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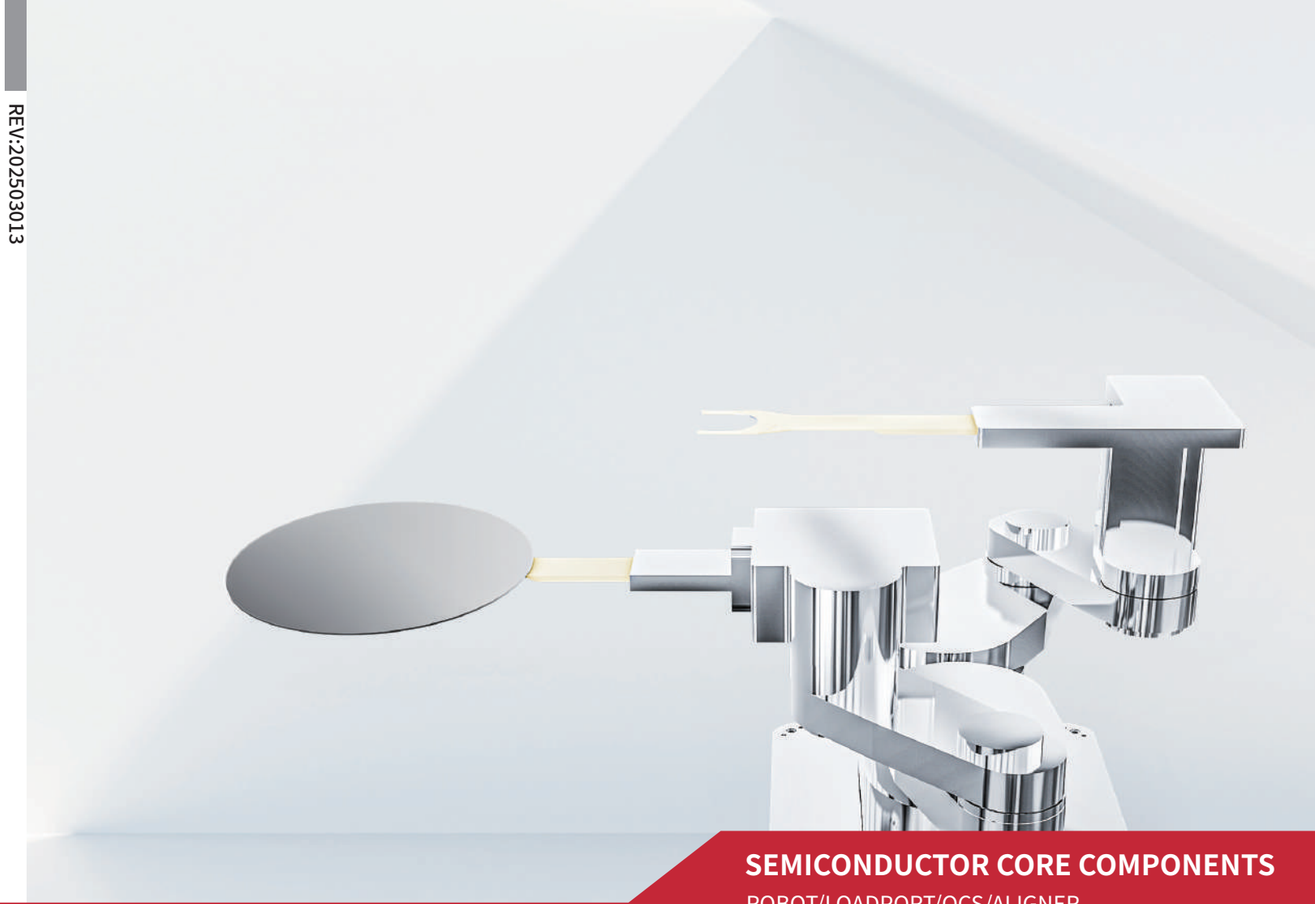

SEMICONDUCTOR CORE COMPONENTS

ROBOT/LOADPORT/OCS/ALIGNER

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Tel:(1)408-734-9311

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Website： www.fortrend.com

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Company Profile

Wuxi FORTREND Intelligent Technology Co., Ltd. is a semiconductor automatic transfer equipment and core components provider, to provide the industry with stable and reliable products, including: wafer transfer ROBOT, wafer loading system LOAD PORT, wafer finder ALIGNER, etc., widely used in semiconductor and universal semiconductor transfer process.

Core advantage

45+

45 years of experience in semiconductor industry

12.5%

R&D spending accounts for about 12.5% of the company's revenue

36%

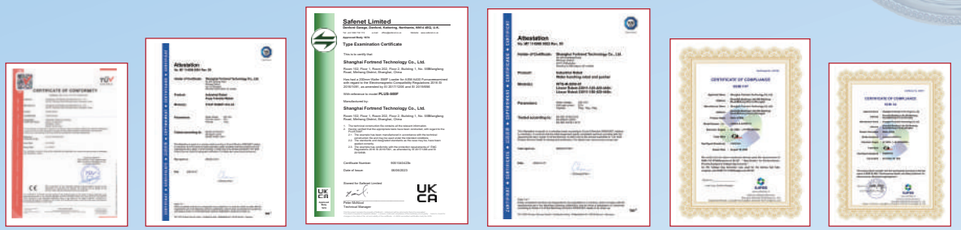
Research and development personnel accounted for 36%

1800+

The annual production capacity exceeds 1800 units

Global Patent

Key core patents have more than 100 global patents.



Global after-sales

24

24 local service centers

24H

The fastest response within 24h

Fortrend Robot Selection Rules

FWRD-Z400-R190.5-Rta-Ata-F-8-MRTX-MOD

F:Fortrend

W:wafer

P:PLP substrate

M:Mask

C:Cassette

H:humid

R:Robot

D:Arm Qty.

S:Single arm

D:Dual-arm

A*:X(X:Number of Arms)

Axis-Z Height

240mm
300mm
400mm
500mm
Z*XXX(Customized)
LZ：Compact Lifting Height：
240mm
300mm
400mm
500mm
LZ*XXX（Customized）
Dual-Z
ZD600mm
ZD700mm
ZD800mm
ZD*XXX(Customized)
Module-based
MZXXX

Drive arm R length

146mm
190.5mm
213mm
Eccentric ER (optional)

Special module

Rta: : Single arm FLiP
Rta2: Double Arm Up FLIP
Rta2: Double Arm Down FLIP
RtaD: Double arm double FLip
FR：wafer frame
No Options

Fork Type

F:Original fork
No Options

Wafer Size

4/6/8/12
N*:Non-wafer object

Special Customization

Have：Special Model
None：Normal Device

End-effector Type

Ata:Vacuum suction
Cta:Edge gripper
Han:Clamp lift type
Ber1:Contact Bernoulli
Ber2:Non-Contact Bernoulli
Customer Customization

Matching Options

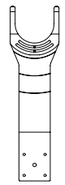
M：
M1:Opposite-shooting Mapping Quantity 1
M2:Opposite-shooting Mapping Quantity 2
M*:Mapping Quantity 1
No Options

