Eagle V8500S

Vision Inspection

Vision #3 (Option)
Side Wall Inspection
Under Vision

Vision Tool
Side Vision
(10para)

Vision #2
3D/2D BTM Inspection

Vision Tool
2D BTM & 3D BTM
(20para)

Vision #1
Top Vision1 Inspection

Loading Rail zone

Tray Transfer unit

Vision #4 (Option)
Top Vision 2
Micro crack detect Vision

Sorting Tool
for Good & Reject device
(4Para)

Reject Buffer Rail Zone

Good Empty Rail Zone

Good Buffer Rail Zone

Vision #5(Option)
Double Device Vision

| Items	Machine specifications	Items	Inspection specification
Bottom Camera 2D/3D	36Mega Camera / 4k 3D Camera	Coplanarity	Accuracy ±5%µm, Repeatability 5%µm
Bottom Inspection	2D/3D simultaneous inspection (One Station)	Ball Height	Accuracy ±5%µm, Repeatability 5%µm
Min Ball Dia. / Height	100um / 75um	Ball Diameter	Accuracy ±5%µm, Repeatability 5%µm
Max PKG Size	50 x 50 mm	Ball Position	Accuracy ±5%µm, Repeatability 5%µm
PKG thickness measurement	Yes	Package Thickness	Accuracy ±7%µm, Repeatability 7%µm
PKG thickness measurement tolerance	Accuracy ±10%um	Overkill	Less than 5%
Cop' Repeatability / Accuracy	1um (Based on Golden device)	UPH	**15.6K (Tray 8X16)** **5.1K (Exclude Side and Micro crack)**
Deep Learning	Yes	Bottom Surface Inspection	Chip out, Void, Metal, Exposure, foreign material, delamination, Orientation, Crack, Bubble
Side Vision	Line Scan Method, OTF (On The Fly) Method	Top Surface Inspection	No Mark, Device Miss Orient, Reverse Mark, Double Mark, Mix Mark, Position, foreign material
Equipment Dimension	2560x1884mm	Side Vision Inspection	Side, Void, Crack, FM

3D Vision (Top & Bottom)

R&R	Less than 1um (less than 3σ 3um)
Accuracy	Less than 1um (Based on Golden Device)
Min Ball detect size	50 um

3D	Camera	Resolution	4K (3904 Pixel)
		Pixel Size	5 um
	Lens	Magnification	0.385 x
		W.D	132 mm (+-2mm)
	Resolution / F.O.V		13.1 um / 55 x 55 mm
Slit Beam	Light	Color	White
		Line Width / W.D	45um (flexible)

❖ **3D Vision Solution - Measurement**
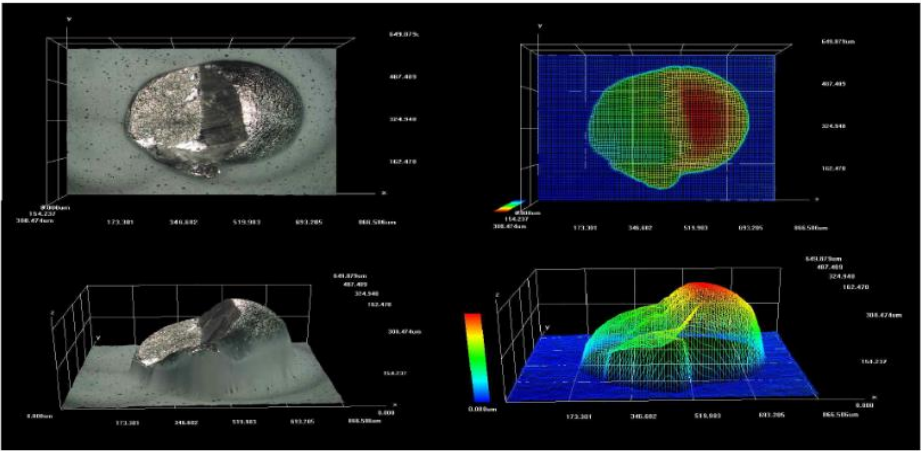
❖ **Optical Triangulation Method**
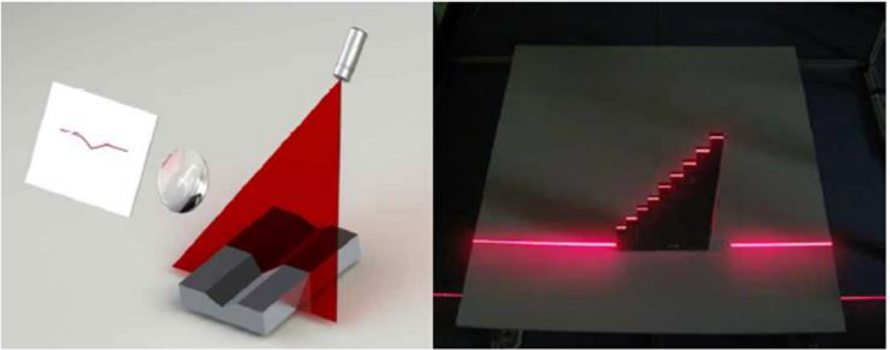
Bottom 2D Vision

