

# HAI ROBOTICS

## Pioneer in Autonomous Case-handling Mobile Robot (ACR) Systems

Brochure



[www.hairobotics.com](http://www.hairobotics.com)



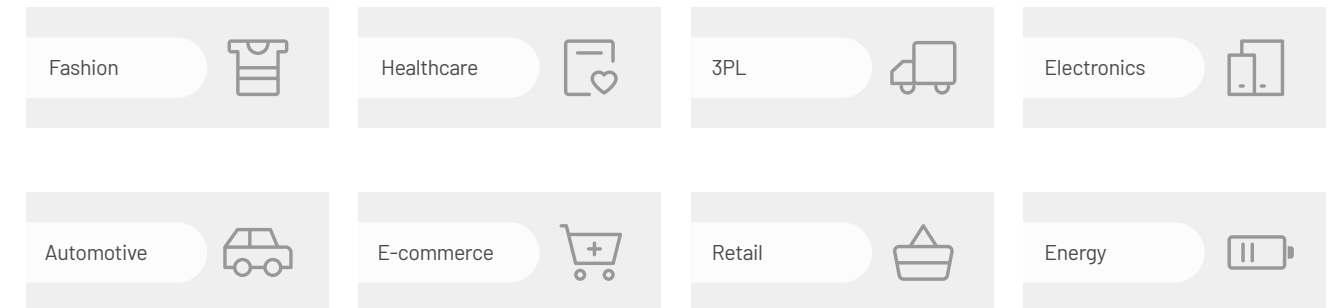
# About Hai Robotics

## Industry

### Pioneer in Autonomous Case-handling Mobile Robot (ACR) systems

Hai Robotics, a leading global provider of automated storage and retrieval systems (ASRS), is committed to providing flexible, intelligent, and efficient warehouse automation solutions through robotics technology and algorithms. Our HaiPick solution, independently developed in 2015, is the world's first-ever ACR solution.

Founded a year later in 2016, Hai Robotics is a global enterprise with more than 1,300 projects in over 40 countries. We have offices around the world including in the United States, the United Kingdom, the Netherlands, Japan, South Korea, Singapore, and Australia. We strive to combine global experience with local expertise to provide our customers with tailored, quality solutions.



#### ► Key Facts

**1,000,000m<sup>2</sup>+**  
Storage area serviced

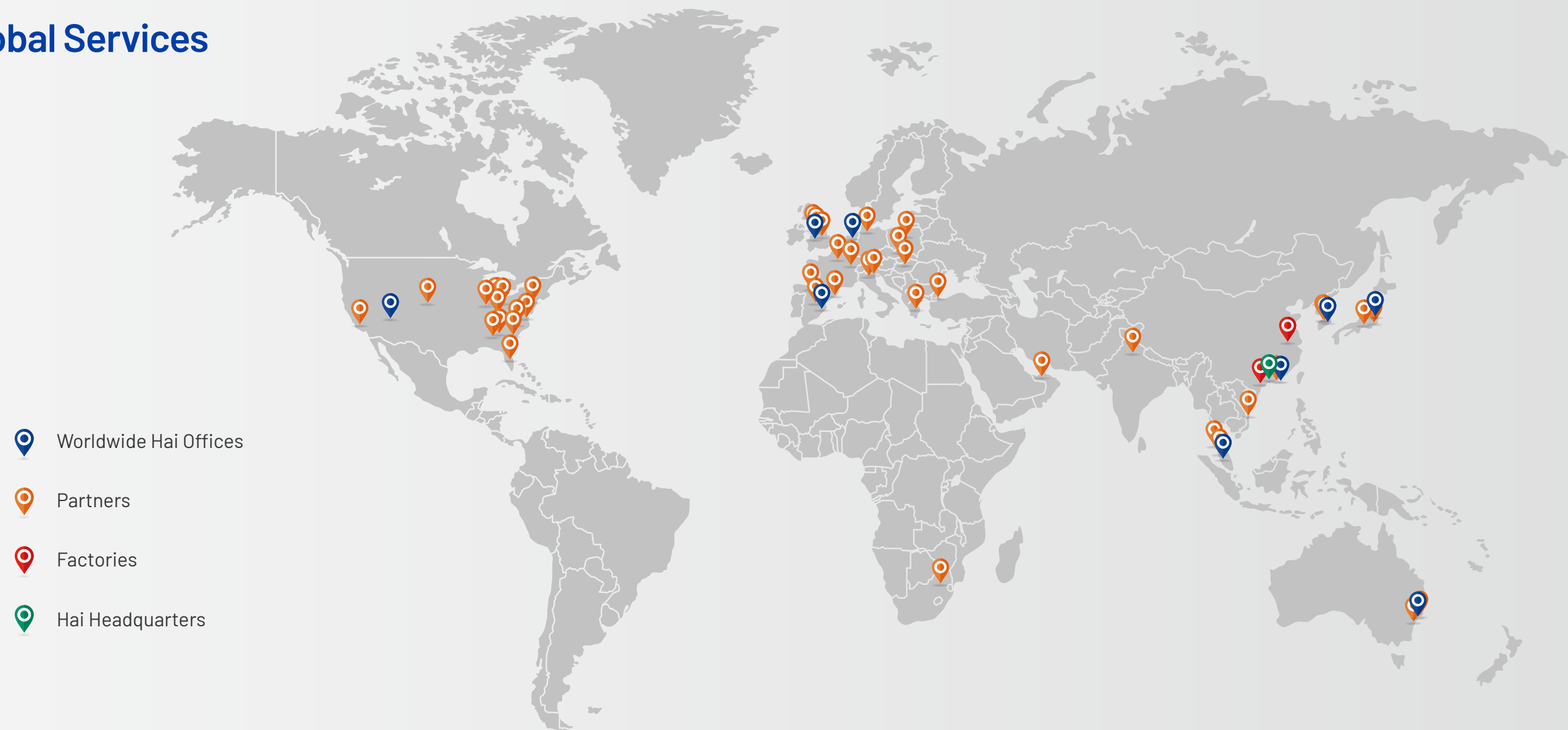
**1,900+**   
Patents

**1,300+**   
Projects

**40+**  
Countries



## △ / Global Services



### ► Our Customers



### ► Our Partners





# Smart Warehouse Logistics Solution

## Enabling Smart Warehouses With Flexible and Scalable Solutions

The smart warehouse of today needs to be adaptable and responsive to the shifting needs of future demands. Hai Robotics designs flexible, highly efficient automated goods-to-person order-picking solutions that keep your operations functioning ahead of the industry to best support business growth.