R：
R:Original teach pendant
No Options

TX:
T:Original Track axis
X:TRACK axis effective distance/mm
No Options

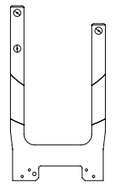
Robot Fork Series

Vacuum Fork

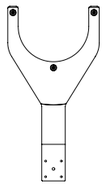


Standard Vacuum Suction Y-Type

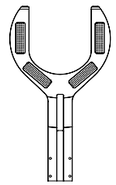
Standard Vacuum Suction Linear Type



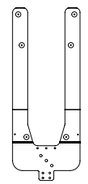
U-shaped Vacuum Fork for Takio Plate



Fork for Large Warping 1.5-5mm

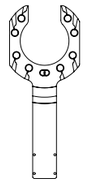


Multi-hole Vacuum Suction Fork

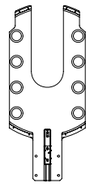


Vacuum Suction & Friction Pad Fork

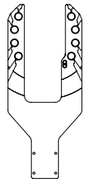
Bernoulli Fork



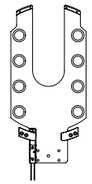
Contact Bernoulli Circular Type



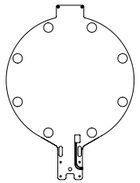
Edge Contact Bernoulli



Contact Bernoulli Y-shaped

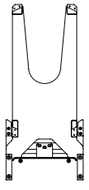


Edge Contactless Bernoulli

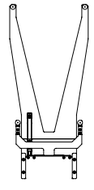


Edge Clamping Non-contact Bernoulli

Wafer-holding Fork



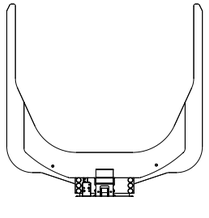
Gripper Type Fork



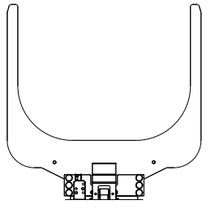
Gripper Rotating Type

Compatible Fork

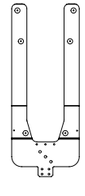
Frame-type Fork



Frame Gripping Fork



Frame Clamping Fork



Frame Vacuum Suction Fork

Transfer Robot

High efficiency

Highly refined

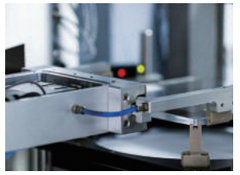
High stability

- The core components are fully developed in-house, and the entire machine is assembled and produced at the Fortrend Wuxi manufacturing base, ensuring greater reliability;
- The device features RS232 serial interface and Ethernet bus communication, making operation more convenient;
- It is equipped with the Smart Move function and features a teaching design, making it more intelligent;
- It offers a variety of end-effector specifications and customizable linear modules to meet the needs of diverse working conditions.ess.

Specification parameter		
Project	Specification	
Structure	3-6 Axis (Servo Motor) Z-axis: Motor with Brake	
Wafer Size	2-inch to 12-inch Wafer	
Working Range	R-axis	146mm/190.5mm/213mm
	Single Z-axis	240mm/300mm/400mm/500mm
	Dual Z-axis	600mm/700mm/800mm/920mm
	θ-axis	340°
	Flip-axis	180°
	Track	Customizable according to working conditions
Maximum Speed	R-axis	1500mm/S
	Single Z-axis	500mm/S
	Dual Z-axis	800mm/S
	θ-axis	235~340°/S
	Flip-axis	360°/S
	Track	800mm—1500mm
Maximum Payload	Third joint center 3Kg or less	
Repeatability	±0.1mm	
Cleanliness Class	Highest ISO Class 1	
Noise Level	80 dB or lower	
Robot Material	Aluminum alloy	
EEF (End Effector)	Ceramic/carbon fiber/aluminum alloy, etc. (customized as required)	
Operating Voltage	220V	
Communication Method	Ethernet communication/RS232	
Communication Protocol	HEX/ASCII	
Air Supply	Positive pressure: 0.15-0.5Mpa/Negative pressure: -70- -90Kpa	

Application Cases






FWRS-3-Axis Single-Arm Robot Series

This mechanical arm is designed for material handling in high-cleanliness environments, employing a closed-loop servo control system and is suitable for high-speed transportation.

Optional pseudo-horizontal multi-joint motion corresponding to parallel equipment layout

Carrying capacity: Below 3Kg at the third joint of the arm

Compatible with various types of Forks to meet the wafer transfer needs for different jobs

Wafer securing methods: Vacuum suction type / Clamping type / Clamping and lifting type / Contact Bernoulli type / Non-contact Bernoulli type

Based on the equipment layout, you can choose either an upper or lower fixing method

Application: Suitable for various semiconductor equipment, including EFEM, Sorter, inspection equipment, etc.

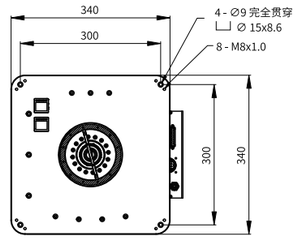
Specification parameter

Handling Object	3-inch/4-inch/6-inch/8-inch/12-inch wafers		
Reachable Range	Arm: 290/376mm	Rotation: 340°	Lifting: 240/300/400/500
Handling Speed (average speed)	750mm/S	235~340°/S	500mm/S
Arm Type	Single Arm		
Handling Height	700-1000mm		
Repeatability Accuracy	Within ±0.1mm		
Communication Protocol	HEX/ASCII		
Communication Method	EtherNet/RS232		
Cleanliness	Highest ISO Class 1		
Facilities	Power: 220V, 10A, Vacuum: -70~-90Kpa, Positive Pressure: 0.1—0.5Mpa		

RANGE OF MOTION

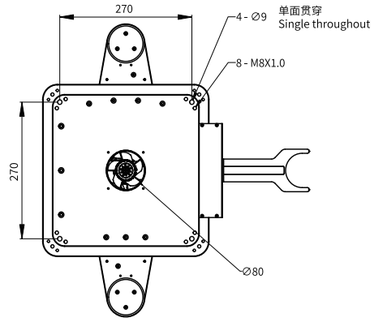
Top fixed mode

(Fix the counterbore and adjust the screw according to the configuration)

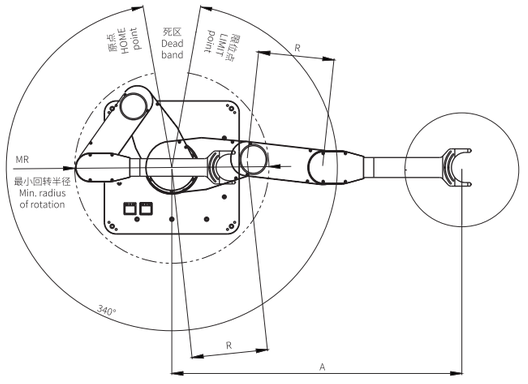


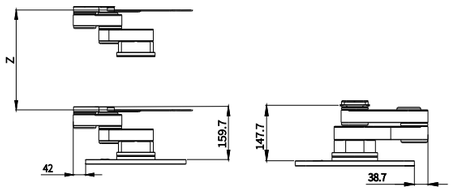
Bottom fixed mode

(Fix the counterbore and adjust the screw according to the configuration)



Single - arm robot motion range schematic





Model	Z	R	MR*	A*
FWRS	300/400/500	146	8寸540	600
		190.5	12寸610	680

The arm length and minimum rotation radius may vary depending on the specific end effectors and drive shafts selected. The actual length should be based on the final product.

FWRD-Four-Axis Dual-Arm Robot Series

This mechanical arm is designed for material handling in high-cleanliness environments, employing a closed-loop servo control system and is suitable for high-speed transportation.

Optional pseudo-horizontal multi-joint motion corresponding to parallel equipment layout

Utilizing a dual-arm structure to achieve high-speed wafer transfer

Carrying capacity: Below 3Kg at the third joint of the arm

Compatible with various types of Forks to meet the wafer transfer needs for different jobs

Wafer securing methods: Vacuum suction type / Clamping type / Clamping and lifting type / Contact Bernoulli type / Non-contact Bernoulli type

Based on the equipment layout, you can choose either an upper or lower fixing method

Application: Suitable for high-speed wafer handling in atmospheric environments, applicable to various semiconductor equipment, including EFEM (Equipment Front End Module), Sorter, coating and developing equipment, cleaning equipment, and inspection equipment

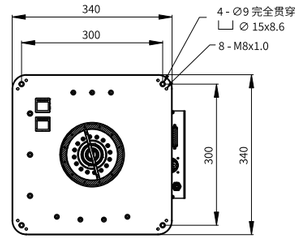
Specification parameter

Handling Object	3-inch/4-inch/6-inch/8-inch/12-inch wafers		
Reachable Range	Arm: 290/376mm	Rotation:340度	Lifting:240/300/400/500
Handling Speed (average speed)	750mm/s	235~340°/s	500mm/s
Arm Type	Dual Arms		
Handling Height	700-1020mm		
Repeatability Accuracy	Within ±0.1mm		
Communication Protocol	HEX/ASCII		
Communication Method	EtherNet/RS232		
Cleanliness	Highest ISO Class 1		
Facilities	Power: 220V, 10A, Vacuum: -70~-90Kpa, Positive Pressure: 0.1—0.5Mpa		

RANGE OF MOTION

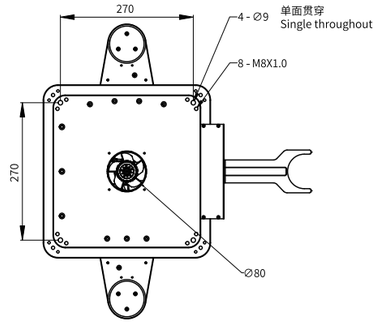
Top fixed mode

(Fix the counterbore and adjust the screw according to the configuration)