Align (±10um)			
Ball Quality inspection (±10um)			
Defect (Length more than 15um)			

2D	**Camera**	Resolution	10640 x 10640 *(Partial)
		Pixel Size	3.67 um
	Lens	Magnification	0.734 x
		W.D	225 mm(+-5mm)
	Resolution / F.O.V		5 um / 53x53mm
	Light	Structure	Multi Dome
		Color	White, Red, Blue

❖ Acquire the precise 3D data (3D + 2D data combination)

- Use ball offset and damage information among 2D ball quality check list
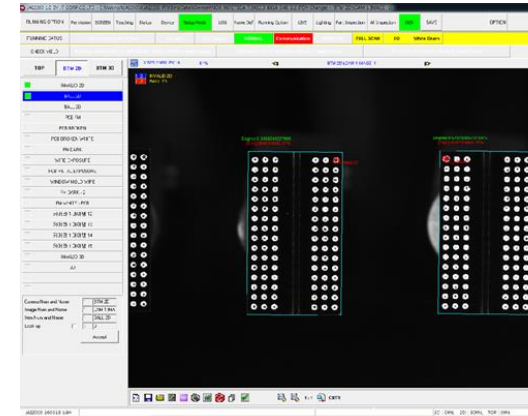
< Ball Damage>
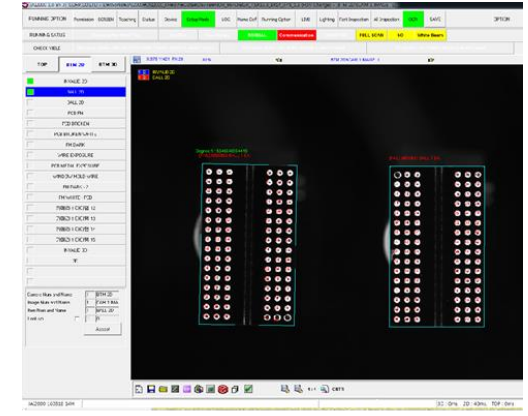
< Ball pushed down >

< Package Broken >

<Foreign Material>
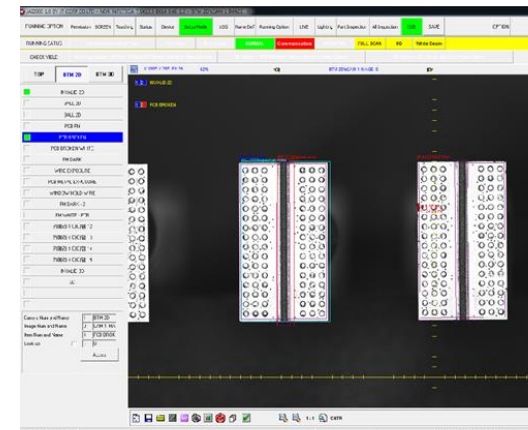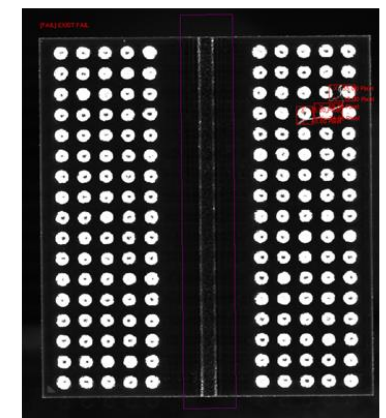
Top 2D Vision

