







6 Small Parts Automation Solutions

For fulfillment strategies in wholesale, retail & e-commerce

Solution Guide

kardex

Your business. Your distinct challenges.

Fulfillment operations are under increasing pressure, but the challenges you face may vary significantly from those of others depending on whether you serve the needs of distribution centers, businesses, or direct consumers. What is always true: the way you store, access, and move small parts has a direct impact on your efficiency, flexibility, and service levels. And automation is becoming an essential strategy to stay competitive.

How can your operation automate small part storage and handling for optimal performance today and in the future? The answer is rarely a one-size-fits-all solution. A true competitive edge requires a solution designed around your specific processes, constraints, and growth plans.

Wholesale challenges

In wholesale operations, your success depends on handling large order volumes efficiently without losing control over costs and complexity.

Classic challenges include:

Order structure
Many order lines and large quantities

Service expectations
Faster delivery, high availability, and error-free fulfillment

Demand profile
Stable, high-stock volumes with increasing fulfillment complexity

Supply chain
Volatile global supply chains increase need for larger stock



Retail challenges

Retail operations are becoming increasingly complex as the industry balances store replenishment with growing e-commerce requirements (omnichannel).

Classic challenges include:

Fulfillment channels
Store supply and online orders (omnichannel flow)

Demand variability
Seasonal peaks and promotion-driven fluctuations

Inventory availability
High product availability across all channels

Service requirements
Fast, reliable, and synchronized fulfillment





E-commerce challenges

E-commerce operations require you to handle a myriad of small orders, growing SKU diversity, and increasing customer expectations for same-day deliveries and flexible return options all at once. Many of these businesses also start small and grow fast, resulting in a need for flexible solutions.

Classic challenges include:

Order profile
Very high quantity of small-volume orders, typically placed in peaks

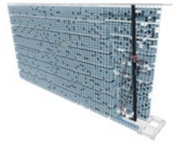
SKU complexity
Large assortments with frequent changes (e.g. seasonal)

Returns handling
High return flows adding cost and operational complexity

Service expectations
Same-day or next-day delivery expected with full transparency of order flow

Your solution fit

Designing the right automation solution starts with understanding your operational priorities. Depending on your business model, your focus may lie on capacity, flexibility, performance, or another requirement. The overview below provides guidance on how different solutions can support specific fulfillment needs and offers inspiration for identifying the right storage solution for you.

Priority	Possible Solution Fit	System Height	Max Weight/ Load Unit	Typical Application Context
Flexible & Fast **Automation Entry**	Vertical Carousel Module **Kardex Megamat** 	max. 10 m	650 kg	Ideal for **fast-moving uniform storage goods,** especially for **entry-level** automation
	 Vertical Buffer Module **Kardex Miniload-in-a-Box**	max. 12 m	35 kg	Ideal **entry point** for either **small-parts** automation or **highly efficient buffering** and **order fulfillment**
High Throughput & High Density	**AutoStore™**   **Bin Shuttle System** powered by ROCKETSOLUTION	max. 6 m	35 kg	Operations with **standardized item size and high throughput demands –** ideal for buildings of max. 10 meters heights
		max. 26 m	50 kg	Operations focused on **compact storage including heavier goods –** ideal for +10-meter-high buildings
Flexible Handling of **Different Load Units**	**Miniload System** 	max. 20 m	50 kg	Operations with **varying bin sizes or mixed product ranges**
Handling of **Odd-Sized Items & Items with Higher Weight**	 Vertical Lift Module **Kardex Shuttle**	max. 40 m	1000 kg	Often used in **combination with other systems** to store **odd-sized** or **very heavy** items
Unit Storage **on Pallets**	Automated **High-Bay Warehouse** 	max. 50 m	Several tons possible	Ideal for **automated storage of large volumes,** for example for **replenishment of small parts picking systems**

EXPERT TIP
Combine small parts solution with pallet storage

«By implementing automation, we were able to increase the efficiency of our warehouse operations, eliminate bottlenecks, speed up picking, and improve overall logistics performance by more than 40%.»

Ivan Skalda, Director of Logistics, Tescoma s.r.o.

Discover more

Learn more about optimal solutions for small parts automation



Automation for wholesale

For wholesale operations, a strong automation solution needs to create a reliable and cost-efficient foundation that can handle large volumes without adding complexity.