## Smart, Highly Adaptable, Efficient

The mastermind of our solutions, the HaiQ software platform, ensures that HaiPick robots always operate at peak efficiency and capacity. HaiQ allows them to seamlessly integrate with any warehouse management systems that may already be in place. Hai Robotics offers a robust, cost-effective, and smart warehouse solution that allows any business to significantly increase storage density and operational efficiency. Installation is quick and painless to best facilitate ongoing warehouse operations.



# Our System Solutions

## HaiPick System 1

### Essential Goods-to-person Automated Picking System

- The most flexible ACR solution
- Handling various storage unit sizes
- Integrates directly with conveyor-based workstations
- Adding HaiPort docking stations supercharges HaiPick efficiency



## HaiPick System 2

### Versatile Shape and Load Performance System

- All HaiPick System 1 advantages apply
- ACR & AMR integration (600 – 1000 KG)
- Utilizes ACR for tote handling and implements
- AMR for pallet/cages/garment rack handling
- Enables order consolidation for multiple types of goods



## HaiPick System 3

### Ultimate Cutting-edge Storage Density System

- Full ACR & AMR integration
- World's first grapple-hook ACR three tote-deep storage
- Relocates 35 to 55 totes /h
- Improves efficiency by 100% (compared to last generation)
- Industry-swiftest AMR at 4 m/s & handles 22 to 28 totes per hour horizontally

## HaiPick A42

### Multi-layer ACR

The A42-series allows for case picking and storage up to 5.2m in height. The four models in the HaiPick series of robots can handle a variety of case types and dimensions—including plastic totes and cardboard boxes.



#### High efficiency

The robot can handle up to nine cases at once with multiple storage trays. This greatly improves operational efficiency.



#### Flexible payload dimensions

The robot supports separate and mixed picking of plastic totes and cardboard boxes in a wide range of case dimensions and types.



#### Flexible and scalable

Users can re-use existing racks and totes, if they fit handling specs. The system can also be easily deployed in a small part of the warehouse and scaled up to a larger installation as your business grows.



#### Efficient deployment

Quickly automate your warehouse with ease, even in the most remote places.



#### Product safety

CE+NRTL certified.



#### Double-deep Fork

Reduce aisle area by 50% while increasing storage density.



#### 3D Visual Recognition

Support carton picking, compatible with multi-size cases. Adapt to the situation that some containers cannot be identified by the code.



#### Flexible Width Fork Technology

The size of the cases can be automatically recognized for flexible pick and place; utilizing case spacing to increase the overall storage density by more than 30%.





# HaiPick A42T

## Telescopic Lift ACR

The HaiPick A42T Telescopic ACR is the world's first ACR that can pick and store plastic totes and carton boxes at a dizzying height of up to 12m. Increase your warehouse storage density even further with the A42T.



### Maximum picking height 12m

Improve storage density by up to an additional 100% compared to the regular A42.



### World's first telescopic ACR

Utilize your warehouse space even more efficiently by picking and storing 30kg payloads up to 12m high.



### High efficiency

The A42T has multiple storage trays to carry up to nine payloads simultaneously, which greatly improves picking efficiency.



### Flexible payload dimensions

Separate and mixed picking of plastic totes and cardboard boxes supported.



### Product safety

CE+NRTL certified.



### Double-deep Fork

Reduce aisle area by 50% while increasing storage density.



### 3D Visual Recognition

Support carton picking, compatible with multi-size cases. Adapt to the situation that some containers cannot be identified by the code.



### Flexible Width Fork Technology

The size of the cases can be automatically recognized for flexible pick and place; utilizing case spacing to increase the overall storage density by more than 30%.



# HaiPick A42T-E2

## Telescopic Grappling-Hook ACR

The world's first telescopic ACR featuring an incredible Chain-Pick system powered by a solo hook. Our grappling hook's Chain-Pick system can haul up to three interlocking totes at once from racks, and carry up to eight in its multi-storage tray tower.

## World's First Chain-Pick Technology

The innovative solo grappling hook significantly reduces the horizontal space between totes by ~60% to a range of 40mm.

This is accomplished by securing the front lip of the tote using the hook. The front and back of each tote interlock with each other, eliminating the space to 0mm and enabling the ACR's Chain-Pick technology.

Maximize your warehouse storage capacity with our incredible Second-Gen A42T Chain-Pick ACR.



### Revolutionary Chain-Pick ability

Up to three-deep tote storage capacity



### Ultimate storage density

Seamless front-rear tote connection



### Elevated efficiency

Improving efficiency by rendering code scanning during the picking and placing process unnecessary

Capable of lifting and stowing 60 totes per hour



# HaiPick A42-E6

## Grappling Hook ACR

HaiPick A42-E6, the grappling hook ACR, has been specially designed to handle cases stored on single- to even triple-deep racks, and its maximum payload can reach up to 300 kg. With this state-of-the-art product, you can experience enhanced storage density and area efficiency.



### Ultimate case spacings

- Horizontal case spacing up to 30 mm
- Longitudinal case spacing up to 0 mm



### Multiple deep options

- Up to three-deep, improving storage density by 150%



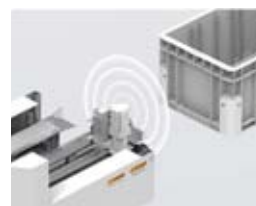
### Highly automated warehousing

- Shorter turnaround time, improving handling efficiency by 30%



### Quick disassembly

- Saving 10% of transportation and maintenance costs



### Solo grappling hook

Innovative hook extracting design, bringing higher safety and efficiency



### Multiple deep options

Supporting single- to triple-deep options, making the best of every inch of usable space



### Minimum case spacings

Horizontal case spacing up to 30 mm while longitudinal case spacing to 0

# HaiPick A3\*

## Fork-lifting ACR

The HaiPick A3\* provides up to 5.5m picking height to increase vertical storage space utilized and reduces the storage footprint. Adaptable to manufacturing operations, the series can store, pick and move goods of different shapes such as tires, trays and foam boxes. It is also suitable for dust-free requirements, handling goods such as PCBs.



