[Proposals to address issues]

# Respond to High Quality Requirements

Panasonic Connect Corporation
Circuit Formation Process Business Division

Panasonic CONNECT

# Content Usage Regulations

- This material is provided solely for the purpose of helping customers consider the purchase of equipment and may not be used by customers for any purpose other than for the purpose of considering the purchase of equipment.
- The copyrights to this website and all text, photographs, video, music, audio, and all other copyrighted materials on this website (hereinafter collectively referred to as “Contents”) belong to the Company or the original authors or other right holders (hereinafter collectively referred to as “Copyright Owners”).
- Except for printing, saving, etc. for personal use or other use permitted by copyright law, any duplication, public transmission, distribution, modification, excision, reproduction on your website, etc. (hereinafter referred to as “Use, etc.”) of the Content without prior permission of the copyright holder is prohibited by copyright law.
- This material may be viewed and disclosed within the customer and the company to which the customer belongs within the scope of the purpose of equipment purchase consideration, and may not be disclosed to any third party other than the customer's company under any circumstances, including for the above purposes.
- If you use the content with our permission, please indicate the copyright as specified by us. You may not change or delete the copyright notice without our prior approval.

# Agenda

# Demand for high quality

Demand for electronic component mounting is becoming more diverse and sophisticated, including in the automotive industry, where EVs are becoming increasingly popular, and in the server industry, where performance improvements are required due to the advancement of AI. At the same time, there is an unchanging demand in all industries to ensure high quality.

Panasonic offers a variety of solutions that achieve high quality by combining various functions of mounter and printer and software.

# Solutions by Panasonic

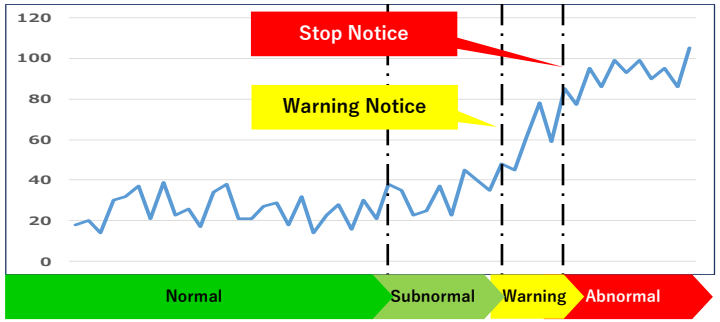
| | | | | |
|---|---|---|---|---|
| **High Quality < System Software >** | Reduce losses caused by excessive maintenance and maintenance delays | Stabilize solder position and volume to ensure printing quality | Suppress effects of solder misalignment and mounting misalignment to ensure mounting quality | Reduce defects caused by incorrect mounting materials |
| | **APC-5M (Real-time unit monitoring)** | **APC System (APC-FB)** | **APC System (APC-FF/APC-MFB2)** | **Material Matching System (PanaCIM)** |
| **High Quality < Printer >** | Print properly even when there is PCB warpage | Suppress defects caused by mask tension | Stabilize printing on high-aspect openings | Stabilize printing on micro-openings |
| | **Top/Side Clamper** | **Mask Tension Feedback** | **Hybrid Adsorption** | **Pre-bend High Filling Squeegee** |
| **High Quality < Mounter >** | Suppress quality failure due to mis-setting of parts when switching models | Maintain low-load/constant-load mounting quality, and record and visualize | Avoid poor mounting quality | Reduce mounting defects and repair time for shield case |
| | **LCR Checker** | **Load Checker V2 Mounting Load Trace** | **Preadsorption Recognition: “Polarity” "Character"** | **Shield Mounting Inspection** |

# Reduce losses caused by excessive maintenance and maintenance delays

## APC-5M (Real-time unit monitoring)

Real-time monitoring of the status of units to be maintained on mounting machines (printers and mounting machines) for each unit. By changing the value, deterioration of the status is detected for each unit, and proper maintenance is promoted.

