

Galaxis shuttle system

Tote & Pallet AS/RS Solution



GALAXIS

Tote shuttle solutions

GALAXIS

Tote shuttle

Unique case-type solution based on modular configuration featuring "racks, 2-way/4-way shuttle and lift" achieves efficient and intelligent storage and retrieval of goods, cross-lane operations, "goods-to-man" picking, automatic identification and mutual device backup; when perfectly integrated with WCS/WMS, it can provide great flexibility and diversity for project layout.

- First in China to complete development and mass production of FLASH
- CE certified, all parts and components conforming to high international standards
- Shorter time for order delivery
- Super capacitors used, 10-second charge for 3-minute operation
- Various system configurations to handle various sizes of goods
- Applicable to business models that feature fast-changing SKUs or product category



FWS (Four-way shuttle) - FLASH



Two-way shuttle - LASER



Tote shuttle lift - THUNDER series



Trans-layer lift - KNIGHT series



GTP picking station



Layer-conveyor



MFC



Shuttle rack



Shuttle product series



Four-way shuttle (FWS) - FLASH

- The picking method is changed from "person to goods" to "goods to person."
- More flexible, higher adaptability
- Four-way moving to any position in the warehouse, fast and efficient
- Modularized and standardized system design, mutual backup with each other
- Telescope is available in single/double deep and clamping



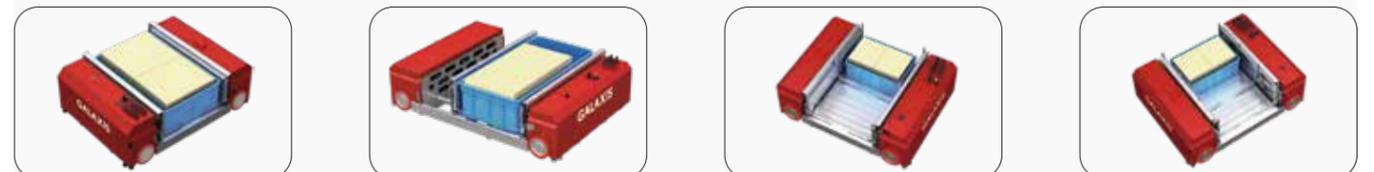
Two-way shuttle - LASER

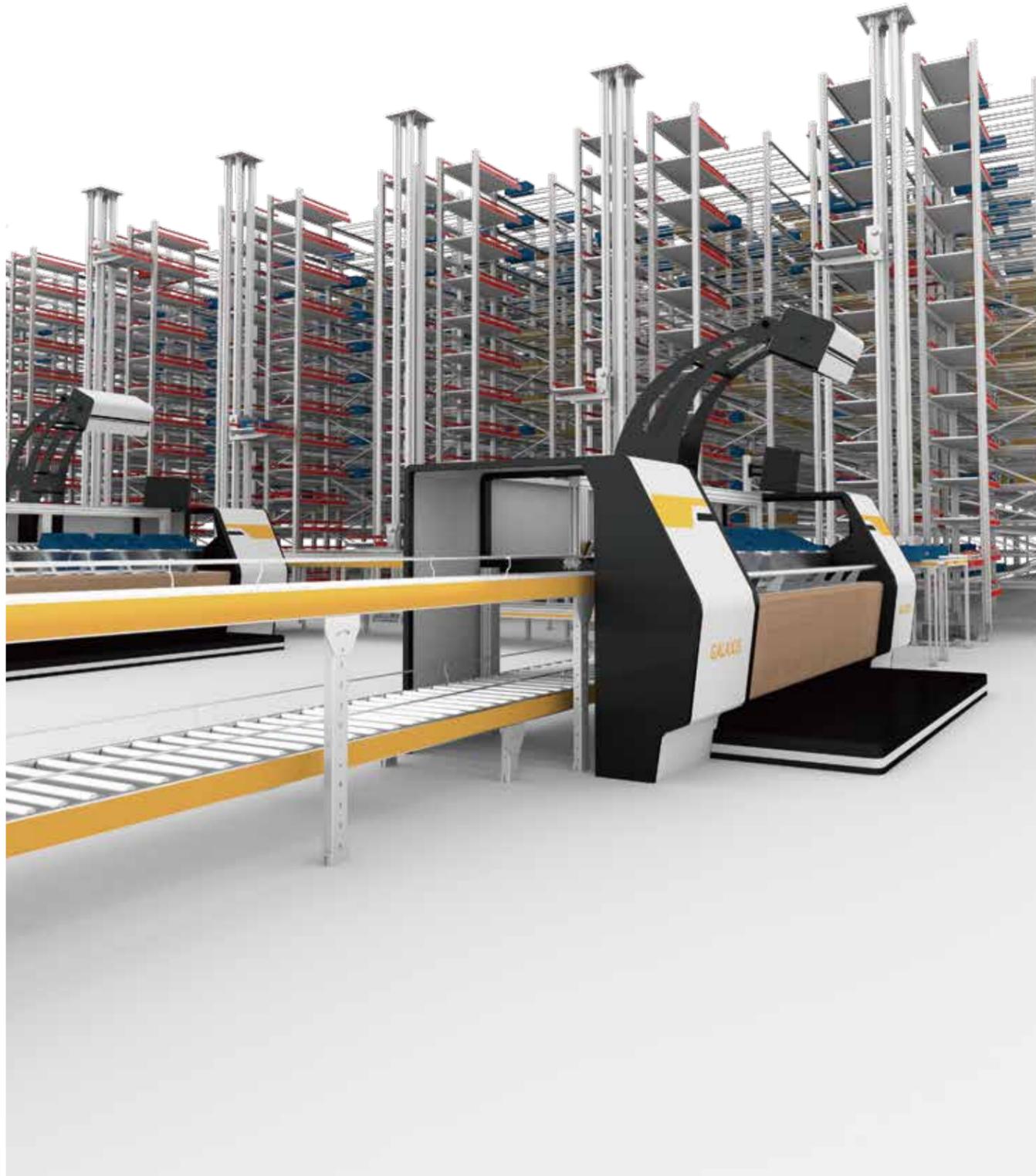
- The picking method is changed from "person to goods" to "goods to person."
- High density storage to increase utilization of warehouse space
- Modularized and standardized system design
- Telescope is available in single/double deep and clamping

