SAMSUNG
SMT EUROPE

NPS Serie

Flexible Wide Range Mounter *for the Next Decade*

WELCOME ☺

- High Performance
- High Reliability
- Flexible Production
- Easy Operation

Screen printer NPS Series

Low cost

INDEX

01
NPS 510

02
NPS 510H

03
NPS 650

04
NPS 850

Screen Printer

NPS510

NPS510H

구 분	NPS510	NPS510H
Size (W*D*H) (mm)	1672 * 1400 * 1515	1880 * 1405 * 1500
Alignment Accuracy	**±15㎛**	**±12.5㎛**
Cycle Time (Exclude Printing)	**8sec**	**7sec**
Stencil Size (mm)	**736 * 736 / 650 * 650**	
PCB Size (mm)	**50 * 50 ~ 510 * 450**	**50 * 50 ~ 510 * 400**

Job Change Time	Model Change 5min / New Model 2min	
Board Clamping	Top Clamp / Edge Clamp	Top Aligner / Edge Clamp
PCB Clearance	Under 24mm / Edge 4.75mm	
PCB Thickness (mm)	**0.5 ~ 5 (Auto)**	
Conveyor Transport (W/Method)	**3 Step (Auto)**	**3 Step (Auto)**
Fiducial Find Algorithm	**Pattern Matching**	**GMF**
Camera	2CCD (1 for Stencil / 1 for PCB)	
Field Of View (mm)(Resolution)	10.4 * 8 (16.6㎛)	
Printing Speed	2 ~ 400mm/sec	
Printing Force (Method)	4 ~ 30kgf (Auto)	4 ~ 25kgf (Auto)
Power Requirements/Pneumatic	1-Phase, 110~240VAC, 3kVA/4~5 bar @ 600~700 NL/min	
Option		
Auto solder supply	○	○
Free Mask Adaptor	○	○
CE	○	○

Screen Printer

NPS650

NPS850

구 분	NPS650	NPS850
Size (W*D*H) (mm)	1732 * 1400 * 1515	2372 * 1510 * 1515
Alignment Accuracy	**±15㎛**	**±15㎛**
Cycle Time (Exclude Printing)	**9sec**	**13sec**
Stencil Size (mm)	**800*800/736*736 650*550**	**1000*800/800*800 736*736/650*550**
PCB Size (mm)	**50 * 50 ~ 650 * 450**	**50 * 50 ~ 850 * 530**

Job Change Time	Model Change 10min / New Model 10min	
Board Clamping	Top Clamp / Edge Clamp	Top Clamp / Edge Clamp
PCB Clearance	Under 24mm / Edge 4.75mm	
PCB Thickness (mm)	**0.5 ~ 5 (Auto)**	
Conveyor Transport (W/Method)	**3 Step (Auto)**	**3 Step (Auto)**
Fiducial Find Algorithm	**Pattern Matching**	**Pattern Matching**
Camera	2CCD (1 for Stencil / 1 for PCB)	
Field Of View (mm)(Resolution)	10.4 * 8 (16.6㎛)	
Printing Speed	2 ~ 400mm/sec	
Printing Force (Method)	4 ~ 30kgf (Auto)	4 ~ 30kgf (Auto)
Power Requirements/Pneumatic	1-Phase, 110~240VAC, 3kVA/4~5 bar @ 600~700 NL/min	
Option		
Auto solder supply	○	○
Free Mask Adaptor	○	○
CE	○	○

SAMSUNG
SMT EUROPE

Simple! Easy!

Screen Printer

NPS510

Item		Specifications
Performance	Size (W*D*H)	1672mm x 1400mm x 1515mm
	Alignment Accuracy	± 12.5 ㎛
	Cycle time (Exclude Printing)	8 sec
	Job Change time	5 min
Handling	Stencil size	736mm x 736mm / 650mm x 550mm
	PCB size (X × Y)	50mm x 50mm ~ 510mm x 450mm
	PCB warpage	± 1.5 mm
	Board Clamp	Top Clamp / Edge Clamp
	Board Support	Magnetic support pin / support block (Option. Vacuum block or Pin)
	PCB Thickness (mm)	0.5 ~ 5 (Auto)
	Conveyor Transport (W/Method)	3-Step (Auto)
	Fiducial Find Algorithm	Pattern Matching
Camera	Camera	2CCD (1 for Stencil / 1 for PCB)
	Field Of View (mm)(Resolution)	10.4 * 8 (16.6㎛)
Printing	Print Pressure	4 ~ 30 kgf
	Print Speed	2 ~ 400 mm/sec
Facilities	Power Requirements	1-Phase, 110 ~ 240VAC , 3 kVA
	Pneumatic	4~5 bar @ 600~700 NL/min

❖ Impletion of stable printing repeatability why highly rigid stage structure

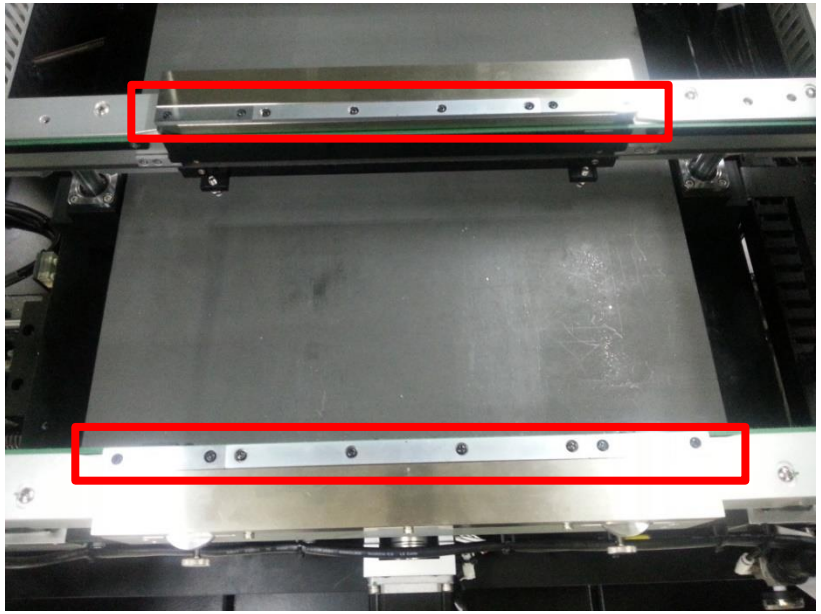
✓ X, Y1, Y2, Z control structure

Stage

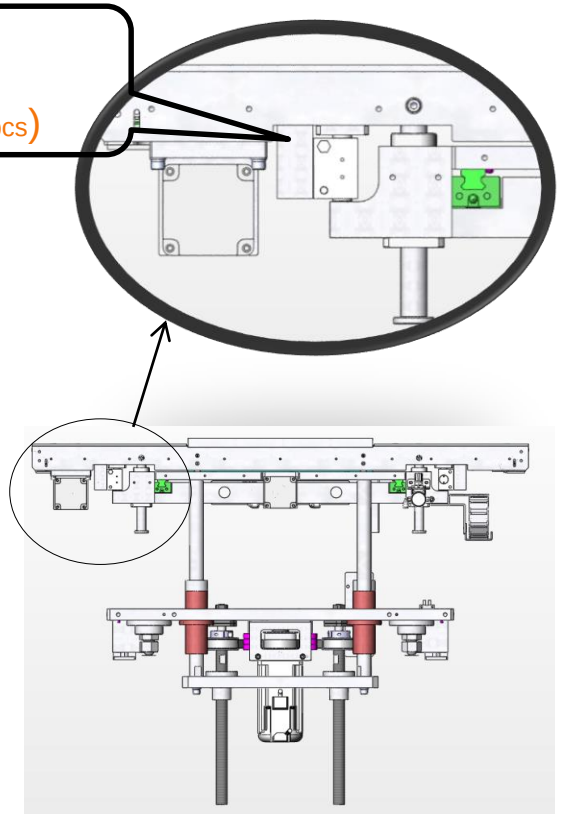
❖ PCB Clamping

✓ Clamping Type : Top Clamp / Edge Clamp.

Automatic adjustment
for PCB thickness
Air Chuck 4 pcs (60Kgf/1pcs)



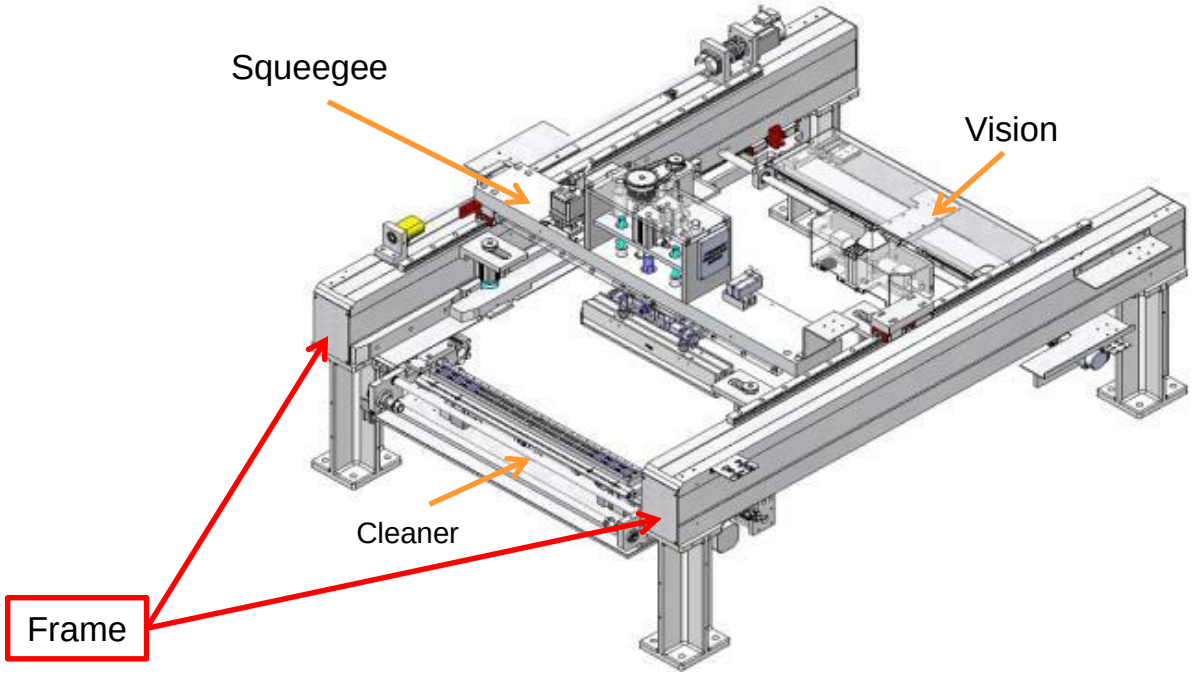
Selecting Clamp blades



Automatic adjustment
for PCB thickness

❖ Rigid design for frame of vision 'Y' axis

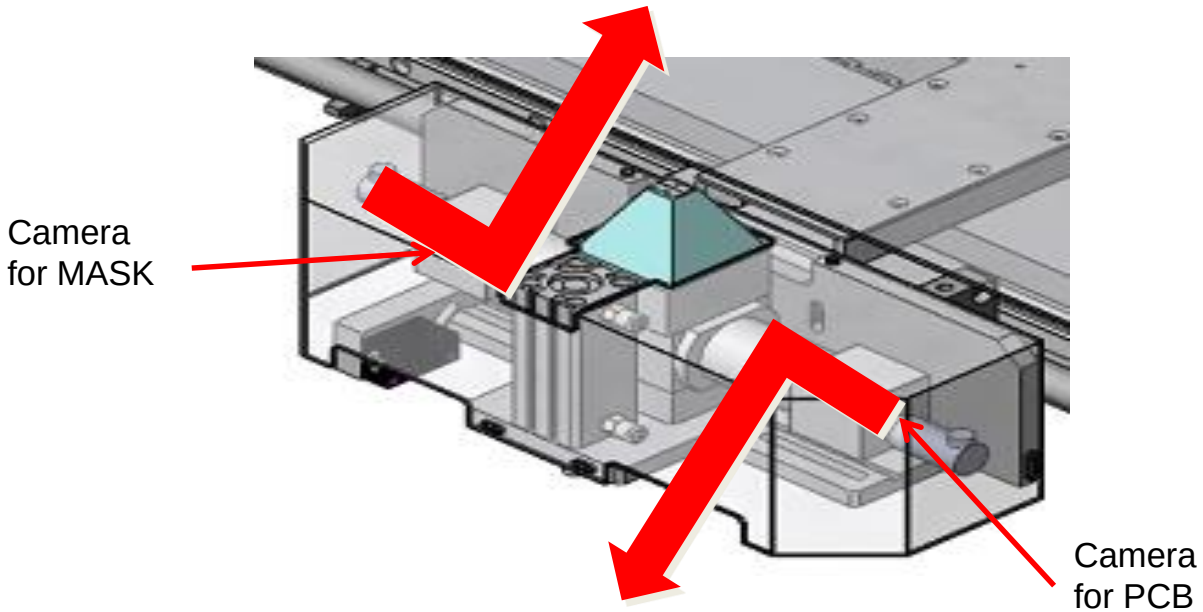
✓ This frame connect with 'vision', 'squeegee', 'cleaner'.
Also, It will be required rigid design same with stage structure
Because, Vision unit require high accuracy of camera position.



Frame structure of vision 'Y' axis

❖ 2 Cameras

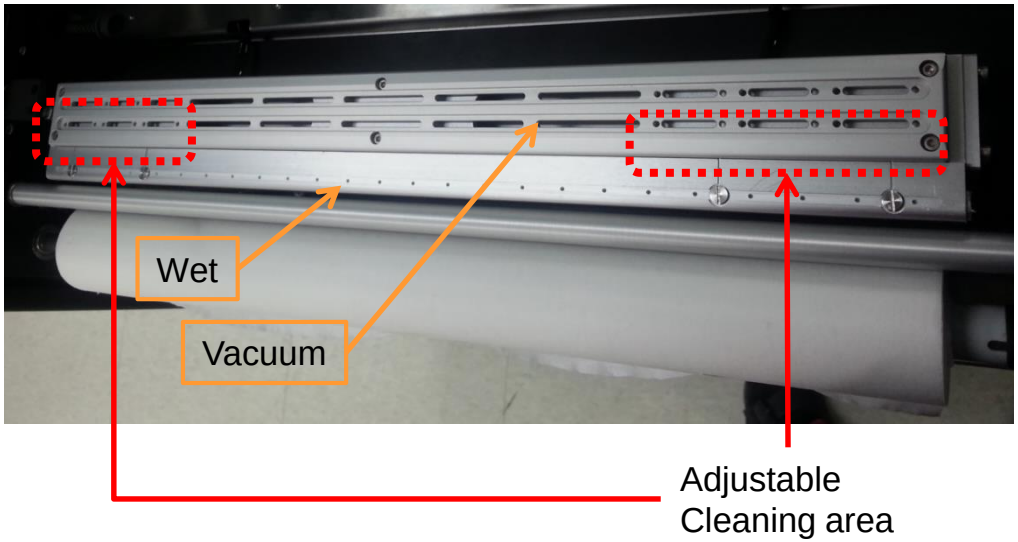
✓ Adopting individual camera for Mask & PCB
It can do recognition fiducial mark & printing for each other.
It can do 2D inspection for PCB after printing.



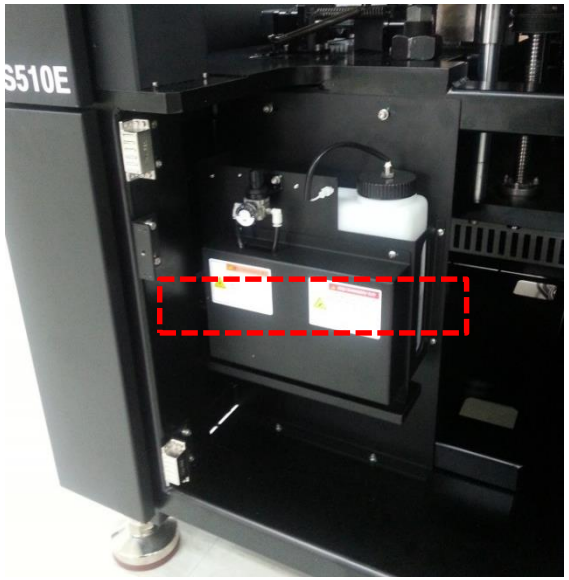
Camera Structure

❖ Easy & convenience Mask Cleaning system

- ✓ Wet, Vacuum
- ✓ Adjustable wet & vacuum area
- ✓ User can set detail cleaning moving by software
- ✓ Alcohol tank is locate machine inside



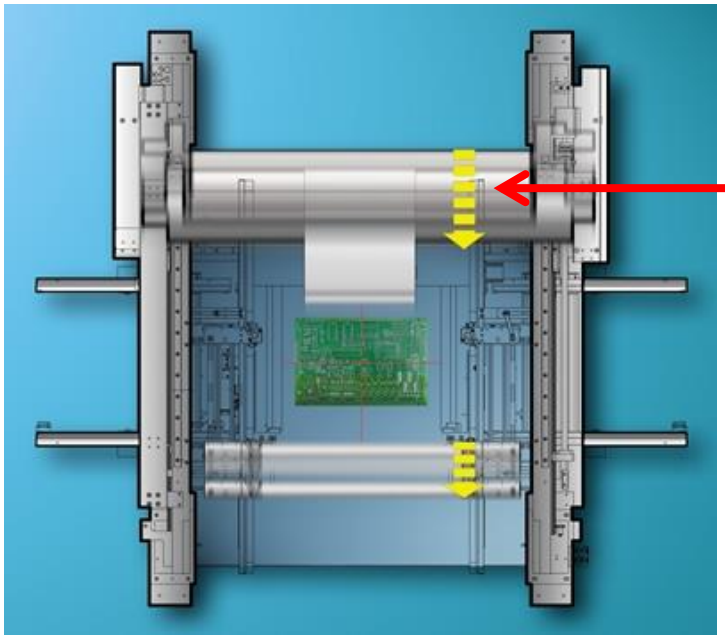
Cleaner structure



Inside alcohol tank

❖ The mask is moved to the optimal position according to the PCB size.

