MOBILE ROBOT PRODUCT CATALOG

Go Beyond the Reachable and Strive for Symbiotic Value

Hikrobotics.com

HIKROBOT

CONTENTS

Hikrobot

Hikrobot is a global product and solution provider specialized in machine vision and autonomous mobile robot. Focusing on industrial internet of things (IIoT), smart logistics, and intelligent manufacturing, we build an open cooperation ecosystem, provide service to customers in industry and logistics, and commit to continuously promoting the intelligentization and leading the intelligent manufacturing process.

Mission

Leading the development of industrial intelligence and creating a new future for intelligent manufacturing.

Vision

Enabling the industrial internet of things and creating sustainable social value.

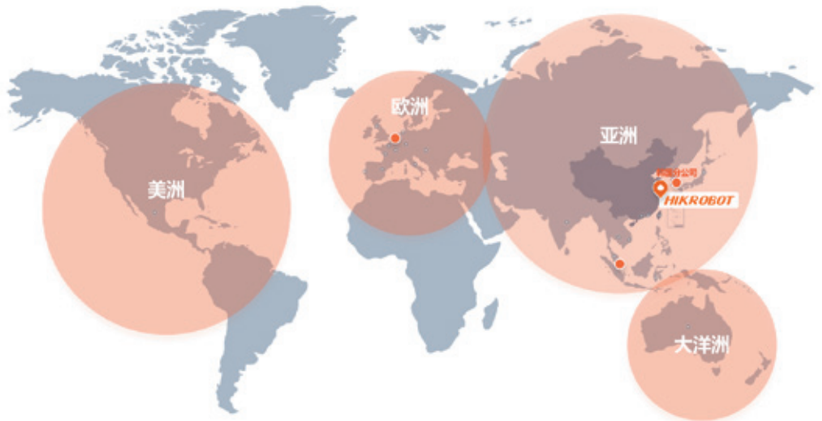
Values

Professional, courageous, honest and pragmatic.

Global Footprint

City-Centered Domestic Marketing Service Network

10+ domestic branches, **30+** domestic offices and **40+** domestic after-sales service network Headquarters



Localized Sales and Technical Service Team in International Markets

Business covers **50+** countries, with branches founded in Korea, Singapore, and Netherlands

Milestones

2014

- Established Machine Vision Department
- Developed software & hardware products independently

2015

- Released 1st GigE Area Scan Camera
- Released 1st Latent Mobile Robot

2016

- Founded Hangzhou Hikrobot Co., Ltd.
- Released RCS and iWMS

2017-2018

- Entered the high-end camera market with 1st HD CCD camera
- Became part of SAC/TC159/SC2/WG15, leading industrial standardization
- Expanded global development
- Won Gold Award of CIIF

2019

- Released 1st Forklift Mobile Robot
- Over 1,000,000 industrial cameras used in market
- Over 10,000 AMRs used in market

2020

- Won Gold Award of CMVU Innovative Products: SC7000
- Got SIL & CE Certification: AMR Safety Controller

2021

- Built Xi'an R&D center
- Launched Machine Vision technology community (V-CLUB)
- Released 4th AMR architecture platform: Intelligent Base
- Over 1,500 AMR customers worldwide

2022

- Established Hikrobot branch in Korea
- Built 3D Camera Production Line
- 50,000+ AMRs delivered

2023

- Established "Shape Our Future Intelligently" philosophy
- Expanded overseas branches
- Initiated Eco-Partner 3.0 Program to expand visual application
- Awarded Best in Intralogistics Certificate for IFOY Award 2023

Improve Software & Hardware

Customize Products and Solutions

Build an Industry Ecosystem

R&D Input


Xi'an R&D Center


Hangzhou R&D Center

R&D Investment

Maintain a rapid growth over the past three years, with a compound annual growth rate

29.51%

Team Size

Employees worldwide for technology and R&D

2000+

Employees regional for technology

60%

Intellectual Property

Patents: **1101**

Software Copyrights: **44**

Before December 31, 2023

Product Architecture

Hardware Product and Software Platform Provider Specialized in Machine Vision and Algorithm

Focus on industrial sensors to drive digitalization and intelligence in production.

Product and Solution Provider Specialized in Autonomous Mobile Robot

Focus on intralogistics to assist the intelligence of manufacturing and circulation industry.

China's First Full Directive CE Marking Certification

CB Certification

KC Certification

RCM Certification

WPC Certification

China Robot Certification

Red Dot Design Award

National High-Tech Enterprise

CIIF Gold Award

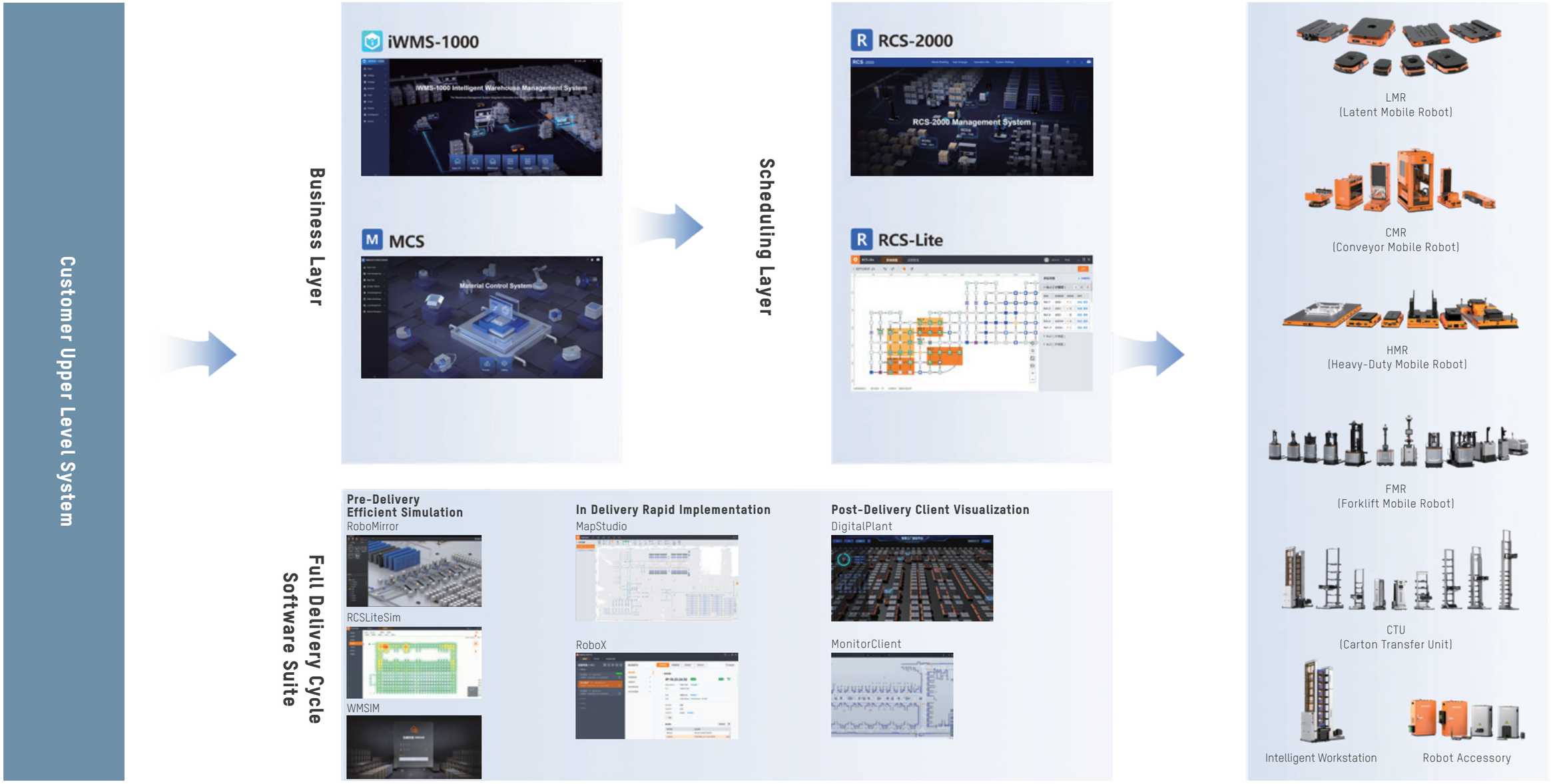
Product and Solution Provider Specialized in Autonomous Mobile Robot

From warehousing logistics to production logistics, our robot-based systems simplify your in-plant logistic processes, reduce costs to increase benefit, and lead intralogistics reform with AI.

Product System

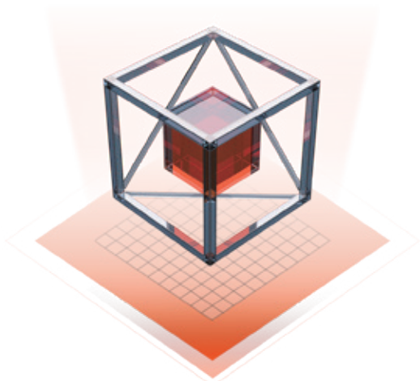
Hikrobot intelligent intralogistics system has formed a "7+2" layout. "5" refers to LMR (Latent Mobile Robot), CMR/HMR (Conveyor/Heavy-duty Mobile Robot), FMR (Forklift Mobile Robot), CTU (Carton Transfer Unit), Intelligent Workstation and robot accessory; "2" refers to iWMS-1000 (Intelligent Warehouse System) and RCS-2000 (Robot Control System). iWMS-1000, RCS-2000, and other application software systems can be combined on demand, seamlessly connecting to customer's upper level system, managing business data, task instructions, etc., and scheduling the whole series of autonomous mobile robots to operate in an orderly, coordinated, and cluster way to meet the intelligentization needs of intralogistics in various industries.

Hikrobot has developed a series of tools for all stages of the project, including business simulation in the early stage, deployment and implementation in the middle stage, and monitoring of operation and maintenance in the later stage. By using these tools, the efficiency of pre-project planning can be effectively improved to ensure the landing quality and rapid delivery, and reduce the difficulty of later operation and maintenance.



IBASE

Intelligent Base is the fourth-generation AMR architecture platform developed by Hikrobot. AMR based on Intelligent Base has higher security standards and more flexibility, and can also support faster delivery and more convenient operation and maintenance, so as to efficiently respond to complex scenarios of real business.



1+N+X

Based on one intelligent base, Hikrobot derives N types of AMRs, covering X scenarios.

BEST-FIT HARDWARE

The modular design, combined with rich hardware configurations and integrated multi-navigation algorithms, further simplifies the development for product expansion and enables adaptation to complex customization needs in various scenarios.

Computing power 60 % ↑

ALGORITHM POWERFUL

Rich perception, intelligent scheduling algorithms, powerful drive assemblies, and multi-sensor configurations enable AMR applications in complex environments.

Perceptual ability 70 % ↑

SOFTWARE UNIFIED

A unified software architecture for all types of AMRs reduces time for secondary development, satisfying the needs for faster project delivery and easier maintenance.

Development efficiency 50 % ↑

ENHANCED SAFETY

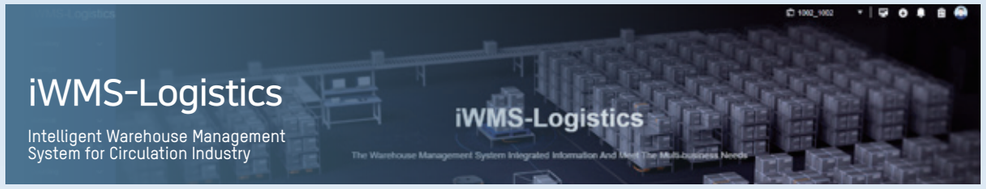
Our AMR adopts fully independent safety assemblies to achieve three levels of safety assurance from assemblies, the whole machine to the system, ensuring the safety and reliability of products from the source.

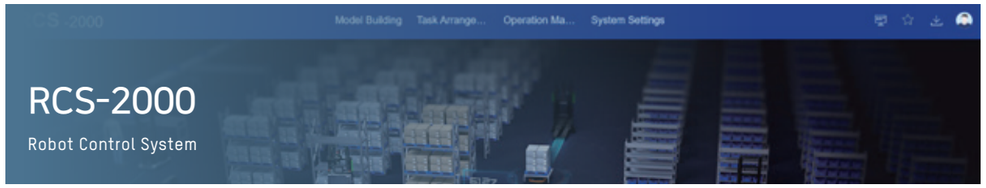
Shape Our Future Intelligently

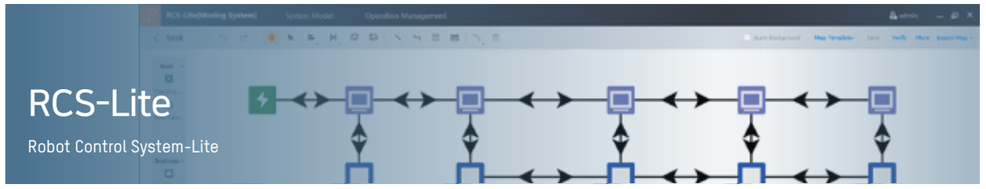
Supported by dual-wheel driving, fueling hardware and software with self-developed technology

Focusing on technological innovation, Hikrobot has continued to develop self-research capabilities at the algorithm, software, structure, and hardware levels, to achieve full range of technological support. In the field of autonomous mobile robot, different types of products have varying structures and hardware configurations, and are equipped with software applications tailored for various scenarios. Moreover, they can also collaborate and work together in synergy. With a wide range of product varieties, coupled with strong technological support, our company can meet full scope of needs.

Software Platform

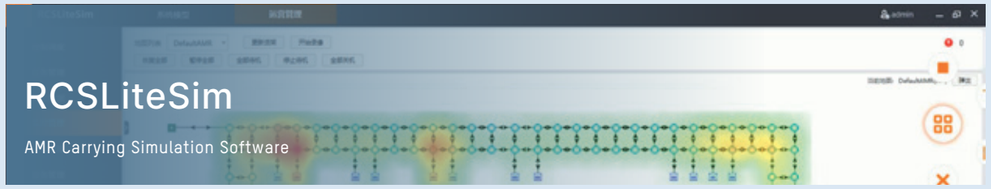




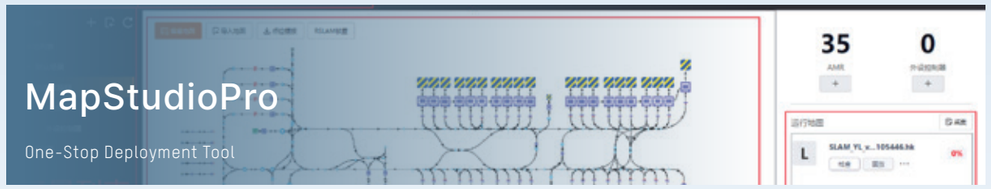


Full Delivery Cycle Software Suite

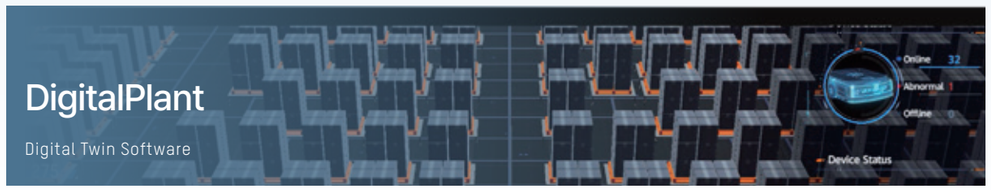
Pre-Delivery



In Delivery



Post-Delivery

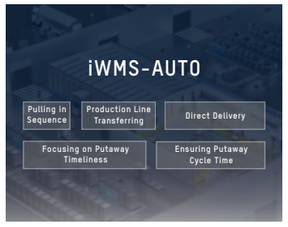


Intelligent Warehouse Management System

iWMS-1000

iWMS is an intelligent warehouse management system that can adapt to business differences of various industries and quickly respond to the needs of subsequent development for enterprises. It features 4 development elements, 3 extensible resource libraries, and N industry systems with task elements as its cornerstone, capability development as the center, and low-code elements as the engine.

Industry Products



Other Industries: iWMS-N+

Source System

Business Layer iWMS-1000

RCS-2000

ERP | WMS | MES | OMS | ...

iDataBus
Hikrobot API Platform

Material Main Data | Inbound Order | Outbound Order | Transfer Posting | Inbound Order | Counting Details

iWMS
Intelligent Warehouse Management System

Operation Scenes	
Receiving and Pallet Linkage	Production Line Delivery
Counting by Order	Counting Without Order
Recommended Putaway	Manual Tallying

Task Strategy	
Putaway Strategy	Mixing Strategy
Picking Strategy	Carrying Strategy
Wave Strategy	Replenishment Strategy

Task Algorithm
Bin Recommendation Algorithm
Inventory Allocation Algorithm
Intelligent Wave Algorithm
SKU Velocity Algorithm
Intelligent Tallying Algorithm

Task Management	
Putaway Strategy	Mixing Strategy
Picking Strategy	Carrying Strategy
Wave Strategy	Replenishment Strategy

iData
Low-Code Development Element

iDataView	
Adding, Deleting, Editing and Searching	
Excel Exporting	Statistics & Reports
Data Source Extension	Decision Support Dashboard

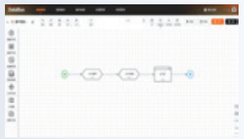
iClientView	
Interface Designing	Pop-Up Window Designing
Printing Template	Basic Element Library
Rendering Engine	

iDataFlow	
Basic Node	Tool Node
Data Model	Task Flow Designing
Data Conversion	

RCMS | RTAS | RCS | WCS | ...

iDataBus API Platform

Multi-source heterogeneous data docking, and interface configuration by graphs.



iDataView Data Visualization

Task data visualization, and custom configuration of reports and dashboards.

iClientView Configurable Terminal

Element dragging to configure operating terminal interface, and custom printing template.

iDataFlow Task Arrangement

Configurable backend logic, and flow-oriented task function configuration, providing secondary development.

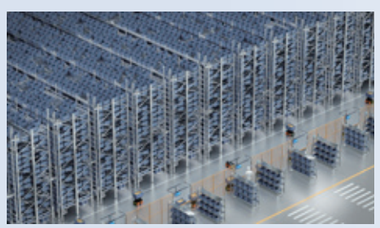
Task Algorithm Library

- Bin Recommendation Algorithm
- Intelligent Wave Continuation Algorithm
- Storage Location Recommendation Algorithm
- Carrier Tallying Algorithm
- Inventory Allocation Algorithm
- Inventory Tallying Algorithm
- Intelligent Wave Algorithm
- Order Analysis Algorithm

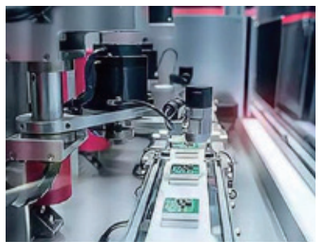
Task Element Library

- Warehouse
- Inventory
- Material
- Algorithm
- Order
- Strategy
- Task
- ...

Task Scene Library



- Loaded Carrier Putaway
- Picking by Order
- Recommended Putaway
- Picking in Start Mode
- Cycle Putaway
- Picking & Distributing
- Picking by Material
- ...



Intelligent Warehouse Management System

iWMS-Logistics

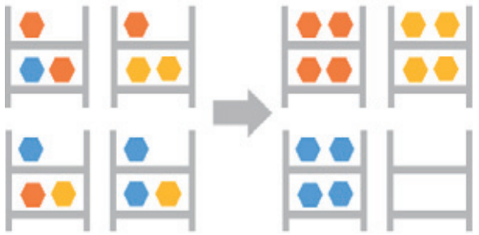
Built upon the Hikrobot system philosophy of 4 + 3 = N, iWMS-Logistics (Intelligent Warehouse Management System for Logistics) is a product designed for the circulation industry. The industry includes many sectors such as e-commerce, shoes and clothing, pharmaceuticals, fresh food, supermarket, and fast-moving consumer goods. The common demand of industry customers is the ultimate pursuit of efficiency in outbound and picking. iWMS-Logistics, while realizing precise warehouse management, focuses on industry scenarios, and integrates intelligent algorithm powered by deep learning to improve efficiency. It also provides innovative solutions such as incidental picking for single piece orders, wave continuation algorithm for multi-goods orders, and fast-moving goods processing. These solutions work together to enhance the efficiency in picking and outbound, meeting the demands of customers.

4 Basic Development Elements | 3 Core Resource Libraries | Circulation Industry Scenario Resource Library

Key Features

Scenarios-oriented
Customized for various order types including TOB, TOC, and returned goods, iWMS-Logistics supports outbound with order, outbound in start mode, and distribution by wave. It provides intelligent wave strategy, with wave grouping taking into account multiple factors like order priority, cut-off time, and SKU similarity. Additionally, it supports distribution based on stores, routes, and destinations.

Algorithm-driven efficiency improvement
Based on artificial intelligence and deep learning, iWMS-Logistics incorporates various intelligent task algorithms. In the inbound process, it applies intelligent bin recommendation algorithm, considering factors such as SKU velocity and material similarity to realize optimal inventory distribution. It also applies intelligent wave algorithm and inventory allocation algorithm, considering factors such as priority, inventory distribution, and efficiency to realize optimal inventory allocation and balanced assignment of outbound sites.



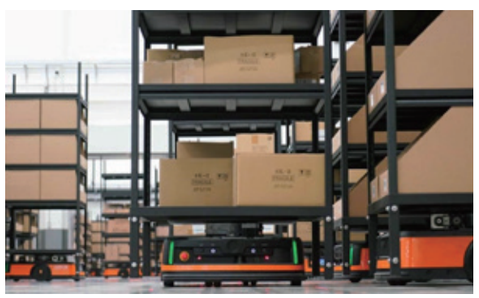
Breakthroughs and innovations
iWMS-Logistics introduces an industry-leading fast-moving goods processing mode, enabling direct outbound and distribution after goods inbound, achieving zero inventory and maintaining an efficiency of 400 to 500 lines per hour. For returned goods warehouses in shoes and clothing industry, which face challenges due to the high variety and complexity of SKUs, the system innovatively adopts wave continuation algorithm to improve hit rates, greatly enhancing the outbound efficiency.

Application Cases

Beijing Xiaomi E-commerce Warehouse Project
Pain points: The traditional manual warehouse picking mode is characterized by low efficiency, high cost, limited flexibility, and heavy labor intensity. Xiaomi wants to introduce the tote-to-person automated system, thus improving warehouse space utilization rate and breakpack efficiency.
Solution: The project adopts a TRP (Tote Relay Picking) solution combining CTU and Q1P. On the software side, the solution adopts iWMS-Logistics and RCS-2000, enabling online changed box inbound, picking and distributing for outbound, and distributing and tallying to dynamically optimize the inventory distribution. Additionally, single piece orders are picked with the multi-material orders, and multi-goods orders are grouped into dynamic wave for outbound. Together with the upgraded intelligent wave algorithm, the solution achieves a peak efficiency of 1,200 orders/hour and a peak picking hit rate of approximately 3.6, meeting the outbound demand for processing an average of 20,000 to 30,000 orders and 60,000 to 70,000 goods per day.

Singapore YCH Smart Logistics Project
Pain points: YCH faces low utilization rate of storage capacity and high warehouse costs, seeking to improve storage density through automated warehousing solution, and to achieve efficient inbound and outbound.
Solution: YCH introduces the tote-to-person intelligent warehouse solution, paired with iWMS software product. The task design includes CTU buffer rack inbound, CTU buffer rack distributing and outbound, and urgent order outbound and distributing. The inbound, outbound, and wave grouping applies the self-developed intelligent algorithms of Hikrobot, such as inbound recommendation algorithm and intelligent wave algorithm. The system intelligently assigns and manages picking waves for orders of different types, enabling smoother order handling, reducing work pressure, and improving operation efficiency.

Shanghai Sunrise Smart Logistics Project
Pain points: With a warehouse area of 11,000 square meters, the project requires a large workforce and high efficiency, while traditional manual work could not meet these requirements and the inbound and outbound throughput demands.
Solution: Sunrise adopts the goods-to-person intelligent warehouse solution, deploying over 300 LMRs. The intelligent warehouse management system (iWMS-1000) docks with the general control system of Sunrise Duty Free seamlessly to perform goods-to-person picking, putaway, and counting tasks, comprehensively improving warehouse picking efficiency, and enabling rapid response to massive and fluctuating business demands. The system handles approximately 150,000 order lines per day and 250+ per hour by each workstation.



Intelligent Warehouse Management System

iWMS-AUTO

Built upon iWMS-1000, iWMS-AUTO (Intelligent Warehouse Management System for AUTO) is specially designed to cater to the unique scenarios in the automotive industry, providing highly professional and tailored goods-to-person intelligent warehouse logistics services. This system enhances product flexibility and coverage, and shortens delivery cycle.

4 Basic Development Elements | 3 Core Resource Libraries | Automotive Industry Scenario Resource Library

Key Features

Integrated warehousing and distribution
iWMS-AUTO covers various stages such as purchased parts inbound, self-made parts offline, direct delivery to production line, goods-to-person sorting, production line delivery, auto parts rack tallying, and returned material management, achieving integrated management of warehousing and production line operations.

Whole plant logistics
iWMS-AUTO provides standard AMR logistics solutions tailored to scenarios like stamping, welding, coating, final assembly, BMS, MCU, VCU, and auto parts, improving logistics flexibility and meeting the flexible production demands for small-batch and multi-goods manufacturing.

Innovative solutions
iWMS-AUTO applies a mode of laser detection and visual gate receiving, which is developed in collaboration with customers, thus greatly enhancing automation, reducing labor costs, and increasing turnover rate.

Application Cases

Geely Original Equipment Manufacturer Project
Pain points: Geely faces the challenges of a wide variety of material, high turnover rate, rapid task cycle time of production line, and high demands on dynamic response and flexibility. For receiving, storage, picking, and distribution, it relies heavily on manual forklifts and latent tractors, leading to low logistics efficiency, difficulty in segregation of personnel and AMRs, and a potential threat to safety.
Solution: From phased implementation to widespread adoption, over 800 AMRs have been deployed across multiple digital factories. By integrating Hikrobot iWMS and RCS scheduling system with Geely GLES upper systems, the project implements smart logistics scenarios, including receiving automotive parts via visual gate, intelligent storage, goods-to-person picking, and unattended production line delivery of parts to final assembly, welding, and painting workshops.

FAW Jiefang J7 Factory Project
Pain points: The heavy-duty trucks of FAW Jiefang have dozens of sub-models for different scenarios. However, the traditional production methods result in long waiting time from order placement to vehicle delivery.
Solution: With the deployment of 200+ AMRs, the project achieves unattended distribution. By integrating the logistics execution system with AMRs, RFID, and delivery vehicles, the solution enables automated material receiving, goods-to-person picking instructions, and dynamic inventory management. This greatly improves flexibility, increases logistics operation efficiency by 55%, and shortens the product delivery cycle.

Nanjing Changan Automobile Smart Factory Project
Pain points: With the rapid development of the automotive industry, rising sales and customized production have led to increased material types, making material pulling and distribution a challenge.
Solution: Over 400 AMRs, including LMRs, HMRs, latent tractors, and CTUs, are deployed in stages such as interior assembly, final assembly, battery pack, front and rear axles subassembly, dash board assembly, and front-end module, covering the final assembly, stamping, welding, and battery workshops. The solution also integrates smart sensing devices of machine vision, realizing automated and intelligent production.

Intelligent Warehouse Management System

iWMS-3C

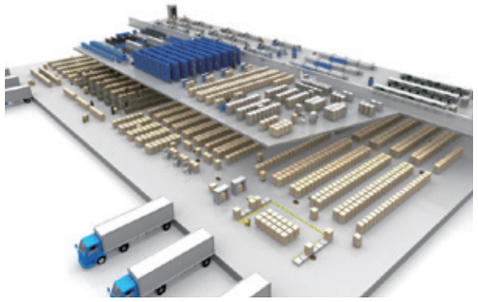
Built upon the Hikrobot system philosophy of 4 + 3 = N, iWMS-3C (Intelligent Warehouse Management System for 3C) is an intelligent warehouse system tailored to the unique characteristics of the 3C industry. With its widest coverage, 3C encompasses various sectors, including mobile phones, computers, consumer electronics, appliance manufacturing, display panels, and semiconductors. From its inception at the Tonglu base, Hikrobot has spent the past decade collaborating closely with key industry customers. Through continuous efforts, it has developed a library of industry-specific scenario resources, such as management by unique code, materials supermarkets, and production line delivery, empowering customers in the 3C industry to advance their intelligent and digital transformations.

4 Basic Development Elements | 3 Core Resource Libraries | Consumer Electronics Industry Scenario Resource Library

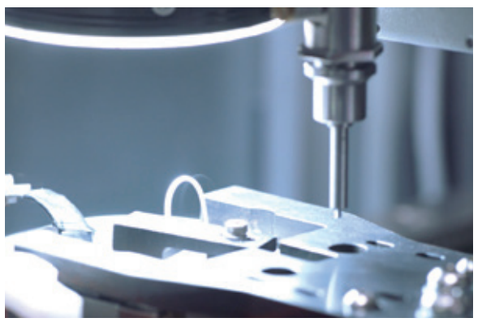
Key Features

Precise management
iWMS-3C offers multi-dimensional inventory management strategies, including managing by unique code, by material, and by serial No., and is compatible with multi-box materials management. It supports the flexible splitting and merging of unique codes to optimize the allocation of inventory.

Integrated warehousing and distribution
iWMS-3C enables logistics from the warehouse to the production line. It supports the picking and outbound of raw materials based on work orders, automatic delivery to materials supermarkets for temporary storage after materials preparation, and subsequent response to production line calling and direct delivery to the production line. After material picking at the production line, the system also supports automatic recycling and circulation of empty auto parts racks.



Enhanced empowerment
iWMS-3C expands the boundaries of traditional systems. Beyond managing conventional raw material and finished products warehouses, it supports the management of buffer warehouses between production processes and materials supermarkets for production lines. Additionally, it enables users to customize operation interfaces, data dashboards, and business processes. The system also applies the industry-first algorithm for less splitting during outbound, significantly reducing manual splitting tasks and empowering the industry.



Application Cases

OPPO Dongguan Factory CTU Intelligent Warehouse Project
Pain points: The factory previously relies on manual operations for inbound and outbound, leading to low efficiency, high work intensity, and frequent errors in information transferring.
Solution: An innovative VariaPick mode is adopted, and large and small raw materials realize mixed storage management by tote and pallet, increasing utilization rate of storage capacity by over 50%. For purchasing and receiving, the system intelligently calls different AMR types for inbound tasks based on storage areas. Inventory is managed using unique codes. For outbound, picking tasks are generated based on material storage warehouse areas, with tote breakpack and pallet picking at a single site. Inventory data is synchronized with upper level systems in real time. The solution improves overall inbound and outbound efficiency by 40%, and significantly reduces manual work intensity.

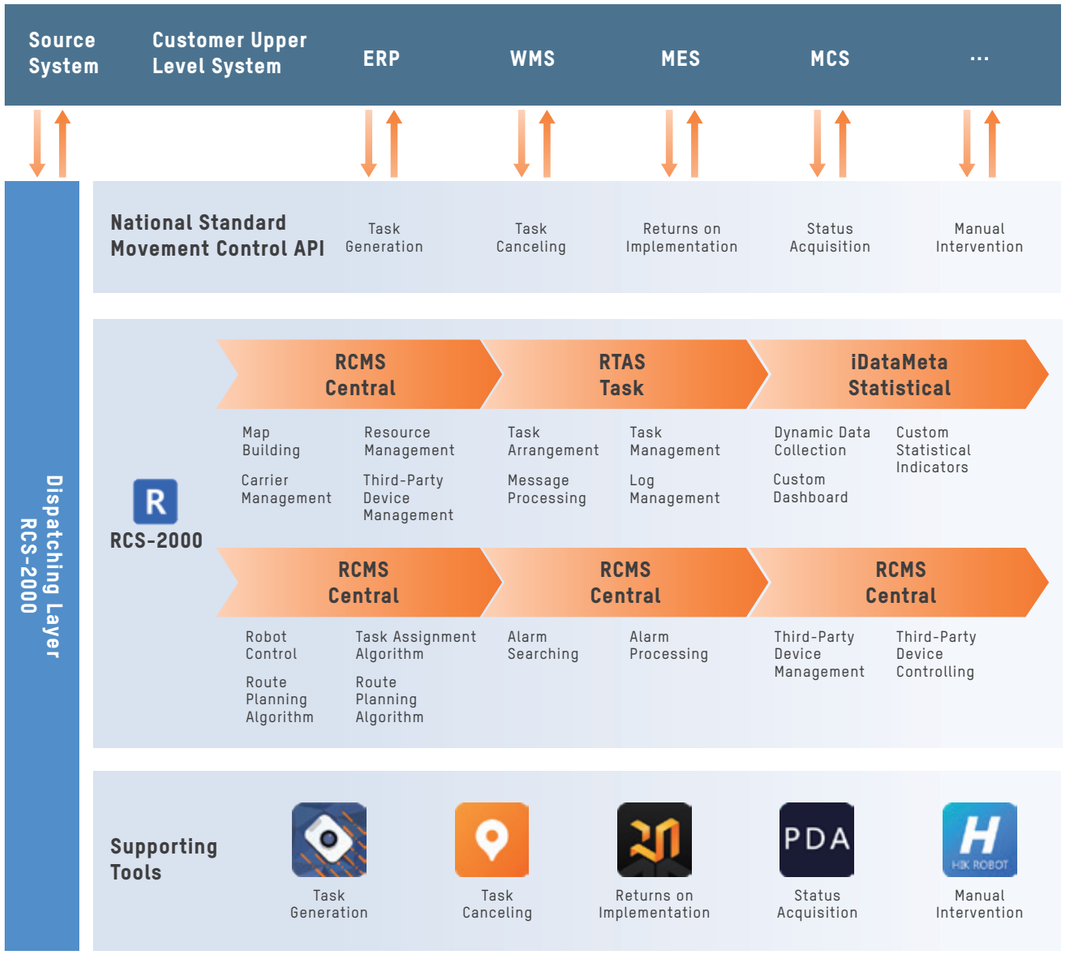
Guilin Kaifa Technology Smart Logistics Project
Pain points: The company purchases a wide variety of raw materials with complex inventory management logic, while maintaining high requirements on timely material delivery to production line. The manual warehouse mode requires a large number of professional personnel.
Solution: The project covers the typical and full-scope business processes of the whole factory in consumer electronics manufacturing, including raw material inbound (purchasing, allocation, transferring, and production return), raw material outbound (production, allocation, and transferring), production carrying (raw material carrying and delivery, temporary storage / carrying of semi-finished products, and finished products out of production line), and finished products inbound and outbound. With iWMS-3C, the project greatly reduces the work intensity of workers and improves the efficiency of picking and distribution, increasing the picking efficiency of single work order by 30% and saving 40% of the workload of logistics personnel in factory.