### Picks a wide variety of materials

Handles trays, tires, foam boxes, baskets, cardboard, plastic bins, and many other materials, sizes and shapes. Often used in manufacturing industries such as electronics and automotive.



### Class 10000 cleanliness and anti-static

Dustproof and anti-static qualities take exceptional performance to a new level suitable for handling goods such as PCBs.



### Highly customizable

A large range of standard customizations are available. The A3-series can work with different types of shelves, conveyors and other docking equipment.



### Integration flexibility

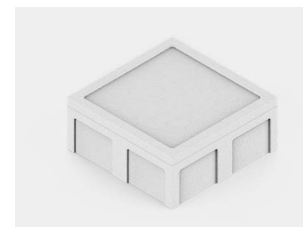
As with any HaiPick-series, the software can integrate with almost any upstream software platform to orchestrate and automate processes within the warehouse or facility.



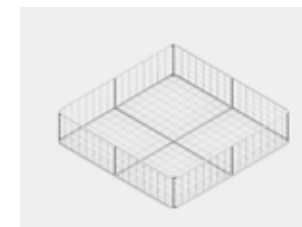
### Product safety

CE+NRTL certified.

## Supported shapes and materials



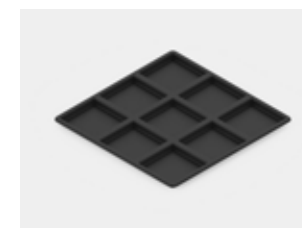
Foam box



Iron basket



Tire



Tray



\*The HaiPick A3 models are not available in Japan .  
Please contact us for more information.





## HaiStation

### Multi-function Workstation

HaiStation is the backend of the solution. It typically includes a HaiPort workstation, conveyor, put wall, buffer wall, workstation, robotic arm etc. The HaiStation provides ultra-efficient case loading and unloading with safe human-robot interactions.

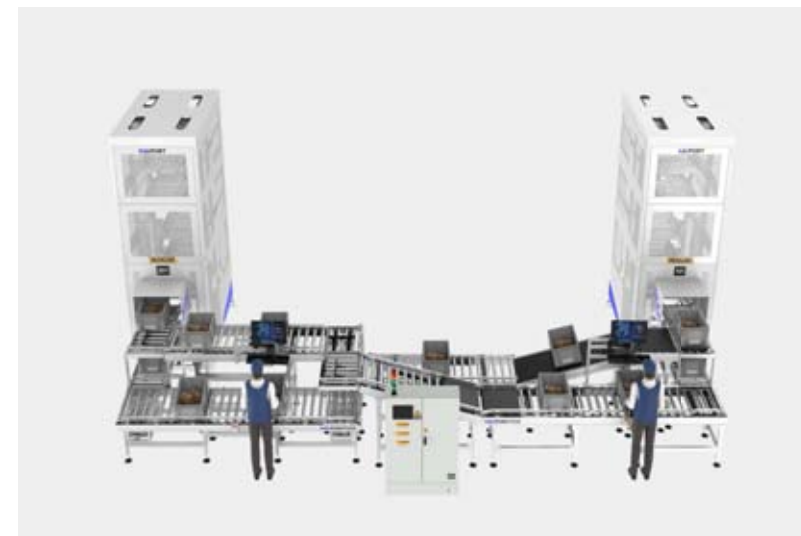
### Why HaiStation :

<b>Efficient</b>	Significantly increases HaiPick ACR's efficiency. Fast delivery of totes to workers helps to increase facility throughput.
<b>HaiPort-powered Workstation</b>	HaiPort can load eight cases in three seconds and unload eight cases in five seconds, which significantly increases workflow efficiency.
<b>On-conveyor Picking Workstation</b>	Workers and HaiPick robots are indirectly connected through an ergonomic design. Goods can be sorted on the conveyor line with minimal movement.



### HaiPort-powered Workstation

Loads eight cases in three seconds, unloads eight cases in five seconds to significantly improve efficiency.



### On-conveyor Picking Workstation

With an ergonomic design, workers and HaiPick robots are indirectly connected. Goods can be sorted on the conveyor line with minimal movement.



### Storage Units



- © Multi-size carton/tote storage units.
- © Customizable shelving dimensions (height/width/length/type).

### Product safety

CE/NRTL certified.

### Ergonomic

Provides workers with an ergonomic workspace.

### Friendly

Human-system interaction, empowering maximum manual in-and-outbound efficiency.





## K50 Fast-Transit Companion AMR

Our Fast-Transit Companion K50 is a high-performance AMR independently developed by Hai Robotics, featuring a compact-sized chassis and quick and agile maneuverability. Our Fast-Transit Companion AMR supports our HaiPick ACR series robots by efficiently and swiftly handling individual totes with its special rack-to-workstation 'backpack method'.

Equipped with autonomous navigation, active obstacle avoidance, and automatic charging capabilities, this speedy support is the perfect solution for achieving fast and hassle-free tote handling.



### Compact size

- Slightly larger than a tote, allowing for easy shuttle movement under rack

### High-speed movement

- A driving speed up to 4.0 m/s, significantly improving handling speed and efficiency



### User-friendly design and interface

- Audible and visual alarms and voice alerts for real-time robot status
- Optional touchscreen to display important information



### Multiple protection mechanisms

- Different safety devices, including a LiDAR module for obstacle avoidance a front safety bumper, and front and rear emergency stop buttons



## K600/K1000A Heavy Duty Companion AMR

Our K600 & K1000 are high-performance Autonomous Mobile Robots (AMR) that are available as supplementary units for our HaiPick ACR. They integrate advanced software strategies and hardware features, such as DM code navigation plus inertial navigation, optional SLAM navigation, and environmental mapping. These top-of-the-line AMRs effortlessly execute path planning, obstacle avoidance, premier goods transport, and autonomous charging within our comprehensive ACR system.

### 1000kg Self-propelled

Can lift various carriers such as steel pallets, racks, roll containers, and put carts.

### 630mm Ultra-narrow body

High-density storage, flexible shuttle.

### Combined with HaiPick ACR for system-level integration

- One-stop picking for standard/irregular parts
- One-stop picking for 2B&2C multi-channel
- ACR + Heavy Duty AMR

### Multiple navigation methods

- Laser obstacle avoidance.
- Front and rear TOF stereoscopic obstacle avoidance.
- Front and rear emergency stop buttons.
- Front and rear anti-collision edges.
- Dynamic obstacle avoidance.

