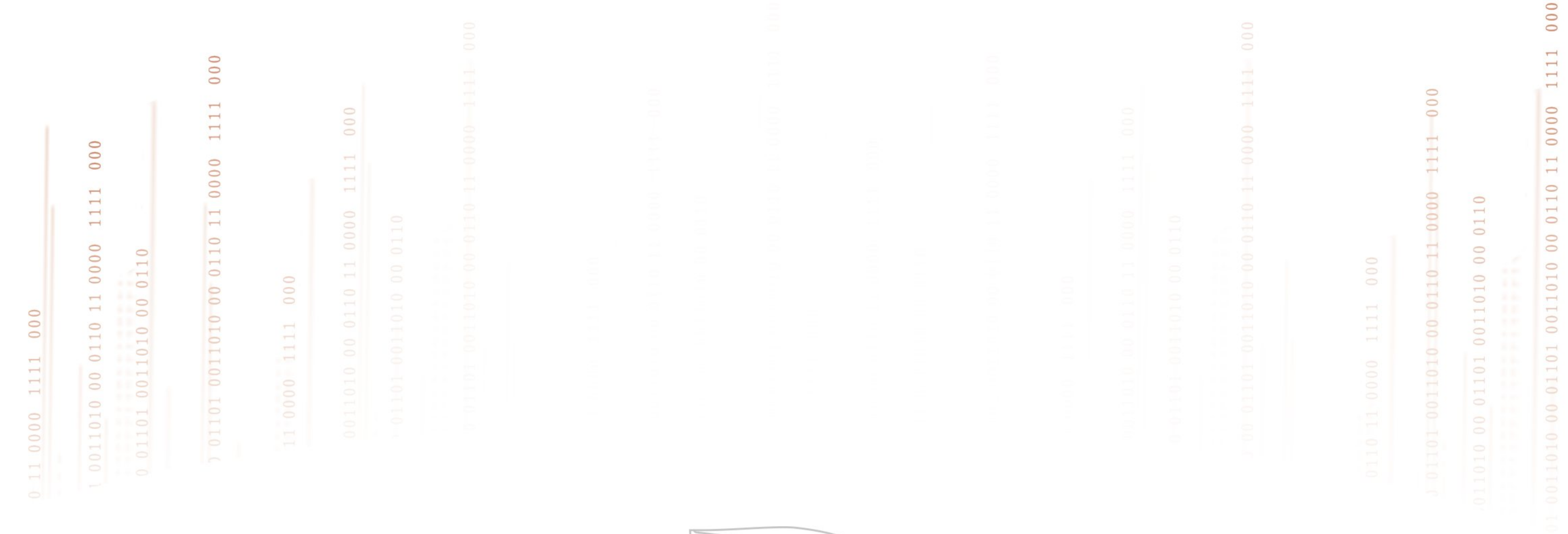
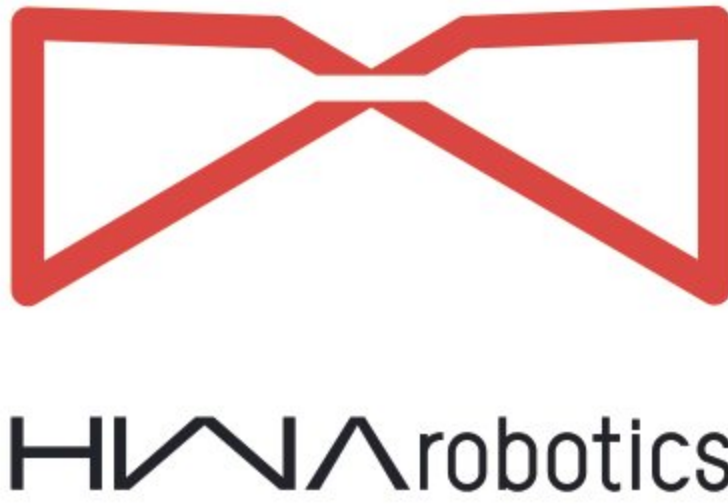




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# CATALOG

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# COMPANY PROFILE

## I. Company Introduction

HWArobotics is a warehouse and logistics robot company based in Singapore, dedicated to providing high quality warehouse and logistics robot products for the global market. Our comprehensive product range is featured with pallet shuttle system, tote shuttle system, mini shuttle system, split-case picking system, and associated control software.

