

# INTELLIGENT ROBOTICS





## Detachable Joint Robot System

For various and small-scale automated production lines, diverse types of robotic arms are required. However, the robotic arms available on the market come in fixed configurations, making customization impossible for customers. When maintenance is needed, the entire arm must be sent back to the manufacturer for repairs. The process not only involves laborious tasks but also halts production lines, leading to delays in delivery schedules.

### Technical Advantages and Features

#### Flexible Modular Design

- Quickly replace faulty joints, reducing factory downtime from 2 days to 0.2 days.
- Easily adjust the robotic arm's degrees of freedom and arm length without being constrained by the fixed configurations.

#### Quick Replacement

- Similar to LEGO bricks, customized robotic arms are based on cost and requirements.
- Completing assembly within 5 minutes; setting up operation within 10 minutes.

#### High Performance

- Modules integrate intelligent components, such as motors, gearboxes, encoders, and drivers, for plug-and-play functionality without requiring additional configuration.
- Volume has been reduced by 15%, the high torque-to-weight ratio has been increased by 30%.

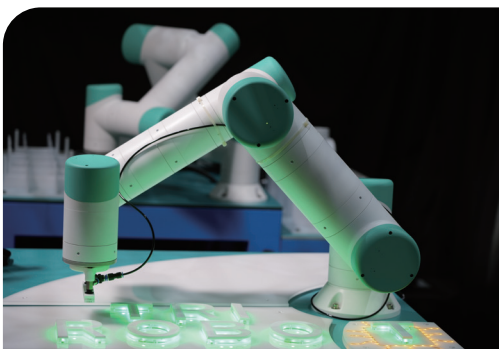
### Industrial Benefits and Business Opportunities

#### Industry Applications:

Multi-industrial applications (Light Industry, Semiconductor Industry, Medical Industry, etc). Applied to parts assembly, material inspection, surgical assistance.

#### Application Examples:

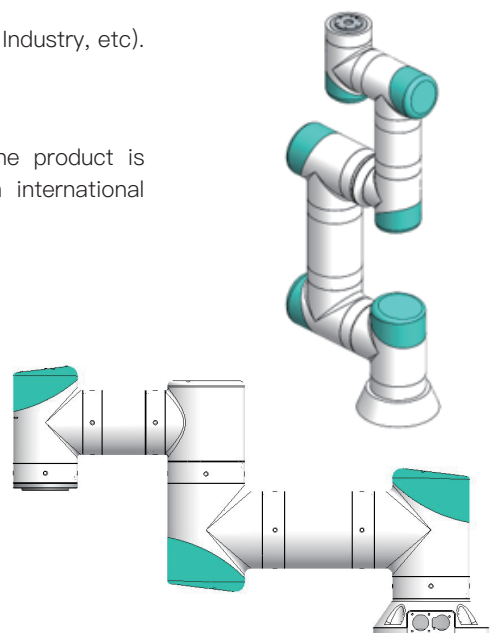
In co-production with the largest domestic joint module manufacturer, the product is exported to Europe, America, India, and Southeast Asia markets through international distributors to meet the demands of collaborative and DIY requirements.



Pick-and-place



All-In-One Module



Adaptable Robot Assembly





## AMR and Intelligent Fleet Management System

Autonomous Mobile Robots (AMRs) alleviate labor shortages and enhance factory efficiency by performing tasks such as goods delivery and environmental cleaning independently. However, inconsistent communication systems across factories hinder AMRs from communicating during routine tasks, complicating the coordination and integration with equipment such as elevators and shelves, thereby limiting the use and expansion.

### Technical Advantages and Features

#### Seamlessly Communicate Across Different Areas

- Satisfying the communication standards of the Autonomous Mobile Robot Alliance (AMRA).
- Integrating with various domestic brands of AMRs.
- Compatible with different types of mobile vehicles, such as Automated Guided Vehicles (AGVs), Autonomous Mobile Robots (AMRs), and Overhead Hoist Transporters (OHTs).

#### Smart Traffic Management & Dual-Module Scheduling

- Intelligent traffic management and multi-path planning algorithms with flexibly arranged tasks.
- Dual modular (simultaneously running direct routes and detour tasks)
- Smart charging and parking management for continuous 24/7 operation.

#### Support the Factory Communication Protocols

- Communication among the factory's peripheral equipment, including warehouses, electronic shelves, elevators, and automatic doors.
- Supports Universal Communication Protocols, including Modbus, AMQP, REST API, and SECS, ensuring high compatibility with enterprises.

### Industrial Benefits and Business Opportunities

#### Industry Applications:

Semiconductor Industry, Manufacturing Industry, Medical and Service Industry.

#### Application Examples:

- Applied at the semiconductor packaging and testing plant, Siliconware Precision Industries, the Intelligent Fleet Management System commands and dispatches multiple autonomous mobile robots to transport wafer carriers (FOUPs and Magazines) in the cleanroom, achieving flexible scheduling. This technology has successfully reduced manpower by 15%, increased production capacity by 50%, and achieved a production line utilization rate of 95%.
- Applied at the screw mold factory, San Shing Fastech Corp, the "Intelligent Task Scheduling" achieves dual-module operation of detour and direct transport between workstations. The "Fleet Management System" communicates with peripheral automatic, enabling AMRs to have the capability of transporting goods across floors and buildings. After implementation, it saved 3 manpower in each area.