Performance parameter of tote shuttle

Model	FLASH 6040 SD	FLASH 6040 DD	FLASH 8060 SD	LASER 6040 SD	LASER 6040 DD	LASER V
Models	Four-way shuttle 6040 single deep position	Four-way shuttle 6040 double deep position	Four-way shuttle 8060 single deep position	Two-way shuttle 6040 single deep position	Two-way shuttle 6040 double deep position	Two-way shuttle 8560 single deep position
Shuttle width (mm)	744	744	894	744	744	1016
Shuttle length (mm)	940	940	1147	970	970	1291
Shuttle weight (kg)	90	95kg	100	90	90	90
Shuttle height (mm)	338(after jacking)	338(after jacking)	338(after jacking)	325	325	300
Max. aisle-wise moving speed w/o loading (m/s)	5	5	5	5	5	5
Max. cross-wise moving speed (m/s)	2	2	2	*	*	*
Max. aisle-wise moving acceleration (m/s ²)	2	2	2	2	2	2
Max. load (kg)	50	50	50	50	50	50
Min. load size (mm)	290x300	290x300	360x490	290x300	290x300	200x200
Max. load size (mm)	600x400	600x400	800x600	600x400	600x400	850x600
Min. load height (mm)	100	100	100	100	100	100

※Optional: In addition to standard models, it is also customizable in size according to actual dimensions of goods; single-deep/double-deep layout of telescopic fork; fixed-space/flexible-space telescopic fork structure; Electrical-conductive wheels (applicable to goods with special requirements for static charge); and configuration of 3 groups/4 groups of handling fingers.





Tote lift

THUNDER HS is a reciprocating vertical lift used for transporting cases between different heights. It effectively meets the needs of multi-level and high-volume mixed incoming and outgoing cargo, improves work efficiency and safety reliability, and saves investment and operating costs.

- THUNDER HSS/HSD is installed at the tail end of aisle to perform vertical transportation at single/double locations
- THUNDER HST can be embedded and installed directly beside the shuttle aisle, and more than one lift can be placed in the same aisle according to actual needs
- It can also work with conveyors to allow handling of goods at different heights or between floors
- In the shuttle system, it works in conjunction with the layer-conveyor for case infeed/outfeed process.

