

PL-UNiverse Robotics

A pioneering provider of embodied AI solutions across multiple scenarios





Mission

Carrying forward human expertise through robotic innovation

Vision

Shape the future of embodied robotics

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Focus on the R&D and practical applications of embodied AI robots

PL-Universe Robotics Technology (Suzhou) Co., Ltd. (PL-Universe Robotics), founded in January 2025 and headquartered in Suzhou Industrial Park, is a pioneering provider of embodied AI solutions across multiple scenarios, specializing in the development and practical applications of embodied AI robots. Guided by the mission of "Carrying forward human expertise through robotic innovation", we are committed to shape the future of embodied robotics.

Our core team consists of seasoned talents from leading companies such as Tesla, Huawei, and iFLYTEK, alongside leading academic institutions such as Tsinghua University and overseas QS Top 50 universities. R&D professionals comprise 90% of our workforce. By leveraging a talent pool with dual strengths in "industry experience + academic background", we have independently built full-stack R&D capabilities in embodied intelligence. This has enabled us to pioneer the SDPAA technical architecture, which has successfully overcome multi-scenario adaptation barriers and delivers industry-leading precision, efficiency, and stability.

With stable partnerships forged with leading clients in 3C electronics, automotive, semiconductors, and other industrial manufacturing sectors, we are also actively expanding into pharmaceutical manufacturing, livestock farming, and other livelihood-related fields. Through end-to-end solutions, we empower clients to reduce costs, enhance efficiency and drive industrial transformation.

R&D Personnel

90%

Application Scenarios

10+

PL- ProWhite Robot 2.0

First Industrial-Grade Wheeled Embodied Robot Combining Flexibility and Precision in Robotics Industry

Our Robot, ProWhite, is a new embodied AI robot specifically designed for flexible manufacturing and collaborative operations. It integrates with three core advantages: high precision, strong adaptability, and process value-addition. By deeply integrating end-to-end flexible industrial VLA model and reusable autonomous decision-making technology, it supports tasks dispatching from enterprise MES systems. ProWhite collaborates autonomously across workstations to perform tasks efficiently, including handling, assembly, inspection, and packaging. ProWhite can proficiently apply to industries such as consumer electronics, 3C, automotive parts manufacturing, semiconductor manufacturing and packaging & testing, as well as biological medicine development.

Core Advantages



High Precision

Sub-millimeter operational accuracy with ± 0.05 mm absolute positioning, featuring adaptive dynamic accuracy compensation to ensure consistent quality and precision



Strong Adaptability

Achieves flexible operations by utilizing a humanoid body with modular end effectors that can be swapped to suit various scenarios



Process Added-value

Features a parent-child separation design that enables the robot to perform operation, automated loading/unloading, and material collection simultaneously, achieving seamless end-to-end production flow

Features

Proprietary Core Algorithms

Powered by self-developed SPDAA parallel acquisition framework and InduThread-VLA architecture, uniquely engineered for robust generalization in complex industrial environments

Clustered Decision & Execution

"Super Brain" centralized planning paired with "Smart Cerebellum" local control architecture enables efficient swarm intelligence and real-time multi-robot orchestration

Efficient Skill Transfer

Distributed learning framework dramatically reduces time-to-deployment in new application domains

Precision Visual Localization

Combines multimodal 3D perception with industrial-grade 2D localization to guarantee sub-millimeter accuracy even in cluttered or dynamic workspace

Expanded Operational Workspace

Liftable torso and dual-arm coordination offer over 30% more reach than human operators