Guangdong Xinbao Electrical Appliances Smart Factory Project
Pain points: The factory faces complex business operations, poor information flow among systems, low connectivity between warehouses and workshops, and high work intensity of workers.
Solution: The project covers the entire intralogistics processes, from raw material receiving, quality inspection, inbound, picking, cross-floor production line delivery, to finished products inbound. Implemented in 3 phases, it deploys 240 AMRs in total. Seamless docking is achieved between Hikrobot iWMS (intelligent warehouse management system) and RCS (robot control system), and the upper level systems including ERP, QMS, APS, and SRM. The workshops realizes the unattended delivery from raw material warehouse to calling points of production workshops, greatly reducing costs and improving efficiency. The introduction of Hikrobot software systems in the entire process reduces the dependency on manual operation, prevents the system from errors, and reduces the actual stock and inventory record mismatch.

Robot Control System

RCS-2000

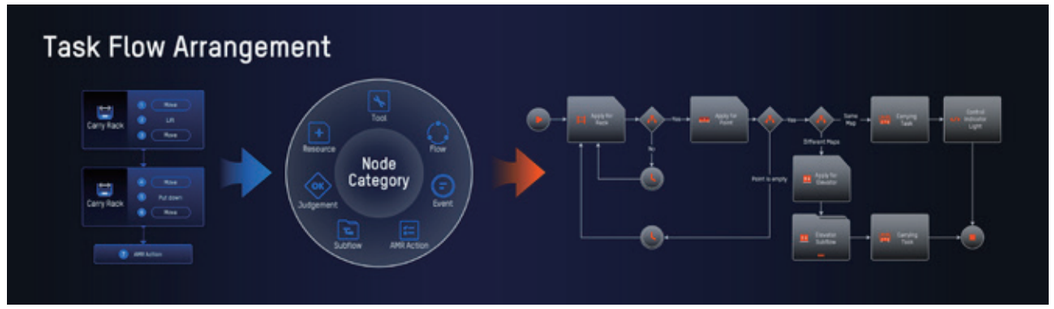
Robot Control System (RCS) is a centralized system for task assignment, AMR scheduling, and route planning for infield logistics robots. Externally, as a downstream system of the order system, the RCS system undertakes the processing of orders. Internally, the RCS system communicates and interacts with access control, elevators, and other equipment within the environment to complete full-field traffic automation. Finally, the RCS system provides complete robot queue exception monitoring and management.



Key Features

Enhances openness at the business level, building task scenes by using branched logical connections.

Adapts to complex task scheduling and responds quickly to task changes.
Provides a rich online code library and enables secondary development.



Abstracts business processes originally tailored to specific projects into scenario modules.

Enables easy dragging of modules to create new business processes that adapt to various business changes.
Continuously accumulates scenario modules through project applications to enhance business coverage.

Intelligent Decision Making / Cluster Operation

Accommodates up to 1,200+ robots in one map, supports assigning tasks to 1,000 AMRs in 1 second, and supports 300 different models of AMR to perform tasks.

Mixed scheduling of multiple AMR types

To cope with more complex scenes of multiple robots working together, it supports same-field coexistence of and transferring between multiple types of robots, such as LMR, FMR, CTU, and CMR.

Flexible integration of multi-type logistics devices

Provides access to WCS devices, supports various mainstream logistics devices communication protocols to enable the integration, and ensures smooth interaction between logistics devices during AMR operations.

Open operation management center

The operation management center offers comprehensive, real-time, and visualized monitoring of server resources, enabling quick inspection of cluster status and pushing of real-time faults and alarms, with multi-level monitoring indicators covering servers, networks, middleware, and application software. It provides a console for application status management and updates, with updating announcements in advance. It also offers a unified and convenient entry for downloading application logs, and automatically handles data backup, migration, and regular clearing.

Application Cases

RCS-2000 is aimed at industries such as manufacturing, consumer electronics, automotive, logistics, food and pharmaceuticals, and fast-moving consumer goods. By controlling and scheduling AMRs, it achieves the carrying automation for raw materials, semi-finished products, and finished products between production lines, between production lines and warehouses, and within warehouses, reducing labor costs and improving work efficiency.

Nanjing Changan Automobile Smart Logistics Project

Pain points: The rapid development of the automotive industry has led to customized production, and the material types have also increased, making material pulling and distribution a challenge. With continuous rising sales in recent years, Changan Automobile has seen an increase in production demand. The company has been exploring ways to enhance the efficiency of material pulling and distribution while not affecting production capacity.
Solution: Over 400 AMRs, including LMRs, HMRs, latent tractors, and CTUs, are deployed in stages such as interior assembly, final assembly, battery packing, front and rear axles subassembly, dash board assembly, and front-end module, covering the final assembly, stamping, welding, and battery workshops. The solution also integrates smart sensing devices of machine vision, realizing automated and intelligent production. In different scenarios, various types of AMRs operate on shared routes. During operation, automatic traffic control ensures orderly coexistence between humans and AMRs, avoiding congestion and safety hazard while improving distribution efficiency.

DAVE & BELLA Smart Warehouse Project

Pain points: The garment industry faces challenges due to a wide range of SKUs, pronounced seasonal changes, and extreme sale fluctuations during promotional events. These characteristics result in difficulties in warehousing, low efficiency, and slow logistics. During major sales peaks, such as Children's Day and the June 18th (618) shopping festival, the kids apparel market demands even higher efficiency in warehousing and logistics.
Solution: The project introduces the tote-to-person solution of Hikrobot. By deploying 75 CTUs in an 8,000-square-meter warehouse, the solution fully utilizes nearly 40,000 storage locations and enables three-dimensional storage, significantly enhancing the storage capacity and efficiency of the warehouse. It not only optimizes warehouse space utilization, but also provides a more flexible and intelligent operation model. Additionally, the precise operation of AMRs eliminates human errors, and their arc-shaped route saves time and distance, further improving work efficiency. To enhance outbound efficiency, the warehouse is divided into fast and slow velocity areas, realizing flexible warehouse management. The system intelligently predicts hot-selling products based on historical outbound data, and moves them in advance to fast velocity area, which is near the picking area, thereby greatly reducing material carrying time.

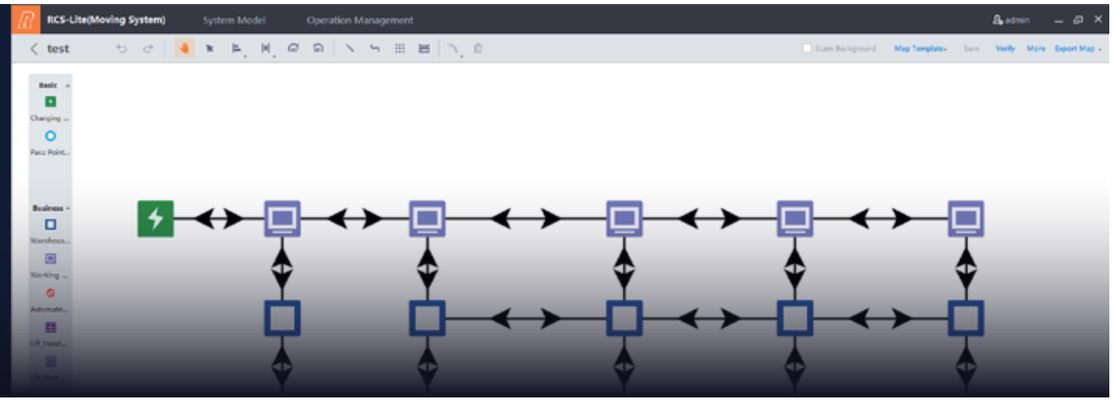
CRRC Times Electric Vehicle Project

Pain points: The company features numerous production lines, each with unique material requirements, favoring a multi-variety and small-batch mode. Materials range widely in size, with a large number of SKUs. Materials are distributed across different warehouse areas by type, involving diverse delivery cycle time. The material distribution points across the factory are extensive and complex, making material delivery quite challenging.
Solution: Low-position CTUs are used to create unmanned warehouses for storing materials used in assembly and converter module production lines, and high-position CTUs are used in the electronic warehouses to store electronic materials for PCBA production, with multi-tote picking adopted. The solution reduces response time from the previous 1.5 to 2 days to just 2 to 3 hours. A centralized distribution area is set in the factory to centralize various materials from the warehouse. These materials are then sorted and distributed based on the specific requirements of each production line. LMRs and CTUs transfer in an organized manner across the centralized distribution area, bulk production areas, and scattered production areas. They automatically carry materials to different production lines, supporting the manufacturing of key parts like high-speed trains of CRH and CR.

Robot Control System-Lite

RCS-Lite

Robot Control System-Lite (RCS-Lite) is designed for AMR projects with a robot count of around 10, aiming at the small and medium-sized robotics market. It advances low requirements for hardware and software. The system has the advantages of rapid deployment, suggested configuration, full-link task flow display, and fast troubleshooting to improve implementation efficiency. It can seamlessly connect to WMS, MES, WCS, and other enterprise systems through flexible management to achieve transparency, integration and intelligence in production and logistics management. The draggable interface helps to combine task actions and configure algorithm for allocating optimal routes for AMR. APP, PDA, caller, and other developed clients makes task application more convenient.



Key Features

Low hardware requirement, reducing project costs

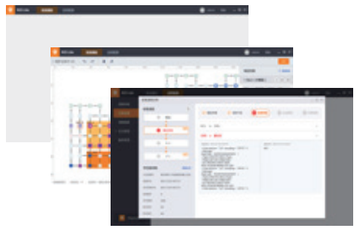
Use of industrial computers or all-in-one computers, reducing project costs

Easy installation and configuration

Supports one-click installation, process chaining configuration, and third-party device access

Low learning threshold

Supports quick start for novices, and Helps users understand the system



Application Cases

Since its development and promotion, RCS-Lite has undergone multiple iterations, and it has been applied in 100+ projects to meet the urgent needs of customers for small and medium-sized AMR carrying projects, helping industries develop in a rapid pace.

3C Electronics Manufacturing Plant Project

Pain points: In the initial stage of enterprise automation upgrading, based on costs and business process integration, experimental and phased transformation approach is preferred. The enterprise hopes to introduce cost-effective and phased AMR solution to save costs.
Solution: Reducing hardware and software costs by using industrial computers or all-in-one computers as the hardware devices to support the scheduling system. The plant has 230 pallets, with an operating area of 2,000 square meters and an average of 200+ tasks per day. Three AMRs have been put into operation to realize PCB board loading and unloading process.

Photovoltaic Company Factory Project

Pain points: Cross-floor carrying via elevator is required, bringing difficulty to the transformation from manual forklift operation to FMR operation. In the process of implementation and use, it is found that the transformation cycle is too long, and systematic learning of automation equipment is difficult.
Solution: The RCS-Lite system is used with two automated FMRs to transform to automation operation mode; roadways are adopted to increase pallet storage capacity. The system helps to perform efficient automated carrying in the case of low business volume and limited number of robots. After one week of implementation by the new integrator's staff, the project can be launched and delivered to the customer.

Production Line Material Control System

MCS

MCS (Material Control System) is designed with a focus on highly automated industries such as lithium battery and photovoltaics, targeting collaborations with industries and enterprises seeking to achieve highly automated production. Built upon WCS (Warehouse Control System) of Hikrobot, MCS enables management of production line machines and collection of loading and unloading signals. It can also seamlessly dock with upper level systems like MES, facilitating the applying of loading and unloading tasks. With flexible configuration of machine site rules, MCS meets the production line material pulling demands for various scenarios, such as empty-full exchange and calling first then unloading, and identifies the optimal material based on these demands. Ultimately, material carrying tasks are executed via RCS-2000, ensuring smooth material flow between production line machines and supporting a wide range of production scenarios, including multi-material matching, material transportation, material updating, and material verification.

Key Features

Visualized workshop production line model

Supports the management of workshop machines, sites, buffer areas, buffer area racks, bins, and other related infrastructure, displaying real-time inventory and material information for buffer area bins or storage locations; provides data support for matching required materials to machines.
Supports calling rules based on multi-materials and multi-attributes, and supports various strategies and scenarios such as expiration reminders, timeout alarms, first-in-first-out, and categorized storage.

Demand reception and task management of machine loading and unloading

Supports setting loading and unloading rules for each site of the machine. Supports external systems, such as upper-level systems and MES, to apply material pulling signals. Based on the signals, MCS identifies target materials and destinations such as machines, sites, and areas. It automatically matches rules and generates carrying tasks.
Supports AMRs performing empty-full exchange and a single AMR performing combination pulling, such as calling first then unloading, loading empty carriers first then unloading full materials, and loading and waiting for a certain time before unloading.
Supports material confirmation, material quality inspection, material updating, and material tracking for both calling and unloading.

Diverse site pulling strategies to meet production cycle time

Supports triggering tasks in advance, adjusting task priorities, and other pre-pulling strategies.
Supports scheduled execution, conditional execution, and task serialization or parallelization.
Visualized and real-time monitoring and task cycle time calculation to increase efficiency.
Supports real-time displaying of pulling and carrying at each site, and real-time calculation of completion time, from material searching, transportation, and loading, to the next round of signal reception.
Supports various emergency handling methods, handling fire alarms, abnormal interruptions, and automatic materials returning.

Application Cases

Post-Processing Project of a Leading Company in New Energy Industry

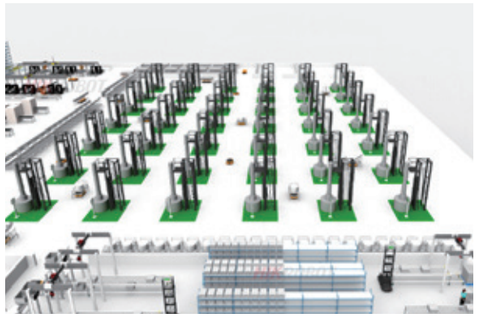
Pain points: Lineside buffer areas in the factory of lithium battery cannot be systematically managed. Manual counting and bookkeeping are time-consuming and laborious. Different processes of lithium battery require different AMR types. Many kinds of materials and expiration dates need to be managed.

Solution: Based on site rule setting, buffer area management, and monitoring dashboard, the MCS system supports automatic operations such as automatic loading/unloading of machines and transferring of electrode rolls between processes, improving the timeliness and safety of logistics and delivery, and enabling digitalized management of intralogistics in the workshop.

Photovoltaic Crystal Pulling Project

Pain points: Due to the extreme length and weight of crystal silicon ingots and the high temperature of the crystal pulling workshops, manual operations are challenging. These processes consume significant manpower for operation and monitoring, and the human-robot coexistence poses safety risks.

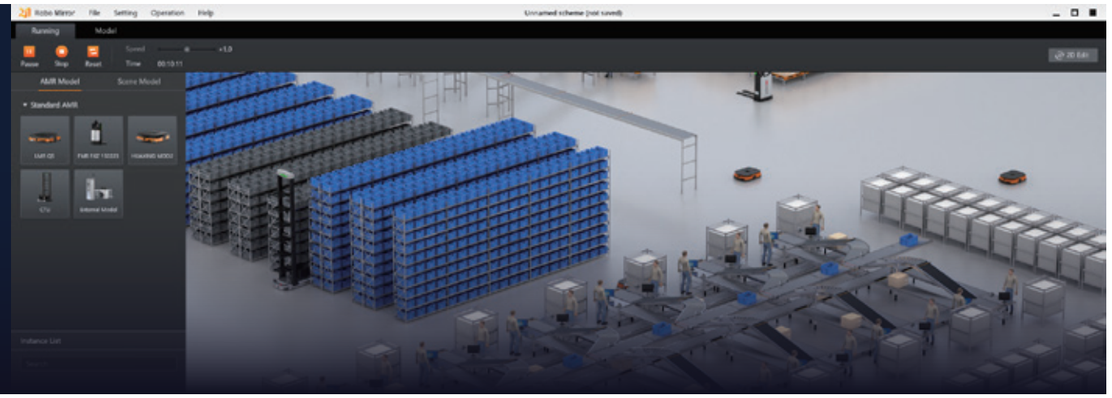
Solution: MCS docks with the upper system, and leverages features such as site pulling rules, buffer area configuration, non-locked start and target points, linked sites, and monitoring dashboards to achieve signal docking for loading and unloading along the production line. Catering to different furnaces and specifications within the factory, and meeting production requirements, it supports scenarios such as first-in-first-out and manual intervention to ensure material verification in sequence and material rechecking. This helps enterprises achieve the goal of dark factories, realizing fully automated and unattended production.



Full Delivery Cycle Software Suite

RoboMirror

RoboMirror, also known as mobile robot simulation software, is used to provide 3D visualization simulation of AMR operation model, operation environment, and operation logic. Users can use RoboMirror to build virtual AMR and AMR operation environment, execute the tasks issued by the scheduling system, and realize the whole business simulation.

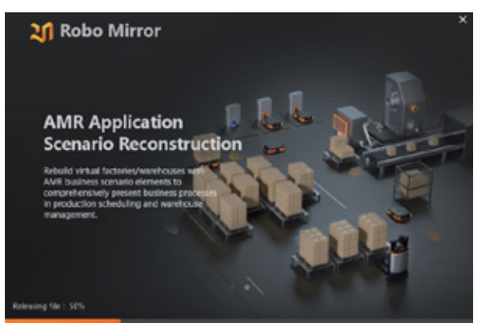


Key Features

AMR rapid autonomous building
Choosing common chassis driver and combining multiple execution structures to build an AMR quickly.

Virtual sensors empowering intelligent innovation
Virtual sensor technology and multi-dimensional spatial perception capability empowering AMR intelligence.

AMR application scenario reconstruction
Reconstructing virtual scenarios and presenting business processes.

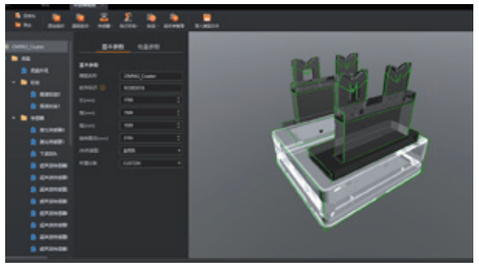


Application Cases

AMR rapid autonomous building
1. It can rapidly build a simulation AMR for design verification based on the design prototype, significantly shortening the delivery cycle.
2. It deeply optimizes navigation perception algorithms through virtual sensor information, covering more industry scenarios.
3. It realizes 1:1 restoration of on-site task scenes and flows, and deep customization of optimization strategies, tapping the upper limit of business efficiency.

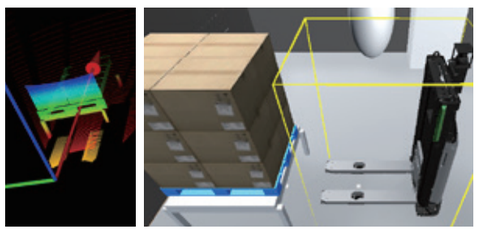
New Energy Industry Project Case

The new model designs in this project are verified through simulation, shortening the delivery time by about 4 to 6 weeks.



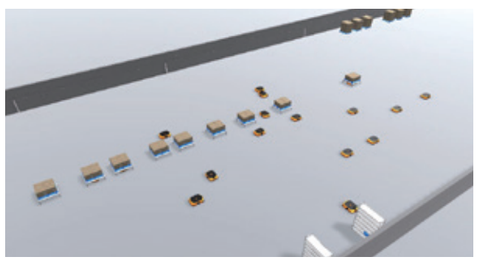
Smart Logistics Project Case

For different working conditions, the pallet recognition dataset is built through virtual simulation data to improve the success rate of the recognition algorithm.



In-Plant Carrying Project Case

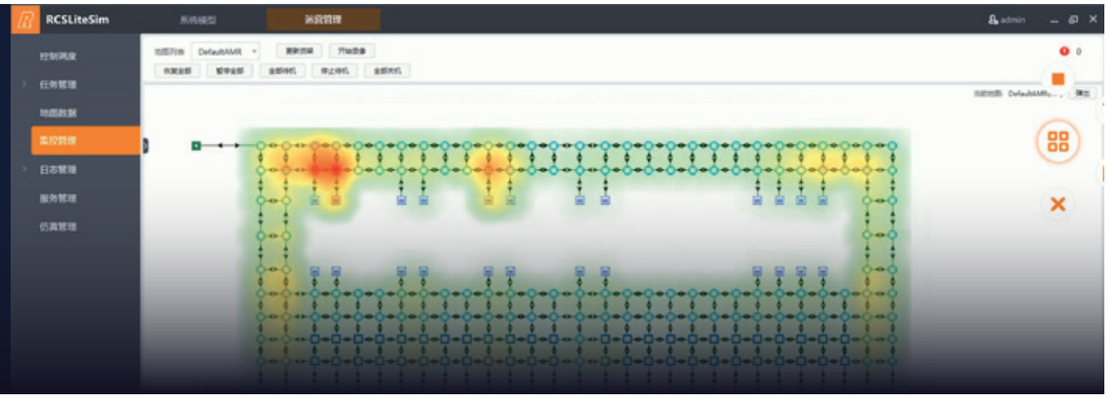
In the project, efficiency bottlenecks are analyzed through simulation, and buffer area is redesigned to improve timeliness rate of carrying by 20%.



Full Delivery Cycle Software Suite

RCSLiteSim

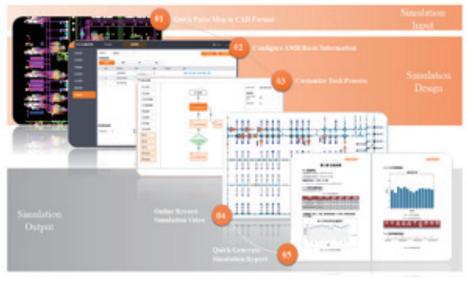
RCSLiteSim is a flexible software that achieves quick simulation. It integrates full-chain simulation functions from CAD drawings to simulation reports, meeting the material carrying simulation needs of various industries and scenarios.



Key Features

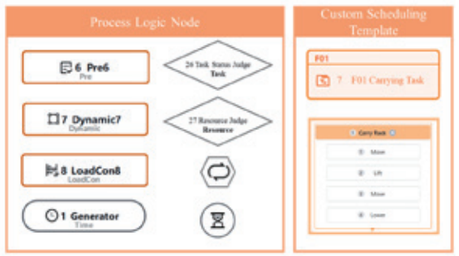
Full-chain simulation

The software integrates full-chain simulation functions, including one-click parsing of CAD layout plans, custom arrangement of business processes, acceleration of simulation processes, real-time viewing of simulation monitoring, immediate analysis of simulation data, and one-click generation of simulation reports.



Flexible arrangement of simulation task logic

With 8 major logical nodes and numerous scheduling templates, you can customize the arrangement of simulation task logic to flexibly apply simulation tasks. Code-free and no experience required, it meets the simulation needs for AMR carrying tasks across industries and scenarios.



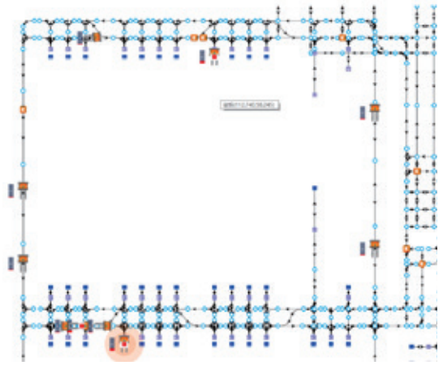
Multi-dimensional analysis of simulation results

Simulation is conducted based on simulation maps and task arrangement. Once the simulation is completed, reports can be exported with one click. These reports provide key data analyses, such as AMR task completed quantity, AMR device utilization rate, and AMR task execution distribution, empowering project decision-making and analysis.

Application Cases

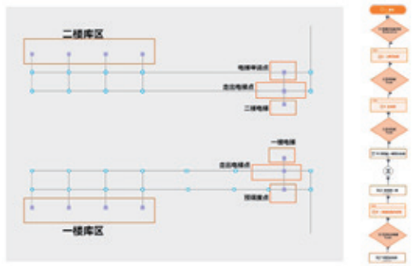
FMR + LMR Carrying Efficiency Simulation in 3C Industry

This project involves FMR floor stacking warehouse areas and LMR multi-layer rack warehouse areas, with dozens of FMRs and LMRs coexisting and performing carrying tasks within the same area, leading to aisle resource constraints. By dividing the warehouse areas and arranging simulation tasks in the simulation environment, and observing real-time task execution via MonitorClient, route optimization and device quantity assessment are conducted.



AMR Cross-Floor Carrying Efficiency Simulation in Home Appliance Industry

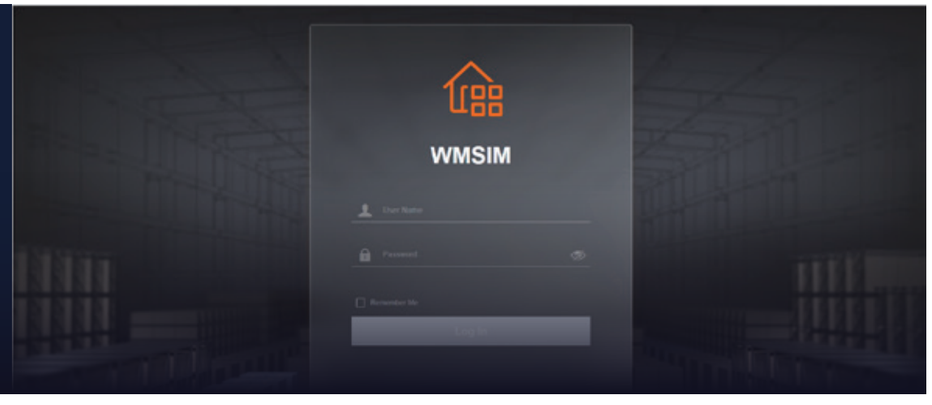
This project involves a multi-floor finished products warehouse. After processing, finished products are transferred via elevators to designated storage floor. AMR on the second floor carries goods to the elevator, and the pre-scheduled AMR on the first floor waits at the elevator waiting point. Once the elevator arrives at the first floor, AMR carries goods to the target warehouse area. By arranging logical and scheduling nodes, simulation of the task scene is achieved, assessing AMR task execution efficiency and the required devices quantity.



Full Delivery Cycle Software Suite

WMSIM

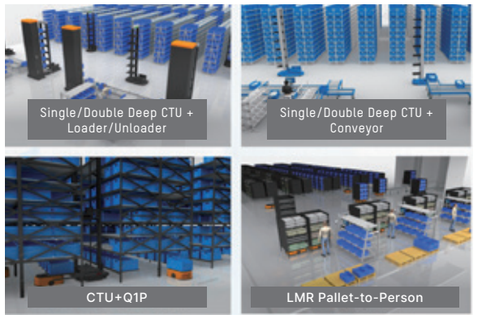
WMSIM is a simulation platform for AMR warehouse solutions with autonomous planning capabilities, supporting multi-user online login and simulation.



Key Features

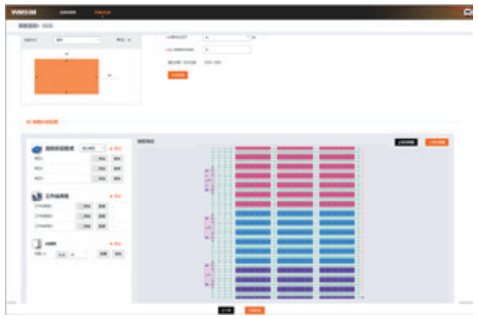
Standard paradigms for warehouse solutions

The platform offers typical warehouse solutions such as “single/double deep CTU + loader/unloader” and “single/double deep CTU + conveyor.” It also incorporates strategies like incidental picking, empty totes returning, and wave assignment. You can select suitable solutions based on application requirements and warehouse planning for solution designing and simulation verification.



One-click solution generation and quick simulation configuration

The platform automatically generates 3D solutions based on warehouse area and storage patterns. You can configure the input parameters such as subdivided warehouse areas, storage capacity structure, inbound/outbound order structure, workstation efficiency configuration, and AMR device quantities. With accelerated simulation, the platform quickly realizes AMR warehouse solution designing and simulation verification.



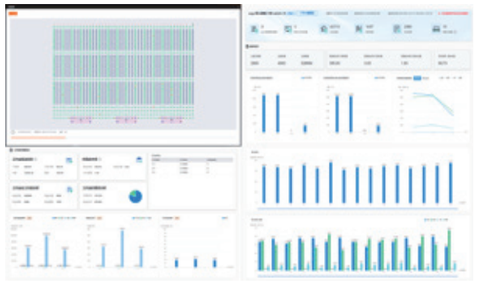
Multi-dimensional analysis of simulation results

Through 3D and 2D simulation monitoring, you can view simulation processes and operation statistics data in real time. The platform provides multi-dimensional analysis of data such as tote hit rates, workstation picking efficiency, workstation utilization rate, AMR task completed quantity, and AMR device utilization rate. It enables simulation verification for issues like warehouse area, aisle quantity, storage capacity distribution, AMR device quantity, and task area allocation.

Application Cases

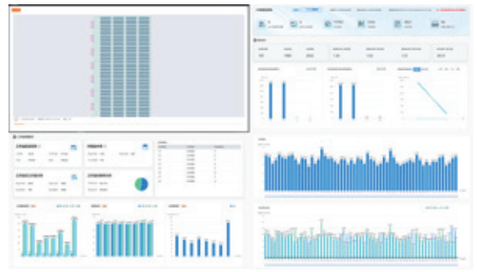
CTU Warehouse Simulation Case in Pharmaceuticals Industry

The project involves a warehouse area of approximately 2,500 square meters, with 31,000+ bins and 22,000+ SKUs. The initial plan includes three FlashStations and 15 CTUs. However, WMSIM simulation analysis reveals a CTU utilization rate of 95%, indicating insufficient CTU quantity. Through subsequent simulation verification, the number of CTU increases to 19. After the project is implemented, the FlashStation picking efficiency matches the CTU quantity, meeting the requirements of customers for outbound cycle time and effectively mitigating project risks.



CTU Returned Goods Warehouse Simulation Case in Shoes and Clothing Industry

The warehouse, covering about 5,000 square meters, is equipped with 59 CTUs and 8 picking workstations. Due to the large SKU variety and low overall hit rate, efficiency bottlenecks emerges. WMSIM simulation analysis identifies imbalances in task assignment among workstations, resulting in multiple tasks to some CTUs while some are idle, thus reducing efficiency. To address this, the workstation task assignment algorithm is optimized, achieving balanced task assignment and greatly improving overall outbound efficiency.



Full Delivery Cycle Software Suite

MapStudioPro

MapStudioPro is a one-stop deployment software designed for AMR system, integrating multiple tools such as MapStudio, RoboX, iAS, HIK-Code, and RCU. It features a new function layout and an excellent user experience, making system implementation more convenient and efficient. The main functions include map management, AMR and third-party device management, and log analysis.

Key Features

Integration of multiple tools

MapStudioPro integrates various tools commonly used in daily project implementation, including RoboX for device management, MapStudio for map implementation, iAS for log analysis, and HIK-Code for coding, serving as a comprehensive toolkit for technical support.

New function layout for device management and great user experience

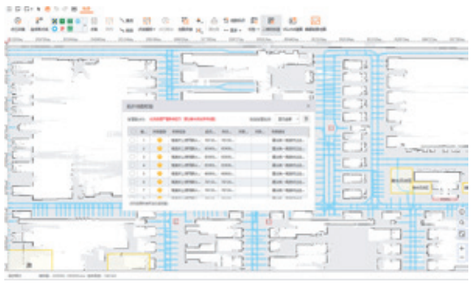
Centered around device parameter configuration, status viewing, and commonly used device management, MapStudioPro features:
1. Integration of parameter configuration and corresponding status information for centralized viewing;
2. Organized common functions of devices and a function menu bar;
3. A step-by-step guidance for quick configuration of devices, simplifying the device online process.