### High compatibility

Can be connected to elevator control, door control, PDA, and other equipment.

### Multiple navigation methods

- QR code + inertial navigation.
- Multi-sensor fusion navigation.
- Laser SLAM (optional).

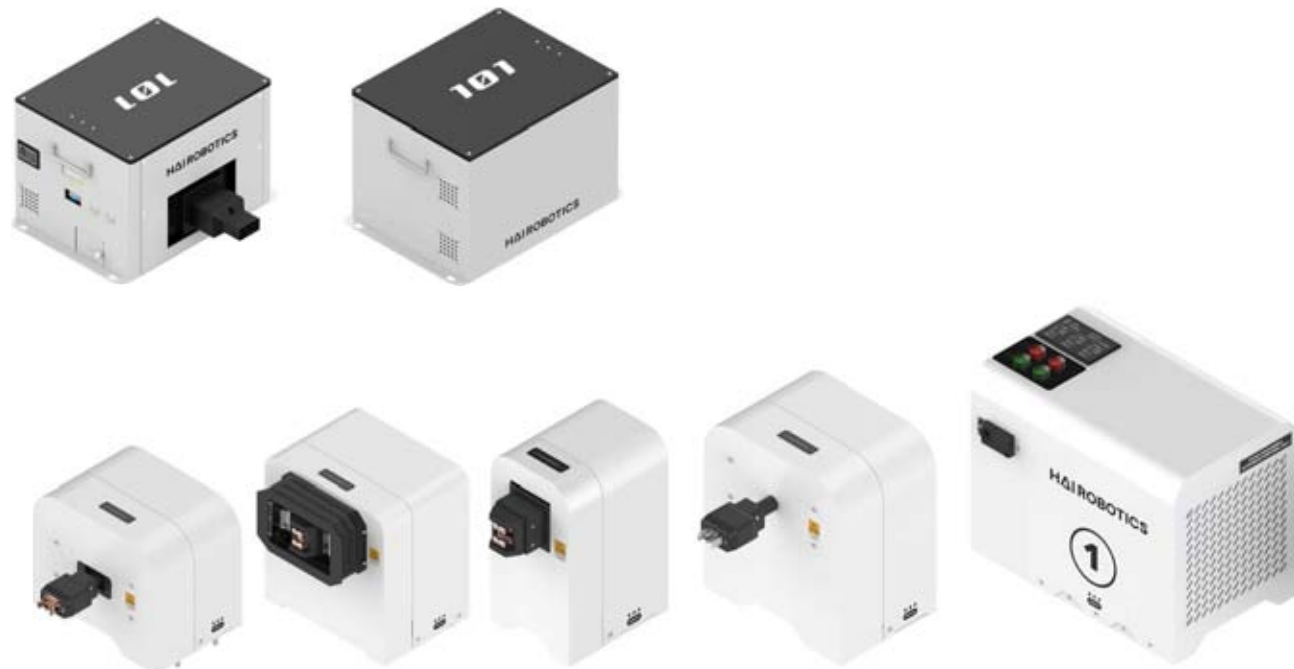
# HaiCharger

HaiCharger is designed for automatic charging of the HaiPick and K-series AMR robots. This charging station is easy to operate and provides comprehensive functions. It features a user-friendly display screen that displays machine status, including plug-in connection, charging, and communication. This charging product integrates multiple protection mechanisms to provide safe and reliable DC charging services.

Supports fast & full charging modes to ensure 24/7 operation.

Easy to operate, plug and play, real-time display of charging and communication status.

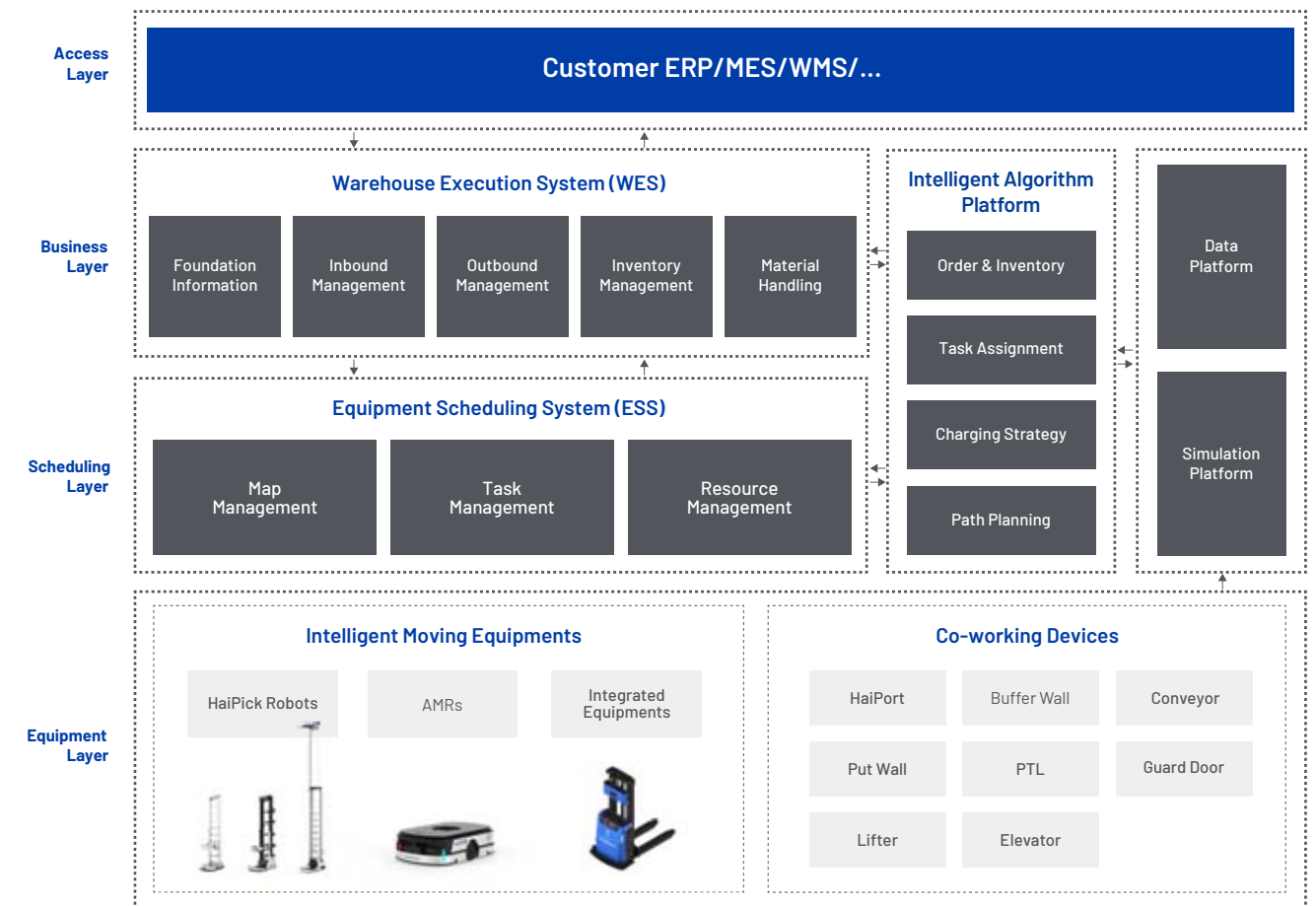
Multiple protection features that prevent exceeding voltage & current limits, overheating, short circuit, reverse connection, and electric shock.



