

White Paper

Meeting Demand for Faster Fulfillment



Introduction

The use of automated, software-driven picking technologies for inventory picking can slash fulfillment times, labor needs and warehouse footprint requirements, while vastly improving throughput and worker productivity. These systems support same-day and next-day delivery objectives and boost customer satisfaction.

Throughout the retail, distribution and manufacturing sectors, competitive pressures are driving the demand for faster, more-accurate order fulfillment. Consumers everywhere are demanding faster access to the goods they purchase — with next-day delivery expected, and same-day delivery and in-store pickup on the rise. Similarly, for many manufacturers and operators of industrial processes, demand is growing for near real-time access to replacement inventory and spare parts.

The process of manually retrieving and consolidating orders within any warehouse is extremely labor- and time-intensive, typically involving a legion of workers walking multiple laps throughout the facility (sometimes on multiple floors) to handpick items and transport them to the shipping zone. Adding more workers only compounds the problem. Overcrowding causes picking rates to fall, as workers are forced to wait, and the increased head count inevitably invites socializing, further hindering productivity.

To meet this customer demand, a growing number of distributors and centralized inventory management warehouses are implementing a combination of automated technologies and improved workflow processes to drastically improve order fulfillment times and accuracy — often enabling faster delivery with later daily cutoff times.

New tools, new strategies

Today, advances in warehouse automation technologies and the increased use of optimized picking and fulfillment strategies are helping forward-thinking warehouses and distribution centers to make the most of both their floor space and their labor resources to meet the demands of their customers. Specifically, the use of automation for parts picking and order fulfillment can yield the following improvements:



Automated picking systems can significantly boost throughput rates while reducing labor requirements. This allows for later order cut-off times.



Software-driven picking systems can improve picking accuracy up to 99.9%. They direct operators to the exact pick location and thus decrease picking errors.



Using the full overhead ceiling height, automated picking systems can reduce floor space requirements by up to 85% and thus create space to add inventory.



Designed with the worker in mind, automated picking systems feature an ergonomic design. With the push of a button, stored items are delivered to workers at waist height.

Automation technology options

Today, a variety of automation technologies and optimization strategies are available to help warehouse operators overcome the limitations and inefficiencies of manual fulfillment. And because these technology options are modular, systems can be phased in over time. This gives warehouse managers great flexibility in terms of managing expenses, training and analyzing ongoing results and fine-tune their approach.

In all cases, the potential opportunities for improvement can be identified by an analysis of the inventory stored at the facility, in terms of picking size (e.g., can the inventory be characterized as picked by piece, by case or by pallet?), and by pick frequency, also known as pick velocity or SKU movement (e.g., can the inventory be characterized as fast-, medium-, slow- or very-slow-moving?).



Storage system comparison ranked by their benefits
Rankings: 5=Best, 4= Great, 3=Better, 2= Good, 1=Fair

Benefits	Drawer Systems	Shelving	Pallet Rack	Pick Modules	HCM	VCM	VLM	VBM
Space/ Footprint	3	1	2	2	4	5	5	4
Throughput	1	1	3	2	5	3	4	5
Productivity	1	1	1	2	5	3	4	5
Accuracy	2	2	3	2	5	4	5	5
Inventory Control	3	1	3	3	3	4	4	5
Ergonomics	1	1	1	2	4	5	5	5
Expandability	5	5	5	4	4	3	4	4

Most companies tend to focus optimization efforts solely on the fastest-moving products in the facility. However, this approach is shortsighted, as this category of products typically comprises just a small fraction of the overall inventory. To fully exploit the benefits of automation, it is worth applying these improvement techniques to some or all of the slow- and medium-moving SKUs, as well.

To help select the right equipment for your operations, first review the challenges you’re looking to solve, then match them with the equipment below to get started.

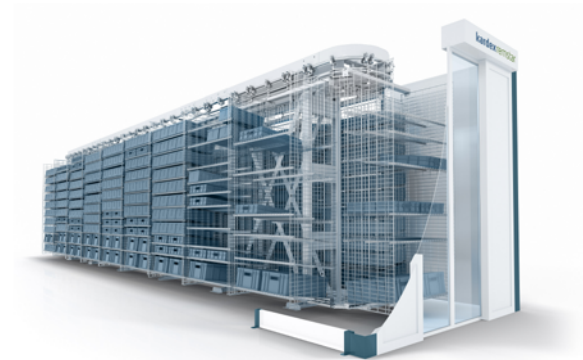
Automated storage & retrieval systems

Automated storage and retrieval systems (ASRS) such as Horizontal Carousel Modules, Vertical Carousel Modules, Vertical Lift Modules and Vertical Buffer Modules are highly efficient, goods to person delivery systems. By reducing the walk and search time to pick a part, productivity can be improved by up to 2/3. In addition, these systems are designed to work within your existing facility to maximize space. As a result, ASRS can save up to 85% floor space and increase storage capacity. When integrated with inventory management software and pick-to-light technology, inventory accuracy can increase up to 99.9%.

