

WAFER EFEM



High Cleanliness



High Compatibility



High Capacity



- ◆ Wafer thickness support: 100 - 1500μm
- ◆ Workstations 2 to 8 are optional
- ◆ Supports the transportation of wafers of various sizes
- ◆ Various feeding methods are available
- ◆ Interface with multiple process equipment
- ◆ SECS/GEM
- ◆ Light curtain
- ◆ OCR (top or bottom)
- ◆ N2 purge LP

Specification parameter

- ◆ Fortrend equipment front - end modules are mainly designed to meet customized process requirements and are compatible with wafers ranging from 3" to 12".
- ◆ The internal cleanliness of the equipment can reach ISO Class 1, and it can adapt to wafers of different sizes and types, featuring high cleanliness, high compatibility, and other characteristics;
- ◆ It is compatible with all SEMI-standard FOUP, FOSB, SMIF POD, and Cassette.

Specification parameter	
Rated Voltage	Phase AC 220V 50/60 Hz
Rated Power	3.52kW(Decide by config)
Comm Interface	RJ45
Comm Protocol	ASCI/HEX/HSMS&SECS 1I
Software	Fortrend independently developed software
Cleanliness	ISO 14644-1 class 1 / ISO class 3
Uptime	≥99%
MTBF	≥4000 hours
MTTR	≤2 hours
MTBA	>100 hours
MTTA	<10 hours
MCBF	100,000Wafers
Wafer Breakage Rate	≤1/1,000,000
OCR Accuracy Rate for Bare Wafers	≥99.8%
Repeatability of Positioning Accuracy	±0.1mm

EFEM Standardized(Product Series)

EFEM-2 Loadport

1605mm (L) ×1237mm(W)×1886mm (H)



EFEM-3 Loadport

2155mm (L) ×1237mm(W)×1886mm (H)



EFEM-4 Loadport

2600mm (L) ×1237mm(W)×1886mm (H)



Independently Developed Core Module



Wafer/Frame Loadport



150/200mm Loadport



Open Cassette Stage



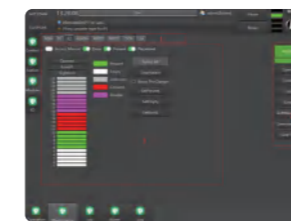
Wafer transfer Robot



Vacuum Pre-Aligner



Edge-grip type Aligner



Independently Developed Software



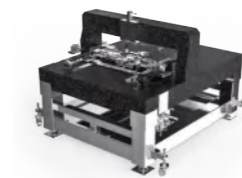
Optical Character Recognition (OCR)



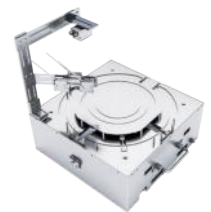
Reversing Mechanism



Reversing Mechanism



Marble Platform



Centralized Stage

EFEM Customized(Interface with Measurement Process)

 High Precision

 High Cleanliness

 High Stability



Wafer Aligner



Humid Robot



Drying Unit

- ◆ EFEM for interfacing with metrology process equipment typically come equipped with high-precision edge finders and code readers. They are widely used in devices such as metrology, AOI , and CD-SEM . In the context of interfacing with immersion metrology processes, they can be configured with air knives, humid robot, and drying modules to perform functions such as wafer air drying and cooling, as well as surface cleaning.


Case Presentation



EFEM Customized(Interface with Ion Implantation Process)

 High Cleanliness

 Modular design

 High stability



Dual Robot Layout Diagram



FOUP Handling Robot



FOUP Buffer Station


- ◆ The ion implantation process equipment EFEM can be equipped with wafer box storage functions, and can be interfaced with overhead cranes or manual loading. It is configured with FOUP storage positions and FOUP Robots. Typically, it features dual Robots for wafer transfer to increase production capacity. It can also be configured with a 1+5 Robot setup, supporting the simultaneous pick-up and placement of five wafers.

Case Presentation

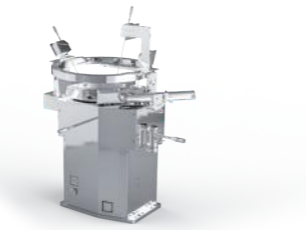


EFEM Customized(Epitaxial)

 High Integration

 Modular Performance

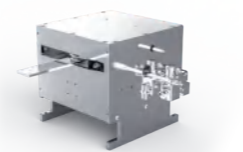
 High Stability



Merge and Split Module



Grinding Stone Cassette



Cleaning Module

- ◆ The front-end automation module for epitaxy processes includes a graphite plate/ring merging and splitting module, a grinding plate Cassette, a cleaning module, a wafer flying detection module, and a grinding plate edge-finding module, interfacing with the vacuum transfer chamber (VTM).

