Dreams of Automation Technologies

COMIZOA

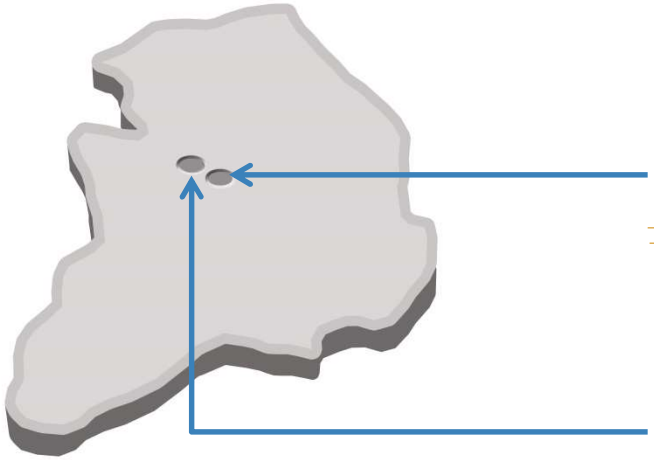
Dreams of Automation Technologies

COMIZOA
COMPANY OVERVIEW

COMIZOA introduction

SINCE 2000

COMIZOA is a research and development company with more than 300 types of products through constant research and development in motion control, measurement, and automation (FA) fields..



- Establishment : 2000. 08. 01
- CEO : Kyung hoon Min
- Employees : 40 people
- Research institute : 20 people
- China branch : Established in 2007

Headquarters lab
314, Techno 2 in
Yuseong-gu, Daejeon

Completed in March 2013.
Land 3,112m²
Building area 770m² 4th floor.
The total floor area is 2,994m²

Myeonghak factory
57, Myeonghaksandanseo-ro,
Yeondong-myeon, Sejong

Completed in April 2019.
Land 9,366.9m²
Building area 1,823.92m² 4th floor.
The total floor area is 6,454.7m²

COMIZOA introduction

	Contents
Land	6,465 m²
Floor	Under ground, Ground 10th
Structure	Ferroconcrete
Building Area	2,239 m²
Total Floor Area	21,081 m²
Parking	212
Completion	2023~2024

COMIZOA SEJONG TECHVALLEY

COMIZOA introduction

	Contents
Land	5,834 m²
Floor	3rd Floors
Structure	Ferroconcrete
Total Floor Area	1,775 m²
Parking	40
Completion	November 2022

COMIZOA Daejeon Factory2

Headquarters lab

3rd – Test Room

3rd - Office

2nd - Lobby

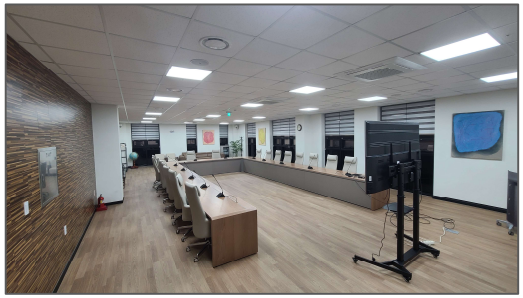
2nd - Office

1st – Quality Control

1st - Caffeteria

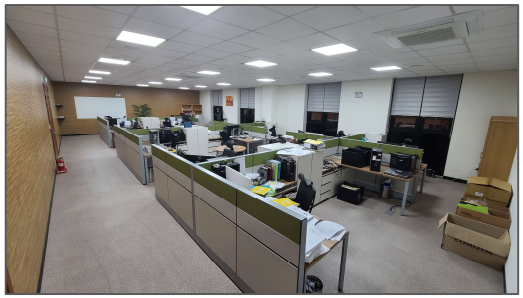
Myeonghak factory

3rd – Lobby



4th – Meeting Room

2nd - Laboratory



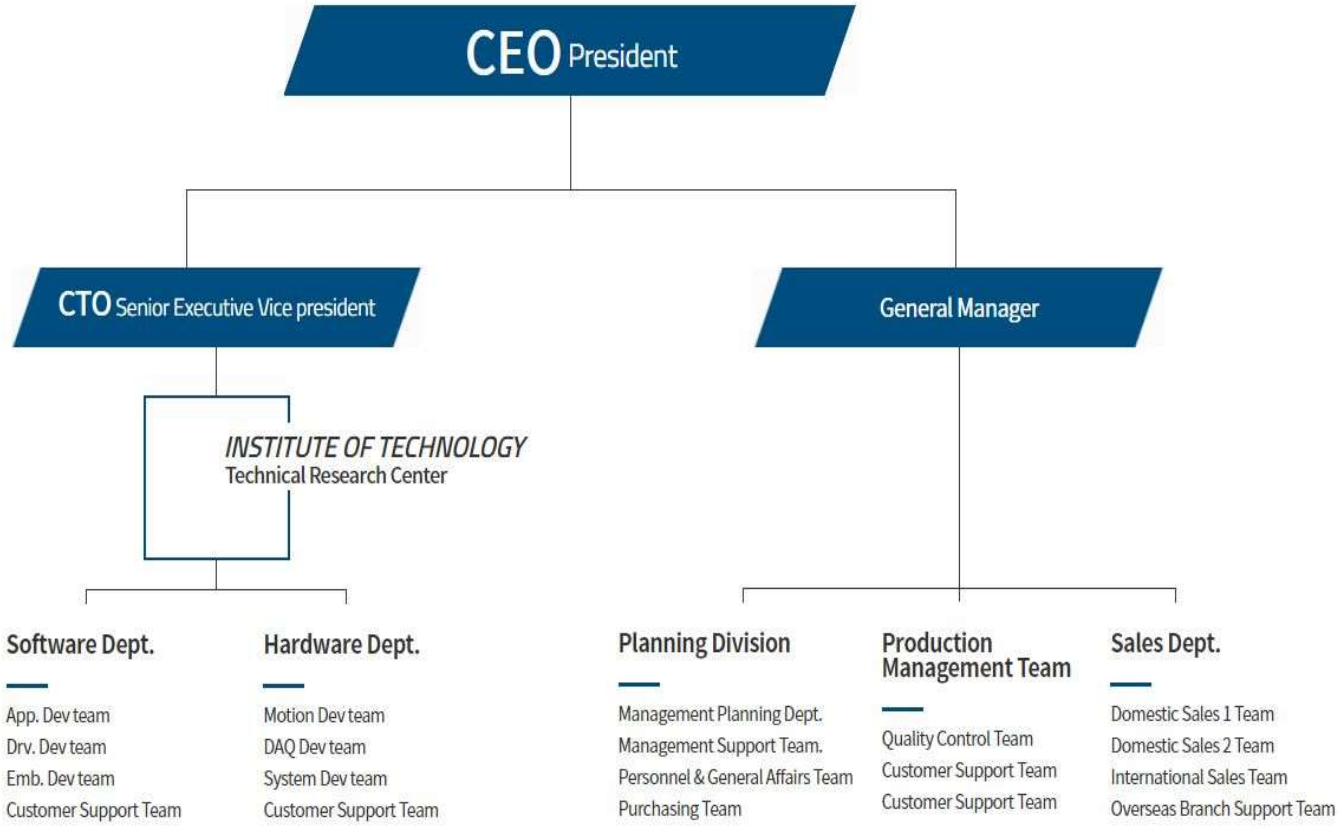
2nd – Sales department

2nd – SRC

1st – Clean Room

Dreams!

COMIZOA



Our history

Start
2000~2003

- 2000.08 Established COMIZOA
- 2001.07 Acquired ISO 9001 certification
- 2001.08 Confirmed venture company
- 2002.08 Selected as INNO-BIZ company
- 2002.09 Selected as a Promising Small and Medium Business in Daejeon

Major product development & launch

- CP Series and SD Series products
- Motion Controller PCI Series Products
- Eurocard-type cPCI integrated solution

Growth
2004~2008

- 2005.08 Established branch office in Shanghai, China
- 2007.02 Established in China
- 2008.03 Patent acquisition (wafer inspection equipment)
- 2008.06 Certified as a component material company

Major product development & launch

- USB-based DAQ products
- Stand-alone motion controller etc

Jump
2009~

- 2011.03 Selected as Excellent Employment Certification Company (Daejeon)
- 2015.06 Selected as a high growth company
- 2016.11 Ministry of Science and ICT by the future creation science department
- 2017 EtherCAT Temperature Controller development
  EtherCAT Software Master development

Major product development & launch

- Network Motion Controller Family
- cEIP / AllNet Family
- EtherCAT Master / Slave Family

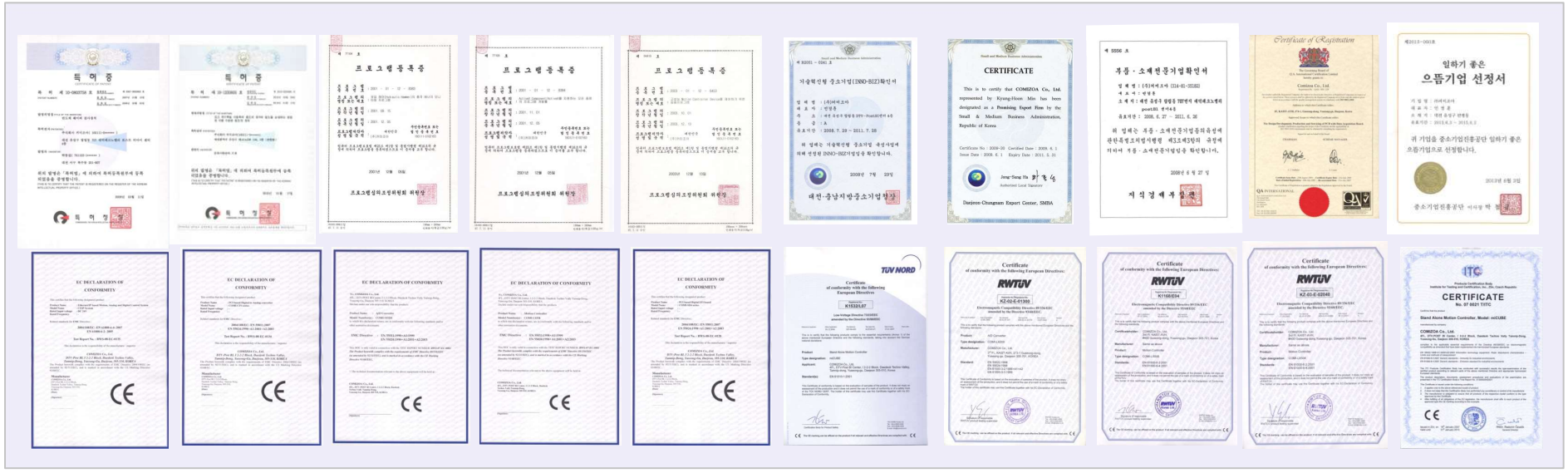
Industrial Right & Certification

Industrial property rights

- Patent - Semiconductor wafer inspection device
- Patent - Using torque feedback, the gantry device A method of correcting the tilt and using it. The gantry device
- Program registration (motion builder and 2 other cases)