Align (±5um)	
Ball Quality inspection (±10um)	
Defect (Length more than 15um)	

Top 2D	Camera	Resolution	10640 x 10640 *(Partial)
		Pixel Size	3.67 um
	Lens	Magnification	0.734 x
		W.D	225 mm(+-5mm)
	Resolution / F.O.V		5 um / 53x53mm
	Light	Structure	Multi Dome
		Color	White, Red, Blue

< Mark Angle >

< Mark >

< Metal Exposure >

Top 2D Vision – Micro Crack

- Align (±10um)

- Defect (Length more than 2um)

		Resolution	9344 x 7000 (65M)
TOP 2	Camera	Pixel Size	3.2 um
	Lens	Magnification	2 x
		W.D	192 mm(+-3mm)
	Resolution / F.O.V		1.6um / 14.9 x11.2mm
	Light	Structure	Coaxial, Ring Type
		Color	White, Red, Blue

Micro Crack

145mm

204mm

<Void>
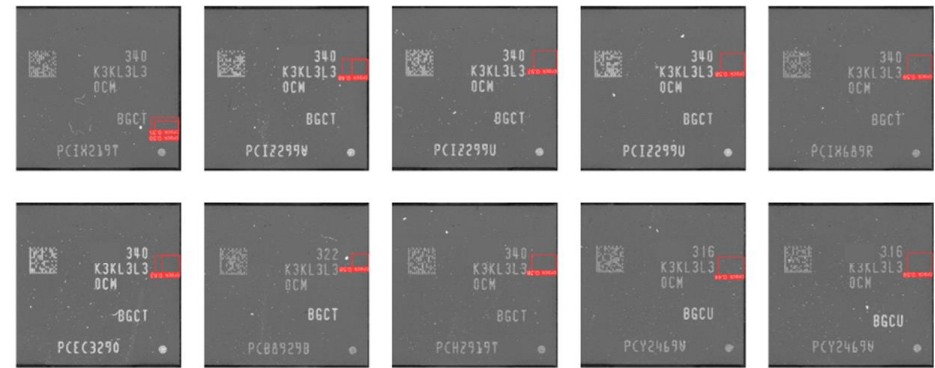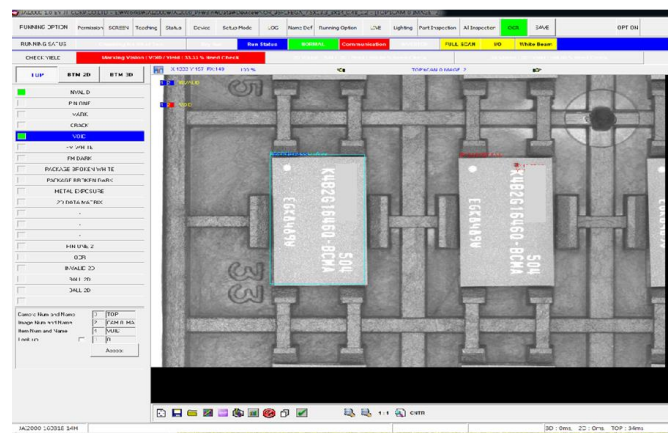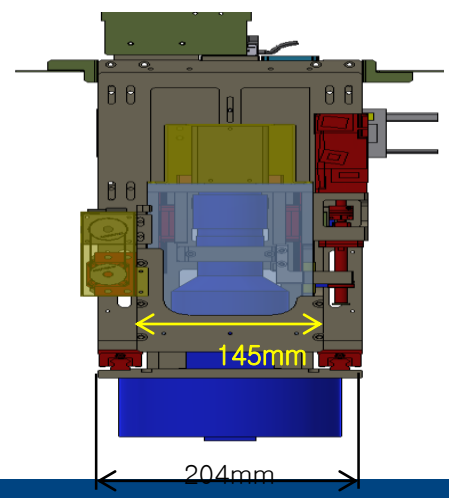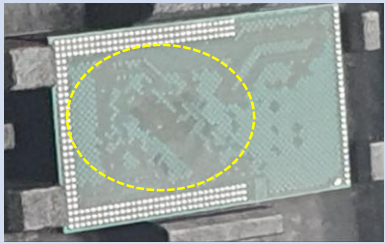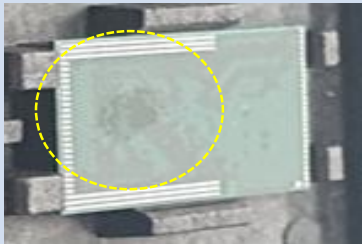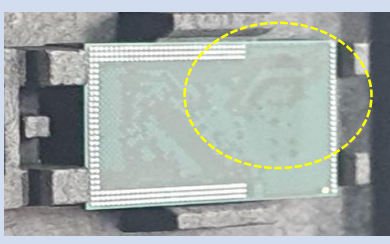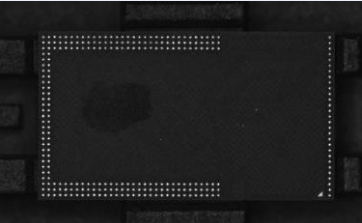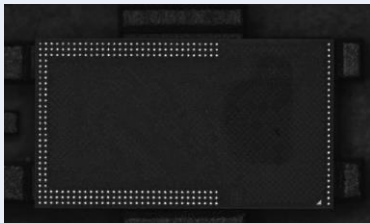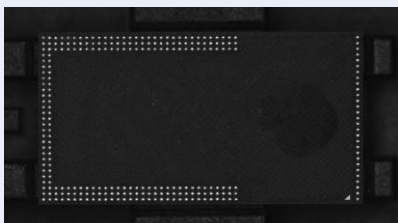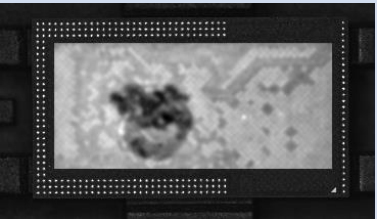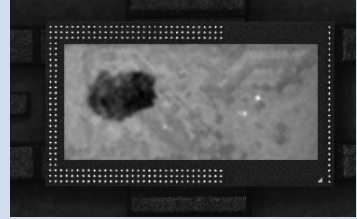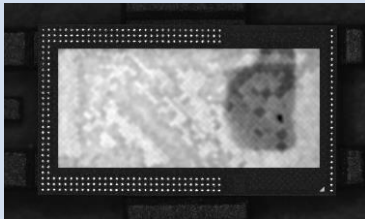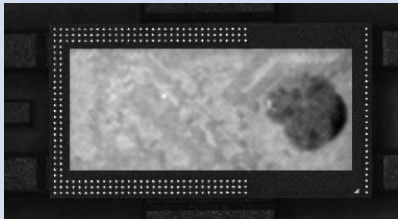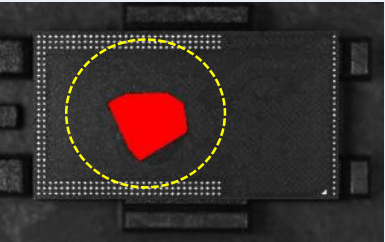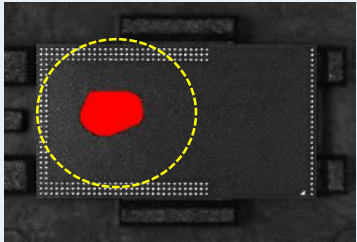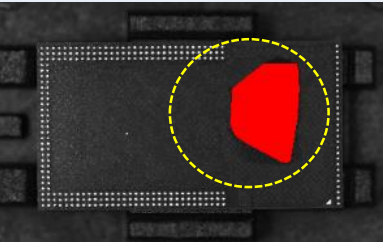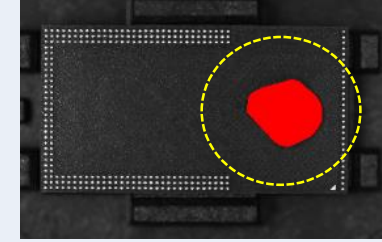
DD Vision