Case Presentation



EFEM Customized(Interface with PVD / CVD / ETCH)

 High Cleanliness

 Modular Design

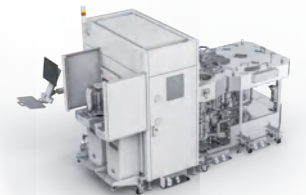
 High Efficiency



Wafer Buffer Module



Single-Arm Dual-Fork Robot




EFEM+VTM


- ◆ The front-end automation module for PVD/CVD/ETCH processes is typically equipped with a high-speed single-arm dual-fork robot to enhance productivity. It also includes a wafer buffer mechanism and can be integrated with a vacuum transfer module (VTM).


Case Presentation

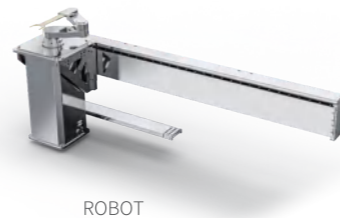


EFEM Customized(Interface with Lithography Process)

 Compatible with the low material input port of the lithography machine

 Dual Robots

 Capable of independently interfacing with a photolithography machine



Lithography Machine Docking Robot


- ◆ Independent front-end automated transfer module for direct docking with photolithography machines: It enables direct connection with the photolithography machine for automatic loading and unloading. The robotic arm is adaptable for transferring wafers from the wafer cassette to the photolithography machine's docking window. Equipped with dual robots: a standard robot and a small Z-axis robot, it offers transfer solutions for wafers of various sizes (6"/8"/12"). The small Z-axis robot meets the transfer requirements for docking platforms with heights ranging from 620mm to 800mm.

Case Presentation



EFEM Customized(Interface with CMP / Bonding Process)

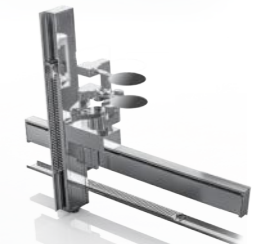
 High Cleanliness

 Long-term Stability

 High Compatibility



Large Z-axis Robot



Dual-Flip Robot with Large Z-axis and Large X-axis

- ◆ Interface with CMP and Bonding processes: Solutions that integrate EFEM with process robots can be provided. Process robots can be configured with large Z-axis robots and large Z-axis, large X-axis dual-rotation robots. For the CMP process, they can also be matched with Wet Robot and drying modules.


Case Presentation



EFEM Customized(Frame wafer)

 High Cleanliness

 High Compatibility

 Independently Developed Alignment Module




- ◆ The Frame EFEM supports both Frame Wafer Loadport and Open Cassette Stage wafer loading systems. It is compatible with 4" - 12" frame wafers and can be equipped with our self - developed high - precision alignment mechanisms. The mechanical arms can be either clamping type or vacuum - suction type. Additionally, it can also meet the compatibility requirements between frame wafers and regular wafers.

Case Presentation



Core Module 150mm/200MM LOADPORT

 High Versatility

 Customization

 High Compatibility



Standard Load Port Universal equipment , fully compliant with SEMI standards, with high versatility, high compatibility.

Loading type: SMIF POD is compatible with 6" and 8" wafers.

Built-in original factory mapping system enables the detection of overlapping, skewed, and protruding wafers, effectively preventing wafer collisions during integrated wafer transportation.

Optional multiple types of code reading are available: RFID/Smart Tag.

Optional customization components are available: Info Pad Sensor; E84 interface; Adapter to implement the open cassette loading method, flexibly meeting various working condition requirements.


- ◆ PLM is a mature wafer opener that is equipped with sensors compatible with both 6-inch and 8-inch wafer unpacking and inspection, capable of accurately detecting the status of wafers in POD boxes. PLM can interface with a variety of equipment, and its rich selection of optional features provides more solutions for customer production line upgrades.


Specification Parameter

Outer Dimensions	L: 432mm W: 422mm H: 772mm	Cleanliness	Class I @ 0.1um
Communication Interface	Serial EIA-RS232C, Paralle I/O	Rated Voltage	DC 24 V
Main Material	Aluminum alloy, Stainless steel (SUS 304)	Rated Voltage	60 W
Optional Features	ID reading and writing device with optional RFID module or IR Link	Comm Protocol	HEX, SECS

Core Module(Wafer Pre-Aligner)

 Self-Developed

 Customization

 High Versatility
High Compatibility



Efficient operation, locating the wafer notch position in less than 7 seconds (excluding the time for wafer handling), quickly completing the correction of the wafer center and angle.

It supports both translucent and opaque wafer applications, suitable for silicon wafers and silicon carbide wafers with diameters ranging from 150 to 300mm.

Integrated design with a built-in controller, eliminating the need for an additional controller and wiring space, achieving an ultra-compact size.

The system is equipped with real-time monitoring capabilities, allowing for the live detection of the status of motor drive control systems, vacuum systems, detection systems, and circulation systems.