Tote lift parameters

Model	THUNDER HSD	THUNDER HSS	THUNDER HST
Max. handling (m)	23	23	23
Min. handling (mm)	500	500	600
Qty. of conveying platform	2	1	1
Max. applicable size of case unit (mm)	800*600	800*600	600*400
Max. load (kg)	150	150	100
Applicable loaded case qty.per conveying platform	2	2	1
Max. lifting speed (m/s)	4	4	4
Max. lifting acceleration (m/s ²)	5	5	5
Positioning accuracy (mm)	±2	±2	±2
Loading platform	conveyor	conveyor	telescope



Trans-level shuttle lift

To address the variation of tote case dimensions and the high requirement for positioning accuracy, Galaxis KNIGHT HS series is equipped with servo motors + synchronous belts to ensure speed and stability, and a variety of mechanisms such as encoders and high-precision sensors to ensure accuracy. To meet the height requirements, the KNIGHT HS series is designed with a stronger frame and reaches an access height of up to 23m.

- In the shuttle reservoir area, it enables the shuttle to change levels
- The KNIGHT HS/CM lift needs to be installed at the end of the aisle
- The KNIGHT HS/CM mates with conveyor to realize cases inbound and outbound

Parameters of trans-level shuttle lift

Model	KNIGHT HS	KNIGHT CM	KNIGHT LT
Max. access height (m)	23	8	23
Min. access height (mm)	450	450	600
Max. load (kg)	150	150	100
Max. lifting speed (m/s)	4	1.4	4
Max. lifting acceleration (m/s ²)	3	1.5	3
Positioning accuracy (mm)	±2	±2	±2



Standardized modular components

The shuttle subsystem is mainly composed of six standard modules, namely shuttle, lift, picking station, conveyor, wireless network system, and control system. As an intelligent warehouse solution for "Goods to Person", the system can be easily connected to the logistics information system to realize such functions as automatic storage and retrieval, transportation and picking. The shuttle is capable of cross-aisle operation, whereas the equipment backup each other, offering unrivalled flexibility and diversity for projects' layout.



Performance parameter of shuttle

Low energy consumption

- Energy recovery system
- Super capacitor for main power supply allows 1 million times of repeated charge and discharge
- Charging for 10 seconds can meet the needs of driving for 3 minutes

Safety

- CE certification standard
- Real-time monitoring management

Precision

- High-precision detection with photo-eye sensor for position.
- Positioning accuracy of $\pm 1\text{mm}$.

Intelligence

- System intelligent dispatching, preset optimal path.
- Shuttles backup each other.

Standard

- All parts of shuttle comply with global industrial standard

Noise level

- Work noise $\leq 70\text{db}$

Max. speed: 5m/s

Max. acceleration: 2m/s²

Max. load: 50kg

Power supply form: Super capacitor + lithium battery (for spare use).

Cargo size: L:290-800mm W:300-600mm.

Models:

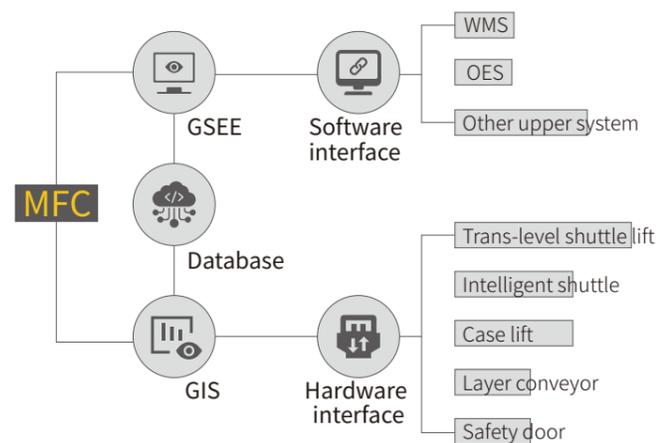
FLASH—Four-way shuttle

LASER—two-way shuttle

The telescopic fork of single/double-depth structure can be customized, as well as the gap between telescopic forks.

