Shuttle System

Greater storage capacity and faster order fulfillment

Interlake MECALUX

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This high-density automated storage and retrieval system (AS/RS) speeds up picking operations through a combination of robotic solutions. An electric shuttle deposits and removes totes on each level using telescopic arms.

The shuttles' multilevel and simultaneous operation ensures a constant flow of boxes from storage racks to pick stations, streamlining order fulfillment and boosting productivity.

Advantages

High throughput
The travel speed of the elevators and shuttles, along with their simultaneous operation, enables a higher number of movements per hour.

Increased productivity
Automation and the goods-to-person method improve throughput in storage and order picking tasks.

Optimization of available surface area
The system provides a high storage capacity, with racks reaching up to 49.2' in height.

More accurate picking
Errors due to manual management are eliminated.

Continuous flow
The AS/RS enables uninterrupted operations 24/7.

Modular, scalable system
The height and number of aisles can be expanded to support business growth.

Easy maintenance
Servicing is carried out without halting operations. In the event of an issue, the shuttle moves to the maintenance area, and another takes its place.

Applications

- **Healthcare and pharmaceutical** companies that manage small high-turnover products that take up little space.

- **E-commerce** retailers with high daily shipping volumes.

- **Distributors** of components, spare parts, and other small items such as hardware, plumbing, and electrical supplies.

- **Buffer warehouses** where the Shuttle System serves as a temporary storage area for goods sent to production lines.

- Facilities that supply **sorters** handling a high number of orders simultaneously.

Components

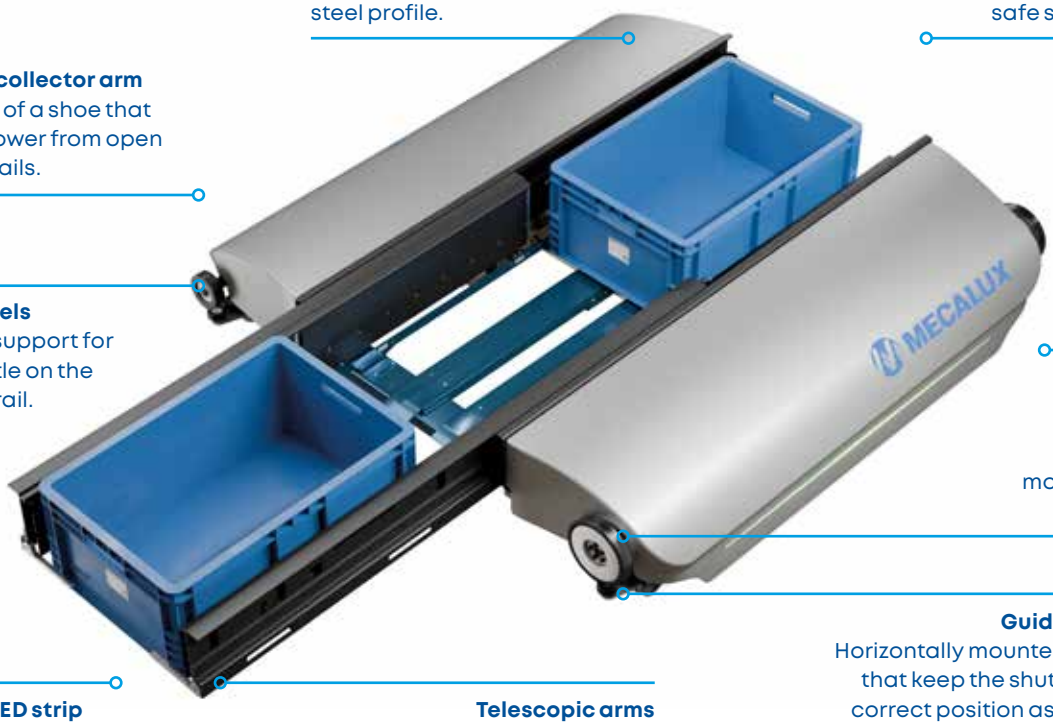
Designed and manufactured entirely by the Mecalux Group, from the racks and shuttles to the elevators, conveyor system, and pick stations.

Frame
Rectangular tubular steel profile.

Safe Limited Speed (SLS) system
Enables the shuttle's position and safe speed throughout its route.

Current collector arm
Consists of a shoe that draws power from open copper rails.

Sensors
Detect when the shuttle approaches the tote on the rack or the end of the aisle, gradually reducing speed.



Freewheels
Provide support for the shuttle on the running rail.

Drive wheels
Charged with moving the shuttle along the aisle.

