

# PRODUCT MANUAL

产品手册



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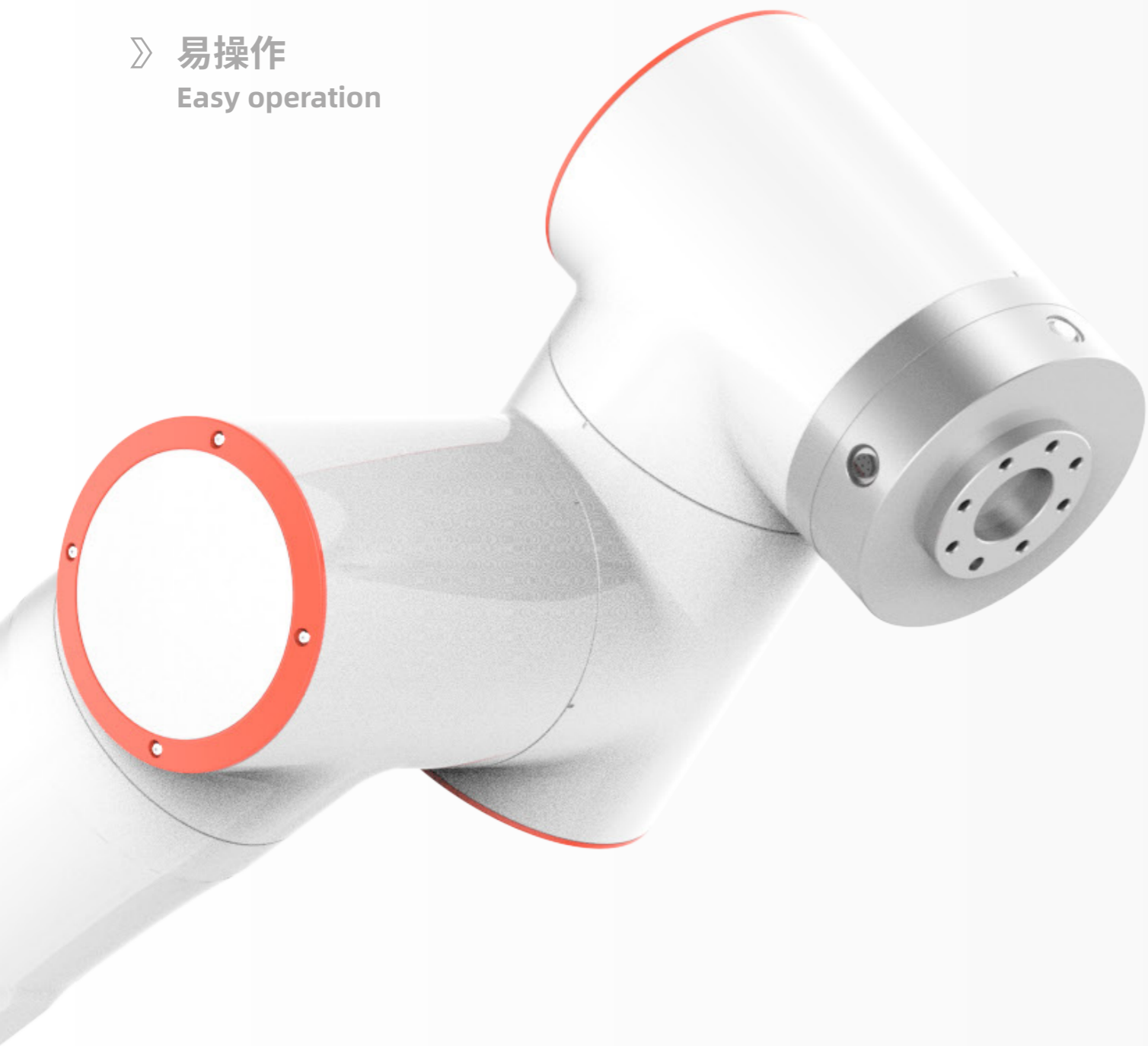


抖音公众号

FAIRINO

法奥意威(苏州)机器人系统有限公司  
FAIR Innovation (Suzhou) Robot System Co.,Ltd.

- › 模块化  
Modularization
- › 快部署  
Quick deployment
- › 易操作  
Easy operation



# FAIRINO ROBOT

## PRODUCT VISION

### 产品愿景

协作机器人将延伸您的时间和空间,解放繁杂的低效重复,让您的双手和大脑拥抱更广袤的天际。未来,您将见证法奥协作机器人**与众协同**。随着它的出现,不仅提高了人机协作的效率,也加快了更多企业自动化进程,对许多制造商来说,它还节省了空间,降低了部署机器人产线的成本。

Collaborative robots will extend your time and space, liberate complex and inefficient repetition, and let you embrace a wider horizon. In the future, You will see **FAIRINO ROBOTS**. With its emergence, it not only improves the efficiency of human-machine collaboration, but also speeds up the automation process for more enterprises and frees floor space and lowers the cost of implementing robots for manufacturers.

# PRODUCT DISPLAY

产品展示



FR3



FR5



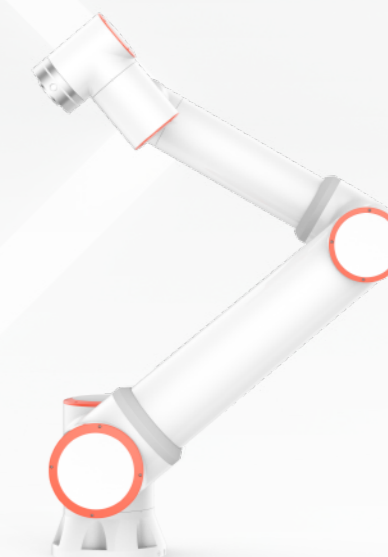
FR10



FR16



FR20



FR30



# FAIRINO FR SERIES

## 系列排布

根据不同的负载能力和参数范围,法奥协作机器人产品FR系列拥有六个型号:FR3、FR5、FR10、FR16、FR20和FR30。

全新V6.0版机器人在原有版本基础上进行了整体升级:更柔性、更高效、更安全、模块化程度更高,法奥不断探索协作机器人应用边界,努力为各行业提供“+”得起的产品。

法奥协作机器人FR系列产品生产通过了**ISO9001**质量管理体系认证

产品认证:**CR, CE, KCs, NRTL, RoHS 2.0, NSF, SEMI, 高防护IP65**

ISO功能安全认证:**ISO 10218, ISO 13849, ISO 15066**

According to different payload and parameter, FAIRINO collaborative robots FR series are divided into six models: FR3, FR5, FR10, FR16, FR20 and FR30.