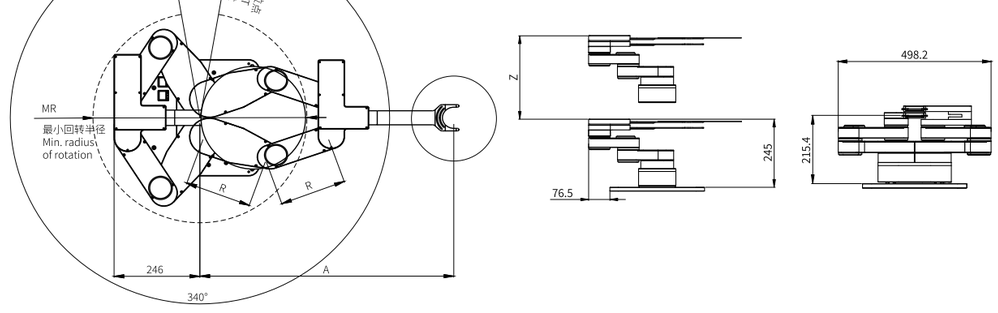


Bottom fixed mode

(Fix the counterbore and adjust the screw according to the configuration)



Schematic diagram of the motion range for a dual-arm robotic arm

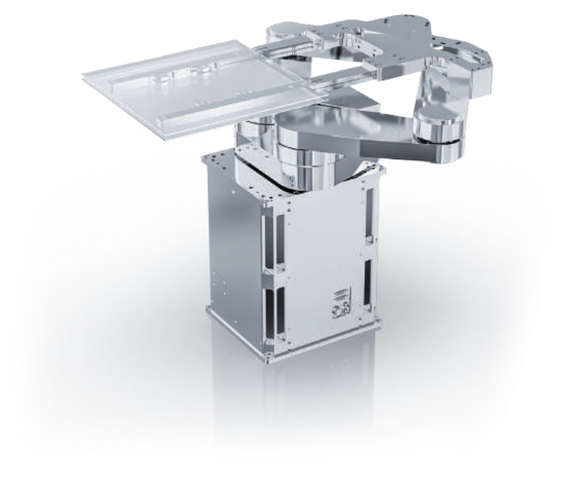


Model	Z	R	MR*	A*
FWRS	300	146	8寸520	600
	400	190.5	8寸600	720
	500	213	12寸630	910

The arm length and minimum rotation radius may vary depending on the specific end effectors and drive shafts selected. The actual length should be based on the final product.

FPRD Series Dual-Arm 4-Axis PLP Robot

This mechanical arm is designed for material handling in high-cleanliness environments. It employs a closed-loop control system and is suitable for the transportation of PLP glass substrates.



Optional pseudo-horizontal multi-joint motion corresponding to parallel equipment layout

Carrying weight: below 4Kg

Capable of being paired with different types of Forks to meet various wafer transfer requirements

Fixed methods can be chosen either from the top or bottom based on the equipment layout

Application: High-cleanliness, space-constrained glass substrate PLP EFEM and similar equipment.

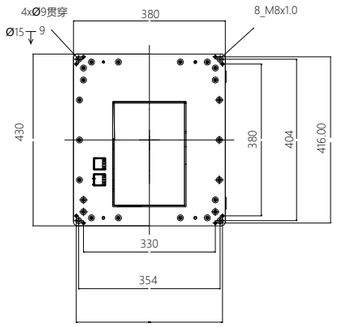
Specification parameter

Handling Object	515*510mm Glass Substrate		
Reachable Range	Arm: 376/500/760mm	Theta Rotation:340°	Lifting:Z300/ZD500/ZD700
Handling Speed (average speed)	550mm/s	200°/s	300mm/s
Arm Type	Dual Arms		
Handling Height	890mm		
Repeatability Accuracy	Within ±0.2mm		
Communication Protocol	HEX/ASCII		
Communication Method	EtherNet/RS232		
Cleanliness	Highest ISO Class 1		
Facilities	Power: 220V, 10A, Vacuum: -70~-90Kpa, Positive Pressure: 0.1—0.5Mpa		

RANGE OF MOTION

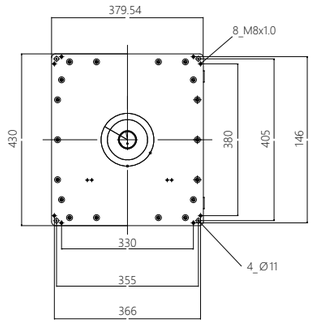
Top fixed mode

(Fix the counterbore and adjust the screw according to the configuration)

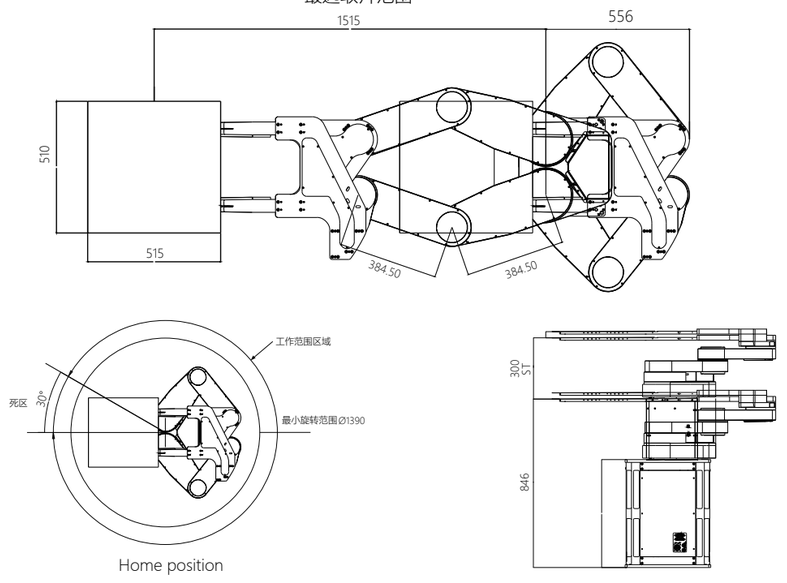


Bottom fixed mode

(Fix the counterbore and adjust the screw according to the configuration)



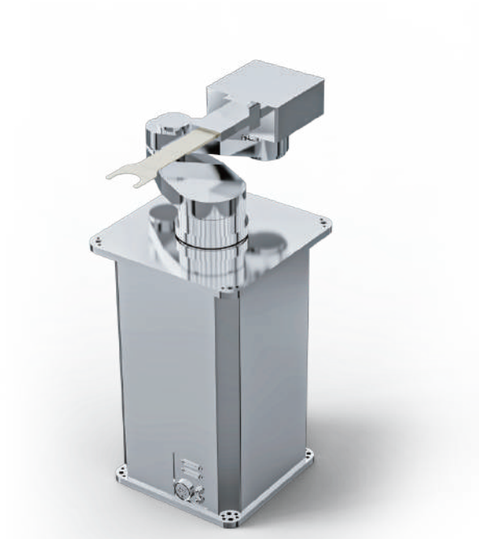
Schematic diagram of the motion range for a dual-arm robotic arm



The arm length and minimum rotation radius may vary depending on the specific end effectors and drive shafts selected. The actual length should be based on the final product.

FWRS Series Single-Arm Rotary Robot with 4-Axis

This mechanical arm is designed for material handling in high-cleanliness environments. It features a closed-loop control system and is suitable for applications where End Effector (EEF) rotation is required.



Optional pseudo-horizontal multi-joint motion corresponding to parallel equipment layout

The EEF can achieve a flip from 0 to 180 degrees

Carrying capacity: Below 3Kg at the third joint of the arm

Compatible with various types of Forks to meet the wafer transfer needs for different jobs

Wafer retention methods: Vacuum suction type/Clamping type/Contact Bernoulli type/Non-contact Bernoulli type

Based on the equipment layout, you can choose either an upper or lower fixing method

- Application: High-speed wafer handling in atmospheric environments, suitable for various semiconductor equipment such as EFEM, Sorter, coating and developing equipment, cleaning equipment, and inspection equipment.

