EDS15/EMS10
Die Sorter Introduction

UPDATED BY JONATHAN
01/11/2021

EDS15

Fully automated and high-speed die sorter, it can handle any wafer sizes up to 300mm and can reconstruct wafers to different output form factor.

Machine Model	EDS15
UPH	Up to 15K for (1.0 x 1.0mm; all vision on with single snap)
Handling wafer frame size Input	8” to 12” wafer size; 17” frame maximum
Handling Wafer frame size output	Up to 8” wafer size; 12” frame maximum
Waffle pack handling – input and output	2” and 4” with adaptor. Manual loading/unloading
Gelpak pack handling – input and output	2” and 4” with adaptor. Manual loading/unloading
Carrier tape • Dual tape and reel for multi bin or maximize output for same bin (optional) • Dual tape and reel with different size to reduce conversion time for high mix production. (optional)	8mm, 12mm, & 16mm
Multi pitch feature	Available
Bond head	16
Dark field light (vision)	Available
Bright field light (vision)	Available
Die size range	0.2mm x 0.4mm to 7mm x 7mm

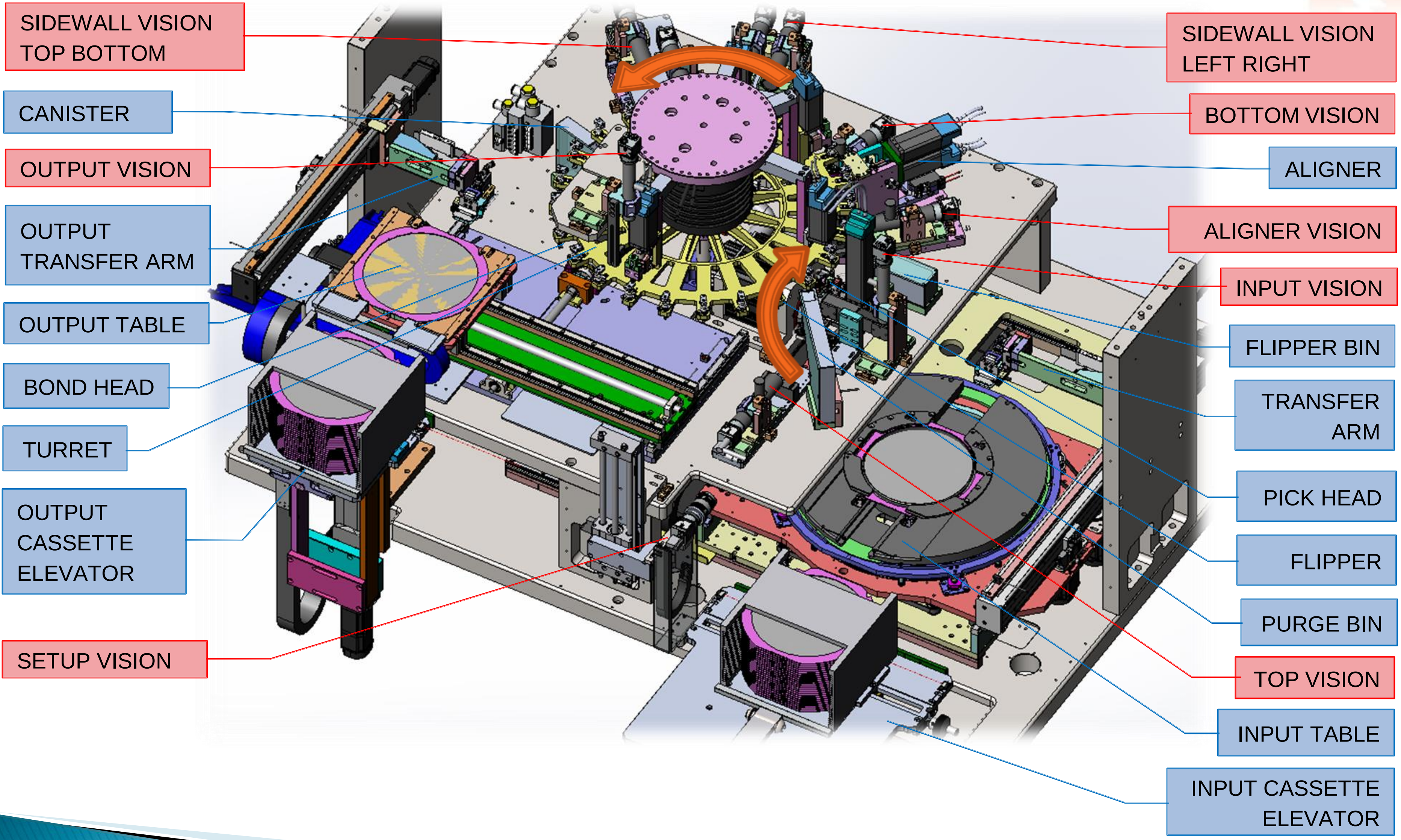
Vision Capability

Vision	Camera Res.	Position	Description	Resolution (um/pixel)				
				<2mm	2mm – 7mm	7mm – 12mm	12mm – 25mm	25mm – 30mm
Top Vision	25MP	Flipper	Die orientation, mark, crack, chip, contamination, defect inspection	1.2um	1.8um	2.8um	5.4um	6.3um
Aligner Vision	5MP	Turret	Unit alignment	16um				
Bottom Vision	12MP	Turret	Active surface, bump, crack, chip, contamination, defect inspection	2.3um	3.2um	5um	9.6um	12um
Side Wall Vision 1 (Top & Bottom)	12MP	Turret	crack, chip, contamination, defect inspection	2.3um	3.2um	5um	9.6um	12um
Side Wall Vision 2 (Left & Right)	12MP	Turret	crack, chip, contamination, defect inspection	2.3um	3.2um	5um	9.6um	12um
Output Vision (Alignment)	5MP	Turret	Wafer & unit alignment in wafer output form	16um				