Horizontal Carousel Module (HCM)

Consisting of bins mounted on an oval track that rotate horizontally to deliver stored items to an operator. These automated storage and retrieval systems save up to 60% of floor space when compared to standard shelving and rack.

[Learn more about HCMs.](#)



Vertical Carousel Module (VCM)

Comprised of a series of shelves that rotate around a track—similar to a Ferris wheel—these automated storage and retrieval systems quickly deliver stored items to an ergonomically positioned work counter at the operator's command. When compared to static shelving and rack, they save up to 75% of floor space.

[Learn more about VCMs.](#)



Vertical Lift Module (VLM)

An enclosed automated storage and retrieval system that incorporates two columns of trays with a central inserter/extractor that automatically locates and retrieves stored trays from both columns, then presents them to the operator at a waist-high pick window. These systems save up to 85% of floor space compared to static shelving and rack.

[Learn more about VLMs.](#)

Vertical Buffer Module (VBM)

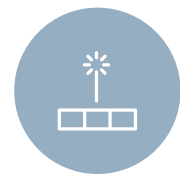
In the middle of a multi-segment shelving system is an aisle, where a moveable mast with a telescopic gripper operates. The control unit sets the gripper in motion picking a bin and transporting it to a picking station.

[Learn more about VBMs.](#)



Getting the most out of automation

When seeking to automate the picking process in a warehouse or distribution center, selecting the right equipment is just the first step. To get the most out of the investment, facility operators should also consider implementing complimentary technologies and improving work processes to improve the overall workflow within the facility and speed picking rates.



Incorporate 'pick-to-light' technology



Arrange picking technologies in 'pods'



