

Automatic replacement of support pins

A function to automatically set up the support pin using the placement head.
Up to 30 support pins can be automatically configured per a piece of PCB. (Standard support pins cannot be used.)
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)



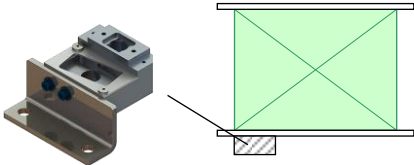
*1 For a PCB of 350 × 300 mm
(It does not include time to change the width of the transfer rail.)
*2 Under some conditions, the pin configuration of product A will be directly switched to the one of product B.

Accessory	Remarks
PCB support block (For automatic replacement)	Exclusive to AM100
Dedicated nozzle changer	

Selection option	Remarks
Nozzle for support pin changeover: 1100M nozzle	Exclusive to AM100, VM102
Support pin (For automatic replacement)	Common to VM, NPM-D3/ D2/ D/ TT/ W2/ W

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

Dedicated nozzle changer



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

Customer

Nozzle for support pin changeover: 1100M nozzle



Customer

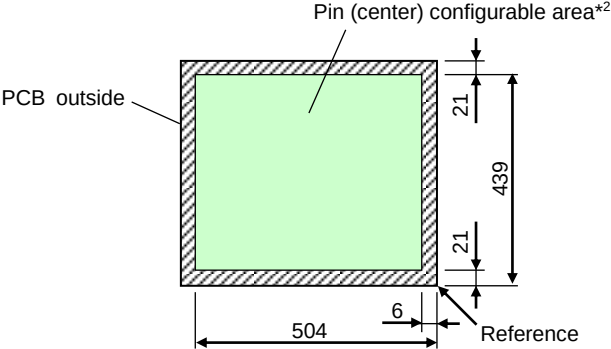
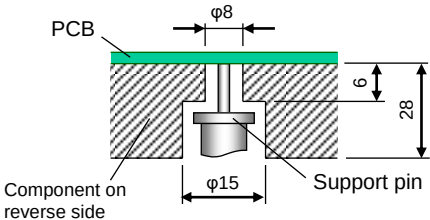
Support pin (For automatic replacement)



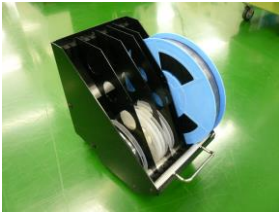
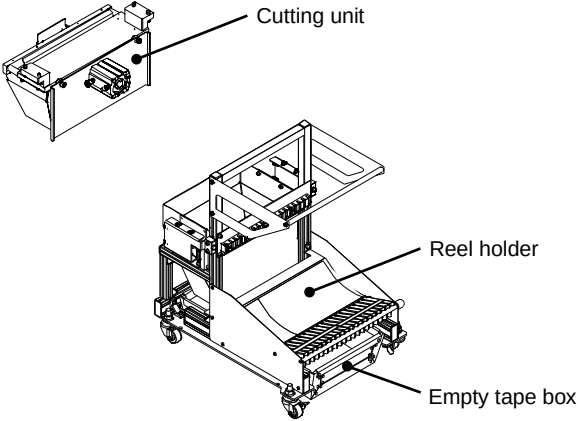
Tip diameter: $\phi 1.5$ mm

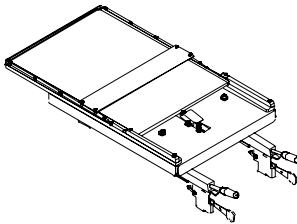
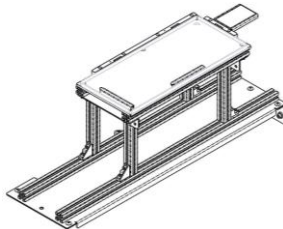
- Up to 30 pieces can be configured per a piece of PCB.

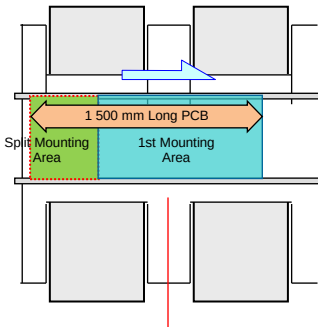
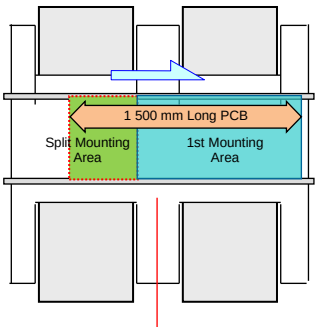
* Not designed to work with the Long PCB Specification.

B-11	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	 *1 If PCB flow is from right to left, the above dimensions are symmetrically situated. *2 Visible outline is not included in the pin (center) configurable area.
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.

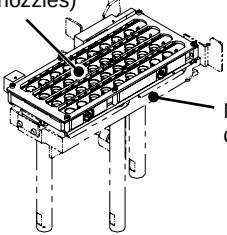
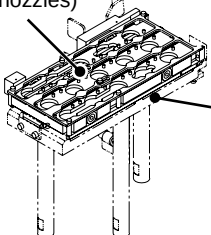
* Not designed to work with the Long PCB Specification.

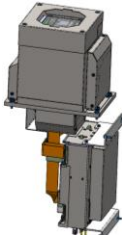
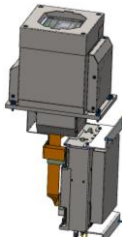
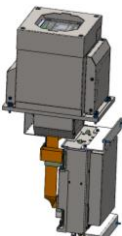
B-12	To select options on the fixed feeder base.
Customer	Table Reel box 
• Two reel boxes are required for one table. • Up to 12 reels can be stored in each reel box (8 mm small reel). • You cannot concurrently select “Cutting unit & Reel holder.”	
Factory	Whole machine Cutting unit & Reel holder 
• The cutting unit is added to the fixed feeder base. • Up to 20 reels can be stored in the reel holder (8 mm small reel). An empty tape box is included. • You cannot concurrently select “Reel box.” * Please consult us separately for “Reel holder that can accommodate 40 reels.” (Custom specification)	

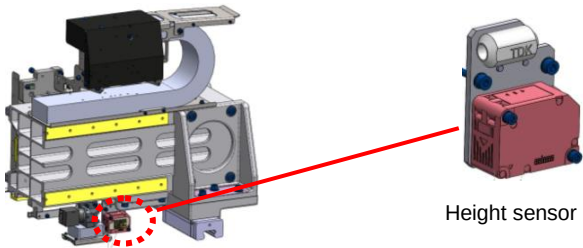
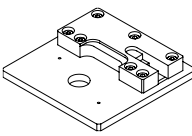
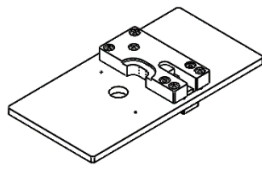
B-12		To select options on the fixed feeder base.
Factory	☐ Table	
Manually setting tray & Manually setting tray support unit		
• A manually setting tray and manually setting tray support unit are provided in a set. • Can be installed only on the rear side fixed feeder base. (One set each on the right and left) • A manually setting tray can accommodate a tray with L 230 × W 335 mm max. Several trays can be set on a manually setting tray if they all are within a size limit of L 230 × W 335 mm (up to 10 types of tray components). • You should also select "Rear operation panel" when selecting this option.		
Customer		
Spare manually setting tray		
• Please select it when it is necessary in the addition.		
Customer	☐ Table	
Bypass tray on the mounter(2 trays)		
• You can combine Feeder Supply Stage. • There are 2 patterns compatible with the Rear Supply Stage: Fixed Feeder and No Supply Unit. • The tray can accommodate a tray with a maximum of L 140 × W 335 mm. Several trays can be set on a tray if they all are within a size limit of L 140 × W 335 mm.(Up to 10 types of components)		