All of HWArobotics's senior management team has rich professional experience with international backgrounds, a multi-national global team has already been established headquartered in Singapore, HWArobotics has subsidiaries in the United States, Europe, and South Korea. With manufacturing plants in Thailand and Chuzhou, China, leveraging the cost-effective supply chain attributes of Asia-Pacific region, HWArobotics is dedicated to providing clients with advanced and reliable logistics automation systems.

Drawing from over two decades of extensive product experience and pioneering technology, HWArobotics develops products characterized by advanced technology, stable performance and exceptional reliability.



## II. Company History: The Development of AS/RS Shuttles

HWArobotics started its shuttle robot development in 2003, is one of the innovators shuttle robots for automated storage and retrieval systems (AS/RS) in the world.

HWArobotics obtained patent for the complete tote-transporting AS/RS shuttle system in 2007.

Over the past 20 years, HWArobotics has been focusing on shuttle products development, created many "first of its kind" in shuttle history, until now, HWArobotics has possessed full-fledged shuttle series divided into 6 major series of over ten more types, e.g. for different environments (e.g. -25-40) , different efficiencies (from 20 bins/hour up to 2500 bins/hour in a single aisle, different densities (e.g.. variable sized storage unit. multi-unit within one location .etc), different loads (from 10kg to 2000kg), different storage units (e.g. pallets, totes, cartons), etc.

By 2023, HWArobotics already delivered over a total of 10000 units of shuttle robot to different countries around the world.







### III. Super Reliability Guaranteed with World-class Quality

1. Overall reliability of HWArobotics's shuttle robot system (Data verified by reputable third-party certification agency)

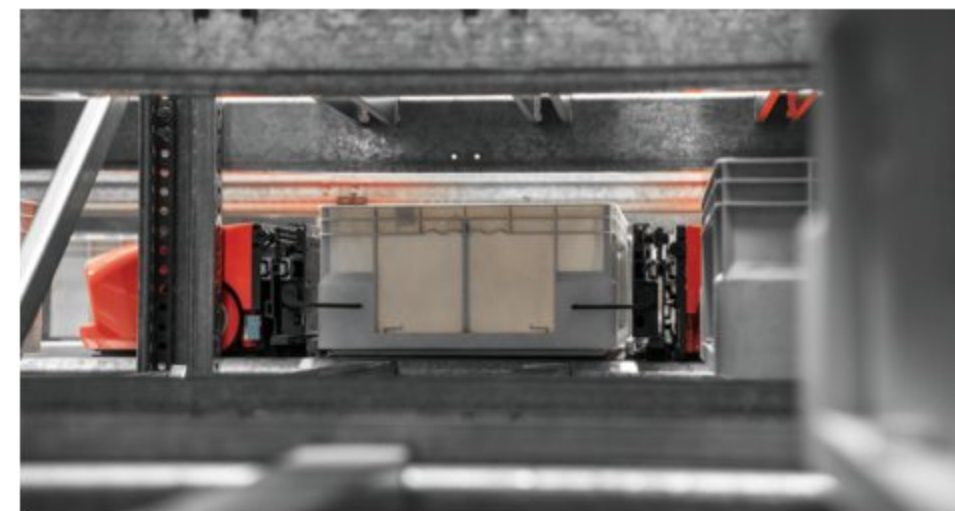
Shuttle robot system availability (SA) > 99%:

MMBF > 5000 (none breaking operation over 5k times)

2. Service life of HWArobotics product parts, example:

Shuttle's forklift service life: More than 12 million times

3. Illustrations of the outstanding techniques in HWArobotics products



### IV. HWArobotics's World-Leading Products Created with Expertise

1. HWArobotics developed shuttle robot system in 2003

2. HWArobotics obtained shuttle robot system patent in 2007

3. HWArobotics implemented the Goods-To-Robot system project in 2017 (JD.COM “Asia No 1”& A Fully-unmanned Warehouse Logistic Center In Shanghai)