- ✓ The movement of stage can be minimized and high precision position control is possible by moving Mask.
- ✓ The mask auto moving after selecting PCB & Mask size

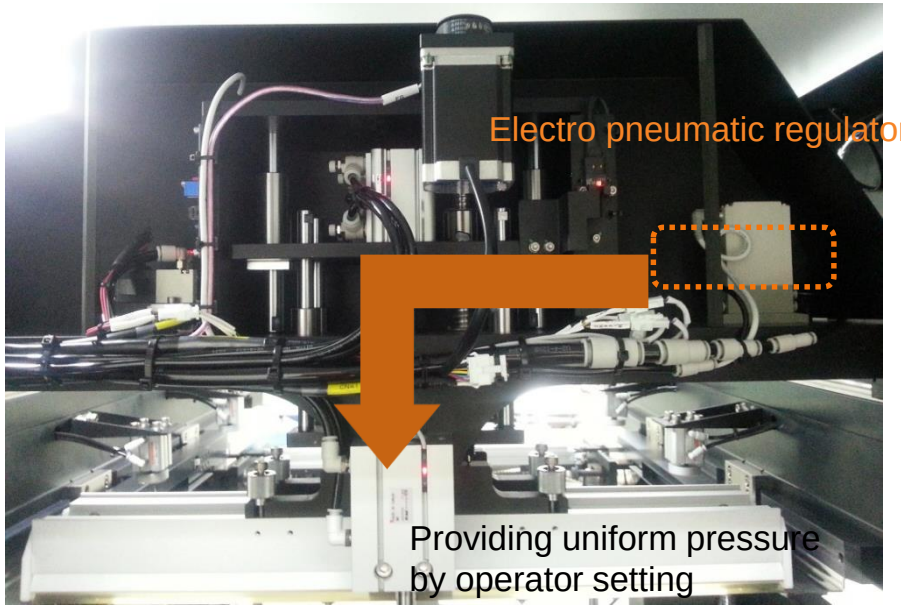


The Squeegee move the mask to optimize printing position by size of PCB & Mask.

Mask Moving

❖ Uniform pressure control

✓ Providing high precision uniform pressure control by electro pneumatic regulator

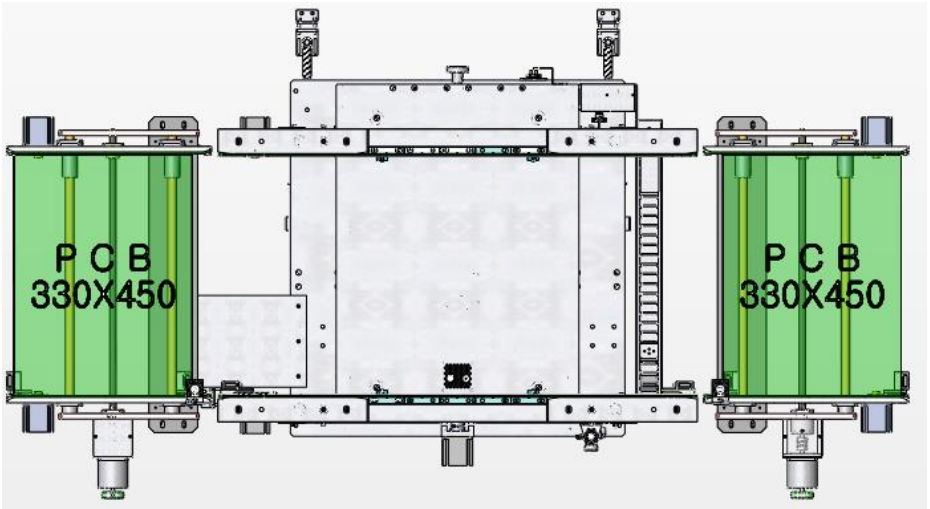


Squeegee structure

Squeegee setting

❖ Convenience Conveyor system

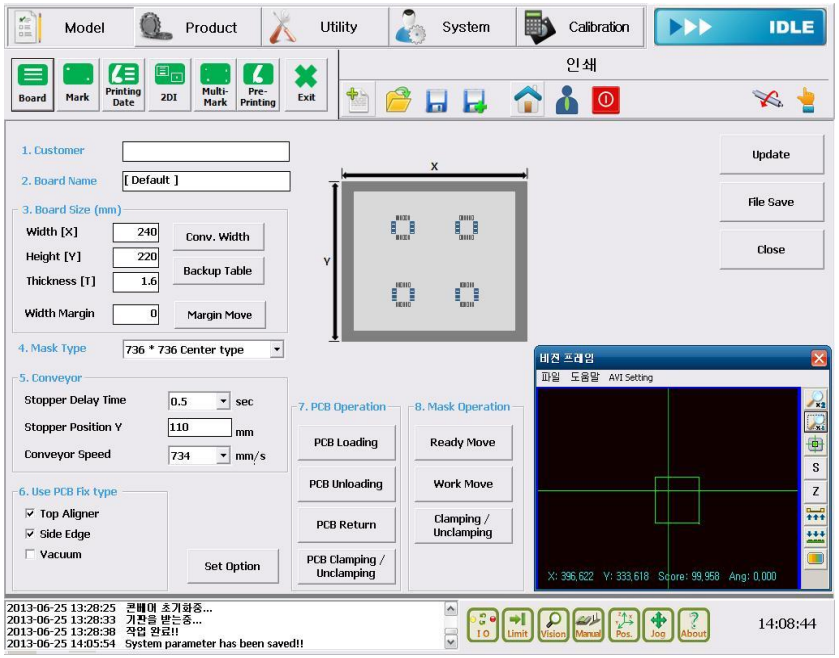
- ✓ 3 step structure (In/Stage/Out) (Standard type)
- ✓ Automatic conveyor width control



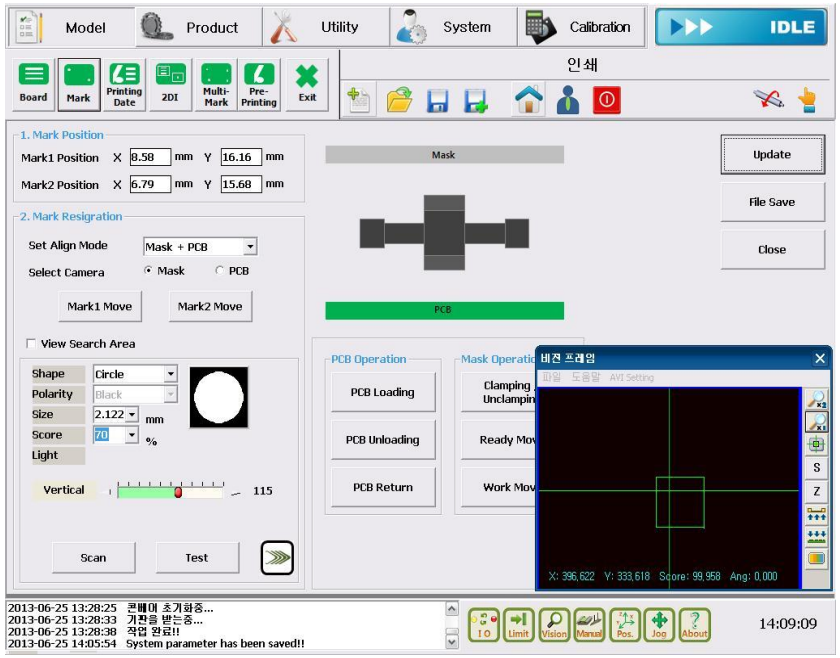
3 Step Conveyor

❖ Interface for User convenience

- ✓ Simple registration process of PCB information & Fiducial Mark
- ✓ High recognition for Fiducial Mark
- ✓ Production information & situation on one window(view)
- ✓ Icon for frequently used menu



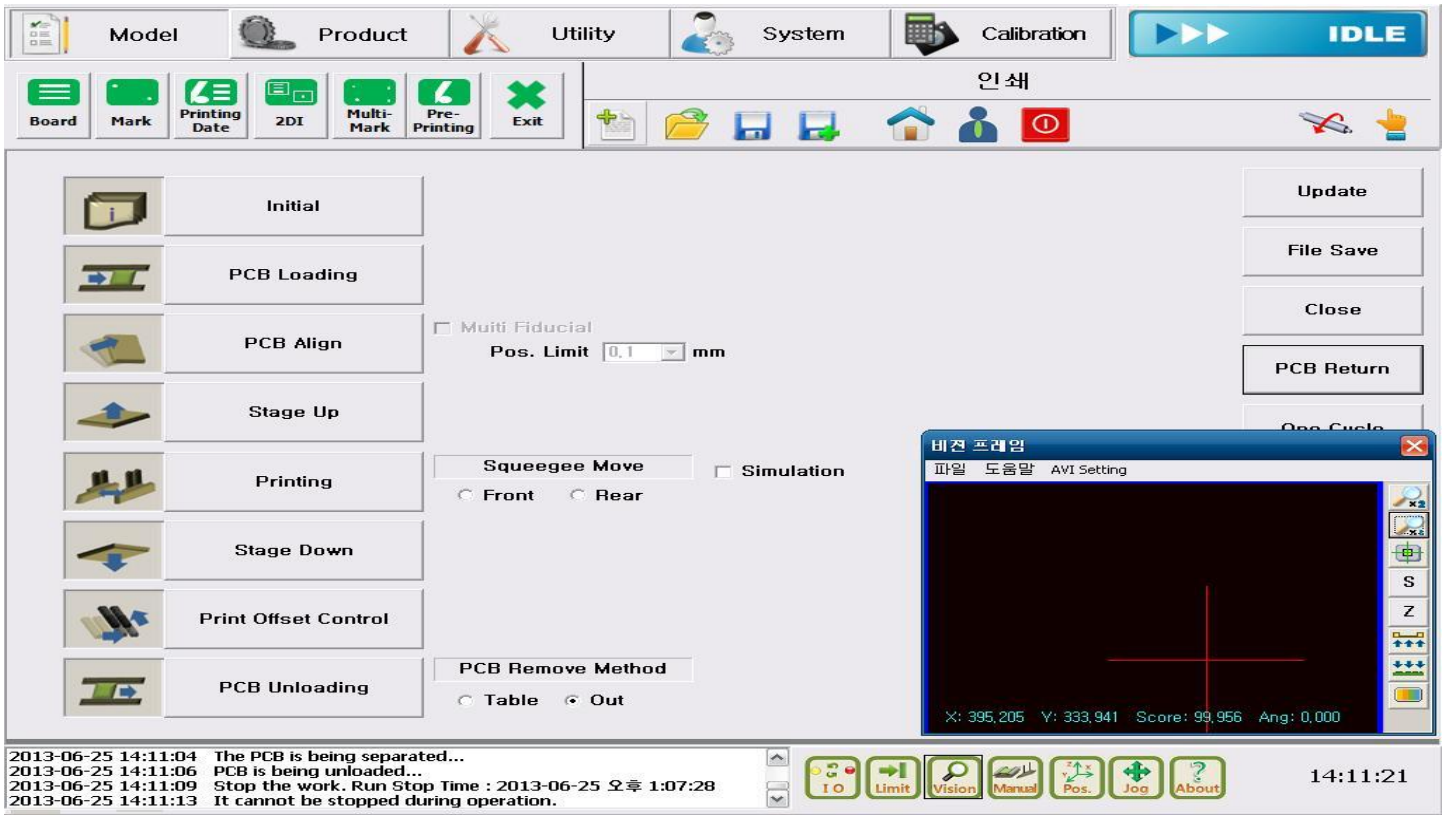
PCB information



Fiducial Mark registration

❖ Convenience printing off-set adjusting

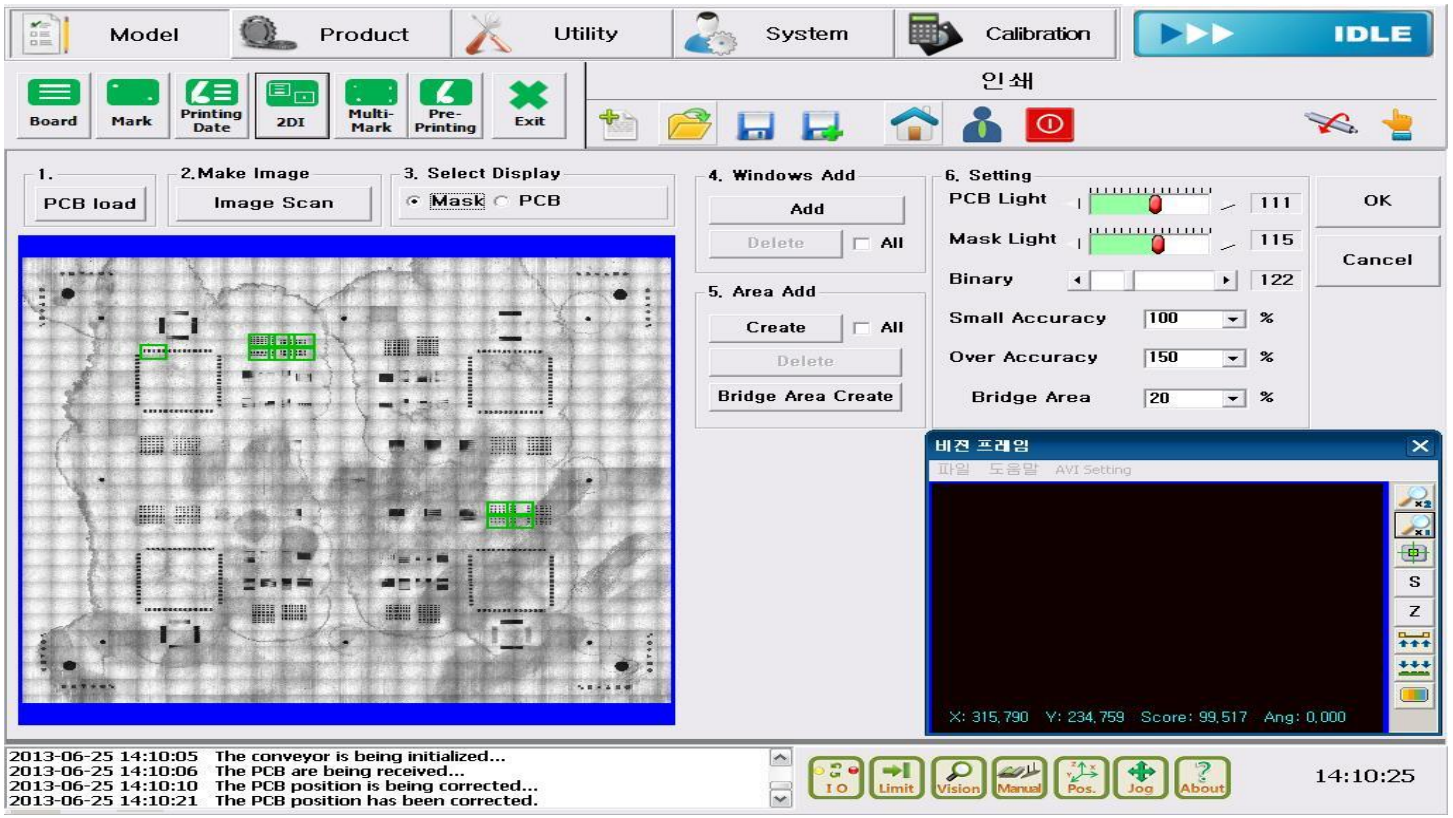
✓ Printing off-set adjusting on monitor by Pre-printing function



Pre-printing

❖ 2D Inspection (Standard)