B-13	To use a 1 500 mm conveyor
Factory	Whole machine
Long PCB(1 500 mm) Specification  Front 1st Mounting Area  Front Sliding Mounting Area	
- It is a specification that supports PCB up to 1 500 mm. - In the appropriate PCB length(L) from 50 mm to 1 500 mm, When L is $\leq 1\,200$ mm, it is batch mounting, When L is $1\,200\text{ mm} < L \leq 1\,500$ mm, it is split mounting. - Since 2-Step mounting of sliding mounting and PCB standby are not allowed, you cannot choose Support Pin Automatic Replacement.	

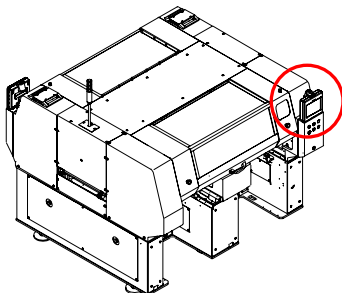
B-14	To mount thin embossed tape components (Feeding holes become deformed when tape thickness is equivalent to 0.2 mm or thinner)
Customer	
8 mm double feeder (Thin embossed tape ready)	
- At embossed tapes that is ultra-thin and weak tape strength, sprockets to feed tapes could deform feeding holes. - With a thin embossed tape feeder, sprocket surface becomes even smoother, 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".	

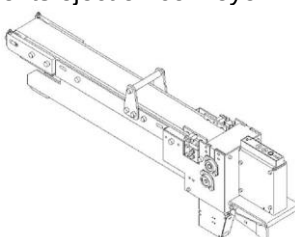
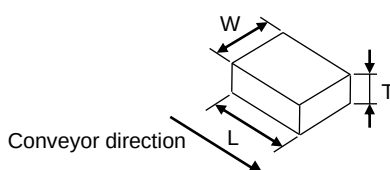
C-1	To attach a dedicated nozzle changer to the rear.
Factory	Nozzle changer & Nozzle changer driving unit Nozzle changer: Rear side (For small nozzles)  Nozzle changer driving unit Nozzle changer: Rear side (For large nozzles)  Nozzle changer driving unit • Nozzle changer and nozzle changer driving unit are provided in a set. • This nozzle changer is rear side-specific, and is removable so that you can prepare for an arrangement of nozzles off-line. (Differs in shape from “Nozzle changer: Front.”) • The nozzle changer for small nozzles can be stocked with up to 36 small nozzles. • The one for large nozzles can be stocked with up to 15 large nozzles.
Customer	Spare nozzle changer: Rear side (For small nozzles) Spare nozzle changer: Rear side (For large nozzles) • Please select it if additional nozzle changer is required.

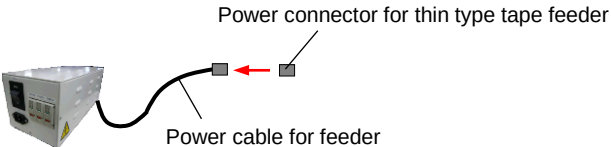
C-2	To mount the component recognition camera on the rear
On-site	Table Multi-recognition camera V2: Type 1  • The position in picking up the chip and the angle deviation are corrected. • Please be sure to select it for the table where the placement head is selected. • Please refer to "4.5 Recognition Unit Configuration" for details.
On-site	Table Multi-recognition camera V2: 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 V2: 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 V2 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 V2 Type3 comes with side lighting.

C-3	To correct the PCB height (Warp) and improve placement quality.
On-site	Height sensor  Height sensor - Controls the placement height of a PCB by measuring the height (warp) of the whole PCB. Measurement time: 3.0 s (510 × 460 mm in an optimal condition, with 9-point measurement) - Select the height sensor for the first AM100 in line. - The measured data is transferred to the downstream machine, AM100 which controls the placement height. - Please refer to "4.5 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, and VM series.
Customer	Height sensor teaching jig (For long PCB only)  - It calibrates linearity and offset of the height sensor. - It is necessary if you purchase the height sensor for the first time. - It is for Long PCB(1 500 mm) Specification only.

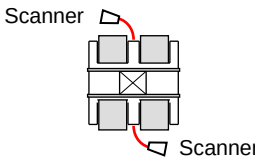
C-4	To place 0402 chips.
On-site	
0402 component placement support	
- Support for placement of 0402 components. (± 0.04 mm ($Cpk \geq 1$): Under below conditions) - Parameters dedicated for 0402 components are set. - At 0402 chip mounting, "256M nozzle" and "8mm type feeder(for 0402)" are necessary. - Choose the "0402 component placement support" option.	
<Placement condition>	
Target head	14-nozzle head
Applicable components	0402 R/C
Placement angle	0°, 90°, 180°, 270° only
Component recognition	Placement angle recognition

C-5	To operate the machine at its rear side.
Factory	
Rear operation panel	
- The standard operating panel is installed on the machine's front side only. - Make sure to select it when you select Tray feeder or manually setting tray.	

C-6	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 ~ 10.5 mm  - Component shape - No space exceeding 0.3 mm on its underside on a horizontal surface - No extremely unstable shape, e.g. small underside compared with its height
- This is used for ejecting recognition NG components. - This option will occupy four feeder setting slots.	

