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微信公众号



官方网站



真空传输核心零部件

VACUUM TRANSFER CORE COMPONENTS

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无锡富创得精密设备有限公司
WUXI FORTREND PRECISION EQUIPMENT CO.,LTD

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CONTENTS

关于公司

ABOUT THE COMPANY

公司简介 Company Profile	01
核心优势 Core Advantage	01
全球专利 Global Patent	02
全球售后 Global After-sales	02

真空机械手

VACUUM ROBOT

PIONEER-7 晶圆真空机械手 PIONEER-7 Wafer Vacuum Robot	05-18
PIONEER-8 MASK 真空机械手 PIONEER-8 MASK Vacuum Robot	19-22
PIONEER-9-玻璃基板真空机械手 PIONEER-9 Glass Substrate Vacuum Robot	23-24

真空片盒升降装置VCE

VACUUM CASSETTE ELEVATOR VCE

真空片盒升降装置VCE Vacuum Cassette Elevator VCE	25-26
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真空寻边器

VACUUM EDGE FINDER

4/6/8寸内置式真空寻边器 4/6/8-inch Built-in Vacuum Edge Finder	27
4/6/8寸外挂式真空寻边器 4/6/8-inch External Vacuum Edge Finder	28
6/8/12寸内置式真空寻边器 6/8/12-inch Built-in Vacuum Edge Finder	29
12寸外挂式真空寻边器 12-inch External Vacuum Edge Finder	30
6寸外挂式MASK真空寻边器 6-inch Pendant MASK Vacuum Edge Finder	31

公司简介

Company Profile

无锡富创得精密设备有限公司坐落于中国无锡市新吴区，公司自成立之初，便传承了母公司45年的半导体行业经验及技术成果，**致力于为全球半导体产业提供卓越的真空自动化传输设备及配套解决方案。**

公司主要产品：**晶圆真空搬运腔体(VTM)、真空机械手及配套组件、具备强有力的客制化能力，广泛应用于：**

PVD、CVD、蚀刻、光掩膜、CD-SEM、离子注入等工艺设备的真空转移领域。

Wuxi Fortrend Precision Equipment Co., Ltd. is located in the Xinwu District of Wuxi City, China. Since its establishment, the company has inherited 45 years of semiconductor industry experience and technical achievements from its parent company. It is committed to providing outstanding vacuum automation transfer equipment and supporting solutions for the global semiconductor industry. Main products of the company include: Wafer Vacuum Transfer Modules (VTM), vacuum manipulators, and supporting components. With strong customization capabilities, they are widely used in the vacuum transfer field of process equipment such as PVD, CVD, etching, photomasks, CD-SEM, and ion implantation.

核心优势

Core advantage

45+

45年半导体行业经验

45 years of experience in semiconductor industry

21%

研发支出约占公司收入的21%

R&D spending accounts for about 21% of the company's revenue

33%

研发人员占比33%

Research and development personnel accounted for 36%

150+

年产能超150台

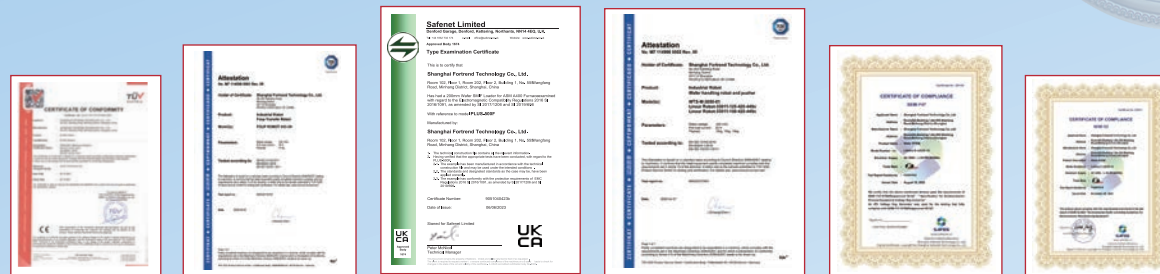
The annual production capacity exceeds 150 units

全球专利

Global Patent

关键核心专利自有 | 全球专利超100项

Key core patents have more than 100 global patents



全球售后无忧

Global after-sales

32

32个当地客服中心

32 local call centers

2-4H

最快2-4小时内响应

The fastest response within 2-4h



PIONEER 系列

高效

High efficiency

高精

Highly refined

高真空度

High vacuum level



- 高温、高真空度、高洁净度传输、避免晶圆受到空气、杂质、离子等污染;