Side	Camera	Resolution	4096 X 3000
		Pixel Size	3.45 um
	Lens	Magnification	0.1 x
		W.D	291 mm(+-3mm)
	Resolution / F.O.V		34.5um / 140 X 75 mm
	Light	Structure	Laser
		Color	Red
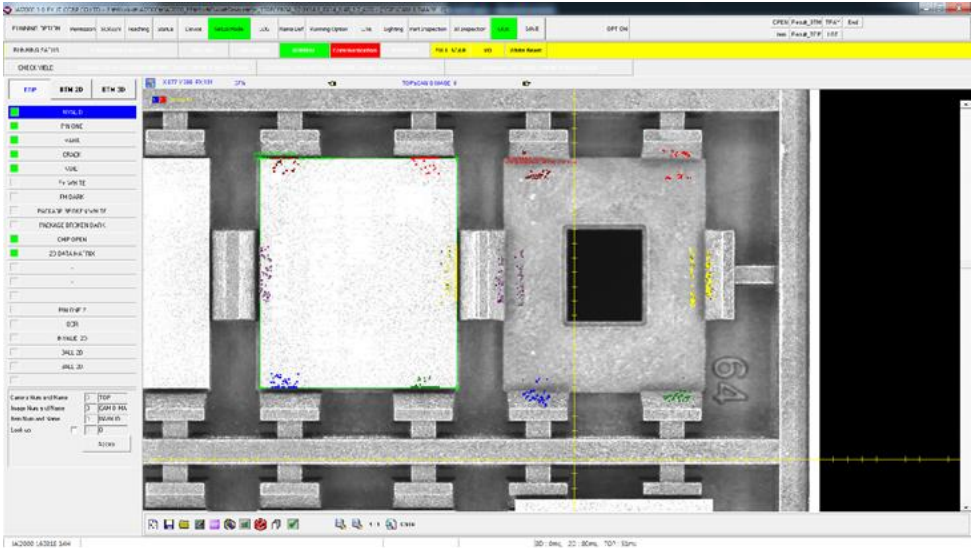
< Tray Package exist Detection>

Inspection sample images

Description	Images				Detect Sequence
Actual PKG					Image Acquisition
Origin Image					Image Pre-Processing
Inspection Image					Defect Extraction
Image Result					Separation & Selection Based On X, Y Size / Pixel Count

