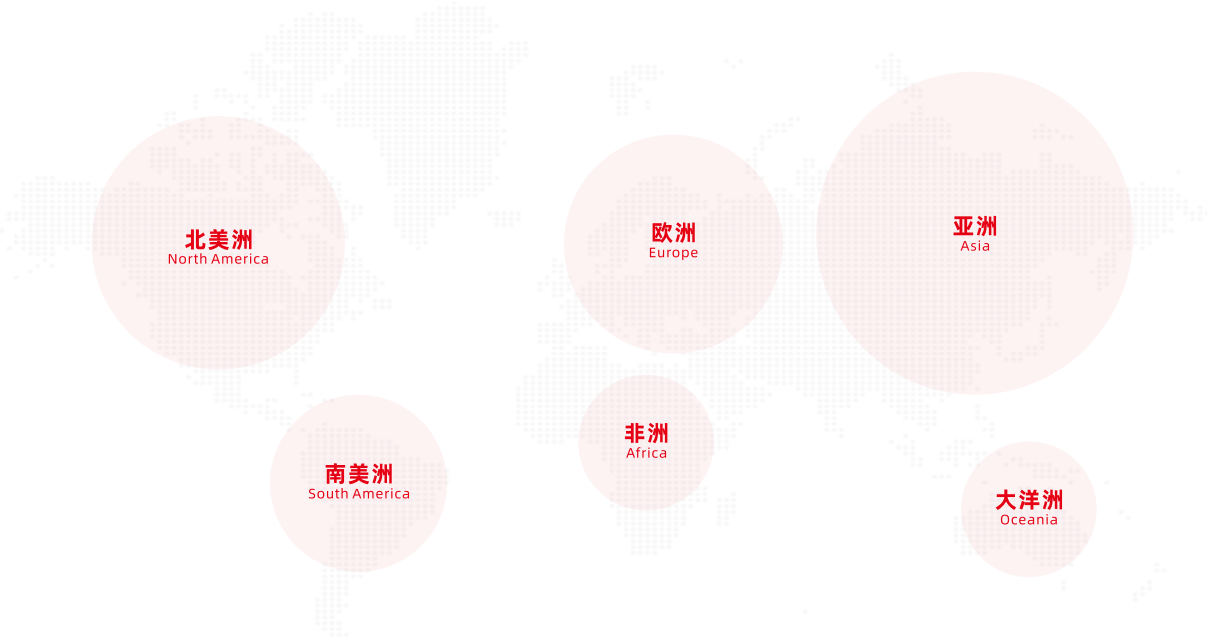




四川天链机器人股份有限公司
SICHUAN TLIBOT Co.,Ltd



VERSION: 250519

四川天链机器人股份有限公司
SICHUAN TLIBOT Co.,Ltd



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公众号
Official Account



B站
Bilibili



抖音号
TikTok

四川天链机器人股份有限公司
SICHUAN TLIBOT Co.,Ltd

公司简介

Company Profile

四川天链机器人股份有限公司（川机器人，835015），成立于 2012 年，由胡天链先生率领的创业团队孵化而来，该团队曾在胡天链先生的带领下，斩获ROBOCON大学生机器人大赛国内冠军、国际亚军及最佳技术奖，并于 2015 年在新三板挂牌上市。

公司主要从事人形机器人、协作机器人及谐波减速机等机器人核心零部件的研发、生产、销售，并提供机器人技术服务和行业化解决方案。

SICHUAN TLIBOT Co., Ltd. (Stock Code, 835015), founded in 2012, is incubated by an entrepreneurial team led by Mr.Tianlian Hu. Under the leadership of Mr. Tianlian Hu, the team won the domestic championship, international runner-up and best technology award in the college student robot competition of ROBOCON, and was listed on the New Third Board in 2015.

The company is mainly engaged in the research and development, production and sales of humanoid robots, collaborative robots and core robot components such as harmonic reducers, and provides robot technology services and industry solutions.

公司荣誉

Company Honors



>>>> 荣誉/Honor

国家高新技术企业	National High-Tech Enterprise
“专精特新”企业	SMEs in Specialized New Sectors
青年文明号	Youth Civilization
市级企业技术中心	Municipal Enterprise Technology Center
行业标准主要起草单位	Main Drafting Unit of Industry Standards



>>>> 专利/Patent

75+	发明专利	Patent for invention
79+	实用新型专利	Utility model patents
8+	外观专利	Appearance patent
16+	软件著作权	Software copyright



>>>> 认证/Certification

IAF
ISO9001
CNAS
GJB
CE等多项认证/CE and others

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Bearing wear-resistant	

-02

Product Application

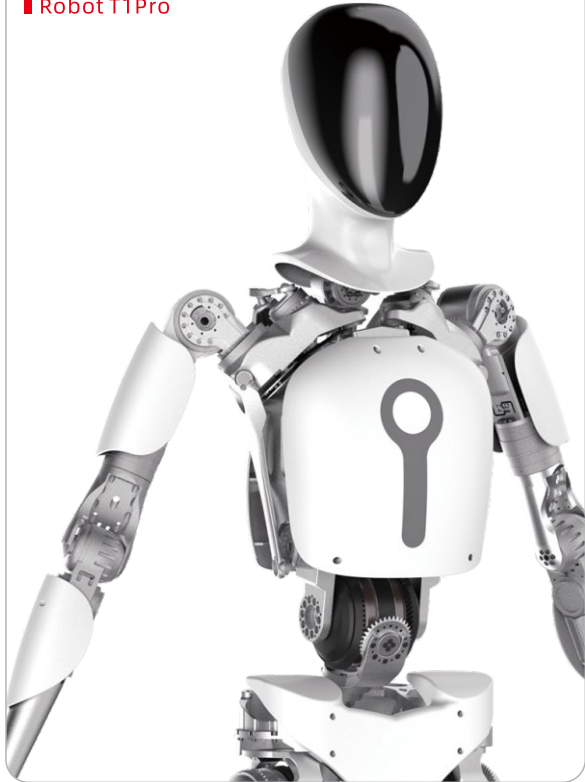
产品应用场景

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人形机器人-天链T1Pro

Humanoid Robot-TLIBOT T1 Pro

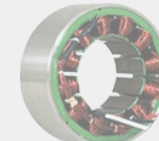
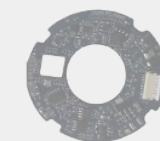
天链首款