High temperature, high vacuum, and ultra-high cleanliness transfer to prevent wafers from contamination by air, particulates, ions, and other impurities.
- 具有碰撞保护系统以及AWC纠偏功能,最大限度的保护了机械手和晶圆;

It has an extremely safe collision protection system and AWC web correction function, which protects the robot and wafer to the greatest extent;
- 被广泛应用于PVD、CVD、ALD、PECVD、MOCVD等工艺设备,具有很强的工艺适用性,支持客户化定制;

It is widely used in PVD, PVD, ALD, PECVD, MOCVD and other process equipment, with strong process applicability and support customized customization;

富创得真空机械手命名规则

Fortrend Vacuum Robot Naming Rules



系列名称	结构形式(TYPE)	R轴长度	Z轴高度	特殊定制
Series Name	Structure Type	R-axis Length	Z-axis Height	Special Customization
7-晶圆(wafer)	F:FROG	800: 800mm	0: 0mm	
8-MASK	S:SCARA	950: 950mm	35: 35mm	
9-玻璃基板 (PLP)	Q:QuadraFly	1050: 1050mm	100: 100mm	
	R: Radius	K: 尺寸定制	150: 150mm	
	H: Horizontal multi-joint	K: Custom Size	K: 尺寸定制	
			K: Custom Size	

PIONEER-7 高温单蛙腿真空机械手

PIONEER-7 High-Temperature Single Cantilever Vacuum Robot

该产品采用磁流体密封, 具有先进的碰撞防护功能, 广泛应用于MBE半导体传输设备。主要应用于采用了高端制造工艺的芯片制程, 可在200°C, 10⁻⁸Pa环境下稳定运行, 大大提高了芯片生产制造的良率和效率, 是芯片制造装备的关键产品。PIONEER-7系列机械手满足用户个性化定制, 手臂长度可选, 提供1KG以内的负载搬运的解决方案。

This product utilizes ferrofluidic sealing technology and features advanced collision protection functionality. It is widely applied in MBE (Molecular Beam Epitaxy) semiconductor transfer equipment, primarily serving advanced chip manufacturing processes. The manipulator operates stably in environments up to 200°C and 10⁻⁸ Pa, significantly improving yield and efficiency in chip production, making it a critical component in semiconductor manufacturing equipment.The PIONEER-7 series offers customizable configurations to meet individual customer requirements, with optional arm lengths and handling solutions for payloads up to 1 kg.



直驱电机结构具有更高的真空特性, 内部结构没有齿轮, 皮带等部件, 系统运行的平稳性更好, 拥有更低的发尘量, 可靠性更高。

The direct-drive motor structure offers superior vacuum compatibility, as its interior contains no gears, belts, or similar components; this yields smoother operation, generates fewer particles, and delivers higher reliability.

智能精准控制:集成多路高速可编程IO模块, 支持硬件中断及毫秒级互锁控制, 结合AWC纠偏与微米级重复定位精度, 实现晶圆高精度传输, 防碰撞响应<30ms。

Intelligent and Precise Control: Integrated with multiple high-speed programmable I/O modules, supporting hardware interrupts and millisecond-level interlocking control, combined with AWC (Automatic Web Control) deviation correction and micrometer-level repeat positioning accuracy, it achieves highly accurate wafer transfer with collision prevention response time of less than 30ms.

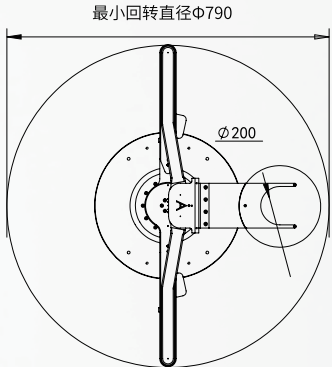
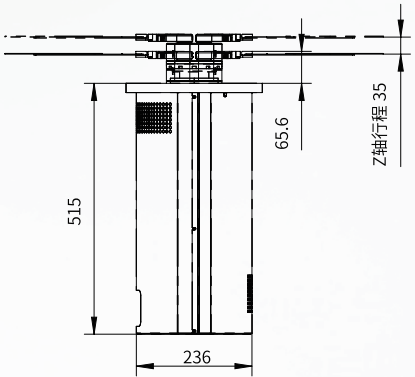
模块化深度定制:可定制机械臂长度/负载/耐腐蚀涂层, 兼容半导体洁净环境, 配备4.3寸触控示教器支持热插拔与离线编程, 调试效率提升60%。

Modular deep customization: The length/load/corrosion-resistant coating of the robotic arm can be customized, compatible with semiconductor clean environments, equipped with a 4.3-inch touch teach pendant to support hot-swap and offline programming, and the debugging efficiency is increased by 60%.