Deep learning sample data

No.	Lot Num.	Total fail	Over Fail Count	Fail Count	Deep Learning Normal filter Count	Recover (%)
1	688B9V	11	0	11	0	100
2	688BYF	44	28	16	28	100
3	688B8B	31	23	8	23	100
4	60FAC7	121	104	17	93	89.4230769
5	60FCN2	2	0	2	0	100
6	60FAA8	9	0	9	0	100
7	60F8BY	28	3	25	3	100
8	60FD4C	58	50	8	47	94
9	60FDGD	618	564	54	524	92.9078014
10	60F9UT	154	146	8	125	85.6164384
11	60FB06	55	6	49	6	100
12	60FCCD	24	6	18	6	100
13	60FC51	14	9	5	8	88.8888889
14	60FD2B	14	11	3	11	100
15	60FC2X	25	14	11	14	100
16	60FC0F	31	5	26	5	100
17	60F9A3	29	8	21	8	100
18	60FBRR	15	6	9	6	100
19	60FBRU	14	3	11	3	100
20	60FBHY	5	3	2	3	100
		1302	989	313	913	92.3154701
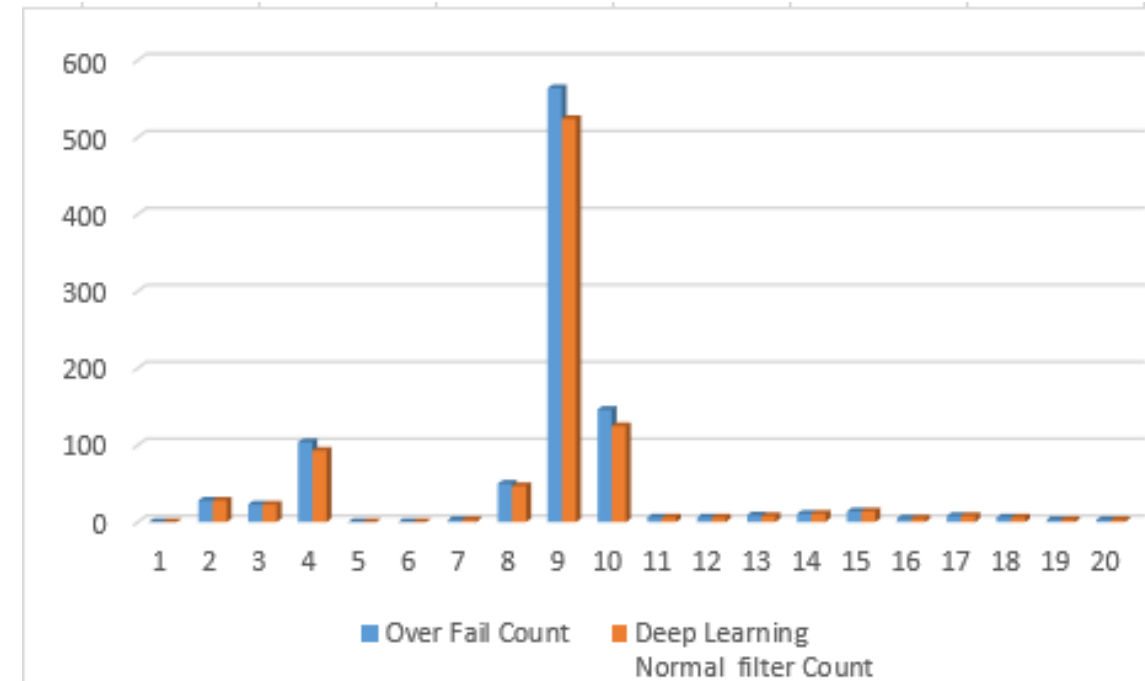
Description	
Number of over fail before Deep learning (Blue)	989ea
Number of converted GOOD from over fail after Deep learning (Red)	913ea
Recover rate from over fail to GOOD	**92%**