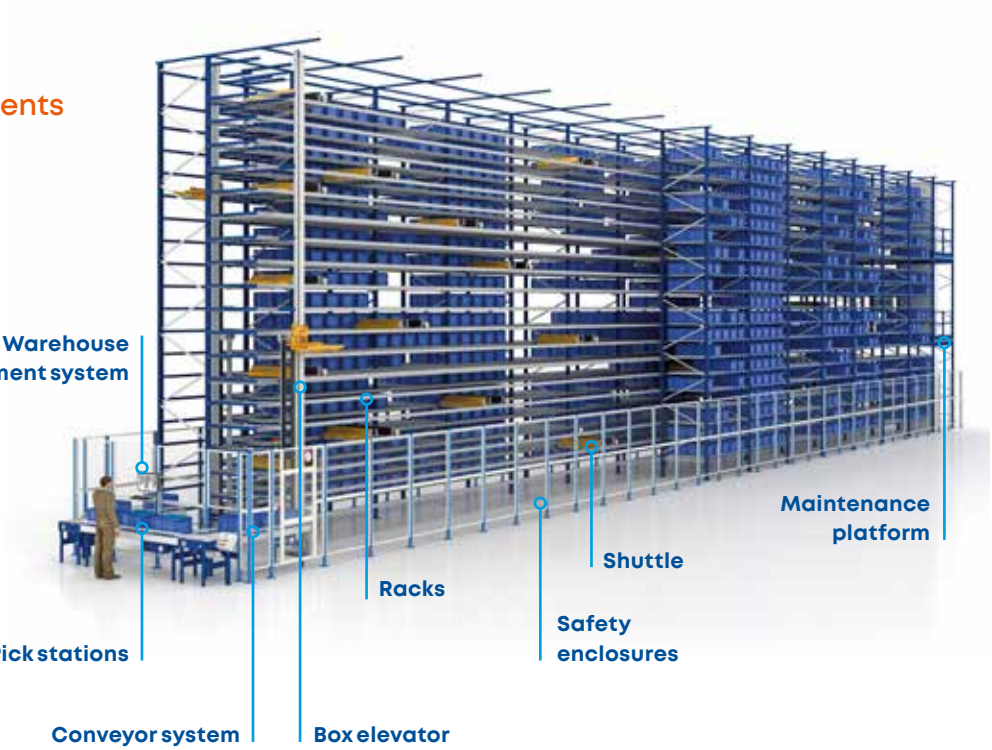
Guide wheels
Horizontally mounted wheels that keep the shuttle in the correct position as it moves along the rail.

IO-Link LED strip signaling
Multicolor LED strip with animation effects. It reports the shuttle's status: whether it is loading or unloading goods, which side of the storage system it is working on, its direction of travel, the operating mode (manual, semi-automatic, or automatic), and whether it is out of service.

Telescopic arms
Extraction system with which the shuttle loads and unloads boxes from racks with single, double, and triple depth.

Characteristics	
Max. AS/RS height	49.2'
Max. AS/RS length	230'
Unit load	Reinforced Euro box (23.6" x 15.7" x 16.5")
Max. load weight	220.4 lb (2 x 110.2 lb)
Storage	Single-, double-, or triple-deep
Travel speed	11.8'/s without load (9.8'/s with load)
Translation acceleration	5.2'/s² without load (3.3'/s² with load)
Extractor speed	6.6'/s without load (1.6'/s with load)
Extractor acceleration	13.1'/s² without load (1.3'/s² with load)
Environmental conditions	Relative humidity: 70% Temperature range: 32 °F to 104 °F

System components



Shuttle
This automatic car moves between levels at a speed of 13.1'/s. It loads and unloads totes from their locations, transporting them to the elevators at the ends of the aisles.

Racks
This structural framework is designed to optimize storage space. Racks can hold up to three boxes deep and reach heights of up to 49.2'.

Running rails
Each storage level is equipped with a pair of parallel horizontal rails that guide the shuttles along the aisle.

Box elevators
They transfer boxes and totes between levels. Each aisle is equipped with two elevators — one for inflow and one for outflow — each capable of transporting up to two boxes at a time.

Shuttle elevators
Located at the front end of each aisle, they move the shuttles between levels. One shuttle elevator is installed per aisle.

Conveyors
These connect the elevators at the rack entry and exit points to the pick stations, ensuring a continuous flow of goods.

Operation

High-performance solution that significantly speeds up order fulfillment.

1

The shuttle receives an order and **travels to the assigned position** to retrieve a tote from the racking using its telescopic arms.

2

Once the tote is in the cradle, the shuttle moves to the **elevator, which lowers the goods** to the outgoing conveyor on the bottom level.

3

The conveyor system **transports the tote to the pick station**. There, the associate receives order fulfillment instructions from the warehouse management system.

4

Once picking has finished, **the storage tote returns to the AS/RS** or is sent to another workstation. The completed order is moved to the consolidation area or directly to shipping.

Pick stations

The Shuttle System works with goods-to-person pick stations for order fulfillment.

Standard pick station

This solution — ideal for basic order picking — is based on a U-shaped conveyor system positioned at the front or side of the AS/RS.

Associates retrieve items from the storage totes they receive from the AS/RS and sort them in the corresponding bins. With this method, they can pick **60 to 120 order lines per hour** (depending on tote dimensions) for single-SKU orders.

Multi-order pick station

The U-shaped conveyor system streamlines the fulfillment of multiple orders simultaneously. Associates remove items from storage totes and complete orders on both sides.