人形机器人 T1Pro
TLIBOT First Humanoid
Robot T1Pro

天链机器人自主研发的人形机器人T1Pro，身高约1.60m，全身自由度71个，重量43kg，关节最大扭矩达到450Nm，手臂单臂负载8kg，最大负载16kg，负重深蹲突破145kg。关节活动范围可以达到舞蹈演员的活动灵活度，其中髋关节具备-25°~142°的运动范围，膝部关节具备-10°~155°的运动范围，腰部左右具备±45°运动范围，腰部前后具备±90°运动范围。关节角速度达到720°/s，部分关节可达到900°/s。机器人最大行走速度8km/h。

The TLIBOT humanoid robot T1 Pro, independently developed by TLIBOT, is about 1.60 meters tall, has 71 DoF, weighs 43 kg, has a max.torque of 450Nm, a single arm load of 8kg, a max.load of 16kg, and a weighted squat of over 145kg. The range of joint motion can reach the flexibility of a dancer, with the hip joint having a range of motion of -25°~142°, the knee joint having a range of motion of -10°~155°, the waist having a range of motion of ±45° left and right, and the waist having a range of motion of ±90° front and back. The joint angular velocity reaches 720°/s, and some joints can reach 900°/s. Maximum walking speed is 8km/h.

全产业链自研自产

Self research and production throughout
the entire industry chain控制器
Controller行星丝杠
Planetary Screw减速机
Harmonic Reducer电机
Motor驱动器
Driver编码器
Encoder制动器
Brake

目前已在机器人相关领域获得发明专利50余项，总专利数近200项。

At present, it has obtained more than 50 invention patents in the field of robots, and the total number of patents exceeds 150.

产品特点

Product Feature

操控智能
Control Intelligence

多平台操控APP智能交互，轻松上手
Multi-platform control APP intelligent interaction, easy to use

续航时间长
Long battery life

1250Wh的电池容量，超长续航能力
1250Wh battery capacity, ultra-long battery life

负载力大
Large load capacity

单腿负重可达65kg，双腿负重可达145kg
The weight of one leg can reach 65kg, and the weight of both legs can reach 145kg

灵活性好
Good flexibility

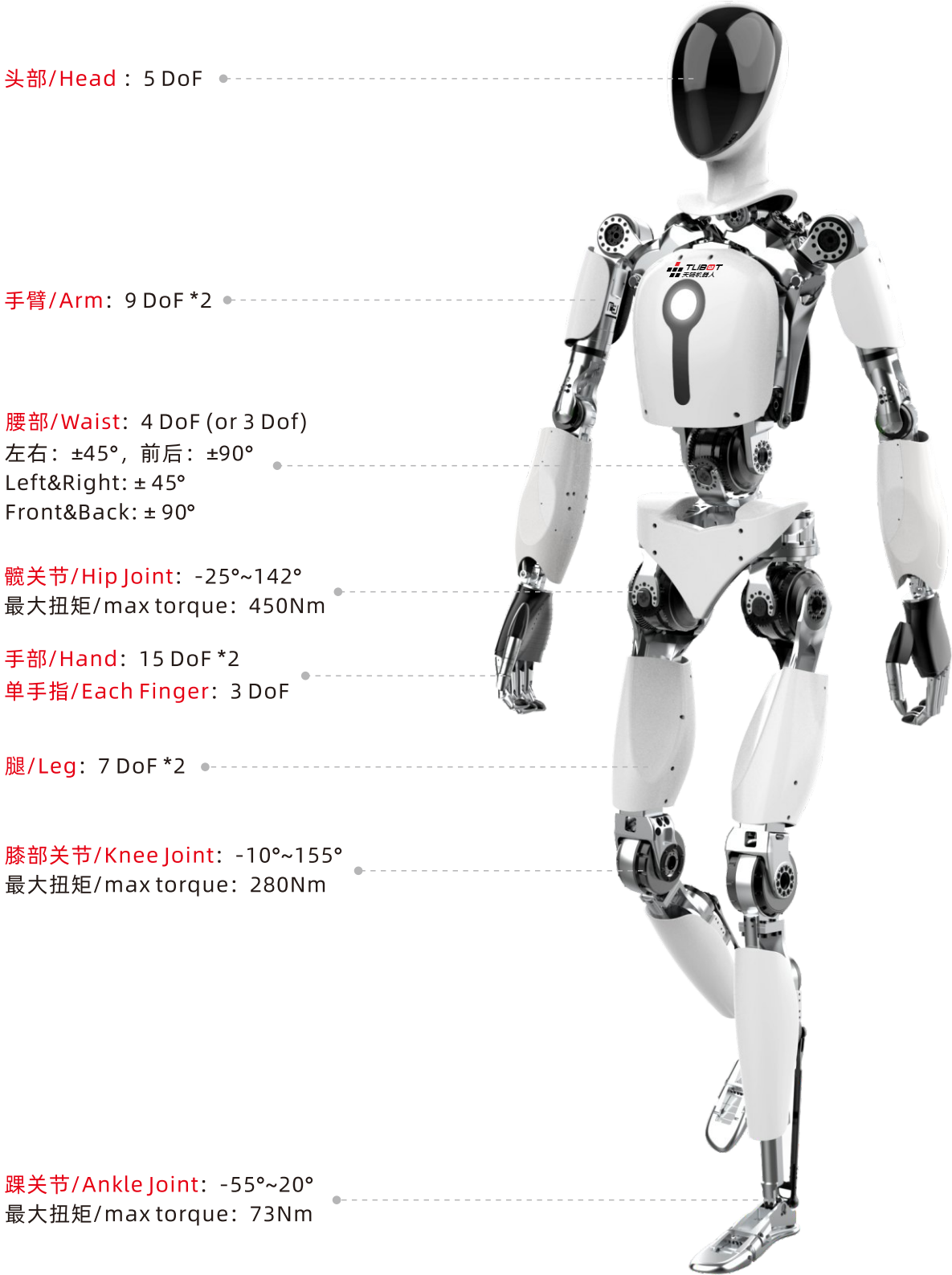
71个自由度，更接近人的灵动感
71 DoF, Closer to human agility