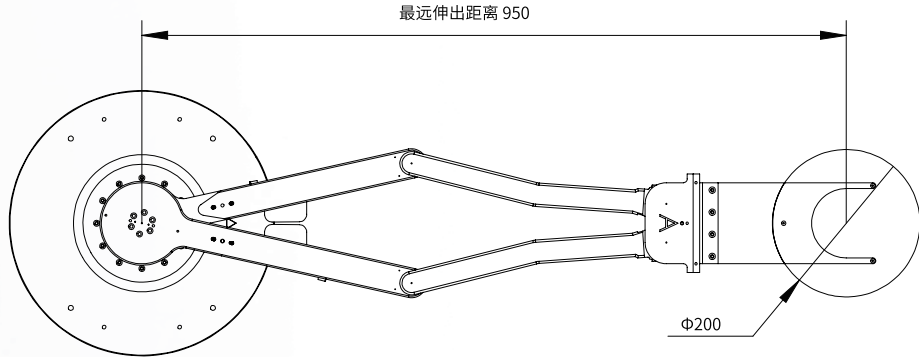
规格参数 SPECIFICATIONS PARAMETER

型号 Model		PIONEER 7-FSS-950-35-C	PIONEER 7-FSS-950-100-C	PIONEER 7-FSS-950-150-C
轴数 Number of Axes		3轴 3-axis		
机械手形式 Manipulator Type		Frog双臂 Frog Dual Arms		
晶圆尺寸 Wafer Size		100mm, 125mm, 150mm,200mm,300mm 100mm, 125mm, 150mm, 200mm, 300mm		
运动范围 Motion range	R轴 R-axis	根据实际工位及手指定制 Customized according to actual workstation and fingers		
	T轴 T-axis	±360 ° ±360 °		
	Z轴 Z-axis	0mm、35mm (可定制) 0mm, 35mm (customizable)		
机械手取放交换时间(不同手指) Manipulator pick-and-place exchange time		7~15s	10-18s	13-21s
重复定位精度 Repeat positioning accuracy	R轴 R-axis	±0.05mm		
	T轴 T-axis	±0.006°		
	Z轴 Z-axis	±0.05mm		
耐真空度 Vacuum resistance		10 ⁻⁶ Pa		
漏率 Leak rate		5×10 ⁻⁹ Pa.m ³ /sec He (Base Vacuum 5x10 ⁻⁴ Pa)		
电源范围 Power supply range		208VAC(+7%, -10%)		
本体+手臂重量 Weight of body + arm		<50kg		
通讯协议 Communication protocol		ASCII		
通讯方式 Communication method		EtherNet/EtherCAT		
洁净等级 Cleanliness level		ISO Class 1		

运动范围 RANGE OF MOTION



运动范围 RANGE OF MOTION



PIONEER-7 双臂双叉真空机械手

PIONEER-7 Dual-Arm Dual-Fork Vacuum Manipulator

该产品采用直驱电机结构，无齿轮传动，使机械手具有更高的稳定性及可靠性，可拖拽示教更大限度提高了用户体验及安全性，被广泛应用于PECVD、PVD、ETCH等设备，具有极其安全的碰撞保护系统，以及AWC纠偏功能，最大限度地保护晶圆，有效提升设备工艺的稳定性。该系列产品的软硬件都具有较高的兼容性，兼容各类芯片制造机台，手臂长度可选，为用户提供100mm到300mm尺寸晶圆的搬运解决方案。

This product uses direct-drive motor structure, without gear transmission, giving the manipulator higher stability and reliability. It can drag and demonstrate to a larger extent, improving user experience and safety. It is widely used in PECVD, PVD, ETCH and other equipment, with a very safe collision protection system, as well as AWC correction function, maximizing the protection of wafers and effectively enhancing the stability of the equipment process. The software and hardware of this series of products have high compatibility, compatible with various chip manufacturing platforms, with arm lengths optional, providing users with handling solutions for wafers sized from 100mm to 300mm.



直驱电机结构具有更高的真空特性，内部结构没有齿轮，皮带等部件，系统运行的平稳性更好，拥有更低的发尘量，可靠性更高。

The direct-drive motor structure offers superior vacuum compatibility, as its interior contains no gears, belts, or similar components; this yields smoother operation, generates fewer particles, and delivers higher reliability.

智能精准控制：集成多路高速可编程IO模块，支持硬件中断及毫秒级互锁控制，结合AWC纠偏与微米级重复定位精度，实现晶圆高精度传输，防碰撞响应<30ms。

Intelligent and Precise Control: Integrated with multiple high-speed programmable I/O modules, supporting hardware interrupts and millisecond-level interlocking control, combined with AWC (Automatic Web Control) deviation correction and micrometer-level repeat positioning accuracy, it achieves highly accurate wafer transfer with collision prevention response time of less than 30ms.

