Shuttle System

Greater storage capacity and faster order fulfilment



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The operational flexibility of these shuttles — which work simultaneously and can move between levels — ensures a continuous flow of goods from the racking to the picking stations. These capabilities significantly speed up the movement of boxes to and from storage and accelerate order picking.

Advantages

High throughput
The travel speed of the elevators and shuttles, combined with their simultaneous operation, increases the number of movements per hour.

Greater productivity
The goods-to-person configuration speeds up order picking by automating the flow of products from the racking to the pick stations. It also reduces operator travel and minimises picking errors.

Space optimisation
The high-density racking, which accommodates up to three boxes deep, expands storage capacity. The racks can reach heights of up to 15 m.

Operational versatility
The shuttles move between levels and are dynamically assigned to locations according to operational needs. This considerably reduces the initial investment compared with other automated storage and retrieval systems (AS/RS) that require one shuttle per level.

Modular, scalable system
The height, number of aisles and number of shuttles can be increased to adapt the system to business growth.

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



Applications

- **Healthcare and pharmaceutical** companies managing small, fast-moving products.

- **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.

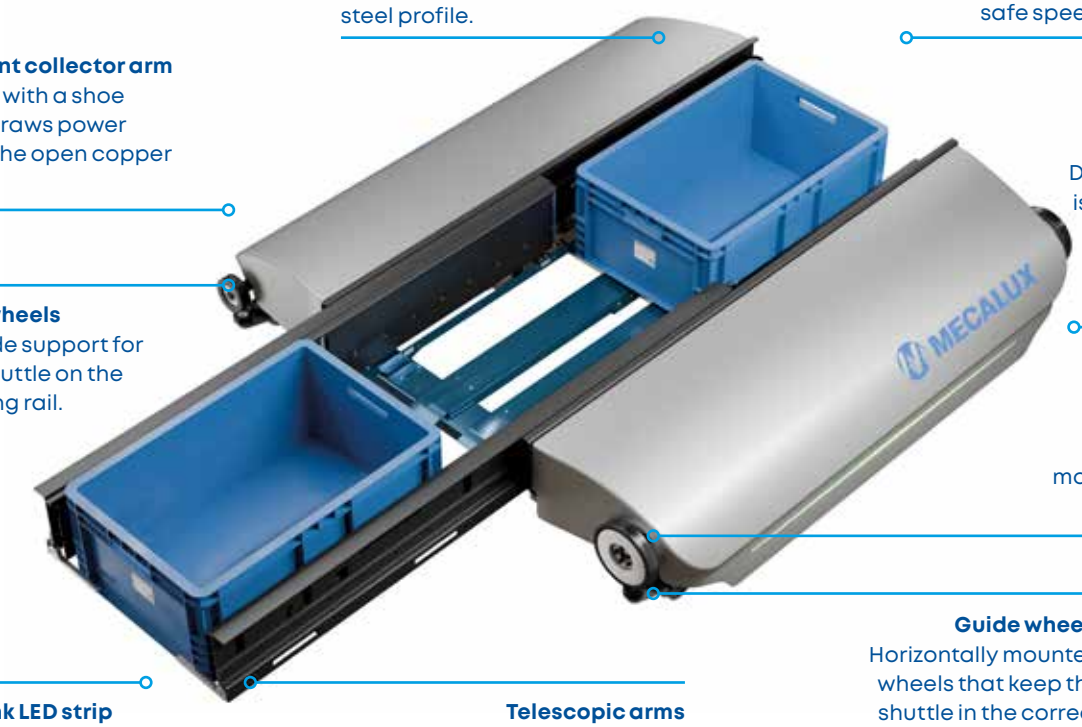
- Facilities that continuously supply **sorters** handling a high number of orders simultaneously.





Components

Designed and manufactured entirely by Mecalux, from the shuttles and racking 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
Fitted with a shoe that draws power from the open copper rails.

Sensors
Detect when the shuttle is approaching 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.