Machine Model	EDS15
Additional features	▪ Offline Review Station PC (optional) ▪ Flip and Non-Flip (Conversion needed; (optional) ▪ Class 1K with Hepa Filter System (optional) ▪ Multi product Wafer / reticle map ▪ Load cell station (optional) ▪ Reject tray station at tape and reel station (optional) ▪ Input/Output Traceability Log ▪ SECS/GEM capable ▪ Auto bond head calibration

EDS15 OVERVIEW

ESTEK AUTOMATION



SIDEWALL VISION TOP BOTTOM

CANISTER

OUTPUT VISION

OUTPUT TRANSFER ARM

OUTPUT TABLE

BOND HEAD

TURRET

OUTPUT CASSETTE ELEVATOR

SETUP VISION

SIDEWALL VISION LEFT RIGHT

BOTTOM VISION

ALIGNER

ALIGNER VISION

INPUT VISION

FLIPPER BIN

TRANSFER ARM

PICK HEAD

FLIPPER

PURGE BIN

TOP VISION

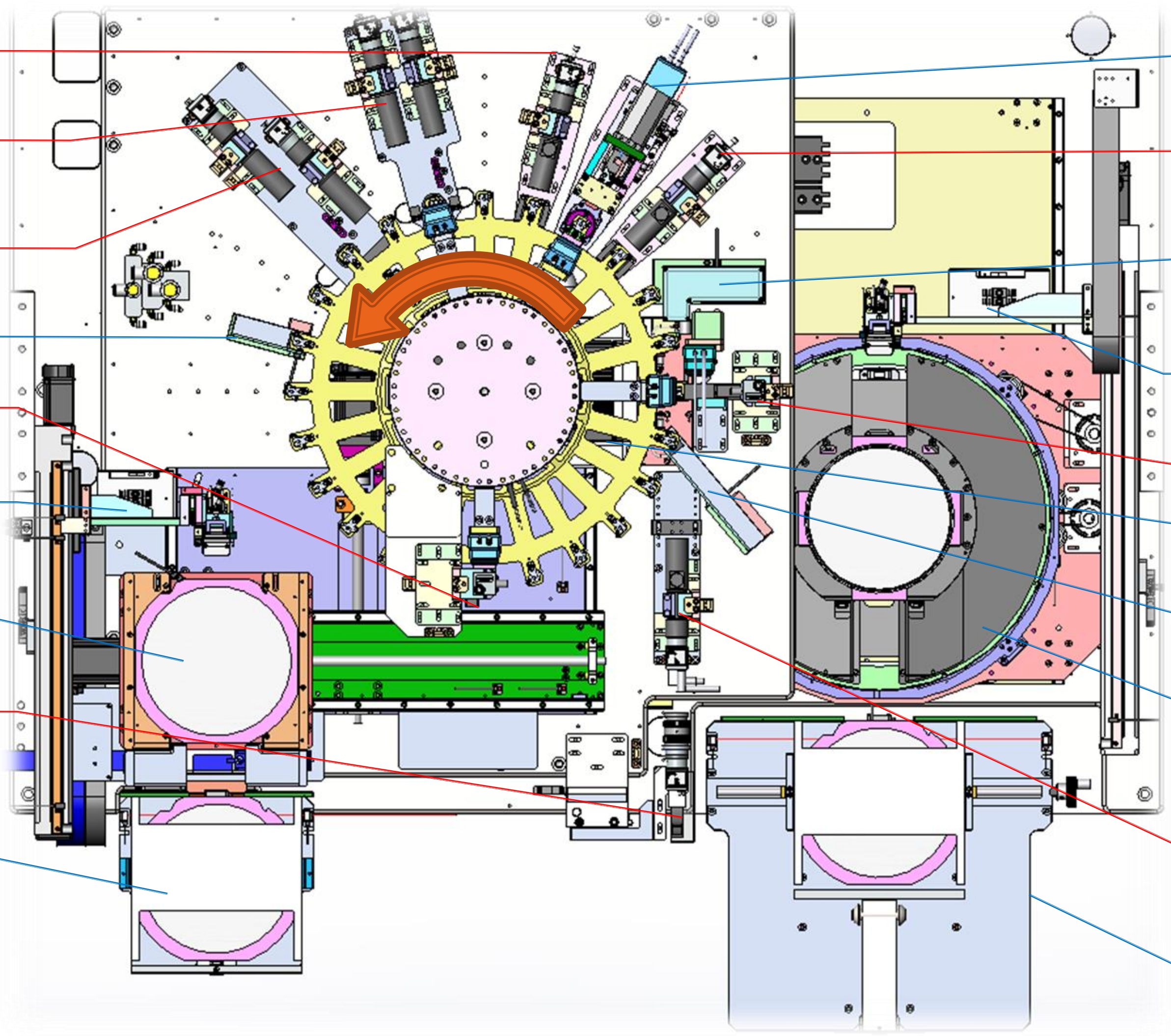
INPUT TABLE

INPUT CASSETTE ELEVATOR

CONFIDENTIAL

EDS15 LAYOUT

ESTEK AUTOMATION



BOTTOM VISION

SIDEWALL VISION LEFT RIGHT

SIDEWALL VISION TOP BOTTOM

CANISTER

OUTPUT VISION

OUTPUT TRANSFER ARM

OUTPUT TABLE

SETUP VISION

OUTPUT CASSETTE ELEVATOR

ALIGNER

ALIGNER VISION

FLIPPER BIN

INPUT TRANSFER ARM

INPUT VISION

TURRET

PURGE BIN

INPUT TABLE

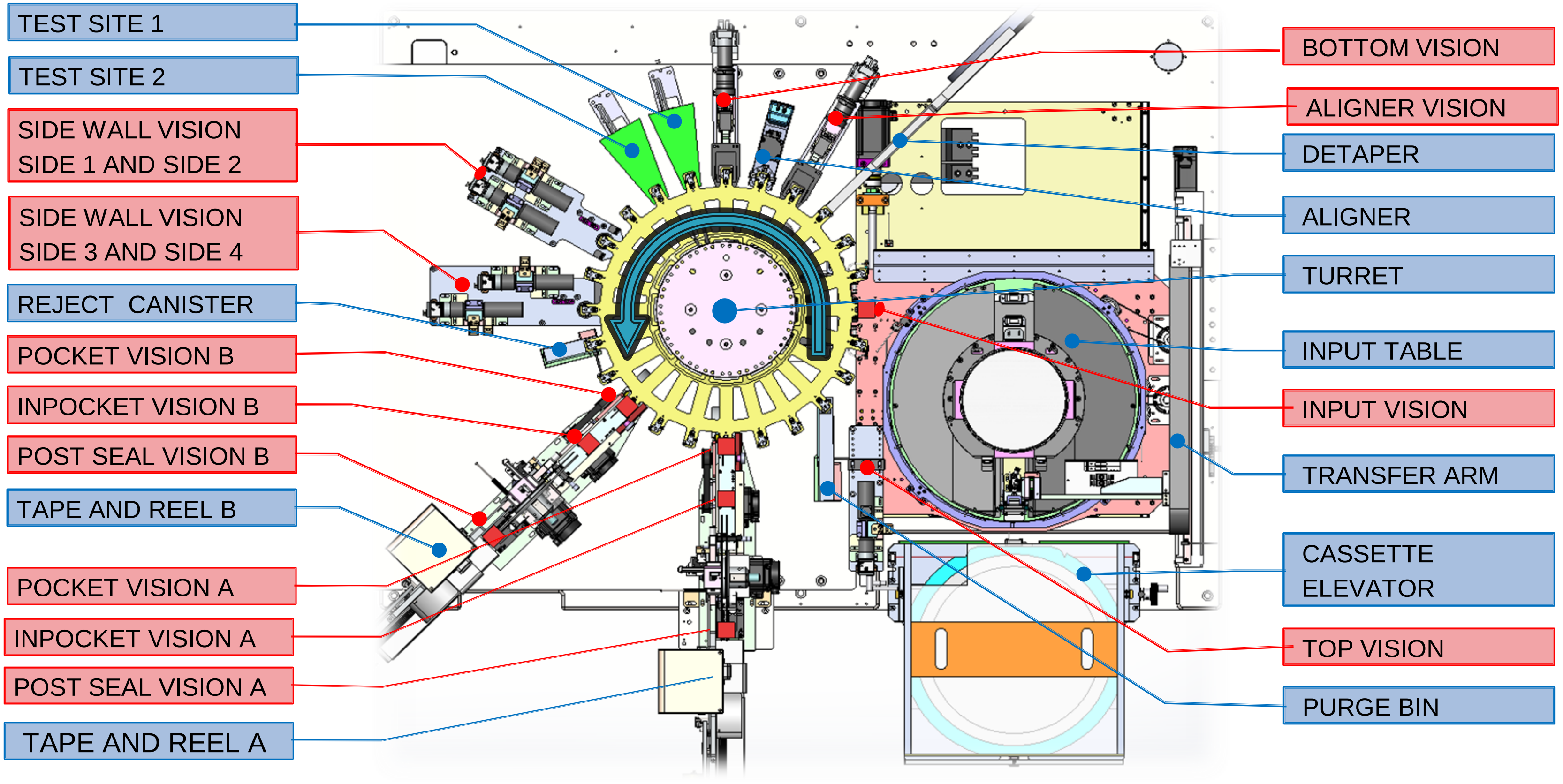
TOP VISION

INPUT CASSETTE ELEVATOR

EDS15 LAYOUT

ESTEK AUTOMATION

Wafer frame to tape and reel / with Detaper



TEST SITE 1

TEST SITE 2