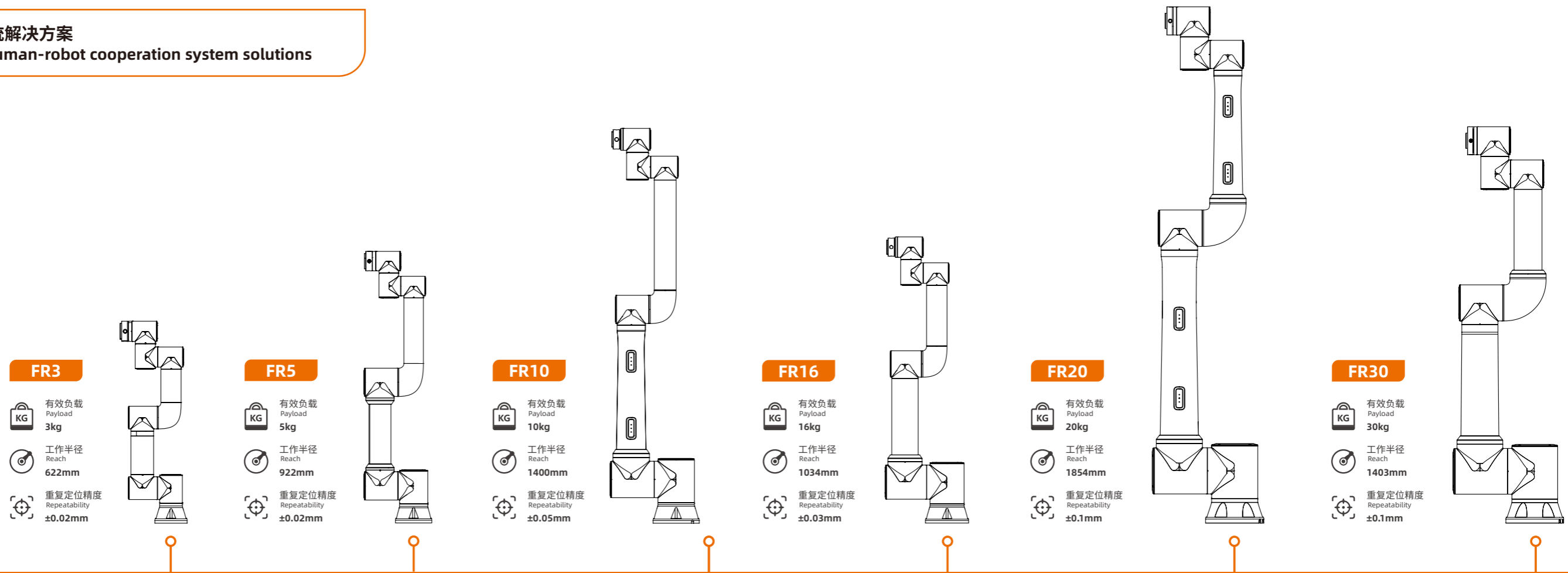
The latest V6.0 FR series cobot has been upgraded on the basis of the original V5.0 version: more safety, flexibility, efficiency and modularity. FAIRINO is constantly exploring the boundaries of collaborative robots and endeavouring to provide affordable products for various industries.

Production Certification: **ISO 9001 Quality Management System**

Product Certification: **CR, CE, KCs, NRTL, RoHS 2.0, NSF, SEMI, High Protection IP65**

ISO Functional Safety Certification: **ISO 10218, ISO 13849, ISO 15066**

智能人机系统解决方案  
Intelligent human-robot cooperation system solutions



# ROBOT ARM TECHNICAL SPECIFICATION

## 机械臂规格参数

	FR3	FR5	FR10	FR16	FR20	FR30						
有效负载(Payload)	3kg	5kg	10kg	16kg	20kg	30kg						
工作半径(Reach)	622mm	922mm	1400mm	1034mm	1854mm	1403mm						
自由度(Degrees of freedom)	6个旋转关节 6 rotating joints	6个旋转关节 6 rotating joints	6个旋转关节 6 rotating joints	6个旋转关节 6 rotating joints	6个旋转关节 6 rotating joints	6个旋转关节 6 rotating joints						
人机交互(HMI)	10.1 英寸示教器或移动终端 Web App 10.1 inch teach pendant or mobile terminal Web App				10.1 英寸示教器或移动终端 Web App 10.1 inch teach pendant or mobile terminal Web App							
符合ISO 9283的姿势可重复性 (Pose repeatability per ISO 9283 )	±0.02mm	±0.03mm	±0.05mm	±0.03mm	±0.1mm	±0.1mm						
轴移动(Axis movement)	工作范围(Working range)	最大速度(Maximum speed)	工作范围(Working range)	最大速度(Maximum speed)	工作范围(Working range)	最大速度(Maximum speed)	工作范围(Working range)	最大速度(Maximum speed)	工作范围(Working range)	最大速度(Maximum speed)	工作范围(Working range)	最大速度(Maximum speed)
基座(Base)	±175°	±180°/s	±175°	±180°/s	±175°	±120°/s	±175°	±120°/s	±175°	±120°/s	±175°	±120°/s
肩部(Shoulder)	+ 85°/ - 265°	±180°/s	+ 85°/ - 265°	±180°/s	+ 85°/ - 265°	±120°/s	+ 85°/ - 265°	±120°/s	+ 85°/ - 265°	±120°/s	+ 85°/ - 265°	±120°/s
肘部(Elbow)	±150°	±180°/s	±160°	±180°/s	±160°	±180°/s	±160°	±180°/s	±160°	±120°/s	±160°	±120°/s
腕部 1 (Wrist 1)	+ 85°/ - 265°	±180°/s	+ 85°/ - 265°	±180°/s	+ 85°/ - 265°	±180°/s	+ 85°/ - 265°	±180°/s	+ 85°/ - 265°	±180°/s	+ 85°/ - 265°	±180°/s
腕部 2 (Wrist 2)	±175°	±180°/s	±175°	±180°/s	±175°	±180°/s	±175°	±180°/s	±175°	±180°/s	±175°	±180°/s
腕部 3 (Wrist 3)	±175°	±180°/s	±175°	±180°/s	±175°	±180°/s	±175°	±180°/s	±175°	±180°/s	±175°	±180°/s
典型 TCP 速度(Typical TCP speed)	1m/s		1m/s		1.5m/s		1m/s		2m/s		2m/s	
防护等级(IP classification)	IP54 (可选 IP65)	(IP65 Optional)	IP54 (可选 IP65)	(IP65 Optional)	IP54 (可选 IP65)	(IP65 Optional)	IP54 (可选 IP65)	(IP65 Optional)	IP54 (可选 IP65)	(IP65 Optional)	IP54 (可选 IP65)	(IP65 Optional)
噪音(Noise)	<65dB		<65dB		<65dB		<65dB		<70dB		<70dB	
安装方向(Robot mounting)	任何方向 Any orientation		任何方向 Any orientation		任何方向 Any orientation		任何方向 Any orientation		任何方向 Any orientation		任何方向 Any orientation	
I/O端口(I/O Ports)	数字输入(DI) 2 数字输出(DO) 2		数字输入(DI) 2 数字输出(DO) 2		数字输入(DI) 2 数字输出(DO) 2		数字输入(DI) 2 数字输出(DO) 2		数字输入(DI) 2 数字输出(DO) 2		数字输入(DI) 2 数字输出(DO) 2	
	模拟输入(AI) 1 模拟输出(AO) 1		模拟输入(AI) 1 模拟输出(AO) 1		模拟输入(AI) 1 模拟输出(AO) 1		模拟输入(AI) 1 模拟输出(AO) 1		模拟输入(AI) 1 模拟输出(AO) 1		模拟输入(AI) 1 模拟输出(AO) 1	
工具I/O电源(Tool I/O power supply)	24V/1.5A		24V/1.5A		24V/1.5A		24V/1.5A		24V/1.5A		24V/1.5A	
底座直径(Footprint)	128mm	149mm	190mm	190mm	240mm	240mm						
整机重量(Weight)	≈15kg	≈22kg	≈40kg	≈40kg	≈85kg	≈85kg						
工作温度(Operating temperature)	0-45	0-45°C	0-45	0-45	0-45°C	0-45°C						
工作湿度(Operating humidity)	90%RH(non-condensing)	90%RH(non-condensing)	90%RH(non-condensing)	90%RH(non-condensing)	90%RH(non-condensing)	90%RH(non-condensing)						
设备材料(Materials)	铝、钢 Aluminium Steel	铝、钢 Aluminium、Steel	铝、钢 Aluminium、Steel	铝、钢 Aluminium、Steel	铝、钢 Aluminium Steel	铝、钢 Aluminium、Steel						