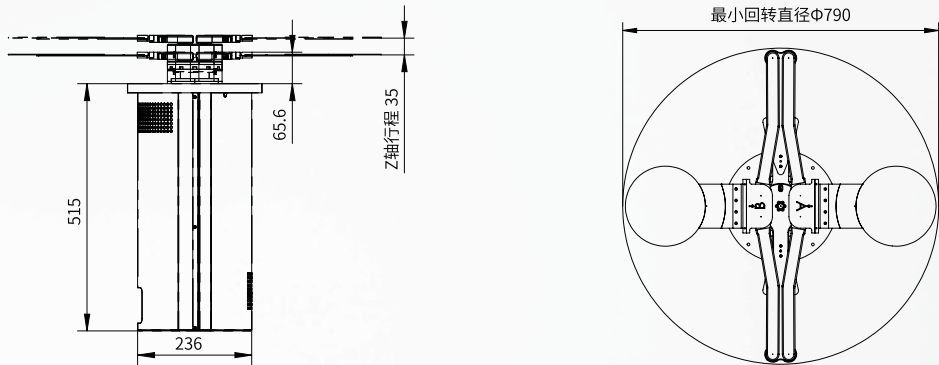
模块化深度定制：可定制机械臂长度/负载/耐腐蚀涂层，兼容半导体洁净环境，配备4.3寸触控示教器支持热插拔与离线编程，调试效率提升60%。

Modular deep customization: The length/load/corrosion-resistant coating of the robotic arm can be customized, compatible with semiconductor clean environments, equipped with a 4.3-inch touch teach pendant to support hot-swap and offline programming, and the debugging efficiency is increased by 60%.

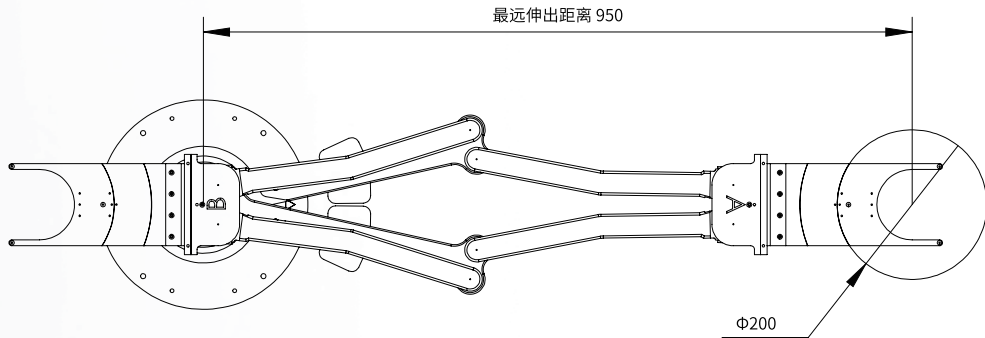
规格参数 SPECIFICATIONS PARAMETER

型号 Model		PIONEER 7 -FDD-950-35-C	PIONEER 7 -FDD-950-100-C	PIONEER 7 -FDD-950-150-C
轴数 Number of Axes		3轴 3-axis		
机械手形式 Manipulator Type		Frog 双臂 Frog Dual-Arm		
晶圆尺寸 Wafer Size		100mm, 125mm, 150mm,200mm,300mm 100mm, 125mm, 150mm, 200mm, 300mm		
运动范围 Motion range	R轴 R-axis	800mm,950mm,1050mm(R轴长度可定制) 800mm, 950mm, 1050mm (customizable R-axis length)		
	T轴 T-axis	±360 ° ±360 °		
	Z轴 Z-axis	35mm 、100mm 、150mm (Z轴高度可定制) 35mm, 100mm, 150mm (customizable Z-axis height)		
机械手取放交换时间(不同手指) Manipulator pick-and-place exchange time		7~15s	10-18s	13-21s
重复定位精度 Repeat positioning accuracy	R轴 R-axis	±0.05mm		
	T轴 T-axis	±0.006 °		
	Z轴 Z-axis	±0.05mm		
工作真空度 Operating vacuum level		10 ⁻⁶ Pa		
漏率 Leak rate		5x10 ⁻⁹ Pa.m ³ /sec He (Base Vacuum 5x10 ⁻⁴ Pa)		
电源范围 Power supply range		208VAC(+7%,-10%)		
本体+手臂重量 Weight of body + arm		<50kg		
通讯协议 Communication protocol		ASCII		
通讯方式 Communication method		EtherNet/EtherCAT		
洁净等级 Cleanliness level		ISO Class 1		