4. HWArobotics entered the European and American markets in 2018

5. HWArobotics sold more than 10,000 units of its self-developed shuttle robots worldwide

6. HWArobotics provides one of the most comprehensive shuttle portfolios in the world and had implemented GTP system projects for

many industries, including publishing, medicine, e-commerce, manufacturing, etc



HWArobotics HAS BEEN DEDICATED  
IN DEVELOPING SHUTTLE ROBOTS  
AND MATERIAL PICKING SYSTEMS  
FOR TWO DECADES WITH WORLD-CLASS PRODUCTS  
POSSESSING OVER 100+ PATENTS  
AND 10+ PCT (*Patent Cooperation Treaty*)  
PATENTS INTERNATIONALLY

# 1 CORE PRODUCTS



# I.HWArobotics Tote Shuttles

The tote shuttle series includes four major tote-handling AS/RS shuttle product lines: SLS300, SLS400, SLS500, and SLS600.



## 1. SLS300 — Standard Tote-handling Shuttle Robot System

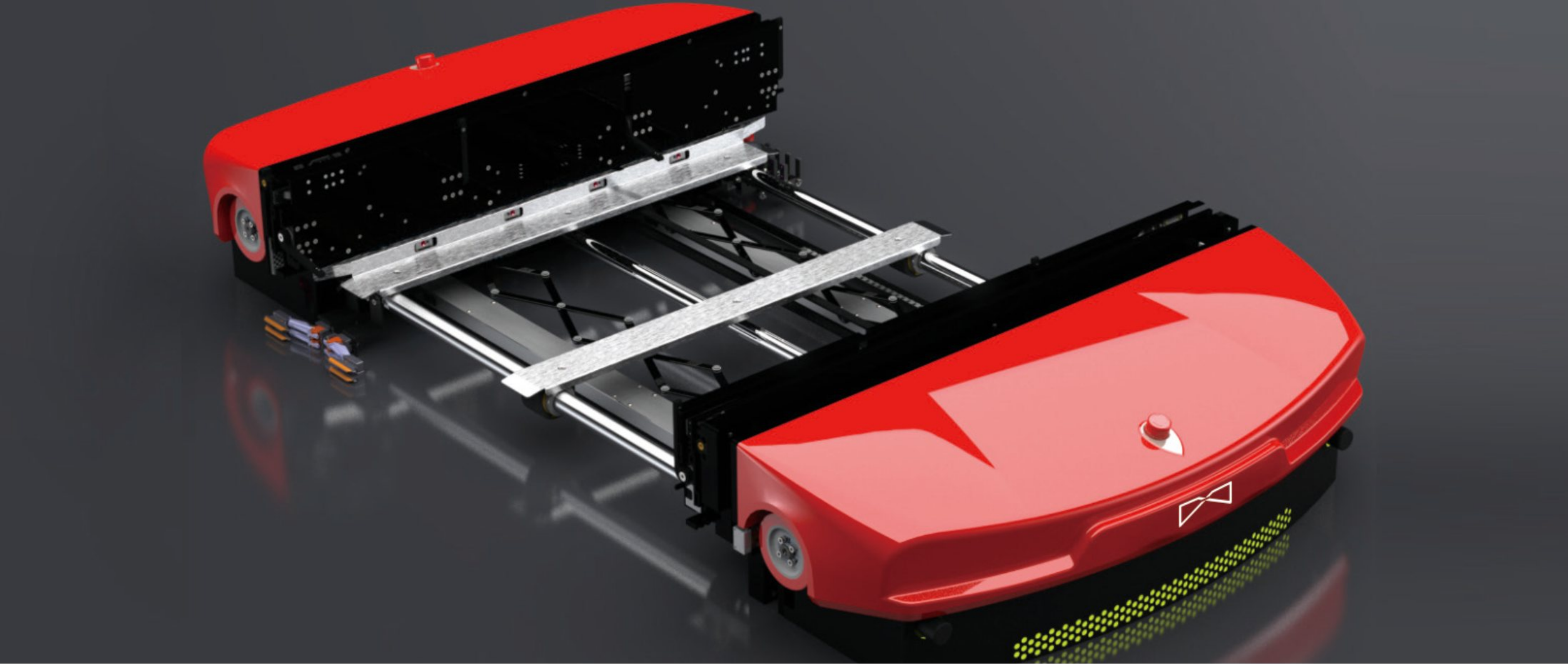
### Technical Features

The SLS300 robotic shuttle system is an efficient buffering solution for totes and cartons. The ideal solution for fully automated storage and retrieval of totes and cartons with efficient throughput, flexible specifications, better use of space, and with the highest reliability

### Use Cases

The SLS300 shuttle system can be used in e-commerce, media, tobacco, medicine, electricity, electronics, aviation, and other industries.





## 2. SLS400 — Variable-size Tote-handling Shuttle Robot System

### Technical Features

SLS400 is a variable AS/RS shuttle system for mixed storage within one rack location that provides excellent storage density and high rack space utilization.

### Use Cases

The SLS400 shuttle system can be used in e-commerce, media, tobacco, medicine, electricity, electronics, aviation, and other industries.



## 3. SLS500 — Shuttle Robot System For Buffering & Sorting

### Technical Features

SLS500 is a shuttle system for buffering and sorting based on flow rack, supports warehouses with high throughput, multiple aisles, and large storage depths. The system also provides a first-in-first-out mechanism and enables fast automatic replenishment and high storage and retrieval efficiencies. It is suitable for short-term storage and sorting of a large number of goods.

### Use Cases

The SLS500 shuttle system can be widely used in the manufacturing industry, business applications, distribution centers, assembly workshops, and warehouses with a high dispatch frequency, especially for dispatching.