# CONTROLLER TECHNICAL SPECIFICATION

## 控制箱规格参数



直流mini控制箱

mini控制箱2kw

控制箱4kw

控制箱6kw

设备特性  
Features

防护等级(IP classification)	IP54	IP54	IP54	IP54
工作温度(Operating temperature)	0-45°C	0-45°C	0-45°C	0-45°C
工作湿度(Operating humidity)	90%RH(non-condensing)	90%RH(non-condensing)	90%RH(non-condensing)	90%RH(non-condensing)
I/O端口(I/O Ports)	数字输入(DI) 16 数字输出(DO) 16	数字输入(DI) 16 数字输出(DO) 16	数字输入(DI) 16 数字输出(DO) 16	数字输入(DI) 16 数字输出(DO) 16
	模拟输入(AI) 2 模拟输出(AO) 2	模拟输入(AI) 2 模拟输出(AO) 2	模拟输入(AI) 2 模拟输出(AO) 2	模拟输入(AI) 2 模拟输出(AO) 2
	高速脉冲输入(High speed pulse input) 2	高速脉冲输入(High speed pulse input) 2	高速脉冲输入(High speed pulse input) 2	高速脉冲输入(High speed pulse input) 2
I/O电源(I/O power supply)	24V/1.5A	24V/1.5A	24V/1.5A	24V/1.5A
标配通讯(Standard communication)	I/O、TCP/IP、Modbus_TCP/RTU	I/O、TCP/IP、Modbus_TCP/RTU	I/O、TCP/IP、Modbus_TCP/RTU	I/O、TCP/IP、Modbus_TCP/RTU
可选通讯(Optional communication)	CC-Link、Profinet、Ethernet/IP、EtherCAT	CC-Link、Profinet、Ethernet/IP、EtherCAT	CC-Link、Profinet、Ethernet/IP、EtherCAT	CC-Link、Profinet、Ethernet/IP、EtherCAT
软件开发包(Software development kit)	C#/C++/Python/ROS/ROS2	C#/C++/Python/ROS/ROS2	C#/C++/Python/ROS/ROS2	C#/C++/Python/ROS/ROS2
尺寸参数(L*W*H)	245*180*44.5mm (不含凸出物)	245*180*44.5mm (不含凸出物)	245*180*89mm (不含凸出物)	320*183*100mm (不含凸出物)
设备重量(Weight)	2.1kg (不含线重量)	2.5kg (不含线重量)	3.6kg (不含线重量)	6.5kg (不含线重量)
设备材料(Materials)	镀锌板 Galvanized plate	镀锌板 Galvanized plate	镀锌板 Galvanized plate	镀锌板 Galvanized plate

物理性能  
Physical

# TEACH PENDANT

选配  
Optional

示教器



操作尽在掌心  
All operations are gathered in the hand

示教器、电脑、平板或手机与WebAPP系统连接,从而实现对协作机器人的操控。

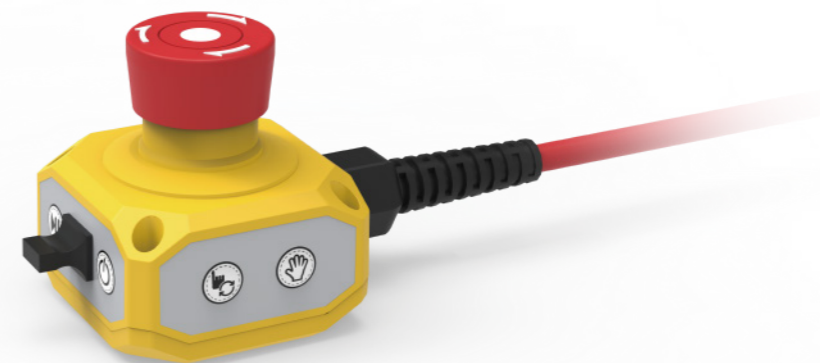
The teach pendant, computer, tablet or mobile phone is connected to the WebAPP system to realize the operation of the collabroative robot.