Shuttle control system

Warehouse control system



- Available for complicated application scenarios
- Easy software operation and high safety
- Quick, stable and reliable system response
- Timely recovery of data exception, error message prompt and data integrity
- Module development for system with flexible function modulation and module upgrading
- Realize functions such as local scheduled backup, master-slave backup, and start on boot



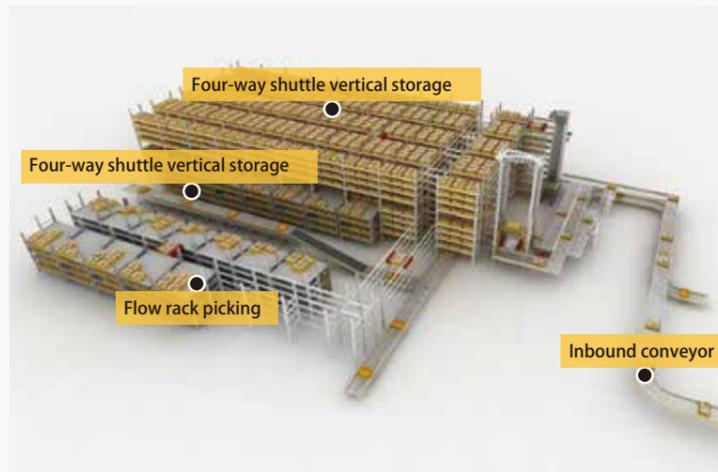
Note MFC: Galaxis Materials Process Control System/GIS: Galaxis Intelligent System/GSEE: Galaxis Monitoring System.



Split-case picking

Usually, it is mainly used as the de-palletizing and picking of B/C products. For A-class products, considering the operation characteristics of the four-way shuttle, the flow rack can be integrated in the shelf storage area planning, and the flow rack can be replenished through the four-way shuttle operation.

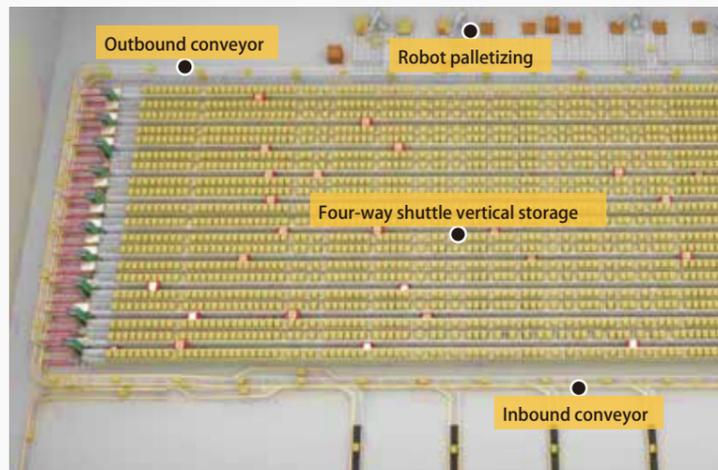
Applications



Outbound/inbound buffer

It reduces the number of devices targeting situations with large stock while low/medium traffic demands. Even with high traffic demand, it still may achieve the target of operation with less devices compared with multi-shuttle according to the layout of the warehouse.

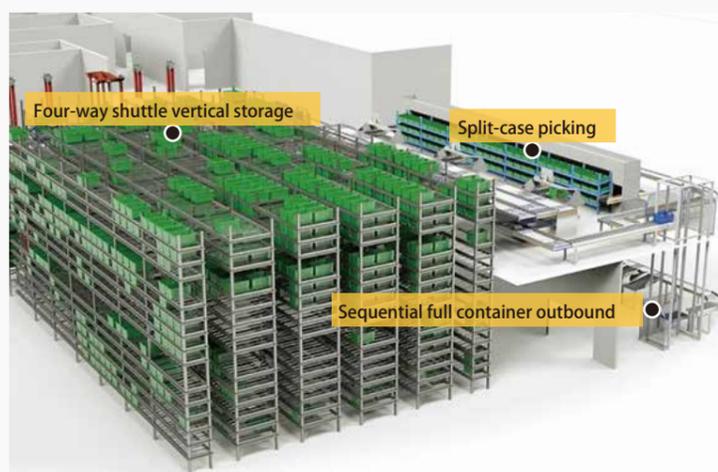
Applications



Sequencing

The four-way shuttle (FWS) can reach any position in the warehouse, and the operation sequence of the shuttle can be strictly implemented according to the sorting requirements. However, in this case, the maximum performance of the equipment cannot be exerted, and the efficiency is greatly lost.