自动避障
Automatic obstacle avoidance

3D视觉+激光雷达识别灵活避障
3D vision and laser radar recognition, automatic obstacle avoidance

动作模拟训练
Action Simulation Training

全身71个自由度
71 Degree of Freedom



天链T1Pro技术参数表
TLIBOT T1 Pro Technical Parameter

身高/Height	160cm
体重/Weight	43kg
自由度/DoF	腿7*2, 臂9*2, 颈5, 腰4 (或3) , 灵巧手5*3*2 (选配) Leg7*2, Arm9*2, Neck5, Waist4 or 3, Multi-fingered hand5*3*2 (optional)
导航/Navigation	激光Slam导航+视觉 Laser Slam Navigation + Vision
负载/Load	手臂负载: 伸展状态单臂8kg,最大负载16kg 下肢负载: 深蹲负重 $\geq 100\text{kg}$,深蹲负重突破145kg Arm load: a single arm load of 8 kg in extend state, maximum load of 16kg Legs load: Squat load $\geq 100\text{kg}$, Squat weight exceeds 145kg
行走/Walking	最大行走速度/Max. walking speed: 8km/h 最大不平整适应/Max. unevenness adaptation: 5cm 最大上下台阶高度/Max. step height: 20cm
伺服关节/Servo Joint	Tmax=450Nm; Vmax=150rpm
接口/Interface	雷电4接口*2, USB3.2*2 Thunderbolt 4 port*2,USB3.2*2
电源/Power Supply	锂电池44.4V/25Ah/4.2Kg 充电2.5h, 使用 (综合工况) 4h Li battery44.4V/25Ah/4.2kg Charging 2.5h,using 4h (Comprehensive working conditions)
通讯方式/Communication Mode	CAN总线 CAN Bus
操作系统/Operating System	Ubuntu+LinuxRT Preempt+Android
处理器/Processor	Intel i7 13代 Intel i7 13Generation
网络/Internet	Intel 2.5G以太网接口 Intel Wi-Fi 6E无线网卡, 蓝牙5.3 Intel 2.5G Ethernet interface Intel Wi-Fi 6E Wireless LAN,bluetooth 5.3
仿真平台/Simulation Platform	Mujoco 、Isaac-Gym