One-stop mapping process guidance

MapStudioPro displays mapping process on interface, guiding users through each step of the workflow, including onsite implementation confirmation, route designing, parameter configuration, data collection, and map editing. This structured guidance ensures an orderly mapping process.

Comprehensive and convenient mapping functions

MapStudioPro supports batch configuring map elements, greatly enhancing the speed of map editing. It also enables map validity checking to promptly identify abnormal and unreasonable configuration, calling for adjustments.



Full Delivery Cycle Software Suite

iDatameta

The iDataMeta data analysis platform collects real-time data of AMRs, devices, business, and operation and maintenance through a modular approach, and performs intelligent data management, analysis, and visualization display. It supports integration with multiple data sources, and customization of data models and visualization. With low-code elements, it allows rapid construction of application scenarios, providing quick guidance for AMR operation and maintenance and comprehensive business data analysis for managers. This assists in decision making and improves production efficiency.

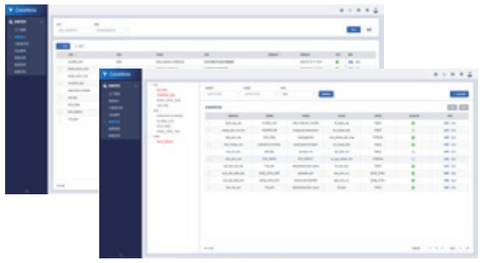
Key Features

Rich visualization applications

The analysis chart supports in-depth analysis from such dimensions as devices, efficiency, tasks, and alarms, the device statistics dashboard provides an operation overview, the integrated monitoring dashboard combines real-time operation monitoring with data analysis, and the business monitoring dashboard offers real-time monitoring of business operations and maintenance.

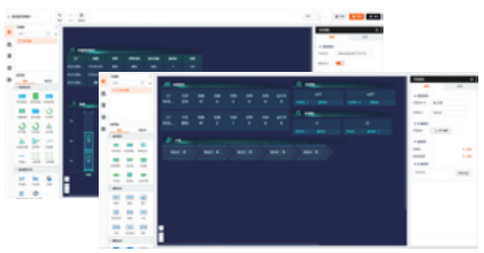
Custom data collection

Custom data collection supports various data sources, easily collecting data through system tracking. It also supports data cleaning and aggregation, and archives data based on production shifts to make data analysis more accurate.



Multi-dimensional perspectives and full-scene perception

igitalPlant supports fixed perspectives, tracking perspectives, and patrol route modes, perceiving the overall situation while considering the layout from different angles.



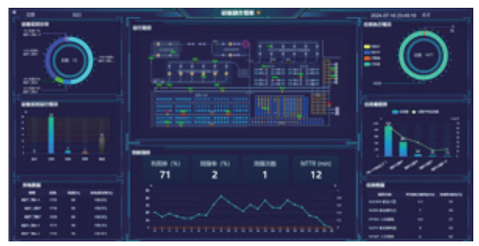
Application Cases

Host Assembly Workshop Case

Pain points: Production personnel cannot monitor the process of material calling and delivery, and production operations and maintenance teams cannot promptly learn about the execution of AMR tasks and elevator exception, leading to delayed maintenance, production shutdown, and warehouse overflow.
Solution: By implementing a business monitoring visualization dashboard, the system tracks warehouse areas, AMR task execution, and elevator operations in real time. It utilizes water levels, timeout thresholds, and AMR alarms as warning indicators to prompt proactive handling by the operations and maintenance team, thus ensuring smooth production logistics and improved efficiency.

Consumer Electronics Manufacturing Workshop Case

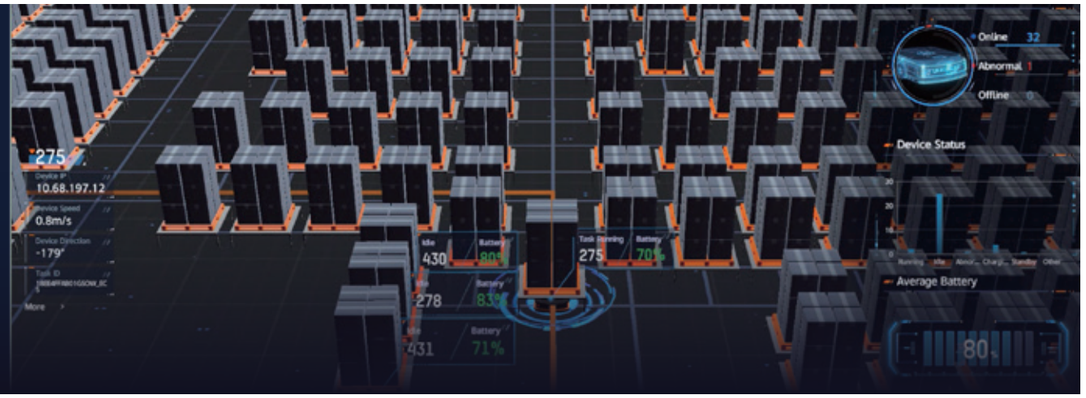
Pain points: The enterprise needs to show its intelligent manufacturing and digital capabilities during visits, but these features cannot be displayed through a dynamic dashboard.
Solution: Through the integration of device statistics dashboard and AMR real-time monitoring, both the dynamic device operation and data statistics can be displayed. The solution allows flexible adjustments based on onsite area and layout, better showing the intelligent operation capabilities of the enterprise.



Full Delivery Cycle Software Suite

DigitalPlant

DigitalPlant is a digital twin software specializing in the industrial logistics sector. It works seamlessly with the Hikrobot RCS-2000 system. By acquiring maps, storage objects, and carrying objects data while collecting real-time operation data of AMRs, it presents the real-time logistics operations of the entire factory in 3D. By combining the physical and digital worlds in 3D, dynamic data is displayed more vividly and intuitively, creating a digital factory. DigitalPlant supports real-time AMR status displaying, real-time alarm displaying, dynamic data statistics, custom patrol route, and custom layout of external device models. On this basis, it supports connection to security monitoring devices for a full-perspective view.



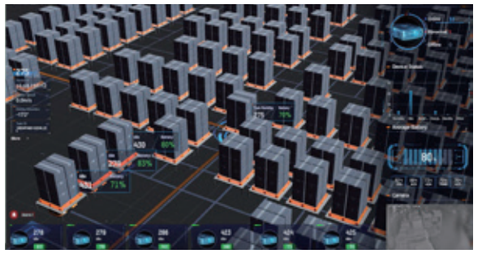
Key Features

Multi-AMR type model with restored digital-physical mapping

DigitalPlant uses physical data interfaces and 3D visualization technology to display physical models in a 3D format. It supports 3D dynamic displaying of the entire AMR type series of Hikrobot, and allows custom layouts of standard physical models, accurately restoring the real production environment of the factory.

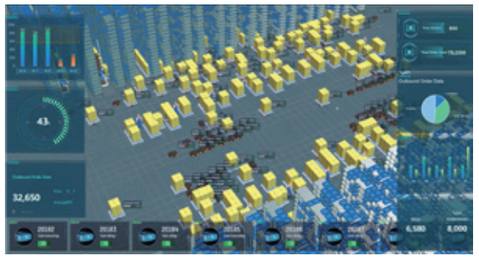
Diverse information displaying and comprehensive data monitoring

Supports displaying images in multiple angles, and robot tracking mode.



Statistics and report

Supports analysis of task execution status.



Application Cases

DigitalPlant enables a first-hand view of the entire business and visualization of business details.

Photovoltaic Industry Project Case

300+ AMRs are deployed on the project site, docking to the machines and racks to perform tasks. DigitalTwin is adopted to present the robot docking process by showing the task execution status as well as the AMR status in real time.

Autonomous Mobile Robot

LMR

Latent Mobile Robot

LMR is a leading mobile robot product characterized by its lifting mechanism. LMR has an optimized motion performance and enhanced safety protection.

CMR

Conveyor Mobile Robot

CMR covers conveyor & transmission series, latent tractor series, and lifting series. With high customization mechanism, it can fulfill auto transferring requirements in different scenes.

HMR

Heavy-Duty Mobile Robot

HMR covers various series, such as heavy-duty lifting, coating, crystal silicon ingot carrying, and automotive final assembly line. With high customization mechanism, it can fulfill requirements for carrying materials with heavy weight and large volume.

FMR

Forklift Mobile Robot

FMR focuses on the automatic transportation of standard pallets. Various series of unmanned products are involved, such as omnidirectional stacking, carrying, and reach truck series.

CTU

Carton Transfer Unit

Based on tote-to-person solution, CTU and its accessories include single-cargo series, multi-cargo series, and high-speed sorting system, achieving outstanding performance in precise delivery and efficient inbound and outbound of totes/materials. It is applicable to scenarios such as multi-level tote storage, efficient storing and picking, and production material delivery.

Intelligent Workstation

Intelligent workstation includes FlashStation product series, assisting the mobile robot in efficiently executing various tasks.

Accessory

Accessory

The accessories include charging station, caller, and I/O controller, realizing flexible docking with the mobile robot for efficient task execution such as charging.

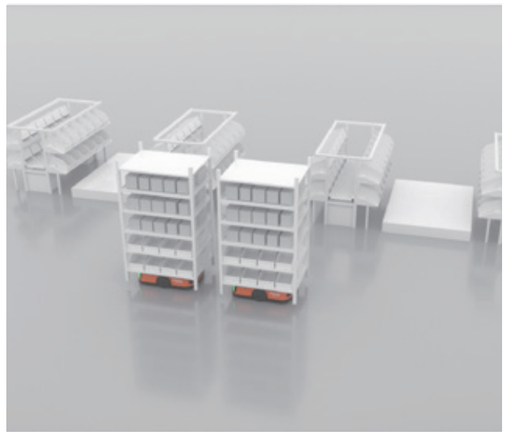
Latent Mobile Robot (LMR)

Backpack Latent Mobile Robot - Lifting Type

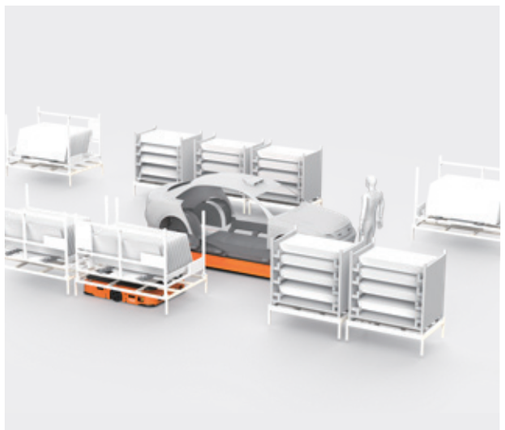
A lifting LMR is an automated logistics device capable of autonomous loading, lifting, and transportation. Characterized with a lifting device, it can lift goods from the ground to a higher position to perform carrying and storage tasks. It is commonly used in industrial and warehousing logistics scenes to effectively improve productivity and reduce logistics costs.

Application Cases

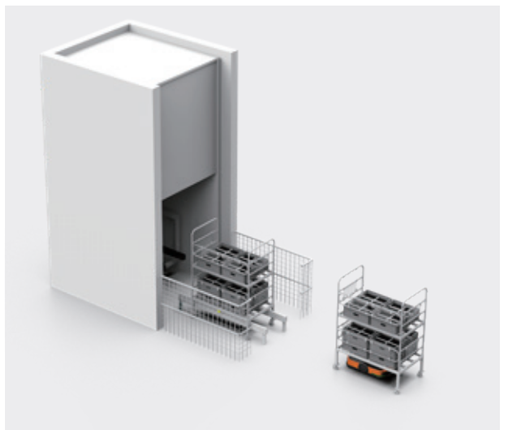
Circulation 3C tote carrying



Workstation picking in circulation industry



Automotive parts carrying



3C warehouse carrying

Key Features

High extensibility
- Extension modules and assemblies: supports rapid delivery and convenient operation
- Various hardware third-party devices: one-stop configurable third-party devices

High flexibility
- Intelligent integrated sensing: integrated sensing with data from multiple sensors
- Precise controlling: high-accuracy motions and docking
- Multiple navigation modes switching: switching among V-SLAM, L-SLAM, and 2D barcode navigation modes
- Multi-safety protection: multi-directional stereoscopic protection and multiple safety protection measures

Strong adaptability to scenes
- High load/weight ratio: outstanding loading capacity
- Long endurance: high transmission efficiency and long battery life
- Strong adaptability to carriers: flexibly transfers carriers in various sizes
- Cluster collaboration: provides scheduling and carrying in large scale clusters

Specification

Model						
		Q1P-40	**Q2-400D**	**Q3-600D**	**Q7-1000E**	**Q8-2000A**
Basic Parameter	**Navigation mode**	2D barcode	2D barcode/LSLAM	2D barcode/LSLAM	2D barcode/LSLAM	2D barcode/LSLAM
	Dimension (L × W × H) (mm)	650*450*380	780*545*300	950*650*250	1150*820*254	1523*1150*327
	Rotation diameter (mm)	680	820	995	1200	1780
	Chassis above ground (mm)	15	30	25	25	25
	Lifting platform dimension (mm)	Comb assembly	724*504	850*600	1030*770	1250*1000
	Lifting stroke (mm)	400	60	60	60	100
	Lifting structure type	Electric	Electric	Electric	Electric	Hydraulic
	Weight (kg)	75	93	132	172	550
	Rated load (kg)	40	400	600	1000	2000
	Human-machine interaction	/	Touchscreen	Touchscreen	Touchscreen	Touchscreen
Safety Protection	**Front protection**	Laser	Laser	Laser	Laser	Laser
	Rear protection	Customizable	Customizable	Customizable	Customizable	Customizable
	Side protection	Customizable	Customizable	Customizable	Customizable	Customizable
	Sound and light alarm	Support	Support	Support	Support	Support
	Laser clearance lamp	Customizable	Customizable	Customizable	Customizable	Customizable
	Bumper strip	Support	Support	Support	Support	Support
	Emergency stop button	Support	Support	Support	Support	Support
Motion Performance	**Rated running speed (empty) (mm/s)**	4000	2000	2000	2000	940
	Rated acceleration (empty) (mm/s²)	2000	800	1200	1000	500
	Positioning accuracy (mm)/(°)	±10/±1	±10/±1	±10/±1	±10/±1	±10/±1
Battery Performance	**Run time (h)**	4-6	8	8	8	8
	Charging time (h)	≤1.5	≤1.5	≤1.5	≤1.5	≤1.5

LMR

Backpack Latent Mobile Robot - Chassis Type

A chassis LMR is a mobile robot supporting upper-level extension and chassis mobility. Integrated with upper-layer mounting holes and interface boards for upper-level structures acquiring port, it can connect with various upper-level extension structures, such as rollers, small mechanical arms, patrolling cameras, and environmental testing equipment. With strong secondary development capabilities, it can be widely used in industrial, warehousing logistics, intelligent manufacturing, and other scenes.

Application Cases

Upper-layer roller equipment

Upper-layer mechanical arm equipment

Upper-layer lifting equipment

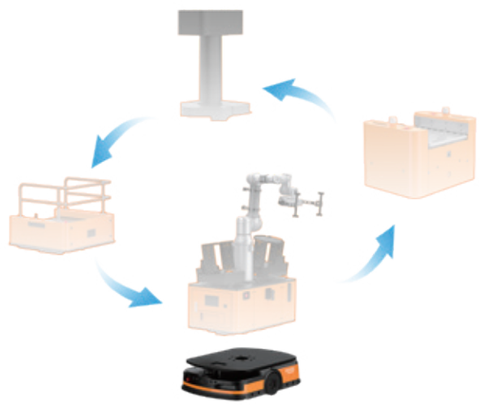
Upper-layer belt equipment

Key Features

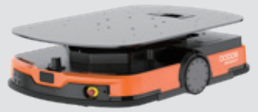
High extensibility
- Compatible with various upper-level structures, including rollers, small mechanical arms, and patrolling equipment
- Supports hardware interface requirements such as power supply, communication, and I/O from upper-level structures

Rich products
- Its products include Q2B, Q3B, Q7B, and other series, allowing for selection based on the requirements of different upper-level structures
- Developed by the same platform as the lifting LMR, it is characterized with modules and assemblies, and rich hardware third-party devices

High flexibility
- Intelligent integrated sensing: integrated sensing with data from multiple sensors, supporting soft obstacle avoidance
- Precise controlling: high-accuracy motions and docking
- Multiple navigation modes switching: switching among V-SLAM, L-SLAM, and 2D barcode navigation modes. Multi-safety
- Protection: multi-directional stereoscopic protection and multiple safety protection measures



Specification

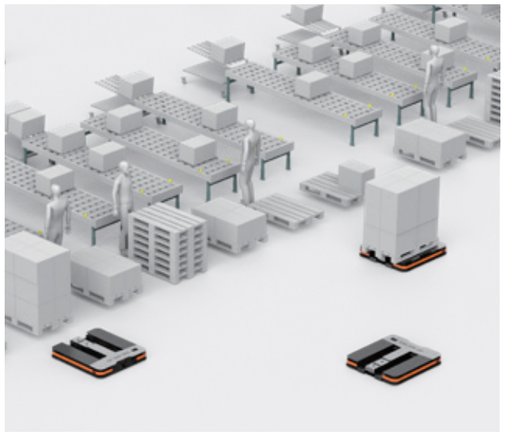
Model				
		Q2B-400D	**Q3B-600D**	**Q7B-1000E**
Basic Parameter	**Navigation mode**	2D barcode/L-SLAM/V-SLA	2D barcode/L-SLAM/V-SLA	2D barcode/L-SLAM/V-SLA
	Dimension (L × W × H) (mm)	780*545*300	950*650*300	1150*820*300
	Rotation diameter (mm)	820	995	1200
	Chassis above ground (mm)	30	25	25
	Lifting platform dimension (mm)	/	/	/
	Lifting stroke (mm)	/	/	/
	Lifting structure type	/	/	/
	Weight (kg)	90	126	184
	Rated load (kg)	400	600	1000
	Human-machine interaction	Touchscreen	Touchscreen	Touchscreen
Safety Protection	**Front protection**	Laser	Laser	Laser
	Rear protection	Customizable	Customizable	Customizable
	Side protection	Customizable	Customizable	Customizable
	Sound and light alarm	Support	Support	Support
	Laser clearance lamp	Customizable	Customizable	Customizable
	Bumper strip	Support	Support	Support
	Emergency stop button	Support	Support	Support
Motion Performance	**Rated running speed (empty) (mm/s)**	2000	2000	2000
	Rated acceleration (empty) (mm/s²)	800	1000	1000
	Positioning accuracy (mm)/(°)	±10/±1	±10/±1	±10/±1
Battery Performance	**Run time (h)**	8	8	8
	Charging time (h)	≤1.5	≤ 1.5	≤ 1.5

LMR

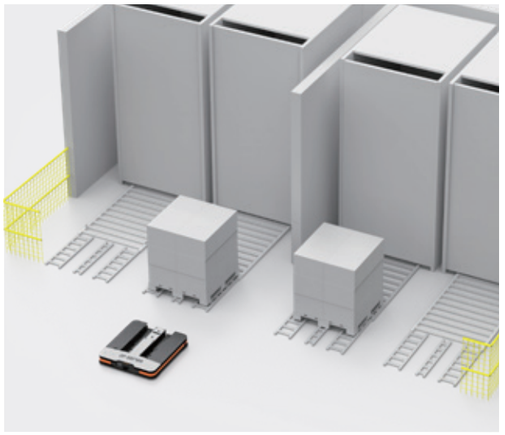
Forklift Latent Mobile Robot

Forklift LMR combines the advantages of LMR and FMR. Equipped with both the chassis and forks, it retains the flexibility of LMR while being able to directly carry pallets. It addresses the pain points of existing FMR such as large turning radius and slow moving speed, and those of LMR such as requiring additional single-layer racks when LMR carries pallets.

Application Cases



Material distribution



Ground roller conveyor docking

Pallet-to-person

Unstacker crane automatic docking

Key Features

Rich product lines

- Two types of chassis: differential chassis and omnidirectional chassis
- CE safety configuration: complies with Machinery Directive (MD), Radio Equipment Directive (RED), and Electromagnetic Compatibility (EMC)
- Two types of picking and putaway methods: configured with fork-lifting type and drive-in type for picking and putaway according to various scenarios
- Various types of carriers: national standard pallets, non-standard pallets, and industry-specific racks

Product competitiveness

- Omnidirectional AMR supports extremely narrow roadway picking and putaway with national standard pallets (1.2 m*1 m) to reduce the width of picking and putaway aisle to 1.5 m
- Max. running speed for differential AMR type is 2 m/s
- Rich third-party devices for docking: supports direct interaction with third-party devices such as ground roller conveyors, elevators, freight elevators, air shower gates, etc
- Multiple navigation modes switching: switching among V-SLAM, L-SLAM, and 2D barcode navigation modes
- The full range of products are equipped with carrier dynamic recognition function to precisely recognize pallet, ensuring the safety and reliability of each picking and putaway task

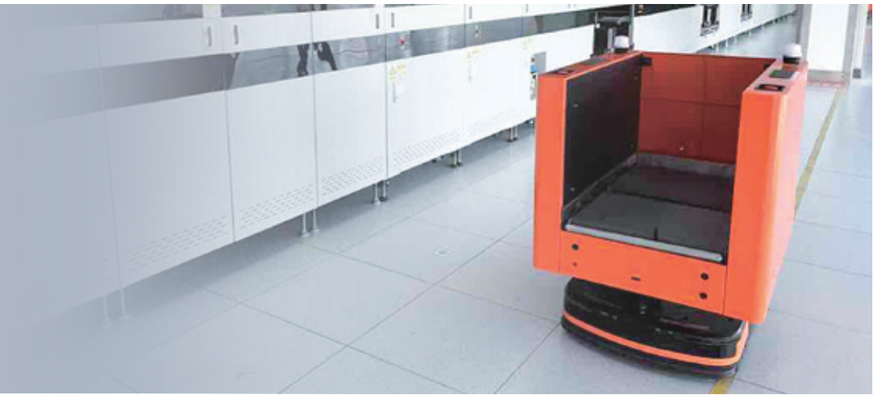
Specification

Model				
		QF2-6000	QF3-1000D	QF2-1000D (CE)
Basic Parameter	Dimension (L × W × H) (mm)	1310*1194*190	1250*1200*190	1423*1200*246
	Weight (with battery) (kg)	330	325	335
	Rated load (kg)	600	1000	1000
	Lifting stroke (mm)	335	335	335
	Applicable pallet entry height (mm)	100-130	95-130	95-130
	Applicable pallet entry inner width (mm)	≤ 140	≤ 210	≤ 140
	Applicable pallet entry outer width (mm)	≥ 600	≥ 670, ≤ 1000	≥ 600, ≤ 1000
	Pallet length (mm)	600~1400	600~1400	600~1400
Safety Protection	Laser obstacle avoidance	Support	Support	Support
	Laser clearance lamp	Customizable	Customizable	Customizable
	Bumper strip	Support	Support	Support
	Pallet in-position detection	Support	Support	Support
	Fork collision detection	Customizable	Customizable	Support
	Emergency stop button	Support	Support	Support
	Low obstacles detection	Customizable	Customizable	Customizable
	Sound and light alarm	Support	Support	Support
Motion Performance	Drive method	omnidirectional	Differential	Differential
	Rated running speed (empty) (mm/s)	1400	2000	1900
	Positioning accuracy (mm)/(°)	±10/±1	±10/±1	±10/±1
	Rotation diameter (mm)	1682	1640	1640
	Min. aisle width (1200 × 1000 pallet)(mm)	1500	1800	1800
Battery Performance	Run time (h)	6-8	6-8	6-8
	Charging time (h)	≤ 1.5	≤ 1.5	≤ 1.5

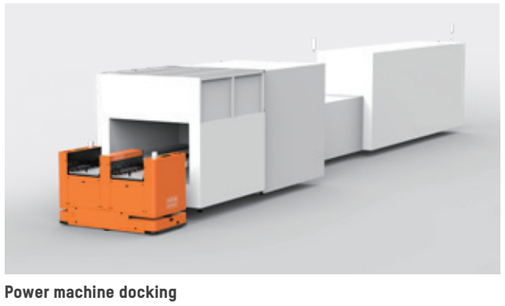
Conveyor Mobile Robot (CMR)

Conveyor & Transmission Series

Conveyor & transmission series robots are based on standard chassis and equipped with upper-level assemblies. Multiple models of the series are developed according to different layers and bins. They can be docked with machines, conveyors, tools, etc. to transfer carriers or materials, so as to meet the needs of intelligent production.



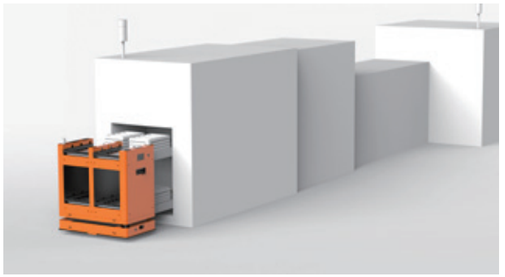
Application Cases



Power machine docking

Conveyor / Buffer conveyor docking

Carrying among Lines



Full and empty totes exchanging

Degumming device carrying in photovoltaics industry

Square crystal silicon ingot carrying in photovoltaics industry

Key Features

- Wide scope of loading capacity, ranging from 15 kg to 1.5 t
- Supports multiple navigation modes, including 2D barcode, L-SLAM, V-SLAM, and tape navigation
- Supports differential and omnidirectional driving
- Max. speed ranges from 1.2 m/s to 1.5 m/s
- Supports seamless switching between multi-robot collaboration and single-robot operation modes
- High-precision docking. The docking accuracy of secondary positioning models reaches ± 5 mm
- Meets the customized needs of various carriers and dimensions
- Supports response to all kinds of structure customization / hardware customization / software business logic customization
- Supports data interface openness (XML/ROBTX) for efficient function configuration and secondary development

Specification

Model							
		CU1-400	CU1-600	CU1-1500	CU2-120	CU2-200	CU4-200
Industry specific		Universal	Universal	Universal	Universal	Universal	Universal
Basic Parameter	Dimension (L × W × H)(mm)	950*840*700	1400*1115*1230	1750*1500*1404	1150*824*1119	1470*950*1438	1250*730*1344
	Rotation diameter (mm)	1218	1740	2230	1337	1708	1410
	Conveying type	Single roller	Single roller	Chain	Double roller	Double roller	Quad-Roller
	Chassis above ground (mm)	25	25	30	25	23	25
	Weight (kg)	550	701	1050	478	540	412
	Rated load (kg)	400	600	1500	120	200	200
	Navigation mode	2D barcode /LSLAM	2D barcode /LSLAM	2D barcode /LSLAM	2D barcode /LSLAM	2D barcode /LSLAM	2D barcode /LSLAM
	Human-machine interaction	Touchscreen	Touchscreen	Touchscreen	Touchscreen	Touchscreen	Touchscreen
Execution Structure	Conveying speed (mm/s)	200	200	150	200	200	200
	Working surface height (from ground) (mm)	500	650	800	450/850	750	450/1150
Safety Protection	Front protection	Laser	Laser	Laser	Laser	Laser	Laser
	Rear protection	Laser	Laser	Laser	Laser	Laser	Laser
	Side protection	-	-	-	-	-	-
	Bumper strip	Support	Support	Support	Support	Support	Support
	Emergency stop button	Support	Support	Support	Support	Support	Support
	Sound and light alarm	Support	Support	Support	Support	Support	Support
Motion Performance	Rated running speed (empty) (mm/s)	1200	1200	1000	1200	1200	1200
	Rated acceleration (empty) (mm/s2)	400	400	400	400	400	250
	Docking accuracy (mm)	±10/±1	±10/±1	±10/±1	±10/±1	±10/±1	±10/±1
	Driving direction	Bi-directional driving	Omnidirectional driving	Omnidirectional driving	Bi-directional driving	Bi-directional driving	Omnidirectional driving
	Other capability	360° in-place rotation	360° in-place rotation	360° in-place rotation	360° in-place rotation	360° in-place rotation	360° in-place rotation
Battery Performance	Run time (h)	6-8	8	6-8	8	8	6-8
	Charging time (h)	≤ 1.5	≤2	≤2	≤2	≤ 1.5	≤ 1.5

Specification

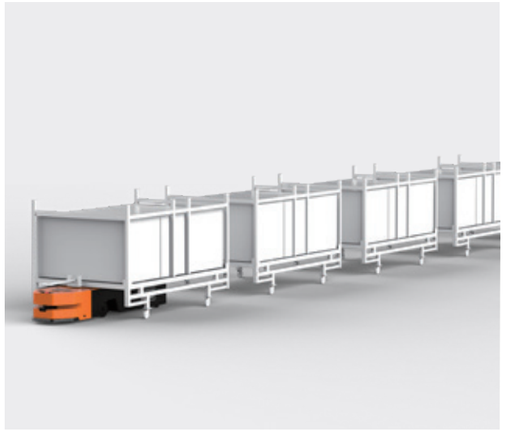
Model							
		CU1-100	**CU1-1000**	**CU1-1200**	**CU1-400**	**CU2-350**	**CU2-100**
Industry specific		Industry-specific CMR for cell workshop carrying in lithium battery industry	Industry-specific CMR for electrode roll carrying in lithium battery industry	Industry-specific CMR for PACK line carrying in lithium battery industry	Industry-specific CMR for degumming device carrying in photovoltaics industry	Industry-specific CMR for sqaure crystal silicon ingot carrying in photovoltaics industry	Industry-specific CMR for frame carrying in PCB industry
Basic Parameter	**Dimension (L × W × H)(mm)**	1304*1134*832	1680*1300*1981	2830*2574*920	1450*630*1053	1182*883*1123	950*650*693
	Rotation diameter (mm)	1619	2074	3646	1548	1459	1085
	Conveying type	Single roller	Single roller	Single roller	Single roller	Double belt	Double chain
	Chassis above ground (mm)	25	40	40	30	25	25
	Weight (kg)	353	1244	1978	415	325	177
	Rated load (kg)	100	1000	1200	400	350	100
	Navigation mode	2D barcode /LSLAM	2D barcode /LSLAM	2D barcode /LSLAM	2D barcode /LSLAM	2D barcode /LSLAM	2D barcode /LSLAM
	Human-machine interaction	Touchscreen	Touchscreen	Touchscreen	Touchscreen	Touchscreen	Touchscreen
Execution Structure	**Conveying speed (mm/s)**	200	150	150	200	200	200
	Working surface height (from ground) (mm)	500	700	820	650	850	360
Safety Protection	**Front protection**	Laser + binocular	Laser	Laser	Laser + binocular	Laser + binocular	Laser
	Rear protection	Laser	Laser	Laser	Laser + binocular	Laser + binocular	Laser
	Side protection	-	binocular	Laser	Laser	-	-
	Bumper strip	Support	Support	Support	Support	Support	Support
	Emergency stop button	Support	Support	Support	Support	Support	Support
	Sound and light alarm	Support	Support	Support	Support	Support	Support
Motion Performance	**Rated running speed (empty) (mm/s)**	1200	1200	1000	1200	1200	1200
	Rated acceleration (empty) (mm/s2)	400	400	400	200	400	400
	Docking accuracy (mm)	±10/±1	±10/±1	±10/±1	±5/±0.5	±10/±1	±10/±1
	Driving direction	Bi-directional driving	Omnidirectional driving	Omnidirectional driving	Omnidirectional driving	Bi-directional driving	Bi-directional driving
	Other capability	360° in-place rotation	360° in-place rotation	360° in-place rotation	360° in-place rotation	360° in-place rotation	360° in-place rotation
Battery Performance	**Run time (h)**	8	6-8	6-8	6-8	6-8	8
	Charging time (h)	≤ 1.5	≤2	≤2	≤ 2	≤ 1.5	≤ 1.5

CMR

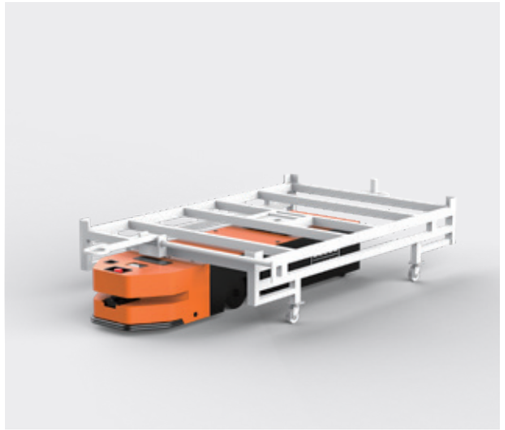
Latent Tractor Series

Latent tractor series robots are based on standard chassis and equipped with upper-level assemblies. Multiple models of the series are developed according to different layers and bins. They can be docked with machines, conveyors, tools, etc. to transfer carriers or materials, so as to meet the needs of intelligent production.