Specification parameter

Handling Object	3-inch/4-inch/6-inch/8-inch/12-inch wafers			
Reachable Range	Arm: 290/376mm	Rotation: 340°	Lifting:240/300/400/500	Flip Rotation:180°
Handling Speed (average speed)	750mm/s	340°/s	500mm/s	360°/s
Arm Type	Single Arm			
Handling Height	690-1050mm			
Repeatability Accuracy	±0.1mm Within			
Communication Protocol	HEX/ASCII			
Communication Method	EtherNet/RS232			
Cleanliness	Highest ISO Class 1			
Facilities	Power: 220V, 10A, Vacuum: -70~-90Kpa, Positive Pressure: 0.1—0.5Mpa			

FWRD-Five/Six-Axis Dual-Arm Flip Manipulator Series

This mechanical arm is designed for material handling in high-cleanliness environments. It features a closed-loop control system and is suitable for applications where End Effector (EEF) rotation is required.

Optional pseudo-horizontal multi-joint motion corresponding to parallel equipment layout

Utilizing a dual-arm structure to achieve high-speed wafer transfer

Utilizing a dual-arm structure to achieve high-speed wafer transfer

Carrying capacity: Below 3Kg at the third joint of the arm

Carrying capacity: Below 3Kg at the third joint of the arm

Wafer holding methods: Vacuum suction/Clamping/Contact Bernoulli/Non-contact Bernoulli

Carrying capacity: Below 3Kg at the third joint of the arm

- Application: High-speed wafer handling in atmospheric conditions, suitable for various semiconductor equipment, including EFEM, Sorter, cleaning equipment, and inspection equipment.

Specification parameter

Handling Object	3-inch/4-inch/6-inch/8-inch/12-inch wafers			
Reachable Range	Arm: 290/376mm	Rotation: 340°	Lifting:240/300/400/500	Flip Rotation:180°
Handling Speed (average speed)	750mm/s	235~340°/s	500mm/s	360°/s
Arm Type	Dual-arm Single Flip/Dual-arm Double Flip Options Available			
Handling Height	690-1050mm			
Repeatability Accuracy	Within ±0.1mm			
Communication Protocol	HEX/ASCII			
Communication Method	EtherNet/RS232			
Cleanliness	Highest ISO Class 1			
Facilities	Power: 220V, 10A, Vacuum: -70~-90Kpa, Positive Pressure: 0.1—0.5Mpa			

FMRS-Three-Axis MASK Single-Arm Manipulator

This mechanical arm is designed for material handling in high-cleanliness environments. It employs a closed-loop control system and is suitable for the transfer of MASK wafers and square glass plates.

Optional pseudo-horizontal multi-joint motion corresponding to parallel equipment layout

The EEF employs a closed-loop control system using a gripping mechanism

Carrying capacity: Below 3Kg at the third joint of the arm

Compatible with various types of Forks to meet the wafer transfer needs for different applications

Wafer holding methods: Clamping type, Lifting type

Based on the equipment layout, you can choose either an upper or lower fixing method

- **Application: Suitable for working conditions with high requirements for cleanliness, precision, and reliability, ensuring the efficient and stable transfer of photomask (MASK) wafers in lithography processes. It is applicable to MASK EFEM and other MASK wafer transfer systems.**

Specification parameter

Handling Object	Mask Wafer/Square Glass Wafer		
Reachable Range	Arm: 376mm	Theta Rotation: 340°	Lifting:240/300/400/500
Handling Speed (average speed)	600mm/s	235°/s	250mm/s
Arm Type	Single Arm		
Handling Height	520-820mm		
Repeatability Accuracy	±0.1mm Within		
Communication Protocol	HEX/ASCII		
Communication Method	EtherNet/RS232		
Cleanliness	Highest ISO Class 1		
Facilities	Power: 220V, 10A, Vacuum: -70~-90Kpa, Positive Pressure: 0.1—0.5Mpa		

FMRD-Four-Axis MASK Dual-Arm Manipulator

This mechanical arm is designed for material handling in high-cleanliness environments. It employs a closed-loop control system and is suitable for the transfer of MASK wafers and square glass plates.

Optional pseudo-horizontal multi-joint motion corresponding to parallel equipment layout;

The EEF employs a closed-loop control system using a gripping mechanism;

Adopting a dual-arm structure, the robotic arm can reduce the wafer exchange time。

Wafer holding methods: Clamping type, Lifting type;

Compatible with various types of Forks to meet the wafer transfer needs for different applications;

Carrying capacity: Below 3Kg at the third joint of the arm;

Based on the equipment layout, you can choose either an upper or lower fixing method。

- **Application: Suitable for working conditions with high requirements for cleanliness, precision, and reliability, ensuring the efficient and stable transfer of photomask (MASK) wafers in lithography processes. It is applicable to MASK EFEM and other MASK wafer transfer systems.**

Specification parameter

Handling Object	Mask Wafer/Square Glass Wafer		
Reachable Range	Arm: 376mm	Theta Rotation: 340°	Lifting:240/300/400/500
Handling Speed (average speed)	600mm/s	235°/s	250mm/s
Arm Type	Dual Arms		
Handling Height	520-820mm		
Repeatability Accuracy	±0.1mm Within		
Communication Protocol	HEX/ASCI		
Communication Method	EtherNet/RS232		
Cleanliness	Highest ISO Class 1		
Facilities	Power: 220V, 10A, Vacuum: -70~-90Kpa, Positive Pressure: 0.1—0.5Mpa		

FHRS-Three-Axis Humid Single-Arm Manipulator

This robotic arm is suitable for wafer transfer in waterproof environments and can be used in conjunction with a wafer flipper and edge grip mechanism. It has a protection level of IP64 and is capable of handling wafers in acidic, alkaline, and cleaning environments.

Optional pseudo-horizontal multi-joint motion corresponding to parallel equipment layout

Carrying capacity: Below 3Kg at the third joint of the arm

The arm section is coated with Teflon to ensure corrosion resistance

O-ring seals are used at component joint interfaces

The waterproof structure of the Z-axis utilizes an accordi-on-style bellows

Wafer fixing methods: Vacuum suction type / Clamping type

Application: High-speed transportation of semiconductor wafers in waterproof environments, suitable for various wet process semiconductor equipment, EFEM (Equipment Front End Module), Sorter, and other cleaning process equipment.

Specification parameter

Handling Object	3-inch/4-inch/6-inch/8-inch/12-inch wafers		
Reachable Range	Arm: 290/376mm	Theta Rotation: 340°	Lifting:300/400/500
Handling Speed (average speed)	750mm/s	235°/s	500mm/s
Arm Type	Single Arm		
Handling Height	780--980mm		
Repeatability Accuracy	±0.1mm Within		
Communication Protocol	HEX/ASCII		
Communication Method	EtherNet/RS232		
Cleanliness	Highest ISO Class1		
Facilities	Power: 220V, 10A, Vacuum: -70~-90Kpa, Positive Pressure: 0.1—0.5Mpa		

FHRD-Four-Axis Humid Dual-Arm Manipulator

This manipulator is suitable for wafer transfer in waterproof environments and can be used in conjunction with wafer flipping and edge clamping mechanisms. It has a protection level of IP64, enabling the handling of wafers in acidic, alkaline, and cleaning environments.

Optional pseudo-horizontal multi-joint motion corresponding to parallel equipment layout

The arm section is coated with Teflon to ensure corrosion resistance

Carrying capacity: Below 3Kg at the third joint of the arm

O-ring seals are used at component joint interfaces

The waterproof structure of the Z-axis utilizes an accordi-on-style bellows

Wafer fixing methods: Vacuum suction type / Clamping type

Adopting a dual-arm structure, the robotic arm can reduce the wafer exchange time

Based on the equipment layout, you can choose either an upper or lower fixing method

Application: High-speed transportation of semiconductor wafers in waterproof environments, suitable for various wet process semiconductor equipment, EFEM (Equipment Front End Module), Sorter, and other cleaning process equipment.

Specification parameter

Handling Object	3-inch/4-inch/6-inch/8-inch/12-inch wafers		
Reachable Range	Arm: 290/376mm	Theta Rotation: 340°	Lifting:300/400/500
Handling Speed (average speed)	750mm/s	235°/s	500mm/s
Arm Type	Dual Arms		
Handling Height	800--1000mm		
Repeatability Accuracy	±0.1mm Within		
Communication Protocol	HEX/ASCII		
Communication Method	EtherNet/RS232		
Cleanliness	Highest ISO Class1		
Facilities	Power: 220V, 10A, Vacuum: -70~-90Kpa, Positive Pressure: 0.1—0.5Mpa		

FHRA*4-6 Axis Humid Quadruple-Arm Robot

This robotic arm is suitable for wafer transfer in waterproof environments and can be equipped with vacuum suction/edge clamping mechanisms. It has an IP64 protection rating, allowing it to handle wafers in acidic, alkaline, and cleaning environments.