They sort goods across several picking tables, achieving a throughput of **140-220 lines per hour**.

High-performance pick station

This solution enables associates to prepare large volumes of orders simultaneously and ergonomically. Totes arrive at the station's upper level, where the associate retrieves the required SKUs and places them in the boxes on the lower level to complete orders. This process helps minimize errors.

A high-performance pick station allows associates to fulfill up to six orders at once, reaching up to **1,000 picks per hour**.

Robotic pick station

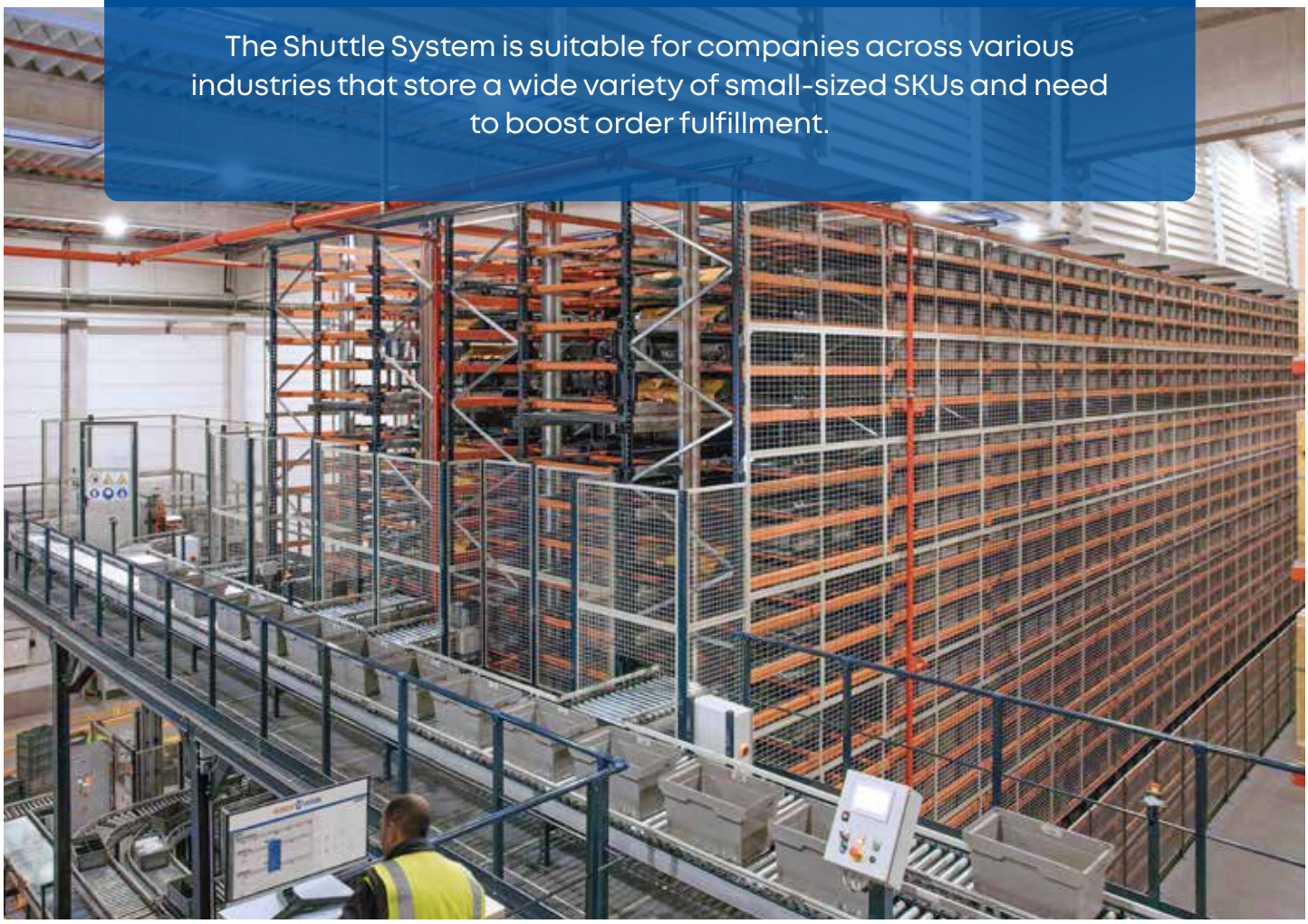
These autonomous pick stations are operated by high-precision, versatile robots that pick products from Shuttle System storage totes and place them into order boxes. By leveraging robotics, the solution completely automates order fulfillment, ensuring uninterrupted workflows that boost warehouse productivity.

Flow rack picking

The Shuttle System can be combined with gravity flow channels for mass picking of individual items. This solution is designed for warehouse areas with high order volumes. It ensures perfect FIFO (first in, first out) product turnover and supports pick-to-light technology for faster order completion.

Shuttle System

The Shuttle System is suitable for companies across various industries that store a wide variety of small-sized SKUs and need to boost order fulfillment.



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