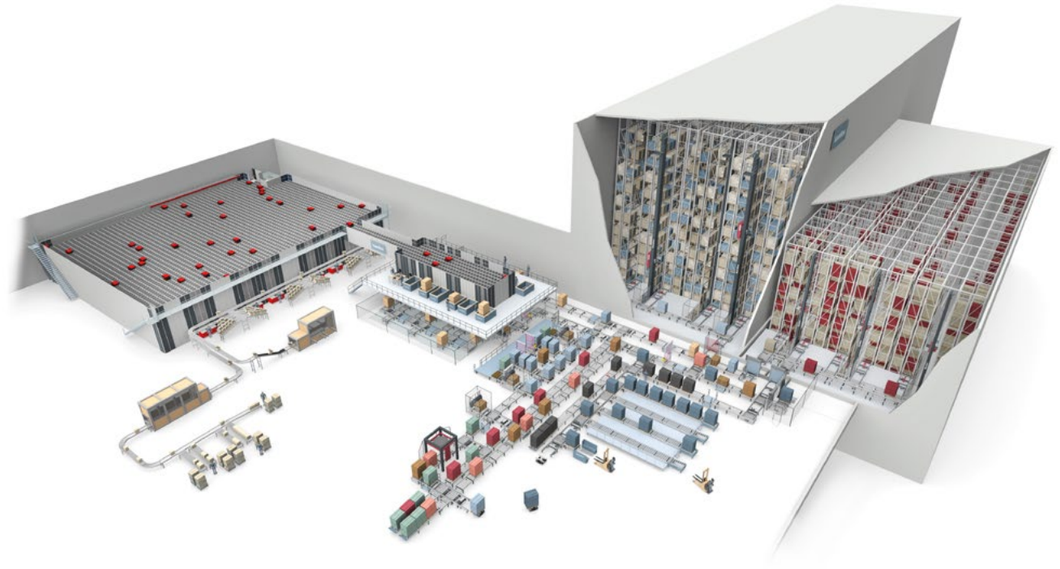
Automation solutions to consider
Depending on your specific requirements, the Miniload System, the Bin Shuttle System powered by ROCKETSOLUTION or an AutoStore™ solution can play a central role in handling small parts, enabling high-capacity storage and predictable performance. These systems can be seamlessly integrated with pallet-based high-bay warehouses, ensuring smooth replenishment and material flow between bulk storage and picking operations. Furthermore, the solution can be complemented by vertical solutions such as the VLM Kardex Shuttle to handle odd-sized items more flexibly.

The result is a solution that allows you to store large volumes efficiently, pick big orders (e.g. full-case picking) with speed and accuracy, manage a wide range of SKUs in a structured way, and scale your capacity in line with business growth without compromising operational stability.