Equipped with four Forks, it can be separated for dry and wet handling.

Carrying capacity: Below 3Kg at the third joint of the arm

Wafer fixing methods: Vacuum suction type / Clamping type

Using a 4-arm structure, with independent motion for wafer transfer, reduces wafer exchange time

The arm reach and track travel can be customized according to actual working conditions

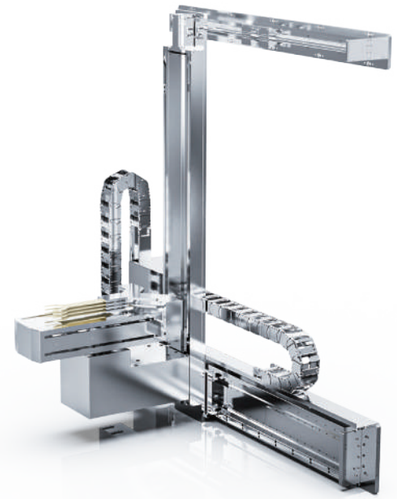
Application: High-speed wafer handling in waterproof environments, suitable for various semiconductor equipment related to wet processes, including EFEM, Sorter, and cleaning process equipment with compact space requirements.

Specification parameter

Handling Object	3-inch/4-inch/6-inch/8-inch/12-inch wafers		
Reachable Range	Arm: 290/376mm	Theta Rotation: 340°	Lifting:300/400/500
Handling Speed (average speed)	1000mm/s	200°/s	500mm/s
Arm Type	Single Arm		
Handling Height	692--792		
Repeatability Accuracy	±0.1mm Within		
Communication Protocol	HEX/ASCII		
Communication Method	EtherNet/RS232		
Cleanliness	Highest ISO Class1		
Facilities	Power: 220V, 10A, Vacuum: -70~-90Kpa, Positive Pressure: 0.1—0.5Mpa		

FHRA*4-7 Axis Humid Quadruple-Arm Robot

This robotic arm is suitable for wafer transfer in waterproof environments and can be equipped with vacuum suction/edge clamping mechanisms. It has an IP64 protection rating, allowing it to handle wafers in acidic, alkaline, and cleaning environments.



Equipped with four Forks, it can be separated for dry and wet handling.

Carrying capacity: Below 500g at the third joint of the arm

Carrying capacity: Below 3Kg at the third joint of the arm

Wafer fixing methods: Vacuum suction type / Clamping type

Using a 4-arm structure, with independent motion for wafer transfer, reduces wafer exchange time

The arm reach and track travel can be customized according to actual working conditions

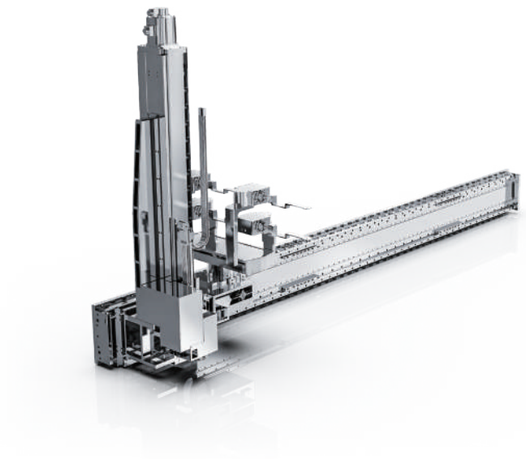
Application: High-speed wafer handling in waterproof environments, suitable for various semiconductor equipment related to wet processes, including EFEM, Sorter, and cleaning process equipment where the vertical and horizontal travel distances need to be customized according to space requirements.

Specification parameter

Handling Object	3-inch/4-inch/6-inch/8-inch/12-inch wafers			
Reachable Range	Arm: 1000mm	Rotation: 340°	Lifting: Customized ⩾500	Track:定制
Transport Speed (average speed)	2000mm/s	200°	400~1000mm/s	800~3500mm/s
Arm Type	Quad Arms			
Repeat Precision	±0.1mm以内			
Communication Protocol	HEX/ASCII			
Communication Method	EtherNet/RS232			
Cleanliness Level	Highest ISO Class1			
Facilities	Power: 220V, 10A, Vacuum: -70~-90Kpa, Positive Pressure: 0.1—0.5Mpa			

FHRD-Seven-Axis Electroplating Process Manipulator

This mechanical arm is designed for material handling in cleanroom environments with corrosive liquids. It employs a closed-loop servo control system and is suitable for stable transportation.



Optional XY Module-based Equipment Layout

Adopting a modular dual-arm structure to achieve high-speed wafer transfer

Adopting a modular lifting structure to achieve rapid elevation of the main body and customized design

Can be paired with different types of Forks to meet various wafer transfer requirements under different working conditions

Handling Weight: The arm, including the End Effector (EEF), is below 3Kg

Wafer Fixation Methods: Vacuum Adsorption / Mechanical Clamping

Customizable according to customer space requirements

Application: Positioned inside the customer's electroplating process chamber to facilitate the transfer of wafers in wet processes, and the travel range of XYR can be customized according to the customer's spatial requirements.

Specification parameter

Handling Object	12-inch Wafer			
Reachable Range (from rotation center to the third joint center)	Arm: 475mm Customizable	Theta Rotation:340°	Lifting: 500—2000mm customizable	Flip Axis: ±180°
Handling Speed (average speed)	550mm/s	340°/s	400——1000mm/s customizable	340°/s
Arm Type	Dual Arms			
Handling Height	Depends on configuration			
Repeatability Accuracy	Within ±0.1mm			
Communication Protocol	HEX/ASCII			
Communication Method	EtherNet/RS232			
Cleanliness	Highest ISO Class 1			
Facilities	Power: 220V, 10A, Vacuum: -70~-90Kpa, Positive Pressure: 0.1—0.5Mpa			

FCRS-Four-Axis Cassette Robot

This robotic arm is designed for material handling in high-cleanliness conditions, employing a closed-loop servo control system, and is suitable for high-speed transfer operations.

Optional pseudo-horizontal multi-joint motion corresponding to parallel equipment layout

Adopting a single-arm construction, it can achieve high-speed transfer of wafers

Adopting a single Z-axis lifting structure, it is possible to achieve rapid lifting and lowering of the main body

Carrying capacity: Below 4Kg at the third joint of the arm

Capable of being paired with various types of custom forks to meet the transportation needs of different specifications of Cassette/reagent boxes

Fixed Method: Clamping Type

Fixed methods can be chosen either from the top or bottom based on the equipment layout

Application: Suitable for handling open cassettes, reagent boxes, and similar items in clean environments, with customization available based on specific usage conditions.

Specification parameter

Handling Object	3-inch/4-inch/6-inch/8-inch Cassette/Suitable Size Reagent Box		
Reachable Range (from rotation center to the third joint center)	Arm: 290/376mm	Theta Rotation:340°	Lifting: 300/400/500
Handling Speed (average speed)	750mm/s	235°/s	500mm/s
Arm Type	Single Arm		
Handling Height	Configuration dependent		
Repeatability Accuracy	±0.1mm Within		
Communication Protocol	HEX/ASCII		
Communication Method	EtherNet/RS232		
Cleanliness	Highest ISO Class 1		
Facilities	Power: 220V, 10A, Vacuum: -70~-90Kpa, Positive Pressure: 0.1—0.5Mpa		

FWRD-ZD Five-Axis Dual-Z Robot Series

This robotic arm is designed for material handling in high-cleanliness conditions, employing a closed-loop servo control system, and is suitable for high-speed transfer operations.

The robot is equipped with four forks to accommodate dry/wet robotic arms

The dual-arm configuration can achieve high-speed wafer transfer

Using a dual Z-axis lifting structure, rapid lifting and lowering of the main body can be achieved within a high travel range.