### Detection of unit status




| Color | Status | Description |
|---|---|---|
| | Not measured | Initial status |
| | Normal | Normal Within the specification range |
| | Semi-normal | Normal Within the specification range |
| | Warning | Warning threshold has been reached |
| | Abnormal | Normal Out of specification |

| Target Unit | | Monitored item |
|---|---|---|
| Printing machine | PCB clamper | Clamper plane |
| | | Operating unit operating state |
| | | Dirt |
| | Vacuum pump | Vacuum rise time |
| | | Vacuum pump running time |
| | Machine running time | Running distance |
| | PCB transport section | PCB transport time |
| | Mask recognition camera | Presence of foreign matter on camera |
| | Solvent discharging section | Amount of solvent discharging |
| | Blower | Operating time |
| Mounting machine | Head | Clog |
| | | Holder sliding |
| | Nozzle | Clog |
| | | Tip state |
| | Feeder | Feeder accuracy |

## Merit

Preventive maintenance before deterioration of the status is possible, and error stopping due to insufficient maintenance is suppressed

By analyzing the status of each unit, it is possible to visualize whether maintenance is necessary or unnecessary, and excessive maintenance is suppressed

*Please contact us for details on products compatible with each function.

# Stabilize solder position and volume to ensure printing quality

## APC System (APC-FB)

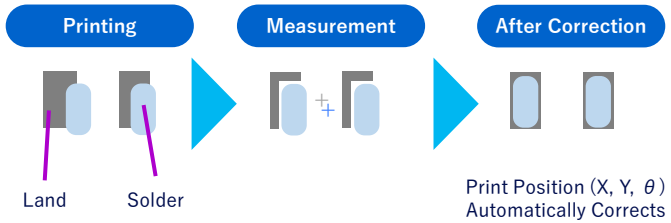
APC System automatically stabilizes print quality by statistically processing the solder measurement results from the Solder Pasete Inspection (SPI) machine and feeding them back to the printer to control the solder position and volume.

### APC-FB (Position)

Maintain print quality by feedback control of the solder print position

SPI

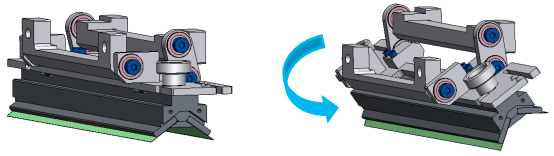
Print Position Correction Based on SPI Print Deviation Information




### APC-FB (Volume)

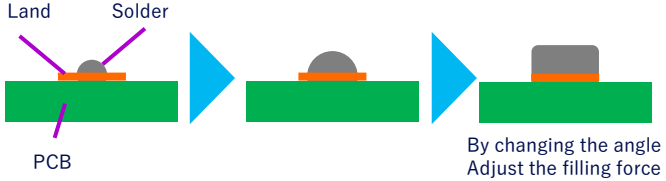
Automatically correct volume by using 3D solder inspection equipment and angle variable squeegee

Attack angle variable squeegee (optional)



Standby for printing　　Printing

Automatically adjusts the squeegee angle according to the volume measurement result




## Merit

Stable print quality is achieved by automatically correcting the print position based on the print misalignment information from the SPI

High quality printing is maintained by quickly correcting the print position misalignment caused by material factors such as model switching or the board

Optimum solder volume is maintained by automatically adjusting the filling force by changing the squeegee attack angle based on the volume information from the SPI

*Please contact us for details on products compatible with each function.

High Quality
< System Software >

# Suppress effects of solder misalignment and mounting misalignment to ensure mounting quality

## APC System (APC-FF/APC-MFB2)

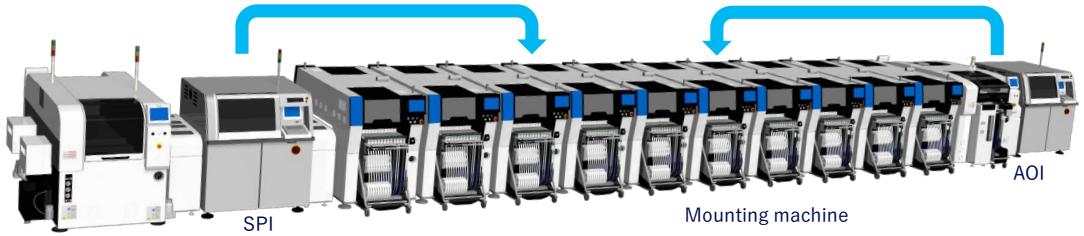
Maintaining mounting quality by controlling solder printing and component mounting variation in cooperation with other companies' inspection facilities.