- 用户界面更直观
- The user interface is more intuitive
- 工艺包种类更齐全
- Wide range of technological packages
- 云端部署更便捷
- Cloud deployment provides greater convenience

设备特性 Features	防护等级(IP classification)	IP54
	工作湿度(Operating humidity)	90%RH(non-condensing)
物理性能 Physical	显示分辨率(Display resolution)	1280 x 800 pixels
	尺寸参数(L*W*H)	268*210*88mm
	设备重量(Weight)	1.6kg
	设备材料(Materials)	ABS、PP
	线缆长度(Cable length)	5m

# SAFTY BOX

按钮盒



人机交互工具,可实现基础交互功能。通过RJ45接口可与电脑、平板等设备链接,直接登录到web示教界面。

Human-cobot interaction tools for basic interaction functions. It can be linked with computers, tablets and other devices through the RJ45 interface, and directly log in to the Web App teaching interface.

- 简单易用
- 操作方便
- 灵活部署
- Simple to use
- Easy to operate
- Flexible to deploy

设备特性 Features	防护等级(IP classification)	IP54
	按钮功能(Button function)	手动/自动、拖动、点记录、是否配合按钮盒、开始/停止、关机 Manual/Auto, Drag, Point Record, Match or Not with Safety Button Box, Start/Stop, Shutdown
	协议类型(Communication)	TCP/IP
	网络传输速率(Network transfer rate)	100M
物理性能 Physical	供电(Power over ethernet)	标准POE Standard POE
	尺寸参数(L*W*H)	136*60*66mm (不含凸出物) (No protrusions)
	设备重量(Weight)	490g (带线重量) (Cable weight included)
	设备材料(Materials)	ABS
	线缆长度(Cable length)	5m
	按键次数(Number of keys)	≥20W 次

# INDUSTRY APPLICATIONS



## 上下料解决方案

上下料机器人能够提高生产效率、质量和安全性,降低劳动强度,并提供灵活适应性,为企业带来更高的效益和竞争优势。

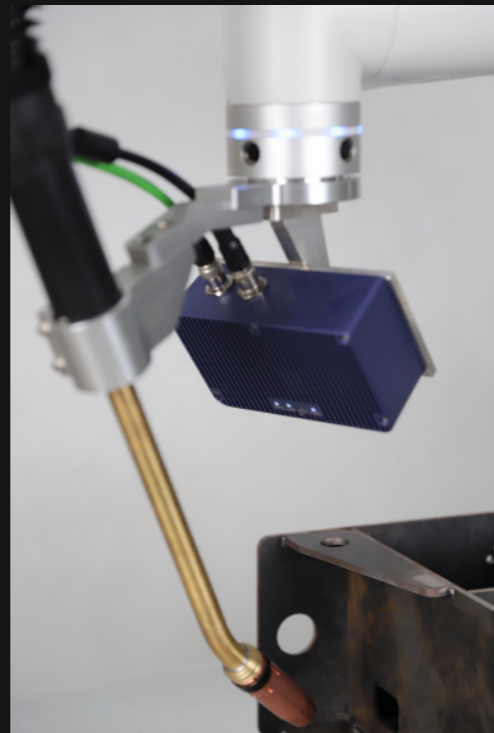
## Pick And Place Solution

Material handling robots can improve production efficiency, quality, and safety, reduce labor intensity, and provide flexibility and adaptability, bringing higher benefits and competitive advantages to businesses.

## Welding Robot 焊接机器人

丰富的焊接工艺包,具备多种焊接工艺,包含有点焊、段焊、直焊、摇摆焊、圆弧焊、多层多道焊,并且具备焊丝寻位、焊缝追踪的智能焊接技术,显著提升焊接效率,保障焊接品质。

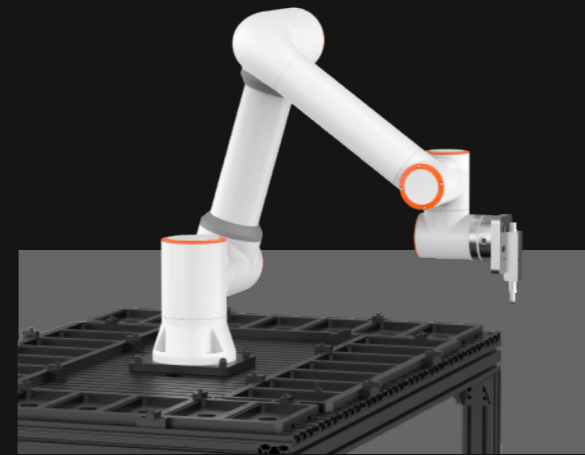
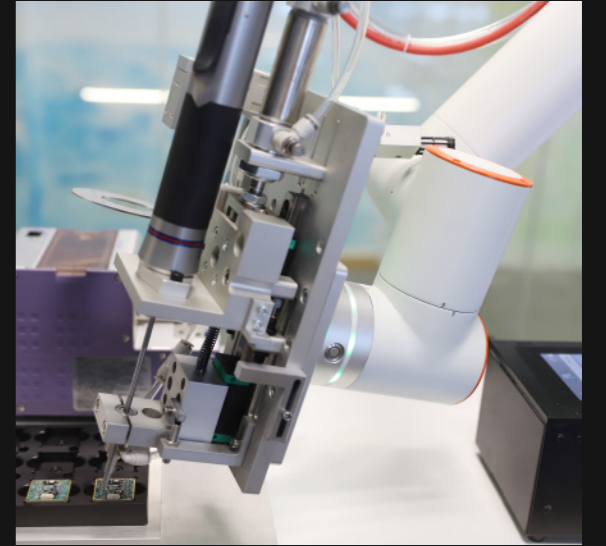
Abundant welding process kits, with a variety of welding technologies such as spot welding, seam welding, straight welding, oscillating welding, arc welding, and multi-layer multi-pass welding. It also incorporates intelligent welding technologies for wire positioning and weld seam tracking, significantly enhancing welding efficiency and ensuring welding quality.



## Screw Tightening Robot 螺丝锁付机器人

搭配末端智能拧紧装置,实现了扭矩可调、可控、可编辑,适合各种场景下的螺丝锁付,能够稳定、高效、准确完成生产过程,极大减少工人重复性劳动,支持数据溯源。

Combined with the end intelligent tightening device, it achieves adjustable, controllable, and programmable torque, making it suitable for screw locking in various scenarios. It can stably, efficiently, and accurately complete the production process, greatly reducing repetitive labor for workers and supporting data traceability.