Carrying capacity: Below 3Kg at the third joint of the arm

Capable of being paired with different types of Forks to meet various wafer transfer requirements

Wafer holding methods: Vacuum suction type/Clamping type/Clamping and lifting type/Contact Bernoulli type / Non-contact Bernoulli type

Based on the equipment layout, you can choose either an upper or lower fixing method

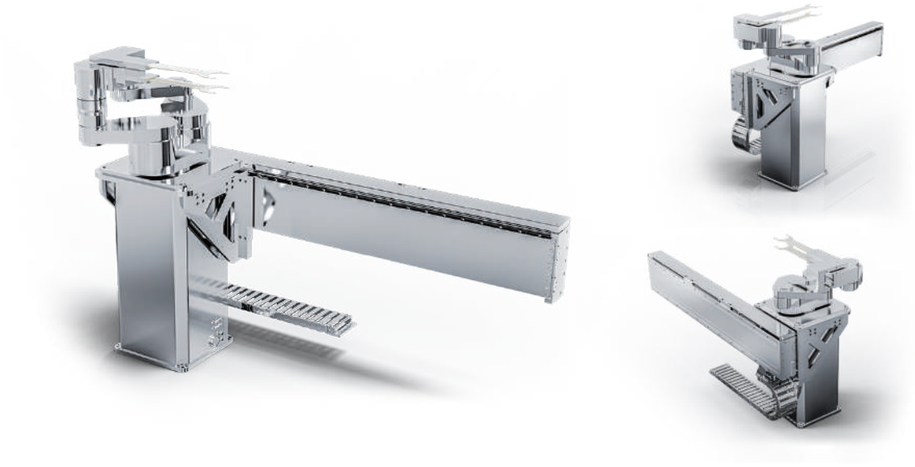
Specification parameter

Handling Object	3-inch/4-inch/6-inch/8-inch/12-inch wafers		
Reachable Range	Arm: 290/376mm	Theta Rotation:340°	Lifting: 300/400/500
Handling Speed (average speed)	750mm/s	235°/s	800mm/s
Arm Type	Dual Arms		
Handling Height	820--1020mm		
Repeatability Accuracy	±0.1mm以内		
Communication Protocol	HEX/ASCII		
Communication Method	EtherNet/RS232		
Cleanliness	Highest ISO Class 1		
Facilities	Power: 220V, 10A, Vacuum: -70~-90Kpa, Positive Pressure: 0.1—0.5Mpa		

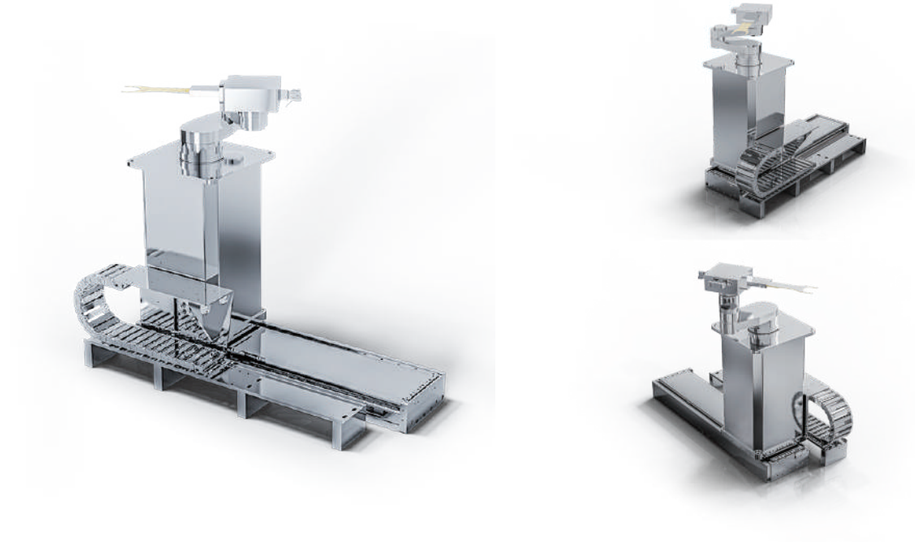
Optional TRACK Axis Series

With the optional Track axis, it can be coordinated with Fortrend Robot to be suitable for 2-4 LOADPORT wafertransfer

Side-Mounted TRACK



Floor-Mounted TRACK



300mm LoadPort

Fortrend 300mm LoadPort is an equipment interface designed for automated wafer transfer. It enables efficient and clean automated wafer transfer between FOUP (Front Opening Unified Pod) containers and equipment, suitable for various semiconductor equipment such as EFEM (Equipment Front End Module), Sorter, cleaning equipment, inspection equipment, etc.

The key structures and designs of the 300mm LoadPort are all independently patented by Fortrend, and both the design and production are carried out within Fortrend's own production base. Integration of hardware and software ensures the standardization and consistency of the equipment

Compliant with SEMI standards, utilizing the RS-232 HEX communication protocol for communication with interfacing equipment, and also capable of expanding to various communication and interfacing methods

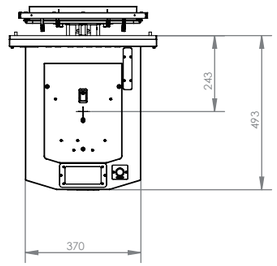
The original Wafer Mapping system utilizes proprietary advanced control algorithms to enable detection of wafer presence, absence, stacking, and tilting. Optional functions such as the E84 communication protocol and N2 purge can meet various on-site requirements

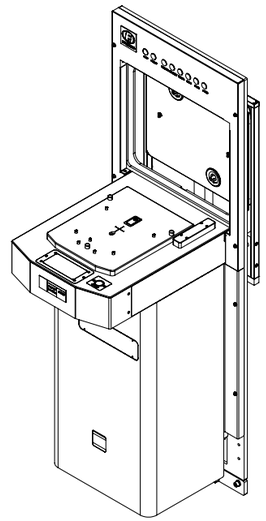
Specification parameter

Machine Dimensions	H 1349 mm * W 472 mm * L 586 mm	
Prepared Mass	66 kg ± 0.5 kg (varies depending on configuration)	
Rated Voltage	DC 24 V	
Rated Current	6 A	
Rated Power	144W	
Communication Method	Serial communication RS-232C, parallel communication I/O	
Communication Protocol	HEX, ASCII	
Carrier Size	Complies with SEMI standards 300 mm / 200 mm (optional) FOUP	
Load Height	900 mm ± 10 mm	
Cycle Time	FOUP Open	11 sec（with mapping）
	FOUP Close	8 sec（without mapping）
Facility Requirements	Positive Pressure	0.5 ~ 0.6 MPa （Ø 6 air tube）
	Negative Pressure	< - 80 kPa （Ø 6 air tube）
	Nitrogen (optional)	0.1 ~ 0.2 MPa （Ø 8 air tube）
Optional Accessories	Nitrogen Purge Function	
	Automated Material Handling System Communication Interface (E84)	
	8-inch Cassette Adapter	
	Mechanical/Electronic	
	Cables (PIO cable, 485 debug cable, RS232 debug cable)	

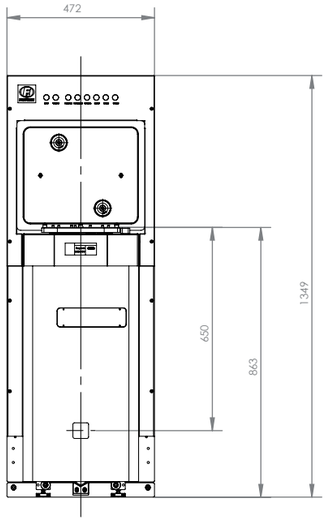
PRODUCT VIEW

Top View

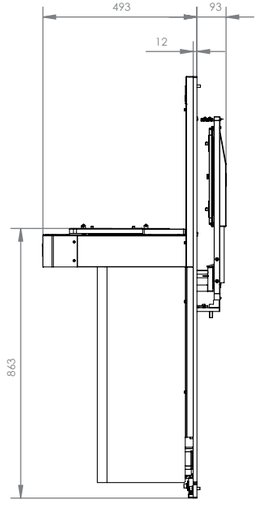




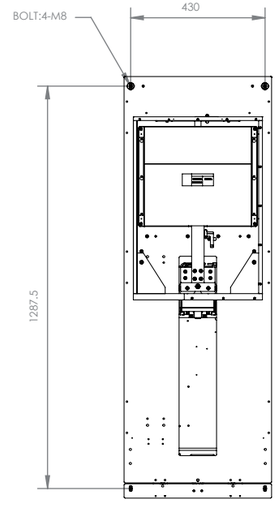
Top View



Side View



Rear View



Frame LoadPort

Fortrend Frame LoadPort is an interface for automated wafer transfer designed for equipment. It efficiently and cleanly facilitates automated wafer transfer between FOUP (Front Opening Unified Pod) boxes and equipment, suitable for various semiconductor devices like EFEM (Equipment Front End Module), Sorter, etc., and can accommodate Frame FOUPs from manufacturers such as Zhongqin and Shuoding.