SIDE WALL VISION SIDE 1 AND SIDE 2

SIDE WALL VISION SIDE 3 AND SIDE 4

REJECT CANISTER

POCKET VISION B

INPOCKET VISION B

POST SEAL VISION B

TAPE AND REEL B

POCKET VISION A

INPOCKET VISION A

POST SEAL VISION A

TAPE AND REEL A

BOTTOM VISION

ALIGNER VISION

DETAPER

ALIGNER

TURRET

INPUT TABLE

INPUT VISION

TRANSFER ARM

CASSETTE ELEVATOR

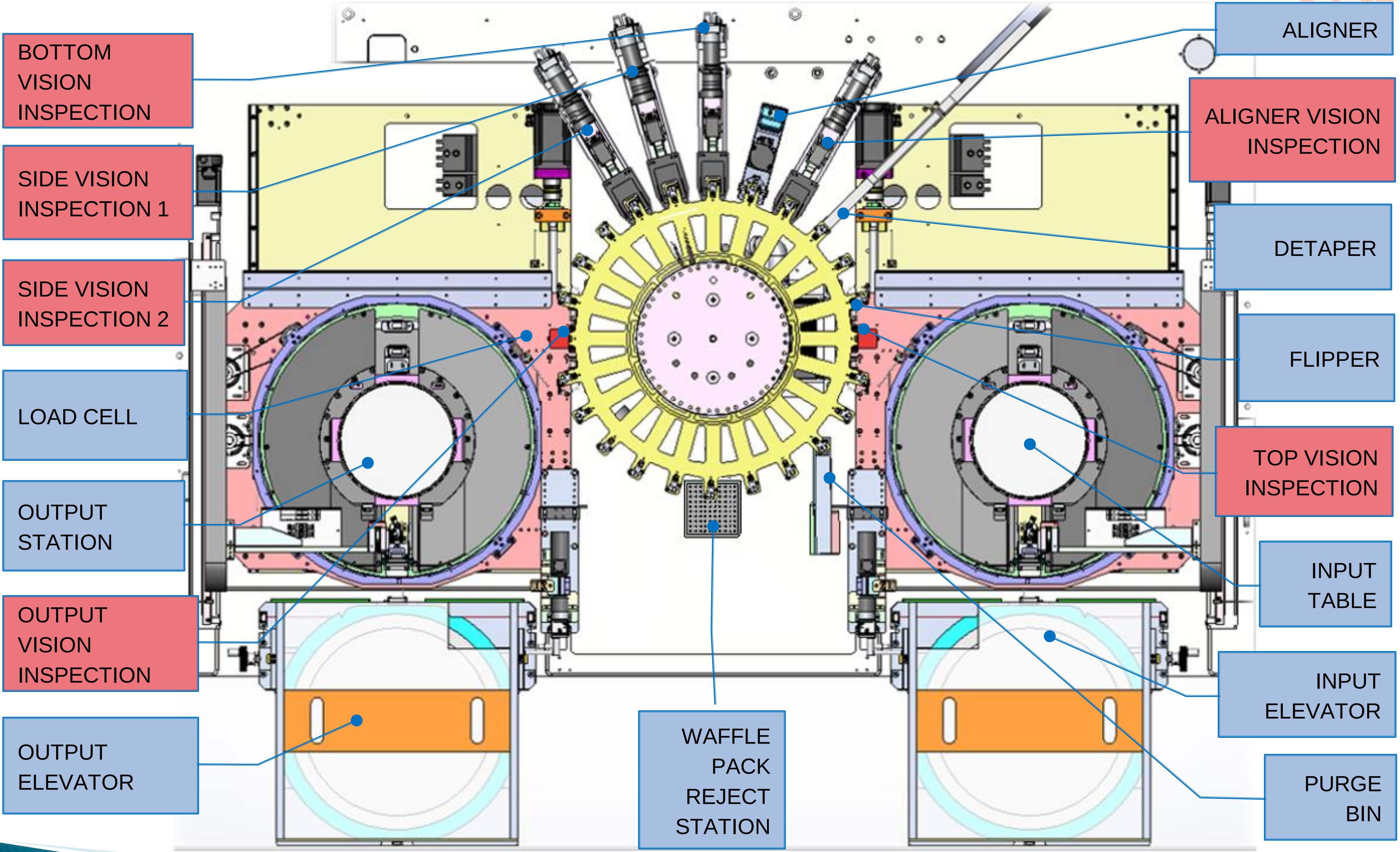
TOP VISION

PURGE BIN

EMS10

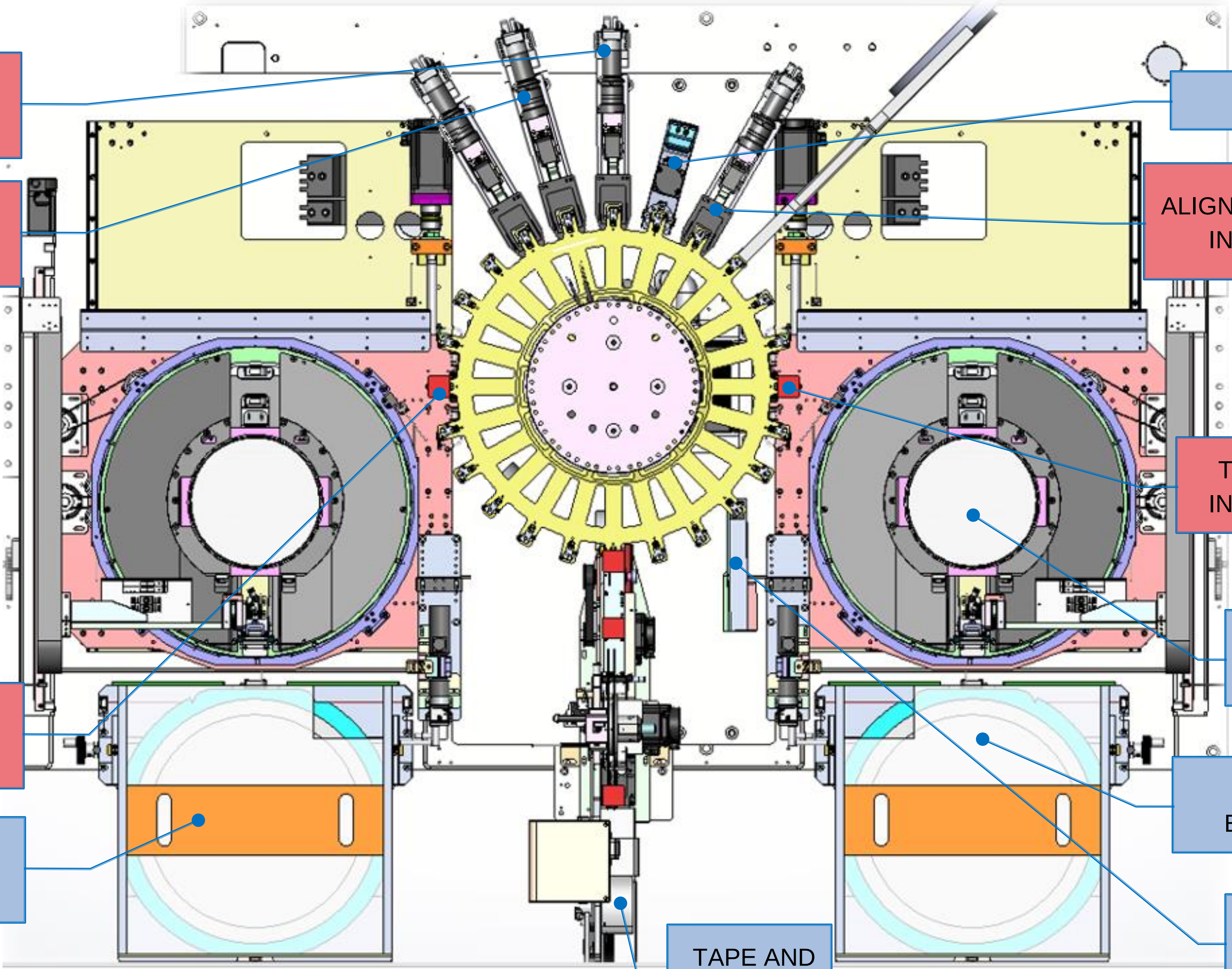
Fully automated and high-speed die sorter, it can handle any wafer sizes up to 300mm. Configurable for Multi carrier: Wafer frame 300mm wafer, JEDEC tray, Waffle/GelPak, and Tape and Reel