# 4. SLS600 — 3Dimensionstion AS/RS Shuttle Robot System

## Technical Features

The SLS600 3Dimensionstion AS/RS shuttle system enables flexible shuttle movements between aisles and levels, adapting system capacity by adjusting the number of shuttle robots. It can be shared across different warehouses, so that the operating capacity of shuttles robots can meet the efficiency requirements under general load or with short-term peak load.

## Use Cases

The SLS600 shuttle system is applicable in low-throughput and high-efficiency use cases such as spare parts warehouses and books.



# II. HWArobotics Pallet Shuttles

The Pallet Shuttle series includes two major AS/RS pallet shuttle product lines: FPSS1500A and FPSS1500B.





# 1. FPSS1500A — four-directional pallet shuttle system for room temperature environments

## Technical Features

The FPSS1500 four-directional pallet shuttle system is made of components from world-class brands and powered by 100% electricity, enhancing quality, reliability, and controllability while lowering the failure rate. It has also achieved swarm intelligence in the PSR system with AI scheduling algorithms, realizing optimum efficiency by automatically adjusting the efficiency based on the number of vehicles and the rack structure.

## Use Cases

The FPSS1500 four-directional pallet shuttle system is suitable for full case picking, including tobacco raw materials and finished products, food and beverage, industrial manufacturing, and other industries.



# 2. FPSS1500B — four-directional pallet shuttle system for low temperature environments

## Technical Features

The four-directional pallet shuttles for low temperature environments are developed and designed for cold storage and can enable unmanned automatic storage and retrieval at a temperature as low as -25°C.

## Use Cases

Ideal for food, medicine, cold chain, and other cold storage businesses.





### III. HWArobotics Information Software And Supporting Workstations

The information software mainly features the Material Flow Controller(MFC)

#### 1.HWArobotics MFC software

MFC software is designed to streamline and monitor material flows within fully or nearly fully automated warehouses and distribution centers.

It offers a high degree of flexibility to control components such as conveyor systems, sorters, robotic solutions, shuttle systems and lifts—even from diverse manufacturers.

Visualization and route optimization techniques are used to map out all storage areas for optimal order execution.

MFCs integrate seamlessly within facility logistics processes, whether set up independently or as part of an existing WMS. The software offers complete oversight at all times to facilitate user interventions as needed.