The key structures and designs of the Frame mm LoadPort are all independently patented by Fortrend, and both the design and production are carried out within Fortrend's own production base. Integration of hardware and software ensures the standardization and consistency of the equipment

Compliant with SEMI standards, utilizing the RS-232 HEX communication protocol for communication with interfacing equipment, and also capable of expanding to various communication and interfacing methods

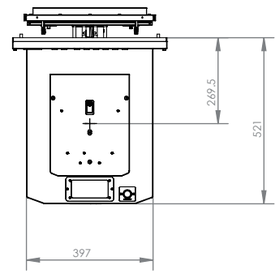
The original Wafer Mapping system utilizes proprietary advanced control algorithms to enable detection of wafer presence, absence, stacking, and tilting. The optional E84 communication protocol can be applied to AMHS/AGV automated transportation

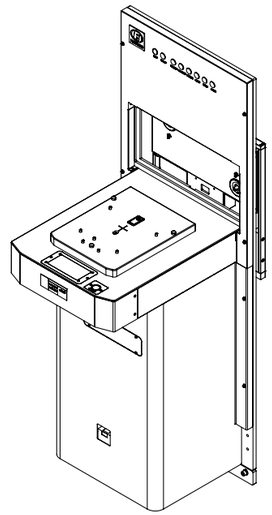
Specifications parameter

Machine Dimensions	H 1349 mm * W 485 mm * L 594 mm	
Prepared Mass	70 kg ± 0.5 kg (varies depending on configuration)	
Rated Voltage	DC 24 V	
Rated Current	6 A	
Rated Power	144W	
Communication Method	Serial communication RS-232C, parallel communication I/O	
Communication Protocol	HEX, ASCII	
Carrier Size	Frame FOUP	
Load Height	900 mm ± 10 mm	
Cycle Time	Open FOUP	11 sec（with mapping）
	Close FOUP	8 sec（without mapping）
Facility Requirements	Positive Pressure	0.5 ~ 0.6 MPa （Ø 6 air tube）
	Negative Pressure	< - 80 kPa （Ø 6 air tube）
Optional Accessories	Automated Material Handling System Communication Interface (E84)	
	Mechanical/Electronic Info Pad (default standard with electronic type)	
	Cables (PIO cable, 485 debug cable, RS232 debug cable)	

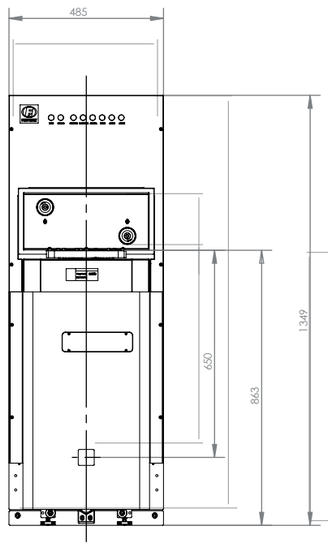
PRODUCT VIEW

Top View

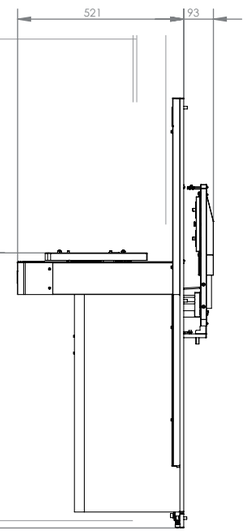




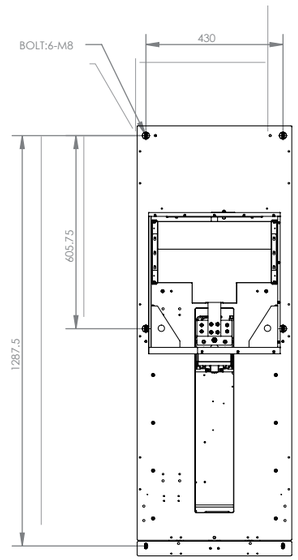
Top View



Side View



Rear View



Panel LoadPort

Fortrend Panel LoadPort is an efficient equipment interface specifically designed for FO-PLP (Fan-Out Panel Level Package) packaging processes. It enables clean, high-precision transfer of glass substrates and seamless integration with packaging equipment, ensuring automation and high yield in the production process.

Full machine production is self-reliant, with core components and patents owned independently

The software and hardware design complies with SEMI standards and general specifications

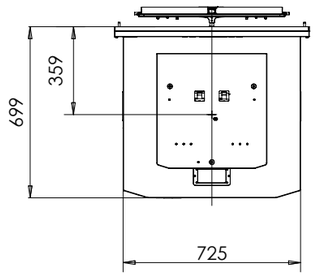
Diverse functional configuration options are available to meet a wide range of working conditions

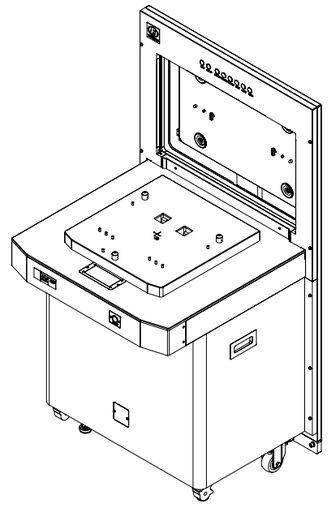
Specification parameter

Machine Dimensions	H 1424 mm * W 796 mm * L 732 mm	
Prepared Weight	100 kg ± 1 kg (varies depending on configuration)	
Rated Voltage	DC 24 V	
Rated Current	8 A	
Rated Power	192 W	
Communication Method	Serial communication RS-232C, parallel communication I/O	
Communication Protocol	HEX, ASCII	
Carrier Size	SEMI standard Panel FOUP compliant	
Load Height	913 mm ± 10 mm	
Facility Requirements	Positive Pressure	0.5 ~ 0.6 MPa (Ø 6 air tube)
	Negative Pressure	< - 80 kPa (Ø 6 air tube)
Optional Components	Automated Material Handling System Communication Interface (E84)	
	Mechanical/Electronic (Electronic is standard by default)	
	Cables (PIO cable, 485 debug cable, RS232 debug cable)	

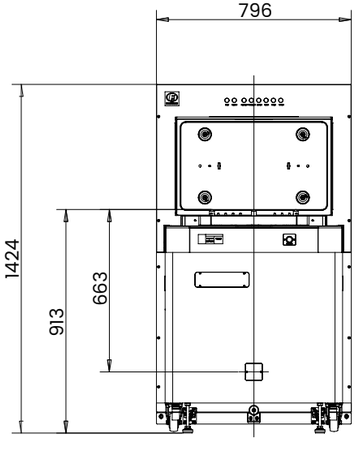
PRODUCT VIEW

Top View

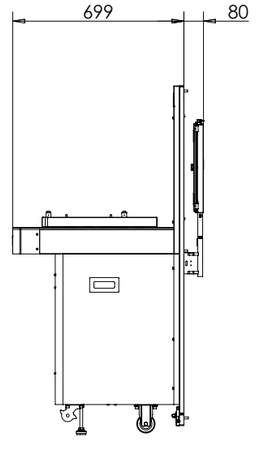




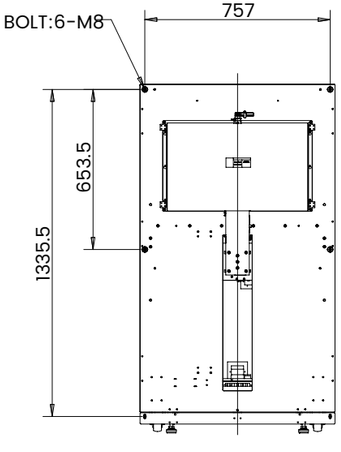
Top View



Side View



Rear View



Wafer Open Cassette Stage

Fortrend Wafer OCS (Open Cassette Stage) can accommodate wafer cassettes of various sizes, supports both open and semi-open designs, and is equipped with a protective cover to reduce the risk of particle contamination. It ensures cleanliness and stability during wafer transfer and is widely applicable to semi-conductor equipment such as EFEM (Equipment Front End Module) and Sorter.

Wafer OCS with Enclosure Bracket

Wafer OCS

A variety of customizable accessories are available to flexibly meet the needs of different working conditions.