Certification status

- INNO-BIZ Enterprise Certification (Small and Medium Business Administration)
- CE certification - all motion control products, other than CEIP,
- Designation of promising SMEs for export (Small and Medium Business Administration)
- Excellent employment companies (Daejeon Metropolitan City)
- Companies specializing in parts and materials (Ministry of Trade, Industry and Energy)



CUSTOMERS (wafer Inspection)

GlobalWafers

MEMC
TECHNOLOGY IS BUILT ON US

GlobalWafers Co., Ltd.
環球晶圓股份有限公司

GWJ
GlobalWafers Japan
グローバルウェーハズ・ジャパン株式会社

FerroTec

中环半导体
ZHONGHUAN SEMICONDUCTOR

SK siltron

SUMCO

COMIZOA

CUSTOMERS (Controller)

Silicon wafer Inspection

ESIS-3000/2000

Edge and Surface Inspection System

	Specification
Wafer Diameter	300mm, 200mm silicon wafer
Wafer Thickness	500 ~ 1,000㎛
Wafer Surface	DSP, EPI, CVD
Edge Inspection	Judgement (OK / NG), Classification, Position
	Chip, Fracture, Scratch, Stain, Particle
Notch Inspection	Chip, Crack, Scratch, Wheel Mark, Stain
Front side Inspection	Crack, Scratch, Stain, Particle
Back side Inspection	Crack, Scratch, Stain, Particle, Grind Mark, Chuck Mark, Pin Mark, Halo, etc
PIT Inspection	Judgement (OK / NG), Classification, Position
3000 Dimension	2280(W) x 2760(D) x 2002(H)
2000 Dimension	2050(W) x 2440(D) x 2002(H)

EIS-3000

Edge Inspection System

Wafer Type	P-, P+, P++, P+++, N-, N+, N++, N+++
Wafer Diameter	300mm silicon wafer
Wafer Thickness	500 ~ 1,000㎛
Wafer Surface	Polished, Etched
Defects	Location and Size of Crack
	Chip, Fracture, Scratch, Stain, Particle
Scan camera pix el size	2.5㎛
Review camera pixel size	0.62㎛
Detected Information	Types of defects
	Rotating coordinate from Origin
	Size of defects
Throughput	70 wfr/h
Dimension	1670 ㎜ (W) x 2440 ㎜ (D) x 2002 ㎜ (H)

IIM-3010

Air-Pocket Inspection System

	Specification
Target Wafer	Φ 300 ㎜ Si Wafer (Polished, Etched) / N, P-, P+, P++
Detectable Defects	Buried Air-pocket, Surface Bump, Through–Hole
Min. Detectable Airpocket	≥ 10 ㎛ (Double Side Polished Wafer) Capture Rate : 95 % for APK (≥ 25 ㎛ diameter)
Defect Information	Diameter, Long-Short Ratio, Circularity X,Y,Z coordinate (Z means the depth of defect)
Throughput	155 Wfrs/h (in case of no defect in Wafer)
Dimension	1450 ㎜ (W) x 2380 ㎜ (D) x 2010 ㎜ (H)

IIM-2010

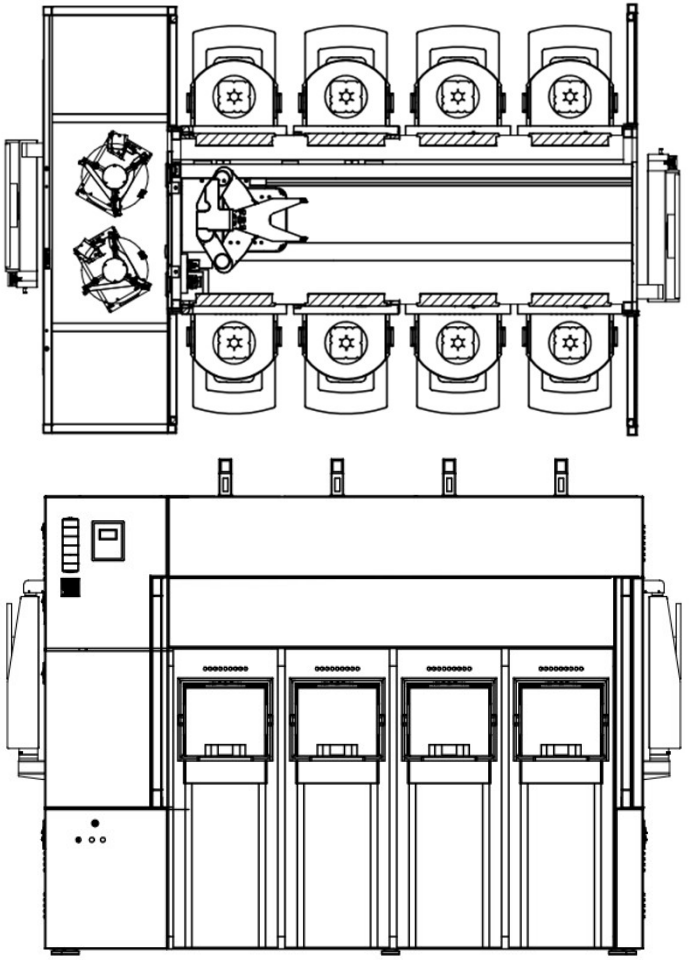
Air-Pocket Inspection System

	Specification
Target Wafer	Φ 200 ㎜ Si Wafer (Polished, Etched) / N, P-, P+, P++
Detectable Defects	Buried Air-pocket, Surface Bump, Through–Hole
Min. Detectable Airpocket	≥ 10 ㎛ (Double Side Polished Wafer) Capture Rate : 95 % for APK (≥ 25 ㎛ diameter)
Defect Information	Diameter, Long-Short Ratio, Circularity X,Y,Z coordinate (Z means the depth of defect)
Throughput	180 Wfrs/h (in case of no defect in Wafer)
Dimension	1457 ㎜ (W) x 1980 ㎜ (D) x 1912 ㎜ (H)

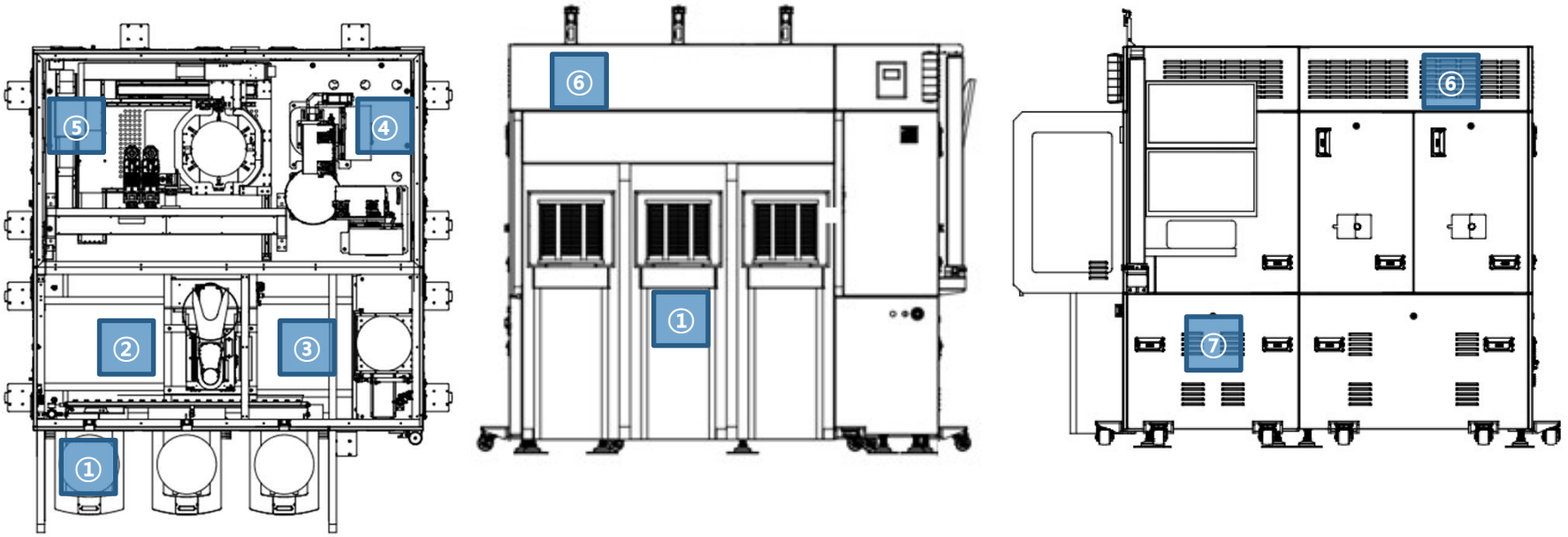
IWS-3000

Intelligent Wafer Sorter

	Specification
Target Wafer	Φ 300 ㎜ Si Wafer (Polished, Etched
WTR	Edge gripped Dual Arm Robot
Aligner	2 Aligner for high throughput
Laser Mark	4set Laser Mark Reader supported
Load Port	8 set Foup (SEMI E47.1 and E62 compliant) FOSB : KT-3020D, KT-3004A, KT-3004A2/A3/A4, KT-3005, MW-300GT, SB300, GSW300 V2
Throughput	300 wafers/hour Transport 25 wafers within 6 minutes with Load port open and Close
Communication	Supports full automation with SECS/GEM (GEM300) Standard compliance
Dimension	2700 ㎜ (W) x 1900 ㎜ (D) x 2100 ㎜ (H)