Cross-Industry Applications

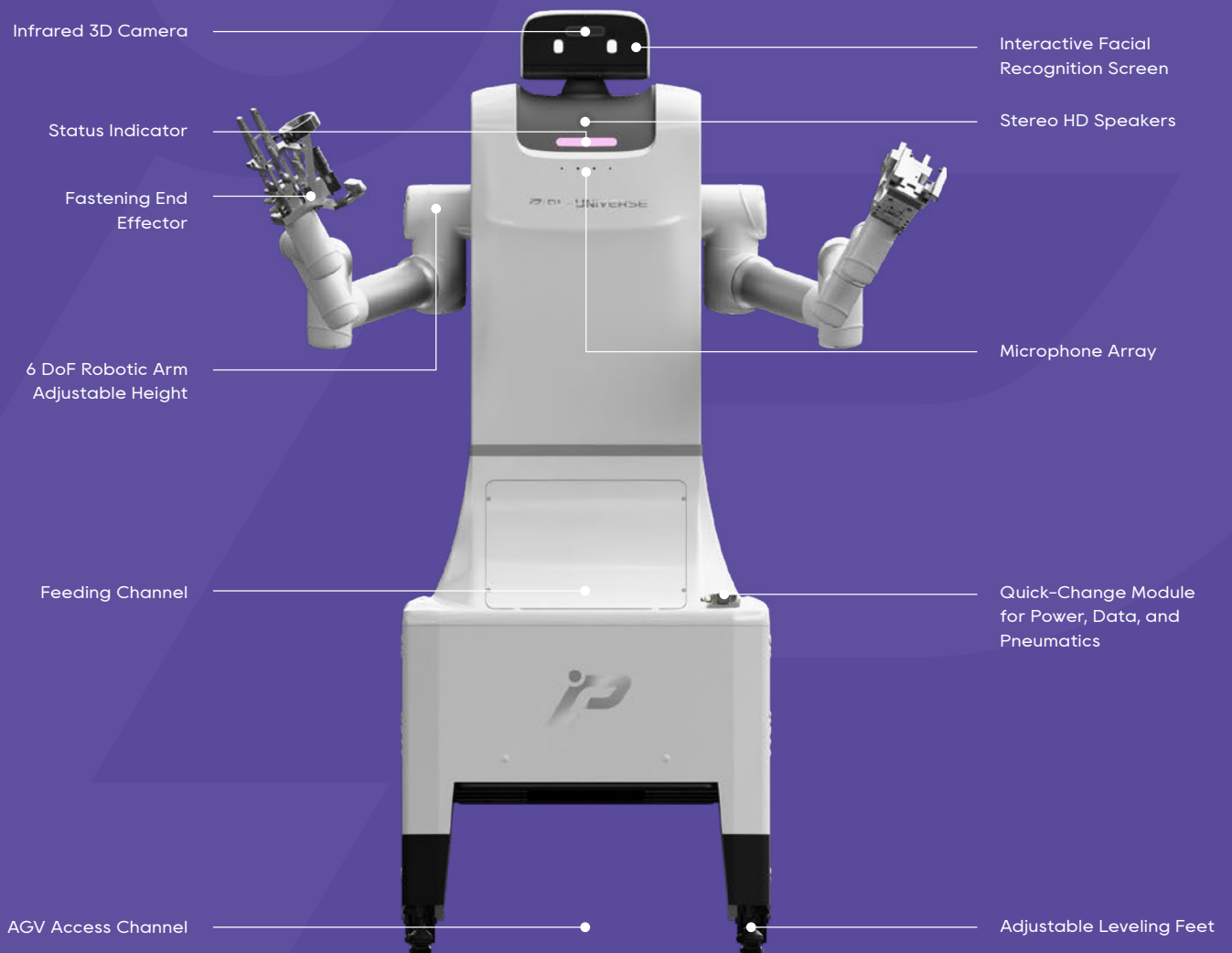
Designed for seamless deployment across manufacturing, healthcare, commercial services, and research



Absolute positioning accuracy

$\pm 0.05\text{mm}$

Specifications



Interchangeable End Effectors



Intelligent Fastening
End Effector



High Precision Dispensing
End Effector



Micro-oiling
End Effector



Adaptive Soldering
End Effector

Detailed Specifications

Dimensions:	1051mm(L)*800(W)*2035mm(H)
Weight:	400kg
Arm span:	910mm
Degrees of freedom of the arm:	6
Repeated positioning accuracy:	±0.05mm
Maximum load per arm:	≈7kg
Overall Machine Load:	12Kg
Operating height:	700-1300mm
Walking mode:	AGV
Charging time:	2h
Battery capacity:	40V100Ah
Endurance:	≥8h
Charging methods:	AC/DC/plug-in/battery swap

Application Scenarios



Smart Factory Collaboration



Medical Experiments



Scientific Research and Education



Commercial Complex Services

PL-Universe End Effectors

Flexible & Adaptable | Intelligent & Collaborative | Precise & Efficient

The self-developed end-effectors of PL-Universe Robotics is designed for a range of applications, including fastening, dispensing, oiling, and soldering. This innovative technology seamlessly integrates high-precision control with real-time visual positioning to deliver flexible and intelligent solutions for complex industrial scenarios.