## 涂胶解决方案 Glue Dispensing Solution

搭配末端智能出胶装置,精细化作业,适合多场景下的精细化涂胶、点胶工作,能够稳定、高效、准确完成涂胶过程,保证涂胶效果,极大减少工人重复性劳动,保护工人健康。

Paired with an intelligent dispensing device at the end effector, it enables precise operations and is suitable for precise gluing and dispensing tasks in various scenarios. It can achieve stable, efficient, and accurate adhesive application, ensuring the quality of the adhesive work. This greatly reduces repetitive labor for workers and protects their health.

## 传送带解决方案 Conveyor Belt Solution



- 提升工作安全性 Enhance work safety
- 实时监控与反馈 Real-time monitoring and feedback
- 降低错误率和损耗 Reduce error rate and losses
- 提高生产效率 Improve production efficiency
- 数据记录与溯源 Data recording and traceability
- 精确追踪与识别 Accurate tracking and identification



# COMMERCIAL APPLICATIONS

## 茶饮机器人

### Automated Tea Robot

节约人力成本, 替代人工, 提高工作效率; 冲泡茶饮口感一致, 改善不同人操作、不同时间点操作而带来的差异性; 具有表演性, 给消费者带来乐趣, 而员工可以去完成更有成就感、待遇更高的工作; 成本低, 快速回本, 经济效益好; 占地面积小, 坪效更高, 能适应多种新颖的创业模式。

协作机器人可以应用在多类型的新零售场景, 并且根据不同场景需求, 进行个性化定制。

Cooperative robots can be applied in various types of new retail scenarios and can be customized according to different scenario requirements. Benefits include:

Cost-saving: They replace manual labor, reducing manpower costs while increasing work efficiency.

Consistent tea brewing: They ensure consistent taste regardless of different operators or different time points, eliminating variations caused by human factors.

Entertainment value: The robotic performance brings enjoyment to consumers, while employees can focus on more fulfilling and higher-paying jobs.

Cost-effective: They have low costs and provide a quick return on investment, resulting in good economic benefits.

Small footprint: They occupy less space, resulting in higher space utilization and adaptability to various innovative business models.



## 康复解决方案

### Rehabilitation Solution

实现了上肢康复与下肢锻炼的一体化, 通过运动轨迹的复现, 降低了使用门槛。通过实时记录反馈数据, 显著提升安全性能。多种模式设定, 让康复治疗更有针对性, 显著提升康复效率。

It has achieved integration of upper limb rehabilitation and lower limb exercise, reducing the barrier to entry through the reproduction of motion trajectories. By recording real-time feedback data, it significantly enhances safety performance. With various mode settings, it makes rehabilitation treatment more targeted, leading to a significant improvement in rehabilitation efficiency.



## 艾灸解决方案

### Moxibustion Solution

完整复刻五大灸法, 提供悬停灸、雀啄灸、回旋灸、往复灸和循经灸, 降低艾灸门槛。经过最新认证, 搭配末端碰撞检测、温控、红外测距, 三重防护保障艾灸安全。内置吸入装置, 避免艾灸过程烟尘吸入。

- 极致安全
- 部署灵活
- 门槛降低
- 高效艾灸

It fully replicates the five major moxibustion techniques, offering hovering moxibustion, sparrow pecking moxibustion, rotating moxibustion, reciprocating moxibustion, and meridian moxibustion, thus reducing the barrier to entry for moxibustion. With the latest certifications, it is equipped with end collision detection, temperature control, and infrared distance measurement, providing triple protection to ensure the safety of moxibustion.

It also has a built-in suction device to prevent inhalation of smoke and dust during the moxibustion process.

- Ultimate safety
- Flexible deployment
- Lower barrier to entry
- Efficient moxibustion



## COMPANY PROFILE

### 公司简介



# FAIRINO ROBOT

**FAIRINO**，优先实现全核心零部件自主研发的协作机器人公司。

我们关注用户体验，致力于为行业提供便利的深度智能系统解决方案。

我们为行业客户提供定制化的部件、整机及系统，开放的开发平台为我们的合作伙伴提供更多的便捷和可能。

与伙伴和客户共同高速成长，为伙伴和客户提供超额价值。

欢迎来到FAIRINO的智能世界。

**FAIRINO** is the collaborative robot company who has achieved independent R&D of all core components.

We focus on user experience and are dedicated to offering the industry with artificial intelligent robot system.

We provide customized components, complete machines and systems for industry customers, the open development platform provides more convenience and possibility for our partners.

FAIRINO, as always, provides values and grow together with customers and partners.

Welcome to the intelligent world of FAIRINO.

随着智能制造时代的到来，许多行业迈入“智能”行列，协作机器人能为其做什么呢？

协作机器人为企业用户降本增效，提升员工技能；为商业用户提供更优质服务，优化客户使用体验；为手工业者制定标准化流程，降低制作成本；为家庭成员分担家务，辅助清洁，烹饪工作。

相信协作机器人具有无限潜力，未来可以应用到更多的场景里。

Lots of manufacturers have begun taking advantage of AIoT and human-robot collaboration. What can collaborative robots do for them?

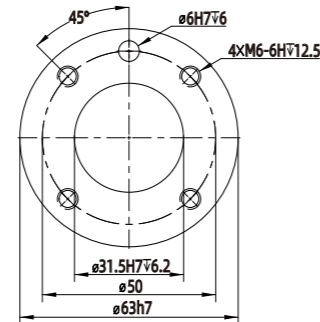
Collaborative robots decrease manufacturing costs, increase the efficiency of production and enhance the skills of employees. They also offer better service quality and improve the customer experience. By providing the standardized functions and low deploying costs, cobots are widespread in commercial scenarios such as household chores, room cleaning and cooking.

Cobots are believed to have unlimited potential and would be introduced to more scenarios in the future.