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 power to feeder carts and feeders, and another one implements component verification in addition to the power supplying. - To use PanaCIM-EE for off-line setup, "Support station box (Component verification type)" is required. - Please refer to "5.6 Support Station" for details. * Common to NPM series.
On-site	Support station: Component verification type (License) - This is required for the use of "Support station box (Component verification type)." - FA PC is needed when you select this option. (AM-LNB cannot be used.) * The license is not required for off-line setup (component verification) using PanaCIM-EE.
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)." - FA PC is needed when you select this option. (For material verification of PanaCIM Express, AM-LNB can be used) - 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. In accordance with each customer's operation, selection can be made from following three types, "External scanner read type", "Head read type", and "Planned form read type." - FA PC is needed when you select this option. (AM-LNB cannot be used.) - 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 the mode automatically where production cannot be continued. It is possible to customize order of barcode scanning and/or barcode definition, according to customers' operation. - There are the wired scanner type and the wireless scanner type. - It is not available to select with "PanaCIM-EE ready (License)" at the same time. - FA PC is needed when you select this option. (AM-LNB cannot be used.) - 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. - FA PC is needed when you select this option. (AM-LNB cannot be used.) - 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)") - FA PC is needed when you select this option. (AM-LNB cannot be used.) - 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 improve placement quality by controlling process through process measurement data of inspection head (solder inspection).
Customer	APC system ready (License)
	- APC system can help improve placement quality by feed forwarding solder measurement data of inspection head to placement head which enables component placement at the optimum and highly accurate positions. AM100 is APC system-ready when connected with NPM series. - With component inspection, misalignment can be inspected against controlled reference position of placement. - This option is required per AM100 that receives APC offset data. - FA PC is needed when you select this option. (AM-LNB cannot be used.) - Please refer to "5.7 APC system" for details. * APC system ready equipment: NPM series, NPM-X series, AM/ VM series, SP series (Compatible even at a mixed line) If line is made up with other equipment than the above, please contact us. * For SP series, "Inspection result feedback support (License)" is required.

C-16	To enable APC system using existing printed solder inspection machine.
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 AM100 that receives APC offset data. • Select this option, together with “APC system-ready (License)” for the same number. • FA PC is needed when you select this option. (AM-LNB cannot be used.) • Please refer to “5.8 Interface software 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 customers.
Customer	APC system ready (License) • This is required when using “Interface software (License) of inspection machine from other companies.” • This option is required per AM100 that receives APC offset data. * For SP series, “Inspection result feedback support (License)” is required.

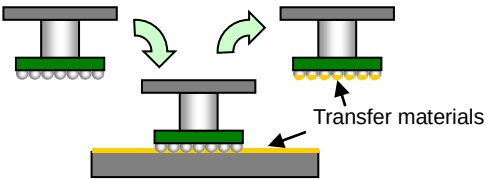
C-17 To perform transfer.

Customer

Multi-functional transfer unit

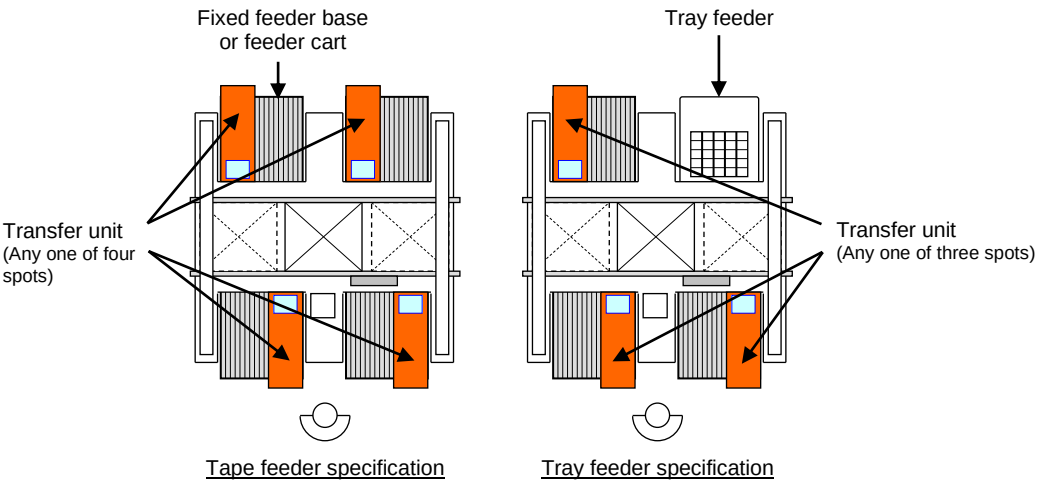
1. Outline

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 fixed feeder base or feeder cart in the same way as that of the intelligent tape feeder.
The feeder address numbers 13 to 20 (8 slots) are occupied.



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. Applicable components

Item	Specifications
Feeding method	Taping and tray
Component dimension	2 × 2 mm ~ 20 × 20 mm
Applicable component	BGA, CSP

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 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.

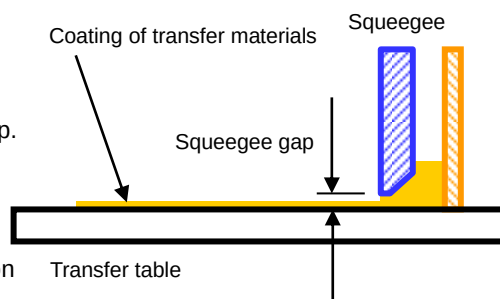
6. Programmable squeegee gap

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 MSP511 Flux, MSP513 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 NPM series, CM602, and CM101.

Customer

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

Coating thickness gauge (0 μm to 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 NPM series, CM602, and CM101.

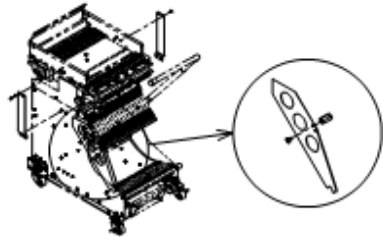
On-site

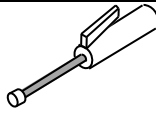
Table

Air supply unit for the feeder: For fixed feeder base

Air supply unit for the feeder: For feeder cart

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

C-18	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-19	To use large reels
Customer	
Separator for feeder cart	
	Separator for feeder cart is used when supplying taping components for large reels.
C-20	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 "5.11 Pre-pickup inspection (Polarity)".
C-21	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 "5.10 Pickup error automatic recovery".
C-22	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 "5.12 Tray 1 Pallet 10 Kind".

D-1	To keep the machine condition in regular maintenance.		
Option name	Usage	Description	Remarks
Customer Lubrication set	Greasing the specified parts of machine	Grease gun Nozzle 	Common with NPM series, 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.
- These are used for the periodical application of grease and cleaning in machine maintenance, etc. - They are necessary in purchasing the first machine.			

D-2	To calibrate as needed.				
• Placement head jig kits for various adjustments.					
Option name	Usage	Description	Recommended set		
			Recommended	Simple calibration	All calibration
Customer (1) Jig kit for accuracy verification & adjustment of main body	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)
	For teaching placement position of QFP placement and for verifying accuracy	Jig parts, Jig parts supplier, Jig parts supply pallet, Nozzles (153M × 2, 392M × 1)			
	For placement height calibration	Placement height jig			
	For line-camera-related calibration	Line camera jig			
	Exclusive to AM100				
Customer (2) Jig kit for standard calibration	For use in calibrations during a periodic inspection	Jig station, Jig parts	/	/	
	For pickup position calibration	Pickup position height teaching jig			
	Common with NPM-D3/ D2/ D/ TT and NPM-W2/ W				
Customer (3) Plane calibration jig	For plane calibration	Common with NPM-W2/ W	/	/	
The following nozzles are separately needed for placement position teaching.					
For jig chip (1005) calibration (required)			For 0402R calibration (recommended)*		
226M nozzle		14 pcs.	256M nozzle		14 pcs.
* For 0402 chip placement, tape feeder for 0402 or thin type tape feeder is required.					