For Different Guiding Type Magnetic Guidance & SLAM



SANSHING

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# RoboTwin Integrated Virtual-Real Robot Control Unit

Virtual-real integration is not commonly implemented in all factory lines due to a lack of big data and reliable verification platforms. This increases the risk of failure in the actual implementation of products and requires more time to be spent on the production line.

## Technical Advantages and Features

### Advanced Factory Deployment

- Rendering a 3D scene from 2D static images without Computer-Aided Design (CAD) models.
- Simultaneous remote immersive interaction with three units helps overcome cross-factory limitations.
- Completed advanced simulation and dynamic verification within a week to enhance implementation confidence.

### Robots Equipped with Smart Vision

- Fully automated database generation by using AI-powered vision database automation tools.
- Completed the visual recognition system within 3 days, with general machine adjustment taking about 10 days.
- Visual-guided robot for loading, unloading, and processing operations.

### Digital Twin Fast-Learner

- Generative AI robots equipped with learning and decision-making capabilities.
- Non-engineers can easily get started.
- Optimize configurations and adjust paths within one day.

## Industrial Benefits and Business Opportunities

### Industry Applications:

Manufacturing Industry, such as electrical machinery factories, steel industry, powder metallurgy, metal processing industry, and other Processing Industries.

### Application Examples:

- Successfully entered the Horizon Europe research project, collaborating with European partners such as Fundacion TEKNIKER in Spain, DFKI in Germany, and Philips Consumer Lifestyle in the Netherlands.
- Introduced to the top 10 hand tool factories in Taiwan, the system is used for high-difficulty assembly (e.g., ratchet wrenches), resolving high-contact-rich issues and increasing productivity by 30%.



Horizon Europe

#### Practical Applications in Electrical Manufacture

Virtual War Situation Room

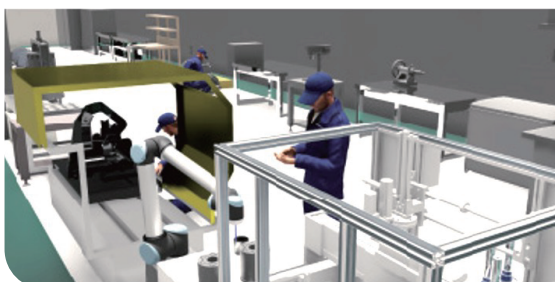
Virtual-Reality Integration

Remote Maintenance and Operation

Human-Machine Collaboration

Robot Automation

AI Intelligence



High-Fidelity Bidirectional Connectivity

Production Line AI Database



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## RobotSmith: Robot Metal Processing Technology

Metal component manufacturing traditionally relied on manual labor, making tasks such as grinding, quality inspection, defect assessment, and regrinding prone to quality variability. Additionally, the factory environment contributes to labor shortages due to noise, odors, and the risk of occupational injuries associated with the inspection process.

### Technical Advantages and Features

#### First Set of Domestic Virtual and Augmented Reality Software

- Own brand “RobotSmith”
- Compatible with 10+ global robot brands, such as ABB, KUKA, FANUC, YASKAWA.
- Introducing ChatGPT to the production line to offer troubleshooting guidance through an AI assistant.

#### No Programming Required & High Processing Accuracy

- No programming needed; the production line be deployed within 5 seconds through natural language.
- Automatically generate machining programs, reducing operation time by 95%.
- Supports multiple sensors (temperature, pressure, position, etc.) for instant detection of process variations, achieving machining accuracy within 0.1 mm—three times better than the industry standard.

#### Real-Time Presentation with Predictive Capabilities

- The simulation and actual error are within 0.5mm, with no time discrepancy.
- Predicting the time of abrasive belt wear with an accuracy of over 95%.
- Defect recognition rate exceeds 95%.

### Industrial Benefits and Business Opportunities

#### Industry Applications:

Metal Processing Industry (such as plumbing fixtures, kitchenware, fine cutlery, bicycles, and artificial joint medical materials) performs grinding, polishing, deburring, sawing, welding, and spraying, among other tasks.

#### Application Examples:

- Successfully implemented at HCG, a leading sanitary ware manufacturer, RobotSmith has decreased faucet grinding time from 6 to 3.5 minutes, increasing efficiency by 41%. It also reduced product costs by 20%, generated over 50 million NTD in benefits, and enhanced Taiwan’s sanitary ware
- production lines for greater international competitiveness.

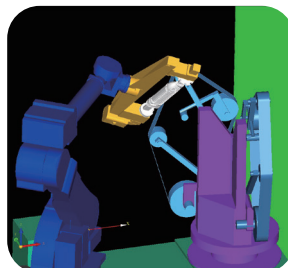
RobotSmith, the first nationwide grinding and polishing robot, partners with top domestic medical material manufacturers to precisely grind complex, custom titanium artificial joints. It enhances surface smoothness and biocompatibility, extending the implant lifespan to 30 years.



Artificial Joint Grinding



Polishing and Grinding Production Line



Simulation Software Interface



Metal Processing Robot Machine



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