Compatible With

PL-Universe ProWhite Robot

Embodied AI Robots

Robotic Arm for Industrial Automation, and Others



Intelligent Fastening End Effector

- | Lightweight & Integrated
- | Precision Fastening
- | Guaranteeing Zero-Defect Manufacturing

This product adopts an integrated design that integrates high-precision force sensing with vision guidance to support quick-change within seconds, ensuring fastening quality while enhancing production line flexibility.



Core Advantages



Zero-defect production for enhanced consistency and reliability



Highly integrated for plug-and-play operation



Multi-purpose capability for flexible production line operations



Standard interfaces for compatibility with mainstream robots



Specifications

Dimensions: 230 mm (L) × 101 mm (W) × 520 mm (H)

Weight: 5 kg

Voltage: 48 V

Motor Type: Servo Motor

Encoder: 23-bit communicative optical encoder

Minimum Motion Increment: 0.1°

Maximum Speed: 2000 rpm

Cross-threading Detection: Yes

Stripping Detection: Yes

Origin Return: Yes

485/232 Communication Interfaces: Can be used simultaneously

USB Interface: Yes

Mounting Interface: Damped

Fastening Torque Curve: Yes

Features

High-precision torque feedback

Delivers high-precision torque feedback with an accuracy up to ± 0.01 Nm to ensure each screw's tightening force meets process standards and prevent stripping, over-tightening, or loosening

Integrated Design

Integrates the servo motor, drive, controller, and sensors into a compact housing to significantly reduce the load on the robot's wrist

Adaptive Axial Pressure

Monitors and adjusts downward pressure in real time to easily accommodate workpiece surface tolerances and uneven initial thread resistance, thereby protecting precision components

Modular Quick-Change

Supports quick-change of pneumatic/electric bits to handle various screw types, featuring compatibility with hundreds of bits for tool-free changeover within seconds

Application Scenarios



3C Electronics Manufacturing



Home Appliance Manufacturing



Automotive Part Manufacturing

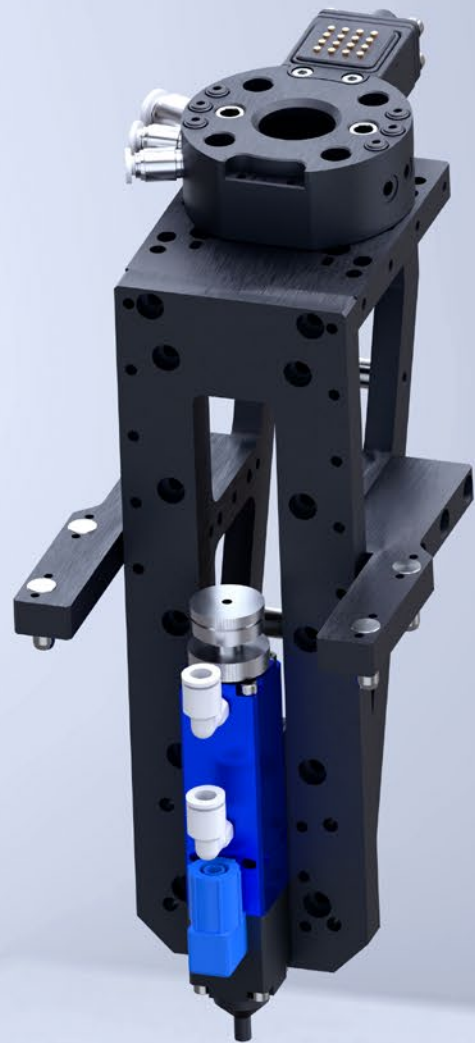


Research and Laboratories

High Precision Dispensing End Effector

- | Precise Control
- | Plug and Play
- | Flexibility for Manufacturing

Seamlessly integrating high-precision fluid control, real-time visual positioning , and process monitoring, this product enables precise production control that remarkably boosts operational consistency and yield while maintaining high efficiency.