* 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 & adjustment of main body



Case for standard calibration jig kit



D-3

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

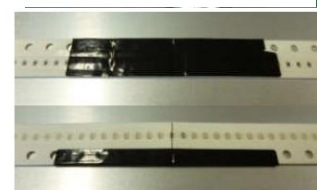
*1) 8 mm × 1P (Paper) : Prior confirmation will be needed.

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

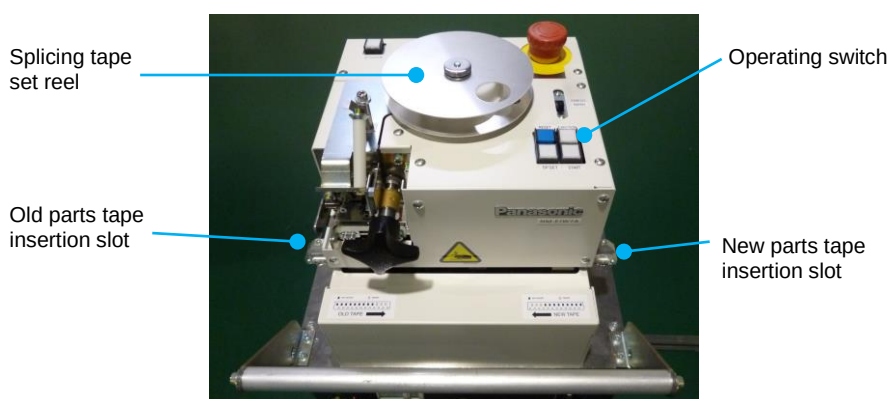
*3) This is estimated time in the situation where 28Ah deep cycle battery is used. Working time may vary depending on battery's capacity.



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-3

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.

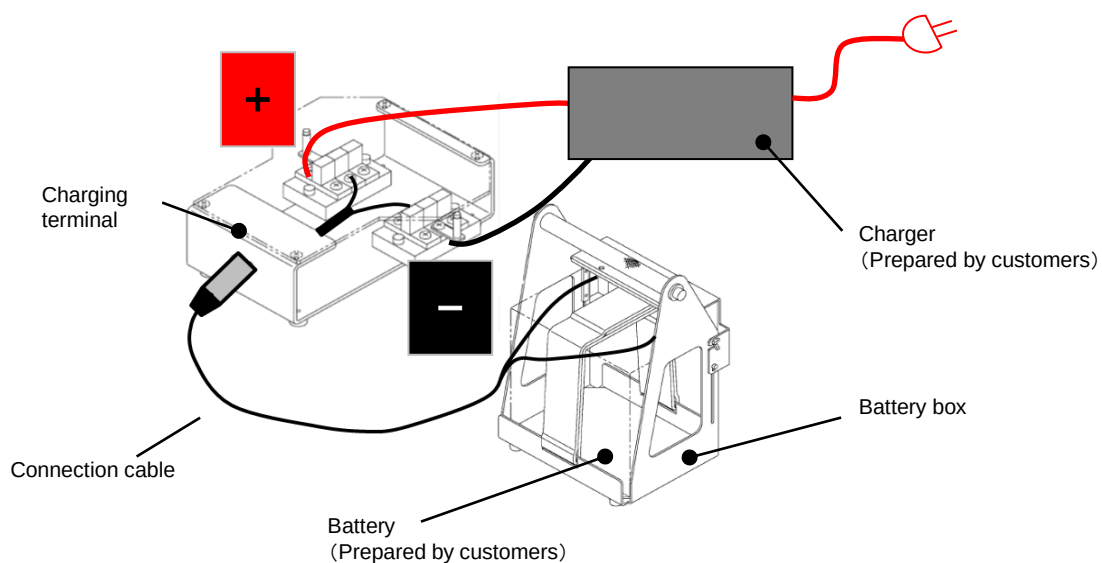
*2 Time to run on one time charge becomes shorter though it runs on 12Ah capacity battery.

*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-4

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

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	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		○	○	○	○	○
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-4	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)	

D-4

To maintain the tape feeder automatically

Customer

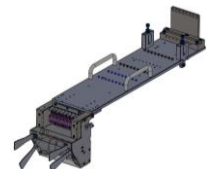
Attachment for thin type single feeder

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-4	To maintain the tape feeder automatically
Customer	Master jig for thin type single feeder
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-4

To maintain the tape feeder automatically.

Customer

When using the Feeder maintenance unit (IFMU), the following hardwares & softwares 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

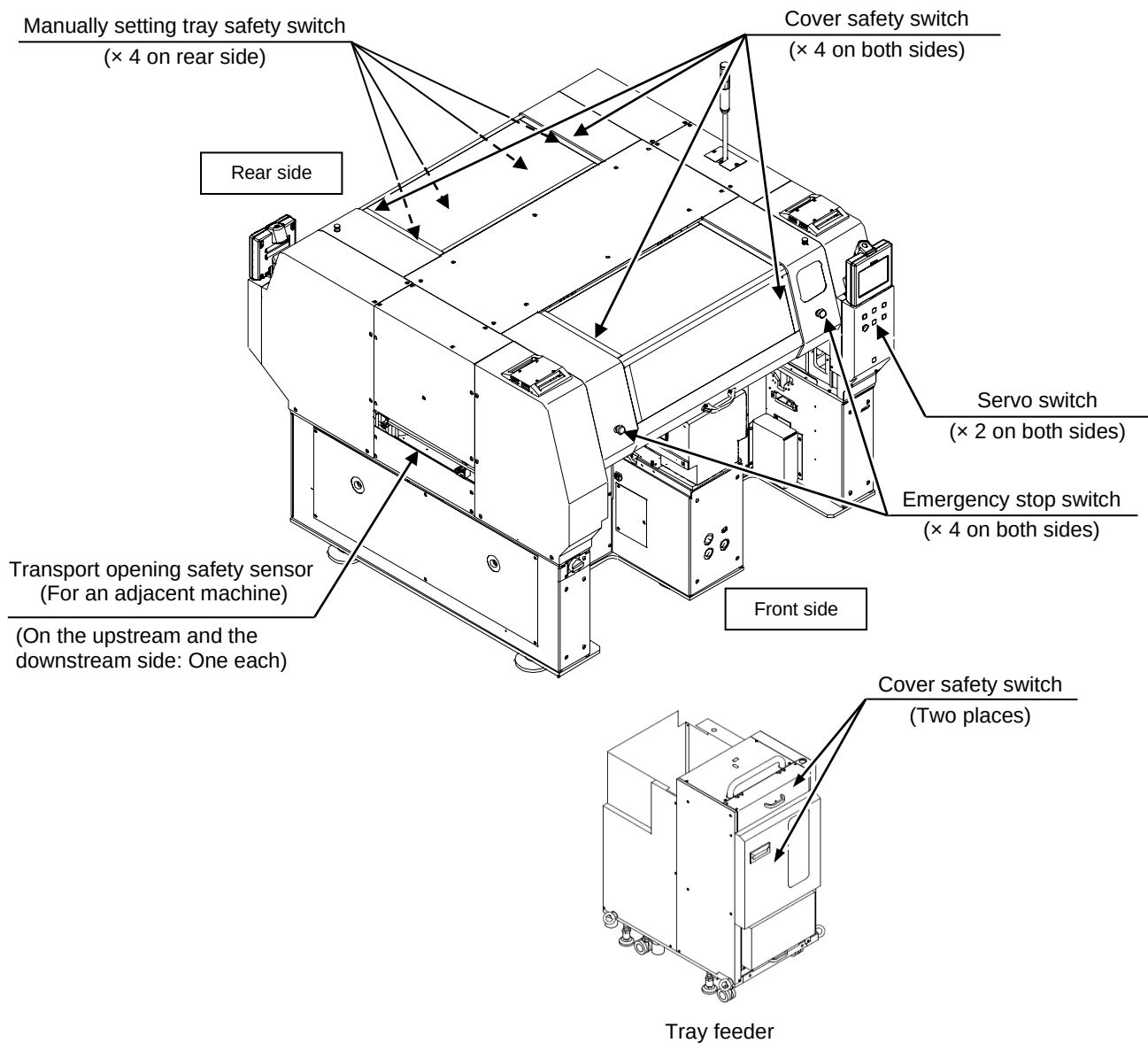
White W-13 (G10)