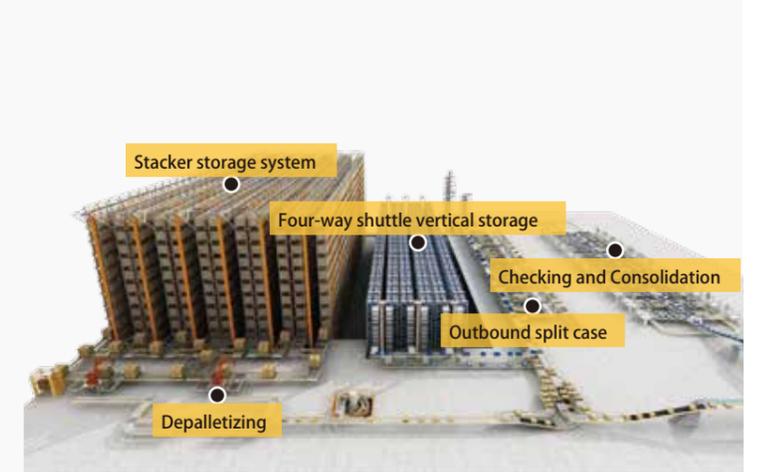
Applications



Warehouses with a large number of SKUs

The number of SKUs is huge, and each SKU cannot be evenly arranged in multiple places in the warehouse area. In this case, the layout of the four-way shuttle will avoid the situation that the required goods cannot be processed normally due to the failure of a single equipment.

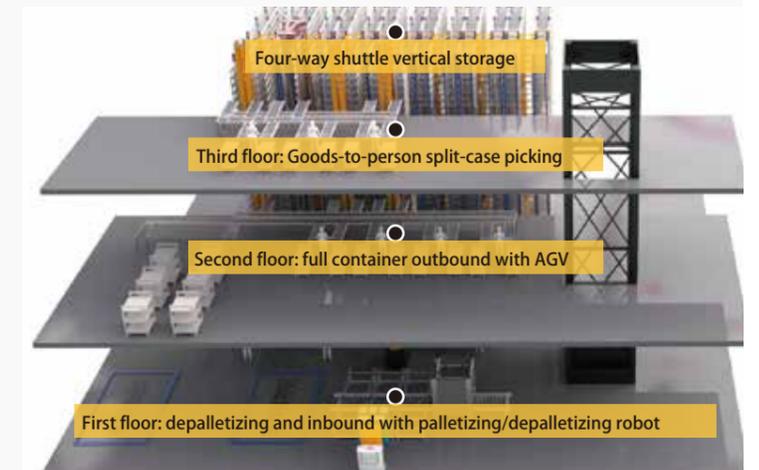
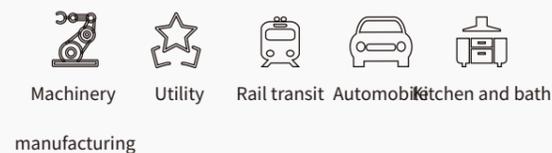
Applications



Spare parts storage/ Temporary storage

Mainly based on storage, or according to the pre-planned situation of goods inbound/outbound of the warehouse, the four-way shuttle can achieve the operation requirements with the minimum number of equipment.

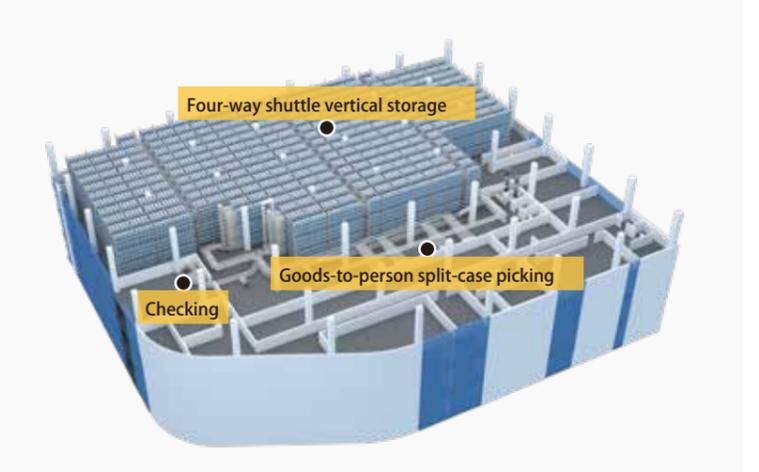
Applications



Special-shaped warehouse

The four-way shuttle (FWS) can reach any position in the storage area through various operation paths combined with the cooperation of different turning channels of the equipment and the layer-changing lift. For special-shaped storage, it can minimize the loss of location space caused by construction interference.