✓ Sampling inspection for printing results by machine's camera

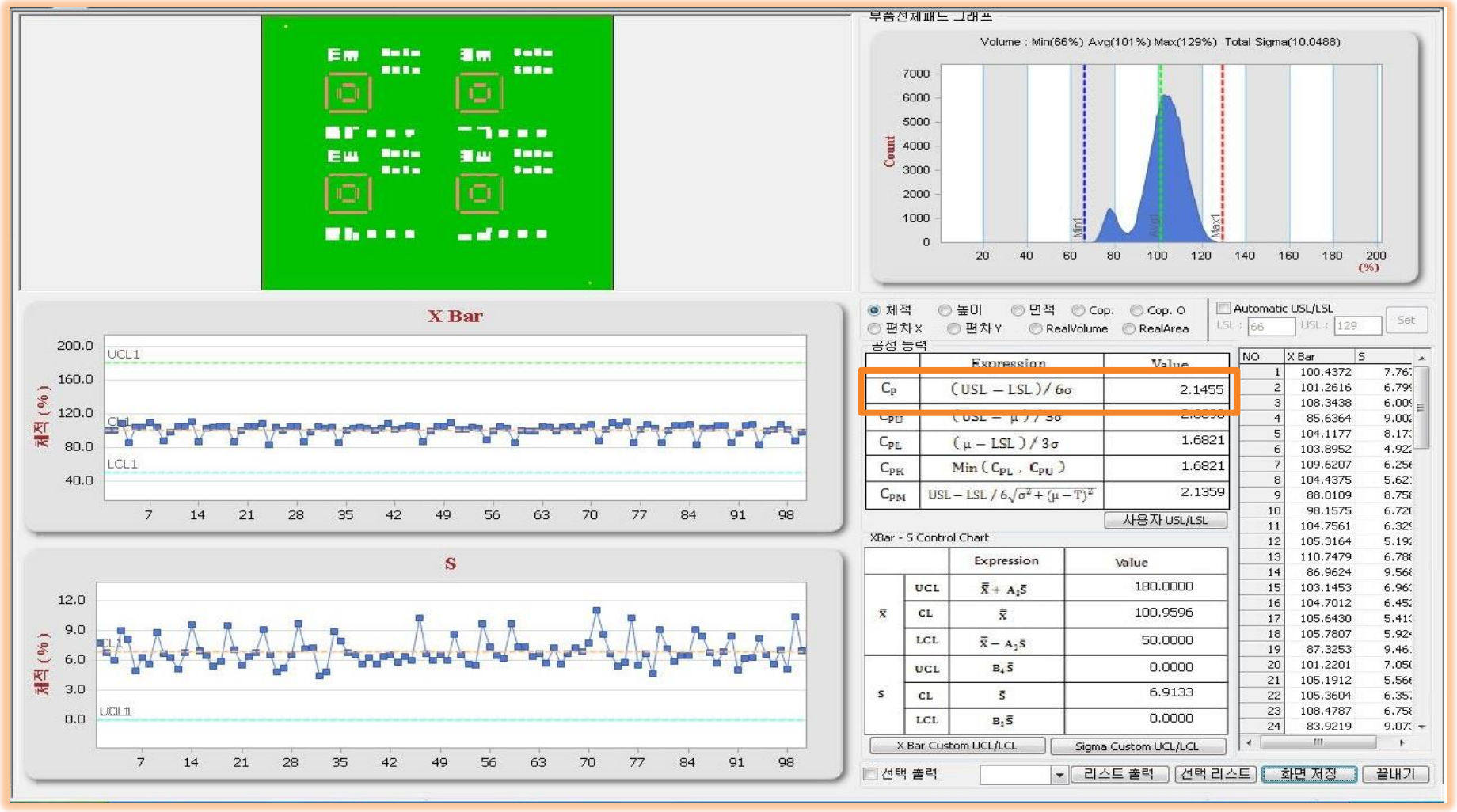


Teaching of 2D Inspection

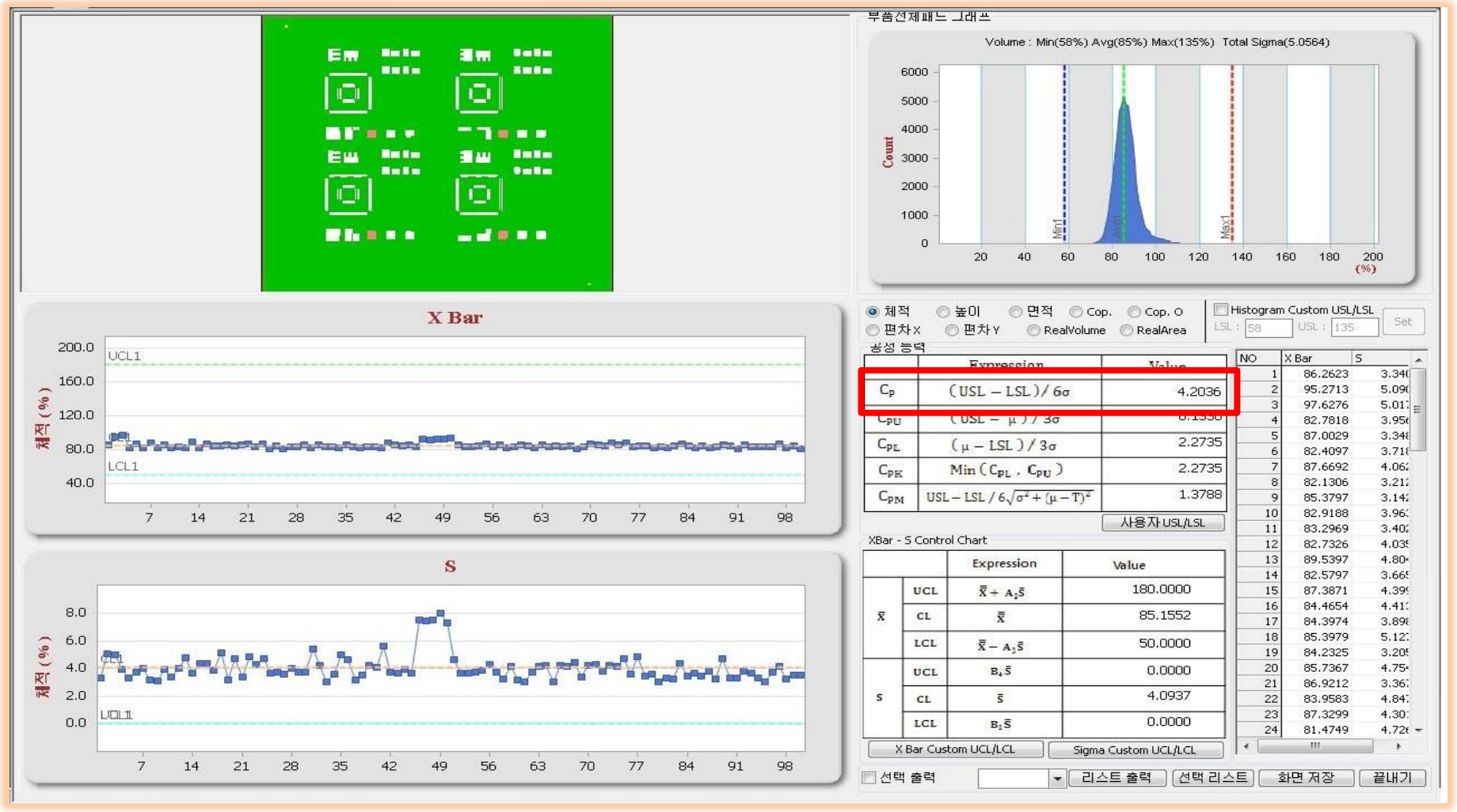
PCB Size	Valuation basis	Item	CP value of COMPONENT			Remarks
			QFP_0.4	BGA_0.3	CHIP_0603	
240 * 220 (X*Y, mm)	CP 2.00 ≥ (6σ)	Height	2.72	3.19	2.84	Mask thickness : 0.1mm
		Area	4.40	5.00	4.39	
		Volume	**2.14**	**4.20**	**3.19**	

Printing Condition	SQUEEGEE	STAGE	CLEANER
	Printing Speed 50mm/sec	Separation Mask & PCB Mode : Normal mode Speed : 1 mm/sec Distance : 3 mm/sec	Cleaning frequency : 1time / 5 PCB printing
	Printing Offset From : 40 mm To : 20 mm		
	Printing Pressure Front : 6Kgf Rear : 6Kgf		

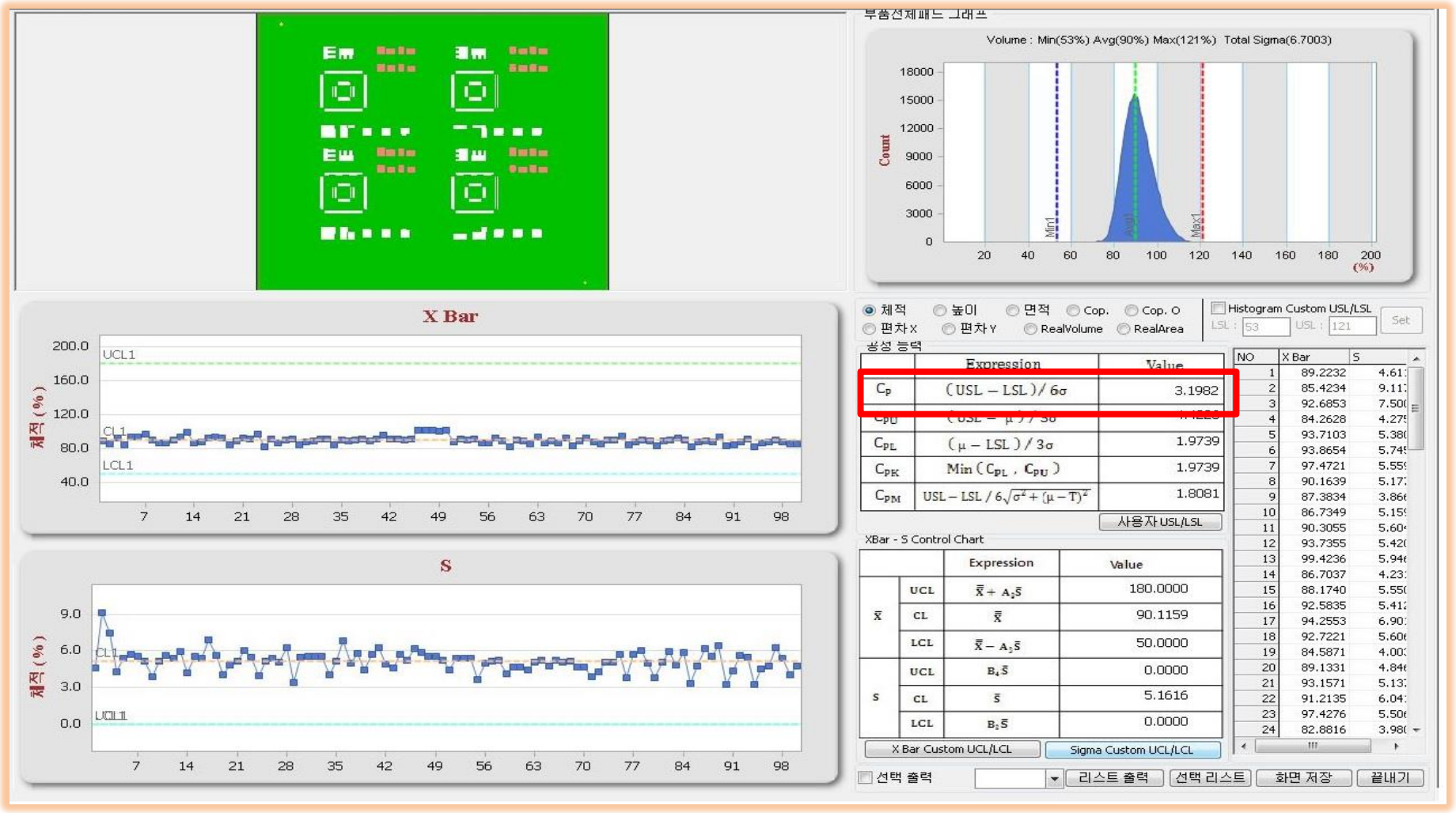
※ Inspection 100 printing PCB
※ SPI : SE500 (Cyberoptics)



QFP 0.4 pitch (Volume)



BGA 0.3 pitch (Volume)



Chip 0603 (Volume)

SAMSUNG
SMT EUROPE

Simple! Easy!

Screen Printer

NPS510H

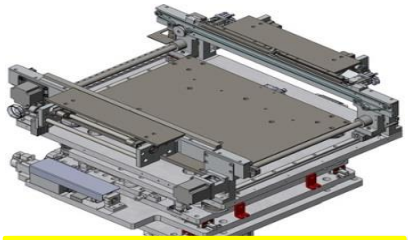
Wide Productivity,

High precision repeat printing,

Pursuance for user-convenience

▣. Main Concept

Stage



Highly rigid Stage

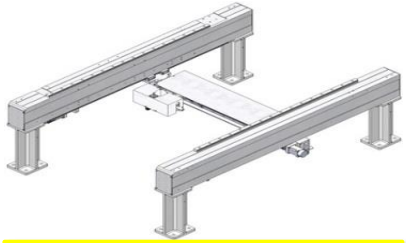
Camera

Adopting 2 cameras

Cleaner

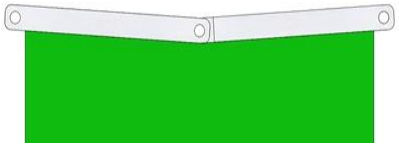
Mask cleaning

Vision Frame



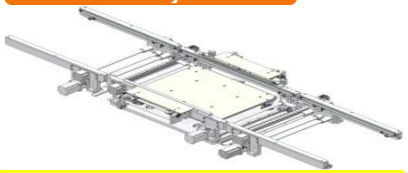
Vision 'Y'axis

PCB Tilting



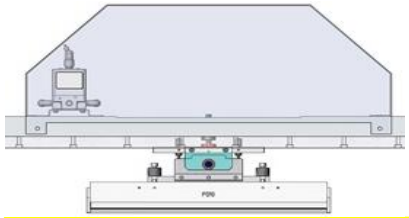
Ideal PCB clamping

conveyor



3 step & adjustable speed

Squeegee

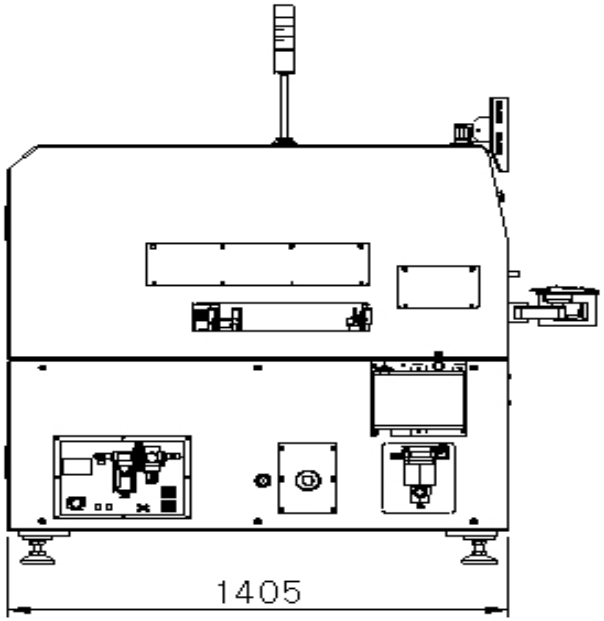


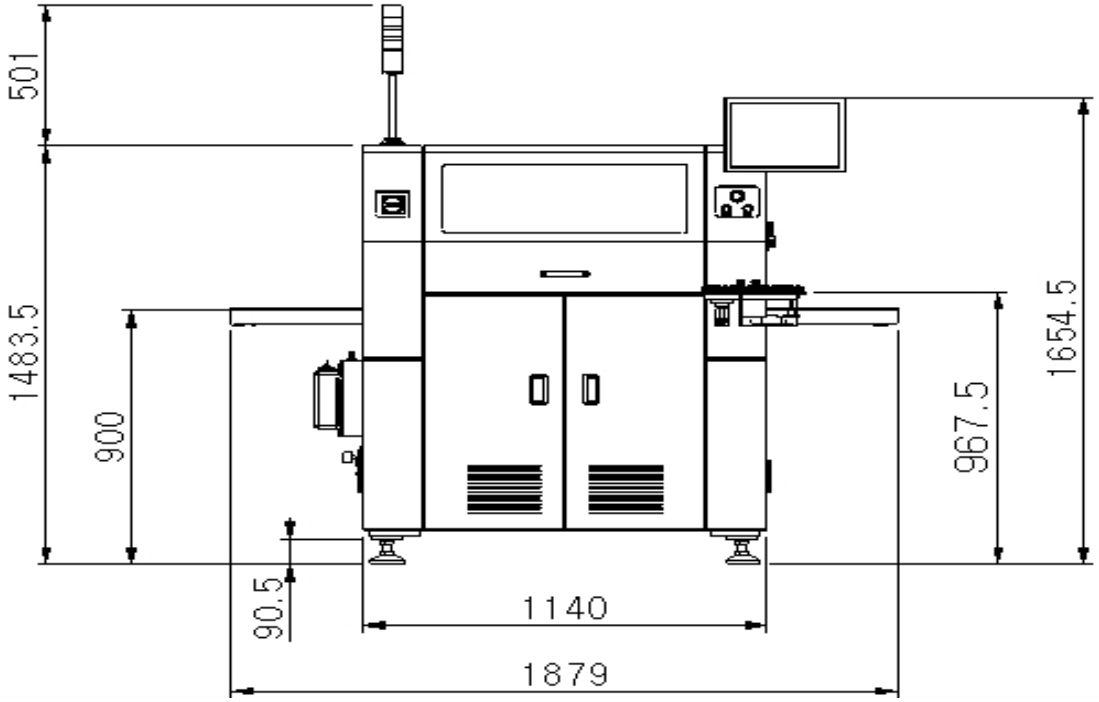
Uniform pressure control

Software

Interface for user

Item		Specifications
Performance	Size (W*D*H)	1880mm x 1405mm x 1500mm
	Alignment Accuracy	± 12.5 ㎛
	Cycle time (Exclude Printing)	7 sec
	Job Change time	5 min
Handling	Stencil size	736mm x 736mm / 650mm x 550mm
	PCB size (X × Y)	50mm x 50mm ~ 510mm x 400mm
	PCB warpage	± 1.5 mm
	Board Clamp	Top Aligner / Edge Clamp
	Board Support	Magnetic support pin (Option. Vacuum block or Pin)
	PCB Thickness (mm)	0.5 ~ 5 (Auto)
	Conveyor Transport (W/Method)	3-Step (Auto)
	Fiducial Find Algorithm	GMF
Camera	Camera	2CCD (1 for Stencil / 1 for PCB)
	Field Of View (mm)(Resolution)	10.4 * 8 (16.6㎛)
Printing	Print Pressure	4 ~ 25 kgf
	Print Speed	2 ~ 400 mm/sec
Facilities	Power Requirements	1-Phase, 110 ~ 240VAC , 3 kVA
	Pneumatic	4~5 bar @ 600~700 NL/min

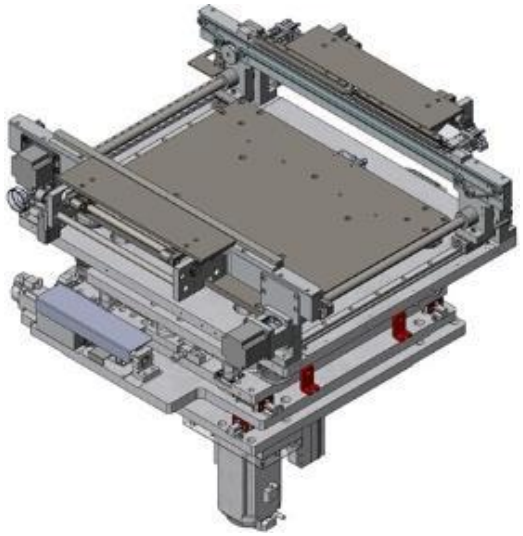




Item	Value
Conveyor - Conveyor	1,880 mm
Front - Rear	1,405 mm
Height	1,485 mm

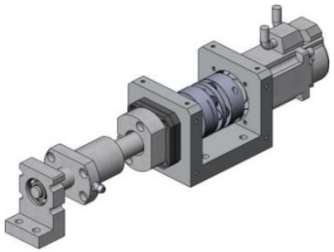
❖ Impletion of stable printing repeatability why highly rigid stage structure

- ✓ Simultaneous X, Y, Z, θ control structure
- ✓ Direct connection servo motor with ball screw (none-adopting timing belt)
- ✓ Detail control θ by ring guide [patent application]



Stage structure

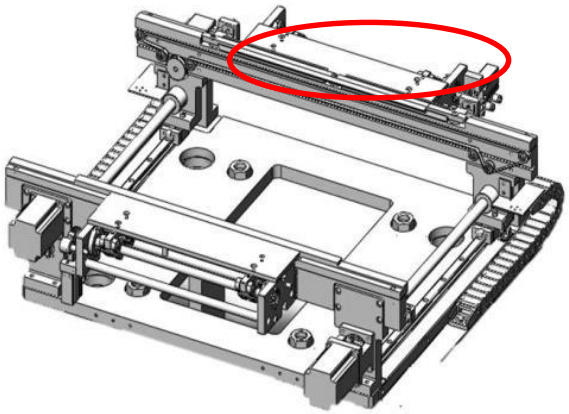
Ring Guide

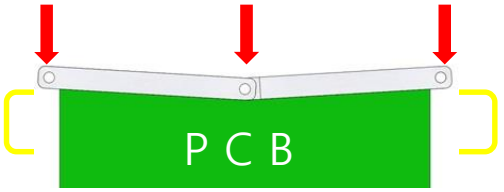


Direct connection

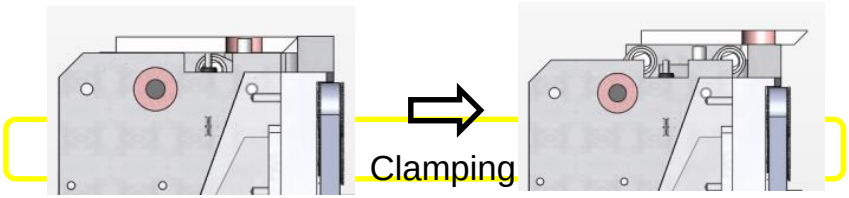
❖ Strong PCB Clamping

- ✓ Clamping type: Edge Clamp, Top Aligner
- ✓ The 'Tilting structure' can clamp PCB that have flexion on side.
  2 points control [patent application]