### APC-FF

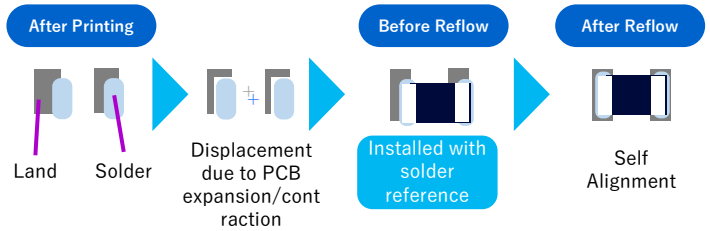
Quality after reflow is maintained by controlling variation in solder printing position

### APC-MFB2

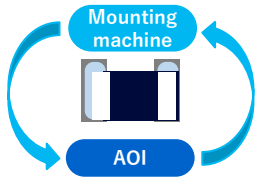
Elimination of deterioration in accuracy with time by controlling variation in mounting position



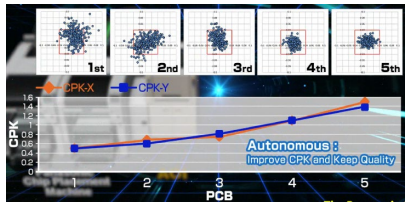

APC-FF: Mounting position correction based on SPI printing deviation information




APC-MFB2: Mounting position correction based on AOI inspection deviation information




Repeated feedback the amount of deviation




## Merit

APC-FF

Components are installed at the optimum position based on the SPI solder measurement position, and high quality mounting is achieved by effectively utilizing the self-alignment effect

APC-MFB2

Components are installed by correcting misalignment based on AOI measurement results, and stable mounting quality is achieved by automatically correcting equipment fluctuation

By using APC-FF and MFB2 together (APC-MFB correction is applied based on the component mounting coordinates corrected by APC-FF), further high-quality mounting is realized.

*Please contact us for details on products compatible with each function.

High Quality
< System Software >

# Reduce defects caused by incorrect mounting materials

## Material Matching System (PanaCIM)

If the wrong material is installed in accordance with the production data downloaded to the equipment, the interlock function of the equipment is activated, and production cannot continue automatically.

**Scan the barcode of the material at the time of model switching, material replacement, or replenishment**


*Wireless scanner and related accessories must be provided by the customer.

## Merit

Match the barcode information of the material to be replaced with the production data to prevent incorrect setting of the material at the time of model switching, material replacement, or replenishment

Stop the facility (interlock) in case of incorrect matching or non-matching to prevent continued production due to incorrect setting

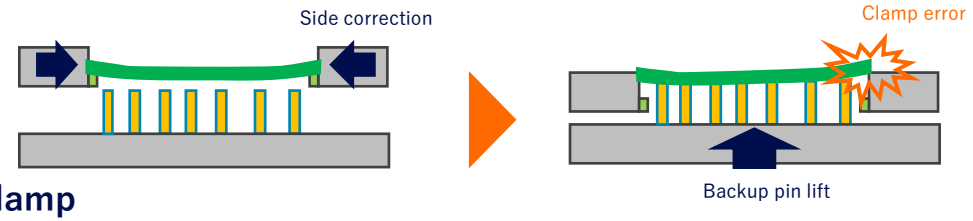
*Please contact us for details on products compatible with each function.

# Print properly even when there is PCB warpage

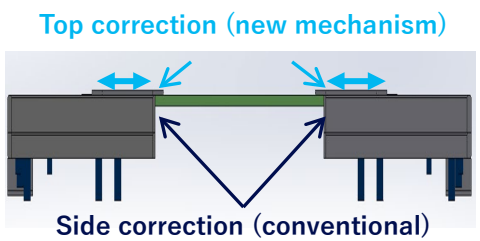
## Top/Side Clamper

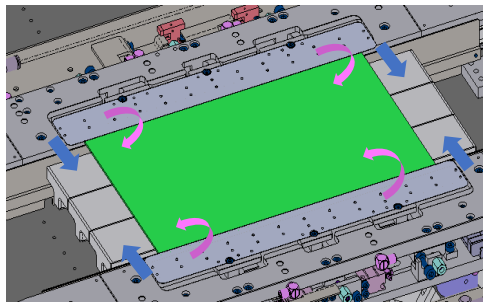
In addition to the conventional side clamper, a top clamper is adopted to hold the PCB from the top. This strengthens the solution to PCB warpage and further improves print quality.