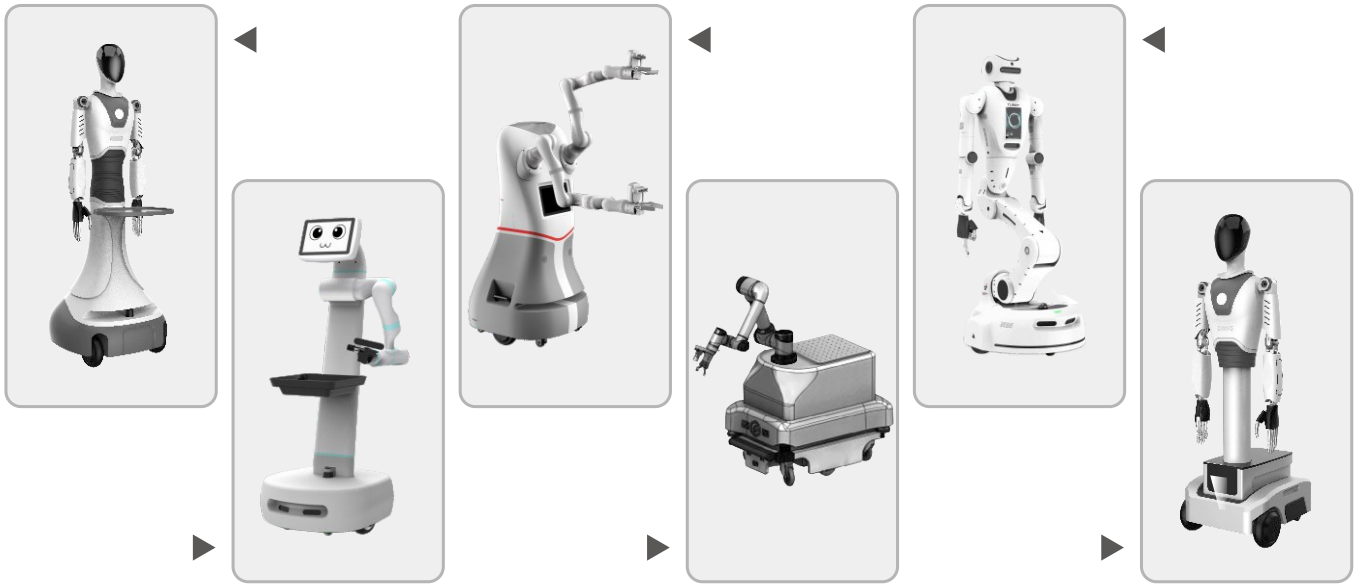
复合机器人
Composite Robot

复合机器人简介
Introduction to Composite Robot

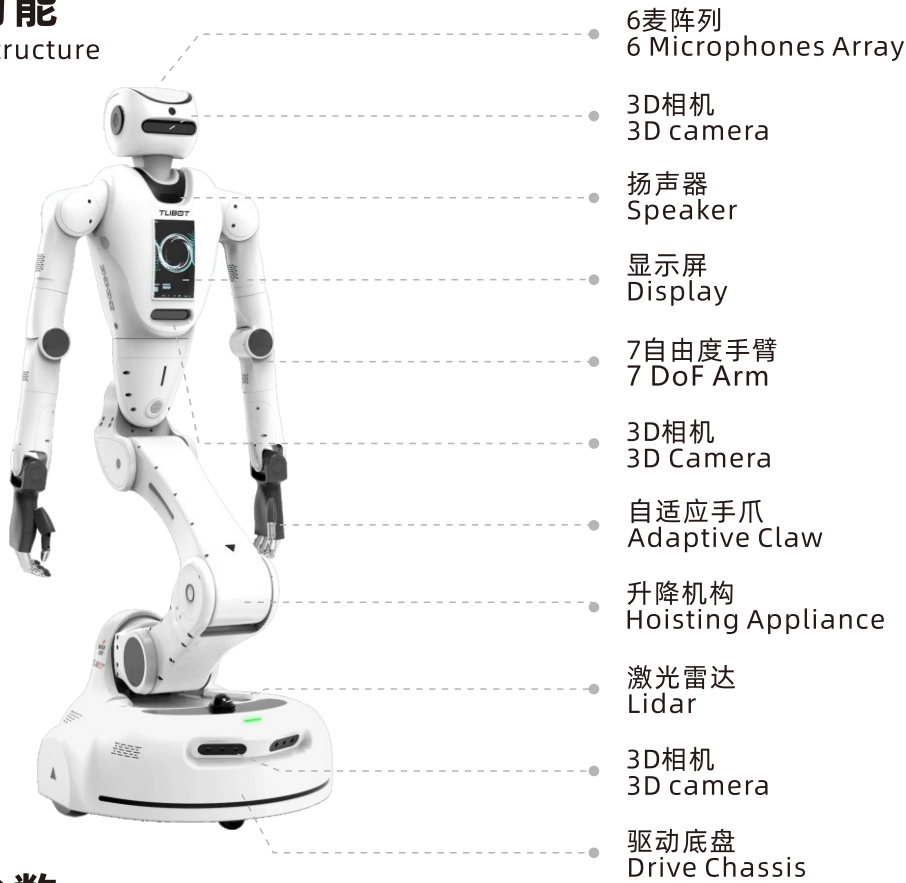
天链复合机器人，是集成移动机器人、协作机器人于一体的智能平台。整体轻巧灵活，双臂可独立操作或协同作业，具备语音交互、定向拾音、终端选购商品，实现自动抓取物体到指定位置等功能，能够高效的完成工作要求。可快速布置于无人零售、无人智能充电站、自动化工厂、仓储物流、档案室、娱乐表演、餐饮酒店服务、家庭服务、教育培训等应用场景。

The TLIBOT composite robot is an intelligent platform that integrates mobile robots and collaborative robots. It is lightweight and flexible, and its two arms can operate independently or collaboratively. It has functions such as voice interaction, directional sound recognition, terminal goods procurement, and automatic grabbing of objects to designated locations, and can efficiently complete work requirements. It can be quickly deployed in unmanned retail, unmanned smart charging stations, automated factories, warehousing and logistics, archives, entertainment performances, catering and hotel services, family services, education and training, and other application scenarios.

定制产品
Customized Products



产品功能
Product Structure



产品参数
Product Parameter

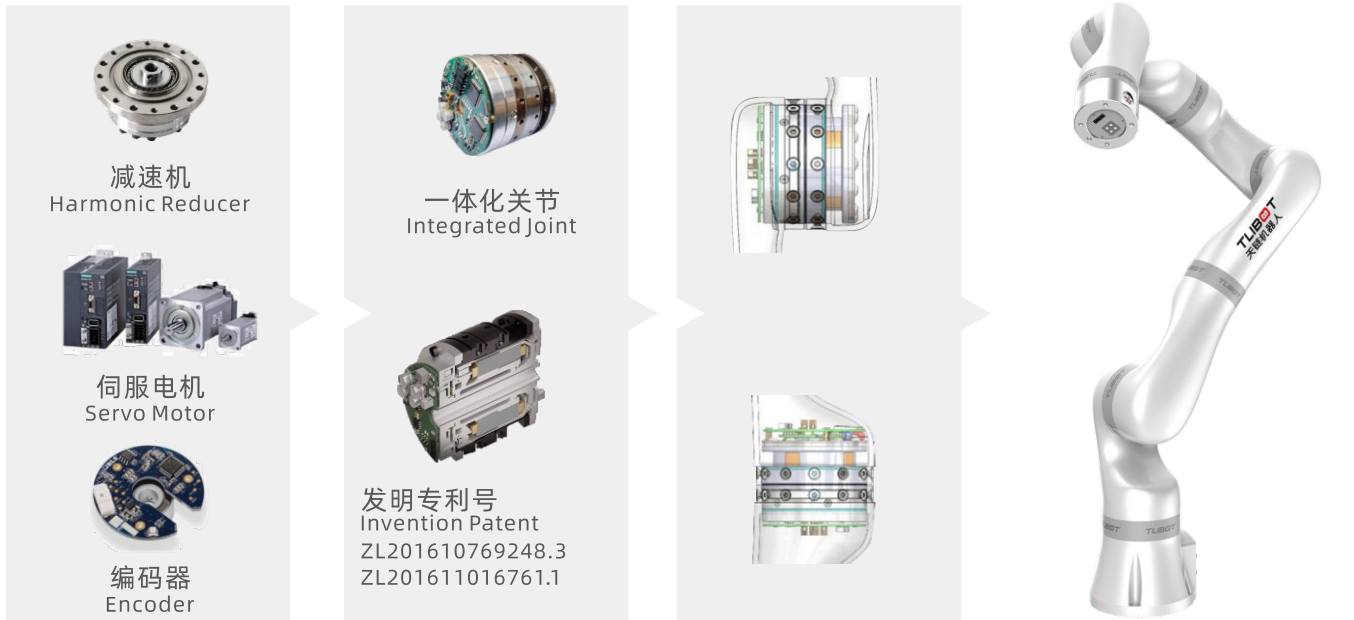
重量 Weight	≤90kg	导航方式 Navigation	激光Slam导航 Laser Slam Navigation
机械臂本体重量 Arm weight	6.5kg	避障方式 Obstacle avoidance method	激光+视觉 Laser + Vision
机械臂数量 Arm quantities	2	充电电压 Charging Voltage	AC220V
单机械臂臂展 Single robotic arm span	≥550mm	目标定位方式 Target positioning method	视觉识别 Visual recognition
单机械臂负载 Single arm load	5kg	最大越障 Maximum obstacle clearance	15mm
机械臂重复定位精度 Robot arm repeat positioning accuracy	±0.05mm	速度 Speed	0-1.5m/s可调 0-1.5 m/s (adjustable)
单机械臂自由度 Single arm DoF	7	运行时长 Running time	8h
视觉定位精度 Visual positioning accuracy	±0.5mm	对外接口 External interface	网口、USB、HDMI Net gape,USB,HDMI
底盘定位精度 Chassis positioning accuracy	±2mm		