Application Cases

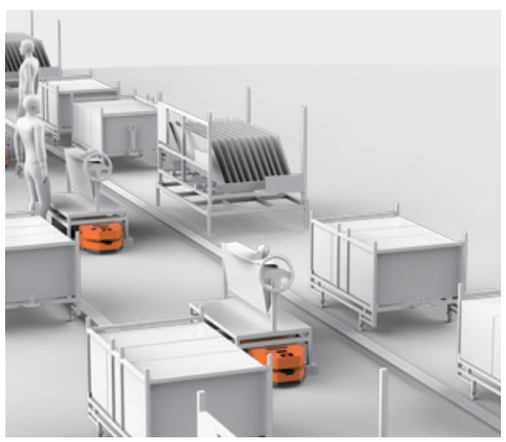


Pulling multiple racks with one AMR



Automatic hook

Lithium PACK assembly line



Automotive final assembly SPS & subassembly line CT5

Key Features

- Load includes 500 kg, 1 t, and 1.5 t
- Supports multiple navigation modes, including 2D barcode, L-SLAM, V-SLAM, and tape navigation
- Supports single-directional and bi-directional driving
- Maximum running speed (fully loaded) is 1.0 m/s
- Supports seamless switching between multi-robot collaboration and single-robot operation modes
- A compact body and small turning radius
- Multi-safety protection, with laser detection, electronic bumper strip, emergency stop and optional 3D obstacle avoidance
- Optional ground and side charging assemblies
- Configurable wireless App and wired manual controller
- Supports data interface openness (XML/ROBTX) for efficient function configuration and secondary development
- Well-developed product baselines and series, contributing to shorter delivery time

Specification

Model					
		CT5-500L	CT5-1000L	CT5-1500L	CT7-1500L
Basic Parameter	Dimension (L × W × H) (mm)	1615*360*285	1615*470*285	1600*540*320	2000*520*320
	Arc turning radius (mm)	1000	1000	1200	1200
	Conveying type	Traction	Traction	Traction	Traction
	Chassis above ground (mm)	30	30	30	30
	Weight (kg)	175	225	410	490
	Rated load (kg)	500	1000	1500	1500
	Navigation mode	QR CODE /LSLAM/VSLAM	QR CODE /LSLAM/VSLAM	QR CODE /LSLAM/VSLAM	QR CODE /LSLAM/VSLAM
	Human-machine interaction	Touchscreen	Touchscreen	Touchscreen	Touchscreen
Execution Structure	Traction pin jacking speed (mm/s)	≥ 20	≥ 20	≥ 20	≥ 20
	Traction pin stroke (mm)	50	50	60	60
Safety Protection	Front protection	Laser	Laser	Laser	Laser
	Rear protection	-	-	-	Laser
	Side protection	-	-	-	Optional
	Bumper strip	Support	Support	Support	Support
	Emergency stop button	Support	Support	Support	Support
	Sound and light alarm	Support	Support	Support	Support
Motion Performance	Rated running speed (empty) (mm/s)	1000	1000	1000	1000
	Rated acceleration (empty) (mm/s2)	500	400	400	400
	Positioning accuracy (mm)/(°)	± 10/± 1	±10/±1	±10/±1	±10/±1
	Driving direction	Forward	Forward	Forward	Bi-directional driving
	Other capability	Arc turning	Arc turning	Arc turning	Arc turning and half-loaded sidesway
Battery Performance	Run time (h)	8	8	8	8
	Charging time (h)	≤ 1.5	≤ 1.5	≤2	≤2

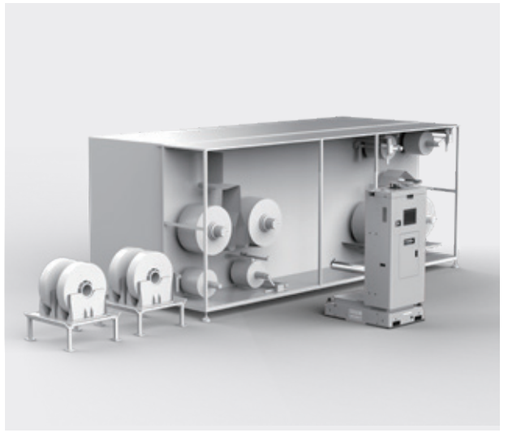
CMR

Lifting Series

Lifting series robots are based on the lifting structure, combining roller, cantilever, clamping arm and other execution structures to realize more composite application functions. They can be docked with machines or tools of different heights, depths and types to transfer carriers or materials, so as to meet the needs of complex application scenarios in smart factories.

Application Cases

Buffer rack docking



Machine docking

Cantilever shaft docking with rolls

Key Features

Execution structure

- Combined with designs of cantilever shaft, pushing structure, tension structure, and slide bearing
- Supports customized cantilever shaft
- Supports customized docking height

Robot body system

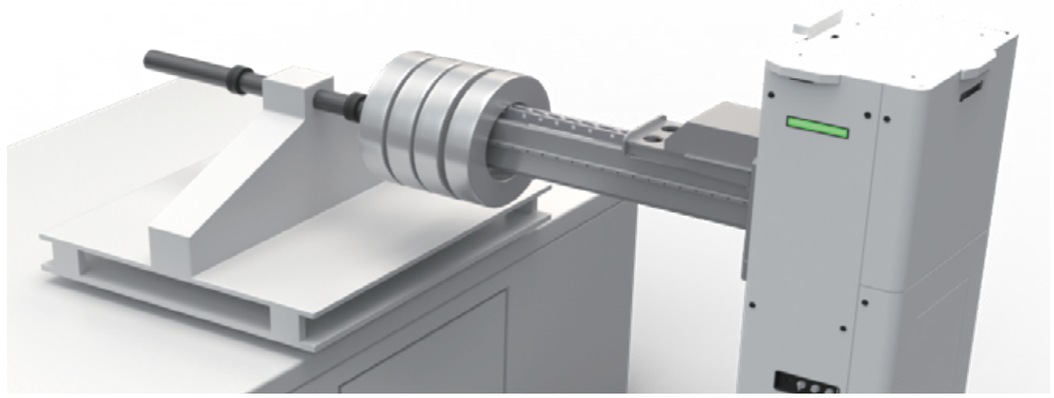
- Supports multi-safety protection, such as 360° laser obstacle avoidance on the chassis and upper 3D sensor detection
- Supports smooth motion with max. running speed of 1.0 m/s

Positioning navigation

- Supports 2D barcode, L-SLAM, and V-SLAM high-precision navigation methods
- Supports secondary positioning, with a docking accuracy of ± 2 mm

Wireless network and manual operation

- Supports Wi-Fi and 5G signal, with seamless operation switching
- Supports operating through wireless APP and wired manual controller



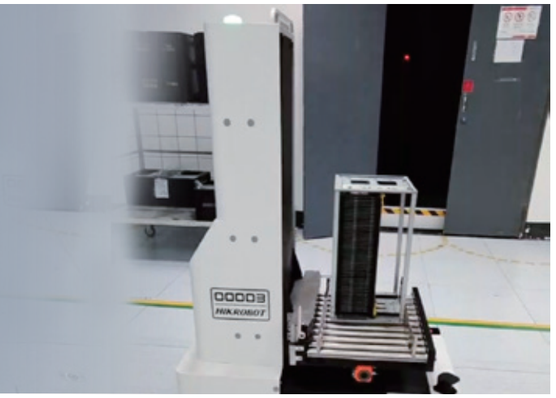
Specification

Model					
		CHA-300L-A	CHA-300L-B	CHA-600L-A	CHA-800L-A
Basic Parameter	Dimension (L × W × H) (mm)	1416*930*1895	1420*808*1960	1849*950*2112	2041*1185*1990
	Rotation diameter (mm)	1554	1614	2038	2396
	Conveying type	3" cantilever	6" cantilever	6" cantilever	6" cantilever
	Chassis above ground (mm)	25	30	30	40
	Weight (kg)	700	850	900	1500
	Rated load (kg)	300	300	600	800
	Navigation mode	2D barcode, L-SLAM navigation methods	2D barcode, L-SLAM navigation methods	2D barcode, L-SLAM navigation methods	2D barcode, L-SLAM navigation methods
	Human-machine interaction	Touchscreen	Touchscreen	Touchscreen	Touchscreen
Execution Structure	Picking height (mm)	560~1490	679~1419	750~1650	760~1410
Safety Protection	Top protection	Laser	Laser	Laser	Laser
	Front protection	Laser+ultrasonic	Laser+binocular	Laser+binocular	Laser+binocular
	Rear protection	Laser+binocular	Laser	Laser	Laser+binocular
	Side protection	-	-	Laser	Laser
	Bumper strip	Support	Support	Support	Support
	Emergency stop button	Support	Support	Support	Support
	Sound and light alarm	Support	Support	Support	Support
Motion Performance	Rated running speed (empty) (mm/s)	1000	1000	1000	1000
	Rated acceleration (empty) (mm/s2)	500	500	500	500
	Positioning accuracy (mm)/(°)	±10/±1	±10/±1	±10/±1	±10/±1
	Docking accuracy (mm)	±2	±2	±2	±2
	Driving direction	Omnidirectional driving	Omnidirectional driving	Omnidirectional driving	Omnidirectional driving
	Other capability	360° in-place rotation	360° in-place rotation	360° in-place rotation	360° in-place rotation
Battery Performance	Run time (h)	8	8	8	8
	Charging time (h)	≤2	≤2	≤1.5	≤2

CMR

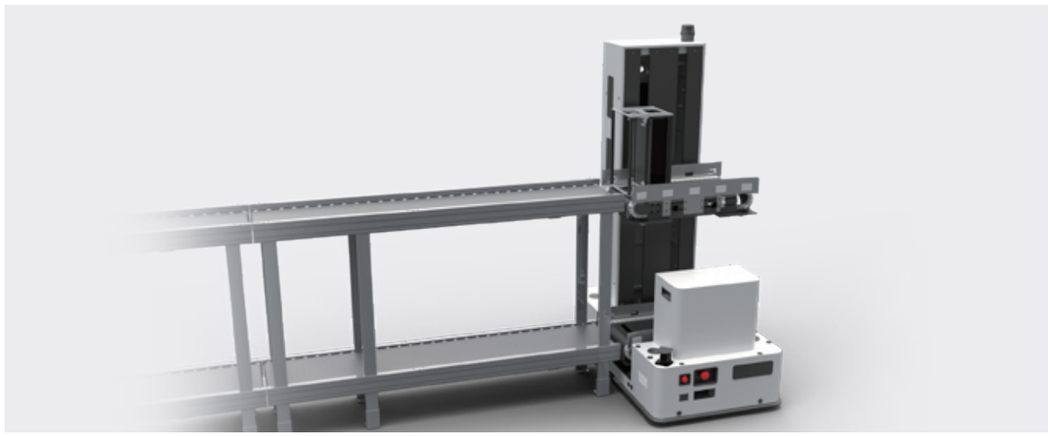
SMT Series

Focusing on box for PCB boards carrying scenario in 3C industry and meeting different demands such as different production line heights, various carrier sizes, and high precision docking, SMT series robots are equipped with bin lifting structure, bin width adjustment structure, and secondary positioning camera to realize a docking accuracy within ± 2.5 mm.



Application Cases

Lineside picking



Lineside picking

Key Features

Safety protection
- Equipped with laser sensors diagonally on the chassis, realizing 360° active safety detection
- Covered with bumper strips in the front and rear of chassis, realizing 360° physical safety detection
- Equipped with self-developed binocular camera in the front, realizing 3D space detection on the AMR running direction
- Adopts other safety components such as emergency stop button and sound and light alarm
- Supports optional accessories such as clearance lamp, recorder, and binocular sensor (supplementary)

Robot body system
- Configured with omnidirectional chassis, realizing forward and backward movement, horizontal movement, and 360° in-place rotation
- Upper assembly configured with lifting structure, bin adjustment structure, and drive structure
- Configured with secondary positioning smart camera of high precision

Positioning navigation
- Supports L-SAM navigation and V-SLAM high-precision navigation
- Supports secondary alignment, with an accuracy of ± 2.5 mm

Robot maintenance
- Features small size and light weight for facilitating manual operation
- Equipped with special robot movers for quick transportation to maintenance area during maintenance

Energy system
- Equipped with 48 V / 24 Ah battery, with battery life of 8 h to 10 h in standard operating conditions

Tote

Tray

Carton

PCB frame

Specification

Model				
		CHU1-30L	**CHS1-50L**	**CHU2-200L**
Basic Parameter	**Dimension (L × W × H) (mm)**	1200*630*1490	1100*650*1650	1550*800*1395
	Rotation diameter (mm)	1316	1236	1706
	Conveying type	SMT plate link conveyor belt	SMT plate link conveyor belt	SMT plate link conveyor belt
	Chassis above ground (mm)	20	25	20
	Weight (kg)	500	335	571
	Rated load (kg)	30	50	200
	Navigation mode	2D barcode, L-SLAM navigation methods	2D barcode, L-SLAM navigation methods	2D barcode, L-SLAM navigation methods
	Human-machine interaction	Touchscreen	Touchscreen	Touchscreen
Execution Structure	**Conveying speed (mm/s)**	100	250	200
	Working surface height (from ground) (mm)	280~980	260~1100	290~980
Safety Protection	**Front protection**	Laser+binocular+ultrasonic	Laser+binocular	Laser+binocular
	Rear protection	Laser+ultrasonic	Laser	Laser+binocular
	Side protection	ultrasonic	-	-
	Bumper strip	Support	Support	Support
	Emergency stop button	Support	Support	Support
	Sound and light alarm	Support	Support	Support
Motion Performance	**Rated running speed (empty) (mm/s)**	1200	1400	1000
	Rated acceleration (empty) (mm/s²)	600	500	400
	Positioning accuracy (mm)/(°)	±5/±1	±5/±1	±5/±1
	Docking accuracy (mm)	±2.5	±2.5	±2.5
	Driving direction	Omnidirectional driving	Omnidirectional driving	Omnidirectional driving
	Other capability	360° in-place rotation	360° in-place rotation	360° in-place rotation
Battery Performance	**Run time (h)**	8	8	8
	Charging time (h)	≤2	≤1.5	≤2

CMR

Telescopic Fork Series

Focusing on the characteristics of the docking business in the touchscreen panel industry and meeting the needs of different machine structures, carrier structures, and high precision docking, telescopic fork series robots are equipped with flexible and efficient telescopic fork assembly with secondary positioning function to achieve a docking accuracy within ± 5 mm.

Application Cases

Tray picking and putaway

Key Features

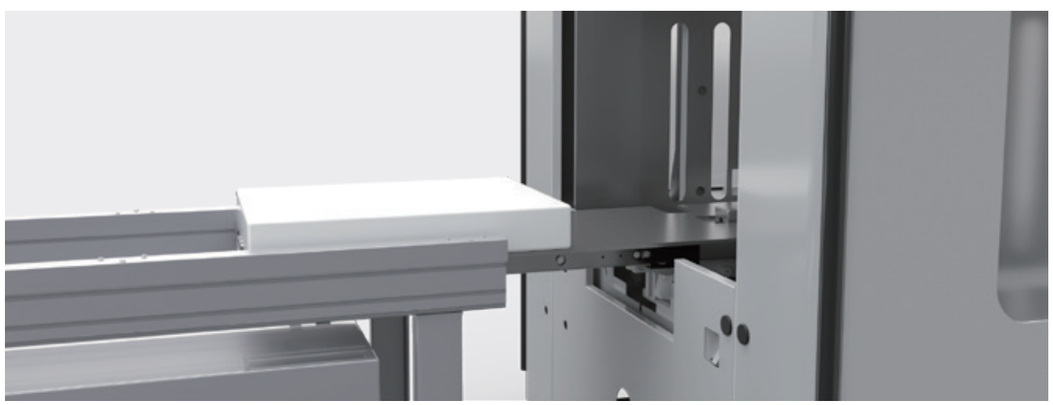
Safety protection
- Adopts chassis laser 360° safety protection and upper laser to realize suspended obstacle avoidance
- Supports safety protection including 4 laser sensors, multiple ultrasonic radars, fork obstacle detection, pneumatic bumper strip, emergency stop button, and sound and light alarm
- Equipped with recorders to record real-time conditions of surrounding environment

Robot body system
- Configured with omnidirectional chassis, realizing forward and backward movement, horizontal movement, and 360° in-place rotation
- Configured with industrial code reader to read 2D barcode and bar code on trays and link material information

Positioning navigation
- Supports L-SLAM and V-SLAM high-precision navigation
- Supports secondary positioning, with a docking accuracy within ± 5 mm

Maintenance
- Equipped with observing windows in the rear / on the sides for real-time observation
- Supports whole robot hoisting, and adopts towing hole for quick transportation

Energy system
- Equipped with 48 V / 44 Ah battery, with battery life of 8 h to 10 h in standard operating conditions



Specification

Model			
		CHF-35L	CHF-50L
Basic Parameter	Dimension (L × W × H) (mm)	980*906*1612	1424*1100*2107
	Rotation diameter (mm)	1230	1736
	Conveying type	Telescopic Fork	Telescopic Fork
	Chassis above ground (mm)	15	25
	Weight (kg)	454	800
	Rated load (kg)	35	50
	Navigation mode	2D barcode, L-SLAM navigation methods	2D barcode, L-SLAM navigation methods
	Human-machine interaction	Touchscreen	Touchscreen
Execution Structure	Conveying speed (mm/s)	600	600
	Working surface height (from ground) (mm)	555~635	1040~1160
Safety Protection	Top protection	Laser	-
	Front protection	Laser+binocular	Laser+binocular
	Rear protection	Laser+binocular	Laser+binocular
	Side protection	-	-
	Bumper strip	Support	Support
	Emergency stop button	Support	Support
	Sound and light alarm	Support	Support
Motion Performance	Rated running speed (empty) (mm/s)	1200	1200
	Rated acceleration (empty) (mm/s2)	500	500
	Positioning accuracy (mm)/(°)	±3/±0.5	±2/±0.3
	Docking accuracy (mm)	±5	±12
	Driving direction	Omnidirectional driving	Omnidirectional driving
	Other capability	360° in-place rotation	360° in-place rotation
Battery Performance	Run time (h)	8	8
	Charging time (h)	≤2	≤2

HMR

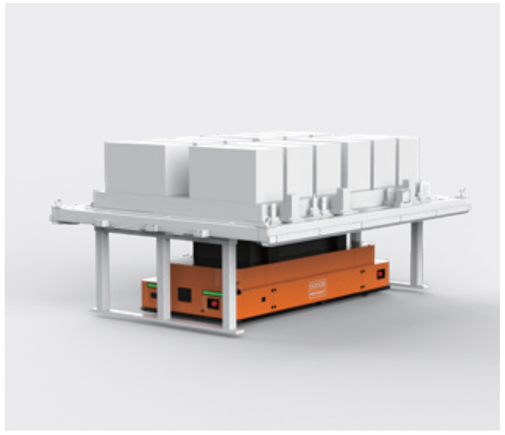
Heavy-Duty Mobile Robot (HMR)

Heavy-Duty Lifting Series

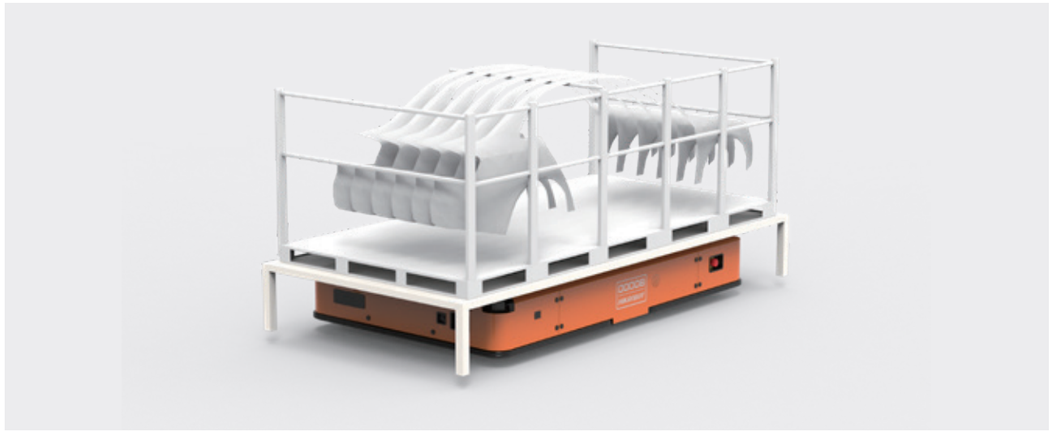
Heavy-duty lifting series robots are used to realize the docking of large materials with production lines or tools, transferring carriers or materials, so as to meet the needs of industrial or logistics automation. They can be used for the carrying of medium and large materials in industries such as lithium battery, photovoltaic, automobile, and construction machinery.

Application Cases

Point-to-point carrying operations



The assembly and testing process of PACK packagess of cells



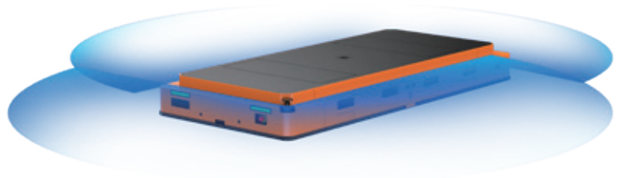
Point-to-point carrying operations

Key Features

Rich product weights
- Supports wide scope of loading capacity, ranging from 0 t to 10 t
- Supports multiple navigation modes, including 2D barcode, L-SLAM, V-SLAM, and tape navigation

Highly innovative
- The maximum traveling speed of 1.2 m/s leads the world
- Supports seamless switching between multi-robot collaboration and single-robot operation modes

Rich derivative products
- Single or double lifting models can be configured based on the size and weight of the carried object
- The business scope covers PACK line models of the lithium battery industry, silicon ingot carrying models and silicon material carrying explosion-proof models of the photovoltaic industry, stamping, welding and assembly line models of the automobile industry, and logistics line models of the construction machinery industry
- The core components are all self-developed, and support responses to all kinds of structure, hardware and software customization
- Supports data interface openness (XML/ROBTX) for efficient function configuration and secondary development



Specification

Model												
		H7-1500B	**H8-2000B**	**H9-3000B**	**H10-4000A**	**HL10-5000B**	**HL10-6000B**	**HL7-1500A**	**H8-2000B**	**HL9-3000B**	**H10-5000B**	**H10-10000A**
Industry specific		Universal	Universal	Universal	Universal	Universal	Universal	Universal	Universal	Universal	Universal	Universal
Basic Parameter	**Dimension (L × W × H) (mm)**	1600*1000*370	1900*1200*370	2000*1400*400	2200*1500*400	2200*1500*410	2500*1100*370	2500*1100*370	3000*1400*370	3000*1400*370	3200*1500*400	3200*1500*500
	Rotation diameter (mm)	1822	2182	2374	2596	2596	2674	2674	3255	3254	3479	3296
	Lifting stroke (mm)	100	100	100	150	150	150	100	150	150	100	150
	Chassis above ground (mm)	40	40	40	40	40	40	40	40	40	40	40
	Lifting platform dimension (mm)	1330*730	1600*900	1700*1100	1800*1100	1800*1100	1800*1100	240*810	1030*430	1160*510	1250*510	1340*250
	Lifting structure type	Single hydraulic lifting	Single hydraulic lifting	Single hydraulic lifting	Single hydraulic lifting	Single hydraulic lifting	Single hydraulic lifting	Double lifting	Double lifting	Double lifting	Double lifting	Double lifting
	Weight (kg)	600	685	1000	1529	1350	1400	800	1000	1238	1995	2850
	Rated load (kg)	1500	2000	3000	4000	5000	6000	1500	2000	3000	5000	10000
	Navigation mode	QR CODE /LSLAM/ VSLAM	QR CODE /LSLAM/ VSLAM	QR CODE /LSLAM/ VSLAM	QR CODE /LSLAM/ VSLAM	QR CODE /LSLAM/ VSLAM	QR CODE /LSLAM/VSLAM	QR CODE /LSLAM/VSLAM	QR CODE /LSLAM/VSLAM	QR CODE /LSLAM/VSLAM	QR CODE /LSLAM/VSLAM	QR CODE /LSLAM/VSLAM
	Human-machine interaction	Touchscreen	Touchscreen	Touchscreen	Touchscreen	Touchscreen	Touchscreen	Touchscreen	Touchscreen	Touchscreen	Touchscreen	Touchscreen
Safety Protection	**Front protection**	360°Laser	360°Laser	360°Laser	360°Laser	360°Laser	360°Laser	360°Laser	360°Laser	360°Laser	360°Laser	360°Laser
	Rear protection	360°Laser	360°Laser	360°Laser	360°Laser	360°Laser	360°Laser	360°Laser	360°Laser	360°Laser	360°Laser	360°Laser
	Side protection	360°Laser	360°Laser	360°Laser	360°Laser	360°Laser	360°Laser	360°Laser	360°Laser	360°Laser	360°Laser	360°Laser
	Sound and light alarm	Support	Support	Support	Support	Support	Support	Support	Support	Support	Support	Support
	Bumper strip	Support	Support	Support	Support	Support	Support	Support	Support	Support	Support	Support
	Emergency stop button	Support	Support	Support	Support	Support	Support	Support	Support	Support	Support	Support
Motion Performance	**Rated running speed (empty) (mm/s)**	1200	1200	1200	1200	1000	1500	1500	1000	1200	1200	750
	Rated acceleration (empty) (mm/s2)	500	500	500	500	500	500	500	500	500	500	400
	Positioning accuracy (mm)/ (°)	±10/±1	±10/±1	±10/±1	±10/±1	±10/±1	±10/±1	±10/±1	±10/±1	±10/±1	±10/±1	±10/±1
	Driving direction	Omnidirectional driving	Omnidirectional driving	Omnidirectional driving	Omnidirectional driving	Omnidirectional driving	Omnidirectional driving	Omnidirectional driving	Omnidirectional driving	Omnidirectional driving	Omnidirectional driving	Omnidirectional driving
Battery Performance	**Run time (h)**	6-8	6-8	6-8	6-8	6-8	6-8	6-8	6-8	6-8	6-8	6-8
	Charging time (h)	≤ 1.5	≤2	≤2	≤ 2.5	≤2	≤ 3	≤1.5	≤2	≤2.5	≤ 2.5	≤ 2

Specification

Model					
		HL7-1000B	**HL7-1500A**	**HL8-2500B**	**HL9-3000B**
Industry specific		Industry-specific - HMR for PACK carrying in lithium battery industry	Industry-specific - HMR for PACK carrying in lithium battery industry	Industry-specific - HMR for PACK carrying in lithium battery industry	Industry-specific - explosion-proof HMR for photovoltaics industry
Basic Parameter	**Dimension (L × W × H) (mm)**	1900*1000*665	2000*1000*650	2100*1000*650	2300*1400*540
	Rotation diameter (mm)	2088	2362	2268	2630
	Lifting stroke (mm)	250	250	250	100
	Chassis above ground (mm)	40	40	40	40
	Lifting platform dimension (mm)	1500*590	1500*590	1600*590	1500*1060
	Lifting structure type	Single hydraulic	Single hydraulic	Single hydraulic	Double lifting
	Weight (kg)	650	1140	916	1000
	Rated load (kg)	1000	1500	2500	3000
	Navigation mode	LSLAM navigation methods	LSLAM navigation methods	LSLAM navigation methods	LSLAM navigation methods
	Human-machine interaction	Touchscreen	Touchscreen	Touchscreen	Touchscreen
Safety Protection	**Front protection**	360°Laser	360°Laser	360°Laser	360°Laser
	Rear protection	360°Laser	360°Laser	360°Laser	360°Laser
	Side protection	360°Laser	360°Laser	360°Laser	360°Laser
	Sound and light alarm	Support	Support	Support	Support
	Laser clearance lamp	Support	Support	Support	Support
	Bumper strip	Support	Support	Support	Support
	Emergency stop button	Support	Support	Support	Support
Motion Performance	**Rated running speed (empty) (mm/s)**	1200	1200	1200	1200
	Rated acceleration (empty) (mm/s²)	500	500	500	500
	Positioning accuracy (mm)/(°)	±10/±1	±10/±1	±10/±1	±10/±1
	Driving direction	Omnidirectional driving	Omnidirectional driving	Omnidirectional driving	Omnidirectional driving
Battery Performance	**Run time (h)**	6-8	6-8	6-8	6-8
	Charging time (h)	≤ 1.5	≤2	≤2	≤3

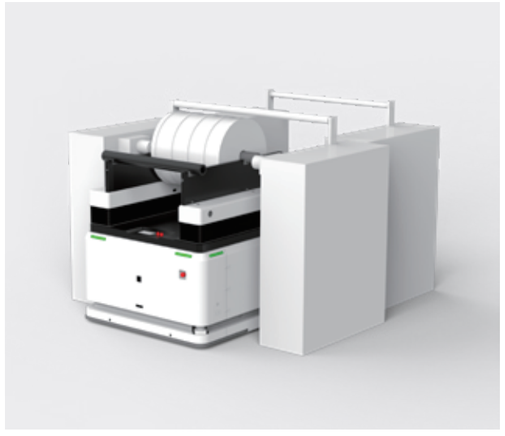
HMR

Heavy-Duty Coating Series

Focusing on the docking characteristics of the pre-process (loading, unloading, calendering and slitting of coating) in the lithium battery industry, Hikrobot has combined the structural forms of machines, the characteristics of electrode rolls and the demand for high-precision docking, and has developed coating CMR models for lithium battery industry. The models are based on the chassis of heavy-duty lifting robots, equipped with a flexible and efficient multi-axle double-fork lifting assembly, with a secondary positioning function, to achieve docking accuracy within ± 1 mm.

Application Cases

The loading of coating (replace the empty shaft with the loaded rob)



High-precision docking of AMRs to coating CMRs

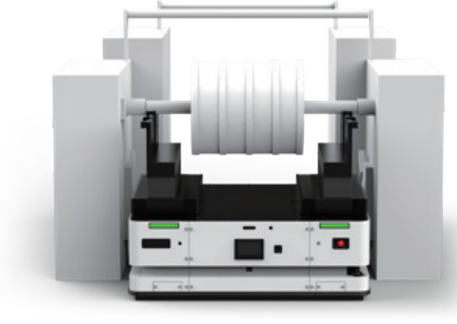
Rolls buffer area

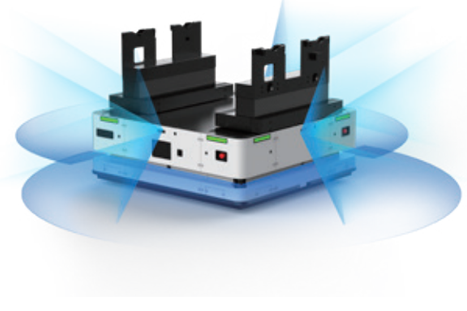
Key Features

Rich product weights and wide range of applications
- The whole machine load ranges from 1 t to 4 t, covering the whole series of demand for electrode rolls carrying in lithium battery industry
- They can be applied to the electrode rolls carrying of all kinds of batteries in 3C / power / energy storage industries

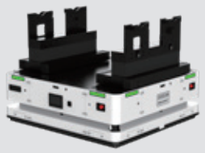
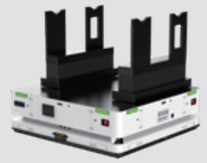
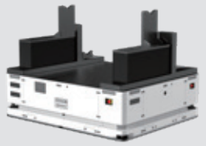
Highly innovative
- Supports high-precision docking with secondary docking accuracy up to ± 1mm
- Supports the empty-full exchange of double bin without using any machines to improve efficiency

Rich derivative products
- The core components are all self-developed, and support responses to all kinds of structure, hardware and software customization
- Supports data interface openness (XML/ROBOX) for efficient function configuration and secondary development





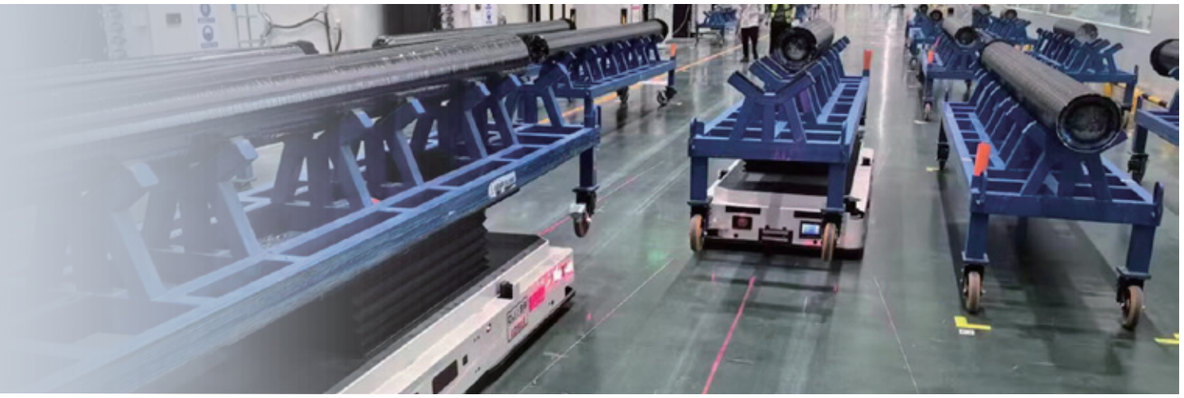
Specification

Model					
		HC7-1000	HC8-2000	HC9-3000	HC10-4000
Basic Parameter	Dimension (L × W × H) (mm)	1700*1500*1530	1700*1600*1230	1900*1800*1590	2200*1800*1595
	Rotation diameter (mm)	2196	2263	2546	2772
	Lifting stroke (mm)	200	200	200	200
	Chassis above ground (mm)	40	40	40	30
	Lifting structure type	Electric	Electric	Electric	Electric
	Weight (kg)	1351	1500	1638	3342
	Rated load (kg)	1000	2000	3000	4000
	Navigation mode	L-SLAM	L-SLAM	L-SLAM	L-SLAM
	Human-machine interaction	Touchscreen	Touchscreen	Touchscreen	Touchscreen
Safety Protection	Stereoscopic obstacle avoidance	Support	Support	Support	Support
	Sound and light alarm	Support	Support	Support	Support
	Bumper strip	Support	Support	Support	Support
	Emergency stop button	Support	Support	Support	Support
Motion Performance	Rated running speed (empty) (mm/s)	1200	1200	1200	1200
	Rated acceleration (empty) (mm/s2)	500	500	500	500
	Positioning accuracy (mm)/(°)	± 10 / ± 1	± 10 / ± 1	± 10 / ± 1	± 10 / ± 1
	Secondary docking accuracy (mm)	± 1	± 1	± 1	± 1
	Driving direction	Omnidirectional driving	Omnidirectional driving	Omnidirectional driving	Omnidirectional driving
Battery Performance	Run time (h)	6-8	6-8	6-8	6-8
	Charging time (h)	≤ 2	≤ 2	≤ 3	≤ 2

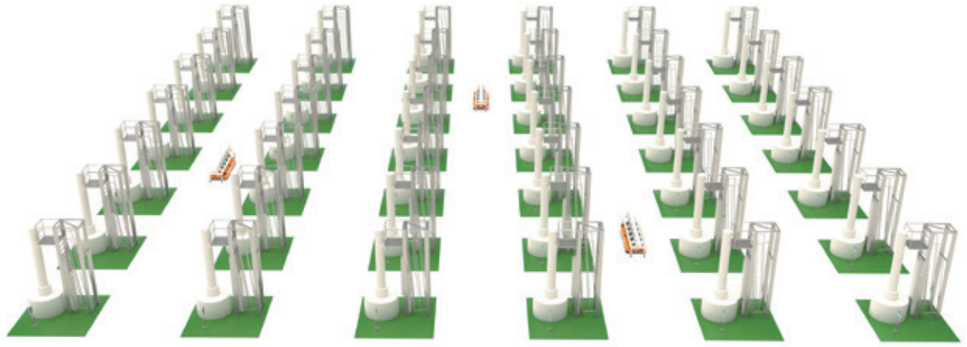
HMR

Photovoltaics Crystal Silicon Ingot Series

Focusing on the business characteristics of the crystal pulling and machining in photovoltaics industry and conforming to the requirements of cutting machine in machining workshop, characteristics of long crystal silicon ingots, and high-precision docking, this series robots are equipped with a flexible and efficient multi-level lifting structure and 4 cameras to support secondary positioning, and realize a docking accuracy within ± 5 mm. The mobile robot is configured with ultra-long distance obstacle avoidance and stereoscopic avoidance to secure the safety of crystal silicon ingots, and supports carrying long crystal silicon ingot rack within a length of 7.5 m and a weight of 2,000 kg. The core components of all crystal silicon ingot series robots use silicon powder proof design.