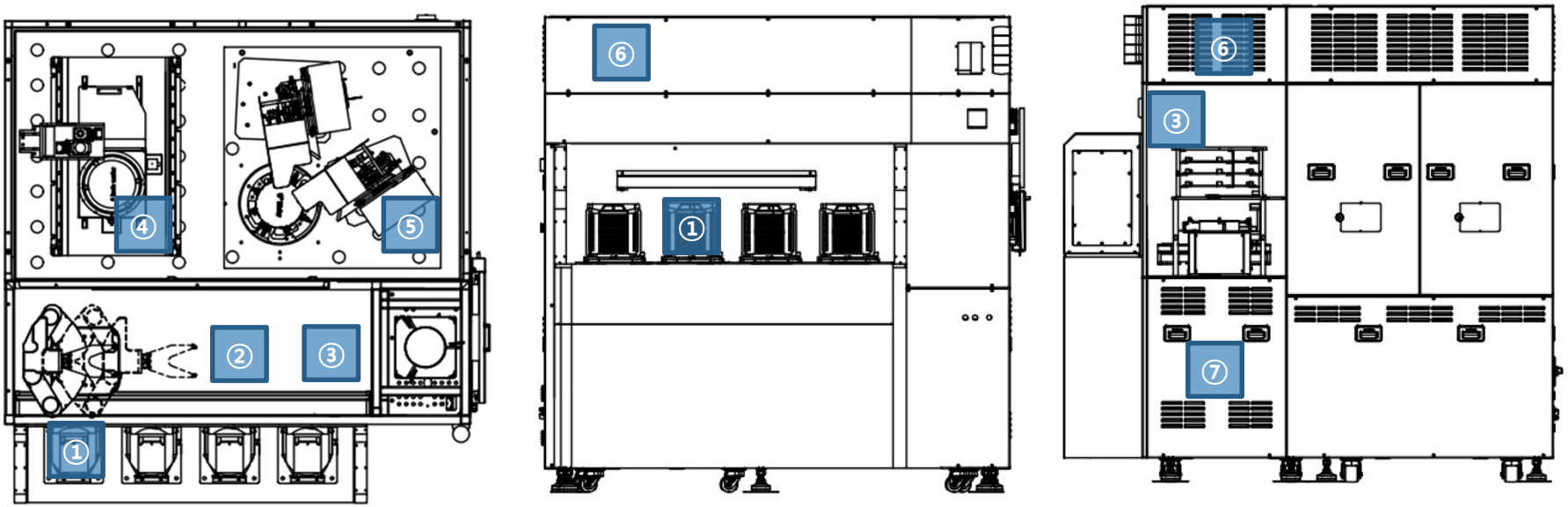


- ESIS-3000 System Layout



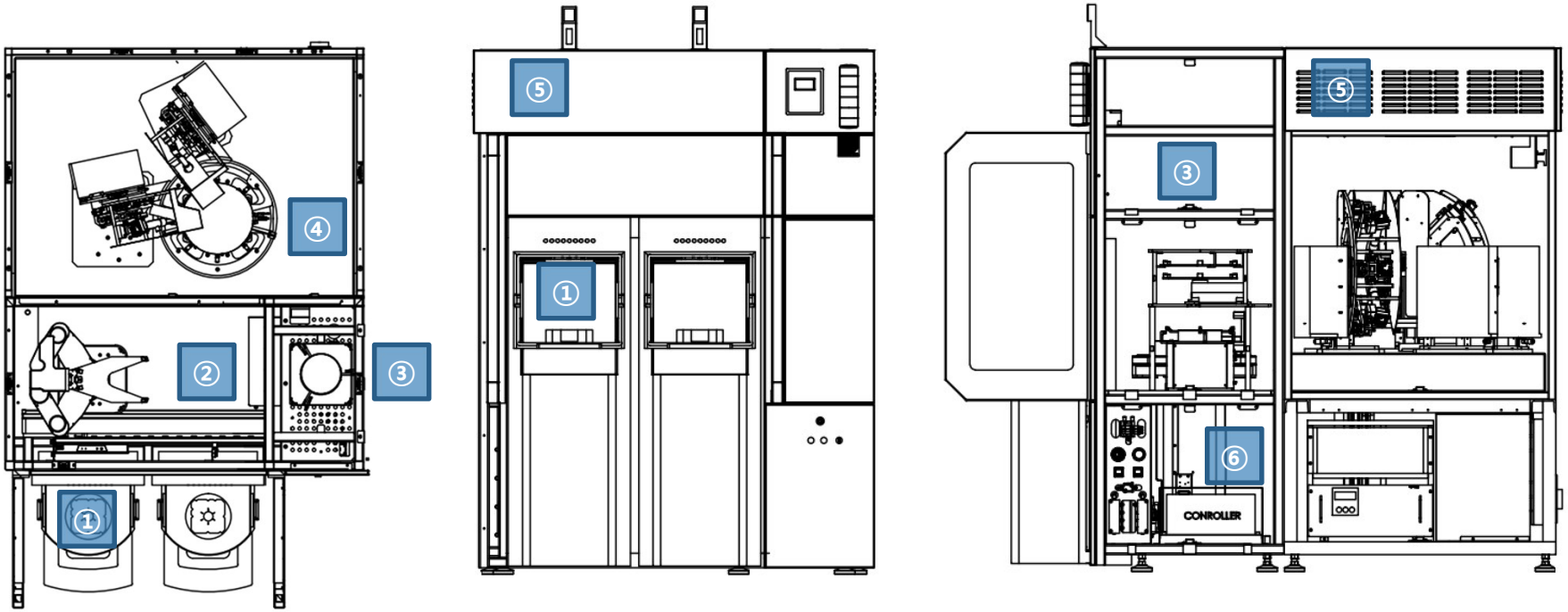
① : Foup Opener (3 EA)
② : WTR
③ : Buffer Stage with Calibration Wafer
④ : Edge Inspection Stage
⑤ : Surface Inspection Stage
⑥ : FFU
⑦ : Control Systems

- ESIS-2000 System Layout



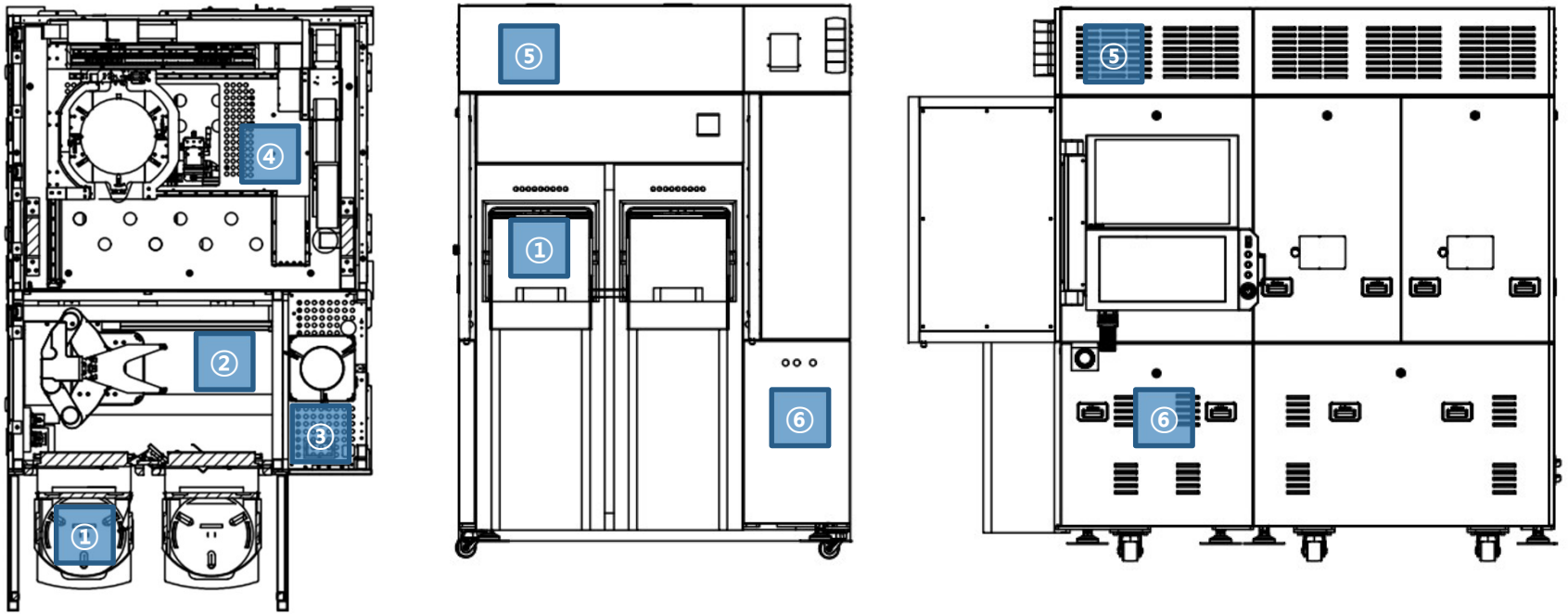
① : Cassette Port (4 EA)
② : WTR
③ : Buffer Stage with Calibration Wafer
④ : Surface Inspection Stage
⑤ : Edge Inspection Stage
⑥ : FFU
⑦ : Control Systems