# DRAWINGS

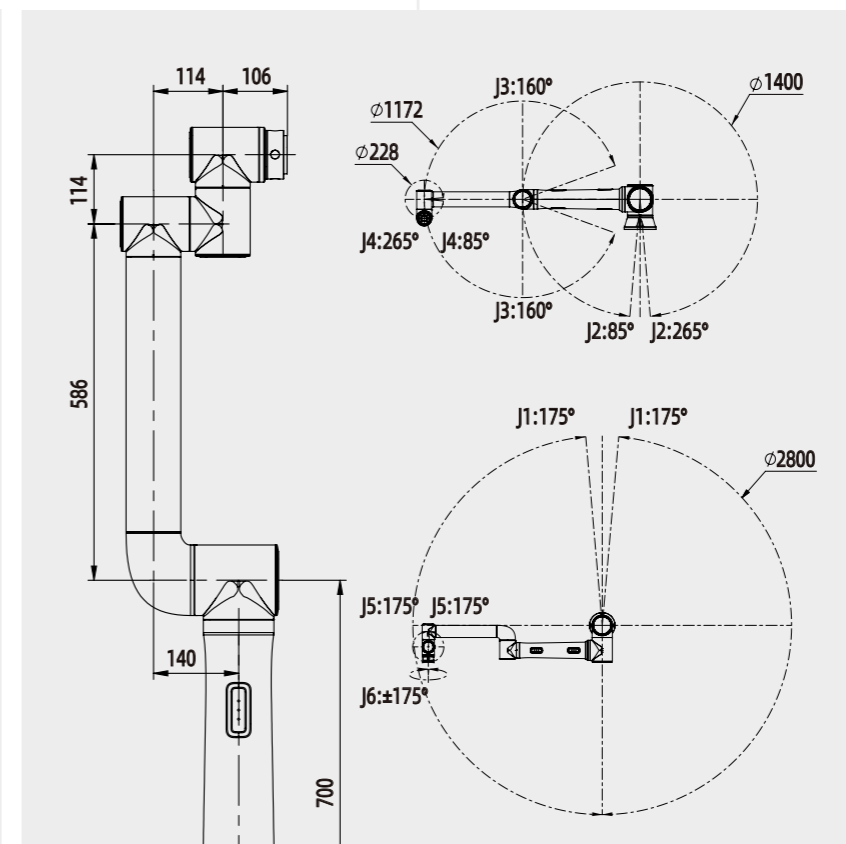
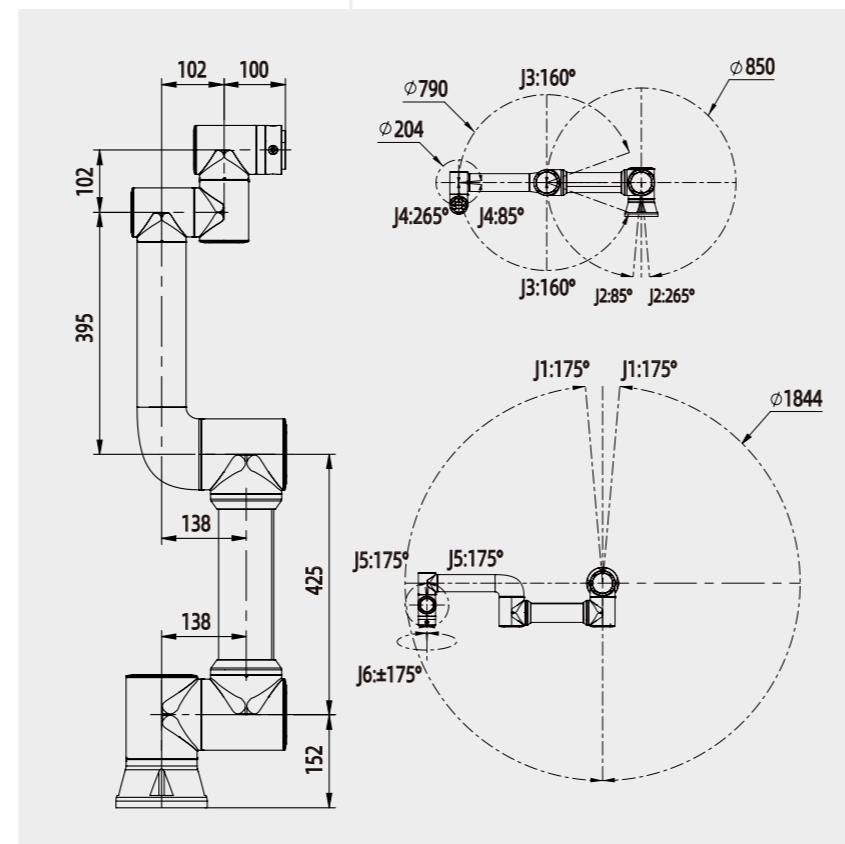
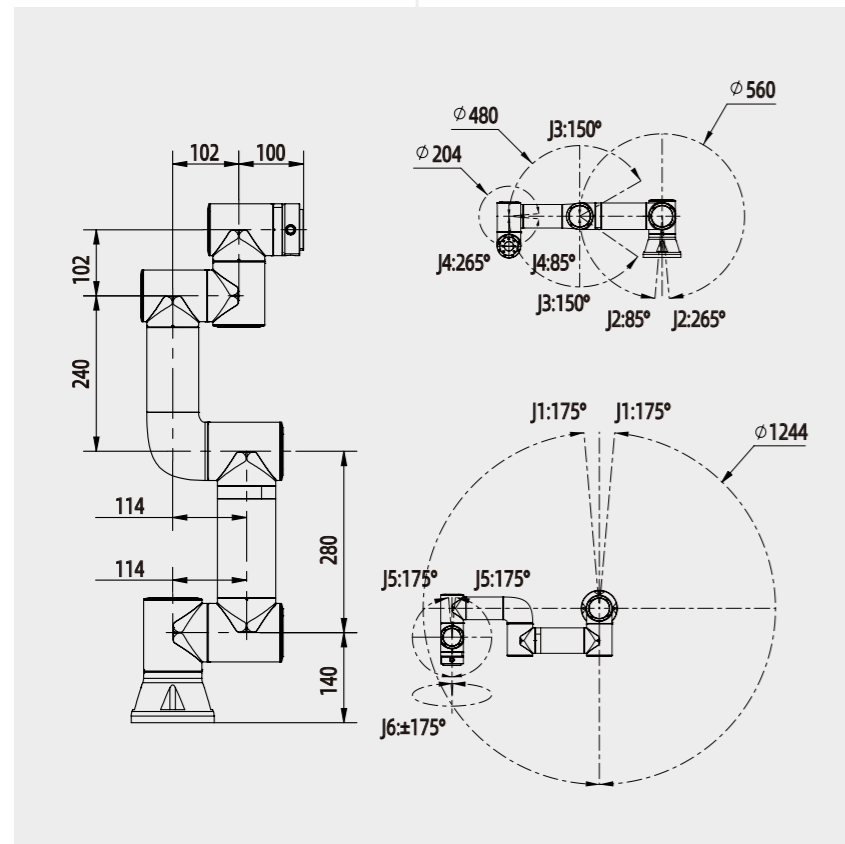
## 技术图纸