# HaiQ

## Highly Intelligent and Adaptable

HaiQ is an intelligent software platform that leverages advance algorithms to streamline order fulfillment and inventory management. It serves as the central command for inbound, outbound and inventory management, seamlessly integrating with other devices.



### Thorough R&D

Results in rugged software with seamless integrations.



### Flexible Configuration

Meet the specific demands of the warehouse process.



### Flexible Scheduling

Support quick integration of multi-type equipment and coordination.



### Service Oriented Architecture

Modular in-house developed software environment easily adapts to any changes in your business.



### Intelligent Resource Orchestration

Optimize capacity and space utilization.



### Continuous Algorithmic Optimization

Achieve operational optimization.





HaiQ - Multiple Integration Methods

Supports a variety of system integration methods. Proven experience integrating with WMS, ERP, OMS, MES, WCS systems.



WES: Warehouse Execution System

Hai Robotics Warehouse Execution System (WES) is a smart system that seamlessly interfaces with upstream systems such as ERP, WMS, MES and supports operations such as outbound, inbound, inventory check, stock consolidation and material handling. The system features flexible workstation configuration and operation strategies, such as order grouping, order splitting, wave rule and heat strategy.



Convenient upstream system access

We have experience in implementing projects with well-known ERP and WMS vendors, allowing for flexible field configuration to meet various docking requirements.



Efficient configuration and Algorithms

Configure workstation operation rules, support business strategies such as grouping and splitting orders, and have intelligent and efficient algorithms.



Standard deployment plan

It has high availability with automatic switching in case of failure, as well as load balancing and data disaster prevention features.



Stable and secure platform

Capable of processing up to 10,000 external requests per second. The data communication between robots uses encrypted components.

ESS: Equipment Schedule System

Hai Robotics Equipment Scheduling System (ESS) integrates robots, equipment, and physical environment information into a unified management system, including task management, resource management, and map monitoring and other functions. It receives instructions from upstream systems to control various types of warehouse robots to perform material handling tasks.



Order Allocation Algorithm

Select orders from the order pool and assign them to workstations to maximize order timeliness, picking efficiency, and workload balance.



Task Allocation Algorithm

Assign tasks to robots to ensure optimal transport efficiency and timely completion of transport tasks.



Path Planning Algorithm

Minimize robot travel distance, achieve robot avoidance, queueing, and other actions, and reduce workstation downtime.



Charging Algorithm

Provide stable and sufficient robot transport resources to ensure efficient completion of warehouse operations.



Sinocare Semi-finished Pharmaceuticals Warehouse

Location: Changsha, China

Sinocare is a global pharmaceutical leader that develops, manufactures, and markets rapid diagnosis testing products for chronic diseases. The company is dedicated to the innovation of biosensor technology and BGM (Blood Glucose Monitors) and is a leading expert in diabetes management.

The project mainly serves as storage for much needed BGMs, test strips, and other pharmaceutical and laboratory items of various sizes and weights.

Solution

- » Six HaiPick ACR A42D units for double-deep high-density storage shelving
- » Four compact AMR for agile tote transportation.
- » The comprehensive and intelligent HaiQ software digitally manages the HaiPick ACR and the AMR units and fluidly links up to Sinocare's Electric Cloud Storage (ECS) system
- » A manual buffer wall as an outbound workstation.
- » Two charging stations for the HaiPick ACR, and two for the AMR units

Results

<b>10,652</b> Storage Locations within 1,096m <sup>2</sup>	<b>13 totes/m<sup>2</sup></b> Storage density
<b>200 totes</b> Inbound Efficiency Per Hour	<b>99.9%</b> Picking accuracy



Li Zhi, Senior Manager of Bioengineering Sinocare

"The future of the big health industry will witness the inevitable trend of deep integration and advancement of the smart supply chain in the medical device health manufacturing sector. Sinocare is committed to leveraging digital transformation to achieve optimal performance growth in the industry."







## Geely LINK&CO Chengdu Factory Small Parts Warehouse

Location: Chengdu, China

Jisu Logistics (a logistics company established by Geely Automobile known as Link&CO) wanted to improve the overall automation and intelligence level of factory logistics. The company wanted to implement a smart warehouse to increase warehouse utilization, improve personnel efficiency, and reduce on-site operational safety risks.

Geely Link&CO chosen Hai Robotics to upgrade warehouse automation, improve the existing small item stacking operation mode, and promote the comprehensive upgrade of intelligent logistics in Chengdu base.

### ► Solution

- » Achieved over a 99.9% accuracy rate, improving performance efficiency
- » Conveyor inbound workstations reached a new max rate of 100 totes/hour
- » Fast-inbound workstations effortlessly met the needed demand of 600 totes /hour
- » Workflow efficiency improved due to the HaiPick which can retrieve up to eight totes at a time docking with the HaiPort
- » Fulfilled the simultaneous production of multiple car models with a towering vertical storage system and with the added flexibility of six different types of totes

### ► Results

<b>43,966 Storage Locations within 3,300m<sup>2</sup></b> Storage locations	<b>600 totes/h</b> Fast-inbound Workstation Efficiency
<b>99.9%</b> Picking Accuracy	<b>100 totes/h</b> Conveyor Inbound Workstation Efficiency



Zhiwei Yang, General Manager of Geely RDC

"The use of Hai Robotics' ACRs has greatly improved the efficiency of warehouse picking. Geely achieved a more refined management of multiple SKUs and met the factory's just-in-time production requirements. Additionally, the high utilization of storage space further increased the storage density."