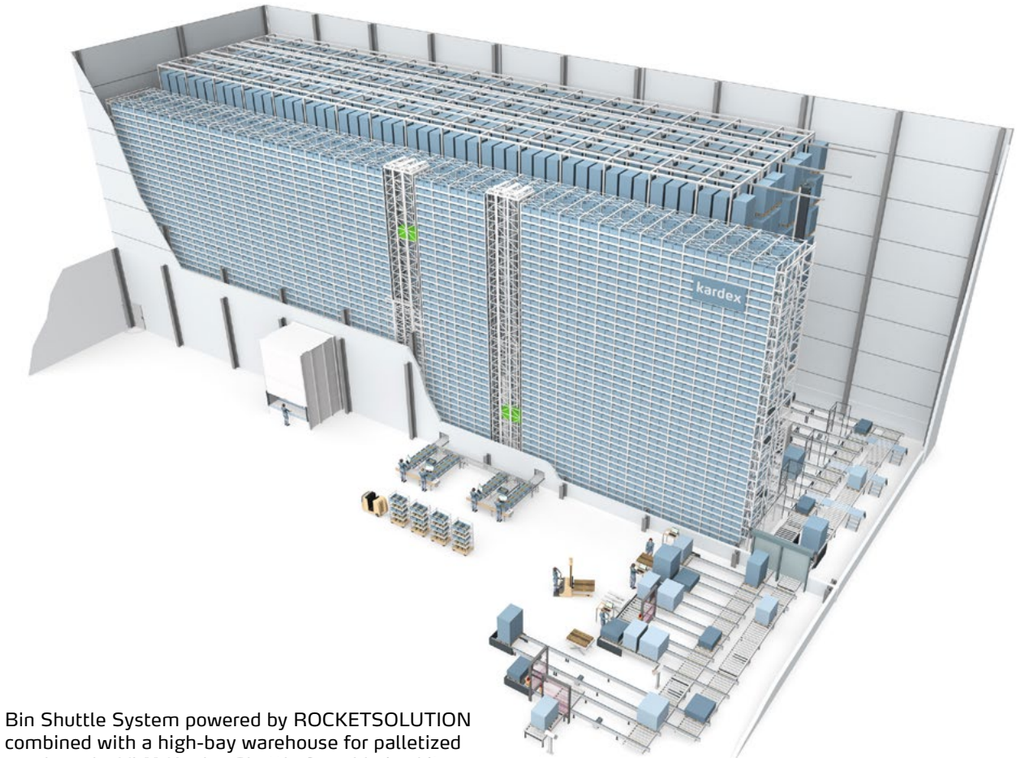
Possible solution components

- Miniload System Bin Shuttle System powered by ROCKETSOLUTION / AutoStore™ for high-capacity and end-to-end material flow
- A high-bay warehouse for bulk storage of palletized goods
- The VLM Kardex Shuttle to store and handle odd-sized, very heavy items efficiently

Watch the video to learn more



Combined AutoStore™ and high-bay warehouse system



Bin Shuttle System powered by ROCKETSOLUTION combined with a high-bay warehouse for palletized goods and a VLM Kardex Shuttle for odd-sized items

Automation for retail

For retail operations, the focus is on creating a flexible and high-performance fulfillment setup that can handle multiple channels and fluctuating demand without compromising availability or speed.

Retail fulfillment typically places small parts systems at the center of the operation to enable high-speed, item-level processing across channels.

Automation solutions to consider
A key success factor for entry-level automation is selecting a scalable core system that enables fast ROI while allowing for gradual growth into automation and easy adaptation to changing business requirements. Solutions such as the VCM Kardex Megamat, VBM Kardex Miniload-in-a-Box and the VLM Kardex Shuttle – or a combination of these – can play an active role here, enabling efficient small parts handling and buffering while supporting a step-by-step automation strategy. For fast-moving items, the Kardex VCM excels, whereas the VBM works both for picking and buffering. The VLM enables higher flexibility as a key feature.

For higher throughput and more advanced automation strategies, systems such as the Bin Shuttle System powered by ROCKETSOLUTION, the Miniload System, or AutoStore™ can serve as an operational core. The Bin Shuttle powered by ROCKETSOLUTION and AutoStore™ are particularly suited for high-density storage and dynamic, high-throughput environments. The Miniload System is best when heavier items (up to 50 kg) are part of the mix. However, the best fit will always depend on your specific requirements. All of these solutions can be combined to suit specific business needs.

Possible solution components

- ✓ VCM Kardex Megamat, VBM Kardex Miniload-in-a-Box and/or VLM Kardex Shuttle for flexible automation entry, buffering, and handling of diverse or fast-moving items
- ✓ Bin Shuttle System powered by ROCKETSOLUTION, AutoStore™, or Miniload System as core systems for high-density storage and high-throughput picking

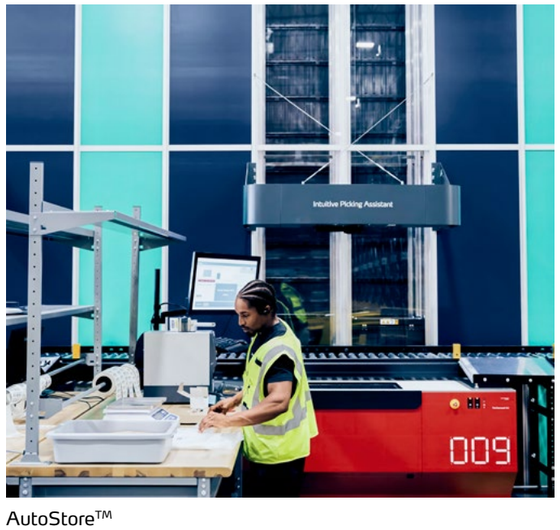

VCM Kardex Megamat


VBM Kardex Miniload-in-a-Box



VLM Kardex Shuttle


Bin Shuttle System powered by ROCKETSOLUTION



AutoStore™


Miniload System

Automation for e-commerce

For e-commerce operations, the focus is on building a highly scalable and space-efficient fulfillment solution that can handle rapidly increasing order quantity, high SKU diversity, and demanding delivery expectations. In contrast to retail environments, where flexibility across channels is key, e-commerce operations are typically centered around high-performance small parts systems that enable fast, continuous, and highly efficient item-level picking at scale.

Automation solutions to consider
A key success factor is often being able to start small as many e-commerce businesses are startups that have been successful enough to see rapid growth. For entry-level automation the VCM Kardex Megamat is an ideal starting point especially suitable for frequently accessed goods because it conveys the right carrier to the access opening via the shortest possible path. It can be combined with the VBM Kardex Miniload-in-a-Box or the VLM Kardex Shuttle in a tailor-made system that fits smaller to medium-sized e-commerce businesses.