Applications

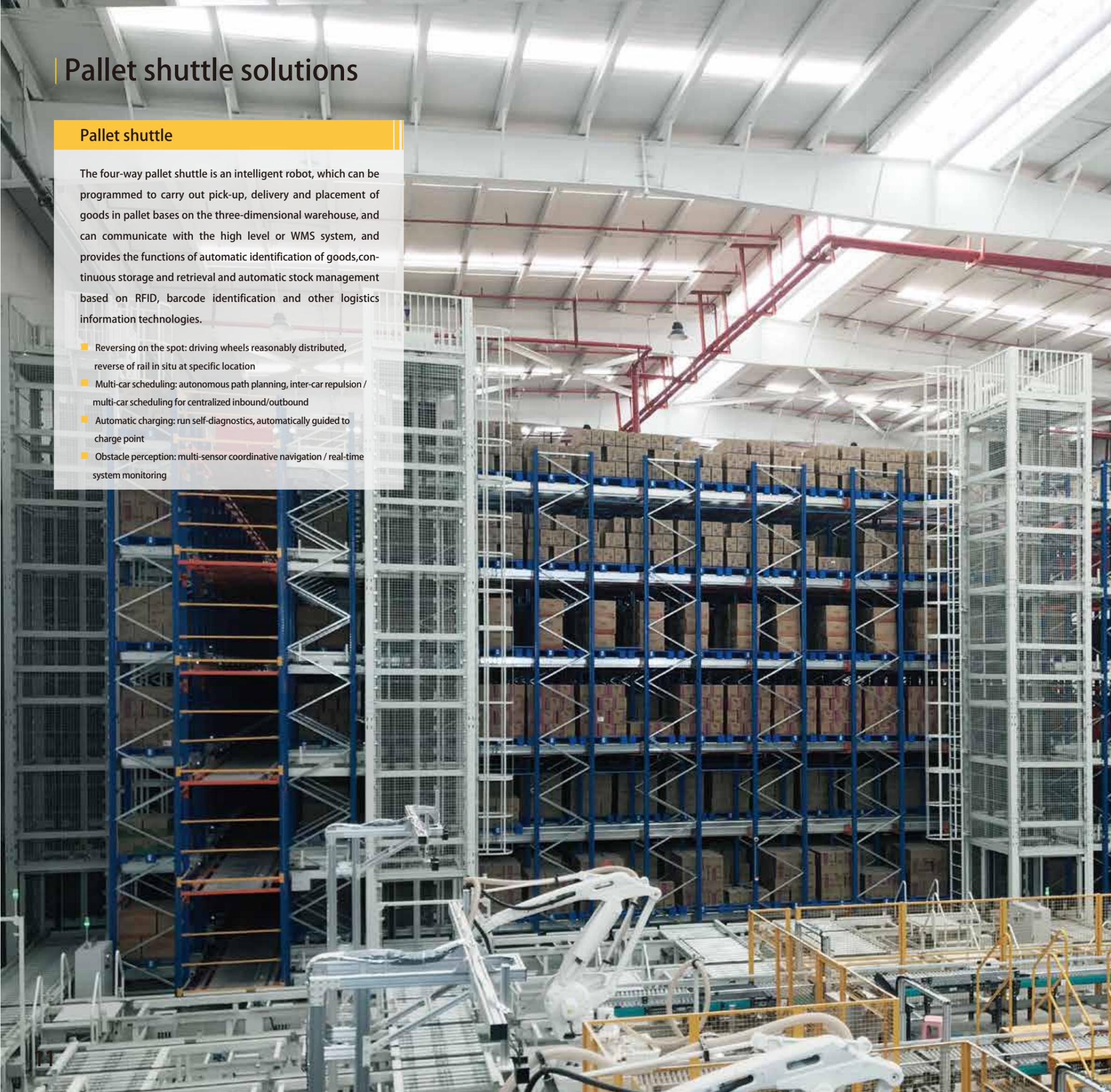


Pallet shuttle solutions

Pallet shuttle

The four-way pallet shuttle is an intelligent robot, which can be programmed to carry out pick-up, delivery and placement of goods in pallet bases on the three-dimensional warehouse, and can communicate with the high level or WMS system, and provides the functions of automatic identification of goods, continuous storage and retrieval and automatic stock management based on RFID, barcode identification and other logistics information technologies.

- Reversing on the spot: driving wheels reasonably distributed, reverse of rail in situ at specific location
- Multi-car scheduling: autonomous path planning, inter-car repulsion / multi-car scheduling for centralized inbound/outbound
- Automatic charging: run self-diagnostics, automatically guided to charge point
- Obstacle perception: multi-sensor coordinative navigation / real-time system monitoring



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Four-way pallet shuttle - FLASH - TP



Pallet shuttle lift

Performance advantages of pallet shuttle

Efficient controller

Adopting the high performance controller of ARM architecture independently developed by Galaxis, the equipment may achieve stable operation and more excellent performance.