Application Cases



Crystal pulling scenario

Long crystal silicon ingot carrying

Key Features

Safety protection
- Long-distance safety obstacle avoidance
- 360° obstacle avoidance
- Full surrounding piezoelectric bumper strips
- Four-side emergency stop buttons
- Sound and light alarm
- Secondary verification for high-precision docking
- Silicon powder proof design for core components
- Equipped with slippery-proof / track reduction drive wheel set

Robot body system
- Omnidirectional chassis, allowing forward, backward, horizontal, arc, and diagonal movement and 360° rotation
- AMR body width reaches 800 mm, suitable for racks with industrial characteristics
- Equipped with supporting robot mover, realizing moving robot in 3 minutes

Optional functions
- Unbalanced loading detection
- Weight detection
- Temperature detection
- Low obstacle detection
- 5G communication
- Wi-Fi 6 communication
- Long range highlight laser clearance lamp
- Four-side recorders

Specification

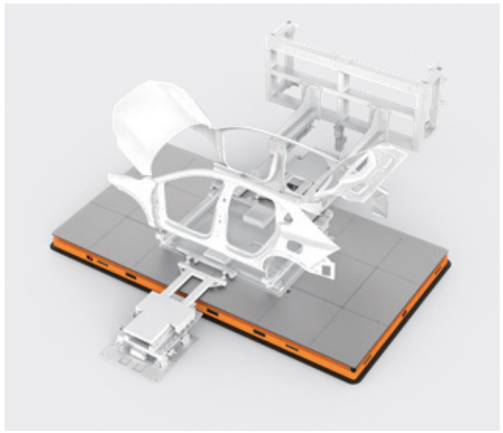
Model			
		HR7-1500A	HR8-2000A
Basic Parameter	Dimension (L × W × H) (mm)	2000*800*420	2000*800*420
	Rotation diameter (mm)	2105	2106
	Lifting stroke (mm)	150	150
	Chassis above ground (mm)	40	40
	Lifting platform dimension (mm)	1800*600	1800*600
	Lifting structure type	Hydraulic	Hydraulic
	Weight (kg)	600	629
	Rated load (kg)	1500	2000
	Navigation mode	2D barcode/LSLAM/VSLAM	2D barcode/LSLAM/VSLAM
	Human-machine interaction	Touchscreen	Touchscreen
Safety Protection	Front protection	360°Laser	360°Laser
	Rear protection	360°Laser	360°Laser
	Side protection	360°Laser	360°Laser
	Sound and light alarm	Support	Support
	Laser clearance lamp	Customizable	Customizable
	Bumper strip	Support	Support
	Emergency stop button	Support	Support
Motion Performance	Rated running speed (empty) (mm/s)	1200	1200
	Rated acceleration (empty) (mm/s2)	500	500
	Positioning accuracy (mm)/(°)	±5/±0.5	±5/±0.5
	Docking accuracy (mm)	±5	±5
	Driving direction	Omnidirectional driving	Omnidirectional driving
Battery Performance	Run time (h)	8	8
	Charging time (h)	≤1.5	≤2

HMR

Automotive Final Assembly Line Series

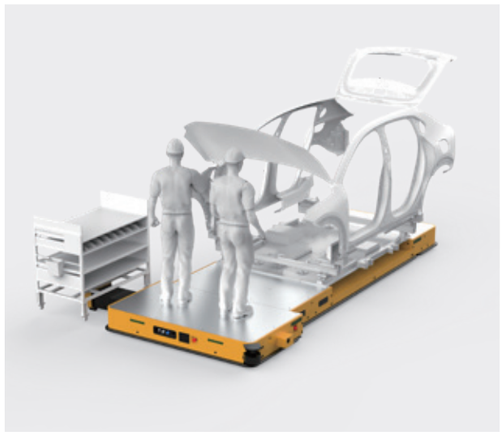
Focusing on automotive industry, the automotive final assembly line series robots have a higher flexibility in scenarios such as interior assembly and final assembly and meet the requirements of enterprises, including vehicle model upgrading, capacity improvement, production line optimization, production process optimization, and route change. It supports flexible switching between multiple navigation modes, adapted to various production processes such as mixed-line production, AMR running along assembly line, continuous motion assembly, stop-and-go assembly, trolley carry along assembly line. It supports flexible customizations of adding battery lifting, manual lifting platform, and single lifting models, and is applicable to industries such as commercial vehicles, construction machinery, and heavy material production.

Application Cases

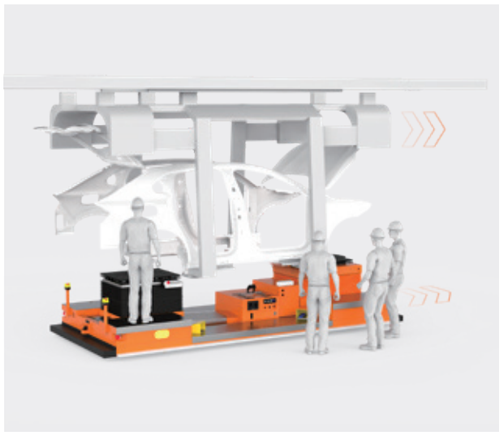


Automotive body srtructure auto picking and putaway via lifter

Continuous motion assembly



Trolley carry along assembly line



Carry along lifting assembly line

Key Features

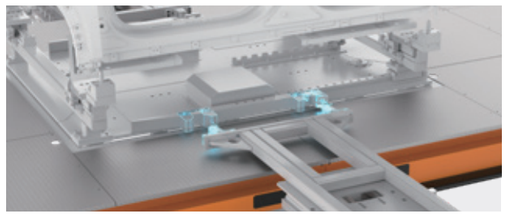
Flexible production operation
- Speeds up the building of production line, no need for pre-embedding and excavation, and reduces the line construction cost by 30%
- Supports all types of AMR cluster scheduling
- Supports self-adjusting lifting stroke according to the operation height requirements of different workgroups
- Each workgroup can dock with the upper level system and lineside device to transmit production information

Space-saving layout
- Optimizes site layout on the assembly line to form a continuous circulation operation mode
- Supports setting production line routes according to the layout and space of workshop factory

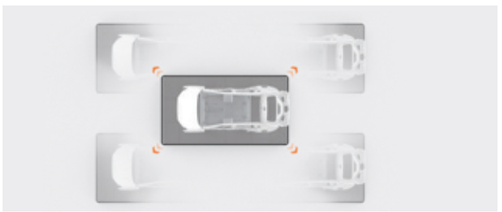
Mixed-line assembly
- Supports multiple devices in mixed-line production assembly and switching different wheelbases quickly
- Supports dynamically adjusting assembly tasks, saving storage cost and space for finished product
- Realizes safety signal interlocking with lineside technological equipment

Route flexibility and variation
- Supports changing navigation modes (tape / 2D barcode / L-SLAM/ V-SLAM) in a short time according to the scene
- Supports changing site quantity when AMR and production cycle time change
- Supports light target carry along assembly line
- Configured with different running speeds according to different production operation requirements

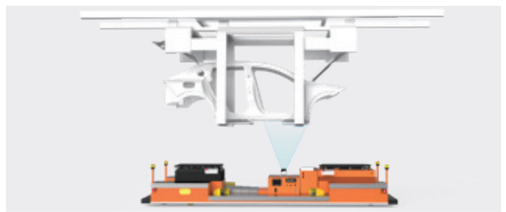
Height maintainability
- Adopts self-developed core components passing the durability test, and uses the modular design, ensuring its high stability
- Providing emergency rescue plan for exceptions, and can be removed quickly by robot mover
- Equipped with a standby device to replace in case of single device exception



Assistant structure high precision docking

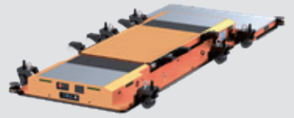


Moving in oblique line for route optimization



AMR running along assembly line

Specification

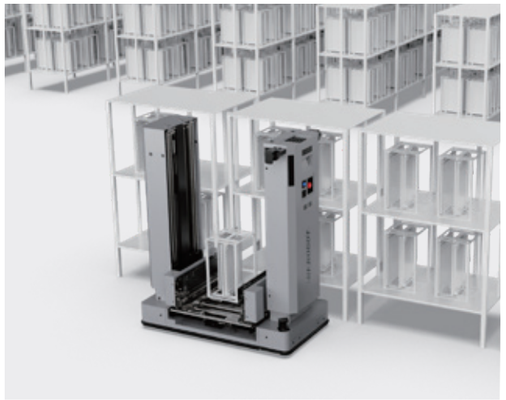
Model					
		HPT8-2000A	**HPT8-2000A**	**HPM10-3000A**	**HPC9-3000A**
Industry specific		Industry-specific - HMR for automotive interior assembly line	Industry-specific - HMR for automotive interior assembly line	Industry-specific - HMR for automotive mating assembly line	Industry-specific - HMR for automotive final assembly line
Basic Parameter	**Dimension (L × W × H) (mm)**	5500*3000*486	4810*2200*335	5300*2300*845	5341*2017*360
	Rotation diameter (mm)	6188	6104	5716	6590
	Lifting stroke (mm)	/	1000	1000	/
	Chassis above ground (mm)	60	40	50	40
	Lifting structure type	/	Electric	Electric	/
	Weight (kg)	2800	1400	5200	3100
	Rated load (kg)	2000	2000	3000	3000
	Navigation mode	Tape /2D barcode/LSLAM/VSLAM	Tape /2D barcode/LSLAM/VSLAM	Tape /2D barcode/LSLAM/VSLAM	Tape /2D barcode/LSLAM/VSLAM
	Human-machine interaction	Touchscreen	Touchscreen	Touchscreen	Touchscreen
Safety Protection	**Front protection**	360°Laser	360°Laser	180°Laser	360°Laser
	Rear protection	360°Laser	360°Laser	180°Laser	360°Laser
	Side protection	360°Laser	360°Laser	Customizable	360°Laser
	Sound and light alarm	Support	Support	Support	Support
	Bumper strip	Support	Support	Support	Support
	Emergency stop button	Support	Support	Support	Support
Motion Performance	**Rated running speed (empty) (mm/s)**	1200	1200	1000	1200
	Rated acceleration (empty) (mm/s2)	400	500	300	500
	Positioning accuracy (mm)/(°)	±10/±1	±10/±1	±10/±1	±10/±1
	Docking accuracy (mm)	±2 (assistant positioning)	±3 (assistant positioning)	±10	±10
	Driving direction	Omnidirectional driving	Omnidirectional driving	Omnidirectional driving	Omnidirectional driving
	AMR running along assembly line	/	/	Support	/
Battery Performance	**Run time (h)**	6-8	6-8	6-8	6-8
	Charging time (h)	≤1.5	≤2	≤1.5	≤2

Carton Transfer Unit (CTU)

TP1 Single-Cargo Series

For process scenarios such as production delivery and PCB frame transferring in industries like 3C and automotive, this series of robots supports chassis running modes such as differential and omnidirectional. Execution structure assembly supports various customizations, including clamping, lifting, and composite assemblies, with docking accuracy reaching millimeters level, meeting the onsite requirements.

Application Cases



Lineside transportation and delivery & buffer rack docking

Docking with upper and lower plate stackers & PCB frame transferring

Delivering totes to flow rack on lineside

Application Cases

PCB frame

Standard tote

Tray

Key Features

High adaptability

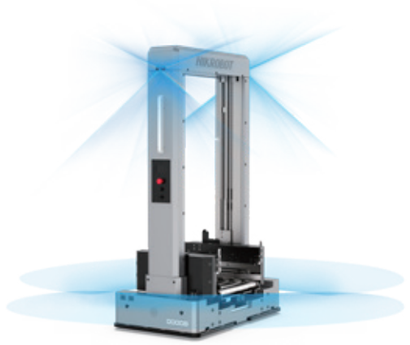
- **Site environment:** adopts differential or omnidirectional chassis according to the onsite aisle
- **Docking type:** for buffer rack, power roller conveyor, and rack, supports customizing assembly structure to reduce machine transformation

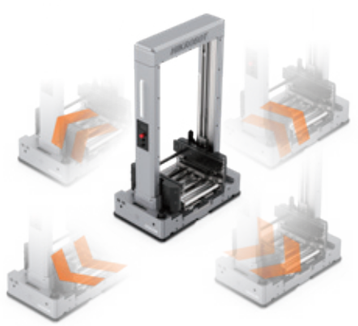
Safety protection

- **Stereoscopic protection:** equipped with 360 degree chassis laser protection, and supports low and suspended obstacle avoidance
- **Collision protection:** equipped with bumper strip on the AMR running direction for collision detection

Easy to use

- **Touchscreen control:** supports indicating device status directly, and the touchscreen controls various actions of execution structures, such as lifting and telescoping
- **V-SLAM navigation:** high-precision visual navigation without coding on textured grounds
- **L-SLAM navigation:** laser navigation





Specification

Model			
		TP1-50UM	**TP1-50DC**
Basic Parameter	**Dimension (L × W × H) (mm)**	1220*650*1500	950*690*2000
	Weight (with battery) (kg)	350	310
	Rated load (kg)	50	50
	Acuator load(kg)	50	50
	Acuator Type	Composite (multiple execution structures supported)	Clamping (multiple execution structures supported)
	Picking height (mm)	200~1050	350~1485
	Compatible goods size (L × W × H) (mm)	530*535*570 (Customizable)	600*400*300 (Customizable)
Motion Performance	**Rated running speed (m/s)**	1500	1800
	Travel stopping accuracy (mm)/(°)	±10/±1	±10/±1
	Lifting/lowering stopping accuracy (mm)	±2	±2
	Aisle width (mm)	800	850
	Rotation diameter (mm)	1350	1000
Battery Performance	**Run time (h)**	8	8
	Charging time (h)	≤1.5	≤1.5
Safety Protection	**Laser obstacle avoidance**	Support	Support
	Surrounding bumper strip detection	Support	Support
	Emergency stop button	Support	Support
	Sound and light alarm	Support	Support
Other capability	**Drive method**	Omnidirectional drive	Differential drive
	Human-machine interaction	Touchscreen	Touchscreen
	Navigation mode	2D barcode/LSLAM/VSLAM	2D barcode/LSLAM/VSLAM

CTU

TP5 Multi-Cargo Series

As powerful products of CTU robots, TP5 series robots support multiple totes transportation at one time. The modular components cover multiple types such as clamping, grabbing, lifting, and composite to adapt to carriers and material transferring in various industries, meeting the needs of various scenarios.

Application Cases

Warehouse and circulation scenario: TP5 series robots are widely applied in warehouse and circulation industries, including shoes and clothing warehouse, e-commerce warehouse, pharmaceuticals central warehouse, not only improving storage density and sorting efficiency, but also reducing warehouse and logistics costs.

Intelligent manufacturing scenario: TP5 series robots are widely applied in manufacturing scenarios, such as small parts stereoscopic warehouse in automotive industry, raw material / semi-finished products warehouse and PCB frame transferring in consumer electronics industry, semi-finished and finished products testing scenarios of the battery back-end process in the new energy industry, automatic loading of silicon raw materials for monocrystalline silicon production in the photovoltaics industry, and lineside warehouse scenario of various industries, significantly improving intelligent manufacturing.

Multi-level rack storage CTU solution

Production line material carrying

TRP solution (CTU + Q1P)

VariaPick solution: (CTU + LMR)

Key Features

High adaptability
- Supports flexible selection of assemblies and adapts to typical carriers in various industries
- Meets the operational height demands from 0.2 m to 10 m
- Supports rated load per tote of 30 kg and 50 kg and rated load of lifting telescopic fork type up to 100 kg

High-efficiency docking
- Efficient inbound and outbound via multiple tote carrying
- TRP solution with Q1P for the ultra-high tempo sorting tasks
- VP solution with LMR for the hot products high hit rate tasks and irregularly shaped objects storage tasks
- FP solution with FlashStation for whole tote inbound/outbound operations

Easy to use
- Touchscreen control: supports indicating device status directly, and the touchscreen controls various actions of execution structures, such as lifting and telescoping
- Navigation mode: supports V-SLAM navigation, and achieves high-precision navigation without coding on textured grounds

High safety
- Adopts 360° chassis obstacle avoidance with diagonal double lasers as standard for full perimeter protection
- Supports configuring detection of low and suspended obstacles to realize 720° stereoscopic protection
- Supports multiple functions such as abnormal material detection and tote protrusion detection of storage location before putaway task to achieve safety for personnel and materials
- Complies with CE certification

Adapted Carriers

Tote

Carton

Tray

Battery magazine

Specification

Model						
		TP5-50DC-B	TP5-50DC-C	TP5-50DCH	TP5-50DCH(T)	TP5-50DCP/ TP5-50DCP(T)
Basic Parameter	Dimension (L × W × H) (mm)	1730*850*2630	1600*900*4335	1730*950*6330	1880*950*6560	1850*1050*6355 1950*1050*6560
	Weight (with battery) (kg)	600	475	640	1150	680/1150
	Rated load (kg)	300	300	300	300	300
	Acuator load(kg)	50	50	50	50	50
	Execution structure	Clamp and single deep	Clamp and single deep	Clamp and single deep / double deep	Clamp and single deep / double deep	Clamp and single deep / double deep
	Picking height (mm)	300~2300	200~4000	300~6000	400~10240	(300~6000)/(400~10240)
	Compatible goods size (L × W × H) (mm)	600*400*300 (Customizable)	600*400*300 (Customizable)	600*400*300 (Customizable)	600*400*300 (Customizable)	600*400*300 (Customizable)
Motion Performance	Rated running speed (m/s)	1800	1600	1800	1800	1800/1500
	Travel stopping accuracy (mm)/(°)	±10/±1	±10/±1	±10/±1	±10/±1	±10/±1
	Lifting/lowering stopping accuracy (mm)	±2	±2	±2	±2	±2
	Aisle width (mm)	1000	1000	1100	1100	1200
	Rotation diameter (mm)	1865	1600	1865	1975	1980/2070
Battery Performance	Run time (h)	8	8	8	8	8
	Charging time (h)	≤ 1.5	≤ 1.5	≤ 1.5	≤ 2	≤2
Safety Protection	Laser obstacle avoidance	Support	Support	Support	Support	Support
	Surrounding bumper strip detection	Support	Support	Support	Support	Support
	Emergency stop button	Support	Support	Support	Support	Support
	Sound and light alarm	Support	Support	Support	Support	Support
	Tote protrusion detection	Support	Support	Support	Support	Support
Other capability	Drive method	Differential drive	Differential drive	Differential drive	Differential drive	Differential drive
	Human-machine interaction	Touchscreen	Touchscreen	Touchscreen	Touchscreen	Touchscreen
	Navigation mode	2D barcode/LSLAM/VSLAM	2D barcode/LSLAM/VSLAM	2D barcode/LSLAM/VSLAM	2D barcode/LSLAM/VSLAM	2D barcode/LSLAM/VSLAM

Specification

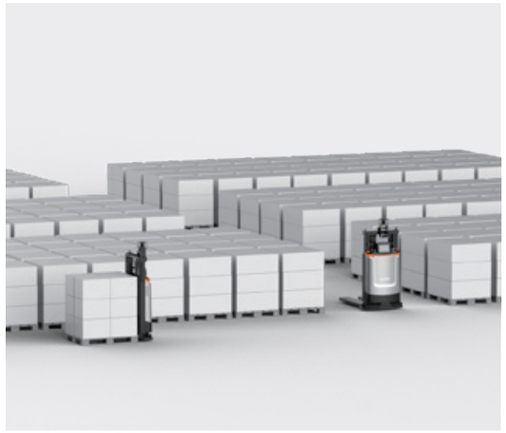
Model					
		TP5-50DCW/ TP5-50DCW(T)	**TP5-50DGH(DT)**	**TP5-50DTH**	**TP5-50DM-C**
Basic Parameter	**Dimension (L × W × H) (mm)**	2050*1150*6375/ 2240*1150*6560	1880*950*6550	1730*950*3265	1600*900*3370
	Weight (with battery) (kg)	700/1200	1150	650	600
	Rated load (kg)	300	300	300	250
	Acuator load(kg)	50	30	100	50
	Execution structure	Clamp and single deep	Grabbing and double deep	Lifting telescopic fork and single deep / double deep	Composite (roller and clamp)
	Picking height (mm)	(300~6000)/(400~10240)	400~10000	380~3000	370~3000
	Compatible goods size (L × W × H) (mm)	800*600*300 (Customizable)	600*400*300 (Customizable)	650*500*300 (Customizable)	400*380*565 (Customizable)
Motion Performance	**Rated running speed (m/s)**	1800/1500	1500	1800	1600
	Travel stopping accuracy (mm)/(°)	±10/±1	±10/±1	±10/±1	±10/±1
	Lifting/lowering stopping accuracy (mm)	±2	±2	±2	±2
	Aisle width (mm)	1300	1100	1100	1050
	Rotation diameter (mm)	2225/2400	1975	1865	1600
Battery Performance	**Run time (h)**	8	8	8	8
	Charging time (h)	≤2	≤2	≤ 2	≤ 1.5
Safety Protection	**Laser obstacle avoidance**	Support	Support	Support	Support
	Surrounding bumper strip detection	Support	Support	Support	Support
	Emergency stop button	Support	Support	Support	Support
	Sound and light alarm	Support	Support	Support	Support
	Tote protrusion detection	Support	Support	Support	Support
Other capability	**Drive method**	Differential drive	Differential drive	Differential drive	Differential drive
	Human-machine interaction	Touchscreen	Touchscreen	Touchscreen	Touchscreen
	Navigation mode	2D barcode/LSLAM/VSLAM	2D barcode/LSLAM/VSLAM	2D barcode/LSLAM/VSLAM	2D barcode/LSLAM/VSLAM

Forklift Mobile Robot (FMR)

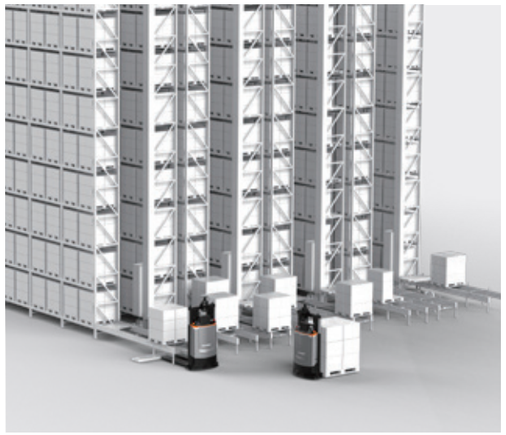
Omnidirectional Series

Omnidirectional series FMRs are unique products in the industry, covering loads ranging from 300kg to 1,400kg. By designing different steering drive wheels nested in the FMR body, omnidirectional movement of different sizes of FMRs can be realized, occupying little space in the passageway with flexible route planning, to support skew, arc, and traverse movements, which solves the customer's pain points of high storage capacity and narrow passageway planning, covering industries such as 3C, new energy, automotive parts, and tobacco.

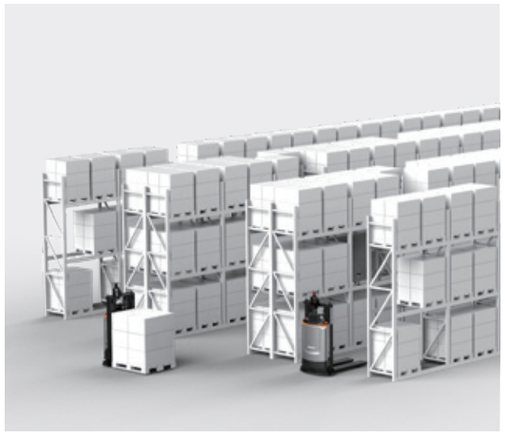
Application Cases



Deep storage warehouse



Conveyor docking



Multi-level rack (low level transferring)

SMT machine docking

Key Features

Superior performance

- Efficient transportation: maximum steady running speed up to 1.5m/s
- Wide load coverage: fully independent design, with load ranging from 300kg to 1,400kg
- Safe and reliable: 360° stereo sensing, recognizing various environments and objects
- Precise positioning: millimeter-level positioning accuracy, combining laser and vision positioning

Full-featured

- Ominidirectional movement: supports smooth motions like moving in straight line, in oblique line, in arc, in place, or horizontal movement
- Carrier recognition: autonomous fork picking based on carrier offset
- Suspended low detection: supports detecting suspended obstacles and low obstacles
- Local positioning: realizes secondary accurate positioning through 2D barcode, texture, and other information

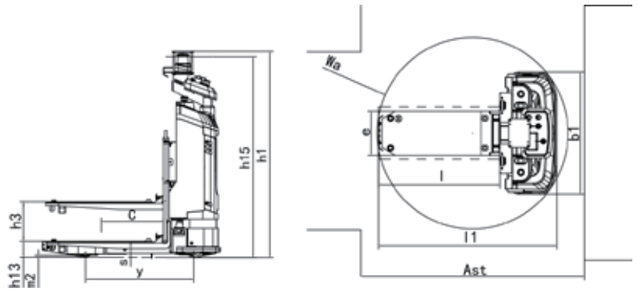
Rich models

- Human-machine collaboration: organic synergy between manual and autonomous operations
- Rich scenarios: covering a variety of storage forms such as lineside carrying, material stacking, and deep storage
- Diversified docking devices: dock with other types of AMRs, elevators, automatic doors, conveyors, and other third-party devices

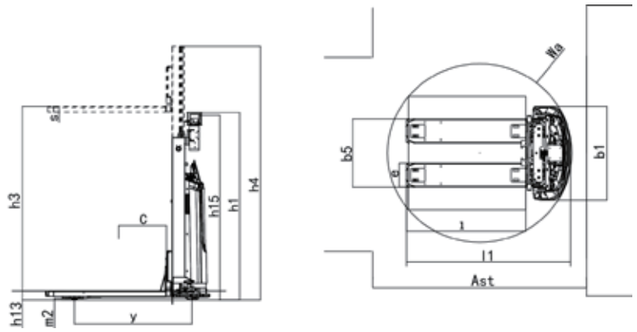
Specification

Model					
		F1-300T	F1-500T	F1-600U	F1-1000U
Basic Parameter	Dimension (L × W × H) (mm)	1093*745*1932	1257*800*1545	1656*990*1984	1650*990*1984
	Weight (with battery) (kg)	300	350	700	825
	Rated load (kg)	300	500	600	1000
	Load center distance (C) (mm)	381.5	480	600	600
	Fork lifting height (h3+h13) (mm)	438	510	1344	2049
	Fork above ground after lowering (h13) (mm)	100	115	94	99
	Fork dimension (s/e/l) (mm)	47/270/744	74/380/720	60/210/1215	60/255/1215
	Fork outer width (b5) (mm)	/	/	680	720
	Applicable pallet dimension (mm)	800*593	705*610	1200*1200	1200*1200
Motion Performance	Rated running speed (m/s)	1	1	1.2	1.2
	Positioning accuracy (mm)/(°)	±10/1	±10/±1	±10/±1	±10/±1
	Min. rotation radius (Wa) (mm)	585	727	933	933
	Motion method	Omnidirectional driving	Omnidirectional driving	Omnidirectional driving	Omnidirectional driving
	Min. aisle width (Ast) (mm)	1370	1754	1866	1866
Battery Performance	Run time (h)	6-8	6-8	6-8	6-8
	Charging time (h)	≤ 1.5	≤ 1.5	≤ 1.5	≤2
Safety Protection	Laser obstacle avoidance	Support	Support	Support	Support
	Recorder	Optional	Optional	Optional	Optional
	Bumper strip	Support	Support	Support	Support
	Pallet in-position detection	Support	Support	Support	Support
	Fork collision detection	Support	Support	Support	Support
	Emergency stop button	Support	Support	Support	Support
	Indication light	Support	Support	Support	Support
	Sound and light alarm	Support	Support	Support	Support
Other capability	Human-machine interaction	Touchscreen	Touchscreen	Touchscreen	Touchscreen
	Navigation mode	3D Navigation mode/LSLAM/Visual aid	3D Navigation mode/LSLAM/Visual aid	3D Navigation mode/LSLAM/Visual aid	3D Navigation mode/LSLAM/Visual aid
	Fork size customization	Customizable	Customizable	Customizable	Customizable
	Pallet attitude recognition	Customizable	Customizable	Customizable	Customizable
	Pallet binding recognition	Customizable	Customizable	Customizable	Customizable

Dimension



Dimension 1



Dimension 2

FMR

Stacking Series

Stacking series FMRs cover the load ranging from 1,000kg to 3,000kg, with the highest lifting height being customized up to 4.5m. The specially designed thickness of the FMR body greatly reduces the operation aisle width, and effectively improves the storage space of materials. Adopting iconic robot head design and modular components, 80% of the components can be used in different scenarios. The whole series obtains full directive CE marking, which are the preferred product series for logistics solutions.