运动范围 RANGE OF MOTION



运动范围 RANGE OF MOTION



VHP真空机械手

VHP Vacuum Handler

该产品由高精度电机、轴承系统、控制系统组成，主要用于薄膜沉积设备。采用的无接触扭矩传递技术解决了传统机械密封式机械手的泄漏、磨损、污染等致命缺陷。且具有极其安全的碰撞保护系统，以及AWC纠偏功能，最大限度地保护晶圆，有效提升设备工艺的稳定性。

Comprising a high-precision motor, bearing system, and control system, this product is designed for thin film deposition equipment, utilizing contactless torque transmission technology to eliminate the critical flaws of traditional mechanically sealed arms—such as leakage, wear, and contamination—while featuring an advanced collision protection system and AWC (Active Wafer Correction) deviation correction capability to maximize wafer protection and effectively enhance process stability.



高刚性和抗变形的设计能有效避免运动失真和摩擦，保障工艺长期稳定运行。采用DD马达直驱与优化的连接结构，减少了传动误差，实现了更高的运动精度。

The high-rigidity and deformation-resistant design effectively prevents motion distortion and friction, ensuring long-term process stability. Utilizing DD (Direct Drive) motor technology combined with an optimized connection structure, it minimizes transmission errors and achieves superior motion precision.

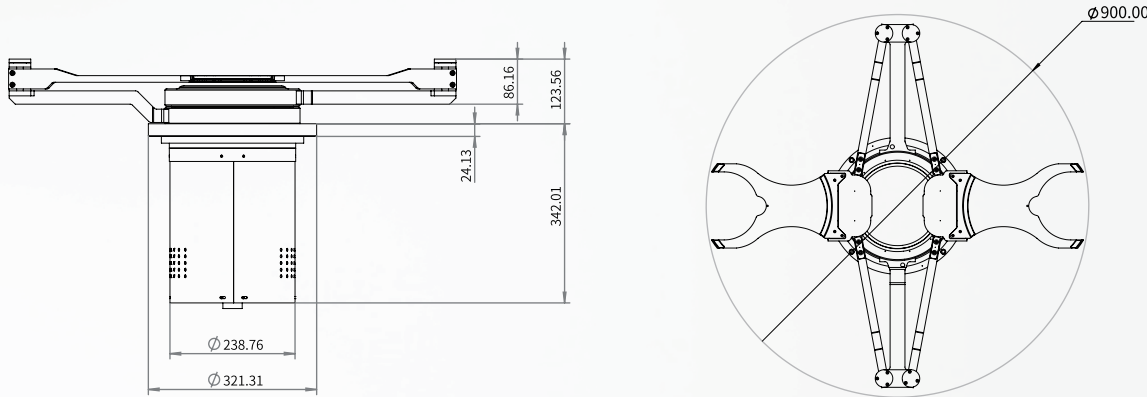
智能精准控制：集成多路高速可编程IO模块，支持硬件中断及毫秒级互锁控制，结合高精度闭环反馈系统与微米级重复定位精度，实现晶圆高精度传输。

Intelligent and precise control: Integrating multiple high-speed programmable IO modules, supporting hardware interrupts and millisecond-level interlock control, combined with high-precision closed-loop feedback and micron-level repeat positioning accuracy, to achieve intelligent and precise wafer handling.