Implement batch picking

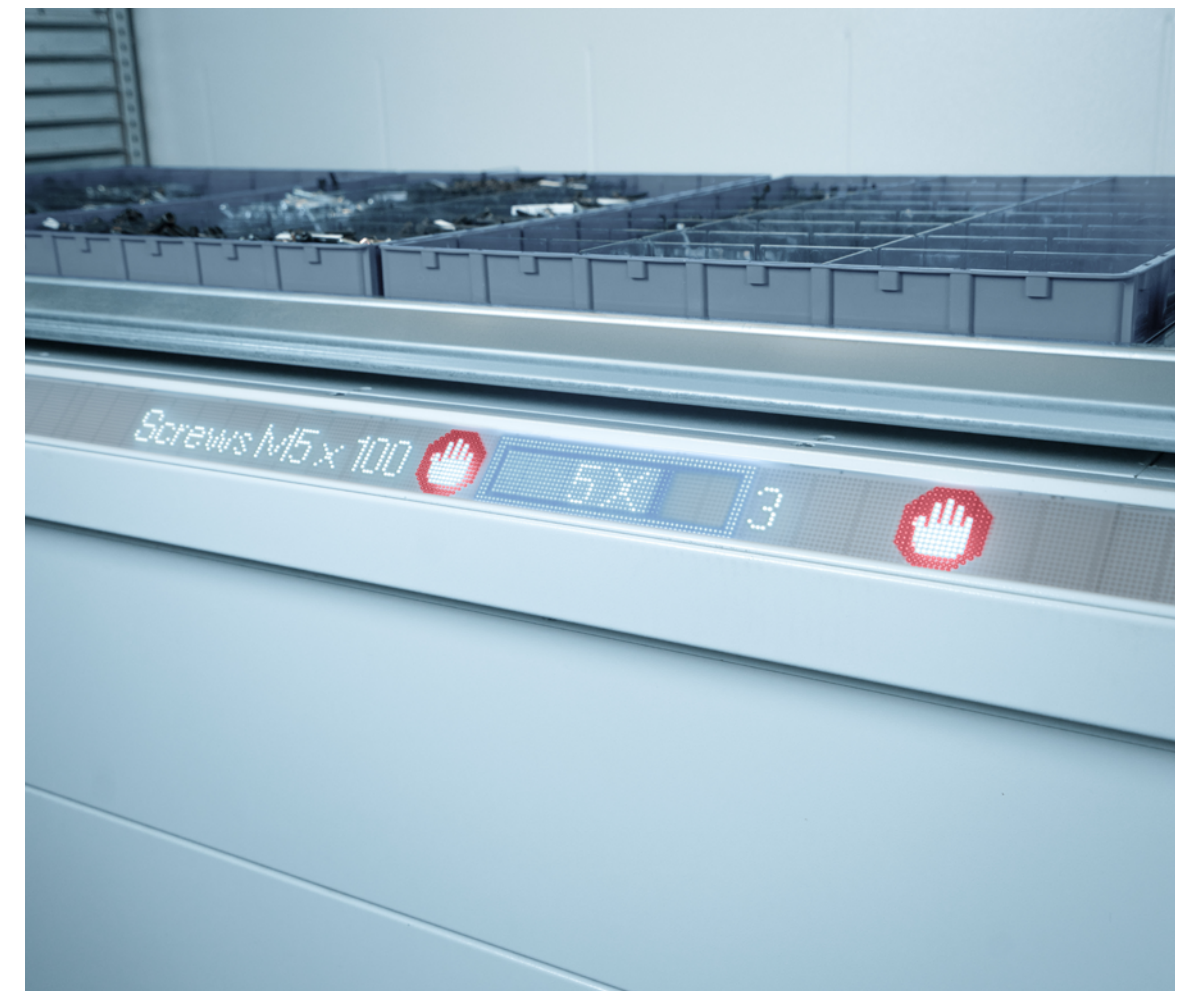


Integrate inventory management software

Incorporate 'pick-to-light' technology

Each ASRS can be integrated with light-directed technology to increase picking speeds and accuracy. Using pick-to-light technology directs operators to the exact pick location in the unit. For example, the Display LED-Navigator not only directs the operator to the pick location, but also displays the quantity to pick, part number and description. In addition, the lights signal to the operator when it is ok to begin the picking process.

Pick-to-light technology has been shown to sustain picking accuracy levels of 99.9%. This produces direct savings for the operation, improved overall throughput and eliminates the added effort and time lag incurred to correct a picking mistake.



Arrange picking technologies in 'pods'

To maximize order picking speeds, picking technologies are commonly arranged in pods, whereby two to four ASRS — equipped with pick-to-light and inventory management software (discussed below) — are oriented around a centralized picking zone where the worker stands. This configuration allows the units to work in coordination and reduce worker travel and wait time. As the worker is picking the first SKU required for the order, the other units are moving to pre-position the next SKU required. The units are in constant motion bringing items right to the worker's fingertips with little walk, search or dwell time.