### Side Clamp




### Side + Top Clamp



## Merit

Corrects PCB warpage and improves printing quality by pressing from the top of the PCB.

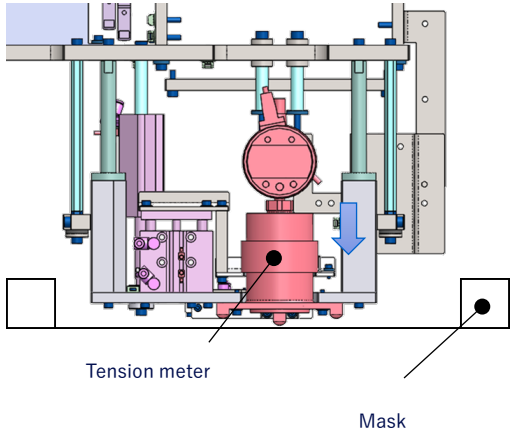
Prevents the PCB from sticking to the mask after printing.

*Please contact us for details on products compatible with each function.

# Suppress defects caused by mask tension

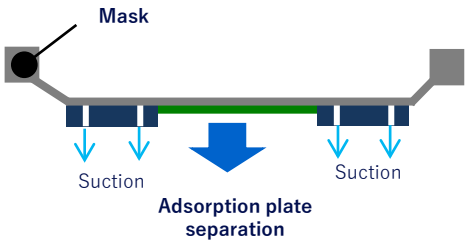
## Mask Tension Feedback

Check the mask condition by measuring the mask tension when setting the mask. Notify that the mask has changed to the optimum plate separation operation or that the mask has been replaced.




Tension is weak
- Mask suction plate separation
- Replacement announcement

**Mask Adsorption plate separation**




## Merit

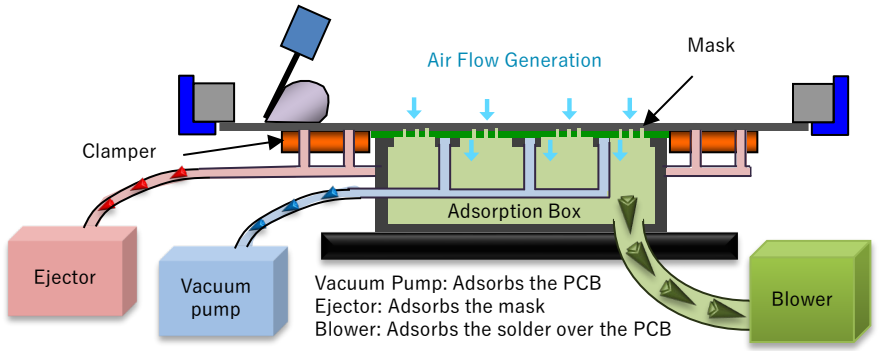
- Confirm the mask condition and realize stable printing
- Realize the optimum plate separation operation
- Notify the replacement of the mask

*Please contact us for details on products compatible with each function.

# Stabilize printing on high-aspect openings

## Hybrid Adsorption

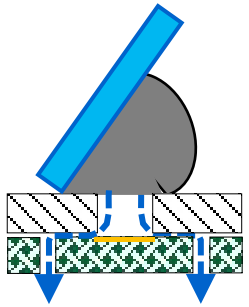
To overcome the problems of solder filling in high-aspect openings of masks and solder disengagement during plate separation, stable printing can be continued by combining PCB adsorption by vacuum and mask suction by blower.