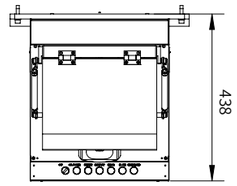
Specifically designed for Wafer Open Cassette.

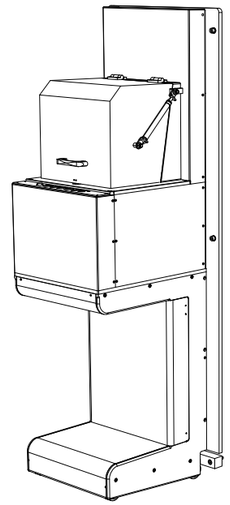
It can be equipped with the original factory Mapping system, capable of detecting overlapping and tilted wafers, effectively preventing wafer collisions during transfer.

Specification parameter	
Machine Dimensions	425mm*365mm*772mm (varies depending on configuration)
Prepared Mass	35~100±0.5kg (varies depending on configuration)
Rated Voltage	DC 24 V
Rated Current	6 A
Rated Power	144W
Communication Method	RS232
Communication Protocol	HEX, ASCII
Carrier Size	SEMI standard Open Cassette compliant
Optional Components	RFID
	Mapping (left-right sweep, front-back sweep)
	Enclosure (metal enclosure, plastic enclosure)
	Port Bracket

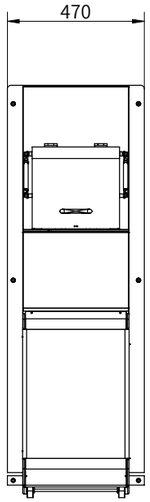
PRODUCT VIEW

Top View

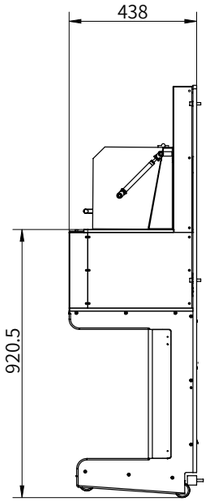




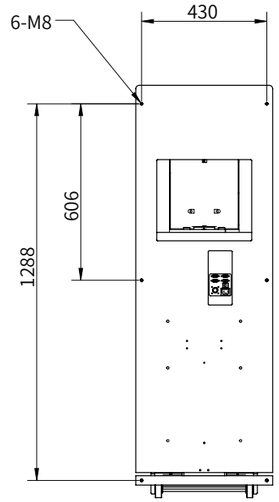
Top View



Side View



Rear View



Frame Open Cassette Stage

Fortrend Wafer OCS (Open Cassette Stage) can accommodate wafer cassettes of various sizes, supports both open and semi-open designs, and is equipped with a protective cover to reduce the risk of particle contamination. It ensures cleanliness and stability during wafer transfer and is widely applicable to semi-conductor equipment such as EFEM (Equipment Front End Module) and Sorter.

Frame OCS

A variety of customizable accessories are available to flexibly meet the needs of different working conditions

Specifically designed for Frame Open Cassette

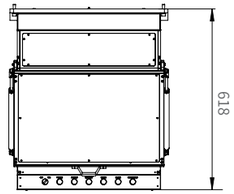
Frame OCS with Enclosure Bracket

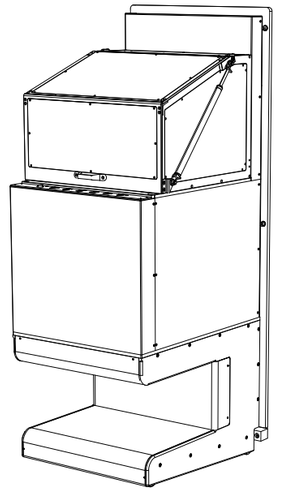
It can be equipped with the original factory Mapping system, capable of detecting overlapping and tilted wafers, effectively preventing wafer collisions during transfer

Specification parameter	
Machine Dimensions	425mm*365mm*772mm (varies with configuration)
Prepared Mass	60~130±1kg (varies with configuration)
Rated Voltage	DC 24 V
Rated Current	6 A
Rated Power	144W
Communication Method	RS232
Communication Protocol	HEX, ASCII
Carrier Size	SEMI standard compliant Open Cassette
Optional Components	RFID
	Mapping (left-right sweep, front-back sweep)
	Enclosure (metal enclosure, plastic enclosure)
	Port Bracket

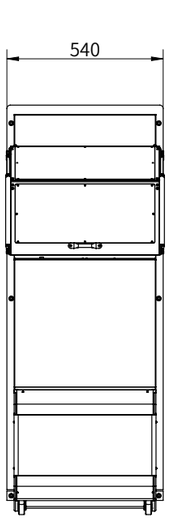
PRODUCT VIEW

Top View

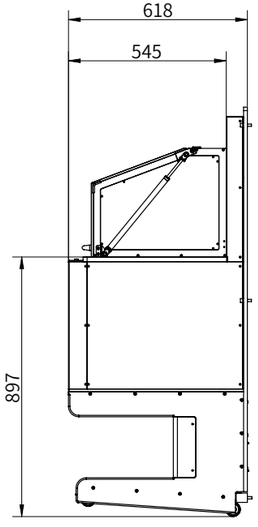




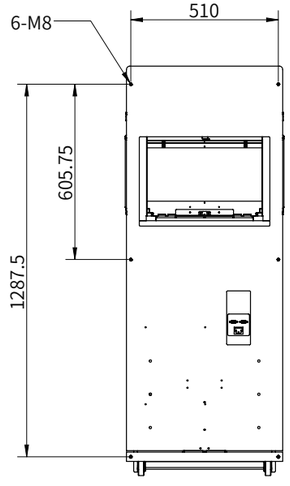
Top View



Side View



Rear View



Wafer Aligner

Ultra-compact size

Real-time monitoring

High-speed, high-efficiency, and high-precision

FPA-612-V

FPA-48-V

- The FPA series Aligner is a four-axis controlled device, utilizing a compact single-axis robot module with high rigidity characteristics. It achieves high-speed.High-efficiency, and high-precision wafer edge finding and center alignment. (Wafer position accuracy ⩽ ±0.1 mm;Wafer edge/notch angle accuracy ⩽ ±0.1°)。
- Efficient operation, locating the wafer notch position in ⩽7 seconds (excluding wafer pick-up and placement time), and quickly completing wafer centering and angular correction;
- Supports both semi-transparent and opaque wafer applications, suitable for silicon wafers, silicon carbide wafers, and others with diameters ranging from 100 to 300 mm;
- Integrated design with an embedded controller, eliminating the need for additional controller setup and wiring space, achieving an ultra-compact size;
- The system is equipped with real-time monitoring capabilities, allowing for instant detection of the status of various systems, including the motor drive and control system, vacuum system, detection system, and circulation system;

SPECIFICATION PARAMETER

- Fortrend Aligner can achieve high-speed, stable, and high-precision calibration, suitable for pre-alignment in wafer processing to ensure the position and orientation of the wafers. These products are widely used in various stages of the semiconductor manufacturing process and can be integrated into a range of semiconductor equipment for use.

Specification parameter			
Equipment Model		FPA-612-V	FPA-48-V
Wafer Size		Common type for 6-inch, 8-inch, 12-inch	Common type for 4-inch, 5-inch, 6-inch, 8-inch
Wafer Material		Semi-transparent, Opaque	
Wafer Characteristics		Flat or Notch (SEMI Standard)	
Number of Axes		4-axis (X, Y, Z, Theta)	
Wafer Handling Method		Vacuum Chuck	
Wafer Thickness		0.3-0.8mm*	
Wafer Warpage		⩽1mm	
Position Accuracy		Wafer Center: ±0.1mm Wafer Flat (Notch): ±0.1°	
Wafer Offset Tolerance		±R5 mm	±R5 mm
Range of Motion	X	±5 mm	±5 mm
	Y	30 mm	50 mm
	Z	11 mm	11 mm
	θ	Continuous	Continuous
Communication Method		RS232	
Communication Protocol		HEX、ASCII	
Power Supply	Voltage	DV24V	
	Current	5V	
Vacuum	Pipe Diameter	ф6mm	
	Pressure	-50~-80kPa	
	Flow Rate	10L/min(ANR)	
Ambient Temperature		5~40°C	
Ambient Humidity		30~65%(No condensation)	
Weight		8 kg	
Dimensions		L305mmxW220mmxH202 mm	L305mmxW220mmxH222 mm
Edge-Seeking Time		⩽7S	