EMS10 Layout



EMS10 Layout

ESTEK AUTOMATION



BOTTOM VISION INSPECTION

SIDE VISION INSPECTION 1

ALIGNER

ALIGNER VISION INSPECTION

TOP VISION INSPECTION

INPUT TABLE

INPUT ELEVATOR

PURGE BIN

TAPE AND REEL

OUTPUT VISION INSPECTION

OUTPUT ELEVATOR

EMS10

Machine Model	EMS10
UPH	UPH: Estimated 10K (3mm x 3mm unit size)
Die size range	0.2mm to 30mm
Handling wafer frame size Input	Up to 12” wafer size; 17” frame maximum
Handling Wafer frame size output	Up to 12” wafer size;17” frame maximum
Hoopring handling input and output with adaptor	Up to 12” wafer size; 17” frame maximum
Waffle pack handling – input and output	2” and 4” with adaptor. Manual loading/unloading
Gelpak pack handling – input and output	2” and 4” with adaptor. Manual loading/unloading
Carrier tape	8mm, 12mm, & 16mm • Dual tape and reel for multi bin or maximize output for same bin (optional) • Dual tape and reel with different size to reduce conversion time for high mix production. (optional)
Bond head	16
Dark field light (vision)	Available
Bright field light (vision)	Available

Machine Model	EMS10
Additional features	▪ Offline Review Station PC (optional) ▪ Flip and Non-Flip (Conversion needed; (optional) ▪ Class 1K with Hepa Filter System (optional) ▪ Multi product Wafer / reticle map ▪ Load cell station (optional) ▪ Reject tray station at tape and reel station (optional) ▪ Input/Output Traceability Log ▪ SECS/GEM capable ▪ Auto bond head calibration

Vision Capability

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Product Features

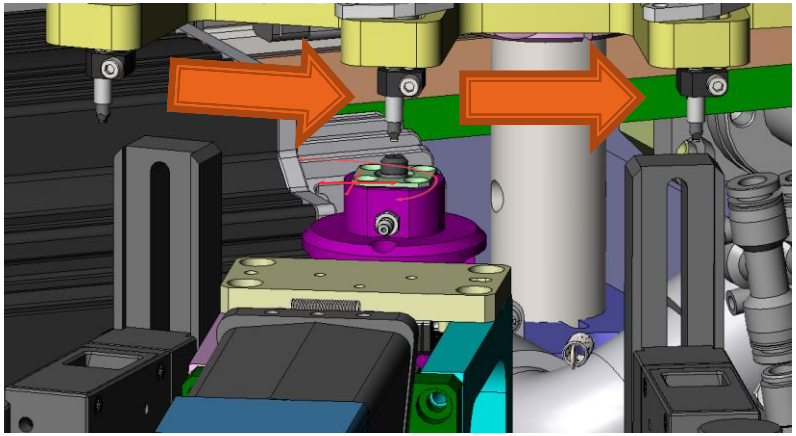
TURRET SYSTEM

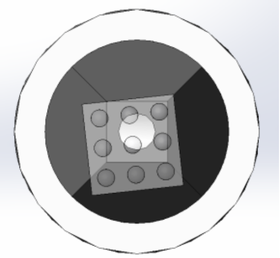
Advantages:

- Many additional feature can be added/combined in. (Detaper, sidewall inspection, OS test, laser marking, etc)
- Additional features without UPH slow down, parallel process.
- Easy machine setup, auto Z teaching.

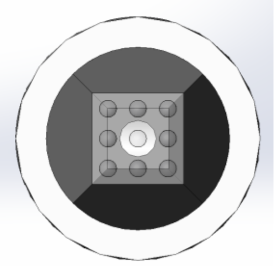
ALIGNER Module

- Vision guided XYθ alignment.
- Unit at center of bond head after alignment.
- Better placement stability when unit at center of bond head. Bond head purging and pocket vacuum hole are in line, less chance for unit tilted.

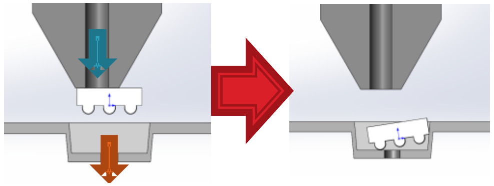




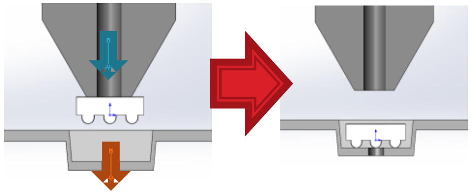
Before alignment



After alignment



without aligner

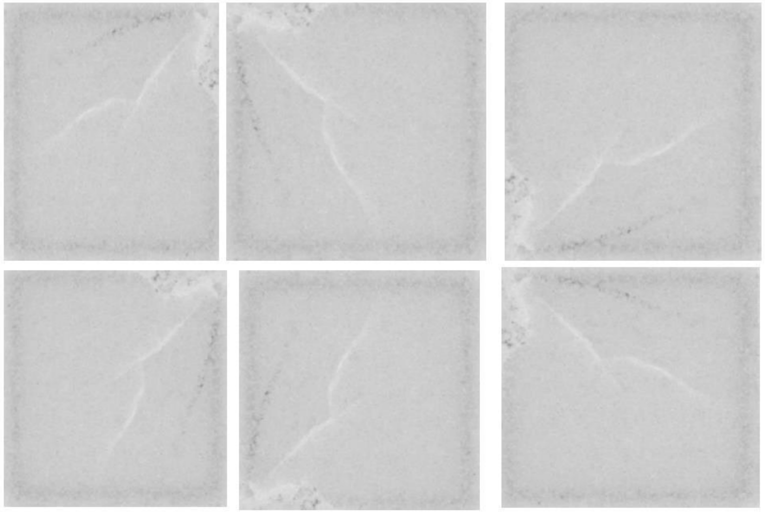


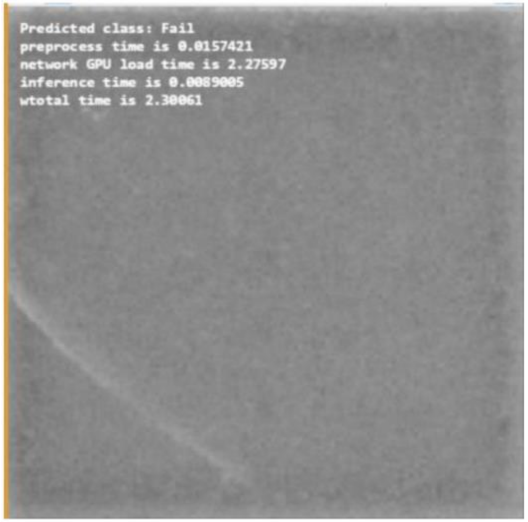
with aligner

Vision Capability

Deep learning Option

AI Inspection tools for optimizing the minor defect on the unit.