HWArobotics's MFC provides a high level of process data to help clients better understand their machines and systems. Advanced data visualization capabilities enable users to quickly get access to system status and throughput performance. This may include number of pallets, orders or dual cycles the system has handled within a given period.

### IV. Various AI-Based Workstations: HWArobotics's Sorter Series

The Sorter series features three lines of sorters, including the PSD310 double-layer sorting station, the PSS105 single-layer sorting station, and the GTR200 goods-to-robot sorting station.

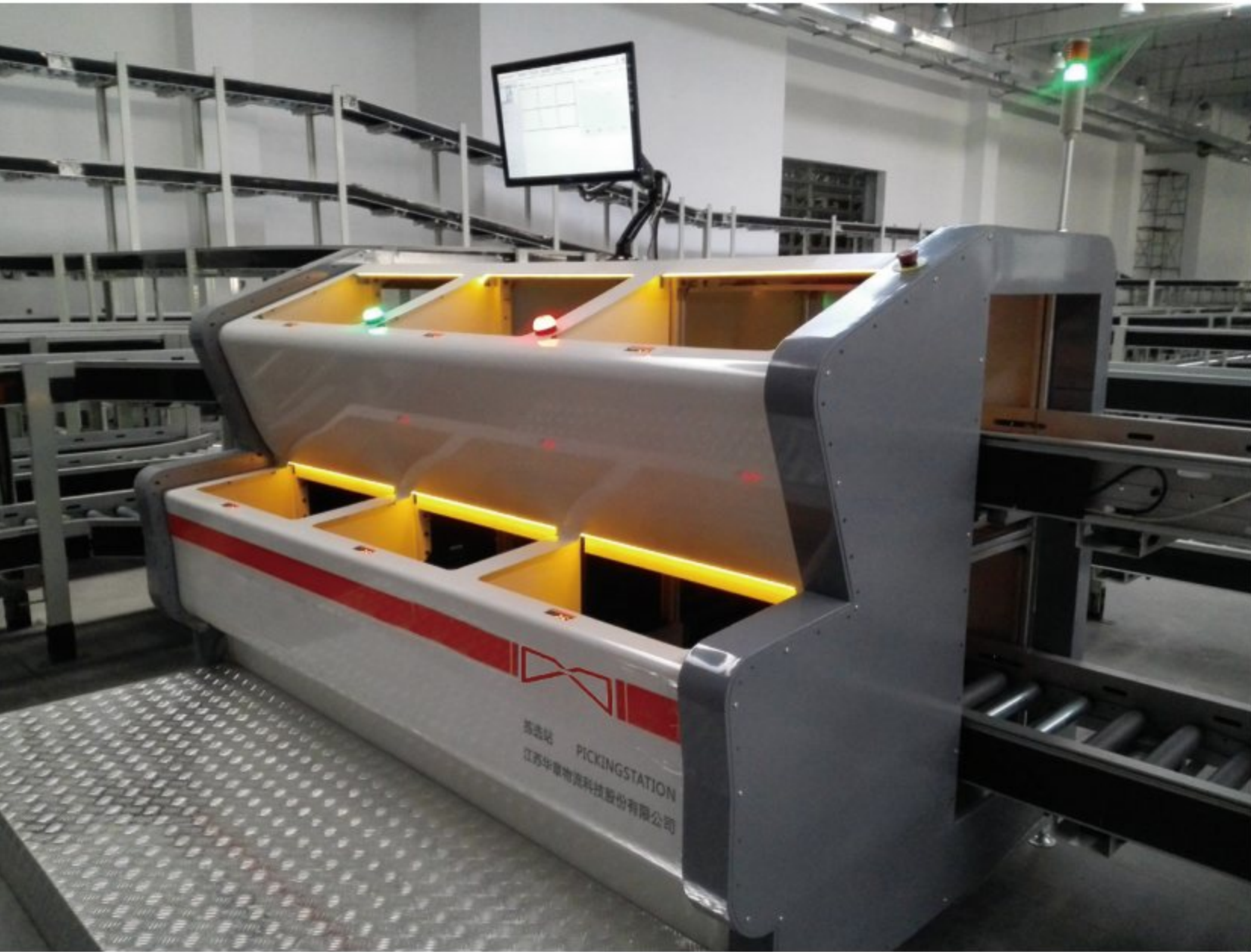
#### 1. PSD310 Double-Layer Sorting Station

##### Product Description

The PSD310 series is an important part of the “goods-to-person” system, which is used for split case picking integrated with the AS/RS shuttle system and the conveyor system.