单位(Unit) : mm



▶ 机器人末端  
均采用国际标准

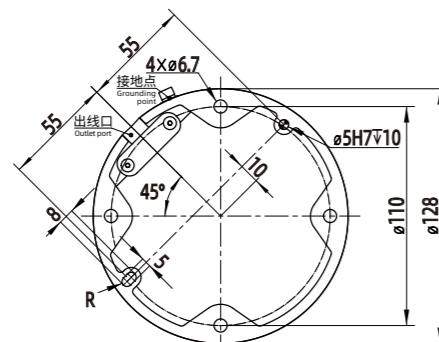
ROBOT END-EFFECTOR COMPATIBLE WITH  
INDUSTRIAL ROBOT END-EFFECTOR CONNECTION METHODS



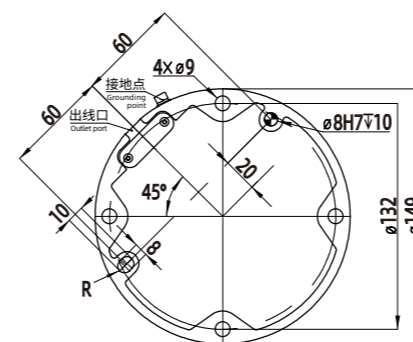
FR3

FR5

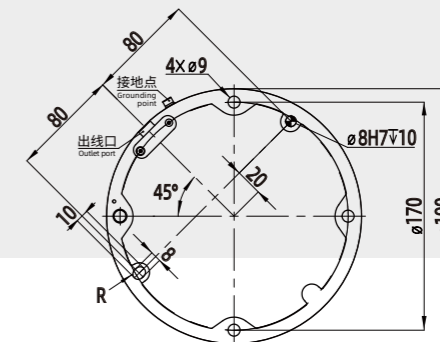
FR10



FR3 基座图  
Pedestal diagram



FR5 基座图  
Pedestal diagram

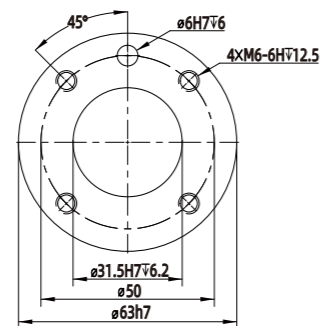


FR10 基座图  
Pedestal diagram

# DRAWINGS

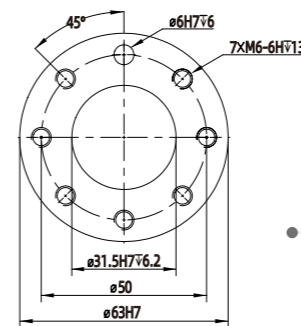
## 技术图纸

单位(Unit) : mm



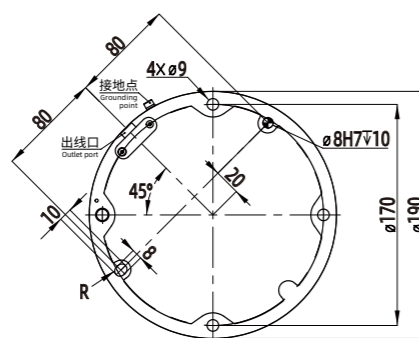