GEELY  
LINK&CO



## SF-DHL Apparel Warehouse Project

Location: Shanghai, China

SF-DHL Supply Chain is the world's leading 3PL company. They serve fashion brands and provides B2B & B2C order fulfillment.

Hai Robotics was chosen by SF-DHL to improve its warehouse operational efficiency, reduce labor costs, and optimize storage density. SF-DHL was so successful using Hai Robotics' solution that it purchased more ACR systems and applied them to three additional sites.

### ► Solution

- » Nine units HaiPick A42 Robots and three workstations
- » Designed 1,500m<sup>2</sup> shelving storage area in 2,000m<sup>2</sup> warehouse
- » 4m shelving height with 20,000 storage spaces
- » Accurate and efficient management powered by Visual Kanban

### ► Results

<b>20 times</b> Improved inbound efficiency	<b>1 month</b> Go live	<b>7 Days</b> Deployment
<b>3 years+</b> Project running smoothly	<b>60%</b> Increased storage density	



Ping Zhifeng, General Manager of FMCG/Retail Business Unit of SF-DHL

"Through this project, we see more possibilities for intelligent warehousing in the future. SF-DHL strongly supports warehouse automation. In the future, we will automate more warehouses with Hai Robotics."

SF  
Supply Chain





## JD Logistics California Distribution Center

Location: Fontana, California, USA

JD Logistics is a leading international logistics company offering Retail-as-a-Service, managing inventory and fulfilling e-commerce orders on behalf of their customers. Their order fulfillment facility was growing quickly and to maintain the industry leading service their customers have come to rely on, JD Logistics once again turned to Hai Robotics.

In 2021 JD Logistics' California location upgraded their manual processes by implementing Hai Robotics' Autonomous Case-handling Robotic (ACR) Automated Storage and Retrieval System (ASRS) to speed up order fulfillment, increase storage density, increase efficiencies, and improve inventory management.

### ► Solution

- » Improved daily order fulfillment by 42.09% (from 451.6 outbound orders /hour to 641.7 outbound orders /hour)
- » 174.6% more throughput on Black Friday
- » Increased SKUs by 42.9% (from 70,000+ to 100,000+ SKUs)
- » 240% more vertical storage

### ► Results

<b>100,000+</b> SKUs Currently Managed	<b>42,028 sqft</b> (3,906 m <sup>2</sup> )
<b>32,428</b> tote locations	<b>731</b> sets of shelves



## Philips Manufacturing Smart Factory Project

Location: Zhuhai (GBA), China

In recent years, Philips Zhuhai home appliance factory's demand for intelligent warehouse transformation has become increasingly urgent. Philips hoped to increase picking and handling efficiency through automation transformation and realise intelligent inbound and outbound warehousing processes with data and information-based warehousing management.

### ► Solution

- » Introduced two HaiPick A42 robots, two U-shaped on-conveyor picking workstations
- » Storage density increased by 4m shelving in the 500m<sup>2</sup> warehouse
- » Standardized the case turnover and the use of QR codes
- » Intelligent split orders powered by HaiQ software platform

### ► Results

<b>2,466</b> Storage locations	<b>130</b> Cases/hour	<b>Logistic process standardization</b>
<b>8 cases/m<sup>2</sup></b> Storage density	<b>99.9%</b> Picking accuracy	<b>Manual efficiency improved</b>