* The color of tray feeder is White W-13 (G50).

11. Safety Devices

AM100 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.



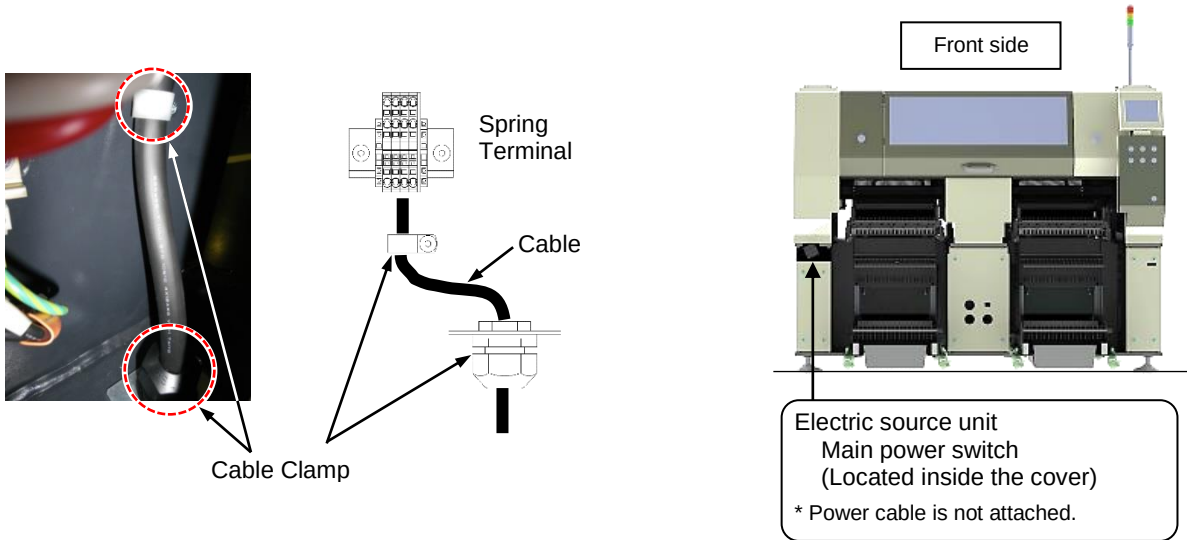
** Remarks **

- 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 exclusive tool.
- The cable should be clamped in two points as the lower-left figure shows.
 1. Outside diameter dimensions of the cable: $\phi 13.5 \text{ mm} \sim \phi 18.0 \text{ mm}$
 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.

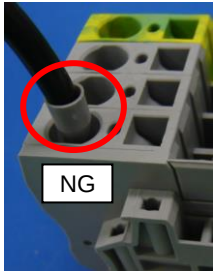
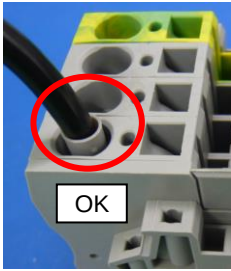


Precautions in terminal block connection

Terminal connecting pin (Recommended)

Manufacturer		Phoenix Contact	
Type	Power wire	3.5 mm ² ~ 4.0 mm ²	Al 4-12 GY
		5.5 mm ² ~ 6.0 mm ²	Al 6-12 YE
	PE wire	3.5 mm ² ~ 4.0 mm ²	Al 4-10 GY
		5.5 mm ² ~ 6.0 mm ²	Al 6-10 YE

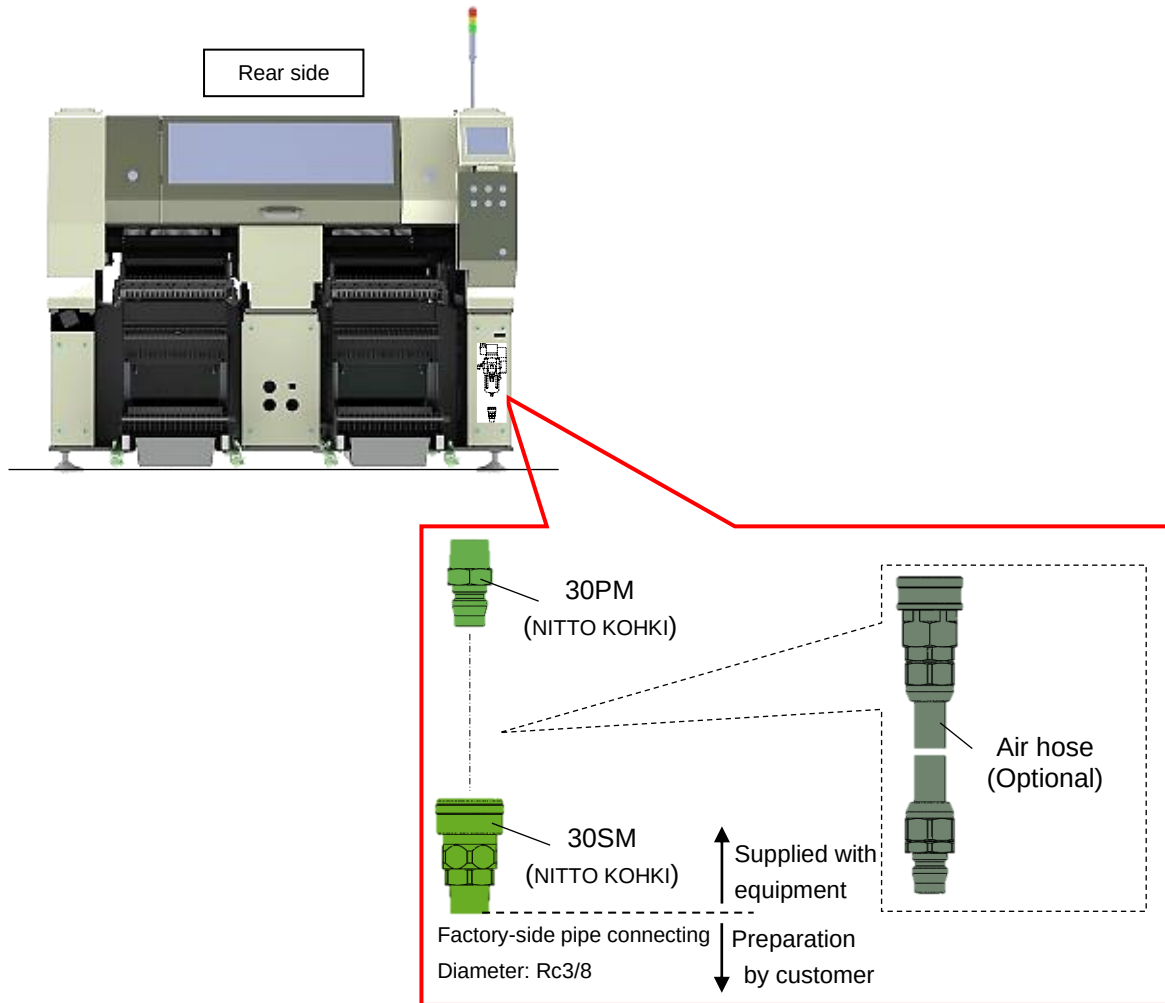
1. Put in a terminal block making sleeve terminal's uneven surface parallel along the terminal block.
2. Make sure that you put the sleeve terminal all the way in it
3. When you do not use a sleeve terminal, check if cores are organized and are properly put in.