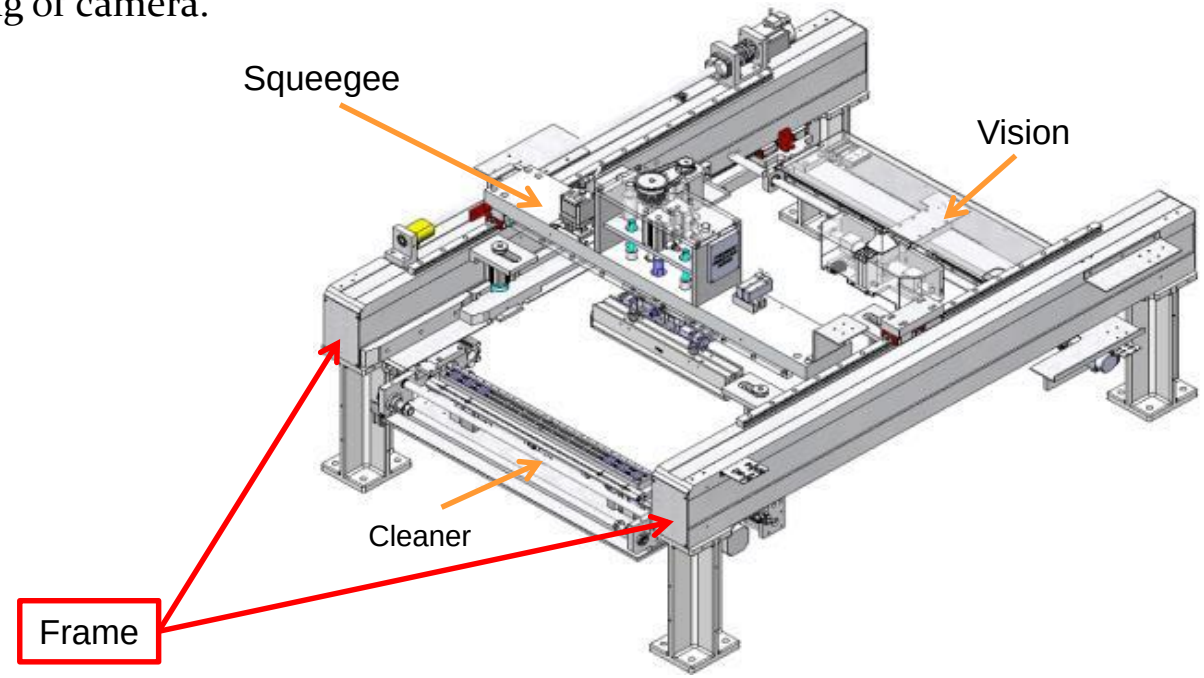
PCB Tilting



Top Aligner

❖ Rigid design for frame of vision 'Y' axis

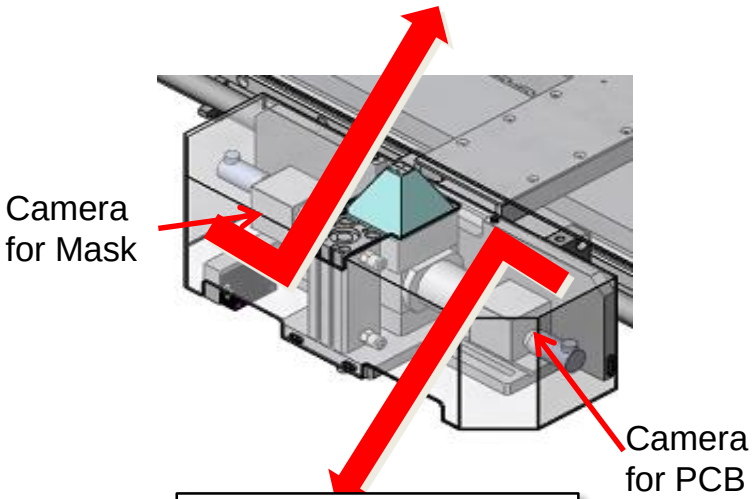
✓ This frame is connected with 'vision', 'squeegee', 'cleaner'.
Also, It will be required rigid design same with stage structure.
Because, Vision unit require high accuracy of camera position & high speed moving of camera.



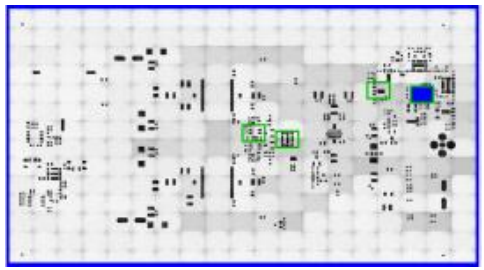
Frame structure of vision 'Y' axis

❖ 2 Cameras

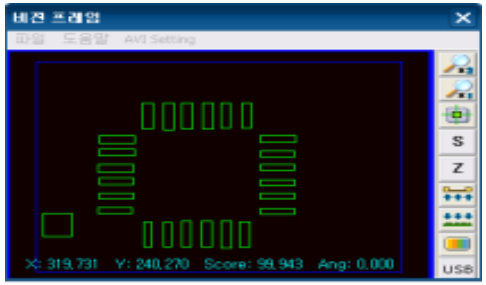
✓ Adopting individual camera for Mask & PCB
It can do 2D inspection for PCB after recognition fiducial mark & printing



Camera Structure



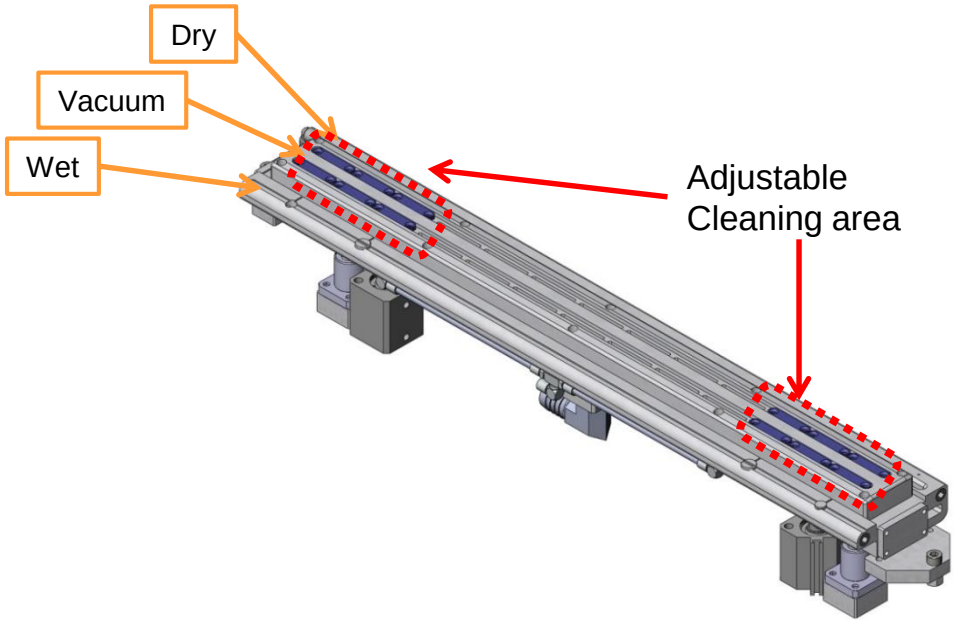
Scan image for Mask



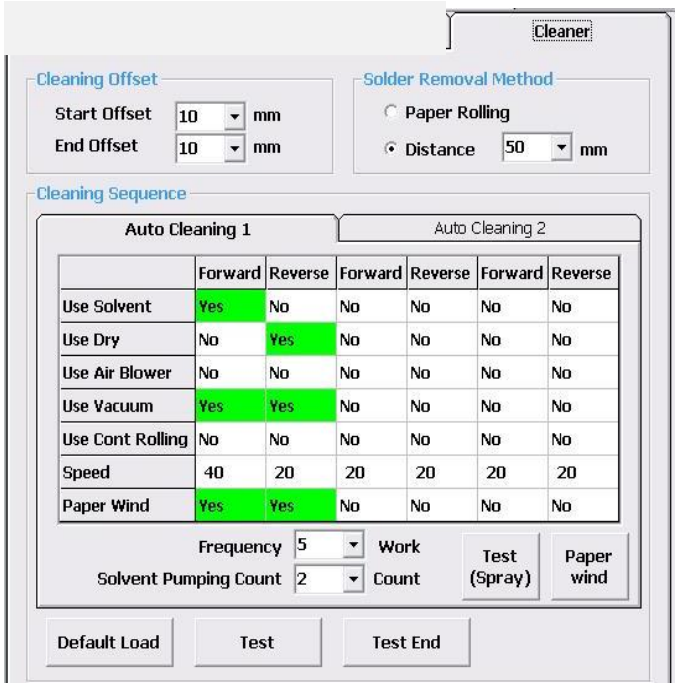
2D Inspection for PCB side

❖ Easy & convenience Mask Cleaning system

- ✓ Wet, Vacuum, Dry
- ✓ Adjustable wet & vacuum area
- ✓ User can set detail cleaning moving by software



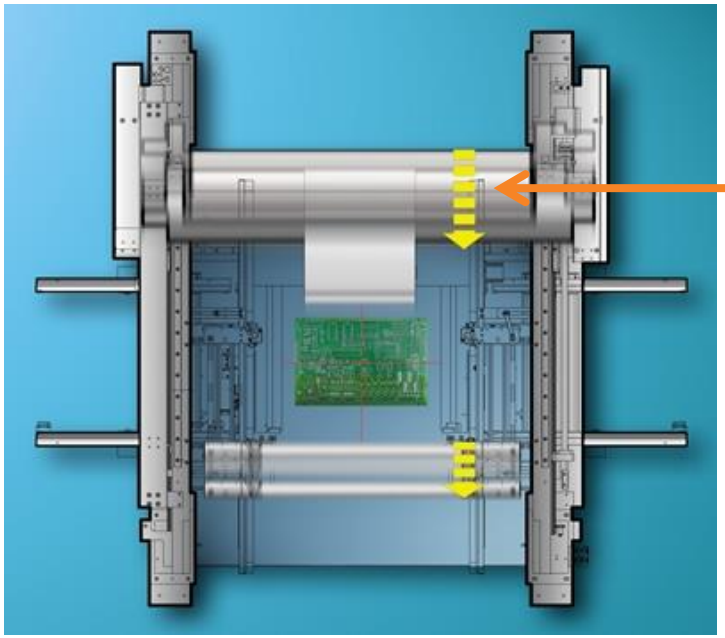
Cleaner structure



Cleaning Setting

❖ The mask is moved to the optimal position according to the PCB size.

- ✓ The movement of stage can be minimized and high precision position control is possible by moving Mask.
- ✓ The mask auto moving after selecting PCB & Mask size

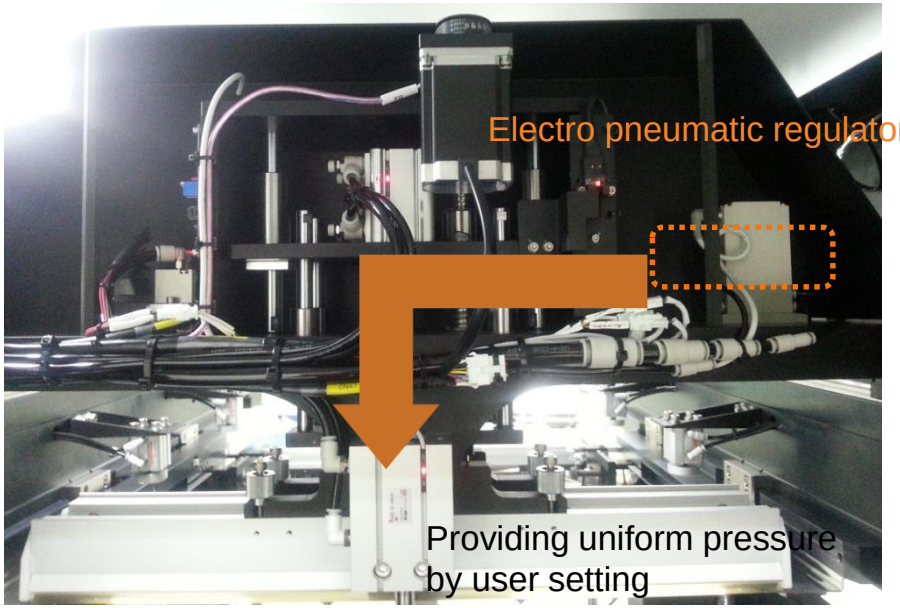


The Squeegee move the mask to optimize printing position by size of PCB & Mask.

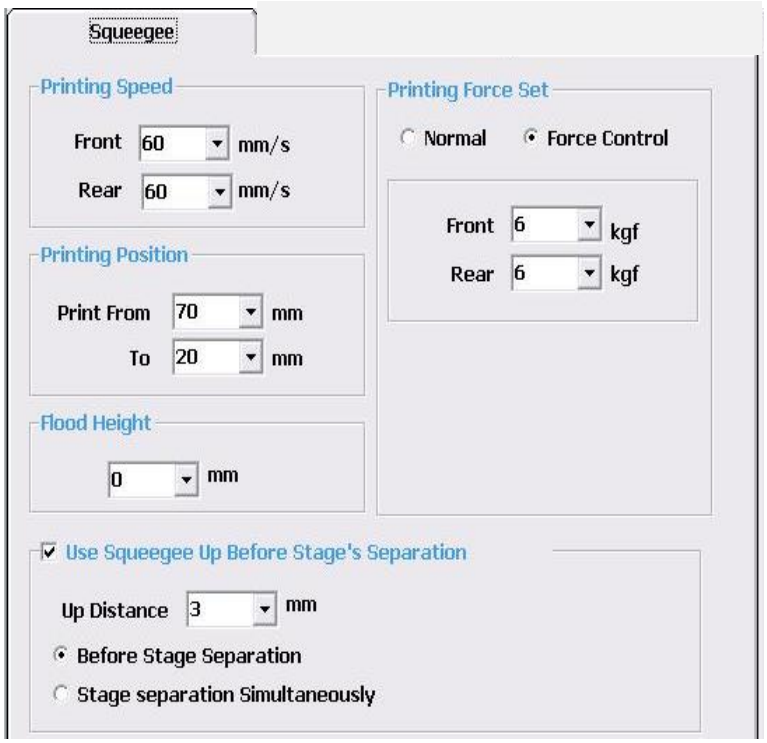
Mask Moving

❖ Uniform pressure control

✓ Providing high precision uniform pressure control by electro pneumatic regulator



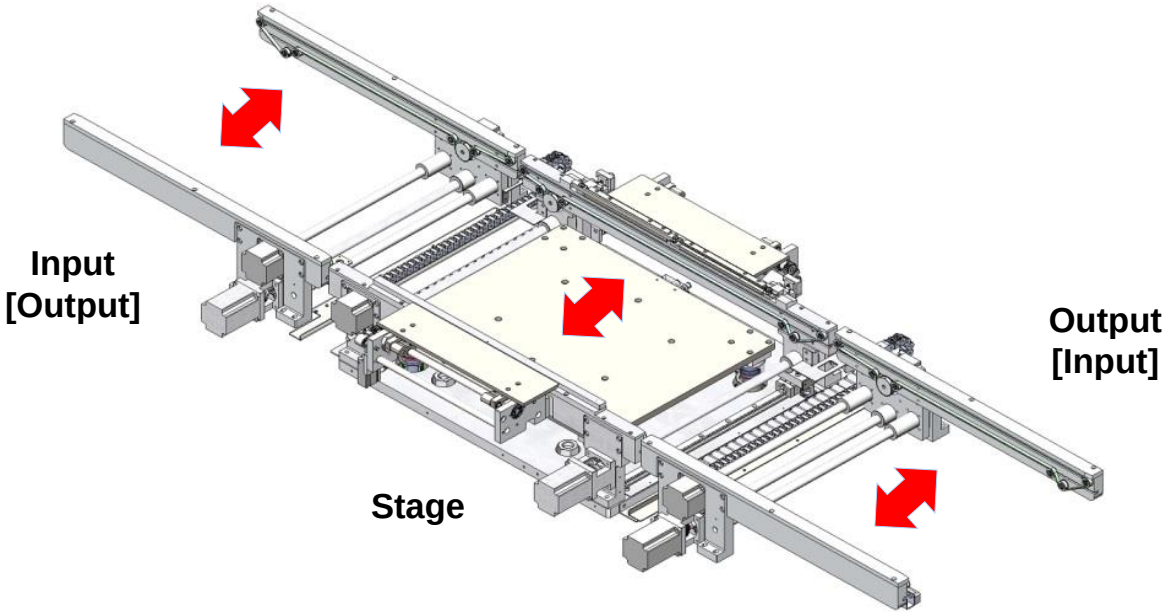
Squeegee structure



Squeegee setting

❖ Convenience Conveyor system

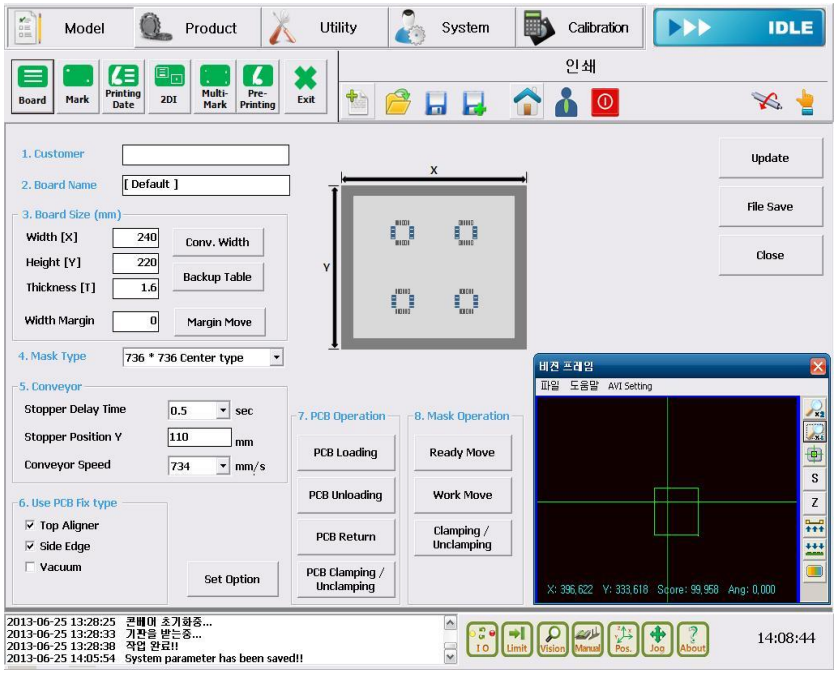
- ✓ 3 Step structure (Input / Stage / Output)
- ✓ Automatic conveyor width control
- ✓ Adjustable 4 step moving speed by software