Application Cases

Logistics warehouse

Stereoscopic warehouse conveyor

Shuttle docking

Upper and lower floor transferring

Deep storage warehouse

Key Features

Superior performance

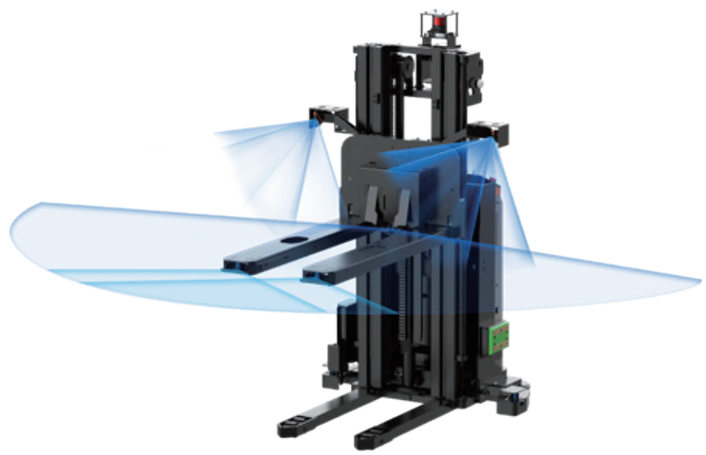
- Efficient transportation: maximum steady running speed up to 1.5m/s
- Wide load coverage: fully independent design, with load ranging from 300kg to 1,400kg
- Safe and reliable: 360° stereo sensing, recognizing various environments and objects
- Precise positioning: millimeter-level positioning accuracy, combining laser and vision positioning

Full-featured

- Carrier recognition: autonomous fork picking based on carrier offset
- Storage location identification: identify storage location with goods, spaces, its height and offset
- Suspended low detection: supports detecting suspended objects and low obstacles

Rich models

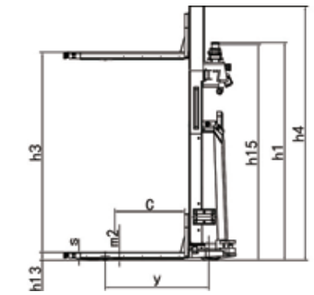
- Rich scenarios: covering a variety of storage forms such as multi-level storage, material stacking, and deep storage
- Diversified docking devices: dock with other types of AMRs, elevators, automatic doors, conveyors, and other third-party devices
- Various types of materials/carriers: multiple types of pallets, frames, cage trolleys, flexible packages, rolls, barrels, and irregularly shaped objects at home and abroad

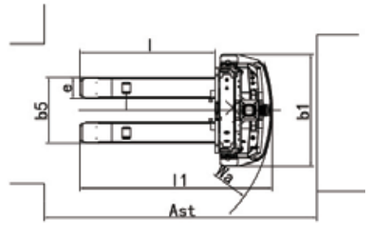


Specification

Model						
		F4-1000	F4-1000(CE)	F4-2000	F4-2000(CE)	F4-3000
Basic Parameter	Dimension (L × W × H) (mm)	1672*990*1915	1666*1073*1915	1889*1009*2219	1926*1009*2225	2378*1170*1983
	Weight (with battery) (kg)	746	746	1110	1110	1500
	Rated load (kg)	1000	1000	2000	2000	3000
	Load center distance (C) (mm)	600	600	600	600	600
	Fork lifting height (h3+h13) (mm)	2081	2081	3017	3017	5500
	Fork above ground after lowering (h13) (mm)	81	81	87	87	107
	Fork dimension (s/e/l) (mm)	65/180/1200	65/160/1119	75/200/1200	75/200/1200	60/225/1235
	Fork outer width (b5) (mm)	680	680	680	680	680
	Applicable pallet dimension (mm)	1200*1000	1200*800	1200*1000	1200*1000	1200*1000
Motion Performance	Rated running speed (m/s)	1.2	1.2	1.2	1.2	1.5
	Positioning accuracy (mm)/(°)	±10/±1	±10/±1	±10/±1	±10/±1	±10/±1
	Min. rotation radius (Wa) (mm)	1183	1180	1400	1437	1891
	Motion method	Forward, backward, arc motion, and rotation in place	Forward, backward, arc motion, and rotation in place	Forward, backward, arc motion, and rotation in place	Forward, backward, arc motion, and rotation in place	Forward, backward, arc motion, and rotation in place
	Min. aisle width (Ast) (mm)	2195	2120	2444	2444	2864
Battery Performance	Run time (h)	6-8	6-8	6-8	6-8	6-8
	Charging time (h)	≤2	≤2	≤2	≤ 2	≤2
Safety Protection	Laser obstacle avoidance	Support	Support	Support	Support	Support
	Recorder	Optional	Optional	Optional	Optional	Optional
	Bumper strip	Support	Support	Support	Support	Support
	Pallet in-position detection	Support	Support	Support	Support	Support
	Fork collision detection	Support	Support	Support	Support	Support
	Emergency stop button	Support	Support	Support	Support	Support
	Indication light	Support	Support	Support	Support	Support
	Sound and light alarm	Support	Support	Support	Support	Support
Other capability	Human-machine interaction	Touchscreen	Touchscreen	Touchscreen	Touchscreen	Touchscreen
	Navigation mode	3D Navigation mode/LSLAM/ Visual aid	3D Navigation mode/LSLAM/ Visual aid	3D Navigation mode/LSLAM/Visual aid	3D Navigation mode/LSLAM/Visual aid	3D Navigation mode/LSLAM/Visual aid
	Fork size customization	Customizable	Customizable	Customizable	Customizable	Customizable
	Pallet attitude recognition	Customizable	Customizable	Customizable	Customizable	Customizable
	Pallet binding recognition	Customizable	Customizable	Customizable	Customizable	Customizable

Dimension





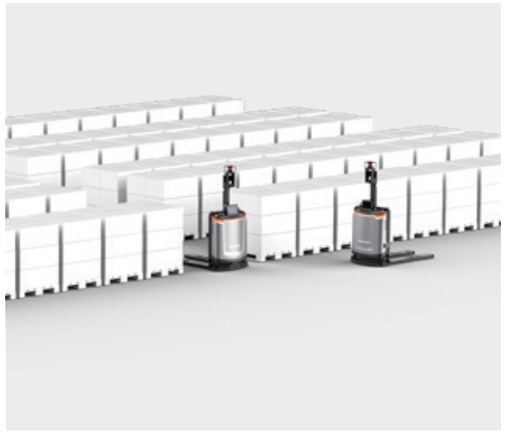
FMR

Carrying Series

Carrying series FMRs cover load ranging from 1,000kg to 3,000kg, with a maximum running speed of 2m/s. The lightweight FMR body is equipped with high-capacity batteries, which can be selected according to the needs of the right size, reducing redundancy with precise requirements. The specially designed thickness of the FMR body greatly reduces the width of the running aisle and improves the material storage space. The whole series adopts environmental contour navigation method and supports texture navigation, which makes full use of environmental information for localization and facilitates deployment and implementation.

Application Cases

Lineside carrying



Finished goods inventory storage

Non-passenger freight lifter docking

Floor-to-floor transferring

Key Features

Superior performance
- Efficient transportation: maximum steady running speed up to 2m/s
- Wide load coverage: fully independent design, with load ranging from 300kg to 3T
- Safe and reliable: 360° stereo sensing, recognizing various environments and objects
- Precise positioning: millimeter-level positioning accuracy, combining laser and vision positioning

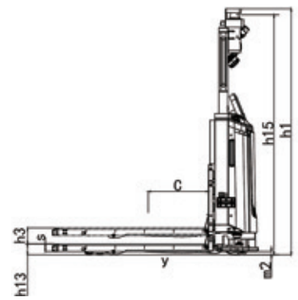
Full-featured
- Pallet recognition: automatic fork picking based on carrier offset
- Suspended low detection: supports detecting suspended objects and low obstacles
- Supports full directive CE architecture design, including mechanical, wireless, and electromagnetic directives

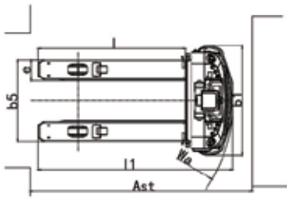
Rich models
- Rich scenarios: multiple forms of storage, including lineside carrying, deep storage, alleyway storage
- Diversified docking devices: dock with other types of AMRs, elevators, automatic doors, conveyors, and other third-party devices
- Various types of materials/carriers: multiple types of pallets, frames, cage trolleys, flexible packages, and rolls

Specification

Model							
		F3-1000	F3-1500C	F3-1500	F3-2000	F3-3000	F3-3000(CE)
Basic Parameter	Dimension (L × W × H) (mm)	2245*806*2040	2245*806*2040	1645*870*1984	1694*990*1984	1712*950*1985	1702*950*1917
	Weight (with battery) (kg)	440	440	500	650	750	750
	Rated load (kg)	1000	1000	1500	2000	3000	3000
	Load center distance (C) (mm)	600	600	600	600	600	600
	Fork lifting height (h3+h13) (mm)	215	215	200	200	200	200
	Fork above ground after lowering (h13) (mm)	90	90	75	75	75	75
	Fork dimension (s/e/l) (mm)	85/180/1441	85/180/1441	70/175/1232	70/200/1200	70/210/1230	70/210/1213
	Fork outer width (b5) (mm)	680	680	680	680	700	720
	Applicable pallet dimension (mm)	1800*1200	1800*1200	1200*1000	1200*1000	1200*1000	1200*1000
	Rated running speed (m/s)	2.5	2.5	1.2	1.5	1.6	1.2
Motion Performance	Positioning accuracy (mm)/(°)	±10/±1	±10/±1	±10/±1	±10/±1	±10/±1	±10/±1
	Min. rotation radius (Wa) (mm)	1701	1701	1297	1370	1480	1301
	Motion method	Forward, backward, arc motion, and rotation in place	Forward, backward, arc motion, and rotation in place	Forward, backward, arc motion, and rotation in place	Forward, backward, arc motion, and rotation in place	Forward, backward, arc motion, and rotation in place	Forward, backward, arc motion, and rotation in place
	Min. aisle width (Ast) (mm)	2525	2525	2191	2355	2230	2087
Battery Performance	Run time (h)	6~8	6~8	6~8	6~8	6~8	6~8
	Charging time (h)	≤2	≤2	≤2	≤2	≤3	≤3
Safety Protection	Laser obstacle avoidance	Support	Support	Support	Support	Support	Support
	Recorder	Optional	Optional	Optional	Optional	Optional	Optional
	Bumper strip	Support	Support	Support	Support	Support	Support
	Pallet in-position detection	Support	Support	Support	Support	Support	Support
	Fork collision detection	Support	Support	Support	Support	Support	Support
	Emergency stop button	Support	Support	Support	Support	Support	Support
	Indication light	Support	Support	Support	Support	Support	Support
	Sound and light alarm	Support	Support	Support	Support	Support	Support
Other capability	Human-machine interaction	Touchscreen	Touchscreen	Touchscreen	Touchscreen	Touchscreen	Touchscreen
	Navigation mode	3D Navigation mode/LSLAM/Visual aid	3D Navigation mode/LSLAM/Visual aid	3D Navigation mode/LSLAM/Visual aid	3D Navigation mode/LSLAM/Visual aid	3D Navigation mode/LSLAM/Visual aid	3D Navigation mode/LSLAM/Visual aid
	Fork size customization	Customizable	Customizable	Customizable	Customizable	Customizable	Customizable
	Pallet attitude recognition	Support	Support	Support	Support	Support	Support
	Pallet binding recognition	Customizable	Customizable	Customizable	Customizable	Customizable	Customizable

Dimension





FMR

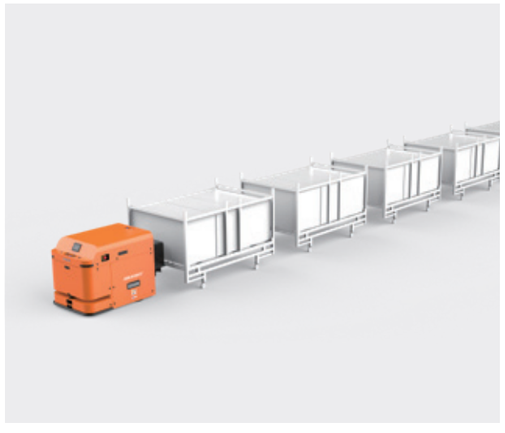
Tow Tractor Series

F7-2000 series robots can tow goods up to 2 t, realize automatic hooking and unhooking, and is capable of towing multiple trolleys at a time for efficient operation.

Application Cases

Tow tractor series robots are often used for raw material production line delivery scenes in automotive final assembly workshop, auto parts, home appliance, and manufacturing industries.

Cage trolley towing



Cage trolley towing

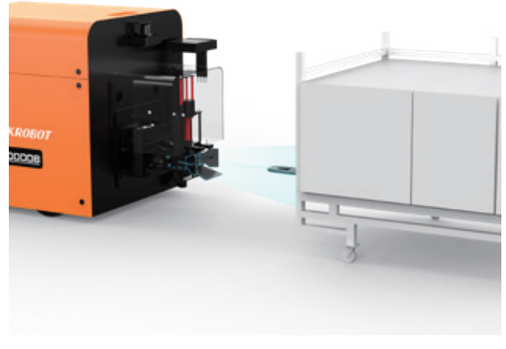
Rack

Wire mesh container

Key Features

- Efficient transportation: with maximum running speed up to 1.6 m/s, capable of towing multiple trolleys
- High reliability: supports multiple safety protections, such as laser obstacle avoidance, load detection, emergency stop button, and audible alarm
- Precise positioning: supports millimeter-level positioning accuracy, combining laser and visual positioning
- Carrier recognition: supports automatic hooking based on carrier offset
- Ominidirectional movement: supports multiple motions like moving in straight line, in oblique line, in arc, and in-place rotation
- Suspended obstacles detection: supports detecting suspended obstacles

Towing three trolleys with one AMR

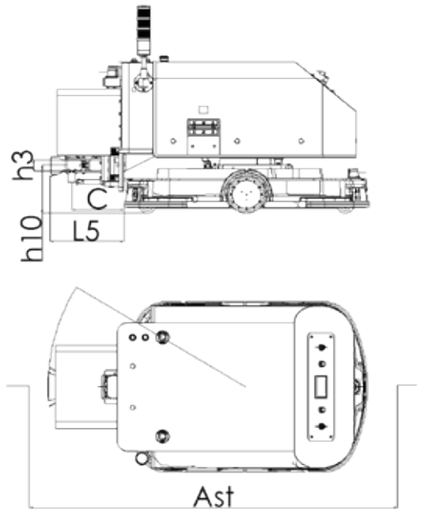


Automatic picking and putaway

Specification

Model			
		F7-2000A	F7-3000A
Basic Parameter	Dimension (l1*b1*h1)(mm)	1496*820*1025	1416*760*833
	Weight (with battery) (kg)	680	1050
	Rated load (kg)	2000	3000
	Traction center above ground (mm)	230 (Customizable)	235 (Customizable)
	Traction pin diameter (mm)	25	25
	Min. ground clearance (mm)	26	30
Motion Performance	Rated running speed (empty) (mm/s)	1000	1000
	Positioning accuracy (mm)/(°)	±10/±1	±10/±1
	Max. gradeability	3%	3%
	Motion method	Two-wheel differential drive, forward, backward, arc turning and rotation	Two-wheel differential drive, forward, backward, arc turning and rotation
Battery Performance	Run time (h)	6-8	6-8
	Charging time (h)	≤2	≤2
Safety Protection	Laser obstacle avoidance	Support	Support
	Bumper strip	Support	Support
	Emergency stop button	Support	Support
	Sound and light alarm	Support	Support
Others/Customizable	Drive method	Two-wheel differential drive	Two-wheel differential drive
	Human-machine interaction	Support	Support
	Navigation mode	L-SLAM/V-SLAM	L-SLAM/V-SLAM
	Manual operation	Mobile client app	Mobile client app
	Working noise (dB)	< 75	< 75

Dimension



FMR

Lightweight Carrying Series

F9-300 series robots can load goods up to 300 kg, with a width of only 450 mm. The mobile robot is configured with pallet recognition to fork goods accurately, adopts 2D laser to realize 360 degree obstacle avoidance, and is equipped with multiple sensors like safety edges to achieve 3D stereoscopic protection. This series robots with compact size and flexible fork customization are the optimal choice for scenes such as tortoise car platform trolley or small carrier carrying, improving the production efficiency.

Application Cases

The mobile robot can be used to pick and put away carriers in compact space such as extremely narrow roadway, and is applicable to various carriers, including tortoise car platform trolley, cage trolley, and small tote. It is capable of self-adaption to onsite environment, thus saving transformation costs. It is often used in scenes such as auto parts, machinery manufacturing, and supermarket delivery.

Tortoise car platform trolley | Feeder trolley | Tote | Cage trolley

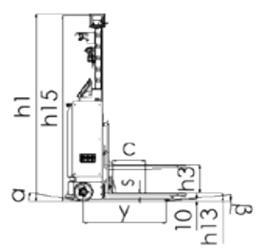
Key Features

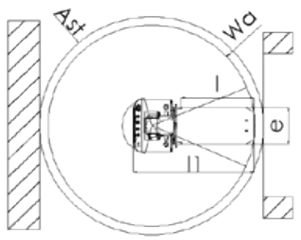
- **Efficient transportation:** supports smooth motions like forward, backward, dynamic obstacle avoidance, and rotation in place with maximum running speed up to 1.6 m/s
- **Compact size:** with a width of only 450 mm, a minimum passage width of 650 mm, and a rotation radius of 683 mm, it is suitable for flexible operations in extremely narrow aisles
- **Various types of carriers:** supports flexible customization of forks with a min. fork distance of 75 mm and a min. fork width of 150 mm, applicable to most carriers
- **Carrier recognition:** equipped with fork laser, it supports obstacle avoidance recognition, realizing stable and efficient picking and putaway
- **Intelligent upgrading:** applied in the automated carrying of small carriers in various industries, improving carrying efficiency, and helping customers upgrade production line efficiency through intelligent management

Specification

Model		
		F9-300
Basic Parameter	Dimension (l1*b1*h1)(mm)	899*450*1581
	Weight (with battery) (kg)	194
	Rated load (kg)	300
Motion Performance	Rated running speed (empty) (mm/s)	1.6
	Positioning accuracy (mm)/(°)	±10/±1
	Max. gradeability (Wa)(mm)	588
	Motion method	Forward, backward, arc motion, and rotation in place
	Min. aisle width (Ast) (mm)	1309
Battery Performance	Run time (h)	6-8
	Charging time (h)	≤2
Safety configuratio	Laser obstacle avoidance	Support
	Sound and light alarm	Support
Others	Human-machine interaction	Touchscreen
	Navigation mode	3D navigation /LSLAM/ Visual aid

Dimension





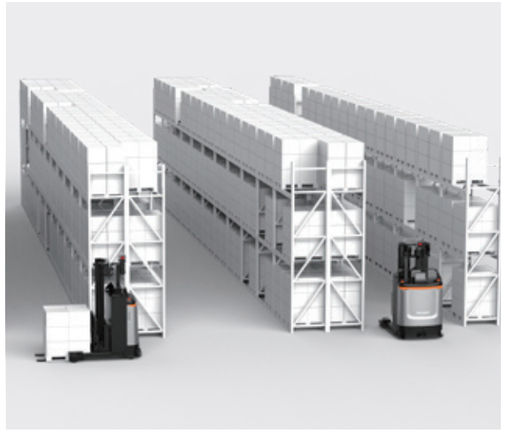
FMR

Reach Truck Series

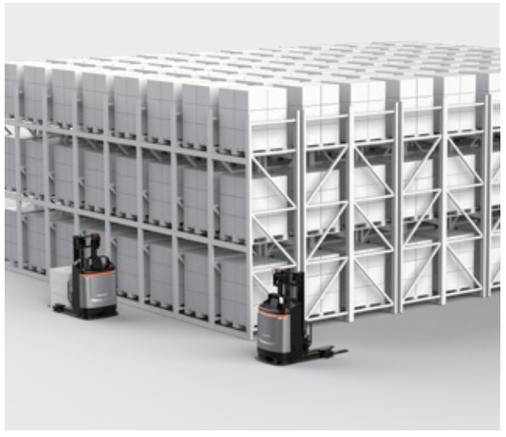
Reach truck series robots adopt self-developed robot design, and can load goods up to 1.6 t. The mobile robot with reach truck module design is applicable to indoor carrying scenes with small fork space carriers such as block pallet and Euro pallet, and is used in lithium battery, beverage, home appliances, and panel industry. As one of the production series with strong expandability, it also preserves carrier port for non-standard carrier customization business such as distance adjustment and clamping, and is applicable to multiple workplaces such as logistics warehouse system, automated factory, workshop, and warehouse.

Application Cases

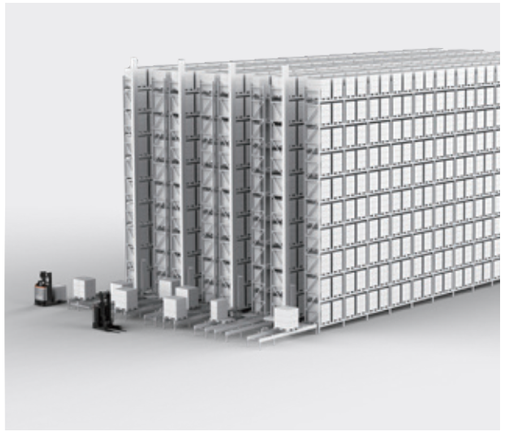
Intensive stacking



Multi-level rack



Drive-in rack



Conveyor docking

Key Features

Superior performance

- **Efficient transportation:** max. running speed up to 1.5 m/s
- **Wide load range:** fully independent design, with load ranging from 300 kg to 2 t
- **Safety and reliability:** supports 360° stereo sensing, recognizing various environments and objects
- **Precise positioning:** adopts millimeter-level positioning accuracy, combining laser and visual positioning

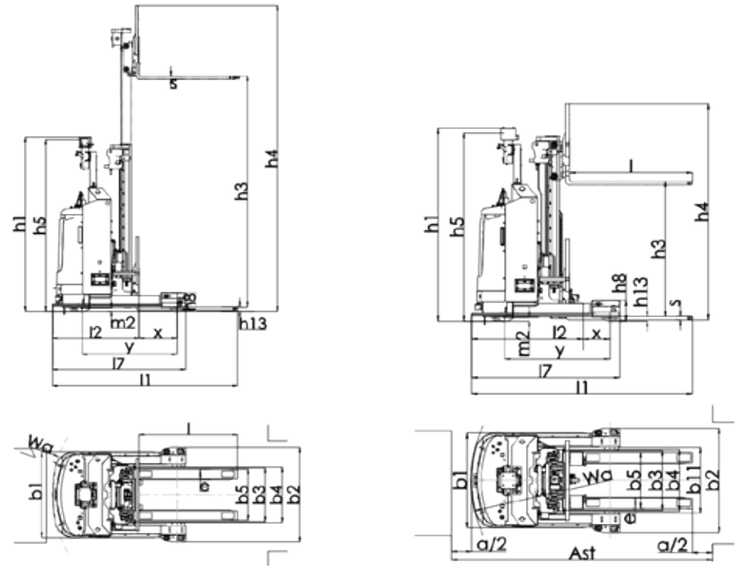
Diverse modes

- **Human-machine collaboration:** collaboration between manual operation and autonomous operation
- **Multiple scenarios:** applicable to a variety of storage forms such as multi-level storage, material stacking, and intensive storage
- **Diversified docking devices:** docking with other types of AMRs, automatic doors, conveyors, and other third-party devices
- **Various types of materials/carriers:** multiple types of pallets, frames, cage trolleys, flexible packages, rolls, barrels, and irregularly shaped objects

Specification

Model				
		F5-1600(3m)	F5-1500(CE)	F5-1600(4.5m)
Basic Parameter	Dimension (L × W × H) (mm)	2260*1200*2225	2260*1200*2219	2427*1091*2219
	Weight (with battery) (kg)	2310	2310	2600
	Rated load (kg)	1600	1600	1350
	Load center distance (C) (mm)	600	600	600
	Fork lifting height (h3+h13) (mm)	3000	3000	4500
	Fork above ground after lowering (h13) (mm)	55	55	55
	Fork dimension (s/e/l) (mm)	40/132/1200	40/132/1200	40/132/1200
	Fork outer width (b5) (mm)	650	650	650
	Applicable pallet dimension (mm)	1200*1000	1200*1000	1200*1000
Motion Performance	Rated running speed (empty) (mm/s)	1.5	1.5	1.5
	Positioning accuracy (mm)/(°)	±10/±1	±10/±1	±10/±1
	Min. rotation radius (Wa) (mm)	1528	1528	1528
	Motion method	Forward, backward, arc motion, and rotation in place	Forward, backward, arc motion, and rotation in place	Forward, backward, arc motion, and rotation in place
	Min. aisle width (Ast) (mm)	2671	2671	2895
Battery Performance	Run time (h)	6-8	6-8	6-8
	Charging time (h)	≤ 3	≤ 3	≤ 3
Safety Protection	Laser obstacle avoidance	Support	Support	Support
	Recorder	Optional	Optional	Optional
	Bumper strip	Support	Support	Support
	Pallet in-position detection	Support	Support	Support
	Fork collision detection	Support	Support	Support
	Emergency stop button	Support	Support	Support
	Indication light	Support	Support	Support
	Sound and light alarm	Support	Support	Support
Other capability	Human-machine interaction	Touchscreen	Touchscreen	Touchscreen
	Navigation mode	3D Navigation mode/LSLAM/Visual aid	3D Navigation mode/LSLAM/Visual aid	3D Navigation mode/LSLAM/Visual aid
	Fork size customization	Customizable	Customizable	Customizable
	Pallet attitude recognition	Support	Support	Support
	Pallet binding recognition	Customizable	Customizable	Customizable

Dimension



Dimension 1

Dimension 2

FMR

Counterweight Serie

Counterweight series robots can adopt self-developed robot design, and can load goods up to 2 t. The mobile robot with counterweight module design is applicable to indoor carrying scenes with small fork space carriers such as block pallet and Euro pallet, and is used in lithium battery, beverage, home appliances, and panel industry. As one of the production series with strong expandability, it also preserves carrier port for non-standard carrier customization business such as distance adjustment and clamping, and is applicable to multiple workplaces such as logistics warehouse system, automated factory, workshop, and warehouse.

Application Cases

Flexible packages stacking

Rack stacking

Block pallet stacking

Intensive stacking (two forks)

Intensive stacking (four forks)

Drive-in rack

Key Features

Superior performance

- **Efficient transportation:** max. running speed up to 1.5 m/s
- **Wide load range:** fully independent design, with load ranging from 300 kg to 2 t
- **Safety and reliability:** supports 360° stereo sensing, recognizing various environments and objects
- **Precise positioning:** adopts millimeter-level positioning accuracy, combining laser and visual positioning

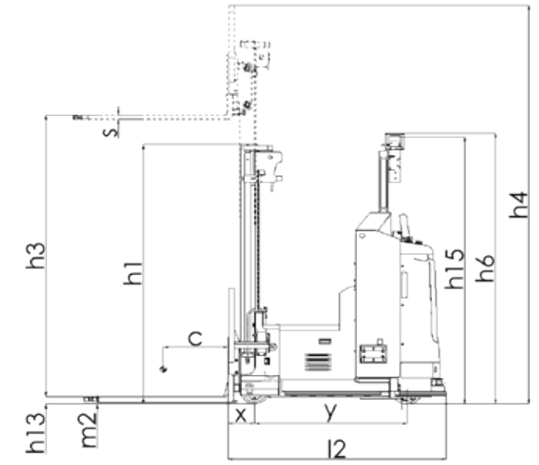
Diverse modes

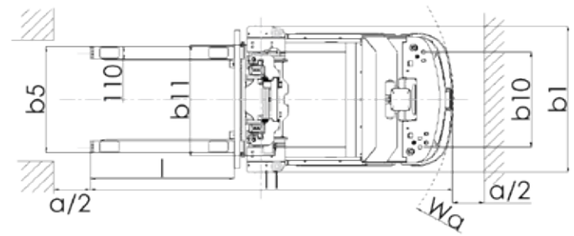
- **Human-machine collaboration:** collaboration between manual operation and autonomous operation
- **Multiple scenarios:** applicable to a variety of storage forms such as multi-level storage, material stacking, and intensive storage
- **Diversified docking devices:** docking with other types of AMRs, automatic doors, conveyors, and other third-party devices
- **Various types of materials/carriers:** multiple types of pallets, frames, cage trolleys, flexible packages, rolls, barrels, and irregularly shaped objects

Specification

Model			
		F6-2000 (3 m)	F6-2000 (4.5 m)
Basic Parameter	Dimension (L × W × H) (mm)	3260*1206*2235	3315*1206*2235
	Weight (with battery) (kg)	2750	3170
	Rated load (kg)	2000	2000
	Load center distance (C) (mm)	600	600
	Fork lifting height (h3+h13) (mm)	3000	4500
	Fork above ground after lowering (h13) (mm)	60	60
	Fork dimension (s/e/l) (mm)	45/132/1237	45/137/1237
	Fork outer width (b5) (mm)	690	700
	Applicable pallet dimension (mm)	1200*1000	1200*1000
Motion Performance	Rated running speed (empty) (mm/s)	1.5	1.5
	Positioning accuracy (mm)/(°)	±10/±1	±10/±1
	Min. rotation radius (Wa) (mm)	1897	1897
	Motion method	Forward, backward, arc motion, and rotation in place	Forward, backward, arc motion, and rotation in place
	Min. aisle width (Ast) (mm)	3665	3817
Battery Performance	Run time (h)	6-8	6-8
	Charging time (h)	≤3	≤3
Safety Protection	Laser obstacle avoidance	Support	Support
	Recorder	Customizable	Customizable
	Bumper strip	Support	Support
	Pallet in-position detection	Support	Support
	Fork collision detection	Support	Support
	Emergency stop button	Support	Support
	Indication light	Support	Support
	Sound and light alarm	Support	Support
Other capability	Human-machine interaction	Touchscreen	Touchscreen
	Navigation mode	3D Navigation mode/LSLAM/Visual aid	3D Navigation mode/LSLAM/Visual aid
	Fork size customization	Customizable	Customizable
	Pallet attitude recognition	Support	Support
	Pallet binding recognition	Customizable	Customizable

Dimension



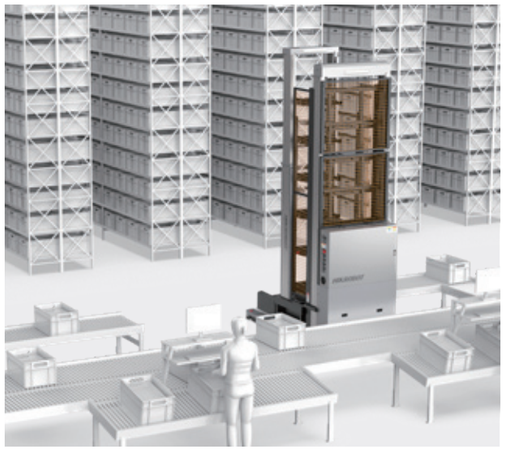


Intelligent Workstation

TP7 FlashStation Series

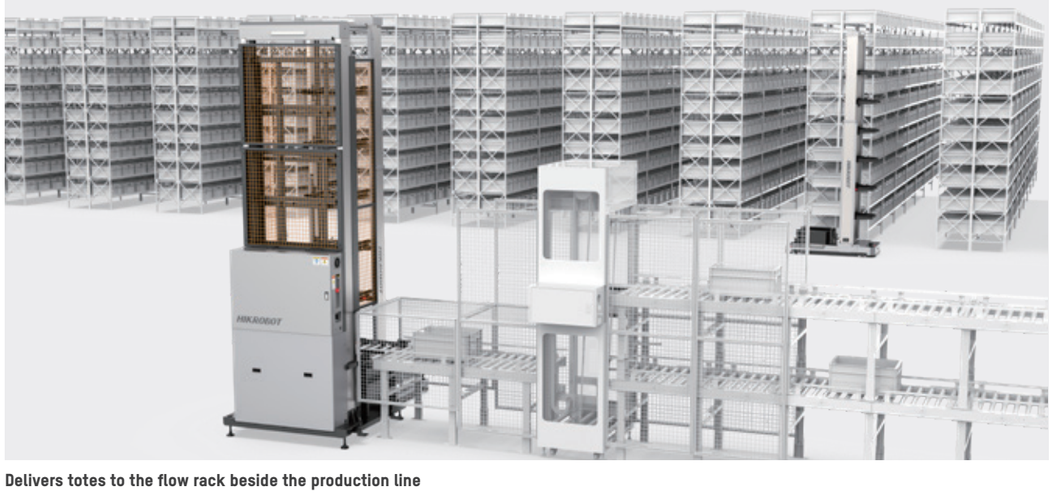
For high tempo material transferring scenes, Hikrobot developed FlashStation products which support carton transfer unit (CTU), and can realize a single docking of 8 boxes, significantly improving the inbound and outbound efficiency of the system, and reducing the cost of the program. The products are widely used in different industry scenes, including e-commerce logistics warehouse, shoes and clothing warehouse, automotive warehouse, and medical center warehouse.

Application Cases



Sorting application scenario with circular conveyor of FlashStation

Whole tote in and out of the warehouse through conveyor



Delivers totes to the flow rack beside the production line

Key Features

Simple, reliable, flexible and scalable
- Innovative comb design with small occupation and flexible extension
- Supports customization of conveyor docking heights
- Optional non-passenger freight lifters to dock with double-layer conveyors

Multi-box docking, stable and efficient
- Supports transferring 8 to 10 totes each time, picking and putaway within 2 seconds, and work efficiency up to 800 totes per hour
- Single box loaded weight can be up to 50 kg and device loaded weight up to 300 kg
- Supports clamping and lifting devices for docking

Multi-function machine, reducing cost and increasing efficiency
- Intelligent switching of outbound/inbound modes on the same workstation, reducing workstation deployment

Human-machine safety with protection certification
- Obtains CE marking and SEMI certification

Specification

Model		 TP7-FH	 TP7-FW
Basic Parameter	Dimension (L × W × H) (mm)	1570*1385*4100	1940*1485*4825
	Weight (kg)	700	750
	Inbound/outbound efficiency (boxes/h)	600-800	
	Standard tote dimension (L × W × H) (mm)	600*400*300	800*600*420
	Ground load bearing (kg/m2)	800	850
	Number of layers	6 (can be customized to 8 to 10 layers)	
Motion Performance	Single layer loaded weight (kg)	≤ 50	
	Max. loaded weight (kg)	300	
	Rated power (kW)	3	
	Supply voltage (VAC)	220	
	Loading/unloading time (s)	≤ 2	

Accessory

Robot Accessory

Charging Station

The charging station is in the auto charging mode by default. Manual intervention is not needed in this mode. The mobile robot can auto move to the charging station for charging when it is lying idle according to working status and remaining battery capacity. After being charged to full capacity, the mobile robot can auto return to work.