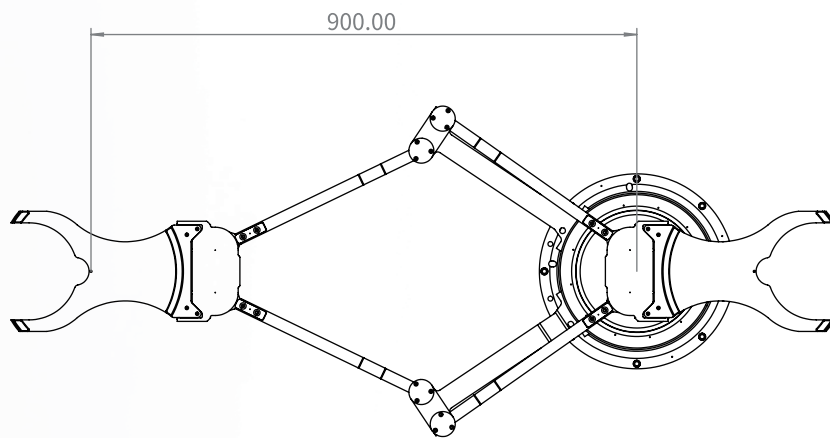
规格参数 SPECIFICATIONS PARAMETER

名称 Name	VHP真空机械手 VHP Vacuum Manipulator	
轴数 Number of Axes	2轴 2-axis	
晶圆尺寸 Wafer Size	300mm	
运动范围 Motion range	R轴 R-axis	900mm
	T轴 T-axis	±360°
机械手取放交换时间 Robot Pick-and-Place Exchange Time	15s	
重复定位精度 Repeat positioning accuracy	R轴 R-axis	±0.05mm
	T轴 T-axis	±0.006°
耐真空度 Vacuum resistance	10 ⁻⁶ Pa	
漏率 Leak rate	5x10 ⁻⁹ Pa.m³/sec He (Base Vacuum 5x10 ⁻⁴ Pa)	
电源范围 Power supply range	208VAC(+7%,-10%)	
本体+手臂重量 Weight of body + arm	≤30kg	
通讯协议 Communication protocol	ASCII	
通讯方式 Communication method	EtherNet/EtherCAT	
洁净等级 Cleanliness level	ISO Class 1	

运动范围 RANGE OF MOTION



运动范围 RANGE OF MOTION



PIONEER-7 单臂单叉真空机械手

PIONEER-7 Single-Arm Single-Fork Vacuum Manipulator

该产品采用磁流体密封, 具有先进的碰撞防护功能, 广泛应用于ETCH、PVD、PECVD、MOCVD等半导体设备。主要应用于采用了高端制造工艺的芯片制程, 实现晶圆在各个工艺腔室间的传送, 具有真空度高, 传输效率高, 负载能力强, 耐高温等特点, 大大提高了芯片生产制造的良率和效率, 是芯片制造装备的关键产品。PIONEER-7系列机械手满足用户个性化定制, 手臂长度可选, 提供1KG以内的负载搬运的解决方案。

The product employs magnetorheological (MR) fluid sealing and features advanced collision protection capabilities. It is extensively used in semiconductor equipment such as ETCH, PVD (Physical Vapor Deposition), PECVD (Plasma Enhanced Chemical Vapor Deposition), and MOCVD (Metal Organic Chemical Vapor Deposition). It is primarily utilized in chip manufacturing processes that incorporate advanced manufacturing techniques, enabling the transfer of wafers between various process chambers. With high vacuum levels, efficient transfer rates, strong load-bearing capacity, and resistance to high temperatures, it significantly enhances the yield and efficiency of chip production and manufacturing. It is a crucial product in chip manufacturing equipment. The PIONEER-7 series of robotic arms caters to personalized customer customization, offering selectable arm lengths and providing load handling solutions for loads within 1KG.



高效传动设计: 通过伺服电机与高精度谐波减速机传动, 360°旋转精准定位, 负载多变性, 手臂灵活性高, 适应性强;

High-efficiency transmission design: driven by a servo motor and high-precision harmonic reducer, it enables 360° precise positioning, handles variable loads, offers high arm flexibility, and strong adaptability.

智能精准控制:集成多路高速可编程IO模块, 支持硬件中断及毫秒级互锁控制, 结合AWC纠偏与微米级重复定位精度, 实现晶圆高精度传输, 防碰撞响应<30ms。

Intelligent and Precise Control: Integrated with multiple high-speed programmable I/O modules, supporting hardware interrupts and millisecond-level interlocking control, combined with AWC (Automatic Web Control) deviation correction and micrometer-level repeat positioning accuracy, it achieves highly accurate wafer transfer with collision prevention response time of less than 30ms.

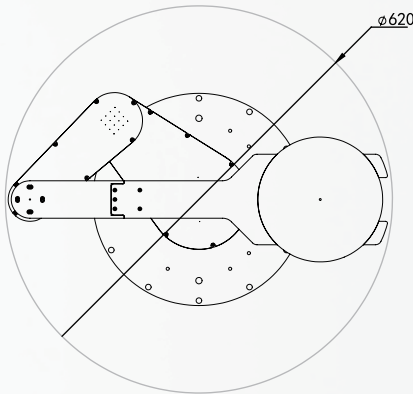
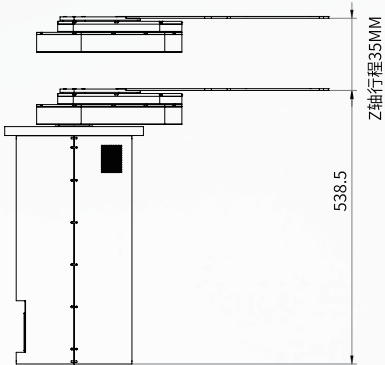
模块化深度定制:可定制机械臂长度/负载/耐腐蚀涂层, 兼容半导体洁净环境, 配备4.3寸触控示教器支持热插拔与离线编程, 调试效率提升60%。

Modular deep customization: The length/load/corrosion-resistant coating of the robotic arm can be customized, compatible with semiconductor clean environments, equipped with a 4.3-inch touch teach pendant to support hot-swap and offline programming, and the debugging efficiency is increased by 60%.