- EIS-3000 System Layout



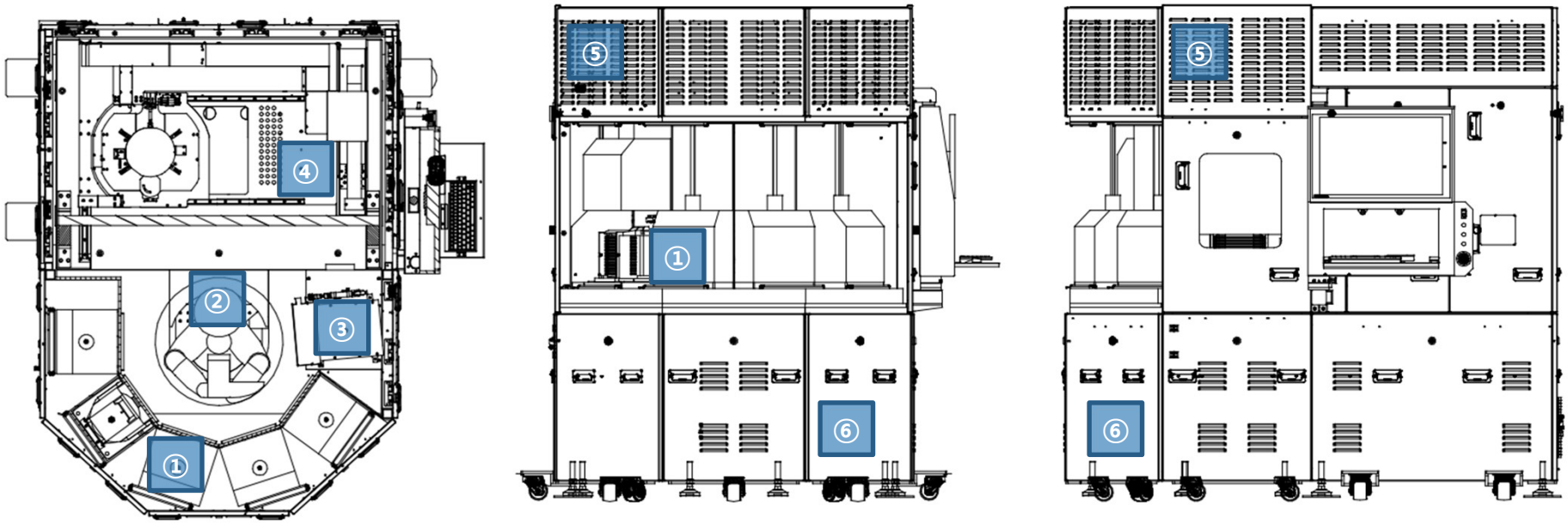
① : Foup Opener (2 EA)
② : WTR
③ : Buffer Stage with Calibration Wafer
④ : Edge Inspection Stage
⑤ : FFU
⑥ : Control Systems

- IIM-3010 System Layout



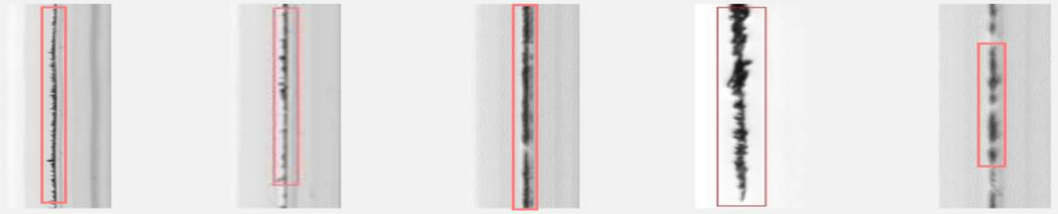
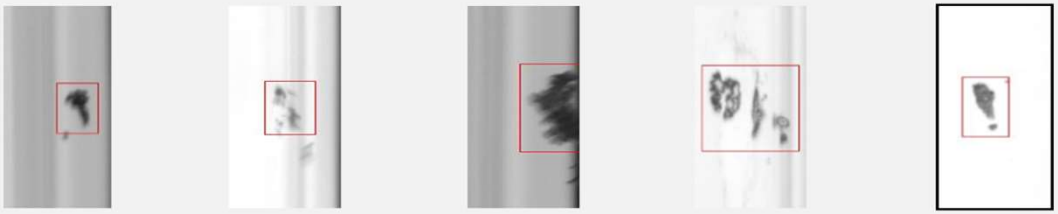
① : Foup Opener (2 EA)
② : WTR
③ : Buffer Stage with Calibration Wafer
④ : IR Inspection Stage
⑤ : FFU
⑥ : Control Systems

- IIM-2010 System Layout



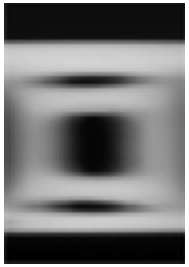
① : Cassette Port (5 EA)
② : WTR
③ : Buffer Stage with Calibration Wafer
④ : IR Inspection Stage
⑤ : FFU
⑥ : Control Systems

- Edge Defect Image Samples

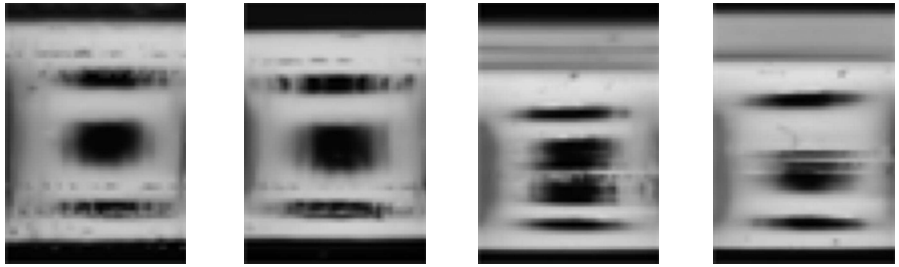
Defect Type	Defect Image Samples
Chip	
Crack	
Sparkle	
Stain	

- Notch Defect Image Samples

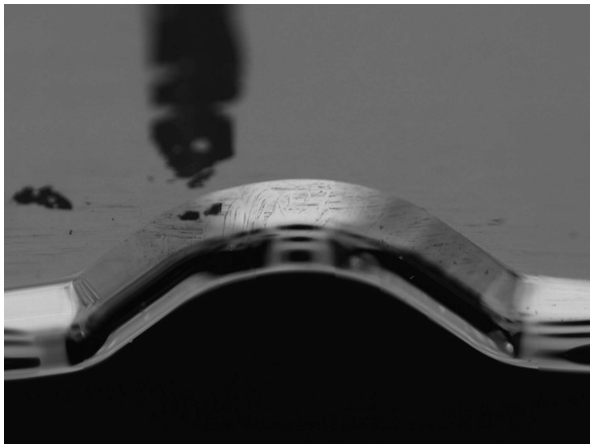
OK

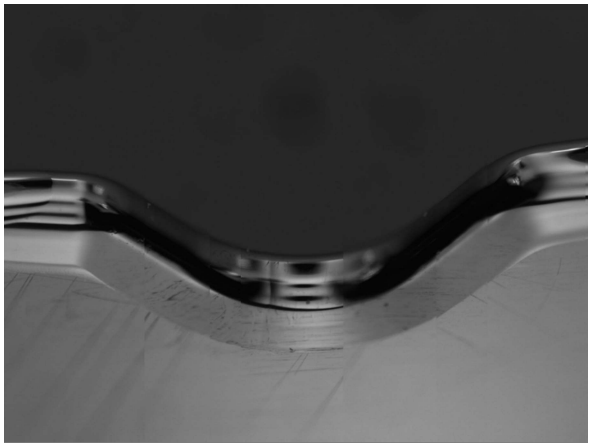


NG (Wheel mark detected)



Notch Apex Images

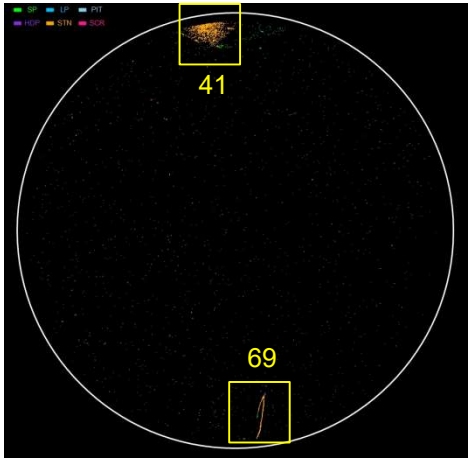
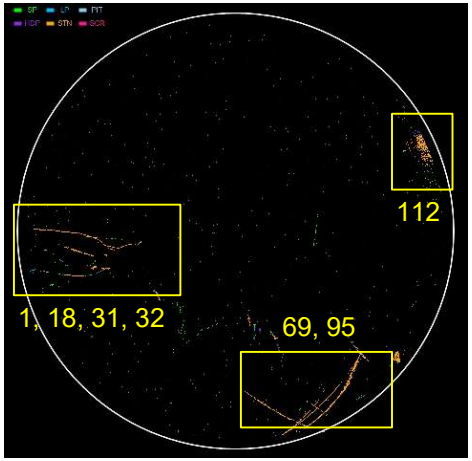
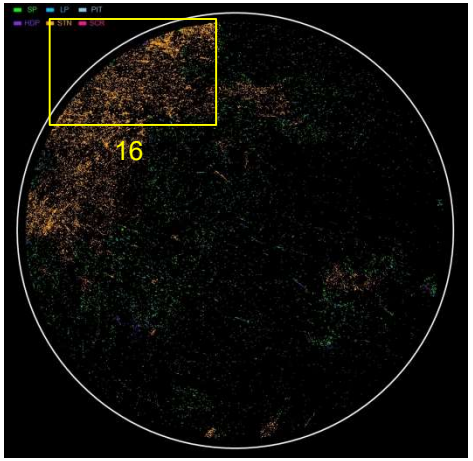
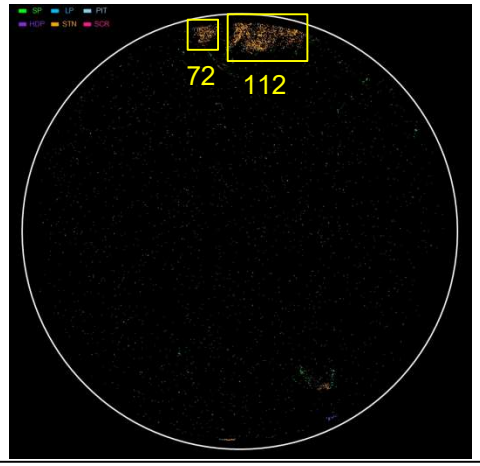
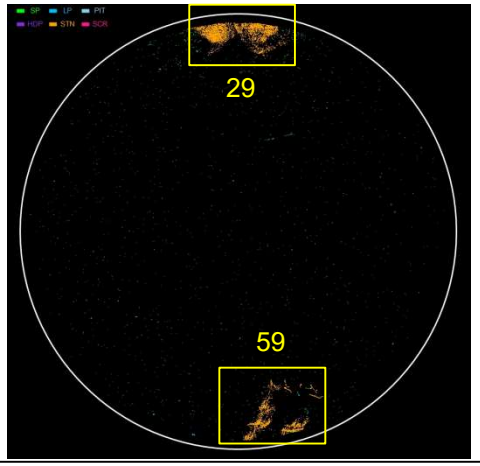
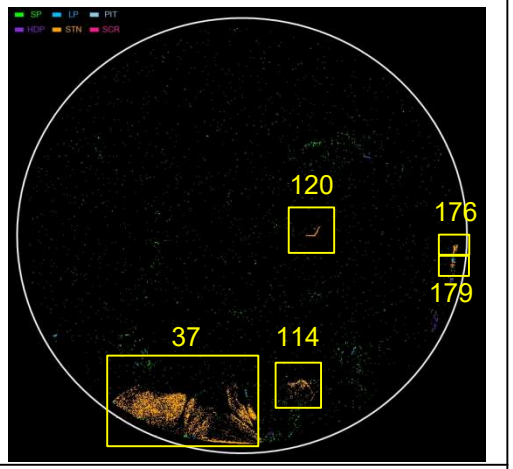