超轻量协作机器人

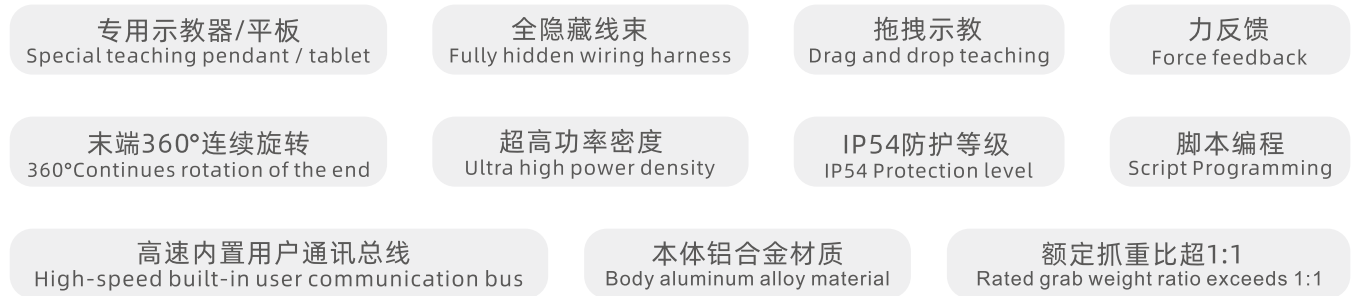
Ultra-light Collaborative Robot

极限负载，超自重2倍
Extreme load, 2 times of its own weight

本体构成
Component



产品特点
Product Features



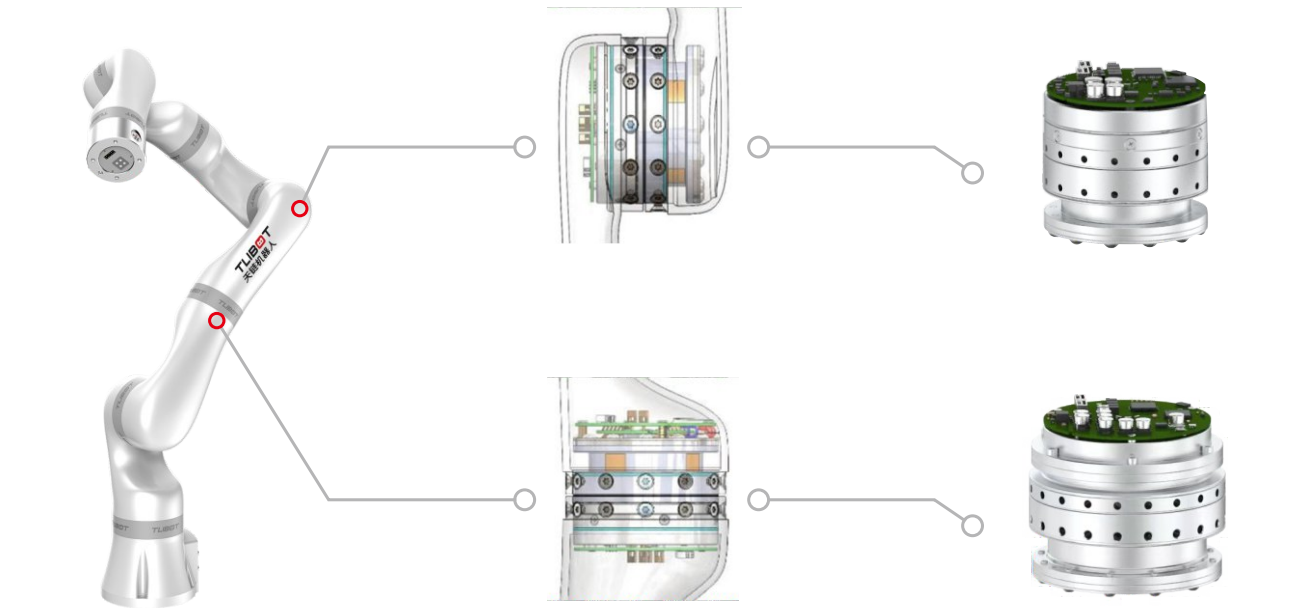
产品参数
Product Parameter

项目/Project		TCB605	TCB705	TCB610	TCB710
自由度 DoF		6	7	6	7
本体重量 Weight		5.9kg	6.6kg	8.95kg	9.95kg
额定负载 Rated Load		5kg	5kg	10kg	10kg
有效工作半径 Effective Working Radius		500mm	500mm	600mm	600mm
最大工作半径 Maximum Working Radius		653mm	653mm	761.5mm	761.5mm
重复定位精度 Repeated Positioning Accuracy		±0.05mm	±0.05mm	±0.05mm	±0.05mm
供电电压 Supply Voltage		DC48V	DC48V	DC48V	DC48V
平均功率 Average Power		160W	180W	240W	260W
编码器 Encoder		双/Dual	双/Dual	双/Dual	双/Dual
运动范围 Activity Range	关节J1 JointJ1	±180°	±180°	±180°	±180°
	关节J2 JointJ2	±135°	±135°	±135°	±135°
	关节J3 JointJ3	±140°	±180°	±140°	±180°
	关节J4 JointJ4	±180°	±140°	±180°	±140°
	关节J5 JointJ5	±130°	±180°	±130°	±180°
	关节J6 JointJ6	±180°	±130°	±180°	±130°
	关节J7 JointJ7	/	±180°	/	±180°
最大速度 Maximum Speed	关节J1 JointJ1	180°/s	180°/s	180°/s	180°/s
	关节J2 JointJ2	180°/s	180°/s	180°/s	180°/s
	关节J3 JointJ3	225°/s	225°/s	225°/s	225°/s
	关节J4 JointJ4	225°/s	225°/s	225°/s	225°/s
	关节J5 JointJ5	225°/s	225°/s	225°/s	225°/s
	关节J6 JointJ6	225°/s	225°/s	225°/s	225°/s
	关节J7 JointJ7	/	225°/s	/	225°/s

超轻量一体化关节
Ultralight Integrated Joint

创新性的将伺服电机与特制谐波减速机高度集成，具备极高的功率密度。主要应用于机器人领域，其尺寸和重量均达到普通同规格一体化关节的1/2及以下，可大幅度降低协作机器人的尺寸和本体重量。

The servo motor and the special harmonic reducer are innovatively highly integrated, with extremely high power density. Mainly used in the field of robots, its size and weight are 1/2 or less of the ordinary integrated joints of the same specification, which can greatly reduce the size and weight of collaborative robots.



协作机械臂
Collaborative robot

机器人关节
Robot joints

高度集成一体化关节
Highly integrated joint

- 关节主体结构具备IP54防护等级，可实现360度连续旋转，拓展应用范围。
The main structure of the joint has an IP65 protection level and can achieve 360-degree continuous rotation,expanding the scope of applications.
- 适用于抓重在5-10kg，臂展500-1000mm的轻量机械臂，可实现全臂展抓重比超过1:1的超轻量协作机器人。