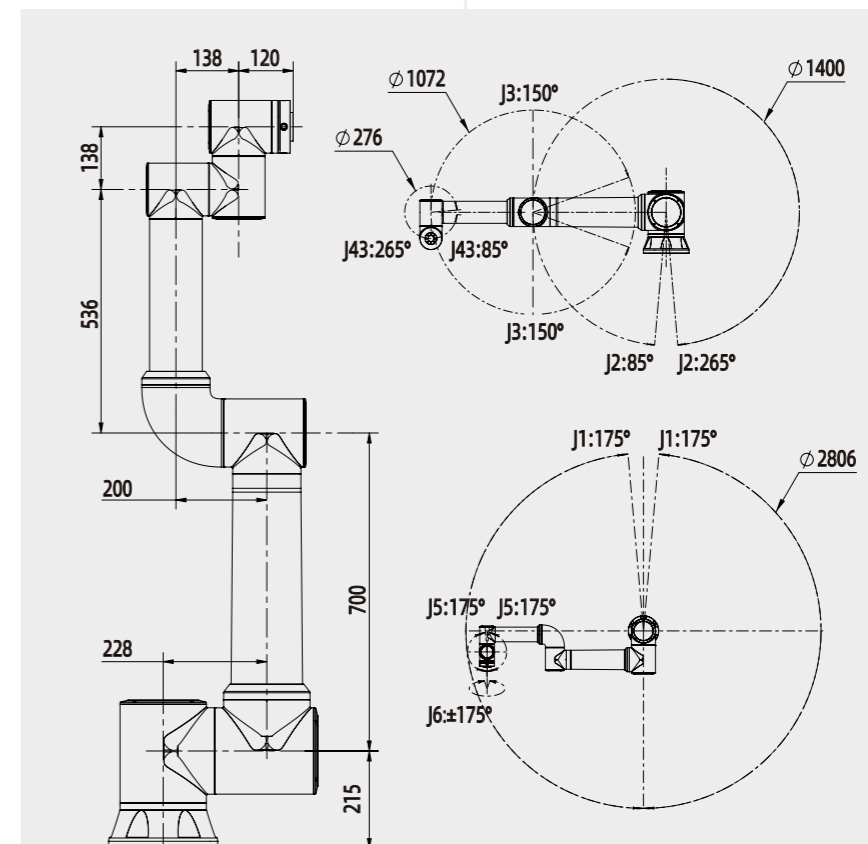
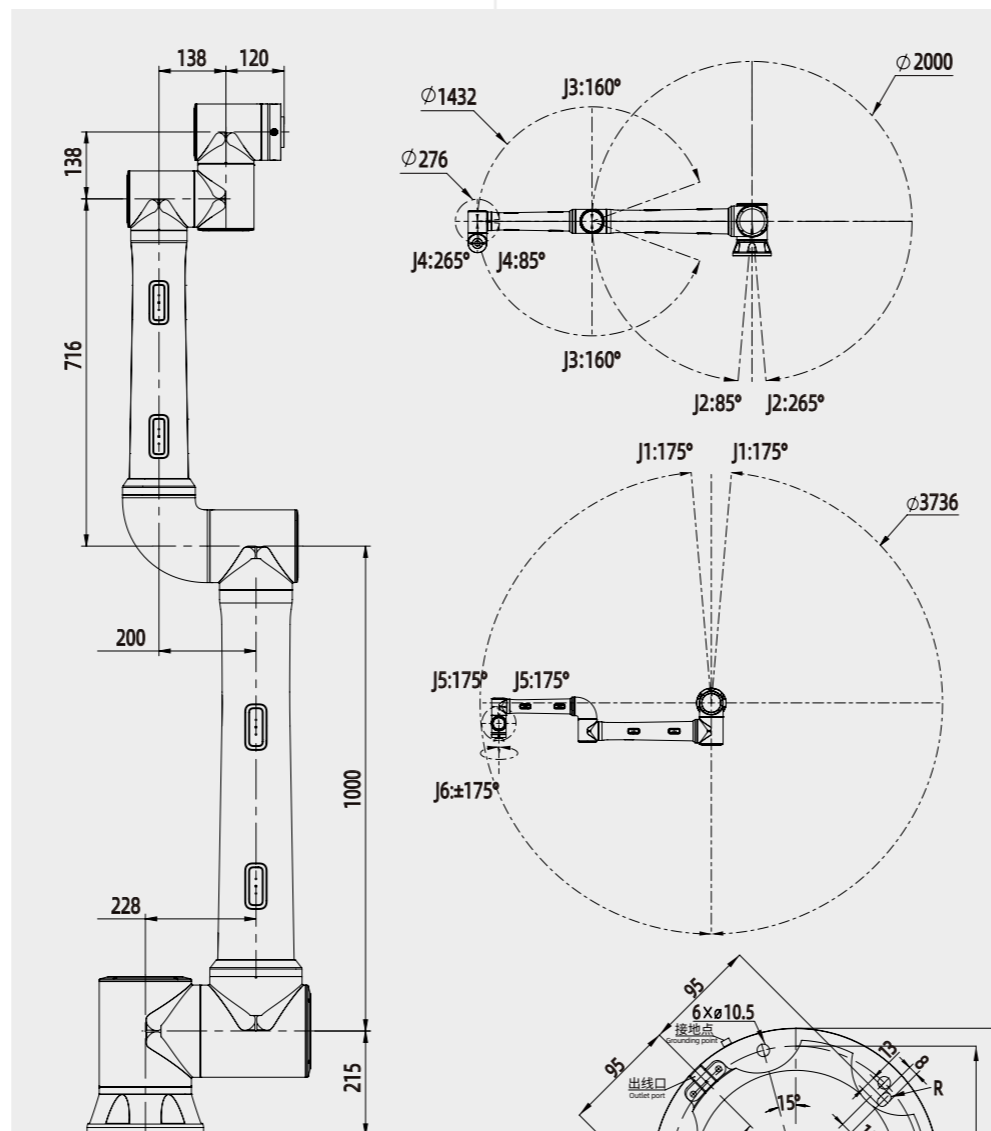
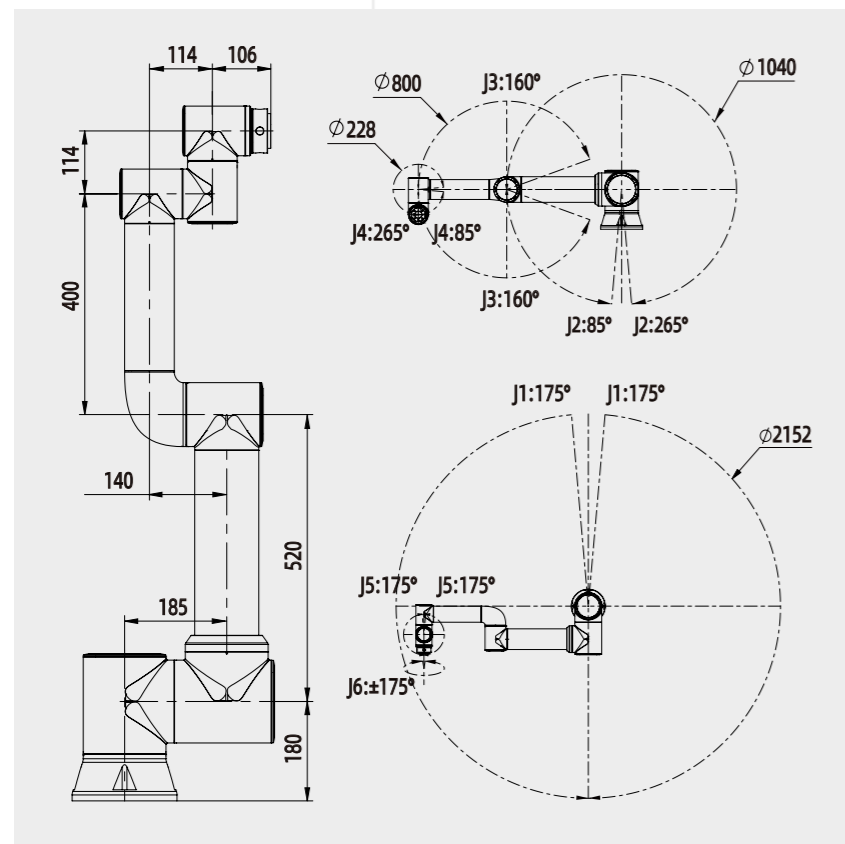
▶ 机器人末端均采用国际标准

ROBOT END-EFFECTOR COMPATIBLE WITH INDUSTRIAL ROBOT END-EFFECTOR CONNECTION METHODS

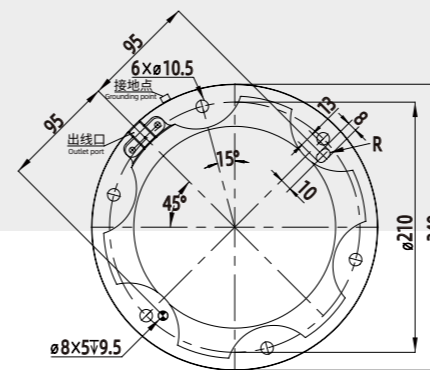


▶ 机器人末端兼容工业机器人末端连接方式

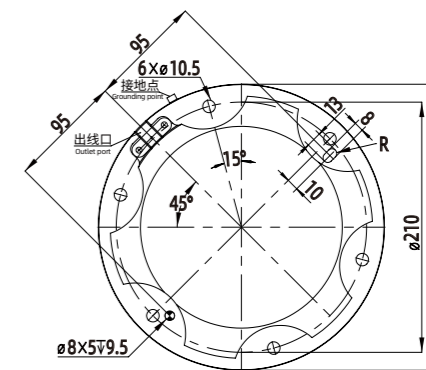
ROBOT END-EFFECTOR COMPATIBLE WITH INDUSTRIAL ROBOT END-EFFECTOR CONNECTION METHODS



FR16 基座图  
Pedestal diagram



FR20 基座图  
Pedestal diagram



FR30 基座图  
Pedestal diagram