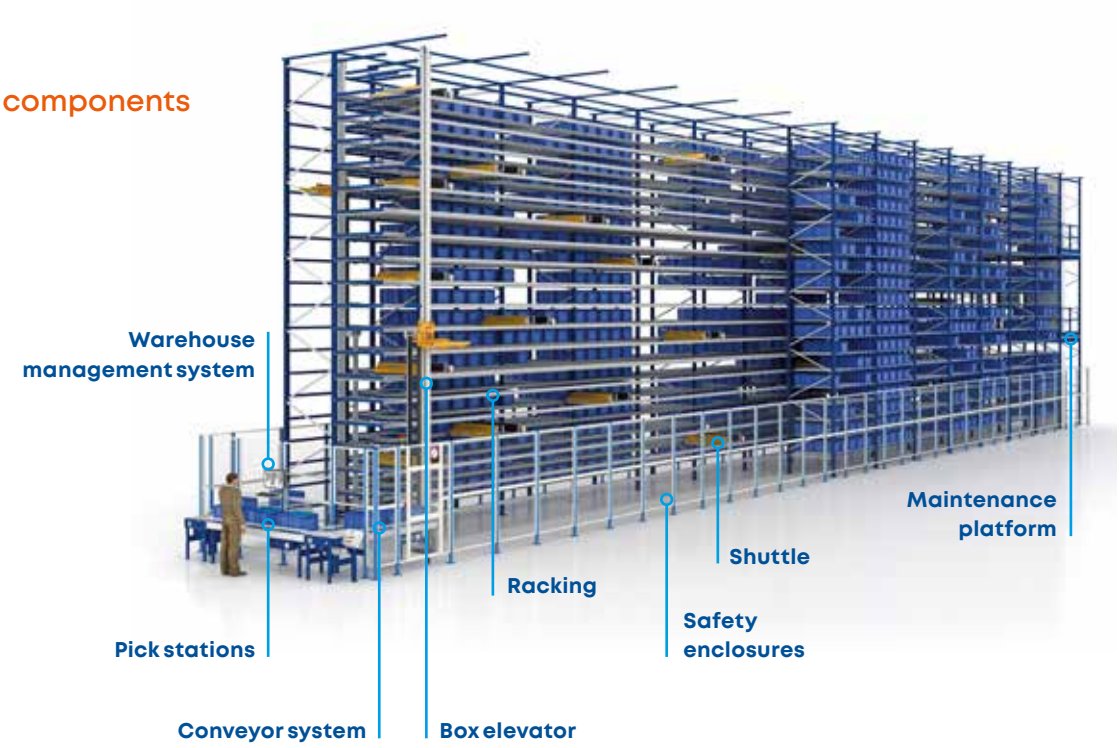
Guide wheels
Horizontally mounted wheels that keep the shuttle in the correct position as it moves along the rail.

IO-Link LED strip signalling
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 totes from the racking with single, double and triple depth.

Characteristics	
Max. AS/RS height	15 m
Max. AS/RS length	70 m
Unit load	Reinforced Euro box (600 x 400 x 420 mm)
Max. load weight	100 kg (2 x 50 kg)
Storage	Single-, double- or triple-deep
Travel speed	36 m/s without load (3 m/s with load)
Translation acceleration	1.6 m/s² without load (1 m/s² with load)
Extractor speed	2 m/s without load (0.5m/s with load)
Extractor acceleration	4 m/s² without load (0.4 m/s² with load)
Environmental conditions	Relative humidity: 70% Temperature range: 0 °C to 40 °C

System components





Shuttle
This automatic car moves between levels at a speed of 4 m/s. It loads and unloads totes from their locations, transporting them to the elevators at the ends of the aisles.



Racking
This structural framework is designed to optimise storage space. Racks can hold up to three boxes deep and reach heights of up to 15 m.



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.



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

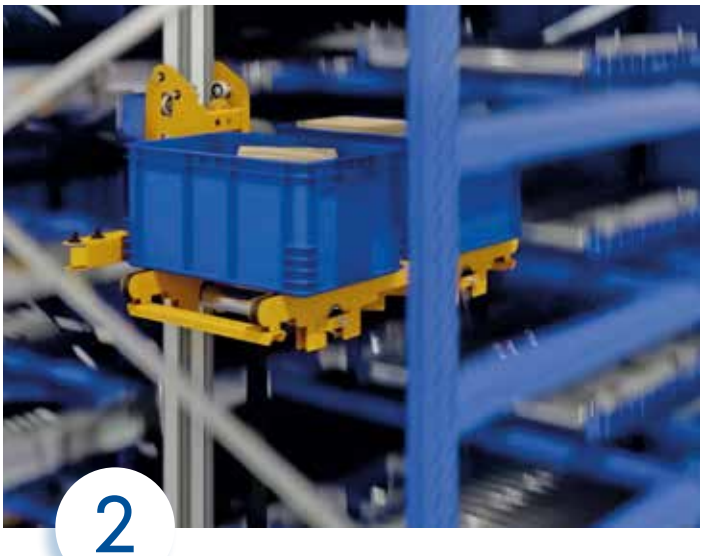
Operation

High-performance solution that significantly speeds up order fulfilment.



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 operator receives order fulfilment 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 fulfilment.



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.