It is suitable for lightweight robotic arms with a grasping weight of 5-10 kg and an arm span of 500-1000 mm.It can achieve an ultra-lightweight collaborative robot with a full-arm span grasping to weight ratio exceeding 1:1

技术参数
Technical Parameter

项目 / PROJECT	TSJ17				TSJ20				TSJ25			
谐波减速比(可选) Reduction Ratio(optional)	50	80	100	120	80	100	120	160	80	100	120	160
额定扭矩(Nm) Rated Torque	17	23	25	25	36	42	42	42	66	70	70	70
允许启停峰值扭矩(Nm) Allowable Start-Stop Peak Torque	35	45	56	56	77	85	90	96	142	163	174	183
重复定位精度(') Repeated Positioning Accuracy	1				1				1			
电机额定转速(RPM) Motor Rated Speed	3000				3000				3000			
电机瞬时最高转速(RPM) Motor Instantaneous Maximum Speed	4500				3500				3500			
电机额定功率(W) Motor Rated Current	60				150				2600			
额定电压(V) Rated Voltage	48				48				48			
额定电流(A) Rated Current	2.3				4.3				7.6			
重量(kg) Weight	0.58				0.8				1.25			
输入端编码器 Input Encoder	19bit单圈绝对值，18bit多圈绝对值 19-bit single-turn absolute value, 18-bit multi-turn absolute value											
通讯总线 Communication Bus	Ethercat(可选配RS485/CAN/CAN FD) EtherCat (RS485/CAN/CAN FD optional)											
内置制动器 Built-in Brake	齿啮合式电磁制动 Gear meshing electromagnetic brake											

参数对比表
Parameter Comparison

技术参数 Technical Parameters	超轻量一体化关节对比常规一体化关节 Ultralight Integrated Joint VS Conventional Integrated Joints					
	TSJ17	常规-17 Conventional-17	TSJ20	常规-20 Conventional-20	TSJ25	常规-25 Conventional-25
额定扭矩(Nm) Rated Torque	17/23/25	21/29/31	36/42	52/78	60/70	51/82/87
外径(mm) Outer Diameter	66	80	78	90	92	110
重量(kg) Weight	0.58	1.25	0.8	1.875	1.25	3.06
额定扭矩密度(Nm/kg) Rated Torque Density	44.64	24.8	57.77	27.8	68.5	32.46
最大扭矩密度(Nm/kg) MaximumTorque Density	125	56	116.66	57.2	149.6	76.49
额定功率密度(W/kg) Rated Power Density	150.00	116.80	200.00	160.00	245.67	245.10

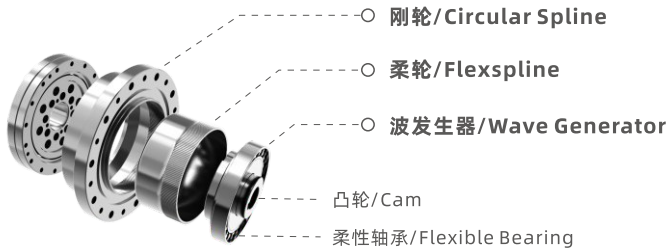
谐波减速机
Harmonic Reducer

谐波传动装置的构成

Composition of a harmonic reducer

谐波传动装置主要由三个基本零部件构成，即波发生器、柔轮、刚轮。

The harmonic reducer is mainly composed of three basic components, namely the wave generator, the flexspline and the circular spline.