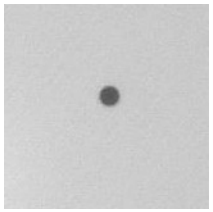
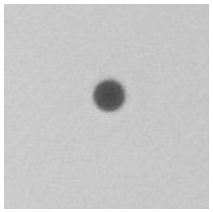
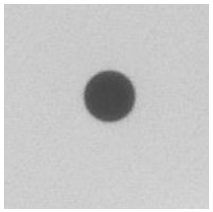
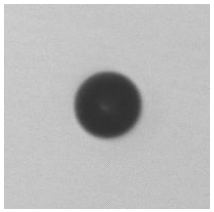
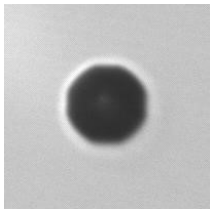
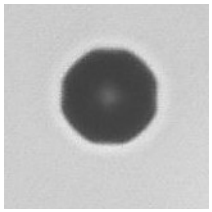
Upper Bevel Image

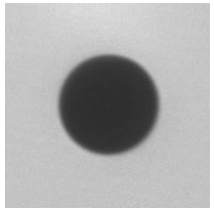
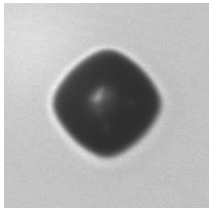
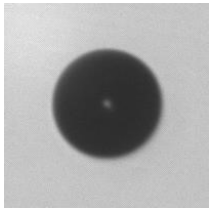
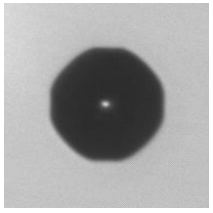
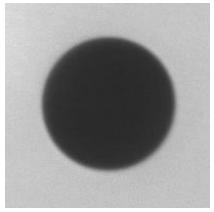
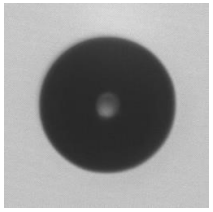
Lower Bevel Image

- Surface Inspection Stage
  : Real Sample Images

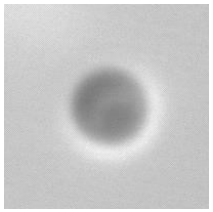
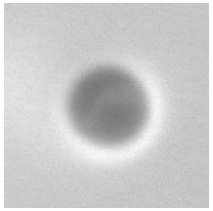
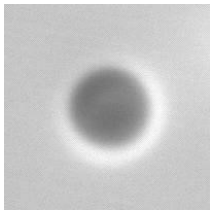
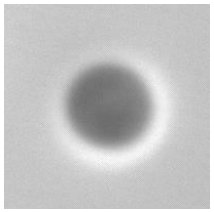
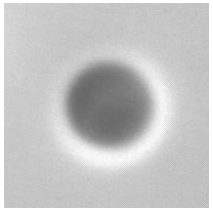
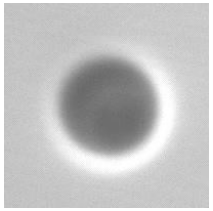
		
Stain	Stain	Stain
		
Stain	Stain	Stain

• Buried-APK

Size	21.6 μm	35.4 μm	55.3 μm	92.8 μm	112.2 μm	135.8 μm
Image						

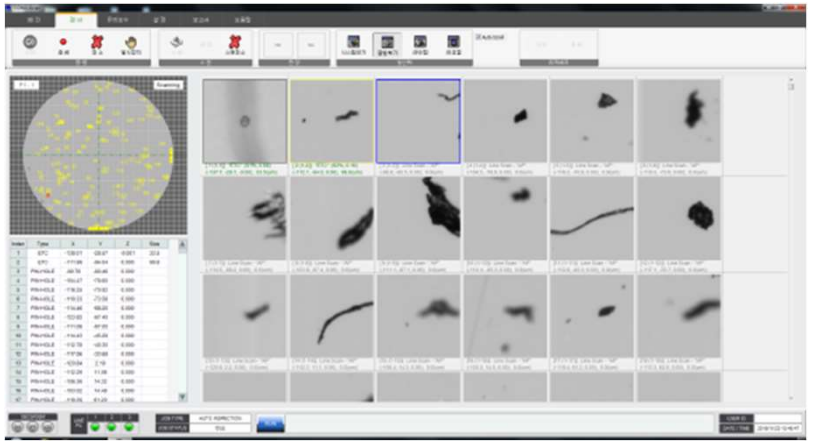
Size	140.3 μm	143.7 μm	150.4 μm	160.5 μm	184.9 μm	240.0 μm
Image						

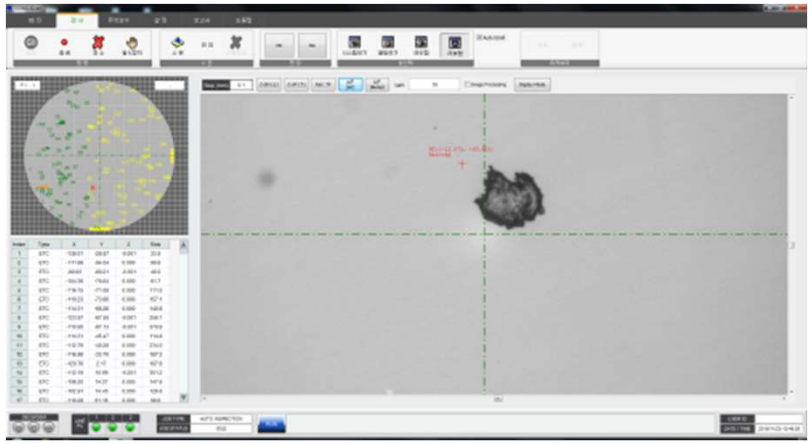
• Surface-Bump

Size	102.2 μm	107.0 μm	111.5 μm	115.0 μm	120.3 μm	134.8 μm
Image						

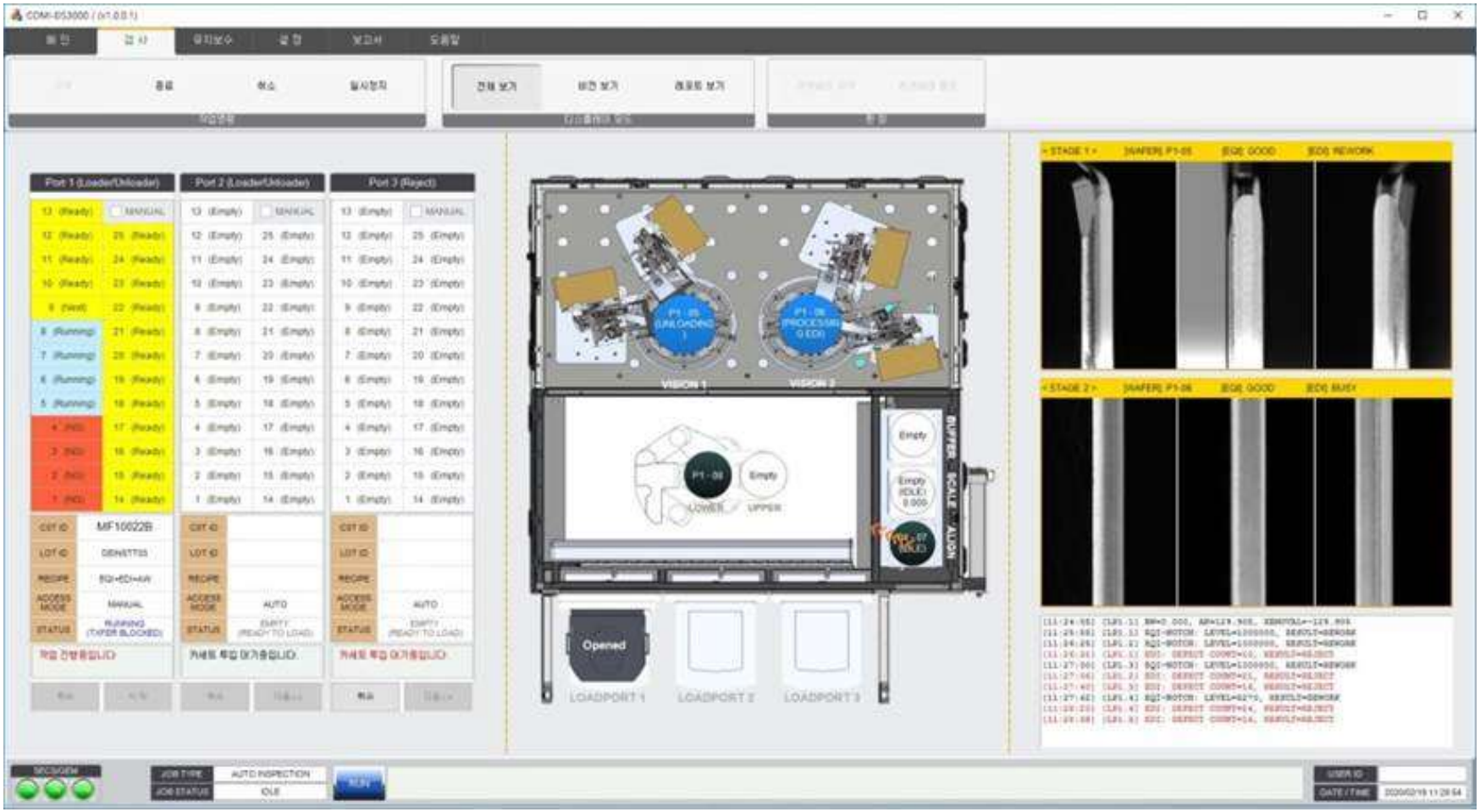
- ## User Interface : IIM-3010 System View

IIM series products have put a lot of effort into providing an intuitive and convenient user interface. It is designed to minimize the operator's error in operation. At the same time, various convenient functions are provided to maximize the convenience of maintenance.