For larger facilities or very rapid projected growth, high-density solutions such as AutoStore™ and the Bin Shuttle System powered by ROCKETSOLUTION enable compact storage of a large number of SKUs while supporting high-speed goods-to-person picking. While AutoStore™ is particularly well suited for buildings up to 10 meters in height and standardized items up to 30 kg with a very high throughput guaranteed. It also stands out due to its flexible system scaling options.

With its options of 4- and 6-deep storage, the Bin Shuttle System powered by ROCKETSOLUTION is one of the most compact shuttle system in the world. It supports heavier loads of up to 50 kg including the possibility to use trays and is well suited for buildings taller than 10 meters.

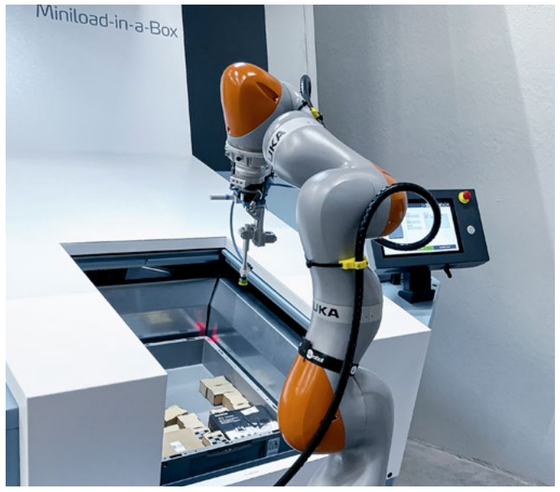
Together, these systems create a highly adaptable fulfillment environment that allows you to process large order volumes with speed and accuracy, maximize storage density within limited space, and scale your operations seamlessly as demand grows.

Possible solution components

- For entry-level automation: the VCM Kardex Megamat for fast-moving, similar sized good along with the VBM Kardex Miniload-in-a-Box for buffering and the VLM for flexible goods handling or as a good entry-level solution with the option to combine
- AutoStore™ systems for high-density storage with a max load unit of 35 kg and scalable, high-performance picking
- Bin Shuttle System powered by ROCKETSOLUTION for the most compact shuttle system and handling load units of up to 50 kg
- Miniload System with high flexibility in load units (up to 50 kg) including possible direct carton storage without trays



VCM Kardex Megamat for fast-moving, similar sized goods



VBM Kardex Miniload-in-a-Box for fast picking and buffering



VLM Kardex Shuttle for flexible goods handling including larger and heavier items



AutoStore for scalable, high-performance picking



Bin Shuttle System by ROCKETSOLUTION for ultra compact storage



Miniload System including option of carton storage without trays



Success stories

Logistics center success

groninger is a manufacturer of filling and sealing machines, managing a wide range of small parts and components. Its logistics center supports production and spare parts supply with both pallet and small parts storage.

Challenge
Manual storage had reached capacity limits, making it difficult to efficiently manage growing volumes of small parts and ensure smooth production supply.

Solution
A fully automated logistics center combining high-bay pallet storage with a bin shuttle system for high-density small parts storage.

Benefits
Highly scalable system with +17'000 bin locations, integrated material flow, improved efficiency, and future expansion capability.

Discover more

Retail automation success

TSC is a leading Canadian retailer offering over 15,000 products, including high-value small items like jewelry. Operating a large-scale distribution center, it processes around 10,000 orders daily.

Challenge
Highly fluctuating demand for small, high-value items created inefficiencies in labor and order fulfillment.

Solution
Deployment of VCM Kardex Megamat with inventory management and batch picking for small parts storage.

Benefits
54% less labor, 75% space savings, and up to 600% increase in throughput.

Discover more



E-commerce automation success

Arbeitsschutz-Express is a fast-growing e-commerce company specializing in small parts and order fulfillment. With rapid growth, it handles high daily parcel volumes and requires scalable logistics.

Challenge
Storage for small parts had exceeded capacity, limiting space, speed, and reliable order fulfillment.

Solution
Implementation of an AutoStore™ goods-to-person system for high-density, automated small parts storage.

Benefits
50% less floor space, faster picking, reduced staffing needs, and scalable capacity for future growth.

Discover more





Your one-stop automation partner for small parts solutions

With our broad portfolio and deep intralogistics expertise, Kardex supports you in designing a small parts automation solution that aligns with your fulfillment strategy.

If you are looking to optimize your fulfillment processes or explore automation for small parts, our experts are ready to support you.

Contact us

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