The PSD310 double-layer sorting station can meet the need of split case picking for small orders with multiple different items and is well suited for various fields including food, tobacco, medicine, cosmetics, publications, electronic manufacturing, auto parts, e-commerce, new retail, omnichannel logistics, etc.

PSD310 can be used for sorting and as a general workstation for receiving goods, counting inventory, auditing, and other tasks.





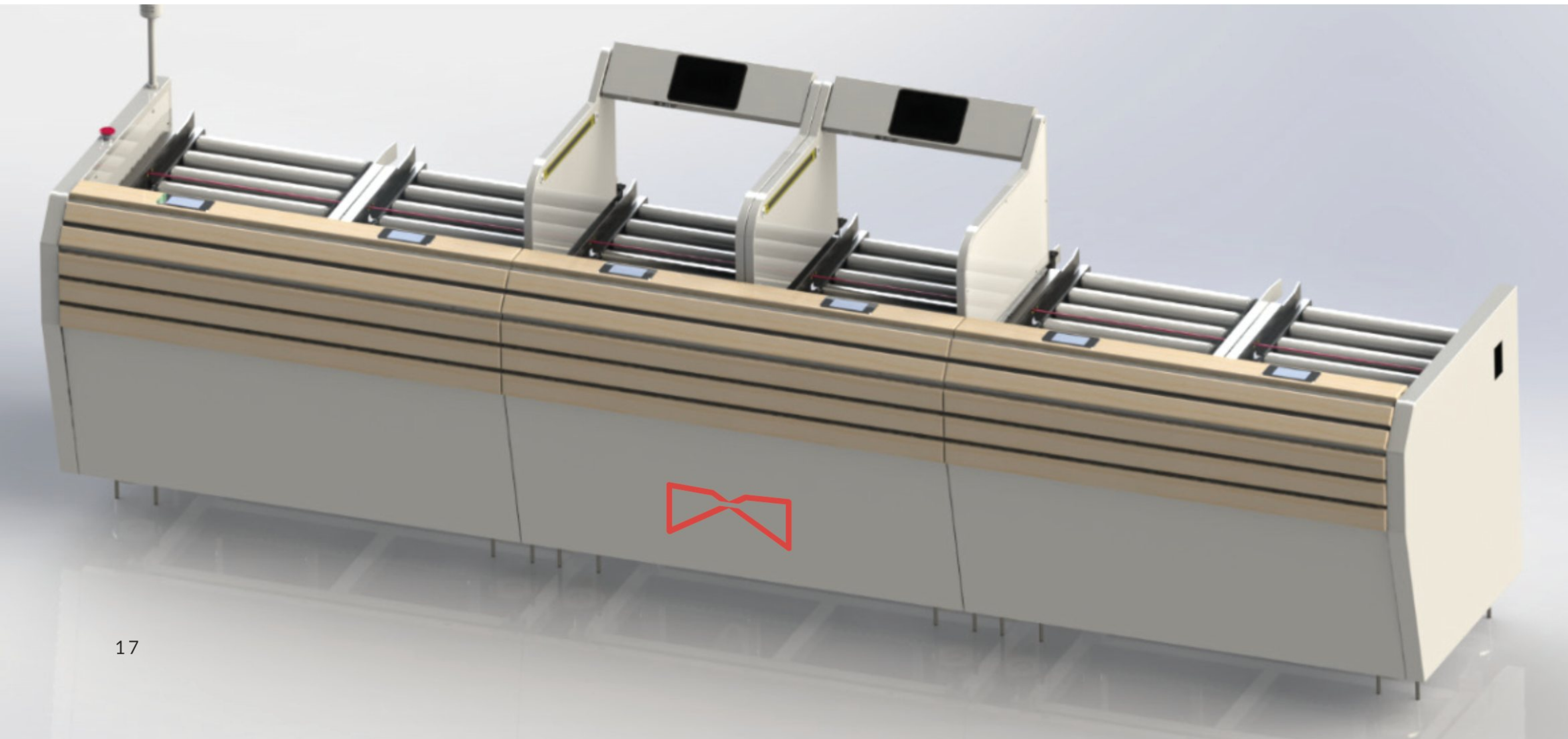
## 2. PSS105 Single-Layer Sorting Station