Core Advantages



High Flexibility

Frees dispensing processes from fixed equipment, and when combined with embodied robots' mobility, easily handles large workpieces (such as automotive glass, battery trays) or multi-station, small-batch production tasks



Cost Reduction and Efficiency Gains

Delivers precise dispensing control with exceptionally high yield rates, reducing material waste and lowering costs

Specifications

Dimensions: 175mm (L) × 101mm (W) × 250mm (H)

Weight: 4 kg

Type: Double-Action Suction Diaphragm Valve

Air Supply Pressure: 4–7 kgf/cm²

Control Solenoid Valve:
Compatible with both 5/2-way and 3/2-way types

Minimum Dispensing Volume: 0.01 ml

Maximum Flow Rate: 800 g/10 s

Operating Viscosity: 1–100.00 cps

Body Material: SUS304 Stainless Steel + POM + PTFE

Inlet Pressure: <10 kgf/cm²

Inlet Size: 1/8" npt(f)

Flow Adjustment:
Regulated by supply air pressure

External Dimensions: 31 mm (Dia.)×105mm (H), Square

Adhesive Cleaning Module: Optional

Features

Integrated Design

Incorporates the dispense valve, controller, metering unit, and sensors into a single compact and lightweight module to minimize the load on the robot

Modular Temperature Control System

Features an optional integrated heating function that precisely controls temperature for dispensing valves and adhesive supply lines, ensuring smooth flow of high-viscosity adhesives

Plug-and-Play Interface

Provides standard industrial bus interfaces (such as EtherCAT and PROFINET) and ROS drivers, enabling rapid integration with mainstream embodied robot platforms and greatly shortening deployment cycles.

Real-Time Monitoring and Feedback

Utilizes flow and pressure sensors to provide real-time oil discharge status feedback, and interfaces with the Manufacturing Execution System (MES) to enable data traceability and error-proofing

Application Scenarios



3C Electronics Manufacturing



Semiconductor Packaging



Automotive Part Manufacturing



Medical Device Manufacturing

Micro-oiling End Effector

- | Efficient Operation
- | Precise Control
- | Adaptable for Highly Flexible Production

This product features a modular oiling head for quick-change to achieve rapid changeovers. It also offers high-precision dosing control and anti-drip functions that adapt to various media and application modes, ensuring efficient and clean operations in flexible manufacturing.

Core Advantages



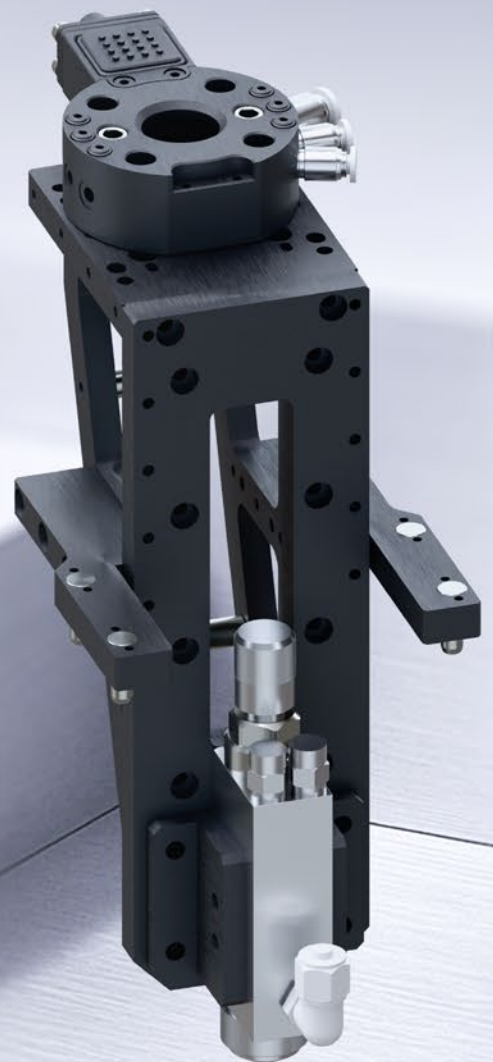
Modular Design

Provides modular oiling heads and a multi-line oil supply system, meeting flexible manufacturing requirements with automatic switching between oilers or end effectors via a quick-change plate



Anti-drip and Self-cleaning

Employs a unique needle valve structure, vacuum recovery, or electrostatic adsorption technology to achieve true "zero dripping"



Specifications

Dimensions: 175mm (L) × 101mm (W) × 250mm (H)