谐波减速机常用减速比

Common Reduction Ratio for Harmonic Reducers

范例 √: 有/可定制 - : 无
Eg: √: Have or customize - : Don't have

结构类型 Structure Type	型号大小 Model Size	标准扭矩机型减速比 Standard Torque Ratio						高扭矩机型减速比 High Torque Ratio					定制减速比 Customized Ratio
		30	50	80	100	120	160	50	80	100	120	160	
标准机型 Standard Model	5	√	√	√	√	-	-	-	-	-	-	-	√
	8	√	√	√	√	-	-	-	-	-	-	-	√
	11	√	√	√	√	-	-	-	-	-	-	-	√
	14	√	√	√	√	-	-	√	√	√	-	-	√
	17	√	√	√	√	√	-	√	√	√	√	-	√
	20	√	√	√	√	√	√	√	√	√	√	√	√
	25	√	√	√	√	√	√	√	√	√	√	√	√
	32	√	√	√	√	√	√	√	√	√	√	√	√
	40	-	√	√	√	√	√	√	√	√	√	√	√
	45	-	√	√	√	√	√	√	√	√	√	√	√
	50	-	√	√	√	√	√	√	√	√	√	√	√
	58	-	√	√	√	√	√	√	√	√	√	√	√
	65	-	√	√	√	√	√	√	√	√	√	√	√
	80	-	√	√	√	√	√	√	√	√	√	√	√
	90	-	√	√	√	√	√	√	√	√	√	√	√
	100	-	√	√	√	√	√	√	√	√	√	√	√
超薄机型 Ultra-thin Model	5	√	√	√	√	-	-	-	-	-	-	-	√
	8	√	√	√	√	-	-	-	-	-	-	-	√
	11	√	√	√	√	-	-	-	-	-	-	-	√
	14	-	√	√	√	-	-	-	-	-	-	-	√
	17	-	√	√	√	√	-	-	-	-	-	-	√
	20	-	√	√	√	√	√	-	-	-	-	-	√
	25	-	√	√	√	√	√	-	-	-	-	-	√
	32	-	√	√	√	√	√	-	-	-	-	-	√
	40	-	√	√	√	√	√	-	-	-	-	-	√
	45	-	√	√	√	√	√	-	-	-	-	-	√
	50	-	√	√	√	√	√	-	-	-	-	-	√

关于定制减速比：定制减速比的大小请咨询本公司技术人员或授权代理商
About customized ratio: Please consult our technicians or authorized agents for customized reduction ratio

技术参数

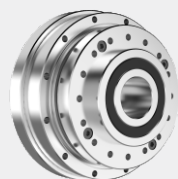
Technical Parameters

范例 ◎:极好 ○:优良 △:良好

Eg: ◎:Great ○:Good △:Fine

	系列名称 Series Name		产品特征/Product Characteristic									
			可变选项 Variable Options		转矩·重量比 Torque : Weight ratio	扭转刚度·力矩刚性 Torque Rigidity : Momental Rigidity	施转精度 Turning precision	轻量 Lightweight	扁平形状 Flat shape	中空构造 Hollow structure	定制 custom-made	使用寿命 Service life
			峰值扭矩 (Nm) Peak Torque	减速比 Reduction Ratio								
标准组件型 Standard Component Type	FHS-CJ	标准凸轮廓型 Standard Cam Hat Type	9 ~ 2656	30 ~ 160	○	◎	◎	○	○	—	◎	○
	FHS-CO	标准十字滑座帽型 Standard Cross Slide Hat Type	9 ~ 2656	30 ~ 160	○	◎	◎	○	○	—	◎	○
	FCS-CJ	标准凸轮廓杯型 Standard Cam Cup Type	9 ~ 2656	30 ~ 160	○	○	◎	○	○	△	○	○
	FCS-CO	标准十字滑座杯型 Standard Cross Slide Cup Type	9 ~ 2656	30 ~ 160	○	○	◎	○	○	△	○	○
	FCD-C	超薄杯型 Ultra-thin Cup Type	12 ~ 823	50 ~ 160	◎	◎	◎	○	◎	◎	○	○
标准组合型 Standard Combination Type	FHS-AH	标准中空帽型 Standard Hollow Hat Type	9 ~ 2656	30 ~ 160	○	◎	◎	△	△	◎	○	○
	FHS-AJ	标准中轴帽型 Standard Centre Shaft Hat Type	9 ~ 2656	30 ~ 160	○	◎	◎	△	△	—	○	○
	FHS-SJ	标准凸轮廓型 Standard Cam Hat Type	9 ~ 2656	30 ~ 160	○	◎	◎	○	○	—	◎	○
	FHS-SO	标准十字滑座帽型 Standard Cross Slide Hat Type	9 ~ 2656	30 ~ 160	○	◎	◎	○	○	—	◎	○
	FHS-SH	标准简易中空帽型 Standard Simple Hollow Hat Type	9 ~ 2656	30 ~ 160	○	◎	◎	○	○	◎	◎	○
	FCS-AJ	标准凸轮廓杯型 Standard Cam Cup Type	9 ~ 2656	30 ~ 160	○	○	◎	○	○	△	○	○
	FCS-AO	标准十字滑座杯型 Standard Cross Slide Cup Type	9 ~ 2656	30 ~ 160	○	○	◎	○	○	△	○	○
	FCD-AH	超薄中空杯型 Ultra-thin Hollow Cup Type	12 ~ 453	50 ~ 160	◎	◎	◎	○	◎	◎	○	○
	FCD-AJ	超薄小径杯型 Ultra-thin Small Diameter Cup Type	12 ~ 823	50 ~ 160	◎	◎	◎	○	◎	○	○	○
	FHD-SH	超薄简易中空型 Ultrathin Simple Hollow Type	12 ~ 453	50 ~ 160	◎	○	◎	◎	◎	◎	◎	○
高扭组件型 High Torque Component Type	FHG-CJ	高扭凸轮廓型 High Torque Cam Hat Type	24 ~ 3419	50 ~ 160	◎	◎	◎	○	○	—	◎	◎
	FHG-CO	高扭十字滑座帽型 High Torque Cross Slide Hat Type	24 ~ 3419	50 ~ 160	◎	◎	◎	○	○	—	◎	◎
	FCG-CJ	高扭凸轮廓杯型 High Torque Cam Cup Type	24 ~ 3419	50 ~ 160	◎	○	◎	○	○	△	○	◎
	FCG-CO	高扭十字滑座杯型 High Torque Cross Slide Cup Type	24 ~ 3419	50 ~ 160	◎	○	◎	○	○	△	○	◎
高扭组合型 High Torque Combination Type	FHG-AH	高扭中空帽型 High Torque Hollow Hat Type	24 ~ 3419	50 ~ 160	◎	◎	◎	△	△	◎	○	◎
	FHG-AJ	高扭中轴帽型 High Torque Centre Shaft Hat Shaft	24 ~ 3419	50 ~ 160	◎	◎	◎	△	△	—	○	◎
	FHG-SJ	高扭凸轮廓型 High Torque Cam Hat Type	24 ~ 3419	50 ~ 160	◎	◎	◎	○	○	—	◎	◎
	FHG-SO	高扭十字滑座帽型 High Torque Cross Slide Hat Type	24 ~ 3419	50 ~ 160	◎	◎	◎	○	○	—	◎	◎
	FHG-SH	高扭简易中空帽型 High Torque Simple Hollow Hat Type	24 ~ 3419	50 ~ 160	◎	◎	◎	○	○	◎	◎	◎
	FCG-AJ	高扭凸轮廓杯型 High Torque Cam Cup Type	24 ~ 3419	50 ~ 160	◎	○	◎	○	○	△	○	◎
	FCG-AO	高扭十字滑座杯型 High Torque Cross Slide Cup Type	24 ~ 3419	50 ~ 160	◎	○	◎	○	○	△	○	◎