### Product Description

The PSS105 single-layer sorting station is the next-generation modular single-layer workstation developed by HWArobotics to cater for semi-automated split case picking.

The PSD105 modular product is an important part of the “goods-to-person” system, which is used for split case picking integrated with the AS/RS shuttle system and the conveyor system.

PSS105 is ergonomically designed to reduce pressure on the human body and improve picking efficiency.



## 3. GTR200 Goods-to-Robot Sorting Station

### Product Description

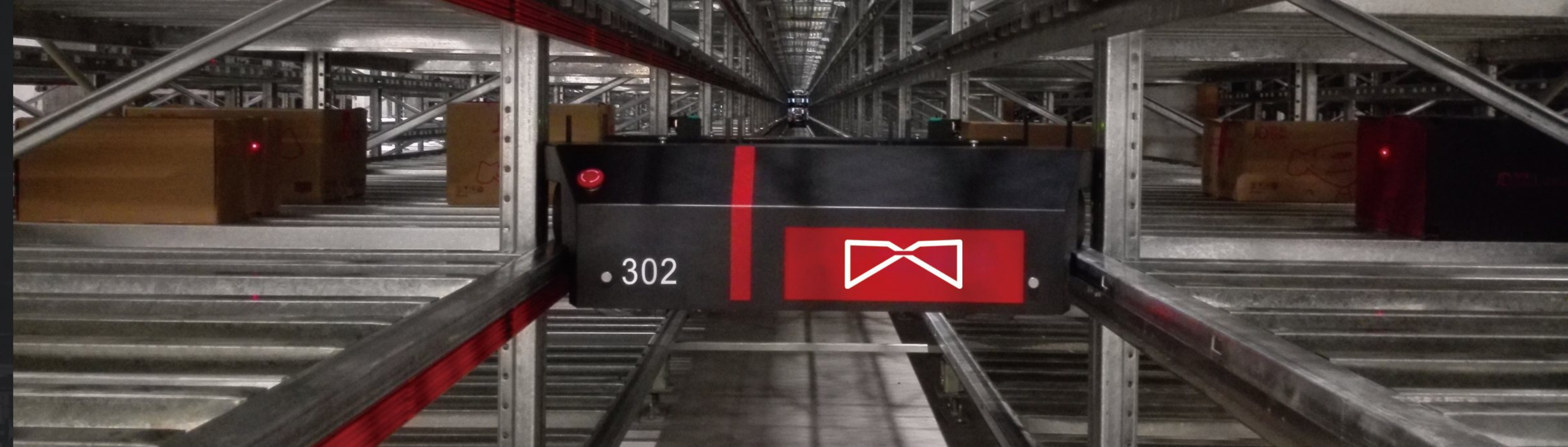
The GTR200 goods-to-robot sorting station is an innovative solution for optimizing the split case picking process. The robots can repeat picking actions for a long period of time to save manpower and significantly improve picking efficiency and ensure accuracy. As the labor cost is getting higher, goods-to-robot sorters undoubtedly have their unique advantages.

Powered by machine vision recognition, HWArobotics's goods-to-robot system is the core technology for unmanned warehouse material handling. It can also be used for inspection, replenishment, palletizing, and other tasks in addition to sorting. The goods-to-robot system can unlock productivity with 24/7 uninterrupted operations.