Weight: 4 kg

Type: High-Viscosity Spray Valve

Air Supply Pressure: 3–6 kgf/cm²

Control Solenoid Valve:
Compatible with both 5/2-way and 3/2-way types

Spray Area: 2–20 mm²

Operating Viscosity: 1–30,000 cps

Body Material: SUS304 Stainless Steel

Inlet Pressure: <10 kgf/cm²

Inlet Size: 1/8" npt(f)

Flow Adjustment:
Precision Gear-Screw Metering

Operating Rate: < 600/min

Oil Purge / Cleaning Module: Optional

Flow Data Monitoring: Available

Features

Multi-Mode Coating

Supports various coating patterns, including spot coating (oiling specific points), line coating (drawing lines along a trajectory), and surface coating (covering an area)

High-precision Dosing Control

Precisely controls the oil dispensing volume, oiling trajectory, and application area for each operation, ensuring uniform and consistent oil application on every workpiece

Real-Time Monitoring and Feedback

Utilizes flow and pressure sensors to provide real-time oil discharge status feedback, and interfaces with the Manufacturing Execution System (MES) to enable data traceability and error-proofing

Broad Lubricant Compatibility

Supports oils from thin lubricants to thick greases and integrates seamlessly with oil supply systems using quick-change connectors

Application Scenarios



3C Electronics Manufacturing



Semiconductor Packaging



Automotive Part Manufacturing



Medical Device Manufacturing

Adaptive Soldering End Effector

- | Millimeter-Level Solder Feeding
- | Precise Temperature Control
- | Meeting Precision Soldering Challenges

This product integrates high-precision fluid control, real-time visual positioning, and process monitoring. It liberates the soldering process from fixed workstations and moves freely with robots on the production line, achieving flexible soldering with unrestricted accessibility

Core Advantages



"Millimeter-Level" Precision Solder Feeding Control

Precisely controls the length, speed, and timing of solder wire feeding through servo or stepper motors



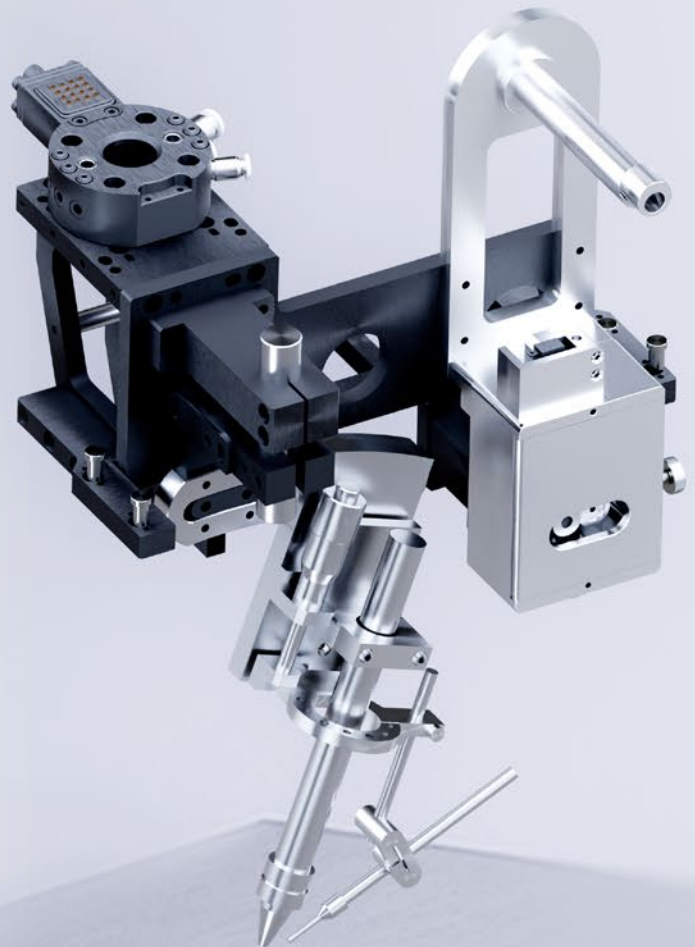
"Closed-Loop" Constant Temperature Control & Rapid Recovery

Monitors the tip temperature in real-time with a built-in temperature sensor, dynamically adjusting heating power against the set value to ensure solder joint consistency