The blower generates air flow from the upper surface of the mask to the lower surface

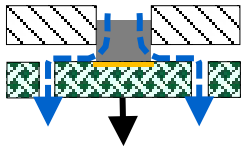
< Filling process >

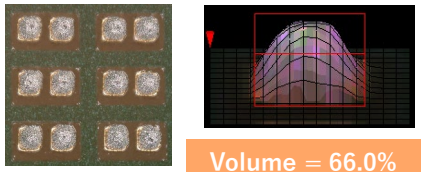
Assist solder filling

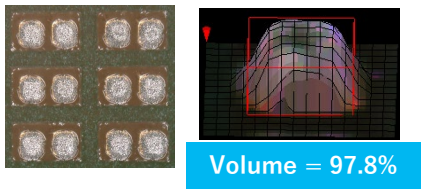


< plate separation process >

Assist solder transfer






## Merit

- Achieves stable printability due to high filling and good plate separation
- Stable printing of small openings such as 0201 parts with high printing difficulty
- Effective for stable printing of thin PCBs and PCBs with large warpage

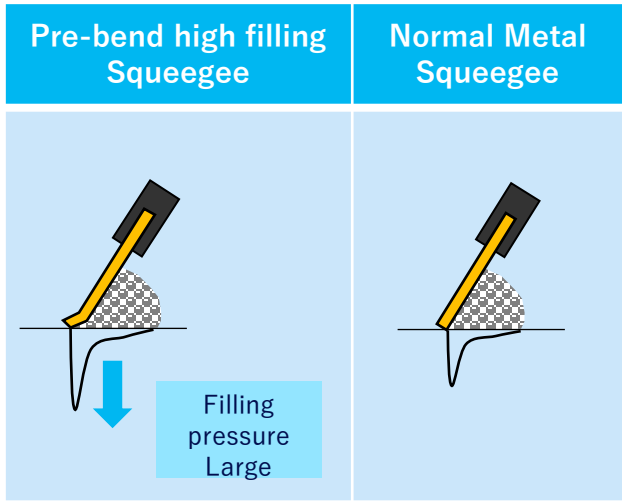
*Please contact us for details on products compatible with each function.

# Stabilize printing on micro-openings

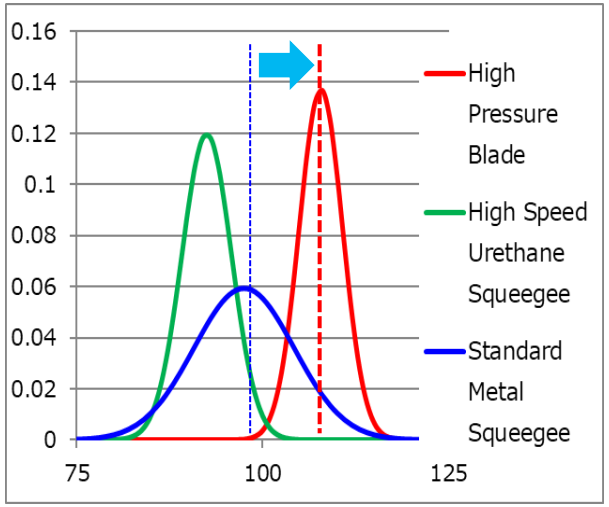
## Pre-bend High Filling Squeegee

For cream solder printing on small parts with a high aspect ratio of mask openings, a high bending-type filling squeegee is effective. It increases the filling pressure at the bent part of the tip, improving the volume fraction and suppressing dispersion.

### Filling pressure image




### Average volume : 10% improvement




### Merit

- Easy to handle as usual metal squeegee
- Achieves higher filling performance than urethane squeegee
- Effective for industrial, automotive, and other PCBs with thick resist silk

*Please contact us for details on products compatible with each function.