◆ The FPA series wafer edge finder is a four-axis controlled device that uses a miniature single-axis robotic module, characterized by high rigidity and small size. It achieves high-speed, efficient, and high-precision wafer edge detection and center position calibration. (Wafer position $\leq \pm 0.1\text{mm}$; Wafer notch/flat $\leq \pm 0.1^\circ$)

Centralized Stage



Compatible with 6, 8, and 12-inch Frame rings.

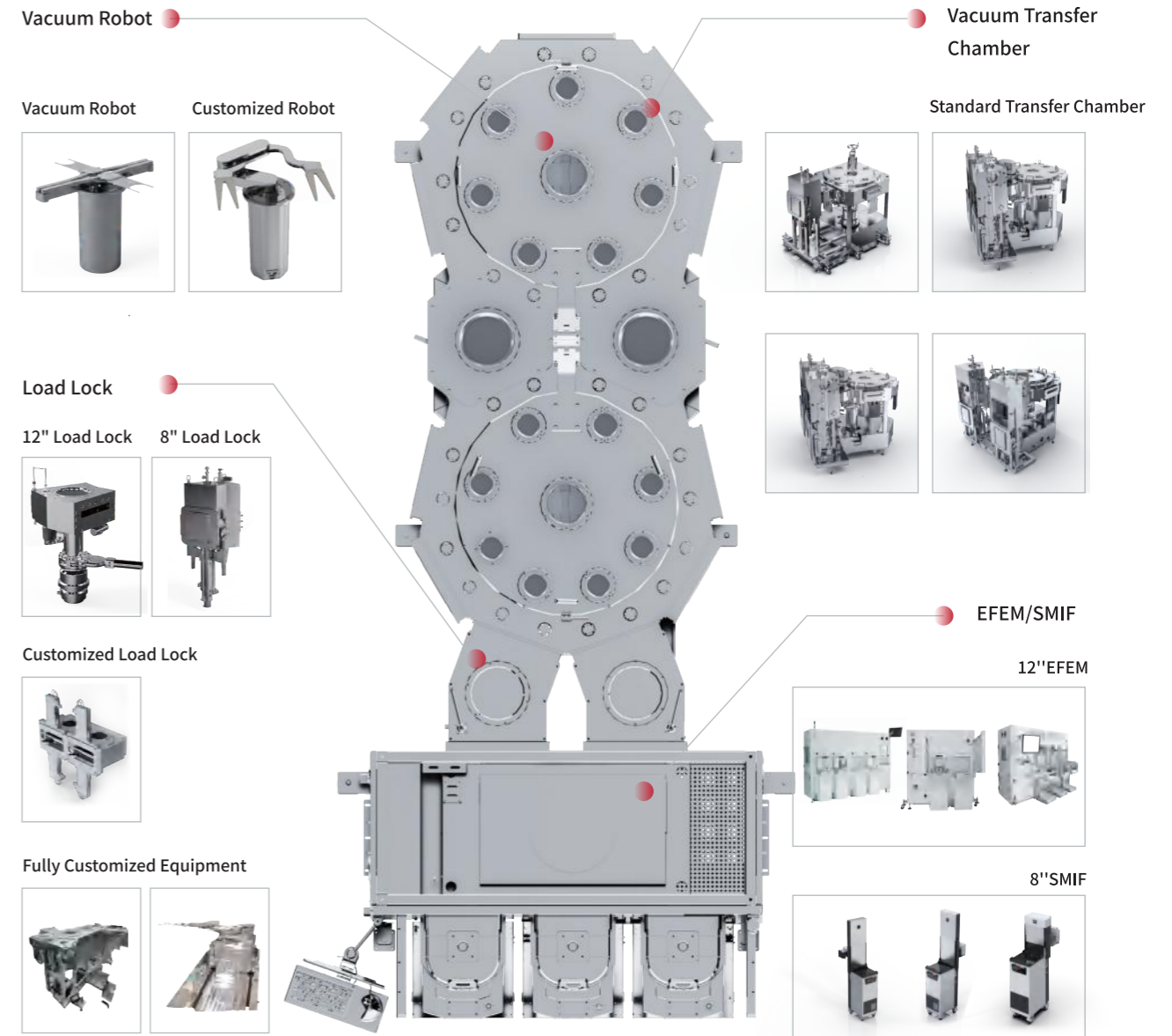
Capable of configuring QR code reading functionality.

Repeat positioning accuracy $\leq \pm 0.1\text{mm}$, rotation angle $\leq \pm 0.1^\circ$.

Adjustment time < 6 seconds.

Maximum initial offset $\pm 7\text{mm}$.

Three-stage Integration Plan



The equipment front end can optionally be equipped with an EFEM or SMIF, The EFEM is available in both standard and customized types;

The Load Lock is available with different structures and transfer methods;

Customized transfer chambers can be designed to meet the specific requirements of the process chambers;

Vacuum robots can be selected in different models and end effectors based on actual operating conditions;

The transfer chamber and Load Lock can be optionally equipped with built-in modules for orientation, cooling, and preheating.

Optional AWC (Automatic Wafer Centering) function, Buffer function, and wafer storage module.