Energy management

The high performance BMS management system allows the battery to be under optimum working condition all the time and achieve long working hours up to 10 hours.

High speed moving

With a maximum speed of 1.85m/s, and a maximum acceleration speed of 1m/s², the pallet shuttle board may enable higher equipment operation efficiency

Intelligent protection

The intelligent motor protection system will automatically stop operation and trigger warning when the motor detects undesirable torque during moving or loading.

Pallet shuttle scheduling system—RCS



Performance parameters of pallet shuttle

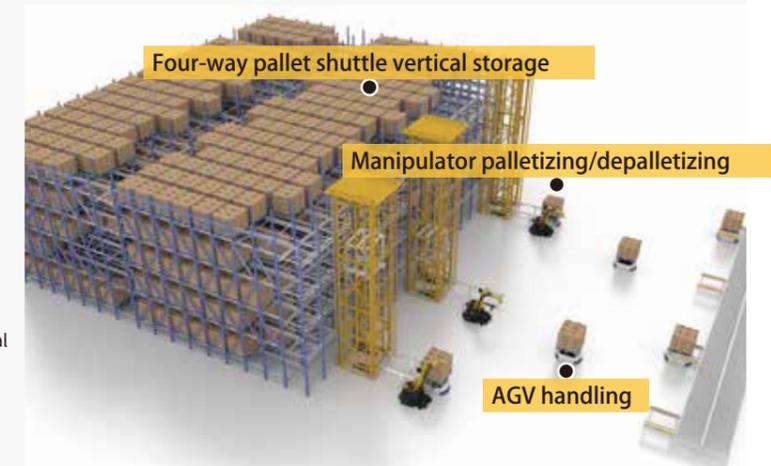
Model	FLASH-TP1210-R-1000	FLASH-TP1210-R-1500
Shuttle Length(mm)	1010	1010
Shuttle width (mm)	989	989
Max. height of shuttle (mm)	182	182
Min. height of shuttle (mm)	157	157
Main roadway track inner width (mm)	912	912
Sub-lane track inner width (mm)	883	883
Maximum pallet size (mm)	1300*1300	1300*1300
Max. load (KG)	1000	1500
Max full load speed (m/s)	1.5	1.5
Max full load acceleration (m/s ²)	0.8	0.8
Max no-load acceleration (m/s ²)	1	1
Track change positioning accuracy (mm)	±3	±3
Roadway positioning accuracy (mm)	±2	±2
Control System	GALAXIS PC ARM	GALAXIS PC ARM



Palletizer+AGV handling integrating with lift for outbound/inbound

Usually, it is mainly used as the de-palletizing and picking of B/C products. For A-class products, considering the operation characteristics of the four-way shuttle board, the flow rack can be integrated in the shelf storage area planning, and the flow rack can be replenished through the four-way shuttle board

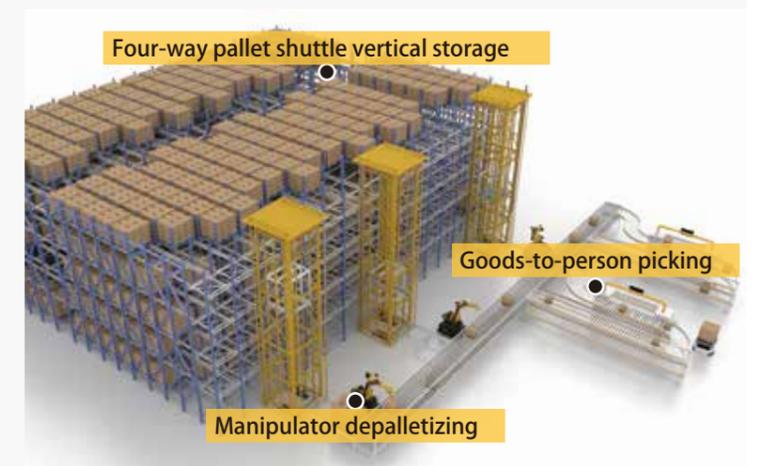
Applications



Pallet picking and outbound

It reduces the number of devices targeting situations with large stock while low/medium traffic demands. Even with high traffic demand, it still may achieve the target of operation with less devices compared with multi-shuttle board according to the layout of the warehouse.