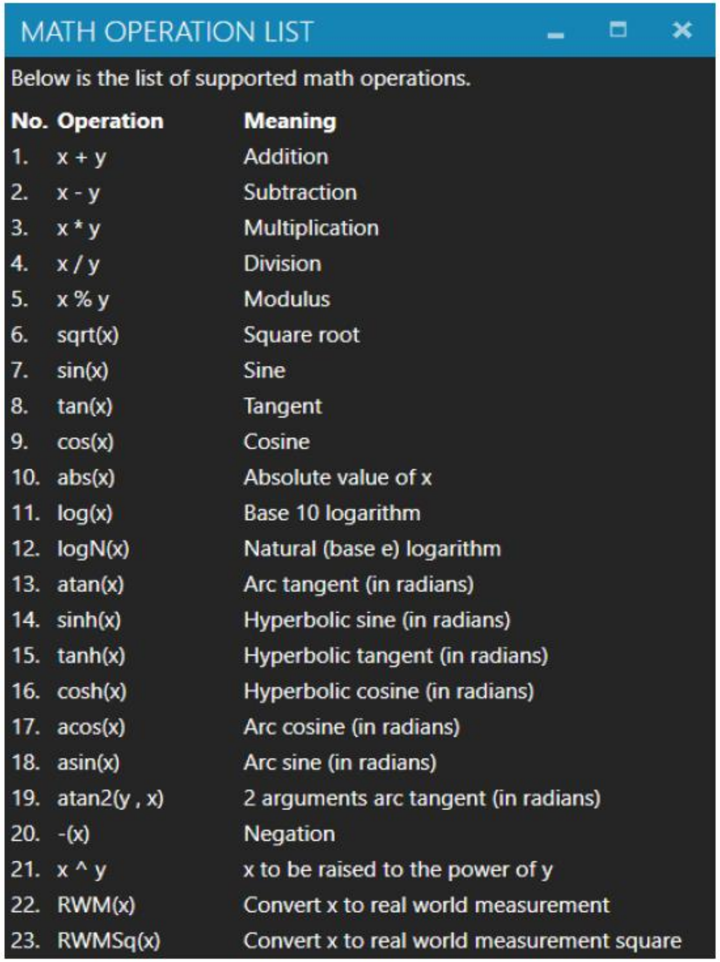


```
Predicted class: Fail
preprocess time is 0.0157421
network GPU load time is 2.27597
inference time is 0.0089005
wtotal time is 2.30061
```

Vision Capability

Flexible Mathematics Formula

- Flexible mathematics formula(s) to compute the output(s) from other tools to get the final inspection result, or analyze the outputs of other inspection tools



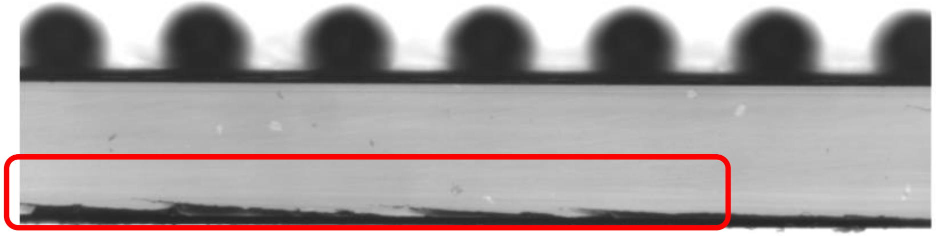
Below is the list of supported math operations.

No.	Operation	Meaning
1.	x + y	Addition
2.	x - y	Subtraction
3.	x * y	Multiplication
4.	x / y	Division
5.	x % y	Modulus
6.	sqrt(x)	Square root
7.	sin(x)	Sine
8.	tan(x)	Tangent
9.	cos(x)	Cosine
10.	abs(x)	Absolute value of x
11.	log(x)	Base 10 logarithm
12.	logN(x)	Natural (base e) logarithm
13.	atan(x)	Arc tangent (in radians)
14.	sinh(x)	Hyperbolic sine (in radians)
15.	tanh(x)	Hyperbolic tangent (in radians)
16.	cosh(x)	Hyperbolic cosine (in radians)
17.	acos(x)	Arc cosine (in radians)
18.	asin(x)	Arc sine (in radians)
19.	atan2(y , x)	2 arguments arc tangent (in radians)
20.	-(x)	Negation
21.	x ^ y	x to be raised to the power of y
22.	RWM(x)	Convert x to real world measurement
23.	RWMSq(x)	Convert x to real world measurement square

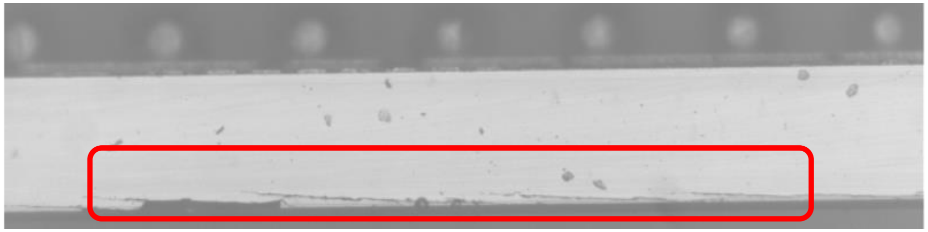
VISION CAPABILITY

Sidewall: Crack Inspection

Colour Camera



Inner Crack (IR)