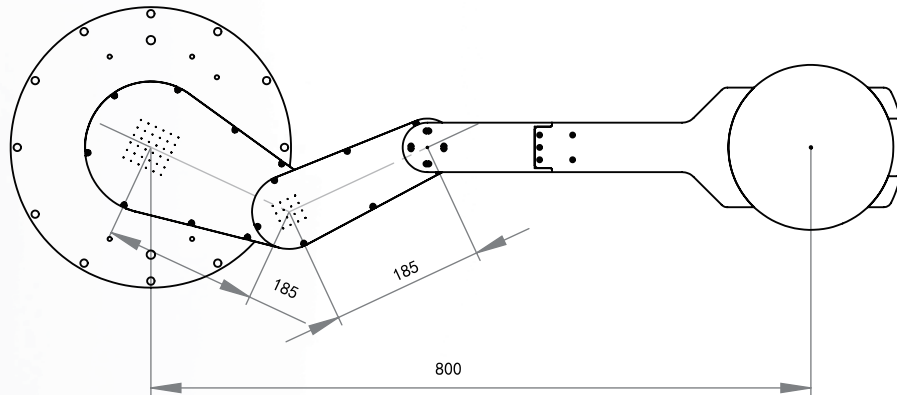
规格参数 SPECIFICATIONS PARAMETER

型号 Model		PIONEER 7-SSS-950-35-C	PIONEER 7-SSS-950-100-C	PIONEER 7-SSS-950-150-C
轴数 Number of Axes		3轴 3-axis		
机械手形式 Manipulator Type		Scara单臂 SCARA single arm		
晶圆尺寸 Wafer Size		100mm, 150mm,200mm,300mm 100mm, 150mm, 200mm, 300mm		
运动范围 Motion range	R轴 R-axis	根据实际工位及手指定制 Customized according to actual workstation and fingers		
	T轴 T-axis	±360 ° ±360 °		
	Z轴 Z-axis	35mm、100mm、150mm (Z轴高度可定制) 35mm, 100mm, 150mm (customizable Z-axis height)		
机械手取放交换时间(不同手指) Manipulator pick-and-place exchange time		7~11s	8~12s	12~16s
重复定位精度 Repeat positioning accuracy	R轴 R-axis	±0.05mm		
	T轴 T-axis	±0.006 °		
	Z轴 Z-axis	±0.05mm		
耐真空度 Vacuum resistance		10 ⁻⁶ Pa		
漏率 Leak rate		5x10 ⁻⁹ Pa.m³/sec He (Base Vacuum 5x10 ⁻⁴ Pa)		
电源范围 Power supply range		208VAC(+7%,-10%)		
本体+手臂重量 Weight of base + arm		<50kg		
通讯协议 Communication protocol		ASCII		
通讯方式 Communication method		EtherNet/EtherCAT		
洁净等级 Cleanliness class		ISO Class 1		

运动范围 RANGE OF MOTION



运动范围 RANGE OF MOTION



PIONEER-7 单臂双叉真空机械手

PIONEER-7 Single-Arm Dual-Fork Vacuum Manipulator

该产品采用磁流体密封,具有先进的碰撞防护功能,广泛应用于ETCH、PVD、PECVD、MOCVD等半导体设备。主要应用于采用了高端制造工艺的芯片制程,实现晶圆在各个工艺腔室间的传送,具有真空度高,传输效率高,负载能力强,耐高温等特点,大大提高了芯片生产制造的良率和效率,是芯片制造装备的关键产品。PIONEER-7系列机械手满足用户个性化定制,手臂长度可选,提供1KG以内的负载搬运的解决方案。

The product employs magnetorheological (MR) fluid sealing and features advanced collision protection capabilities. It is extensively used in semiconductor equipment such as ETCH, PVD (Physical Vapor Deposition), PECVD (Plasma Enhanced Chemical Vapor Deposition), and MOCVD (Metal Organic Chemical Vapor Deposition). It is primarily utilized in chip manufacturing processes that incorporate advanced manufacturing techniques, enabling the transfer of wafers between various process chambers. With high vacuum levels, efficient transfer rates, strong load-bearing capacity, and resistance to high temperatures, it significantly enhances the yield and efficiency of chip production and manufacturing. It is a crucial product in chip manufacturing equipment. The PIONEER-7 series of robotic arms caters to personalized customer customization, offering selectable arm lengths and providing load handling solutions for loads within 1KG.