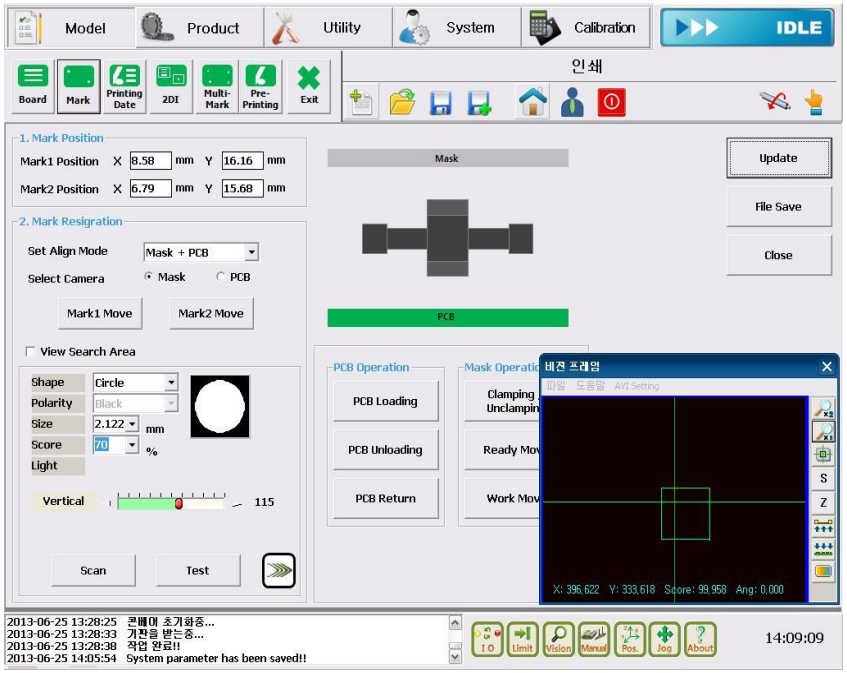
Conveyor structure

❖ Interface for User convenience

- ✓ Simple registration process of PCB information & Fiducial Mark
- ✓ High recognition for Fiducial Mark
- ✓ Production information & situation on one window(view)
- ✓ Icon for frequently used menu



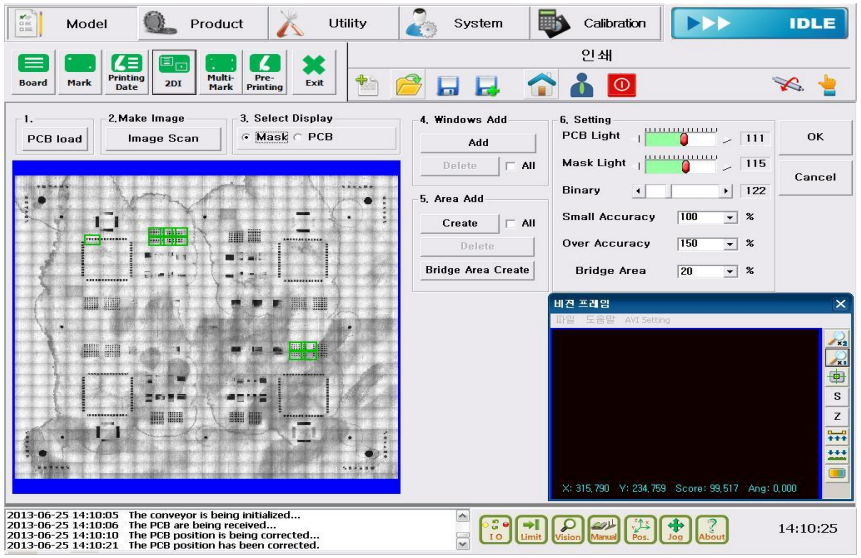
PCB information



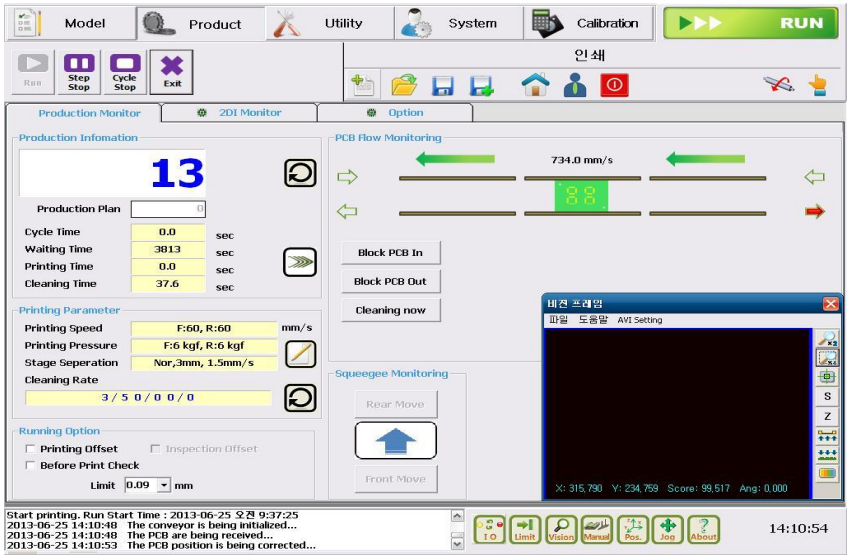
Fiducial Mark registration

Implementation high precision position control

Fiducial Mark recognition



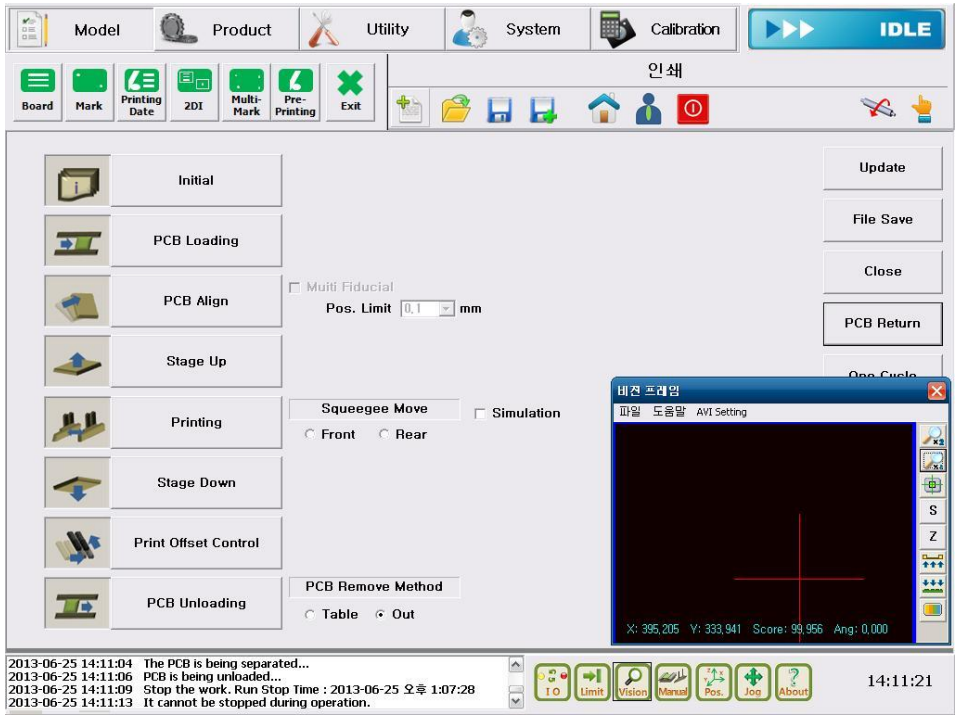
Teaching of 2D inspection



Production information

❖ Convenience printing off-set adjusting

- ✓ Printing off-set adjusting on monitor by Pre-printing function
- ✓ Providing Jog box that can use to adjust by user-eyes.

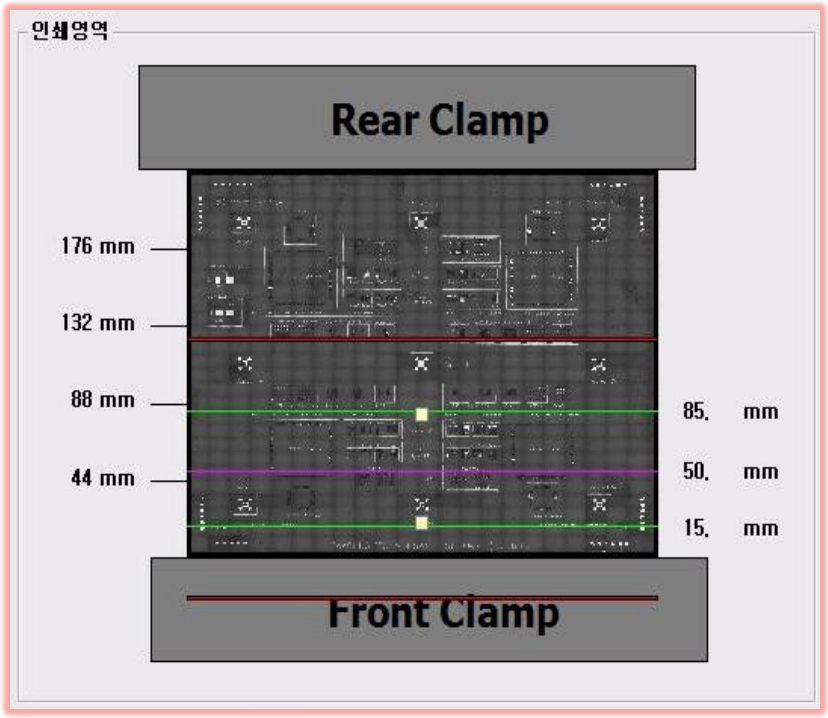


Pre-printing

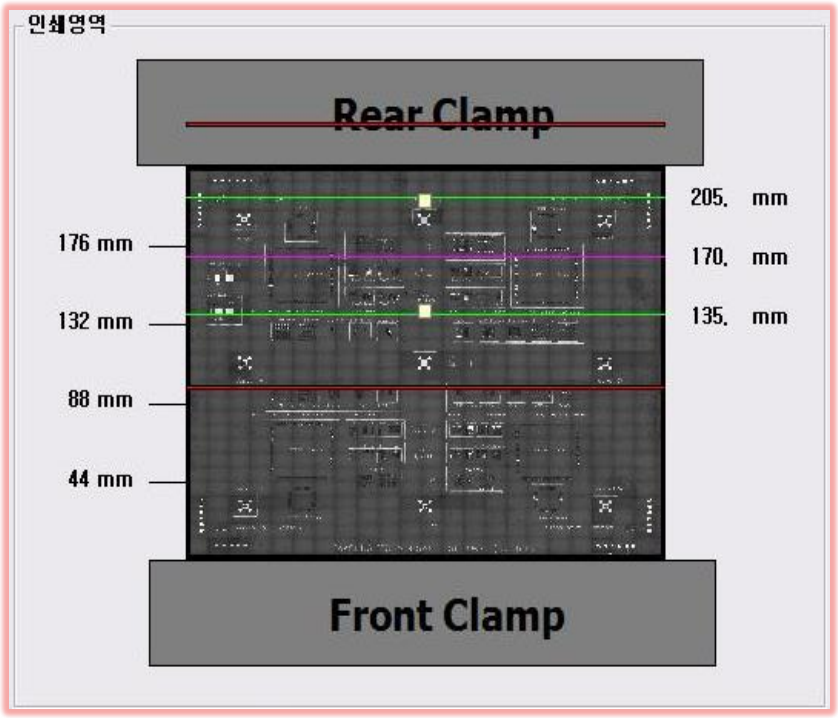
Jog Box

❖ Convenience adjusting printing area

- ✓ User can adjust printing area by monitor
- ✓ If the mask have 2 patterns, user can adjust printing area for printing model



Pattern at front

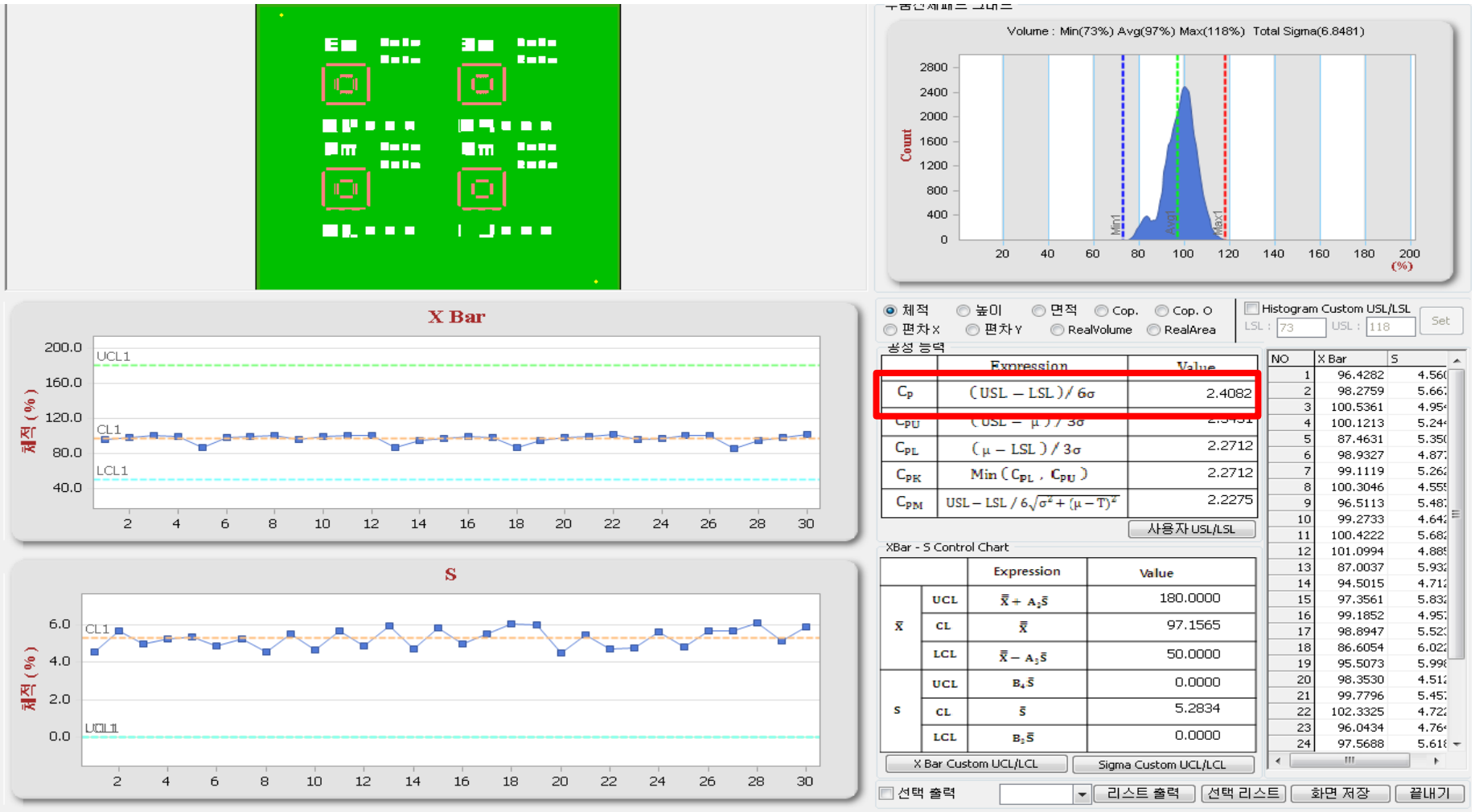


Pattern at rear

PCB Size	Valuation basis	Item	CP value of COMPONENT			Remarks
			QFP_0.4	BGA_0.3	CHIP_0603	
240 * 220 (X*Y, mm)	CP 1.33 ≥ (4σ)	Height	3.73	2.87	3.02	Mask thickness : 0.1mm
		Area	4.10	4.37	4.52	
		Volume	2.40	4.49	3.29	

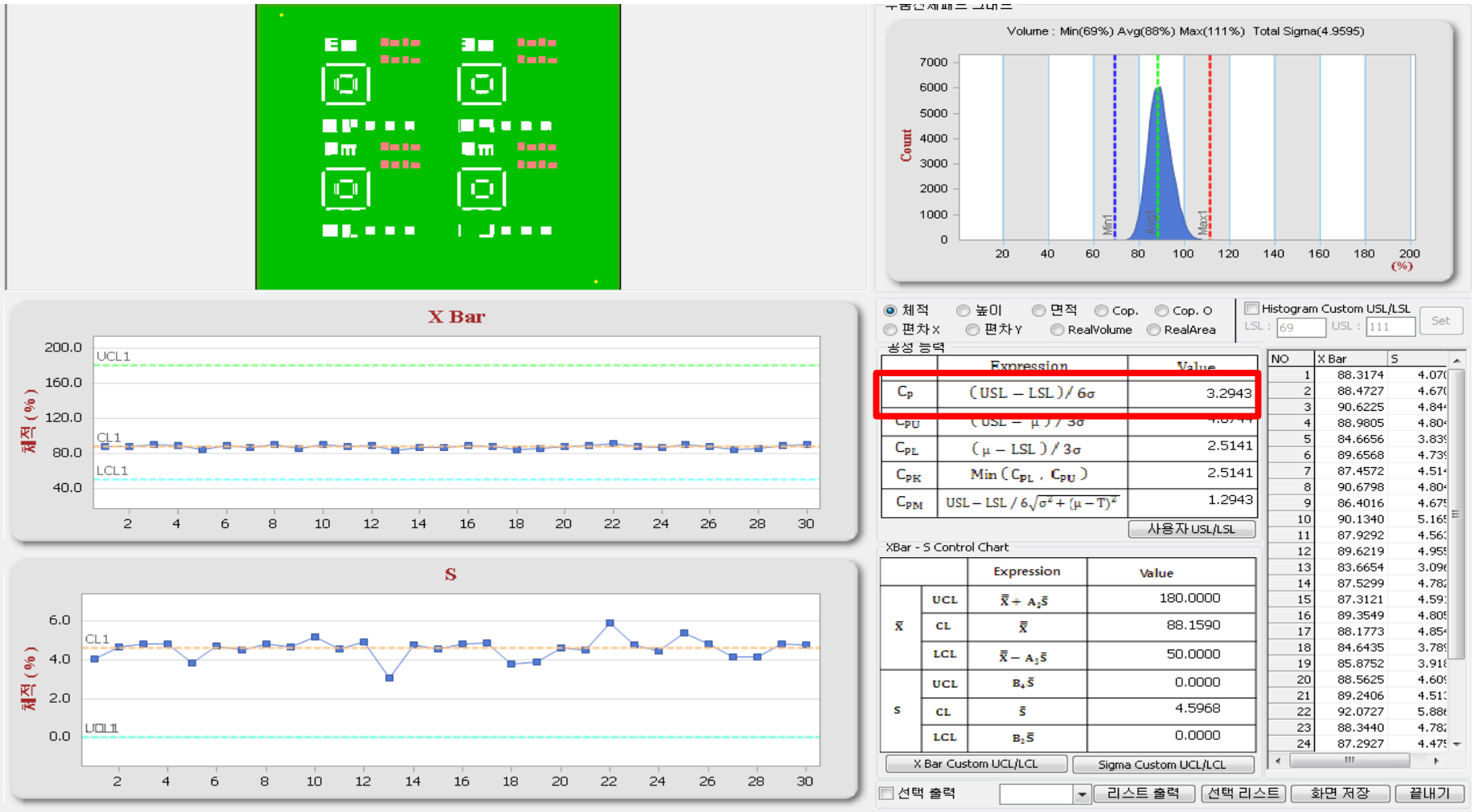
Printing Condition	SQUEEGEE	STAGE	CLEANER
	Printing Speed 50mm/sec	Separation mode : Normal Speed : 1 mm/sec Distance : 3 mm/sec	Cleaning frequency : 1time / 5 PCBs
	Printing Offset From : 40 mm To : 20 mm		1st one-way : Wet, Vacuum Paper usage
	Printing Pressure Front : 6Kgf Rear : 6Kgf		2nd one-way : Vacuum, Paper usage 3rd one-way : Dry, Vacuum, Paper usage

※ Inspection 100 printing PCB
※ SPI : SE500ultra (Cyberoptics)



Volume of QFP 0.4 pitch

Volume of BGA 0.3 pitch



Volume of Chip 0603

SAMSUNG
SMT EUROPE

Simple! Easy!