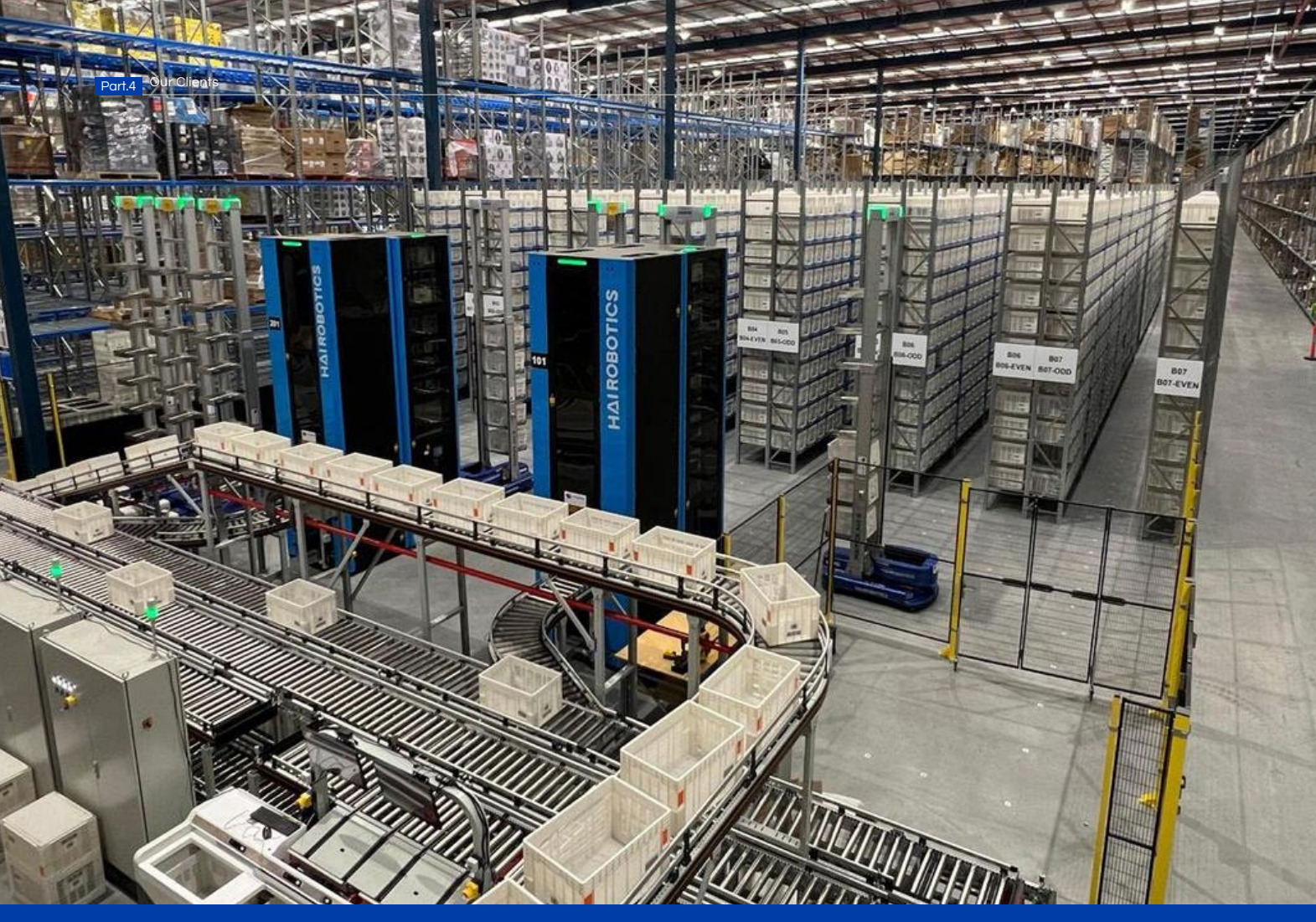


Thomas, Senior Manager of Philips Zhuhai

"Both Philips Dutch headquarters and Philips Zhuhai attach great importance to this warehouse automation transformation project. After one year of full investigation and comprehensive evaluation, we selected ACR systems which greatly meet our storage needs, truly optimizes the warehouse operation process and improves human efficiency."







## Harvey Norman Apparel Warehouse Project

Location: Sydney, Australia

Harvey Norman Commercial Division provides an extensive selection of brand-name products to builders, developers, architects, and designers. Committed to innovation and improving its service offering, the leading retailer has invested heavily in automation technology that is set to transform its operation at its facility.

### ► Solution

- » 10 HaiPick A42 robots with 5.3m shelving
- » Integrated with 3 on-conveyor picking stations powered by one set of HaiPorts
- » Cases can be adjusted according to commodity size

### ► Results

<b>3-4 times</b> Improved Efficiency	<b>1/2/3/4/6/8/12</b> Flexibly dividable grids
<b>9,000+</b> Storage locations in a 750m <sup>2</sup> area	<b>High-Efficiency Solution with a low-cost investment</b>



Kabe Franklin, Merchandise Manager at Harvey Norman Commercial Division.

"We've experienced rapid growth across our service offerings in the past couple of years and have made the decision to invest significantly in our supply chain capabilities"

Harvey Norman



## Maersk Contract Logistics Apparel Warehouse Project

Location: Shenzhen (GBA), China

Maersk Contract Logistics provides export, import, FCL, LCL and other services. Due to the growth of business, Maersk Contract Logistics' need for scenario diversification has increased, and the reputation of Hai Robotics' products and solutions in the industry has become the reason for Maersk Contract Logistics' choice.

### ► Solution

- » 49 HaiPick A42 robots cooperate with HaiStation to achieve efficient operation
- » 4.3m shelving maximizes storage density and buffer area
- » Meets omni-channel business requirements and adapts to B2C and B2B scenarios
- » Flexibility to cope with peak seasons

### ► Results

<b>30%</b> Increased storage density	<b>2-2.9 times</b> B2B/B2C picking efficiency increased
<b>63,770</b> Storage locations within 7,500m <sup>2</sup>	<b>Reduce Labor Intensity</b>



Wendong Wang, Vice President, Maersk Supply Chain Management Guangdong

"Maersk Contract Logistics is very satisfied with the effect of warehouse automation. Hai Robotics' ACR solution has improved the picking efficiency by 2.9 times for B2B business and 2 times for B2C business. The storage density has increased about 30%."

MAERSK



SPECIFICATIONS		HaiPick A42			HaiPick A42		HaiPick A42T		
		A42-M-E4	A42-G-E4	A42-X-E4	A42-G-E5	A42-E6	A42T-L-E1	A42T-X-E1	A42T-E2
									
Compatible Case Parameters	Case Dimension Scope (mm)	L300~400mm × W200~300mm	L300~600mm × W300~400mm	L480~800mm × W480~600mm	L400~600mm × W200~400mm	L650mm × W450mm	L400~650mm × W300~500mm	L600~850mm × W400~650mm	L650mm × W450mm
	Case Height Scope (mm) [Multi heights supported]	H105~330mm	H120~330mm	H120~330mm	H120~330mm	H200~400mm	H120~330mm	H135~330mm	H200/250/300/400mm
Robotics Parameters	Case Weight (kg)	≤ 30kg	≤ 30kg	≤ 30kg	≤ 30kg	≤ 30kg	≤ 30kg	≤ 30kg	-
	Robot Dimensions (mm)	L1,300mm × W800mm × H3,160mm	L1,600mm × W1,000mm × H4,360mm	L2,130mm × W1,240mm × H4,470mm	L1,580mm × W900mm × H4,320mm	L1,750mm × W1015mm × H5,600mm	8m: L1,850mm × W1,030mm × H4,890mm 12m: L1,850mm × W1,030mm × H5,730mm	8m: L2,220mm × W1,250mm × H4,890mm 12m: L1,800mm × W1,030mm × H5,730mm	L1,850mm × W1,030mm × H5,730mm
	Picking Height Range (mm)	H400mm~3,200mm	H400~5,200mm	H430~5,200mm	H220~4,000mm	H280~5,300mm	8m: H350~8,000mm 12m: H350~12,000mm	8m: H350~8,000mm 12m: H350~12,000mm	H12,000mm
	Mechanical Rotation Diameter (mm)	1,300mm	1,600mm	2,130mm	1,580mm	1,750mm	1,850mm	2,245mm	1,850mm
	Robot Net Weight (kg)	380kg	480kg	650kg	550kg	660kg	8m:900kg 12m:950kg	8m:1,050kg 12m:1,100kg	960kg
	Robot Max Load (kg)	≤180kg	≤180kg	≤180kg	≤550kg	≤180kg	≤270kg	≤270kg	≤270kg
	Number of Back Trays	5	6	6	6	6 to 8	8	8	8
Main Deployment Parameters	Certification	CE/NRTL	CE/NRTL	CE/NRTL	CE/NRTL	-	CE/NRTL	CE/NRTL	CE/NRTL
	Aisle Width (mm)	920mm	1,110mm	1,375mm	1,000mm	-	1,160mm	1,380mm	1,160mm
	Working Environment Temperature	0~45°C	0~45°C	0~45°C	0~45°C	0~45°C	0~45°C	0~45°C	0~45°C
Performance	Ground Flatness (mm) / 2.25m²	±3mm	±4mm	±4mm	±4mm	±3mm	±3mm	±3mm	±3mm
	Max Straight Move Speed (m) /s	1.8m	1.8m	1.2m	1.67m	1.8m	1.5m	1.5m	1.5m
Battery Specifications	Stop Accuracy in Travel Direction (mm)	±10mm	±10mm	±10mm	±10mm	±10mm	±10mm	±10mm	Roadway Area ± 28mm, public area ± 50mm
	Full Charging Time (20%~100%)(h)	≤1.5	≤1	≤1	≤1	≤1	≤1	≤1	≤1.1
	Fast Charging Time (30%~80%)(min)	≤40	≤32	≤32	≤32	-	≤32	≤32	-
	Full Charge Endurance (100%~20%)(h)	≥5.4	≥6.5	≥6.5	≥6.5	≥6.5	≥6	≥5.5	≥6.6
Safety Functions	Fast Charge Endurance (80%~30%)(h)	≥3.4	≥4.0	≥4.0	≥4.0	-	≥3.8	≥3.5	-
	Communication Encryption	✓	✓	✓	✓	-	✓	✓	-
	Zoned Obstacle Avoidance	✓	✓	✓	✓	✓	✓	✓	✓
	Zone Deceleration	✓	✓	✓	✓	-	✓	✓	-
	Emergency Stop Button	✓	✓	✓	✓	✓	✓	✓	✓
	Anti-collision Mechanism	✓	✓	✓	✓	✓	✓	✓	✓
	Sound & Light Alarm	✓	✓	✓	✓	✓	✓	✓	✓
	Motor Protection	✓	✓	✓	✓	✓	✓	✓	-
	Battery Protection	✓	✓	✓	✓	-	✓	✓	-