产品图册
Catalogue



FHS-AH



FHS-AJ



FHS-SJ



FHS-SO



FHS-SH



FHS-CJ



FHS-CO



FCS-AJ



FCS-AO



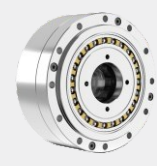
FCS-CJ



FCS-CO



FCD-AH



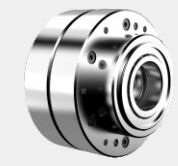
FCD-AJ



FCD-C



FDS-CJ



FDS-SJ

轴承耐磨涂层
Bearing wear-resistant

产品优势
Advantages

为了保护零部件，提高产品的使用寿命，尤其是在轴承行业，绝大多数的轴承需要更持久的寿命。但是常规的涂层技术会对轴承的硬度带来致命的影响，所以很难达到预期的效果。

在PVD传统膜技术的基础上，自主研发材料，采用低温工艺，使零件生成纳米级的强化镀层，该技术可抗金属粘着烧结，技术实施之后轴承磨损显著降低。

In order to protect parts from wear and increase the service life of products, especially in the bearing industry, most bearings need a longer life. However, conventional coating technology will have a fatal impact on the hardness of the bearing, so it is difficult to achieve the expected effect.

Based on the traditional PVD film technology, we independently develop materials and use low-temperature processes to generate nano-level reinforced coatings on parts. This technology can resist metal adhesion and sintering. After the implementation of the technology, bearing wear is significantly reduced.

适用的产品范围
Applicable Product Range



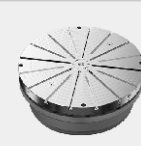
轴承
Bearing



主轴
Main Shaft



导轨
Guide Rail



转台
Turntable



丝杆
Lead Screw

技术优势
Technical Advantages



延长寿命
Extend life

自润滑性，降低设备运转摩擦系数，可以延长使用寿命
Self-lubricating property can reduce the friction coefficient of equipment operation and extend its service life



低温工艺
Low temperature process

强化温度低，不用担心造成零件热变形、硬度降低等不良影响
The strengthening temperature is low, so there is no need to worry about adverse effects such as thermal deformation of parts and reduction of hardness.



防腐防锈
Anti-corrosion and anti-rust

材料防腐防锈，能有效减低零件损耗，节省维护保养成本
The material is anti-corrosion and anti-rust, which can effectively reduce the loss of parts and save maintenance costs.



抗粘着烧结
Anti-adhesion sintering

抗金属粘着烧结，减少局部应力集中产生的开裂和剥落现象
Resist metal adhesion and sintering, reduce cracking and peeling caused by local stress concentration



纳米厚度
Nano thickness

纳米级别厚度材料，对高精度易变形零件，不会影响零件精度
Nano-level thickness materials will not affect the precision of high-precision and easily deformed parts.

“无人零售”应用

Unmanned Retail" Application



无人零售结合人机配合运营模式，使用复合机器人进行夜间取货服务，延长售卖时间，即实现夜间无人化售卖。

Unmanned retail combines human-machine cooperation operation mode, uses composite robots for nighttime pickup service, and extends the sales time, realizes unmanned sales at night.

改造/Transformation

1. 针对需要夜间售卖的商品货架统一升级为标准货架，兼容人员及机器人取货
2. 新增选购屏幕与取货窗口

1. For the commodity shelves that need to be sold at night, they are uniformly upgraded to standard shelves, which are compatible with personnel and robots to pick up goods.
2. Add a selection screen and a pickup window

优点/Advantages

1. 店面无需变更整体布局，改造成本低
 2. 对已有24小时店面而言可节约成本
 3. 对非24小时店面而言可延长售卖时间，分摊房租，增加收入
 4. 机器人物尽其用，提升店面形象
1. The store does not need to change the overall layout, and the transformation cost is low
 2. It can save costs for existing 24-hour stores
 3. For non-24-hour stores, it can extend the sales time, share the rent, and increase income
 4. Make full use of robots to improve the store image

产品应用场景

Product Application