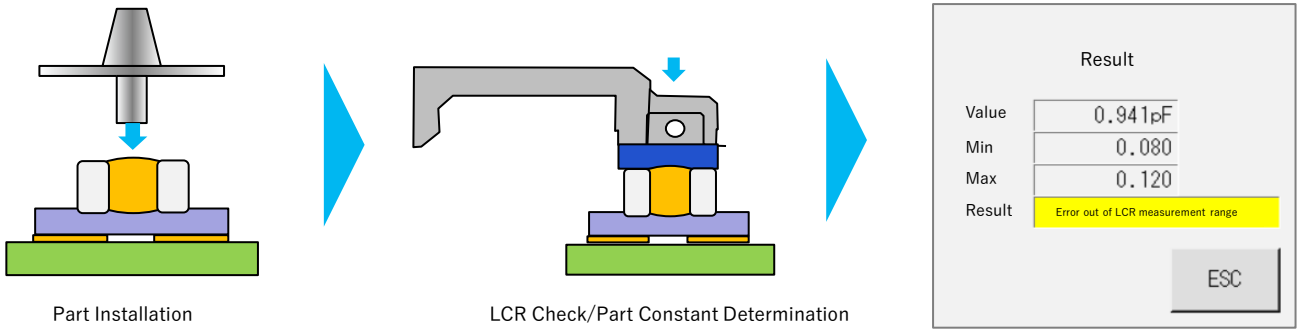
High Quality
< Mounter >

# Suppress quality failure due to mis-setting of parts when switching models

## LCR Checker

LCR checker automatically checks the constant number of installed parts when starting production, supplying parts, or switching models.  This function contributes to the production of good quality products by preventing incorrect mounting due to incorrect feeding, abnormal parts, or incorrect labeling on reels.

**Judge whether the electrical characteristics of the parts are within the specified range before mounting**




Part Installation

LCR Check/Part Constant Determination

Target Part Size: 0402 to □6 mm
Target Parts: Resistance, Capacitor, Inductor, Diode

## Merit

Suppress quality defects caused by operators such as barcode affixing or incorrect setting of feeders, and quality defects caused by abnormal parts

Automatic recording of measurement data enhanced traceability

Reduction of first-time inspection and ICT man-hours

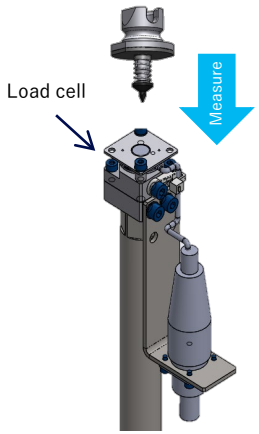
*Please contact us for details on products compatible with each function.

# Maintain low-load/constant-load mounting quality, and record and visualize

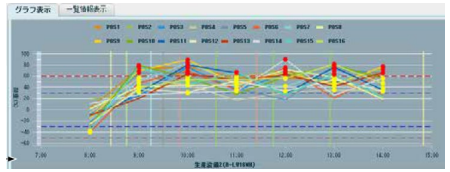
## Load Checker V2/Mounted Load Trace

With the increase in the number of small parts, mounting load management becomes more important. By visualizing the nozzle sliding condition of the mounting head, performance maintenance and stable operation are realized. In addition, by recording the actual load at each mounting point, the quality is visualized and contributes to quality improvement.

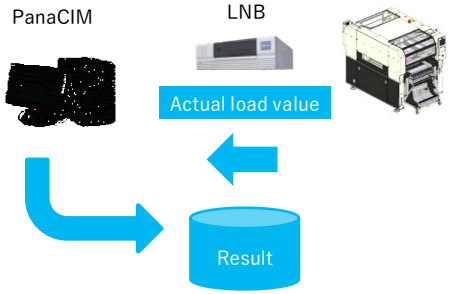
### Load Checker V2




- Check and calibrate the load for each nozzle by load cell
- Automatic recording of measurement data



### Mounted Load Trace Function




Trace the actual load at each mounting point

| Table | Feeder | Type | Nozzle | Load |
|---|---|---|---|---|
| 1 | 15 | 8 mm | 225 | 0.81 |
| 2 | 20 | 8 mm | 230 | 0.85 |

## Merit

Load Checker

Automatically checks the mounted load on a regular basis, contributing to quality improvement by maintaining signs.

Mounted Load Trace

Contribute to quality improvement by visualizing quality by recording load results at each mounting point

*Please contact us for details on products compatible with each function.

# Avoid poor mounting quality

## Recognition before suction: "polarity" "character"

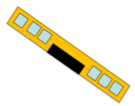
Check tray and reel components before suction to prevent mis-setting.

### Recognition of polarity before suction

#### Detection of wrong part direction

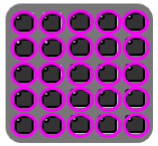
**Inspection mode**

Splicing detection, others



First 1 part

All parts



**Part inspection location**

1 location

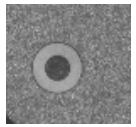
2 locations


4 locations

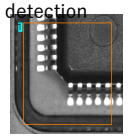

**Part inspection method**

Luminance average

Pattern match



Chamfer detection



If NG, the image is displayed and single stop is performed.
According to the inspection setting, the angle can be automatically corrected for suction and mounting.