高效传动设计:通过伺服电机与高精度谐波减速机传动,360°旋转精准定位,负载多变性,手臂灵活性高,适应性强;

High-efficiency transmission design: driven by a servo motor and high-precision harmonic reducer, it enables 360° precise positioning, handles variable loads, offers high arm flexibility, and strong adaptability.

智能精准控制:集成多路高速可编程IO模块,支持硬件中断及毫秒级互锁控制,结合AWC纠偏与微米级重复定位精度,实现晶圆高精度传输,防碰撞响应<30ms。

Intelligent and Precise Control: Integrated with multiple high-speed programmable I/O modules, supporting hardware interrupts and millisecond-level interlocking control, combined with AWC (Automatic Web Control) deviation correction and micrometer-level repeat positioning accuracy, it achieves highly accurate wafer transfer with collision prevention response time of less than 30ms.

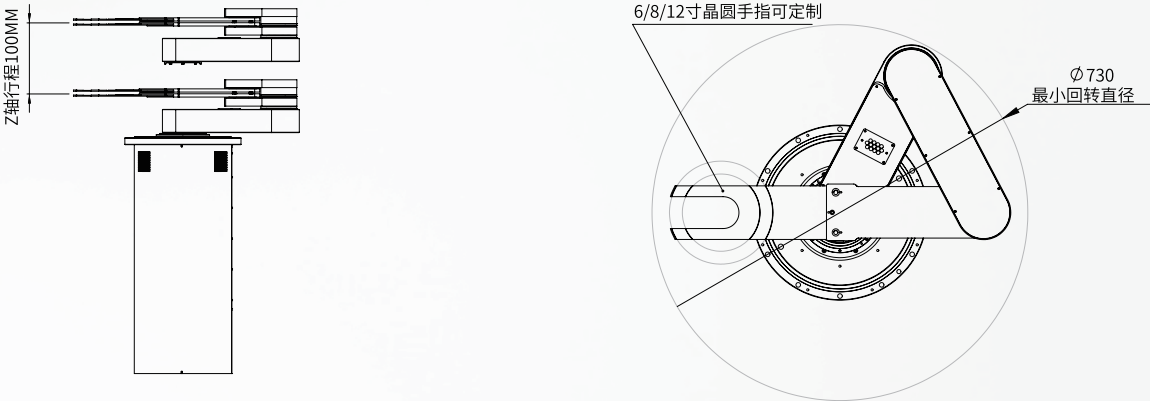
模块化深度定制:可定制机械臂长度/负载/耐腐蚀涂层,兼容半导体洁净环境,配备4.3寸触控示教器支持热插拔与离线编程,调试效率提升60%。

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规格参数 SPECIFICATIONS PARAMETER

型号 Model		PIONEER 8-SSD-800-100-C	PIONEER 8-SSD-950-100-C	PIONEER 8-SSD-1100-100-C
轴数 Total Weight		4轴 4-axis		
机械手形式 Rated Voltage		Scara单臂 SCARA single arm		
晶圆尺寸 Rated Current		100mm, 150mm,200mm,300mm 100mm, 150mm, 200mm, 300mm		
运动范围 Motion range	R轴 R-axis	根据实际工位及手指定制 Customized according to actual workstation and fingers		
	T轴 T-axis	±360 ° ±360 °		
	Z轴 Z-axis	35mm、100mm、150mm (Z轴高度可定制) 35mm, 100mm, 150mm (customizable Z-axis height)		
机械手取放交换时间(不同手指) Manipulator pick-and-place exchange time		8~12s	12~16s	16~20s
重复定位精度 Repeat positioning accuracy	R轴 R-axis	±0.05mm		
	T轴 T-axis	±0.006 °		
	Z轴 Z-axis	±0.05mm		
耐真空度 Vacuum resistance		10 ⁻⁶ Pa		
漏率 Leak rate		5x10 ⁻⁹ Pa.m ³ /sec He (Base Vacuum 5x10 ⁻⁴ Pa)		
电源范围 Power supply range		208VAC(+7%,-10%)		
本体+手臂重量 Weight of body + arm		<80kg		
通讯协议 Communication protocol		ASCII		
通讯方式 Communication method		EtherNet/EtherCAT		
洁净等级 Cleanliness level		ISO Class 1		

运动范围 RANGE OF MOTION



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