Operators retrieve items from the storage totes delivered by the AS/RS and sort them into the corresponding bins. This enables them to pick between **60 and 120 order lines per hour** (depending on tote dimensions) for single-SKU orders.



Multi-order pick station

The U-shaped conveyor system streamlines the fulfilment of multiple orders simultaneously. Operators 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

With this ergonomic solution, operators pick a large number of orders simultaneously. Totes arrive at the station's upper level, where the operator retrieves the required SKUs and places them in boxes on the lower level to complete orders. This process helps minimise errors.

A high-performance pick station allows operators to fulfil 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 retrieve products from Shuttle System storage totes and place them in order boxes. By maximising automation, they ensure uninterrupted workflows and optimal operational performance.

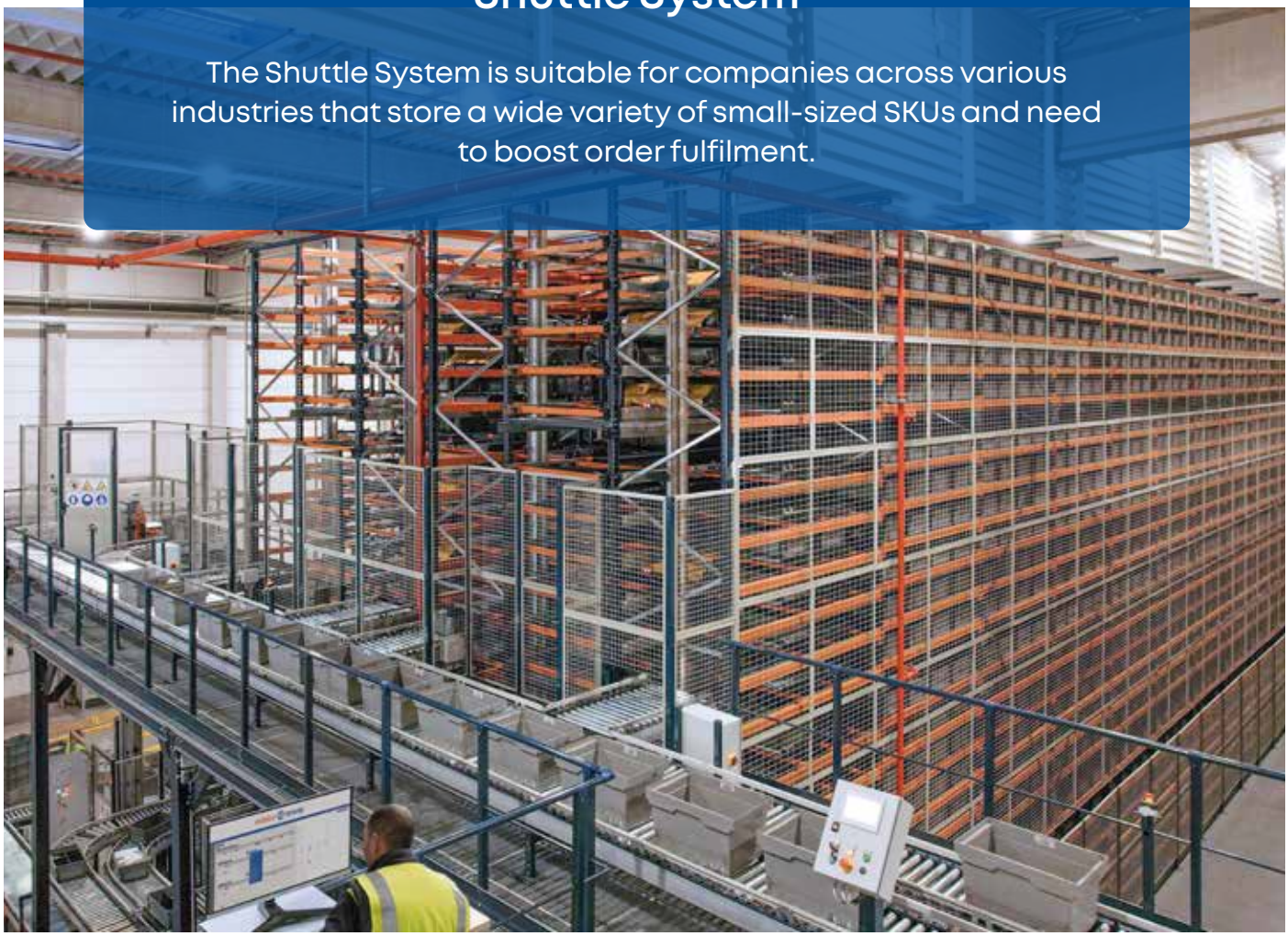


Flow rack picking

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 flawless 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 fulfilment.



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