Process Parameterization and Complete Data Traceability

Achieves full parameter traceability, ensuring consistent and reliable soldering quality and providing data for process optimization



Specifications

Dimensions: 240mm(L)*220mm(W)*250mm(H)
Input Voltage: AC220V ± 10%, 50Hz,A 110 V version is available upon request
Output Power: ≥150W (at set temperature of 400℃)
Standby Power Consumption: <3W
Temperature Control Range: 50 °C – 600 °C
Heating Method: High-frequency eddy current heating

Ground Resistance: <2 ohms
Temperature Control Accuracy: ± 1℃ (at room temperature under still air conditions)
Ground Voltage: <2 mV (measured using a new soldering tip with good grounding)
Communication Interface: RS232 × 1
Baud Rate: 4800,9600,19200,38400 kbs
I/O Interface: 24V NPN IO with 2 inputs, 2 outputs, external sleep mode and alarm output

Features

Servo/Stepper Motor Drive

Enables millimeter-level precise control of solder wire starting, stopping, speed, and length, ensuring solder joint consistency

Rapid Heating & Thermal Recovery

Reaches the working temperature rapidly with a high-efficiency heater and compensates for heat loss during large joint soldering, thus preventing cold solder joints and improving work quality

Solder Balling Prevention & Retraction

Briefly reverses the motor after feeding to retract the molten solder tip, effectively preventing solder balls and icicles, and thus reducing post-process cleaning and maintenance

AI Process Management

Automatically matches soldering parameters to the specific process and adjusts them in real time, ensuring consistent product quality and supporting rapid production changeovers

Application Scenarios



PL- Universe PL-WitHand

World's First Industrial-Grade Hybrid-Driven Dexterous Hand

PL-WitHand introduces a tendon-linkage hybrid transmission design that merges flexibility with high-precision control. Driven by the self-developed ProxiGrasp intelligent grasping algorithm, the product fully leverages its hardware capabilities to adapt autonomously to complex tasks and deliver precise performance across applications—from industrial automation and precision medicine to extreme environment operations and high-fidelity VR interaction

Core Advantages



Industry-Leading Grasping Capability

Achieves "near-human dexterity and industrial-grade precision" through an innovative tendon-linkage hybrid transmission, balances compliant manipulation with high-accuracy control, and bridges the performance gap of traditional end-effectors in complex tasks



Proven Application Performance

Leverages the self-developed ProxiGrasp intelligent grasping algorithm to fully unlock hardware potential, directly bridge the gap from technology to application, and deliver an immediately deployable product-ready solution



Configurable and Iterative Design

Enables faster iterations and greater customization flexibility than traditional non-modular alternatives via modular control architecture, significantly reducing the time-to-market for specialized applications



Extensive Platform Compatibility

Supports seamless integration with both embodied robots and industrial arms, facilitating cross-scenario reuse and reducing deployment and adaptation costs

Features

Biomimetic Structural Design

Mimics the biomechanics of the human hand with flexible finger joints and efficient force transmission, enabling precise manipulation of diverse objects

Intelligent Perception and Control System

Integrates visual and tactile multi-modal data via the ProxiGrasp algorithm, performs real-time estimation of object shape, contact force, and pose, and generates natural, stable grasping motions

High Reliability and Durability

Utilizes industrial-grade materials and assembly processes to ensure high impact and fatigue resistance and guarantee stable long-term operation

Self-Learning & Calibration Capabilities

Records operational data and automates parameter optimization through built-in self-calibration and learning modules, continuously improving grasping precision and environmental adaptability

Open and Extensible Platform

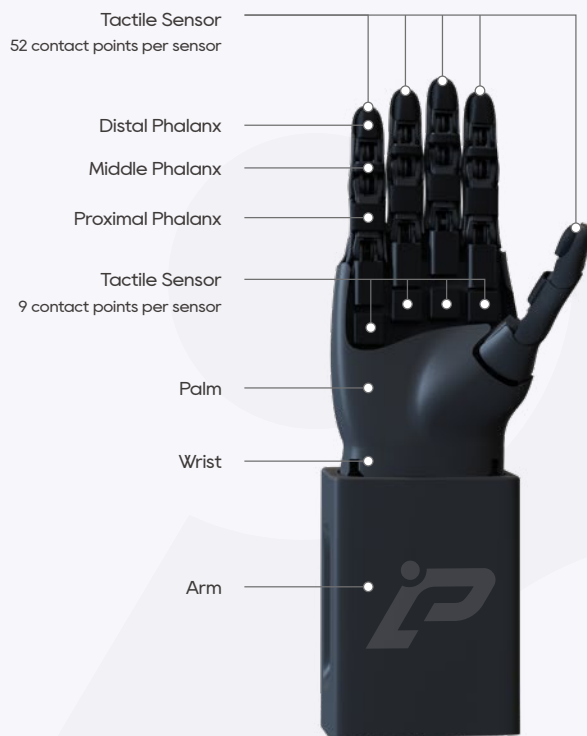
Deeply integrates with ROS/ROS2 as a versatile platform, offering excellent openness and extensibility, and enabling multi-ecosystem connectivity and secondary development