Z-Theta Axis, OTF (On The Fly) inspection

Tool movement direction

Under Vision　Side Vision

Side Vision Check

<Side Vision Check after alignment of angle>

Device direction　Device direction

Side Vision Check　Side Vision Check

Side Vision　Side Vision

Check device 1 and 3 sides while passing through the side vision

Check device 2 and 4 sides while passing through the side vision

Side Vision　Device rotate 90°　Side Vision
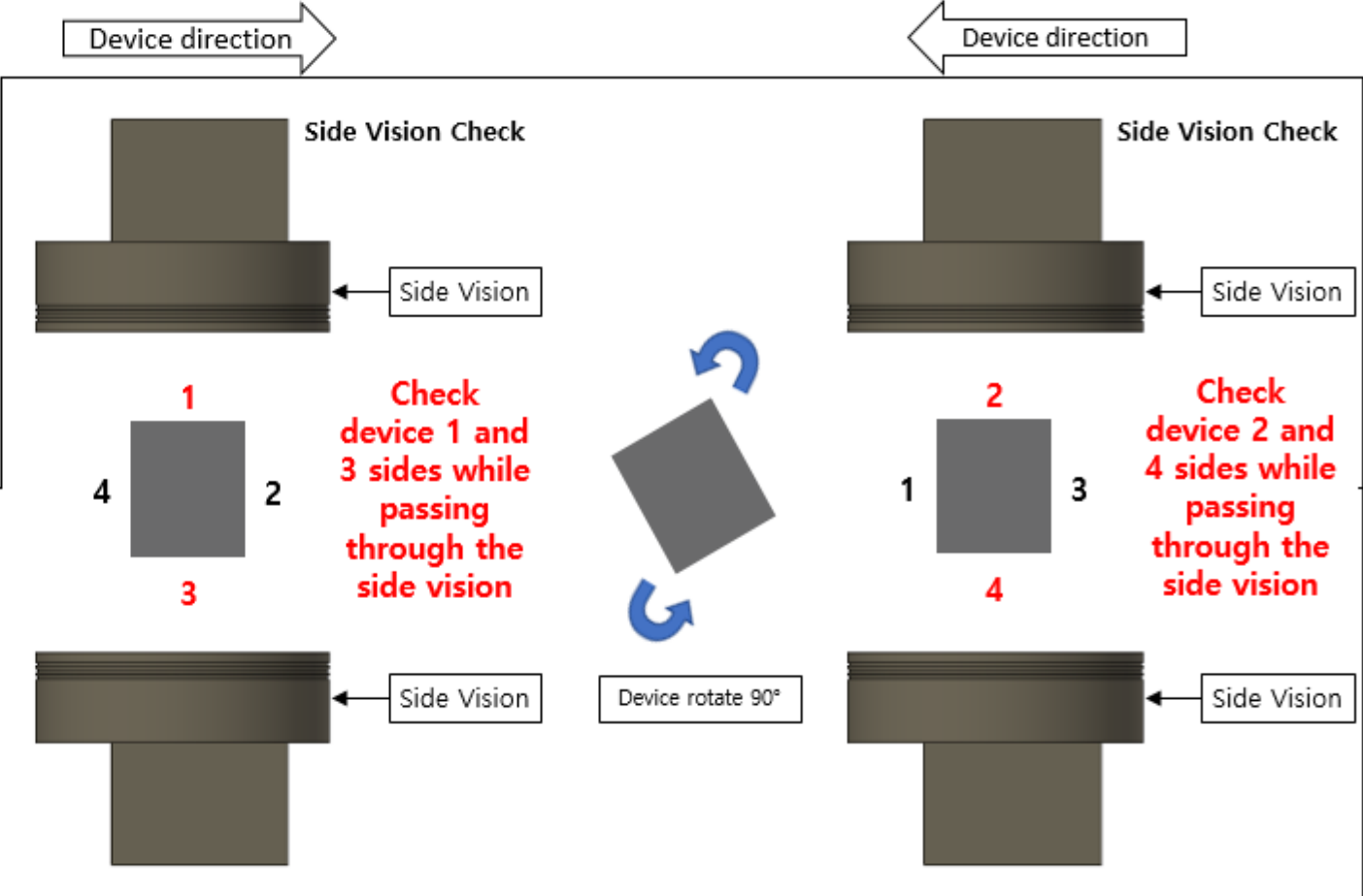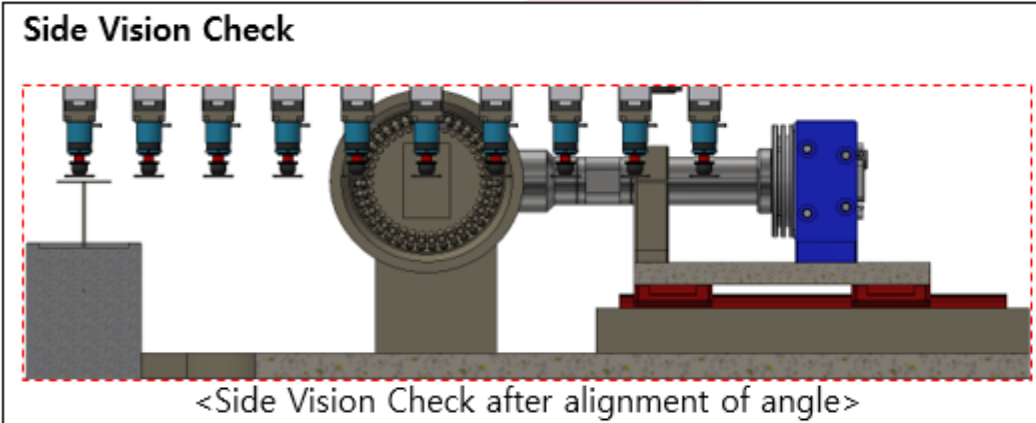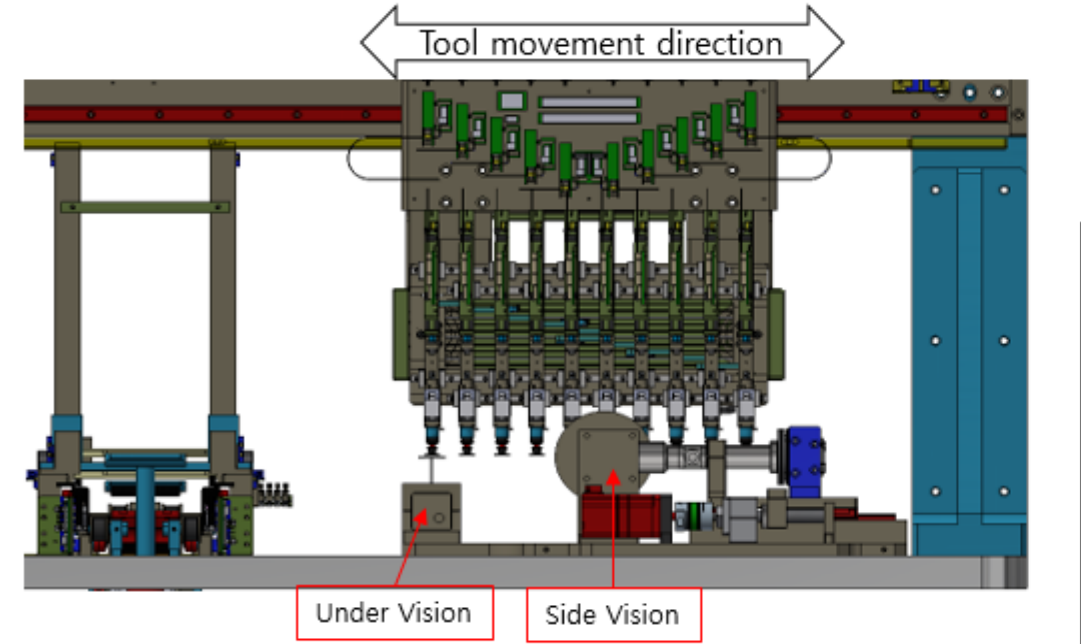
Z-Theta Axis, OTF (On The Fly) inspection