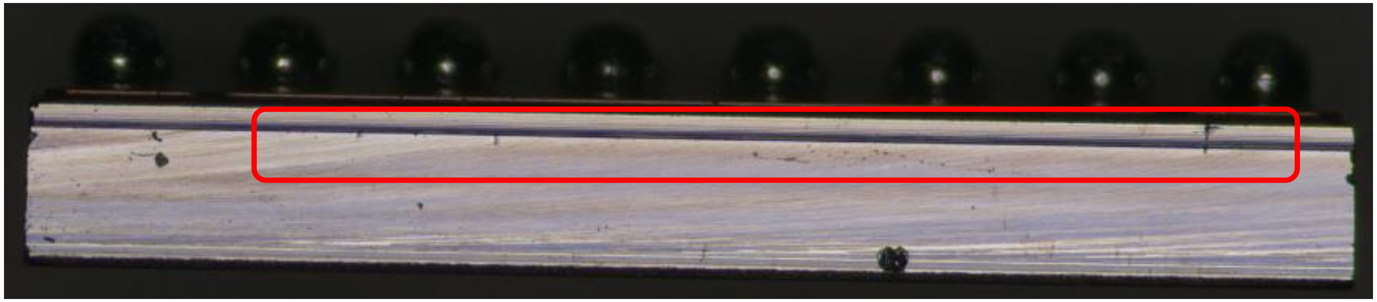


Surface Crack

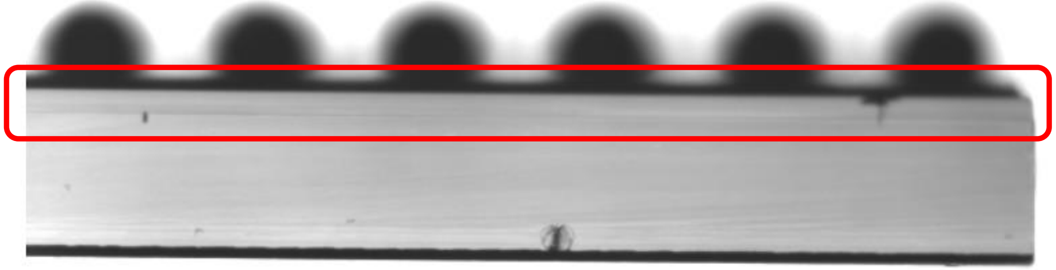
- By applying 2 different technic & filter, we are able to inspect and differentiate surface crack & inner crack (IR) of the unit.