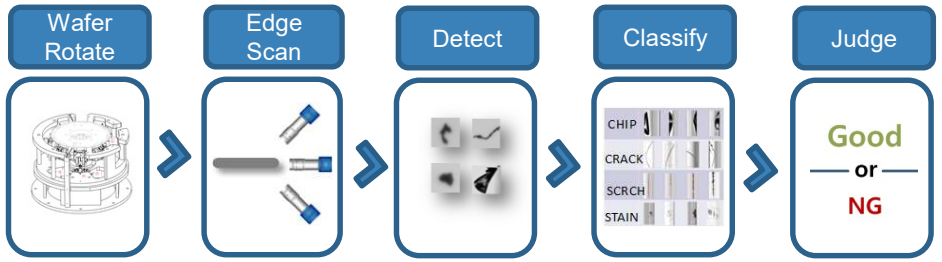
- User Interface : EIS-3000 System View

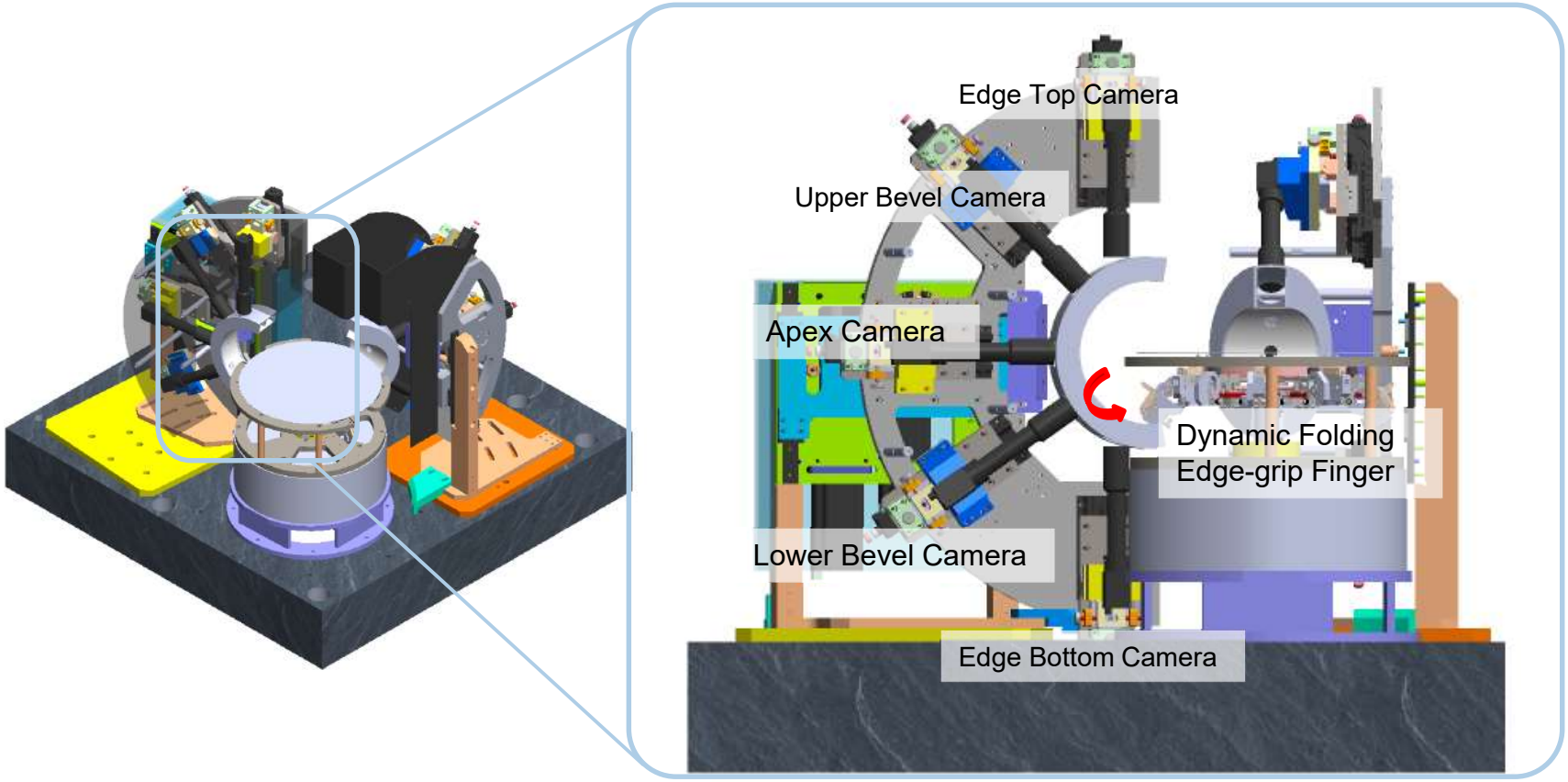


Technolgoies

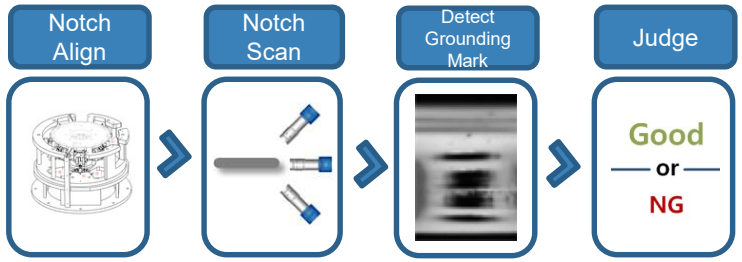
Machine Vision and Mechanics

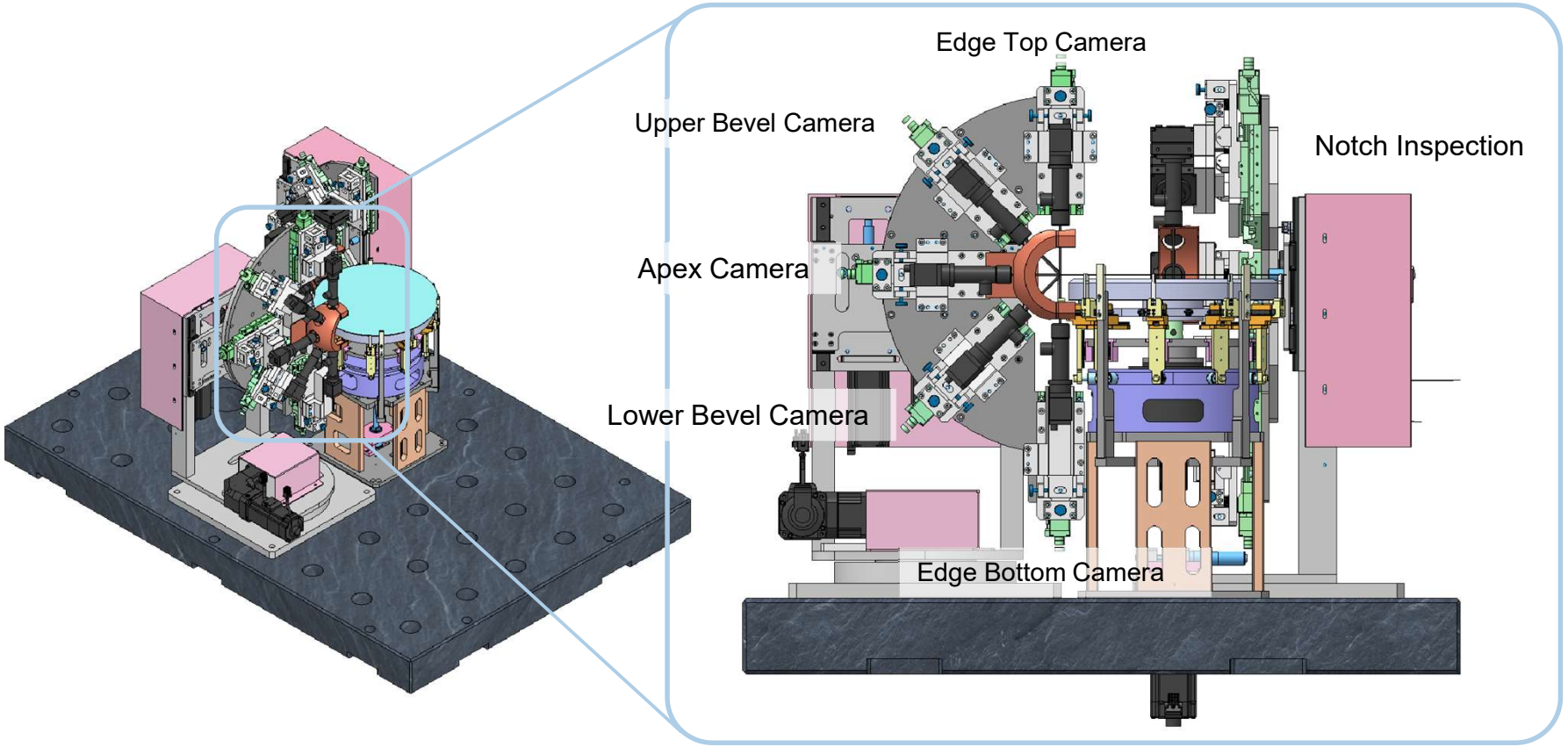
- Edge Inspection
  - Edge Defect Inspection