SPECIFICATIONS		HaiPick A3*		SPECIFICATIONS		K50	K600A	K1000A
		A3-M-E1	A3-G-E1					
								
Compatible Case Parameters	Case Dimension Scope (mm)	L185~300mm × W265~370mm	L360~600mm × W360~500mm	Basic Parameters	Dimensions (mm)	L658mm × W460mm × H330mm	L990mm × W630mm × H250mm	L990mm × W630mm × H260mm
	Case Height Scope (mm)[Multi heights supported]	H50~400mm	H50~600mm		Mechanical rotation diameter (mm)	-	990mm	990mm
Robotics Parameters	Case Weight (kg)	≤ 30kg	≤ 50kg		Lifting height (mm)	-	70mm	70mm
	Robot Dimensions (mm)	L1,520mm × W700mm × 1,985mm	L1,650mm × W900mm × 3,930mm		Weight (kg)	81kg	135kg	170kg
	Picking Height Range (mm)	H465~1,870mm	H330~3,660mm		Max. load (kg)	30/50kg	600kg	1000kg
	Mechanical Rotation Diameter (mm)	1,520mm	1,650mm		Driving mode	Differential-wheeled	Differential-wheeled	Differential-wheeled
	Robot Net Weight (kg)	400kg	580kg		Navigation mode	DM code navigation + IMU	DM code navigation + inertial navigation (SLAM navigation optional)	DM code navigation + inertial navigation (SLAM navigation optional)
	Robot Max Load (kg)	≤60kg	≤250kg	Motion Performance	Max. speed (m/s)	≤ 4.0	≤ 2.0 (without load) ≤ 1.5 (with rated load)	≤ 1.2 (without load) ≤ 1.0 (with rated load)
	Number of Back Trays	2	5		Driving direction	Forward and backward + rotation in place + turning	Forward and backward + rotation in place	Forward and backward + rotation in place
	Certification	CE/NRTL	CE/NRTL		Stop position accuracy (mm)	±10mm	±10mm	±10mm
					Stop angle accuracy (°)	-	±1	±1
Main Deployment Parameters	Aisle Width (mm)	800mm	1,000mm	Charging and Discharging Performance	Battery type	Lithium-Ion	LFP / Ternary lithium battery(Optional)	Ternary lithium / LFP(Optional)
	Working Environment Temperature	0~45°C	0~45°C		Battery voltage (V)	-	48	48
	Ground Flatness (mm) / 2.25m <sup>2</sup>	±3mm	±4mm		Battery capacity (Ah)	35	24(LFP)/36 Ternary lithium battery(Optional)	36Ternary lithium battery /24 LFP(Optional)
Performance	Max Straight Move Speed (m) /s	1.5m	1.57m		Charging mode	Fast charging	Automatic	Automatic
	Stop Accuracy in Travel Direction (mm)	±10mm	±10mm		Charge/Discharge cycles	-	1,500	1,500
Battery Specifications	Full Charging Time (20%~100%)(h)	≤1	≤1		Battery life after full charging (hour)	-	≥8	≥8
	Fast Charging Time (30%~80%)(min)	≤32	≤32		Full charging (hour)	≤0.2	≤1.5	≤1.5
	Full Charge Endurance (100%~20%)(h)	≥6.5	≥6.5	Safety function	Front lidar	✓	✓	✓
	Fast Charge Endurance (80%~30%)(h)	≥4	≥4		Obstacle avoidance Angle	-	210°	210°
Safety Functions	Communication Encryption	✓	✓		Obstacle detection height (mm)	-	200	200
	Zoned Obstacle Avoidance	✓	✓		Collision protection	✓	✓	✓
	Zone Deceleration	✓	✓		Emergency stop button	Front/Rear	Front/Rear	Front/Rear
	Emergency Stop Button	✓	✓		Audible and visual alarm	✓	✓	✓
	Anti-collision Mechanism	✓	✓		Battery protection	✓	✓	✓
	Sound & Light Alarm	✓	✓	Others	Communication protocol	Wi-Fi 802.11b/g/n/ac	Wi-Fi 802.11b/g/n/ac, 5G Optional	Wi-Fi 802.11b/g/n/ac, 5G Optional
	Motor Protection	✓	✓		Operating temperature (°C)	-	0~45°C	0~45°C
	Battery Protection	✓	✓					

\*The HaiPick A3 models are not available in Japan. Please contact us for more information.



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