Screen Printer

NPS650

Item		Specifications
Performance	Size (W*D*H)	1732mm x 1400mm x 1515mm
	Alignment Accuracy	± 15 ㎛
	Cycle time (Exclude Printing)	9 sec
	Job Change time	10 min
Handling	Stencil size	800mm x800mm / 736mm x 736mm / 650mm x 550mm
	PCB size (X × Y)	50mm x 50mm ~ **650mm x 450mm**
	PCB warpage	± 1.5 mm
	Board Clamp	Top Clamp / Edge Clamp
	Board Support	Magnetic support pin / support block (Option. Vacuum block or Pin)
	PCB Thickness (mm)	0.5 ~ 5 (Auto)
	Conveyor Transport (W/Method)	3-Step (Auto)
	Fiducial Find Algorithm	Pattern Matching
Camera	Camera	2CCD (1 for Stencil / 1 for PCB)
	Field Of View (mm)(Resolution)	10.4 * 8 (16.6㎛)
Printing	Print Pressure	4 ~ 30 kgf
	Print Speed	2 ~ 400 mm/sec
Facilities	Power Requirements	1-Phase, 110 ~ 240VAC , 3 kVA
	Pneumatic	4~5 bar @ 600~700 NL/min

❖ Impletion of stable printing repeatability why highly rigid stage structure

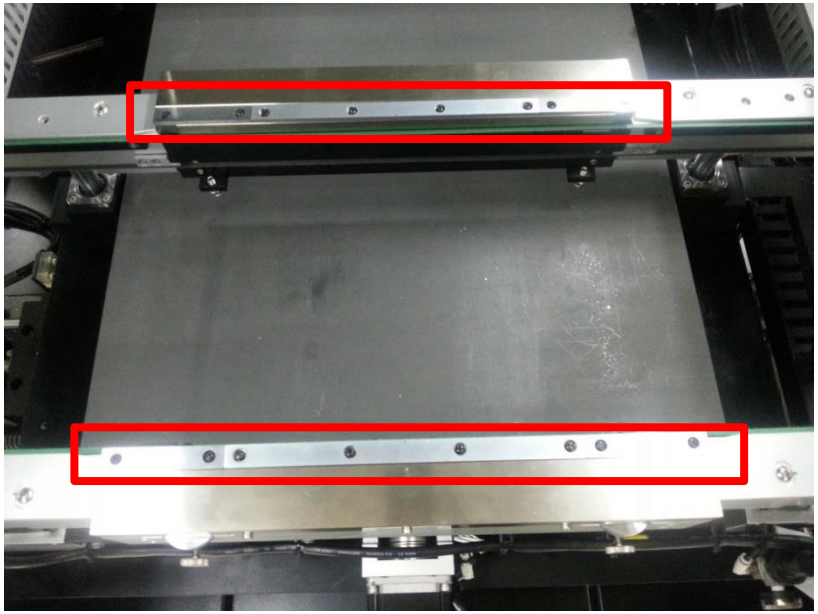
✓ X, Y1, Y2, Z control structure

Stage

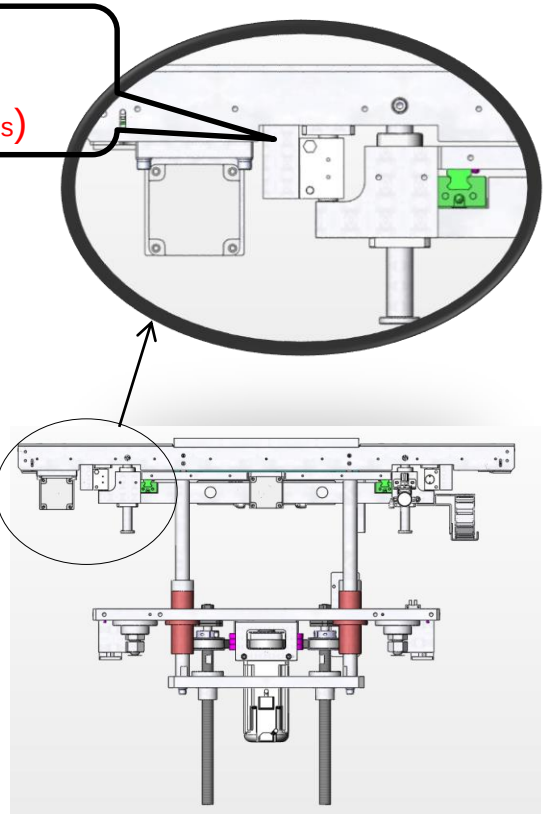
❖ PCB Clamping

✓ Clamping Type : Top Clamp / Edge Clamp.

Automatic adjustment
for PCB thickness
Air Chuck 4 pcs (60Kgf/1pcs)



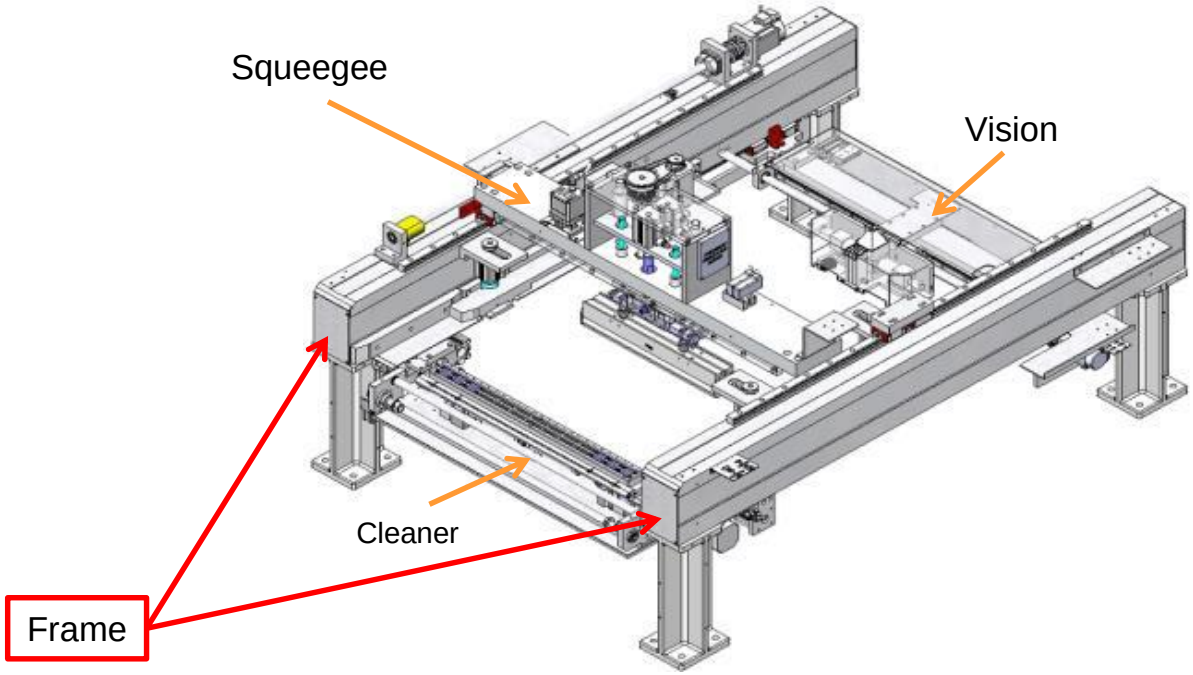
Selecting Clamp blades



Automatic adjustment
for PCB thickness

❖ Rigid design for frame of vision 'Y' axis

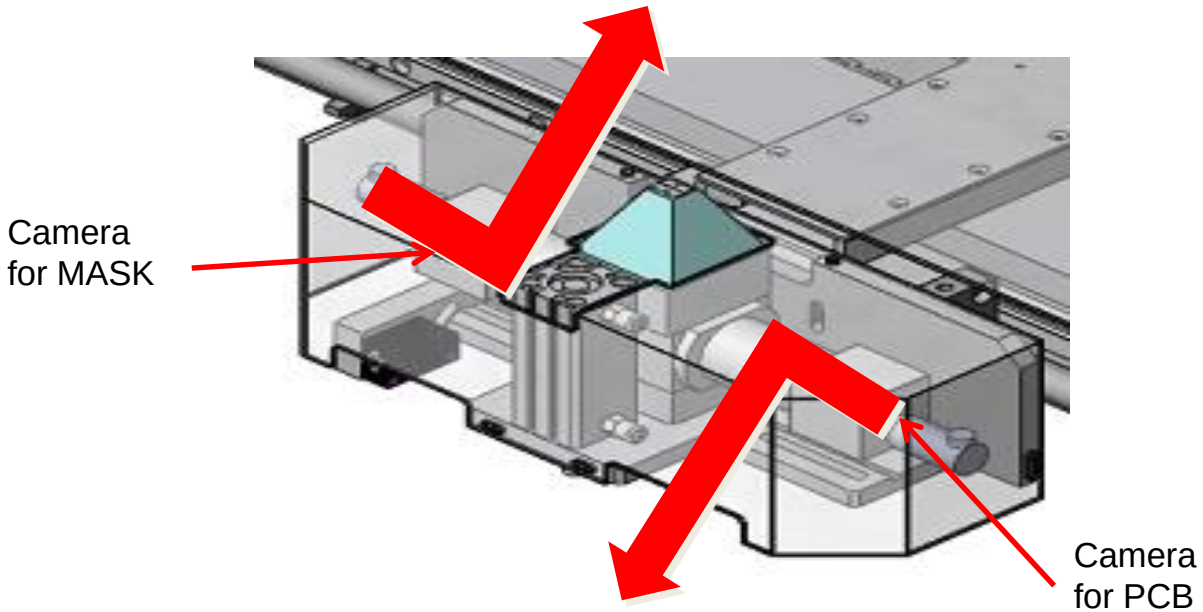
✓ This frame connect with 'vision', 'squeegee', 'cleaner'.
Also, It will be required rigid design same with stage structure
Because, Vision unit require high accuracy of camera position.



Frame structure of vision 'Y' axis

❖ 2 Cameras

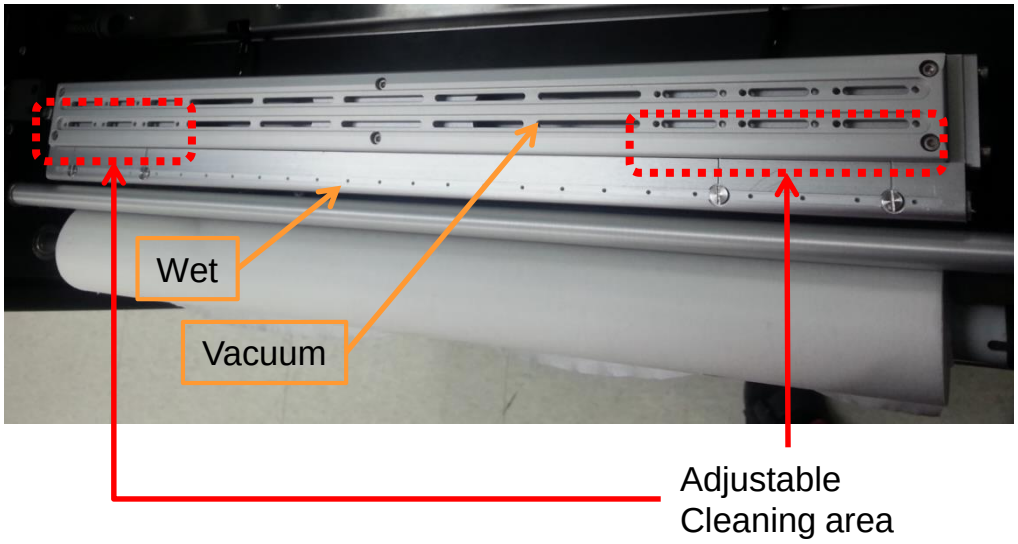
✓ Adopting individual camera for Mask & PCB
It can do recognition fiducial mark & printing for each other.
It can do 2D inspection for PCB after printing.



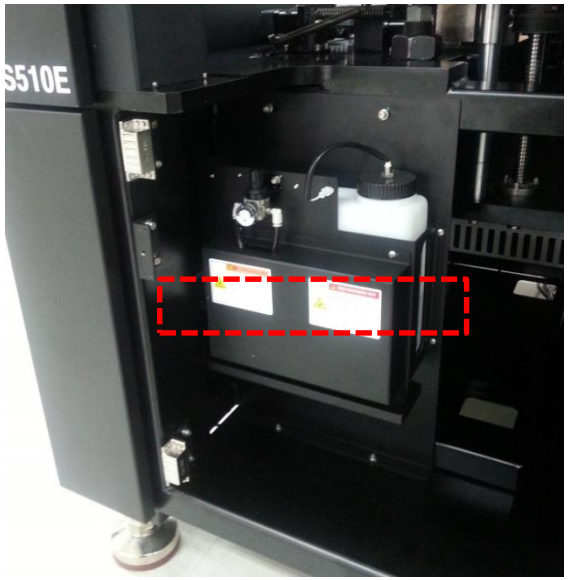
Camera Structure

❖ Easy & convenience Mask Cleaning system

- ✓ Wet, Vacuum
- ✓ Adjustable wet & vacuum area
- ✓ User can set detail cleaning moving by software
- ✓ Alcohol tank is locate machine inside



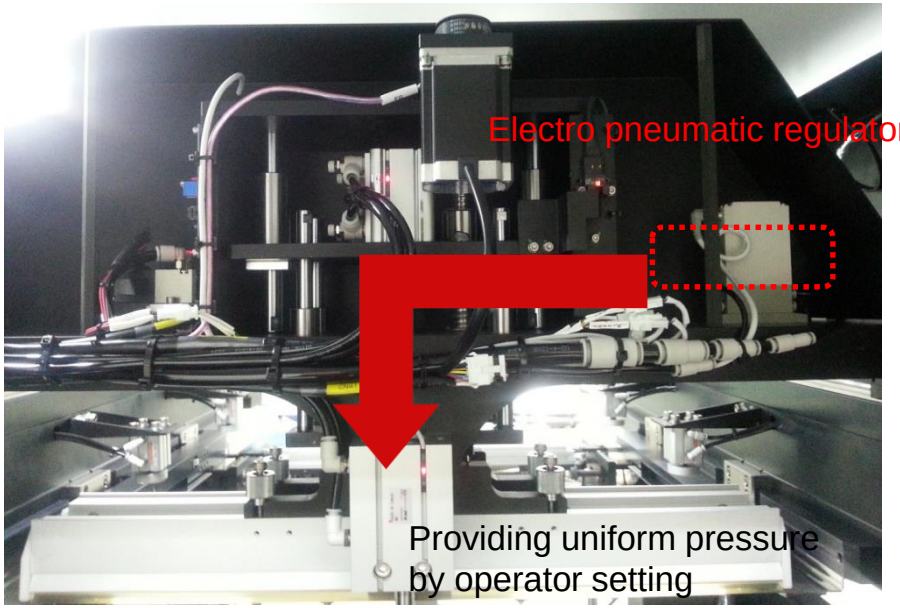
Cleaner structure



Inside alcohol tank

❖ Uniform pressure control

✓ Providing high precision uniform pressure control by electro pneumatic regulator

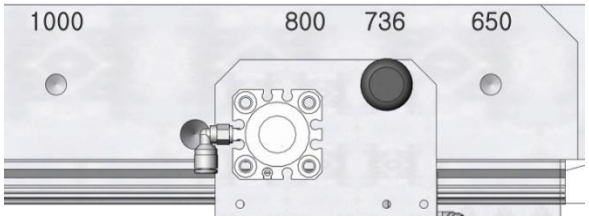


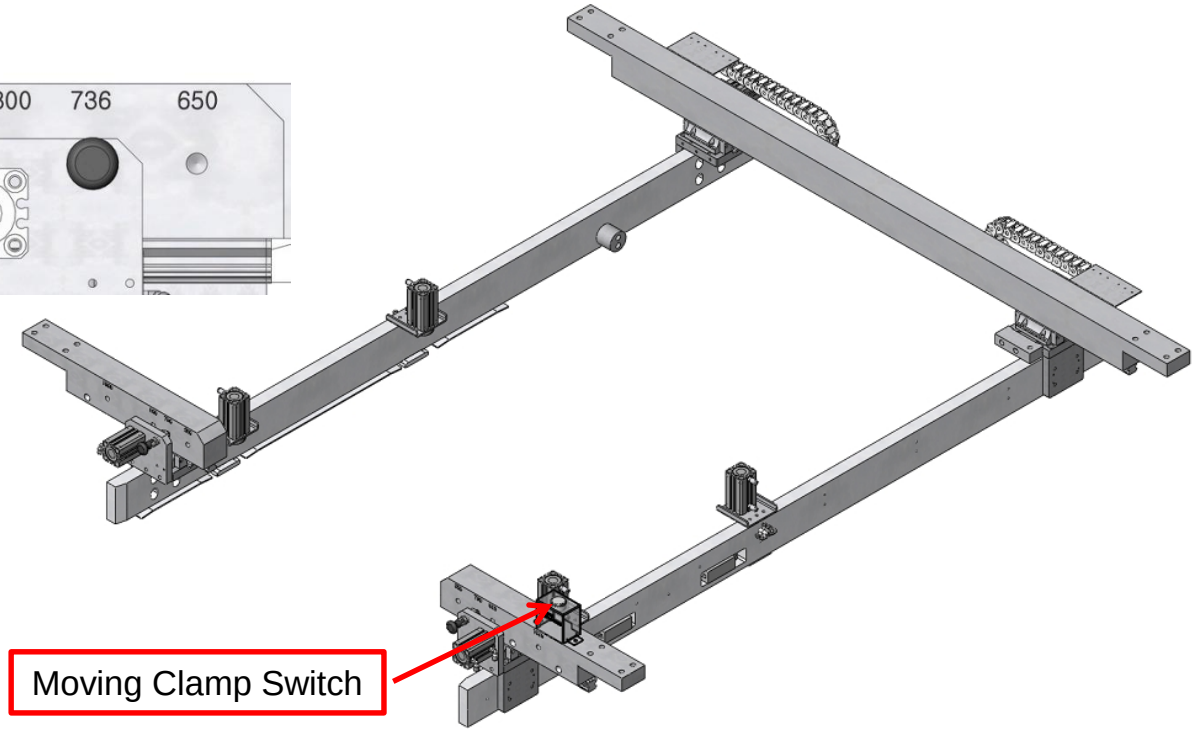
Squeegee structure

Squeegee setting

❖ Mask gudie

- ✓ Moving Mask gudie
- ✓ Mask Size : 800mm x 800mm, 736mm x 736mm, 650mm x 550mm