Human-Robot Collaboration (HRC) Friendly

Delivers responsive and controllable force feedback and is ideally suited for human-robot collaboration scenarios involving collaborative robots and embodied agents



Specifications



Detailed Specifications

Transmission: Tendon + Linkage	Force Resolution: 0.1N
Drive: Micro Servo Electric Cylinder, Micro Servo Motor	Abduction/Adduction Angle (Thumb): 90°
Degrees of Freedom: 16+4 DOF	Abduction/Adduction Angle (Four Fingers): ± 15°
Weight: 800 g	Flexion Angle (Four Fingers): 90°
Maximum Load: 10 kg	Abduction/Adduction Speed (Four Fingers): 140°/s
Wrist: Yes	Abduction/Adduction Speed (Thumb): 120°/s
Operating Voltage: DC 24 V ±10%	Flexion Speed (Four Fingers): 160°/s
Standby Current: 0.2 A	Flexion Speed (Thumb) : 120°/s
Average No-load Current: 1 A	Control Interface: CAN/RS485/TTL
Maximum Current: 3 A	Sensor System : Fingertip Tactile Sensors, Vision Sensors, Angle Sensors, Six-Axis Force Sensors
Finger Repeat Positioning Accuracy: ± 0.20 mm	Main Control MCU: STM32
Maximum Grip Force (Thumb): 15 N	Compatible with: Embodied Robots, Universal Robotic Arm for Industrial Automation
Maximum Grip Force (Four Fingers): 10 N	

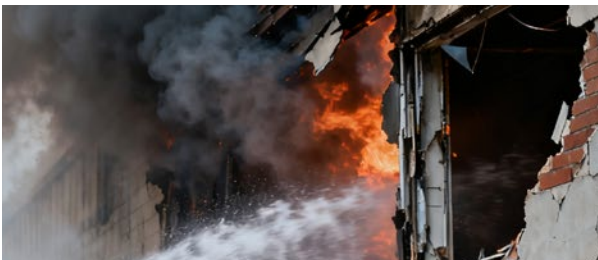
Application Scenarios



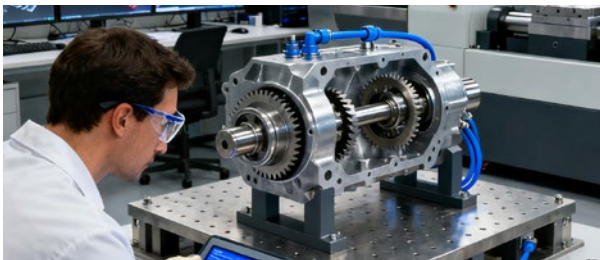
Industrial Sector



Commercial Complex Services



Specialized Scenarios



Scientific Research and Education

PL-Universe

Full Lifecycle Value-added Service System

PL-Universe Robotics has developed a closed-loop service system that integrates products and services to serve customers, ensuring reliable, efficient, and personalized support from small-batch delivery to full lifecycle operations.



1-on-1 Dedicated Service

Dedicated service representatives are assigned to each customer, delivering comprehensive support through a structured process of "precise requirement matching, real-time problem response, and closed-loop result verification".



3-Member Specialized Debugging Team

A 3-member specialized debugging team is deployed during the delivery phase to ensure robots are operational within 48 hours. Additionally, professional training is provided to customers to shorten the production line adaptation period.



1-Year Free Maintenance

1-year free maintenance service is provided with a commitment to 2-hour response time and 24-hour on-site support to minimize production downtime.



Shoot for Universe , Land in Success