Application Cases

- Adopts self-developed battery management system to monitor battery changes in real time and cut off the power supply immediately if exception occurs
- Satisfies different charging needs with 2 charging modes: auto charging and manual charging
- Adopts human-machine interaction interface to display information such as the charging voltage, current, working status, and alarm via touchscreen
- Provides self-protection functions: input overvoltage protection, input under voltage protection, output overvoltage protection, output overcurrent protection, short circuit protection, and over-temperature protection
- Uses the first-level spring buffer to flexibly dock with the mobile robot

Rear

Side

Ground

Specification

Model					
		FRA-CH-48/30S	FRA-CH-48/60S	FRA-CH-48/100S	RA-CH-48/30S
Basic Parameter	Charging method	Side	Side	Side	Side
	Charging port type	Brush block	Brush block	Brush block	Brush block
	Dimension (mm)	649*291*783	649*291*783	675*291*783	633*360*805
	Weight (kg)	40	39	51	40
Basic Parameter	AC input voltage (V)	176~264	176~264	176~264	100 ~ 240
	AC input frequency (Hz)	50&60	50&60	50&60	50&60
	Max. input current (A)	10	10	25	16.5
	DC output voltage (V)	48	48	48	59
	Max. output current (A)	30	60	100	30

Model					
		RA-CH-48/30S	RA-CH-48/30B	RA-CH-48/30B	RA-CH-48/30G
Basic Parameter	Charging method	Side	Caudal	Caudal	Ground
	Charging port type	Brush block	Probe	Brush block	Brush plate
	Dimension (mm)	515*340*273	410*440*670	485*335*670	485*210*630
	Weight (kg)	41	27	27	29
Basic Parameter	AC input voltage (V)	90~264	90~264	90~264	90~264
	AC input frequency (Hz)	50&60	50&60	50&60	50&60
	Max. input current (A)	10	10	25	10
	DC output voltage (V)	48	48	48	48
	Max. output current (A)	30	30	30	30

Accessory

Caller

As the medium for scheduling mobile robot information, the caller is used to connect the mobile robot and robot control system, assists the system in applying command via its buttons, and calls the mobile robot to complete material automated carrying tasks at docking points, such as material outbound, material replenishment, and material empty-full exchange.

Key Features

- Supports wired and wireless communication
- Adopts indicator light (including red, green, and yellow), which supports indicating the task status of robot control system
- It is designed with the card slot set in the center of the device for customers to easily print suitable labels (used for asset management and button customization)
- Supports 3 installation methods: screw fixing, wall mounting, and DIN guide rail installation, which can be applicable to the workstation and truss in the assembly line, island rack of the flexible production workshop, elevator rooms, and warehouse wall

Specifications

Model		
		RA-CB-S06-A1
Basic Parameter	Dimension (L × W × H) (mm)	91*41*151 (without antenna)
		91*41*282 (with antenna)
	Weight (g)	350
	Supply voltage (V)	12
	Supply current (A)	1
	Supply method	Adapter power supply
Wireless Network	Frequency band	2.4G & 5G
Wired Network	Network port	RJ45
	Internet speed (Mbps)	100
Human-Machine Interaction	Status indicator	Red, green, and yellow

Accessory

I/O controller

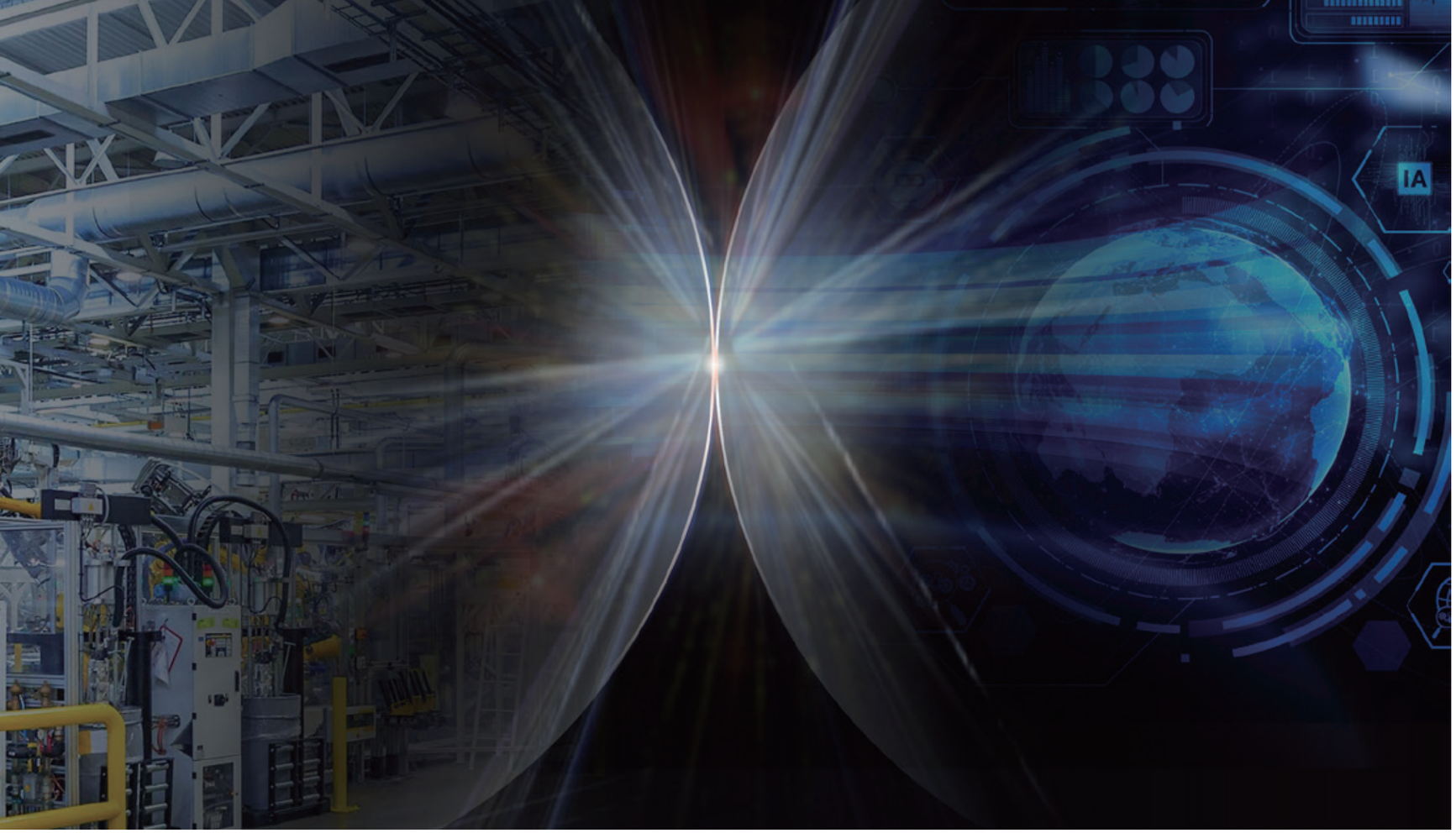
It is used in communication control of automatic door PLC, elevator docking, traffic control, and traffic light.

Key Features

- Supports 8 in and 8 out signal control
- Supports wired and wireless communication
- Supports selecting RS-232, RS-485 and RS-422 serial communication
- Adopts input and output status indicator for displaying the current input and output status

Specifications

Model				
		MR-RA-AC-HI10(232)	MR-RA-AC-HI10(422)	MR-RA-AC-HI10(485)
Basic Parameter	Dimension (L × W × H) (mm)	141*98*26 (without antenna)		
		141*127*179 (with antenna)		
	Weight (g)	270		
	Supply voltage (V)	9-30		
	Supply current (A)	1.5		
	Supply method	Adapter power supply		
Wireless Network	Frequency band	2.4G & 5G		
Wired Network	Network port	RJ45		
	Internet speed (Mbps)	100		
Human-Machine Interaction	I/O status indicator	Green		

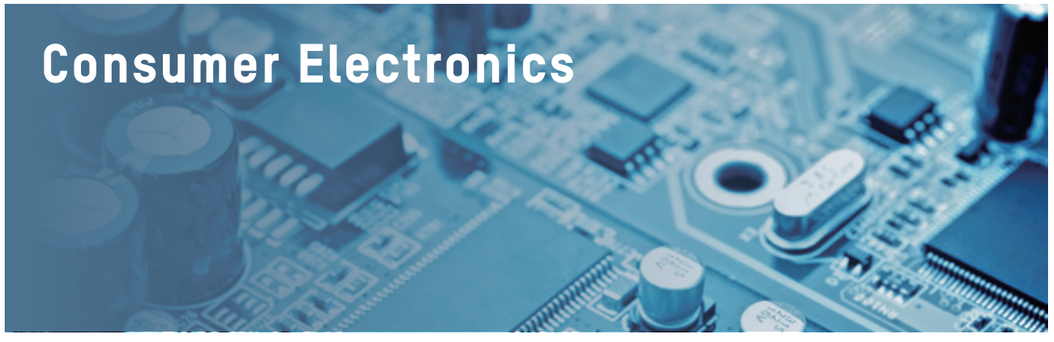


Making Intelligence More Inclusive

Let technology benefit all and manufacture a new future

Hikrobot is committed to benefiting people from technology and making industries more intelligent. Our mission is to make technology accessible to people from all walks of life and make a difference in human society by devoting to application standardization, end-to-end services, ecosystem development and the reduction of technical costs. We hope to make intelligence more inclusive, bring convenience to production and life, and facilitate industrial transformation and upgrading.

Industry Solution



Commercial Warehousing and Distribution

The commercial warehousing and distribution industry requires intelligent warehousing solutions with higher work efficiency, space utilization and flexibility. Relying on the accumulated industry practices, the technology of hardware and software, and the constant optimization and iteration of solutions, Hikrobot has become a long-term partner of clients from different industries to innovate logistics model and to improve supply chain competitiveness.

Challenges

High efficiency requirement

Improving the throughput capacity and work efficiency is core demand to deal with industry market competition.

Large reservoir capacity

It is necessary to take high-density storage and high-efficiency picking into account to reduce logistics cost.

High flexibility

High requirements for flexibility to support flexible expansion and quick replication according to business changes.

Low fault tolerance

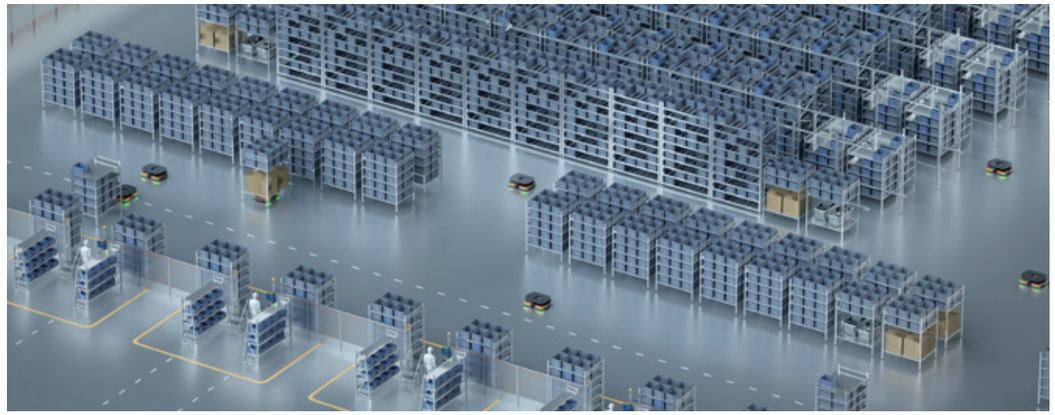
Large business volume and low fault tolerance, accompanied by diverse storages and high requirements for timeliness.

Solution Overview

In circulation logistics industries including retail, medicine, shoes and clothing, books, and tobacco, Hikrobot integrates with technologies such as robots, artificial intelligence, and Internet of Things, and provides the robot control system (RCS-2000) and intelligent warehouse management system (iWMS-1000) to create scene application solutions such as warehousing receiving, putaway, picking, distribution, collection, and cross-docking, effectively improving the flexibility, efficiency and automation of all stages of warehouse.

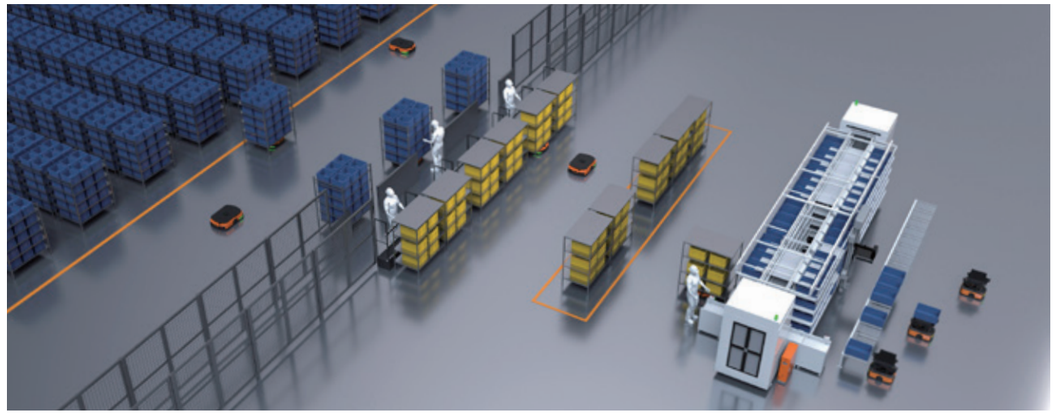
STRP

The Super-Tote Relay Pick solution (hereinafter referred to as STRP) is a new solution of tote-to-person. It improves throughput efficiency and storage density. It can be applied to tote storage and picking in many industries, including pharmaceuticals, shoes and clothing, e-commerce, retail, third party logistics, and consumer electronics.



SGTP

The Super-Goods To Person solution (hereinafter referred to as SGTP) is a new solution of rack-to-person. It improves storage capacity and work efficiency for storing and picking mix-sized materials even in the limited warehouse floor height. It is applicable in many industries, including pharmaceuticals, shoes and clothing, e-commerce, retail, third party logistics, and consumer electronics.



GTP+

Based on the diverse software and hardware of Hikrobot, the Goods To Person+ solution (hereinafter referred to as GTP+) integrates goods-to-person sorting, automatic distribution, automatic empty-full exchange, and transferring.

Overall, GTP+ processes waves and orders by total picking before distributing. It expands the resources of distribution compartment by importing the automatic distribution device SORT, increases the order quantity that a single goods-to-person workstation can simultaneously process, increases the hit rate of orders, and then improves the efficiency and instant throughput capacity of the solution.

GTP+ also integrates the automation solution of empty-full exchange and transferring, expanding applicable scenes of intralogistics automation solution.

Solution Highlights

Goods-to-person mode can improve operational accuracy and picking efficiency

Order breakdown and consolidation can improve sorting efficiency

Supports different kinds of strategies and flexible strategy switching

Intelligent SKU velocity algorithm supports dynamic allocation of racks

Featuring with high work efficiency, space utilization, and flexibility, GTP (Goods-to-Person), TRP (Tote Relay Pick), and other solutions have been applied in many smart logistic centers of industry leaders, such as ADL, Xiaomi, YCH, Alpro pharmacy, helping customers build efficient and flexible supply chains.

Adastria

Background

As a leading fast-fashion retailer in Japan, Adastria Group manages a diverse portfolio of brands catering to various customer preferences. Its nationwide network of 1,200 stores relies on efficient logistics to meet the growing demand for next-day delivery fueled by e-commerce. To face the challenge, Adastria, together with Hikrobot and Okura, has increased both the number of orders and logistic efficiency through the GTP solution.

Solutions

After introducing the GTP solution of Hikrobot, Adastria has deployed 120 autonomous mobile robots (hereinafter referred to as AMRs), 14 picking stations, 1,400 racks, and 16 PTLs. With iWMS-1000 and RCS-2000 systems, the GTP solution ensures the accuracy and efficiency, and reduces the work intensity.

Benefits

Enhancing picking efficiency and productivity
The GTP system simplifies the order fulfillment process and increases the logistics center throughput to a remarkable 34,000 orders per day.

Improving picking accuracy and reducing workload

High flexibility
Racks, workstations or robots can be added to suit the further growth and expansion.

Beijing Xiaomi Smart Logistics Project

Background

Xiaomi Corporation is an Internet company specializing in mobile phone, smart hardware, and IoT platform. It has a wide range of product lines covering smart phones, smart TVs, laptops, smart home ecosystem products, with operations in more than 100 countries and regions. With its own logistics platform, Xiaomi dedicates to offer comprehensive and flexible service to its customers. To enhance the warehousing capability under digitalization, Xiaomi logistics introduces Hikrobot intelligent warehousing solution in its Beijing Yizhuang industrial park, realizing the optimization of work flow and improvement of both storage capacity and efficiency.

Solutions

The traditional manual warehouse operation cannot meet the need of the ever-increasing-and-changing business and diverse time requirements of e-commerce orders. To reduce work intensity, improve outbound efficiency, and meet the time requirements of orders, Xiaomi introduces the Hikrobot TRP solution featuring high storage capacity and efficient transfer.

The iWMS-1000 system and its intelligent algorithm elements innovated by Hikrobot help Xiaomi achieve high hit rate, so as to maximize the outbound efficiency and meet the time requirements.

Benefits

Reducing human work intensity
Totes are transfered to workstation by Q1P AMR, and then picked by workers, reducing the intensity of manual operations.

Improving outbound efficiency
By improving transfer efficiency and hit rate, the overall picking efficiency has increased by 175%, and the time requirements of orders have been met.

Improving storage capacity
The warehouse space has been utilized to its fullest with a double deep tote layout and a 7.8-meter AMR picking height.

Singapore YCH Project

Background

YCH is a renowned 3PL company in Asian-Pacific region. Since its establishment in 1995, YCH has become the biggest third-party logistics company in Singapore, aiming to provide the best logistics and supply chain solutions for global clients from different industries such as e-commerce, shoes and clothing, and consumer electronics. Its supply chain centers locate in over 100 important cities in India, Malaysia, Thailand, Indonesia, the Philippines, Vietnam, Australia, and South Korea.
Due to Singapore's limited land area, its storage cost is high. The end user of the project is a famous clothing and accessory company, who intends to improve storage density through automated warehousing solution while achieving efficient inbound and outbound to meet the supply need of online and offline stores.

Solutions

As a product and solution provider of machine vision and autonomous mobile robot facing global clients, Hikrobot provided YCH with the tote-to-person solution consisting of CTUs, RCS-2000 system, and iWMS-1000 system, helping improve warehouse logistics efficiency, reduce costs, and provide better customer services.

Benefits

Expanding storage space in high density
The project employes 15 telescopic CTUs from Hikrobot, with max. picking and putaway height reaching 8 meters. With stereoscopic storage, 35,000 bins are deployed in the 3,000 m2 warehouse. The combination of CTUs and stereoscopic storage makes ultimate use of the floor height, and maximizes space utilization.

Meeting business needs with high flexibility
The Hikrobot CTUs can carry totes in different sizes, which allows more flexible business operations. The customer can select the most suitable storage containers based on actual situations and goods sizes, improving storage capacity utilization.

Processing orders from various operations with high flexibility
After introducing the intelligent warehousing solution of Hikrobot that supports multiple business types, YCH warehouse allows a single workstation to process order requirements from various channels and businesses simultaneously, and the system can allocate and manage the picking waves for orders of different types. By Hikrobot's solution, the customer can process orders with greater ease, ensuring lower work pressure and higher work efficiency.

Alpro Pharmacy

Background

Hikrobot, together with the core integrator Intelligence Traceability, opens up a new chapter in the Malaysian pharmaceutical industry. As a large chain prescription pharmacy in Malaysia, Alpro Pharmacy has introduced Hikrobot's smart logistics solution to upgrade its pharmaceutical logistics and provide faster and more professional pharmaceutical services, thereby gaining strong competitiveness.

Solutions

The high quality smart logistics solution from Hikrobot is applied in Alpro Pharmacy's central warehouse, catering to the picking and delivery need of drugs and personal care products from over 260 stores across Malaysia, and the picking need of some e-commerce orders. Hundreds of multi-layer racks, LMRs, and iWMS-1000 system have been deployed in the Phase 1 project which covers an area of 800 m2, helping Alpro Pharmacy improve efficiency, visualize management, and upgrade intelligent operations.

Benefits

Increasing work efficiency by 2.5 times
Smart LMRs can automatically carry drugs from warehouse area to the designated workstation according to the scheduled routes and commands, greatly reducing the carrying time. Meanwhile, with LMRs working 24/7, intelligent sorting efficiency has improved by more than 2.5 times compared to manual sorting.

Reducing error rate by 90%
To solve the problem of multiple SKUs and drug batches in the pharmaceutical warehouse, the goods-to-person solution is applied to eliminate the need for human entry into buffer areas to search for goods and reduce manual workload. The automatic and accurate docking among smart devices reduces human mistakes and increases the operation accuracy.

Digitalizing warehouse management
The iWMS-1000 system can smoothly connect to the upper level system ERP for digital management of warehouse information, facilitating inventory and count.

Automobile

With in-depth insight into the new changes and trends in the automotive industry, Hikrobot collaborates with users to overcome challenges, and provides end-to-end value-added services from program planning to delivery and landing. We offer automated logistics solutions to scenarios covering die-casting, stamping, welding, painting, assembling, and the EIC to meet new needs. We continuously upgrade our solutions so as to create long-term values for users.

Application Cases

Increasing labor cost

Fewer experienced and capable workers, changing attitudes to labor, and higher minimum wages around the world have increased the labor cost in the automotive industry.

Unsafe production

Under the traditional logistics mode, a mix operation of labor and equipment brings potential dangers.

Unsafe production

Under the traditional logistics mode, a mix operation of labor and equipment brings potential dangers.

Urgent de-empiricalization

The complexity of automobile and component manufacturing leads to a high dependence on the experience of intralogistics staff.

Increasing demand for coordinated logistics

As automobile consumption and personalized production drive the production model toward mass customization, coordinated and flexible logistics have become a must

The “last 100 meters” in automotive production

Complex working conditions, diverse carriers, and tight schedules have exacerbated the “last 100 meters” logistics problem in automobile production. automotive industry.

Solution Overview

Taking full advantage of autonomous mobile robots and system platforms, Hikrobot provides solutions to die-casting, stamping, welding, painting, assembling, and the EIC based on our rich experience and deep understanding of automotive industry, especially new energy vehicles. We offer standardized scenario solutions and support advanced customization to realize rapid upgrading and delivery, thus meeting the needs of the automotive industry for mass customization manufacturing mode of intralogistics.

Having a wide range of products, we provide optimal hardware solutions according to concrete situations

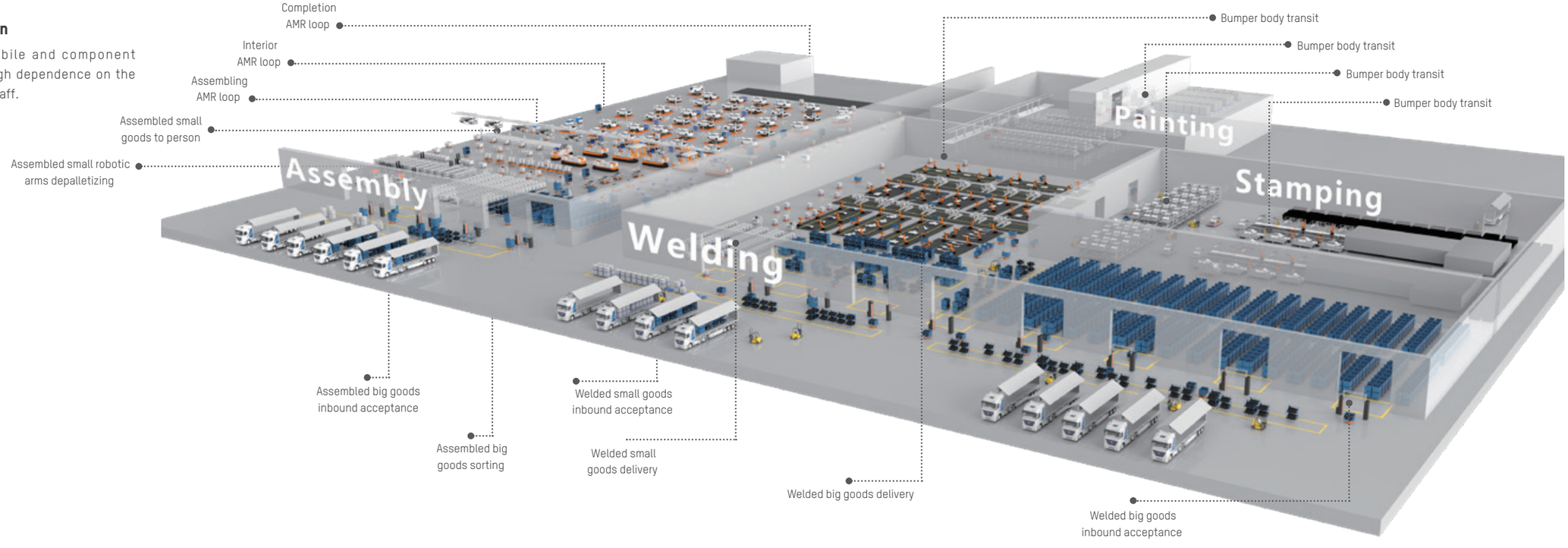
Powerful system supports large-scale scheduling of multiple vehicles

Applicable to all scenarios in logistics and manufacturing process

With rich experience, we serve leading automobile companies in the world

Standardized solutions fit various scenarios

Flexible customization of products and solutions



With a wide range of AMRs and supporting system platforms, combined with intelligent algorithms, we create innovative solutions for the industry. Our solutions are applied to stamping, welding, painting, final assembly and the EIC. Data integration, coordinated logistics, agile manufacturing, sophisticated management helps Geely Automobile, Tianjin FAW Toyota, NIO, Nanjing Changan Automobile and many other leading brands achieve intelligent manufacturing.

Tianjin FAW Toyota Project

Background

As a large Sino-foreign joint venture approved by the Ministry of Commerce of the People's Republic of China, FAW Toyota Motor Co., Ltd. has three production bases in China, located respectively in Tianjin, Changchun and Chengdu. Its production lineup includes VIOS, COROLLA, ALLION, AVALON, IZOA, RAV4, CROWN KLUGER SUVs, and passenger vehicle COASTER, and its annual production is approximately 900,000 units.

Solutions

Hikrobot anticipated and finished the construction of several FAW Toyota digital intelligent factories. Investing more than 2,000 AMRs, we helped the company realize the digital intelligence upgrading of logistics. For the first time in the automotive industry, Hikrobot employed more than 1,000 AMRs in a single factory, replacing all manual forklifts and tractor-trailers in the factory; for the first time in the industry, Hikrobot realized the seamless switching of AMRs across the maps, and the scheduling of super-large-scale AMR clusters, and handled other difficult technical requirements.

Benefits

Achieving intelligent intralogistics in Toyota

Our hardware products and software intelligent platforms contribute to constructing smart logistics through goods receiving via visual products, robots and vision products integration, AMR intelligent warehousing, unmanned delivery of goods, etc. Inbound, storage, transportation, returning empty, and exception response are covered.

Improving intelligence and automation

Given that the new generation of automobile manufacturing is characterized by various components, small batch production and rapid upgrading of models, we cooperate with partners to meet customized needs and design intelligent logistics delivery program on the basis of the new generation of Hikrobot hardware products and intelligent software platforms. By doing so, we help Geely achieve intelligent, automated and digital transformation along the production line side.

Geely Automobile Assembly

Background

Geely Automobile is a leading self-owned Chinese auto brand, integrating design, R&D, production, sales and service of vehicles, powertrains and key parts. It has ranked first in the sales of China's passenger vehicles for five consecutive years, and owns brands such as Geely, Lynk & Co, and Geome. In addition, it also holds 49.9% of shares and all management rights in Proton, as well as 51% of shares in Lotus, a luxury sports car brand.

Solutions

Since 2021, Hikrobot productions have been employed in many digital factories and smart workshops of Geely Automobile, involving nearly 2,500 AMRs. Hikrobot iWMS-1000 and RCS-2000 systems connecting with Geely GLES have been widely applied to smart logistics scenarios such as receiving via visual products, intelligent storage and "goods-to-person" picking in stamping, welding, painting, assembling workshops, and unmanned delivery along the production line.

Benefits

Increasing work efficiency

Work efficiency is greatly improved, such as 50% increase of efficiency in workshop's productivity, 20% in overall efficiency and 40% in small materials picking.

Improving logistics management in workshops

Goods are placed more orderly and standard, and the separation of people and vehicles is achieved.

Reducing labor intensity and improving data accuracy

"Goods-to-person" mode solves the problems of traditional modes, such as difficulty in finding goods and counting stock.

Digital warehouse management

Data sharing, real-time feedback, and intelligent operation & maintenance are realized.

NIO Inc. Project

Background

NIO is a globalized intelligent electric vehicle company dedicated to creating a pleasant lifestyle for its users by providing high-performance cars and ultimate user experience. It is one of the world's leading high-end intelligent electric vehicle companies. Focusing on forward research and development of core technologies, NIO has established independent R&D systems, including batteries, electric drive systems, intelligent systems, intelligent chassis domain controllers, and battery replacement technologies, etc. Its sales and service system covers customers in more than 300 cities around the world.

Solutions

Since April 2022, Hikrobot products have been put into operation in the intelligent workshop of NIO Auto, and nearly 200 AMRs have been employed in the workshop. Hikrobot iWMS-1000 and RCS-2000 systems connecting with NIO LES have been widely applied to smart logistics scenarios, such as stamping parts auto out of production line, automatic delivery of body parts, automatic delivery of assembly parts, SPS delivery, and EDS intelligent carrying.

Benefits

Reducing safety risks in the stamping parts out of production line area

Manual forklift operations in the area is replaced, which significantly reduces operation risks.

Reducing labor intensity

Unmanned line-side delivery docked with production line robotic arms avoids manual pushing of shelves into work stations.

Reducing manual operation and increasing efficiency

Automatic SPS mode solves the problems of traditional mode, such as difficulties in pushing and pulling material trolleys.

Digital management of delivery

Data sharing, real-time monitoring, and intelligent operation & maintenance are realized.

Nanjing Changan Automobile Project

Background

Changan Automobile Co., ltd. is a leading enterprise of Chinese automobile brand, integrating design, R&D, production, sales and service of vehicle, powertrain and key components, and is one of the four major Chinese automobile groups. It ranks steadily in the top three of China's passenger car sales, and owns brands such as Changan, OSHAN, AVATR, Deepal, etc., among which Deepal is a world-class intelligent EV brand that Changan Automobile is focusing on. Nanjing Changan Automobile has undertaken the first mid-to high-end new energy SUV model of Deepal, the Deepal S7.

Solutions

Hikrobot products have been adopted in Changan's stamping, welding, assembly and battery workshops since October 2022, with more than 460 AMRs employed. Due to Hikrobot iWMS-1000 and RCS-2000 connecting with Changan's industrial control system and LMS, Changan has achieved intelligent processes and logistics, such as stamping parts auto out of production line, intelligent storage and delivery, the AMR line of the final assembly process, receiving via visual products, etc.

Benefits

More flexible production line

AMR greatly improves the flexibility of production process and shortens delivery cycle.

Intelligent scheduling and orderly queuing

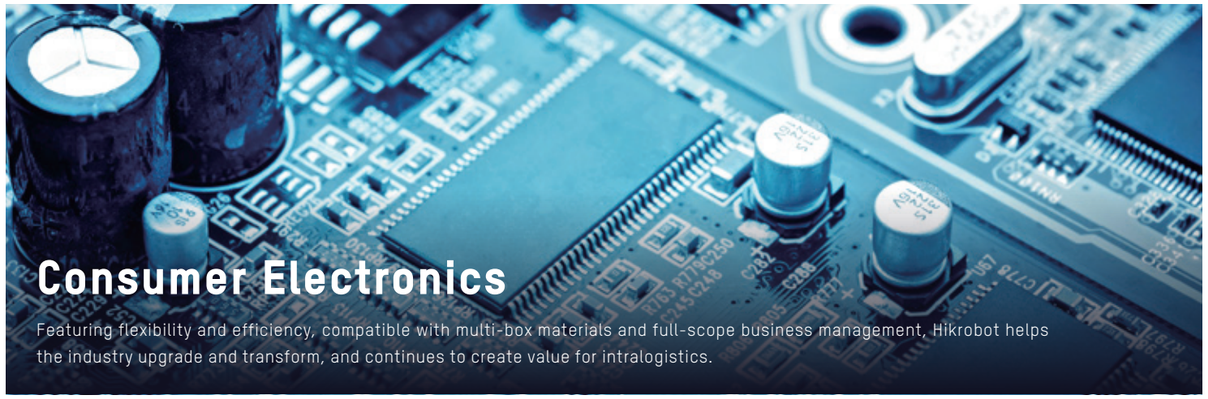
AMRs in the production line, together with AMRs in the logistics delivery, achieve intelligent scheduling and orderly passage.