# CLASSIC CASES



## 1. E-commerce: JD.com fully-unmanned warehouse “Asia No 1”

### Client Profile

JD.com (stock code: JD) is a self-operated e-commerce enterprise, listed on NASDAQ Stock Exchange in the United States. As a professional comprehensive online shopping mall, JD.com features tens of thousands of brands and 40.2 million products of 13 major categories, including household appliances, mobile phones, computers, mother and baby products, and clothing. HWArobotics has undertaken the phase III project for JD.com “Asia No.1” logistics center to implement fully automated systems in processes including receiving, storage, picking, packing, sorting, and dispatching in this completely unmanned warehouse.

### Project Overview

The fully unmanned warehouse project for JD.com “Asia No.1” covers an area of 40,000 square meters with the main body of the logistics center composed of four operating systems for receiving, storage, picking, and packing. It is the first fully unmanned logistics center constructed and put into large-scale use for JD.com Logistics. In January 2018, the project was put into operation successfully. The unmanned warehouse handles the receiving, storage, packing, sorting, and dispatching of 200,000 orders of 3C and other products very day with everything running seamlessly and smoothly.

### Project Features

The world's first fully unmanned warehouse constructed and put into large-scale operation (receiving, storage, picking, and packing)





## 2. Electronics manufacturing: Joyson Safety Systems's intelligent manufacturing plant

### Client Profile

Joyson Safety Systems is a subsidiary of Joyson Electronic Corp. (SHA: 600699, Joyson Electronics). Joyson Safety Systems is the world's second largest supplier of automotive safety systems, operating globally in 98 cities within 25 countries. As a global leader in mobile safety, it provides active and passive safety-critical components, systems, and technology to OEMs worldwide. Joyson Safety Systems has been providing expertise in both active and passive auto safety globally for more than 100 years.

### Project Overview

As a general integrator, HWArobotics has provided a one-stop solution for Joyson Safety Systems's intelligent manufacturing plant in Ningbo, enabling fully automated material handling to have greatly improved production efficiency.

The core equipment includes an AS/RS shuttle system with multi-level shuttles, conveyor system, cross-level shuttle lifts, and goods-to-person picking system. At the same time, HWArobotics's system is equipped with a digital twin system to connect with a variety of intelligent logistics systems of Joyson to have created the "strongest brain" for intelligent logistics, enabling information-based operations in the logistics center and real-time monitoring of the operating state of each equipment for timely alerts.

In 2021, the project was officially put into operation successfully.

### Project Features

Joyson Electronics's global demonstration project; a success story showing how goods-to-person systems can be employed in material handling on the production line.





### 3. Apparel industry: A well-known apparel company in Spain

#### Company Profile

This company is the largest fashion and sports brand headquartered in Spain. It mainly manufactures footwear and clothing for football as well as other related items and casual wear. The company has set up several branches around the world and is the market leader in Europe and South America.

#### Project Overview

To meet the sorting needs of the garment industry, HWArobotics has developed a goods-to-person system solution to have boosted the sorting efficiency for this company, increased the warehouse storage space utilization, and improved the inventory accuracy as well as timely dispatch rate, transforming and upgrading the logistics center to have added intelligence and flexibility. A multi-level shuttle system is used in the logistics center to empower the 6-aisle AS/RS containing 35,600 storage

### 4. Fresh food industry: iCOOP's logistics center in Incheon, South Korea

#### Company Profile

This company was founded in 1997 in Korea, it is a federation established by several primary cooperatives with nearly 300,000 members and 2 large production sites today, producing nearly 2,000 kinds of fair and healthy food. its production mode emphasizes community participation: consumers are producers as well. Its production process aims at avoiding damage to the natural environment and focuses on food safety to provide better food and quality of life for Korean people.

#### Project Overview

The project focuses on a three-in-one goods-to-person system powered by HWArobotics for cross-docking, returns, and inventory processing. To complement the system, HWArobotics has also provided OPS, WCS, conveyors, goods-to-person sorting stations, and a four-aisle AS/RS with multi-level shuttles. This improves the storage density and frees up a lot of storage space, satisfied the client's massive storage needs and significantly reduced its warehousing and operational costs.



OUR CLIENTS