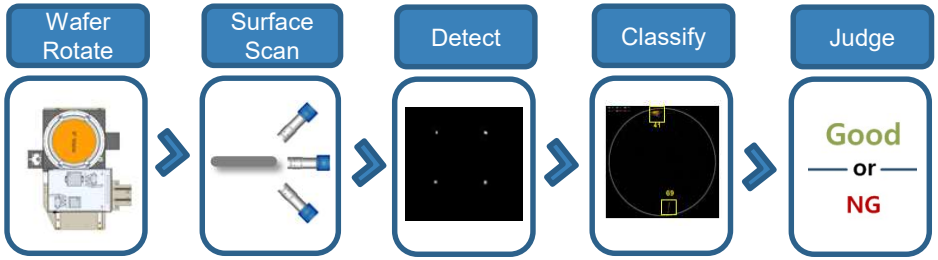


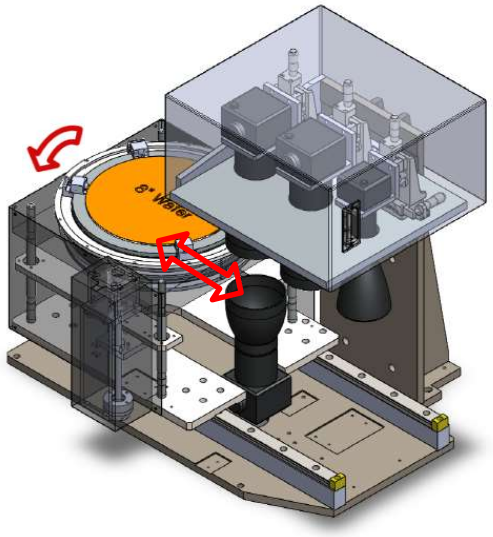
- Edge Inspection
  : Notch Inspection

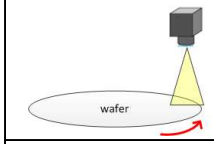
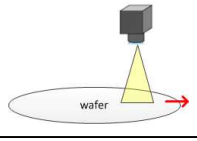
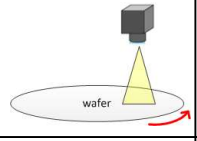
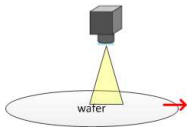
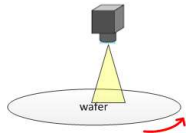
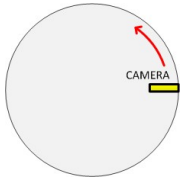
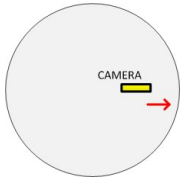
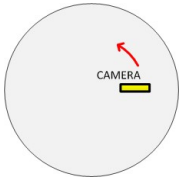
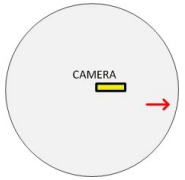
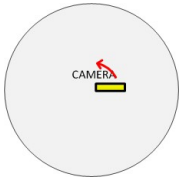




- Surface Inspection
  : Front side & Backside Inspection



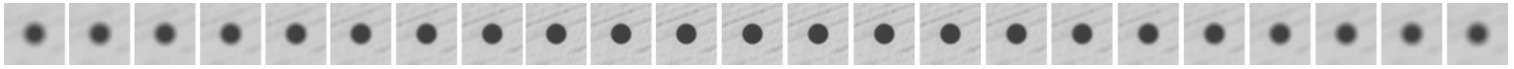


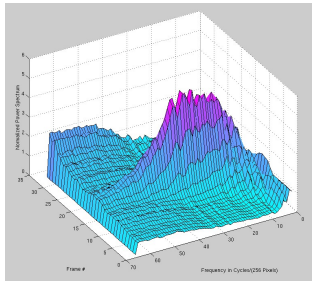
Step1	Step2	Step3	Step4	Step5
				
				
Rotate & Scan	Transition	Rotate & Scan	Transition	Rotate & Scan

※ Front side & Backside inspection is performed at the same time.

Precise & Reliable Depth Measurement

- Precise and reliable depth measurement based advanced autofocus algorithm using one-dimensional Fourier Transform and Pearson Correlation
- Detection Sensitivity : 30 ㎛
- Position Repeatability : less than 20 ㎛
- Position Accuracy : less than -/+ 30 ㎛





Fourier Transform of Image

$$H(f) = \int_{-\infty}^{\infty} h(x)\, e^{-j2\pi fx} dx \quad \text{and} \quad h(x) = \int_{-\infty}^{\infty} H(f)\, e^{j2\pi fx} df$$

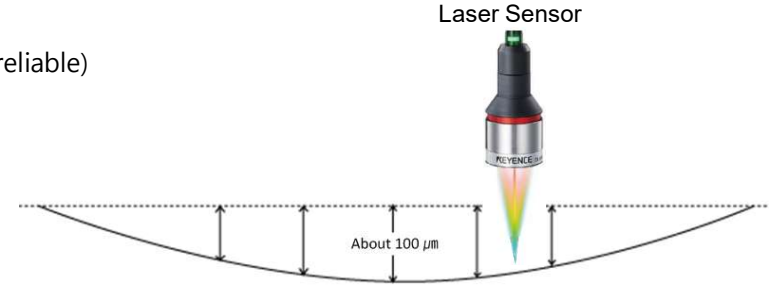
$$\vec{E}(\vec{\rho}, z) = \frac{1}{(2\pi)^2} \int \vec{A}(\vec{q}, z)\, e^{i\vec{q}\cdot\vec{\rho}} d\vec{q}$$

$$\vec{A}(\vec{q}, z) = \int \vec{E}(\vec{\rho}, z)\, e^{-i\vec{q}\cdot\vec{\rho}} d\vec{\rho}$$

Pearson Correlation Coefficient r,

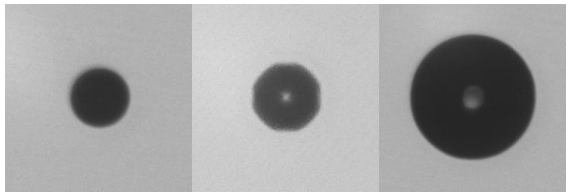
$$r = \frac{\sum XY - \frac{\sum X \sum Y}{n}}{\sqrt{\left(\sum X^2 - \frac{(\sum X)^2}{n}\right)\left(\sum Y^2 - \frac{(\sum Y)^2}{n}\right)}}$$

- Precisely compensates deflection of wafer by laser sensor.
  - Using multi-color confocal type laser sensor (compact & reliable)
  - Reference Distance : 30 mm
  - Measurement Range: -/+ 3.7 mm
  - Measurement Resolution: 0.25 ㎛ Linearity : -/+ 0.94 ㎛

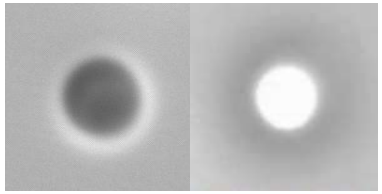


Air Pocket, Through hole and Bump Detection

It is possible to detect wafer defects such as Air pocket, Bump and Thru hole which may occur in wafer production process. Excellent defect detection algorithms are applied to improve its detectability.



Air Pocket

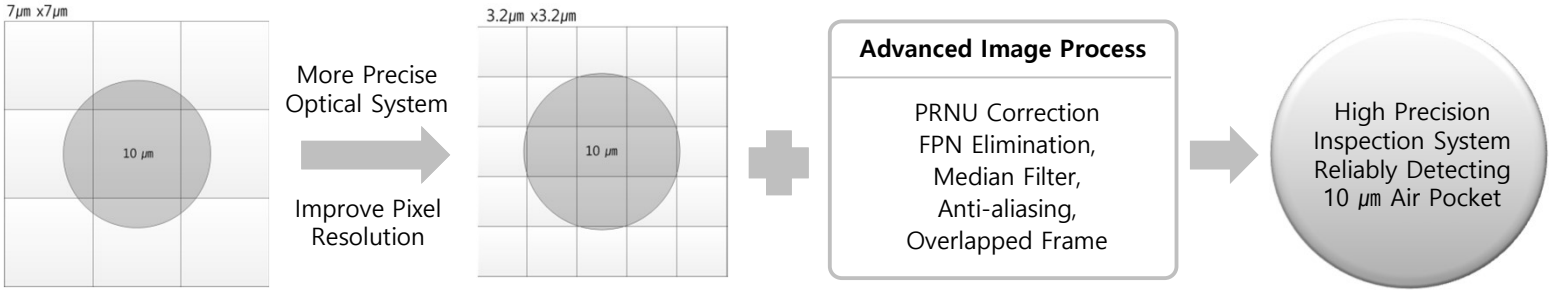


Bump

Thru Hole

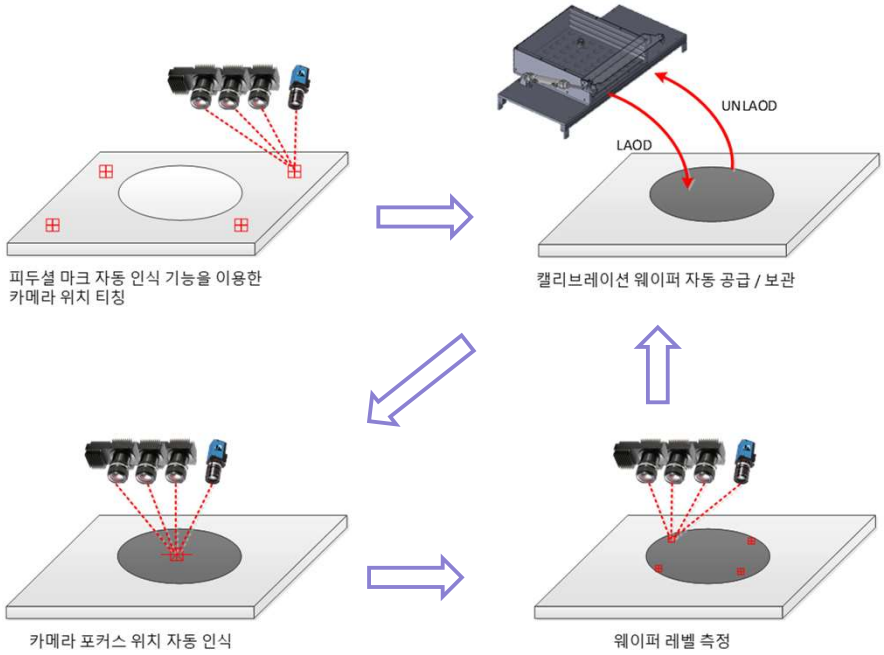
Very High Defect Detection Sensitivity, 10um

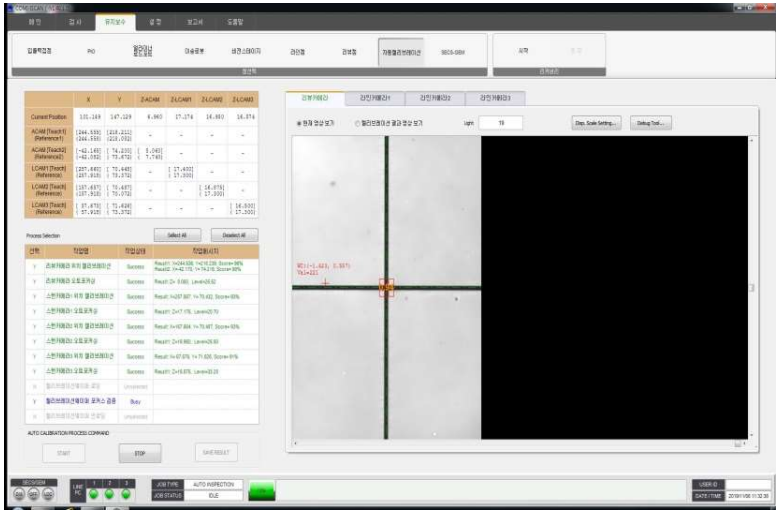
We have improved pixel resolution with precise optical system and applied various advanced high precision image processing algorithms . As a result, we have realized a high precision inspection system reliably detecting 10 ㎛ air-pocket.