** Remarks **

- Please prepare the power cable by yourself.

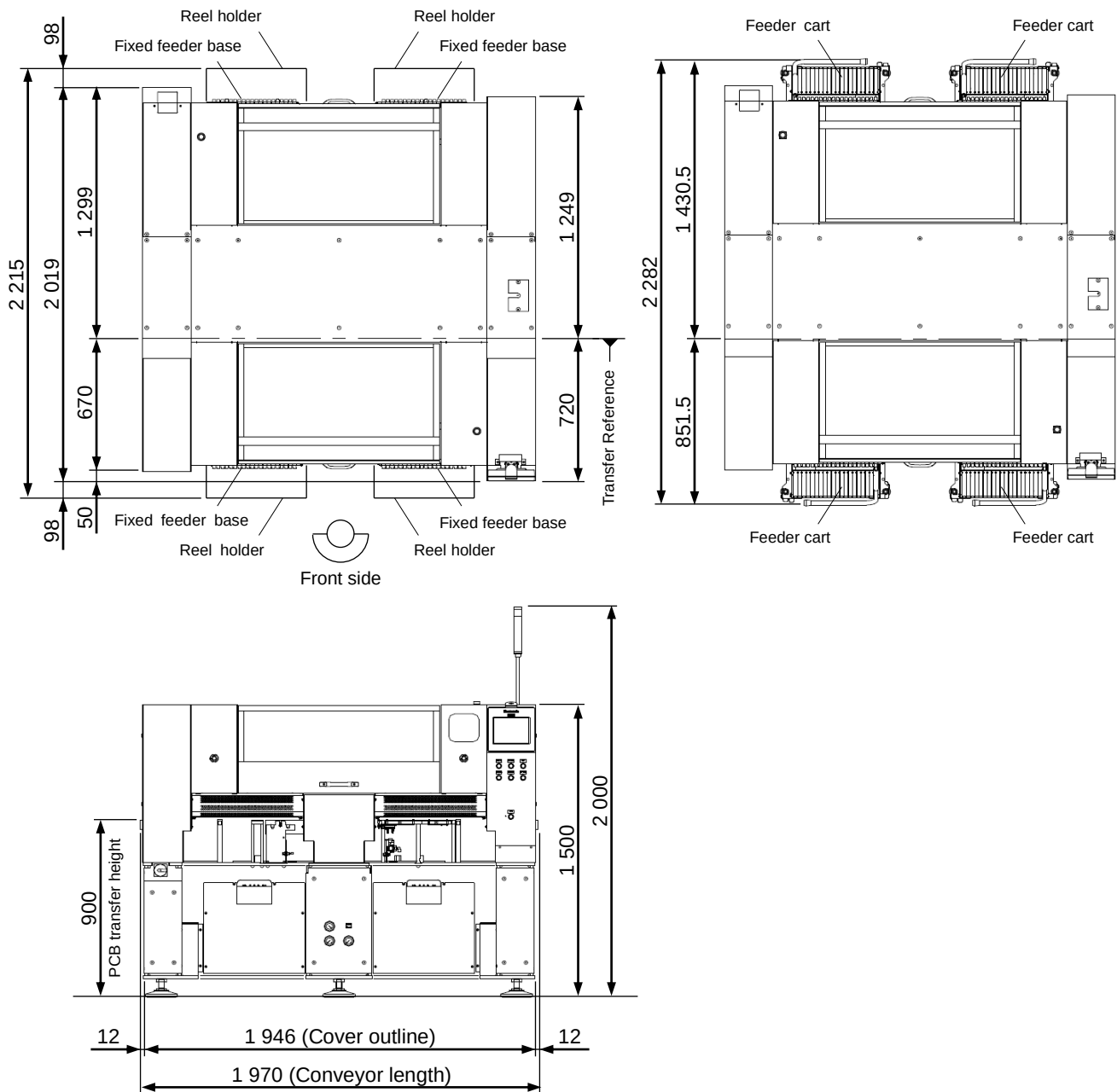
12.2 Pneumatic Source Unit



13. Dimensions

(Unit: mm)