- **Side vision (Optional)**

Min Size	Less than 5um
Item	Chipping, Crack, Void, FM, etc

Side	Camera	Resolution	4K (4640 X 64 Pixel, TDI)
		Pixel Size	5 um
	Lens	Magnification	1 x
		W.D	75 mm (+-2mm)
	Resolution / F.O.V		5 um / 20 mm
	Light	Structure	Coaxial Light & Side
		Color	White

- **Under Vision (For side vision align) (Optional)**

  - Pre-align vision for side vision

  - For the focus alignment of side vision

Side	Camera	Resolution	5120 x 5120
		Pixel Size	2.5 um
	Lens	Magnification	0.25 x
		W.D	150 mm(+-5mm)
	Resolution / F.O.V		5 um / 51x51 mm
	Light	Structure	Coaxial
		Color	White

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Comparison spec

	Eagle V8500S	CI-T890
Picture		
Bottom Camera 2D/3D	36Mega / 4k 3D	36Mega / 36Mega
Top Camera 2D/3D	**36Mega**	25Mega / 36Mega
Min Ball Dia / Height	100um / 15um	100um / 15um
Max PKG Size	50 x 50mm **(Enable to change Based on customer's requirement)**	58 x 58mm
Cop' Repeatability / Accuracy	1um	5um
Deep Learning (Over Kill reduced rate)	**Over 92%**	None
Side Vision	**Direct (OTF)**	Mirror
Price	**20~30% Lower**	20~30% Higher

Thank you!

SAFETY

APPORPRI
ATENESS

FUNCTION

ECONOMY

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