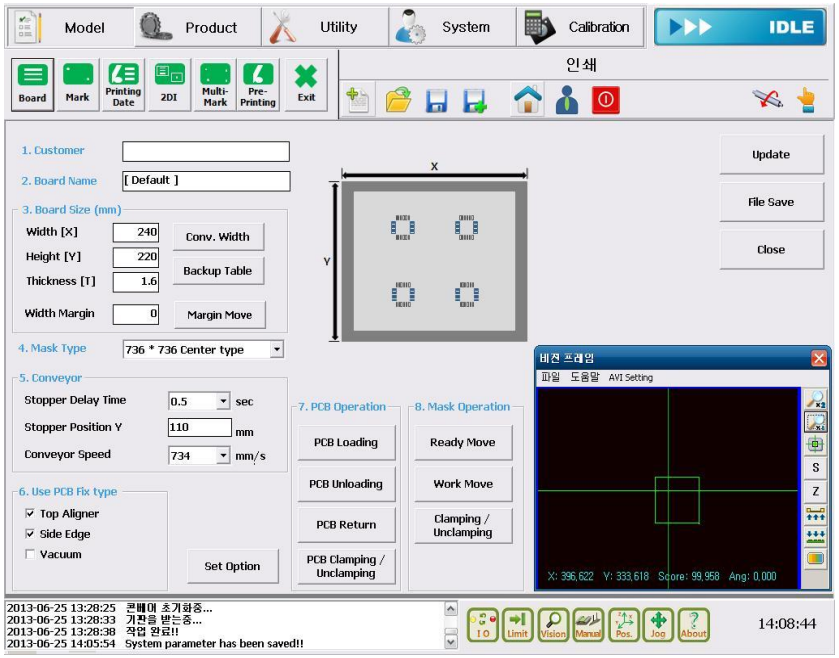




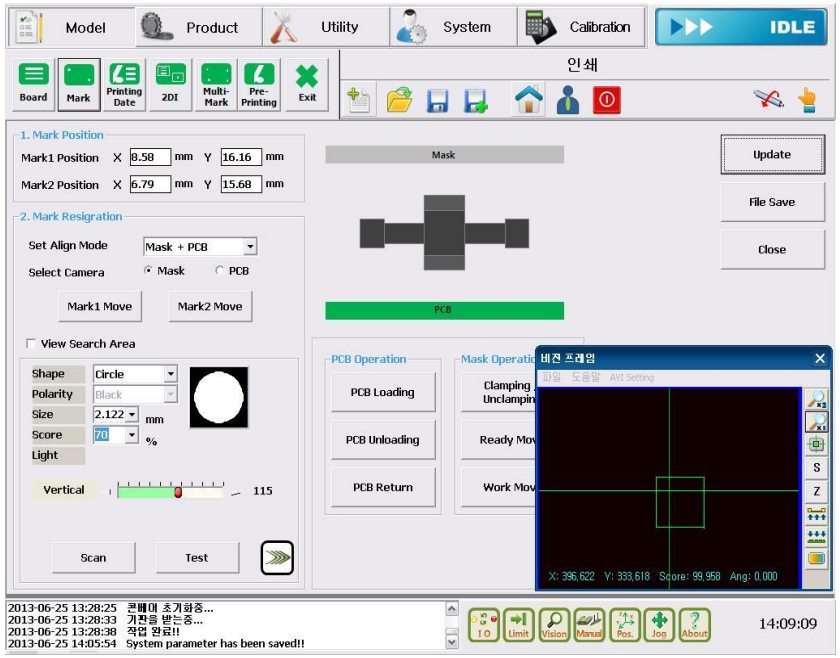
Mask gudie structure

❖ Interface for User convenience

- ✓ Simple registration process of PCB information & Fiducial Mark
- ✓ High recognition for Fiducial Mark
- ✓ Production information & situation on one window(view)
- ✓ Icon for frequently used menu



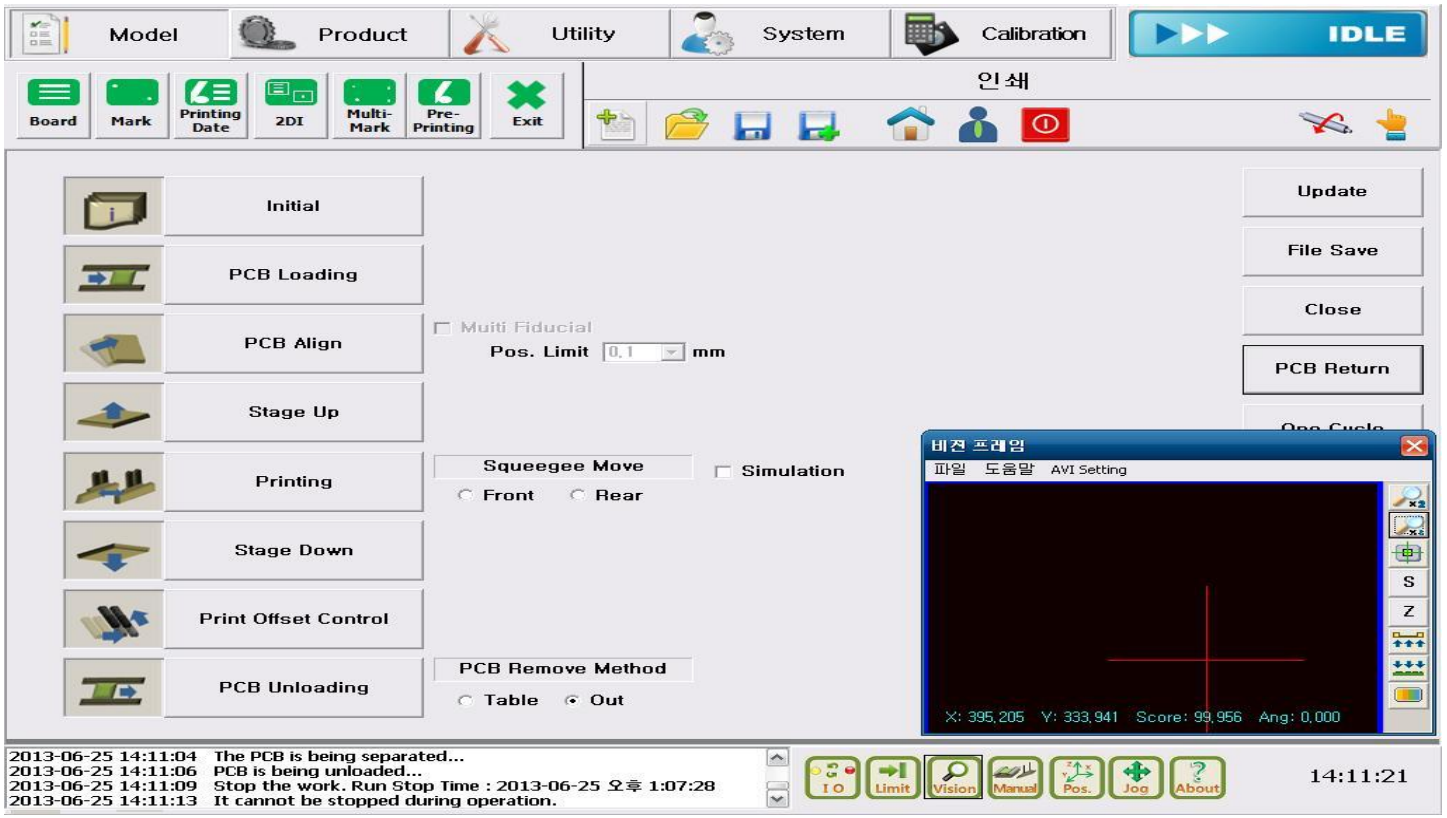
PCB information



Fiducial Mark registration

❖ Convenience printing off-set adjusting

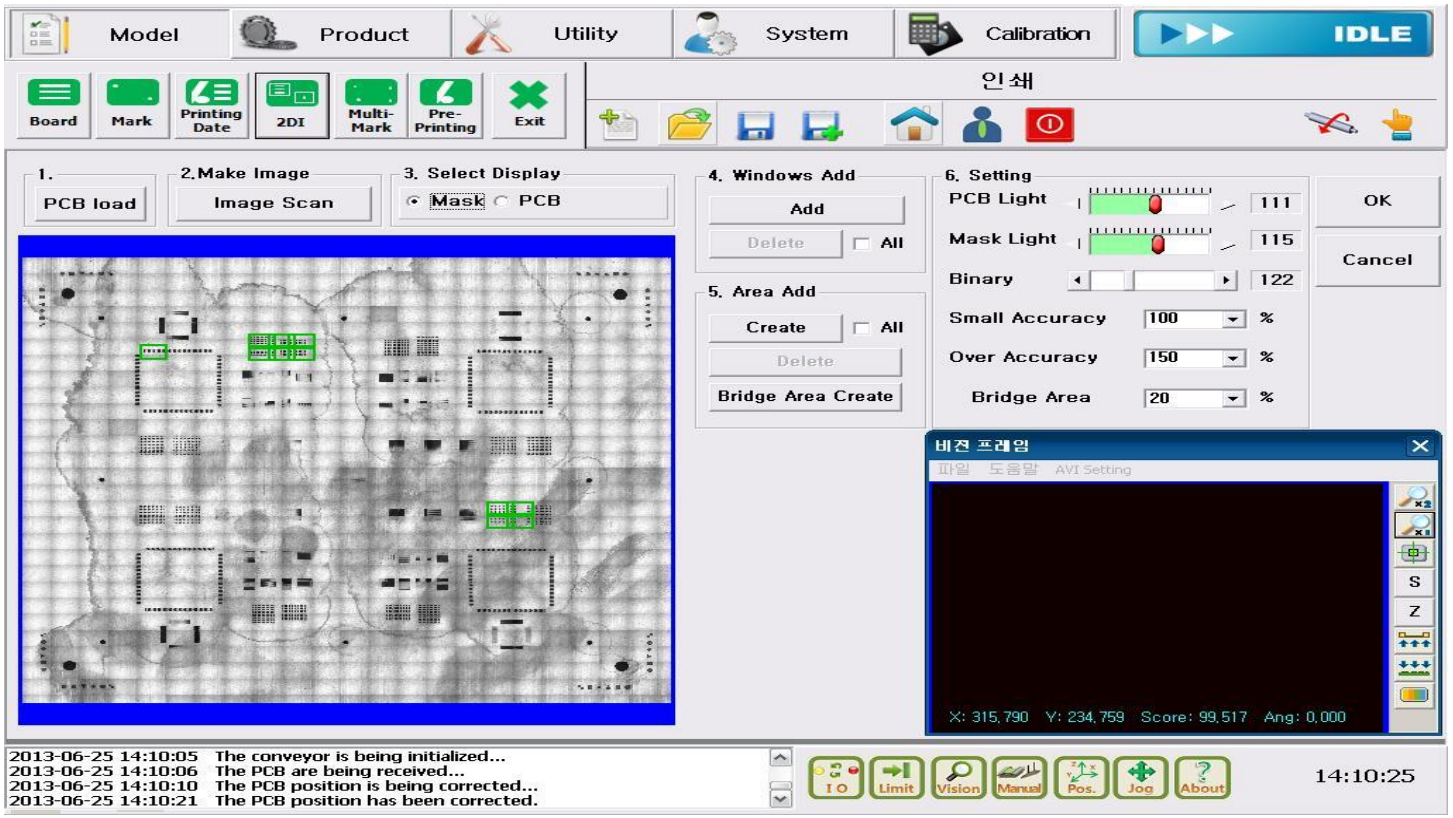
✓ Printing off-set adjusting on monitor by Pre-printing function



Pre-printing

❖ 2D Inspection (Standard)

✓ Sampling inspection for printing results by machine's camera



Teaching of 2D Inspection

SAMSUNG
SMT EUROPE

Simple! Easy!

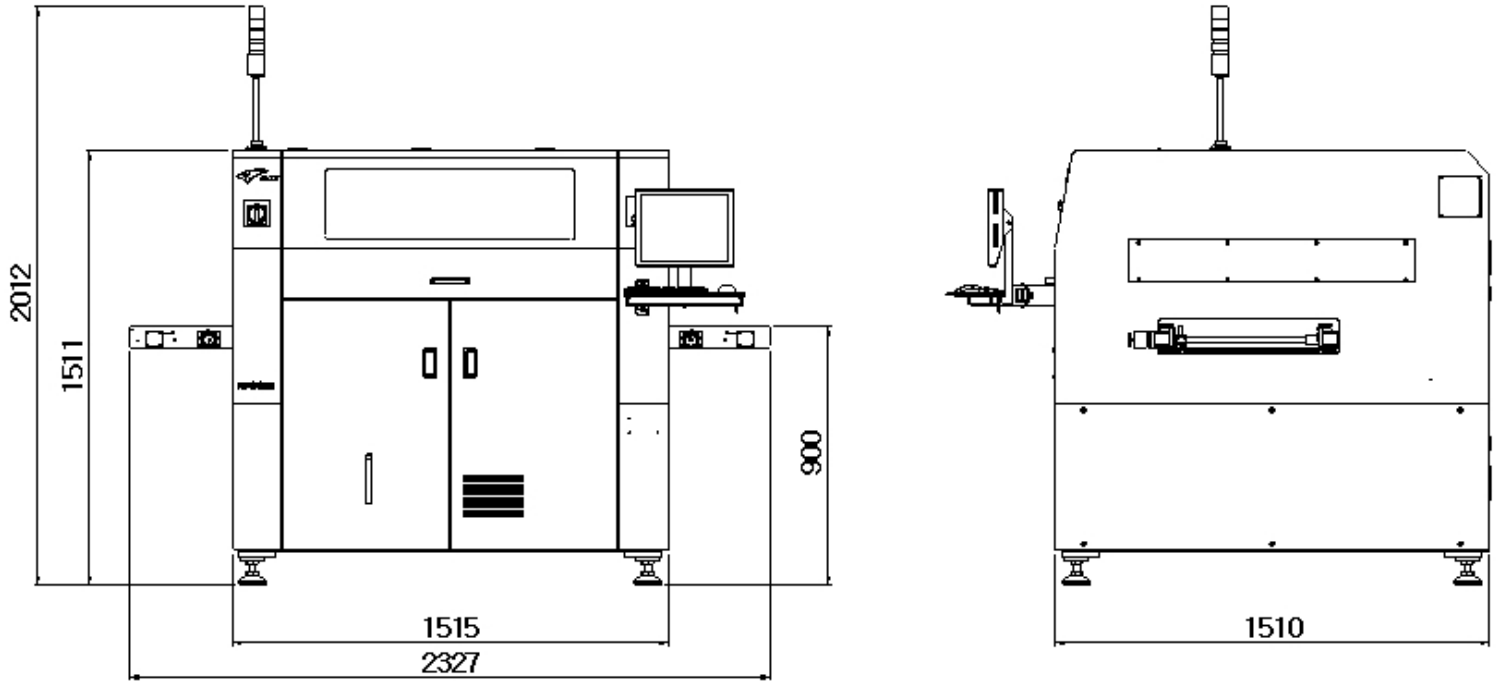
Screen Printer

NPS850

Item		Specifications
Performance	Alignment Accuracy	± 15 ㎛
	Cycle time (Exclude Printing)	13 sec
	Job Change time	10 min
Handling	Stencil size	1000mm x 800mm / 800mm x 800mm 736mm x 736mm / 650mm x 550mm
	PCB size (X × Y)	50mm x 50mm ~ 850mm x 530mm
	PCB warpage	± 1.5 mm
	Board Clamp	Top Clamp / Edge Clamp
	Board Support	Magnetic support pin / support block (Option. Vacuum block or Pin)
Printing	Print Pressure (Option)	4 ~ 30 kgf
	Print Speed	2 ~ 400 mm/sec
Facilities	Power Requirements	1-Phase, 110 ~ 240VAC , 3 kVA
	Pneumatic	4~5 bar @ 600~700 NL/min

❖ Lay out

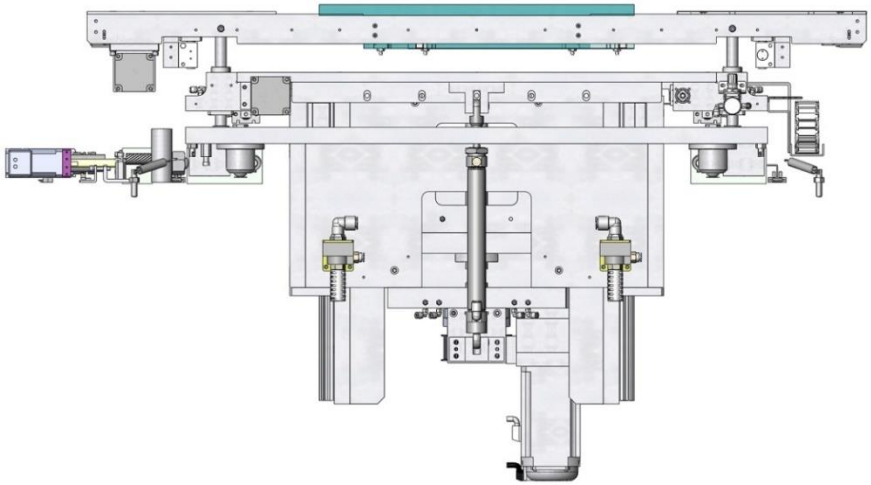
✓ PCB X-axis 510mm Buffer conveyor

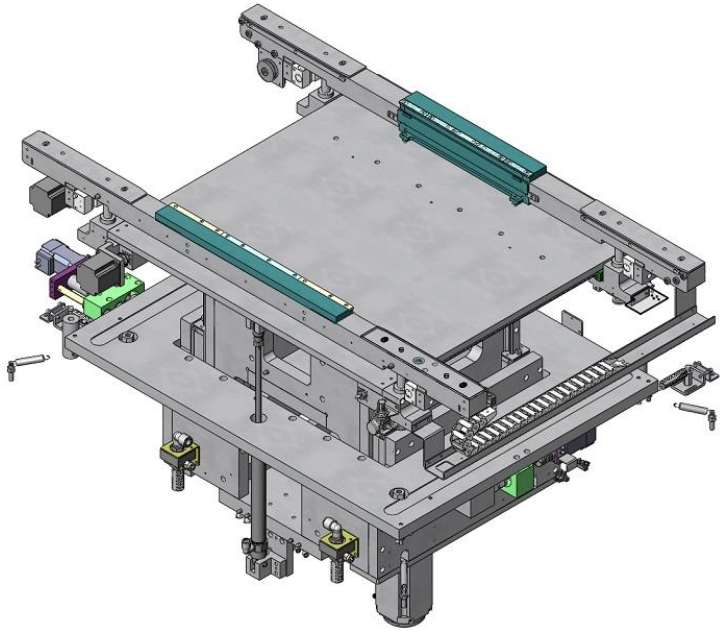


lay-out

❖ Stage Align, up -down

- ✓ X-axis, Y1-axis, Y2-axis align structure, Stage up-down **Direct connected** structure