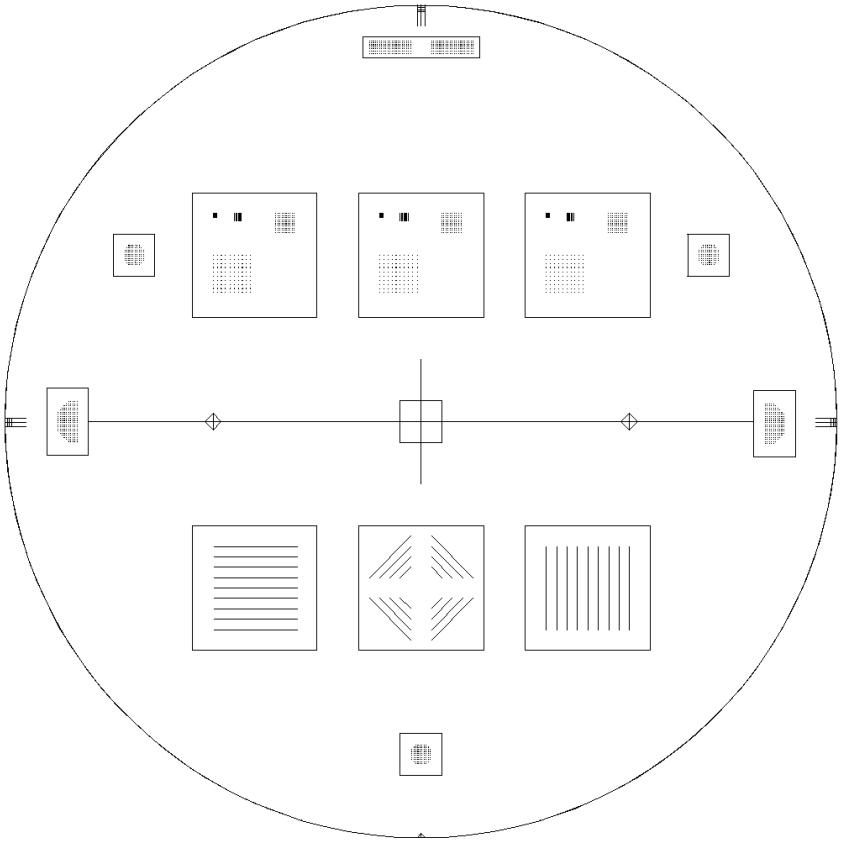
Fully Automated Vision Calibration

- Vision system calibration jobs are fully automated so that user can do fast and convenient vision calibration.
- Automatic recognition of vision coordinate system by pattern matching technique.
- Automatic recognition of camera focus position
- Automatic measure of wafer level status and alarm if out of range (wafer loading process quality verification)
- Automatic calibration wafer loading/unloading (a buffer station is installed in equipment)
- All the processes are automatically executed at a configured interval



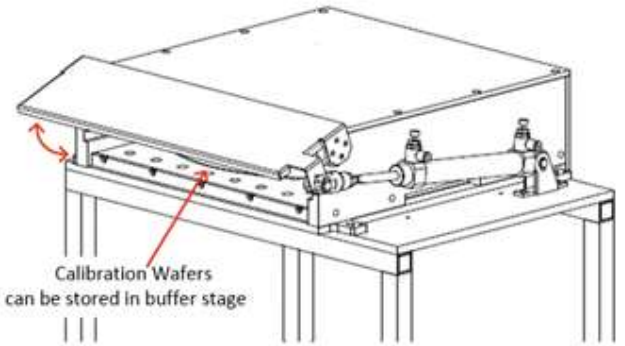


- Calibration Wafer & Buffer Stage



Fully automated setting process using the calibration wafer
=> quick and convenient setup.

* Align vision system and inspection stage.
* Defect detection function calibration.
* Optimize light setting.



PRODUCTS

Test & Measurement & Automation

Types of Products

Fieldbus Module

Ethernet-based COMI-AllNet

Ethernet-based cEIP

High-speed Field bus I/O (C-NET)

PCI & PCI Express

Pulse-type Motion Controller (PCI & Data Acquisition (DAQ)

Network-type Motion Controller (NEMO,NEMO-II)

EtherCAT Motion Controller(EtherCAT)

Application

Burn-In Sorter

Handler

Dispensing & Packaging

LED Handler

LED Inspection Equipment

LED Sorter

Camera Module Die Bonder

Camera Module Inspection Equipment

Mobile Inspection

Industrial Robot

Photovoltaic cell manufacturing equipment.

Factory Automation

PCI & PCI Express

PCI Motion Controller

- PCI Bus-based Motion Controller
- Provides various types of 2/4/6/8-axes products
- Possible to control integrated axes up to 64-axes
- Realization of complete synchronization using Master-Slave function
- Servo and Step Driver can be controlled regardless of maker.
- Equipped with various motion algorithms such as list motion and PT motion.

NEMO

- RTEX Based Network Controller: Controls Panasonic MINAS-A4N/A5N with COMI-LX520
- MECHATROLINK-Ⅲ Based Network Controller: Controls YASKAWA Σ-V with COMI-LX530
- MECHATROLINK-Ⅱ Based Network Controller: Controls YASKAWA Σ-Ⅲ, Σ-V with COMI-LX530S
- SSCNET-Ⅲ Based Network Controller: Controls MITSUBISHI MR-J3 with COMI-LX540
- SSCNET-Ⅲ/H Based Network Controller: Controls MITSUBISHI MR-J4 with COMI-LX540H
- Provides pulse-type motion, network slave module to control digital & analog input/output
- Reduced cost & wiring

EtherCAT

- PCI Bus-based EtherCAT Motion Controller
- Provides advanced motion control algorithm under DSP / BIOS RTOS environment
- Controls the motion of 64-axes (max.) within 1msec
- Guarantees the convenience and flexibility of user S/W development
- Provides various types of utility program
- Possible to form various Slave (Digital I/O module, Analog I/O Module)

PCI & PCI Express

DAQ

- Precision Measurement Data Acquisition Board based on PCI & PCI Express Bus
- Digital I/O, Analog I/O, Counter, Trig Product support
- Support for high-speed DMA Data Transfer
- Simultaneous sampling and Pseudo sampling support
- Wave Form Generation(WFG) Functional support
- Line-up configuration by various functions such as CP, SD, LX, DX, etc

Multiport Serial

- Multi-channel Serial Communication Board Based on PCI & PCI Express Bus
- Support for various communication modes (RS232, RS485, RS422 Mode)
- Electrical insulation between ports (protection to noise and ESD, providing a reliable communication environment)
- Communication line insulation (LX series – insulation from external communication lines, protection against external environment)
- It has a built-in Surge Protector that protects the circuit from external electrical shocks
- Provides various API and utilities dedicated to serial communication (serial manager, etc.)

FIELDBUS

COMI-AllNet

- Provides various types of dispersion control node master (EtherCAT Slave Module)
- Can install up to 9 modules on each node
- Possible to connect up to 253 nodes
- Can combine Analog, Digital, Motion Controller
- Checks status of module through LED with 7 segments
- Adopted backplane system
- Provides terminal gender for convenient writing

cEIP

- Possible to construct a multi-purpose network that is compatible with IEE802 standard Ethernet environment (satisfies both availability and openness of satisfy of standard Ethernet)
- Chose independent communication protocol structure which is constructed to prevent network traffic and for high-speed data transfer
- Increase in flexibility, credibility, and expandability of system and reduce in wiring price
- Possible to monitor the connection status of dispersion node
- Possible to create ideal motion dispersion control module, digital I/O module, analog I/O module, and counter/ serial

C-NET

- Fieldbus type Digital I/O
- Possible to simultaneously scan up to 64 nodes (max. 4,096 channels) within 1msec
- Possible to scan a single node within 15.1μsec
- Supports up to 200Mbps Baud rate
- Simple wiring by using basic LAN cable (UTP/CAT5e)
- Provides various types of slave modules

FIELDBUS

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- Provides various types of slave modules

EtherCAT Motion Controller

- High-performance processor internal board type master
- Provides high-performance motion control algorithms in DSP / BIOS RTOS environments
- Up to 64 axis motion control (within 8 axis, 16 axis, 32 axis, 64 axis - 0.5 msec)
- Provide a high-end language-based PC programming environment
- ETS, ECS Slave configurable (DI/O, A/D, D/A, etc.)
- Flexibility and convenience of user S/W development
- Provide various utility programs

EtherCAT®
COMIZOA EtherCAT Total Solution

EtherCAT Slave Module

- ECS, ETS, EVS, EPS type, etc. support various EtherCAT slaves
- The EtherCAT Slave Controller controls input/output without a separate processor
- ARM processor and flash memory for analog signal filtering
- CPU load relief by data filtering
- Wiring is possible without using a separate interface board (cost reduction)
- ODM Slave suitable for equipment specifications can be manufactured

EtherCAT®
COMIZOA EtherCAT Total Solution

Thank you.

COMIZOA