VISION CAPABILITY

Sidewall: SAW MARK Filtering



Normal Image

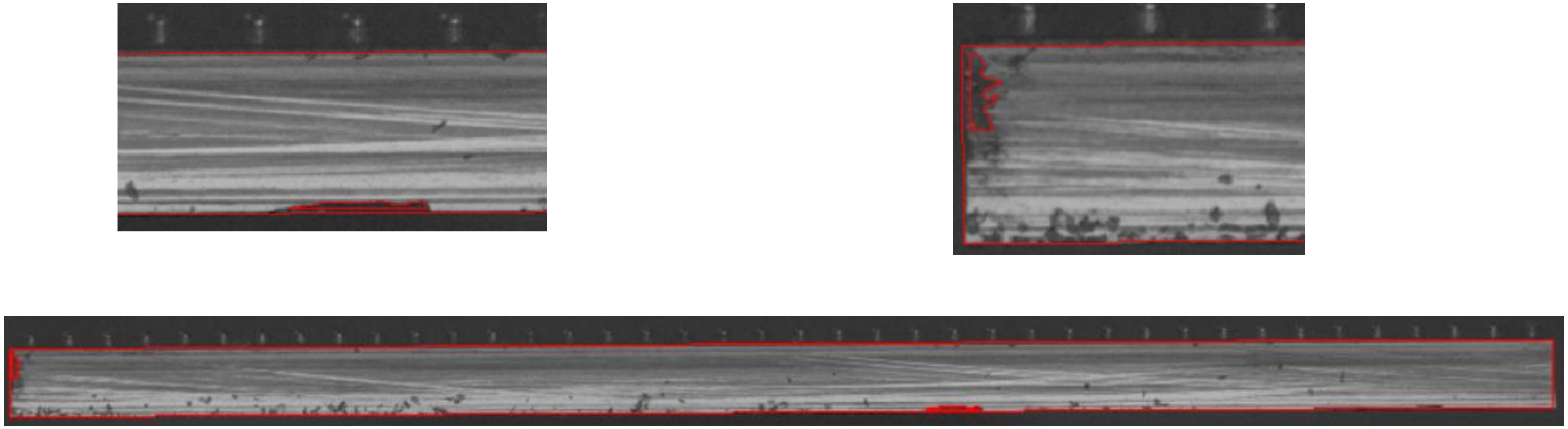


After Filter Image

- By applying IR technic and filter, the saw mark will be minimized

Vision Capability

Sidewall: Chip Inspection

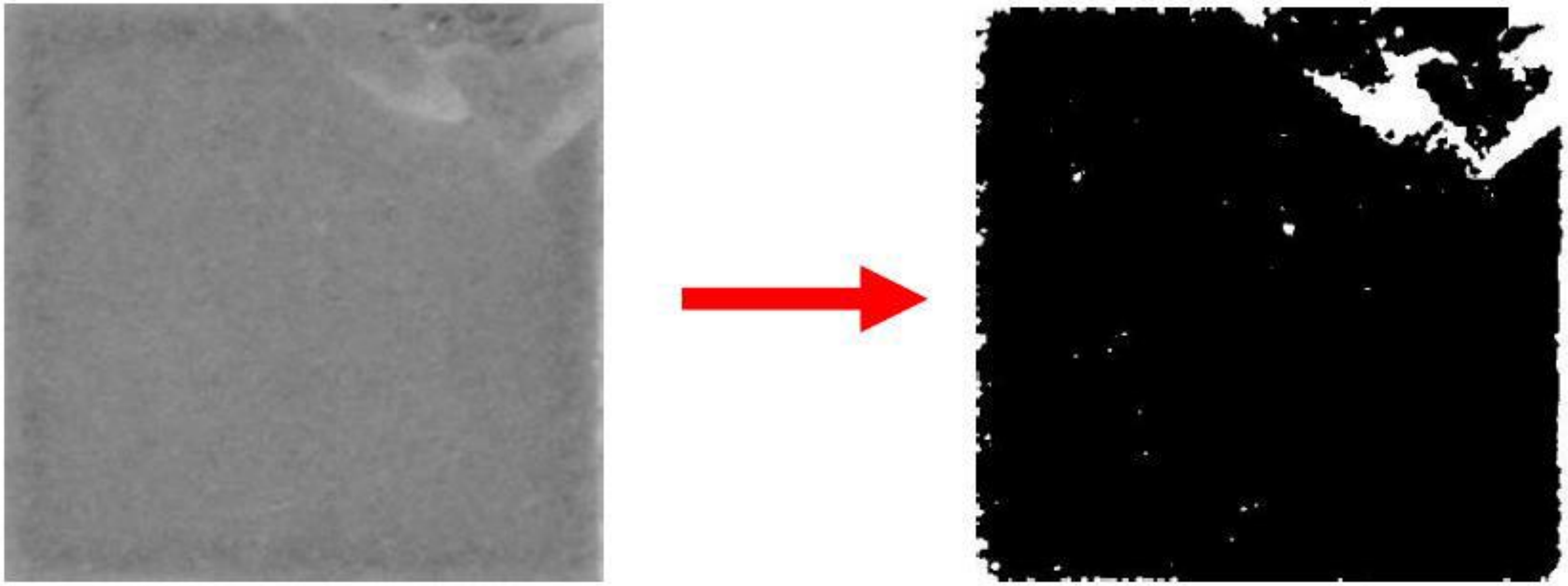


DetectChip (Sided blob extract)	Width (Top side): 0 um Height (Top side): 0 um Diameter (Top side): 0 um Width (Right side): 0 um Height (Right side): 0 um Diameter (Right side): 0 um Width (Bottom side): 218.5 um Height (Bottom side): 13.8 um Diameter (Bottom side): 216.2 um Width (Left side): 103.5 um Height (Left side): 41.4 um Diameter (Left side): 103.295 um	F

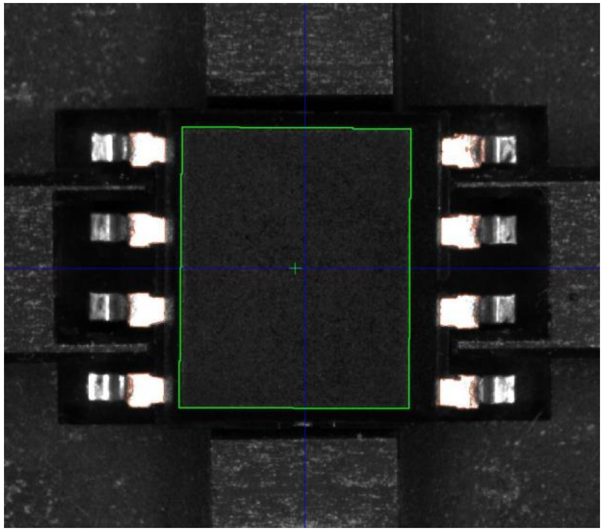
Vision Capability

Image Filtering Tool

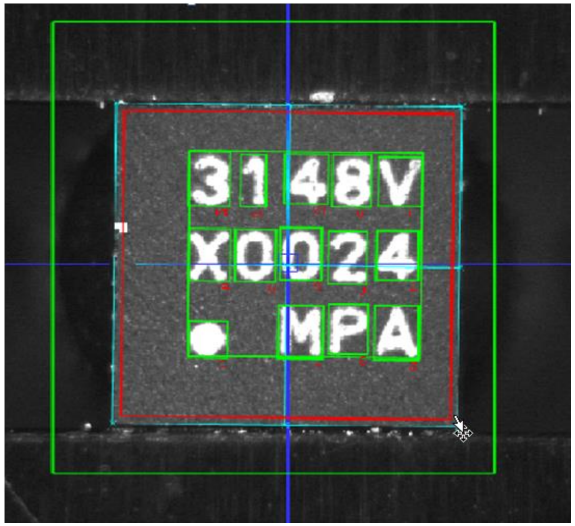
- Powerful image filtering tools to convert a low contrast defect to binary image



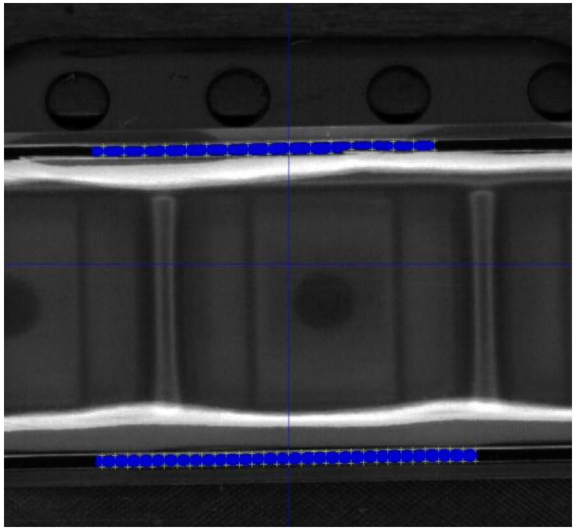
VISION ON TAPE & REEL



IN POCKET



MARK INSPECTION



POST SEAL

Customer INFORMATION REQUIRED

- Input type and related drawing, POD.
- Process required, example: pick up from sawn wafer, flip from dead to life bug, rotate by certain angle, place into tray.
- Inspection required.
- Inspection criteria and specification.
- Output type and related drawing, POD.
- Other concern which need specially taken care.

Thank you