### Recognition of character before suction

#### Detection of wrong part, part trace

**Misset parts matching**

Determines the wrong set by comparing the judgment character string of the component data with the read character string

**Trace Management**

Adds the read lot name and other information to the implementation log file and outputs it to the higher system.

## Merit

Recognition of polarity

When the polarity direction is wrong, the image is displayed and single stop is performed to prevent incorrect setting

Recognition of character

Recognizes the part number and detects the wrong part number to prevent incorrect production

Character recognition

Supports traceability by recognizing the manufacturing lot number of a component

*Please contact us for details on products compatible with each function.

High Quality
< Mounter >

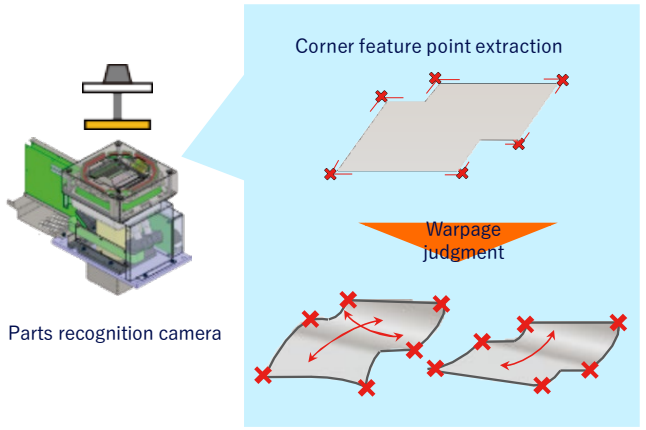
# Reduce mounting defects and repair time for shield case

## Shield Mounting Inspection

To reduce mounting defects and repair time for shield case by performing warpage inspection and misalignment inspection of shield case, which are not normally inspected by AOI, on the mounter.

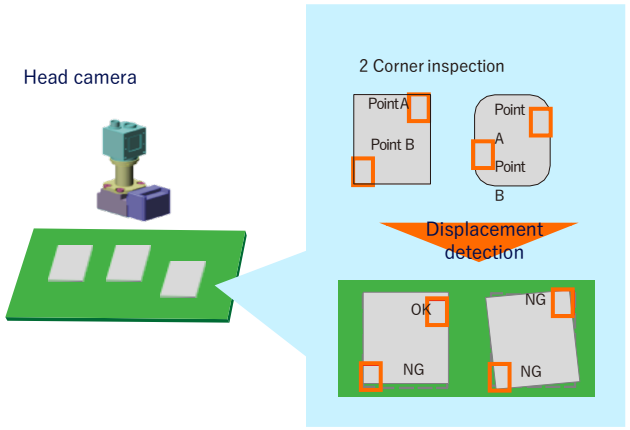
### Warpage inspection before installing shield case

Warpage inspection of shield case is performed by part recognition. If it is judged that the part is deformed, the part is discarded by recognition error judgment.




### Mounted position recognition

After mounting the shield parts, use the head camera of the mounting machine to easily inspect the warpage and dislocation of the shield parts. Error stop when dislocation is judged




## Merit

Warpage inspection before installing

Reducing mounting defects due to defective shield cases by performing warpage inspection on the mounter

Mounted position recognition

Reducing mounting defects and repair time after reflow by performing post-installation inspection on the mounter

*Please contact us for details on products compatible with each function.

# Related Contents

## Our Vision

## Other Solutions

## Case Study

## Movies

Our Vision

Our Vision - Factory Automation - Panasonic Connect

Solutions

Solutions - Factory Automation - Panasonic Connect

Case Study

Case Study

Video Library

Video Library - Library - Factory Automation - Panasonic Connect

# Related Products/Service

- Electronic Component Mounting-related Systems
- Mounting Software
- Operation & Maintenance
- Electronic Materials

Products and services page

Mounting Software

Operation & Maintainance

Electronic Materials

## Please feel free to contact Panasonic.

Contact form

## Please also refer to our website for product information.

Product website

Panasonic

CONNECT