■ Tape feeder specification

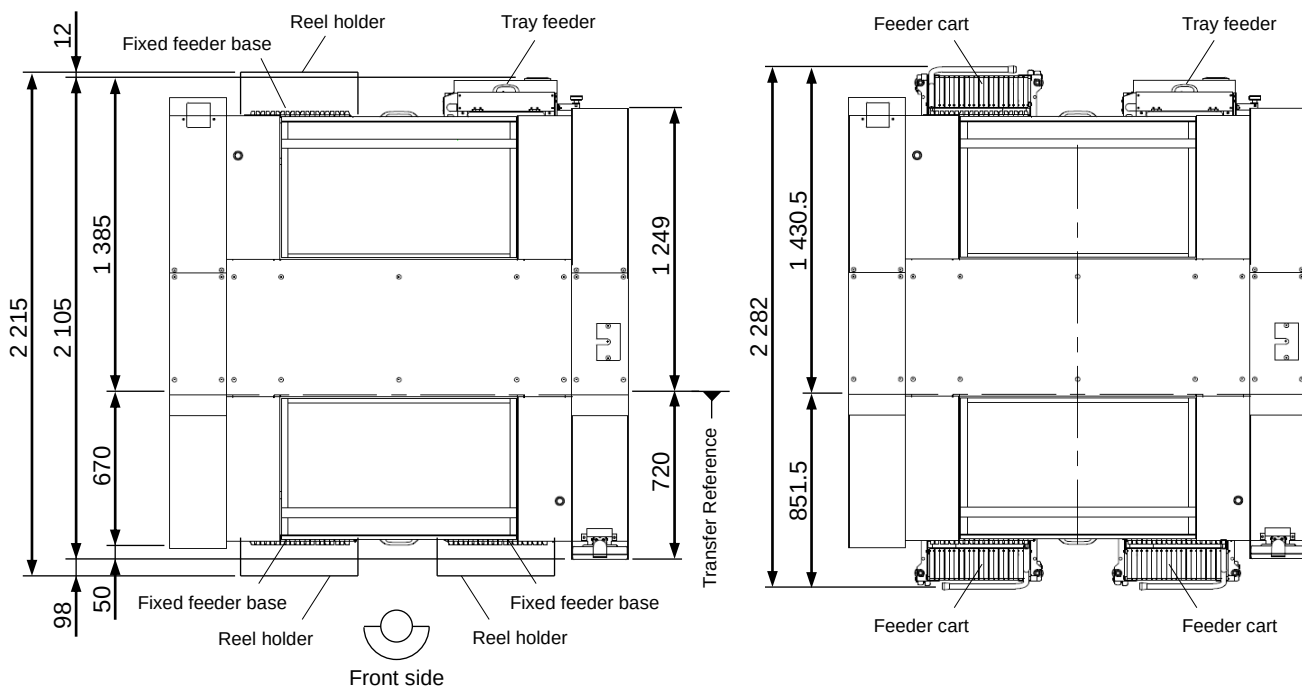


** Remarks **

- 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)

■ Tray feeder specification

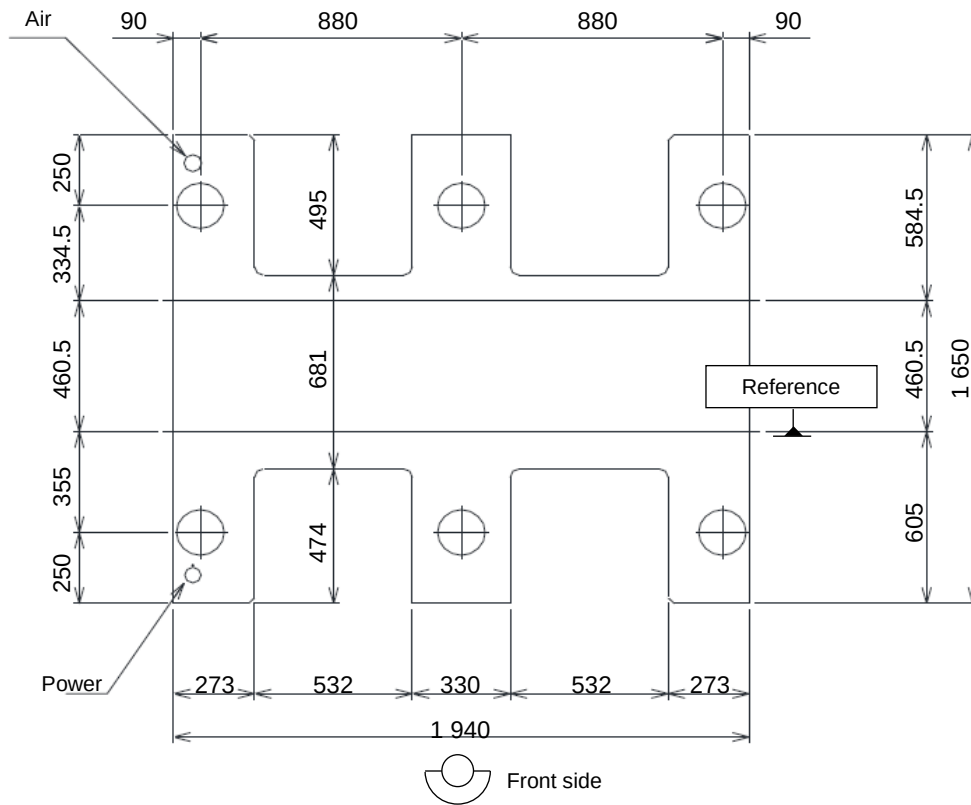


** Remarks **

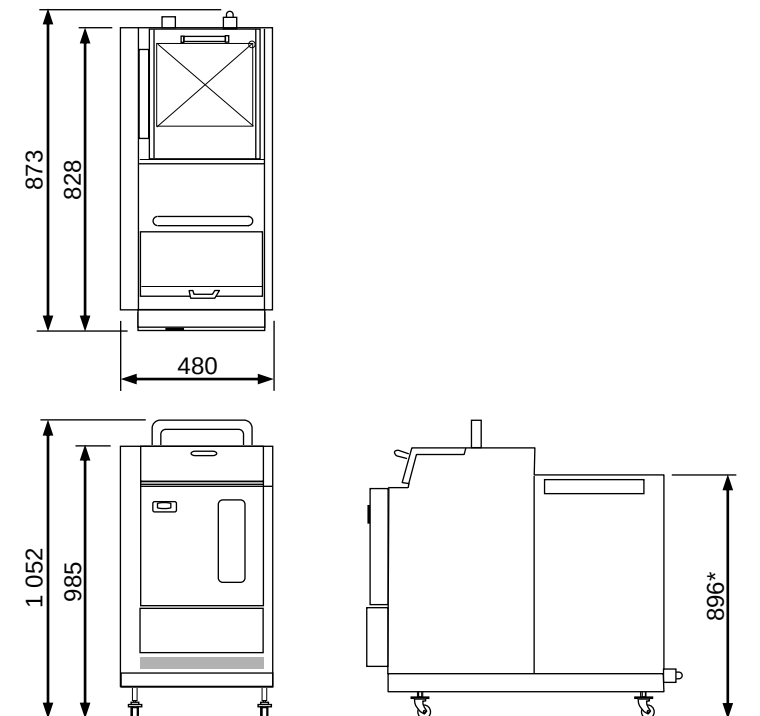
- The above Illustrations do not strictly agree with the actual machine in a reduced scale, etc. When examining the line configuration, dimensions, etc., please ask for the materials for them.
- If passing ducts etc. under this machine, please secure 40 mm or more space between them.