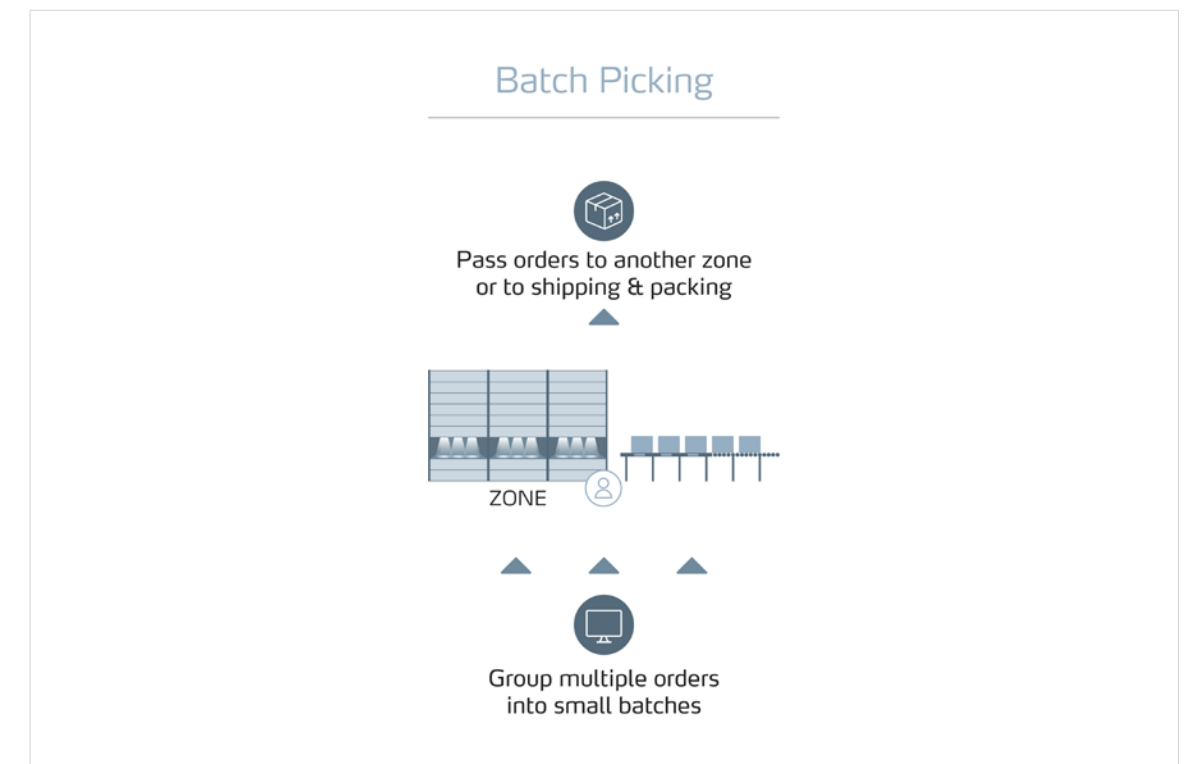


Implement batch picking

This involves arranging units into a pod configuration, integrating pick-to-light technology and using inventory management software (detailed below) to group multiple orders into small batches (typically up to 16 orders). One operator picks all orders in the batch at the same time, working from a consolidated pick list.

By taking advantage of programming logic in the software, this approach consolidates orders that require the same SKU into one pick, thereby saving time and speeding fulfillment rates. As directed by the pick lights, the operator retrieves a number of SKUs from the storage location and turns to the batch station to distribute the SKUs among the orders as directed by the put lights.

When high accuracy is critical, the operator can be required to scan the SKUs before placing the items into the order tote using a scanner mounted at each end of the batch station.



Integrate inventory management software

Inventory management software can fully automate the picking process, including receiving, picking and replenishing inventory. Often designed with a modular structure, inventory management software can be easily tailored to meet the specific needs of a facility and can be modified to keep up with facility changes over time.

Most inventory management software provides seamless integration between the customer's existing enterprise resource planning (ERP) systems and warehouse management systems (WMS). Full software integration allows organizations to track inventory from receiving through order fulfillment and shipping, while managing inventory data in real time.

When desired, a variety of other picking requirements can also be managed using inventory management software, including FIFO (first in, first out) or LIFO (last in, first out) picking. Software can also manage the inventory density within the storage unit and can be set to utilize fixed-location storage (whereby every SKU has a predetermined location) or random-location storage (whereby storage location dynamically changes based on the capacity of the unit).

Inventory management software also gives users access to a variety of data through standard and custom reports. For instance, if a given SKU has not been picked in six months, it can be flagged to potentially move out of an ASRS and reside on a manual shelf to improve efficiency. Reports related to minimum quantity levels can also be sent automatically to an order management team when inventory levels fall to a pre-set threshold value, prompting reorder to ensure that the product is always on hand.

Optimizing material flow

To maximize efficiencies, facilities must understand how parts move through the facility, and match the most appropriate technology to those patterns. Not all SKUs should be handled at the same. For instance, SKUs should be separated into individual pick zones and each pick zone should incorporate the most appropriate technologies (described above) to maximize picking within that specific zone. Depending on the facility and the type of inventory handled within each zone, certain pick zones may be fully automated (fast- and medium-moving SKUs), while others may still incorporate some manual shelving (slow-moving SKUs).

Here are some commonly used strategies that should be considered when automating the picking process. Depending on the physical size, volume and nature of the inventory, any given facility may use one automated picking zone or twenty.





Parallel picking

Similar to zone picking, in this approach, all zones are picked simultaneously and the items from each zone are later matched or consolidated to make orders complete. Similar to pick and pass, this strategy allows each zone to utilize the best mix of picking technology for the SKUs in that zone. This approach is particularly well suited for operations with a high total number of SKUs but a moderate to high number of picks per order.