Reducing labor intensity and improving data accuracy

The "goods-to-person" mode solves the difficulties in traditional mode and visual scanning improves the accuracy of inventory data.

Digital warehouse management

Data integration and visual monitoring are realized.



Consumer Electronics

Featuring flexibility and efficiency, compatible with multi-box materials and full-scope business management, Hikrobot helps the industry upgrade and transform, and continues to create value for intralogistics.

Challenges

Stringent environmental requirement

Production line processing requirements are extremely demanding. Equipment must be anti-static and dustproof.

Varied production equipment

In certain processes, substances such as copper, zinc, dust and moisture are prohibited to prevent any adverse effects on the quality of cell products.

Complicated technological processes

Transforming raw materials into finished products involves dozens of processes. Sometimes, secondary processing is required. Logistics flows and devices should be taken into consideration comprehensively.

Complicated business application

Massive SKU management, high accuracy and timeliness of kitting production and delivery, and complicated warehouse management require high industry experience of suppliers.

Solution Overview

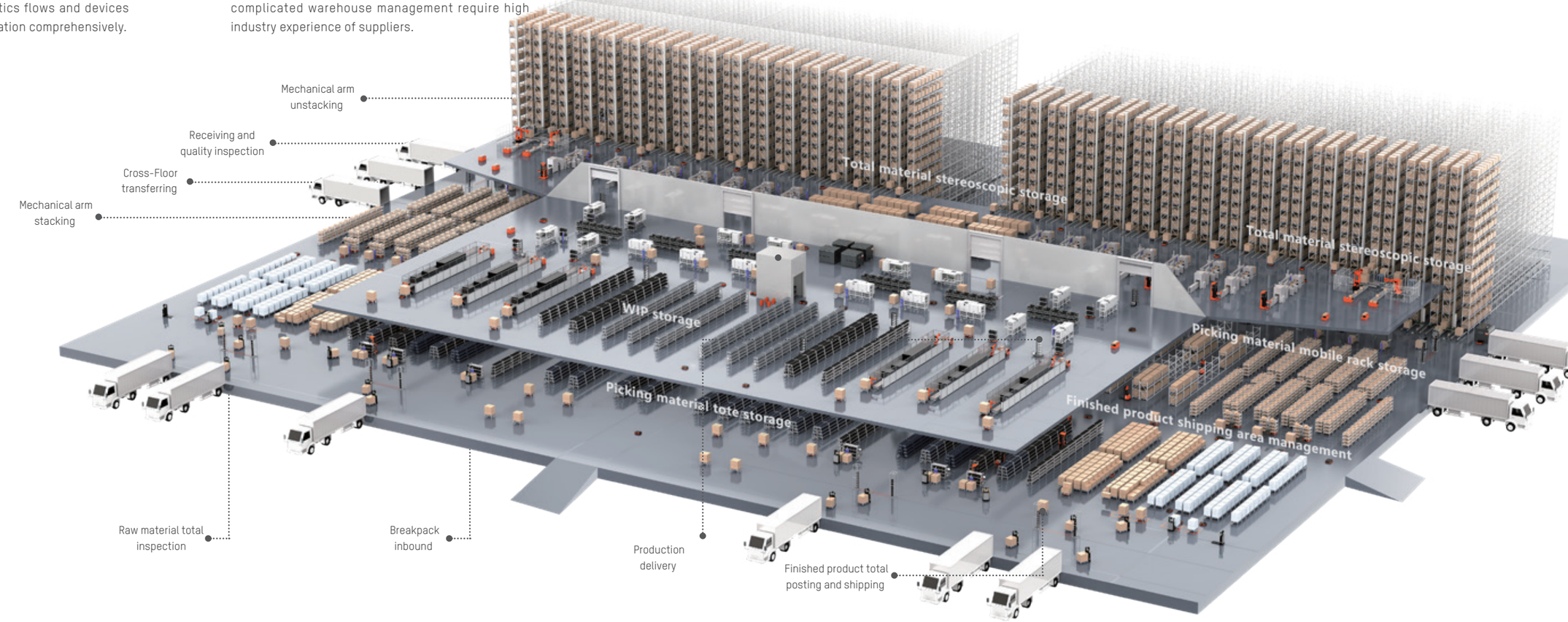
Given the operation processes, machine and material types, customized high-precision LMRs, FMRs, and CMRs are involved. RCS-2000 and MCS are integrated with upper-level systems, and therefore collaborative production is achieved.

Solution Highlights

Provides full-scope intralogistics solutions

Supports flexible manufacturing

Improves industry business management



The intelligent and flexible mobile robot system is designed for the specific requirements of consumer electronics industry. For example, fast-paced production with high-mix and low-volume. Hikrobot has already facilitated a number of leading Consumer Electronics companies, including Longcheer, Xinbao Electrical Appliances Holdings, Zhuhai Chongda Circuit Technology, Zhangzhou Hongfa, Sun&Lynn Circuits, BOE Technology, and other packaging and testing enterprises to increase their productivity.

Longcheer Group Huizhou / Nanchang Production Base Project

Background

Longcheer Technology is a company that focuses on the design, development, manufacturing and service of terminal products such as smart phones, tablets, and smart wearables. Its business covers many countries and regions around the world, and it provides professional smart product overall solutions for global top customers. The base launched the intelligent warehousing construction project in 2021, introducing Hikrobot intelligent warehouse and intralogistics solutions.

Solutions

The project covers intralogistics applications such as raw material warehouses, SMT workshops, glue dispensing workshops, assembly workshops, and packaging workshops. A total of 60 LMRs and 5 CTUs have been put into use. It realizes dynamic inventory management and automated delivery to the production line, greatly improving intralogistics flexibility and efficiency.

Benefits

Reduction in manual working intensity

Changes to "goods-to-person" picking mode from the working mode of walking 20,000 steps per day.

Improvement of operation accuracy

iWMS-1000 system supports anti-error reminders, greatly reducing wrong/missed delivery ratio.

Energy saving in production

Realizes plant-wide automated material delivery, which can realize light-free operation, and reduce production energy consumption.

Panasonic Project

Background

Panasonic is pursuing Panasonic GREEN IMPACT in the recent years. As the vanguard of digital home industry in China, the Panasonic Residential Device BU in Hangzhou has excellent performance in digital layout. The automatic and unmanned delivery of Panasonic smart factory integrates logistics and production into one control system. By the coordinated operations, the company has improved its whole-process operational efficiency.

Challenges

The smart factory of Panasonic Residential Device BU is mainly responsible for the production and R&D of products such as electronic toilet seat cover, electronic toilet seat, vacuum cleaner, and dishwasher, covering 8 important production lines. Facing the labor shortage and the lack of flexibility in high-paced production caused by business growth, Panasonic chooses the intelligent transfer devices of Hikrobot and the smart logistics solution of MSUNG to achieve unmanned inbound and outbound operations, improve the logistics and production efficiency, optimize management structure, and built a smart factory.

Solutions

Multi-AMR models cooperation

21 FMRs collaborate with 11 LMRs for precise docking, allowing the factory warehouse to handle inbound and outbound of more than 1,200 pallets of raw materials and 600 pallets of finished products per day. By scheduling the best route for robots, the cooperation efficiency in warehouse logistics has been improved, accelerating business operations. Besides, the solution combines the efficient operation of FMRs with the flexible picking and putaway of LMRs, achieving intelligent carrying with higher efficiency.

Paperless operation

The intelligent warehouse management system can record real-time inventory information and logistics data, which is displayed in the electronic system for checking at any time. Replacing paper logistics orders with electronic system achieves paperless inventory management, improves work efficiency, and reduces errors.

Automated and light-free operations of robots

AMRs can run without lighting and support 24/7 automated factory operation. The solution greatly improves operation efficiency and realizes high turnover rate. When no tasks are assigned to robots, they automatically switch to sleep mode, minimizing the energy consumption. Besides, the control system precisely manages robots to operate efficiently and stably in any scenarios, eliminating the need for human supervision

Stereoscopic warehouse

The stereoscopic warehouse in Panasonic Hangzhou improves warehousing efficiency and accuracy. By optimizing operation route with unmanned forklifts and building stereoscopic warehouse with high density, the solution makes full use of space floor height, saves the ground space and improves both space utilization rate and production efficiency.

Guangdong Xinbao Electrical Appliances Smart Factory Project

Background

A leading small home appliance enterprise, with products covering electric kettles, coffee makers and other appliances, is one of the world's largest ODM/OBM manufacturers of small home appliance products. Facing the challenges of rising raw material and labor costs, the customer chooses Hikrobot as its intelligent manufacturing partner, providing it with various AMRs such as LMR, forklift LMR, unmanned forklift, and CTU. Working with Hikrobot system platform, it can realize its intelligent storage and distribution of materials and finished products with high storage capacity and efficiency.

Solutions

The project covers full-process intralogistics scenarios from raw material receiving, quality inspection, inbound, sorting, cross-floor production and delivery, and finished product inbound.

The AMR operation area in the third phase of the project covers a total area of more than 20,000 square meters.

Realizes the seamless docking among iWMS-1000, RCS-2000, ERP, QMS, APS, and SRM systems.

RCS system docks with the elevator system, automatically realizing the interaction between AMR and the elevator, and realizing the operational linkage of cross-floor transferring.

Nearly 100 AMRs, such as LMR, forklift LMR, unmanned forklift, and CTU are put into use.

Benefits

The final assembly workshop realizes the automated delivery from raw material warehouse to calling point of production workshops, which greatly reduces the cost and improves the efficiency.

Narrow unmanned forklift is improved with its stacking height, with the narrowest right angled stacking aisle width of 2,500 mm, lifting height up to 3m, and reservoir capacity increased by 30%.

CTU solution is used in the stereoscopic warehouse, utilizing the upper floor space, and increasing reservoir capacity.

Simplifies business process, such as ground floor receiving, and AMR cross-floor carrying via non-passenger freight lifter to avoid long waiting for the elevator.

The introduction of Hikrobot software systems in the entire process reduces the dependency on manual operation, prevents the system from errors, and reduces the actual stock and inventory record mismatch.

OPPO CTU Intelligent Warehouse Project

Background

The ever refined consumer demand has led to an increase in smart phone SKU. The product categories are expanding horizontally to smart watches and other IoT products. These changes require higher manufacturing level of smart phone manufacturers such as OPPO.

As a raw material warehouse, OPPO Factory One mainly stores structural and hardware parts of communication products, IC materials, and other commonly used raw materials in the assembly section. With a large number of SKU, the delivery time and storage capacity are facing challenges.

With the ambition of upgrading the "world factory" to a more intelligent one, OPPO is seeking breakthroughs.

Solutions

The OPPO CTU intelligent warehouse built by Hikrobot was put into use in November 2023. Covering 3,500 square meters, the warehouse is equipped with 30 AMRs, 13,730 tote storage locations and 810 pallet storage locations, increasing the storage capacity by 4,230 totes and 60 pallets compared to the original warehouse. The intelligent warehouse significantly improves logistics efficiency and storage capacity.

The project adopts the VariaPick storage mode which is advanced in the consumer electronics industry. CTU and LMR share a map for collaborative operations, covering the intralogistics links such as raw material acceptance, inbound, quality inspection, storage, and picking. In terms of modular racks, the bottom layer adopts pallet storage while the upper adopts tote storage. The solution realizes whole-process automatic collaboration from intelligent acceptance to intelligent outbound, greatly improving the efficiency of receiving, shipping, storage, inspection, etc.

Highlights

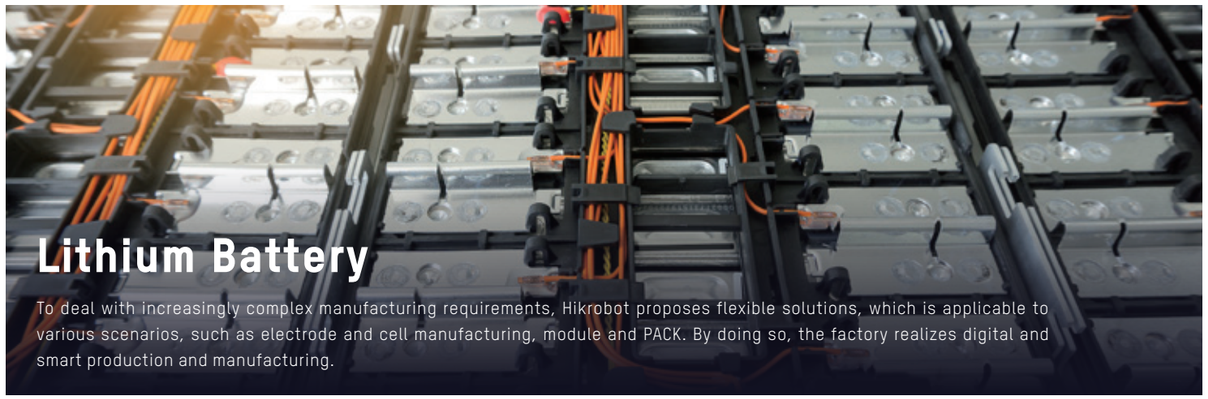
Double deep VariaPick: Through the design of double deep VariaPick and automatic picking scheme, the storage capacity is improved. Replacing "ground stacking" with "rack-and-tote integration", the solution fully utilizes the upward space. The storage capacity has been increased from 9,500 totes + 750 pallets to 13,730 totes + 810 pallets, with a capacity increase of over 40%.

Drawer PTL: The drawer PTL shortens material sorting time, avoids the whole workstation congestion caused by the timeout of a single tote operation, and reduces manual picking labor, resulting in an over 100% increase in workstation outbound picking efficiency.

Multi-functional workstation: Owing to the iWMS-1000 virtual PTL mode, a workstation is upgraded from picking a single order to picking more than 2 orders simultaneously. It improves the efficiency of workstation outbound picking, and allows the outbound of whole pallet and separated tote.

Intelligent charging station: The warehouse is equipped with intelligent charging stations which improve safety performance. When the temperature rises above 55 °C, the power will be automatically cut off, a sound and light alarm will be sent, the roller shutter will be automatically lowered, and the information will be synced to the OPPO fire protection system.

Logistics cost reduction and efficiency improvement: The CTU intelligent warehouse has reduced the workload of workers, improved the efficiency of picking and distribution in warehouse, and improved the efficiency of picking a single work order.



Lithium Battery

To deal with increasingly complex manufacturing requirements, Hikrobot proposes flexible solutions, which is applicable to various scenarios, such as electrode and cell manufacturing, module and PACK. By doing so, the factory realizes digital and smart production and manufacturing.

Challenges

High labor cost

A quick expansion of production capacity and high labor intensity lead to challenges in hiring and high labor cost.

Strict environmental requirements

In certain processes, substances such as copper, zinc, dust and moisture are prohibited to prevent any adverse effects on the quality of cell products.

High difficulty in machine docking

Given that different and heavy rolls need precise machine docking, it is difficult to load and unload materials.

Weak information management

Information flow cannot be retrieved due to the complex production process and frequent errors in material transfer.

Solution Overview

Given the operation processes, machine and material types, customized high-precision LMRs, FMRs, and CMRs are involved. RCS-2000 and MCS are integrated with upper-level systems, and therefore collaborative production is achieved.

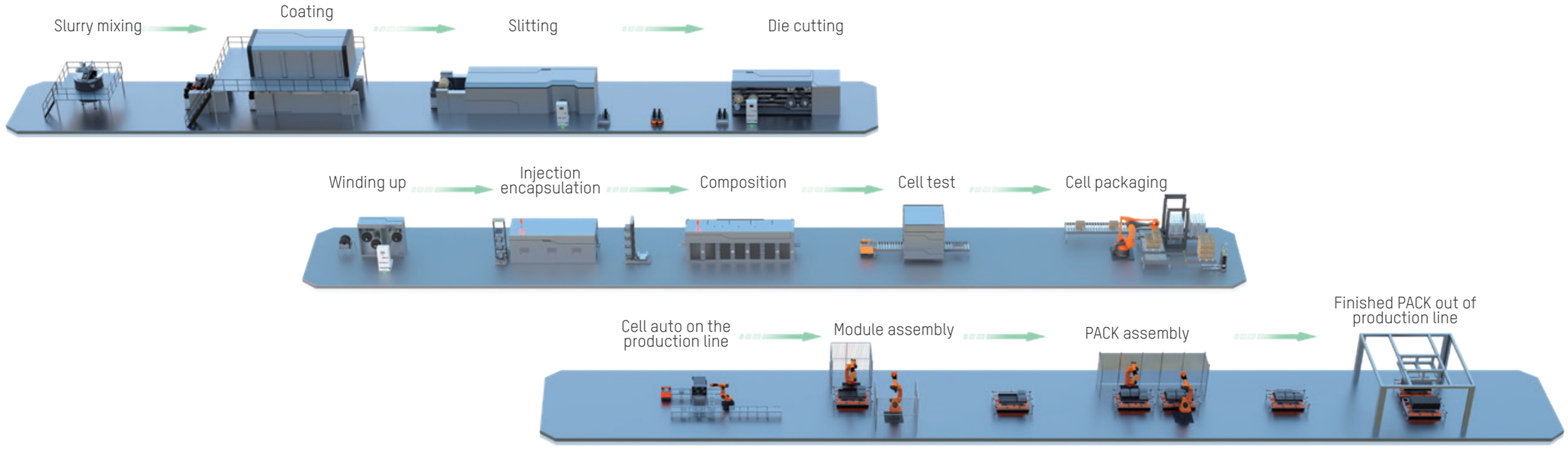
Solution Highlights

Automated robots in the process of crystal pulling, slicing, cells, and modules can adapt to complex production environments

Different robot navigation techniques such as VSLAM and LSLAM can deal with complex environment

The connection of RCS-2000 and MCS with upper-level systems as well as machines facilitates the circulation of information

Automated equipment such as elevators, conveyors, automated gates and air shower gates can be integrated



In the lithium battery production processes, such as coating, slitting, die cutting, winding, cell assembly, and module PACK assembly, mobile robots automatically dock with the production line equipment, effectively improving the automation of intralogistics and significantly reducing labor costs of enterprises. Currently, there are landing cases in BYD, CALB Group, EVE Energy, and other head users.

Power Battery PACK Workshop

Background

A leading Chinese power battery company has landed more than 10 projects, which involve scenarios such as electrode manufacturing, cell manufacturing, module and PACK, and has introduced different types of AMRs, such as LMR, omnidirectional HMR, reach forklift truck, and cantilever AMR. As of June 2022, more than 400 AMRs are involved, out of which around 250 AMRs are for the PACK line.

Solutions

In the testing of PACK assembly, the innovative omnidirectional HMR is capable of 4-way movement, improving the aisle utilization.

Customized carriers are adapted to different sizes of PACK packages from various workshops, and quickly made based on 3D skeleton modeling and modular component design to ensure a rapid delivery.

Benefits

Increase in site utilization

Site utilization rate is increased by 30%.

Improving flexibility of PACK line

Adjusts the points in RCS for easier route changing.

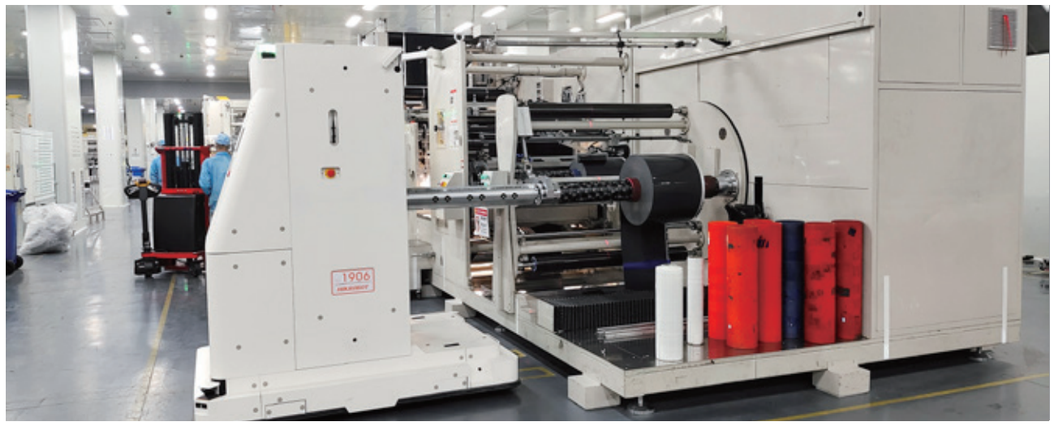
Increase in working efficiency

Single faulty AMR can move to maintenance area to avoid a large-scale shutdown.

Lithium Battery Cell Workshop

Background

A leading lithium battery enterprise has optimized transportation with AMRs in electrode, cell manufacturing, and cell testing workshops. Starting from 2020 when the first project was launched, as of July 2022, more than 10 projects has been landed, involving more than 400 AMRs including LMR, CMR, FMR, and CTU.



Solutions

Digital twin: establishes a virtual factory in 1:1 scale in planning phase to avoid any problems in solutions design, product development, delivery and implementation in advance.

High flexibility in software: Based on SLAM navigation, adjusts points on the server for easier route changes. Real-time data exchange can be set up among RCS-2000, MES, and the upper system, and the automation rate of material transferring is able to reach 100% to realize the traceability of the entire information flow.

Powerful hardware performance: The AMR body features a modular design to guarantee the equipment delivery and spare parts operation and maintenance. Relying on industry-leading 3D visual positioning technologies and multi-sensor fusion technologies, it can meet the docking accuracy of ± 1 mm for inflatable shafts and winding/stacking equipment. The innovative telescopic fork CTU was developed for the formation and grading workshop, which is adapted to different sizes of clips and totes, and is docked with machines and static racks, which is more flexible than the traditional conveyor mode.

Benefits

Staff reduction

Workshop staff are decreased by 20% to 30%, reducing manual working intensity.

Increase in working efficiency

Production efficiency in workshop is increased by 25%.

Digitalized information management

Reduce error rate of material transferring, and trace the entire information flow to improve working efficiency.

Consumer Battery Cell Workshop Project

Background

A lithium battery enterprise has adopted AMRs for logistics planning in electrode manufacturing, cell manufacturing, and cell testing workshops of the consumer battery. More than 200 AMRs are involved, such as LMR, HMR, FMR, and CTU.

Solutions

Develops the customized machines and AMR for the electrode roll loading, unloading and transferring, with the use of double-bin machine for the empty-full exchange of electrode rolls and reels, and high-precision docking with the machine with an accuracy of ± 1 mm.

Develops the innovative single cantilever AMR for roll slitting and unloading, and docking with winding machine to realize auto loading and unloading of electrode rolls.

Uses high-temperature-resistant, high-security CTU to dock with the baking machine to realize the loading and unloading docking of trays and clips. Uses iWMS system to realize the warehousing management of materials.

Benefits

Docks with the roll coating machine to realize auto loading and unloading of electrode rolls, and save labor force.

Adopts cantilever AMR, and realizing high precision docking with the machine with an accuracy of ± 1 mm. Innovative tilt adjustment structure of cantilever shaft can solve the docking height deviation caused by uneven ground area, and can ensure the safety of rolls.

Realizes auto loading and unloading (cutting and stacking) of machines, structural parts delivery, and finished cells transferring in the assembly workshop.

Realizes auto delivery of cells, module raw materials, and finished products in the module workshop.

Copper Foil Workshop Automation Project for Lithium Industry

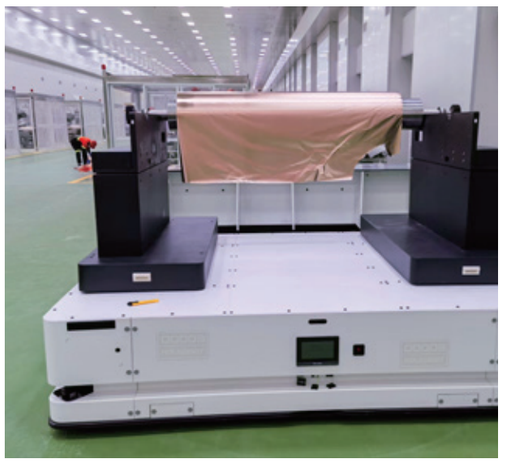
Background

The company is a large-scale multinational mining group engaged in the exploration and development of copper, gold, zinc, lithium and other metal mineral resources, as well as engineering design and technology application research in the world. In the new-built workshop project, Hikrobot has introduced HMR to provide a complete solution for copper foil unloading and transferring.

Solutions

Introduces the customized double-lifting CMR and LMR to achieve high-precision docking with equipment, machines, and buffer racks, and to reduce the logistics pressure.

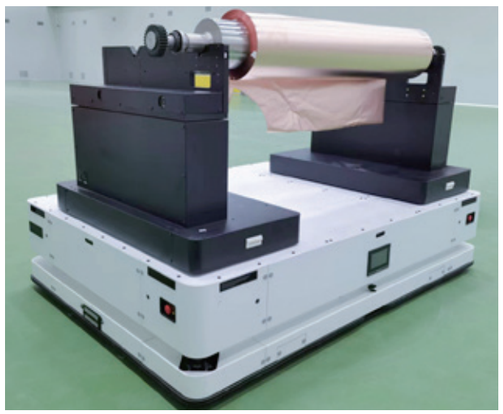
AMR supports docking with various automation equipment such as automatic doors, air shower gates, and elevators to break information isolated island and realize full-process automation services.



Benefits

The first breakthrough in the upstream lithium industry (copper foil plant): including non-standard equipment such as automatic trusses, ovens, weighing buffer racks, and elevators.

Provides the automation process solution of upstream lithium industry, and coordinates the animated simulation produced by the simulation team, effectively improving the implementation accuracy. Realizes foil unpacking, storage, delivery, and storage out of production line services.



Photovoltaic

The photovoltaic industry is a strategic emerging industry supported by China. The industry is flourishing to achieve carbon neutrality so that photovoltaic factories are desired to introduce automated intelligent equipment to replace manual operations.

Challenges

Complex operating environment

The material morphology of the crystal pulling plant changes greatly, the operating environment is complex, and the safety risk is high.

High efficiency requirements

Limited space of solar cell factory, burdensome production tasks and timely delivery are waiting to be addressed.

High requirements of machine docking

High precision of machine docking in the slicing factory poses a heavy burden on employees to load or unload materials.

High labor intensity

Bulky materials in the component factory lead to high labor intensity.

Solution Overview

Taking photovoltaic crystal pulling, slicing, cells, on-site process machines for components, materials and equipment to be transported into consideration, we customize AMRs to realize high-precision auto material loading/unloading, optimize software scheduling, and improve operating efficiency so as to meet different auto logistics requirements. In the end, the company achieves efficient, economical, flexible and intelligent production.

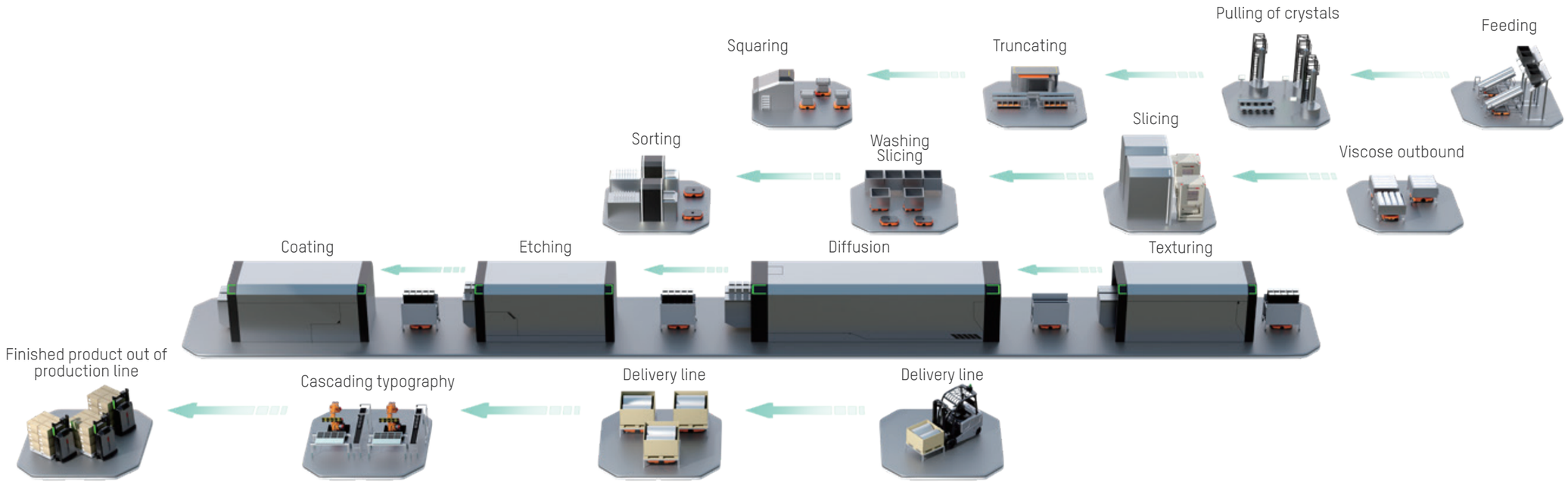
Solution Highlights

Automated robots in the process of crystal pulling, slicing, cells, and modules can adapt to complex production environments

Our VSLAM and LSLAM navigation technology and 5G communication technology take the lead in this industry

Our robots meet the high-precision docking requirements of different machines

The burden of loading/ unloading materials and logistics transfer is lowered



When it comes to silicon materials, crystal pulling, slicing, solar cells and components, AMRs can automatically dock to production line machines to replace manual loading/unloading and transfer, effectively improving logistics and production efficiency in the factory, and greatly reducing labor intensity. At present, our AMRs are also applied to many leading photovoltaic companies.

A leading photovoltaic cell factory

Background

It is the world's largest manufacturer of crystalline silicon cells, and now boasts several bases worldwide. The case base is located in a core industrial park, with an annual production capacity of 10GW high-efficiency crystalline silicon solar cells.

Solutions

The construction of smart factories was launched in 2019. The project aims to build 50 new high-efficiency crystalline silicon cell production lines, related production equipment and supporting facilities, all of which are handled by intelligent transportation robots for internal material handling and machine docking. The project is aimed to create the world's most intelligent and mass-produced green factory with the highest conversion efficiency.

Benefits

99.7% of production handling rate

Materials can be automatically transferred within workshops in a safe and steady way.

20% increase in production efficiency

Production capacity is improved quickly.

More than 50% reduction in labor costs

The condition of the production line is improved, and the on-site management is orderly.

A large-scale photovoltaic module smart factory

Background

Focusing on technological innovation, it takes the lead in product transformation and cost-of-kWh optimization with breakthrough technologies, creating green products and solutions to support global zero-carbon development. It is the solar energy company with the largest market value in the world.

Solutions

To address problems such as high labor costs and low work efficiency, the factory introduces AMRs to achieve intelligent process management.

Benefits

Automatic handling and loading of various auxiliary materials in the component factory is realized. Peripheral devices, such as automatic doors and guard gates, connecting with Hikrobot controllers in real time achieve automatic docking of machines.

A large-scale photovoltaic slicing AMR project

Background

A silicon stick slicing factory realizes automated crystal rods transfer, feeding, and de-gluing frame transfer. To cope with harsh operating environment, customized sensors and protective measures support efficient and stable operation of AMRs, ensuring continuous and high-quality production.

Solutions

Customized AMRs are utilized to send square-crystal rods into slicing machines and transfer sliced silicon wafers to LMRs.

Benefits

AMRs replace workers to operate in harsh production environment and works steadily and efficiently, reducing workers' exposure to terrible situations. Therefore, it can be said that the introduction of AMRs contributes to sustainable development of the company.

Automated operation cuts down manual mistakes.

A large-scale photovoltaic crystal pulling intelligent factory

Background

A leading enterprise established its smart lighthouse factory in 2020. After its completion, logistics equipment was introduced. Digital and intelligent transformation reduces employees to 2,000, which greatly saves labor cost.

Solutions

Our FMRs are docked to the single crystal furnace to realize crystal bar discharging and docking. Hikrobot Q7 robots are involved in front and rear channel dismantling and clearing, crucible, and re-casting cylinder handling.

The Q8-LMRs connect to the finished crystal rods discharging from the single crystal furnace, realizing long-distance handling, inbound, etc. After truncating, round bars are carried by our CMRs. During squaring, grinding, and quality inspection, CMRs together with three-axis manipulators transfer materials. Appearance inspection, visual guidance and positioning of manipulators are also applied by Hikrobot machine vision products.

Benefits

Using about 400 AMRs, the factory realizes intelligence and automation in production and intralogistics transshipment. The project initially plans to employ nearly 5,000 people, but in the end, labor cost is cut down by 50%.

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