(Unit: mm)

■ Adjust Bolt Diagram



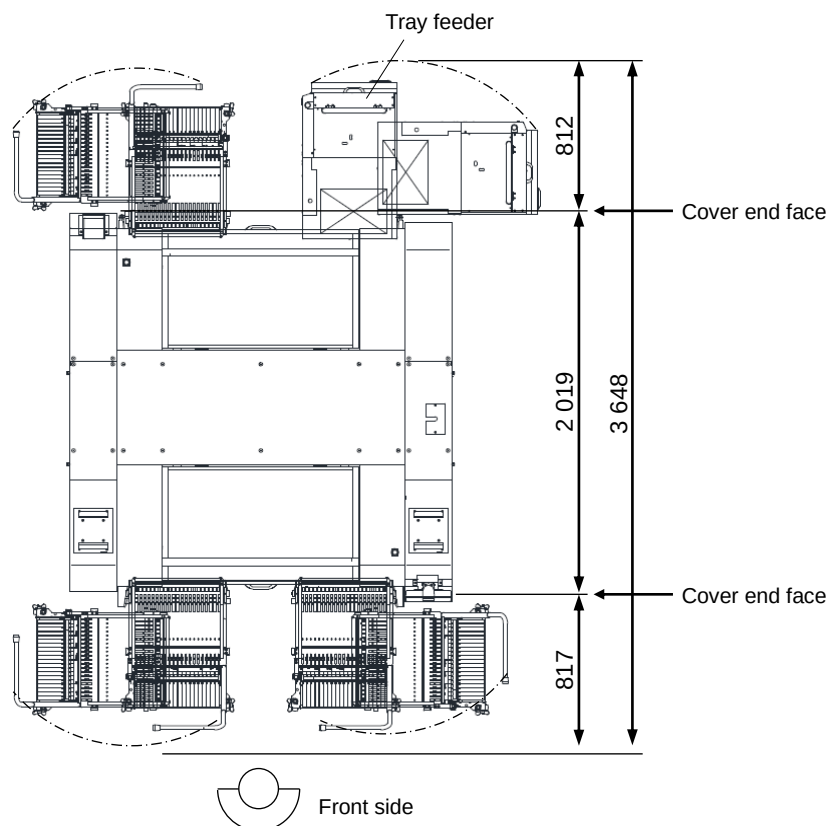
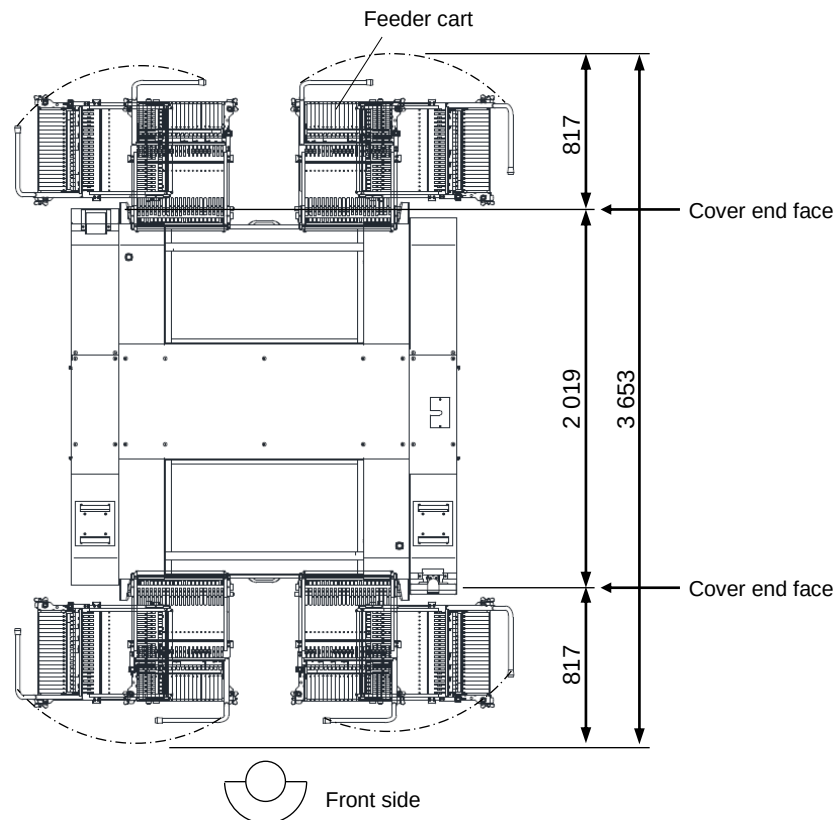
■ Tray feeder



* The tray feeding height of 896 mm is a standard value when the PCB transport height of AM100 is 900 mm.
The adjustable range: $896^{+65}_{-16.5}$ mm

(Unit: mm)

This is the minimum space to be required in installing the feeder cart and tray feeder.
Before installing the machine, please be sure to secure the following space.



** 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

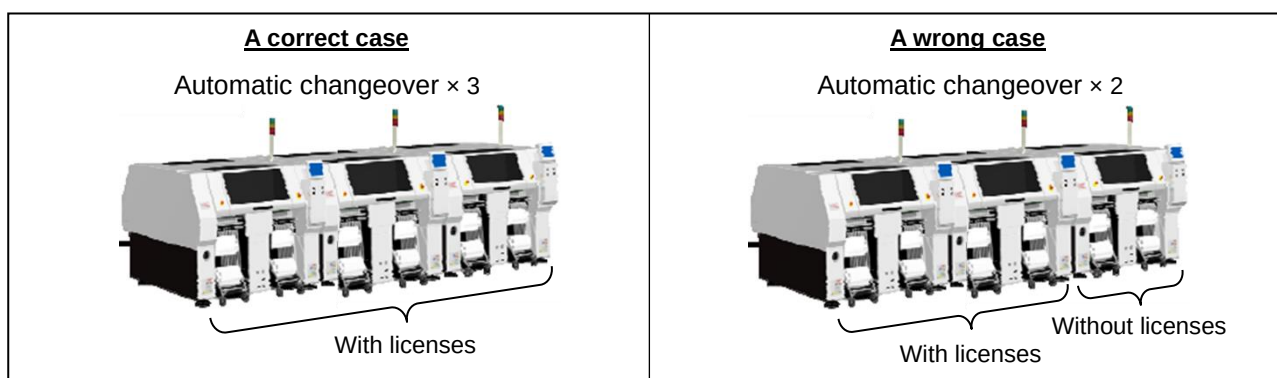
In order to operate the following software (options), you are required to purchase licenses for respective software.

- PanaCIM-EE ready
- iLNB ready
- Component Verification
- Automatic changeover
- Feeder Setup Navigator
- Upper Communication
- APC system ready^{*1}
- Interface software of the inspection machine from other companies^{*2}
- Support station box (Component verification type)
- Component Supply Navigator
- Pickup Error Automatic Recovery
- Polarity Test Before Pickup
- 1 Pallet 10 Kind

A license is required for each machine that is intended for the operation.

Selections for the above 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.



^{*1} APC system license is required per AM100 that receives APC offset data.

^{*2} Interface software license of the inspection machine from other companies is required per AM100 that receives APC offset data.
(APC system licenses are required as the same amount.)

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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