Wave picking

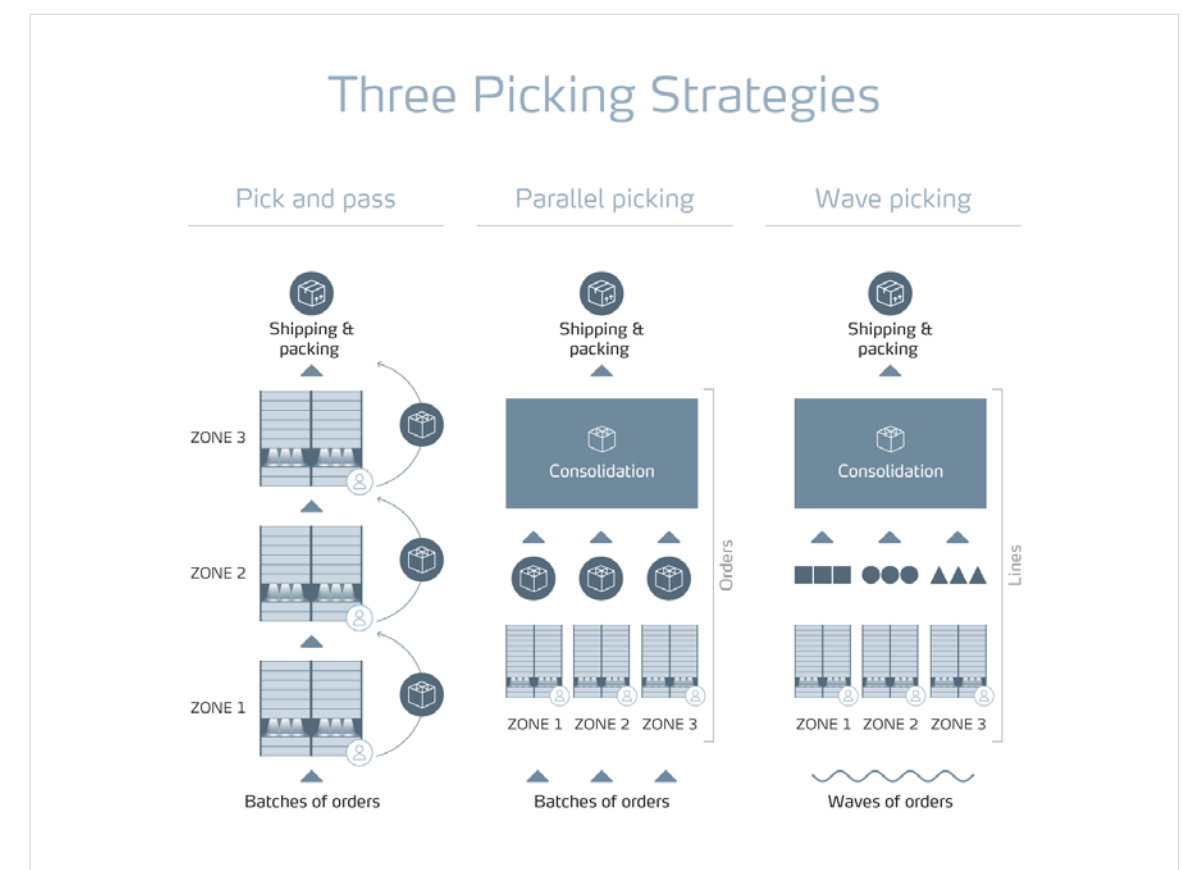
Instead of picking discrete orders, in a wave picking environment operators are picking order lines. Lines are then combined from the various warehouse zones into discrete orders in the consolidation area. In this scenario, operators are often picking directly to a conveyor which transports the items to a consolidation area for packing and shipping. The main benefit is the fast-picking process. It's common to see a wave picking strategy in operations with a lot of single line orders, for example in e-commerce.

 [Learn more about order picking strategies in this guide](#)

'Pick and Pass'

This approach breaks up the picking area into several sections or zones. Order pickers are assigned to a unique zone and only make picks of inventory located in that specific zone. Orders move through the respective zones and are fulfilled using a "pick and pass" strategy. All orders start at the first zone and move through each zone collecting the parts required. Once the order has all required parts, it is routed to a quality check and forwarded to shipping. This allows the right technology mix to be used in each zone, to most efficiently pick the SKUs located there.

This approach is particularly useful in large operations that have a very high total number of SKUs and a high total number of orders, yet a relatively low to moderate number of picks per order.



About Kardex

Kardex is a global industry partner for intralogistics solutions and a leading supplier of automated storage solutions and material handling systems. The Group consists of two entrepreneurially managed divisions, Kardex Remstar and Kardex Mlog.

Kardex Remstar develops, produces, and maintains dynamic storage and retrieval systems and Kardex Mlog offers integrated materials handling systems and automated high-bay warehouses.

The two divisions are partners for their customers over the entire life cycle of a product or solution. This begins with the assessment of customer requirements and continues through planning, realization, and maintenance of customer-specific systems. It ensures a high level of availability combined with low total cost of ownership and operation.