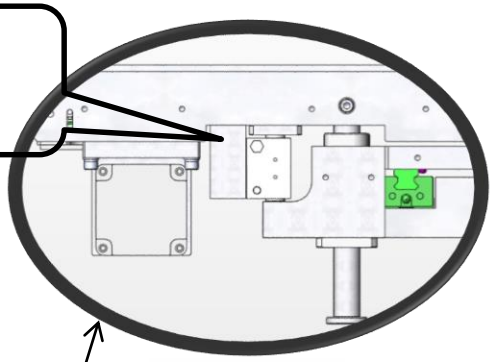


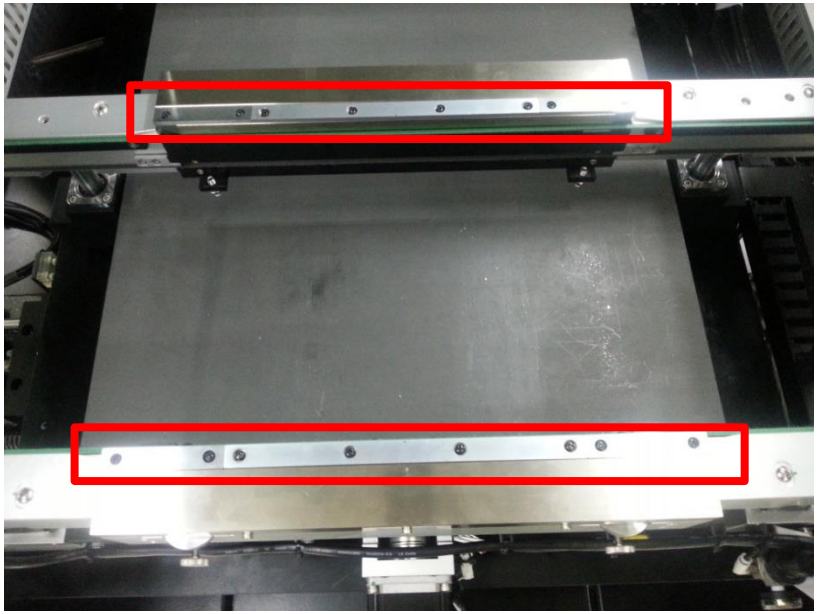
Stage structure

❖ PCB Clamping

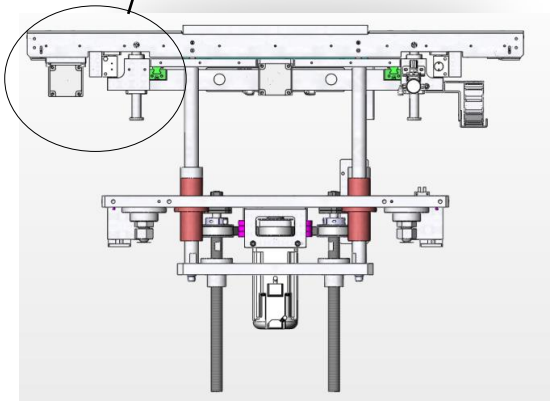
✓ Clamping Type : Top Clamp / Edge Clamp.

Automatic adjustment
for PCB thickness
Air Chuck 4 pcs (60Kgf/1pcs)





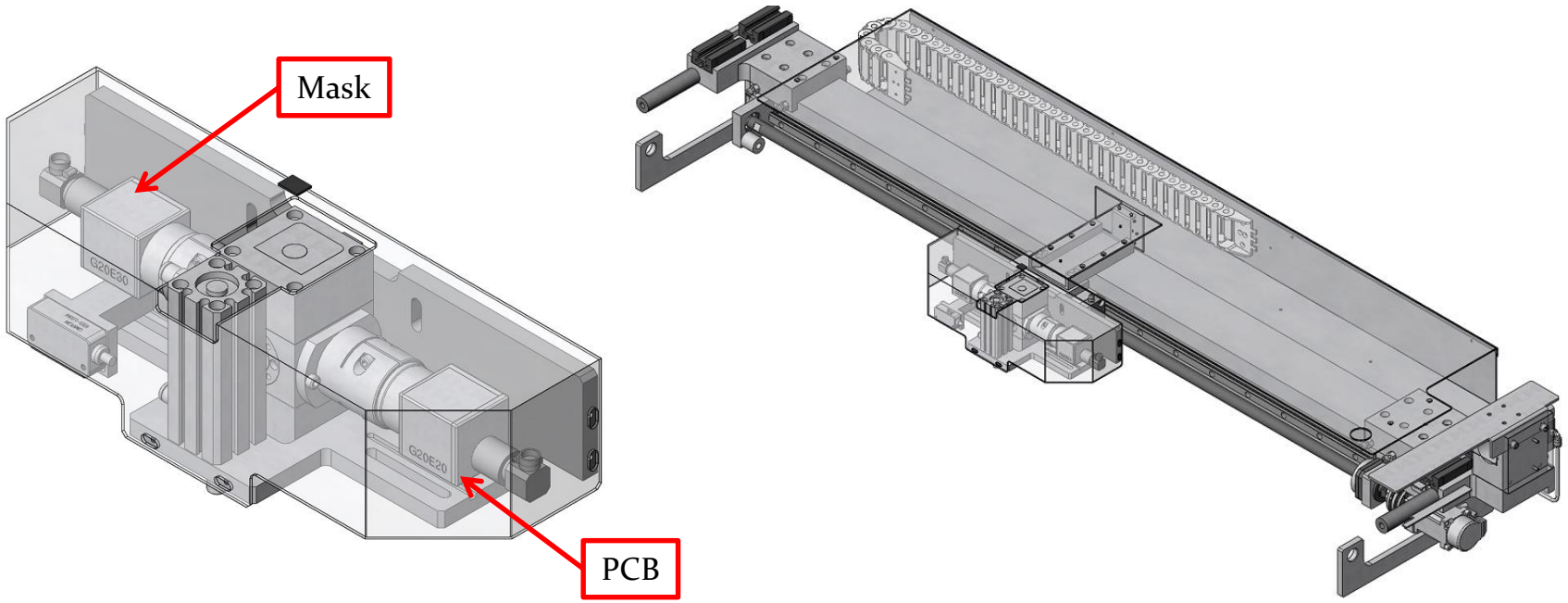
Selecting Clamp blades



Automatic adjustment
for PCB thickness

❖ 2 Cameras

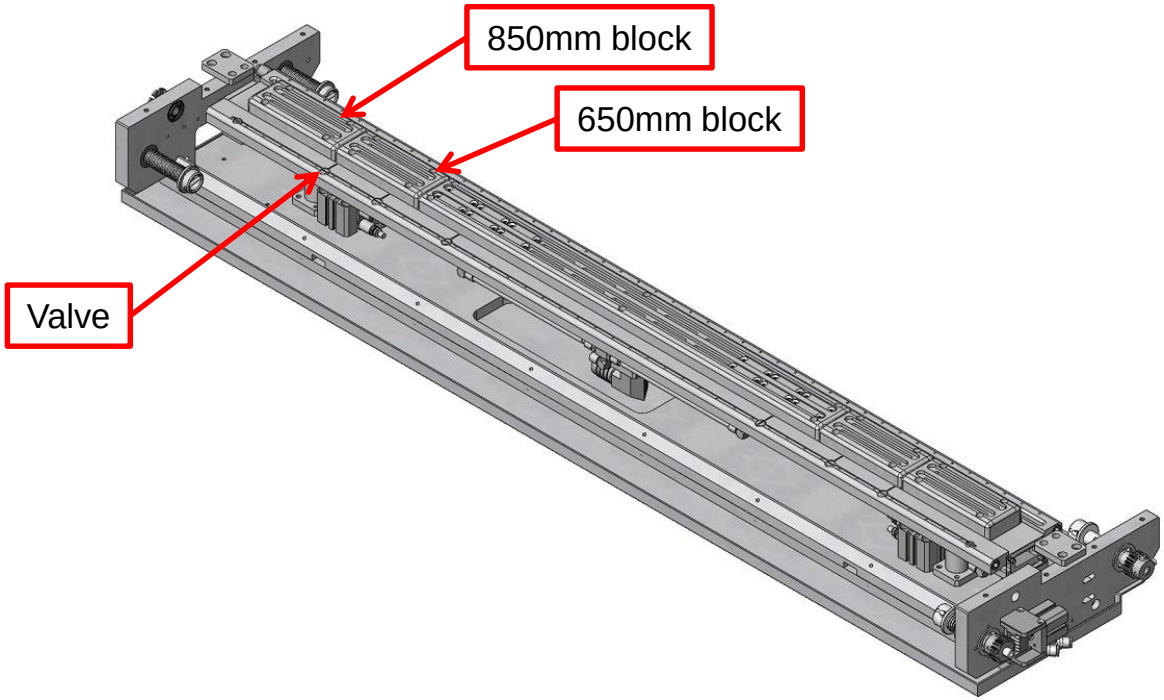
- ✓ Moving Stroke : X-axis 880mm, Y-axis 860mm.
- ✓ 2DI (Standard)



Vision X-axis Frame structure

❖ Easy & convenience Mask Cleaning system

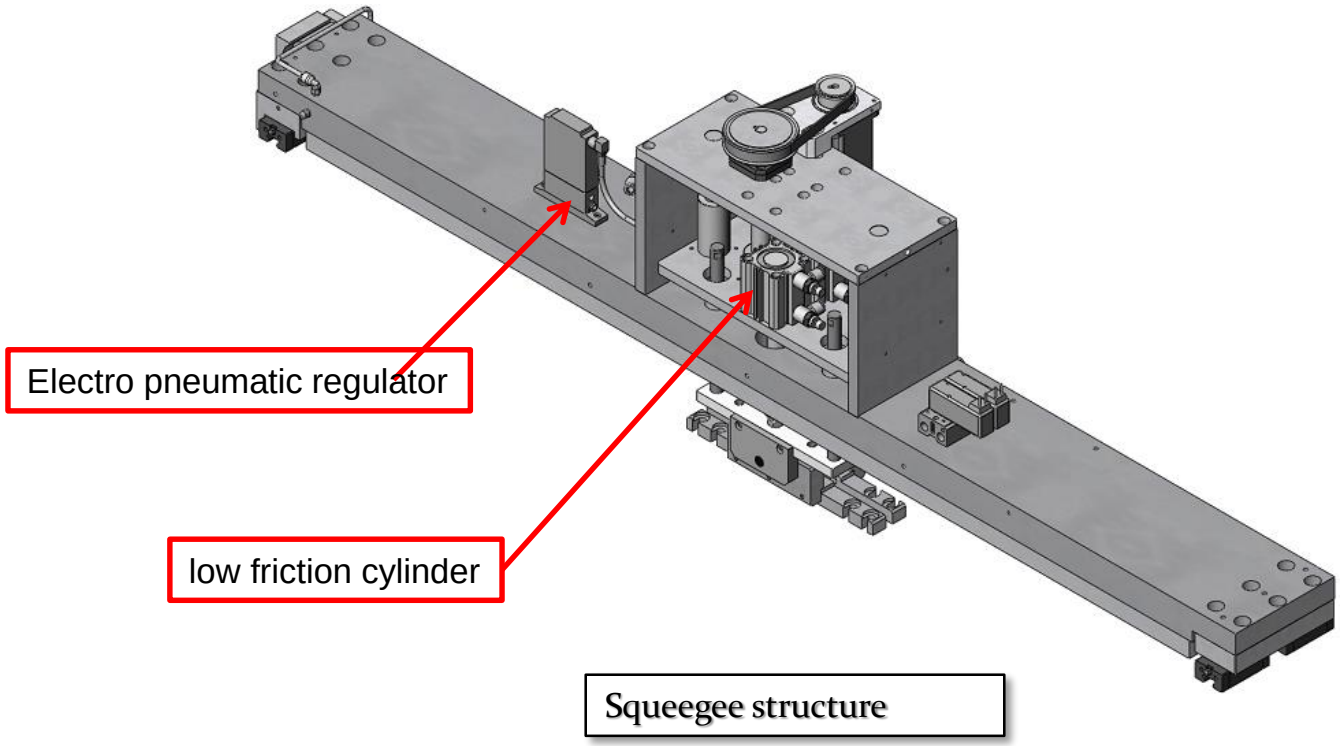
- ✓ Default Vacuum block size 460 mm, block , Adjustable size 650mm,850mm
- ✓ To control possible range of wash liquid & vacuum absorption area.



Cleaner structure

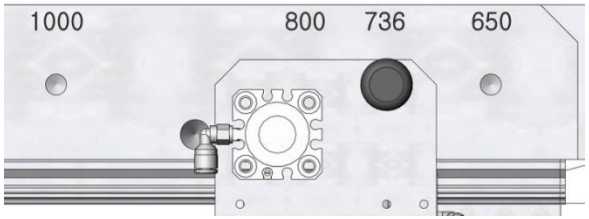
❖ Squeegee

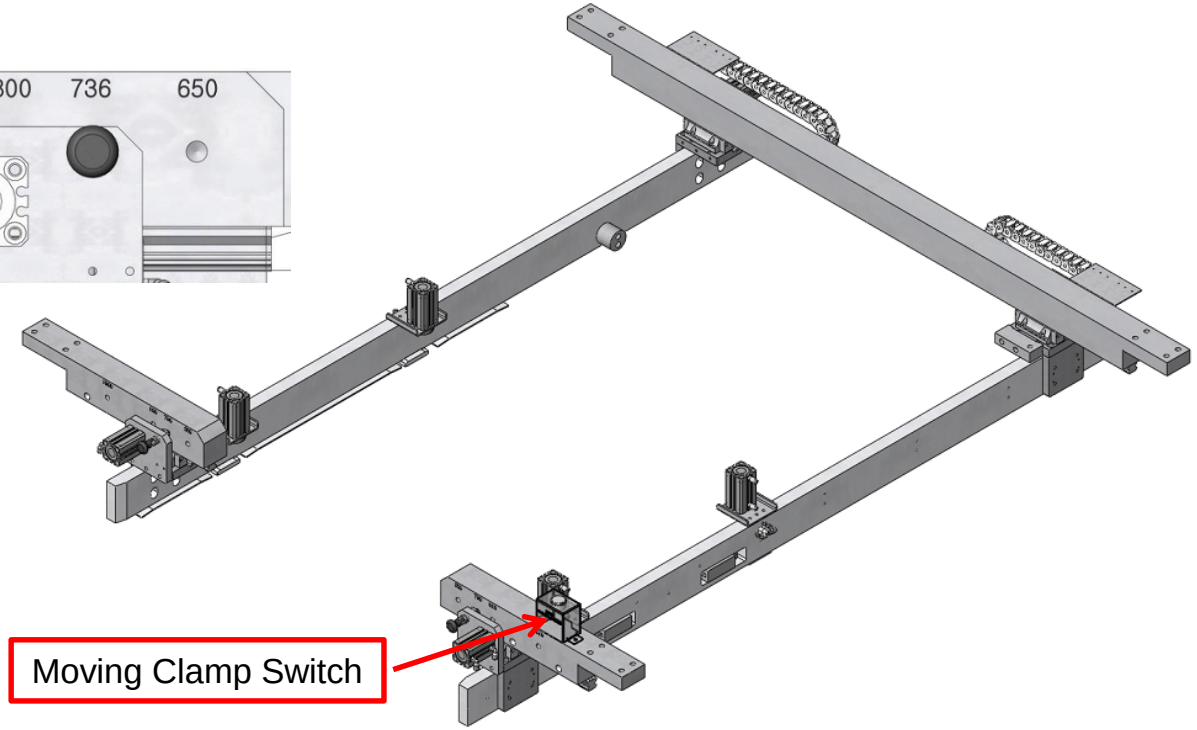
- ✓ Providing high precision uniform pressure control by electro pneumatic regulator(Control value 1~30kg) .



❖ Mask gudie

- ✓ Moving Mask guide
- ✓ Mask Size : 1000mm x 800mm , 800mm x 800mm, 736mm x 736mm, 650mm x 550mm

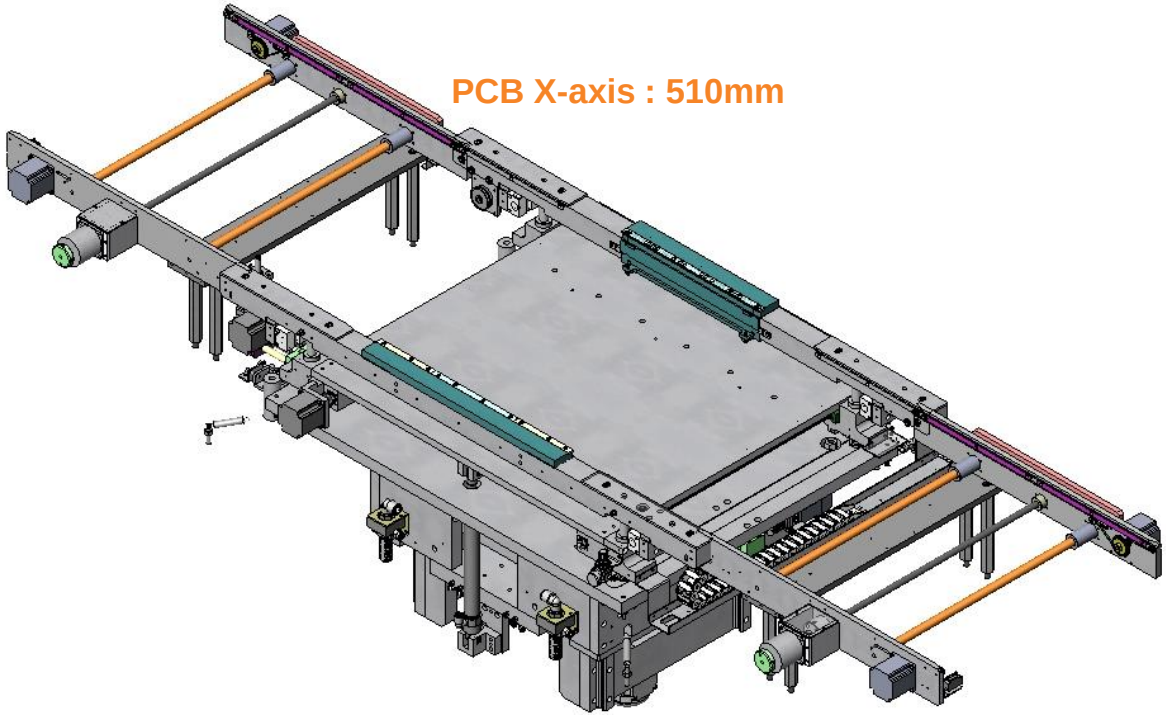




Mask gudie structure

❖ Conveyor

- ✓ 3 step structure (In/Stage/Out) (Standard type)
- ✓ Automatic conveyor width control



Conveyor structure

SAMSUNG
SMT EUROPE

NPS Serie

Flexible Wide Range Mounter *for the Next Decade*

THANK YOU ☺