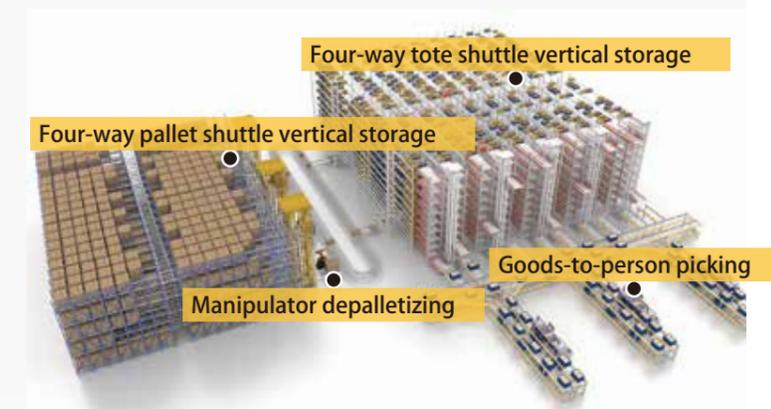
Applications



Four-way pallet shuttle storage+four-way tote shuttle storage

The four-way shuttle (FWS) can reach any position in the warehouse, and the operation sequence of the shuttle can be strictly implemented according to the sorting requirements. However, in this case, the maximum performance of the equipment cannot be exerted, and the efficiency is greatly lost.

Applications



Tote shuttle

01

A well-known international 3C company

The automated warehouse of the distribution center includes two main buildings with a storage area of 46,000 m², consisting of an e-commerce warehouse and a finished goods warehouse, including a pallet stacker storage system and a shuttle storage system, covering more than 20 logistics operation scenarios.

- The middle box and the pallet are respectively 10 times and 4 times the efficiency of manual tallying.
- The utilization rate of storage space is 5 times higher than that of ordinary warehouses.
- Robot palletizing is 3 times more efficient than manual palletizing.



02

Yanfeng Andaotuo in Shanghai

In 2018, in order to meet the needs of business growth, Yanfeng Andaotuo in Shanghai established an intelligent warehouse logistics center for automobile seat parts in collaboration with Galaxis Technology, supporting integrating with flexible production.

- Saving labor cost for production line logistics by 45%
- Over 99.99% feeding accuracy of production line
- Improving storage density by 60%



03

Suzhou Library

The first "intelligent storage library" in China covers a project area of 35,000 square meters with automatic storage capacity of 7 million books. Galaxis has equipped the whole project with 20 multi-shuttles, 4 high-speed lifts, and 2 miniloads with up to 50,000 books per day of input and output efficiency.

- Good for protection and management of classic ancient books
- Lock the storage location in 1 second, and complete output in 1 minute
- Saving land area by 40% with sufficient space reserved for library extension in the later period



Pallet shuttle

01

Liqun Group

Galaxis provides one-stop comprehensive solutions for program consulting, planning and design, project implementation, logistics equipment supply, installation and commissioning, training and after-sales service. The logistics center adopts a pallet storage method, and the vertical warehouse contains 8 aisles and 8 single deep position railed aisle stacker cranes, with a storage capacity of 600,000 pieces.

- Increased storage space and density of goods, with storage capacity exceeding over 600,000 pieces
- Improved delivery efficiency, a maximum of more than 80,000 SKUs outfed daily



02

An international third-party cold chain company

The project is located in Shanghai and consists of a freezer, a cold storage, a room temperature warehouse and an automated freezer. The dense storage area is equipped with 3 four-way pallet shuttles and 2 pallet lifts for infeed and outfeed transportation, simultaneously keeping more than 400 SKUs and 1,500 pallets, and are connected to different functional areas of the warehouse through a conveyor system.

- Automated warehousing operations
- Efficient and intelligent intensive storage system



03

Haoyisheng

The Haoyisheng pharmaceutical distribution center project consists of tote shuttle vertical storage, pallet shuttle vertical storage and AGV picking system. Three split-case picking methods may satisfy the demand for intensive split-case picking operation.

- A storage of 380,000 cartons of drugs that supports a maximum sale revenue of RMB 3 billion
- The split-case picking zone has an order processing capacity of 71,000 lines/day, Daily inbound capacity up to 7700+ cartons/day, daily outbound capacity up to 9500+ cartons/day



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